P-04-292

Oskarshamn site investigation

Hydraulic injection tests in borehole KLX04, 2004

Sub-area Laxemar

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December 2004

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ISSN 1651-4416
SKB P-04-292

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Keywords: Site/project, Hydrogeology, Hydraulic tests, Injection test, Hydraulic parameters, Transmissivity.

Abstract

Hydraulic injection tests have been performed in borehole KLX04 at the Laxemar area, Oskarshamn. The tests are part of the general program for site investigations and specifically for the Laxemar sub-area. The hydraulic testing programme has the aim to characterise the rock with respect to its hydraulic properties of the fractured zones and rock mass between them. Data is subsequently delivered for the site descriptive model.

This report describes the results and primary data evaluation of the hydraulic injection tests in borehole KLX04 performed between 17th of August and 8th of September 2004.

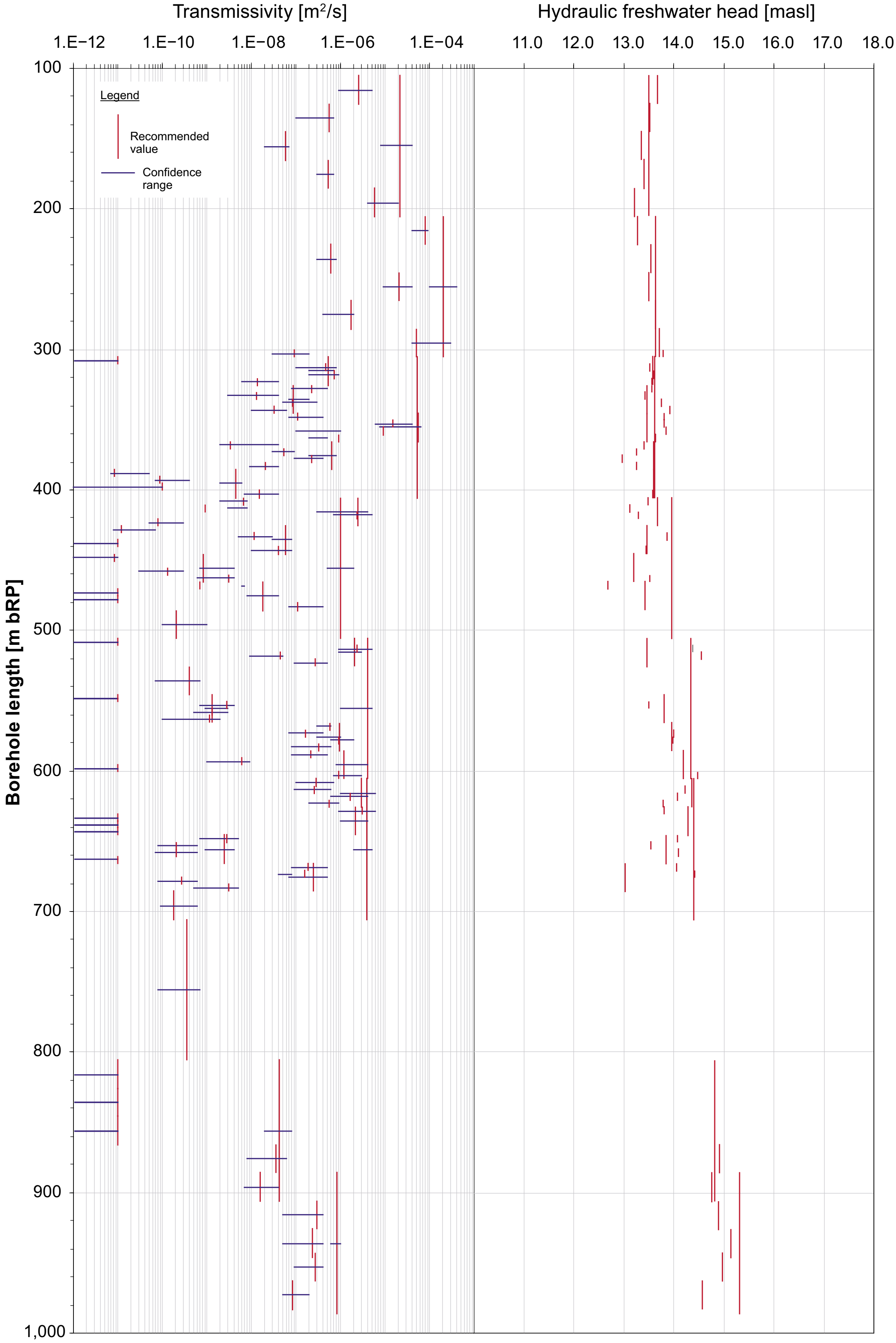
The objective of the hydrotests was to describe the rock around the borehole with respect of hydraulic parameters, mainly transmissivity (T) and hydraulic conductivity (K) at different measurement scales of 100 m, 20 m and 5 m sections. Transient evaluation during flow and recovery period provided additional information such as flow regimes, hydraulic boundaries and cross-over flows. Constant pressure injection tests were conducted between 105.11–986.11 m below ToC. The results of the test interpretation are presented as transmissivity, hydraulic conductivity and hydraulic freshwater head.

Sammanfattning

Injektionstester har utförts i borrhål KLX04 i delområde Simpevarp, Oskarshamn. Testerna är en del av SKB:s platsundersökningar. Hydraultestprogrammet där injektionstesterna ingår har som mål att karakterisera berget med avseende på dess hydrauliska egenskaper av sprickzoner och mellanliggande bergmassa. Data från testerna används vid den platsbeskrivande modelleringen av området.

Denna rapport redovisar resultaten och utvärderingar av primärdata från de hydrauliska injektionstesterna i borrhål KLX04. Testerna utfördes mellan den 17 augusti till den 8 september 2004.

Syftet med hydrotesterna var framförallt att beskriva bergets hydrauliska egenskaper runt borrhålet med avseende på hydrauliska parametrar, i huvudsak transmissivitet (T), hydraulisk konduktivitet (K) vid olika mätskalor av 100 m, 20 m och 5 m sektioner. Transient utvärdering under injektions- och återhämtningsfasen gav ytterligare information avseende flödesgeometri, hydrauliska gränser och sprickläckage. Injektionstester utfördes mellan 105.11–986.11 m borrhålslängd. Resultaten av test utvärderingen presenteras som transmissivitet, hydraulisk konduktivitet och grundvattennivå uttryckt i ekvivalent nivå sötvattenpelare (fresh-water head).



Borehole KLX04 – Summary of results.

Contents

1 Introduction

A general program for site investigations presenting survey methods has been prepared /SKB, 2001a/, as well as a site-specific program for the investigations in the Simpevarp area /SKB, 2001b/. The hydraulic injection tests form part of the site characterization program under item 1.1.5.8 in the work breakdown structure of the execution programme, /SKB, 2002/.

Measurements were carried out accordingly in borehole KLX04 during 17th August to 8th September 2004 following the methodology described in SKB MD 323.001e and in the activity plan AP PS 400-04-75 (SKB internal controlling documents). Data and results were delivered to the SKB site characterization database SICADA. The field note number in SICADA is 466.

The hydraulic testing programme has the aim to characterise the rock with respect to its hydraulic properties of the fractured zones and rock mass between them. This report describes the results and primary data evaluation of the hydraulic injection tests in borehole KLX04. The data is subsequently delivered for the site descriptive modelling. The commission was conducted by Golder Associates AB and Golder Associates GmbH.

Borehole KLX04 is situated in the Laxemar area approximately 1 km west of the nuclear power plant of Simpevarp, Figure 1-1. The borehole was drilled from February 2004 to June 2004 at 993.49 m depth with an inner diameter of 76 mm and an inclination of –84.68°. The upper 12.24 m is cased with large diameter telescopic casing ranging from diameter (outer diameter) 208–324 mm.

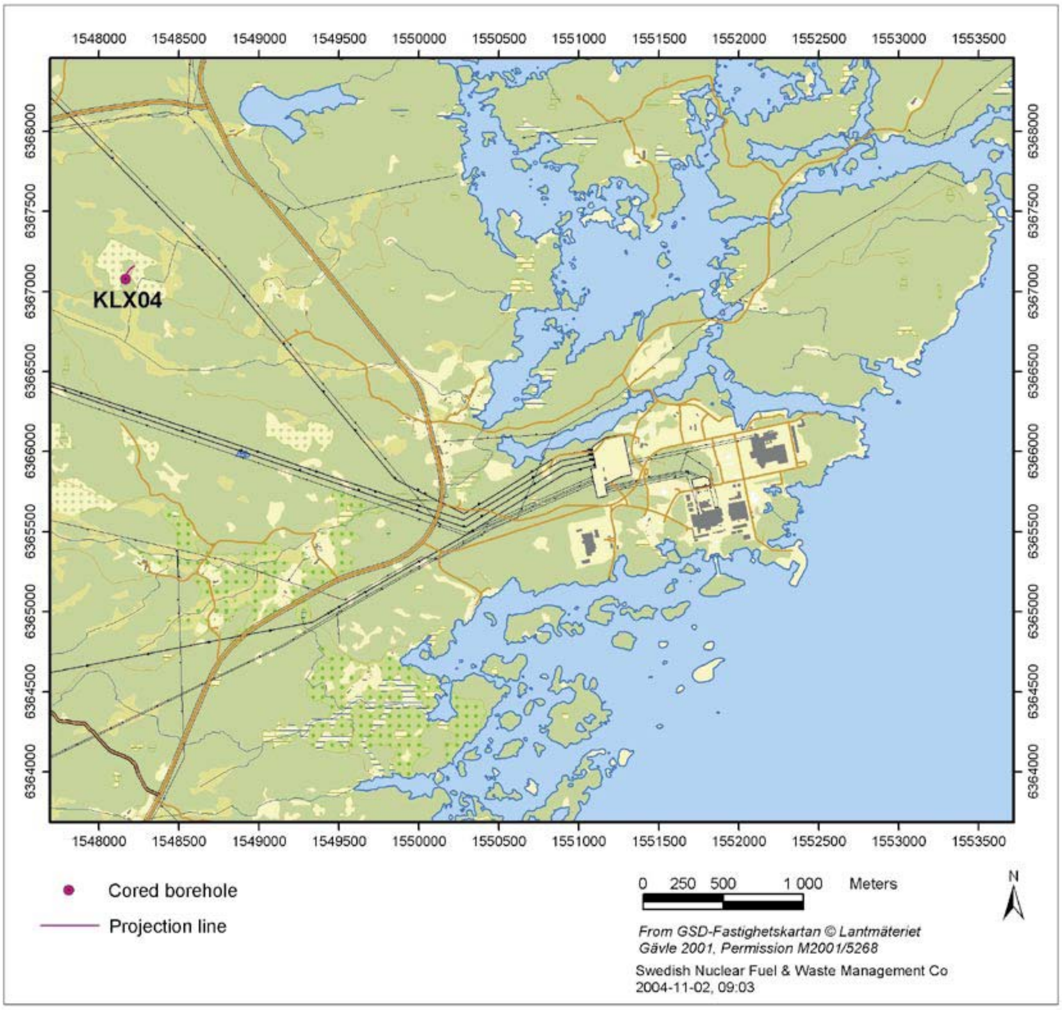


Figure 1-1. *The investigation area Laxemar, Oskarshamn with location of borehole KLX04.*

2 Objective

The objective of the hydrotests in borehole KLX04 is to describe the rock around the borehole with respect to hydraulic parameters, mainly transmissivity (T) and hydraulic conductivity (K). This is done at different measurement scales of 100 m, 20 m and 5 m sections. Among these parameters transient evaluation during the flow and recovery period provides additional information such as flow regimes, hydraulic boundaries and cross-over flows.

A further subactivity was performed according to the activity plan with chemistry investigations including pump tests and taking water samples.

3 Scope of work

The scope of work consisted of preparation of the PSS2 tool which included cleaning of the down-hole tools, calibration and functional checks, injection tests of 100 m, 20 m and 5 m test sections, analysis and reporting.

Preparation for testing was done according to the Quality plan. This step mainly consists of functions checks of the equipment to be used, the PSS2 tool. Calibration checks and function checks were documented in the daily log and/or relevant documents.

The following test programme was performed.

Table 3-1. Performed test programme at borehole KLX04.

No of Injection tests	Interval	Positions	Time/test	Total test time
9	100 m	105.11–986.11 m	125 min	18.8 hrs
39	20 m	105.21–983.05 m	90 min	58.5 hrs
69	5 m	300.41–685.78 m	90 min	103.5 hrs
			Total:	180.8 hrs

3.1 Boreholes

The borehole is telescope drilled with specifications on its construction according to Table 3-2. The reference point in the boreholes is the centre of top of casing (ToC), given as Elevation in table below. The Swedish National coordinate system (RT90) is used in the x-y direction and RHB70 in the z-direction. Northing and Easting refer to the top of the boreholes at the ground surface. The borehole diameter in Table 3-2 refers to the final diameter of the drill bit after drilling to full depth.

Table 3-2. Information about KLX04 (from SICADA 2004-08-11 09:43:36).

Title	Value				
Borehole length (m)	993.490				
Drilling Period(s)	From date	To date	Secup (m)	Seclow (m)	Drilling type
	2004-02-11	2004-02-18	0.000	100.400	Percussion drilling
	2004-03-13	2004-06-28	0.000	993.490	Core drilling
Starting point coordinate	Length (m)	Northing (m)	Easting (m)	Elevation (masl)	Coord Sys
(centerpoint of TOC)	0.000	6367077.188	1548171.937	24.089	RT90-RHB70
Angles	Length (m)	Bearing	Inclination (– = down)		
	0.000	0.109	–84.683		

Borehole diameter	Secup (m)	Seclow (m)	Hole diam (m)	
	0.000	12.000	0.347	
	12.000	12.240	0.254	
	12.240	100.300	0.196	
	100.350	101.470	0.086	
	101.470	993.490	0.076	
Core diameter	Secup (m)	Seclow (m)	Core diam (m)	
	100.350	101.470	0.050	
	101.470	993.490	0.050	
Casing diameter	Secup (m)	Seclow (m)	Case in (m)	Case out(m)
	0.000	12.240	0.200	0.208
	0.000	11.900	0.310	0.324
Grove milling	Length (m)	Trace detectable		
	110.000	YES		
	150.000	YES		
	200.000	YES		
	250.000	YES		
	300.000	YES		
	349.000	YES		
	400.000	YES		
	450.000	YES		
	500.000	YES		
	550.000	YES		
	600.000	YES		
	650.000	YES		
	700.000	YES		
	750.000	YES		
	800.000	YES		
	849.000	YES		
	899.000	YES		
	950.000	YES		

During this testing campaign, the markers at 800.0 m and 849.0 m could not be detected with the positioner.

3.2 Tests

Injection tests were conducted according to the Activity Plan AP PS 400-04-75 and the method description for hydraulic injection tests, SKB MD 323.001 (SKB internal documents). Tests were done in 100 m test sections between 105.11–986.11 m below ToC, in 20 m test sections between 105.21–983.05 m below ToC and in 5 m test sections between 300.41–685.78 m below ToC. The initial criteria for performing injection tests in 20 m and 5 m test sections was a measurable flow of Q > 0.001 L/min in the previous measured tests covering the smaller sections (see Figure 3-1). The measurements were performed with SKB's custom made equipment for hydraulic testing called PSS2.

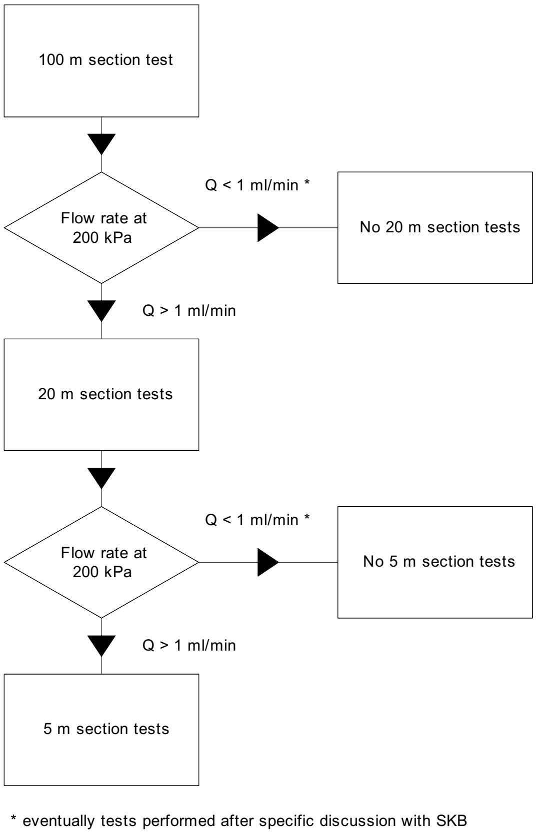


Figure 3-1. *Flow chart for test sections.*

Table 3-3. Tests performed.

Bh ID	Test section (m)	Test type[1]	Test no	Test start Date, time	Test stop Date, time
KLX04	105.11–205.11	3	1	2004-08-20 09:59:51	2004-08-20 12:44:58
KLX04	205.34–305.34	3	1	2004-08-20 14:51:30	2004-08-20 16:01:27
KLX04	205.34–305.34	3	2	2004-08-20 16:11:09	2004-08-20 17:40:53
KLX04	305.41–405.41	3	1	2004-08-21 08:14:28	2004-08-21 10:33:27
KLX04	405.49–505.49	3	1	2004-08-21 11:48:49	2004-08-21 13:37:39
KLX04	505.55–605.55	3	1	2004-08-21 14:57:32	2004-08-21 16:40:32
KLX04	605.69–705.69	3	1	2004-08-22 08:12:10	2004-08-22 10:01:06
KLX04	705.81–805.81	4	1	2004-08-22 11:37:06	2004-08-22 13:58:33
KLX04	805.98–905.98	3	1	2004-08-22 15:17:27	2004-08-22 17:26:26
KLX04	886.11–986.11	3	1	2004-08-23 08:00:11	2004-08-23 09:52:20

Bh ID	Test section (m)	Test type[1]	Test no	Test start Date, time	Test stop Date, time
KLX04	105.21–125.21	3	1	2004-08-24 07:29:54	2004-08-24 08:57:26
KLX04	125.25–145.25	3	1	2004-08-24 09:54:13	2004-08-24 11:20:34
KLX04	145.30–165.30	3	1	2004-08-24 21:02:24	2004-08-24 22:45:41
KLX04	165.30–185.30	3	1	2004-08-24 23:44:26	2004-08-25 01:18:07
KLX04	185.32–205.32	3	1	2004-08-25 06:35:35	2004-08-25 08:06:55
KLX04	205.34–225.34	3	1	2004-08-25 08:49:05	2004-08-25 10:26:31
KLX04	225.35–245.35	3	1	2004-08-25 11:23:52	2004-08-25 14:01:42
KLX04	225.35–245.35	3	2	2004-08-30 05:53:46	2004-08-30 07:04:32
KLX04	245.38–265.38	3	1	2004-08-30 07:53:46	2004-08-30 09:17:27
KLX04	265.38–285.38	3	1	2004-08-30 09:53:02	2004-08-30 10:59:47
KLX04	285.40–305.40	3	1	2004-08-25 21:17:16	2004-08-25 22:08:59
KLX04	285.40–305.40	3	2	2004-08-25 22:12:53	2004-08-26 01:14:47
KLX04	305.41–325.41	3	1	2004-08-26 02:27:59	2004-08-26 04:04:24
KLX04	325.44–345.44	3	1	2004-08-26 06:31:09	2004-08-26 07:55:49
KLX04	345.44–365.44	3	1	2004-08-26 08:37:05	2004-08-26 09:59:32
KLX04	365.44–385.44	3	1	2004-08-26 10:38:16	2004-08-26 12:12:14
KLX04	385.47–405.47	3	1	2004-08-26 14:00:53	2004-08-26 15:53:23
KLX04	405.49–425.49	3	1	2004-08-26 16:37:08	2004-08-26 18:31:33
KLX04	425.51–445.51	3	1	2004-08-26 19:32:01	2004-08-26 21:03:07
KLX04	445.50–465.50	3	1	2004-08-26 22:11:21	2004-08-26 23:40:40
KLX04	445.50–465.50	3	2	2004-08-30 16:11:21	2004-08-30 17:57:14
KLX04	465.52–485.52	3	1	2004-08-27 00:32:05	2004-08-27 02:22:26
KLX04	485.52–505.52	4	1	2004-08-27 06:37:58	2004-08-27 08:29:27

Bh ID	Test section (m)	Test type[1]	Test no	Test start Date, time	Test stop Date, time
KLX04	505.55–525.55	3	1	2004-08-27 09:11:55	2004-08-27 10:43:29
KLX04	525.58–545.58	4	1	2004-08-27 11:14:58	2004-08-27 14:14:03
KLX04	545.62–565.62	3	1	2004-08-27 14:59:36	2004-08-27 16:30:55
KLX04	545.62–565.62	3	2	2004-08-27 19:34:21	2004-08-27 20:42:50
KLX04	565.64–585.64	3	1	2004-08-27 21:41:33	2004-08-27 23:14:34
KLX04	585.65–605.65	3	1	2004-08-28 00:07:31	2004-08-28 01:30:52
KLX04	605.69–625.69	3	1	2004-08-28 02:17:09	2004-08-28 03:47:15
KLX04	625.71–645.71	3	1	2004-08-28 06:37:42	2004-08-28 07:58:43
KLX04	645.73–665.73	3	1	2004-08-28 08:45:57	2004-08-28 10:12:44
KLX04	665.76–685.76	3	1	2004-08-28 10:47:42	2004-08-28 12:40:11
KLX04	685.79–705.79	4	1	2004-08-28 13:37:24	2004-08-28 16:05:04
KLX04	805.98–825.98	Skipped	1	2004-08-28 17:59:56	2004-08-28 19:02:41
KLX04	826.02–846.02	Skipped	1	2004-08-28 20:06:57	2004-08-28 22:06:42
KLX04	846.05–866.05	Skipped	1	2004-08-28 22:55:23	2004-08-29 00:01:00
KLX04	866.08–886.08	3	1	2004-08-29 00:49:05	2004-08-29 02:21:38
KLX04	886.11–906.11	3	1	2004-08-29 03:06:01	2004-08-29 04:52:19
KLX04	886.11–906.11	3	2	2004-08-31 01:49:41	2004-08-31 03:53:30
KLX04	906.16–926.16	3	1	2004-08-31 06:18:18	2004-08-31 07:44:49
KLX04	926.18–946.18	3	1	2004-08-31 08:16:13	2004-08-31 09:47:07
KLX04	943.05–963.05	3	1	2004-08-31 10:30:31	2004-08-31 12:18:04
KLX04	963.05–983.05	3	1	2004-08-31 12:54:06	2004-08-31 14:12:29
KLX04	300.41–305.41	3	1	2004-09-01 10:29:33	2004-09-01 11:52:45
KLX04	305.41–310.41	Skipped	1	2004-09-01 13:06:54	2004-09-01 14:06:37

Bh ID	Test section (m)	Test type[1]	Test no	Test start Date, time	Test stop Date, time
KLX04	310.42–315.42	3	1	2004-09-01 14:43:25	2004-09-01 15:54:17
KLX04	315.43–320.43	3	1	2004-09-01 16:25:29	2004-09-01 18:07:41
KLX04	320.43–325.43	3	1	2004-09-01 18:55:20	2004-09-01 20:41:21
KLX04	325.44–330.44	3	1	2004-09-01 23:17:47	2004-09-02 01:02:45
KLX04	330.44–335.44	3	1	2004-09-02 05:51:47	2004-09-02 07:06:40
KLX04	335.44–340.44	3	1	2004-09-02 07:47:26	2004-09-02 08:53:02
KLX04	340.44–345.44	3	1	2004-09-02 09:24:14	2004-09-02 10:31:13
KLX04	345.44–350.44	3	1	2004-09-02 11:09:34	2004-09-02 12:32:51
KLX04	350.45–355.45	3	1	2004-09-02 13:20:22	2004-09-02 14:49:35
KLX04	355.47–360.47	3	1	2004-09-02 15:14:53	2004-09-02 16:29:18
KLX04	360.47–365.47	3	1	2004-09-02 16:57:00	2004-09-02 18:05:39
KLX04	365.47–370.47	3	1	2004-09-02 20:18:56	2004-09-02 21:54:57
KLX04	370.47–375.47	3	1	2004-09-02 22:36:42	2004-09-03 00:16:41
KLX04	375.47–380.47	3	1	2004-09-03 05:55:55	2004-09-03 07:06:07
KLX04	380.47–385.47	3	1	2004-09-03 07:31:23	2004-09-03 08:51:24
KLX04	385.47–390.47	4	1	2004-09-03 09:25:18	2004-09-03 11:06:17
KLX04	390.48–395.48	4	1	2004-09-03 12:21:21	2004-09-03 13:42:29
KLX04	395.48–400.48	4	1	2004-09-03 14:09:42	2004-09-03 15:43:38
KLX04	400.48–405.48	3	1	2004-09-03 16:10:36	2004-09-03 17:49:58
KLX04	405.49–410.49	3	1	2004-09-03 18:30:04	2004-09-03 20:05:06
KLX04	410.50–415.50	3	1	2004-09-03 21:22:21	2004-09-03 23:01:24
KLX04	415.51–420.51	3	1	2004-09-03 23:33:05	2004-09-04 01:10:21
KLX04	420.51–425.51	4	1	2004-09-04 06:01:13	2004-09-04 07:25:09

Bh ID	Test section (m)	Test type[1]	Test no	Test start Date, time	Test stop Date, time
KLX04	425.51–430.51	4	1	2004-09-04 07:55:22	2004-09-04 09:06:52
KLX04	430.51–435.51	3	1	2004-09-04 09:37:27	2004-09-04 11:35:43
KLX04	435.50–440.50	Skipped	1	2004-09-04 12:31:45	2004-09-04 13:31:13
KLX04	440.50–445.50	3	1	2004-09-04 14:00:55	2004-09-04 15:07:58
KLX04	445.50–450.50	4	1	2004-09-04 15:38:04	2004-09-04 17:26:25
KLX04	450.50–455.50	3	1	2004-09-04 18:04:40	2004-09-04 19:32:27
KLX04	455.50–460.50	4	1	2004-09-04 20:00:04	2004-09-04 22:34:43
KLX04	460.51–465.51	3	1	2004-09-04 23:06:16	2004-09-05 00:34:42
KLX04	465.52–470.52	3	1	2004-09-05 01:14:48	2004-09-05 02:44:26
KLX04	470.52–475.52	Skipped	1	2004-09-05 05:46:55	2004-09-05 06:52:10
KLX04	475.52–480.52	Skipped	1	2004-09-05 07:27:47	2004-09-05 08:31:12
KLX04	480.52–485.52	3	1	2004-09-05 08:57:37	2004-09-05 10:00:55
KLX04	505.55–510.55	Skipped	1	2004-09-05 10:34:20	2004-09-05 12:06:53
KLX04	510.56–515.56	3	1	2004-09-05 12:46:44	2004-09-05 13:58:28
KLX04	515.56–520.56	3	1	2004-09-05 14:22:14	2004-09-05 15:34:00
KLX04	520.57–525.57	3	1	2004-09-05 16:00:31	2004-09-05 17:24:02
KLX04	545.62–550.62	Skipped	1	2004-09-05 18:17:40	2004-09-05 19:22:54
KLX04	550.62–555.62	3	1	2004-09-05 20:03:24	2004-09-05 21:30:37
KLX04	555.63–560.63	3	1	2004-09-05 22:32:51	2004-09-06 00:17:10
KLX04	560.63–565.63	3	1	2004-09-06 00:46:02	2004-09-06 02:36:24
KLX04	565.64–570.64	3	1	2004-09-06 06:09:44	2004-09-06 07:11:55
KLX04	570.64–575.64	3	1	2004-09-06 07:42:56	2004-09-06 08:47:00
KLX04	575.65–580.65	3	1	2004-09-06 09:15:59	2004-09-06 10:19:26

Bh ID	Test section (m)	Test type[1]	Test no	Test start Date, time	Test stop Date, time
KLX04	580.65–585.65	3	1	2004-09-06 10:50:59	2004-09-06 12:11:25
KLX04	585.67–590.67	3	1	2004-09-06 13:11:11	2004-09-06 14:14:45
KLX04	590.67–595.67	3	1	2004-09-06 14:45:17	2004-09-06 15:52:28
KLX04	595.69–600.69	Skipped	1	2004-09-06 16:36:19	2004-09-06 18:14:00
KLX04	600.69–605.69	3	1	2004-09-06 18:43:02	2004-09-06 20:11:31
KLX04	605.69–610.69	3	1	2004-09-06 20:57:59	2004-09-06 22:11:39
KLX04	610.70–615.70	3	1	2004-09-06 22:41:44	2004-09-07 00:09:18
KLX04	615.70–620.70	3	1	2004-09-07 00:39:07	2004-09-07 02:03:42
KLX04	620.71–625.71	3	1	2004-09-07 06:12:03	2004-09-07 07:18:38
KLX04	625.71–630.71	3	1	2004-09-07 07:41:43	2004-09-07 08:50:10
KLX04	630.72–635.72	Skipped	1	2004-09-07 09:16:36	2004-09-07 10:15:08
KLX04	635.72–640.72	Skipped	1	2004-09-07 10:44:34	2004-09-07 11:53:22
KLX04	640.73–645.73	Skipped	1	2004-09-07 12:29:09	2004-09-07 13:29:18
KLX04	645.73–650.73	3	1	2004-09-07 14:03:17	2004-09-07 15:10:29
KLX04	650.74–655.74	3	1	2004-09-07 15:37:39	2004-09-07 17:38:03
KLX04	655.75–660.75	3	1	2004-09-07 18:16:32	2004-09-07 20:10:39
KLX04	660.75–665.75	Skipped	1	2004-09-07 22:36:43	2004-09-07 23:37:39
KLX04	665.76–670.76	3	1	2004-09-08 00:22:39	2004-09-08 02:26:54
KLX04	670.76–675.76	3	1	2004-09-08 10:39:01	2004-09-08 12:33:15
KLX04	675.77–680.77	4	1	2004-09-08 14:08:21	2004-09-08 15:45:31
KLX04	680.78–685.78	4	1	2004-09-08 16:18:01	2004-09-08 17:35:50

1, 3: Injection test; 4: Pulse injection test.

No other additional measurements except the actual hydraulic tests and related measurements of packer position and water level in annulus of borehole KLX04 were conducted.

3.3 Control of equipment

Control of equipment was mainly performed according to the Quality plan. The basis for equipment handling is described in the "Mätssystembeskrivning" SKB MD 345.101–123 which is composed of two parts 1) management description, 2) drawings and technical documents of the modified PSS2 tool.

Function checks were performed before and during the tests. Among these pressure sensors were checked at ground level and while running in the hole calculated to the static head. Temperature was checked at ground level and while running in. Leakage checks at joints in the pipe string were done at least every 100 m of running in.

Any malfunction was recorded, and measures were taken accordingly for proper operation. Approval was made according to SKB site manager, or Quality plan and the "Mätssystem-beskrivning".

4 Equipment

4.1 Description of equipment

The equipment called PSS2 (Pipe String System 2) is a highly integrated tool for testing boreholes at great depth (see conceptual drawing in the next figure). The system is built inside a container suitable for testing at any weather. Briefly, the components consists of a hydraulic rig, down-hole equipment including packers, pressure gauges, shut-in tool and level indicator, racks for pump, gauge carriers, breakpins, etc. shelfs and drawers for tools and spare parts.

There are three spools for a multi-signal cable, a test valve hose and a packer inflation hose. There is a water tank for injection purposes, pressure vessels for injection of packers, to open test valve and for low flow injection. The PSS2 has been upgraded with a computerized flow regulation system. The office part of the container consists of a computer, regulation valves for the nitrogen system, a 24 V back-up system in case of power shut-offs and a flow regulation board.

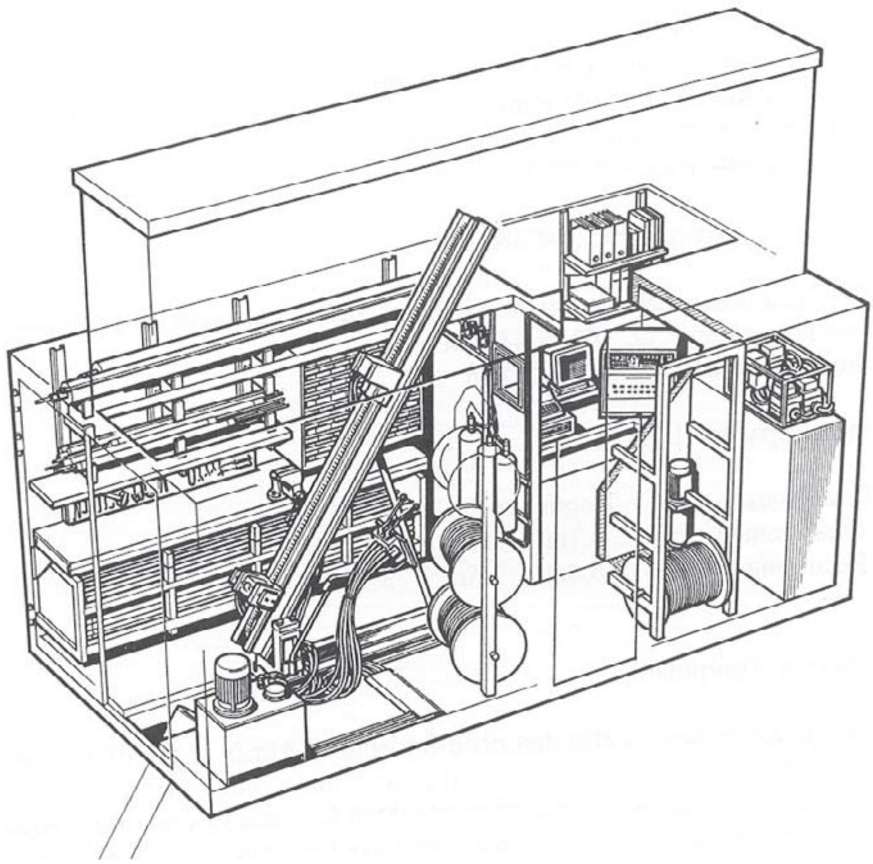


Figure 4-1. *A view of the layout and equipment of PSS2.*

PSS2 is documented in photographs 1–6.

Photo 1. *Hydraulic rig.*

Photo 2. *Rack for pump, down-hole equipment, workbench and drawers for tools.*

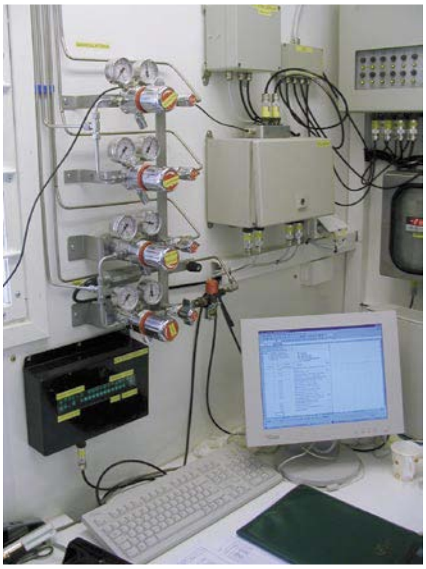


Photo 3. *Computer room, displays and gas regulators.*

Photo 4. *Pressure vessels for test valve, packers and injection.*

Photo 5. *Positioner, bottom end of down-in-hole string.*

Photo 6. *Packer and gauge carrier.*

The down-hole equipment consists from bottom to top of the following equipment:

- Level indicator – SS 630 mm pipe with OD 73 mm with 3 plastic wheels connected to a Hallswitch.
- Gauge carrier – SS 1.5 m carrying bottom section pressure transducer and connections from positioner.
- Lower packer – SS and PUR 1.5 m with OD 72 mm, stiff ends, tightening length 1,0 m, maximum pressure 6.5 MPa, working pressure 1.6 MPa.
- Gauge carrier with breakpin – SS 1.75 m carrying test section pressure transducer, temperature sensor and connections for sensors below. Breakpin with maximum load of 47.3 (± 1.0) kN. The gauge carrier is covered by split pipes and connected to a stone catcher on the top.
- Pop joint – SS 1.0 or 0.5 m with OD 33 mm and ID 21 mm, double O-ring fittings, trapezoid thread, friction loss of 3kPa/m at 50 L/min.
- Pipe string – SS 3.0 m with OD 33 mm and ID 21 mm, double O-ring fittings, trapezoid thread, friction loss of 3 kPa/m at 50 L/min.
- Contact carrier – SS 1.0 m carrying connections for sensors below.
- Upper packer – SS and PUR 1.5 m with OD 72 mm, fixed ends, seal length 1.0 m, maximum pressure 6.5 MPa, working pressure 1.6 MPa.
- Breakpin – SS 250 mm with OD 33.7 mm. Maximum load of 47.3 (± 1.0) kN.
- Gauge carrier – SS 1.5 m carrying top section pressure transducer, connections from sensors below. Flow pipe is double bent at both ends to give room for sensor equipment. The pipe gauge carrier is covered by split pipes.
- Shut-in tool (test valve) – SS 1.0 m with a OD of 48 mm, Teflon coated valve piston, friction loss of 11 kPa at 10 L/min (260 kPa–50 L/min). Working pressure 2.8–4.0 MPa. Breakpipe with maximum load of 47.3 (± 1.0) kN. The shut-in tool is covered by split pipes and connected to a stone catcher on the top.

The tool scheme is presented in Figure 4-2.

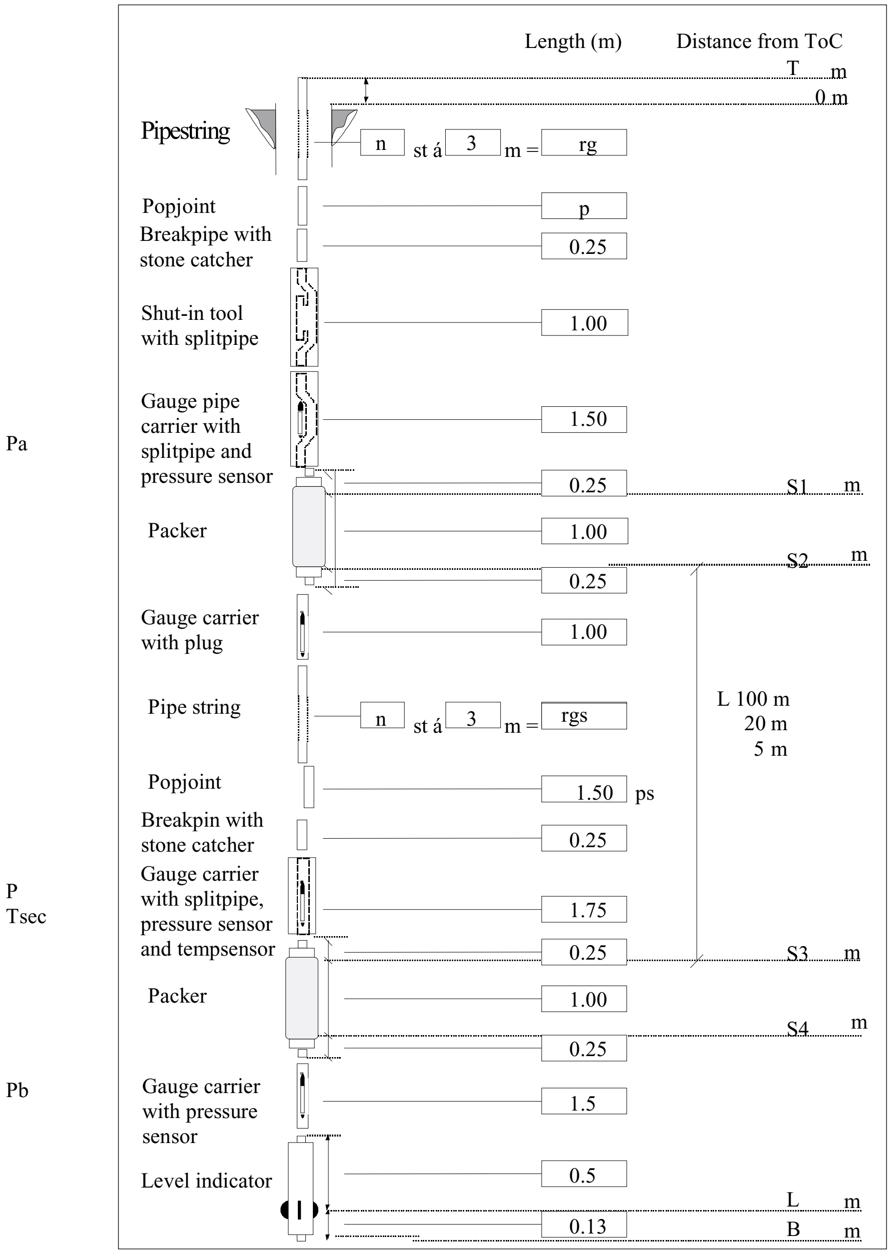


Figure 4-2. *Schematic drawing of the down-hole equipment in the PSS2 system.*

4.2 Sensors

Table 4-1. Technical specifications of sensors.

Keyword	Sensor	Name	Value/range	Unit	Comments
$p_{sec,a,b}$	Pressure	Druck PTX 162-1464abs	9–30	VDC	
			4–20	mA	
			0–13.5	MPa	
			Resolution	% of FS	
			Accuracy		
$T_{sec,surf,air}$	Temperature	BGI	18–24	VDC	
			4–20	mA	
			0–32	°C	
			0.1	°C	

Keyword	Sensor	Name	Value/range	Unit	Comments
Q_{big}	Flow	Micro motion	0–100	kg/min	Massflow
		Elite sensor	± 0.1	%	
Q_{small}	Flow	Micro motion	0–1.8	kg/min	Massflow
		Elite sensor	± 0.1	%	
p_{air}	Pressure	Druck PTX 630	9–30 4–20 0–120 ± 0.1	VDC mA KPa % of FS	
p_{pack}	Pressure	Druck PTX 630	9–30 4–20 0–4 ± 0.1	VDC mA MPa % of FS	
$p_{in,out}$	Pressure	Druck PTX 1400	9–28 4–20 0–2.5	VDC mA MPa	
L	Level Indicator				Length correction

Table 4-2. Sensor positions and wellbore storage (WBS) controlling factors.

Borehole information			Sensors		Equipment affecting WBS coefficient		
ID	Test section (m)	Test no	Type	Position (m fr ToC)	Position	Function	Outer diameter (mm)
KLX04	105.11–205.11	1	p_a p T p_b L	102.61 203.91 204.16 207.11 208.36	Test section	Signal cable Pump string Packer line	9.1 33 6
KLX04	105.21–125.21	11	p_a p T p_b L	102.71 124.01 124.26 127.21 128.46	Test section	Signal cable Pump string Packer line	9.1 33 6
KLX04A	300.41–305.41	57	p_a p T p_b L	297.91 304.21 304.46 307.41 308.66	Test section	Signal cable Pump string Packer line	9.1 33 6

4.3 Data acquisition system

The data acquisition system in the PSS2 container contains a stationary PC with the software Orchestrator, pump- and injection tests parameters such as pressure, temperature and flow are monitored and sensor data collected. A second laptop PC is connected to the stationary PC through a network containing evaluation software, Flowdim. While testing, data from previously tested section is converted with IPPlot and entered in Flowdim for evaluation.

The data acquisition system starts and stops the test automatically or can be disengaged for manual operation of magnetic and regulation valves within the injection/pumping system.

The flow regulation board is used for differential pressure and valve settings prior testing and for monitoring valves during actual test. An outline of the data acquisition system is outlined in Figure 4-3.

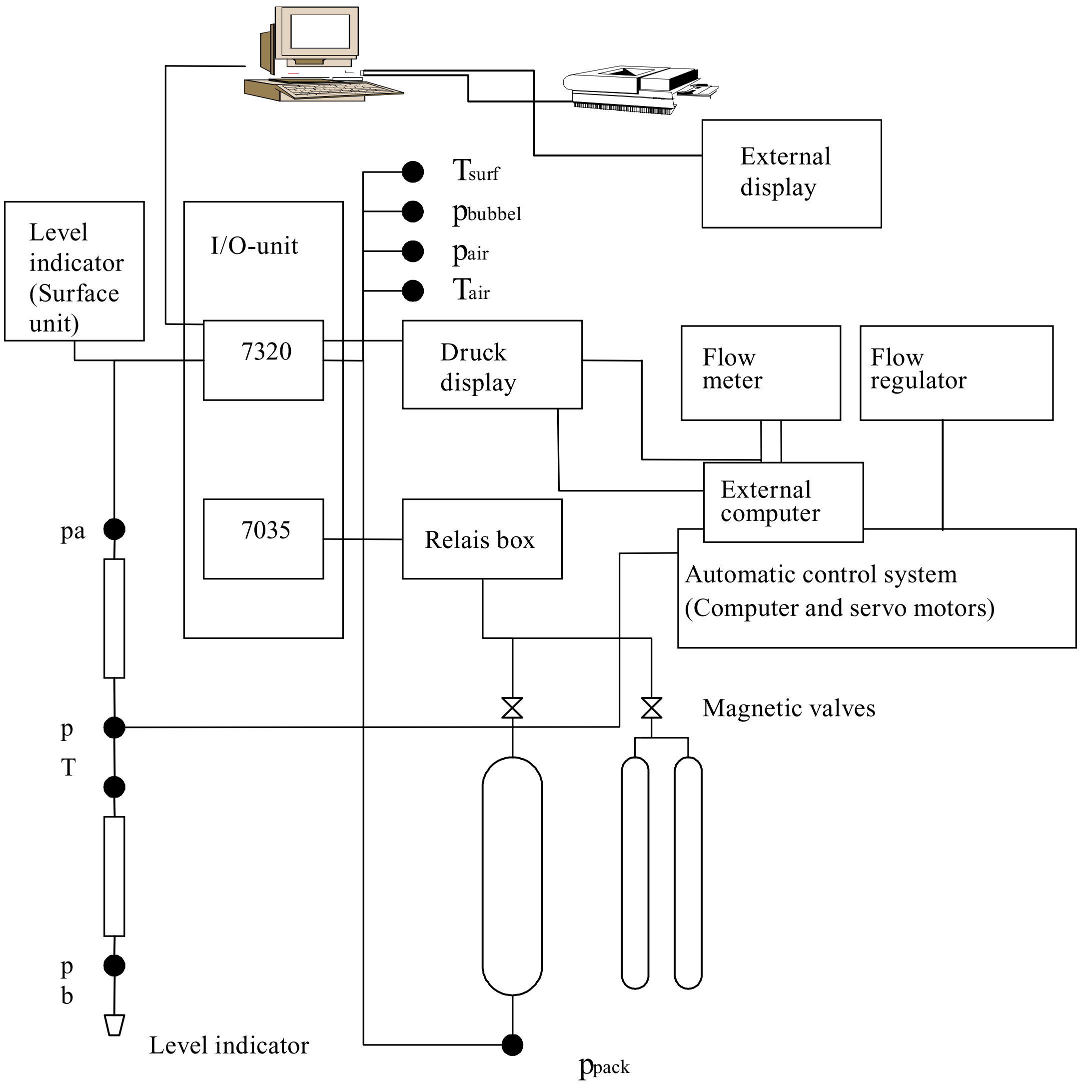


__Figure 4-3.__ Schematic drawing of the data acquisition system and the flow regulation control system in PSS2.

5 Execution

5.1 Preparations

Following preparation work and functional checks were conducted prior to starting test activities:

- Place pallets and container, lifting rig up, installing fence on top of container, lifting tent on container.
- Clean and desinfect of Multikabel and hoses for packer and test valve. Clean the tubings with hot steam and chloride dioxide.
- Clean tanks with chloride dioxide. Filling injection tank with water out of the borehole
- Filling buffer tank with water.
- Filing vessels.
- Filling the hoses for test valve and packer.
- Entering calibration constants to system and regulation unit.
- Synchronize clocks on all computers.
- Function check of shut-in tool both ends, overpressure by 900 kPa for 5 min (OK).
- Check pressure gauges against atmospheric pressure and than on test depth against column of water.
- Translate all protocols into English (where necessary).
- Filling packers with water and de-air.
- Measure and assemble test tool.

5.2 Length correction

By running in with the test tool, a level indicator is incorporated at the bottom of the tool. The level indicator is able to record groves milled into the borehole wall. The depths of this groves are given by SKB in the activity plan (see Table 3-2) and the measured depth is counter checked against the number/length of the tubes build in. The achieved correction value is used to adjust the location of the packers for the testsections to avoid wrong placements and minimize elongation effects of the test string.

5.3 Execution of tests/measurements

5.3.1 Test principle

The tests were conducted as constant pressure injection (CHi phase) followed by a shut-in pressure recovery (CHir phase). In some cases, when the test section transmissivity was too low (typically lower than 1E–9 m^2/s) no measurable flow could be registered during the CHi phase ($Q < 1$ mL/min). In such cases, Puls or Slug tests were conducted as active tests (Figure 5-1).

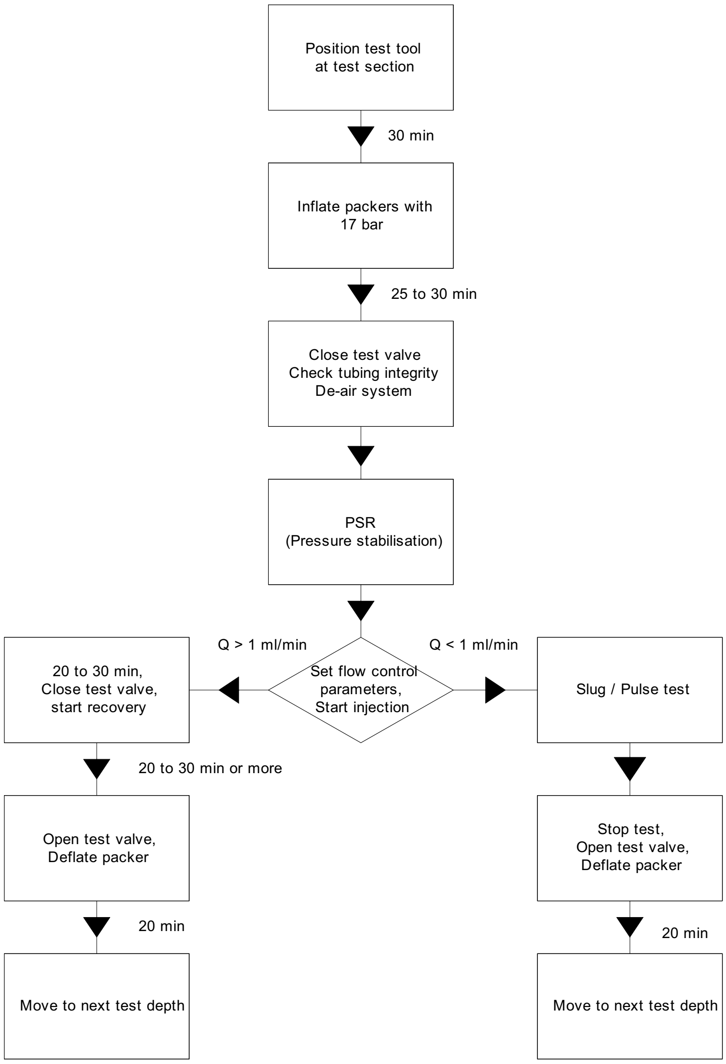


Figure 5-1. *Flow chart for test performance.*

5.3.2 Test procedure

A test cycle includes the following phases: 1) Transfer of down-hole equipment to the next section. 2) Packer inflation. 3) Pressure stabilisation. 4) Constant head injection. 5) Pressure recovery. 6) Packer deflation. The injection tests in KLX04 has been carried out by applying a constant injection pressure of ca 200 kPa (20 m water column) above the static formation pressure in the test section. Before start of the injection tests, approximately stable pressure conditions prevailed in the test section. After the injection period, the pressure recovery in the section was measured. In some cases, if small flow rates were expected, the automatic regulation unit was switched off and the test was performed manually. In other cases, where small flow rates (Q < 1 mL/min) were observed, the test procedure was switched to a pulse test performance. For the performance of a pulse test the shut-in tool has been closed immediately after starting the injection.

The duration for each phase is presented in Table 5-1.

In some cases injection and recovery phases were prolonged. This was due to testing zones of high interest for example high flow zones or low flow zones.

Table 5-1. Durations for packer inflation, pressure stabilisation, injection and recovery phase and packer deflation in KLX04.

Position test tool to new test section (correct position using the borehole markers)	Approx 30 min
Inflate packers with 1900 kPa	25 min
Close test valve	10 min
Check tubing integrity with 800 kPa	5 min
De-air system	2 min
Set automatic flow control parameters	5 min
Start injection	20 to 45 min*
Close test valve, start recovery	20 min. or more
Open test valve	10 min
Deflate packers	25 min
Move to next test depth	…

* In case of a Pulse Injection the injection time is shorter than 1 min.

5.4 Data handling

The data handling followed several stages. The data acquisition software (Orchestrator) produced an ASCII raw data file (*.ht2) which contains the data in voltage and milliampere format plus calibration coefficients. The *.ht2 files were processed to *.dat files using the SKB program called IPPlot. These files contain the time, pressure, flow rate and temperature data. The *.dat files were synthesised in Excel to a *.xls file for plotting purposes. Finally, the test data to be delivered to SKB were exported from Excel in *.csv format. These files were also used for the subsequent test analysis.

5.5 Analyses and interpretation

5.5.1 Analysis software

The tests were analysed using a type curve matching method. The analysis was performed using Golder's test analysis program FlowDim. FlowDim is an interactive analysis environment allowing the user to interpret constant pressure, constant rate and slug/pulse tests in source as well as observation boreholes. The program allows the calculation of type-curves for homogeneous, dual porosity and composite flow models in variable flow geometries from linear to spherical.

5.5.2 Analysis approach

Constant pressure tests are analysed using a rate inverse approach. The method initially known as the /Jacob and Lohman, 1952/ method was further improved for the use of type curve derivatives and for different flow models.

Constant pressure recovery tests are analysed using the method described by /Gringarten, 1986/ and /Bourdet et al. 1989/ by using type curve derivatives calculated for different flow models.

Pulse tests are analysed both by using the pressure deconvolution method described by /Peres et al. 1989/ with improvements introduced by /Chakrabarty and Enachescu, 1997/.

5.5.3 Analysis methodology

Each of the relevant test phases is subsequently analyzed using the following steps:

- Injection Tests.
- Identification of the flow model by evaluation of the derivative on the log-log diagnostic plot. Initial estimates of the model parameters are obtained by conventional straight-line analysis.
- Superposition type curve matching in log-log coordinates. A non-linear regression algorithm is used to provide optimized model parameters in the latter stages.
- Non-linear regression in semi-log coordinates /superposition HORNER plot; Horner, 1951/. In this stage of the analysis, the static formation pressure is selected for regression.

The test analysis methodology is best explained in /Horne, 1990/.

- Pulse Injection Tests.

A test is always initiated as a constant pressure injection. However, if after a few seconds of injection the rate quickly drops to zero, this indicates a very tight section. It is then decided to close the test valve and measure the pressure recovery. The pressure recovery is analysed as a pulse injection phase (PI).

During the brief injection phase a small volume is injected (derived from the flowmeter measurements). This injected volume produces the pressure increase of dp. Using a dV/dp approach, the wellbore storage coefficient relevant for the subsequent pressure recovery can be calculated. It should be noted though that there is large uncertainty connected with the determination of the wellbore storage coefficient (probably one order of magnitude), which will implicitly translate into uncertainty in the derived transmissivity. Figure 5-2 below show an example of a typical pressure versus time evolution for such a tight section.

- Calculation of initial estimates of the model parameters by using the Ramey Plot /Ramey et al. 1975/. This is plot is typically not presented in the appendix.
- Flow model identification and type curve analysis in the deconvolution Peres Plot /Peres et al. 1989; Chakrabarty and Enachescu, 1997/. A non-linear regression algorithm is used to provide optimized model parameters in the later stages. An Example of the type curves is presented in Figure 5-3.

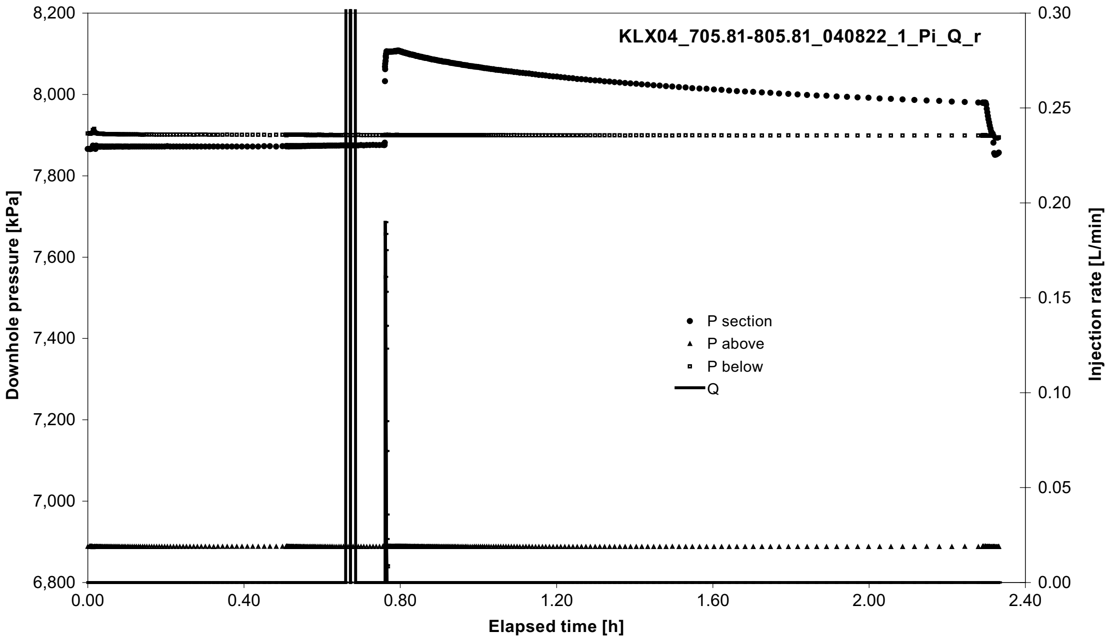


Figure 5-2. *Typical pressure versus time plot of a pulse injection test.*

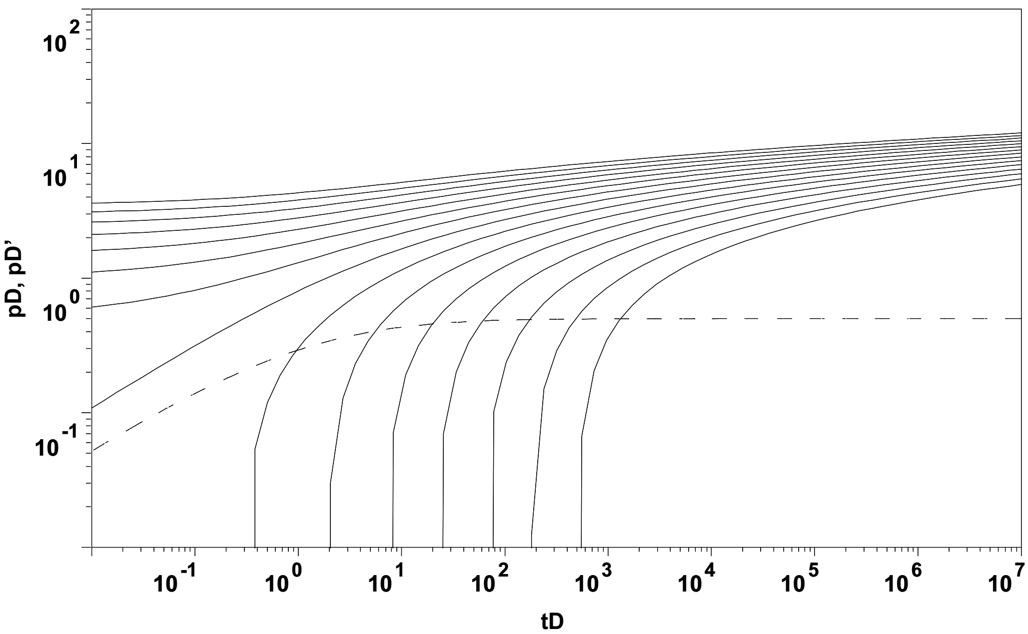


Figure 5-3. *Deconvolution type curve set for pulse test analysis.*

5.5.4 Steady state analysis

In addition to the type curve analysis, an interpretation based on the assumption of stationary conditions was performed as described by /Moye, 1967/.

5.5.5 Flow models used for analysis

The flow models used in analysis were derived from the shape of the pressure derivative calculated with respect to log time and plotted in log-log coordinates.

In several cases the pressure derivative suggests a change of transmissivity with the distance from the borehole. In such cases a composite flow model was used in the analysis.

If there were different flow models matching the data in comparable quality, the simplest model was preferred.

The flow dimension displayed by the test can be diagnosed from the slope of the pressure derivative. A slope of 0.5 indicates linear flow, a slope of 0 (horizontal derivative) indicates radial flow and a slope of –0.5 indicates spherical flow. The flow dimension diagnosis was commented for each of the tests. At tests where a flow regime could not clearly identified from the test data, we assume in general a radial flow regime as the most simple flow model available. The value of p* was then calculated according to this assumption.

In cases when the infinite acting radial flow (IARF) phase was not supported by the data the derivative was extrapolated using the most conservative assumption, which is that the derivative would stabilise short time after test end. In such cases the additional uncertainty was accounted for in the estimation of the transmissivity confidence ranges.

5.5.6 Calculation of the static formation pressure and equivalent freshwater head

The static pressure measured at transducer depth, was derived from the pressure recovery (CHir) following the constant pressure injection phase by using straight line or type curve extrapolation in the Horner plot.

The equivalent freshwater head (expressed in meters above sea level) was calculated from the static formation pressure, corrected for athmospheric pressure measured by the surface gauge and corrected for the vertical depth considering the inclination of the drillhole, by assuming a water density of 1,000 kg/m^3 (freshwater). The equivalent freshwater head is the static water level an individual test interval would show if isolated and connected to the surface by tubing full of freshwater. Figure 5-4 shows the methodology schematically.

The freshwater head in meters above sea level is calculated as following:

$$head = \frac{(p^* - p_{atm})}{\rho \cdot g}$$

which is the p* value expressed in a water column of freshwater.

With consideration of the elevation of the reference point (RP) and the gauge depth (Gd), the freshwater head h_{iwf} is:

$$h_{iwf} = RP_{elev} - Gd + \frac{(p^* - p_{atm})}{\rho \cdot g}.$$

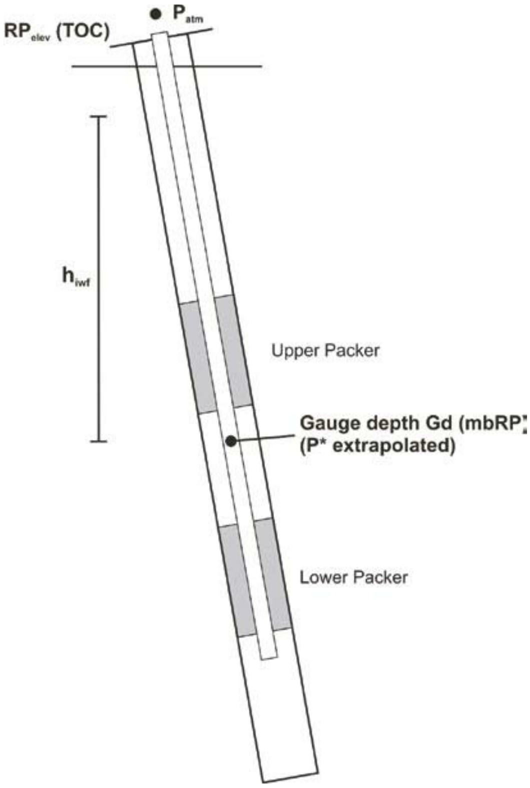


Figure 5-4. *Schematic methodologies for calculation of the freshwater head.*

5.5.7 Derivation of the recommended transmissivity and the confidence range

In most of the cases more than one analysis was conducted on a specific test. Typically both test phases were analysed (CHi and CHir) and in some cases the CHi or the CHir phase was analysed using two different flow models. The parameter sets (i.e. transmissivities) derived from the individual analyses of a specific test usually differ. In the case when the differences are small (which is typically the case) the recommended transmissivity value is chosen from the test phase that shows the best data and derivative quality.

In cases when the difference in results of the individual analyses was large (more than half order of magnitude) the test phases were compared and the phase showing the best derivative quality was selected.

The confidence range of the transmissivity was derived using expert judgement. Factors considered were the range of transmissivities derived from the individual analyses of the test as well as additional sources of uncertainty such as noise in the flow rate measurement, numeric effects in the calculation of the derivative or possible errors in the measurement of the wellbore storage coefficient. No statistical calculations were performed to derive the confidence range of transmissivity.

In cases when changing transmassivity with distance from the borehole (composite model) was diagnosted, the inner zone transmassivity (in borehole vicinity) was recommended. This is consistence with SKB's standards.

In cases when the infinite acting radial flow (IARF) phase was not supported by the data the additional uncertainty was accounted for in the estimation of the transmissivity confidence ranges.

6 Results

In the following, results of all tests are presented and analysed. Chapter 6.1 presents the 100 m tests, 6.2 the 20 m tests and 6.3 the 5 m tests. The results are given as general comments to test pereformance, the identified flow regimes and calculated parameters and finally the parameters which are considered as most representative are chosen and justification is given. All results are also summarised in Table 7-1 and 7-2 of the Synthesis chapter.

6.1 100 m single-hole injection tests

In the following, the 100 m section tests conducted in borehole KLX04 are presented and analysed.

6.1.1 Section 105.11–205.11 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 195 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate control during the CHi phase was good. The injection rate decreased from 11.6 L/min at start of the CHi phase to 10.0 L/min at the end, indicating a relatively high interval transmissivity. The injection phase (Chi) and the recovery phase (CHir) show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test both phases show a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). An infinite acting homogeneous radial flow model was chosen for the analysis of the phases. The analysis is presented in Appendix 2-1.

Selected representative parameters

The recommended transmissivity of 2.2E–5 m^2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 8.0E–6 to 4.0E–5 m^2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 1,986.4 kPa.

The analysis of the CHi and CHir phases shows good consistency. No further analysis is recommended.

6.1.2 Section 205.34–305.34 m, tests no 1 and 2, injection

Comments to test

The first test conducted in this section was repeated due to technical problems with the regulation unit.The Cartesian plots of both tests are shown in the appendix. Only the second test was analysed.

The test was composed of a constant pressure injection test phase with a pressure difference of 20 kPa, followed by a pressure recovery phase. This very high flow zone did not allow a higher pressure difference with a flow of around 30 L/min. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate control during the CHi phase was done manual, because the system could not regulate it. The injection rate decreased from 39.2 L/min at start of the CHi phase to 27.6 L/min at the end, indicating a very high interval transmissivity. The recovery phase (CHir) shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase and the CHir phase show a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-2.

Selected representative parameters

The recommended transmissivity of 2.1E–4 m^2/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 1.0E–4 to 4.0E–4 m^2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 2,966.1 kPa.

The analysis of the CHi and CHir phases shows very good consistency. No further analysis is recommended.

6.1.3 Section 305.41–405.41 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 203 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate control during the CHi phase was good. The injection rate decreased from 12.1 L/min at start of the CHi phase to 9.8 L/min at the end, indicating a relatively high interval transmissivity. Both phases show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase and the CHir phase show a flat derivative at late times, indicating a flow dimension of 2 (radial flow). An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-3.

Selected representative parameters

The recommended transmissivity of 5.4E–5 m^2/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 7.5E–6 to 6.5E–5 m^2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3,943.1 kPa.

The analysis of the CHi and CHir phases shows consistency. No further analysis is recommended.

6.1.4 Section 405.49–505.49 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate control during the beginning of the CHi phase was not very good. After 2 minutes the regulation system managed to get stable flow conditions. The injection rate decreased from 0.62 L/min at start of the CHi phase to 0.50 L/min at the end, indicating a moderate interval transmissivity. The recovery shows a very quick stabilization. Both phases are amenable for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase and the CHir phase show a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). An infinite acting homogeneous radial flow model was chosen for the analysis of the two phases. The analysis is presented in Appendix 2-4

Selected representative parameters

The recommended transmissivity of 1.0E–6 m^2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 5.0E–7 to 2.0E–6 m^2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 4,924.2 kPa.

The analysis of the CHi and CHir phases shows good consistency. No further analysis is recommended.

6.1.5 Section 505.55–605.55 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate decreased from 4.99 L/min at start of the CHi phase to 3.43 L/min at the end, indicating a relatively high interval transmissivity. Both phases are amenable for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a flat derivative at middle times, which is indicative of a flow dimension of 2 (radial flow). At late times the derivative does not look very stable and shows an upward trend followed by a downward slope. The CHir phase derivative shows an downward trend at late times indicating an increase of transmissivity at some distance from the borehole. An infinite acting homogeneous radial flow model was chosen for the analysis of the Chi phase. For the analysis of the CHir phase a radial composite flow model was chosen. The analysis is presented in Appendix 2-5.

Selected representative parameters

The recommended transmissivity of 4.1E–6 m^2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 1.0E–7 to 5.0E–6 m^2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 5,905.1 kPa.

The analysis of the CHi and CHir phases shows good consistency. No further analysis is recommended.

6.1.6 Section 605.69–705.69 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate decreased from 3.55 L/min at start of the CHi phase to 2.76 L/min at the end, indicating a relatively high interval transmissivity. Both phases show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a flat derivative at late times and the Chir phase shows a flat derivative at middle times, indicating a flow dimension of 2 (radial flow). The CHir phase derivative shows an downward trend at late times indicating an increase of transmissivity at some distance from the borehole. An infinite acting homogeneous radial flow model was chosen for the analysis of the Chi phase. For the analysis of the CHir phase a radial composite flow model was chosen. The analysis is presented in Appendix 2-6.

Selected representative parameters

The recommended transmissivity of 3.9E–6 m^2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 2.0E–6 to 5.0E–6 m^2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 6,882.9 kPa.

The analysis of the CHi and CHir phases shows good consistency. No further analysis is recommended.

6.1.7 Section 705.81–805.81 m, test no 1, pulse injection

Comments to test

The test was initiated as a constant pressure injection. However, after a few seconds of injection the rate quickly dropped to zero, indicating a very tight section. It was therefore decided to close the test valve and measure the pressure recovery. The pressure recovery was analysed as a pulse injection phase (PI).

During the brief injection phase a total volume of 0.027 L was injected (derived from the flowmeter measurements. This injected volume produced a pressure increase of 200 kPa. Using a dV/dP approach, the wellbore storage coefficient relevant for the subsequent pressure recovery can be calculated to 1.4E–10 m^3/Pa. It should be noted though that there is large uncertainty connected with the determination of the wellbore storage coefficient (probably one order of magnitude), which will implicitly translate into uncertainty in the derived transmissivity.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the Pi phase shows a flat derivative at middle times, which is indicative of a flow dimension of 2 (radial flow). At late times it shows an upward trend, indicating a decrease of transmissivity at some distance from the borehole. For the analysis a radial composite flow model was chosen. The analysis is presented in Appendix 2-7.

Selected representative parameters

The recommended transmissivity of 3.5E–10 m^2/s was derived from the analysis of the Pi phase. It should be noted that due to the very low interval transmissivity the results are very uncertain. The confidence range for the interval transmissivity is estimated to be 8.0E–11 to 7.0E–10 m^2/s. The flow dimension displayed during the test is 2. No static pressure could be derived.

6.1.8 Section 805.98–905.98 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. The system needed more than two minutes to get stable flow conditions, due to the small injection rates the rate measurements are relatively noisy. The injection rate decreased from 76.0 mL/min at start of the CHi phase to 52.3 mL/min at the end, indicating a relatively low interval transmissivity. The data of the CHi phase are for middle and late times amenable for quantitative analysis. The CHir phase shows relatively fast recovery, however, the data is of good quality and as such, amenable for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a flat derivative at middle times, which is indicative of a flow dimension of 2 (radial flow). At late times it shows an upward trend which could indicate a transition to a zone of lower transmissivity in some distance of the borehole. The CHir phase does not allow for a specific determination of the flow dimension. An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-8.

Selected representative parameters

The recommended transmissivity of 4.3E–8 m^2/s was derived from the analysis of the CHi phase, which is the phase that shows infinite acting radial flow. The confidence range for the interval transmissivity is estimated to be 2.0E–8 to 8.0E–8 m^2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 8,838.7 kPa.

The analysis of the CHi and CHir phases shows some inconsistency, essentially caused by the fast recovery of the CHir phase and the fact that infinite acting radial flow was not measured during the recovery phase.

6.1.9 Section 886.11–986.11 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. The pressure in the bottom zone increases during the injection, indicating a connection to the interval through fractures. The injection rate control during the CHi phase was good. The injection rate decreased from 2.23 L/min at start of the CHi phase to 0.89 L/min at the end, indicating a moderate interval transmissivity. The data quality of both phases is good and as such adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase and the CHir phase show a flat derivative at middle times, which is indicative of a flow dimension of 2 (radial flow). The derivative of the Chi phase shows an upward trend at late times, indicating a transition to a zone of lower transmissivity in some distance of the borehole or a change in flow dimension. For the analysis a radial composite flow model was chosen for both phases. The analysis is presented in Appendix 2-9.

Selected representative parameters

The recommended transmissivity of 8.2E–7 m^2/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 6.0E–7 to 1.0E–6 m^2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 9,623.8 kPa.

The analysis of the CHi and CHir phases shows very good consistency. No further analysis is recommended.

6.2 20 m single-hole injection tests

In the following, the 20 m section tests conducted in borehole KLX04 are presented and analysed.

6.2.1 Section 105.21–125.21 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate control during the CHi phase was good. The injection rate decreased from 4.07 L/min at start of the CHi phase to 3.00 L/min at the end, indicating a relatively high interval transmissivity. The recovery phase (CHir) shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHir phase shows a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). The data of the CHi phase does not allow for a specific determination of the flow dimension. It was analysed assuming a flow dimension of 2. The derivative shows an upward trend at late times. This part was not analysable. For the analysis of both phases a radial composite flow model was chosen. The analysis is presented in Appendix 2-10

Selected representative parameters

The recommended transmissivity of 2.6E–6 m^2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 9.0E–7 to 5.0E–6 m^2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 1,209.2 kPa.

The analysis of the CHi and CHir phases shows consistency. In case further analysis is planned, we recommend conducting a full superposition transient analysis in order to account for pressure history effects and changing flow rates during the CHi phase.

6.2.2 Section 125.25–145.25 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate control during the CHi phase was not very good at the beginning. The injection rate decreased from 0.22 L/min at start of the CHi phase to 0.19 L/min at the end, indicating a relatively moderate interval transmissivity. Both phases are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a flat derivative at middle times, which is indicative of a flow dimension of 2 (radial flow). At late times it shows an upward trend, indicating a transition to a zone of lower transmissivity at some distance from the borehole. The CHir phase derivative is flat at late times. An infinite acting homogeneous radial flow model was chosen for the analysis of the Chir phase. For the analysis of the CHi phase a radial composite flow model was chosen. The analysis is presented in Appendix 2-11.

Selected representative parameters

The recommended transmissivity of 5.6E–7 m^2/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 1.0E–7 to 7.0E–7 m^2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 1,402.5 kPa.

The analysis of the CHi and CHir phases shows consistency. No further analysis is recommended.

6.2.3 Section 145.30–165.30 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate control during the beginning of the CHi phase was not very good. In addition, due to the small injection rates (low transmissivity) the rate measurements are relatively noisy. The injection rate decreased from 53.4 mL/min at start of the CHi phase to 43.2 mL/min at the end, indicating a relatively low interval transmissivity. Both phases are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a flat derivative at middle and late times, which is indicative of a flow dimension of 2 (radial flow). The data quality of the CHir phase does not allow for a specific determination of the flow dimension. The analysis was conducted assuming a flow dimension of 2. An infinite acting homogeneous radial flow model was chosen for the analysis of the Chi phase. For the analysis of the CHir phase a radial composite flow model was chosen. The analysis is presented in Appendix 2-12.

Selected representative parameters

The recommended transmissivity of 5.8E–8 m^2/s was derived from the analysis of the Chi, which shows a clear infinite acting radial flow and the best derivative quality. The confidence range for the interval transmissivity is estimated to be 2.0E–8 to 7.0E–8 m^2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 1,597.2 kPa.

The analysis of the CHi and CHir phases shows good consistency. No further analysis is recommended.

6.2.4 Section 165.30–185.30 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate control during the CHi phase was good. The injection rate decreased from 0.76 L/min at start of the CHi phase to 0.53 L/min at the end, indicating a moderate interval transmissivity. The data of the Chi phase are of good quality and adequate for quantitative analysis. The CHir phase shows very fast recovery, such that the analysis does not provide reliable results. The results should be regarded as order of magnitude only.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a flat derivative at middle and late times, which is indicative of a flow dimension of 2 (radial flow). The data quality of the CHir phase does not allow for a specific determination of the flow dimension. An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-13.

Selected representative parameters

The recommended transmissivity of 5.4E–7 m^2/s was derived from the analysis of the Chi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 3.0E–7 to 7.0E–7 m^2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 1,792.2 kPa.

The analysis of the CHi and CHir phases shows some inconsistency, essentially caused by the fast recovery of the CHir phase and from this resulting data quality of this phase.

6.2.5 Section 185.32–205.32 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate control during the CHi phase was good. After one third of the flow period it shows a relatively fast decrease of the flow rate for which the reason is unknown. The injection rate decreased from 7.10 L/min at start of the CHi phase to 5.81 L/min at the end, indicating a relatively high interval transmissivity. The CHir phase shows relatively fast recovery, however, the data is of good quality and as such, amenable for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase and the CHir phase show a flat derivative at late times, which is indicative for a flow dimension of 2 (radial flow). For the analysis of the Chi phase, only the last part was chosen. An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-14.

Selected representative parameters

The recommended transmissivity of 5.9E–6 m^2/s was derived from the analysis of the CHi phase. The confidence range for the interval transmissivity is estimated to be 4.0E–6 to 2.0E–5 m^2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 1,985.7 kPa.

The analysis of the CHi and CHir phases shows some inconsistency, mainly caused by the fast drop of flow rate after the first third of the flow period and the very fast recovery.

6.2.6 Section 205.34–225.34 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 100 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate control during the CHi phase needed about 90 seconds to get stable pressure and flow conditions. The injection rate decreased from 35.5 L/min at start of the CHi phase to 28.1 L/min at the end, indicating a very high interval transmissivity. The recovery phase (CHir) shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). The CHir phase shows a flat derivative, too. An infinite acting homogeneous radial flow model was chosen for the analysis of the CHir phase. For the analysis of the CHi phase a radial composite flow model was chosen. The analysis is presented in Appendix 2-15.

Selected representative parameters

The recommended transmissivity of 8.1E–5 m^2/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 4.0E–5 to 9.0E–5 m^2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 2,181.6 kPa.

The analysis of the CHi and CHir phases shows good consistency. No further analysis is recommended.

6.2.7 Section 225.35–245.35 m, tests no 1 and 2, injection

Comments to test

The first test conducted in this section was repeated due to the disturbance of pumping water from the annulus to the tank parallel to the running injection test. The Cartesian plots of both tests are shown in the appendix. Only the second test was analysed

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate decreased from 1.35

L/min at start of the CHi phase to 0.82 L/min at the end, indicating a moderate interval transmissivity. The CHir phase shows very fast recovery, such that the analysis does not provide reliable results. The results should be regarded as order of magnitude only.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a flat derivative at middle times, followed by an upward slope and a stabilisation at a higher level, which is indicative for a transition to a zone of lower transmissivity at some distance from the borehole. The CHir phase shows a flat derivative, indicating a flow dimension of 2 (radial flow). An infinite acting homogeneous radial flow model was chosen for the analysis of the CHir phase. For the analysis of the CHi phase a radial composite flow model was chosen. The analysis is presented in Appendix 2-16.

Selected representative parameters

The recommended transmissivity of 6.2E–7 m^2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 3.0E–7 to 8.0E–7 m^2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 2,380.9 kPa.

The analysis of the CHi and CHir phases shows some inconsistency, essentially caused by the fast recovery of the CHir phase.

6.2.8 Section 245.38–265.38 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate control during the CHi phase was good. The injection rate decreased from 19.9 mL/min at start of the CHi phase to 16.4 L/min at the end, indicating a high interval transmissivity. Both phases show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHir phase shows a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). The CHi phase derivative shows a downward trend at late times indicating an increase of transmissivity at some distance from the borehole. An infinite acting homogeneous radial flow model with wellbore storage and skin was chosen for the analysis of the CHir phase. For the analysis of the CHi phase a radial composite flow model was chosen. The analysis is presented in Appendix 2-17.

Selected representative parameters

The recommended transmissivity of 2.1E–5 m^2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 9.0E–6 to 4.0E–5 m^2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 2,574.6 kPa.

The analysis of the CHi and CHir phases shows good consistency. No further analysis is recommended.

6.2.9 Section 265.38–285.38 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate decreased from 0.68 L/min at start of the CHi phase to 0.55 L/min at the end, indicating a relatively moderate interval transmissivity. The CHir phase shows relatively fast recovery, however, the data is of good quality and as such, amenable for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase and the CHir phase show a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). The CHi phase derivative shows a downward trend at middle times indicating an increase of transmissivity at some distance from the borehole. An infinite acting homogeneous radial flow model with wellbore storage and skin was chosen for the analysis of the CHir phase. For the analysis of the CHi phase a radial composite flow model was chosen. The analysis is presented in Appendix 2-18.

Selected representative parameters

The recommended transmissivity of 1.7E–6 m^2/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 4.0E–7 to 2.0E–6 m^2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 2,771.1 kPa.

The analysis of the CHi and CHir phases shows good consistency. No further analysis is recommended.

6.2.10 Section 285.40–305.40 m, tests no 1 and 2, injection

Comments to test

The first test conducted in this section was repeated due to technical problems with the pipe string.The Cartesian plots of both tests are shown in the appendix. Only the second test was analysed

The test was composed of a constant pressure injection test phase with a pressure difference of 35 kPa, followed by a pressure recovery phase. The system could not manage to get a higher pressure dfference. A low pressure increase (5 kPa) in the bottom zone was observed, indicating a hydraulic connection between test interval and that zone. The injection rate control during the CHi phase was not very good. The system needed more than 10 minutes to get stable pressure conditions. Only the very late times of the CHi phase are adequate for quantitative analysis. The injection rate decreased from 37.7 L/min at start of the CHi phase to 24.7 L/min at the end, indicating a very high interval transmissivity. The recovery phase (CHir) shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). The CHir phase derivative shows a downward trend at middle times indicating an increase of transmissivity at some distance from the borehole. An infinite acting homogeneous radial flow model was chosen for the analysis of the Chi phase. For the analysis of the CHir phase a radial composite flow model was chosen. The analysis is presented in Appendix 2-19.

Selected representative parameters

The recommended transmissivity of 5.1E–5 m^2/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 4.0E–5 to 2.0E–4 m^2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 2,967.6 kPa.

The analysis of the CHi and CHir phases shows good consistency. No further analysis is recommended.

6.2.11 Section 305.41–325.41 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate decreased from 0.45 L/min at start of the CHi phase to 0.35 L/min at the end, indicating a relatively low interval transmissivity. The CHir phase shows very fast recovery, such that the analysis does not provide reliable results. The results should be regarded as order of magnitude only.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). At late times it shows an upward trend, indicating a decrease of transmissivity at some distance from the borehole. The CHir phase derivative is flat at late times. An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-20.

Selected representative parameters

The recommended transmissivity of 5.4E–7 m^2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 2.0E–7 to 7.0E–7 m^2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3,161.4 kPa.

The analysis of the CHi and CHir phases shows some inconsistencies, essentially caused by the fast recovery of the CHir phase and from this resulting data quality of this phase.

6.2.12 Section 325.44–345.44 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate control during the CHi phase was good, but after about 12 minutes there was a sharp drop down in flow, however the pressure in the test section stayed stable. The reason for that is unknown. Therefore it was possible to analyse only the first part of the CHi phase. The injection rate decreased from 0.37 L/min at start of the CHi phase to 0.25 L/min at the end, indicating a relatively moderate interval transmissivity. The CHir phase shows very fast recovery, such that the analysis does not provide reliable results. The results should be regarded as order of magnitude only.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a flat derivative at middle times before the sharp drop in flow, which is indicative of a flow dimension of 2 (radial flow). The CHir phase derivative is flat. An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-21.

Selected representative parameters

The recommended transmissivity of 8.8E–8 m^2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 7.0E–8 to 2.0E–7 m^2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3,355.9 kPa.

The analysis of the CHi and CHir phases shows some inconsistency, essentially caused by the fast recovery of the CHir phase.

6.2.13 Section 345.44–365.44 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate decreased from 13.1 L/min at start of the CHi phase to 9.3 L/min at the end, indicating a high interval transmissivity. Both phases are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase and the CHir phase show a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). An infinite acting homogeneous radial flow model was chosen for the analysis of the Chi phase. The analysis is presented in Appendix 2-22.

Selected representative parameters

The recommended transmissivity of 5.6E–5 m^2/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 8.0E–6 to 6.0E–5 m^2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3,551.2 kPa.

The analysis of the CHi and CHir phases shows some inconsistency that should be resolved in case further analysis of the test is planned. In this case we recommend conducting a full superposition transient analysis in order to account for pressure history effects and changing flow rates during the CHi phase.

6.2.14 Section 365.47–385.47 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate decreased from 0.54 L/min at start of the CHi phase to 0.41 L/min at the end, indicating a relatively low interval transmissivity. The CHir phase shows very fast recovery, such that the analysis does not provide reliable results. The results should be regarded as order of magnitude only.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase and the CHir phase show a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-23.

Selected representative parameters

The recommended transmissivity of 6.4E–7 m^2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 2.0E–7 to 8.0E–7 m^2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3,748.2 kPa.

The analysis of the CHi and CHir phases shows some inconsistency, essentially caused by the fast recovery of the CHir phase and from this resulting data quality of this phase.

6.2.15 Section 385.47–405.47 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 245 kPa, followed by a pressure recovery phase. The test was accomplished without using the automatic regulation system. No hydraulic connection between test interval and the adjacent zones was observed. Due to the small injection rates the rate measurements are relatively noisy, but still adequate for quantitative analysis. The injection rate decreased from 10.9 mL/min at start of the CHi phase to 6.4 mL/min at the end, indicating a low interval transmissivity. The recovery phase (CHir) did not reach infinite acting radial flow (IARF) and as such the results should be regarded as order of magnitude only.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows, although it is noisy, a flat derivative at middle times, which is indicative of a flow dimension of 2 (radial flow). The CHir phase does not allow for a specific determination of the flow dimension. The analysis was conducted assuming a flow dimension of 2. Both phases were analysed using an infinite acting homogeneous radial flow model. The analysis is presented in Appendix 2-24.

Selected representative parameters

The recommended transmissivity of 4.4E–9 m^2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 2.0E–9 to 6.0E–9 m^2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3,943.6 kPa.

The analysis of the CHi and CHir phases shows some inconsistencies, which are mainly caused by the fact that the CHir phase did not reach IARF.

6.2.16 Section 405.49–425.49 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate decreased from 0.47 L/min at start of the CHi phase to 0.43 L/min at the end, indicating a relatively moderate interval transmissivity. Especially in the beginning, the data of the Chi phase are relatively noisy. The CHir phase shows very fast recovery, such that the analysis does not provide reliable results. The results should be regarded as order of magnitude only.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase and the CHir phase show a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). An infinite acting homogeneous radial flow model was chosen for the analysis of the CHir phase. For the analysis of the CHi phase a radial composite flow model was chosen. The analysis is presented in Appendix 2-25.

Selected representative parameters

The recommended transmissivity of 2.5E–6 m^2/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 3.0E–7 to 4.0E–6 m^2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 4,139.8 kPa.

The analysis of the CHi and CHir phases shows consistency. No further analysis is recommended.

6.2.17 Section 425.52–445.52 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 198 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate control during the CHi phase was ok, but due to the small injection rates the rate measurements are relatively noisy. The injection rate decreased from 86.4 mL/min at start of the CHi phase to 61.2 mL/min at the end, indicating a relatively low interval transmissivity. The CHir phase shows very fast recovery, such that the analysis does not provide reliable results. The results should be regarded as order of magnitude only.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi and the CHir phase show a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. For the analysis of the CHir phase a radial composite flow model was chosen. The analysis is presented in Appendix 2-26.

Selected representative parameters

The recommended transmissivity of 5.7E–8 m^2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 3.0E–8 to 8.0E–8 m^2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 4,333.3 kPa.

The analysis of the CHi and CHir phases shows some inconsistencies, mainly caused by the fast recovery of the CHir phase and resulting data quality of this phase. No further analysis is recommended.

6.2.18 Section 445.50–465.50 m, tests no 1 and 2, injection

Comments to test

The first test conducted in this section was repeated due to technical problems with the flow meter. The Cartesian plots of both tests are shown in the appendix. Only the second test was analysed

The test was composed of a constant pressure injection test phase with a pressure difference of 225 kPa, followed by a pressure recovery phase. The test was accomplished without using the automatic regulation system. No hydraulic connection between test interval and the adjacent zones was observed. Due to the very small injection rates the rate measurements are relatively noisy, but still amenable for quantitative analysis. The injection rate decreased from 7.2 mL/min at start of the CHi phase to 3.3 mL/min at the end, indicating a low interval transmissivity. The recovery phase (CHir) shows no problems, but did not reach infinite acting radial flow and as such the results should be regarded as order of magnitude only.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). The CHir does not allow a specific determination of the flow dimension. An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-27.

Selected representative parameters

The recommended transmissivity of 8.2E–10 m^2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 7.0E–10 to 4.0E–9 m^2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 4,526.0 kPa.

The analysis of the CHi and CHir phases shows some inconsistencies, which are mainly caused by the low flow rate. No further analysis is recommended.

6.2.19 Section 465.52–485.52 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 209 kPa, followed by a pressure recovery phase. The test was accomplished without using the automatic regulation system. During the injection phase the pressure in the section decreased by 13 kPa. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate decreased from 8.1 mL/min at start of the CHi phase to 3.3 mL/min at the end, indicating a low interval transmissivity. The recovery phase (CHir) shows no problems, but IARF was not measured. As such, the results of the CHir phase should be regarded as order of magnitude only.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a flat derivative at middle and late times, which is indicative of a flow dimension of 2 (radial flow). The data of the CHir phase does not allow for a specific determination of the flow dimension. The analysis was conducted assuming a flow dimension of 2. An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-28.

Selected representative parameters

The recommended transmissivity of 1.8E–8 m^2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 8.0E–9 to 4.0E–8 m^2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 4,723.8 kPa.

The analysis of the CHi and CHir phases shows some inconsistencies, mainly caused by the fact that no IARF was measured for the CHir phase. No further analysis is recommended.

6.2.20 Section 485.52–505.52 m, test no 1, pulse injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. The flow rate was below the measurement limit, indicating a very low interval transmissivity. The test was analysed as a pulse injection (Pi).

During the injection phase a total volume of 0.022 L was injected (derived from the flowmeter measurements. This injected volume produced a pressure increase of 200 kPa. Using a dV/dP approach, the wellbore storage coefficient relevant for the subsequent pressure recovery can be calculated to 3.0E–11 m^3/Pa. It should be noted though that there is large uncertainty connected with the determination of the wellbore storage coefficient (probably one order of magnitude), which will implicitly translate into uncertainty in the derived transmissivity.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test, the data does not allow a specific determination of the flow dimension. The test was analysed assuming a flow dimension of 2 (radial flow). A two shell composite flow model was chosen for the analysis. The analysis is presented in Appendix 2-29.

Selected representative parameters

The recommended transmissivity derived from the analysis is 2.1E–10 m^2/s. It should be noted that due to the very low interval transmissivity the results are very uncertain. The confidence range for the interval transmissivity is estimated to be 1.0E–10 to 1.0E–9 m^2/s. The analysis was conducted using a flow dimension of 2. No static pressure could be derived.

6.2.21 Section 505.55–525.55 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate control during the CHi phase was good. The injection rate decreased from 2.25 L/min at start of the CHi phase to 1.85 L/min at the end, indicating a high interval transmissivity. Both phases are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase and the CHir phase show a flat derivative at middle times, indicating a flow dimension of 2 (radial flow). At late times both phases show a downward trend, which is indicative for an increase of transmissivity at some distance from the borehole. For the analysis a radial composite flow model was chosen. The analysis is presented in Appendix 2-30.

Selected representative parameters

The recommended transmissivity of 2.1E–6 m^2/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 9.0E–7 to 3.0E–6 m^2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 5,115.3 kPa.

The analysis of the CHi and CHir phases shows very good consistency. No further analysis is recommended.

6.2.22 Section 525.58–545.58 m, test no 1, pulse injection

Comments to test

The test was initiated as a constant pressure injection. However, after a few seconds of injection the rate quickly dropped to zero, indicating a very tight section. It was therefore decided to close the test valve and measure the pressure recovery. The pressure recovery was analysed as a pulse injection phase (PI).

During the brief injection phase a total volume of 6.95 mL was injected (derived from the flowmeter measurements. This injected volume produced a pressure increase of 204.9 kPa. Using a dV/dP approach, the wellbore storage coefficient relevant for the subsequent pressure recovery can be calculated to 3.4E–11 m^3/Pa. It should be noted though that there is large uncertainty connected with the determination of the wellbore storage coefficient (probably one order of magnitude), which will implicitly translate into uncertainty in the derived transmissivity.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. The derivative of this test is flat at middle times, which is indicative of a flow dimension of 2 (radial flow). The PI phase derivative shows a downward trend at late times indicating an increase of transmissivity at some distance from the borehole. For the analysis a radial composite flow model was chosen. The analysis is presented in Appendix 2-31.

Selected representative parameters

The recommended transmissivity of 4.1E–10 m^2/s was derived from the analysis of the Pi phase. Considering the inherent uncertainties related to the measurement (e.g. specially the measurement of the wellbore storage coefficient) and to the analysis process (e.g. numeric distortion when calculating the derivative and pressure history effects), the confidence range for the transmissivity is estimated to be 7E–11 to 7E–10 m^2/s (the outer zone transmissivity is considered as most representative).The flow dimension displayed during the test is 2. No static pressure could be derived.

6.2.23 Section 545.62–565.62 m, tests no 1 and 2, injection

Comments to test

The first test conducted in this section was repeated due to technical problems with the flow meter.The Cartesian plots of both tests are shown in the appendix. Only the second test was analysed

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. The test was accomplished without using the automatic regulation system. No hydraulic connection between test interval and the adjacent zones was observed. Due to the very small injection rates the rate measurements are relatively noisy, but still adequate for quantitative analysis. The injection rate decreased from 7.61 mL/min at start of the CHi phase to 3.28 mL/min at the end, indicating a low interval transmissivity. The recovery phase (CHir) shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). The data of the CHir phase does not allow for a specific determination of the flow dimension. An infinite acting homogeneous radial flow model was chosen for the analysis of the Chi phase and the CHir phase. The analysis is presented in Appendix 2-32.

Selected representative parameters

The recommended transmissivity of 1.3E–9 m^2/s was derived from the analysis of the CHi phase, because during the CHir phase no infinite acting radial flow was measured, so that the results for the transmissivity are very uncertain. The confidence range for the interval transmissivity is estimated to be 9.0E–10 to 3.0E–9 m^2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 5,509.9 kPa.

The analysis of the CHi and CHir phases shows some inconsistencies, mainly caused due to the fact that IARF was not measured for the CHir phase. No further analysis is recommended.

6.2.24 Section 565.64–585.64 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate control during the beginning of the CHi phase was not very good. However, the second part of the CHi phase can be analysed quantitatively. The injection rate decreased from 66.8 mL/min at start of the CHi phase to 59.4 mL/min at the end, indicating a relatively low interval transmissivity. The CHir phase shows fast recovery, such that the analysis does not provide reliable results. The results should be regarded as order of magnitude only.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). The CHir phase derivative does not allow a specific determination of the flow dimension, it was analysed using a flow dimension of 2. A two shell radial composite flow model was chosen for the analysis of the Chi phase. For the analysis of the CHir phase an infinite acting radial flow model with wellbore storage and skin was chosen. The analysis is presented in Appendix 2-33.

Selected representative parameters

The recommended transmissivity of 9.5E–7 m^2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality and the most reliable results. The early time response of the CHi phase was regarded as skin, which is consistent with the CHir response. The confidence range for the interval transmissivity is estimated to be 3.0E–7 to 1.0E–6 m^2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 5,706.9 kPa.

The analysis of the CHi and CHir phases shows some inconsistencies, mainly caused by the fast recovery of the CHir phase. No further analysis is recommended.

6.2.25 Section 585.65–605.65 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. The pressure in the bottom zone rose a little (3 kPa) during the injection phase, indicating a connection between the interval and the bottom zone. The injection rate decreased from 1.83 L/min at start of the CHi phase to 1.24 L/min at the end, indicating a relatively high interval transmissivity. The CHir phase shows relatively fast recovery, however, the data is of good quality and as such, amenable for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a flat derivative at middle and late times, which is indicative of a flow dimension of 2 (radial flow). The CHir phase derivative shows a downward trend at late times indicating an increase of transmissivity at some distance from the borehole. An infinite acting homogeneous radial flow model was chosen for the analysis of the Chi phase. For the analysis of the CHir phase a radial composite flow model was chosen. The analysis is presented in Appendix 2-34.

Selected representative parameters

The recommended transmissivity of 1.2E–6 m^2/s was derived from the analysis of the CHi phase, which shows the best derivative quality. The confidence range for the interval transmissivity is estimated to be 8.0E–7 to 4.0E–6 m^2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 5,904.6 kPa.

The analysis of the CHi and CHir phases shows consistency. No further analysis is recommended.

6.2.26 Section 605.69–625.69 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. The pressure in the bottom zone rose by 11 kPa during the injection, indicating a connection to the interval. The injection rate control during the CHi phase was good. The injection rate decreased from 2.48 L/min at start of the CHi phase to 1.97 L/min at the end, indicating a relatively high interval transmissivity. The CHir phase shows relatively fast recovery, however, the data is of good quality and as such, amenable for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase and the CHir phases show a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). An infinite acting homogeneous radial flow model was chosen for the analysis of the Chi phase. For the analysis of the CHir phase an infinite acting radial flow model with wellbore storage and skin was chosen. The analysis is presented in Appendix 2-35.

Selected representative parameters

The recommended transmissivity of 3.0E–6 m^2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. It should be noted, that the results are uncertain, due to the connection to the lower section. The confidence range for the interval transmissivity is estimated to be 1.0E–6 to 6.0E–6 m^2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 6,101.9 kPa.

The analysis of the CHi and CHir phases shows consistency. No further analysis is recommended.

6.2.27 Section 625.71–645.71 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate decreased from 2.37 L/min at start of the CHi phase to 1.93 L/min at the end, indicating a relatively high interval transmissivity. Both phases show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase and the CHir phase show a flat derivative at middle times, which is indicative of a flow dimension of 2 (radial flow). At late times both phases show a downward trend, indicating an increase of transmissivity at some distance from the borehole. For the analysis of both phases a radial composite flow model was chosen. The analysis is presented in Appendix 2-36.

Selected representative parameters

The recommended transmissivity of 2.2E–6 m^2/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 1.0E–6 to 4.0E–6 m^2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 6,296.5 kPa.

The analysis of the CHi and CHir phases shows very good consistency. No further analysis is recommended.

6.2.28 Section 645.73–665.73 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 219 kPa, followed by a pressure recovery phase. The test was accomplished without using the automatic regulation system. No hydraulic connection between test interval and the adjacent zones was observed. Due to the small injection rates the rate measurements are relatively noisy, however, the data is amenable for quantitative analysis. The injection rate decreased from 9.81 mL/min at start of the CHi phase to 4.90 mL/min at the end, indicating a low interval transmissivity. The recovery phase (CHir) is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). The CHir phase derivative does not allow a specific determination of the flow dimension, the test was analysed assuming a flow dimension of 2. An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-37.

Selected representative parameters

The recommended transmissivity of 2.5E–9 m^2/s was derived from the analysis of the CHi phase, because the CHir phase does not clearly show an infinite acting radial flow. The confidence range for the interval transmissivity is estimated to be 9.0E–10 to 4.0E–9 m^2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 6,487.5 kPa.

Considering the low flow rates, the analysis of the CHi and CHir phases shows good consistency. No further analysis is recommended.

6.2.29 Section 665.76–685.76 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 210 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate control during the CHi phase was not very good. The injection rate decreased from 0.38 L/min at start of the CHi phase to 0.11 L/min at the end, indicating a relatively moderate interval transmissivity. The recovery phase (CHir) shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test both phases show a flat derivative at middle times, which is indicative of a flow dimension of 2 (radial flow). At late times both derivatives show an upward trend indicating a change in flow dimension or transition to a zone of lower transmissivity. For the analysis of both phases a radial composite flow model was chosen. The analysis is presented in Appendix 2-38.

Selected representative parameters

The recommended transmissivity of 2.5E–7 m^2/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. It should be noted that the results are uncertain due to the uncertainties concerning the flow dimension. The confidence range for the interval transmissivity is estimated to be 7.0E–8 to 5.0E–7 m^2/s. The analysis was conducted assuming a flow dimension of 2 for the inner zone and a flow dimension of 1 for the outer zone. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 6,675.0 kPa.

The analysis of the CHi and CHir phases shows some uncertainties concerning the flow dimension that should be resolved in case further analysis of the test is planned. In this case we recommend conducting a full superposition transient analysis in order to account for pressure history effects and changing flow rates during the CHi phase.

6.2.30 Section 685.79–705.79 m, test no 1, pulse injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 214 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. One minute after open the shut-in tool, the flow rate decreased below the measurement limit, indicating a very low interval transmissivity. The pressure in the section stayed stable. The duration of the recovery was extended to 75 minutes and was analysed as a pulse injection phase (Pi).

During the injection phase a total volume of 0.0074 L was injected (derived from the flowmeter measurements. This injected volume produced a pressure increase of 214.1 kPa. Using a dV/dP approach, the wellbore storage coefficient relevant for the subsequent pressure recovery can be calculated to 3.4E–11 m^3/Pa. It should be noted though that there is large uncertainty connected with the determination of the wellbore storage coefficient (probably one order of magnitude), which will implicitly translate into uncertainty in the derived transmissivity.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow dimension cannot be determined with any degree of certainty because the shape of the deconvolved pulse data is very sensitive to the assumed p0 and pi values of the test. The analysis was conducted assuming a flow dimension of 2 (radial flow). The analysis is presented in Appendix 2-39.

Selected representative parameters

The recommended transmissivity of 1.8E–10 m^2/s was derived from the analysis of the CHIR phase. Considering the inherent uncertainties related to the measurement (e.g. specially the measurement of the wellbore storage coefficient) and to the analysis process , the confidence range for the transmissivity is estimated to be 9E–11 to 6E–10 m^2/s It should be noted that due to the very low interval transmissivity the results are very uncertain. The analysis was conducted using a flow dimension of 2. No static pressure could be derived.

6.2.31 Section 805.98–825.98 m, test no 1, injection

Comments to test

The intention was to conduct the test as a constant pressure injection test phase (CHi), followed by a pressure recovery phase (CHir). However, after inflating the packers and closing the test valve, the pressure kept rising by 90Pa in 30 minutes. This phenomenon is caused by prolonged packer expansion in a very tight section (T probably smaller than 1E–11 m^2/s). None of the test phases is analysable.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow model cannot be determined. No analysis was performed. The measured data is presented in Appendix 2-40.

Selected representative parameters

Based on the test response (prolonged packer compliance) the interval transmissivity is lower than 1E–11 m^2/s.

No further analysis recommended.

6.2.32 Section 826.02–846.02 m, test no 1, injection

Comments to test

The intention was to conduct the test as a constant pressure injection test phase (CHi), followed by a pressure recovery phase (CHir). However, after a few seconds of injection the rate quickly dropped to zero, indicating a very tight section. It was therefore decided to close the test valve and measure the pressure recovery. The test valve was closed, but the pressure kept rising. This phenomenon is caused by prolonged packer expansion in a very tight section (T probably smaller than 1E–11 m^2/s). None of the test phases is analysable.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow model cannot be determined. No analysis was performed. The measured data is presented in Appendix 2-41.

Selected representative parameters

Based on the test response (prolonged packer compliance) the interval transmissivity is lower than 1E–11 m^2/s.

No further analysis recommended.

6.2.33 Section 846.05–866.05 m, test no 1, injection

Comments to test

The intention was to conduct the test as a constant pressure injection test phase (CHi), followed by a pressure recovery phase (CHir). However, after inflating the packers and closing the test valve, the pressure kept rising by 48 kPa in 30 minutes. This phenomenon is caused by prolonged packer expansion in a very tight section (T probably smaller than 1E–11 m^2/s). The test shows no hydraulic communication between the test interval and the adjacent zones. None of the test phases is analysable.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow model cannot be determined. No analysis was performed. The measured data is presented in Appendix 2-42.

Selected representative parameters

Based on the test response (prolonged packer compliance) the interval transmissivity is lower than 1E–11 m^2/s.

No further analysis recommended.

6.2.34 Section 866.08–886.08 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 181 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate control during the CHi phase was not very good. In addition, due to the small injection rates the rate measurements are relatively noisy. The injection rate decreased from 68.4 mL/min at start of the CHi phase to 44.0 mL/min at the end, indicating a relatively low interval transmissivity. The CHir phase shows very fast recovery, such that the analysis does not provide reliable results. The results should be regarded as order of magnitude only.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the data quality does not allow for a specific determination of the flow dimension. The analysis was conducted assuming a flow dimension of 2 (radial flow). An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-43.

Selected representative parameters

The recommended transmissivity of 3.5E–8 m^2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 8.0E–9 to 6.0E–8 m^2/s. The analysis was conducted using a flow dimension of 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 8,646.0 kPa.

The analysis of the CHi and CHir phases shows some inconsistencies, essentially caused by the fast recovery of the CHir phase and the very noisy data of the Chi phase. No further analysis is recommended.

6.2.35 Section 886.11–906.11 m, tests no 1 and 2, injection

Comments to test

The first test conducted in this section was repeated due to a leackage in the pipe string.The Cartesian plots of both tests are shown in the appendix. Only the second test was analysed

The test was composed of a constant pressure injection test phase with a pressure difference of 225 kPa, followed by a pressure recovery phase. The test was accomplished without using the automatic regulation system. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate control during the CHi phase was not very good. In addition, due to the small injection rates (low transmissivity) the rate measurements are relatively noisy. The injection rate decreased from 27.6 mL/min at start of the CHi phase to 17.6 mL/min at the end, indicating a relatively low interval transmissivity. The recovery phase (CHir) shows no IARF, and as such, the results should be regarded as order of magnitude only.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). The data of the CHir phase does not allow for a specific determination of the flow dimension. For the analysis of both phases a radial composite flow model was chosen. The analysis is presented in Appendix 2-44.

Selected representative parameters

The recommended transmissivity of 1.6E–8 m^2/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 7.0E–9 to 4.0E–8 m^2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 8,839.4 kPa.

The analysis of the CHi and CHir phases shows some minor inconsistencies, caused by the small flow rate. No further analysis is recommended.

6.2.36 Section 906.16–926.16 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. The pressure in the bottom zone increased during the injection by 40 kPa, indicating a major connection to the interval. The injection rate decreased from 0.56 L/min at start of the CHi phase to 0.39 L/min at the end, indicating a moderate interval transmissivity. Both phases are adequate for quantitative analysis, but due to the crossflow it should be noted that the results are uncertain.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). The CHir phase derivative shows a downward trend at late times indicating an increase of transmissivity at some distance from the borehole. An infinite acting homogeneous radial flow model was chosen for the analysis of the Chi phase. For the analysis of the CHir phase a radial composite flow model was chosen. The analysis is presented in Appendix 2-45.

Selected representative parameters

The recommended transmissivity of 2.9E–7 m^2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. Considering the uncertainties due to the connection to the lower zone, the confidence range for the interval transmissivity is estimated to be 5.0E–8 to 4.0E–7 m^2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 9,036.0 kPa.

The analysis of the CHi and CHir phases shows good consistency. No further analysis is recommended.

6.2.37 Section 926.18–946.18 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed, but there is a connection to the section above (see test no 53). Due to that the results of this analysis are uncertain. The injection rate decreased from 0.59 L/min at start of the CHi phase to 0.40 L/min at the end, indicating a moderate interval transmissivity. The recovery phases show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase and the CHir phase show a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-46.

Selected representative parameters

The recommended transmissivity of 2.4E–7 m^2/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. Considering the uncertainties due to the connection to the section above, the confidence range for the interval transmissivity is estimated to be 5.0E–8 to 4.0E–7 m^2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 9,233.3 kPa.

The analysis of the CHi and CHir phases shows very good consistency. No further analysis is recommended.

6.2.38 Section 943.05–963.05 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 202 kPa, followed by a pressure recovery phase. The test was accomplished without using the automatic regulation system. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate decreased from 24.4 mL/min at start of the CHi phase to 15.7 mL/min at the end, indicating a relatively low interval transmissivity. The recovery phase (CHir) shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test both phases show a flat derivative at middle times (radial flow), and an upward trend at late times indicating a decrease of transmissivity at some distance from the borehole. For the analysis of the two phases a radial composite flow model was chosen. The analysis is presented in Appendix 2-47.

Selected representative parameters

The recommended transmissivity of 2.7E–7 m^2/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 9.0E–8 to 4.0E–7 m^2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 9,395.9 kPa.

The analysis of the CHi and CHir phases shows very good consistency. No further analysis is recommended.

6.2.39 Section 963.05–983.05 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 160 kPa, followed by a pressure recovery phase. A little connection between test interval and the bottom zone was observed. The injection rate control during the CHi phase was not very good, however, the data are adequate for quantitative analysis. The injection rate decreased from 0.18 L/min at start of the CHi phase to 0.11 L/min at the end, indicating a relatively moderate interval transmissivity. The recovery phase (CHir) shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). The data of the CHir phase do not allow for a specific determination of the flow dimension. A flow dimension of 2 was assumed. An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-48.

Selected representative parameters

The recommended transmissivity of 8.2E–8 m^2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 5.0E–8 to 2.0E–7 m^2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 9,586.7 kPa.

The analysis of the CHi and CHir phases shows some inconsistency that should be resolved in case further analysis of the test is planned. In this case we recommend conducting a full superposition transient analysis in order to account for pressure history effects and changing flow rates during the CHi phase.

6.3 5 m single-hole injection tests

In the following, the 5 m section tests conducted in borehole KLX04 are presented and analysed.

6.3.1 Section 300.41–305.41 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 160 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. After 13 minutes of the injection phase, the flow dropped relatively sharp from 70.3 mL to 67.4 mL and the pressure dropped from that moment to the end of the Chi phase by 7 kPa. The reason for that drop is unknown. Due to that, only the first part of the Chi phase was analysed. The CHir phase shows very fast recovery, such that the analysis does not provide reliable results. The results should be regarded as order of magnitude only.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the data quality does not allow for a specific determination of the flow dimension. The analysis was conducted assuming a flow dimension of 2 (radial flow). For the analysis of both phases an infinite acting radial flow model was chosen. The analysis is presented in Appendix 2-49.

Selected representative parameters

The recommended transmissivity of 9.1E–8 m^2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. It should be noted, that due to the above mentioned drop in flow, the results are very uncertain. The confidence range for the interval transmissivity is estimated to be 3.0E–8 to 2.0E–7 m^2/s. The analysis was conducted using a flow dimension of 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 2,968.2 kPa.

The analysis of the CHi and CHir phases shows some inconsistencies, essentially caused by the drop in flow and the fast recovery.

6.3.2 Section 305.41–310.41 m, test no 1, injection

Comments to test

The intention was to conduct the test as a constant pressure injection test phase (CHi), followed by a pressure recovery phase (CHir). However, after inflating the packers and closing the test valve, the pressure kept rising by 60 kPa in 30 minutes. This phenomenon is caused by prolonged packer expansion in a very tight section (T probably smaller than 1E–11 m^2/s). The test shows no hydraulic communication between the test interval and the adjacent zones. None of the test phases is analysable.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow model cannot be determined. No analysis was performed. The measured data is presented in Appendix 2-50.

Selected representative parameters

Based on the test response (prolonged packer compliance) the interval transmissivity is lower than 1E–11 m^2/s.

No further analysis recommended.

6.3.3 Section 310.42–315.42 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 220 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. Due to the time needed by the system to get stable pressure conditions, the first part of the Chi phase is not analysable. The injection rate decreased from 0.41 L/min at start of the CHi phase to 0.30 L/min at the end, indicating a relatively low interval transmissivity. The CHir phase shows very fast recovery, such that the analysis does not provide reliable results. The results should be regarded as order of magnitude only.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a flat derivative at middle times, which is indicative of a flow dimension of 2 (radial flow). At late times it shows an upward trend indicating a decrease of transmissivity at some distance from the borehole or a change to a flow dimension of about 1. The CHir phase derivative is flat at late times, indicating aflow dimension of 2. A two shell composite flow model was chosen for the analysis of the Chi phase. For the analysis of the CHir phase an infinite acting radial flow model with wellbore storage and skin was chosen. The analysis is presented in Appendix 2-51.

Selected representative parameters

The recommended transmissivity of 4.6E–7 m^2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 1.0E–7 to 8.0E–7 m^2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3,063.3 kPa.

The analysis of the CHi and CHir phases shows some inconsistency that should be resolved in case further analysis of the test is planned. In this case we recommend conducting a full superposition transient analysis in order to account for pressure history effects and changing flow rates during the CHi phase.

6.3.4 Section 315.43–320.43 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate decreased from 0.38 L/min at start of the CHi phase to 0.32 L/min at the end, indicating a relatively moderate interval transmissivity. After 7 minutes a remarkable decrease of flow rate was observed. Only the first part of the Chi phase is analysable. The CHir phase shows very fast recovery, such that the analysis does not provide reliable results. The results should be regarded as order of magnitude only.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a flat derivative at middle times, which is indicative of a flow dimension of 2 (radial flow). The CHir phase derivative is flat at late times. An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-52.

Selected representative parameters

The recommended transmissivity of 7.2E–7 m^2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 2.0E–7 to 9.0E–7 m^2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3,113.1 kPa.

The analysis of the CHi and CHir phases shows some inconsistencies, mainly caused by the fast recovery. In case further analysis of the test is planned, we recommend conducting a full superposition transient analysis in order to account for pressure history effects and changing flow rates during the CHi phase.

6.3.5 Section 320.43–325.43 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 213 kPa, followed by a pressure recovery phase. The test was accomplished without using the automatic regulation system. The pressure in the section decreased during the injection phase by 10 kPa. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate decreased from 32.2 mL/min at start of the CHi phase to 15.4 mL/min at the end, indicating a relatively low interval transmissivity. After about 13 minutes of the Chi phase, the flow rate rose for about three minutes to decrease again after that. The reason for this is unknown and due to that this part of this Chi phase is not analysable. The CHir phase shows very fast recovery, such that the analysis does not provide reliable results. The results should be regarded as order of magnitude only.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the data quality does not allow for a specific determination of the flow dimension. The analysis was conducted assuming a flow dimension of 2 (radial flow). A radial two shell composite model was for the analysis of the CHi phase. For the analysis of the CHir phase an infinite acting radial flow model was chosen. The analysis is presented in Appendix 2-53.

Selected representative parameters

The recommended transmissivity of 1.4E–8 m^2/s was derived from the analysis of the CHi phase. The confidence range for the interval transmissivity is estimated to be 6.0E–9 to 4.0E–8 m^2/s. The analysis was conducted using a flow dimension of 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3,161.4 kPa.

The analysis of the CHi and CHir phases shows some inconsistencies, mainly caused by the noisy data of the Chi phase and the fast recovery of the CHir phase.

6.3.6 Section 325.44–330.44 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 208 kPa, followed by a pressure recovery phase. The test was accomplished without using the automatic regulation system. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate decreased from 71.5 mL/min at start of the CHi phase to 65.8 mL/min at the end, indicating a relatively low interval transmissivity. The CHir phase shows very fast recovery, such that the analysis does not provide reliable results. The results should be regarded as order of magnitude only.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase and the CHir phase show a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). For the analysis of the CHi phase a radial composite flow model was chosen. An infinite acting homogeneous radial flow model with wellbore storage and skin was chosen for the analysis of the CHir phase. The analysis is presented in Appendix 2-54.

Selected representative parameters

The recommended transmissivity of 2.3E–7 m^2/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 8.0E–8 to 5.0E–7 m^2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3,210.4 kPa.

The analysis of the CHi and CHir phases shows good consistency. No further analysis is recommended.

6.3.7 Section 330.44–335.44 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 215 kPa, followed by a pressure recovery phase. The test was accomplished without using the automatic regulation system. No hydraulic connection between test interval and the adjacent zones was observed. Due to the small injection rates the rate measurements are relatively noisy. The injection rate decreased from 11.0 mL/min at start of the CHi phase to 1.60 mL/min at the end, indicating a low interval transmissivity. The recovery phase (CHir) did not reach IARF, however, the data is of good quality and as such, amenable for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows an upward slope during the entire time, which is indicative of a flow dimension of 1 (linear flow). The CHir phase does not allow for a specific determination of the flow dimension. The analysis was conducted assuming a flow dimension of 2 (radial flow). An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-55.

Selected representative parameters

The recommended transmissivity of 1.3E–8 m^2/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. Concerning the uncertainties due to the low flow rate, the confidence range for the interval transmissivity is estimated to be 3.0E–9 to 4.0E–8 m^2/s. The test data allow not allow for a specific determination of the flow dimension. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3,258.0 kPa.

The analysis of the CHi and CHir phases shows some inconsistencies, this being mainly caused by the very low interval transmissivity and the test design which was not optimized for this transmissivity range. No further analysis is recommended.

6.3.8 Section 335.44–340.44 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. The test was accomplished without using the automatic regulation system. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate decreased from 0.21 L/min at start of the CHi phase to 0.14 L/min at the end, indicating a moderate interval transmissivity. The CHir phase shows very fast recovery, such that this phase is not analysable.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). An infinite acting homogeneous radial flow model was chosen for the analysis of the CHi phase. The analysis is presented in Appendix 2-56.

Selected representative parameters

The recommended transmissivity of 8.5E–8 m^2/s was derived from the analysis of the CHi phase. The confidence range for the interval transmissivity is estimated to be 5.0E–8 to 3.0E–7 m^2/s. The flow dimension displayed during the test is 2. Static pressure measured at the end of the recovery is 3,309.9 kPa. The CHir phase shows very fast recovery, such that this phase is not analysable.

No further analysis is recommended.

6.3.9 Section 340.44–345.44 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. The test was accomplished without using the automatic regulation system. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate decreased from 53.9 mL/min at start of the CHi phase to 36.9 mL/min at the end, indicating a relatively low interval transmissivity. The CHir phase shows very fast recovery, such that the analysis does not provide reliable results. The results should be regarded as order of magnitude only.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase and the CHir phase show a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-57.

Selected representative parameters

The recommended transmissivity of 3.2E–8 m^2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 1.0E–8 to 6.0E–8 m^2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3,360.4 kPa.

The analysis of the CHi and CHir phases shows some inconsistencies, mainly caused by the fast recovery of the CHir phase. No further analysis is recommended.

6.3.10 Section 345.44–350.44 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. It takes about 9 minutes to get stable pressure conditions. Due to that, only the second part of the Chi phase was analysed. The injection rate decreased from 0.30 L/min at start of the CHi phase to 0.18 L/min at the end, indicating a relatively moderate interval transmissivity. The CHir phase shows very fast recovery. This phase is not analysable.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). An infinite acting homogeneous radial flow model was chosen for the analysis of the Chi phase. The analysis is presented in Appendix 2-58.

Selected representative parameters

The recommended transmissivity of 1.1E–7 m^2/s was derived from the analysis of the CHi phase. The confidence range for the interval transmissivity is estimated to be 7.0E–8 to 4.0E–7 m^2/s. The flow dimension displayed during the test is 2. The static pressure measured at the end of the recovery is 3,408.1 kPa.

No further analysis is recommended.

6.3.11 Section 350.45–355.45 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. The pressure in the bottom zone increased during the injection phase by 2 kPa, indicating a little connection to that section. The first part of the CHi phase is not analysable due to the time needed to regulate constant pressure. However, the second part of the CHi phase can be analysed quantitatively. The injection rate decreased from 10.01 L/min at start of the CHi phase to 7.74 L/min at the end, indicating a high interval transmissivity. The CHir phase shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase and the CHir phase show a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-59.

Selected representative parameters

The recommended transmissivity of 1.5E–5 m^2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 6.0E–6 to 4.0E–5 m^2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3,457.1 kPa.

The analysis of the CHi and CHir phases shows some inconsistency that should be resolved in case further analysis of the test is planned. In this case we recommend conducting a full superposition transient analysis in order to account for pressure history effects and changing flow rates during the CHi phase.

6.3.12 Section 355.47–360.47 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate decreased from 1.21 L/min at start of the CHi phase to 1.17 L/min at the end, indicating a relatively high interval transmissivity. The recovery phase (CHir) shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase and the CHir phase show a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). For the analysis of the CHi phase a radial composite flow model was chosen. An infinite acting homogeneous radial flow model with wellbore storage and skin was chosen for the analysis of the CHir phase. The analysis is presented in Appendix 2-60.

Selected representative parameters

The recommended transmissivity of 9.1E–6 m^2/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 1.0E–6 to 1.0E–7 m^2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3,506.4 kPa.

The analysis of the CHi and CHir phases shows some inconsistencies that should be resolved in case further analysis of the test is planned. In this case we recommend conducting a full superposition transient analysis in order to account for pressure history effects and changing flow rates during the CHi phase.

6.3.13 Section 360.47–365.47 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 195 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate control during the CHi phase was good. The injection rate decreased from 0.52 L/min at start of the CHi phase to 0.43 L/min at the end, indicating a moderate interval transmissivity. The CHir phase shows relatively fast recovery, however, the data is of good quality and as such, amenable for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase and the CHir phase show a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-61.

Selected representative parameters

The recommended transmissivity of 9.2E–7 m^2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 5.0E–7 to 2.0E–6 m^2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3,553.3 kPa.

The analysis of the CHi and CHir phases shows consistency. No further analysis is recommended.

6.3.14 Section 365.47–370.47 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. Due to the time needed to regulate constant pressure, the first part of the CHir phase is not analysable. The injection rate decreased from 22.5 mL/min at start of the CHi phase to 10.6 mL/min at the end, indicating a relatively low interval transmissivity. The CHir phase shows relatively fast recovery, however, the data is amenable for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase data does not allow a specific etermination of the flow dimension. The analysis was conducted assuming a flow dimension of 2 (radial flow). The CHir phase derivative is flat at late times, indicating radial flow. For the analysis of the CHi phase a radial composite flow model was chosen. An infinite acting homogeneous radial flow model was chosen for the analysis of the CHir phase. The analysis is presented in Appendix 2-62.

Selected representative parameters

The recommended transmissivity of 3.3E–9 m^2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The early time response of the CHi phase was regarded as skin, which is consistent with the CHir response. Due to the poor data quality, the confidence range for the interval transmissivity is estimated to be 2.0E–9 to 4.0E–8 m^2/s. The analysis was conducted using a flow dimension of 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3,599.9 kPa.

The analysis of the CHi and CHir phases shows some inconsistencies, caused by the poor data quylity. No further analysis is recommended.

6.3.15 Section 370.47–375.47 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 195 kPa, followed by a pressure recovery phase. The pressure in the section decreased during the injection phase by 16 kPa. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate decreased from 101 mL/min at start of the CHi phase to 64.2 mL/min at the end, indicating a relatively low interval transmissivity. The CHir phase shows very fast recovery, such that the analysis does not provide reliable results. The results should be regarded as order of magnitude only.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). The data the CHir phase does not allow for a specific determination of the flow dimension. This phase was analysed assuming a flow dimension of 2. An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-63.

Selected representative parameters

The recommended transmissivity of 5.2E–8 m^2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 3.0E–8 to 9.0E–8 m^2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3,647.1 kPa.

The analysis of the CHi and CHir phases shows some inconsistencies, essentially caused by the fast recovery of the CHir phase and from this resulting data quality of this phase.

6.3.16 Section 375.47–380.47 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 188 kPa, followed by a pressure recovery phase. The test was accomplished without using the automatic regulation system. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate decreased from 0.53 L/min at start of the CHi phase to 0.32 L/min at the end, indicating a moderate interval transmissivity. The CHir phase shows very fast recovery, such that the analysis does not provide reliable results. The results should be regarded as order of magnitude only.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase and the CHir phase show a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-64.

Selected representative parameters

The recommended transmissivity of 2.3E–7 m^2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 9.0E–8 to 4.0E–7 m^2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3,693.3 kPa.

The analysis of the CHi and CHir phases shows some inconsistency, essentially caused by the fast recovery of the CHir phase and from this resulting data quality of this phase.

6.3.17 Section 380.47–385.47 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 205 kPa, followed by a pressure recovery phase. The test was accomplished without using the automatic regulation system. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate control during the CHi phase was not very good. In addition, due to the small injection rates (low transmissivity) the rate measurements are relatively noisy. The injection rate decreased from 29.0 mL/min at start of the CHi phase to 19.6 mL/min at the end, indicating a relatively low interval transmissivity. The recovery phase (CHir) shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). The data of the CHir phase does not allow for a specific determination of the flow dimension. It was analysed assuming a flow dimension of 2. An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-65.

Selected representative parameters

The recommended transmissivity of 2.1E–8 m^2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 9.0E–9 to 4.0E–8 m^2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3,744.8 kPa.

The analysis of the CHi and CHir phases shows some inconsistencies, mainly caused of the fact, that no infinite acting radial flow was measured during the CHir phase. No further analysis is recommended.

6.3.18 Section 385.47–390.47 m, test no 1, pulse injection

Comments to test

The test was initiated as a constant pressure injection. However, after a few seconds of injection the rate quickly dropped to zero, indicating a very tight section. It was therefore decided to close the test valve and measure the pressure recovery. The pressure recovery was analysed as a pulse injection phase (Pi). No hydraulic connection between the test interval and the adjacent sections was observed.

During the brief injection phase a total volume of 1.72 mL was injected (derived from the flowmeter measurements. This injected volume produced a pressure increase of 200.9 kPa. Using a dV/dP approach, the wellbore storage coefficient relevant for the subsequent pressure recovery can be calculated to 8.5E–12 m^3/Pa. It should be noted though that there is large uncertainty connected with the determination of the wellbore storage coefficient (probably one order of magnitude), which will implicitly translate into uncertainty in the derived transmissivity.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow dimension cannot be determined with any degree of certainty. The test was analysed assuming a flow dimension of 2 (radial flow) and using a two shell radial composite flow model. Additionally the analysis was conducted using a flow dimension of 3 (spherical flow) and an infinite acting homogeneous flow model. The analysis is presented in Appendix 2-66.

Selected representative parameters

The recommended transmissivity of 8.3E–12 m^2/s was derived from the analysis of the PI phase, assuming a flow dimension of 2. Considering the inherent uncertainties related to the measurement (e.g. specially the measurement of the wellbore storage coefficient) and to the analysis process (e.g. numeric distortion when calculating the derivative and pressure history effects), the confidence range for the transmissivity is estimated to be 7E–12 to 5E–11 m^2/s. No static pressure could be derived.

The transmissivity derived from the alternative analysis assuming a flow dimension of 3 is 1.0E–12 m^2/s.

No further analysis is recommended.

6.3.19 Section 390.48–395.48 m, test no 1, pulse injection

Comments to test

The test was initiated as a constant pressure injection. However, after a few seconds of injection the rate quickly dropped to zero, indicating a very tight section. It was therefore decided to close the test valve and measure the pressure recovery. The pressure recovery was analysed as a pulse injection phase (PI). No hydraulic connection between the test interval and the adjacent sections was observed.

During the brief injection phase a total volume of 0.004 L was injected (derived from the flowmeter measurements. This injected volume produced a pressure increase of 204.0 kPa. Using a dV/dP approach, the wellbore storage coefficient relevant for the subsequent pressure recovery can be calculated to 2.0E–11 m^3/Pa. It should be noted though that there is large uncertainty connected with the determination of the wellbore storage coefficient (probably one order of magnitude), which will implicitly translate into uncertainty in the derived transmissivity.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow dimension cannot be determined with any degree of certainty. The test was analysed assuming a flow dimension of 2 (radial flow) and using a two shell radial composite flow model. Additionally the analysis was conducted using a flow dimension of 3 (spherical flow) and an infinite acting homogeneous flow model. The analysis is presented in Appendix 2-67.

Selected representative parameters

The recommended transmissivity of 8.7E–11 m^2/s was derived from the analysis of the PI phase assuming a flow dimension of 2. Considering the inherent uncertainties related to the measurement (e.g. specially the measurement of the wellbore storage coefficient) and to the analysis process (e.g. numeric distortion when calculating the derivative and pressure history effects), the confidence range for the transmissivity is estimated to be 7E–11 to 4E–10 m^2/s. No static pressure could be derived.

The transmissivity derived from the alternative analysis assuming a flow dimension of 3 is 1.0E–11 m^2/s.

No further analysis is recommended.

6.3.20 Section 395.48–400.48 m, test no 1, pulse injection

Comments to test

The test was initiated as a constant pressure injection. However, after a few seconds of injection the rate quickly dropped to zero, indicating a very tight section. It was therefore decided to close the test valve and measure the pressure recovery. No hydraulic connection between the test interval and the adjacent sections was observed.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow model cannot be determined. No analysis was performed due to the very poor data quality. The measured data is presented in Appendix 2-68.

Selected representative parameters

Based on the measured test data, the interval transmissivity is lower than 1E–10 m^2/s.

No further analysis recommended.

6.3.21 Section 400.48–405.48 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 214 kPa, followed by a pressure recovery phase. The test was accomplished without using the automatic regulation system. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate decreased from 41.6 mL/min at start of the CHi phase to 22.1 mL/min at the end, indicating a relatively low interval transmissivity. The CHir phase shows very fast recovery, such that the analysis does not provide reliable results. The results should be regarded as order of magnitude only.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the data quality does not allow for a specific determination of the flow dimension. The analysis was conducted assuming a flow dimension of 2 (radial flow). An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-69.

Selected representative parameters

The recommended transmissivity of 1.5E–8 m^2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 7.0E–9 to 4.0E–8 m^2/s. The analysis was conducted using a flow dimension of 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3,943.5 kPa.

The analysis of the CHi and CHir phases shows some inconsistencies, essentially caused by the fast recovery of the CHir phase.

6.3.22 Section 405.49–410.49 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 216 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. Due to the small injection rates (low transmissivity) the rate measurements are relatively noisy. The injection rate decreased from 21.0 mL/min at start of the CHi phase to 10.2 mL/min at the end, indicating a relatively low interval transmissivity. The CHir phase shows very fast recovery, such that the analysis does not provide reliable results. The results should be regarded as order of magnitude only.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the data quality does not allow for a specific determination of the flow dimension. The analysis was conducted assuming a flow dimension of 2 (radial flow). For the analysis of the CHi phase a radial composite flow model was chosen. An infinite acting homogeneous radial flow model was chosen for the analysis of the CHi phase. The analysis is presented in Appendix 2-70.

Selected representative parameters

The recommended transmissivity of 6.7E–9 m^2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 2.0E–9 to 8.0E–9 m^2/s. The analysis was conducted using a flow dimension of 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3,991.4 kPa.

The analysis of the CHi and CHir phases shows some inconsistencies, caused by the fast recovery of the CHir phase.

6.3.23 Section 410.50–415.50 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 215 kPa, followed by a pressure recovery phase. The test was accomplished without using the automatic regulation system. No hydraulic connection between test interval and the adjacent zones was observed. Due to the very small injection rates the rate measurements are relatively noisy. The injection rate decreased from 3.7 mL/min at start of the CHi phase to 1.7 mL/min at the end, indicating a very low interval transmissivity. The recovery phase (CHir) shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the data quality does not allow for a specific determination of the flow dimension. The analysis was conducted assuming a flow dimension of 2 (radial flow). An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-71.

Selected representative parameters

The recommended transmissivity of 9.3E–10 m^2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 8.0E–10 to 3.0E–9 m^2/s. The analysis was conducted using a flow dimension of 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 4,036.9 kPa.

The analysis of the CHi and CHir phases shows some inconsistencies, mainly caused by the fact, that IARF was not measured during the CHir phase and as such, the results of this phase are uncertain. No further analysis is recommended.

6.3.24 Section 415.51–420.51 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. Due to the time needed by the system to regulate stable pressure, the first part of the Chi phase is not analysable. The injection rate decreased from 0.50 L/min at start of the CHi phase to 0.44 L/min at the end, indicating a relatively moderate interval transmissivity. The CHir phase shows relatively fast recovery, however, the data is of good quality and as such, amenable for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the data quality of the CHi phase does not allow for a specific determination of the flow dimension. This phase was analysed assuming a flow dimension of 2 (radial flow) and a two shell composite flow model was chosen for this analysis. In addition, an alternative analysis of this phase was conducted assuming a flow dimension of 3 (spherical flow) and using an infinite acting homogeneous radial flow model. The CHir phase derivative is flat at late times, indicating a flow dimension of 2. For the analysis an infinite acting homogeneous radial flow model was chosen. The analysis is presented in Appendix 2-72.

Selected representative parameters

The recommended transmissivity of 2.4E–6 m^2/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. It should be noted that due to the above mentioned uncertainties regarding the flow dimension, the results are uncertain. The confidence range for the interval transmissivity is estimated to be 7.0E–7 to 5.0E–6 m^2/s. The analysis was conducted using a flow dimension of 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 4,087.5 kPa.

The transmissivity derived from the alternative analysis assuming a flow dimension of 3 is 2.9E–8 m^2/s.

The analysis of the CHi and CHir phases show some inconsistencies, mainly caused by the fast recovery and the uncertainties about the flow dimension. In case further analysis is planned, we recommend conducting a full superposition transient analysis in order to account for pressure history effects and changing flow rates during the CHi phase.

6.3.25 Section 420.51–425.51 m, test no 1, pulse injection

Comments to test

The test was initiated as a constant pressure injection. However, after a few seconds of injection the rate quickly dropped to zero, indicating a very tight section. It was therefore decided to close the test valve and measure the pressure recovery. The pressure recovery was analysed as a pulse injection phase (PI). No hydraulic connection between the test interval and the adjacent sections was observed.

During the brief injection phase a total volume of 1.24 mL was injected (derived from the flowmeter measurements. This injected volume produced a pressure increase of 198.1 kPa. Using a dV/dP approach, the wellbore storage coefficient relevant for the subsequent pressure recovery can be calculated to 6.3E–12 m^3/Pa. It should be noted though that there is large uncertainty connected with the determination of the wellbore storage coefficient (probably one order of magnitude), which will implicitly translate into uncertainty in the derived transmissivity.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow dimension cannot be determined with any degree of certainty. The derivative shows a downward trend at late times, which is indicative for a transition to a zone of higher transmissivity in some distance of the borehole or for a flow dimension of 3. The test was analysed assuming a flow dimension of 2 (radial flow) and using a two shell radial composite flow model. The analysis is presented in Appendix 2-73.

Selected representative parameters

The recommended transmissivity of 7.9E–11 m^2/s was derived from the analysis of the CHir phase assuming a flow dimension of 2. Considering the inherent uncertainties related to the measurement (e.g. specially the measurement of the wellbore storage coefficient) and to the analysis process (e.g. numeric distortion when calculating the derivative and pressure history effects), the confidence range for the transmissivity is estimated to be 5E–11 to 3E–10 No further analysis is recommended.

6.3.26 Section 425.51–430.51 m, test no 1, pulse injection

Comments to test

The test was initiated as a constant pressure injection. However, after a few seconds of injection the rate quickly dropped to zero, indicating a very tight section. It was therefore decided to close the test valve and measure the pressure recovery. The pressure recovery was analysed as a pulse injection phase (PI). No hydraulic connection between the test interval and the adjacent sections was observed.

During the brief injection phase a total volume of 1.58 mL was injected (derived from the flowmeter measurements. This injected volume produced a pressure increase of 200.0 kPa. Using a dV/dP approach, the wellbore storage coefficient relevant for the subsequent pressure recovery can be calculated to 7.9E–13 m^3/Pa. It should be noted though that there is large uncertainty connected with the determination of the wellbore storage coefficient (probably one order of magnitude), which will implicitly translate into uncertainty in the derived transmissivity.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow dimension cannot be determined with any degree of certainty. The test was analysed assuming a flow dimension of 2 (radial flow) and using a two shell radial composite flow model. Additionally the analysis was conducted using a flow dimension of 3 (spherical flow) and an infinite acting homogeneous flow model. The analysis is presented in Appendix 2-74.

Selected representative parameters

The recommended transmissivity of 1.2E–11 m^2/s was derived from the analysis of the PI phase assuming a flow dimension of 2. Considering the inherent uncertainties related to the measurement (e.g. specially the measurement of the wellbore storage coefficient) and to the analysis process (e.g. numeric distortion when calculating the derivative and pressure history effects), the confidence range for the transmissivity is estimated to be 8E–12 to 7E–11 m^2/s. No static pressure could be derived.

The transmissivity derived from the alternative analysis assuming a flow dimension of 3 is 1.4E–12 m^2/s.

No further analysis is recommended.

6.3.27 Section 430.51–435.51 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 212 kPa, followed by a pressure recovery phase. The test was accomplished without using the automatic regulation system. No hydraulic connection between test interval and the adjacent zones was observed. Due to the small injection rates the rate measurements are relatively noisy and the results of the analysis of the Chi phase should be regarded as order of magnitude only. The injection rate stayed during the entire injection phase relative stable at about 4.3 mL, indicating a very low interval transmissivity. The recovery phase (CHir) shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow dimension cannot be clearly derived from one of the phases. An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-75.

Selected representative parameters

The recommended transmissivity of 1.2E–8 m^2/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. Considering the low interval transmissivity the confidence range for the interval transmissivity is estimated to be 5.0E–9 to 3.0E–8 m^2/s. The analysis was conducted using a flow dimension of 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 4,239.7 kPa.

The analysis of the CHi and CHir phases shows some inconsistencies, mainly caused by the poor data quality of the Chi phase. No further analysis is recommended.

6.3.28 Section 435.50–440.50 m, test no 1, injection

Comments to test

The intention was to conduct the test as a constant pressure injection test phase (CHi), followed by a pressure recovery phase (CHir). However, after inflating the packers and closing the test valve, the pressure kept rising by 26 kPa in 30 minutes. This phenomenon is caused by prolonged packer expansion in a very tight section (T probably smaller than 1E–11 m^2/s). The test shows no hydraulic communication between the test interval and the adjacent zones. None of the test phases is analysable.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow model cannot be determined. No analysis was performed. The measured data is presented in Appendix 2-76.

Selected representative parameters

Based on the test response (prolonged packer compliance) the interval transmissivity is lower than 1E–11 m^2/s.

No further analysis recommended.

6.3.29 Section 440.50–445.50 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate decreased from 94.2 mL/min at start of the CHi phase to 61.2 mL/min at the end, indicating a relatively low interval transmissivity. The recovery phase (CHir) shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase and the CHir phase show a downward trend at late times indicating an increase of transmissivity at some distance from the borehole. For the analysis of both phases a radial composite flow model was chosen. The analysis is presented in Appendix 2-77.

Selected representative parameters

The recommended transmissivity of 4.0E–8 m^2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 1.0E–8 to 8.0E–8 m^2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 4,333.1 kPa.

The analysis of the CHi and CHir phases shows some inconsistencies that should be resolved in case further analysis of the test is planned. In this case we recommend conducting a full superposition transient analysis in order to account for pressure history effects and changing flow rates during the CHi phase.

6.3.30 Section 445.50–450.50 m, test no 1, pulse injection

Comments to test

The test was initiated as a constant pressure injection. However, after a few seconds of injection the rate quickly dropped to zero, indicating a very tight section. It was therefore decided to close the test valve and measure the pressure recovery. The pressure recovery was analysed as a pulse injection phase (PI). No hydraulic connection between the test interval and the adjacent sections was observed.

During the brief injection phase a total volume of 1.81 mL was injected (derived from the flowmeter measurements. This injected volume produced a pressure increase of 202.5 kPa. Using a dV/dP approach, the wellbore storage coefficient relevant for the subsequent pressure recovery can be calculated to 8.9E–12 m^3/Pa. It should be noted though that there is large uncertainty connected with the determination of the wellbore storage coefficient (probably one order of magnitude), which will implicitly translate into uncertainty in the derived transmissivity.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative is flat at late times, indicating a flow dimension of 2. There are uncertainties about the flow dimension, because the shape of the deconvolved pulse data is very sensitive to the assumed p* (static pressure) and pi (max pulse pressure) values of the test. The test was analysed assuming a flow dimension of 2 (radial flow) and using a two shell radial composite flow model. The analysis is presented in Appendix 2-78.

Selected representative parameters

The recommended transmissivity of 8.4E–12 m^2/s was derived from the analysis of the PI phase assuming a flow dimension of 2. Considering the inherent uncertainties related to the measurement (e.g. specially the measurement of the wellbore storage coefficient) and to the analysis process (e.g. numeric distortion when calculating the derivative and pressure history effects), the confidence range for the transmissivity is estimated to be 1E–12 to 1E–11 m^2/s. No static pressure could be derived.

No further analysis is recommended.

6.3.31 Section 450.50–455.50 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 209 kPa, followed by a pressure recovery phase. The test was accomplished without using the automatic regulation system. Due to the very small injection rates the rate measurements are very noisy. The injection rate decreased from 4.8 mL/min at start of the CHi phase to 2.3 mL/min at the end, indicating a low interval transmissivity. The recovery phase (CHir) shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow dimension cannot be clearly derived from one of the phases. The analysis was conducted assuming a flow dimension of 2 (radial flow).An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-79.

Selected representative parameters

The recommended transmissivity of 1.6E–9 m^2/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 8.0E–10 to 4.0E–9 m^2/s. The analysis was conducted assuming a flow dimension of 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 4,410.7 kPa.

The analysis of the CHi and CHir phases shows consistency. No further analysis is recommended.

6.3.32 Section 455.50–460.50 m, test no 1, pulse injection

Comments to test

The test was initiated as a constant pressure injection. However, after three minutes of injection the rate quickly dropped to zero, indicating a very tight section. It was therefore decided to close the test valve and measure the pressure recovery. The pressure recovery was analysed as a pulse injection phase (Pi).

During the brief injection phase a total volume of 9.89 mL was injected (derived from the flowmeter measurements. This injected volume produced a pressure increase of 201.0 kPa. Using a dV/dP approach, the wellbore storage coefficient relevant for the subsequent pressure recovery can be calculated to 4.9E–11 m^3/Pa. It should be noted though that there is large uncertainty connected with the determination of the wellbore storage coefficient (probably one order of magnitude), which will implicitly translate into uncertainty in the derived transmissivity.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the Pi phase shows a flat derivative at middle times, which is indicative of a flow dimension of 2 (radial flow). At late times it shows a sharp upward trend. The reason is unknown and this part was not analysed. For the analysis a radial composite flow model was chosen. The analysis is presented in Appendix 2-80.

Selected representative parameters

The recommended transmissivity of 1.3E–10 m^2/s was derived from the analysis of the Pi phase. It should be noted that due to the very low interval transmissivity the results are very uncertain. Considering the inherent uncertainties related to the measurement (e.g. specially the measurement of the wellbore storage coefficient) and to the analysis process (e.g. numeric distortion when calculating the derivative and pressure history effects), the confidence range for the transmissivity is estimated to be 3E–11 to 3E–10 m^2/s. The analysis was conducted using a flow dimension of 2. No static pressure could be derived.

6.3.33 Section 460.51–465.51 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 219 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. Due to the small injection rates the rate measurements are noisy and the results of the Chi phase should be regarded as order of magnitude only. The injection rate decreased from 3.1 mL/min at start of the CHi phase to 0.6 mL/min at the end, indicating a low interval transmissivity. The recovery phase (CHir) shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow dimension cannot be clearly derived from one of the phases. The analysis was conducted using a flow dimension of 2. For the analysis of the CHi phase a radial composite flow model was chosen. An infinite acting homogeneous radial flow model was chosen for the analysis of the CHir phase. The analysis is presented in Appendix 2-81.

Selected representative parameters

The recommended transmissivity of 3.1E–9 m^2/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. Concerning the low interval transmissivity, the confidence range for the interval transmissivity is estimated to be 6.0E–10 to 4.0E–9 m^2/s. The analysis was conducted using a flow dimension of 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 4,529.4 kPa.

The analysis of the CHi and CHir phases shows some inconsistencies, mainly caused by the poor data quality of the Chi phase. No further analysis is recommended.

6.3.34 Section 465.52–470.52 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 220 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate decreased from 17.5 mL/min at start of the CHi phase to 6.1 mL/min at the end, indicating a relatively low interval transmissivity. The recovery phase (CHir) shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow dimension cannot be clearly derived from one of the phases. A flow dimension of 2 was assumed. For the analysis of the Chi phase a radial composite flow model was chosen. An infinite acting radial flow model was chosen for the for the analysis of the CHir phase. The analysis is presented in Appendix 2-82.

Selected representative parameters

The recommended transmissivity of 6.2E–9 m^2/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. Considering the uncertainties concerning the flow dimension, the confidence range for the interval transmissivity is estimated to be 7.0E–10 to 7.0E–9 m^2/s. The analysis was conducted assuming a flow dimension of 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 4,570.1 kPa.

The analysis of the CHi and CHir phases shows consistency. No further analysis is recommended.

6.3.35 Section 470.52–475.52 m, test no 1, injection

Comments to test

The intention was to conduct the test as a constant pressure injection test phase (CHi), followed by a pressure recovery phase (CHir). However, after inflating the packers and closing the test valve, the pressure kept rising by 36 kPa in 30 minutes. This phenomenon is caused by prolonged packer expansion in a very tight section (T probably smaller than 1E–11 m^2/s). The test shows no hydraulic communication between the test interval and the adjacent zones. None of the test phases is analysable.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow model cannot be determined. No analysis was performed. The measured data is presented in Appendix 2-83.

Selected representative parameters

Based on the test response (prolonged packer compliance) the interval transmissivity is lower than 1E–11 m^2/s.

No further analysis recommended.

6.3.36 Section 475.52–480.52 m, test no 1, injection

Comments to test

The intention was to conduct the test as a constant pressure injection test phase (CHi), followed by a pressure recovery phase (CHir). However, after inflating the packers and closing the test valve, the pressure kept rising by 37 kPa in 30 minutes. This phenomenon is caused by prolonged packer expansion in a very tight section (T probably smaller than 1E–11 m^2/s). The test shows no hydraulic communication between the test interval and the adjacent zones. None of the test phases is analysable.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow model cannot be determined. No analysis was performed. The measured data is presented in Appendix 2-84.

Selected representative parameters

Based on the test response (prolonged packer compliance) the interval transmissivity is lower than 1E–11 m^2/s.

No further analysis recommended.

6.3.37 Section 480.52–485.52 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 217 kPa, followed by a pressure recovery phase. The test was accomplished without using the automatic regulation system. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate decreased from 65.6 mL/min at start of the CHi phase to 51.0 mL/min at the end, indicating a relatively low interval transmissivity. The CHir phase shows relatively fast recovery, however, the data is of good quality and as such, amenable for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a flat derivative at middle times, which is indicative of a flow dimension of 2 (radial flow). At late times it shows an upward trend, indicating a decrease of transmissivity at some distance from the borehole. The CHir phase shows a flat derivative at late times. For the analysis of the CHi phase a radial composite flow model was chosen. An infinite acting homogeneous radial flow model with wellbore storage and skin was chosen for the analysis of the CHir phase. The analysis is presented in Appendix 2-85.

Selected representative parameters

The recommended transmissivity of 1.1E–7 m^2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 7.0E–8 to 4.0E–7 m^2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 4,726.6 kPa.

The analysis of the CHi and CHir phases shows good consistency. No further analysis is recommended.

6.3.38 Section 505.55–510.55 m, test no 1, injection

Comments to test

The intention was to conduct the test as a constant pressure injection test phase (CHi), followed by a pressure recovery phase (CHir). However, after inflating the packers and closing the test valve, the pressure kept rising by 33 kPa in 35 minutes. This phenomenon is caused by prolonged packer expansion in a very tight section (T probably smaller than 1E–11 m^2/s). The test shows no hydraulic communication between the test interval and the adjacent zones. None of the test phases is analysable.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow model cannot be determined. No analysis was performed. The measured data is presented in Appendix 2-86.

Selected representative parameters

Based on the test response (prolonged packer compliance) the interval transmissivity is lower than 1E–11 m^2/s.

No further analysis recommended.

6.3.39 Section 510.56–515.56 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate decreased from 2.02 L/min at start of the CHi phase to 1.59 L/min at the end, indicating a relatively high interval transmissivity. The recovery phase (CHir) shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a downward trend at late times indicating an increase of transmissivity at some distance from the borehole or a flow dimension of 3. The CHir phase derivative is flat at middle times (radial flow) and shows a downward trend at late times, indicating an increase of transmissivity at some distance from the borehole. For the analysis of both phases a radial composite flow model was chosen. In addition, the Chi phase was analysed using a flow dimension of 3 and an infinite acting homogeneous radial flow model. The analysis is presented in Appendix 2-87.

Selected representative parameters

The recommended transmissivity of 2.4E–6 m^2/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 9.0E–7 to 5.0E–6 m^2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 5,026.6 kPa.

The transmissivity derived from the alternative analysis of the CHi phase using a flow dimension of 3 is 1.0E–7 m^2/s.

The analysis of the CHi and CHir phases shows some inconsistencies that should be resolved in case further analysis of the test is planned. In this case we recommend conducting a full superposition transient analysis in order to account for pressure history effects and changing flow rates during the CHi phase. There are uncertainties concerning the flow dimension.

6.3.40 Section 515.56–520.56 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 226 kPa, followed by a pressure recovery phase. The test was accomplished without using the automatic regulation system. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate decreased from 57.5 mL/min at start of the CHi phase to 42.5 mL/min at the end, indicating a relatively low interval transmissivity. The CHir phase shows very fast recovery, such that the analysis does not provide reliable results. The results should be regarded as order of magnitude only.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase and the CHir phase show a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). For the analysis of the CHi phase a radial composite flow model was chosen. An infinite acting homogeneous radial flow model was chosen for the analysis of the CHir phase. The analysis is presented in Appendix 2-88.

Selected representative parameters

The recommended transmissivity of 4.5E–8 m^2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 9.0E–9 to 5.0E–8 m^2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 5,077.1 kPa.

The analysis of the CHi and CHir phases shows some inconsistencies, essentially caused by the fast recovery of the CHir phase. No further analysis is recommended.

6.3.41 Section 520.57–525.57 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. After 12 minutes an abrupt drop down of the flow rate from 0.355 L/min to 0.339 L/min was observed, the reason for this is unknown, the pressure in the section stayed stable. The second part of the CHi phase was not part of the analysis. The injection rate decreased during the entire injection phase from 0.46 L/min at start of the CHi phase to 0.33 L/min at the end, indicating a moderate interval transmissivity. The CHir phase shows very fast recovery, such that the analysis does not provide reliable results. The results should be regarded as order of magnitude only.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a downward trend at late times indicating an increase of transmissivity at some distance from the borehole or a flow dimension of 3 (spherical flow). The CHir phase derivative is flat at late times, which is indicative of a flow dimension of 2 (radial flow). For the analysis of the CHi phase a radial composite flow model was chosen. In addition the analysis was conducted using a flow dimension of 3. An infinite acting homogeneous radial flow model was chosen for the analysis of the CHir phase. The analysis is presented in Appendix 2-89.

Selected representative parameters

The recommended transmissivity of 2.7E–7 m^2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 9.0E–8 to 5.0E–7 m^2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 5,125.2 kPa.

The transmissivity derived from the alternative analysis of the CHi phase using a flow dimension of 3 is 2.2E–8 m^2/s.

The analysis of the CHi and CHir phases shows some inconsistencies that should be resolved in case further analysis of the test is planned. In this case we recommend conducting a full superposition transient analysis in order to account for pressure history effects and changing flow rates during the CHi phase. There are uncertainties concerning the flow dimension.

6.3.42 Section 545.62–550.62 m, test no 1, injection

Comments to test

The intention was to conduct the test as a constant pressure injection test phase (CHi), followed by a pressure recovery phase (CHir). However, after inflating the packers and closing the test valve, the pressure kept rising by 190 kPa in 23 minutes to decrease again slowly without stabilization. This phenomenon is caused by prolonged packer expansion in a very tight section (T probably smaller than 1E–11 m^2/s). The test shows no hydraulic communication between the test interval and the adjacent zones. None of the test phases is analysable.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow model cannot be determined. No analysis was performed. The measured data is presented in Appendix 2-90.

Selected representative parameters

Based on the test response (prolonged packer compliance) the interval transmissivity is lower than 1E–11 m^2/s.

No further analysis recommended.

6.3.43 Section 550.62–555.62 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 225 kPa, followed by a pressure recovery phase. The test was accomplished without using the automatic regulation system. No hydraulic connection between test interval and the adjacent zones was observed. Due to the very small injection rates, the rate measurements are very noisy. The injection rate decreased from 5.70 mL/min at start of the CHi phase to 1.90 mL/min at the end, indicating a low interval transmissivity. The recovery phase (CHir) shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). The data of the CHir phase does not allow for a specific determination of the flow dimension. It was analysed assuming a flow dimension of 2. For the analysis of the CHi phase a radial composite flow model was chosen. An infinite acting homogeneous radial flow model was chosen for the analysis of the Chir phase. The analysis is presented in Appendix 2-91.

Selected representative parameters

The recommended transmissivity of 2.8E–9 m^2/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. It should be noted that due to the low flow rate the results are uncertain. The confidence range for the interval transmissivity is estimated to be 7.0E–10 to 4.0E–9 m^2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 5,409.3 kPa.

The analysis of the CHi and CHir phases shows inconsistencies, mainly caused by the noisy data of the Chi phase and the fact, that IARF was not measured during the CHir phase. No further analysis is recommended.

6.3.44 Section 555.63–560.63 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 225 kPa, followed by a pressure recovery phase. The test was accomplished without using the automatic regulation system. No hydraulic connection between test interval and the adjacent zones was observed. Due to the very small injection rates the rate measurements are noisy. The injection rate decreased from 3.28 mL/min at start of the CHi phase to 1.01 mL/min at the end, indicating a low interval transmissivity. The recovery phase (CHir) shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow dimension cannot be clearly derived from one of the phases. The analysis was conducted assuming a flow dimension of 2 (radial flow). An infinite acting homogeneous radial flow model was chosen for the analysis of the Chi phase and the CHir phase. The analysis is presented in Appendix 2-92.

Selected representative parameters

The recommended transmissivity of 1.3E–9 m^2/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. Due to the low flow rate and the uncertainties concerning the flow dimension, the results are relative uncertain. The confidence range for the interval transmissivity is estimated to be 5.0E–10 to 3.0E–9 m^2/s. The analysis was conducted assuming a flow dimension of 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 5,449.0 kPa.

The analysis of the CHi and CHir phases shows some inconsistencies, this being mainly caused by the very low interval transmissivity and the test design which was not optimized for this transmissivity range. No further analysis is recommended.

No further analysis is recommended.

6.3.45 Section 560.63–565.63 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 221 kPa, followed by a pressure recovery phase. The test was accomplished without using the automatic regulation system. No hydraulic connection between test interval and the adjacent zones was observed. Due to the very small injection rates the rate measurements are noisy. The injection rate decreased from 2.33 mL/min at start of the CHi phase to 0.29 mL/min at the end, indicating a low interval transmissivity. The recovery phase (CHir) shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow dimension cannot be clearly derived from one of the phases. The analysis was conducted assuming a flow dimension of 2 (radial flow). For the analysis of the CHi phase a radial composite flow model was chosen. An infinite acting homogeneous radial flow model was chosen for the analysis of the CHir phase. The analysis is presented in Appendix 2-93.

Selected representative parameters

The recommended transmissivity of 1.2E–9 m^2/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. It should be noted that due to the very low flow rate and the uncertainties concerning the flow dimension, the results are uncertain. The confidence range for the interval transmissivity is estimated to be 1.0E–10 to 2.0E–9 m^2/s. The analysis was conducted assuming a flow dimension of 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 5,507.0 kPa.

The analysis of the CHi and CHir phases shows inconsistencies, this being mainly caused by the very low interval transmissivity and the test design which was not optimized for this transmissivity range. No further analysis is recommended. No further analysis is recommended.

6.3.46 Section 565.64–570.64 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 212 kPa, followed by a pressure recovery phase. The test was accomplished without using the automatic regulation system. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate decreased from 0.34 L/min at start of the CHi phase to 0.28 L/min at the end, indicating a relatively moderate interval transmissivity. The CHir phase shows relatively fast recovery, however, the data is of good quality and as such, amenable for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase and the CHir phase show a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-94.

Selected representative parameters

The recommended transmissivity of 5.8E–7 m^2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 3.0E–7 to 6.0E–7 m^2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 5,558.4 kPa.

The analysis of the CHi and CHir phases shows good consistency. No further analysis is recommended.

6.3.47 Section 570.64–575.64 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 215 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate control during the CHi phase was not very good. In addition, due to the small injection rates (low transmissivity) the rate measurements are relatively noisy. The injection rate decreased from 114.5 mL/min at start of the CHi phase to 88.1 mL/min at the end, indicating a relatively low interval transmissivity. The CHir phase shows very fast recovery, such that the analysis does not provide reliable results. The results should be regarded as order of magnitude only.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows an upward trend at late times, which is indicative for a decrease of transmissivity at some distance from the borehole or a change to a flow dimension below 2. The analysis was conducted assuming a flow dimension of 2. The data of the CHir phase does not allow for a specific determination of the flow dimension. Again a flow dimension of 2 was assumed. For the analysis of the CHi phase a radial composite flow model was chosen. An infinite acting homogeneous radial flow model was chosen for the analysis of the CHir phase. The analysis is presented in Appendix 2-95.

Selected representative parameters

The recommended transmissivity of 1.7E–7 m^2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 7.0E–8 to 4.0E–7 m^2/s. The analysis was conducted assuming a flow dimension of 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 5,609.7 kPa.

The analysis of the CHi and CHir phases shows some inconsistencies, mainly caused by the fast recovery of the CHir phase and the uncertainties concerning the flow dimension. In case further analysis of the test is planned, we recommend conducting a full superposition transient analysis in order to account for pressure history effects and changing flow rates during the CHi phase.

6.3.48 Section 575.65–580.65 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 198 kPa, followed by a pressure recovery phase. Due to the time needed to regulate stable pressure, the first part is not analysable. The pressure in the section below rose by 5 kPa during the injection phase, indicating a little connection to the section. The injection rate decreased from 0.59 L/min at start of the CHi phase to 0.38 L/min at the end, indicating a relatively moderate transmissivity. The CHir phase shows relatively fast recovery, however, the data is of good quality and as such, amenable for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase and the CHir phase show a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-96.

Selected representative parameters

The recommended transmissivity of 9.0E–7 m^2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 6.0E–7 to 2.0E–6 m^2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 5,658.4 kPa.

The analysis of the CHi and CHir phases shows consistency. No further analysis is recommended.

6.3.49 Section 580.65–585.65 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 201 kPa, followed by a pressure recovery phase. A little hydraulic connection between the test section and the section above is assumed (see test no 104). The injection rate control during the CHi phase was not very good. The results derived from the Chi phase are uncertain. The injection rate decreased from 0.43 L/min at start of the CHi phase to 0.31 L/min at the end, indicating a moderate low interval transmissivity. The CHir phase shows very fast recovery, such that the analysis does not provide reliable results. The results should be regarded as order of magnitude only.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow dimension cannot be clearly derived from one of the phases. A flow dimension of 2 was assumed. An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-97.

Selected representative parameters

The recommended transmissivity of 3.3E–7 m^2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 8.0E–8 to 6.0E–7 m^2/s. The analysis was conducted assuming a flow dimension of 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 5,711.9 kPa.

The analysis of the CHi and CHir phases shows some inconsistencies, mainly caused y the fast recovery if the CHir phase. No further analysis is recommended.

6.3.50 Section 585.67–590.67 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 217 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate control during the CHi phase was not very good. The injection rate decreased from 0.27 L/min at start of the CHi phase to 0.16 L/min at the end, indicating a relatively moderate interval transmissivity. The CHir phase shows very fast recovery, such that the analysis does not provide reliable results. The results should be regarded as order of magnitude only.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a flat derivative at early and middle times, which is indicative of a flow dimension of 2 (radial flow). At late times the derivative shows an upward trend. The CHir phase derivative is flat at late times, indicating radial flow. For the analysis of the CHi phase a radial composite flow model was chosen. An infinite acting homogeneous radial flow model was chosen for the analysis of the CHir phase. The analysis is presented in Appendix 2-98.

Selected representative parameters

The recommended transmissivity of 2.1E–7 m^2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 8.0E–8 to 5.0E–7 m^2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 5,762.3 kPa.

The analysis of the CHi and CHir phases shows some inconsistency, essentially caused by the fast recovery of the CHir phase and from this resulting data quality of this phase.

6.3.51 Section 590.67–595.67 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. Due to the small injection rates, the rate measurements are relatively noisy. The injection rate decreased from 17.0 mL/min at start of the CHi phase to 7.2 mL/min at the end, indicating a relatively low interval transmissivity. The CHir phase shows very fast recovery, such that the analysis does not provide reliable results. The results should be regarded as order of magnitude only.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow dimension cannot be clearly derived from one of the phases. The analysis was conducted assuming a flow dimension of 2. For the analysis of the CHi phase a radial composite flow model was chosen. An infinite acting homogeneous radial flow model was chosen for the analysis of the CHir phase. The analysis is presented in Appendix 2-99.

Selected representative parameters

The recommended transmissivity of 6.1E–9 m^2/s was derived from the analysis of the CHi phase. Due to the fast recovery and the noisy data of the Chi phase, the results are uncertain. The confidence range for the interval transmissivity is estimated to be 1.0E–9 to 9.0E–9 m^2/s. The analysis was conducted assuming a flow dimension of 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 5,811.9 kPa.

The analysis of the CHi and CHir phases shows some inconsistencies, due to the problems mentioned above. No further analysis is recommended.

6.3.52 Section 595.69–600.69 m, test no 1, injection

Comments to test

The intention was to conduct the test as a constant pressure injection test phase (CHi), followed by a pressure recovery phase (CHir). However, after inflating the packers and closing the test valve, the pressure kept rising by 234 kPa in 14 minutes to decrease after that slowly without stabilization. This phenomenon is caused by prolonged packer expansion in a very tight section (T probably smaller than 1E–11 m^2/s). The test shows no hydraulic communication between the test interval and the adjacent zones. None of the test phases is analysable.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow model cannot be determined. No analysis was performed. The measured data is presented in Appendix 2-100.

Selected representative parameters

Based on the test response (prolonged packer compliance) the interval transmissivity is lower than 1E–11 m^2/s.

No further analysis recommended.

6.3.53 Section 600.69–605.69 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. The pressure below the section increased by 2 kPa, indicating a slight connection between the test section and the section below. The injection rate control during the CHi phase was good, although it was noisy. The injection rate decreased from 1.55 L/min at start of the CHi phase to 0.96 L/min at the end, indicating a relatively high interval transmissivity. The recovery phase (CHir) shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase and the CHir phase show a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). An infinite acting homogeneous radial flow model was chosen for the analysis of the CHi phase. For the analysis of the CHir phase a radial composite flow model was chosen. The analysis is presented in Appendix 2-101.

Selected representative parameters

The recommended transmissivity of 9.2E–7 m^2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 7.0E–7 to 3.0E–6 m^2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 5,907.7 kPa.

The analysis of the CHi and CHir phases shows consistency. No further analysis is recommended.

6.3.54 Section 605.69–610.69 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 230 kPa, followed by a pressure recovery phase. The pressure in the section below increased by 2 kPa, which indicates a little connection to the test section. Due to the time needed by the system, the first part (first minute) of the CHi phase is not analysable. The injection rate decreased from 0.50 L/min at start of the CHi phase to 0.30 L/min at the end, indicating a relatively moderate interval transmissivity. The CHir phase shows very fast recovery, such that the analysis does not provide reliable results. The results should be regarded as order of magnitude only.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). At middle times it shows a downward trend, indicating an increase in transmissivity at some distance from the borehole. The data quality of the CHir phase is poor and as such not amenable to derive a flow dimension from this phase. The analysis was conducted assuming a flow dimension of 2. For the analysis of the CHi phase a two shell radial composite flow model was chosen. An infinite acting homogeneous radial flow model was chosen for the analysis of the CHir phase. The analysis is presented in Appendix 2-102.

Selected representative parameters

The recommended transmissivity of 2.9E–7 m^2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 1.0E–7 to 7.0E–7 m^2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 5,956.1 kPa.

6.3.55 Section 610.70–615.70 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate decreased from 0.14 L/min at start of the CHi phase to 0.12 L/min at the end, indicating a relatively moderate interval transmissivity. The CHir phase shows very fast recovery, such that the analysis does not provide reliable results. The results should be regarded as order of magnitude only.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a flat derivative at middle times, which is indicative of a flow dimension of 2 (radial flow). At the end it shows a sharp upward trend, caused by the noisy data. This part was not analysed. The data quality of the CHir phase does not allow for a specific determination of the flow dimension. An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-103.

Selected representative parameters

The recommended transmissivity of 2.6E–7 m^2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 9.0E–8 to 6.0E–7 m^2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 6,003.1 kPa.

The analysis of the CHi and CHir phases shows some inconsistencies, mainly caused by the fast recovery of the CHir phase. No further analysis is recommended.

The analysis of the CHi and CHir phases shows some inconsistencies, mainly caused by the fast recovery of the CHir phase. In case further analysis of this test is planned, we recommend conducting a full superposition transient analysis in order to account for pressure history effects and changing flow rates during the CHi phase.

6.3.56 Section 615.70–620.70 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. The pressure in the section below rose during the injection phase by 6 kPa, indicating a hydraulic connection to the test section. Due to this there is an uncertainty connected with the determination of the transmissivity. The data of the CHir phase are relatively noisy, however, they are still adequate for quantitative analysis. The injection rate decreased from 0.99 L/min at start of the CHi phase to 0.85 L/min at the end, indicating a relatively high interval transmissivity. The CHir phase shows very fast recovery, such that the analysis does not provide reliable results. The results should be regarded as order of magnitude only.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a flat derivative at middle and late times, which is indicative of a flow dimension of 2 (radial flow). The data of the CHir phase does not allow for a specific determination of the flow dimension. An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-104.

Selected representative parameters

The recommended transmissivity of 1.7E–6 m^2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 6.0E–7 to 4.0E–6 m^2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 6,050.3 kPa.

The analysis of the CHi and CHir phases shows some inconsistencies, mainly caused by the fast recovery of the CHir phase. No further analysis is recommended.

6.3.57 Section 620.71–625.71 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. A hydraulic connection between test interval and the zone below was observed. The injection rate decreased from 0.59 L/min at start of the CHi phase to 0.49 L/min at the end, indicating a relatively moderate interval transmissivity. The CHir phase shows very fast recovery, such that the analysis does not provide reliable results. The results should be regarded as order of magnitude only.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). The data quality of the CHir phase does not allow for a specific determination of the flow dimension. A flow dimension of 2 was assumed. An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-105.

Selected representative parameters

The recommended transmissivity of 5.5E–7 m^2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 2.0E–7 to 9.0E–7 m^2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 6,096.4 kPa.

The analysis of the CHi and CHir phases shows some inconsistencies, mainly caused by the fast recovery of the CHir phase. No further analysis is recommended.

6.3.58 Section 625.71–630.71 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. Hydraulic connection between test interval and the zone above (see test no 113). The injection rate decreased from 2.32 L/min at start of the CHi phase to 1.76 L/min at the end, indicating a relatively high interval transmissivity. The recovery phase (CHir) shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase and the CHir phase show a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-106.

Selected representative parameters

The recommended transmissivity of 3.1E–6 m^2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 9.0E–7 to 6.0E–6 m^2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 6,145.4 kPa.

The analysis of the CHi and CHir phases shows good consistency. No further analysis is recommended.

6.3.59 Section 630.72–635.72 m, test no 1, injection

Comments to test

The intention was to conduct the test as a constant pressure injection test phase (CHi), followed by a pressure recovery phase (CHir). However, after inflating the packers and closing the test valve, the pressure kept rising by 17 kPa in 30 minutes. This phenomenon is caused by prolonged packer expansion in a very tight section (T probably smaller than 1E–11 m^2/s). The test shows no hydraulic communication between the test interval and the adjacent zones. None of the test phases is analysable.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow model cannot be determined. No analysis was performed. The measured data is presented in Appendix 2-107.

Selected representative parameters

Based on the test response (prolonged packer compliance) the interval transmissivity is lower than 1E–11 m^2/s.

No further analysis recommended.

6.3.60 Section 635.72–640.72 m, test no 1, injection

Comments to test

The intention was to conduct the test as a constant pressure injection test phase (CHi), followed by a pressure recovery phase (CHir). However, after inflating the packers and closing the test valve, the pressure kept rising by 200 kPa in 30 minutes. This phenomenon is caused by prolonged packer expansion in a very tight section (T probably smaller than 1E–11 m^2/s). The test shows no hydraulic communication between the test interval and the adjacent zones. None of the test phases is analysable.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow model cannot be determined. No analysis was performed. The measured data is presented in Appendix 2-108.

Selected representative parameters

Based on the test response (prolonged packer compliance) the interval transmissivity is lower than 1E–11 m^2/s.

No further analysis recommended.

6.3.61 Section 640.73–645.73 m, test no 1, injection

Comments to test

The intention was to conduct the test as a constant pressure injection test phase (CHi), followed by a pressure recovery phase (CHir). However, after inflating the packers and closing the test valve, the pressure kept rising by 48 kPa in 30 minutes. This phenomenon is caused by prolonged packer expansion in a very tight section (T probably smaller than 1E–11 m^2/s). The test shows no hydraulic communication between the test interval and the adjacent zones. None of the test phases is analysable.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow model cannot be determined. No analysis was performed. The measured data is presented in Appendix 2-109.

Selected representative parameters

Based on the test response (prolonged packer compliance) the interval transmissivity is lower than 1E–11 m^2/s.

No further analysis recommended.

6.3.62 Section 645.73–650.73 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 212 kPa, followed by a pressure recovery phase. The test was accomplished without using the automatic regulation system. No hydraulic connection between test interval and the adjacent zones was observed. Due to the small injection rates the rate measurements are relatively noisy. The injection rate decreased from about 5 mL/min at start of the CHi phase to about 4 mL/min at the end, indicating a low interval transmissivity. The recovery phase (CHir) shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test due to the very low flow rate, the data quality does not allow for a specific determination of the flow dimension. The analysis was conducted assuming a flow dimension of 2. An infinite acting homogeneous radial flow model was chosen for the analysis of the CHi and the CHir phase. The analysis is presented in Appendix 2-110

Selected representative parameters

The recommended transmissivity of 2.8E–9 m^2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 7.0E–10 to 5.0E–9 m^2/s. The analysis was conducted assuming a flow dimension of 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 6,343.5 kPa.

The analysis of the CHi and CHir phases show some inconsistencies, this being mainly caused by the very low interval transmissivity and the test design which was not optimized for this transmissivity range. No further analysis is recommended.

6.3.63 Section 650.74–655.74 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 205 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. Due to the small injection rates the rate measurements are relatively noisy. The injection rate decreased from 1.4 mL/min at start of the CHi phase to 0.13 mL/min at the end, indicating a very low interval transmissivity. The recovery phase (CHir) shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow dimension cannot be clearly derived from one of the phases. A flow dimension of 2 was assumed. An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-111.

Selected representative parameters

The recommended transmissivity of 2.0E–10 m^2/s was derived from the analysis of the CHir phase (inner zone), which shows the best data and derivative quality. It should be noted that due to the very small transmissivity the results are uncertain..The confidence range for the interval transmissivity is estimated to be 8.0E–11 to 6.0E–10 m^2/s. The analysis was conducted assuming a flow dimension of 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 6,387.2 kPa.

The analysis of the CHi and CHir phases shows consistency. No further analysis is recommended.

6.3.64 Section 655.75–660.75 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 212 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. Due to the small injection rates the rate measurements are relatively noisy and the results of the analysis of the CHi phase should be regarded as order of magnitude only. The injection rate decreased from 1.32 mL/min at start of the CHi phase to 0.13 mL/min at the end, indicating a very interval transmissivity. The recovery phase (CHir) shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow dimension cannot be clearly derived from one of the phases. The analysis was conducted assuming a flow dimension of 2. An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-112

Selected representative parameters

The recommended transmissivity of 2.1E–10 m^2/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. It should be noted that due to the very small transmissivity the results are uncertain. The confidence range for the interval transmissivity is estimated to be 7.0E–11 to 6.0E–10 m^2/s. The analysis was conducted assuming a flow dimension of 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 6,441.5 kPa.

The analysis of the CHi and CHir phases show some inconsistencies, mainly caused by the noisy data of the CHi phase and the very small transmissivity. No further analysis is recommended.

6.3.65 Section 660.75–665.75 m, test no 1, injection

Comments to test

The intention was to conduct the test as a constant pressure injection test phase (CHi), followed by a pressure recovery phase (CHir). However, after inflating the packers and closing the test valve, the pressure kept rising by 24 kPa in 30 minutes. This phenomenon is caused by prolonged packer expansion in a very tight section (T probably smaller than 1E–11 m^2/s). The test shows no hydraulic communication between the test interval and the adjacent zones. None of the test phases is analysable.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow model cannot be determined. No analysis was performed. The measured data is presented in Appendix 113.

Selected representative parameters

Based on the test response (prolonged packer compliance) the interval transmissivity is lower than 1E–11 m^2/s.

No further analysis recommended.

6.3.66 Section 665.76–670.76 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. A hydraulic connection between test interval and the bottom zone was observed. The injection rate control during the CHi phase was not good and the rate measurements are relatively noisy. The injection rate decreased from 0.12 L/min at start of the CHi phase to 0.10 L/min at the end, indicating a relatively moderate interval transmissivity. The recovery phase (CHir) shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHir phase shows a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-114.

Selected representative parameters

The recommended transmissivity of 1.9E–7 m^2/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 8.0E–8 to 5.0E–7 m^2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 6,538.0 kPa.

The analysis of the CHi and CHir phases shows consistency. No further analysis is recommended.

6.3.67 Section 670.76–675.76 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate decreased from 0.21 L/min at start of the CHi phase to 0.14 L/min at the end, indicating a relatively moderate interval transmissivity. The recovery phase (CHir) shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). The CHir phase derivative shows an upward trend at middle times and a downward trend at late times indicating changes of transmissivity at some distance from the borehole. The upward trend at late times was not analysed. An infinite acting homogeneous radial flow model was chosen for the analysis of the CHi phase. For the analysis of the CHir phase a radial composite flow model was chosen. The analysis is presented in Appendix 115.

Selected representative parameters

The recommended transmissivity of 1.6E–7 m^2/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 8.0E–8 to 4.0E–7 m^2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 6,591.1 kPa.

The analysis of the CHi and CHir phases shows consistency. No further analysis is recommended.

6.3.68 Section 675.77–680.75 m, test no 1, pulse injection

Comments to test

The test was initiated as a constant pressure injection. However, after a few seconds of injection the rate quickly dropped to zero, indicating a very tight section. It was therefore decided to close the test valve and measure the pressure recovery. The pressure recovery was analysed as a pulse injection phase (Pi).

During the brief injection phase a total volume of 1.8 mL was injected (derived from the flowmeter measurements. This injected volume produced a pressure increase of 213.0 kPa. Using a dV/dP approach, the wellbore storage coefficient relevant for the subsequent pressure recovery can be calculated to 8.4E–12 m^3/Pa. It should be noted though that there is large uncertainty connected with the determination of the wellbore storage coefficient (probably one order of magnitude), which will implicitly translate into uncertainty in the derived transmissivity.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the Pi phase shows a flat derivative at middle times, which is indicative of a flow dimension of 2 (radial flow). At late times it shows a downward trend, indicating an increase of transmissivity at some distance from the borehole. For the analysis a radial composite flow model was chosen. The analysis is presented in Appendix 2-116.

Selected representative parameters

The recommended transmissivity of 2.7E–10 m^2/s was derived from the analysis of the Pi phase. The confidence range for the interval transmissivity is estimated to be 8.0E–11 to 6.0E–10 m^2/s. It should be noted that due to the very low interval transmissivity the results are very uncertain. The flow dimension displayed during the test is 2. No static pressure could be derived.

6.3.69 Section 680.78–685.78 m, test no 1, pulse injection

Comments to test

The test was initiated as a constant pressure injection. However, after a few seconds of injection the rate quickly dropped to zero, indicating a very tight section. It was therefore decided to close the test valve and measure the pressure recovery. The pressure recovery was analysed as a pulse injection phase (Pi).

During the brief injection phase a total volume of 4.96 mL was injected (derived from the flowmeter measurements. This injected volume produced a pressure increase of 212.0 kPa. Using a dV/dP approach, the wellbore storage coefficient relevant for the subsequent pressure recovery can be calculated to 2.3E–11 m^3/Pa. It should be noted though that there is large uncertainty connected with the determination of the wellbore storage coefficient (probably one order of magnitude), which will implicitly translate into uncertainty in the derived transmissivity.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the Pi phase shows a flat derivative at middle times, which is indicative of a flow dimension of 2 (radial flow). At late times it shows an upward trend indicating a decrease of transmissivity at some distance from the borehole. For the analysis a radial composite flow model was chosen. The analysis is presented in Appendix 2-117.

Selected representative parameters

The recommended transmissivity of 3.1E–9 m^2/s was derived from the analysis of the Pi phase. Considering the inherent uncertainties related to the measurement (e.g. specially the measurement of the wellbore storage coefficient) and to the analysis process (e.g. numeric distortion when calculating the derivative and pressure history effects), the confidence range for the transmissivity is estimated to be 5E–10 to 5E–9 m^2/s. The flow dimension displayed during the test is 2. No static pressure could be derived.

7 Synthesis

The synthesis chapter summarizes the basic test parameters and analysis results. In addition, the correlation between steady state and transient transmissivities as well as between the matched and the theoretical wellbore storage (WBS) coefficient are presented and discussed.

7.1 Summary of results

Table 7-1. General test data from constant head injection tests in KLX04.

Borehole secup (m)	Borehole seclow (m)	Date and time for test, start YYYYMMDD hh:mm	Date and time for test, stop YYYYMMDD hh:mm	Q_p (m^3/s)	Q_m (m^3/s)	tp (s)	t_F (s)	p_0 (kPa)	p_i (kPa)	p_p (kPa)	p_F (kPa)	Te_w (°C)	Test phases measured Analysed test phases marked bold	
105.11	205.11	20040820 09:59	20040820 12:44	1.68E–04	1.74E–04	1800	1800	1986	1986	2181	1986	9.47	CHi	CHir
205.34	305.34	20040820 14:50	20040820 16:01	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	11.18	CHi	CHir
205.34	305.34	20040820 16:11	20040820 17:40	4.60E–04	4.93E–04	1800	600	2965	2966	2987	2967	11.32	CHi	CHir
305.41	405.41	20040821 08:14	20040821 10:33	1.64E–04	1.72E–04	1800	1800	3944	3943	4146	3945	13.08	CHi	CHir
405.49	505.49	20040821 11:48	20040821 13:37	8.41E–06	8.76E–06	1800	1200	4926	4926	5126	4926	14.63	CHi	CHir
505.55	605.55	20040821 14:57	20040821 16:40	5.78E–05	6.18E–05	1800	1200	5909	5906	6106	5907	16.31	CHi	CHir
605.69	705.69	20040822 08:12	20040822 10:01	4.60E–05	4.78E–05	1800	1500	6884	6881	7082	6884	18.08	CHi	CHir
705.81	805.81	20040822 11:37	20040822 13:58	#NV	#NV	18	5400	7866	7876	8104	7980	19.66	Pi	-
805.98	905.98	20040822 15:17	20040822 17:26	8.57E–07	1.01E–06	2700	1800	8844	8840	9040	8842	21.32	CHi	CHir
886.11	986.11	20040823 08:00	20040823 09:52	1.49E–05	1.50E–05	1800	1800	9627	9620	9819	9637	22.60	CHi	CHir
105.21	125.21	20040824 07:29	20040824 08:57	5.00E–05	5.23E–05	1200	1200	1205	1209	1410	1209	8.62	CHi	CHir
125.25	145.25	20040824 09:54	20040824 11:20	3.05E–06	3.13E–06	1200	1200	1401	1402	1602	1402	8.84	CHi	CHir
145.30	165.30	20040824 21:02	20040824 22:45	7.20E–07	8.02E–07	1200	1200	1597	1598	1798	1598	9.20	CHi	CHir
165.30	185.30	20040824 23:44	20040825 01:18	8.97E–06	9.70E–06	1200	1200	1793	1793	1993	1793	9.48	CHi	CHir
185.32	205.32	20040825 06:35	20040825 08:06	9.69E–05	1.05E–04	1200	1200	1988	1987	2188	1986	9.72	CHi	CHir
205.34	225.34	20040825 08:49	20040825 10:26	4.67E–04	4.84E–04	1200	1200	2182	2182	2283	2184	9.98	CHi	CHir
225.35	245.35	20040825 11:23	20040825 14:01	1.08E–05	4.25E–05	1200	1200	2379	2376	2576	2378	10.38	CHi	CHir
245.38	265.38	20040830 07:53	20040830 09:17	2.73E–04	2.85E–04	1200	1200	2576	2576	2777	2576	10.52	CHi	CHir
265.38	285.38	20040830 09:53	20040830 10:59	9.17E–06	9.62E–06	1200	1200	2772	2772	2976	2771	10.82	CHi	CHir
285.40	305.40	20040825 22:12	20040826 01:14	4.12E–04	4.25E–05	1560	1200	2962	2968	3004	2969	11.37	CHi	CHir
305.41	325.41	20040826 02:27	20040826 04:04	5.80E–06	6.27E–06	1200	1200	3160	3161	3362	3161	11.74	CHi	CHir
325.44	345.44	20040826 06:31	20040826 07:55	2.43E–06	3.52E–06	1200	1200	3358	3356	3556	3356	12.07	CHi	CHir
345.44	365.44	20040826 08:37	20040826 09:59	1.56E–04	1.63E–04	1200	1200	3554	3550	3750	3553	12.43	CHi	CHir

Borehole secup (m)	Borehole seclow (m)	Date and time for test, start YYYYMMDD hh:mm	Date and time for test, stop YYYYMMDD hh:mm	Q_p (m³/s)	Q_m (m³/s)	tp (s)	t_F (s)	p_0 (kPa)	p_i (kPa)	p_p (kPa)	p_F (kPa)	Te_w (°C)	Test phases measured Analysed test phases marked bold	
365.47	385.47	20040826 10:38	20040826 12:12	6.80E–06	7.25E–06	1200	1200	3749	3748	3950	3748	12.76	CHi	CHir
385.47	405.47	20040826 14:00	20040826 15:53	1.07E–07	1.28E–07	1200	1200	3946	3945	4188	3945	13.08	CHi	CHir
405.49	425.49	20040826 16:37	20040826 18:31	7.17E–06	7.33E–06	1200	1200	4142	4141	4341	4141	13.41	CHi	CHir
425.51	445.51	20040826 19:32	20040826 21:03	1.00E–06	1.13E–06	1200	1200	4337	4333	4532	4333	13.71	CHi	CHir
445.50	465.50	20040830 16:11	20040830 17:57	5.23E–08	7.27E–08	1200	2700	4537	4536	4762	4545	13.97	CHi	CHir
465.52	485.52	20040827 00:32	20040827 02:22	5.33E–07	6.35E–07	1200	1200	4730	4725	4922	4725	14.32	CHi	CHir
485.52	505.52	20040827 06:37	20040827 08:29	#NV	#NV	#NV	2400	4928	4929	5131	4932	14.63	Pi	-
505.55	525.55	20040827 09:11	20040827 10:43	3.08E–05	3.21E–05	1200	1200	5117	5117	5317	5117	14.99	CHi	CHir
525.58	545.58	20040827 11:14	20040827 14:14	#NV	#NV	#NV	4800	5320	5320	5522	5336	15.34	Pi	-
545.62	565.62	20040827 19:34	20040827 20:42	5.72E–08	7.63E–08	1200	1800	5513	5517	5721	5517	15.68	CHi	CHir
565.64	585.64	20040827 21:41	20040827 23:14	1.00E–05	1.06E–05	1200	600	5710	5708	5909	5709	16.01	CHi	CHir
585.65	605.65	20040828 00:07	20040828 01:30	2.07E–05	2.27E–05	1200	600	5907	5904	6104	5905	16.34	CHi	CHir
605.69	625.69	20040828 02:17	20040828 03:47	3.28E–05	3.45E–05	1200	1200	6104	6101	6301	6102	16.70	CHi	CHir
625.71	645.71	20040828 06:37	20040828 07:58	3.22E–05	3.30E–05	1200	1200	6301	6298	6499	6297	16.99	CHi	CHir
645.73	665.73	20040828 08:45	20040828 10:12	8.33E–08	9.97E–08	1200	1200	6497	6497	6712	6503	17.33	CHi	CHir
665.76	685.76	20040828 10:47	20040828 12:40	1.68E–06	2.55E–06	1200	1200	6692	6694	6903	6726	17.69	CHi	CHir
685.79	705.79	20040828 13:37	20040828 16:05	#NV	#NV	1200	1200	6889	6967	7182	7002	18.06	Pi	-
805.98	825.98	20040828 17:59	20040828 19:02	#NV	#NV	#NV	#NV	8067	#NV	#NV	#NV	20.00	-	-
826.02	846.02	20040828 20:06	20040828 22:06	#NV	#NV	60	3600	8261	8293	8492	8415	20.34	-	-
846.05	866.05	20040828 22:55	20040829 00:01	#NV	#NV	#NV	#NV	8457	#NV	#NV	#NV	20.66	-	-
866.08	886.08	20040829 00:49	20040829 02:21	7.42E–07	8.37E–07	1200	1200	8653	8645	8826	8647	20.99	CHi	CHir
886.11	906.11	20040831 01:49	20040831 03:53	2.83E–07	3.27E–07	1200	1200	8846	8842	9066	8842	21.32	CHi	CHir
906.16	926.16	20040831 06:18	20040831 07:44	6.43E–06	7.25E–06	1200	1200	9045	9038	9240	9043	21.64	CHi	CHir
926.18	946.18	20040831 08:16	20040831 09:47	6.62E–06	7.50E–06	1200	1200	9240	9237	9437	9249	21.96	CHi	CHir
943.05	963.05	20040831 10:30	20040831 12:18	2.62E–06	2.95E–06	1200	1200	9399	9401	9603	9400	22.23	CHi	CHir
963.05	983.05	20040831 12:54	20040831 14:12	1.85E–06	2.03E–06	1200	1200	9601	9589	9799	9590	22.55	CHi	CHir

Borehole secup (m)	Borehole seclow (m)	Date and time for test, start YYYYMMDD hh:mm	Date and time for test, stop YYYYMMDD hh:mm	Q_p (m^3/s)	Q_m (m^3/s)	tp (s)	t_F (s)	p_0 (kPa)	p_i (kPa)	p_p (kPa)	p_F (kPa)	Te_w (°C)	Test phases measured	Analysed test phases marked bold
300.41	305.41	20040901 10:29	20040901 11:52	1.03E–06	1.29E–06	1200	1200	2969	2968	3160	2968	11.08	CHi	CHir
305.41	310.41	20040901 13:06	20040901 14:06	#NV	#NV	#NV	#NV	3017	3020	#NV	#NV	11.34	-	-
310.42	315.42	20040901 14:43	20040901 15:54	5.00E–06	5.42E–06	1200	1200	3066	3065	3285	3064	11.47	CHi	CHir
315.43	320.43	20040901 16:25	20040901 18:07	5.37E–06	5.63E–06	1200	600	3114	3113	3314	3113	11.58	CHi	CHir
320.43	325.43	20040901 18:55	20040901 20:41	2.72E–07	3.45E–07	1200	1200	3162	3161	3363	3161	11.69	CHi	CHir
325.44	330.44	20040901 23:17	20040902 01:02	1.00E–06	1.14E–06	1200	300	3213	3211	3418	3210	11.77	CHi	CHir
330.44	335.44	20040902 05:51	20040902 07:06	2.50E–08	4.81E–08	1200	1200	3263	3261	3477	3261	11.85	CHi	CHir
335.44	340.44	20040902 07:47	20040902 08:53	2.25E–06	2.48E–06	1200	300	3312	3310	3512	3309	11.93	CHi	CHir
340.44	345.44	20040902 09:24	20040902 10:31	6.17E–07	6.56E–07	1200	300	3361	3359	3557	3359	12.05	CHi	CHir
345.44	350.44	20040902 11:09	20040902 12:32	2.97E–06	3.40E–06	1200	1200	3410	3408	3607	3408	12.15	CHi	CHir
350.45	355.45	20040902 13:20	20040902 14:49	1.29E–04	1.35E–04	1200	1200	3458	3457	3658	3458	12.24	CHi	CHir
355.47	360.47	20040902 15:14	20040902 16:29	1.98E–05	3.15E–05	1200	600	3508	3507	3707	3506	12.35	CHi	CHir
360.47	365.47	20040902 16:57	20040902 18:05	7.27E–06	7.55E–06	1200	600	3556	3555	3749	3553	12.43	CHi	CHir
365.47	370.47	20040902 20:18	20040902 21:54	1.83E–07	2.03E–07	1200	1200	3602	3602	3844	3600	12.52	CHi	CHir
370.47	375.47	20040902 22:36	20040903 00:16	1.07E–06	1.17E–06	1200	900	3649	3647	3839	3647	12.61	CHi	CHir
375.47	380.47	20040903 05:55	20040903 07:06	5.38E–06	5.97E–06	1020	660	3698	3694	3884	3694	12.68	CHi	CHir
380.47	385.47	20040903 07:31	20040903 08:51	3.30E–07	3.57E–07	1200	1200	3745	3744	3947	3745	12.76	CHi	CHir
385.47	390.47	20040903 09:25	20040903 11:06	#NV	4.25E–05	#NV	3600	3797	3807	4009	3918	12.85	Pi	-
390.48	395.48	20040903 12:21	20040903 13:42	#NV	4.25E–05	0	2400	3845	3859	4061	3892	12.93	Pi	-
395.48	400.48	20040903 14:09	20040903 15:43	#NV	4.25E–05	0	1800	3895	3930	4138	4091	13.01	Pi	-
400.48	405.48	20040903 16:10	20040903 17:49	3.67E–07	4.13E–07	1200	1200	3946	3944	4156	3943	13.10	CHi	CHir
405.49	410.49	20040903 18:30	20040903 20:05	1.78E–07	2.05E–07	1200	1200	3992	3992	4207	3991	13.18	CHi	CHir
410.50	415.50	20040903 21:22	20040903 23:01	3.33E–08	3.83E–08	1200	1200	4042	4040	4257	4040	13.26	CHi	CHir
415.51	420.51	20040903 23:33	20040904 01:10	7.67E–06	8.00E–06	1200	1200	4090	4088	4288	4088	13.34	CHi	CHir
420.51	425.51	20040904 06:01	20040904 07:25	#NV	4.25E–05	#NV	2100	4139	4143	4343	4158	13.39	Pi	-
425.51	430.51	20040904 07:55	20040904 09:06	#NV	4.25E–05	#NV	1800	4188	4192	4398	4196	13.47	Pi	-

Borehole secup (m)	Borehole seclow (m)	Date and time for test, start YYYYMMDD hh:mm	Date and time for test, stop YYYYMMDD hh:mm	Q_p (m^3/s)	Q_m (m^3/s)	tp (s)	t_F (s)	p_0 (kPa)	p_i (kPa)	p_p (kPa)	p_F (kPa)	Te_w (°C)	Test phases measured Analysed test phases marked bold	
430.51	435.51	20040904 09:37	20040904 11:35	6.67E–08	7.17E–08	1200	3600	4237	4238	4450	4242	13.54	CHi	CHir
435.50	440.50	20040904 12:31	20040904 13:31	#NV	#NV	#NV	#NV	4289	#NV	#NV	#NV	13.62	-	-
440.50	445.50	20040904 14:00	20040904 15:07	1.03E–06	1.10E–06	1200	300	4340	4337	4548	4336	13.70	CHi	CHir
445.50	450.50	20040904 15:38	20040904 17:26	#NV	#NV	#NV	2400	4389	4404	4607	4504	13.77	Pi	-
450.50	455.50	20040904 18:04	20040904 19:32	4.33E–08	4.73E–08	1200	1200	4438	4445	4653	4454	13.85	CHi	CHir
455.50	460.50	20040904 20:00	20040904 22:34	3.75E–05	4.25E–05	#NV	3600	4485	4497	4699	4582	13.93	Pi	-
460.51	465.51	20040904 23:06	20040905 00:34	1.00E–08	2.18E–08	1200	1200	4533	4531	4751	4533	14.01	CHi	CHir
465.52	470.52	20040905 01:14	20040905 02:44	1.08E–07	1.33E–07	1200	1200	4583	4580	4799	4589	14.08	CHi	CHir
470.52	475.52	20040905 05:46	20040905 06:52	#NV	#NV	#NV	#NV	4634	#NV	#NV	#NV	14.15	-	-
475.52	480.52	20040905 07:27	20040905 08:31	#NV	4.25E–05	#NV	#NV	4683	#NV	#NV	#NV	14.22	-	-
480.52	485.52	20040905 08:57	20040905 10:00	8.50E–07	9.17E–07	1200	300	4732	4726	4943	4727	14.31	CHi	CHir
505.55	510.55	20040905 10:34	20040905 12:06	#NV	#NV	#NV	#NV	4977	#NV	#NV	#NV	14.71	-	-
510.56	515.56	20040905 12:46	20040905 13:58	2.66E–05	2.74E–05	1200	600	5029	5025	5226	5026	14.81	CHi	CHir
515.56	520.56	20040905 14:22	20040905 15:34	6.83E–07	7.83E–07	1200	300	5079	5077	5301	5077	14.91	CHi	CHir
520.57	525.57	20040905 16:00	20040905 17:24	5.55E–06	6.00E–06	1200	600	5128	5124	5325	5124	14.99	CHi	CHir
545.62	550.62	20040905 18:17	20040905 19:22	#NV	#NV	#NV	#NV	5372	#NV	#NV	#NV	15.41	-	-
550.62	555.62	20040905 20:03	20040905 21:30	3.83E–08	4.33E–08	1200	1200	5421	5417	5641	5418	15.50	CHi	CHir
555.63	560.63	20040905 22:32	20040906 00:17	1.67E–08	2.17E–08	1200	1200	5468	5464	5689	5468	15.58	CHi	CHir
560.63	565.63	20040906 00:46	20040906 02:36	7.00E–09	1.23E–08	1200	2400	5517	5515	5736	5514	15.65	CHi	CHir
565.64	570.64	20040906 06:09	20040906 07:11	4.62E–06	4.75E–06	1200	300	5565	5559	5772	5560	15.74	CHi	CHir
570.64	575.64	20040906 07:42	20040906 08:47	1.47E–06	1.57E–06	1200	300	5613	5607	5823	5609	15.82	CHi	CHir
575.65	580.65	20040906 09:15	20040906 10:19	6.30E–06	6.48E–06	1020	600	5662	5659	5857	5660	15.91	CHi	CHir
580.65	585.65	20040906 10:50	20040906 12:11	5.13E–06	5.42E–06	1200	1200	5713	5710	5911	5712	15.99	CHi	CHir
585.67	590.67	20040906 13:11	20040906 14:14	2.72E–06	3.20E–06	1200	300	5764	5762	5979	5763	16.07	CHi	CHir
590.67	595.67	20040906 14:45	20040906 15:52	1.17E–07	1.50E–07	1200	600	5815	5814	6027	5814	16.16	CHi	CHir
595.69	600.69	20040906 16:36	20040906 18:14	#NV	#NV	#NV	#NV	5862	#NV	#NV	#NV	16.24	-	-

Borehole secup (m)	Borehole seclow (m)	Date and time for test, start YYYYMMDD hh:mm	Date and time for test, stop YYYYMMDD hh:mm	Q_p (m^3/s)	Q_m (m^3/s)	tp (s)	t_F (s)	p_0 (kPa)	p_i (kPa)	p_p (kPa)	p_F (kPa)	Te_w (°C)	Test phases measured Analysed test phases marked bold	
600.69	605.69	20040906 18:43	20040906 20:11	1.60E–05	1.73E–05	1200	1200	5909	5908	6107	5908	16.32	CHi	CHir
605.69	610.69	20040906 20:57	20040906 22:11	5.05E–06	5.37E–06	1200	300	5959	5956	6186	5956	16.40	CHi	CHir
610.70	615.70	20040906 22:41	20040907 00:09	2.07E–06	2.15E–06	1200	300	6008	6004	6203	6003	16.49	CHi	CHir
615.70	620.70	20040907 00:39	20040907 02:03	1.45E–05	1.50E–05	1200	1200	6055	6052	6251	6051	16.58	CHi	CHir
620.71	625.71	20040907 06:12	20040907 07:18	8.25E–06	8.73E–06	1200	300	6102	6097	6298	6098	16.67	CHi	CHir
625.71	630.71	20040907 07:41	20040907 08:50	2.93E–05	3.04E–05	1200	600	6151	6147	6347	6148	16.75	CHi	CHir
630.72	635.72	20040907 09:16	20040907 10:15	#NV	#NV	#NV	#NV	6199	6221	#NV	#NV	16.83	-	-
635.72	640.72	20040907 10:44	20040907 11:53	#NV	#NV	#NV	#NV	6248	6447	#NV	#NV	16.90	-	-
640.73	645.73	20040907 12:29	20040907 13:29	#NV	#NV	#NV	#NV	6299	6347	#NV	#NV	16.97	-	-
645.73	650.73	20040907 14:03	20040907 15:10	6.67E–08	6.67E–08	1200	600	6350	6354	6566	6352	17.05	CHi	CHir
650.74	655.74	20040907 15:37	20040907 17:38	5.00E–09	6.67E–09	1200	1800	6405	6410	6614	6408	17.13	CHi	CHir
655.75	660.75	20040907 18:16	20040907 20:10	3.42E–09	5.00E–09	1200	2400	6450	6458	6662	6455	17.22	CHi	CHir
660.75	665.75	20040907 22:36	20040907 23:37	#NV	#NV	#NV	#NV	6498	#NV	#NV	#NV	17.31	-	-
665.76	670.76	20040908 00:22	20040908 02:26	1.63E–06	1.72E–06	1200	1200	6546	6540	6742	6541	17.40	CHi	CHir
670.76	675.76	20040908 10:39	20040908 12:33	2.27E–06	2.52E–06	1200	1200	6593	6599	6798	6601	17.48	CHi	CHir
675.77	680.77	20040908 14:08	20040908 15:45	#NV	#NV	#NV	1800	6646	6648	6861	6651	17.57	Pi	-
680.78	685.78	20040908 16:18	20040908 17:35	#NV	#NV	#NV	1800	6695	6703	6915	6703	17.66	Pi	-

#NV not analysed
CHi: constant head injection phase
CHir: recovery phase following the constant head injection phase
Pi Pulse injection

Table 7-2. Results from analysis of constant head tests in KLX04.

Interval position		Stationary flow parameters		Transient analysis														
				Flow regime		Formation parameters											Static conditions	
up	low	Q/s	T_M	Perturb phase	Recovery phase	T_{f1}	T_{f2}	T_{s1}	T_{s2}	T_T	T_{TMIN}	T_{TMAX}	C	ξ	dt_1	dt_2	p*	h_{wif}
m btoc	m btoc	m²/s	m²/s			m²/s	m²/s	m²/s	m²/s	m²/s	m²/s	m²/s	m³/Pa	–	min	min	kPa	masl
105.11	205.11	8.45E–06	1.10E–05	2	WBS2	2.2E–05	#NV	3.6E–05	#NV	2.2E–05	8.0E–06	4.0E–05	3.0E–09	9.4	0.7	16.9	1986.4	13.51
205.34	305.34	2.15E–04	2.80E–04	2	WBS2	2.7E–04	#NV	2.1E–04	#NV	2.1E–04	1.0E–04	4.0E–04	2.2E–07	–3.9	1.9	4.8	2966.1	13.64
305.41	405.41	7.93E–06	1.03E–05	2	WBS2	1.5E–05	#NV	5.4E–05	#NV	5.4E–05	7.5E–06	6.5E–05	4.1E–09	2.7	1.3	25.2	3943.1	13.61
405.49	505.49	4.12E–07	5.37E–07	2	WBS2	1.0E–06	#NV	1.8E–06	#NV	1.0E–06	5.0E–07	2.0E–06	8.9E–10	8.2	4.4	22.2	4924.2	13.97
505.55	605.55	2.83E–06	3.69E–06	2	WBS22	4.1E–06	#NV	3.3E–06	1.6E–05	4.1E–06	1.0E–06	5.0E–06	1.3E–09	0.9	3.4	8.2	5905.1	14.35
605.69	705.69	2.24E–06	2.92E–06	2	WBS22	3.9E–06	#NV	3.3E–06	1.7E–05	3.9E–06	2.0E–06	5.0E–06	2.9E–10	2.6	2.2	23.3	6882.9	14.40
705.81	805.81	#NV	#NV	#NV	WBS22	#NV	#NV	3.5E–10	8.8E–11	3.5E–10	8.0E–11	7.0E–10	1.4E–10	2.7	0.3	2.5	#NV	#NV
805.98	905.98	4.21E–08	5.48E–08	2	WBS2	4.3E–08	#NV	3.0E–07	#NV	4.3E–08	2.0E–08	8.0E–08	3.0E–10	0.0	3.1	17.0	8838.7	14.81
886.11	986.11	7.36E–07	9.58E–07	2	WBS2	6.1E–07	#NV	8.2E–07	#NV	8.2E–07	6.0E–07	1.0E–06	2.1E–09	–1.4	4.0	24.9	9623.8	15.32
105.21	125.21	2.44E–06	2.55E–06	22	WBS22	2.6E–06	1.0E–05	2.5E–06	1.4E–05	2.6E–06	9.0E–07	5.0E–06	1.8E–09	2.3	1.9	3.5	1208.4	13.67
125.25	145.25	1.50E–07	1.56E–07	22	WBS2	3.2E–07	1.4E–05	5.6E–07	#NV	5.6E–07	1.0E–07	7.0E–07	8.4E–11	17.3	1.9	8.1	1402.5	13.52
145.30	165.30	3.53E–08	3.69E–08	2	WBS22	5.8E–08	#NV	2.6E–08	1.3E–07	5.8E–08	2.0E–08	7.0E–08	6.4E–11	6.8	1.1	10.8	1596.4	13.35
165.30	185.30	4.40E–07	4.60E–07	2	WBS2	5.4E–07	#NV	1.7E–06	#NV	5.4E–07	3.0E–07	7.0E–07	1.3E–10	2.6	0.8	14.2	1792.2	13.41
185.32	205.32	4.73E–06	4.95E–06	2	WBS2	5.9E–06	#NV	2.2E–05	#NV	5.9E–06	4.0E–06	2.0E–05	1.3E–09	1.9	8.3	12.5	1985.7	13.22
205.34	225.34	4.54E–05	4.75E–05	22	WBS2	6.6E–05	1.5E–04	8.1E–05	#NV	8.1E–05	4.0E–05	9.0E–05	2.4E–08	1.8	1.4	16.2	2181.6	13.28
225.35	245.35	6.67E–07	6.98E–07	22	WBS2	6.2E–07	3.3E–07	4.5E–06	#NV	6.2E–07	3.0E–07	8.0E–07	6.5E–11	–1.8	0.6	2.1	2379.4	13.53
245.38	265.38	1.33E–05	1.39E–05	22	WBS2	2.1E–05	5.5E–05	4.8E–05	#NV	2.1E–05	9.0E–06	4.0E–05	3.8E–09	1.6	0.4	4.1	2574.6	13.50
265.38	285.38	4.41E–07	4.61E–07	22	WBS2	5.2E–07	1.1E–06	1.7E–06	#NV	1.7E–06	4.0E–07	2.0E–06	1.1E–10	14.9	0.5	6.9	2771.1	13.63
285.40	305.40	1.12E–04	1.17E–04	2	WBS22	9.7E–05	#NV	5.1E–05	1.0E–04	5.1E–04	4.0E–05	2.0E–04	4.0E–08	–5.9	6.8	17.0	2967.3	13.70
305.41	325.41	2.83E–07	2.96E–07	2	WBS2	5.4E–07	#NV	1.3E–06	#NV	5.4E–07	2.0E–07	7.0E–07	1.8E–10	4.6	0.9	7.9	3161.4	13.57
325.44	345.44	1.19E–07	1.25E–07	2	WBS2	8.8E–08	#NV	1.0E–06	#NV	8.8E–08	7.0E–08	2.0E–07	7.3E–11	–2.5	0.5	8.3	3355.9	13.46

Interval position		Stationary flow parameters		Transient analysis														
				Flow regime		Formation parameters											Static conditions	
up	low	Q/s	T_M	Perturb phase	Recovery phase	T_{f1}	T_{f2}	T_{s1}	T_{s2}	T_T	T_{TMIN}	T_{TMAX}	C	ξ	dt_1	dt_2	p*	h_{wif}
m btoc	m btoc	m²/s	m²/s			m²/s	m²/s	m²/s	m²/s	m²/s	m²/s	m²/s	m³/Pa	–	min	min	kPa	masl
345.44	365.44	7.67E–06	8.02E–06	2	WBS2	1.7E–05	#NV	5.6E–05	#NV	5.6E–05	8.0E–06	6.0E–05	5.0E–09	30.2	1.5	15.4	3551.2	13.46
365.47	385.47	3.30E–07	3.45E–07	2	WBS2	6.4E–07	#NV	2.2E–06	#NV	6.4E–07	2.0E–07	8.0E–07	1.5E–10	4.6	0.9	9.6	3748.2	13.60
385.47	405.47	4.31E–09	4.50E–09	2	WBS2	4.4E–09	#NV	3.1E–08	#NV	4.4E–09	2.0E–09	6.0E–09	5.5E–11	1.7	0.4	5.8	3943.6	13.60
405.49	425.49	3.52E–07	3.68E–07	22	WBS2	3.2E–07	1.6E–06	2.5E–06	#NV	2.5E–06	3.0E–07	4.0E–06	6.8E–10	30.1	3.4	11.0	4139.8	13.67
425.51	445.51	4.93E–08	5.16E–08	2	WBS2	5.7E–08	#NV	2.5E–07	#NV	5.7E–08	3.0E–08	8.0E–08	6.0E–11	0.9	1.2	6.3	4333.3	13.46
445.50	465.50	2.27E–09	2.37E–09	2	WBS2	8.2E–10	#NV	1.7E–09	#NV	8.2E–10	7.0E–10	4.0E–09	1.6E–10	–1.6	5.4	11.2	4526.0	13.19
465.52	485.52	2.66E–08	2.78E–08	2	WBS2	1.8E–08	#NV	1.0E–07	#NV	1.8E–08	8.0E–09	4.0E–08	1.5E–11	–1.2	1.3	18.8	4723.8	13.42
485.52	505.52	#NV	#NV	#NV	WBS22	#NV	#NV	2.1E–10	9.9E–10	2.1E–10	1.0E–10	1.0E–09	3.0E–11	1.6	#NV	#NV	#NV	#NV
505.55	525.55	1.51E–06	1.58E–06	22	WBS22	2.1E–06	4.3E–06	2.1E–06	1.1E–05	2.1E–06	9.0E–07	3.0E–06	4.3E–10	1.5	0.4	1.6	5115.3	13.47
525.58	545.58	#NV	#NV	#NV	WBS22	#NV	#NV	4.1E–10	2.1E–09	4.1E–10	7.0E–11	7.0E–10	3.4E–11	3.3	1.8	16.8	#NV	#NV
545.62	565.62	2.75E–09	2.88E–09	2	WBS2	1.3E–09	#NV	8.3E–09	#NV	1.3E–09	9.0E–10	3.0E–09	7.4E–11	–0.9	2.9	14.4	5509.9	13.81
565.64	585.64	4.88E–07	5.11E–07	22	WBS2	9.5E–07	#NV	3.0E–06	#NV	9.5E–07	3.0E–07	1.0E–06	1.1E–09	0.0	4.6	16.2	5706.9	13.96
585.65	605.65	1.02E–06	1.06E–06	2	WBS22	1.2E–06	#NV	1.0E–06	5.2E–06	1.2E–06	8.0E–07	4.0E–06	9.3E–10	–0.5	1.6	14.9	5904.6	14.20
605.69	625.69	1.61E–06	1.68E–06	2	WBS2	3.0E–06	#NV	7.3E–06	#NV	3.0E–06	1.0E–06	6.0E–06	6.2E–10	3.8	0.2	14.7	6101.9	14.37
625.71	645.71	1.57E–06	1.64E–06	22	WBS22	2.0E–06	2.0E–05	2.2E–06	2.8E–05	2.2E–06	1.0E–06	4.0E–06	2.6E–10	1.9	0.3	1.8	6296.5	14.28
645.73	665.73	3.80E–09	3.98E–09	2	WBS2	2.5E–09	#NV	4.1E–09	#NV	2.5E–09	9.0E–10	4.0E–09	4.8E–11	–0.3	1.4	14.1	6487.5	13.84
665.76	685.76	7.90E–08	8.27E–08	22	WBS22	1.3E–07	5.2E–06	2.5E–07	1.3E–05	2.5E–07	7.0E–08	5.0E–07	5.0E–11	–0.9	0.1	0.2	6675.0	13.03
685.79	705.79	#NV	#NV	#NV	WBS22	#NV	#NV	1.8E–10	3.6E–10	1.8E–10	9.0E–11	6.0E–10	3.4E–11	5.9	#NV	#NV	#NV	#NV
805.98	825.98	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	1.0E–11	1.0E–11	1.0E–13	#NV	#NV	#NV	#NV	#NV	#NV
826.02	846.02	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	1.0E–11	1.0E–11	1.0E–13	#NV	#NV	#NV	#NV	#NV	#NV
846.05	866.05	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	1.0E–11	1.0E–11	1.0E–13	#NV	#NV	#NV	#NV	#NV	#NV
866.08	886.08	4.02E–08	4.21E–08	2	WBS2	3.5E–08	#NV	1.9E–07	#NV	3.5E–08	8.0E–09	6.0E–08	5.3E–11	0.0	1.1	10.8	8646.0	14.92

Interval position		Stationary flow parameters		Transient analysis														
				Flow regime		Formation parameters											Static conditions	
up	low	Q/s	T_M	Perturb phase	Recovery phase	T_{f1}	T_{f2}	T_{s1}	T_{s2}	T_T	T_{TMIN}	T_{TMAX}	C	ξ	dt_1	dt_2	p*	h_{wif}
m btoc	m btoc	m^2/s	m^2/s			m^2/s	m^2/s	m^2/s	m^2/s	m^2/s	m^2/s	m^2/s	m^3/Pa	–	min	min	kPa	masl
886.11	906.11	1.24E–08	1.30E–08	22	WBS22	8.6E–09	1.4E–08	1.6E–08	5.3E–08	1.6E–08	7.0E–09	4.0E–08	8.7E–11	4.8	#NV	#NV	8839.4	14.75
906.16	926.16	3.12E–07	3.27E–07	2	WBS2	2.9E–07	#NV	2.5E–07	3.9E–07	2.9E–07	5.0E–08	4.0E–07	1.2E–10	–1.1	1.2	10.5	9036.0	14.89
926.18	946.18	3.25E–07	3.40E–07	2	WBS2	2.5E–07	#NV	2.4E–07	#NV	2.4E–07	5.0E–08	4.0E–07	9.7E–11	–2.3	0.2	18.8	9233.3	15.14
943.05	963.05	1.27E–07	1.33E–07	22	WBS22	1.6E–07	1.0E–07	2.7E–07	1.9E–07	2.7E–07	9.0E–08	4.0E–07	9.0E–11	5.2	1.2	3.6	9395.9	14.97
963.05	983.05	8.64E–08	9.04E–08	2	WBS2	8.2E–08	#NV	4.1E–07	#NV	8.2E–08	5.0E–08	2.0E–07	6.1E–10	0.5	1.1	16.2	9586.7	14.58
300.41	305.41	5.28E–08	4.36E–08	2	WBS2	9.1E–08	#NV	4.1E–07	#NV	9.1E–08	3.0E–08	2.0E–07	1.6E–11	1.9	0.1	1.0	2968.2	13.79
305.41	310.41	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	1.0E–11	1.0E–11	1.0E–13	#NV	#NV	#NV	#NV	#NV	#NV
310.42	315.42	2.23E–07	1.84E–07	22	WBS22	4.6E–07	2.7E–07	1.0E–06	#NV	4.6E–07	1.0E–07	8.0E–07	4.8E–11	5.5	1.0	2.5	3063.3	13.52
315.43	320.43	2.62E–07	2.16E–07	2	WBS2	7.2E–07	#NV	1.2E–06	#NV	7.2E–07	2.0E–07	9.0E–07	3.6E–11	9.4	0.8	4.0	3113.1	13.61
320.43	325.43	1.32E–08	1.09E–08	22	WBS2	1.4E–08	6.5E–09	1.0E–07	#NV	1.4E–08	6.0E–09	4.0E–08	1.5E–11	0.0	0.2	1.1	3161.4	13.55
325.44	330.44	5.21E–08	4.30E–08	22	WBS2	2.8E–08	2.4E–07	2.3E–07	#NV	2.3E–07	8.0E–08	5.0E–07	1.5E–11	21.6	0.7	2.2	3210.4	13.56
330.44	335.44	1.14E–09	9.37E–10	2	WBS2	2.6E–08	#NV	1.3E–08	#NV	1.3E–08	3.0E–09	4.0E–08	2.0E–11	33.0	#NV	#NV	3258.0	13.44
335.44	340.44	1.09E–07	9.02E–08	2	#NV	8.5E–08	#NV	#NV	#NV	8.5E–08	5.0E–08	3.0E–07	#NV	–1.1	0.5	8.5	3309.9	13.75
340.44	345.44	3.06E–08	2.52E–08	2	WBS2	3.2E–08	#NV	1.9E–07	#NV	3.2E–08	1.0E–08	6.0E–08	1.5E–11	1.3	0.4	6.9	3360.4	13.92
345.44	350.44	1.46E–07	1.21E–07	2	#NV	1.1E–07	#NV	#NV	#NV	1.1E–07	7.0E–08	4.0E–07	#NV	–1.5	7.3	17.0	3408.1	13.80
350.45	355.45	6.31E–06	5.21E–06	2	WBS2	1.5E–05	#NV	4.9E–05	#NV	1.5E–05	6.0E–06	4.0E–05	1.9E–09	5.9	3.7	16.4	3457.1	13.81
355.47	360.47	9.73E–07	8.03E–07	22	WBS2	8.2E–07	6.0E–06	9.1E–06	#NV	9.1E–06	1.0E–06	1.0E–07	2.9E–10	31.7	0.9	3.4	3506.4	13.84
360.47	365.47	3.67E–07	3.03E–07	2	WBS2	9.2E–07	#NV	1.6E–06	#NV	9.2E–07	5.0E–07	2.0E–07	6.9E–11	8.6	0.6	17.8	3553.3	13.64
365.47	370.47	7.43E–09	6.13E–09	22	WBS2	3.3E–09	#NV	5.1E–08	#NV	3.3E–09	2.0E–09	4.0E–08	1.5E–11	0.0	8.9	17.9	3599.9	13.42
370.47	375.47	5.45E–08	4.50E–08	2	WBS2	5.2E–08	#NV	3.7E–07	#NV	5.2E–08	3.0E–08	9.0E–08	1.2E–11	0.4	0.9	5.7	3647.1	13.25
375.47	380.47	2.78E–07	2.29E–07	2	WBS2	2.3E–07	#NV	1.0E–06	#NV	2.3E–07	9.0E–08	4.0E–07	7.1E–11	–1.3	1.0	15.5	3693.3	12.98
380.47	385.47	1.59E–08	1.32E–08	2	WBS2	2.1E–08	#NV	7.0E–08	#NV	2.1E–08	9.0E–09	4.0E–08	3.3E–11	2.8	3.3	16.2	3744.8	13.25

Interval position		Stationary flow parameters		Transient analysis														
				Flow regime		Formation parameters											Static conditions	
up	low	Q/s	T_M	Perturb phase	Recovery phase	T_{f1}	T_{f2}	T_{s1}	T_{s2}	T_T	T_{TMIN}	T_{TMAX}	C	ξ	dt_1	dt_2	p*	h_{wif}
m btoc	m btoc	m²/s	m²/s			m²/s	m²/s	m²/s	m²/s	m²/s	m²/s	m²/s	m³/Pa	–	min	min	kPa	masl
385.47	390.47	#NV	#NV	#NV	WBS22	#NV	#NV	8.3E–12	2.1E–11	8.3E–12	7.0E–12	5.0E–11	8.5E–12	2.4	#NV	#NV	#NV	#NV
390.48	395.48	#NV	#NV	#NV	WBS22	#NV	#NV	8.7E–11	1.6E–10	8.7E–11	7.0E–11	4.0E–10	2.0E–11	0.8	#NV	#NV	#NV	#NV
395.48	400.48	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	1.0E–10	1.0E–12	1.0E–10	#NV	#NV	#NV	#NV	#NV	#NV
400.48	405.48	1.70E–08	1.40E–08	22	WBS2	1.5E–08	1.1E–08	8.1E–08	#NV	1.5E–08	7.0E–09	4.0E–08	1.1E–11	0.0	11.5	16.6	3943.5	13.58
405.49	410.49	8.14E–09	6.72E–09	22	WBS2	6.7E–09	3.8E–09	5.7E–08	#NV	6.7E–09	2.0E–09	8.0E–09	1.4E–11	0.0	12.4	16.6	3991.4	13.48
410.50	415.50	1.51E–09	1.24E–09	2	WBS2	9.3E–10	#NV	7.2E–09	#NV	9.3E–10	8.0E–09	3.0E–09	1.5E–11	0.0	3.7	10.9	4036.9	13.13
415.51	420.51	3.76E–07	3.10E–07	22	WBS2	3.8E–07	1.4E–06	2.4E–06	#NV	2.4E–06	7.0E–07	5.0E–06	6.1E–10	31.3	3.2	12.5	4087.5	13.30
420.51	425.51	#NV	#NV	#NV	WBS22	#NV	#NV	7.9E–11	1.6E–10	7.9E–11	5.0E–11	3.0E–10	6.3E–12	3.6	0.7	6.2	#NV	#NV
425.51	430.51	#NV	#NV	#NV	WBS22	#NV	#NV	1.2E–11	3.6E–11	1.2E–11	8.0E–12	7.0E–11	7.9E–13	2.6	#NV	#NV	#NV	#NV
430.51	435.51	3.08E–09	2.55E–09	2	WBS2	3.8E–09	#NV	1.2E–08	#NV	1.2E–08	5.0E–09	3.0E–08	1.4E–11	15.9	#NV	#NV	4239.7	13.87
435.50	440.50	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	1.0E–11	1.0E–11	1.0E–13	#NV	#NV	#NV	#NV	#NV	#NV
440.50	445.50	4.80E–08	3.97E–08	22	WBS22	4.0E–08	7.9E–08	8.3E–08	4.2E–07	4.0E–08	1.0E–08	8.0E–08	1.9E–11	0.0	0.2	0.8	4333.1	13.45
445.50	450.50	#NV	#NV	#NV	WBS22	#NV	#NV	8.4E–12	4.5E–12	8.4E–12	1.0E–12	1.0E–11	8.9E–12	1.0	23.8	36.5	#NV	#NV
450.50	455.50	2.04E–09	1.69E–09	2	WBS2	1.3E–09	#NV	1.6E–09	#NV	1.6E–09	8.0E–10	4.0E–09	6.3E–11	1.4	#NV	#NV	4410.7	11.40
455.50	460.50	#NV	#NV	#NV	WBS22	#NV	#NV	1.3E–010	7.0E–11	1.3E–10	3.0E–11	3.0E–10	4.9E–11	1.1	16.1	26.8	#NV	#NV
460.51	465.51	4.46E–10	3.68E–10	22	WBS2	4.9E–10	2.4E–10	3.1E–09	#NV	3.1E–09	6.0E–10	4.0E–09	1.4E–11	15.9	#NV	#NV	4529.4	13.53
465.52	470.52	4.85E–09	4.01E–09	22	WBS2	7.3E–10	1.5E–09	6.2E–09	#NV	6.2E–09	7.0E–10	7.0E–09	1.6E–10	2.1	#NV	#NV	4570.0	12.68
470.52	475.52	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	1.0E–11	1.0E–11	1.0E–13	#NV	#NV	#NV	#NV	#NV	#NV
475.52	480.52	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	1.0E–11	1.0E–11	1.0E–13	#NV	#NV	#NV	#NV	#NV	#NV
480.52	485.52	3.84E–08	3.17E–08	22	WBS2	1.1E–07	3.7E–08	1.8E–07	#NV	1.1E–07	7.0E–08	4.0E–07	1.3E–11	10.6	0.5	1.7	4726.6	13.71
505.55	510.55	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	1.0E–11	1.0E–11	1.0E–13	#NV	#NV	#NV	#NV	#NV	#NV
510.56	515.56	1.30E–06	1.07E–06	22	WBS22	1.2E–06	4.3E–06	2.4E–06	1.8E–05	2.4E–06	9.0E–07	5.0E–06	1.6E–10	4.3	0.2	1.2	5026.6	14.38

Interval position		Stationary flow parameters		Transient analysis														
				Flow regime		Formation parameters											Static conditions	
up	low	Q/s	T_M	Perturb phase	Recovery phase	T_{f1}	T_{f2}	T_{s1}	T_{s2}	T_T	T_{TMIN}	T_{TMAX}	C	ξ	dt_1	dt_2	p*	h_{wif}
m btoc	m btoc	m²/s	m²/s			m²/s	m²/s	m²/s	m²/s	m²/s	m²/s	m²/s	m³/Pa	–	min	min	kPa	masl
515.56	520.56	2.99E–08	2.47E–08	22	WBS2	4.5E–08	2.4E–08	2.1E–07	#NV	4.5E–08	9.0E–09	5.0E–08	1.8E–11	2.6	15.2	18.8	5077.1	14.55
520.57	525.57	2.71E–07	2.24E–07	22	WBS2	2.7E–07	5.4E–07	1.3E–06	#NV	2.7E–07	9.0E–08	5.0E–07	3.3E–11	0.0	0.6	1.2	5125.2	14.46
545.62	550.62	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	1.0E–11	1.0E–11	1.0E–13	#NV	#NV	#NV	#NV	#NV	#NV
550.62	555.62	1.68E–09	1.39E–09	22	WBS2	1.4E–09	5.4E–10	2.8E–09	#NV	2.8E–09	7.0E–10	4.0E–09	1.8E–11	5.4	#NV	#NV	5409.3	13.51
555.63	560.63	7.27E–10	6.00E–10	2	WBS2	4.6E–10	#NV	1.3E–09	#NV	1.3E–09	5.0E–10	3.0E–09	1.7E–11	5.5	#NV	#NV	5449.0	12.57
560.63	565.63	3.11E–10	2.56E–10	22	WBS2	2.6E–10	6.5E–11	1.2E–09	#NV	1.2E–09	1.0E–10	2.0E–09	1.1E–11	10.3	#NV	#NV	5507.0	13.50
565.64	570.64	2.13E–07	1.76E–07	2	WBS2	5.8E–07	#NV	7.1E–07	#NV	5.8E–07	3.0E–07	6.0E–07	1.4E–10	10.5	1.5	19.7	5558.4	13.75
570.64	575.64	6.66E–08	5.50E–08	22	WBS2	1.7E–07	1.0E–07	4.3E–07	#NV	1.7E–07	7.0E–08	4.0E–07	2.0E–11	8.6	0.5	1.4	5609.7	14.00
575.65	580.65	3.12E–07	2.58E–07	2	WBS2	9.0E–07	#NV	1.0E–06	#NV	9.0E–07	6.0E–07	2.0E–06	6.4E–10	10.9	0.9	14.8	5658.4	13.98
580.65	585.65	2.51E–07	2.07E–07	2	WBS2	3.3E–07	#NV	8.6E–07	#NV	3.3E–07	8.0E–08	6.0E–07	6.6E–10	1.6	0.4	5.4	5711.9	14.46
585.67	590.67	1.23E–07	1.01E–07	22	WBS2	2.2E–07	3.9E–08	6.1E–07	#NV	2.2E–07	8.0E–08	5.0E–07	1.7E–11	3	0.1	2.1	5762.3	14.60
590.67	595.67	5.37E–09	4.44E–09	22	WBS2	6.1E–09	1.5E–09	4.4E–08	#NV	6.1E–09	1.0E–09	9.0E–09	1.7E–11	0	#NV	#NV	5811.9	14.68
595.69	600.69	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	1.0E–11	1.0E–11	1.0E–13	#NV	#NV	#NV	#NV	#NV	#NV
600.69	605.69	7.89E–07	6.51E–07	2	WBS22	9.2E–07	#NV	1.3E–06	2.0E–06	9.2E–07	7.0E–07	3.0E–06	8.4E–10	0.0	2.8	16.5	5907.7	14.47
605.69	610.69	2.15E–07	1.78E–07	22	WBS2	2.9E–07	5.6E–07	1.0E–06	#NV	2.9E–07	1.0E–07	7.0E–07	2.7E–11	1.8	0.8	2.3	5956.1	14.43
610.70	615.70	1.02E–07	8.41E–08	2	WBS2	2.6E–07	#NV	4.4E–07	#NV	2.6E–07	9.0E–08	6.0E–07	6.0E–11	9.5	2.0	8.9	6003.1	14.24
615.70	620.70	7.12E–07	5.88E–07	2	WBS2	1.7E–06	#NV	4.4E–06	#NV	1.7E–06	6.0E–07	4.0E–06	1.5E–10	7.7	1.0	7.6	6050.3	14.07
620.71	625.71	4.03E–07	3.32E–07	2	WBS2	5.5E–07	#NV	2.7E–06	#NV	5.5E–07	2.0E–07	9.0E–07	4.5E–11	1.5	10.6	16.6	6096.4	13.79
625.71	630.71	1.44E–06	1.19E–06	2	WBS2	3.1E–06	#NV	3.3E–06	#NV	3.1E–06	9.0E–07	6.0E–06	2.0E–10	5.9	3.7	12.3	6145.4	13.81
630.72	635.72	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	1.0E–11	1.0E–11	1.0E–13	#NV	#NV	#NV	#NV	#NV	#NV
635.72	640.72	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	1.0E–11	1.0E–11	1.0E–13	#NV	#NV	#NV	#NV	#NV	#NV
640.73	645.73	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	1.0E–11	1.0E–11	1.0E–13	#NV	#NV	#NV	#NV	#NV	#NV

Interval position		Stationary flow parameters		Transient analysis														
				Flow regime		Formation parameters											Static conditions	
up	low	Q/s	T_M	Perturb phase	Recovery phase	T_{f1}	T_{f2}	T_{s1}	T_{s2}	T_T	T_{TMIN}	T_{TMAX}	C	ξ	dt_1	dt_2	p*	h_{wif}
m btoc	m btoc	m²/s	m²/s			m²/s	m²/s	m²/s	m²/s	m²/s	m²/s	m²/s	m³/Pa	–	min	min	kPa	masl
645.73	650.73	3.08E–09	2.55E–09	2	WBS2	2.8E–09	#NV	6.9E–09	#NV	2.8E–09	7.0E–10	5.0E–09	1.4E–11	1.9	0.9	10.3	6343.5	14.08
650.74	655.74	2.40E–10	1.98E–10	2	WBS2	1.6E–10	#NV	2.0E–10	#NV	2.0E–10	8.0E–11	6.0E–10	6.2E–12	1.4	#NV	#NV	6387.2	13.55
655.75	660.75	1.64E–10	1.36E–10	2	WBS2	8.7E–11	#NV	2.1E–10	#NV	2.1E–10	7.0E–11	6.0E–10	4.7E–12	4.2	#NV	#NV	6441.5	14.10
660.75	665.75	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	1.0E–11	1.0E–11	1.0E–13	#NV	#NV	#NV	#NV	#NV	#NV
665.76	670.76	7.93E–08	6.55E–08	2	WBS2	9.2E–08	#NV	1.9E–07	#NV	1.9E–07	8.0E–08	5.0E–07	2.1E–11	8.0	0.6	17.1	6538.7	14.05
670.76	675.76	1.12E–07	9.22E–08	2	WBS22	1.2E–07	#NV	1.6E–07	9.0E–08	1.6E–07	8.0E–08	4.0E–08	1.4E–11	0.9	0.2	0.4	6591.1	14.42
675.77	680.77	#NV	#NV	#NV	WBS22	#NV	#NV	2.7E–10	3.8E–10	2.7E–10	8.0E–11	6.0E–10	8.4E–12	3.8	0.6	6.9	#NV	#NV
680.78	685.78	#NV	#NV	#NV	WBS22	#NV	#NV	3.1E–09	1.4E–09	3.1E–09	5.0E–10	5.0E–09	2.3E–11	6.1	0.6	5.2	#NV	#NV

Notes

1 T1 and T2 refer to the transmissivity(s) derived
reported, in case a two zones composite model was recommended both T1 and T2 are given T_T denotes the recommended transmissivity.

2 The parameter p* denoted the static formation p
extrapolation.

3 The flow regime description refers to The recomme
the flow dimension used in the analysis (1 = linear flow
was used in the analysis, if two numbers are given (WBS22 or 22) a 2 zones composite model was used.

The Figures 7-1 to 7-3 present the transmissivity, conductivity and hydraulic freshwater head profiles.

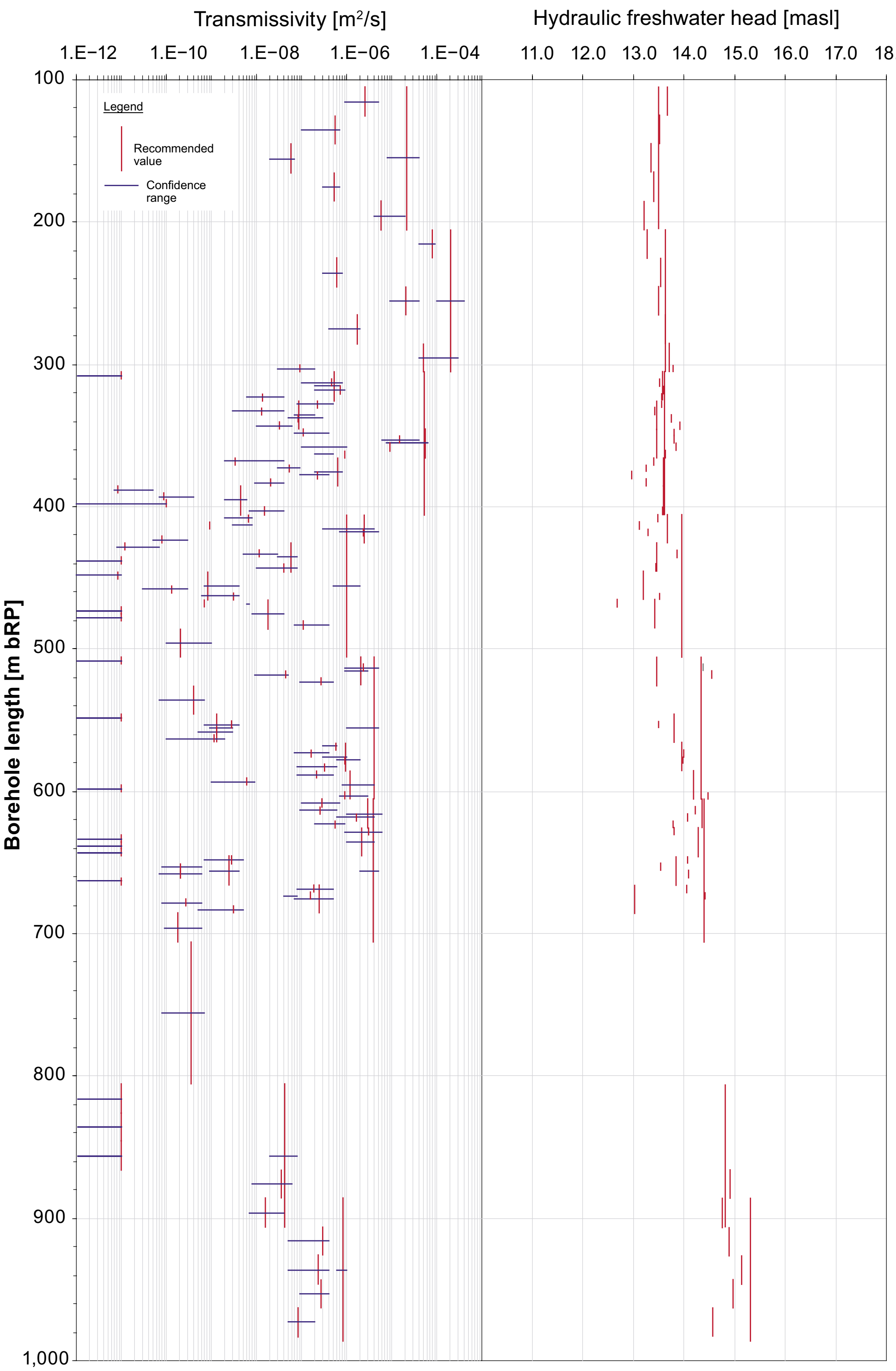


Figure 7-1. *Results summary – profiles of transmissivity and equivalent freshwater head, transmissivities derived from injectiontests, freshwater head extrapolated.*

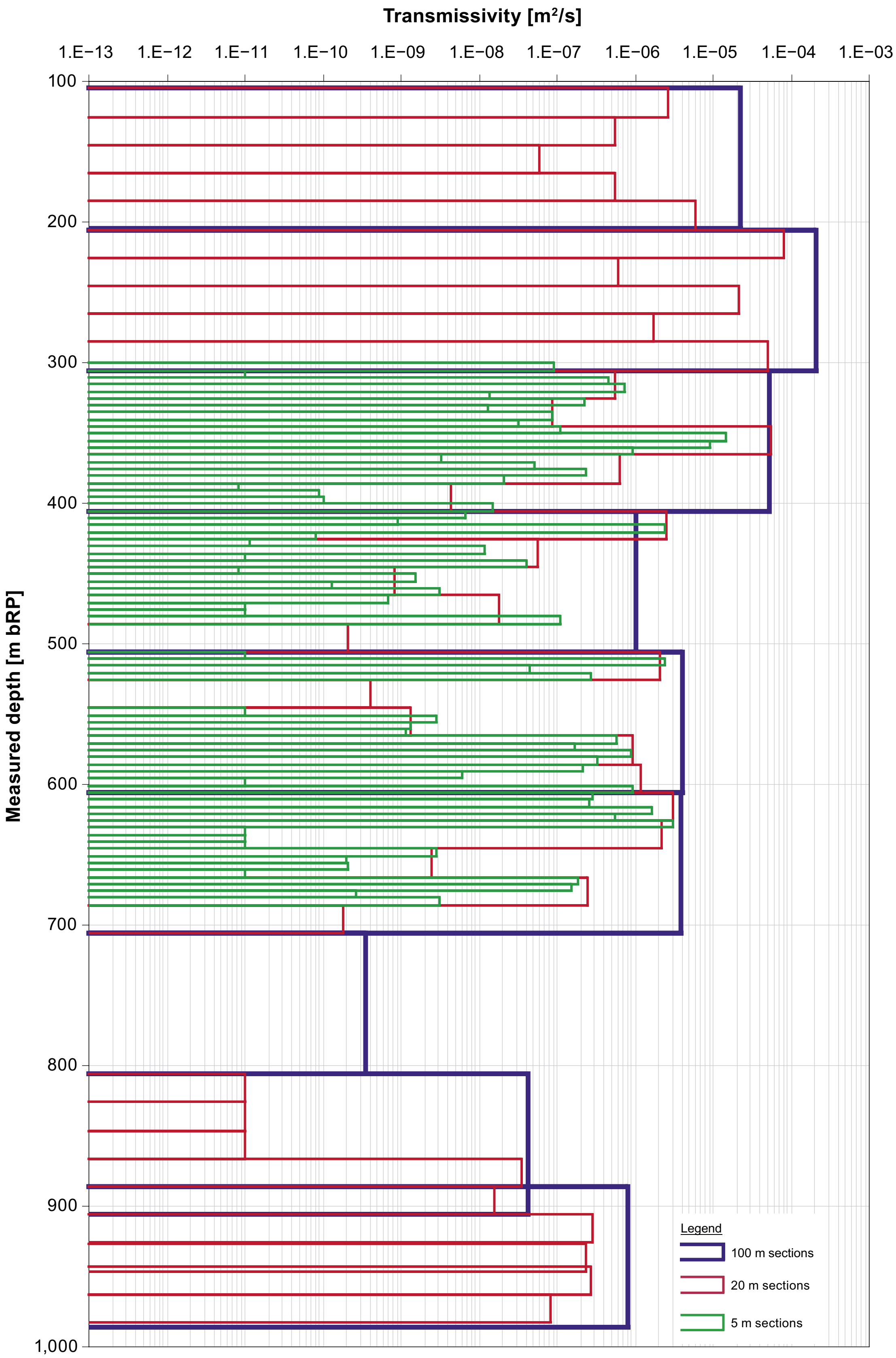


Figure 7-2. Results summary – profile of transmissivity.

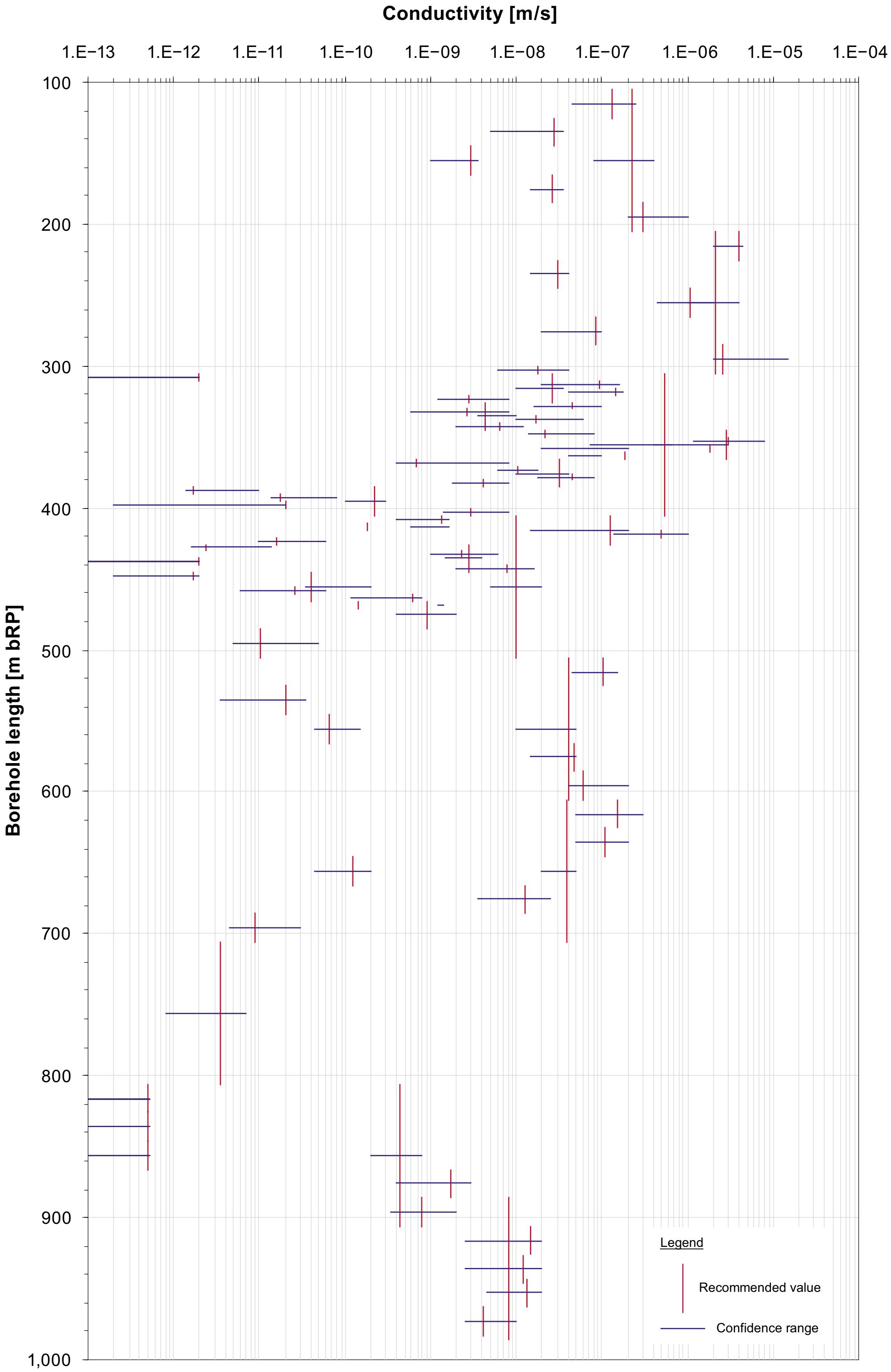


Figure 7-3. Results summary – profile of hydraulic conductivity.

7.2 Correlation analysis

A correlation analysis was used with the aim of examining the consistency of results and deriving general conclusion regarding the testing and analysis methods used.

7.2.1 Comparison of steady state and transient analysis results

The steady state derived transmissivities (T_M and Q/s) were compared in a cross-plot with the recommended transmissivity values derived from the transient analysis (see following figure).

The correlation analysis shows that nearly all of the steady state derived transmissivities differ by less than one order of magnitude from the transmissivities derived from the transient analysis.

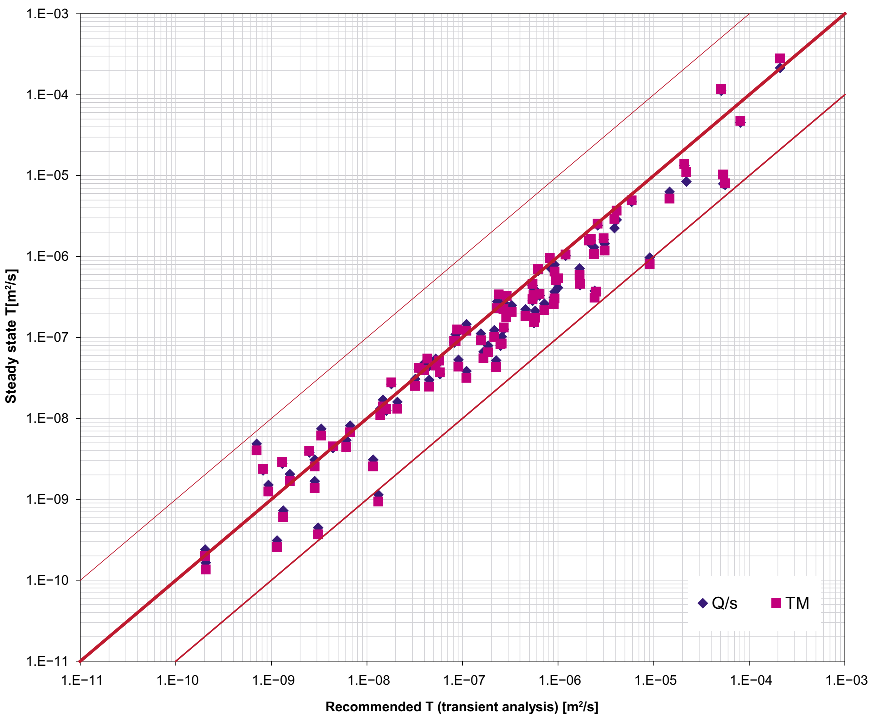


Figure 7-4. *Correlation analysis of transmissivities derived by steady state and transient methods.*

7.2.2 Comparison between the matched and theoretical wellbore storage coefficient

The wellbore storage coefficient describes the capacity of the test interval to store fluid as result to an unit pressure change in the interval. For a closed system (i.e. closed downhole valve) the theoretical value of the wellbore storage coefficient is given by the product between the interval volume and the test zone compressibility. The interval volume is calculated from the borehole radius and interval length. There are uncertainties concerning the interval volume calculation. Cavities or high transmissivity fractures intersecting the interval may enlarge the effective volume of the interval. The test zone compressibility is given by the sum of compressibilities of the individual components present in the interval (water, packer elements, other test tool components, and the borehole wall). A minimum value for the test zone compressibility is given by the water compressibility which is approx. 5E–10 1/Pa. For the calculation of the theoretical wellbore storage coefficient a test zone compressibility of 7E–10 1/Pa was used. The matched wellbore storage coefficient is derived from the transient type curve analysis by matching the unit slope early times derivative plotted in log-log coordinates.

The following figure presents a cross-plot of the matched and theoretical wellbore storage coefficients.

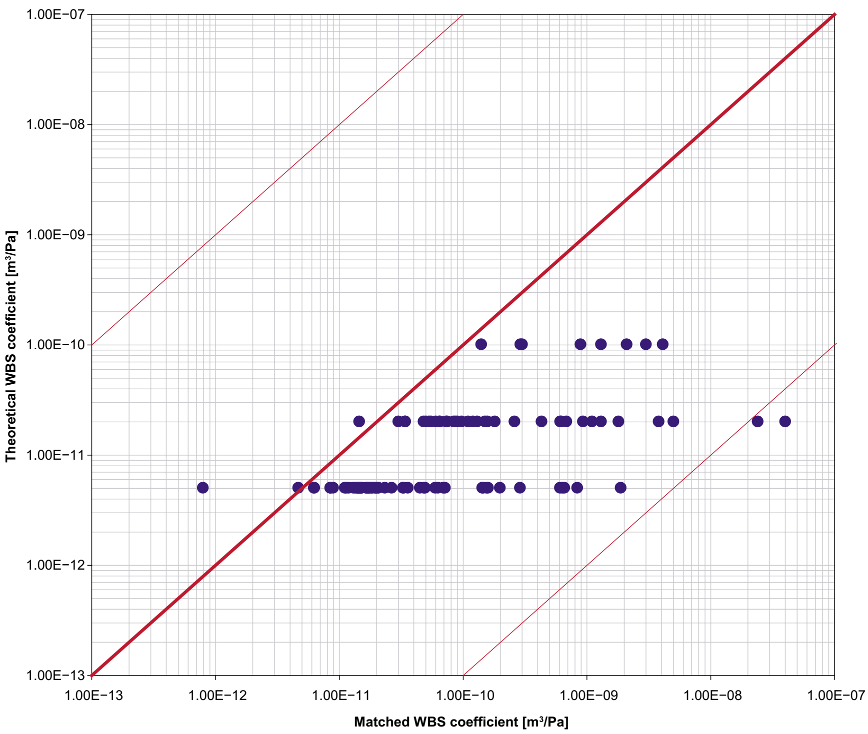


Figure 7-5. *Correlation analysis of theoretical and matched wellbore storage coefficients.*

It can be seen that the matched wellbore storage coefficients are up to three orders of magnitude larger than the theoretical values. A three orders of magnitude increase is difficult to explain by volume uncertainty. Even if large fractures are connected to the interval, a volume increase by three orders of magnitude does not seem probable. The discrepancy can be more likely explained by increased compressibility of the packer system. In order to better understand this phenomenon, a series of tool compressibility tests should be conducted in order to measure the tool compressibility and to assess to what extent the system behaves elastically.

In addition, the observed large skin factor and large borehole coefficients is described in /Spivey et al, 2002/ and explained by turbulent flow taking place in the formation (i.e. along fractures). The possible occurrence of this phenomenom could be examined by applying an adapted test design, for example by using step tests conducted at different pressure levels.

8 Conclusions

8.1 Transmissivity

Figure 7-1 presents a profile of transmissivity, including the confidence ranges derived from the transient analysis. The method used for deriving the recommended transmissivity and its confidence range is described in Section 5.5.7.

Whenever possible, the transmissivities derived are representative for the "undisturbed formation" further away from the borehole. The borehole vicinity was typically described by using a skin effect.

In some cases, no injection test could be performed due to the fact that the flow rates during the CHi phase were below the range of the flowmeter (< 0.5 mL/min). In such cases a pulse injection (Pi) was performed alternatively. Altogether 12 Pulse injection tests were performed and the recommended transmissivities of these sections range between 4.5E–12 m^2/s and 3.1E–9 m^2/s. Recommended transmissivities of the injection tests range between 1.0E–9 m^2/s and 2.0E–4 m^2/s.

The transmissivity profile in Figure 7-1 shows for the 100 m sections from 105 to 705 m transmissivities of 1E–6 m^2/s to 2E–4 m^2/s. The lowest transmissivity of the 100 m sections is 4E–10 m^2/s from 705–805 m. For the two sections below, transmissivities of 4.3E–8 and 8.2E–7 were derived. For the 20 m sections, the transmissivities range from 1E–9 m^2/s to 1E–4 m^2/s. The highest transmissivities were derived in the sections between 105 and 305 m. Between 305 and 705 m the values range typically between 1E–9 and 1E–6 m^2/s. 5 m sections were tested between 305 and 705 m. The highest transmissivity of 1.5E–5 m^2/s was derived from the test in section 350–355 m. In most of the cases the transmissivity is lower than 1E–6 m^2/s. Most of the lowest conductive sections are situated between 400 and 550 m and between 650 and 700 m.

Only one 20 m section (405–425 m) and some 5 m sections show larger transmissivities than the appropriate longer interval. The difference is not very large. This can be explained with crossflow and connection to the zone above. A connection to the upper zone is very hard to detect.

8.2 Equivalent freshwater head

Figure 7-1 presents a profile of the derived equivalent freshwater head expressed in meters above sea level. The method used for deriving the equivalent freshwater head is described in Section 5.5.6.

The head profile shows a freshwater head for the zone between 105 and 505 m depth between 13.0 and 14.0 m asl. Down to 900 m, the freshwater head increases continuously by less than 0.5 m per 100 m depth. This can be explained by a higher salinity of the water down from ca 500 m. The profile shows no distinct zones, which means that there is a good vertical connectivity in the formation around the borehole.

8.3 Flow regimes encountered

The flow models used in analysis were derived from the shape of the pressure derivative calculated with respect to log time and plotted in log-log coordinates.

In several cases the pressure derivative suggests a change of transmissivity with the distance from the borehole. In such cases a composite flow model was used in the analysis.

If there were different flow models matching the data in comparable quality, the simplest model was preferred.

In few cases very large skins has been observed. This is unusual and should be further examined. There are several possible explanations to this behaviour:

- If the behaviour is to be completely attributed to changes of transmissivity in the formation, this indicates the presence of larger transmissivity zones in the borehole vicinity, which could be caused by steep fractures that do not intersect the test interval, but are connected to the interval by lower transmissivity fractures. The fact that in many cases the test derivatives of adjacent test sections converge at late times seems to support this hypothesis.
- A further possibility is that the large skins are caused by turbulent flow taking place in the tool or in fractures connected to the test interval. This hypothesis is more difficult to examine. However, considering the fact that some high skins were observed in sections with transmissivities as low as 1E–8 m^2/s (which imply low flow rates) seems to speak against this hypothesis.

The flow dimension displayed by the test can be diagnosed from the slope of the pressure derivative. A slope of 0.5 indicates linear flow, a slope of 0 (horizontal derivative) indicates radial flow and a slope of –0.5 indicates spherical flow. The flow dimension diagnosis was commented for each of the tests. In all of the cases it was possible to get a good match quality by using radial flow geometry. In some cases an alternative analysis with a flow dimension unequal to two was performed. Those analyses are presented in Appendix 2.

9 References

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APPENDIX 1

File Description Table

HYDROTESTING WITH PSS				DRILLHOLE IDENTIFICATION NO.: KLX04					
TEST- AND FILEPROTOCOL				Testorder dated : 2004-08-18					
Teststart		Interval boundaries		Name of Datafiles		Testtype	Copied to	Plotted	Sign.
Date	Time	Upper	Lower	(*.HT2-file)	(*.CSV-file)		disk/CD	(date)	
2004-08-20	10:27	105.11	205.11	___KLX04_0105.21_200408200959.ht2	KLX04_105.11-205.11_040820_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-21	
2004-08-20	14:50	205.34	305.34	___KLX04_0205.34_200408201450.ht2	KLX04_205.34-305.34_040820_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-21	
2004-08-20	16:11	205.34	305.34	___KLX04_0205.34_200408201611.ht2	KLX04_205.34-305.34_040820_2_CHir_Q_r.csv	CHir	2004-09-08	2004-08-21	
2004-08-21	08:14	305.41	405.41	___KLX04_0305.41_200408210814.ht2	KLX04_305.41-405.41_040821_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-21	
2004-08-21	11:48	405.49	505.49	___KLX04_0405.49_200408211148.ht2	KLX04_405.49-505.49_040821_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-21	
2004-08-21	14:57	505.55	605.55	___KLX04_0505.55_200408211457.ht2	KLX04_505.55-605.55_040821_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-21	
2004-08-22	08:12	605.69	705.69	___KLX04_0605.69_200408220812.ht2	KLX04_605.69-705.69_040822_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-22	
2004-08-22	11:37	705.81	805.81	___KLX04_0705.81_200408221137.ht2	KLX04_705.81-805.81_040822_1_Pi_Q_r.csv	Pi	2004-09-08	2004-08-22	
2004-08-22	15:17	805.98	905.98	___KLX04_0805.98_200408221517.ht2	KLX04_805.98-905.98_040822_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-22	
2004-08-23	08:00	886.11	986.11	___KLX04_0886.11_200408230800.ht2	KLX04_886.11-986.11_040823_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-23	
2004-08-24	07:29	105.21	125.21	___KLX04_0105.21_200408240729.ht2	KLX04_105.21-125.21_040824_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-24	
2004-08-24	09:54	125.25	145.25	___KLX04_0125.25_200408240954.ht2	KLX04_125.25-145.25_040824_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-24	
2004-08-24	21:02	145.30	165.30	___KLX04_0145.30_200408242102.ht2	KLX04_145.30-165.30_040824_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-25	
2004-08-24	23:44	165.30	185.30	___KLX04_0165.30_200408242344.ht2	KLX04_165.30-185.30_040824_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-25	
2004-08-25	06:35	185.32	205.32	___KLX04_0185.32_200408250635.ht2	KLX04_185.32-205.32_040825_1_Chir_Q_r.csv	CHir	2004-09-08	2004-08-25	
2004-08-25	08:49	205.34	225.34	___KLX04_0205.34_200408250849.ht2	KLX04_205.34-225.34_040825_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-25	

HYDROTESTING WITH PSS					**DRILLHOLE IDENTIFICATION NO.: KLX04**					
TEST- AND FILEPROTOCOL					**Testorder dated : 2004-08-18**					
Teststart		Interval boundaries		Name of Datafiles		Testtype	Copied to	Plotted	Sign.
Date	Time	Upper	Lower	(*.HT2-file)	(*.CSV-file)		disk/CD	(date)	
2004-08-25	11:23	225.35	245.35	___KLX04_0225.35_200408251123.ht2	KLX04_225.35-245.35_040825_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-25	
2004-08-25	14:50	242.38	262.38	___KLX04_0242.38_200408251450.ht2	KLX04_242.38-262.38_040825_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-25	
2004-08-25	17:17	262.38	282.38	___KLX04_0262.38_200408251717.ht2	KLX04_262.38-282.38_040825_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-25	
2004-08-25	21:17	285.40	305.40	___KLX04_0285.40_200408252117.ht2	KLX04_285.40-305.40_040825_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-25	
2004-08-25	22:12	285.40	305.40	___KLX04_0285.40_200408252212.ht2	KLX04_285.40-305.40_040825_2_CHir_Q_r.csv	CHir	2004-09-08	2004-09-06	
2004-08-26	02:27	305.41	325.41	___KLX04_0305.41_200408260227.ht2	KLX04_305.41-325.41_040826_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-26	
2004-08-26	06:31	325.44	345.44	___KLX04_0325.44_200408260631.ht2	KLX04_325.44-345.44_040826_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-26	
2004-08-26	08:33	345.44	365.44	___KLX04_0345.44_200408260837.ht2	KLX04_345.44-365.44_040826_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-26	
2004-08-26	10:35	365.47	385.47	___KLX04_0365.47_200408261038.ht2	KLX04_365.47-385.47_040826_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-26	
2004-08-26	14:00	385.47	405.47	___KLX04_0385.47_200408261400.ht2	KLX04_385.47-405.47_040826_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-26	
2004-08-26	16:37	405.49	425.49	___KLX04_0405.49_200408261637.ht2	KLX04_405.49-425.49_040826_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-26	
2004-08-26	19:32	425.51	445.51	___KLX04_0425.51_200408261932.ht2	KLX04_425.51-445.51_040826_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-26	
2004-08-26	22:10	445.50	465.50	___KLX04_0445.50_200408262210.ht2	KLX04_445.50-465.50_040826_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-26	
2004-08-27	00:32	465.52	485.52	___KLX04_0465.52_200408262210.ht2	KLX04_465.52-485.52_040826_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-27	
2004-08-27	06:37	485.52	505.52	___KLX04_0485.52_200408270637.ht2	KLX04_485.52-505.52_040827_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-27	
2004-08-27	09:08	505.55	525.55	___KLX04_0505.55_200408270911.ht2	KLX04_505.55-525.55_040827_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-27	

HYDROTESTING WITH PSS	DRILLHOLE IDENTIFICATION NO.: KLX04
TEST- AND FILEPROTOCOL	Testorder dated : 2004-08-18

Teststart Date	Time	Interval boundaries Upper	Lower	Name of Datafiles (*.HT2-file)	(*.CSV-file)	Testtype	Copied to disk/CD	Plotted (date)	Sign.
2004-08-27	11:12	525.58	545.58	___KLX04_0525.58_200408271114.ht2	KLX04_525.58-545.58_040827_1_Pi_Q_r.csv	Pi	2004-09-08	2004-08-27	
2004-08-27	14:59	545.62	565.62	___KLX04_0545.62_200408271459.ht2	KLX04_545.62-565.62_040827_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-27	
2004-08-27	19:34	545.62	565.62	___KLX04_0545.62_200408271934.ht2	KLX04_545.62-565.62_040827_2_CHir_Q_r.csv	CHir	2004-09-08	2004-08-27	
2004-08-27	21:41	565.64	585.64	___KLX04_0565.64_200408272141.ht2	KLX04_565.64-585.64_040827_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-27	
2004-08-28	00:07	585.65	605.65	___KLX04_0585.65_200408280007.ht2	KLX04_585.65-605.65_040828_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-28	
2004-08-28	02:17	605.69	625.69	___KLX04_0605.69_200408280217.ht2	KLX04_605.69-625.69_040828_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-28	
2004-08-28	06:37	625.71	645.71	___KLX04_0625.71_200408280637.ht2	KLX04_625.71-645.71_040828_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-28	
2004-08-28	08:45	645.73	665.73	___KLX04_0645.73_200408280845.ht2	KLX04_645.73-665.73_040828_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-28	
2004-08-28	10:47	665.76	685.76	___KLX04_0665.76_200408281047.ht2	KLX04_665.76-685.76_040828_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-28	
2004-08-28	13:37	685.79	705.79	___KLX04_0685.79_200408281337.ht2	KLX04_685.79-705.79_040828_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-28	
2004-08-28	17:59	805.98	825.98	___KLX04_0805.98_200408281759.ht2	KLX04_805.98-825.98_040828_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-28	
2004-08-28	20:06	826.02	846.02	___KLX04_0826.02_200408282006.ht2	KLX04_826.02-846.02_040828_1_Pi_Q_r.csv	Pi	2004-09-08	2004-08-28	
2004-08-28	22:55	846.05	866.05	___KLX04_0846.05_200408282255.ht2	KLX04_846.05-866.05_040828_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-29	
2004-08-29	00:49	866.08	886.08	___KLX04_0866.08_200408290049.ht2	KLX04_866.08-886.08_040829_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-29	
2004-08-29	03:05	886.11	906.11	___KLX04_0886.11_200408290305.ht2	KLX04_886.11-906.11_040829_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-29	
2004-08-30	05:53	225.35	245.35	___KLX04_0225.35_200408300553.ht2	KLX04_225.35-245.35_040830_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-30	

HYDROTESTING WITH PSS					DRILLHOLE IDENTIFICATION NO.: KLX04				
TEST- AND FILEPROTOCOL					**Testorder dated : 2004-08-18**				
Teststart		Interval boundaries		Name of Datafiles		Testtype	Copied to	Plotted	Sign.
Date	Time	Upper	Lower	(*.HT2-file)	(*.CSV-file)		disk/CD	(date)	
2004-08-30	07:53	245.38	265.38	___KLX04_0245.38_200408300753.ht2	KLX04_245.38-265.38_040830_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-30	
2004-08-30	09:53	265.38	285.38	___KLX04_0265.38_200408300953.ht2	KLX04_265.38-285.38_040830_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-30	
2004-08-30	16:11	445.50	465.50	___KLX04_0445.50_200408301611.ht2	KLX04_445.50-465.50_040830_2_CHir_Q_r.csv	CHir	2004-09-08	2004-08-30	
2004-08-31	01:49	886.11	906.11	___KLX04_0886.11_200408310149.ht2	KLX04_886.11-906.11_040831_2_CHir_Q_r.csv	CHir	2004-09-08	2004-08-31	
2004-08-31	06:18	906.16	926.16	___KLX04_0906.16_200408310618.ht2	KLX04_906.16-926.16_040831_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-31	
2004-08-31	08:16	926.18	946.18	___KLX04_0926.18_200408310816.ht2	KLX04_926.18-946.18_040831_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-31	
2004-08-31	10:30	943.05	963.05	___KLX04_0943.05_200408311030.ht2	KLX04_943.05-963.05_040831_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-31	
2004-08-31	12:54	963.05	983.05	___KLX04_0963.05_200408311254.ht2	KLX04_963.05-983.05_040831_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-31	
2004-09-01	10:29	300.41	305.41	___KLX04_0300.41_200409011029.ht2	KLX04_300.41-305.41_040901_1_CHir_Q_r.csv	CHir	2004-09-08	2004-09-01	
2004-09-01	13:06	305.41	310.41	___KLX04_0305.41_200409011306.ht2	KLX04_305.41-310.41_040901_1_CHir_Q_r.csv	-	2004-09-08	2004-09-01	
2004-09-01	14:43	310.42	315.42	___KLX04_0310.42_200409011443.ht2	KLX04_310.42-315.42_040901_1_CHir_Q_r.csv	CHir	2004-09-08	2004-09-01	
2004-09-01	16:25	315.43	320.43	___KLX04_0315.43_200409011625.ht2	KLX04_315.43-320.43_040901_1_CHir_Q_r.csv	CHir	2004-09-08	2004-09-01	
2004-09-01	18:55	320.43	325.34	___KLX04_0320.43_200409011855.ht2	KLX04_320.43-325.43_040901_1_CHir_Q_r.csv	CHir	2004-09-08	2004-09-01	
2004-09-01	23:17	325.44	330.44	___KLX04_0325.44_200409012317.ht2	KLX04_325.44-330.44_040901_1_CHir_Q_r.csv	CHir	2004-09-08	2004-09-02	
2004-09-02	05:51	330.44	335.44	___KLX04_0330.44_200409020551.ht2	KLX04_330.44-335.44_040902_1_CHir_Q_r.csv	CHir	2004-09-08	2004-09-02	
2004-09-02	07:47	335.44	340.44	___KLX04_0335.44_200409020747.ht2	KLX04_335.44-340.44_040902_1_CHir_Q_r.csv	CHir	2004-09-08	2004-09-02	

HYDROTESTING WITH PSS					DRILLHOLE IDENTIFICATION NO.: KLX04				
TEST- AND FILEPROTOCOL					**Testorder dated : 2004-08-18**				
Teststart		Interval boundaries		Name of Datafiles		Testtype	Copied to	Plotted	Sign.
Date	Time	Upper	Lower	(*.HT2-file)	(*.CSV-file)		disk/CD	(date)	
2004-09-02	09:24	340.44	345.44	___KLX04_0340.44_200409020924.ht2	KLX04_340.44-345.44_040902_1_CHir_Q_r.csv	CHir	2004-09-08	2004-09-02	
2004-09-02	11:09	345.44	350.44	___KLX04_0345.44_200409021109.ht2	KLX04_345.44-350.44_040902_1_CHir_Q_r.csv	CHir	2004-09-08	2004-09-02	
2004-09-02	13:20	350.45	355.45	___KLX04_0350.45_200409021320.ht2	KLX04_350.45-355.45_040902_1_CHir_Q_r.csv	CHir	2004-09-08	2004-09-02	
2004-09-02	15:14	355.47	360.47	___KLX04_0355.47_200409021514.ht2	KLX04_355.47-360.47_040902_1_CHir_Q_r.csv	CHir	2004-09-08	2004-09-02	
2004-09-02	16:57	360.47	365.47	___KLX04_0360.47_200409021657.ht2	KLX04_360.47-365.47_040902_1_CHir_Q_r.csv	CHir	2004-09-08	2004-09-02	
2004-09-02	20:18	375.47	370.47	___KLX04_0365.47_200409022018.ht2	KLX04_365.47-370.47_040902_1_CHir_Q_r.csv	CHir	2004-09-08	2004-09-02	
2004-09-02	22:36	370.47	375.47	___KLX04_0370.47_200409022236.ht2	KLX04_370.47-375.47_040902_1_CHir_Q_r.csv	CHir	2004-09-08	2004-09-03	
2004-09-03	05:55	375.47	380.47	___KLX04_0375.47_200409030555.ht2	KLX04_375.47-380.47_040903_1_CHir_Q_r.csv	CHir	2004-09-08	2004-09-03	
2004-09-03	07:31	380.47	385.47	___KLX04_0380.47_200409030731.ht2	KLX04_380.47-385.47_040903_1_CHir_Q_r.csv	CHir	2004-09-08	2004-09-03	
2004-09-03	09:25	385.47	390.47	___KLX04_0385.47_200409030925.ht2	KLX04_385.47-390.47_040903_1_PI_Q_r.csv	Pi	2004-09-08	2004-09-03	
2004-09-03	12:21	390.48	395.48	___KLX04_0390.48_200409031221.ht2	KLX04_390.48-395.48_040903_1_PI_Q_r.csv	Pi	2004-09-08	2004-09-03	
2004-09-03	14:09	395.48	400.48	___KLX04_0395.48_200409031409.ht2	KLX04_395.48-400.48_040903_1_PI_Q_r.csv	Pi	2004-09-08	2004-09-03	
2004-09-03	16:10	400.48	405.48	___KLX04_0400.48_200409031610.ht2	KLX04_400.48-405.48_040903_1_Chir_Q_r.csv	CHir	2004-09-08	2004-09-03	
2004-09-03	18:30	405.49	410.49	___KLX04_0405.49_200409031830.ht2	KLX04_405.49-410.49_040903_1_Chir_Q_r.csv	CHir	2004-09-08	2004-09-03	
2004-09-03	21:22	410.50	415.50	___KLX04_0410.50_200409032122.ht2	KLX04_410.50-415.50_040903_1_Chir_Q_r.csv	CHir	2004-09-08	2004-09-03	
2004-09-03	23:33	415.51	420.51	___KLX04_0415.51_200409032333.ht2	KLX04_415.51-420.51_040903_1_Chir_Q_r.csv	CHir	2004-09-08	2004-09-04	

HYDROTESTING WITH PSS	DRILLHOLE IDENTIFICATION NO.: KLX04
TEST- AND FILEPROTOCOL	Testorder dated : 2004-08-18

Teststart Date	Time	Interval boundaries Upper	Lower	Name of Datafiles (*.HT2-file)	(*.CSV-file)	Testtype	Copied to disk/CD	Plotted (date)	Sign.
2004-09-04	06:01	420.51	425.51	___KLX04_0420.51_200409040601.ht2	KLX04_420.51-425.51_040904_1_Pi_Q_r.csv	Pi	2004-09-08	2004-09-04	
2004-09-04	07:55	425.51	430.51	___KLX04_0425.51_200409040755.ht2	KLX04_425.51-430.51_040904_1_Pi_Q_r.csv	Pi	2004-09-08	2004-09-04	
2004-09-04	09:37	430.51	435.51	___KLX04_0430.51_200409040937.ht2	KLX04_430.51-435.51_040904_1_CHir_Q_r.csv	CHir	2004-09-08	2004-09-04	
2004-09-04	12:31	435.50	440.50	___KLX04_0435.50_200409041231.ht2	KLX04_435.50-440.50_040904_1_CHir_Q_r.csv	-	2004-09-08	2004-09-04	
2004-09-04	14:00	440.50	445.50	___KLX04_0440.50_200409041400.ht2	KLX04_440.50-445.50_040904_1_CHir_Q_r.csv	CHir	2004-09-08	2004-09-04	
2004-09-04	15:38	445.50	450.50	___KLX04_0445.50_200409041538.ht2	KLX04_445.50-450.50_040904_1_Pi_Q_r.csv	Pi	2004-09-08	2004-09-04	
2004-09-04	18:04	450.50	455.50	___KLX04_0450.50_200409041804.ht2	KLX04_450.50-455.50_040904_1_Chir_Q_r.csv	CHir	2004-09-08	2004-09-04	
2004-09-04	20:00	455.50	460.50	___KLX04_0455.50_200409042000.ht2	KLX04_455.50-460.50_040904_1_Pi_Q_r.csv	Pi	2004-09-08	2004-09-04	
2004-09-04	23:06	460.51	465.51	___KLX04_0460.51_200409042306.ht2	KLX04_460.51-465.51_040904_1_Chir_Q_r.csv	Chir	2004-09-08	2004-09-05	
2004-09-05	01:14	465.52	470.52	___KLX04_0465.52_200409050114.ht2	KLX04_465.52-470.52_040905_1_Chir_Q_r.csv	Chir	2004-09-08	2004-09-05	
2004-09-05	05:46	470.52	475.52	___KLX04_0470.52_200409050546.ht2	KLX04_470.52-475.52_040905_1_Chir_Q_r.csv	-	2004-09-08	2004-09-05	
2004-09-05	07:27	475.52	480.52	___KLX04_0475.52_200409050727.ht2	KLX04_475.52-480.52_040905_1_Chir_Q_r.csv	-	2004-09-08	2004-09-05	
2004-09-05	08:55	480.52	485.52	___KLX04_0480.52_200409050857.ht2	KLX04_480.52-485.52_040905_1_Chir_Q_r.csv	Chir	2004-09-08	2004-09-05	
2004-09-05	10:34	505.55	510.55	___KLX04_0505.55_200409051034.ht2	KLX04_505.55-510.55_040905_1_Chir_Q_r.csv	-	2004-09-08	2004-09-05	
2004-09-05	12:46	510.56	515.56	___KLX04_0510.56_200409051246.ht2	KLX04_510.56-515.56_040905_1_Chir_Q_r.csv	Chir	2004-09-08	2004-09-05	
2004-09-05	14:22	515.56	520.56	___KLX04_0515.56_200409051422.ht2	KLX04_515.56-520.56_040905_1_Chir_Q_r.csv	Chir	2004-09-08	2004-09-05	

HYDROTESTING WITH PSS					DRILLHOLE IDENTIFICATION NO.: KLX04				
TEST- AND FILEPROTOCOL					**Testorder dated : 2004-08-18**				
Teststart		Interval boundaries		Name of Datafiles		Testtype	Copied to	Plotted	Sign.
Date	Time	Upper	Lower	(*.HT2-file)	(*.CSV-file)		disk/CD	(date)	
2004-09-05	16:00	520.57	525.57	___KLX04_0520.57_200409051600.ht2	KLX04_520.57-525.57_040905_1_Chir_Q_r.csv	Chir	2004-09-08	2004-09-05	
2004-09-05	18:17	545.62	550.62	___KLX04_0545.62_200409051817.ht2	KLX04_545.62-550.62_040905_1_Chir_Q_r.csv	-	2004-09-08	2004-09-05	
2004-09-05	20:03	550.62	555.62	___KLX04_0550.62_200409052003.ht2	KLX04_550.62-555.62_040905_1_Chir_Q_r.csv	Chir	2004-09-08	2004-09-05	
2004-09-05	22:32	555.63	560.63	___KLX04_0555.63_200409052232.ht2	KLX04_555.63-560.63_040905_1_Chir_Q_r.csv	Chir	2004-09-08	2004-09-05	
2004-09-06	00:46	560.63	565.63	___KLX04_0560.63_200409060046.ht2	KLX04_560.63-565.63_040906_1_Chir_Q_r.csv	Chir	2004-09-08	2004-09-06	
2004-09-06	06:09	565.64	570.64	___KLX04_0565.64_200409060609.ht2	KLX04_565.64-570.64_040906_1_Chir_Q_r.csv	Chir	2004-09-08	2004-09-06	
2004-09-06	07:42	570.64	575.64	___KLX04_0570.64_200409060742.ht2	KLX04_570.64-575.64_040906_1_Chir_Q_r.csv	Chir	2004-09-08	2004-09-06	
2004-09-06	09:15	575.65	580.65	___KLX04_0575.65_200409060915.ht2	KLX04_575.65-580.65_040906_1_Chir_Q_r.csv	Chir	2004-09-08	2004-09-06	
2004-09-06	10:50	580.65	585.65	___KLX04_0580.65_200409061050.ht2	KLX04_580.65-585.65_040906_1_Chir_Q_r.csv	Chir	2004-09-08	2004-09-06	
2004-09-06	13:11	585.67	590.67	___KLX04_0585.67_200409061311.ht2	KLX04_585.67-590.67_040906_1_Chir_Q_r.csv	Chir	2004-09-08	2004-09-06	
2004-09-06	14:45	590.67	595.67	___KLX04_0590.67_200409061445.ht2	KLX04_590.67-595.67_040906_1_Chir_Q_r.csv	Chir	2004-09-08	2004-09-06	
2004-09-06	16:36	595.69	600.69	___KLX04_0595.69_200409061636.ht2	KLX04_595.69-600.69_040906_1_Chir_Q_r.csv	-	2004-09-08	2004-09-06	
2004-09-06	18:43	600.69	605.69	___KLX04_0600.69_200409061843.ht2	KLX04_600.69-605.69_040906_1_Chir_Q_r.csv	Chir	2004-09-08	2004-09-06	
2004-09-06	20:57	605.69	610.69	___KLX04_0605.69_200409062057.ht2	KLX04_605.69-610.69_040906_1_Chir_Q_r.csv	Chir	2004-09-08	2004-09-06	
2004-09-06	22:41	610.70	615.70	___KLX04_0610.70_200409062241.ht2	KLX04_610.70-615.70_040906_1_Chir_Q_r.csv	Chir	2004-09-08	2004-09-07	
2004-09-07	00:39	615.70	620.70	___KLX04_0615.70_200409070039.ht2	KLX04_615.70-620.70_040907_1_Chir_Q_r.csv	Chir	2004-09-08	2004-09-07	

HYDROTESTING WITH PSS	**DRILLHOLE IDENTIFICATION NO.: KLX04**
TEST- AND FILEPROTOCOL	**Testorder dated : 2004-08-18**

Teststart		Interval boundaries		Name of Datafiles		Testtype	Copied to	Plotted	Sign.
Date	Time	Upper	Lower	(*.HT2-file)	(*.CSV-file)		disk/CD	(date)	
2004-09-07	06:12	625.71	625.71	___KLX04_0620.71_200409070612.ht2	KLX04_620.71-625.71_040907_1_Chir_Q_r.csv	Chir	2004-09-08	2004-09-07	
2004-09-07	07:41	625.71	630.71	___KLX04_0625.71_200409070741.ht2	KLX04_625.71-630.71_040907_1_Chir_Q_r.csv	Chir	2004-09-08	2004-09-07	
2004-09-07	09:16	630.72	635.72	___KLX04_0630.72_200409070916.ht2	KLX04_630.72-635.72_040907_1_Chir_Q_r.csv	-	2004-09-08	2004-09-07	
2004-09-07	10:44	635.72	640.72	___KLX04_0635.72_200409071044.ht2	KLX04_635.72-640.72_040907_1_Chir_Q_r.csv	-	2004-09-08	2004-09-07	
2004-09-07	12:29	640.73	645.73	___KLX04_0640.73_200409071229.ht2	KLX04_640.73-645.73_040907_1_Chir_Q_r.csv	-	2004-09-08	2004-09-07	
2004-09-07	14:03	645.73	650.73	___KLX04_0645.73_200409071403.ht2	KLX04_645.73-650.73_040907_1_Chir_Q_r.csv	Chir	2004-09-08	2004-09-07	
2004-09-07	15:37	650.74	655.74	___KLX04_0650.74_200409071537.ht2	KLX04_650.74-655.74_040907_1_Chir_Q_r.csv	Chir	2004-09-08	2004-09-07	
2004-09-07	18:16	655.75	660.75	___KLX04_0655.75_200409071816.ht2	KLX04_655.75-660.75_040907_1_Chir_Q_r.csv	Chir	2004-09-08	2004-09-07	
2004-09-07	22:36	660.75	665.75	___KLX04_0660.75_200409072236.ht2	KLX04_660.75-665.75_040907_1_Chir_Q_r.csv	-	2004-09-08	2004-09-08	
2004-09-08	00:22	665.76	670.76	___KLX04_0665.76_200409080022.ht2	KLX04_665.76-670.76_040908_1_Chir_Q_r.csv	Chir	2004-09-08	2004-09-08	
2004-09-08	10:39	670.76	675.76	___KLX04_0670.76_200409081039.ht2	KLX04_670.76-675.76_040908_1_Chir_Q_r.csv	Chir	2004-09-08	2004-09-08	
2004-09-08	14:08	675.77	680.77	___KLX04_0675.77_200409081408.ht2	KLX04_675.77-680.77_040908_1_Pi_Q_r.csv	Pi	2004-09-08	2004-09-08	
2004-09-08	16:18	680.78	685.78	___KLX04_0680.78_200409081618.ht2	KLX04_680.78-685.78_040908_1_Pi_Q_r.csv	Pi	2004-09-08	2004-09-08	

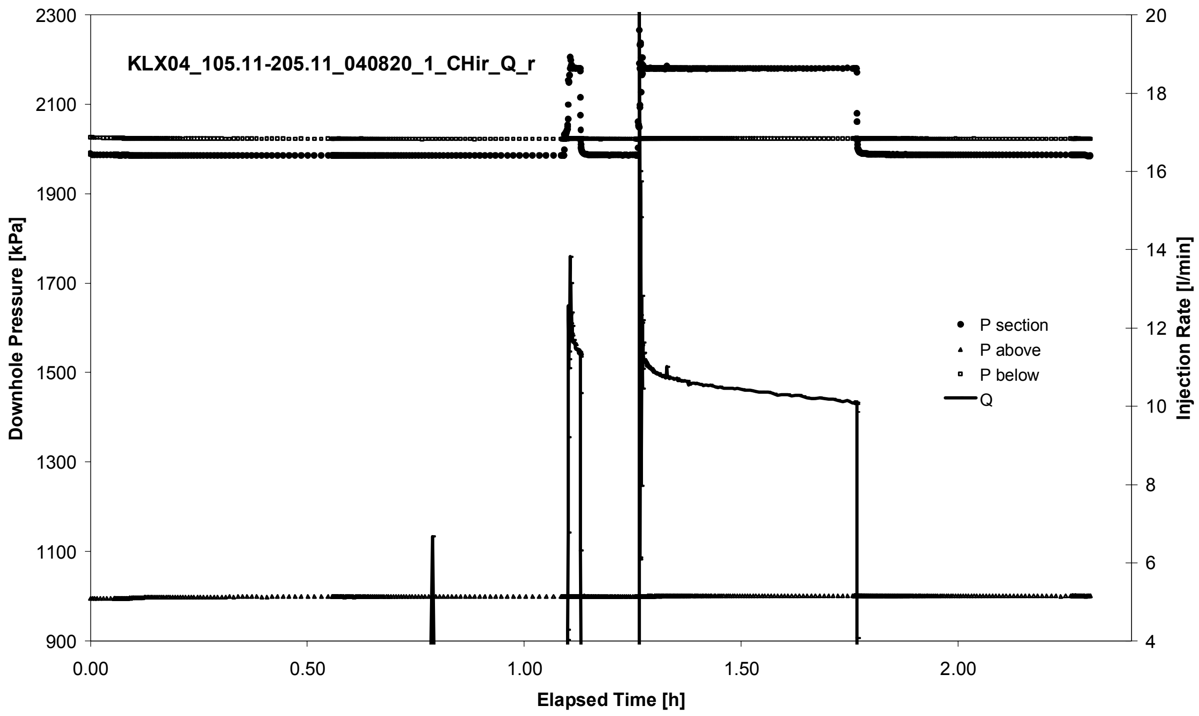
APPENDIX 2

Analysis diagrams

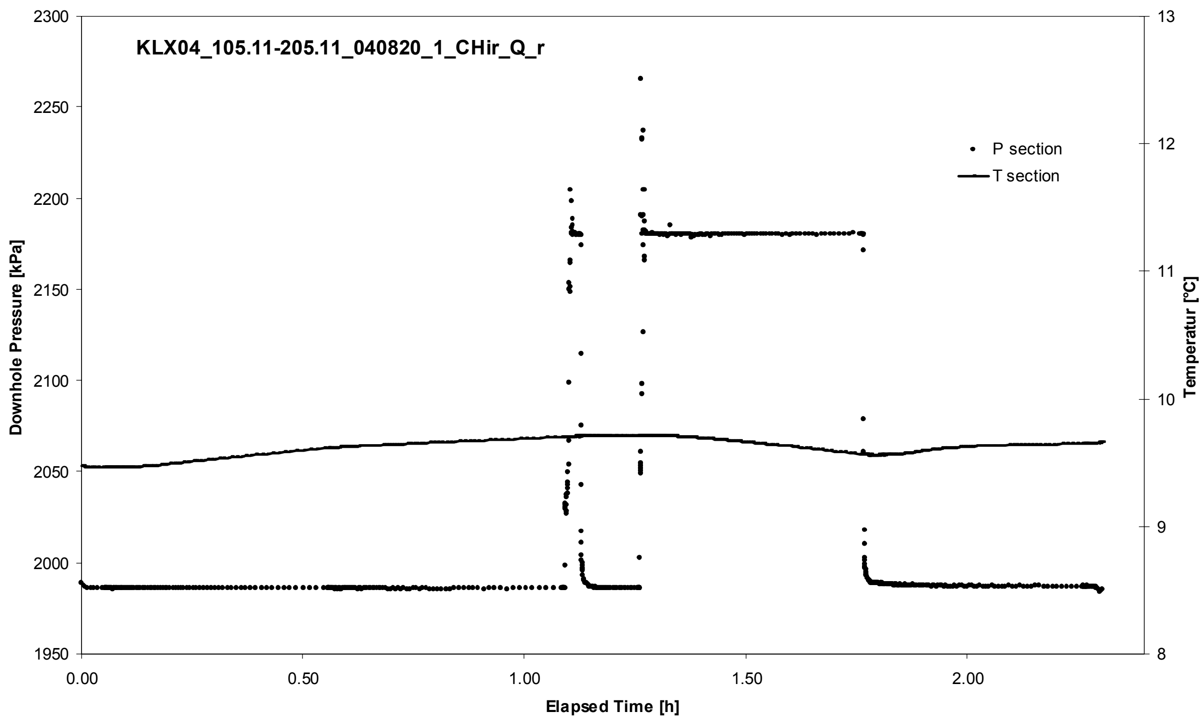
APPENDIX 2-1

Test 105.11 – 205.11 m

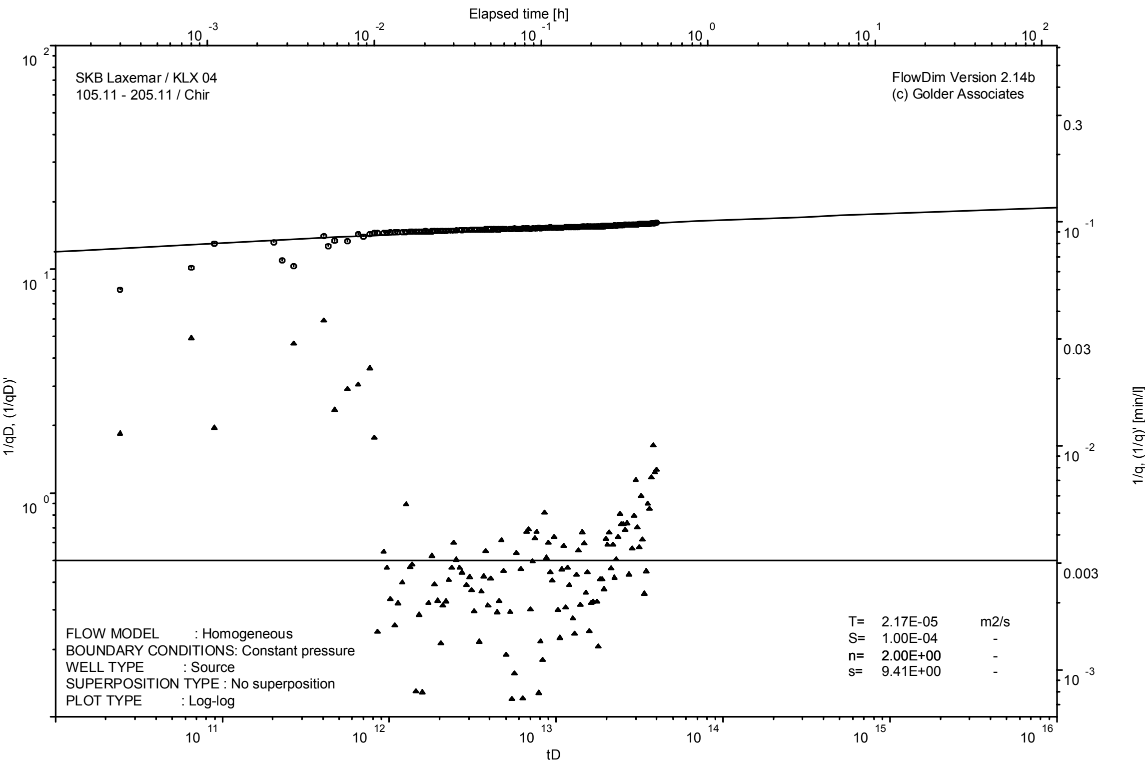
Analysis diagrams



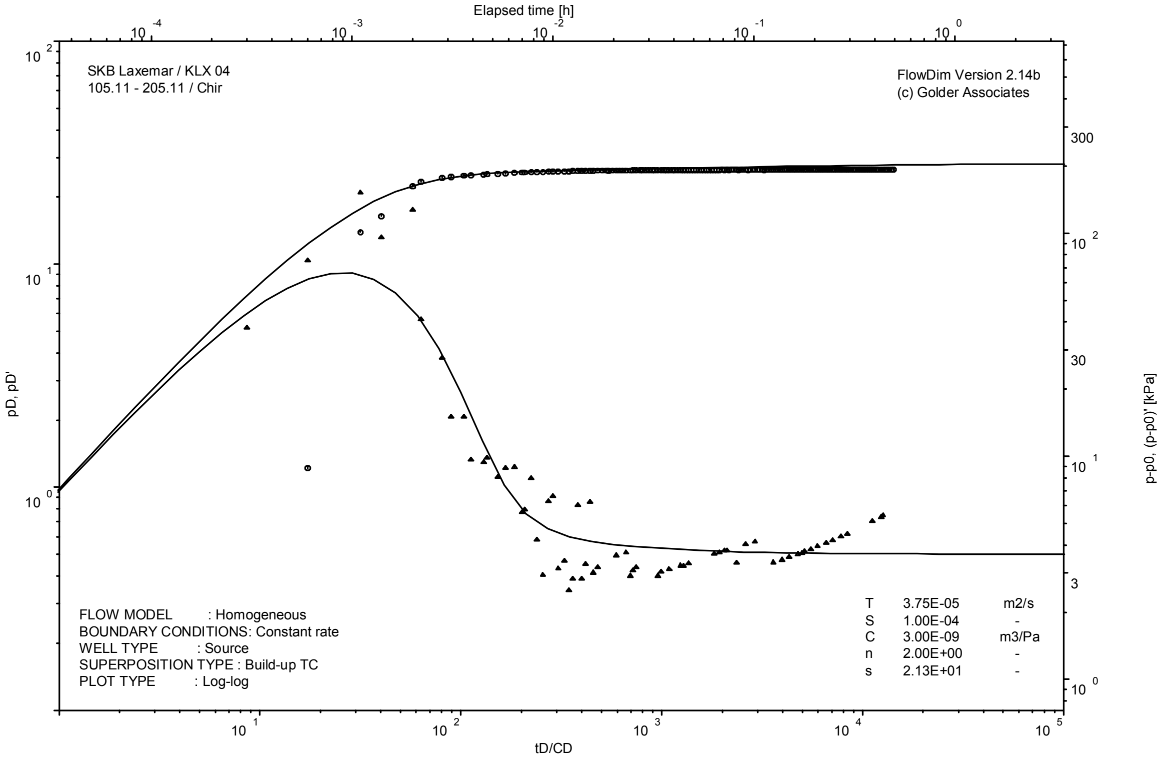
Pressure and flow rate vs. time; cartesian plot



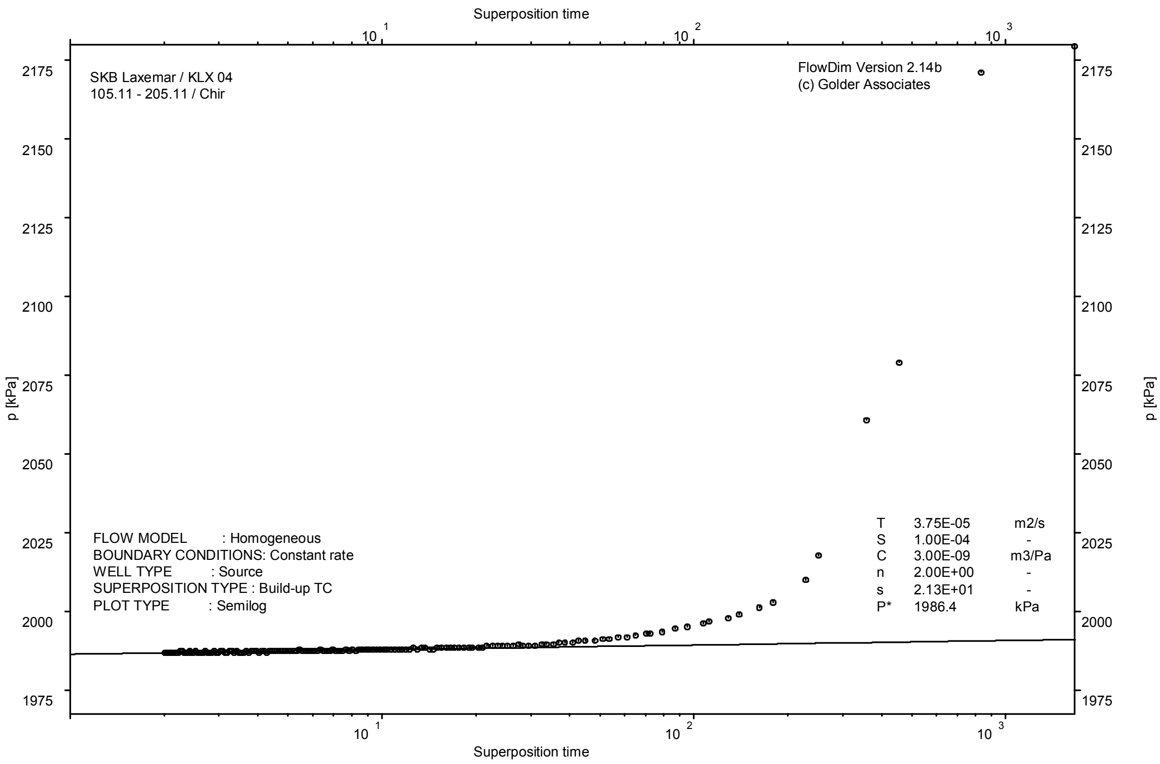
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

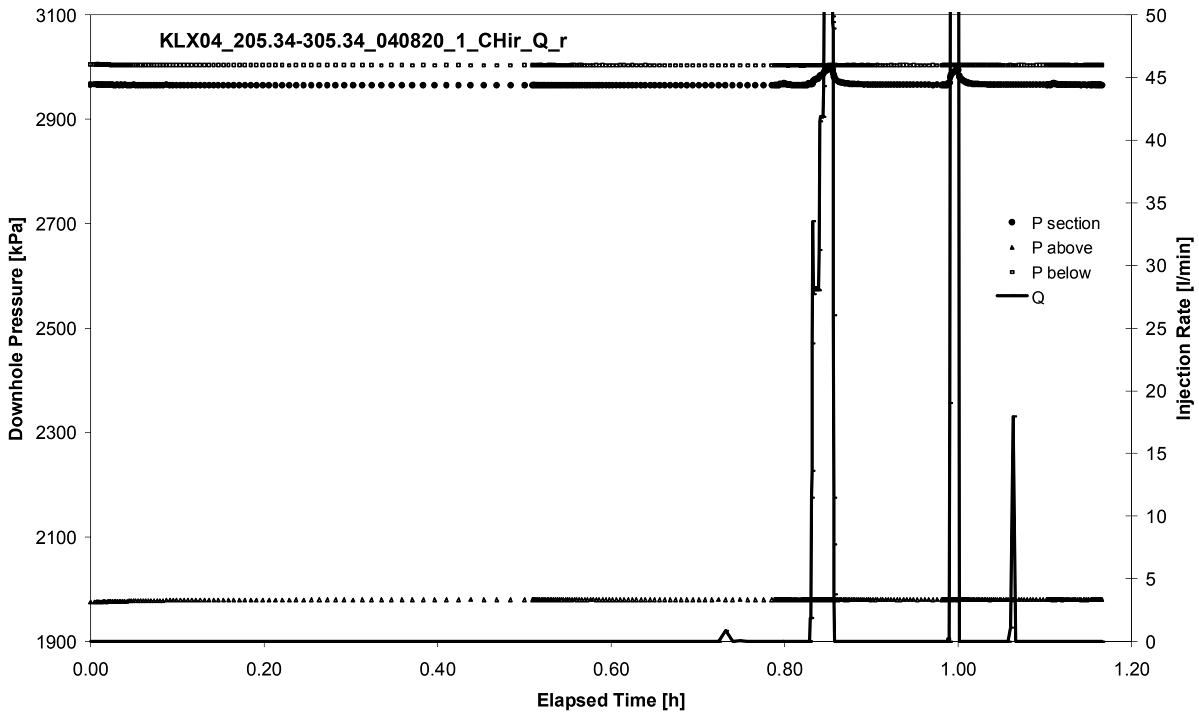


CHIR phase; HORNER match

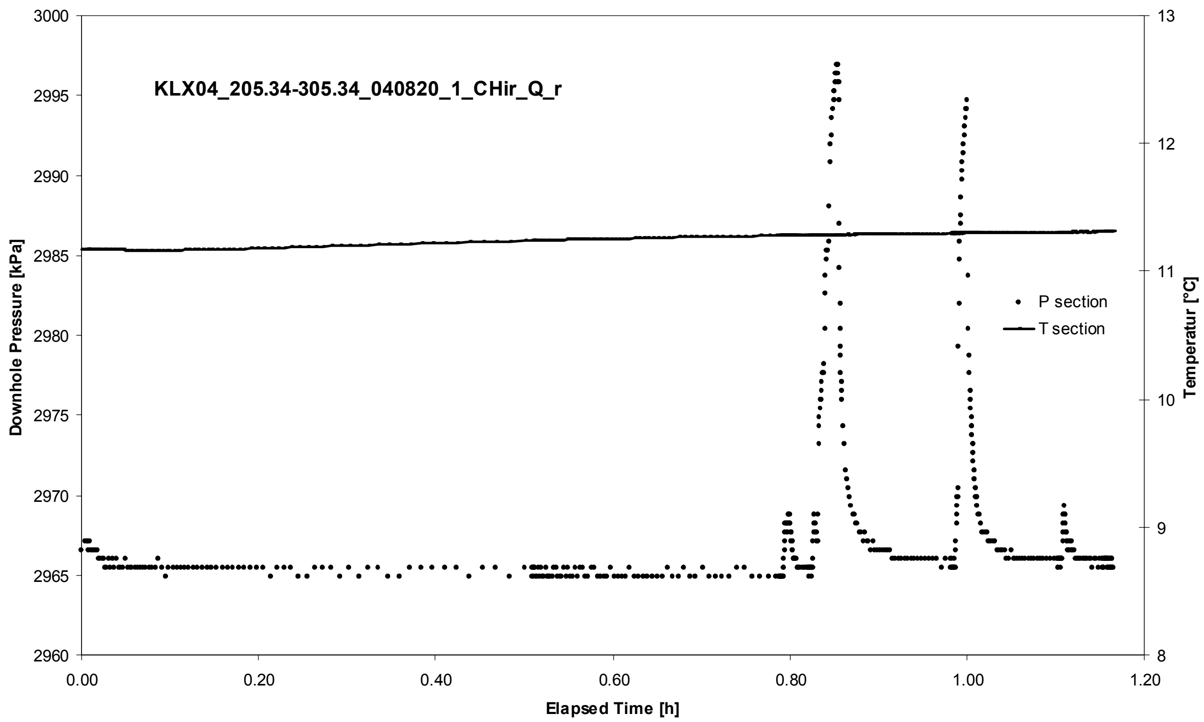
APPENDIX 2-2

Test 205.34 – 305.34 m

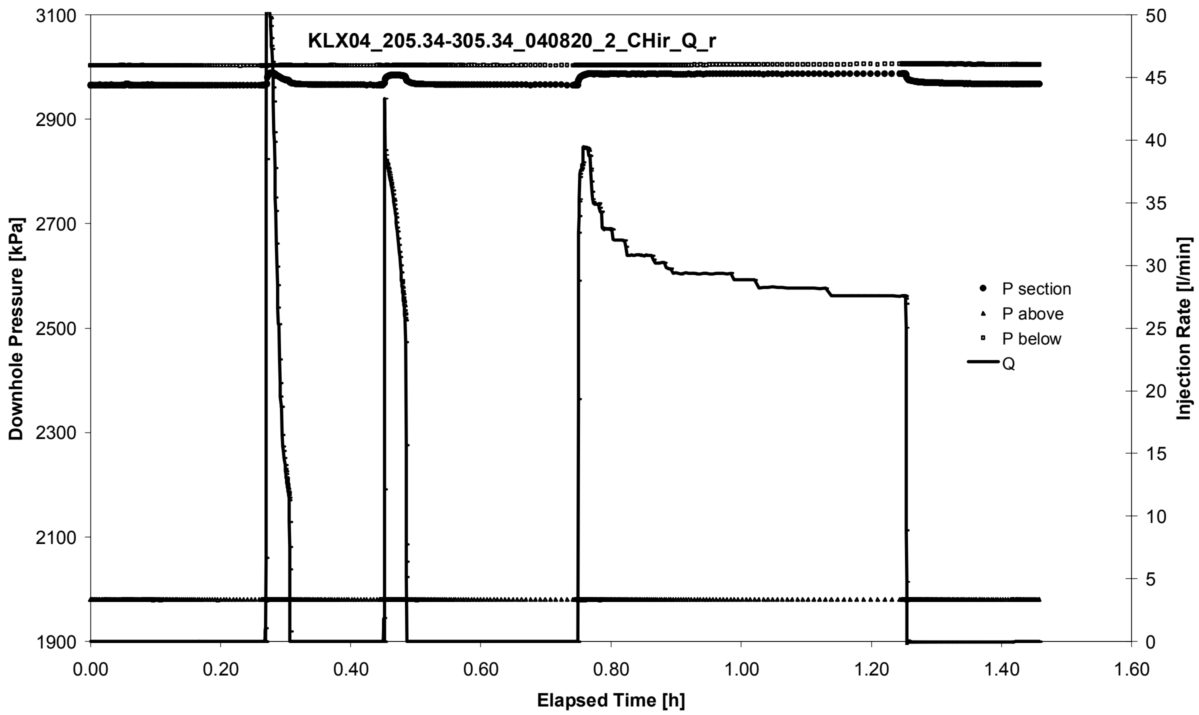
Analysis diagrams



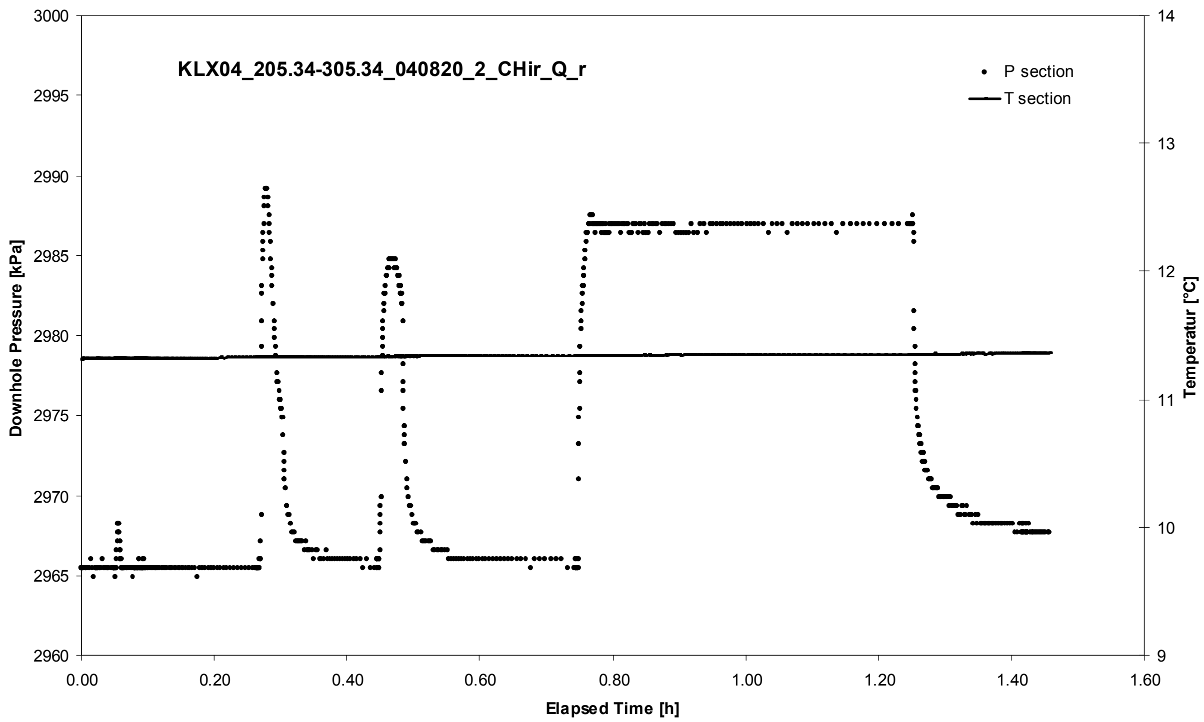
Pressure and flow rate vs. time; cartesian plot (test repeated)



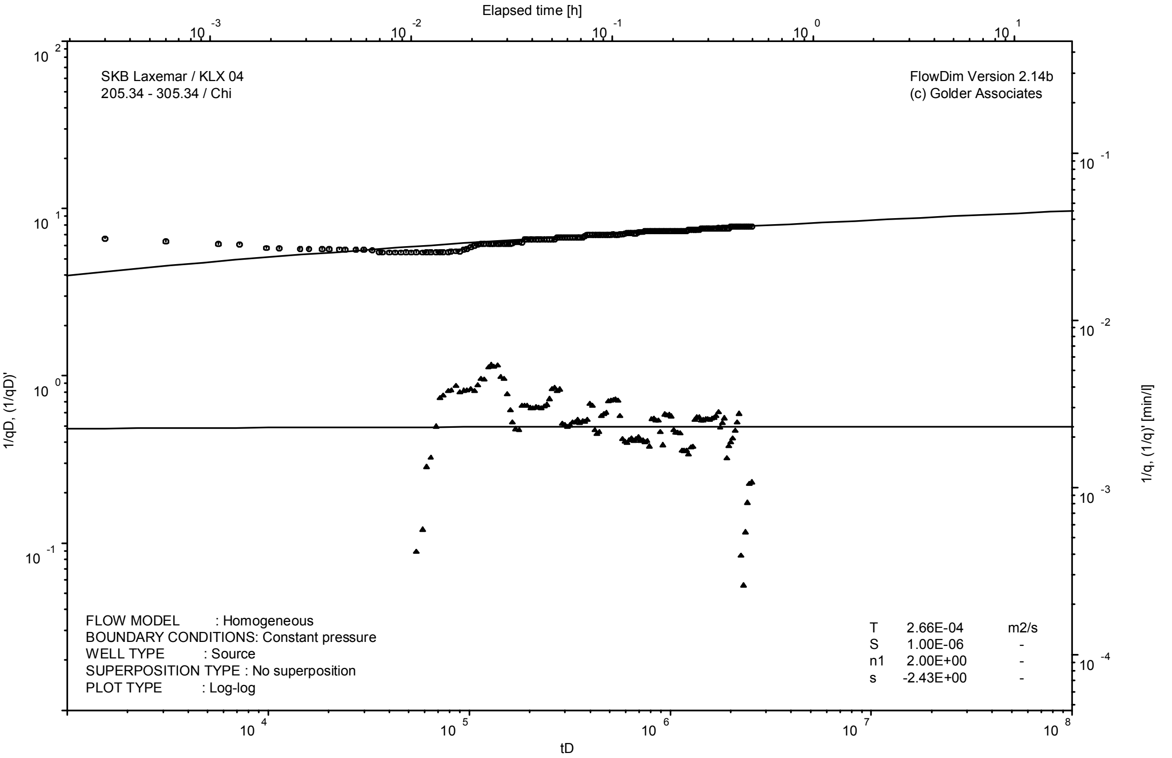
Interval pressure and temperature vs. time; cartesian plot (test repeated)



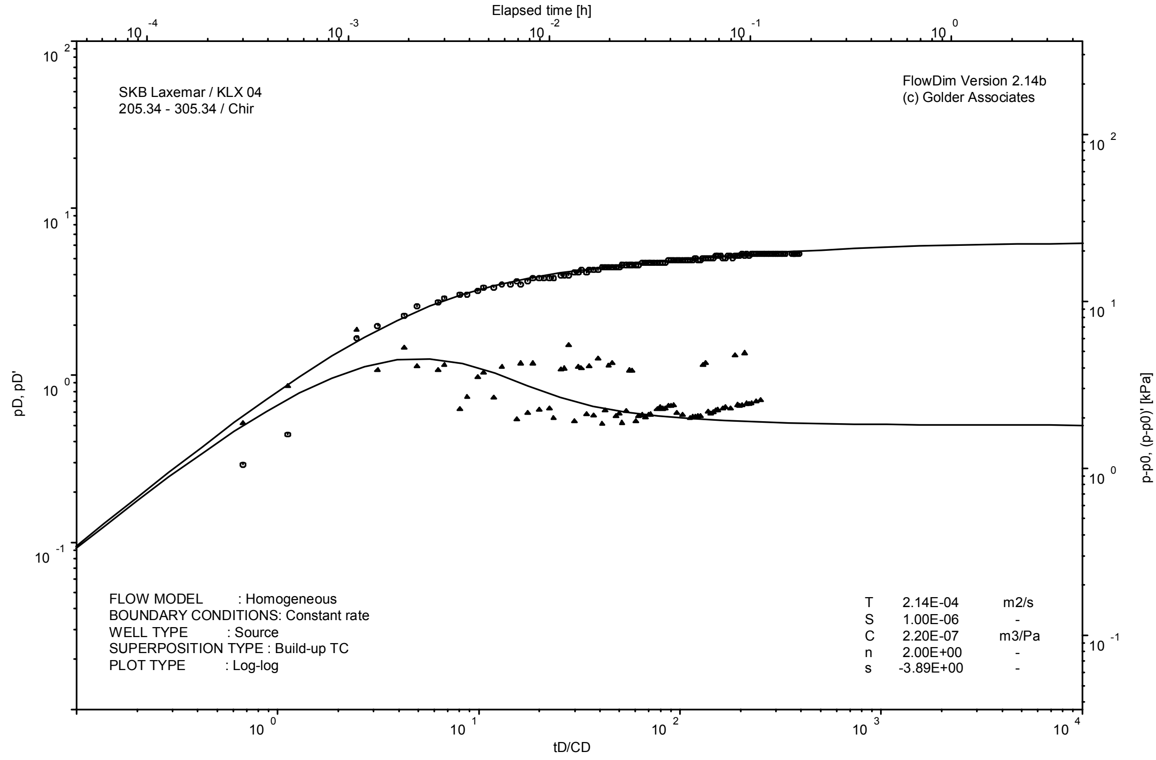
Pressure and flow rate vs. time; cartesian plot (analysed)



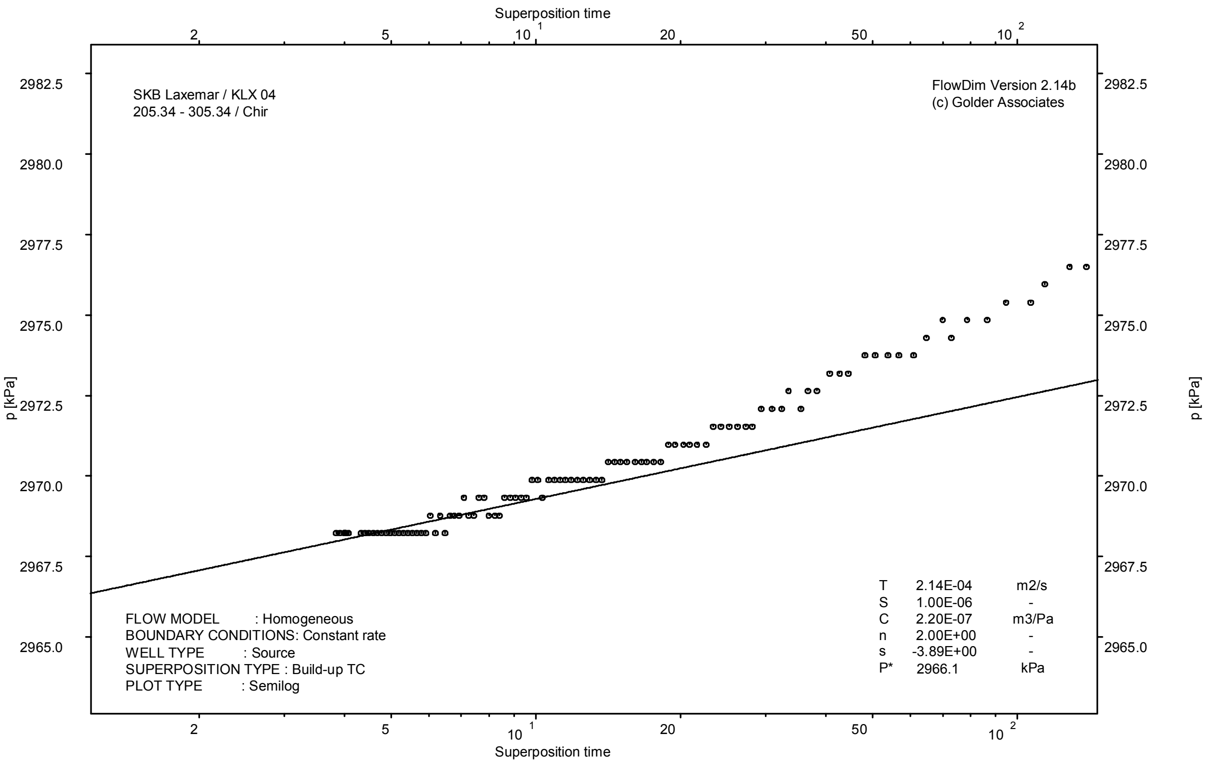
Interval pressure and temperature vs. time; cartesian plot (analysed)



CHI phase; log-log match



CHIR phase; log-log match

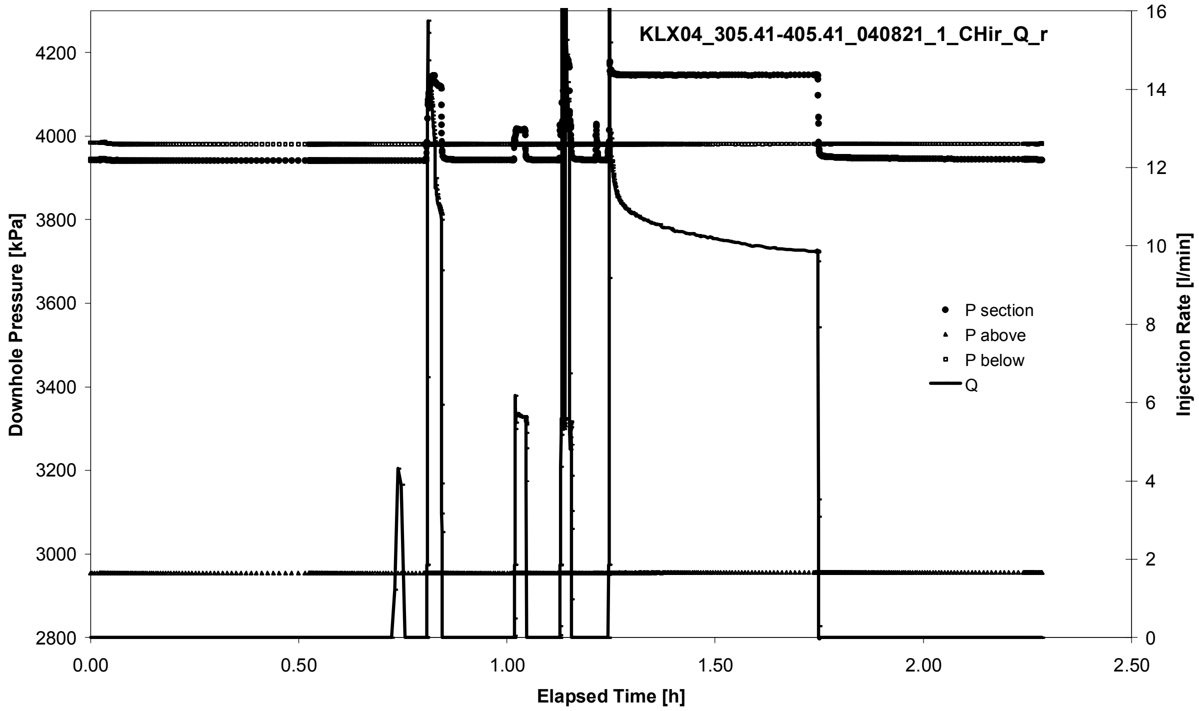


CHIR phase; HORNER match

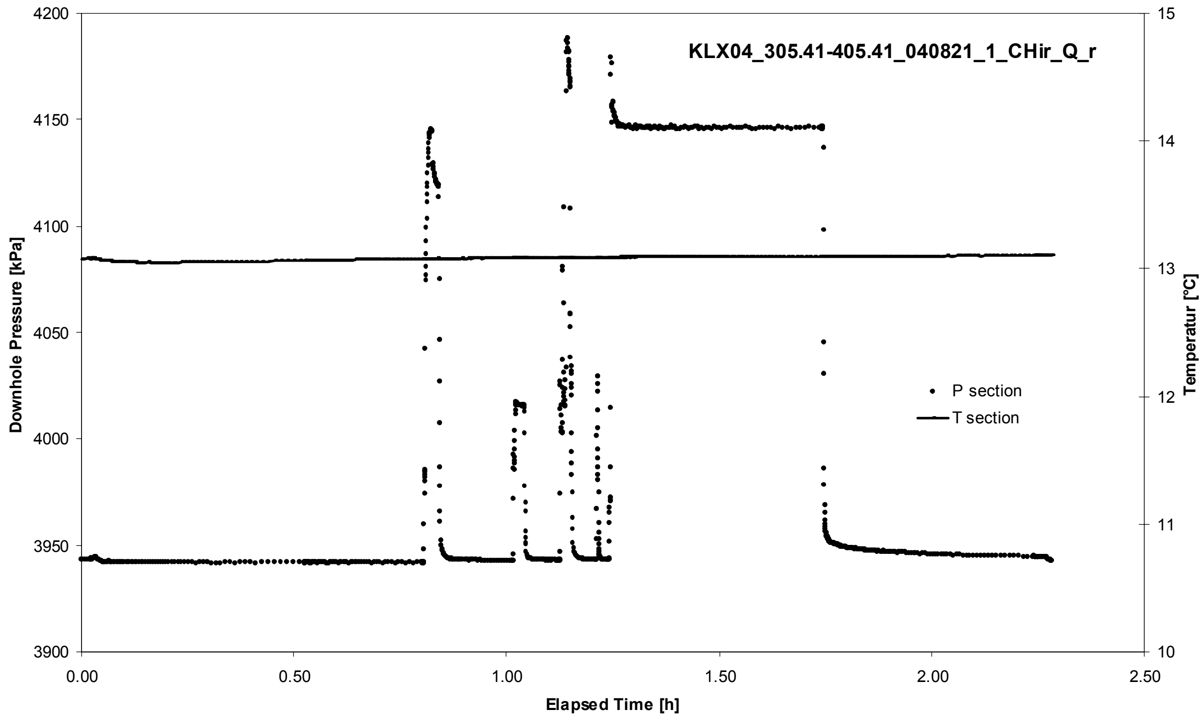
APPENDIX 2-3

Test 305.41 – 405.41 m

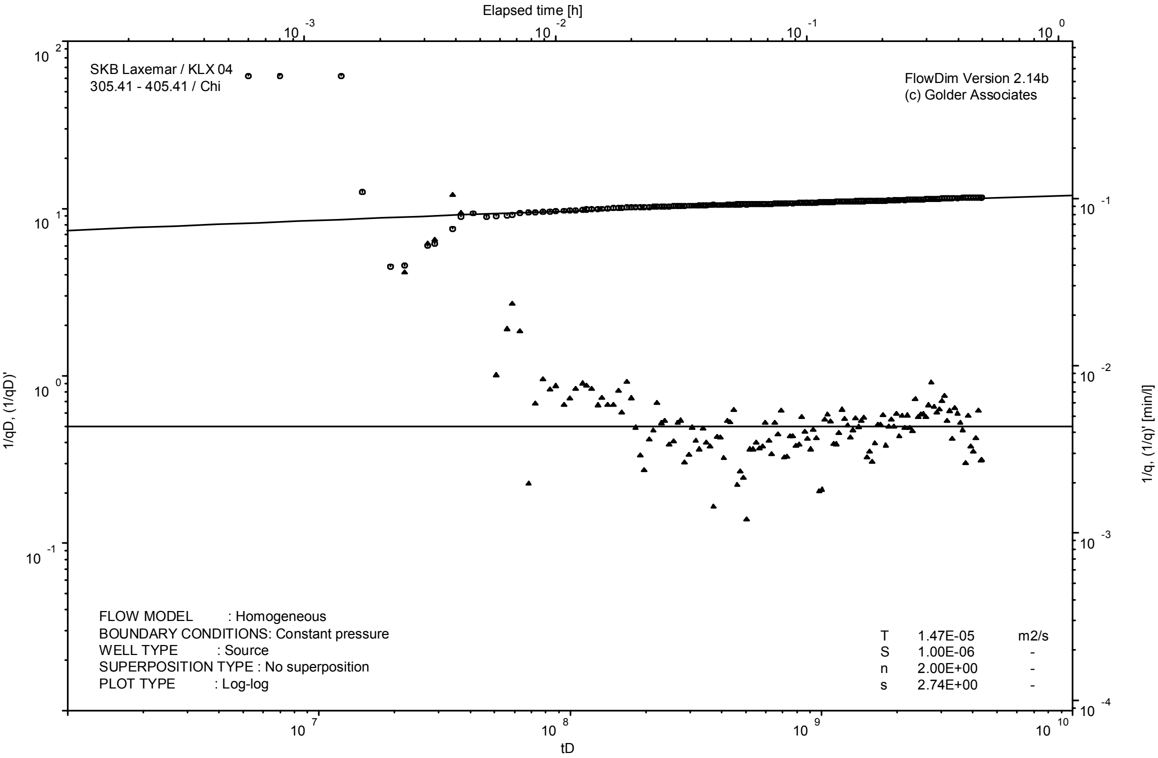
Analysis diagrams



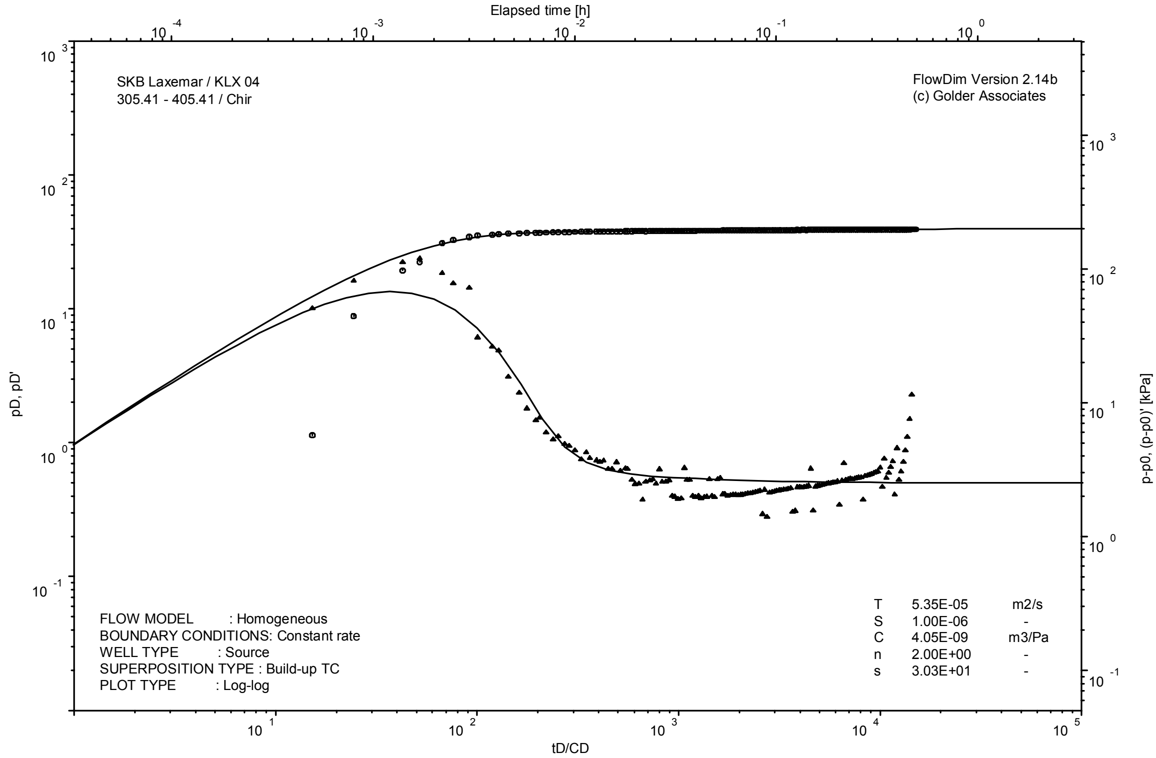
Pressure and flow rate vs. time; cartesian plot



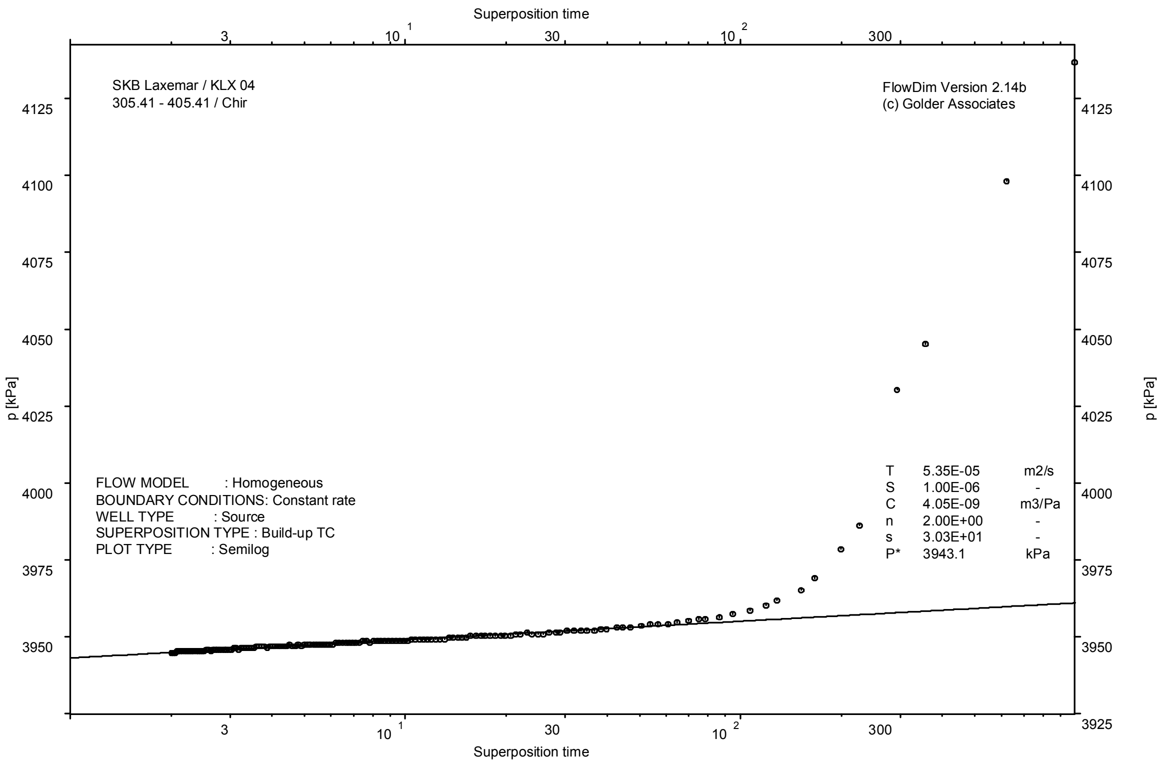
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

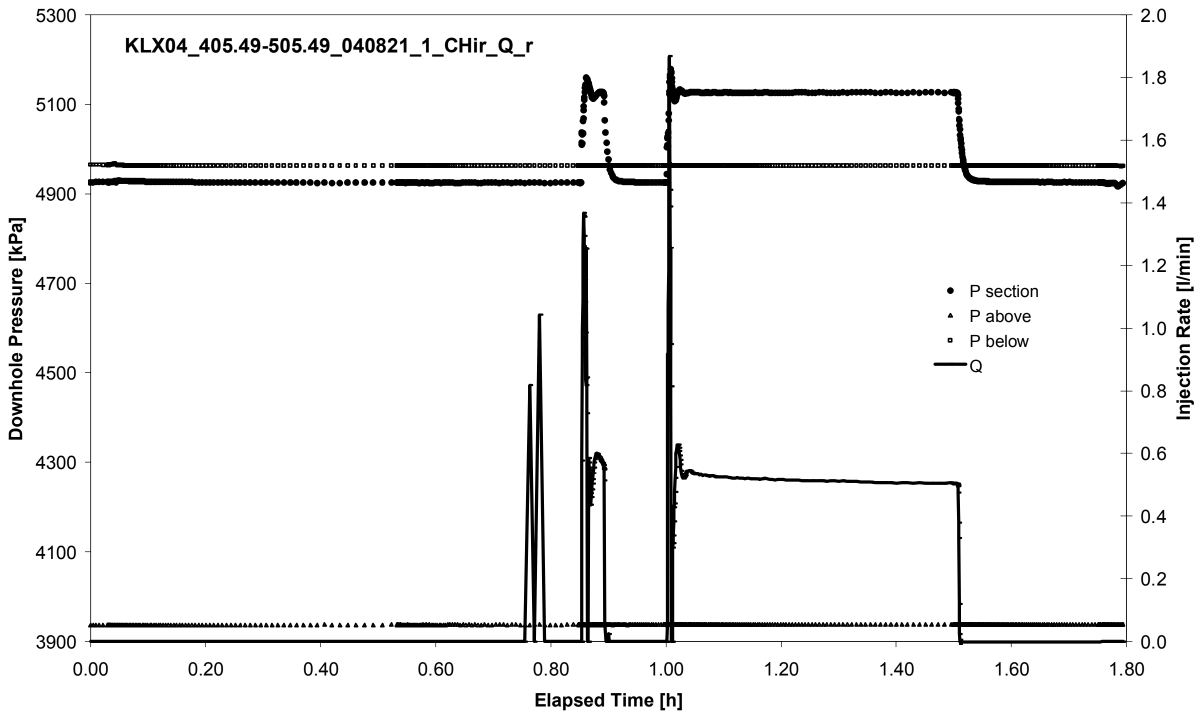


CHIR phase; HORNER match

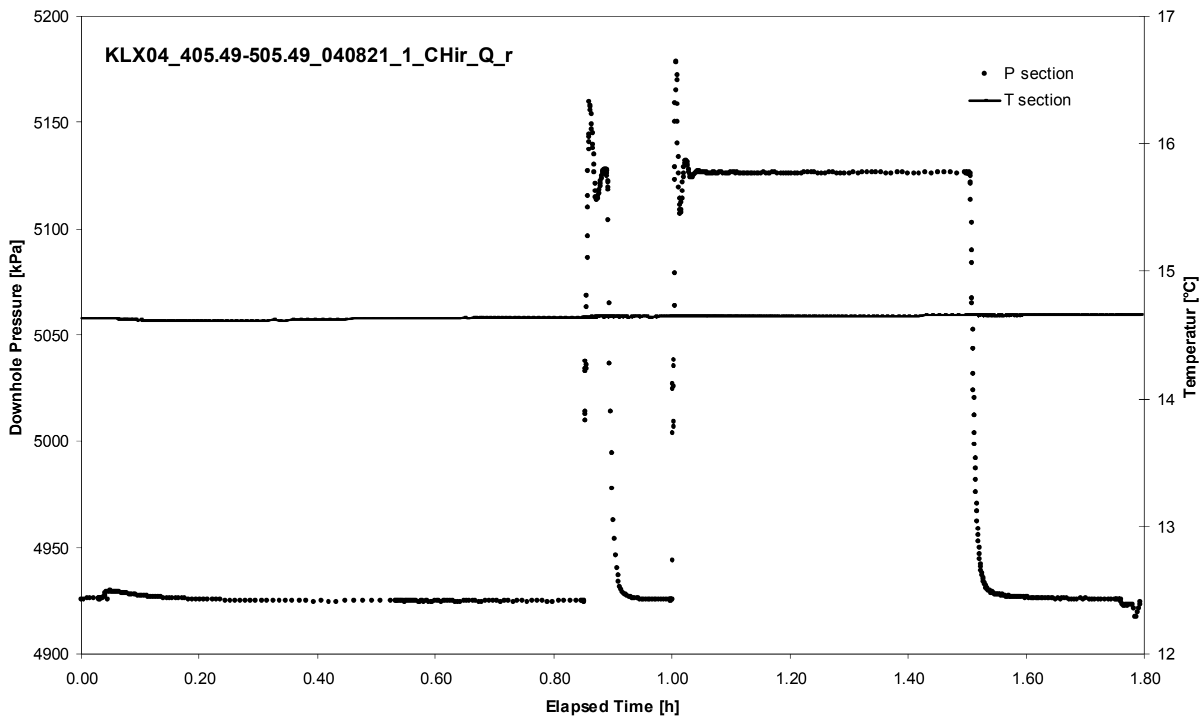
APPENDIX 2-4

Test 405.49 – 505.49 m

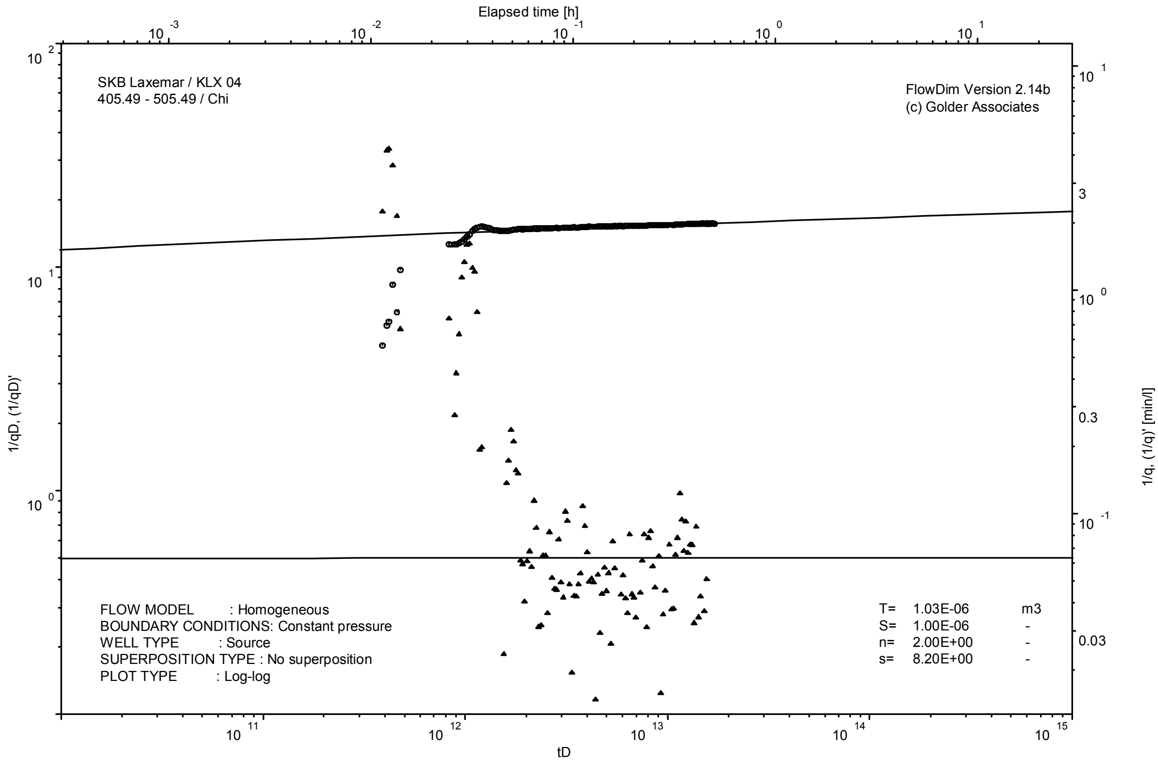
Analysis diagrams



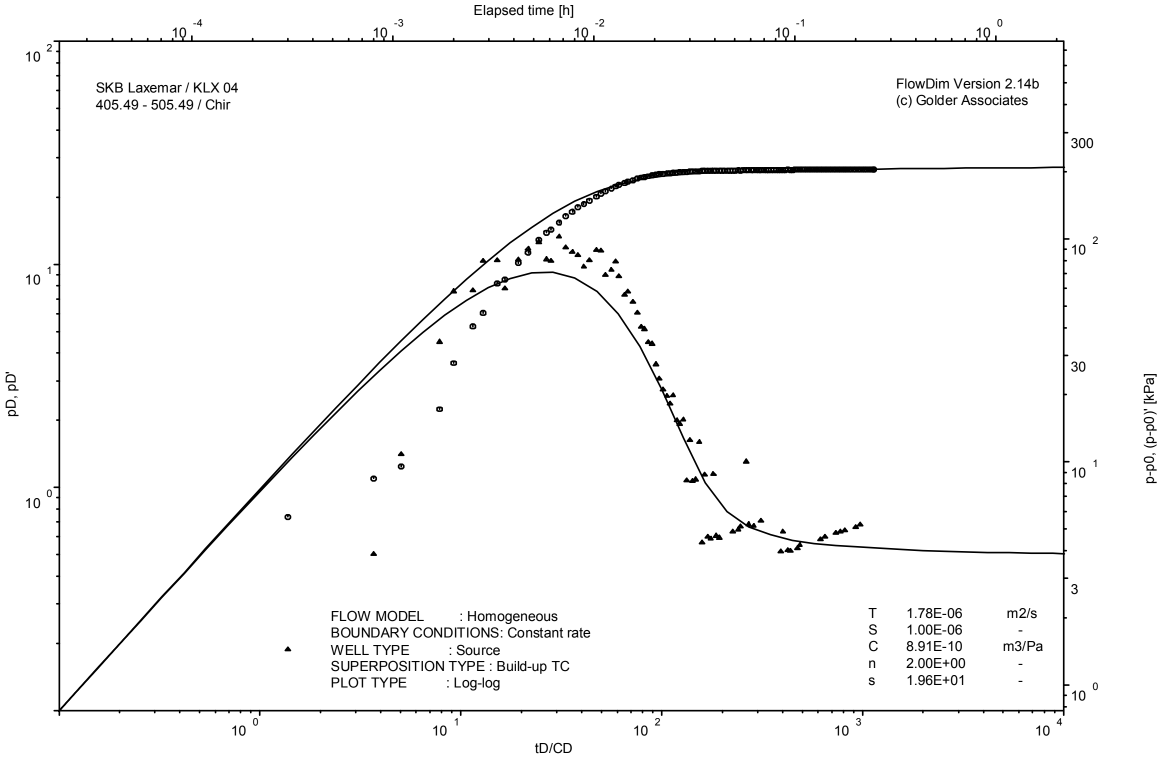
Pressure and flow rate vs. time; cartesian plot



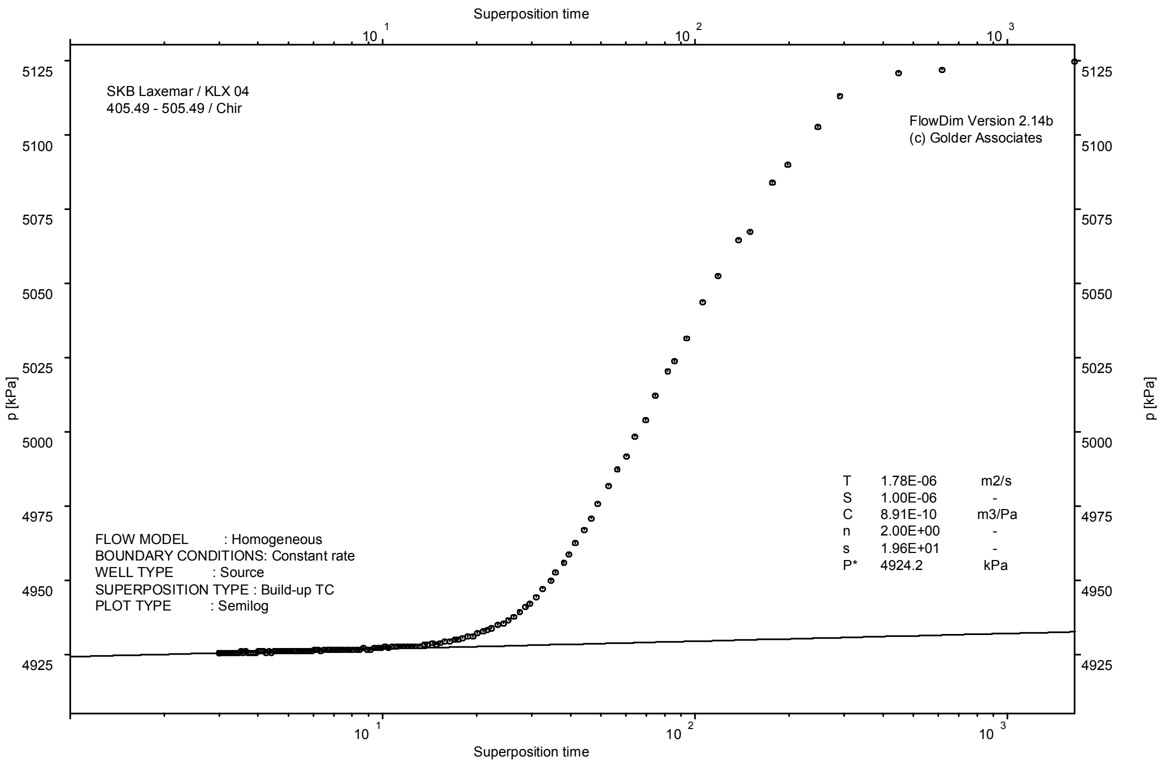
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

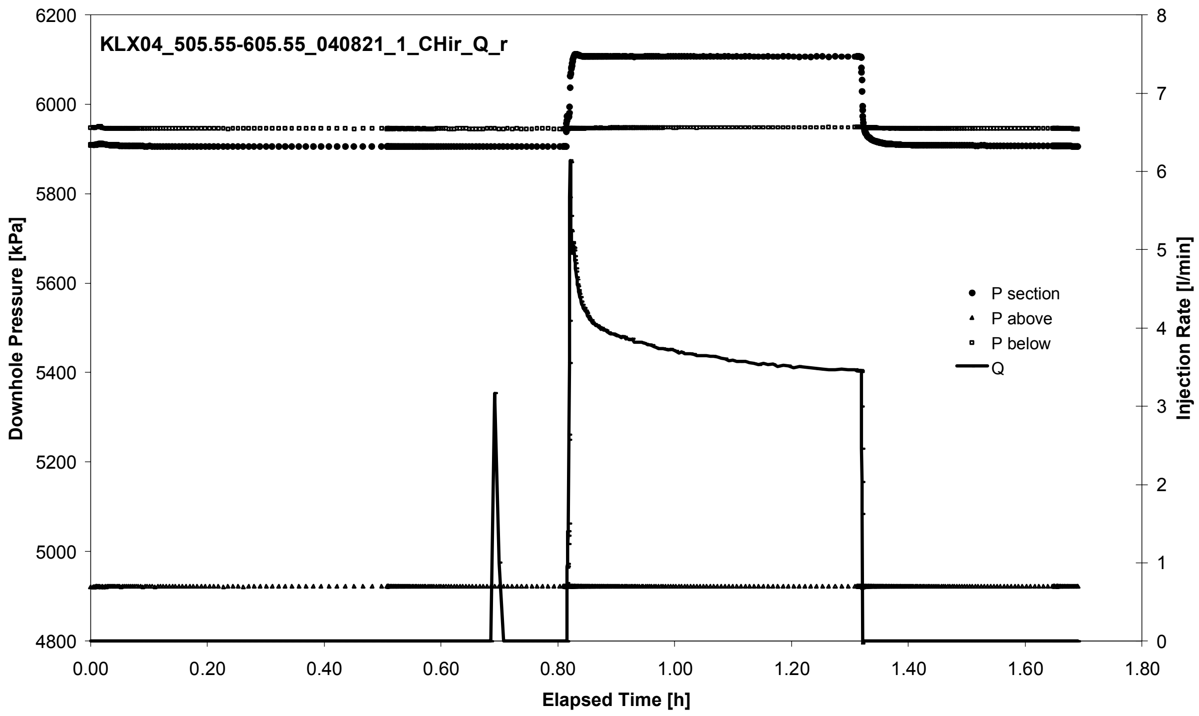


CHIR phase; HORNER match

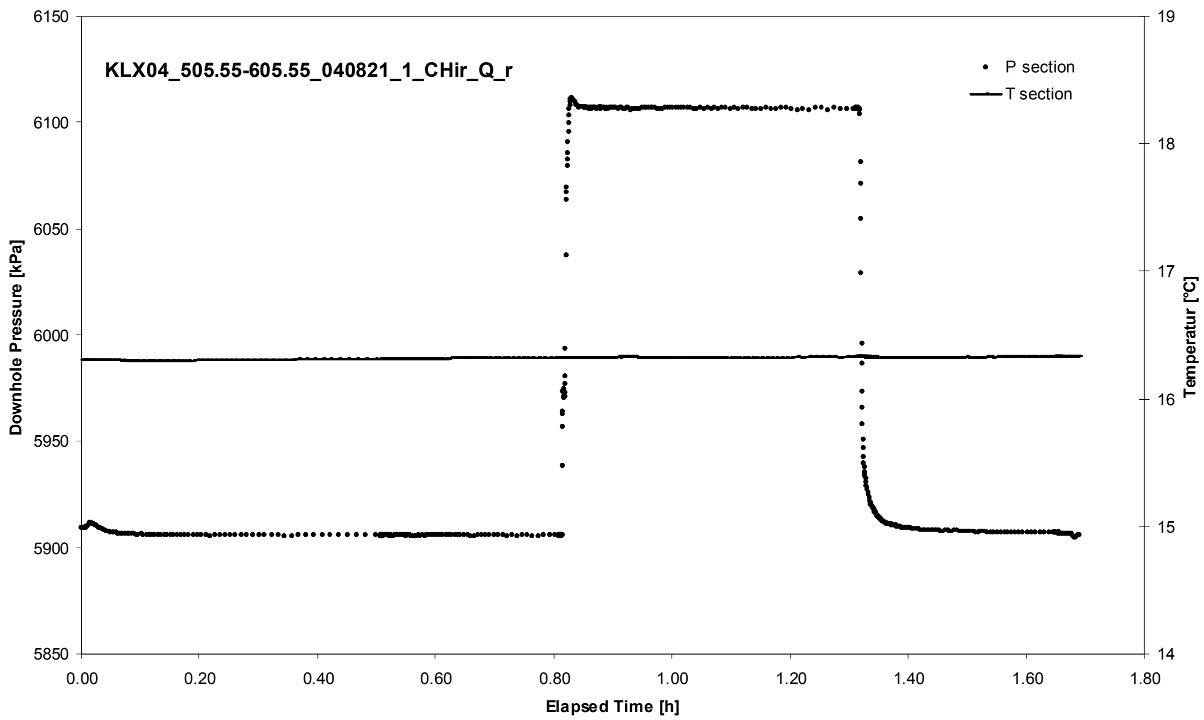
APPENDIX 2-5

Test 505.55 – 605.55 m

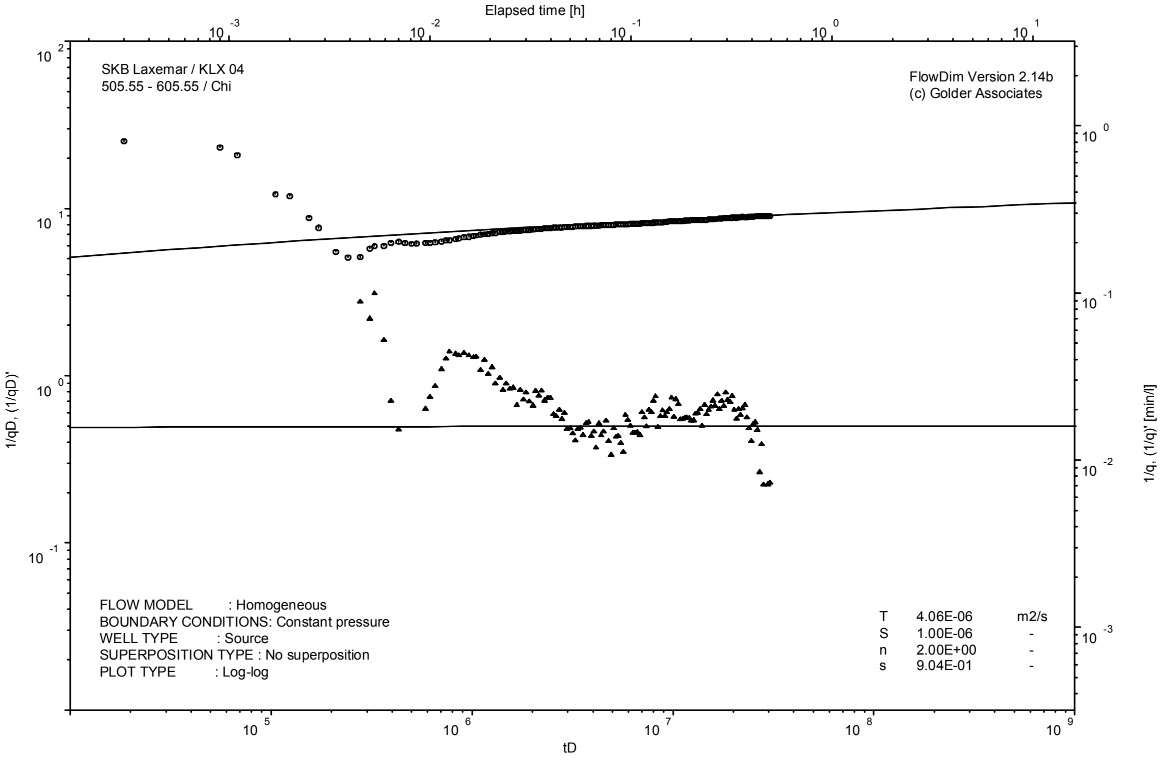
Analysis diagrams



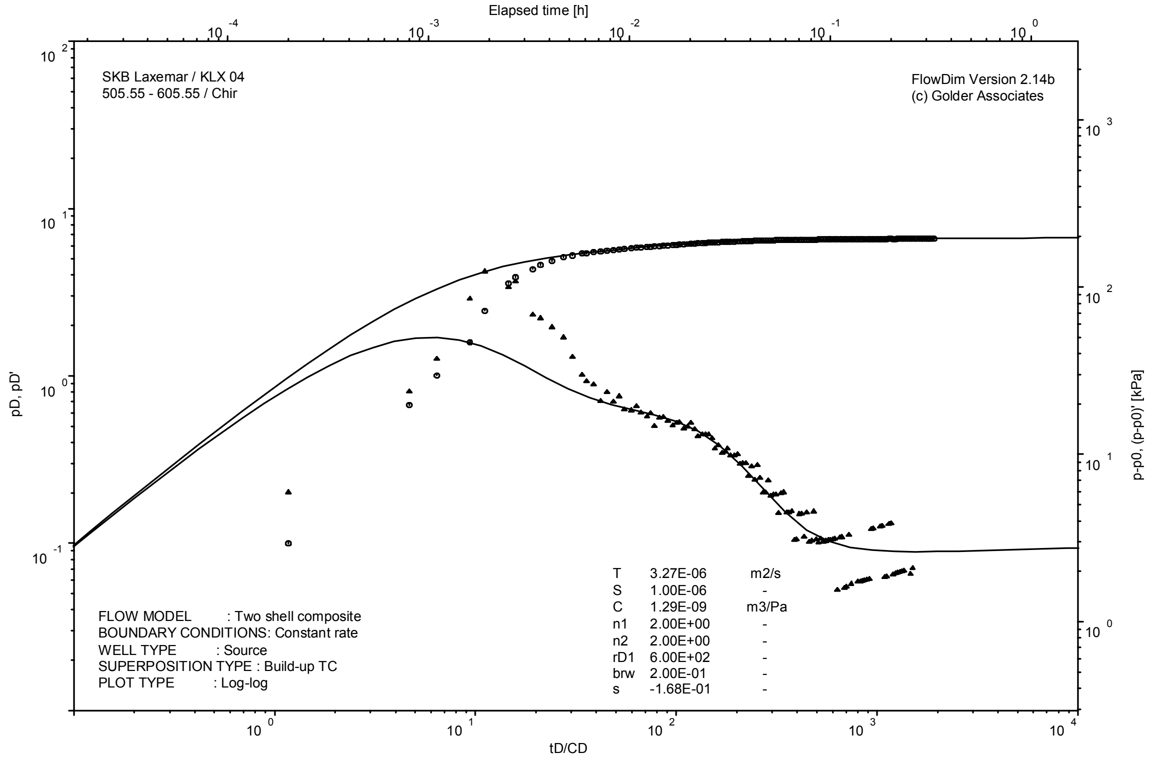
Pressure and flow rate vs. time; cartesian plot



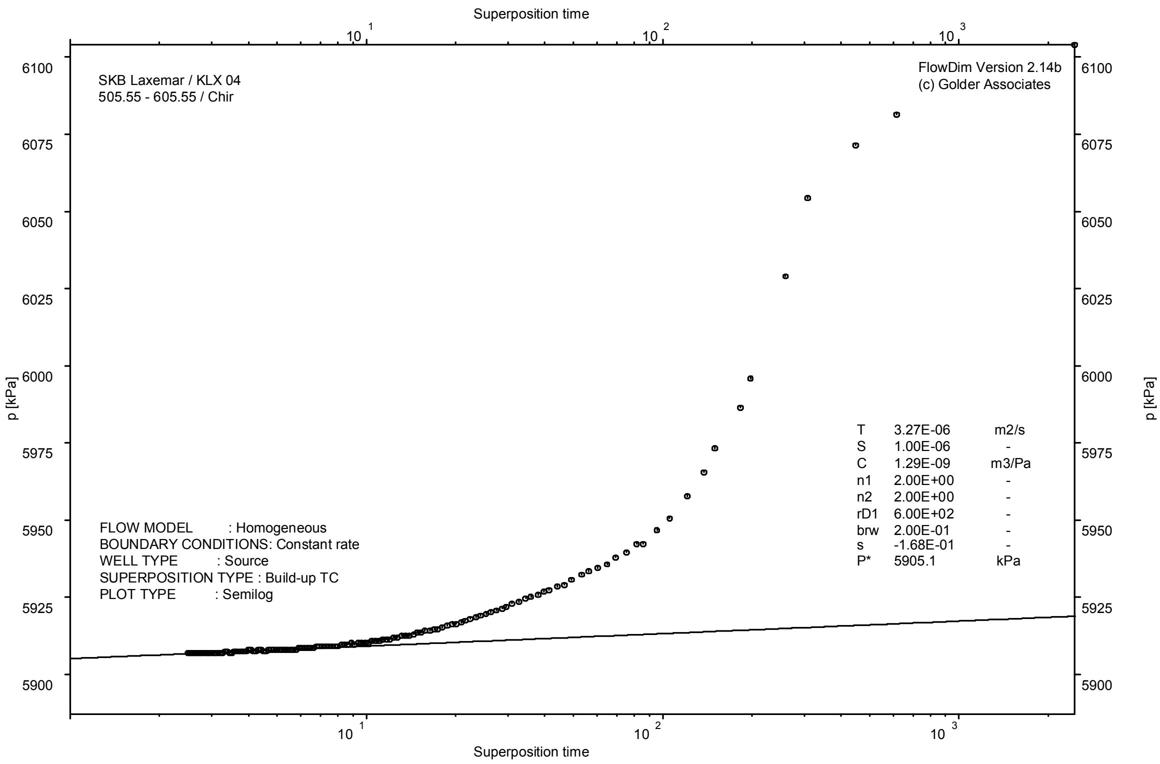
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

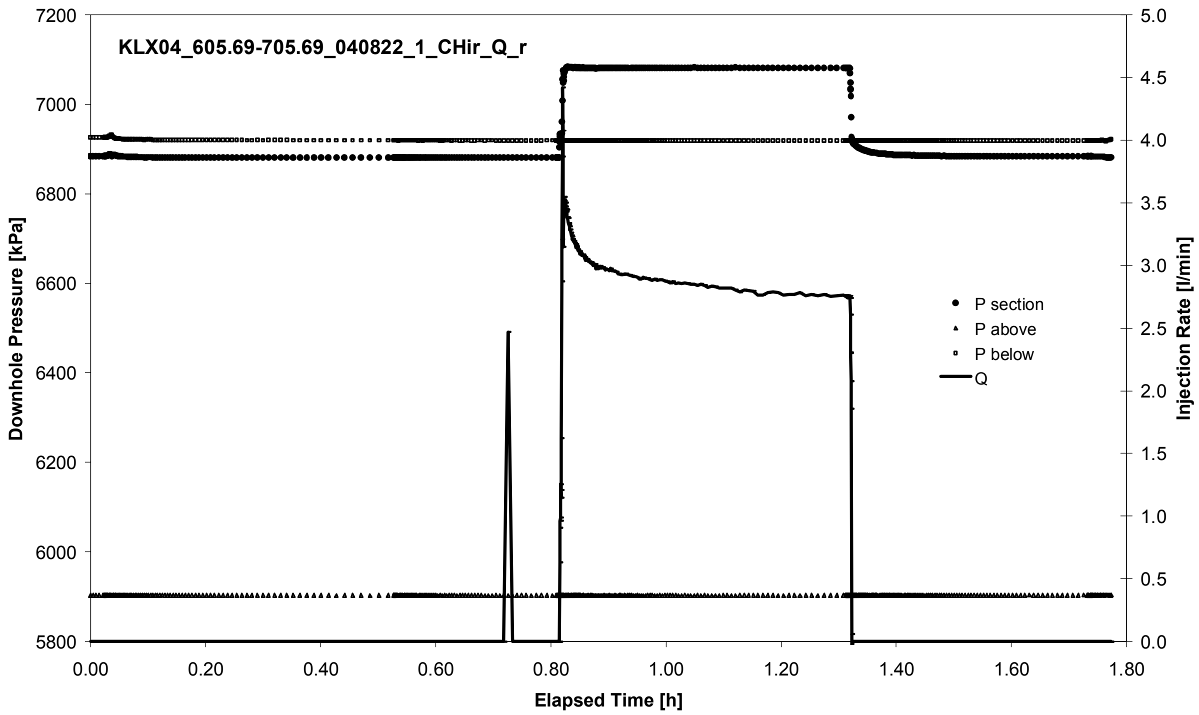


CHIR phase; HORNER match

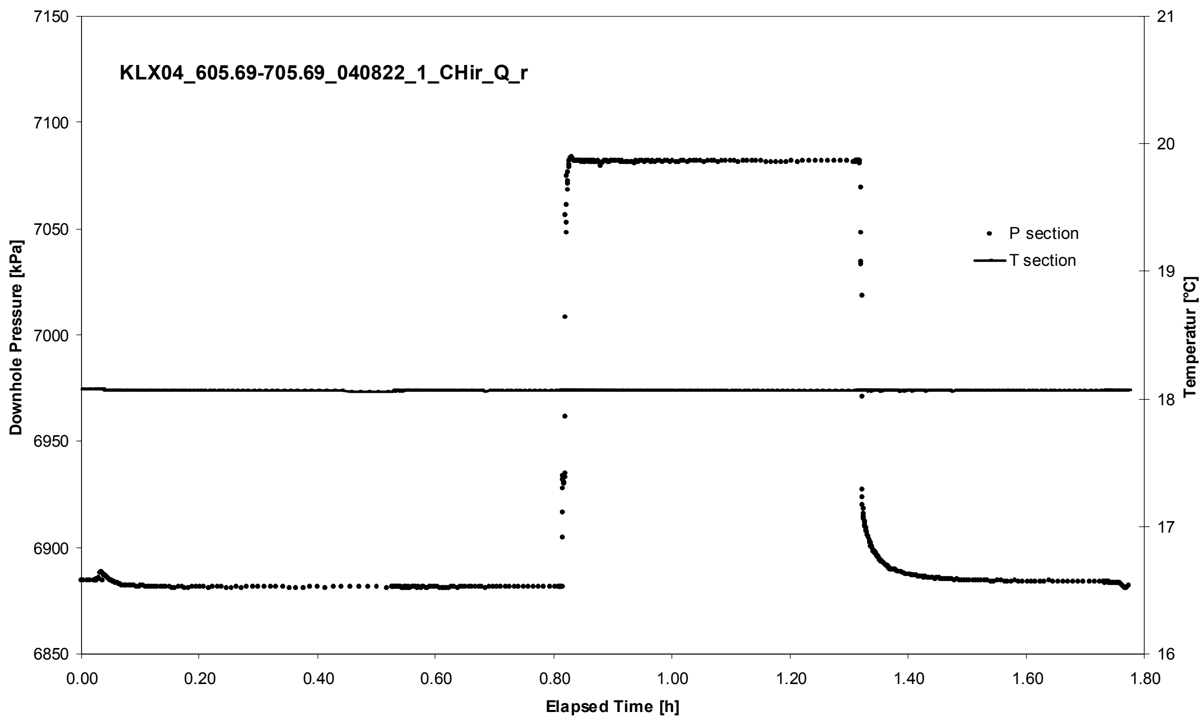
APPENDIX 2-6

Test 605.69 – 705.69 m

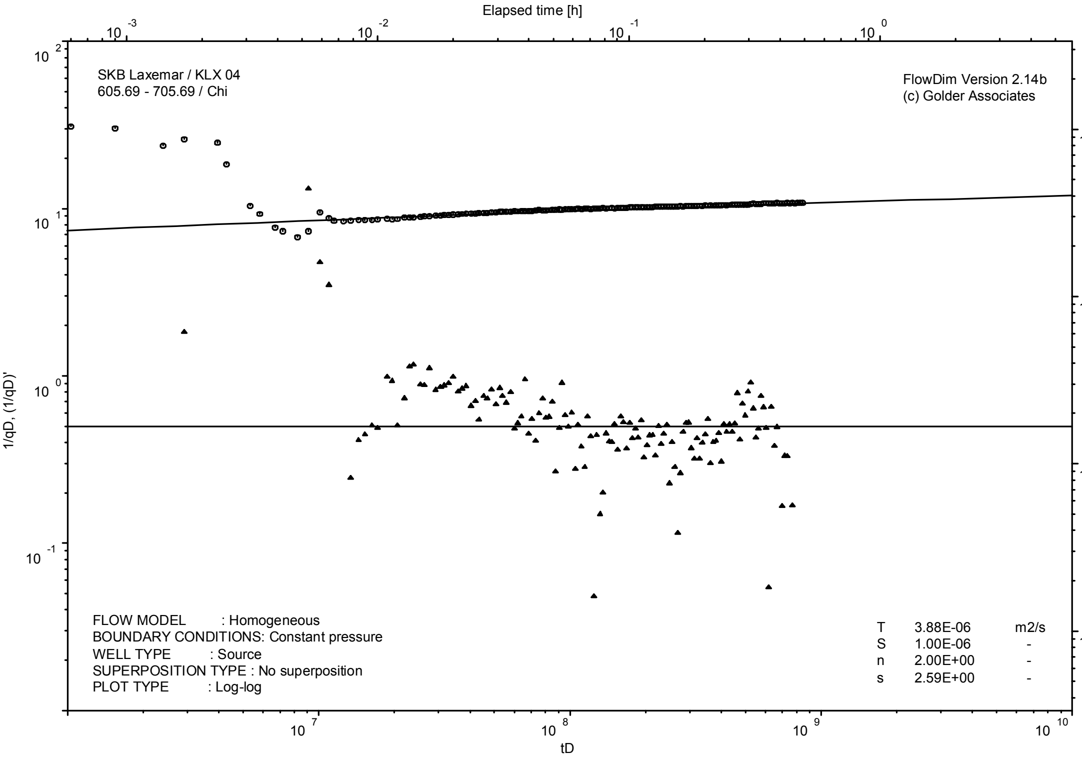
Analysis diagrams



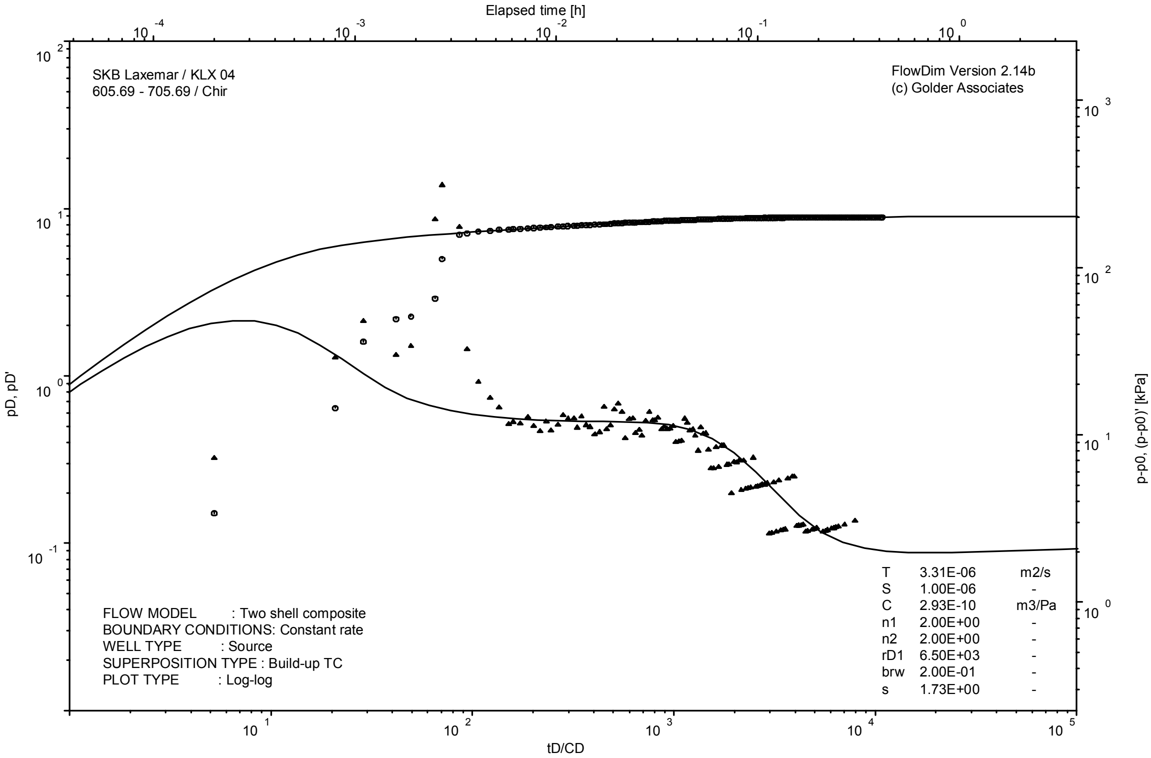
Pressure and flow rate vs. time; cartesian plot



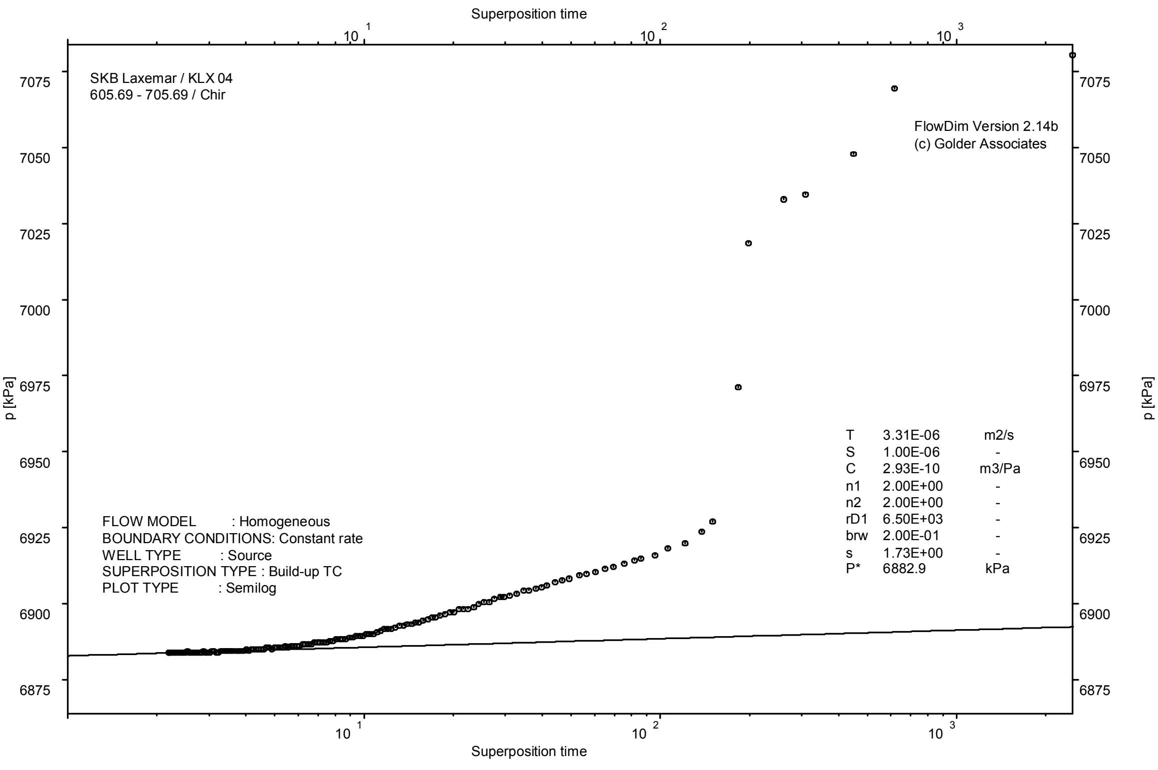
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

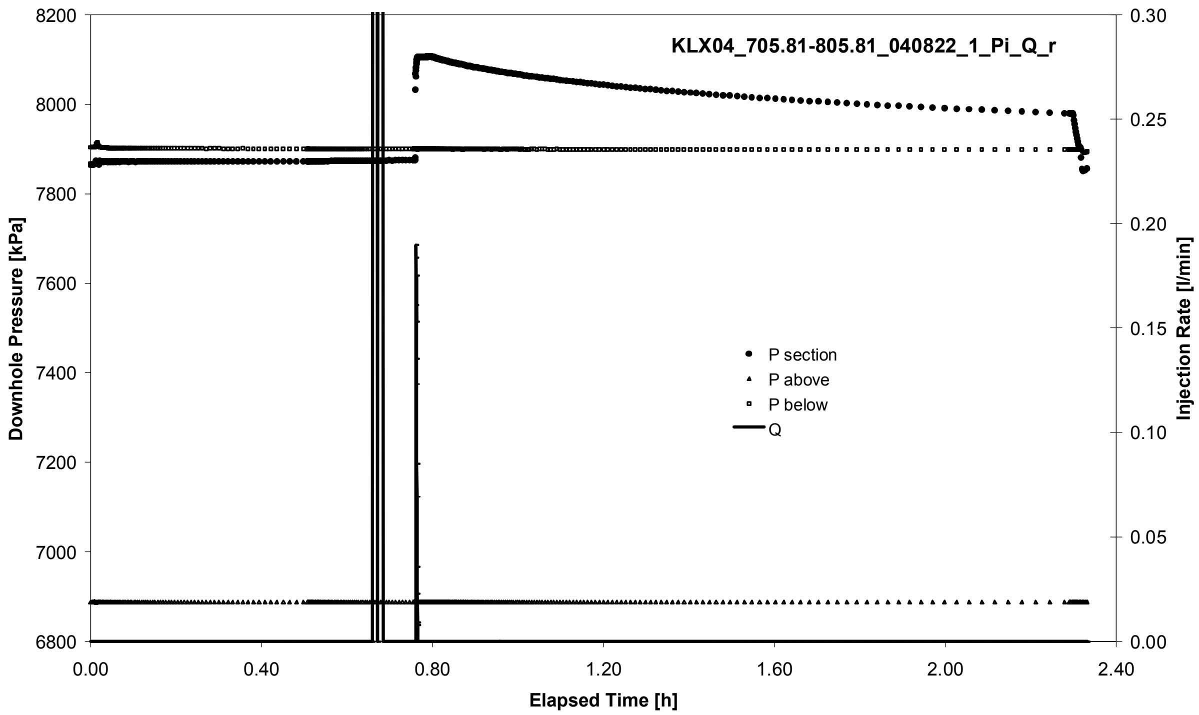


CHIR phase; HORNER match

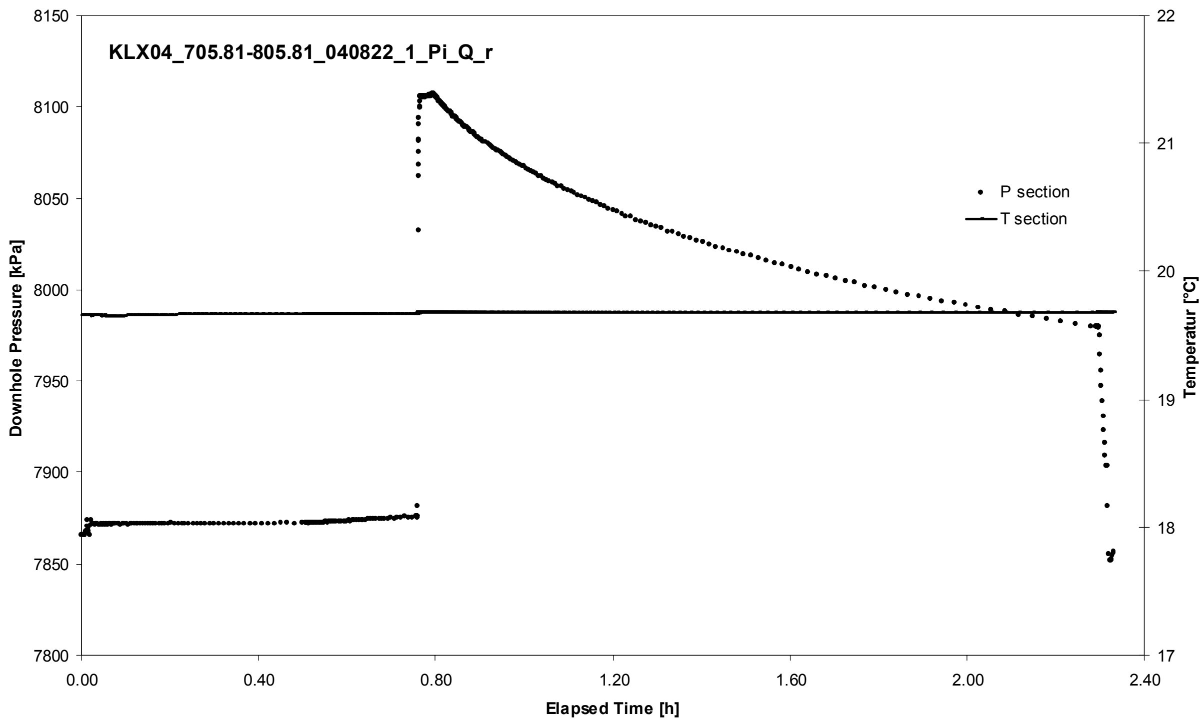
APPENDIX 2-7

Test 705.81 – 805.81 m

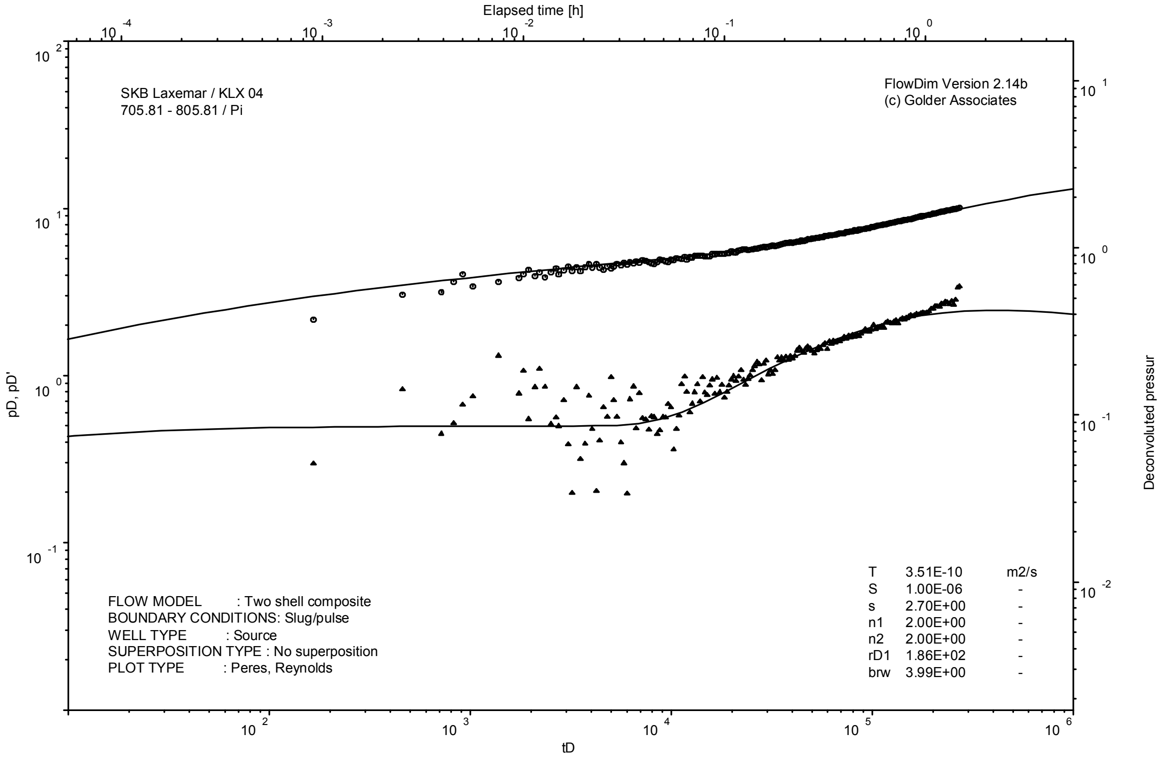
Analysis diagrams



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot

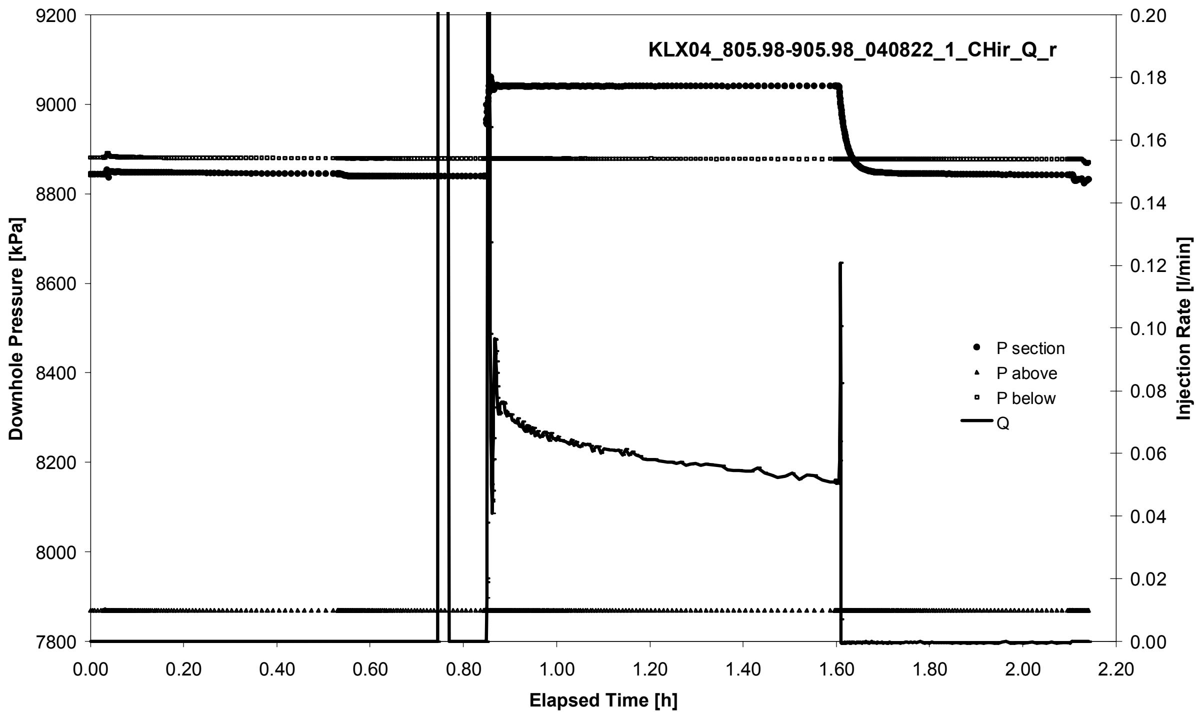


CHIR phase analysed as pulse injection; deconvolution match

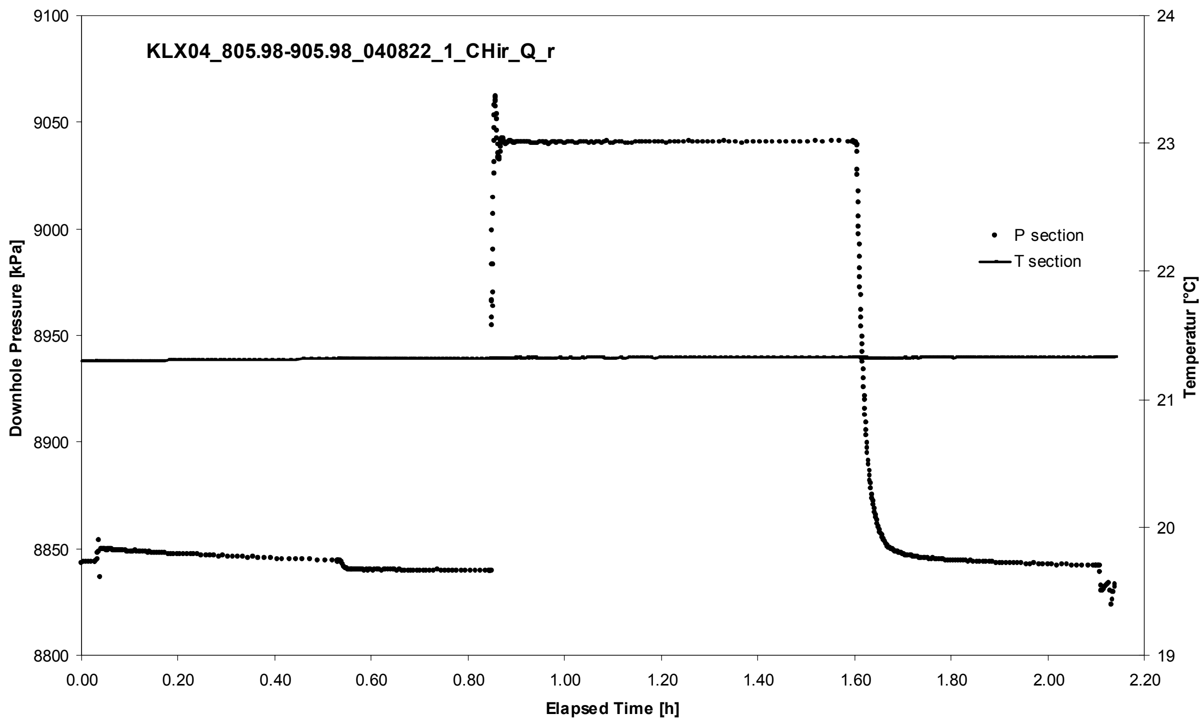
APPENDIX 2-8

Test 805.98 – 905.98 m

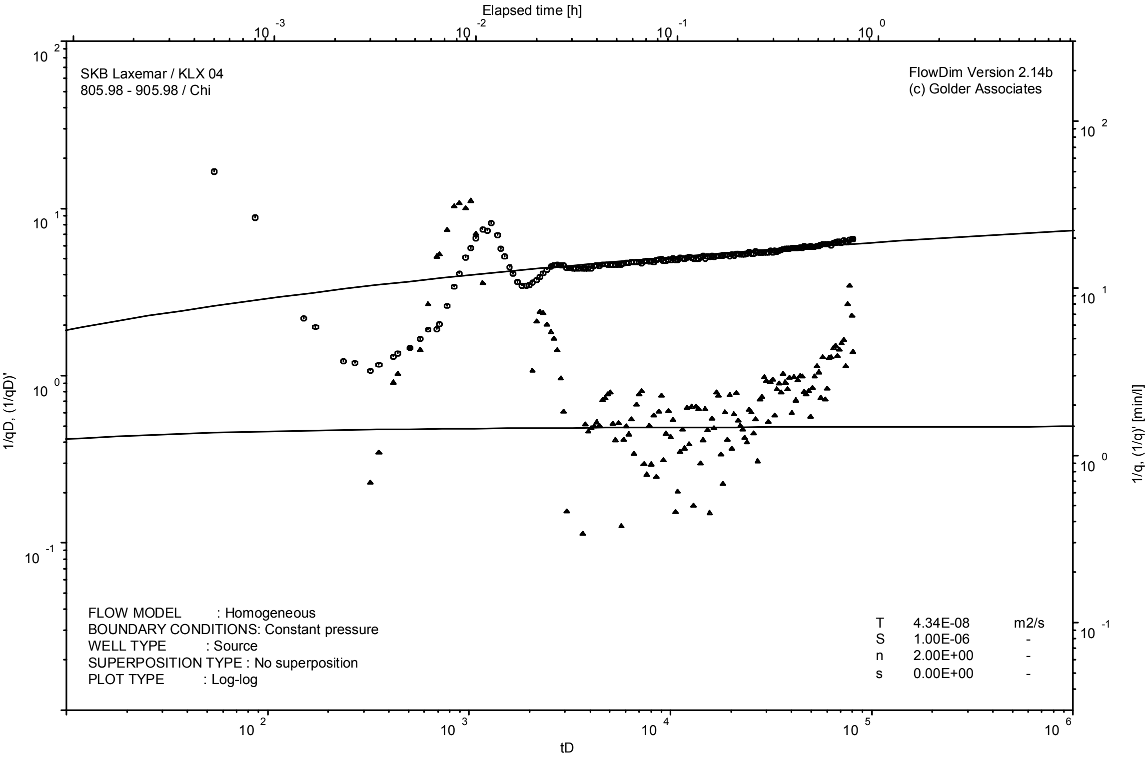
Analysis diagrams



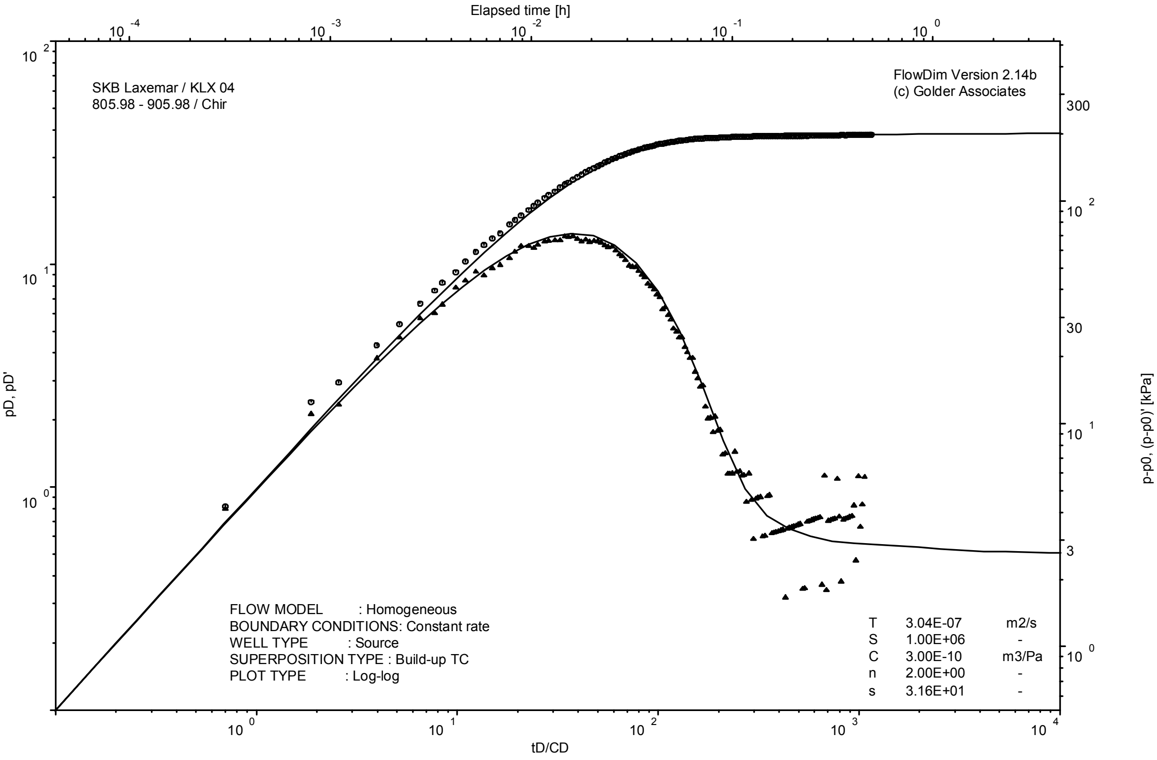
Pressure and flow rate vs. time; cartesian plot



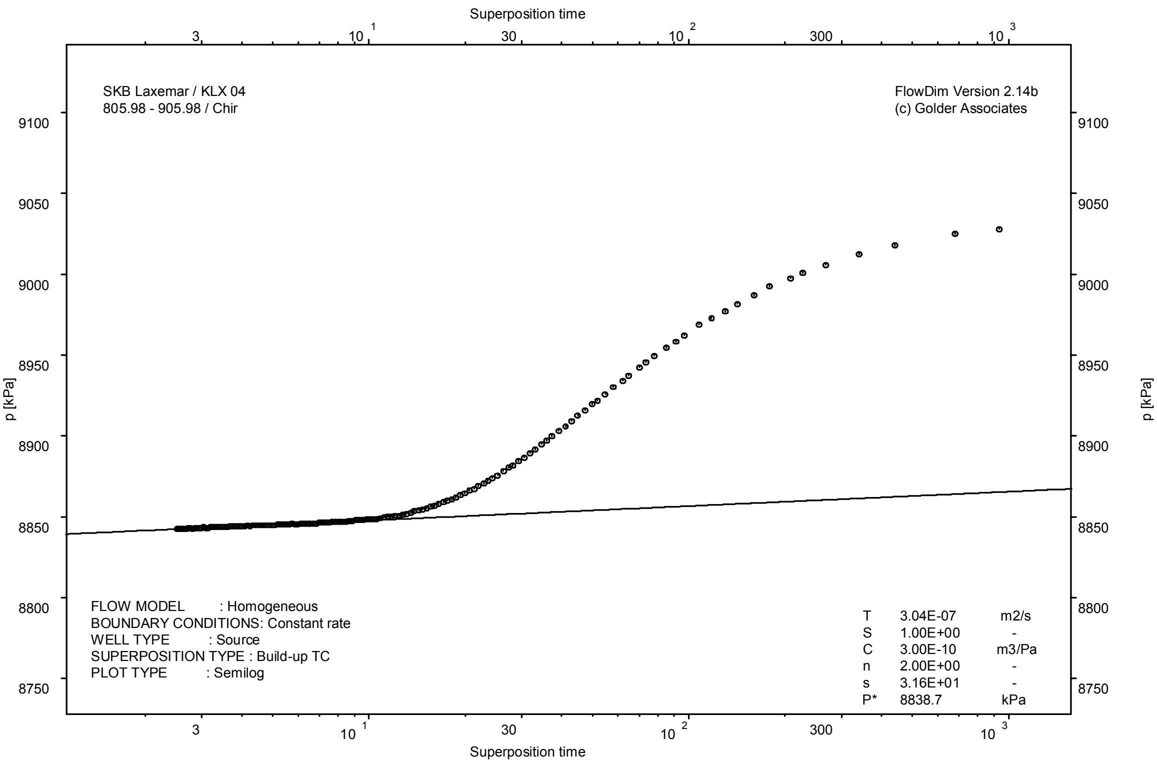
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

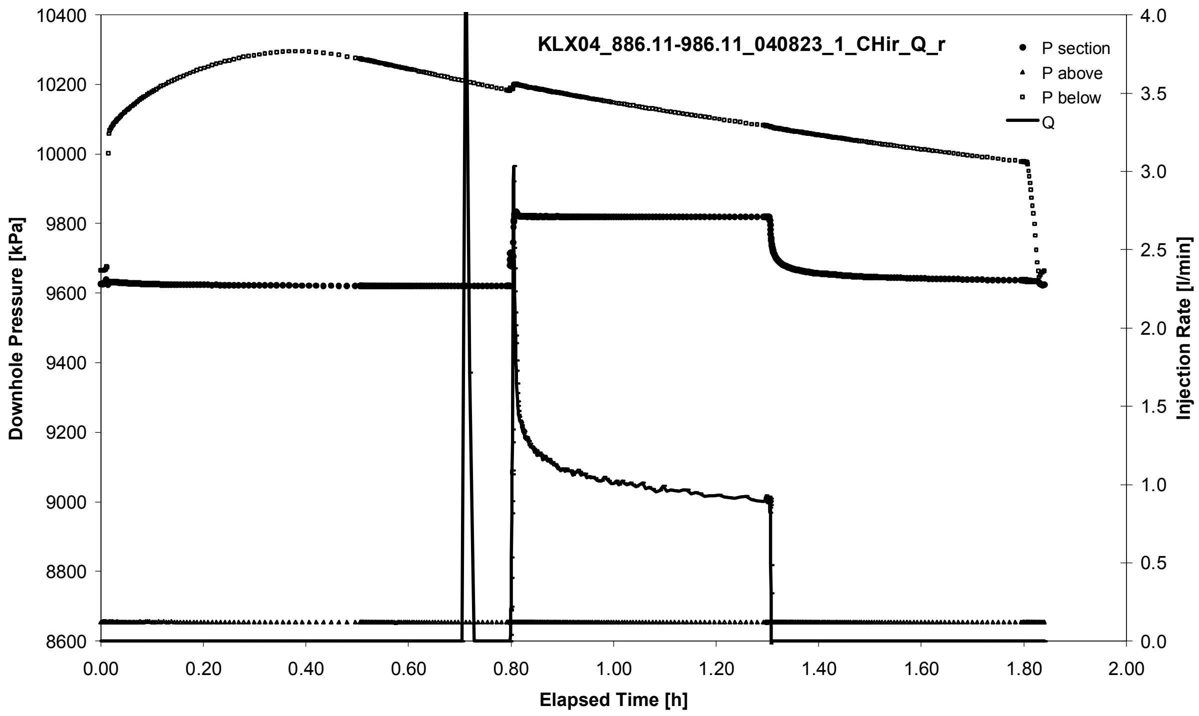


CHIR phase; HORNER match

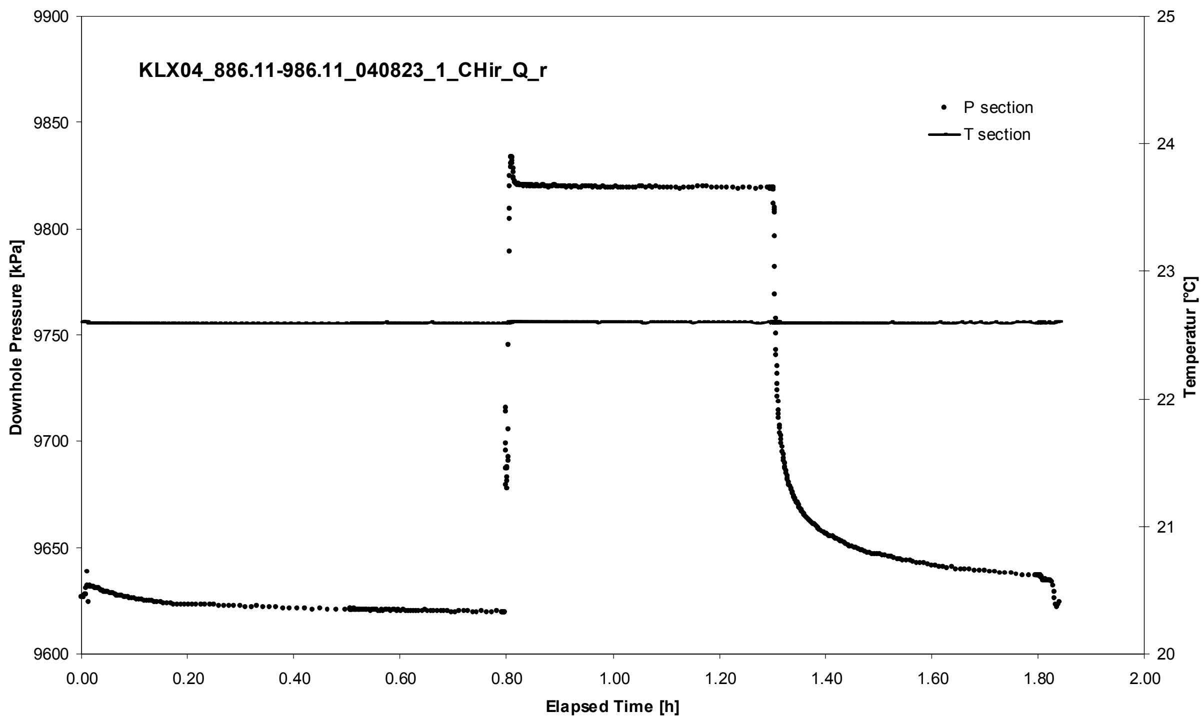
APPENDIX 2-9

Test 886.11 – 986.11 m

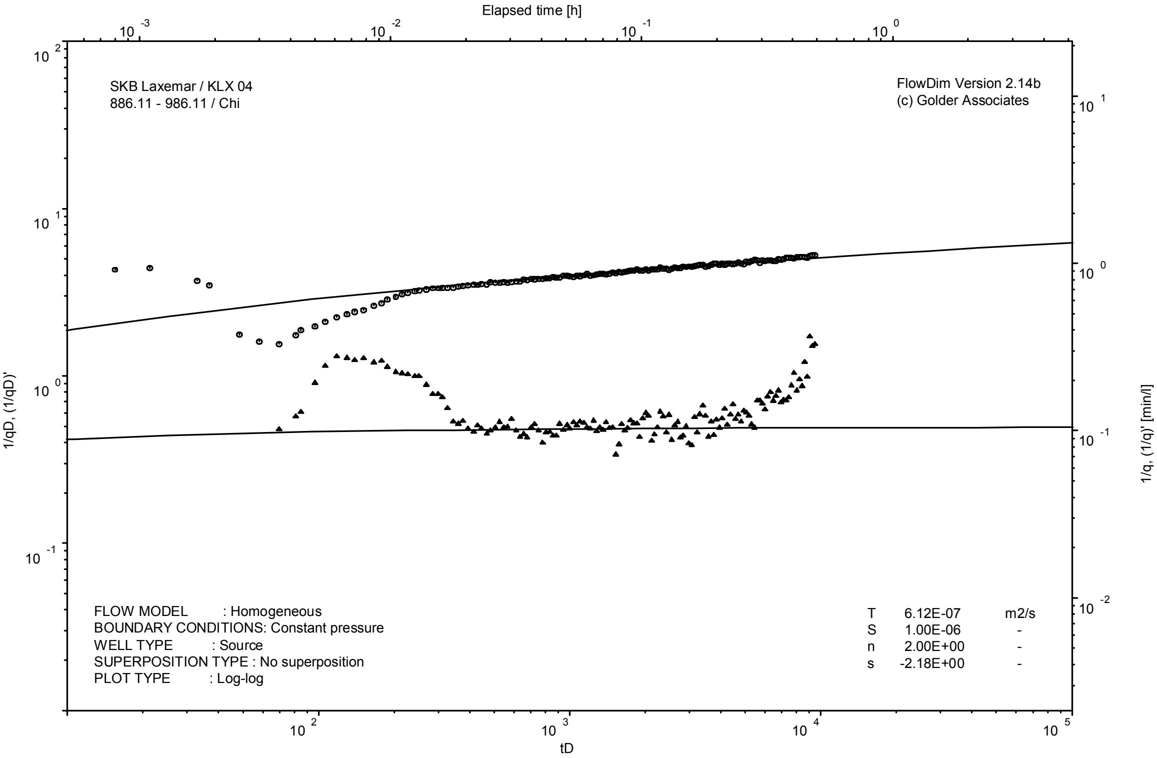
Analysis diagrams



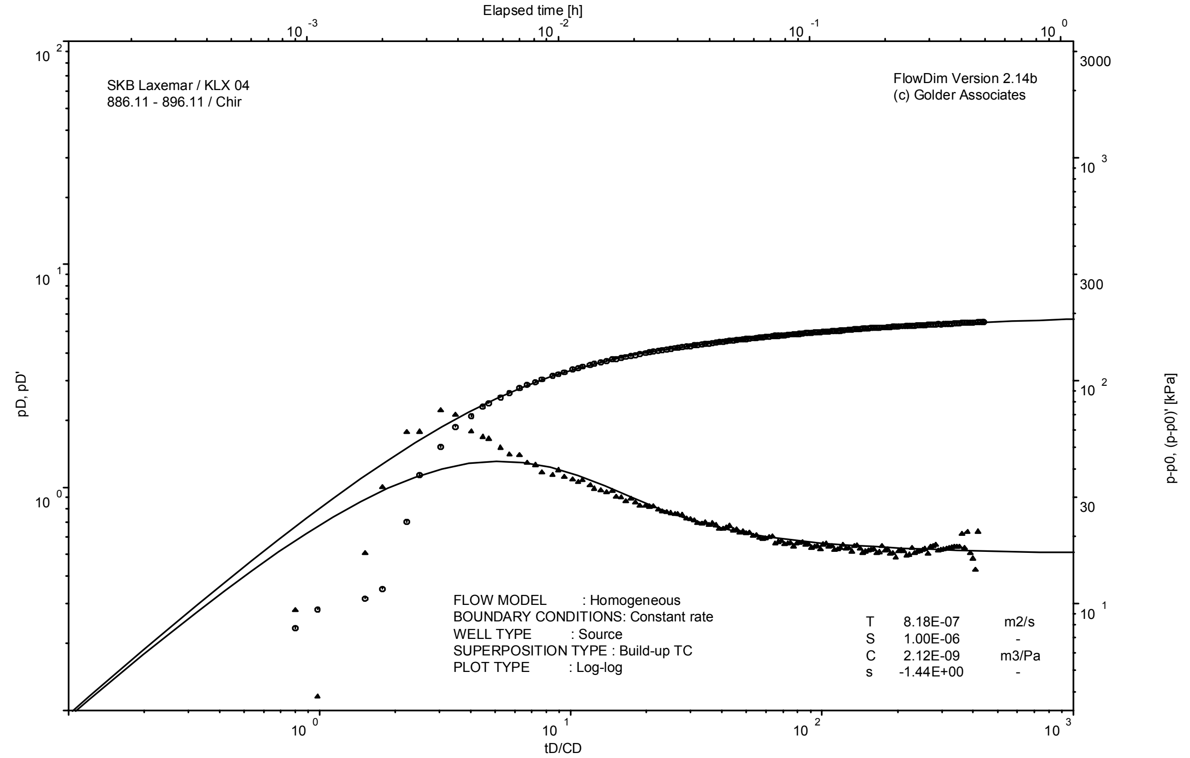
Pressure and flow rate vs. time; cartesian plot



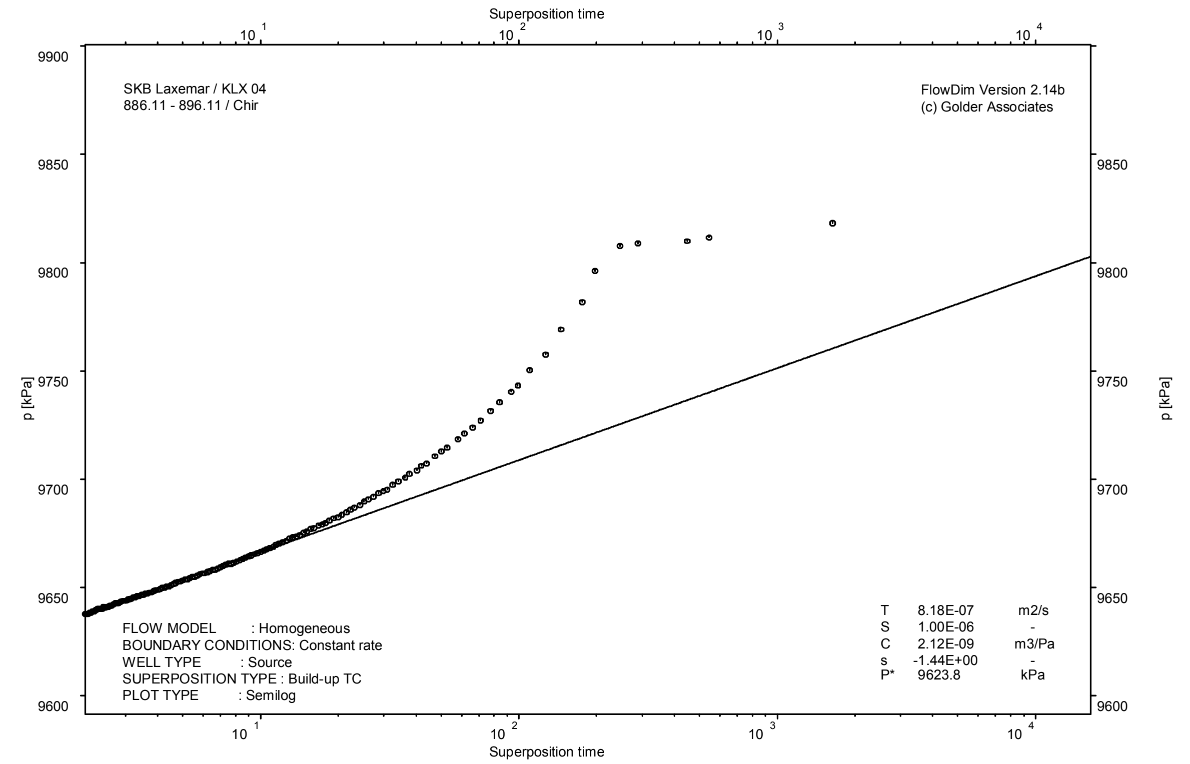
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

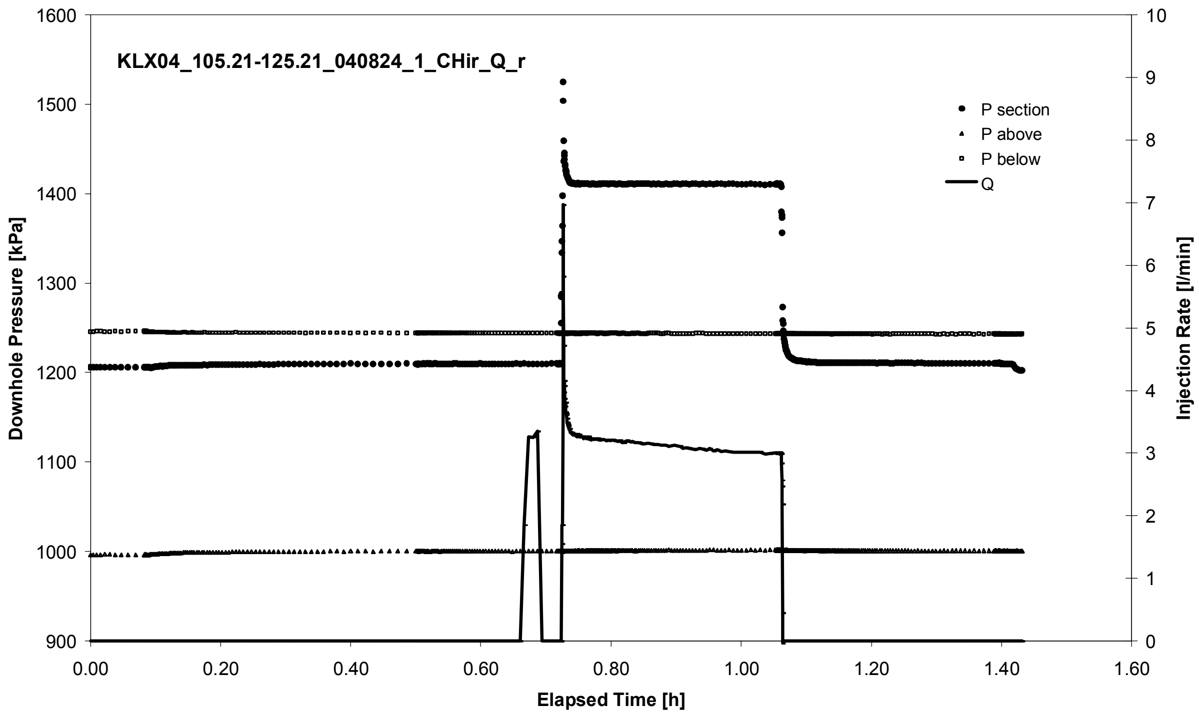


CHIR phase; HORNER match

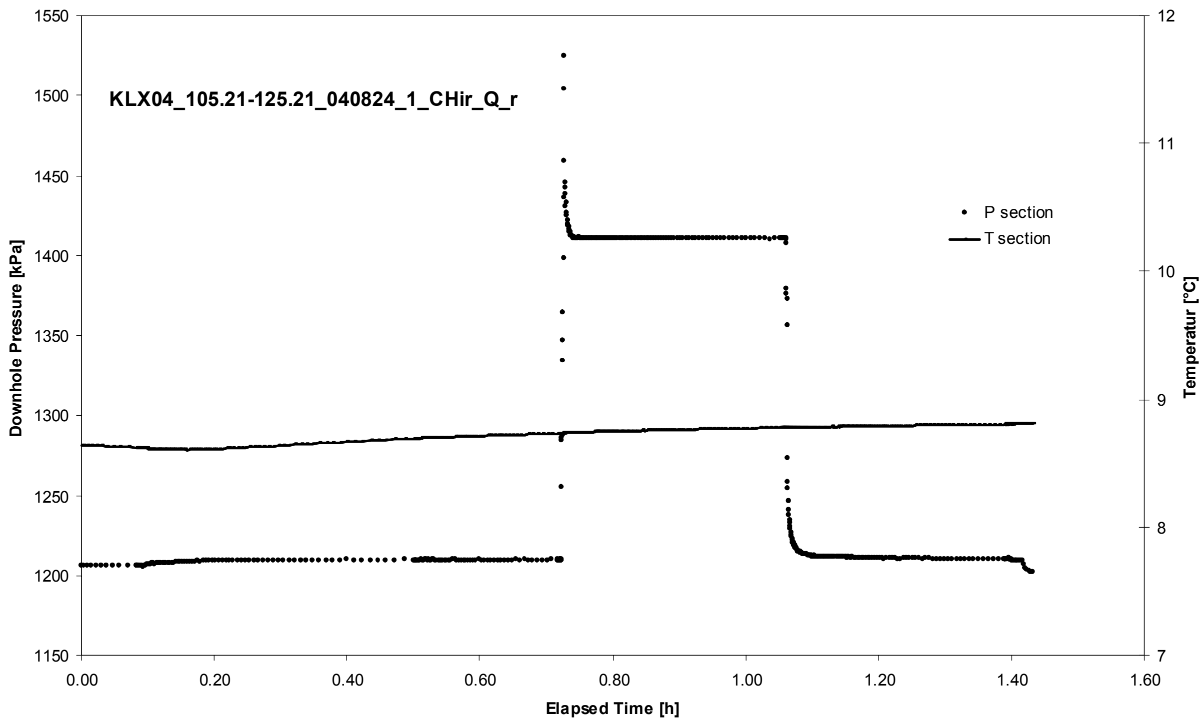
APPENDIX 2-10

Test 105.21 – 125.21 m

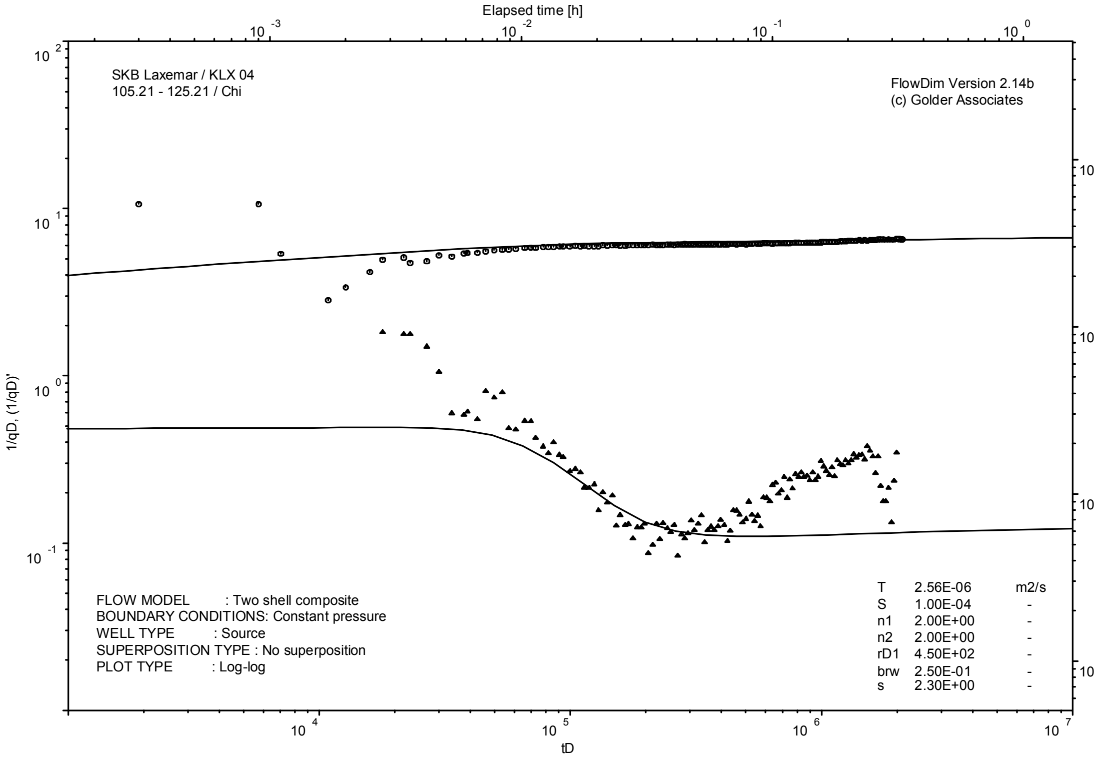
Analysis diagrams



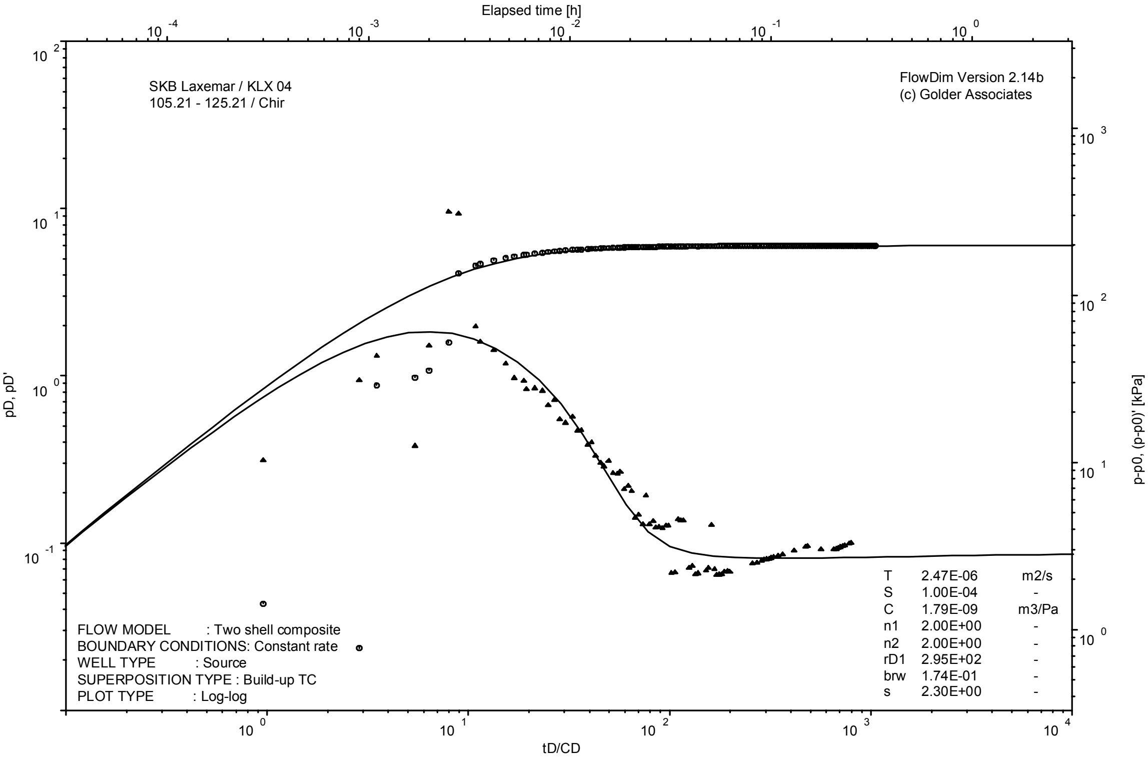
Pressure and flow rate vs. time; cartesian plot



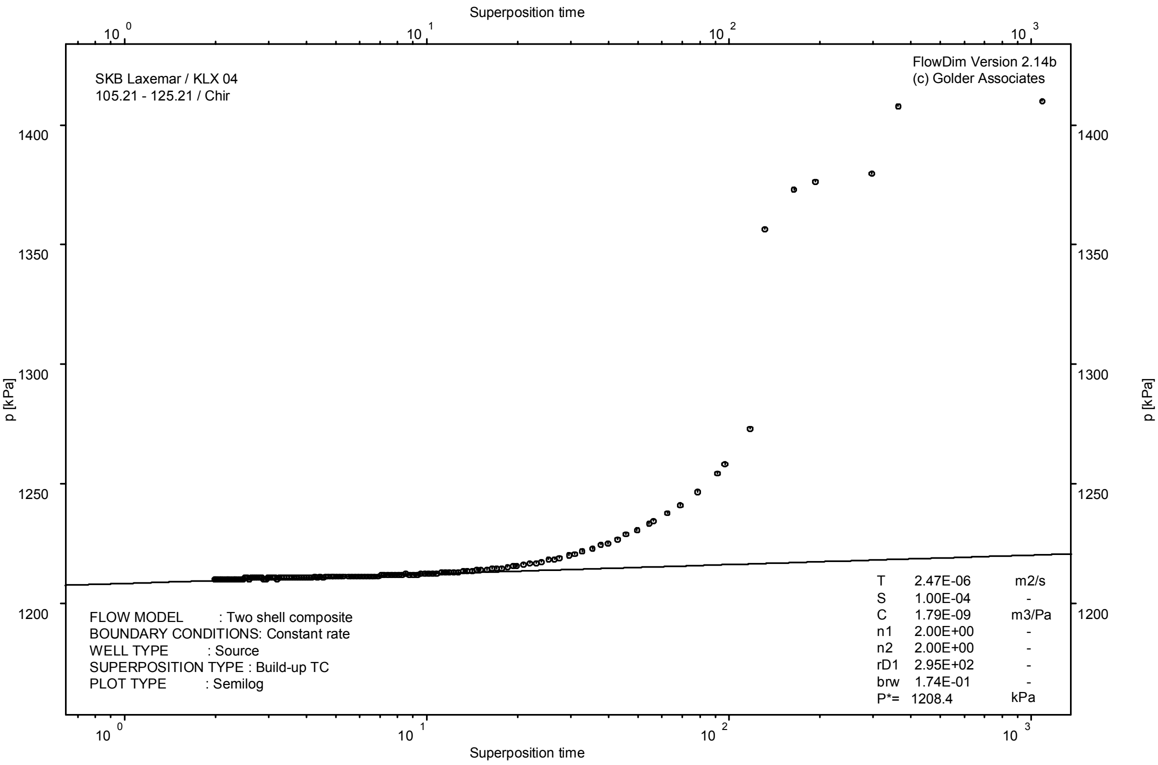
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

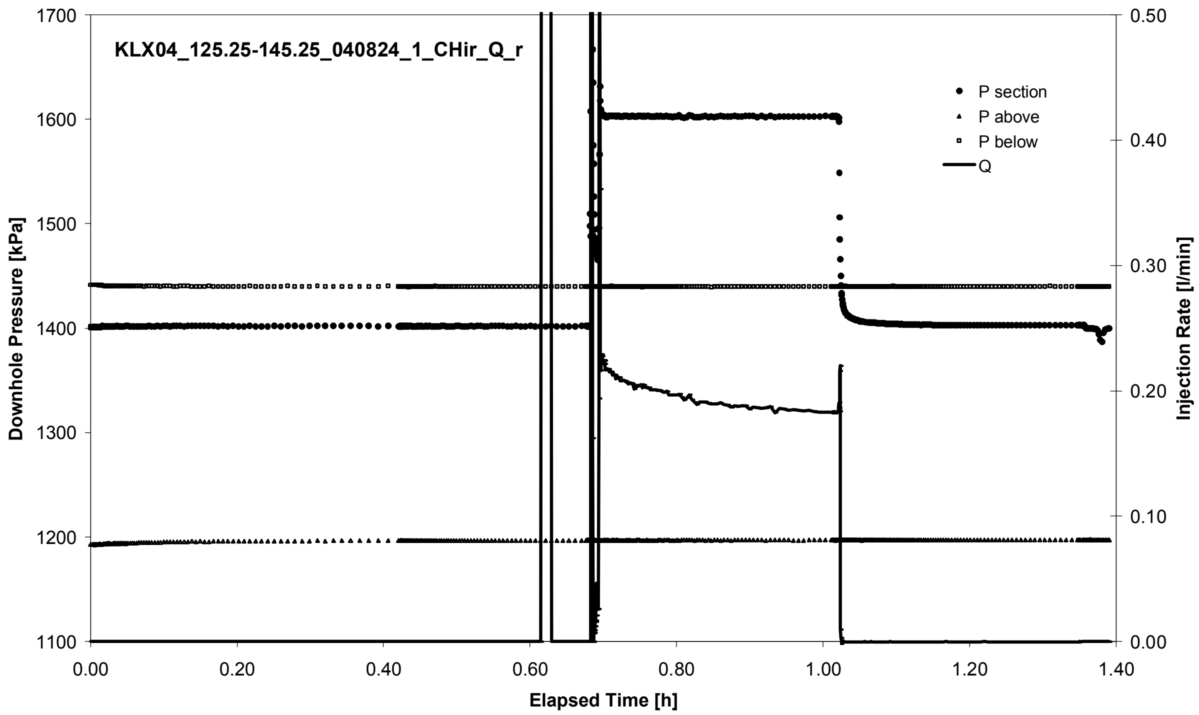


CHIR phase; HORNER match

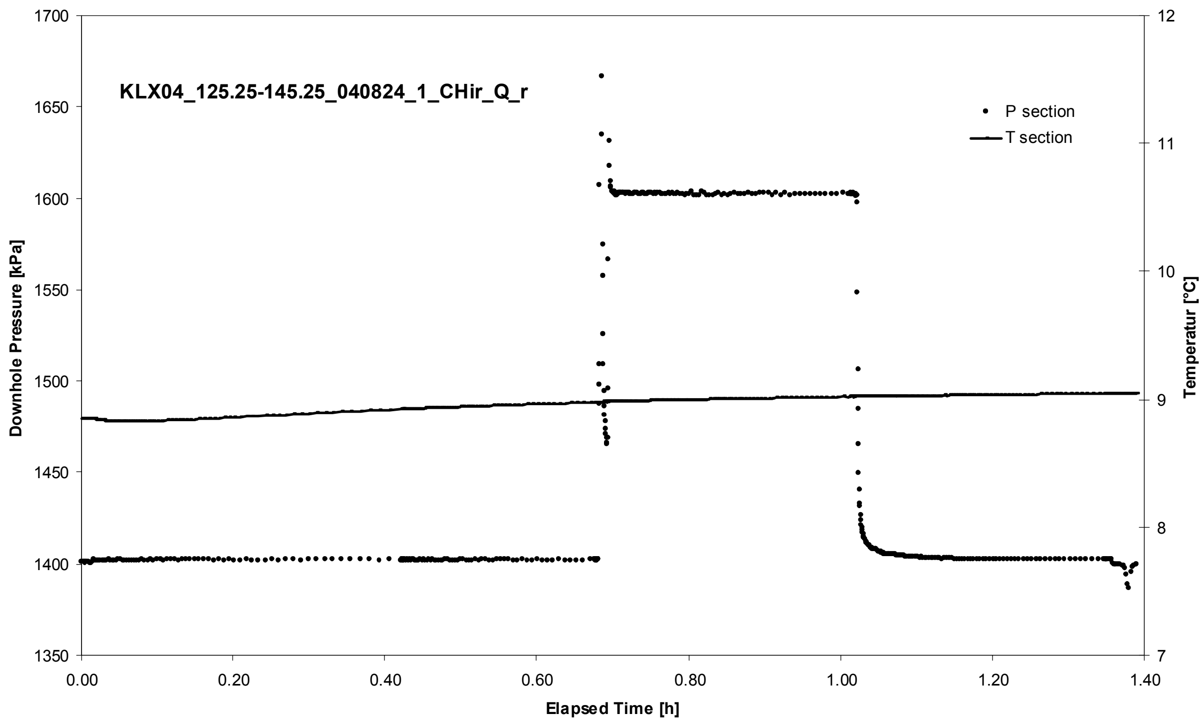
APPENDIX 2-11

Test 125.25 – 145.25 m

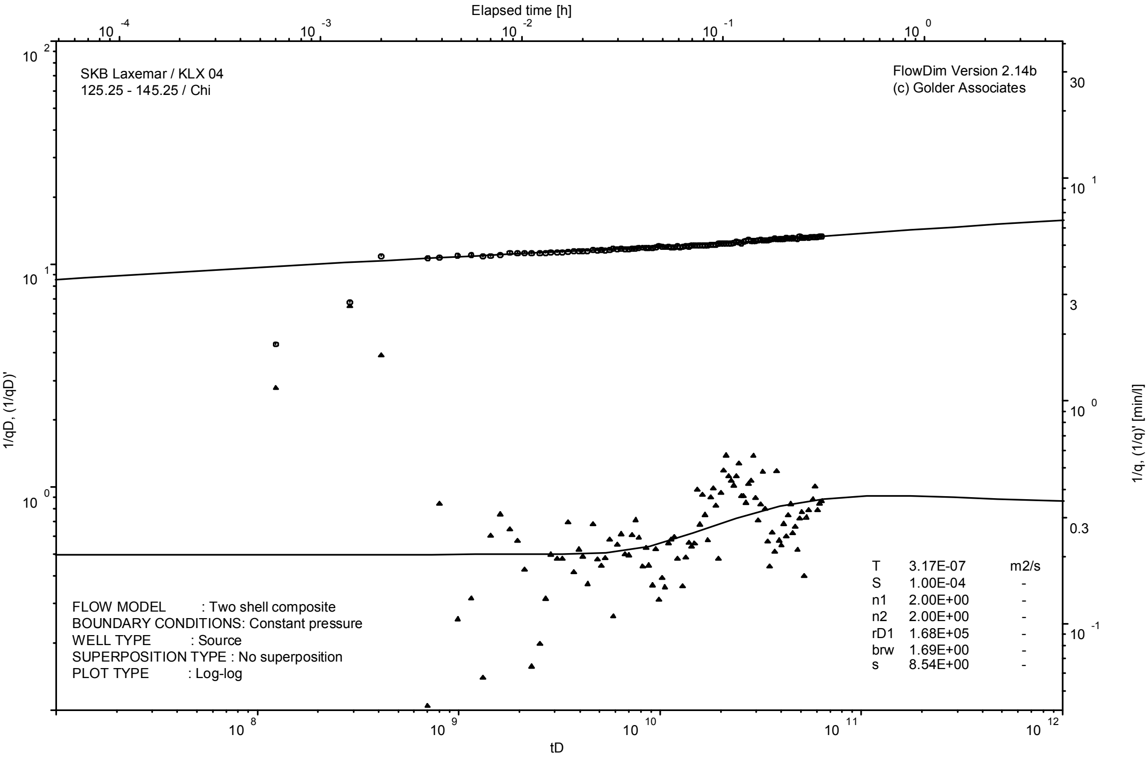
Analysis diagrams



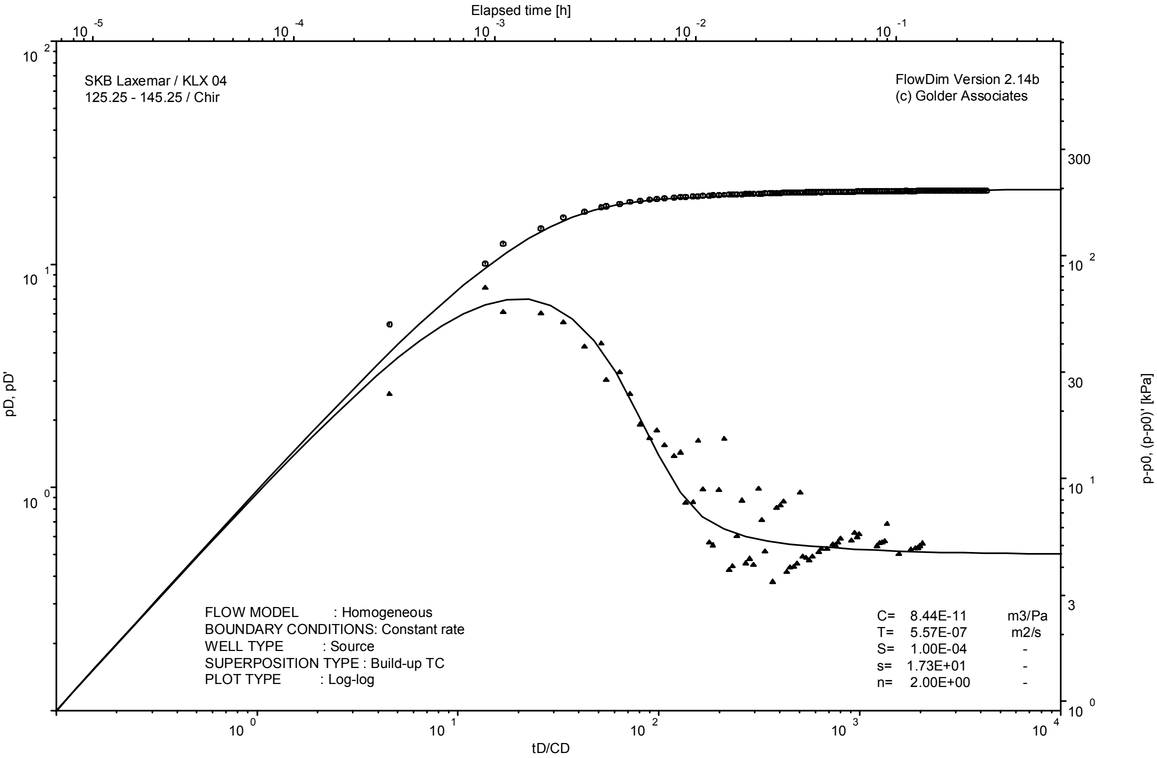
Pressure and flow rate vs. time; cartesian plot



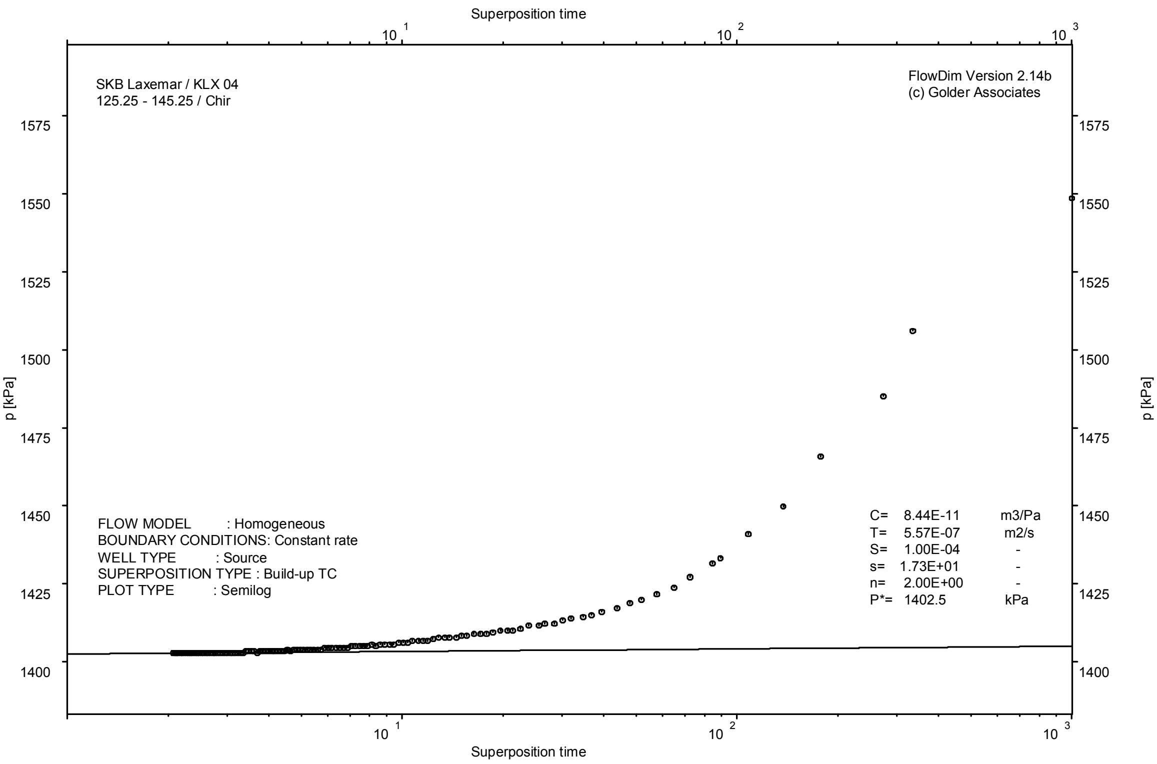
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

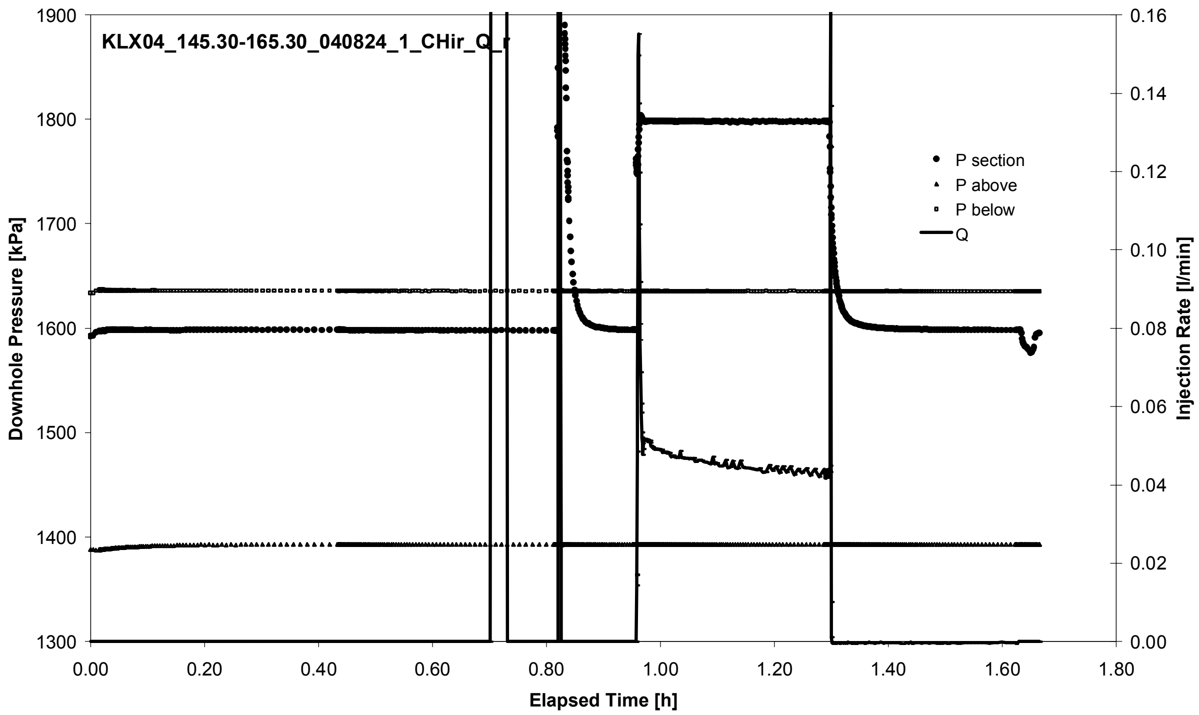


CHIR phase; HORNER match

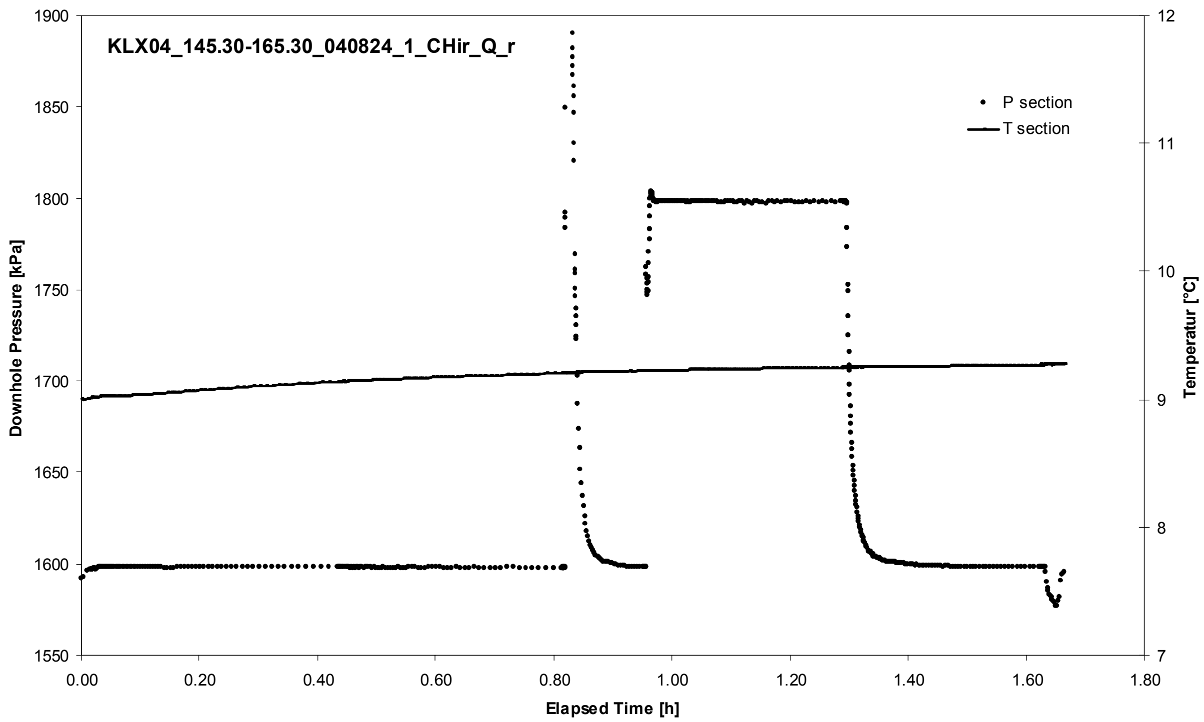
APPENDIX 2-12

Test 145.30 – 165.30 m

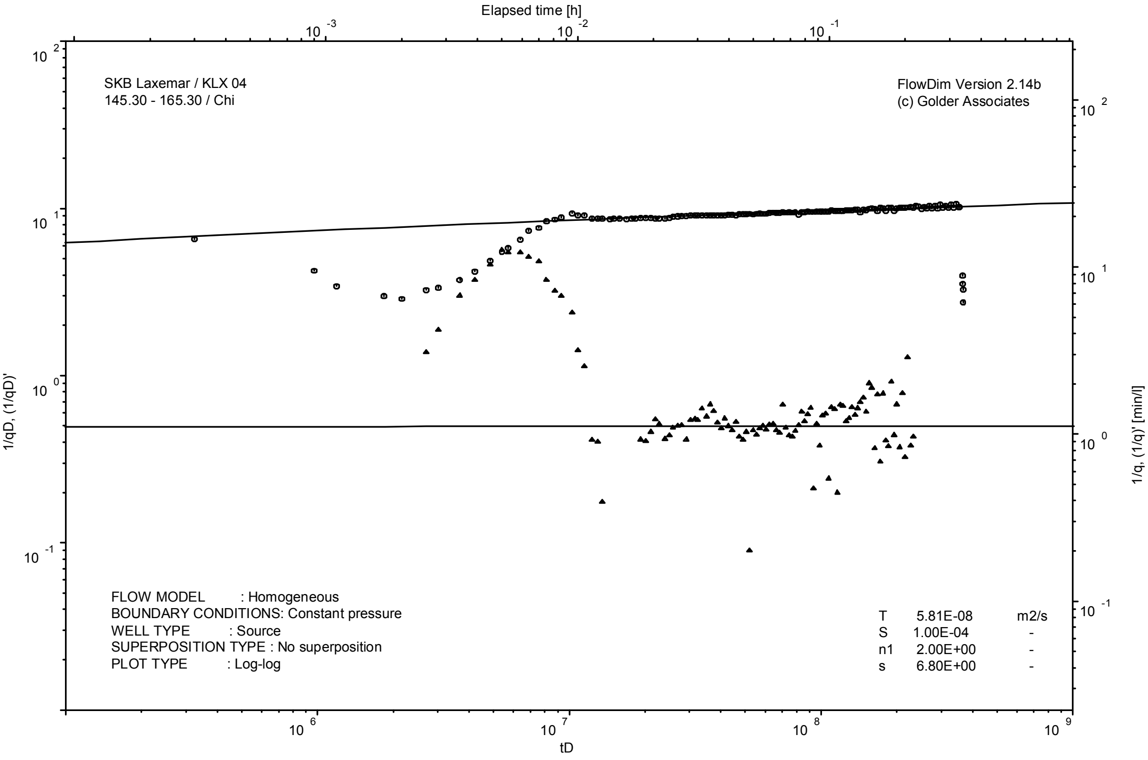
Analysis diagrams



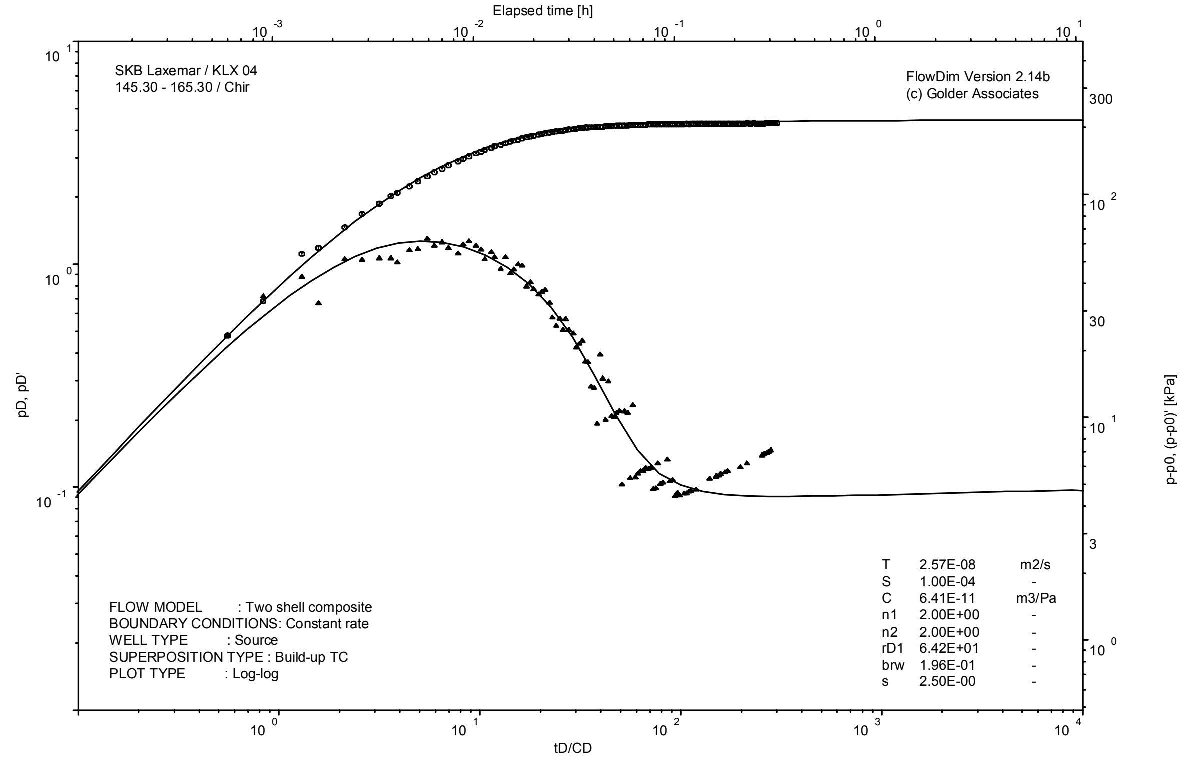
Pressure and flow rate vs. time; cartesian plot



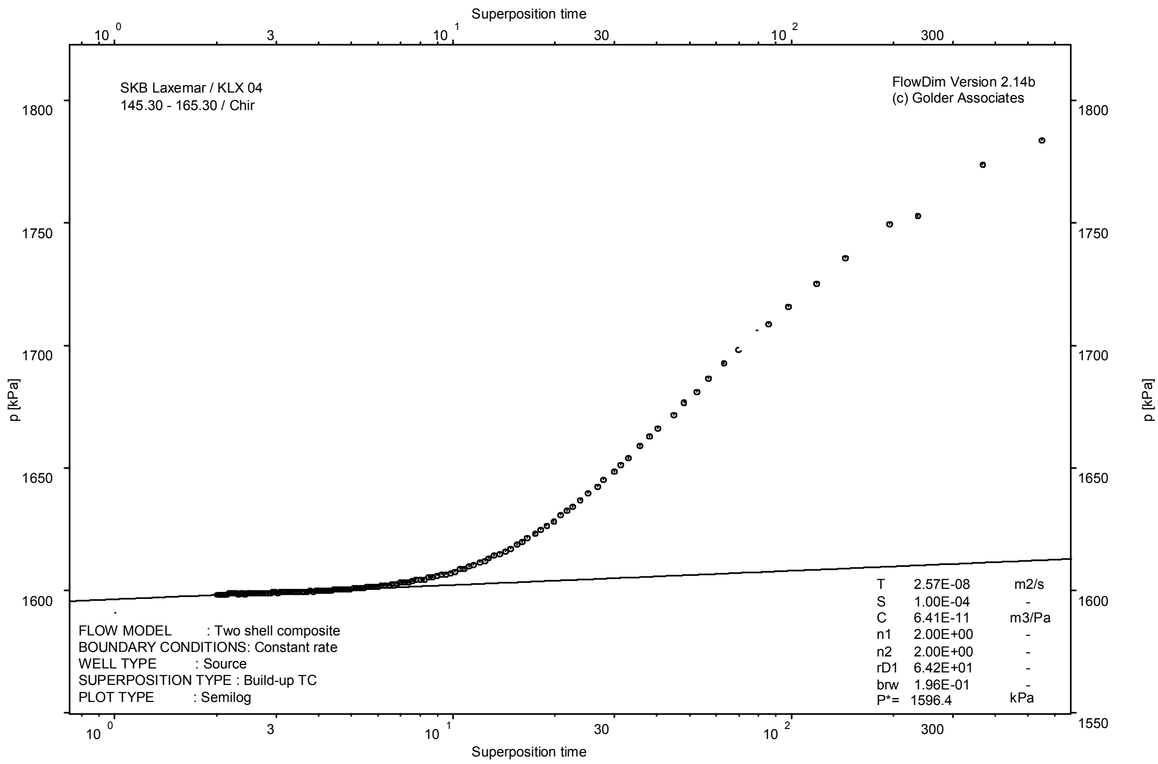
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

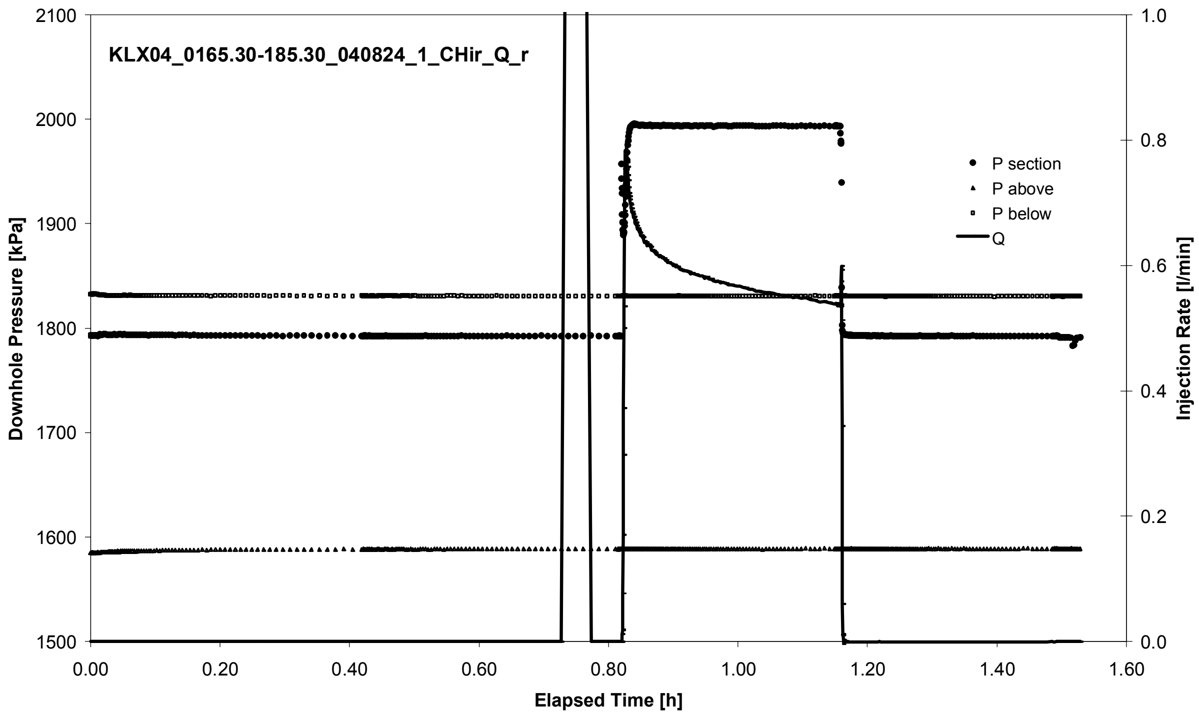


CHIR phase; HORNER match

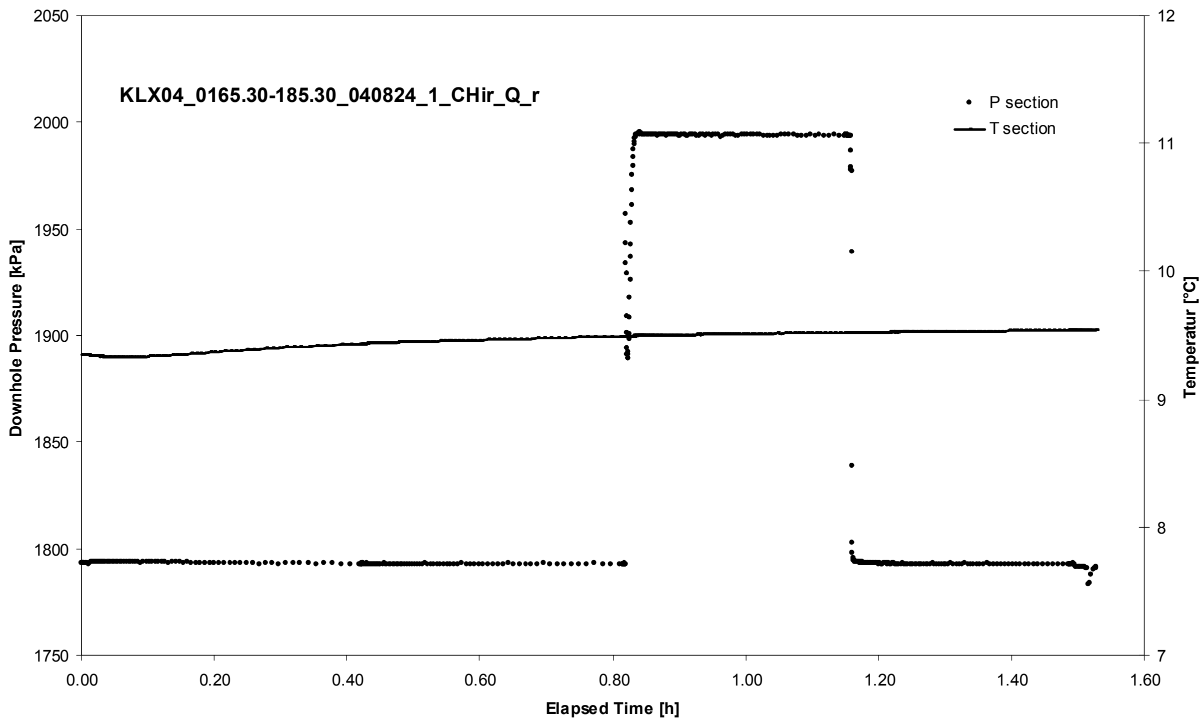
APPENDIX 2-13

Test 165.30 – 185.30 m

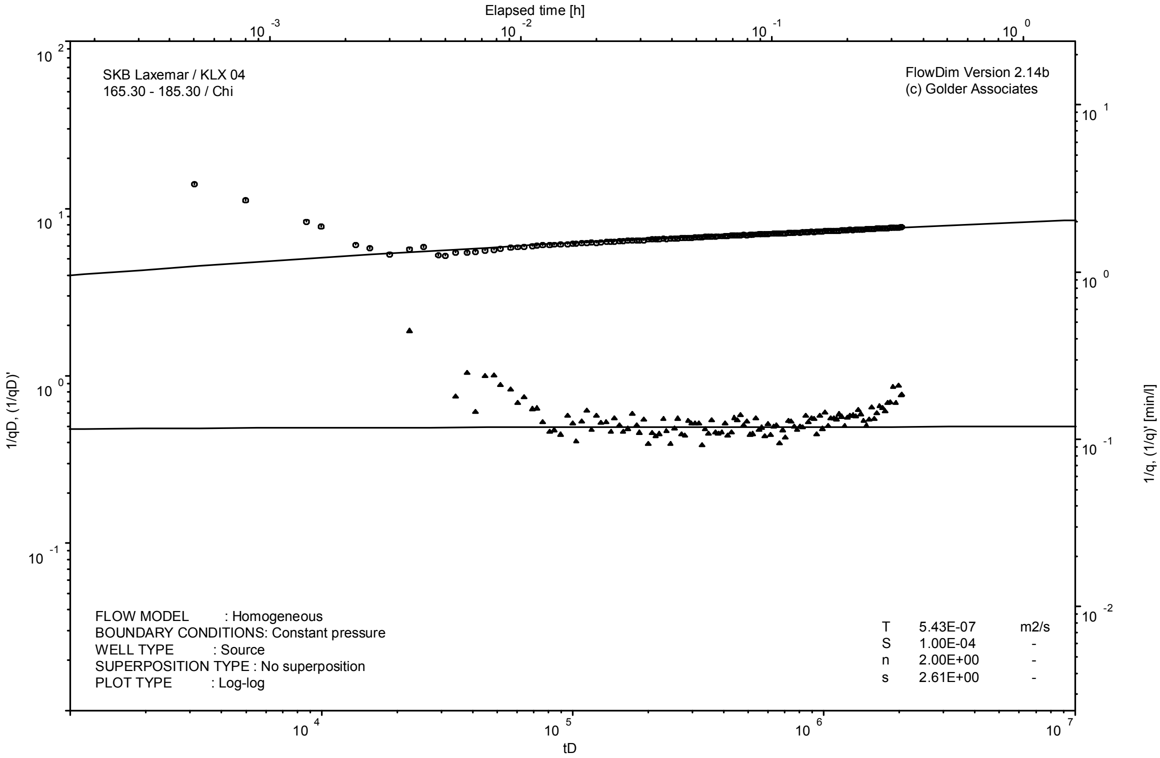
Analysis diagrams



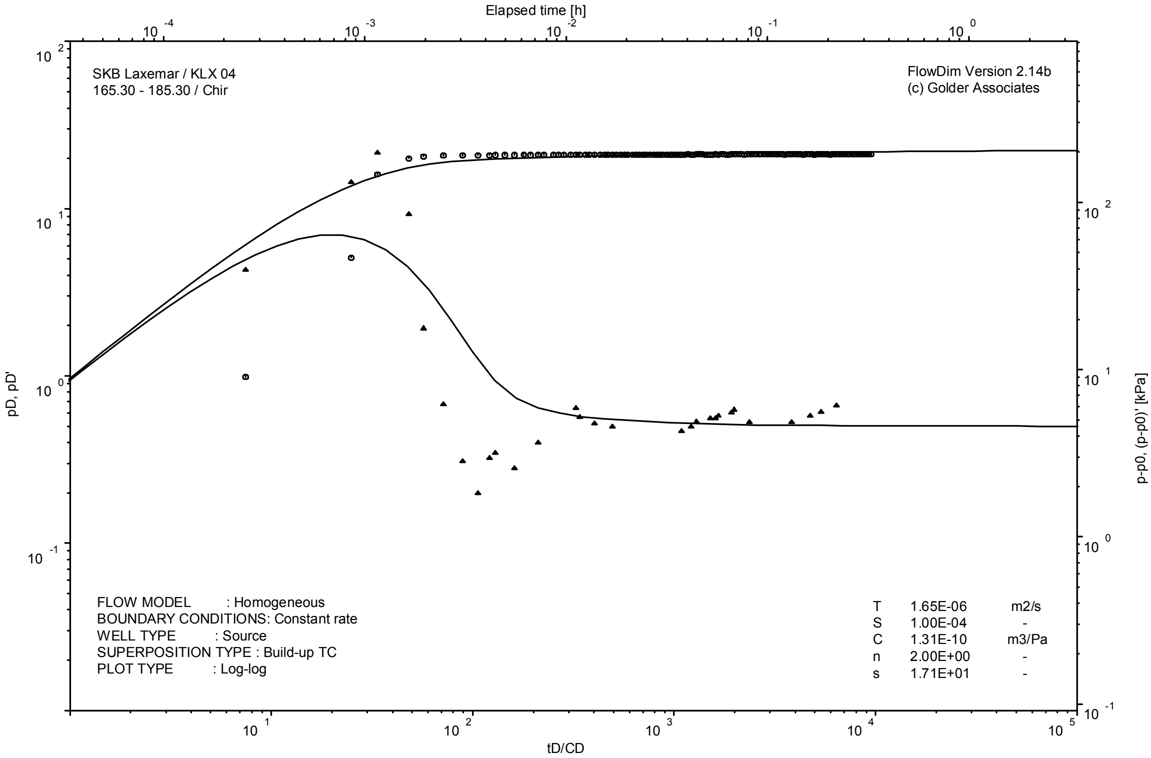
Pressure and flow rate vs. time; cartesian plot



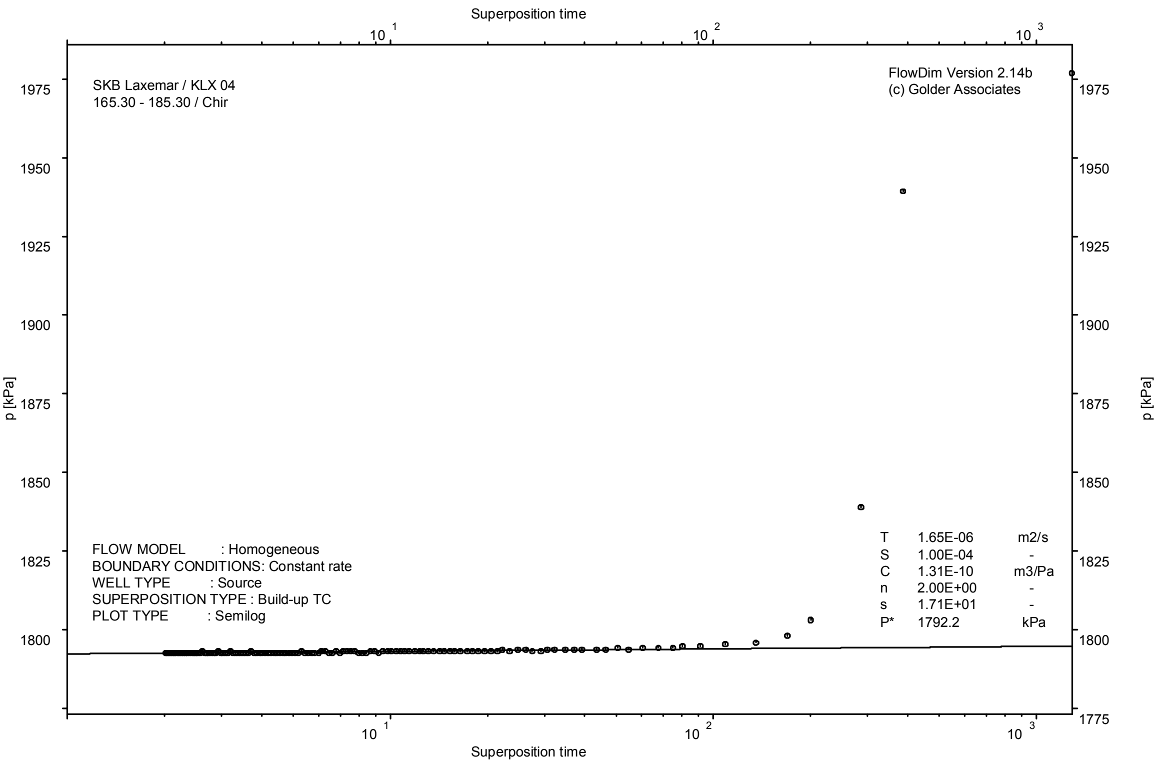
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

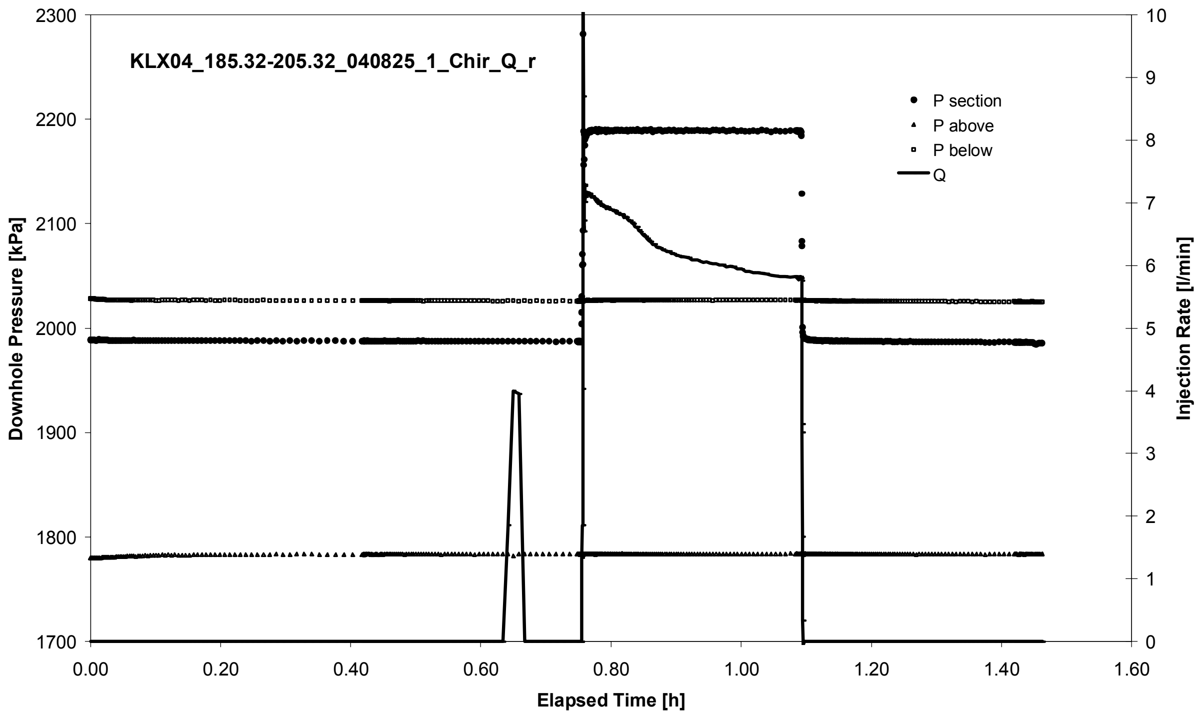


CHIR phase; HORNER match

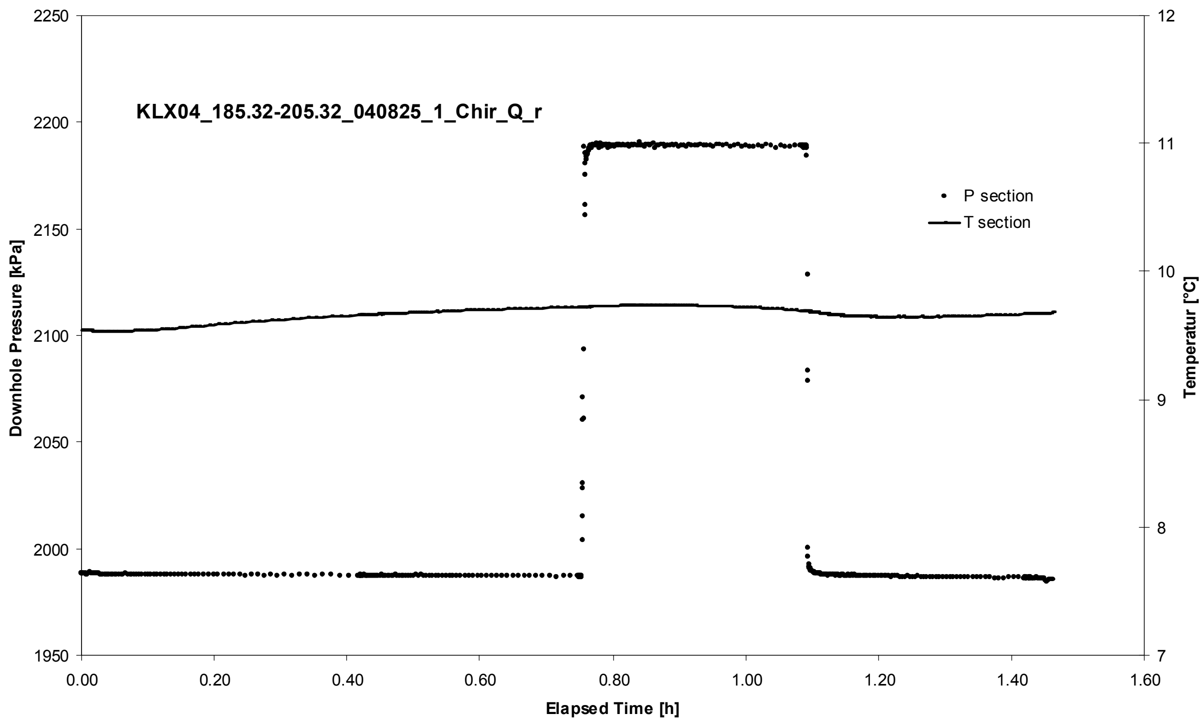
APPENDIX 2-14

Test 185.32 – 205.32 m

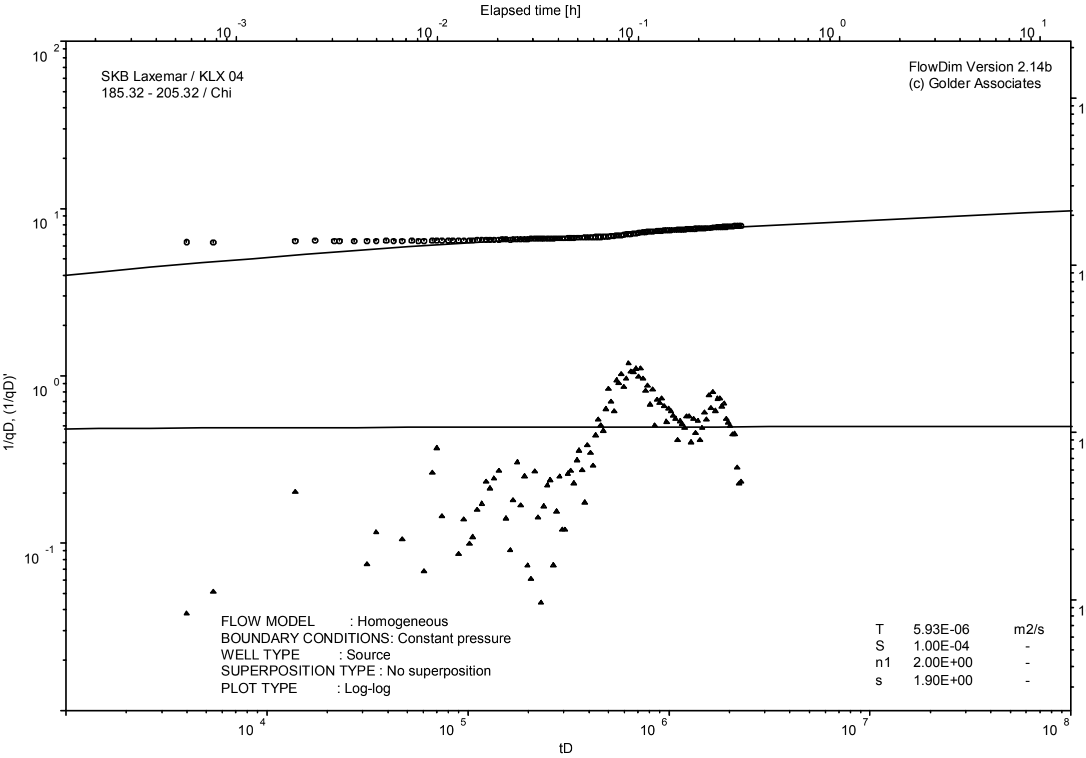
Analysis diagrams



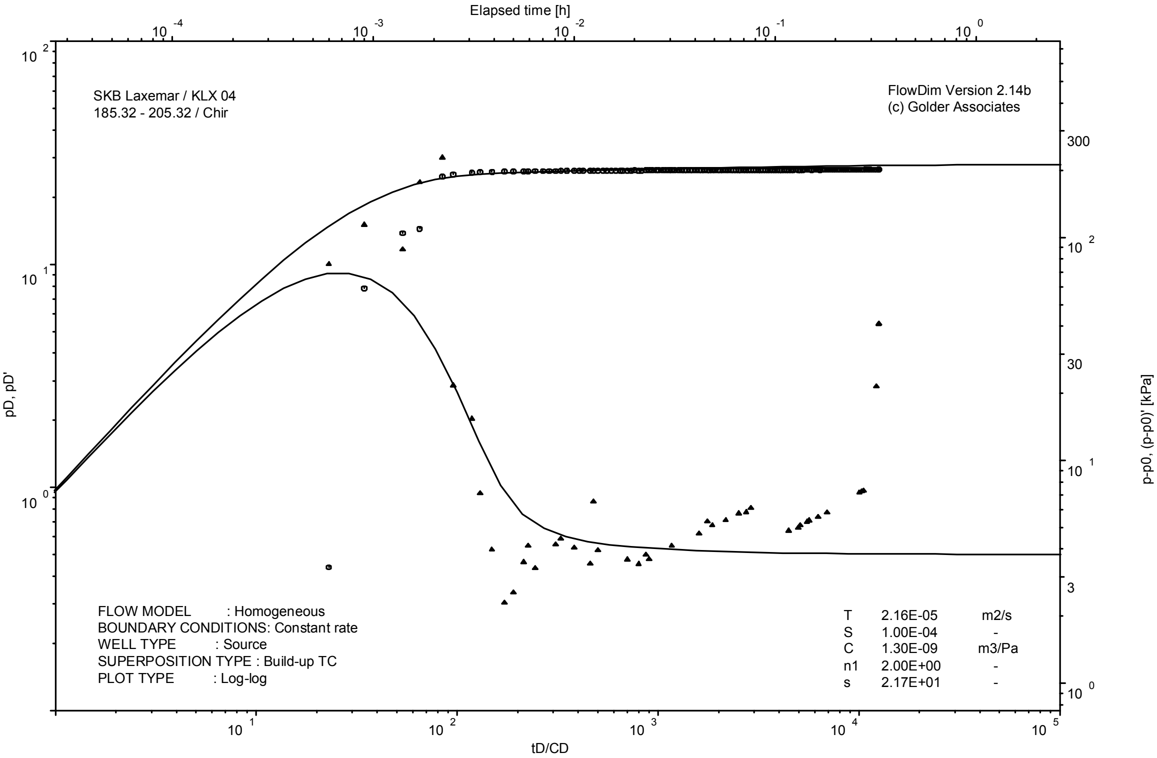
Pressure and flow rate vs. time; cartesian plot



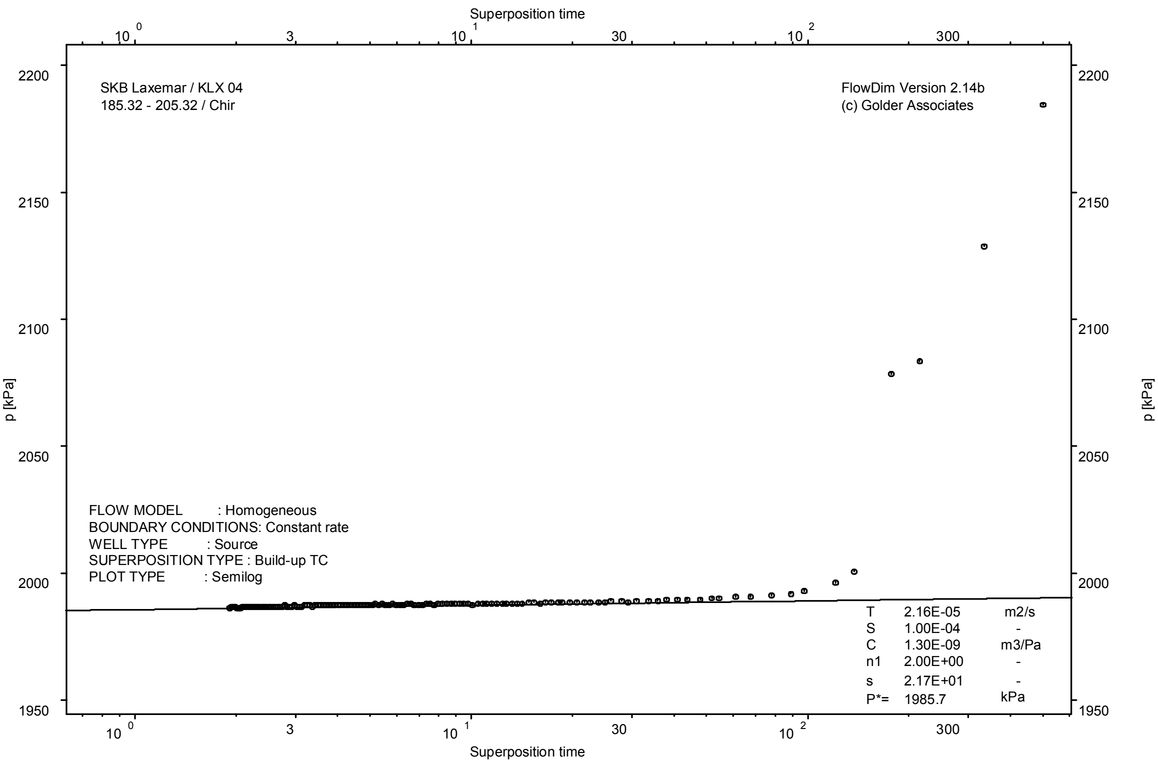
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

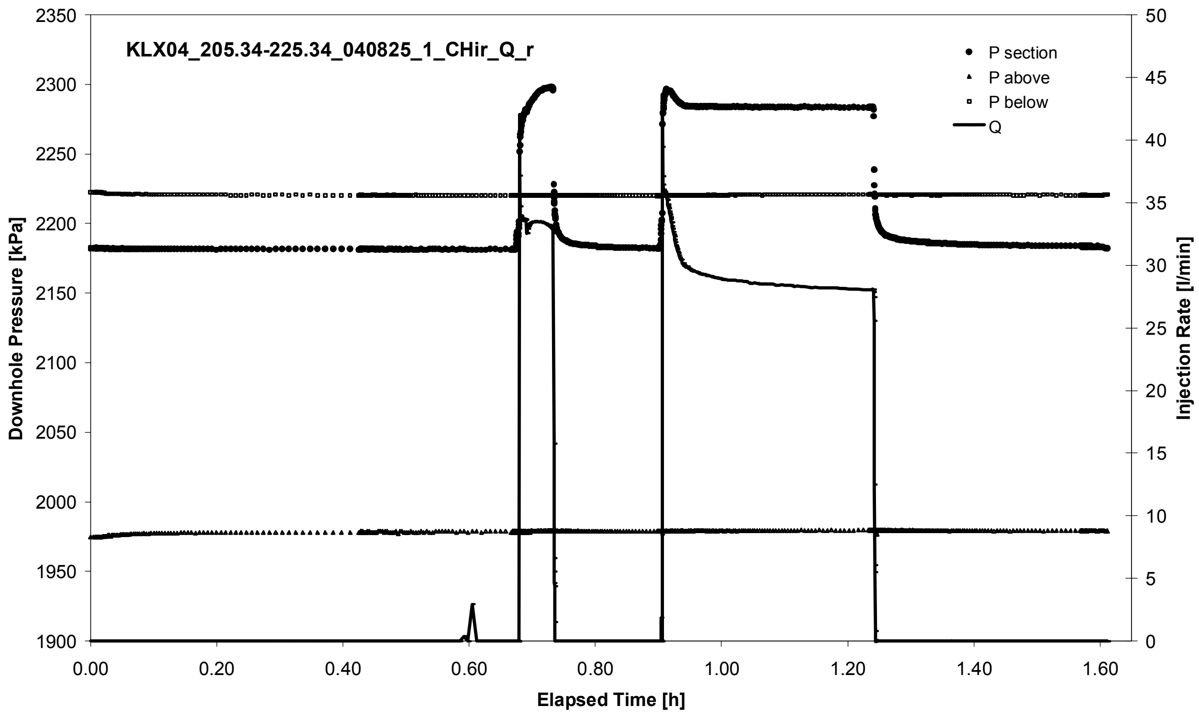


CHIR phase; HORNER match

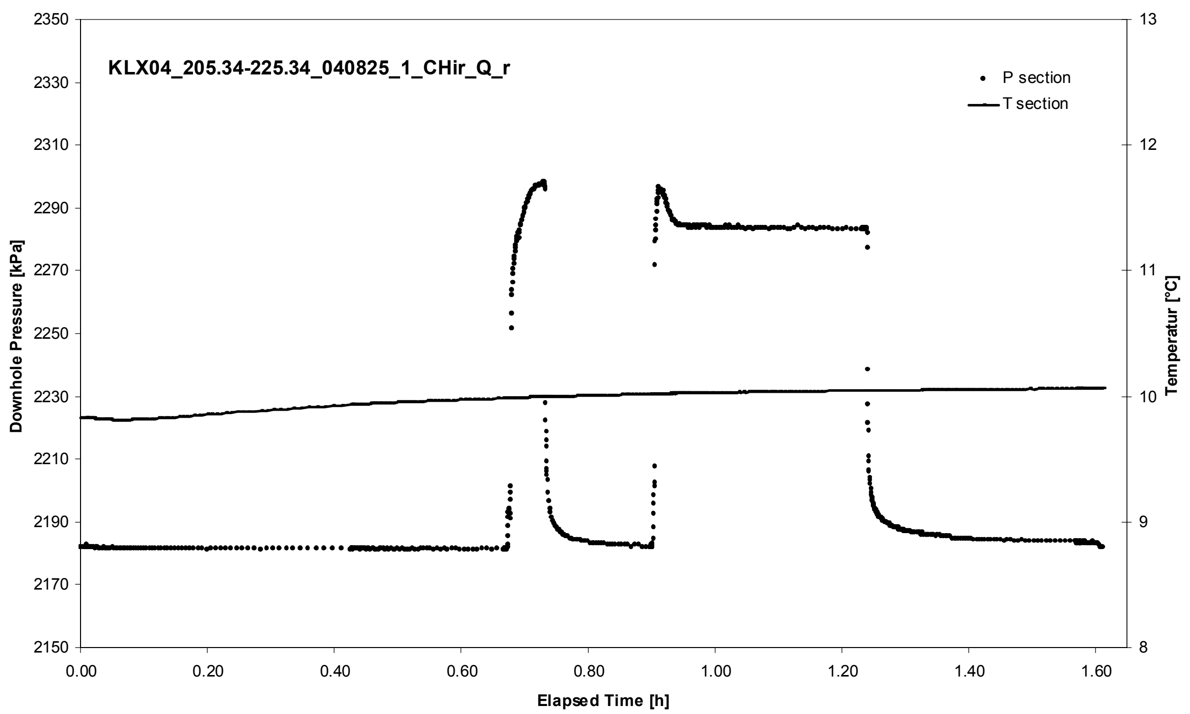
APPENDIX 2-15

Test 205.34 – 225.34 m

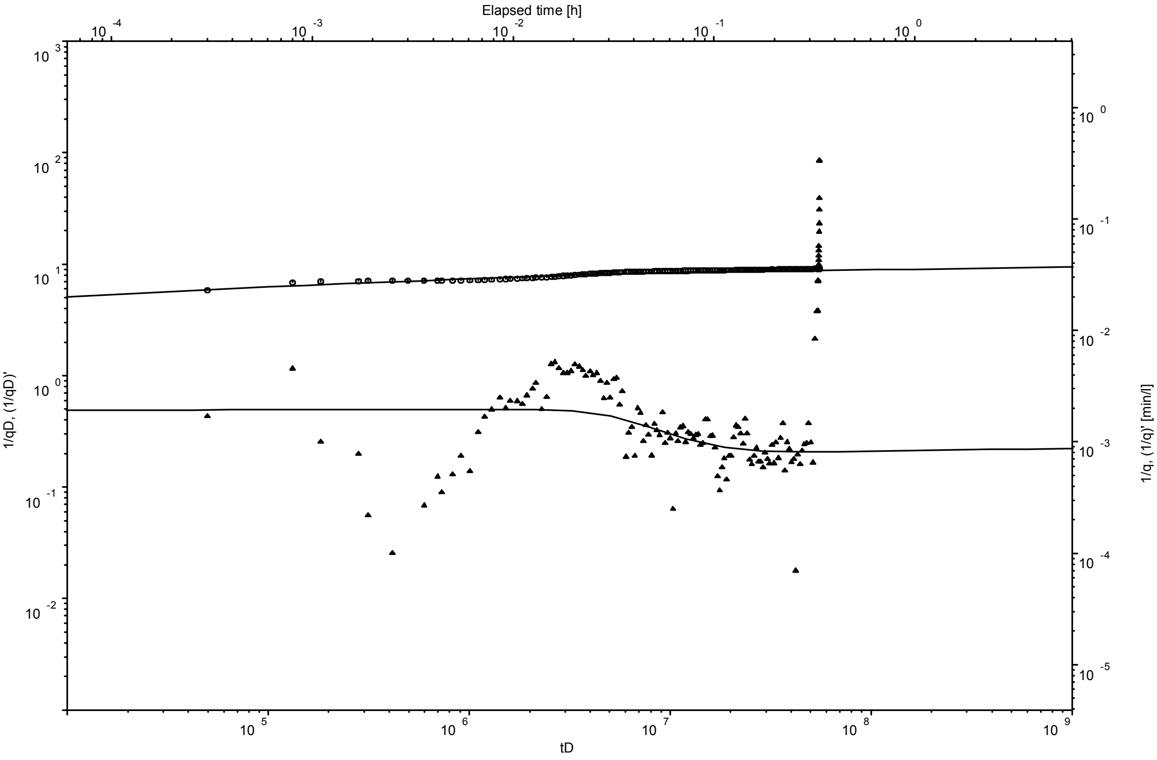
Analysis diagrams



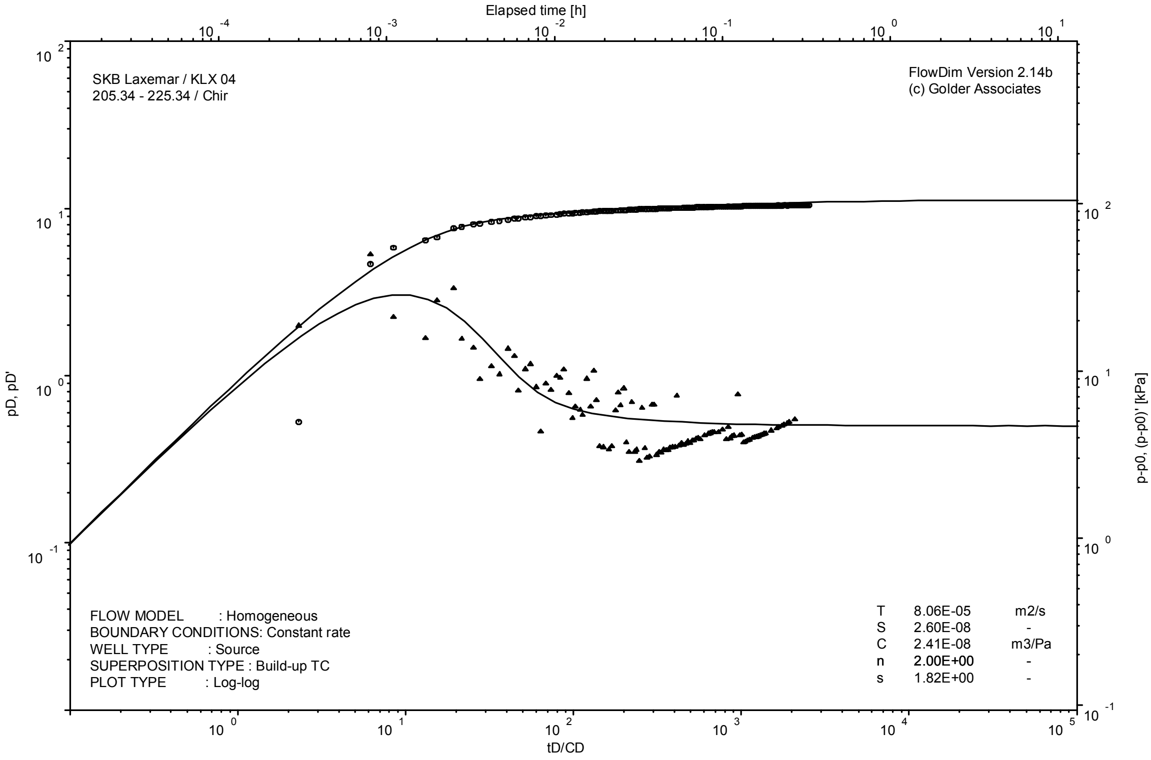
Pressure and flow rate vs. time; cartesian plot



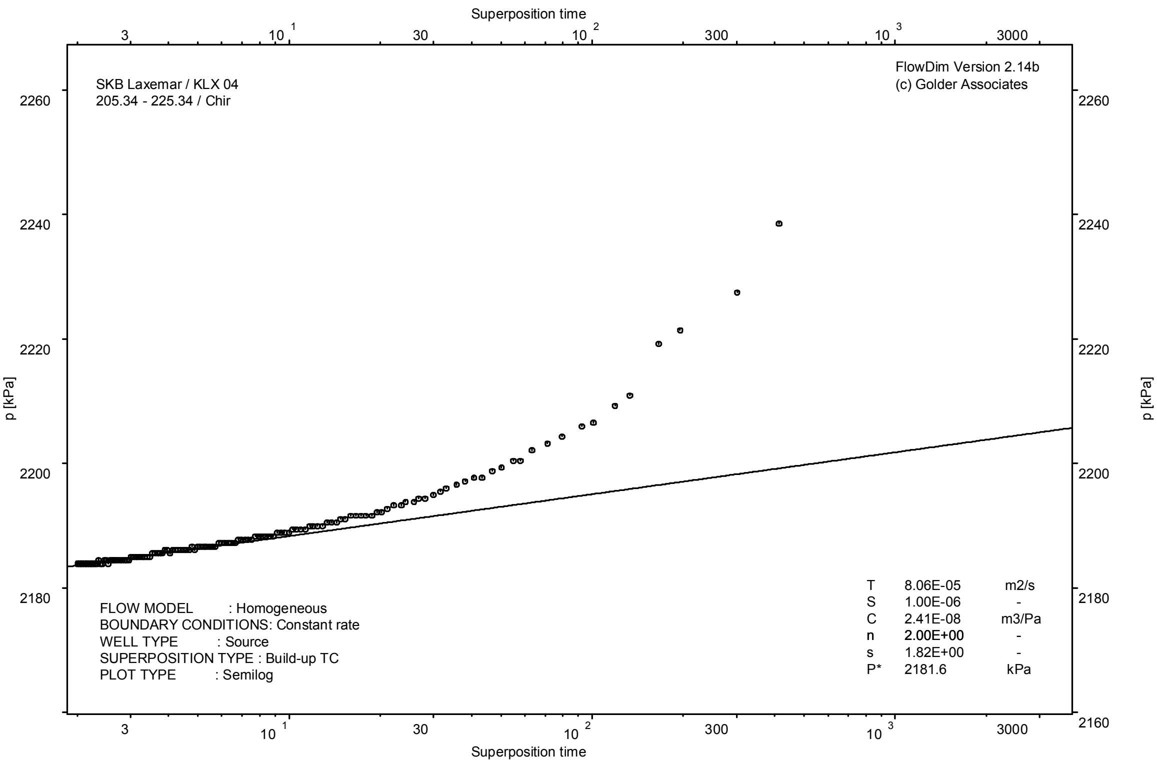
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

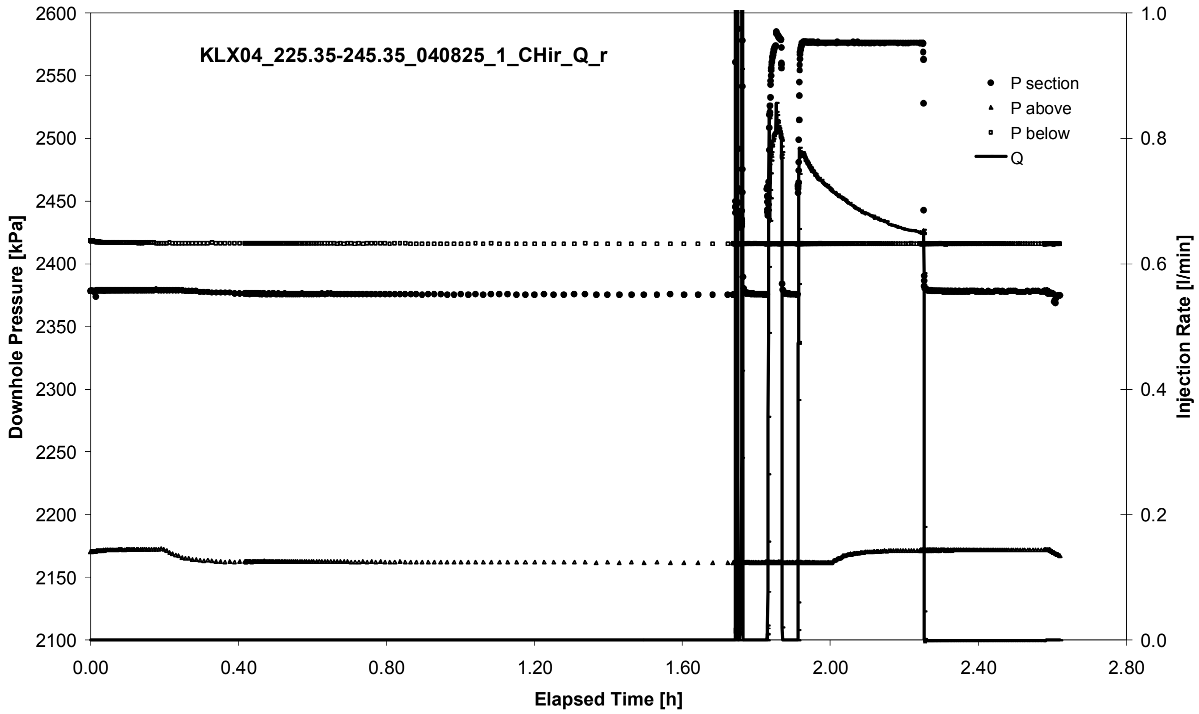


CHIR phase; HORNER match

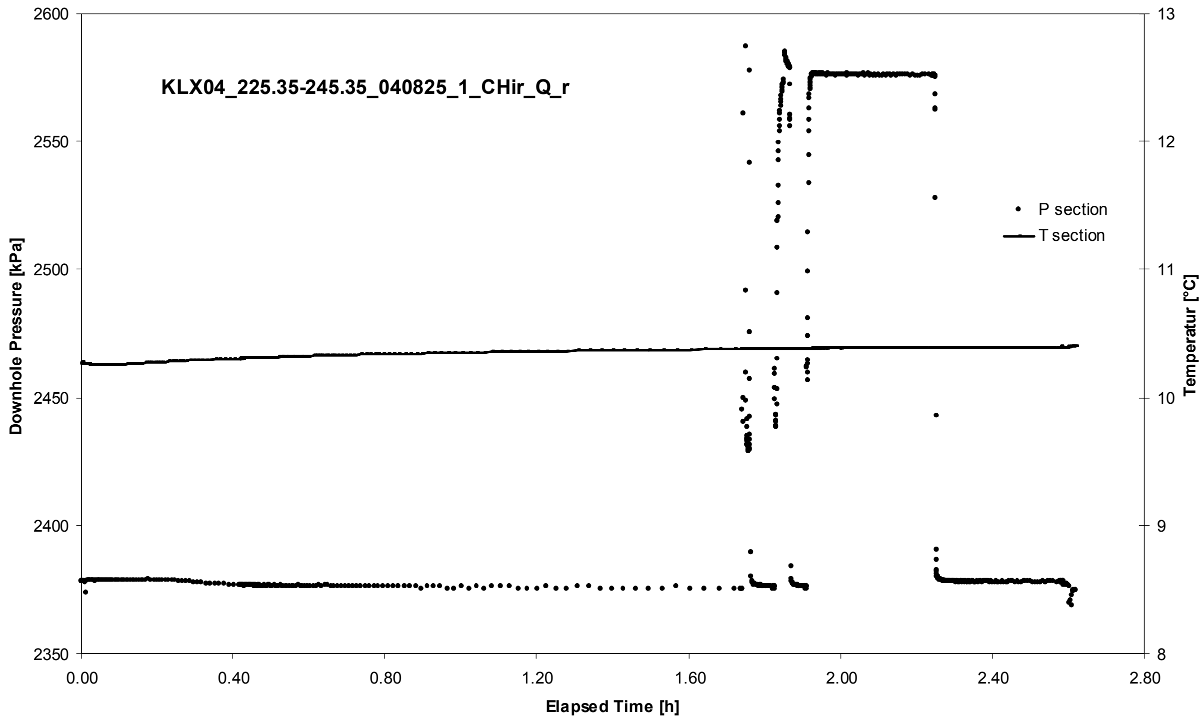
APPENDIX 2-16

Test 225.35 – 245.35 m

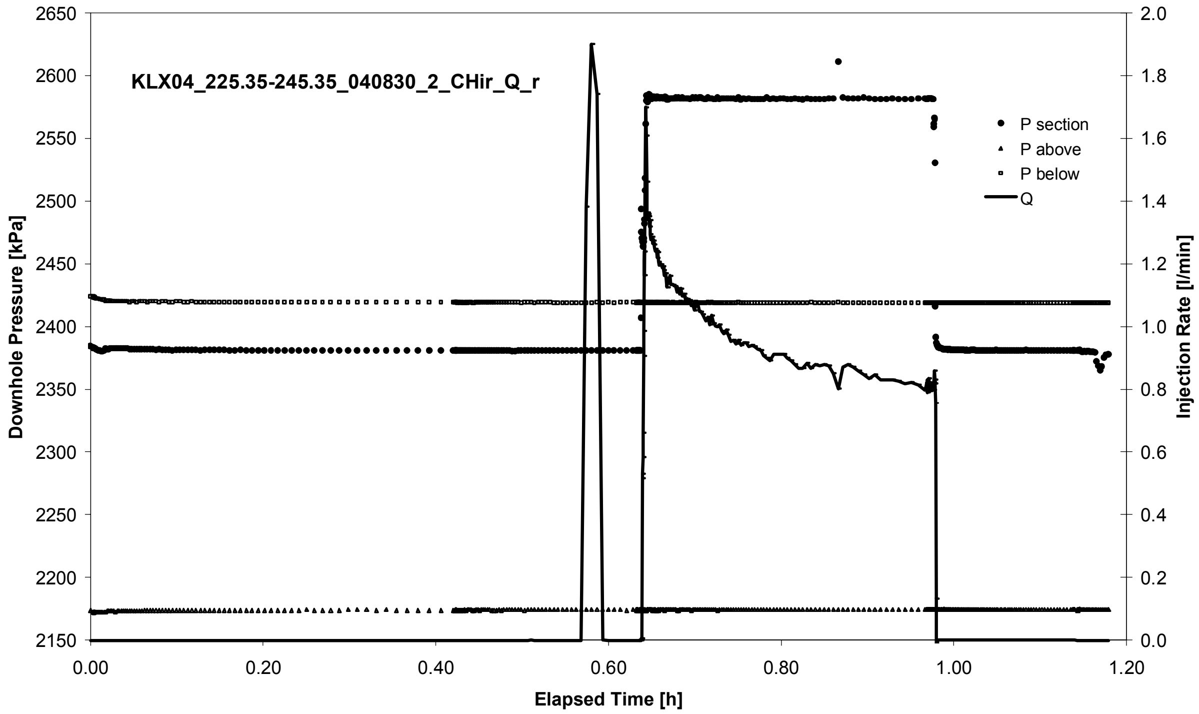
Analysis diagrams



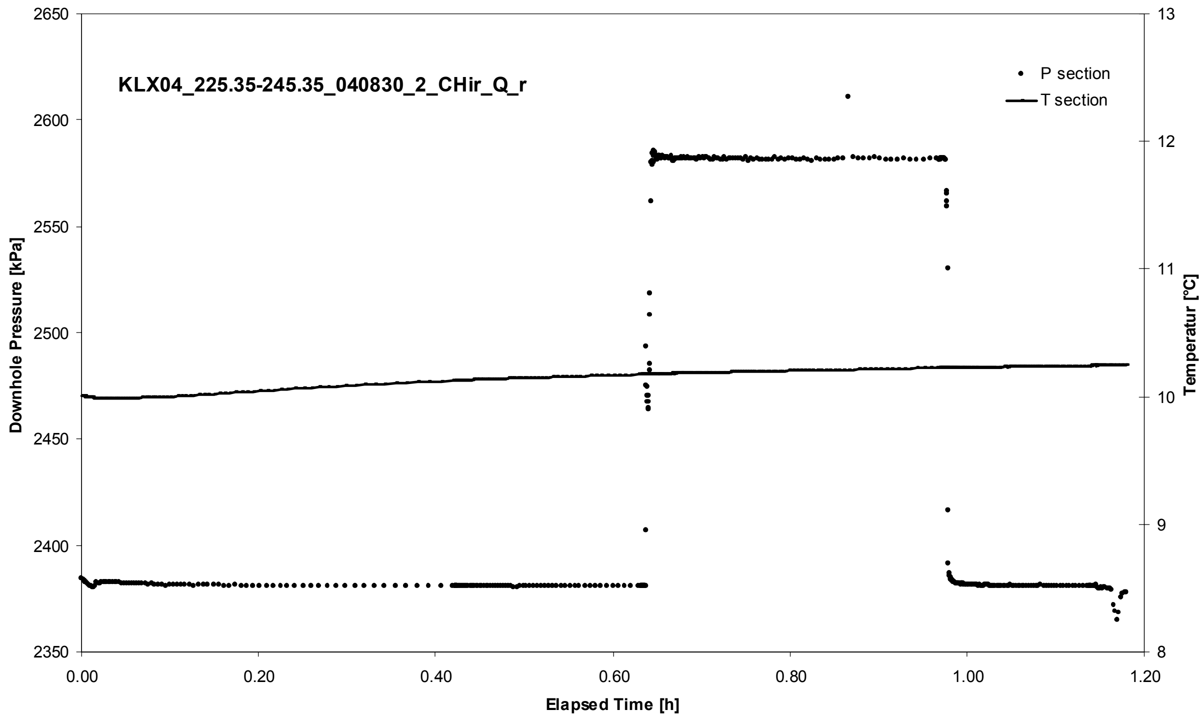
Pressure and flow rate vs. time; cartesian plot (test repeated)



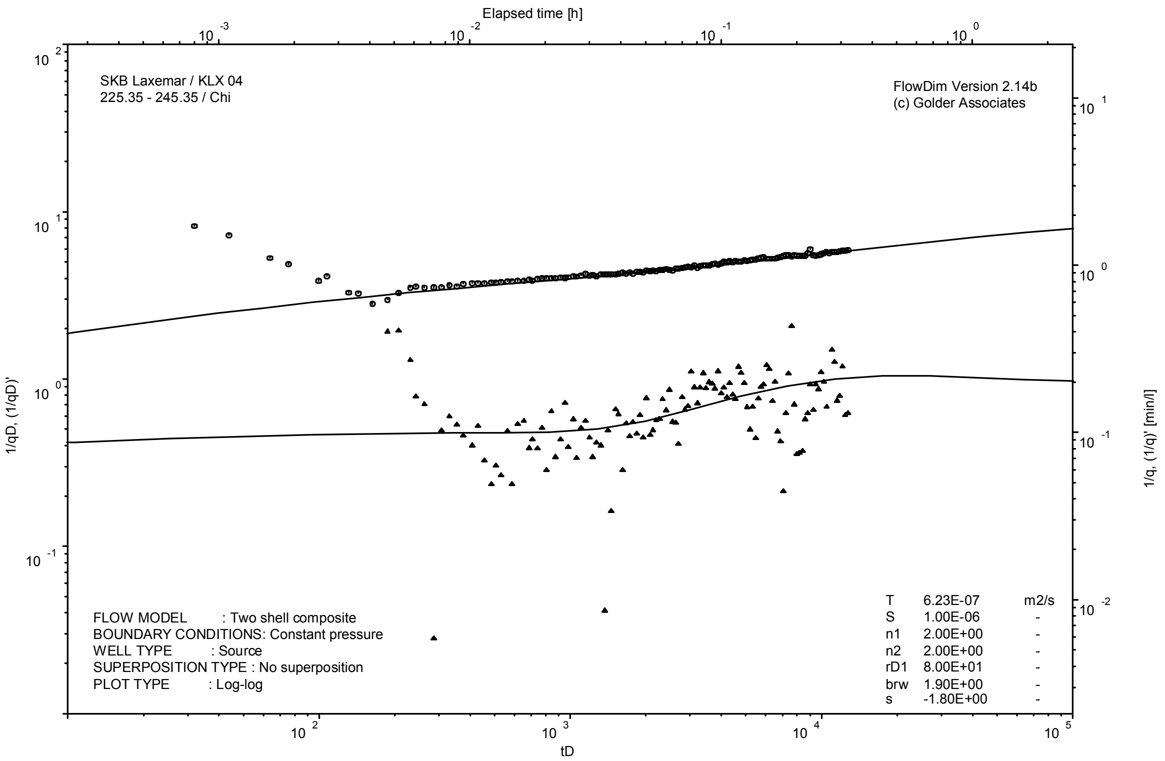
Interval pressure and temperature vs. time; cartesian plot (test repeated)



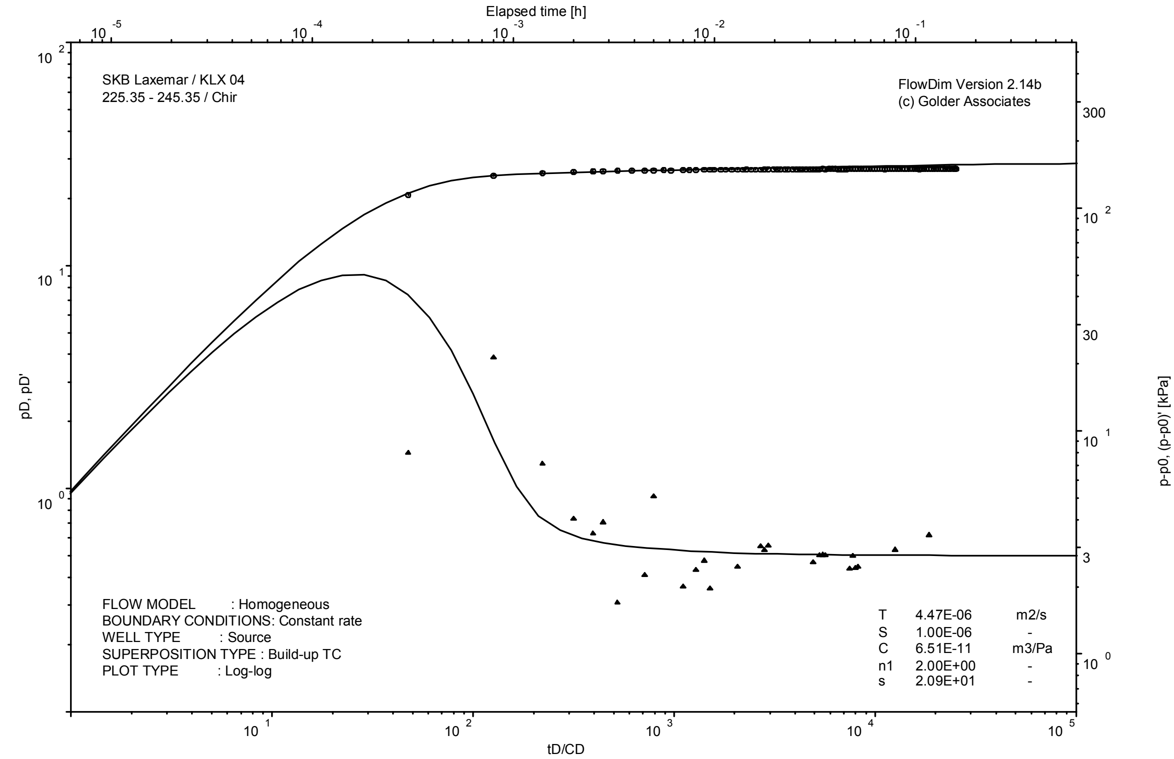
Pressure and flow rate vs. time; cartesian plot (analysed)



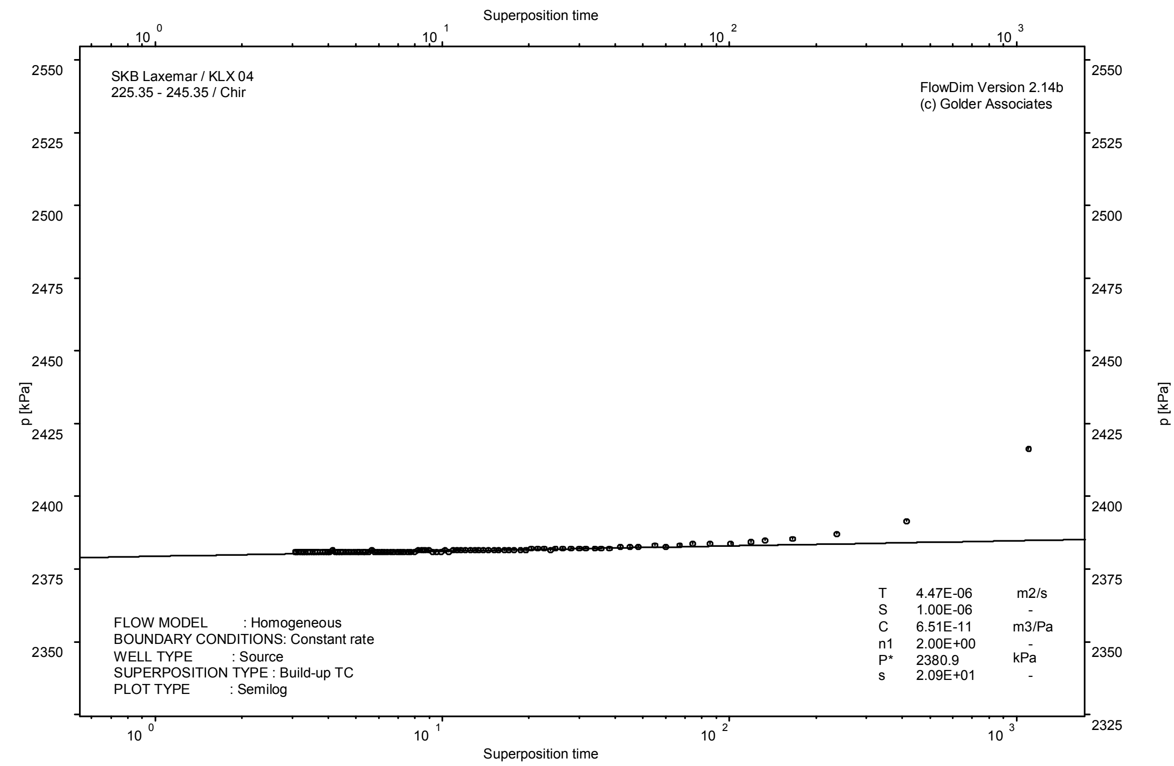
Interval pressure and temperature vs. time; cartesian plot (analysed)



CHI phase; log-log match



CHIR phase; log-log match

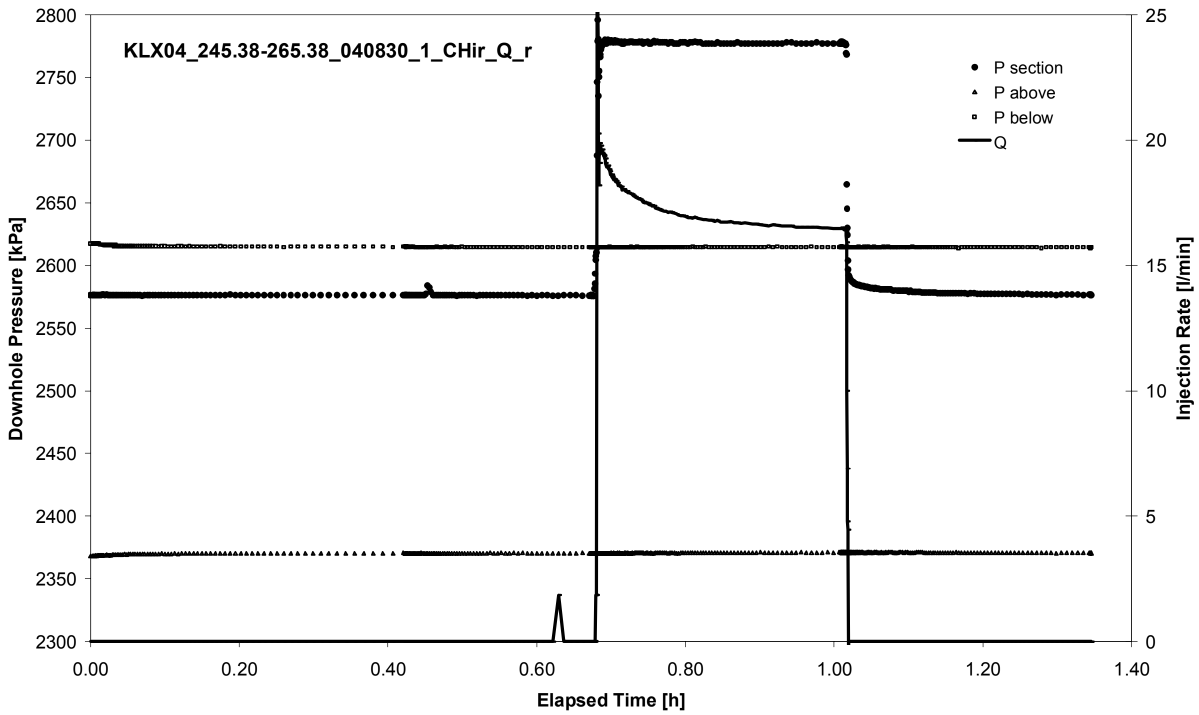


CHIR phase; HORNER match

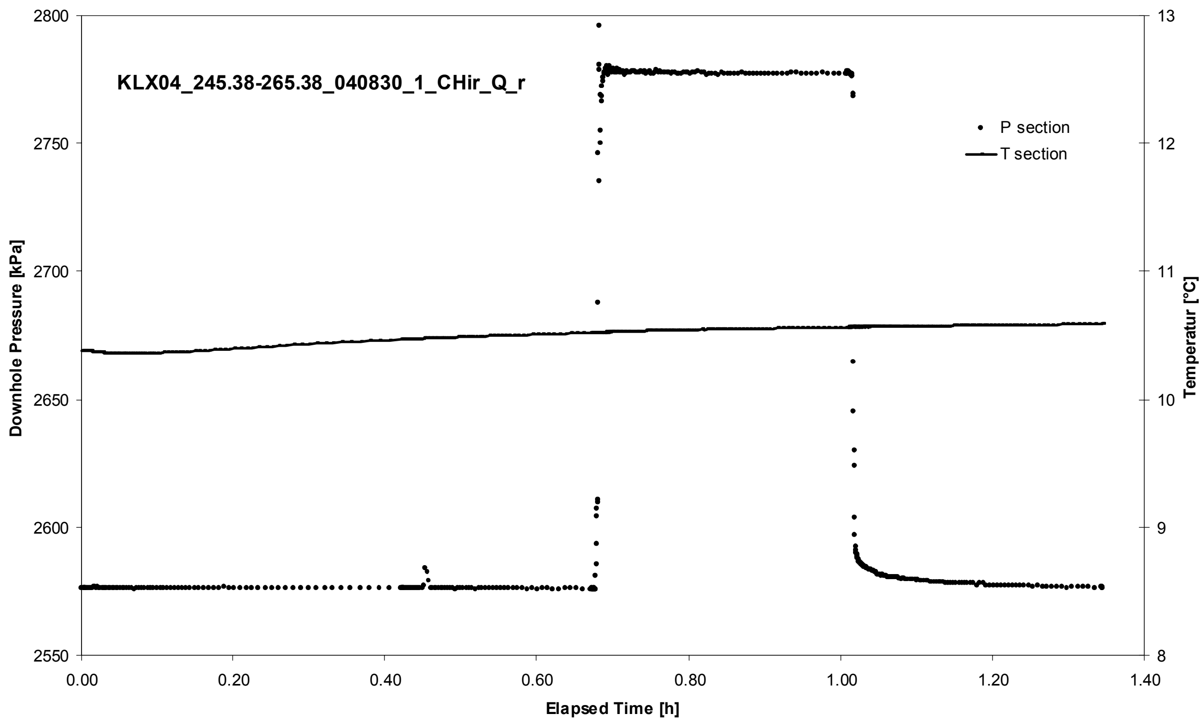
APPENDIX 2-17

Test 245.38 – 265.38 m

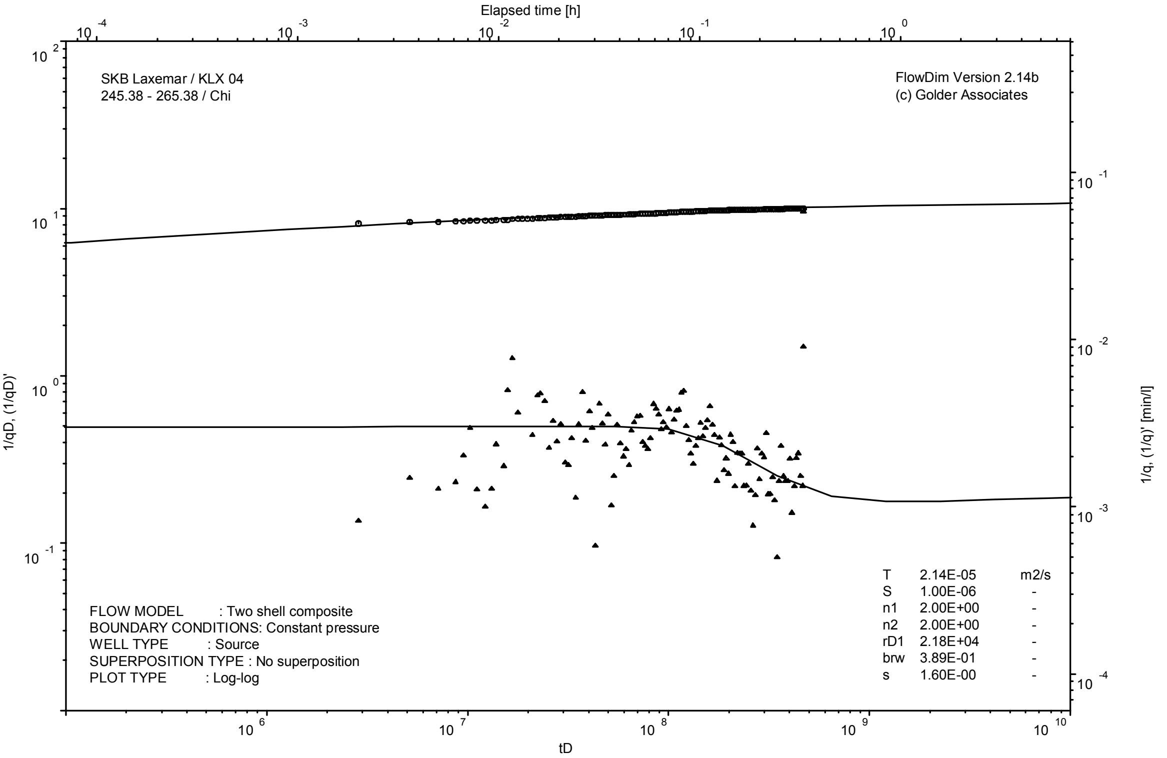
Analysis diagrams



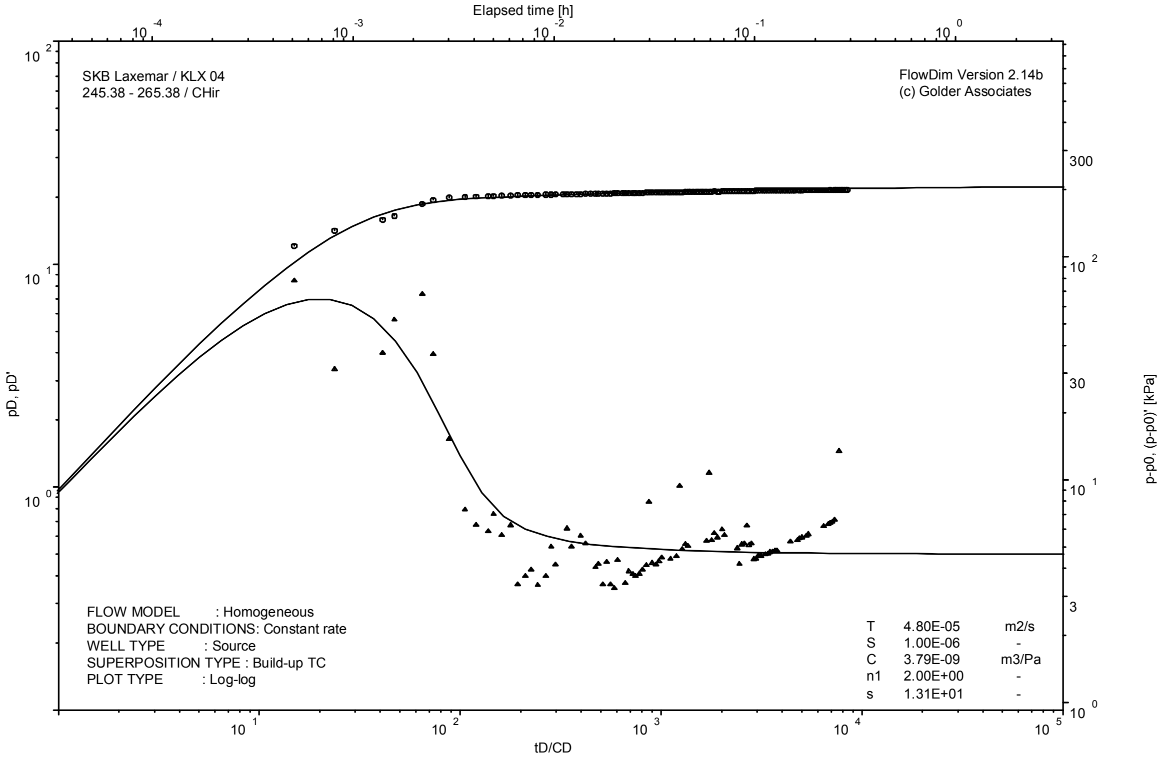
Pressure and flow rate vs. time; cartesian plot



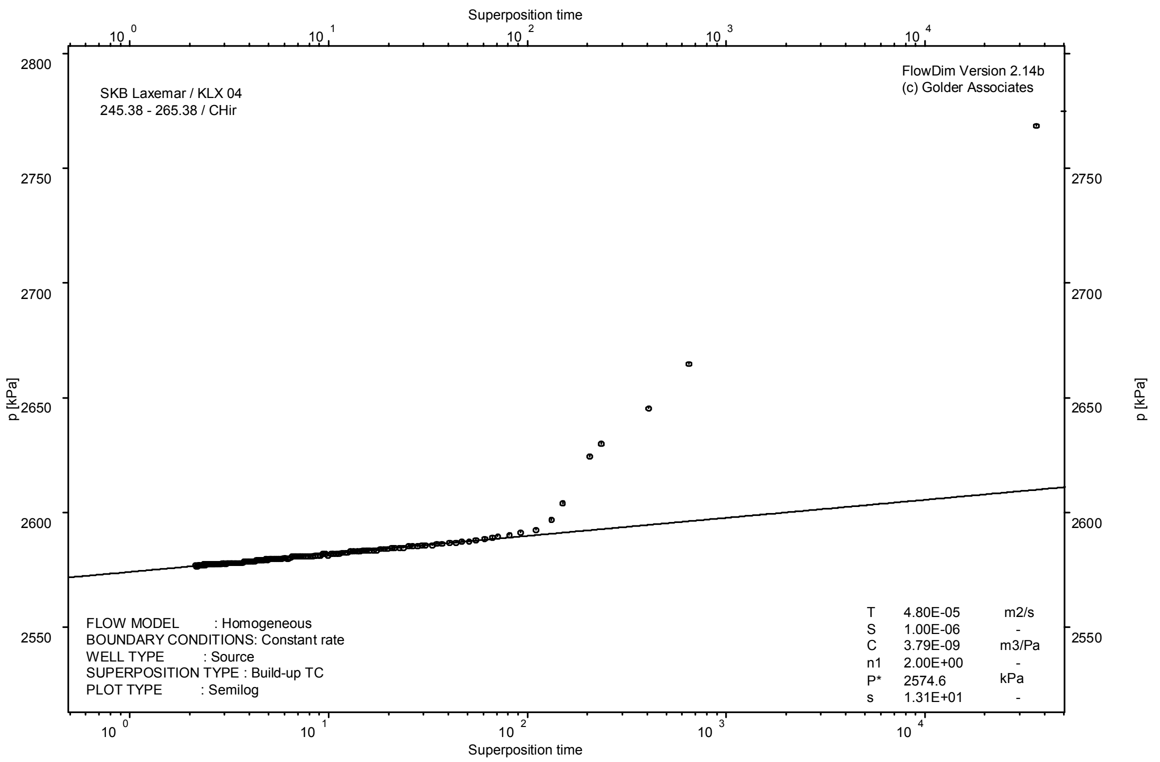
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

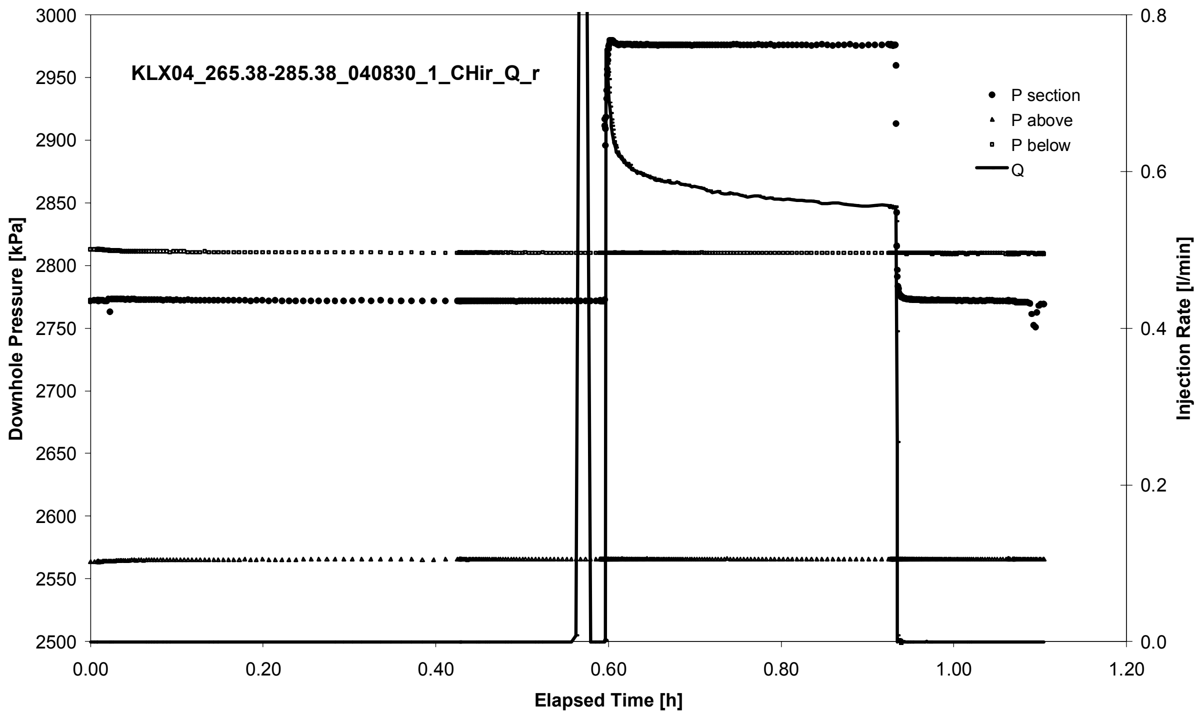


CHIR phase; HORNER match

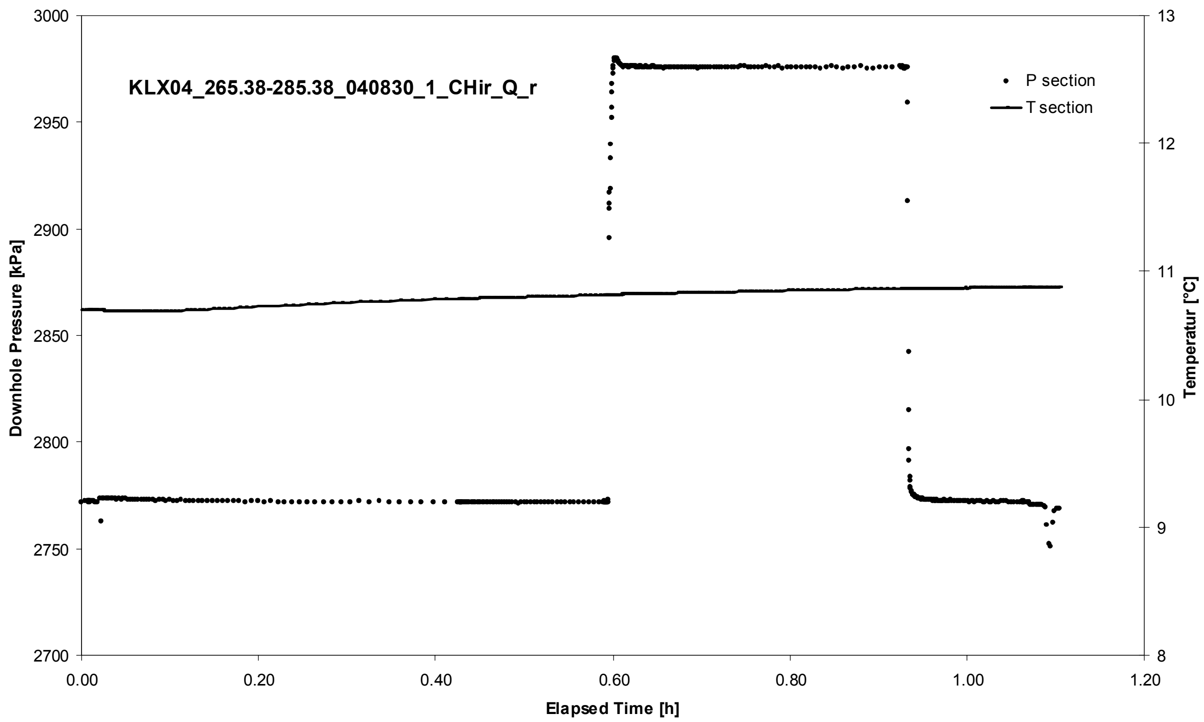
APPENDIX 2-18

Test 265.38 – 285.38 m

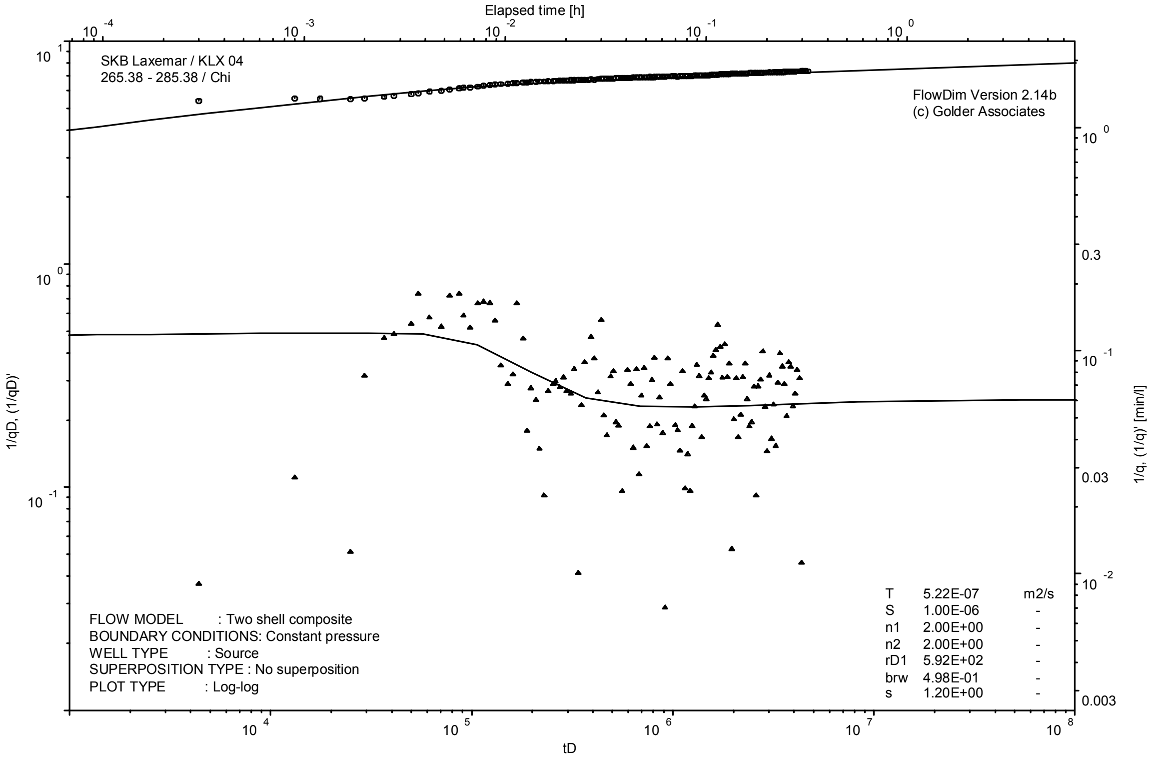
Analysis diagrams



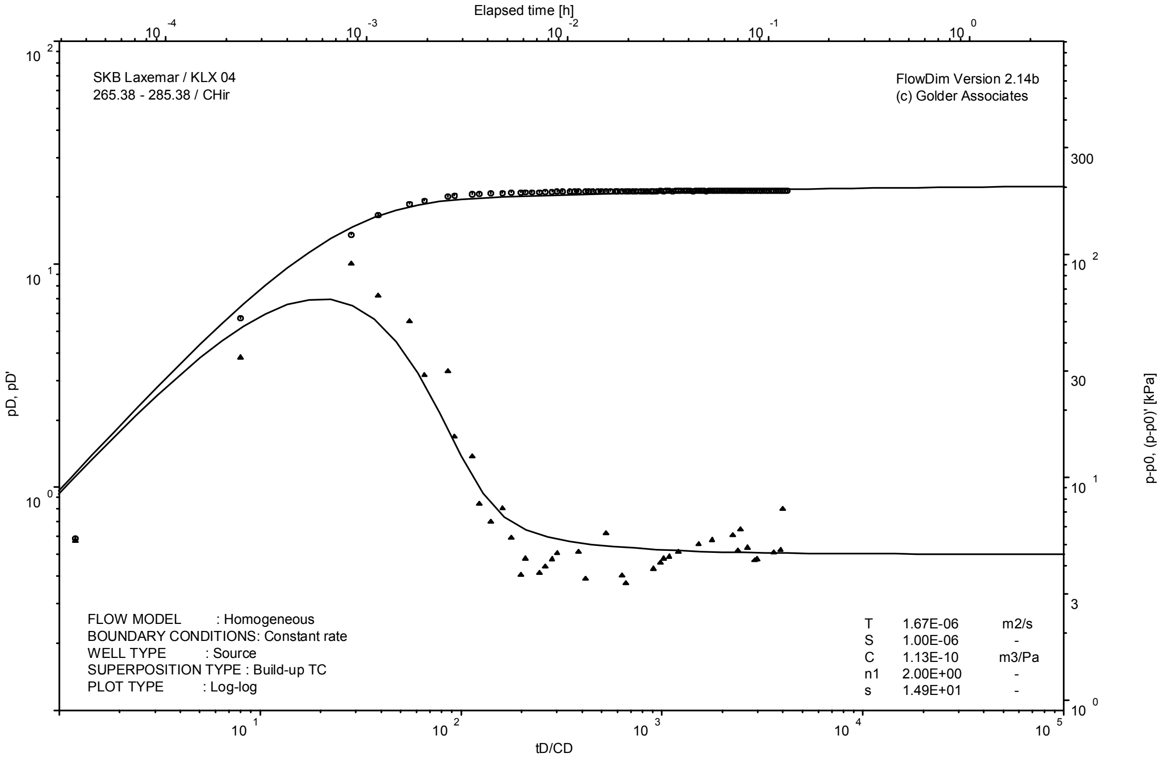
Pressure and flow rate vs. time; cartesian plot



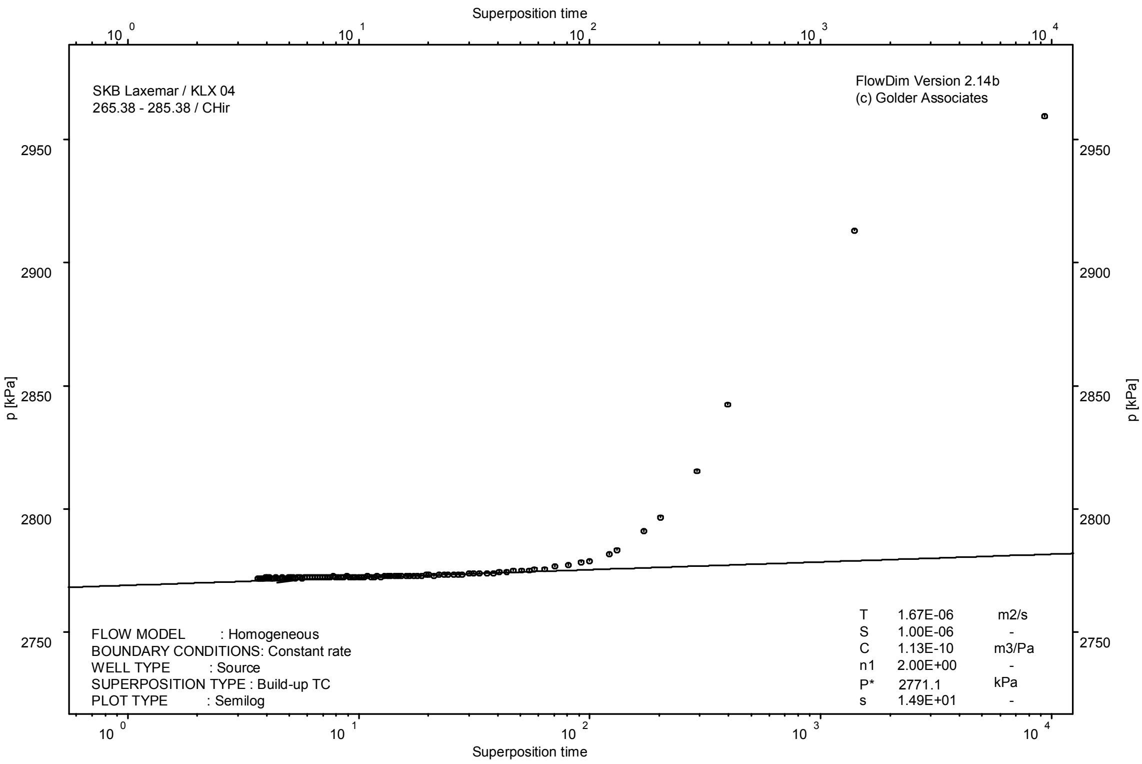
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

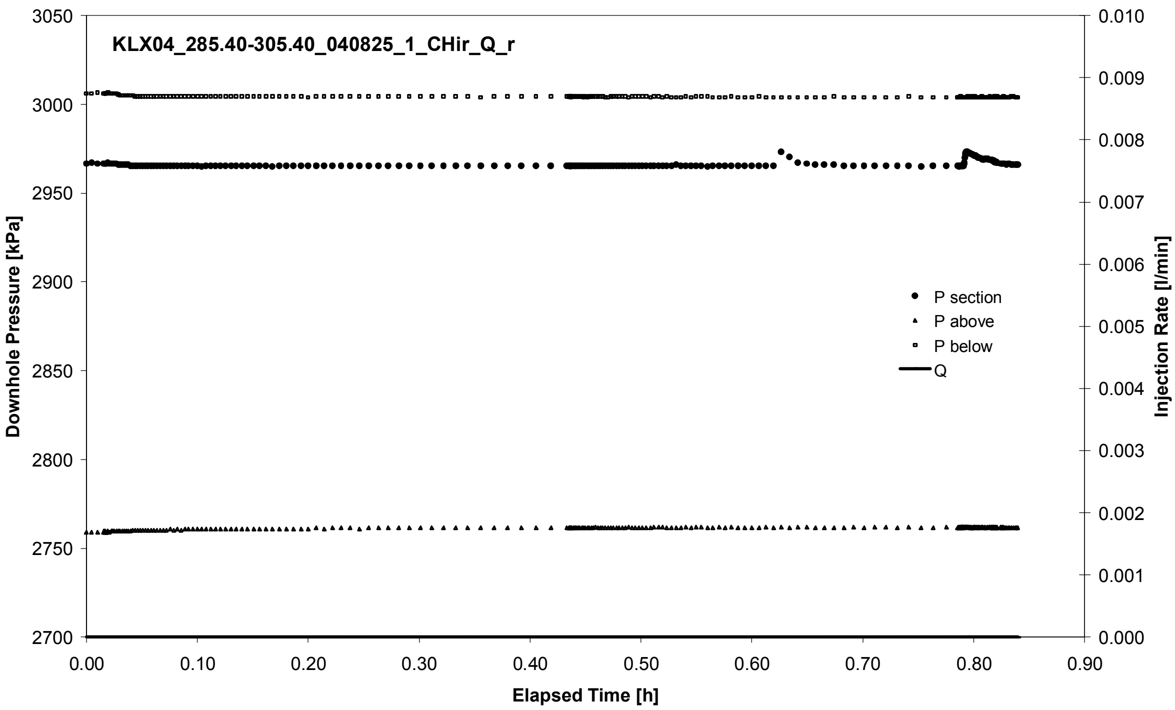


CHIR phase; HORNER match

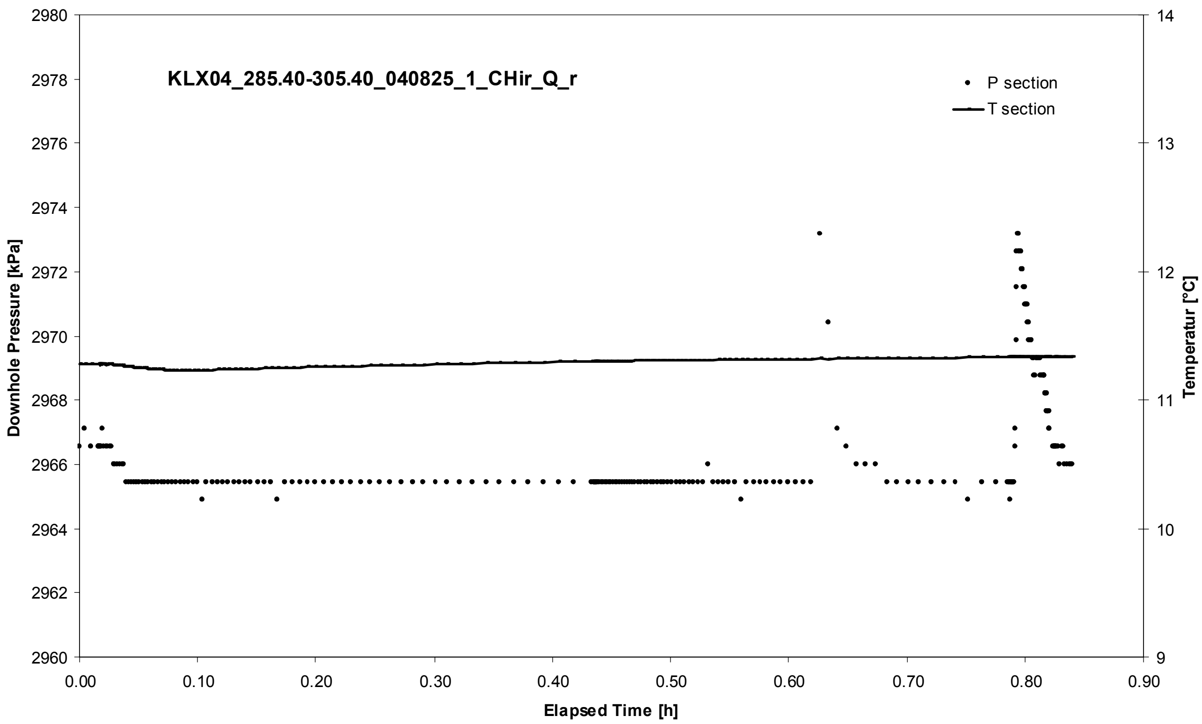
APPENDIX 2-19

Test 285.40 – 305.40 m

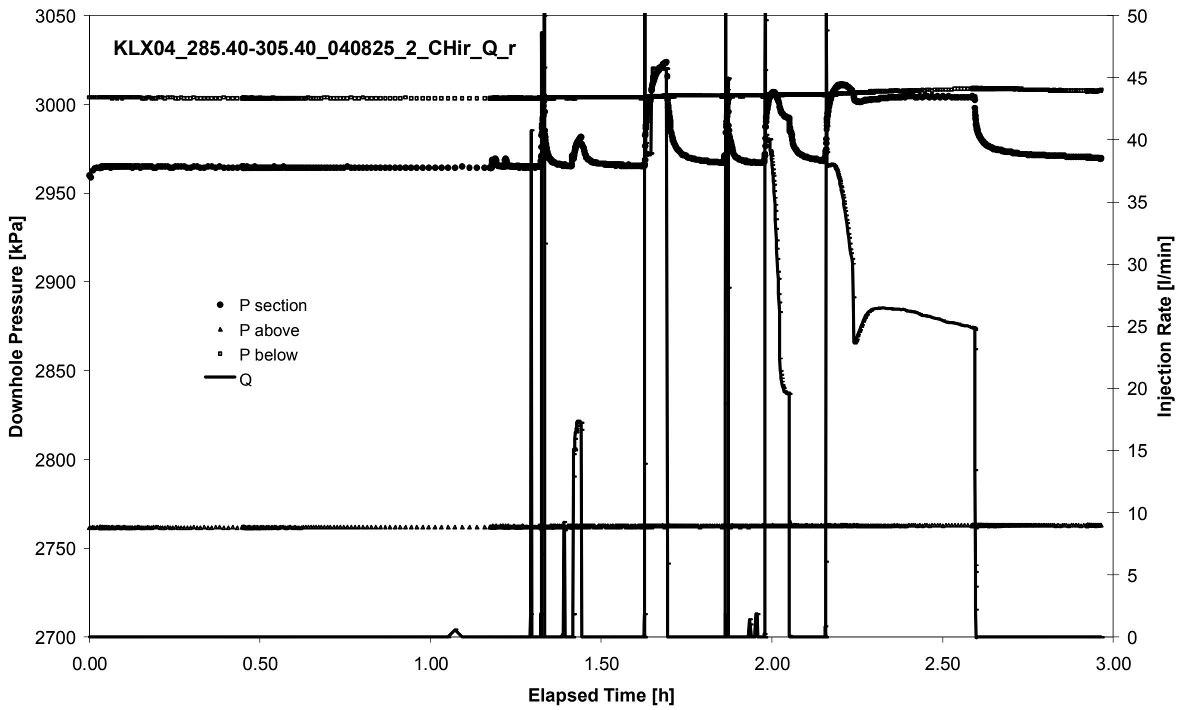
Analysis diagrams



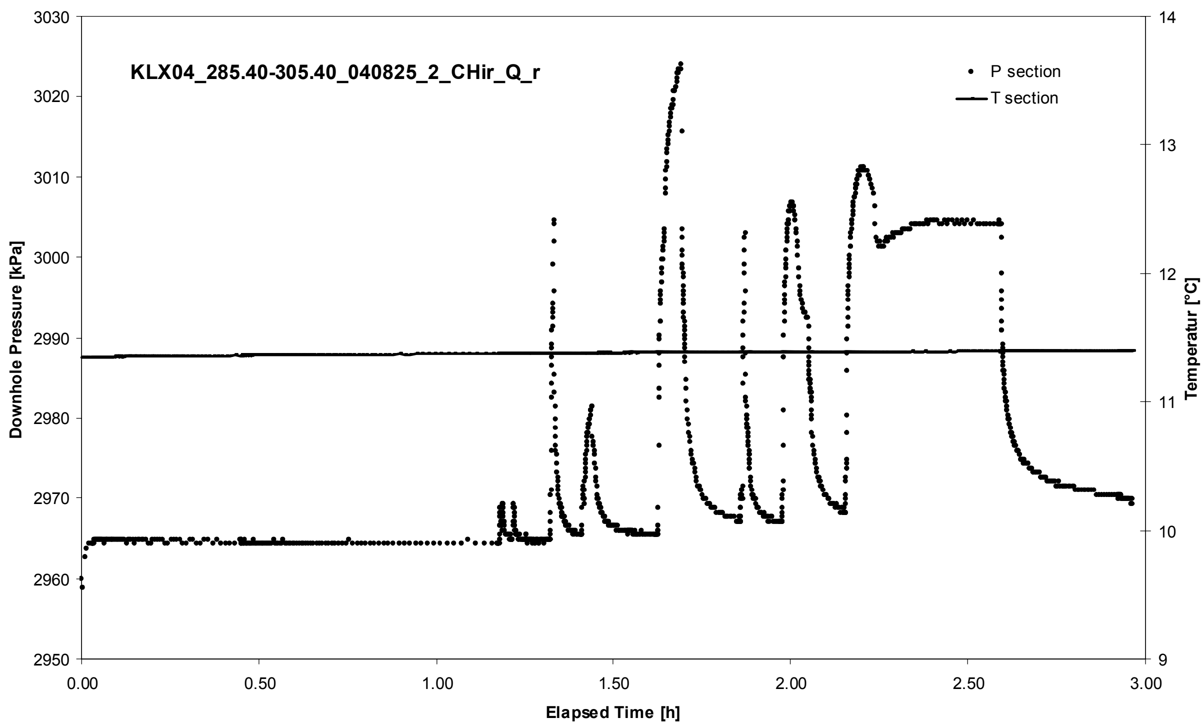
Pressure and flow rate vs. time; cartesian plot (test repeated)



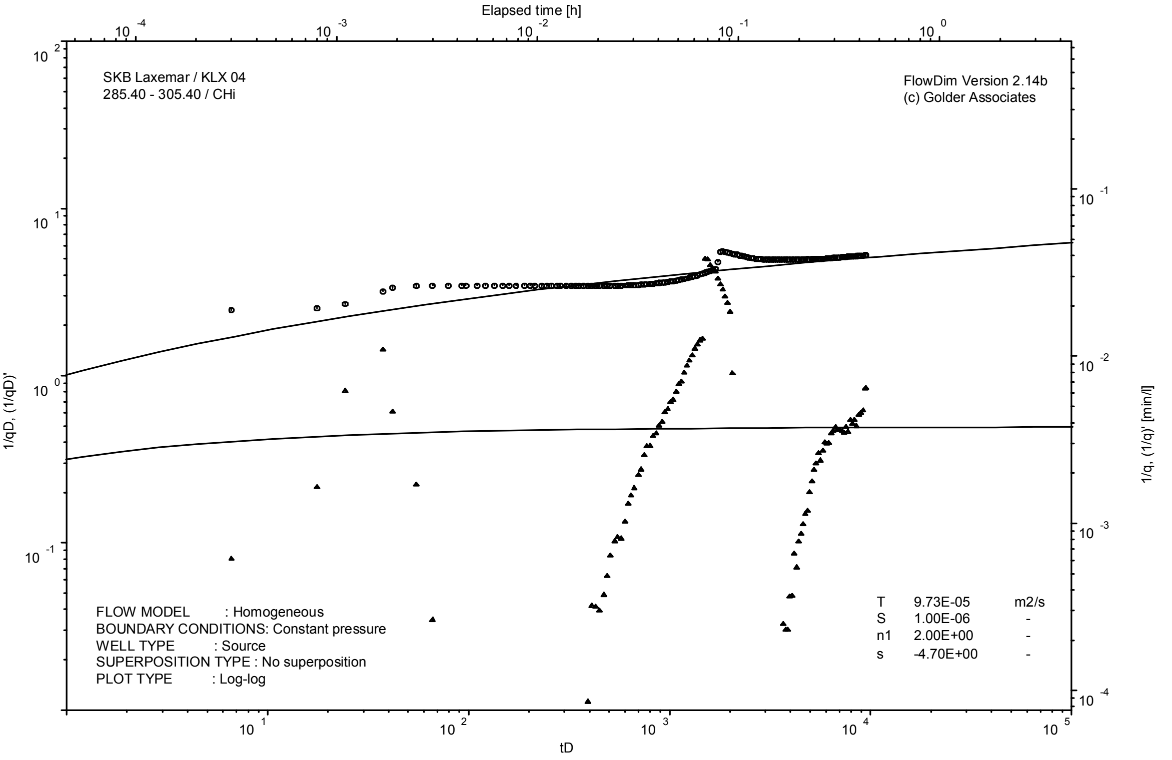
Interval pressure and temperature vs. time; cartesian plot (test repeated)



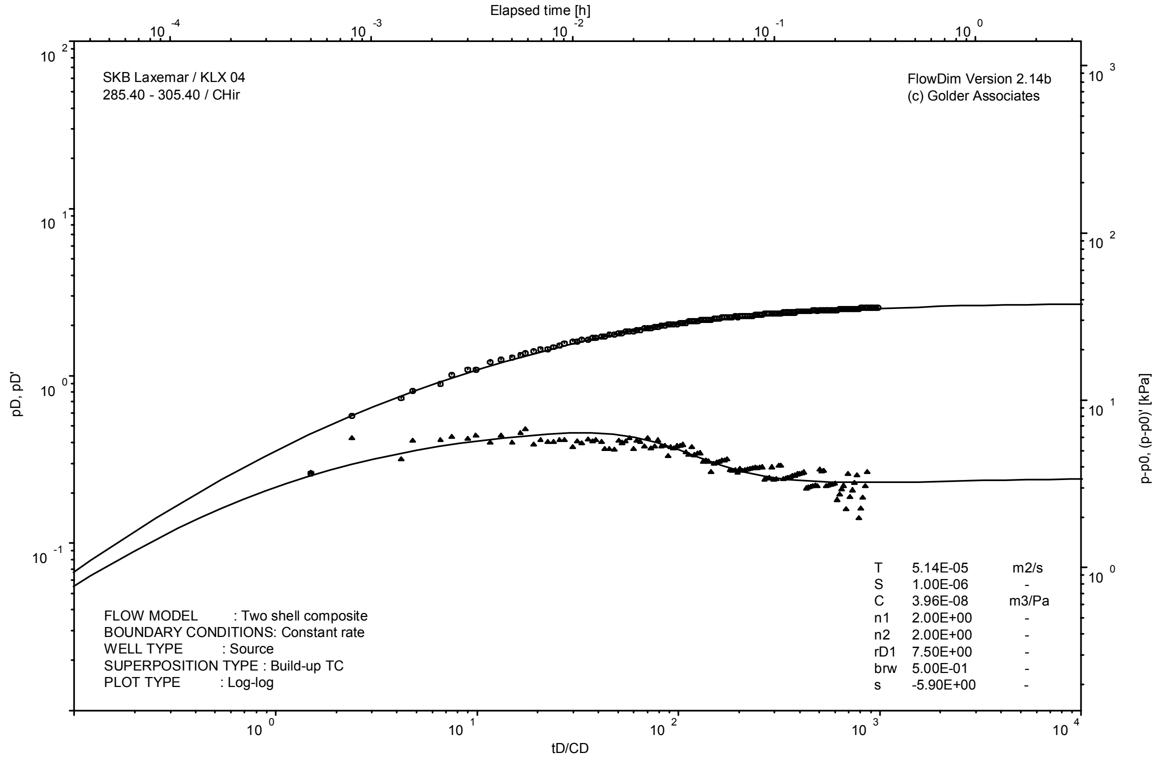
Pressure and flow rate vs. time; cartesian plot (analysed)



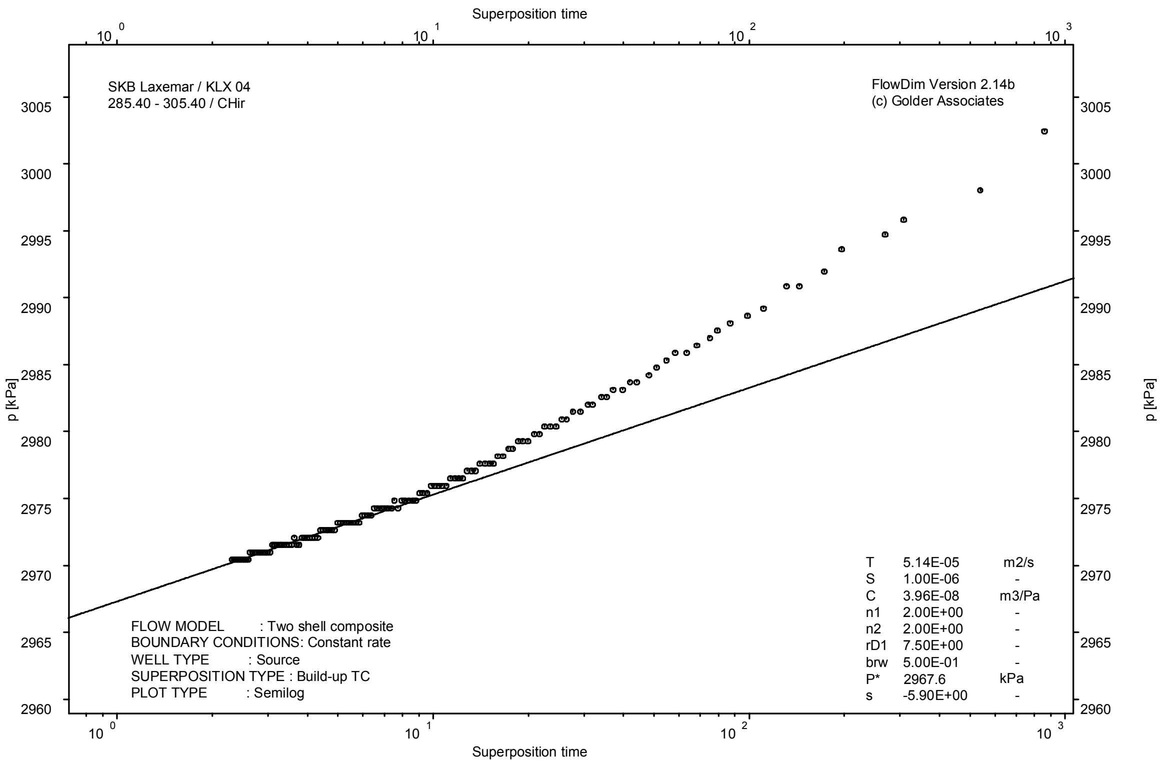
Interval pressure and temperature vs. time; cartesian plot (analysed)



CHI phase; log-log match



CHIR phase; log-log match

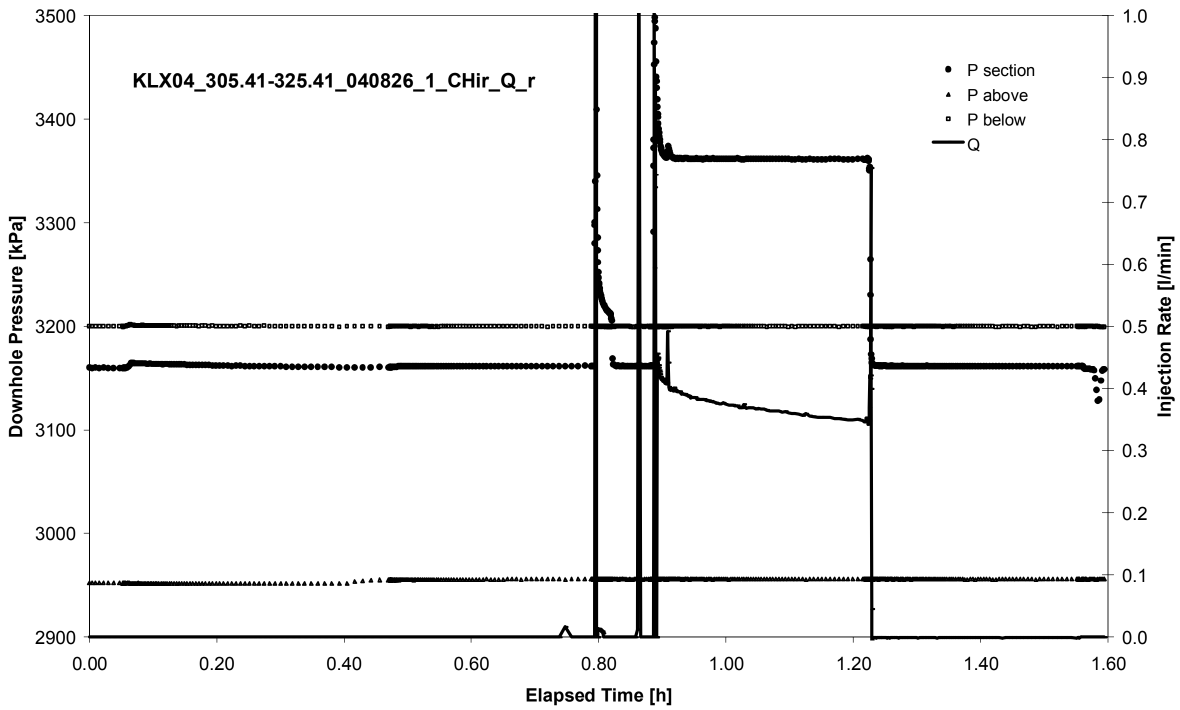


CHIR phase; HORNER match

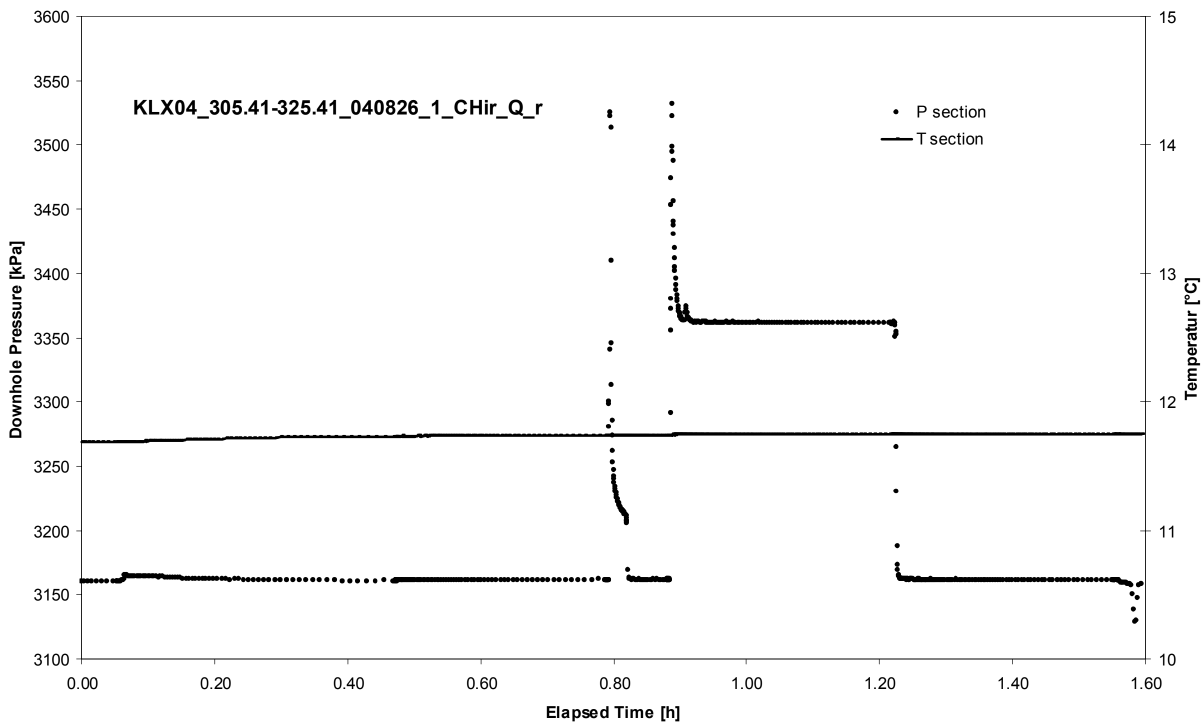
APPENDIX 2-20

Test 305.41 – 325.41 m

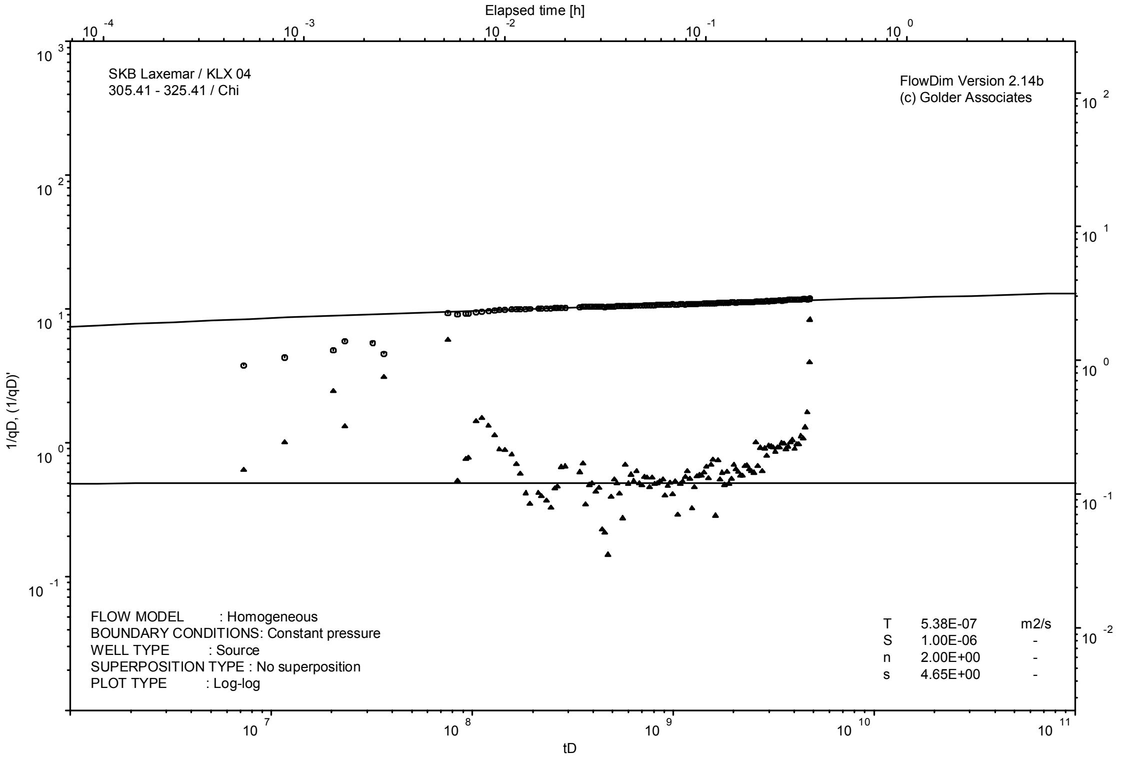
Analysis diagrams



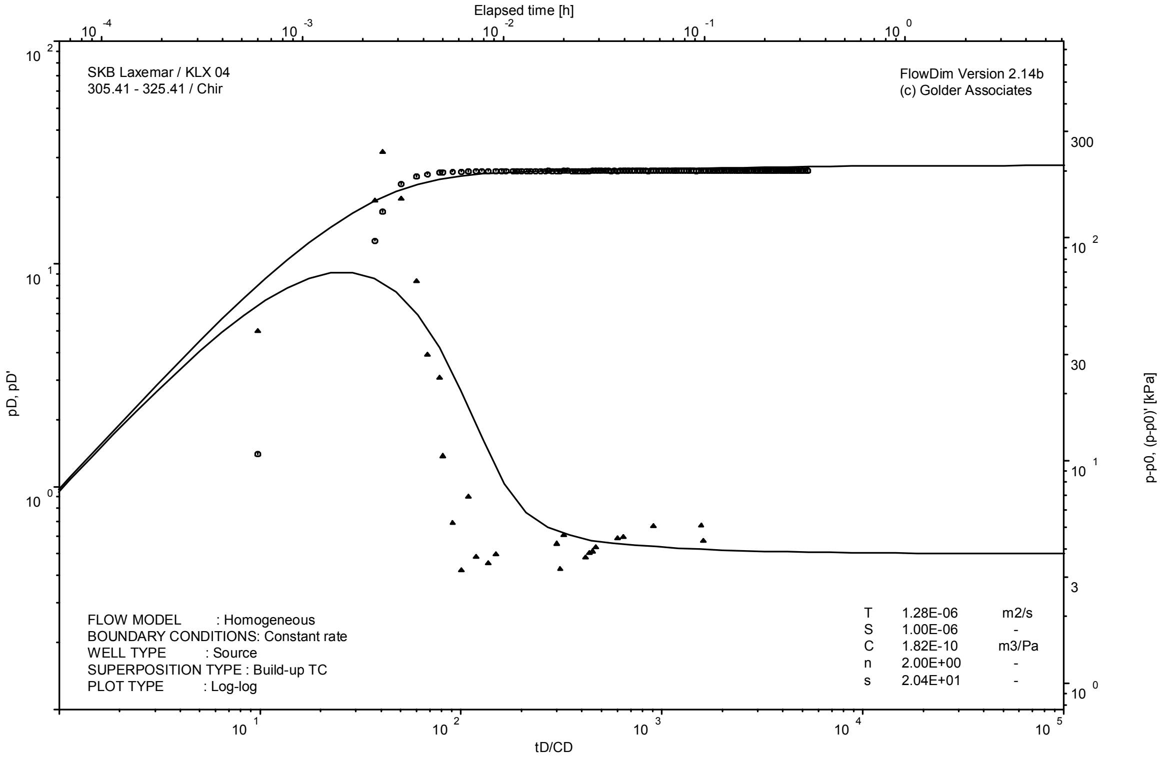
Pressure and flow rate vs. time; cartesian plot



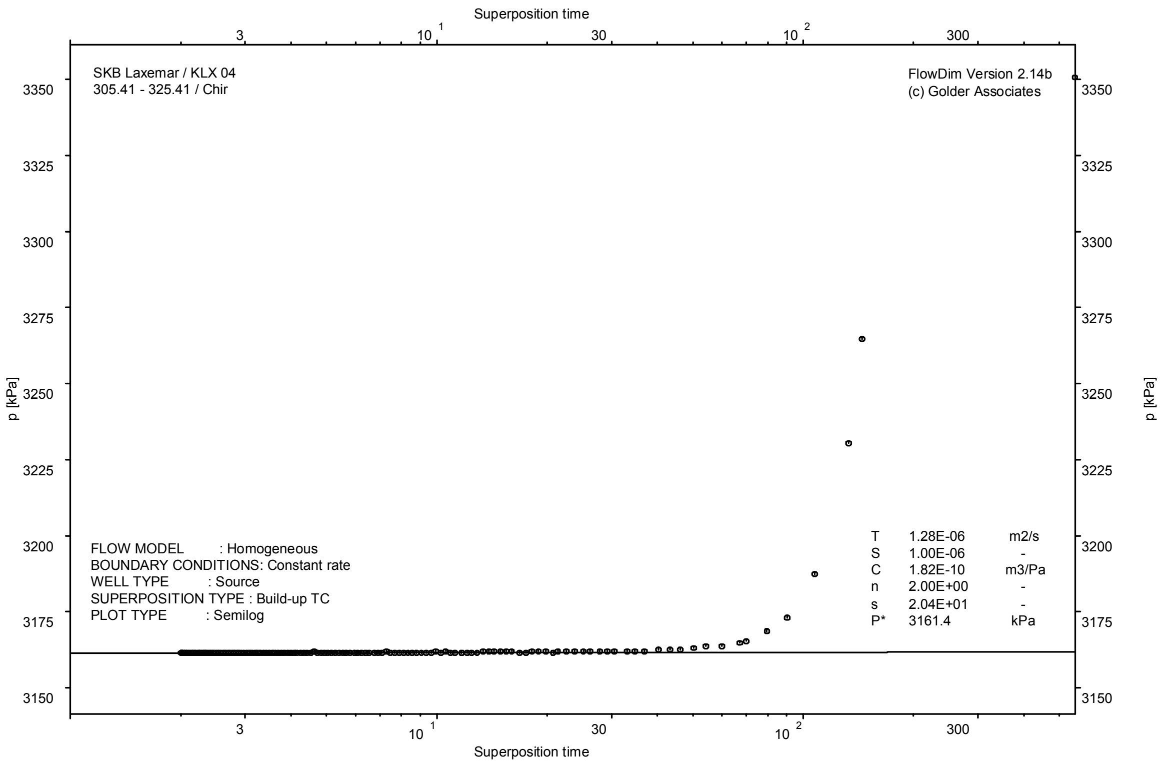
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

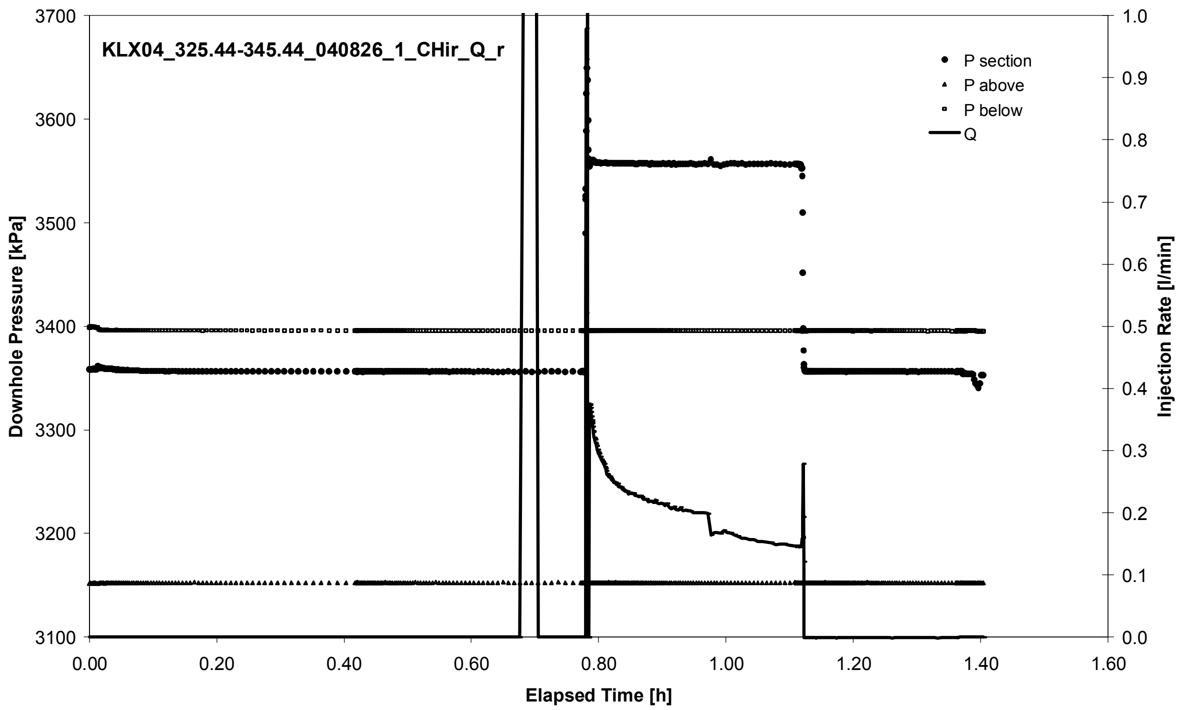


CHIR phase; HORNER match

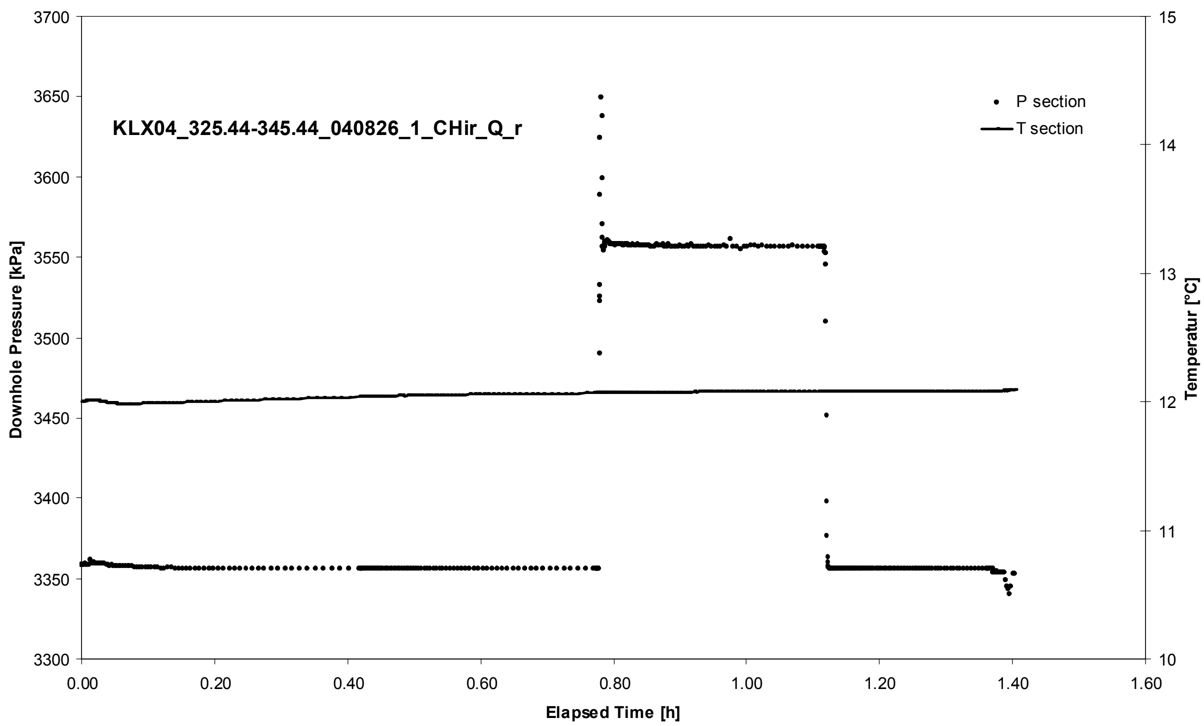
APPENDIX 2-21

Test 325.44 – 345.44 m

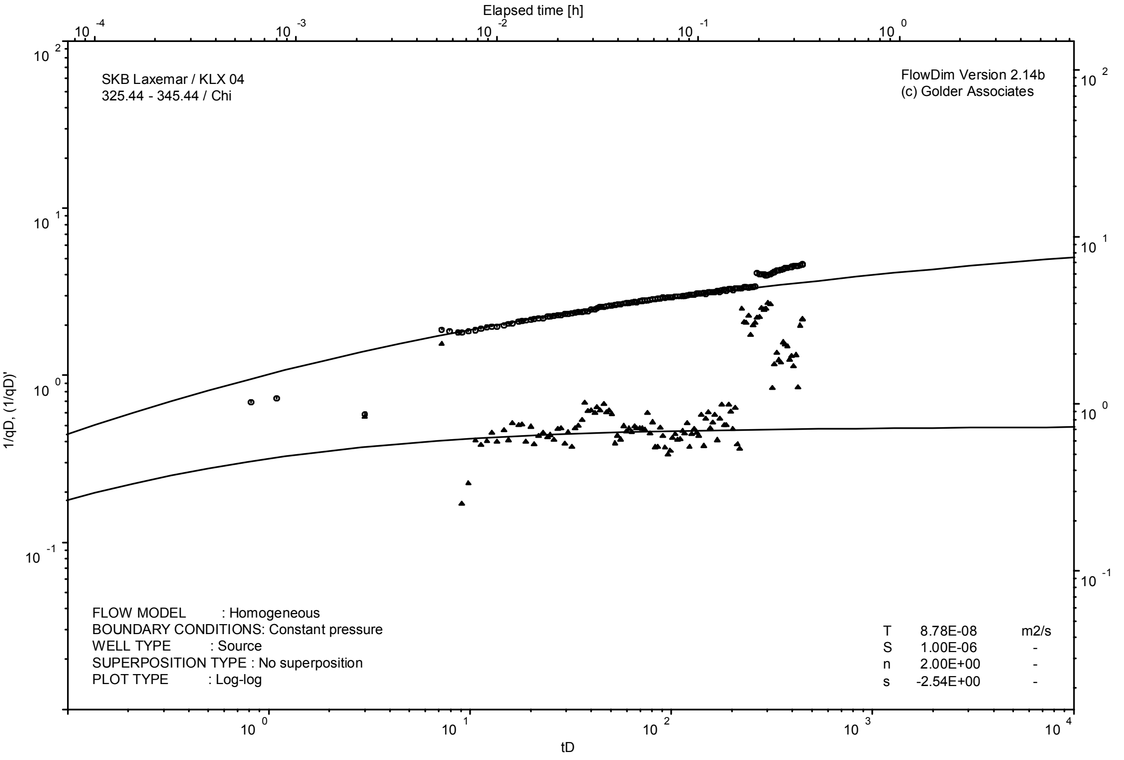
Analysis diagrams



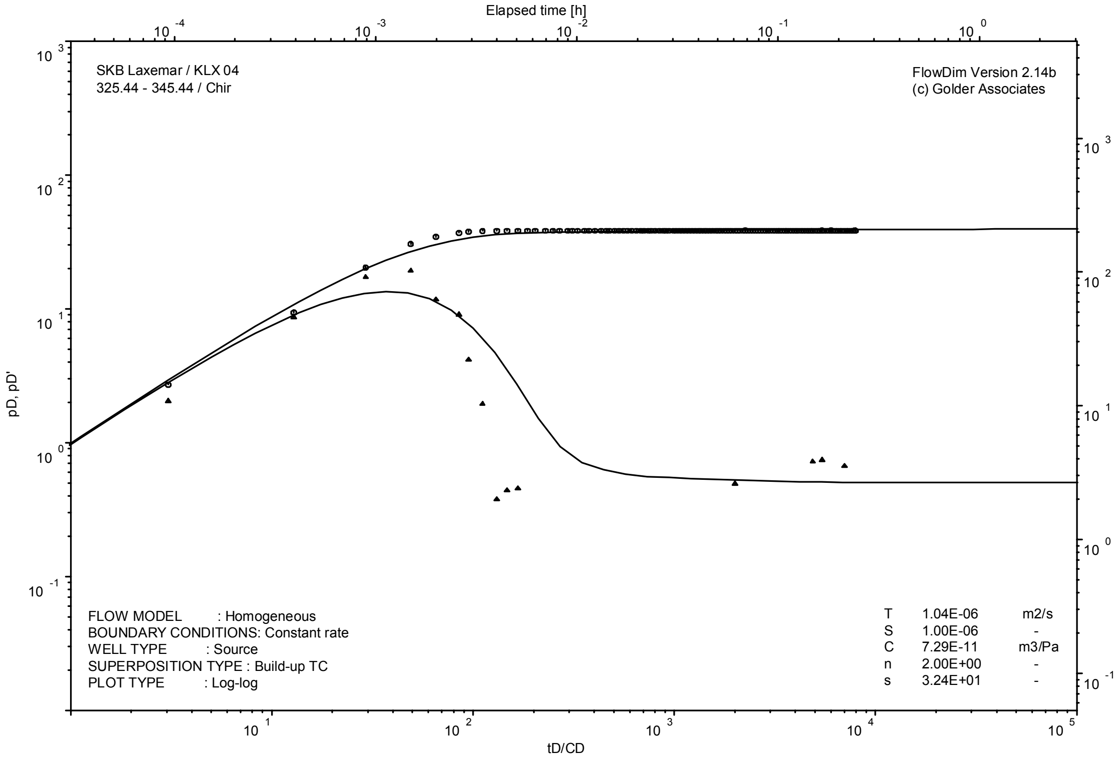
Pressure and flow rate vs. time; cartesian plot



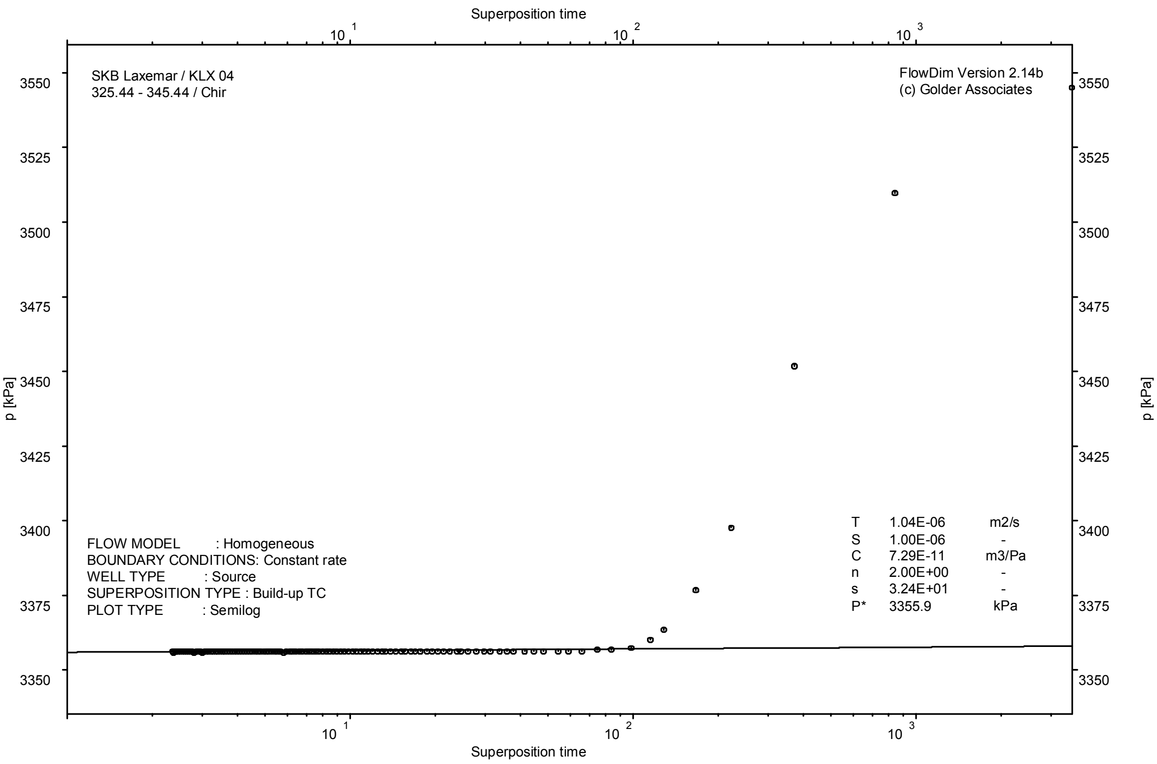
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

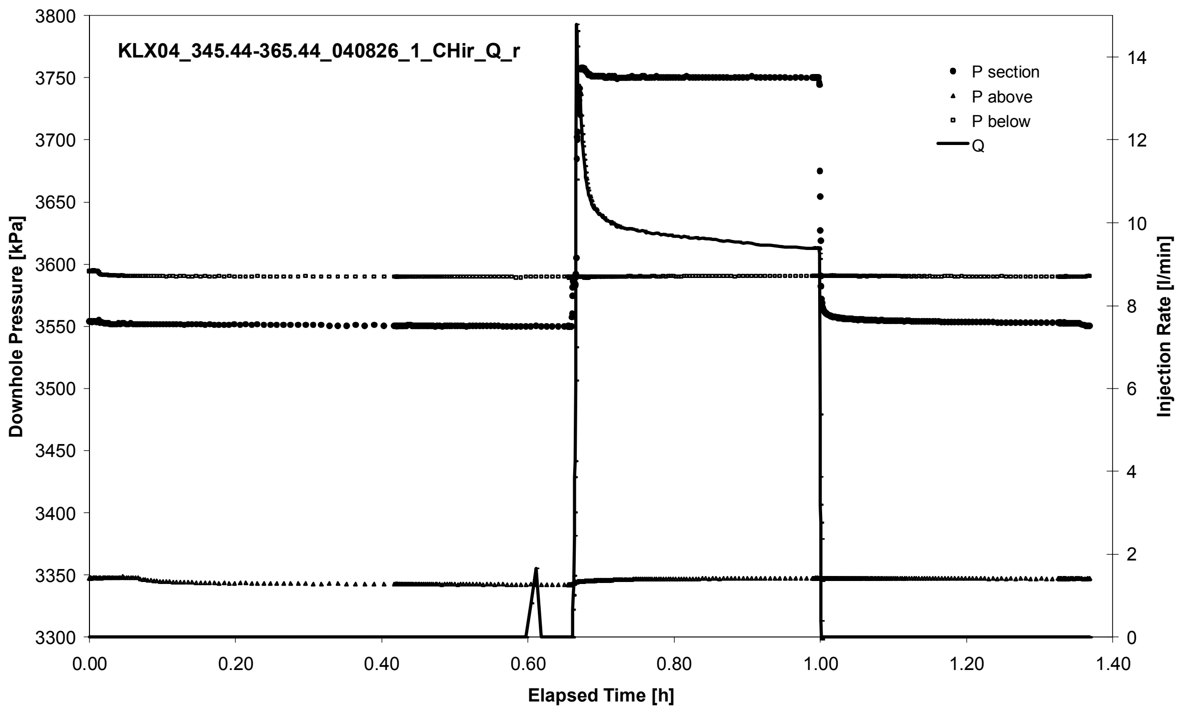


CHIR phase; HORNER match

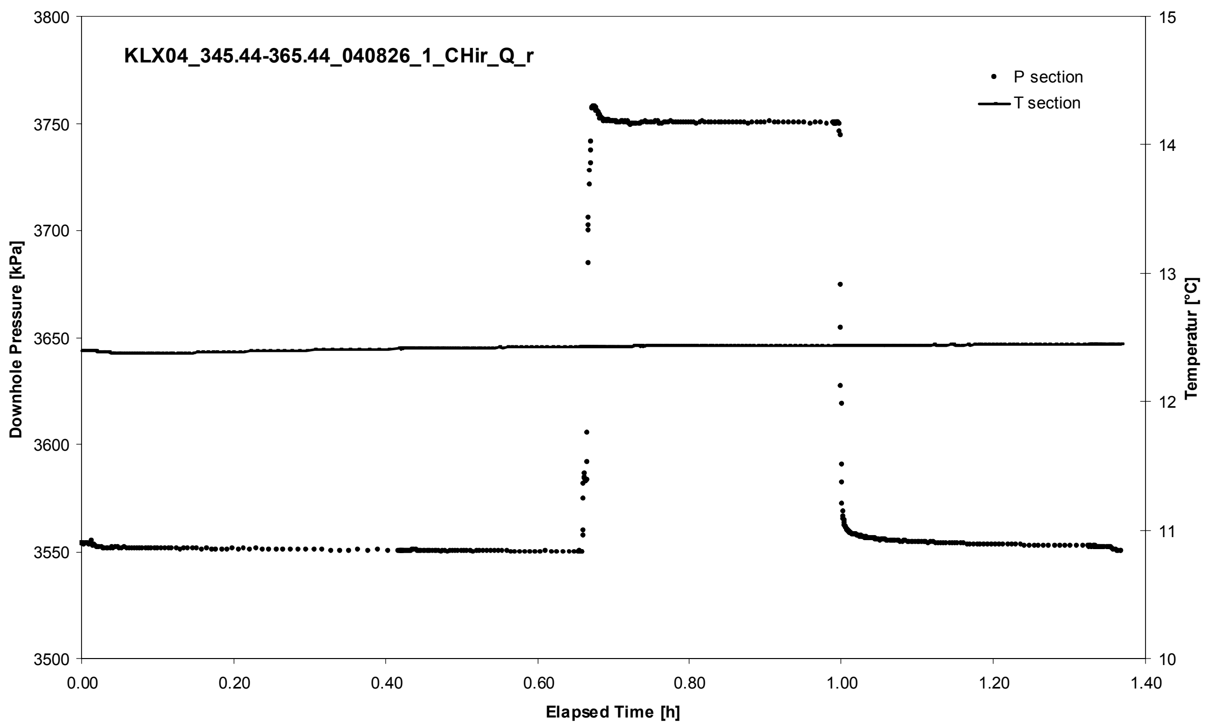
APPENDIX 2-22

Test 345.44 – 365.44 m

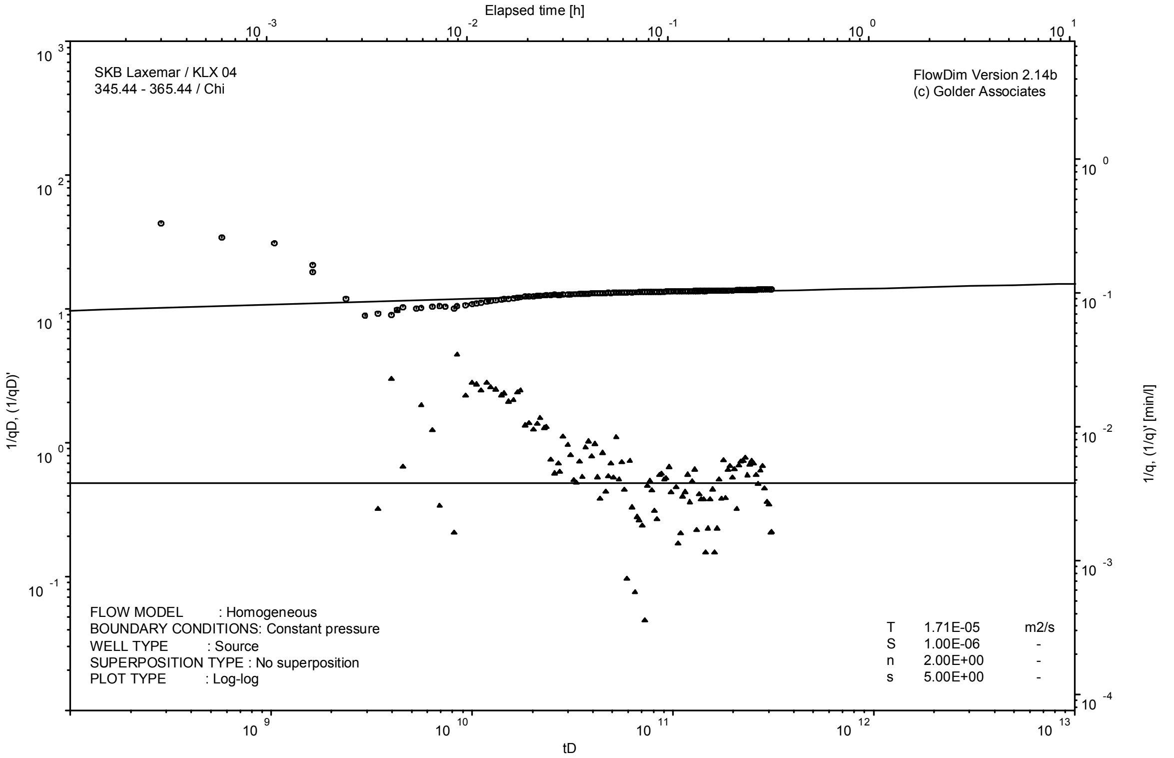
Analysis diagrams



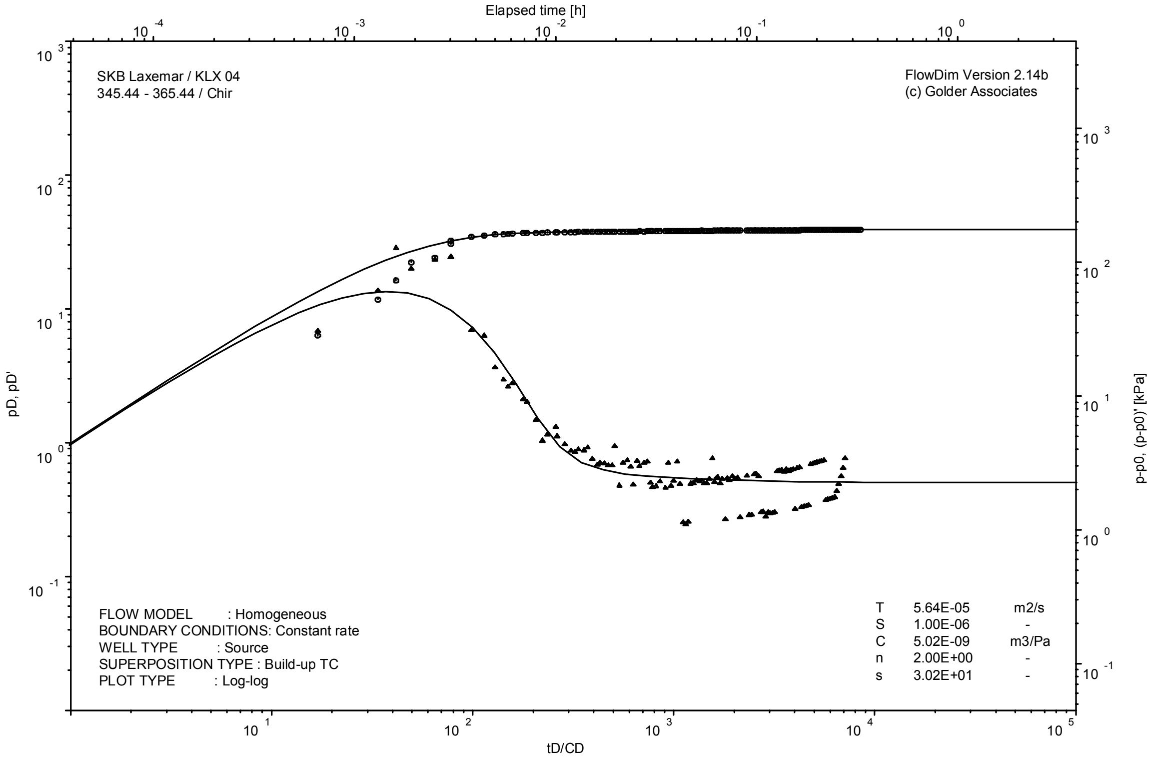
Pressure and flow rate vs. time; cartesian plot



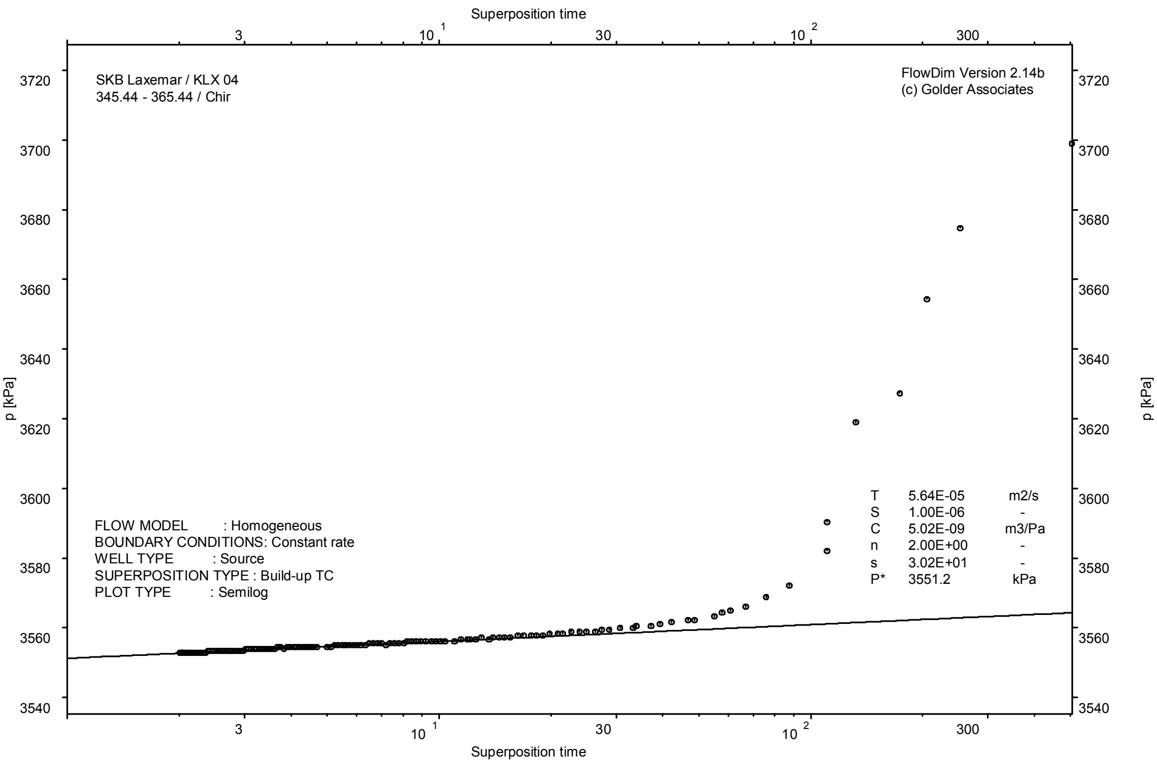
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

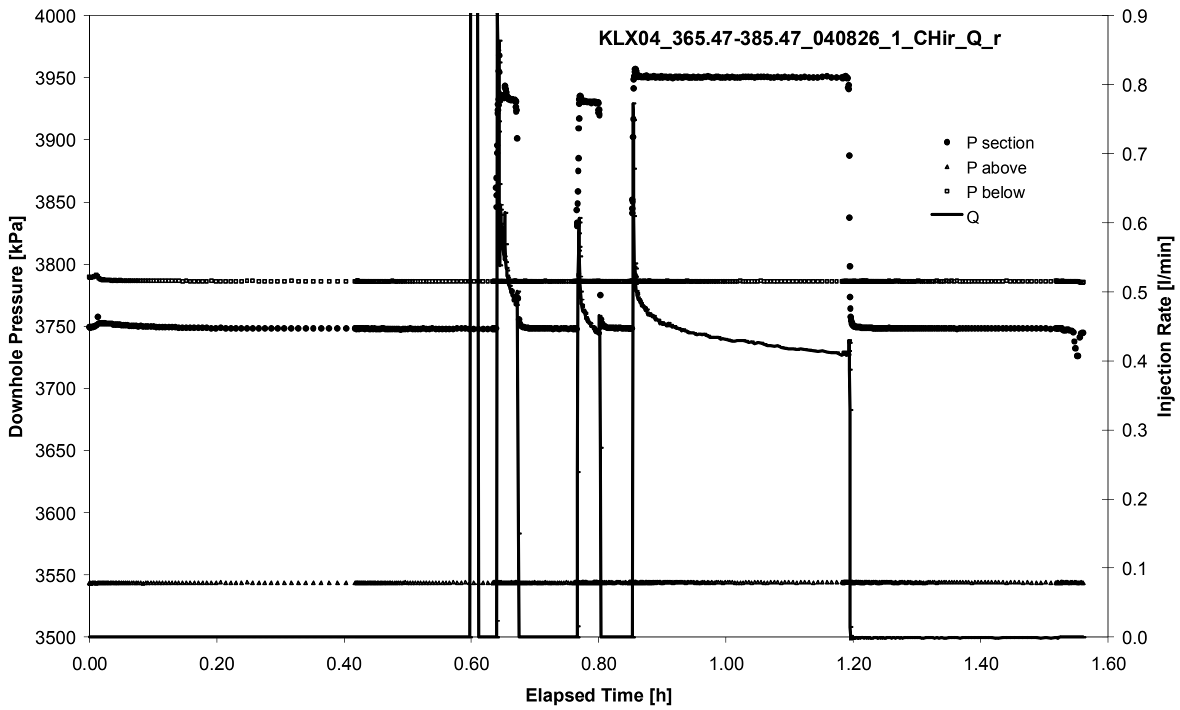


CHIR phase; HORNER match

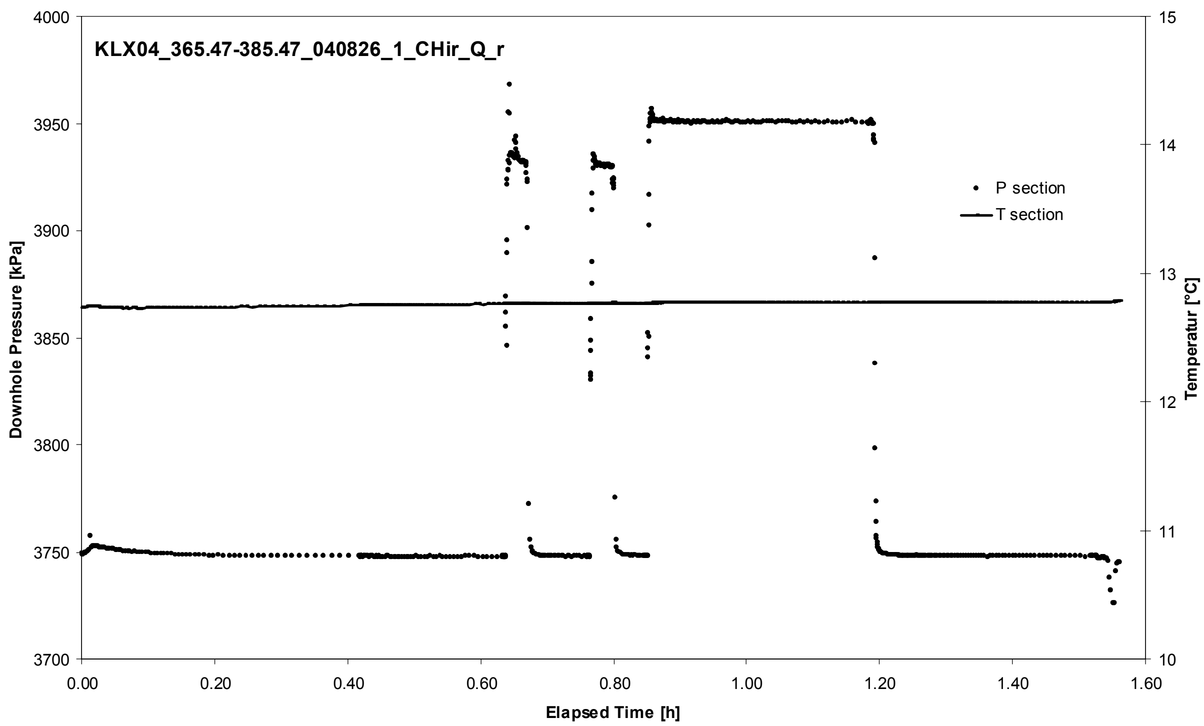
APPENDIX 2-23

Test 365.47 – 385.47 m

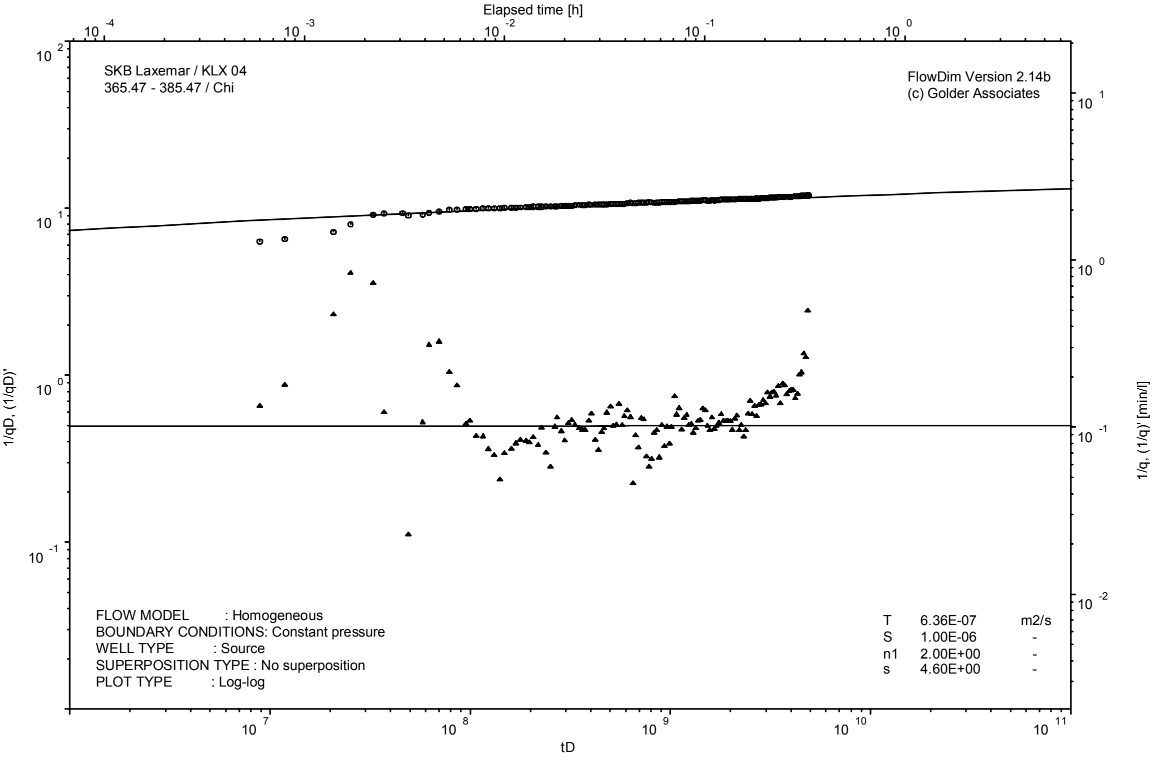
Analysis diagrams



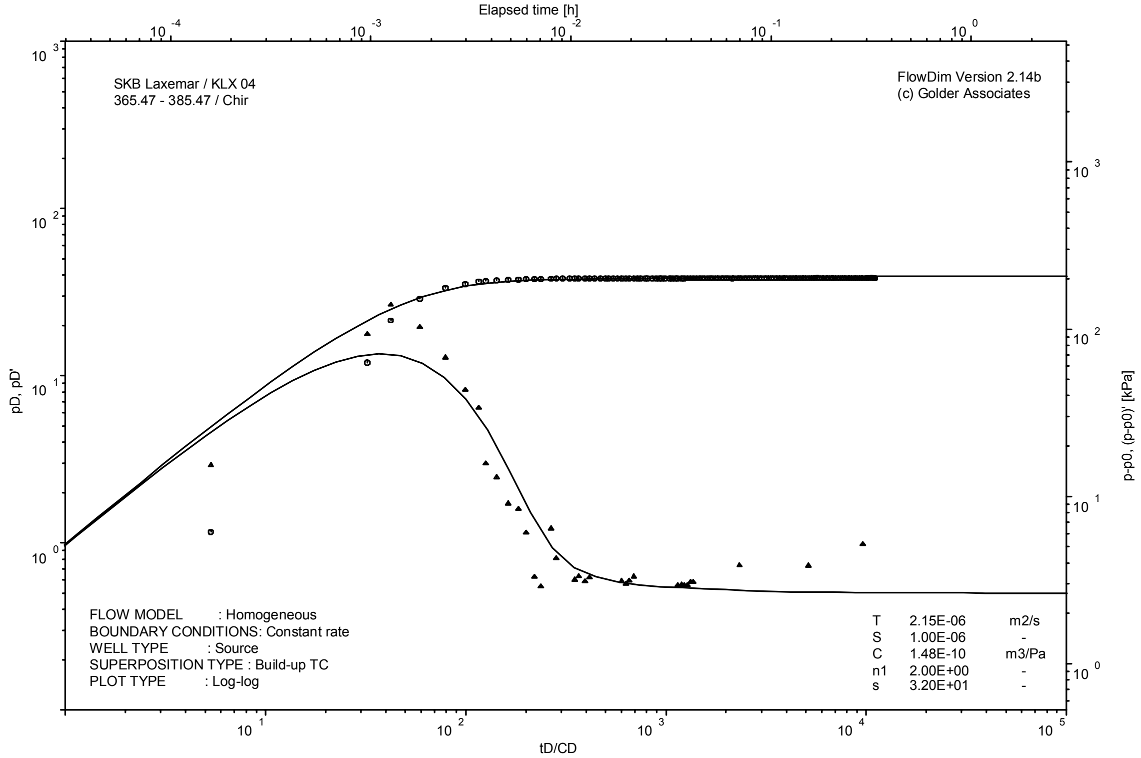
Pressure and flow rate vs. time; cartesian plot



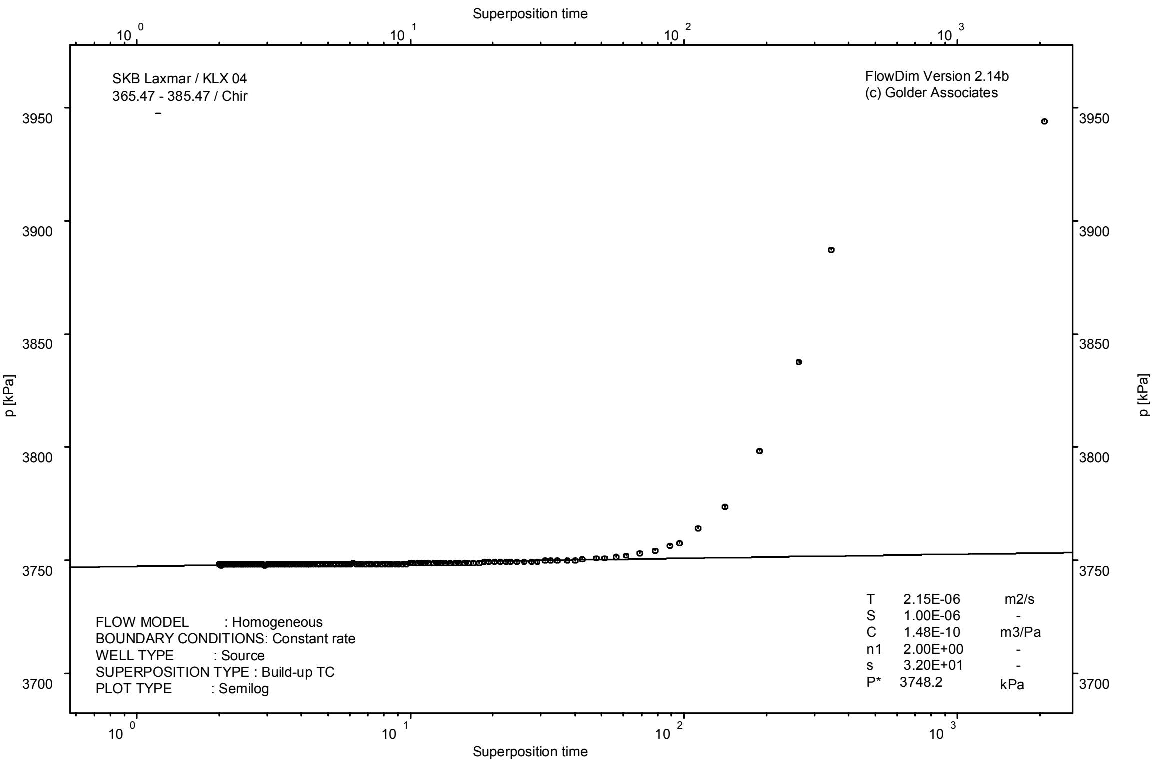
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

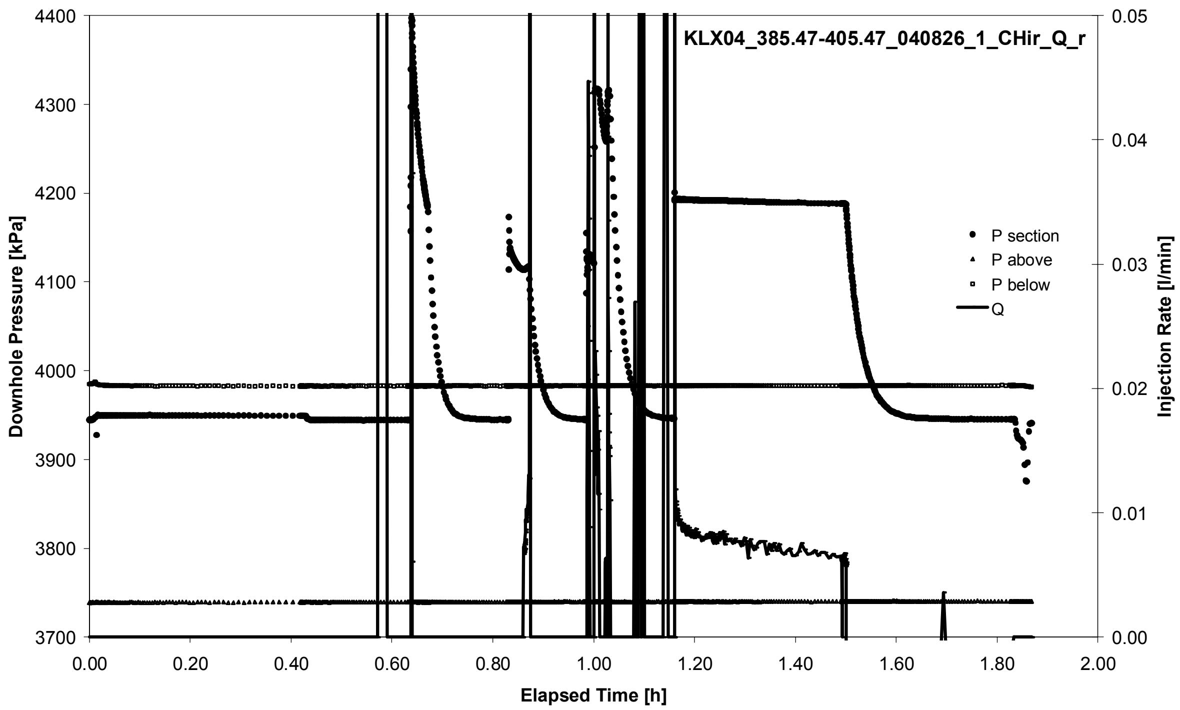


CHIR phase; HORNER match

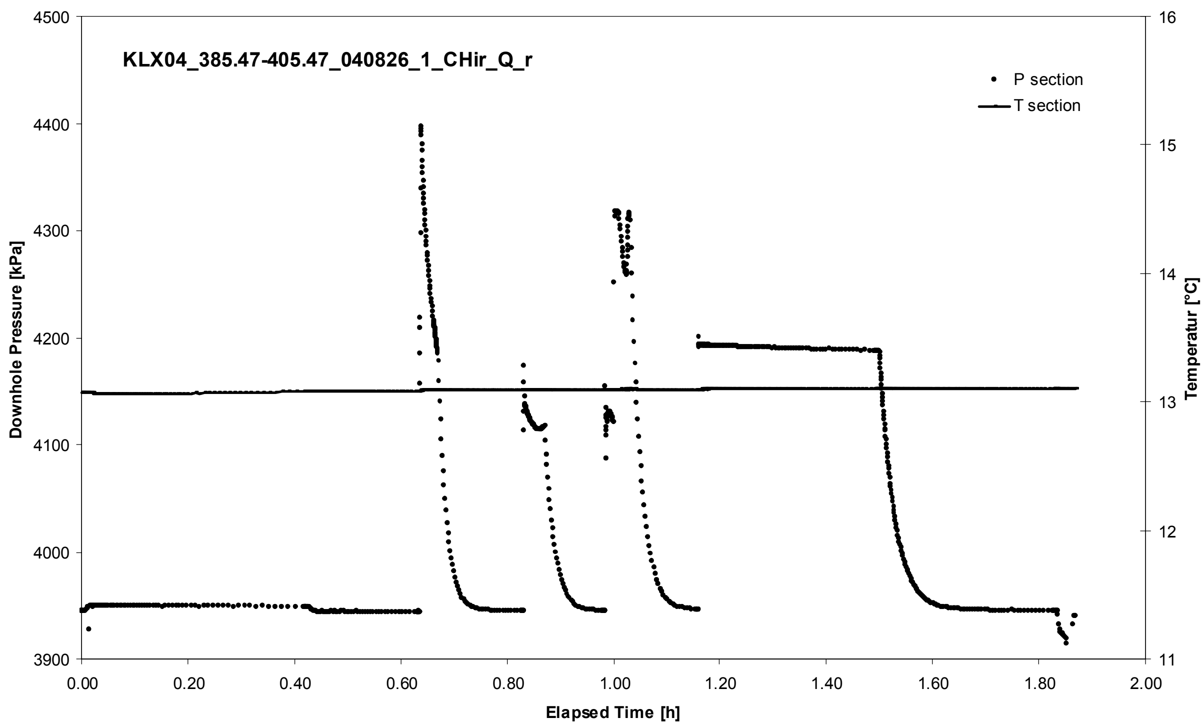
APPENDIX 2-24

Test 385.47 – 405.47 m

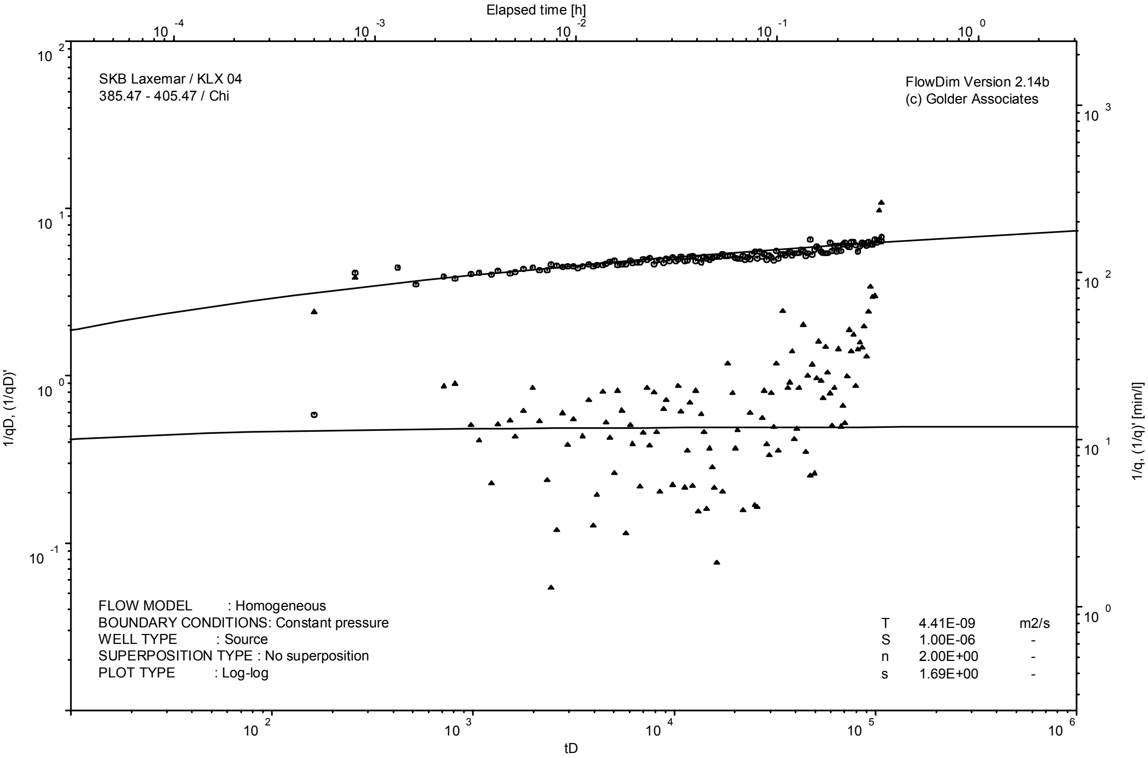
Analysis diagrams



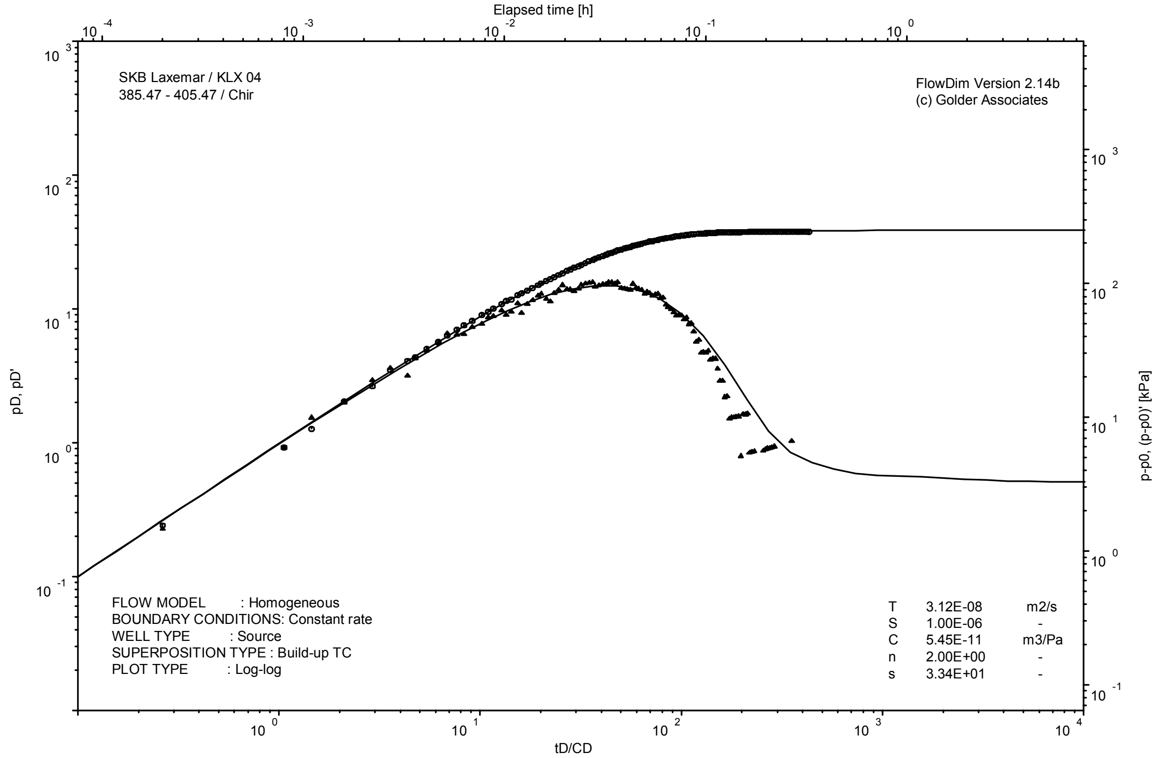
Pressure and flow rate vs. time; cartesian plot



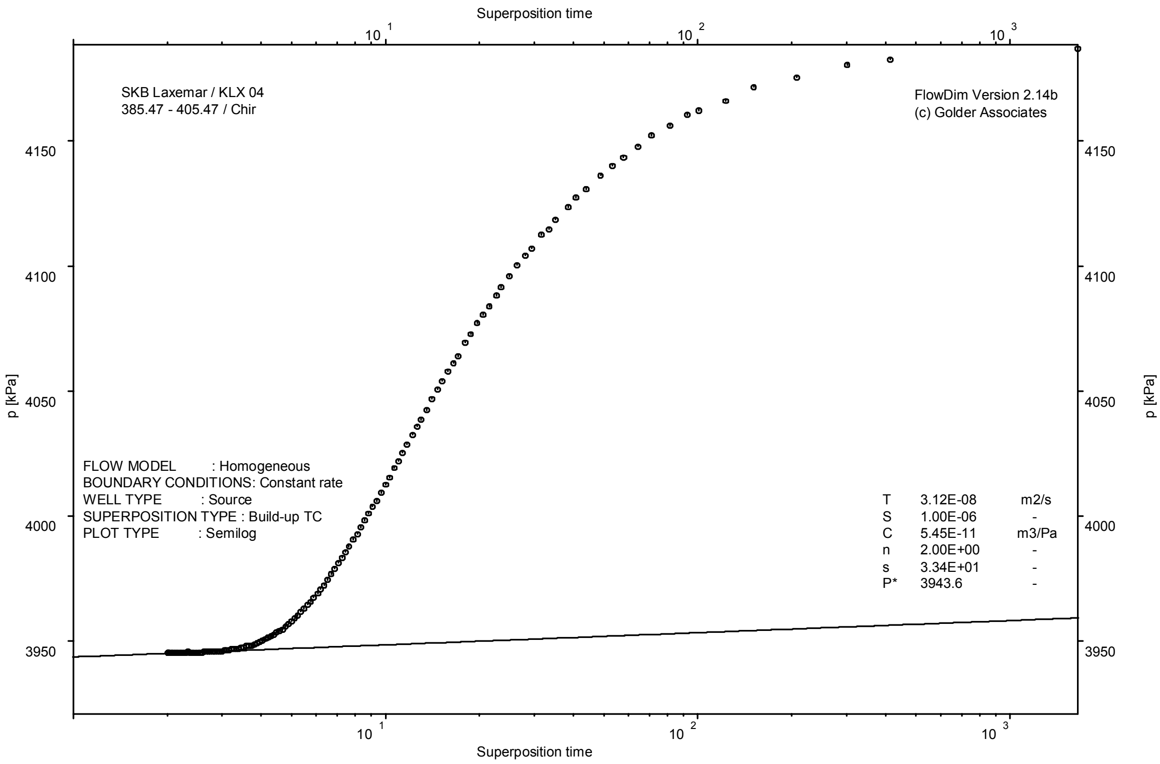
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

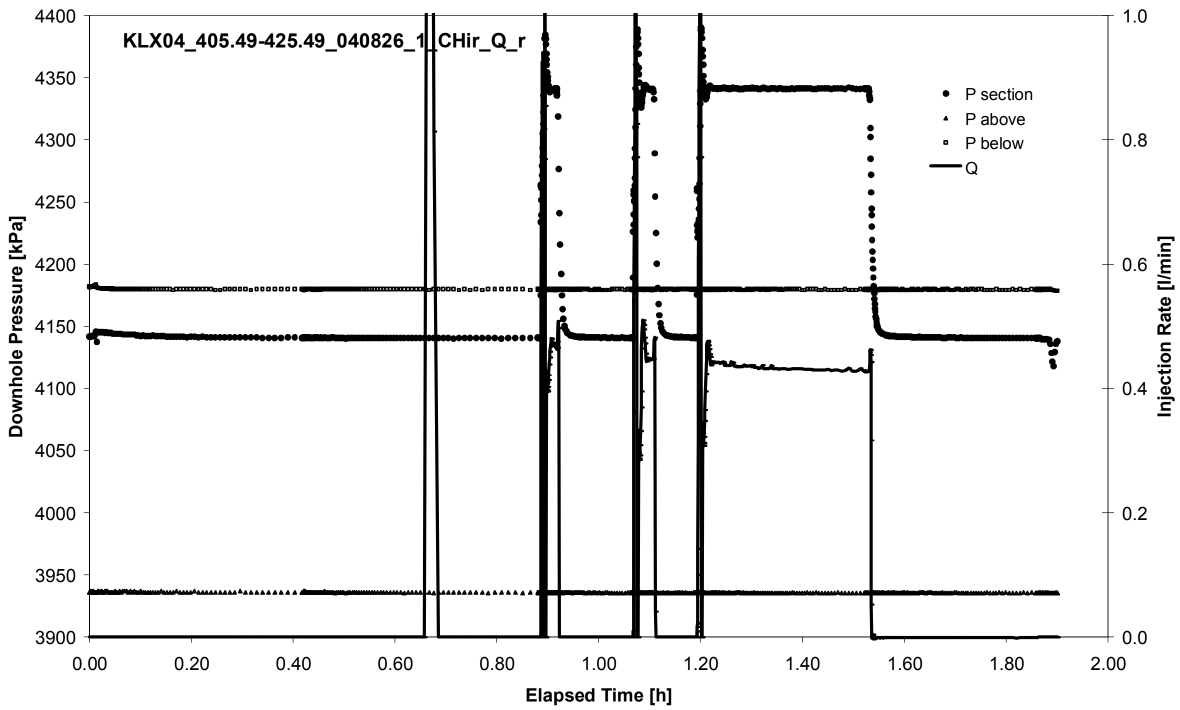


CHIR phase; HORNER match

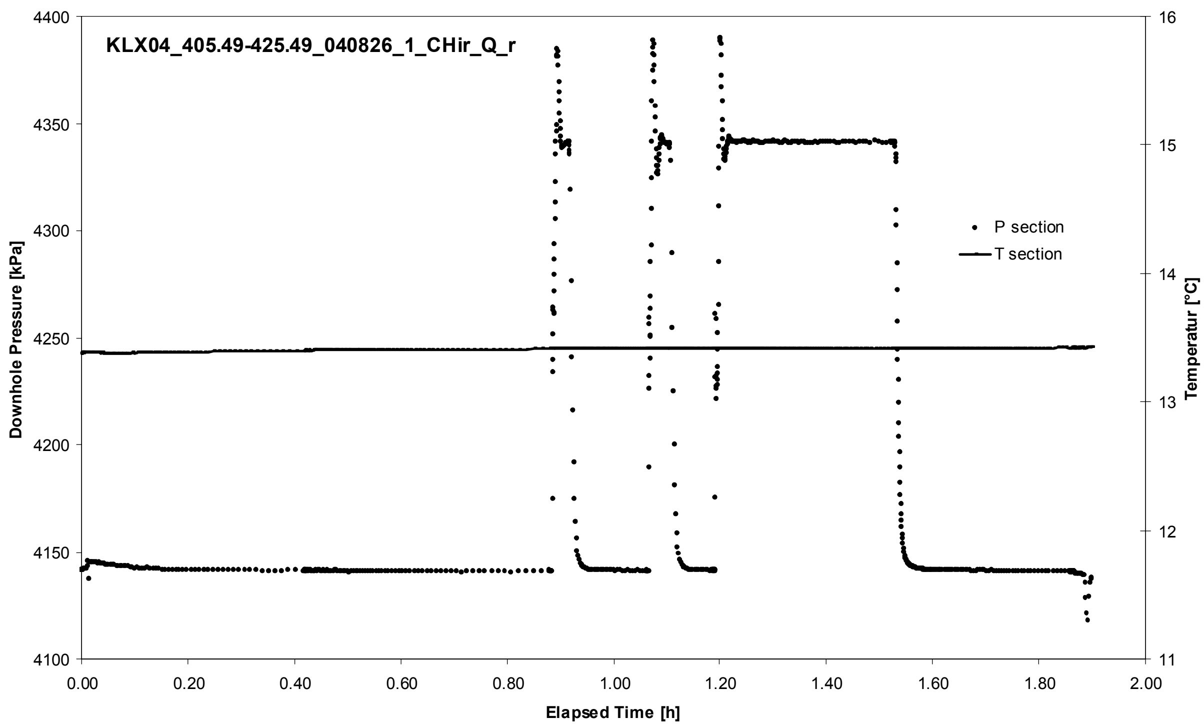
APPENDIX 2-25

Test 405.49 – 425.49 m

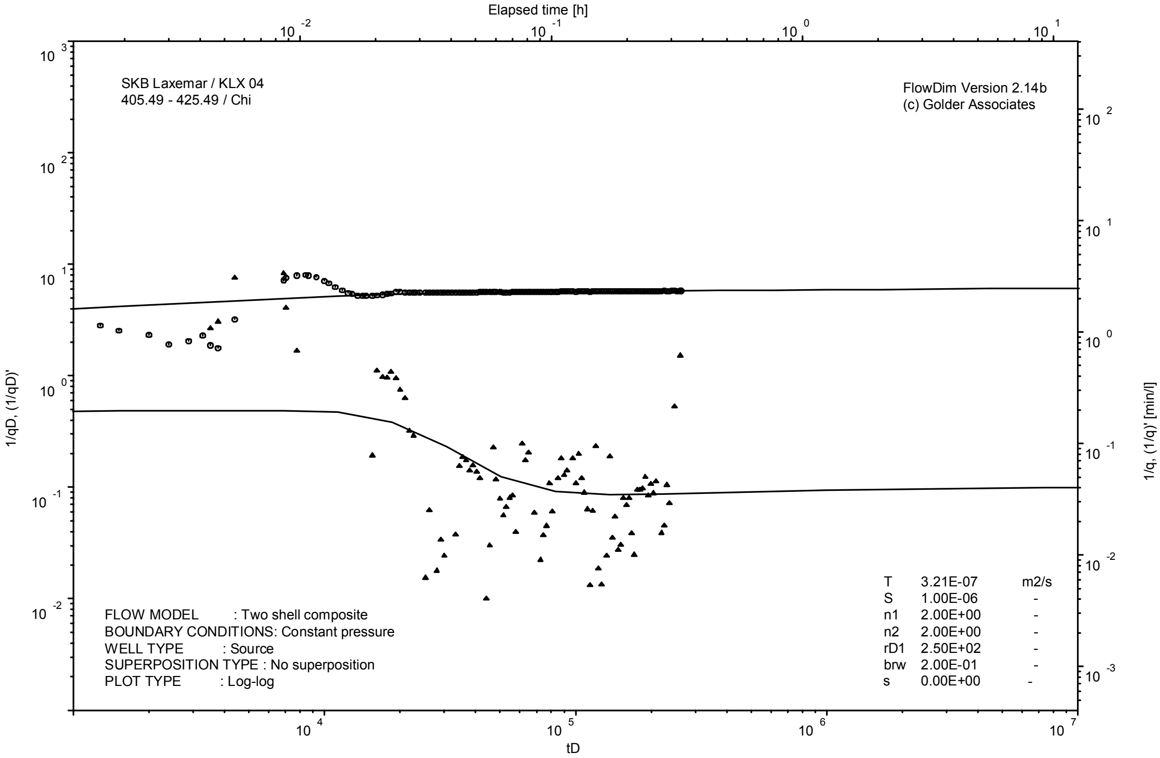
Analysis diagrams



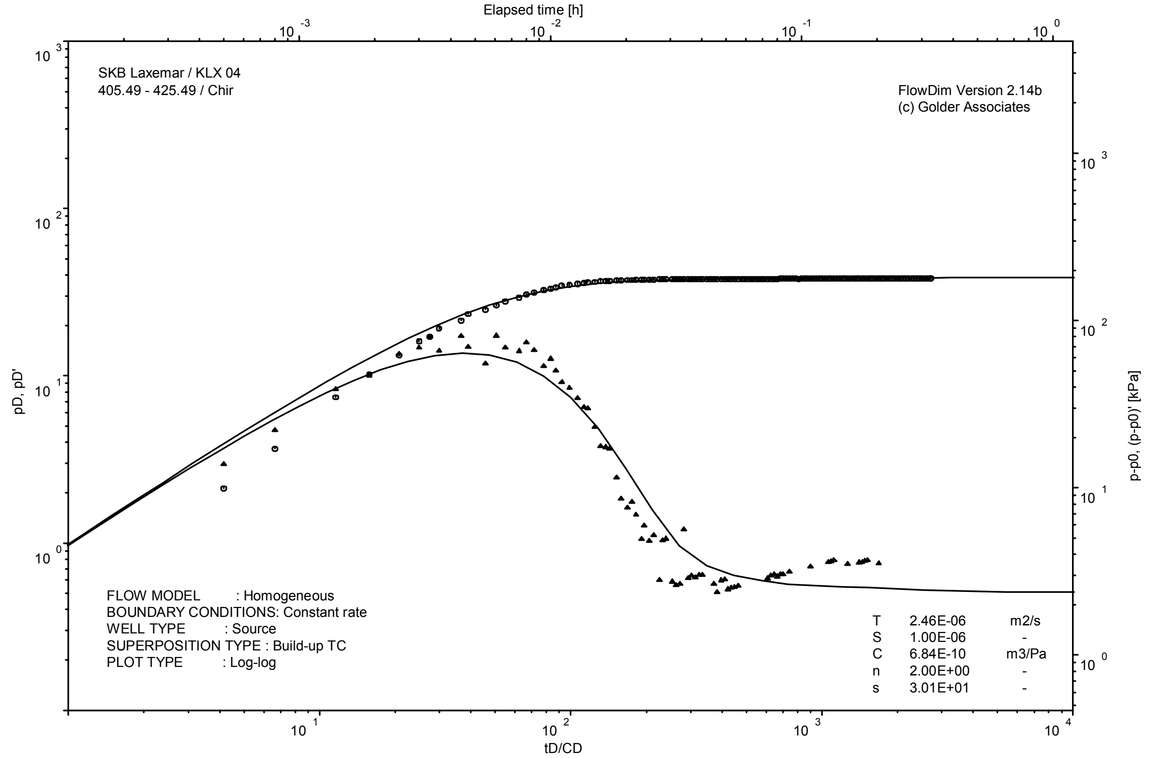
Pressure and flow rate vs. time; cartesian plot



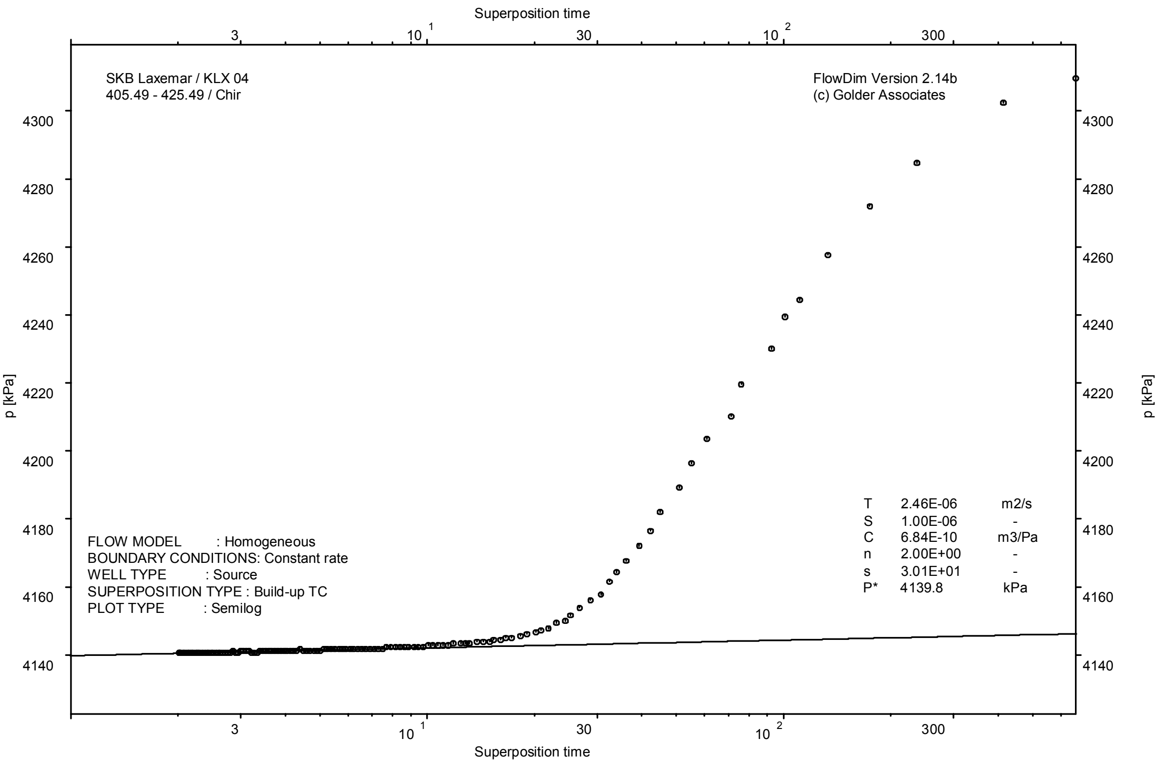
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

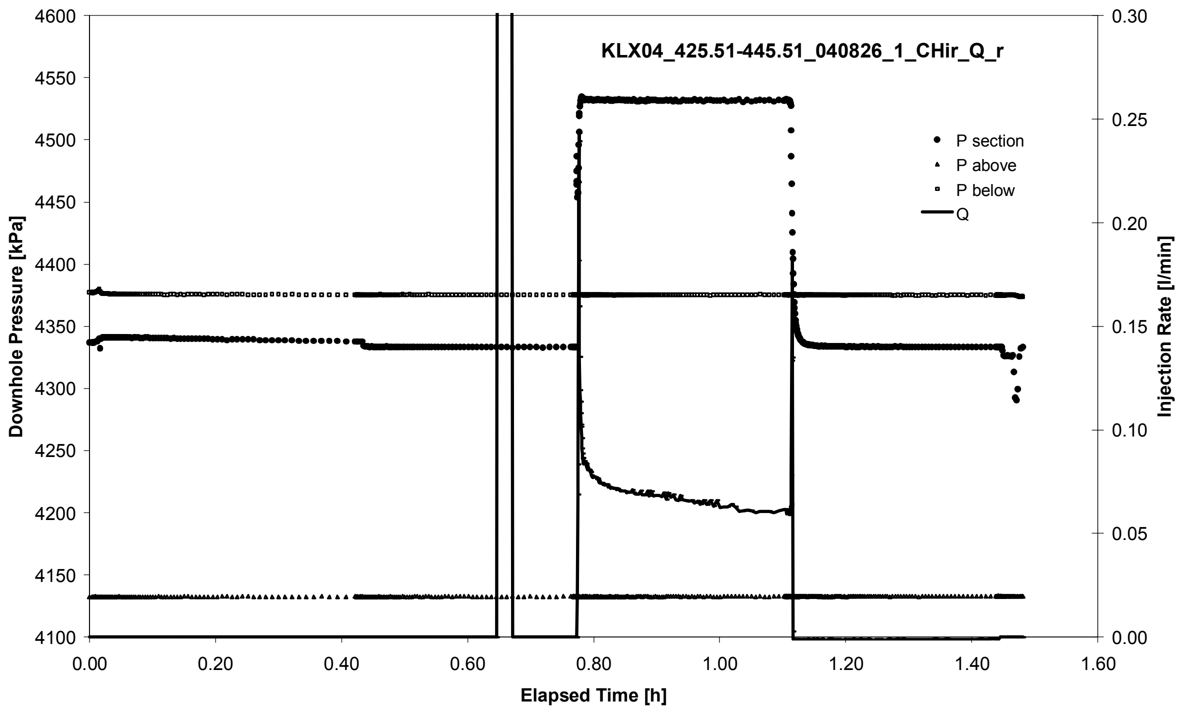


CHIR phase; HORNER match

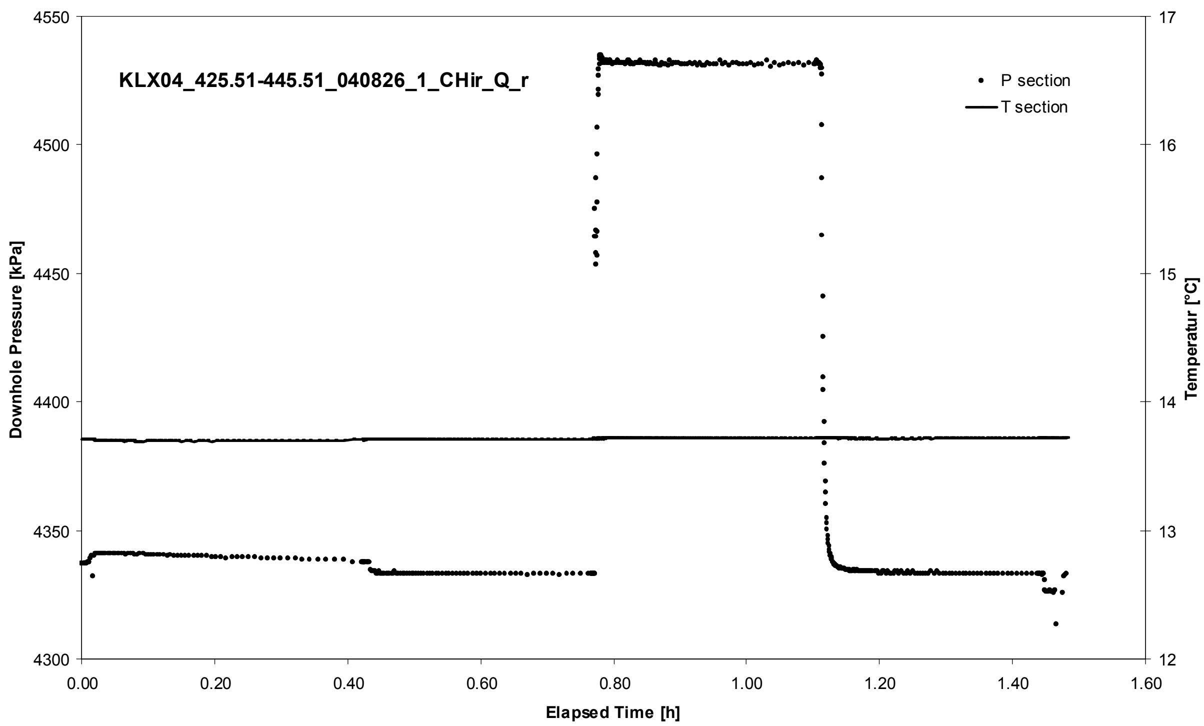
APPENDIX 2-26

Test 425.51 – 445.51 m

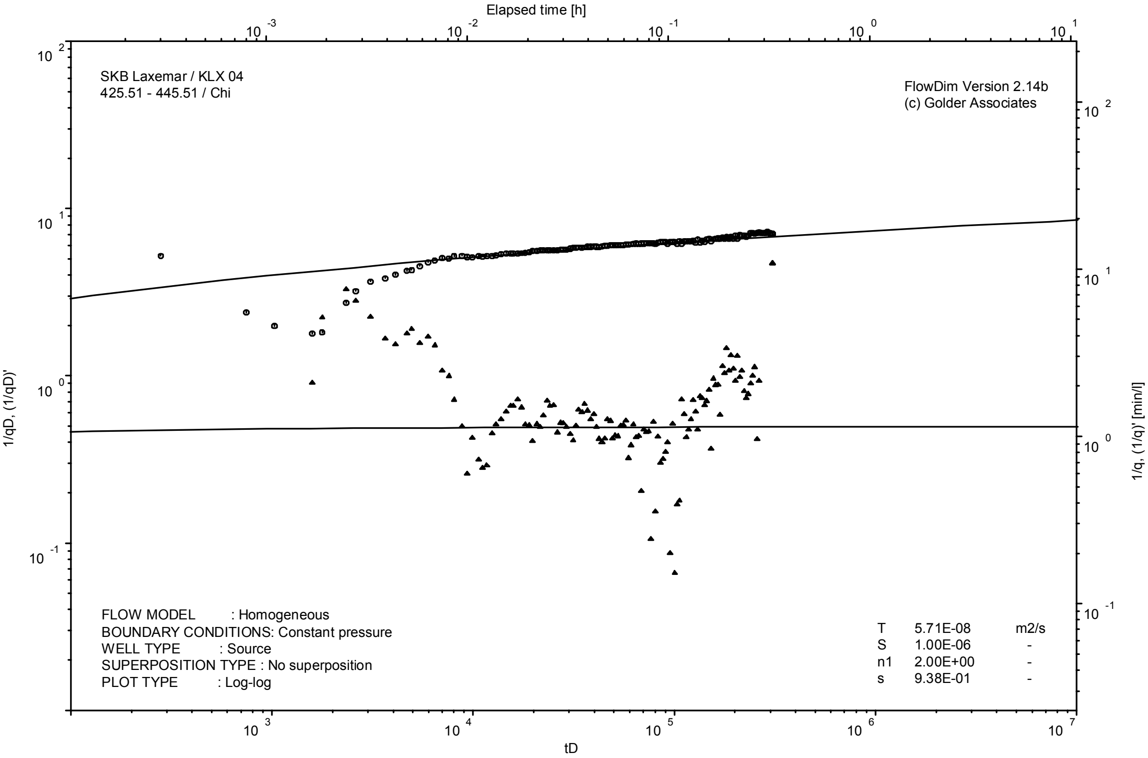
Analysis diagrams



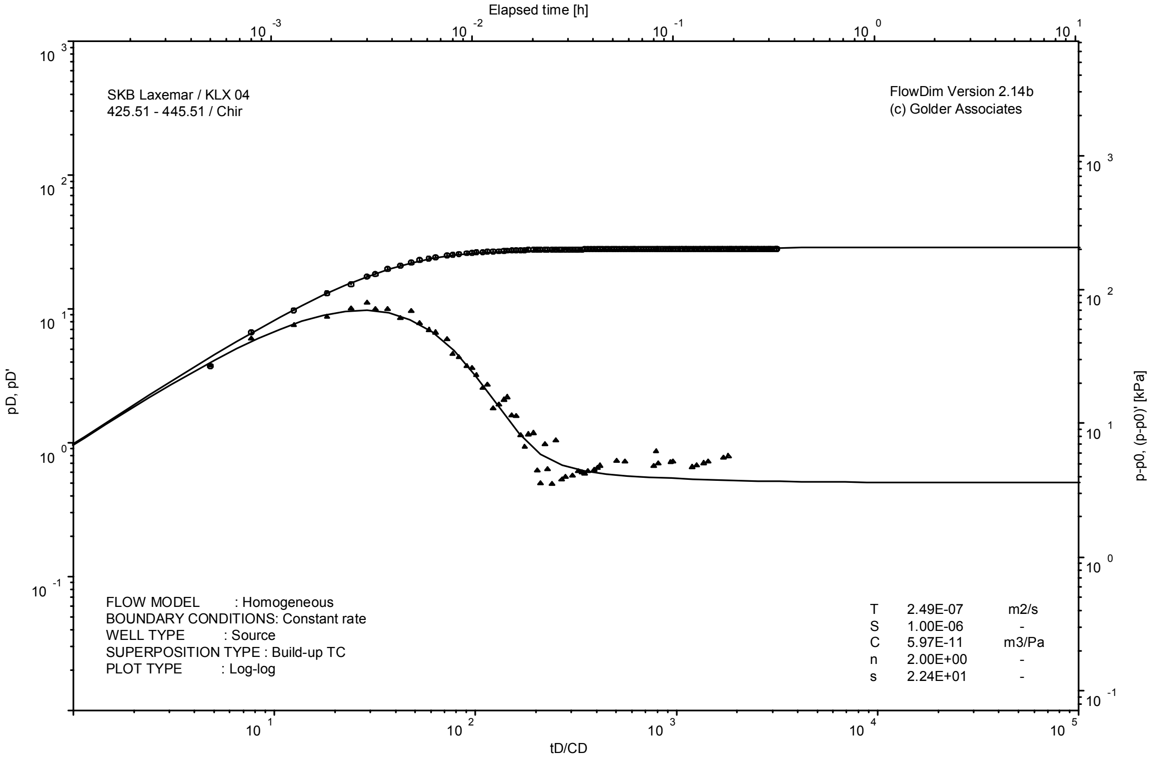
Pressure and flow rate vs. time; cartesian plot



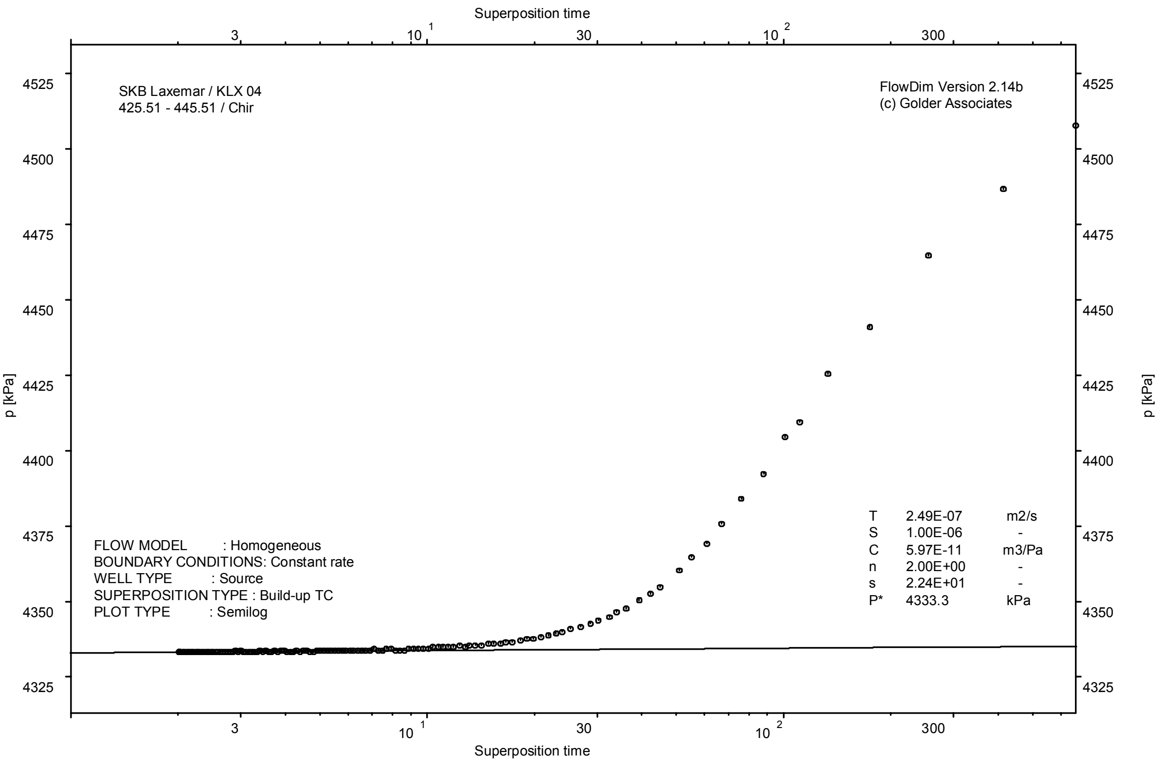
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

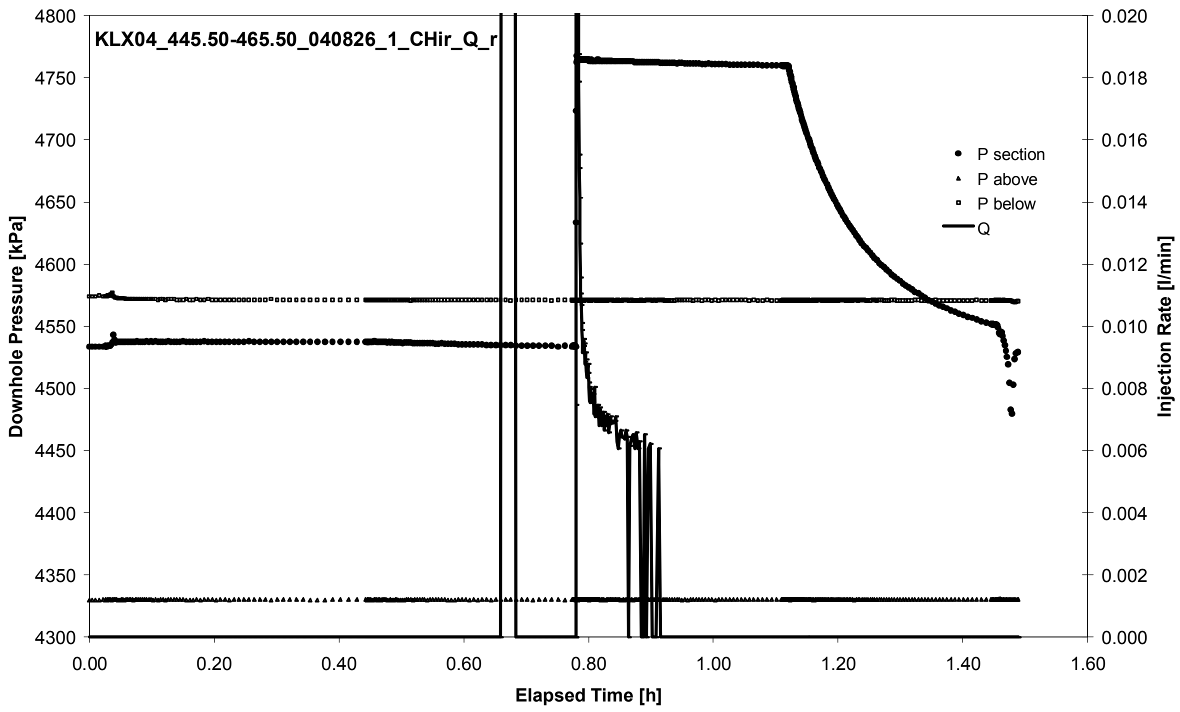


CHIR phase; HORNER match

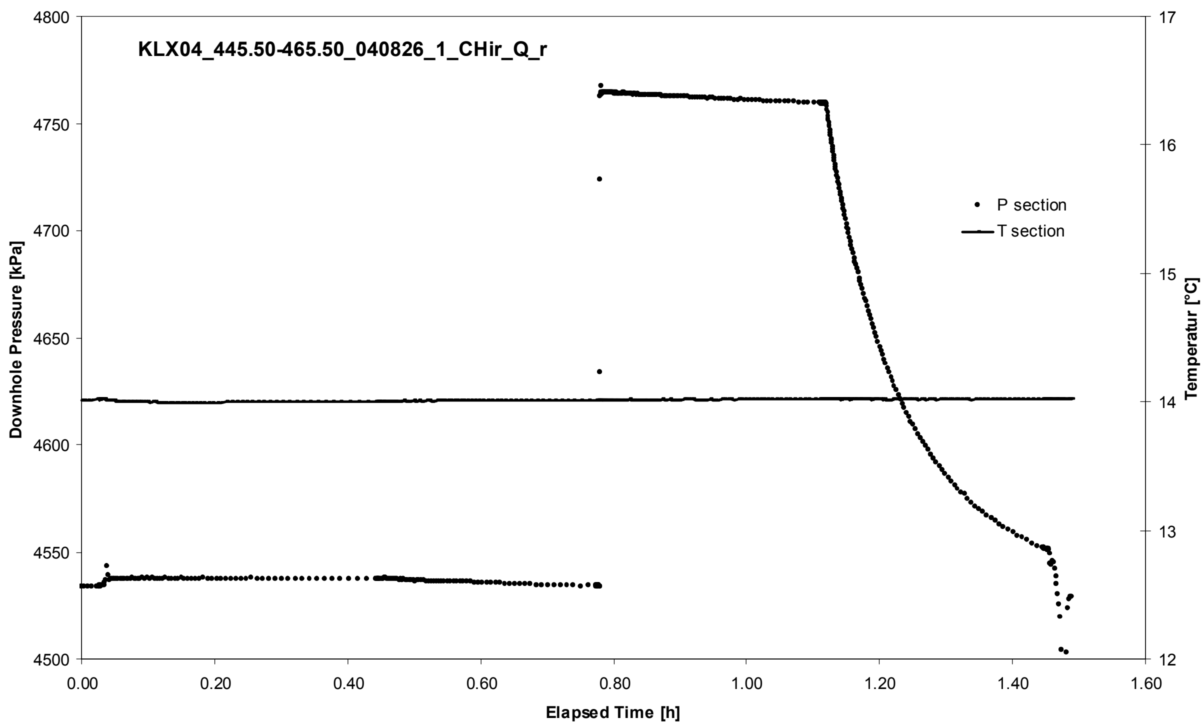
APPENDIX 2-27

Test 445.50 – 465.50 m

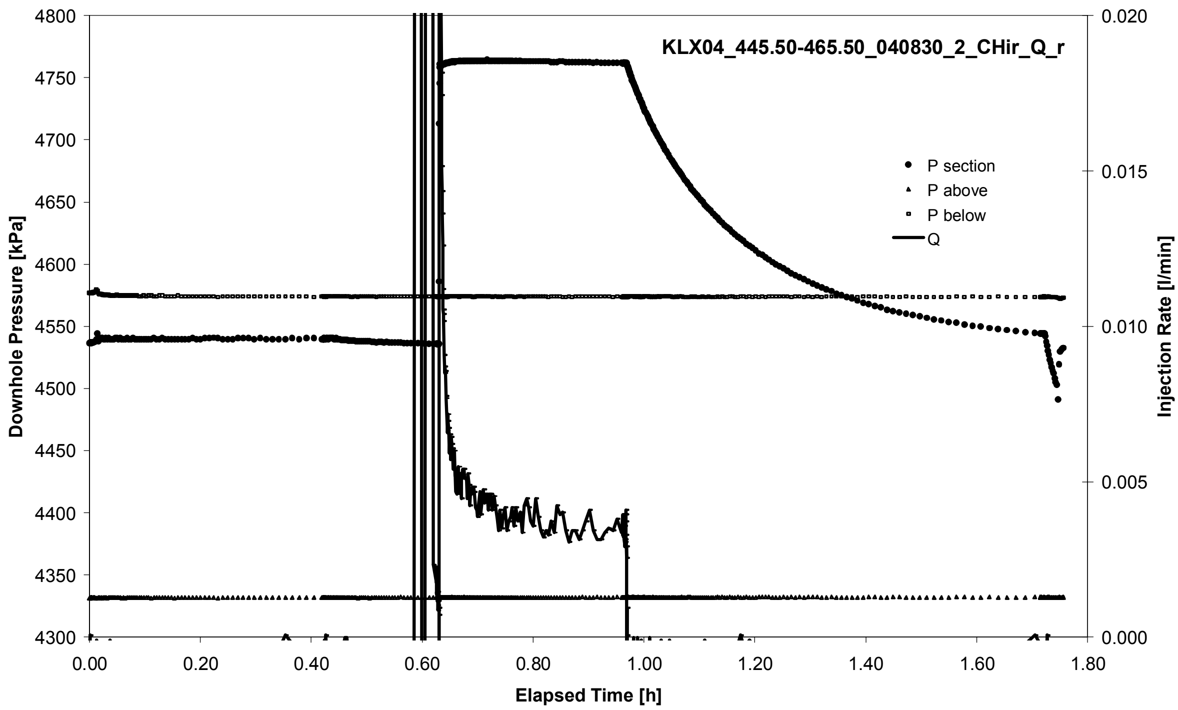
Analysis diagrams



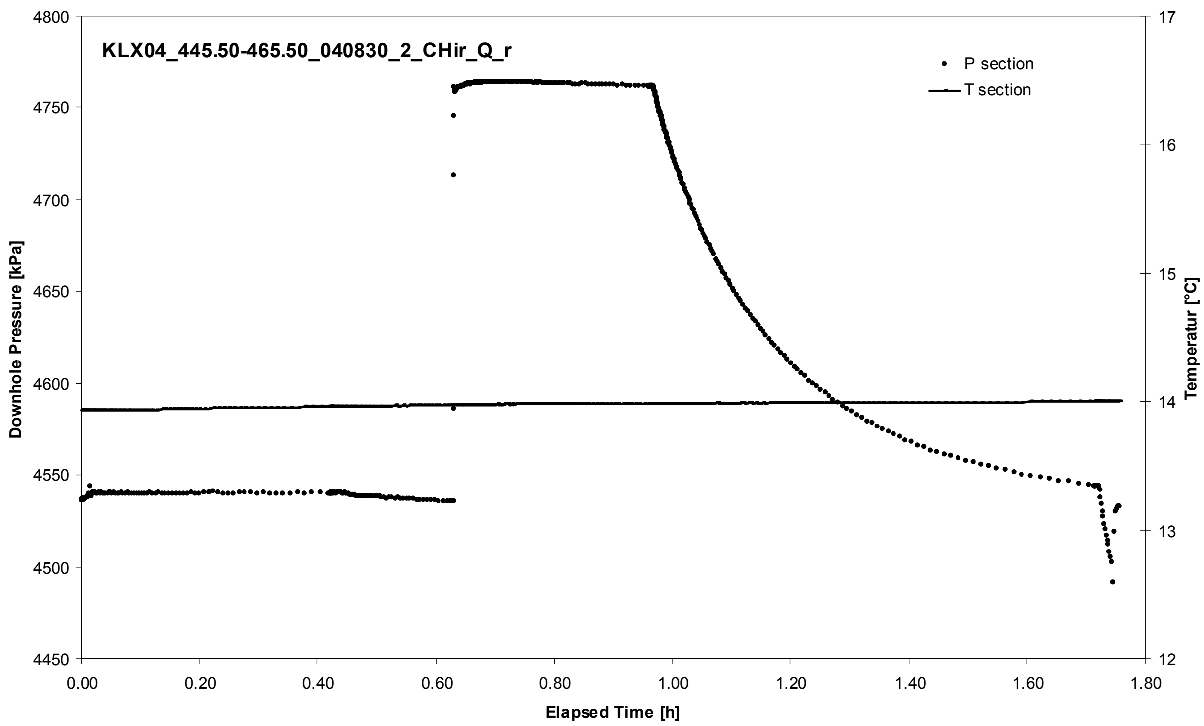
Pressure and flow rate vs. time; cartesian plot (test repeated)



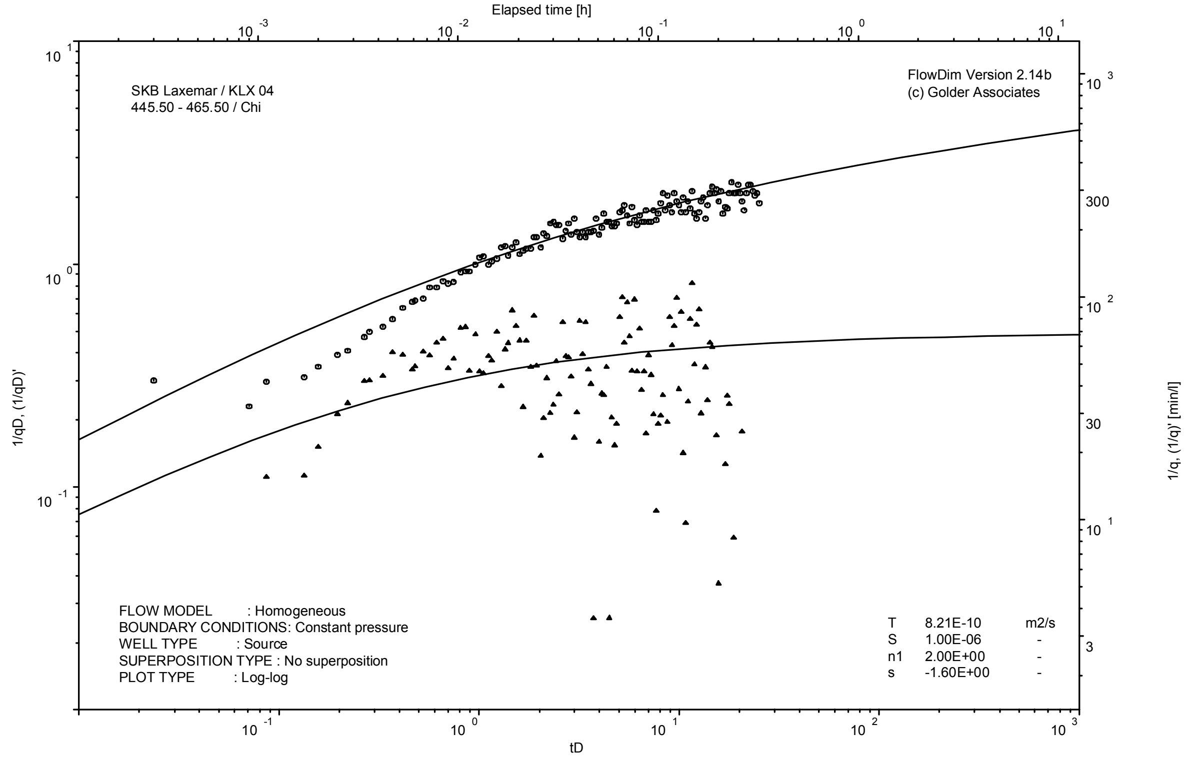
Interval pressure and temperature vs. time; cartesian plot (test repeated)



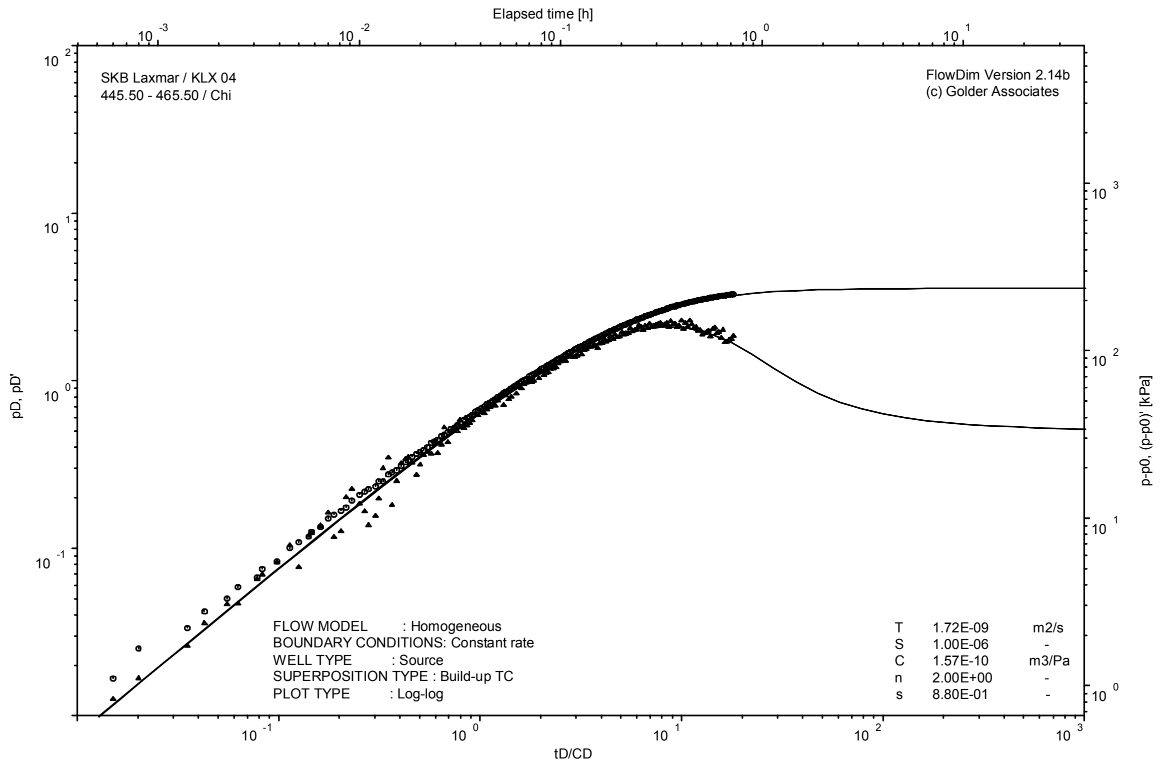
Pressure and flow rate vs. time; cartesian plot (analysed)



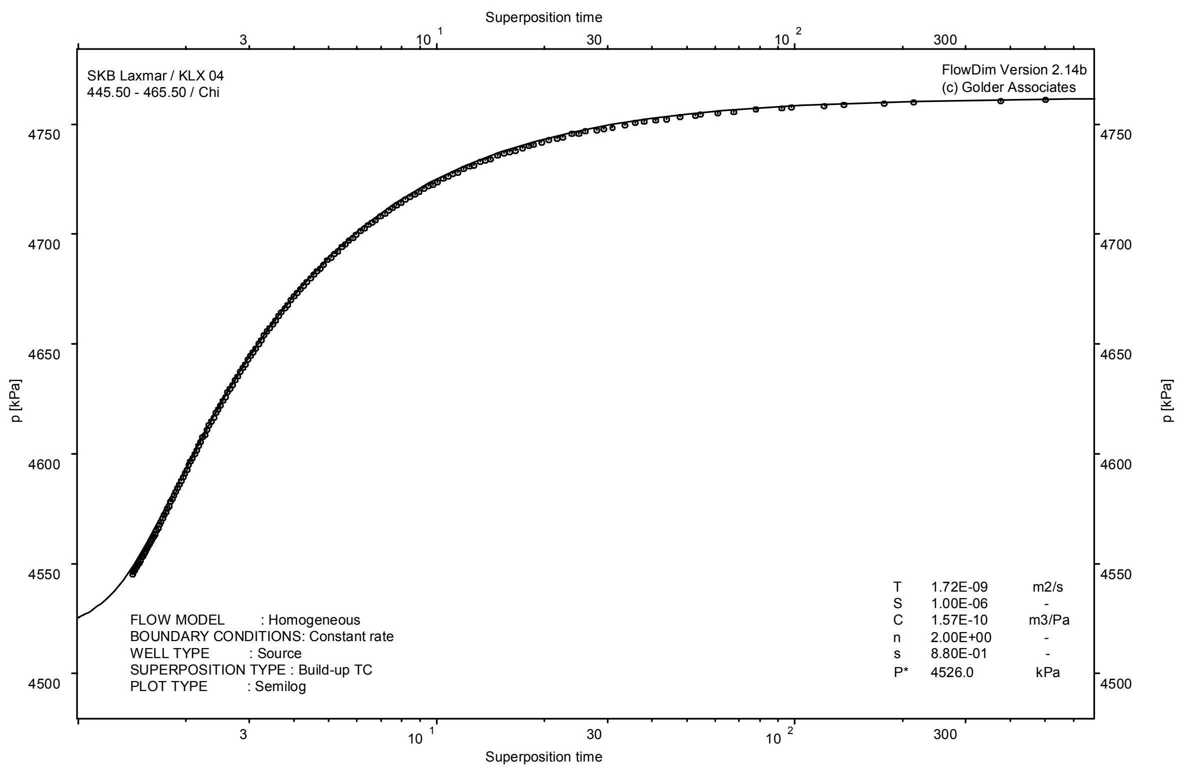
Interval pressure and temperature vs. time; cartesian plot (analysed)



CHI phase; log-log match



CHIR phase; log-log match

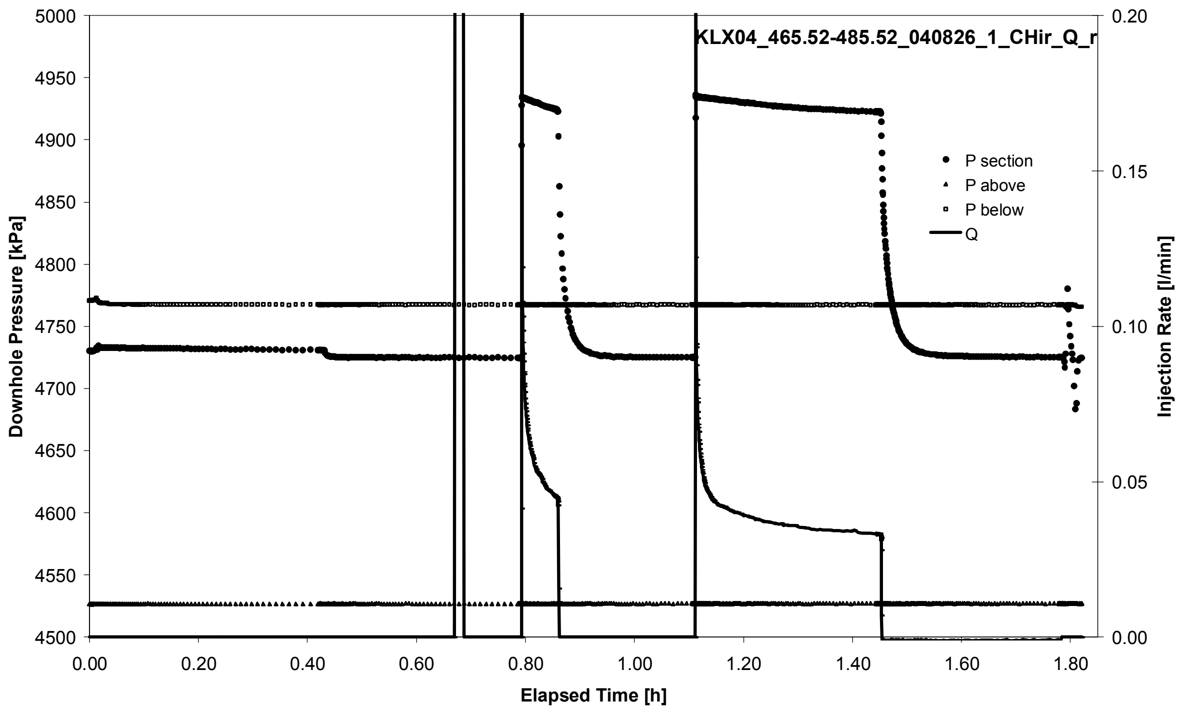


CHIR phase; HORNER match

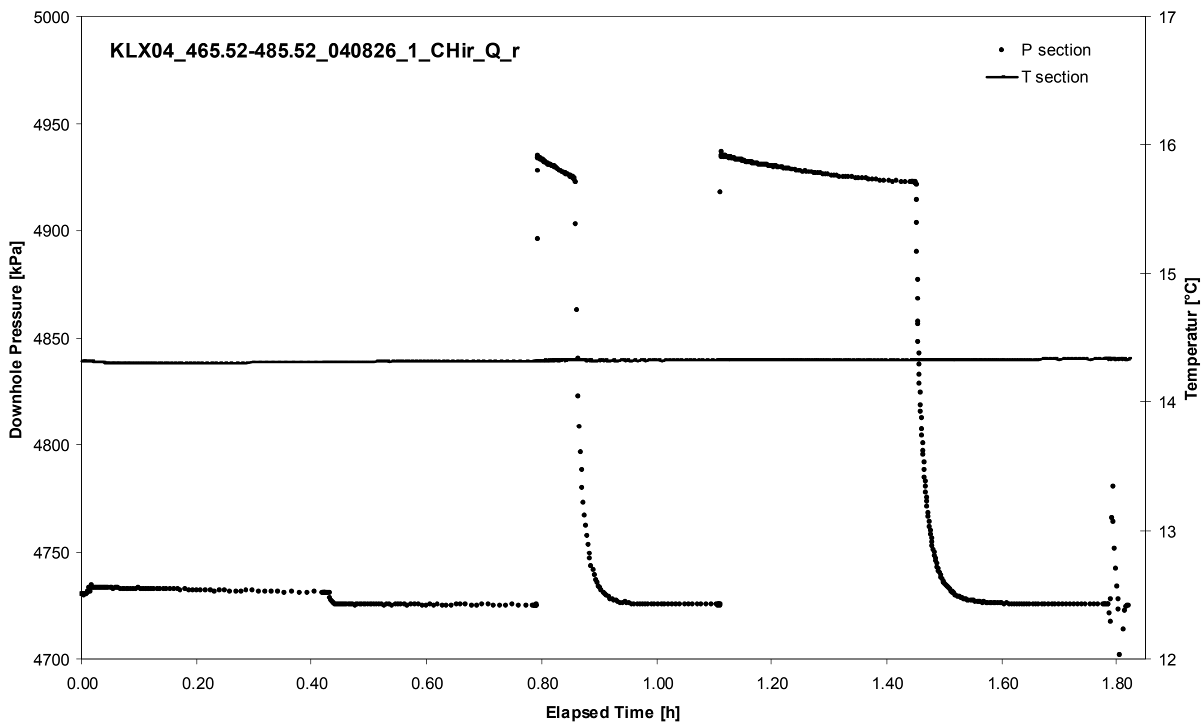
APPENDIX 2-28

Test 465.52 – 485.52 m

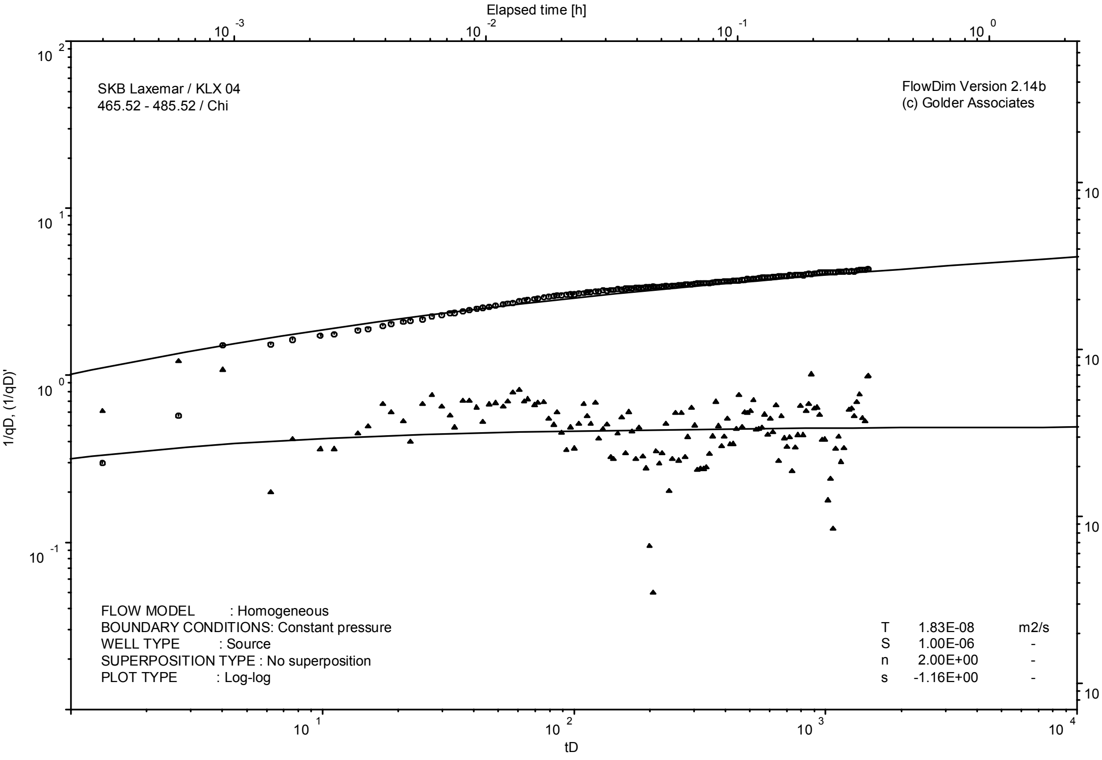
Analysis diagrams



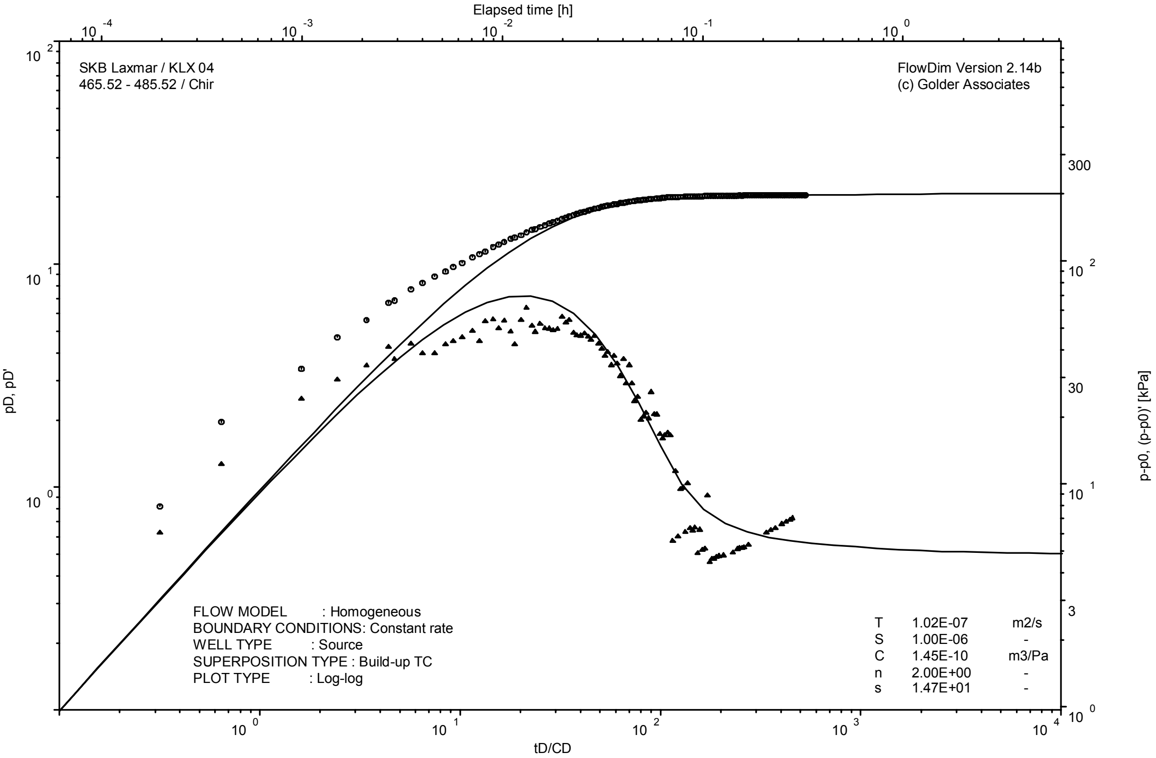
Pressure and flow rate vs. time; cartesian plot



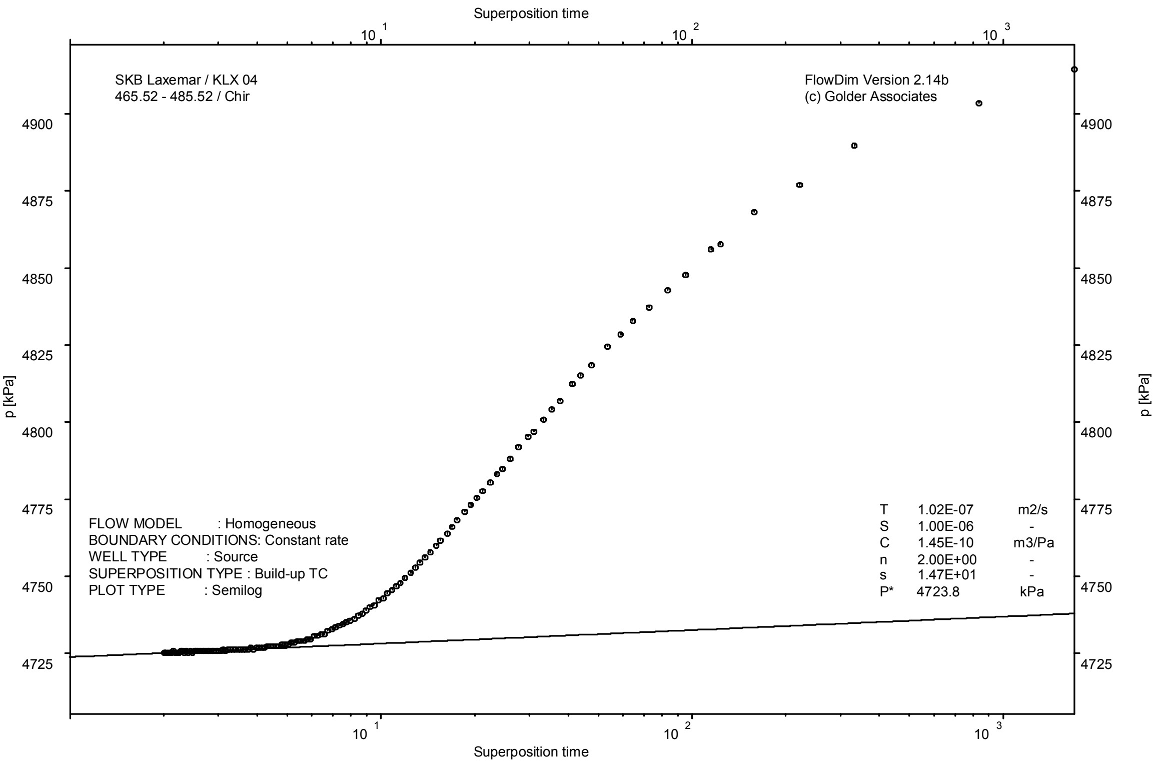
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

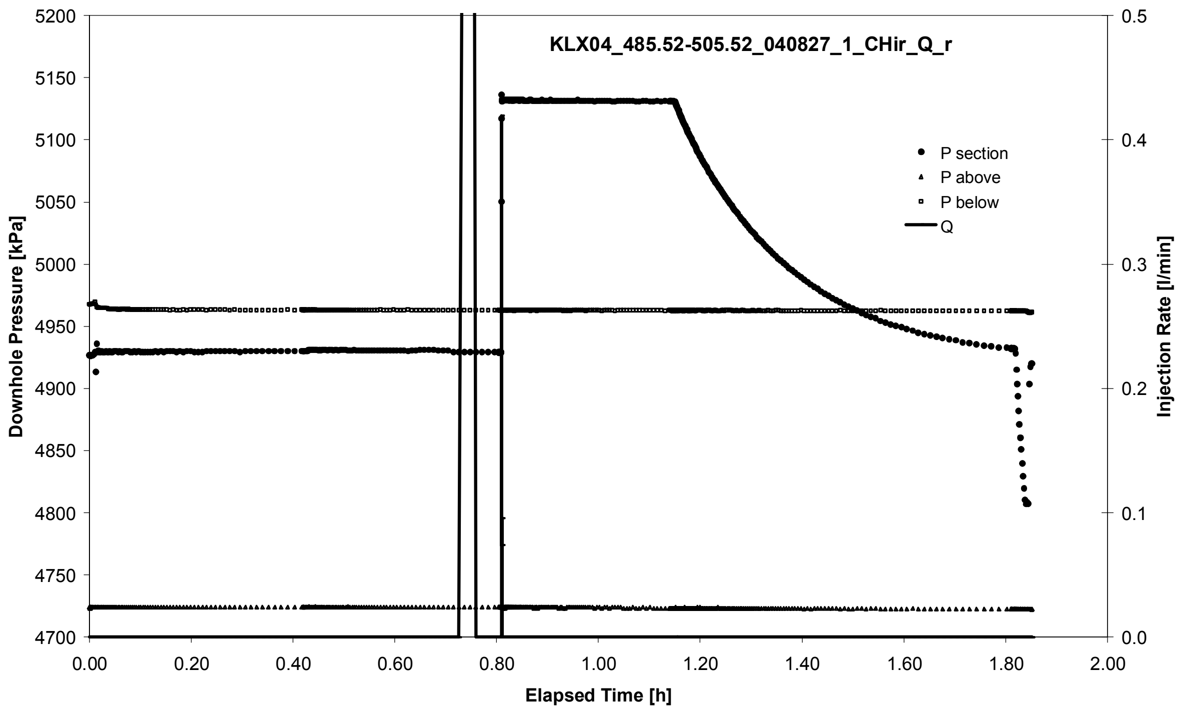


CHIR phase; HORNER match

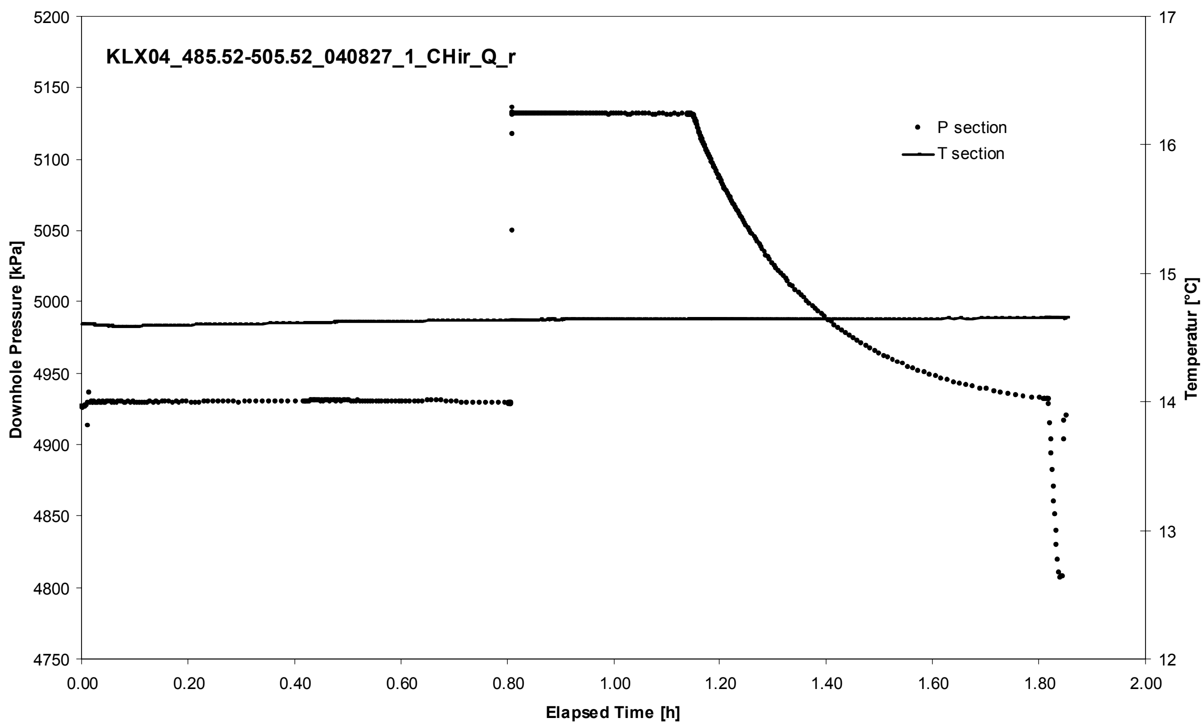
APPENDIX 2-29

Test 485.52 – 505.52 m

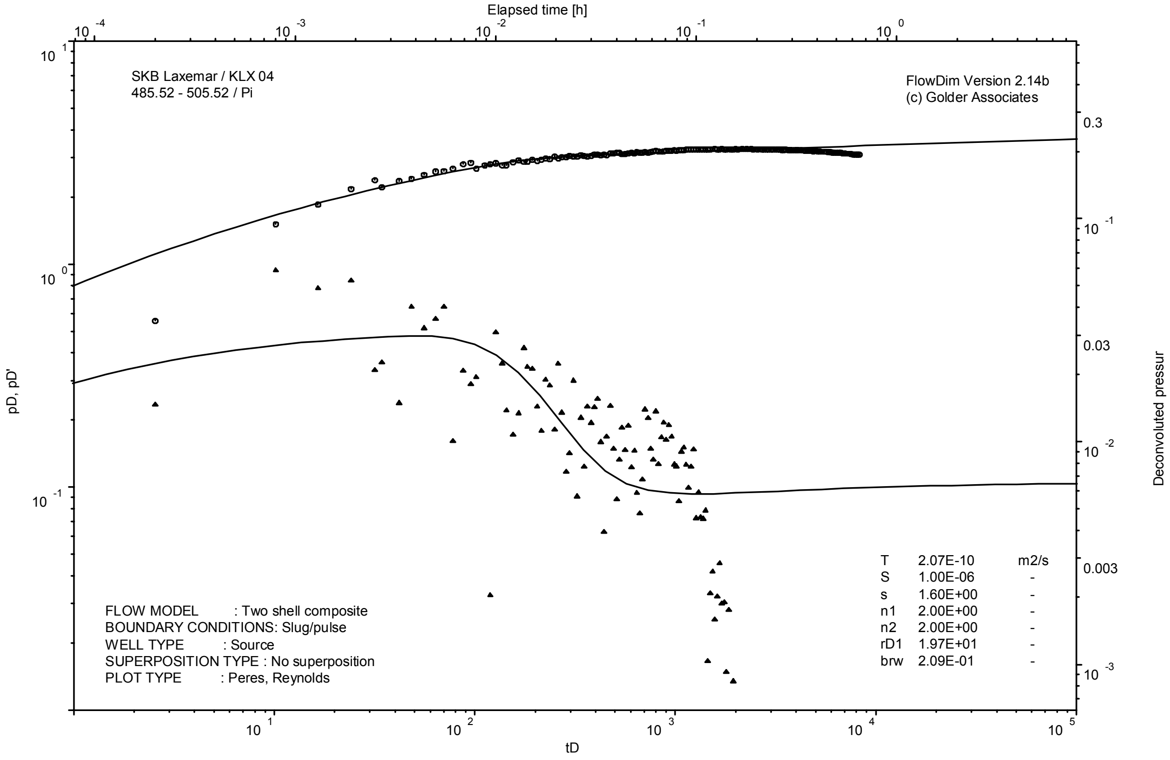
Analysis diagrams



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot

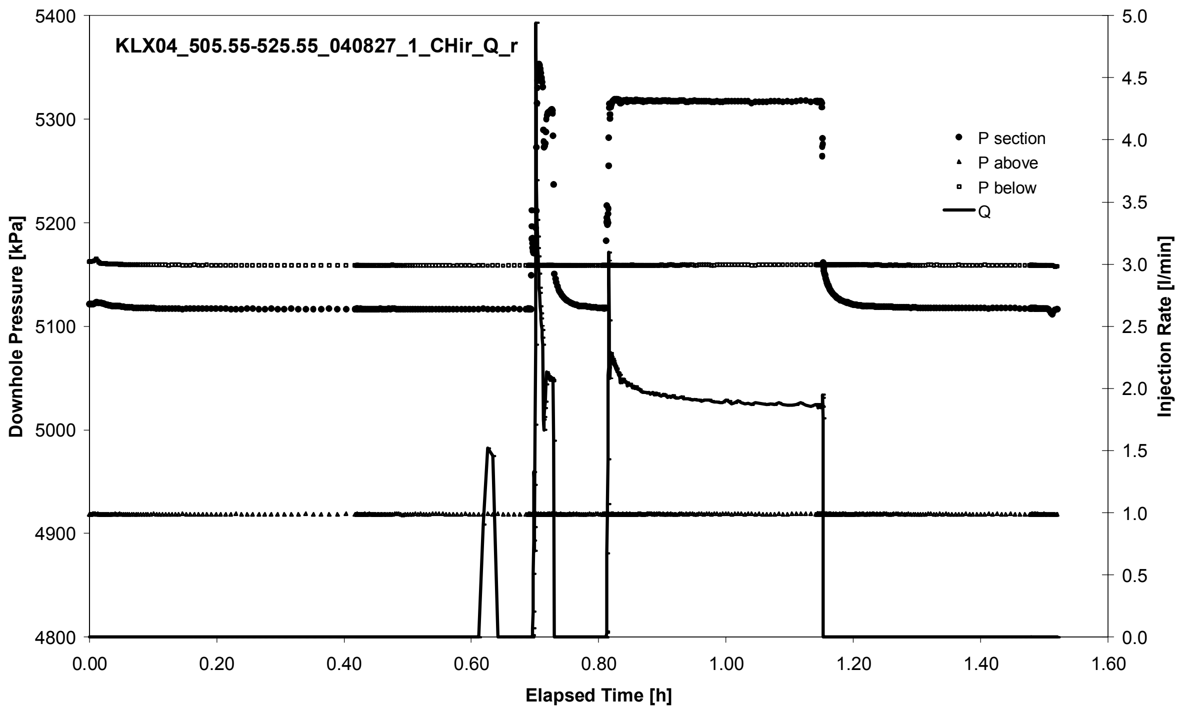


CHIR phase analysed as pulse injection; deconvolution match

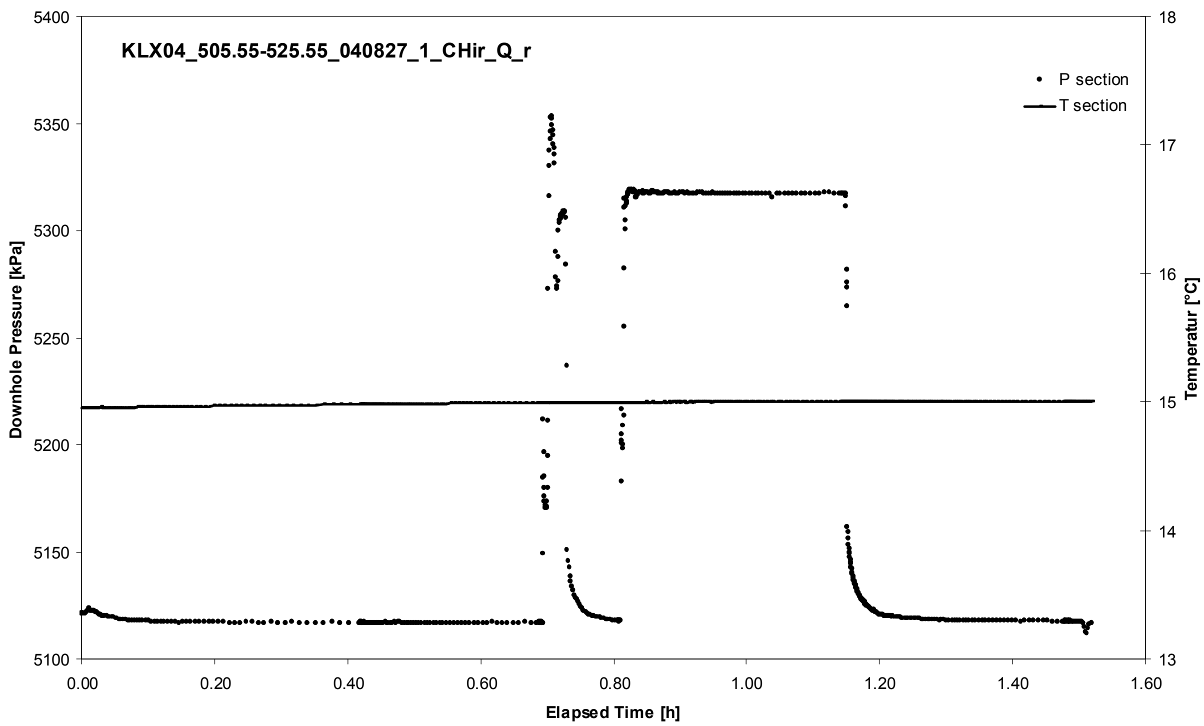
APPENDIX 2-30

Test 505.55 – 525.55 m

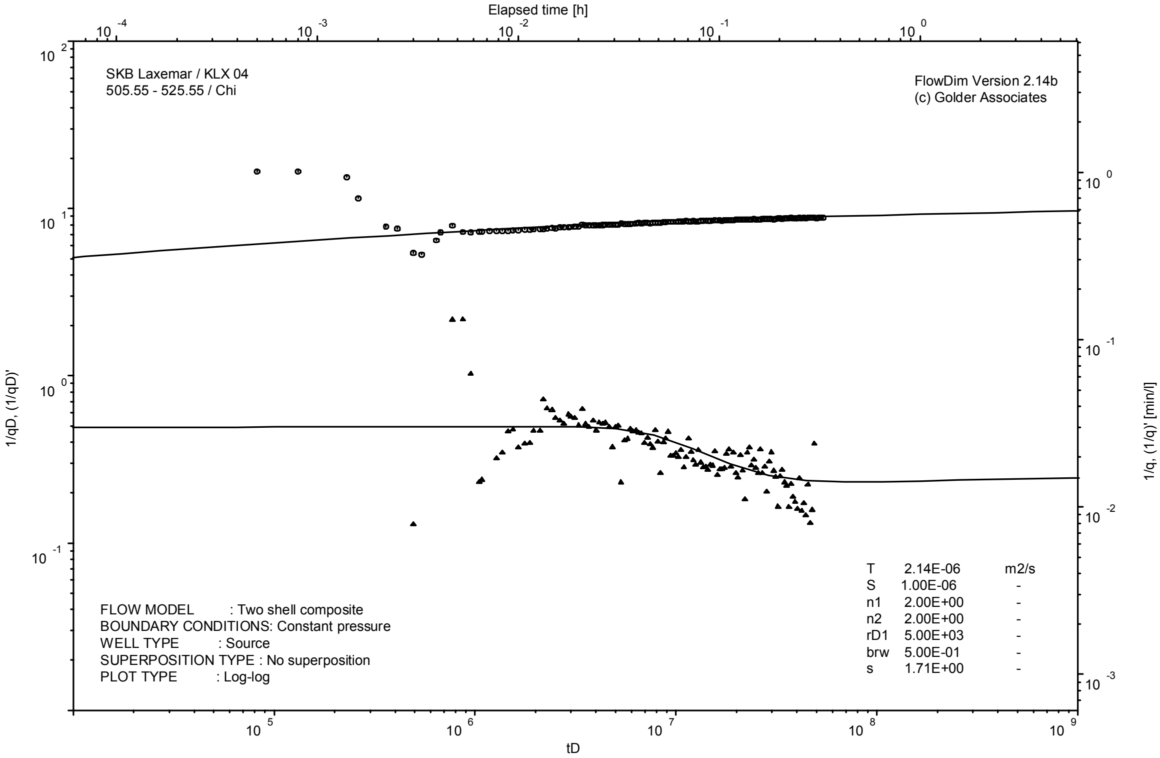
Analysis diagrams



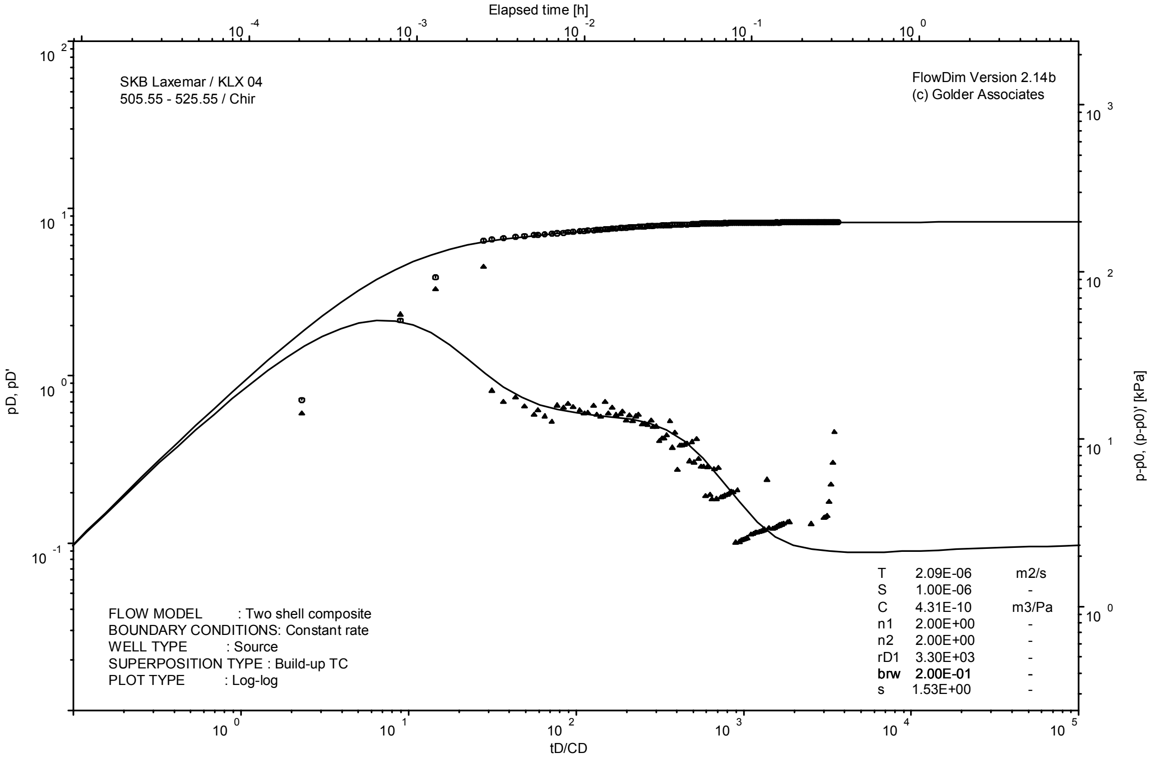
Pressure and flow rate vs. time; cartesian plot



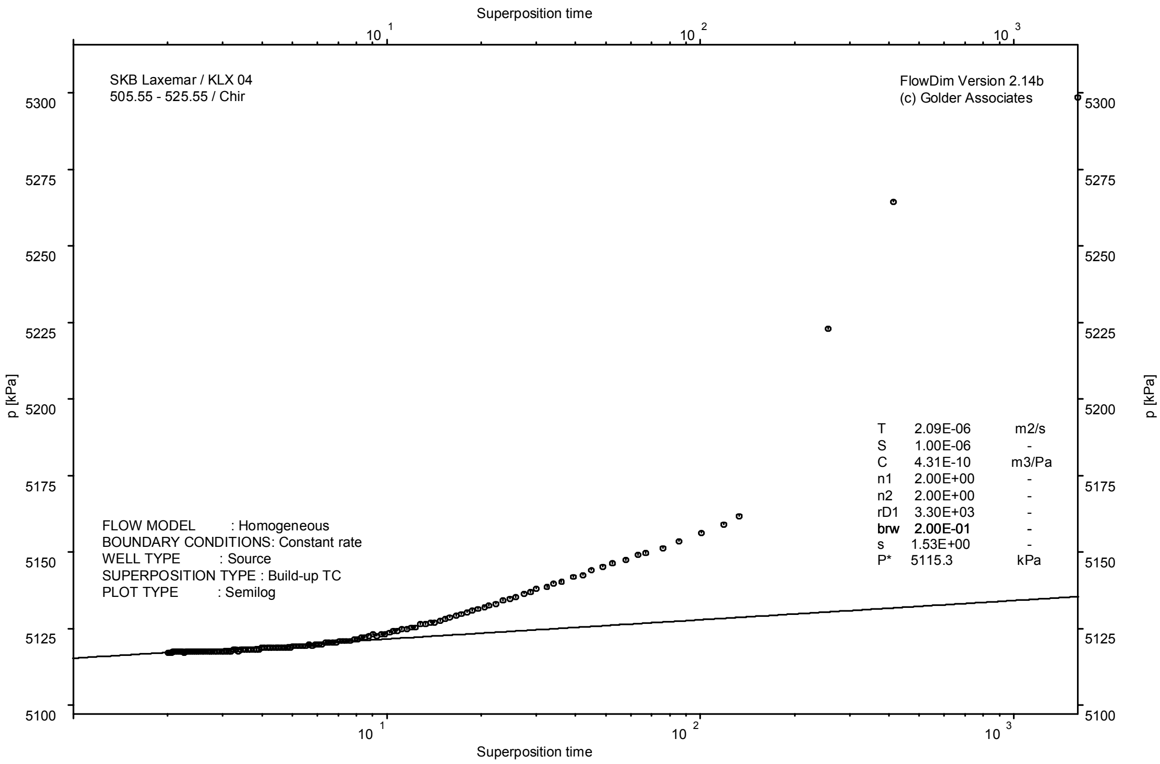
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

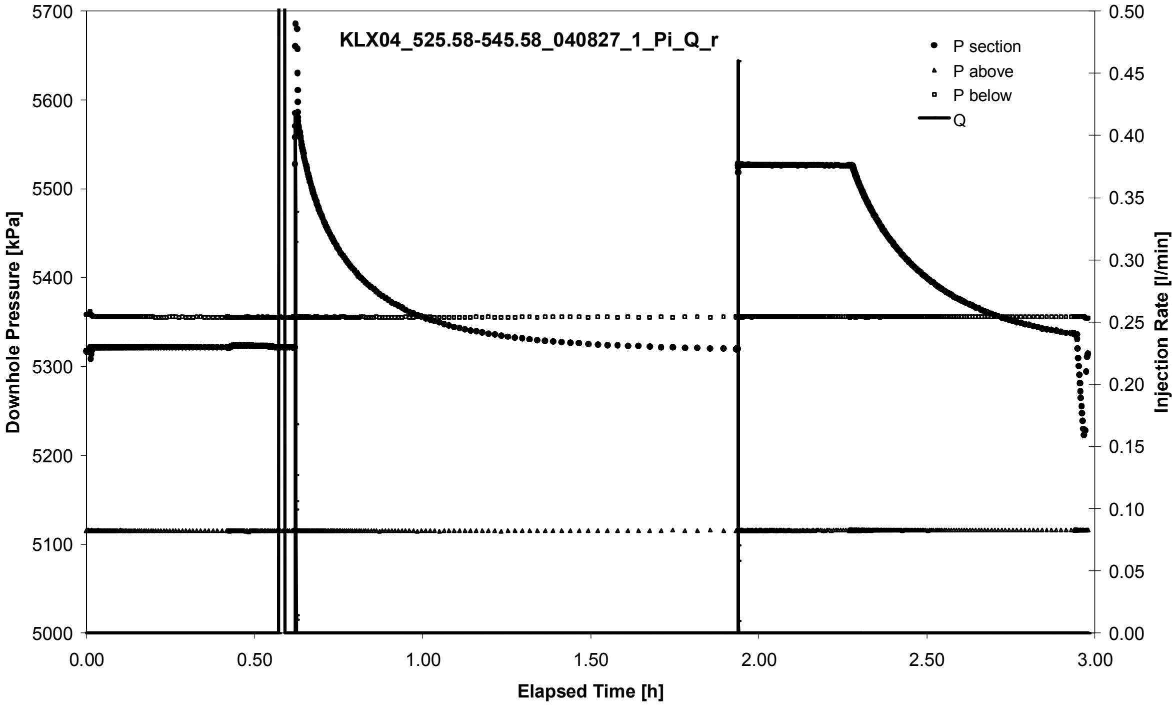


CHIR phase; HORNER match

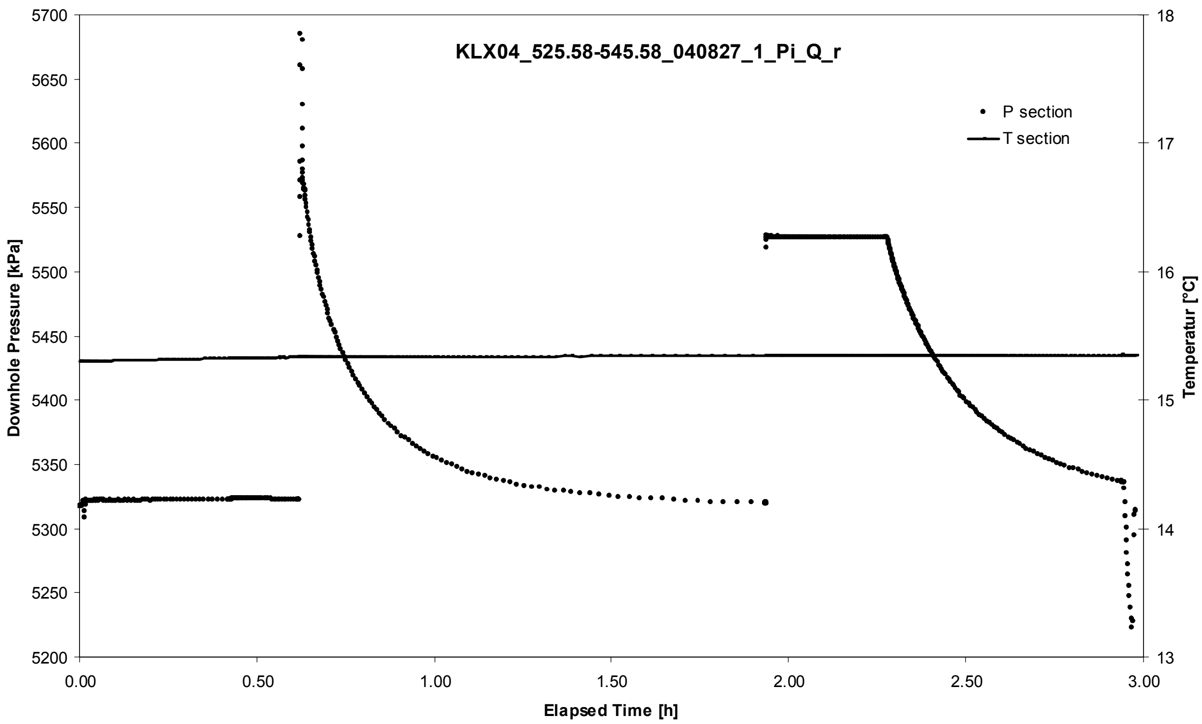
APPENDIX 2-31

Test 525.58 – 545.58 m

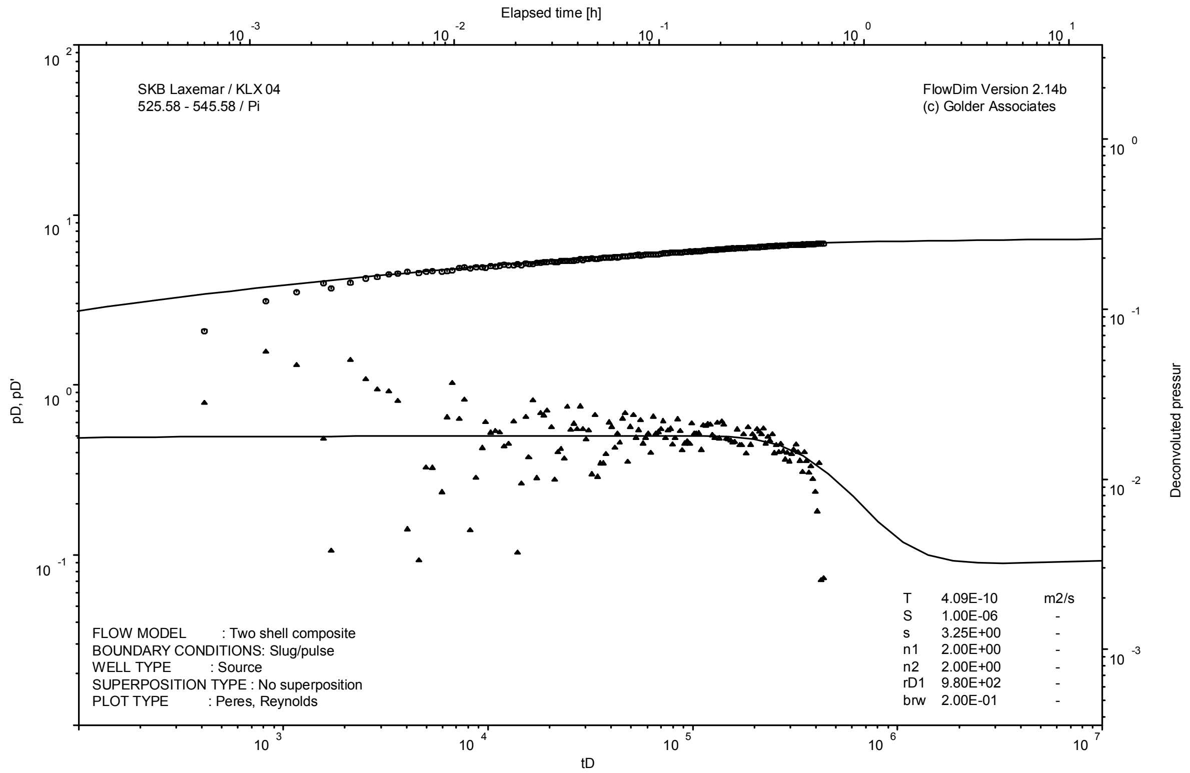
Analysis diagrams



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot

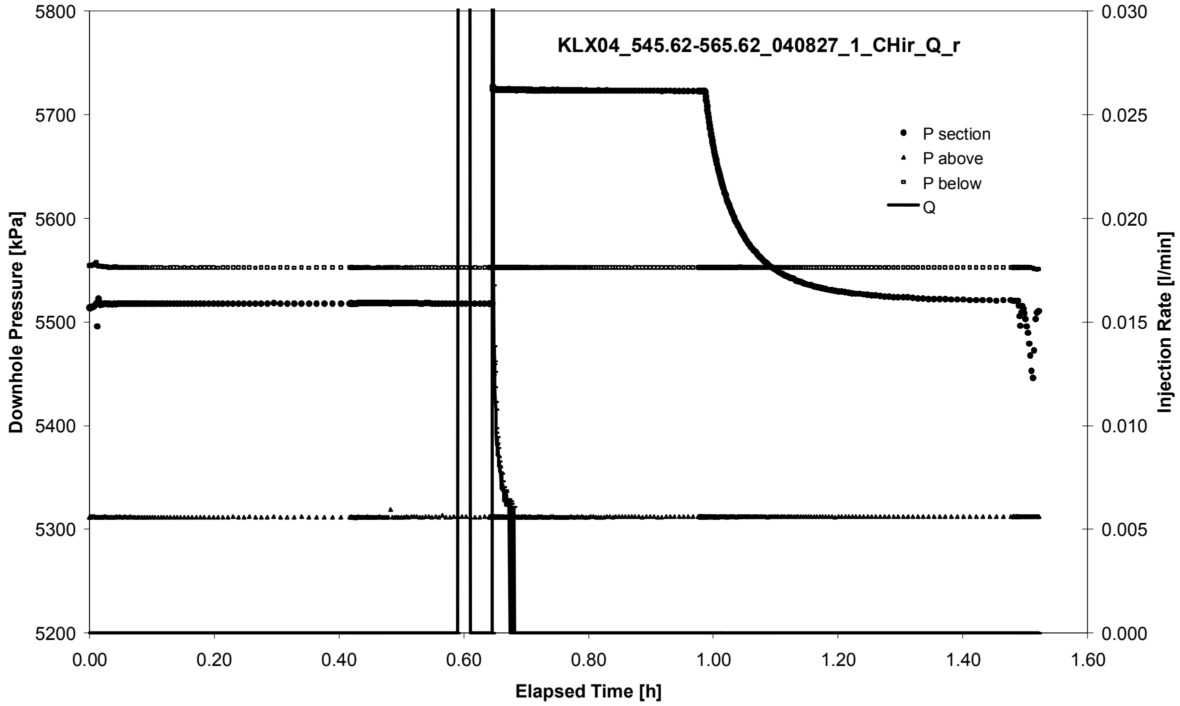


CHIR phase analysed as pulse injection; deconvolution match

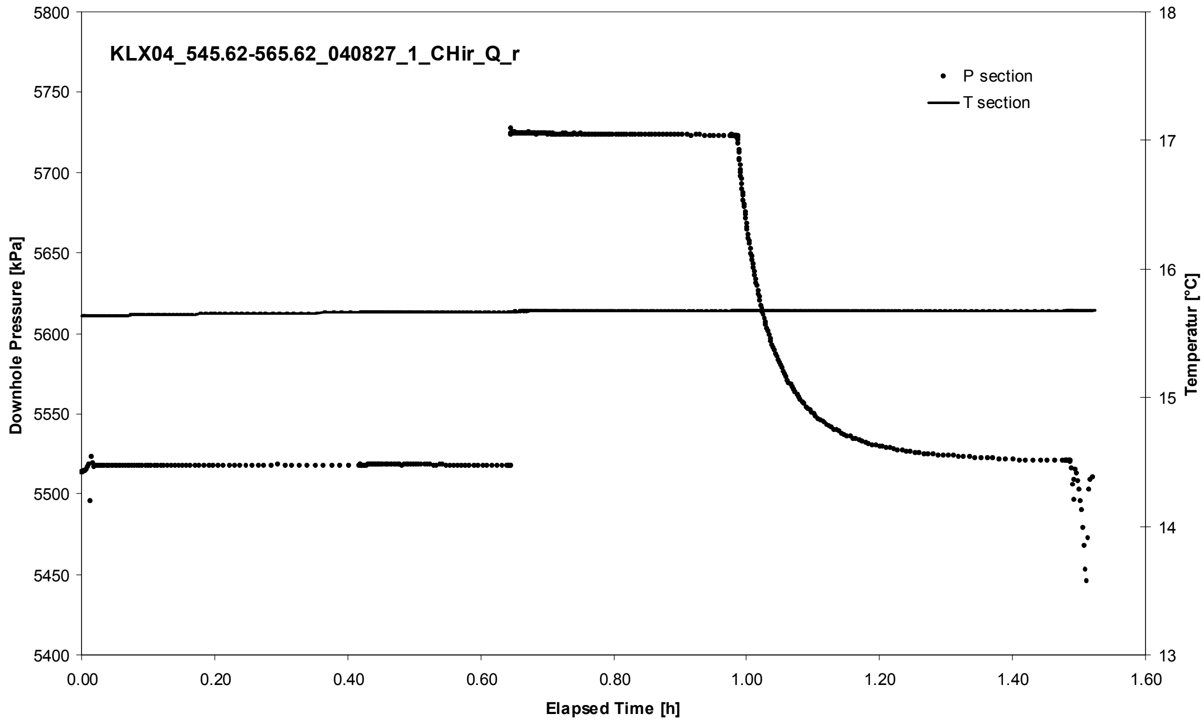
APPENDIX 2-32

Test 545.62 – 565.62 m

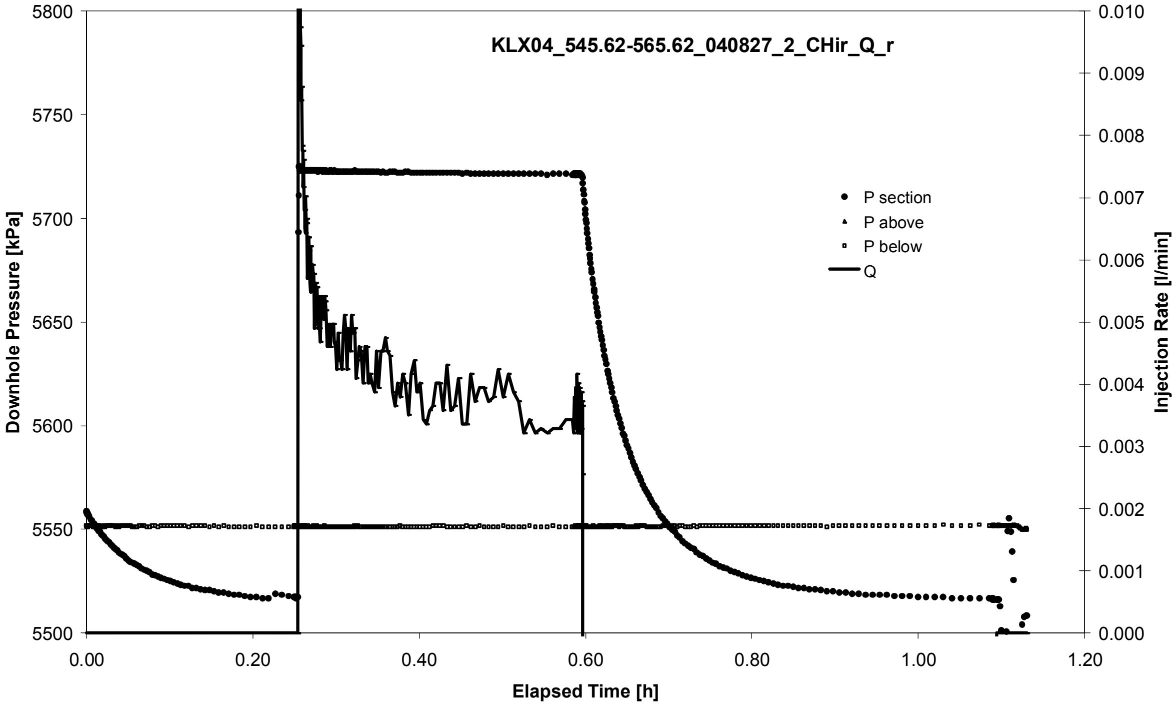
Analysis diagrams



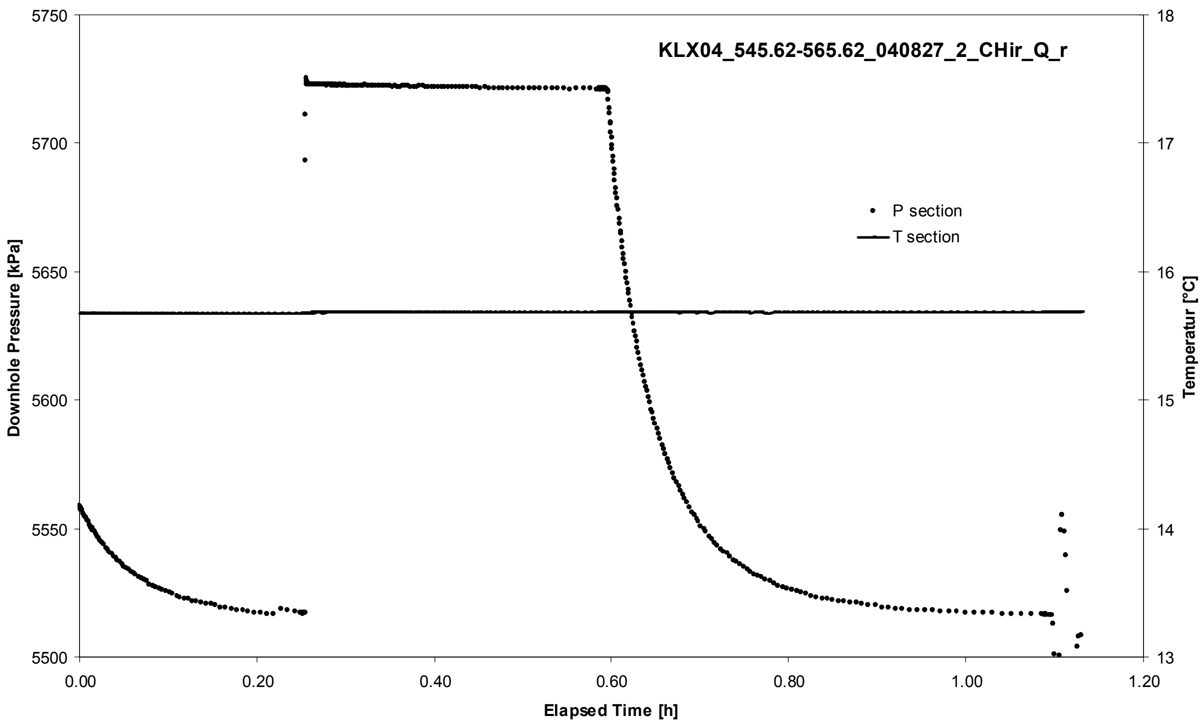
Pressure and flow rate vs. time; cartesian plot (test repeated)



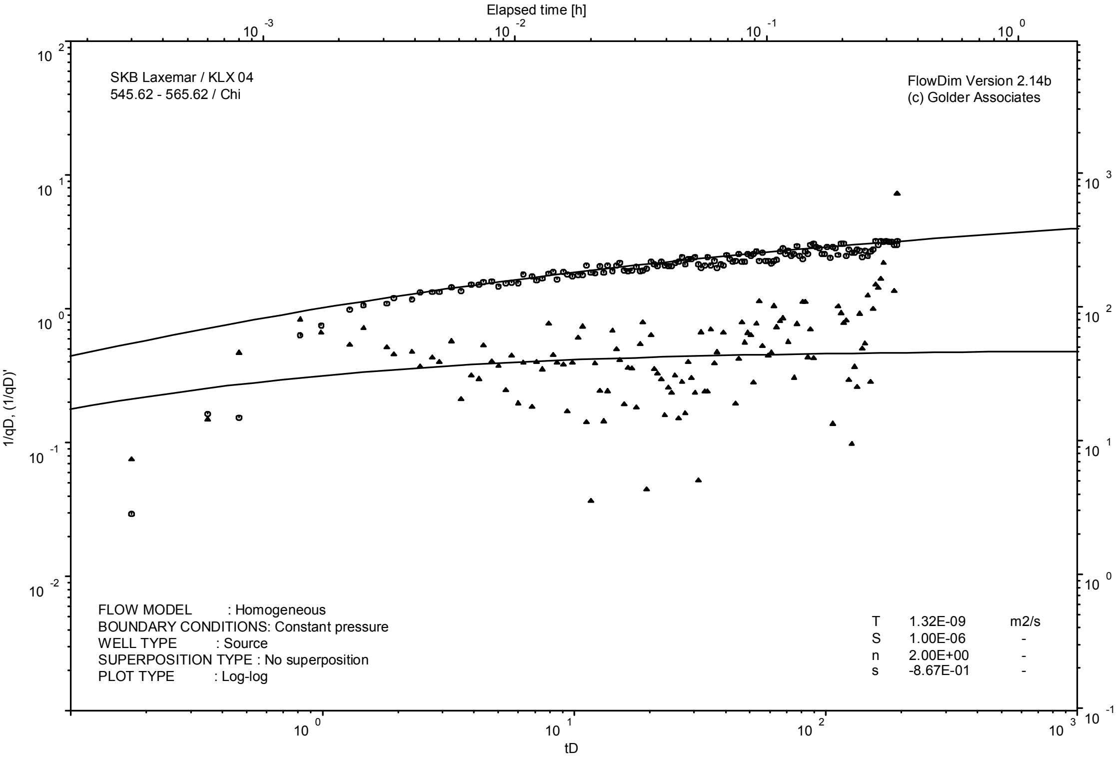
Interval pressure and temperature vs. time; cartesian plot (test repeated)



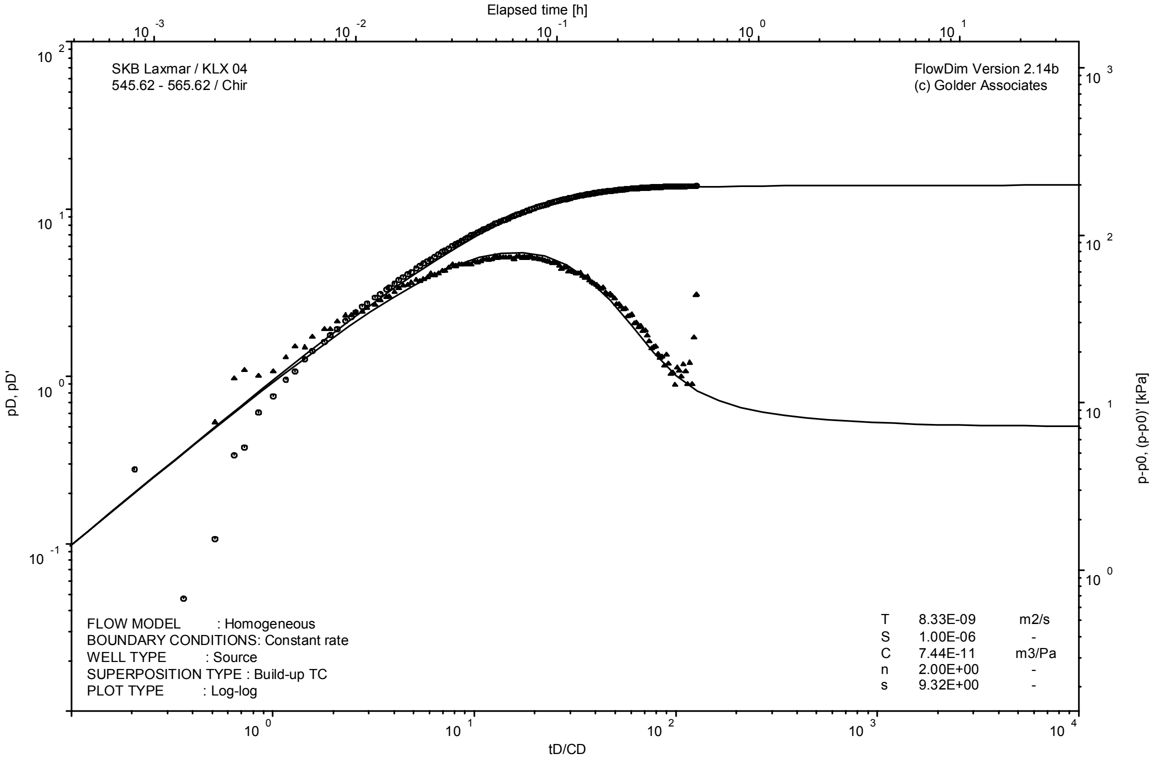
Pressure and flow rate vs. time; cartesian plot (analysed)



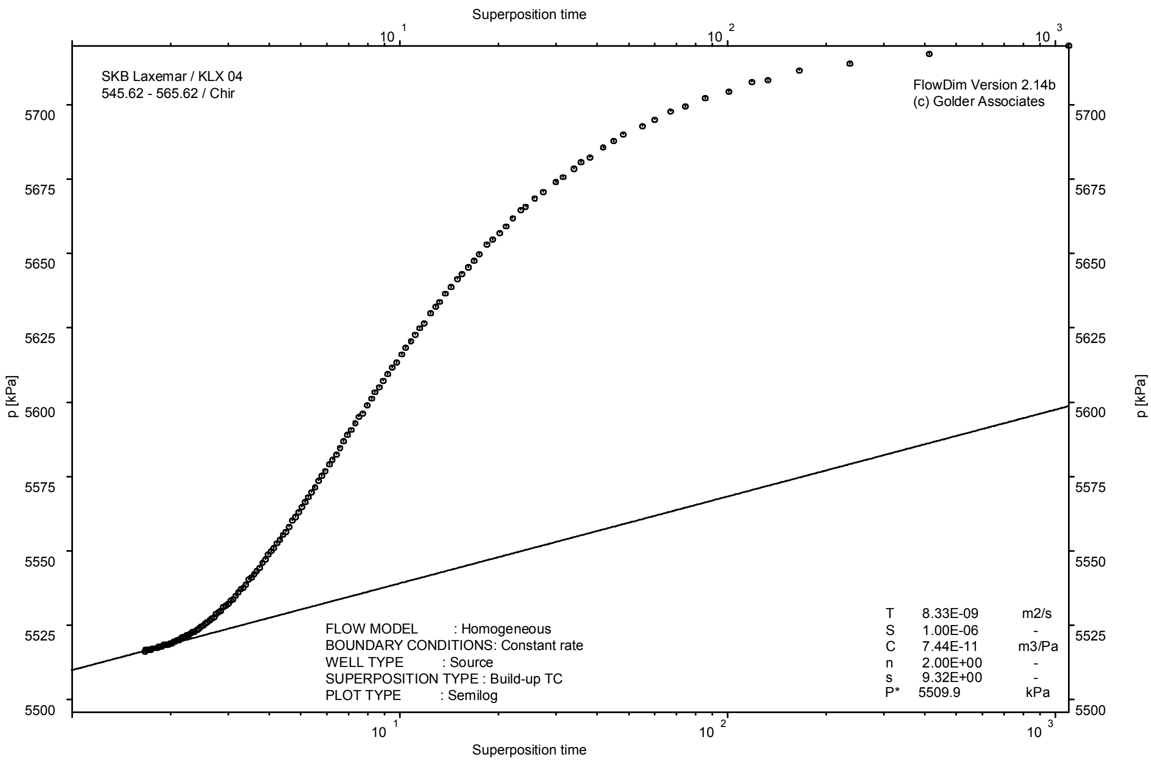
Interval pressure and temperature vs. time; cartesian plot (analysed)



CHI phase; log-log match



CHIR phase; log-log match

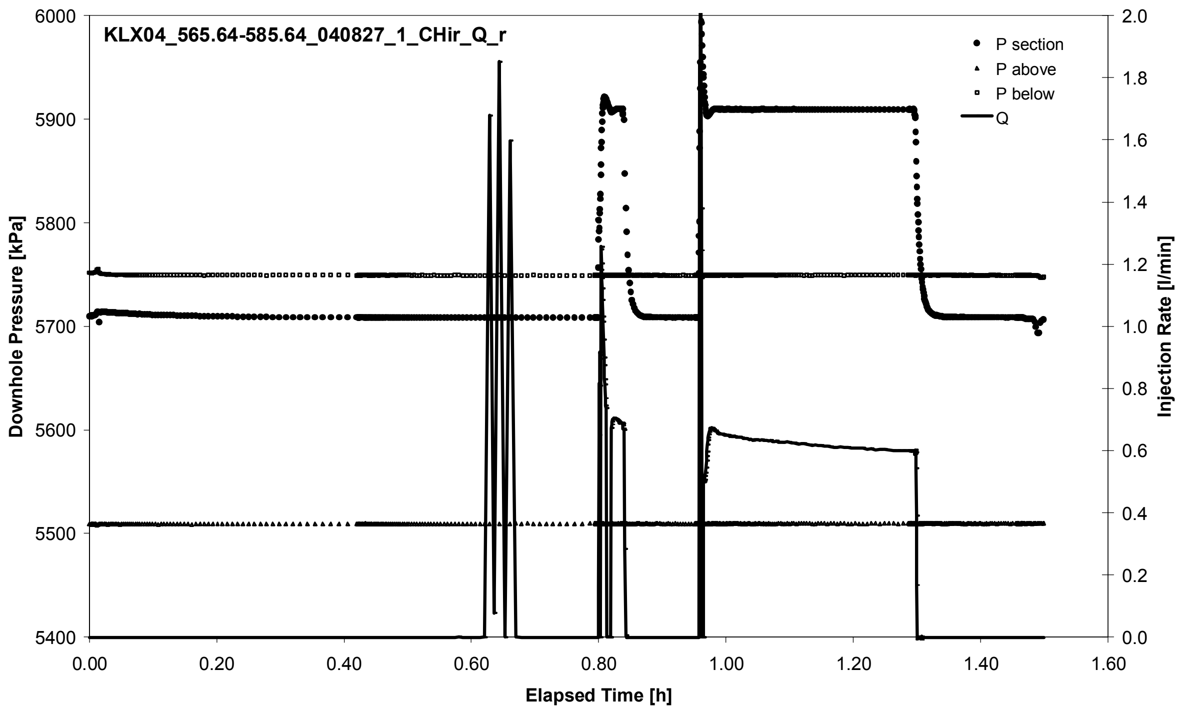


CHIR phase; HORNER match

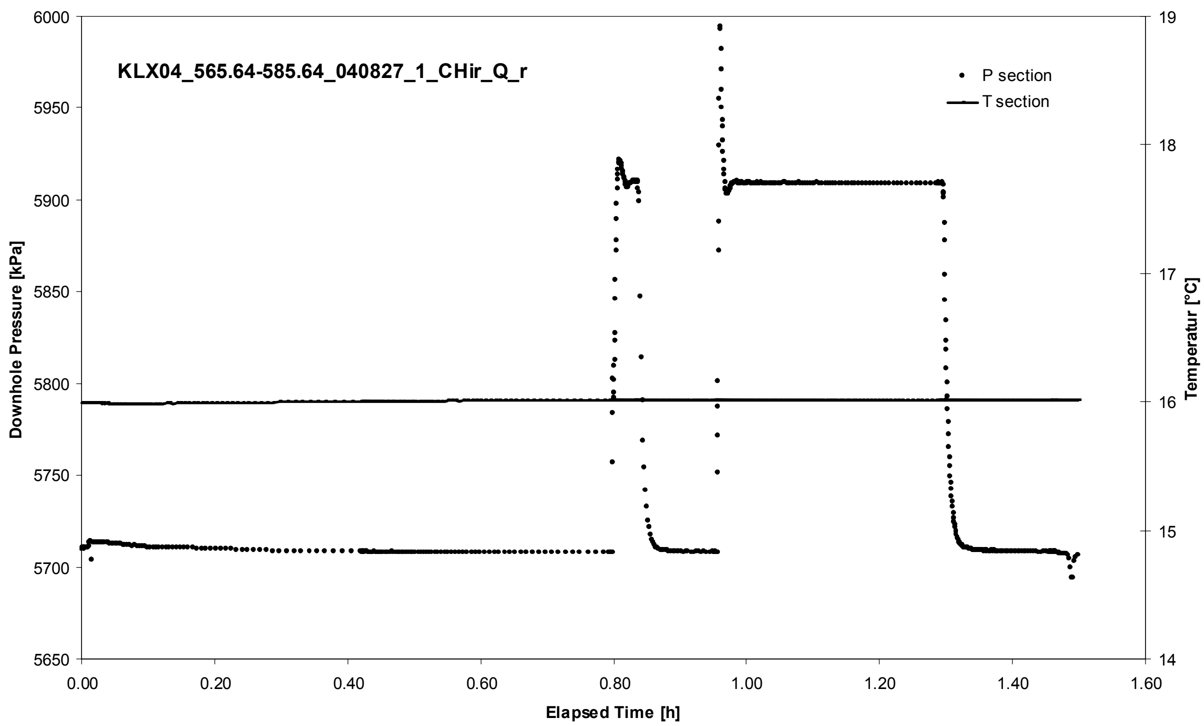
APPENDIX 2-33

Test 565.64 – 585.64 m

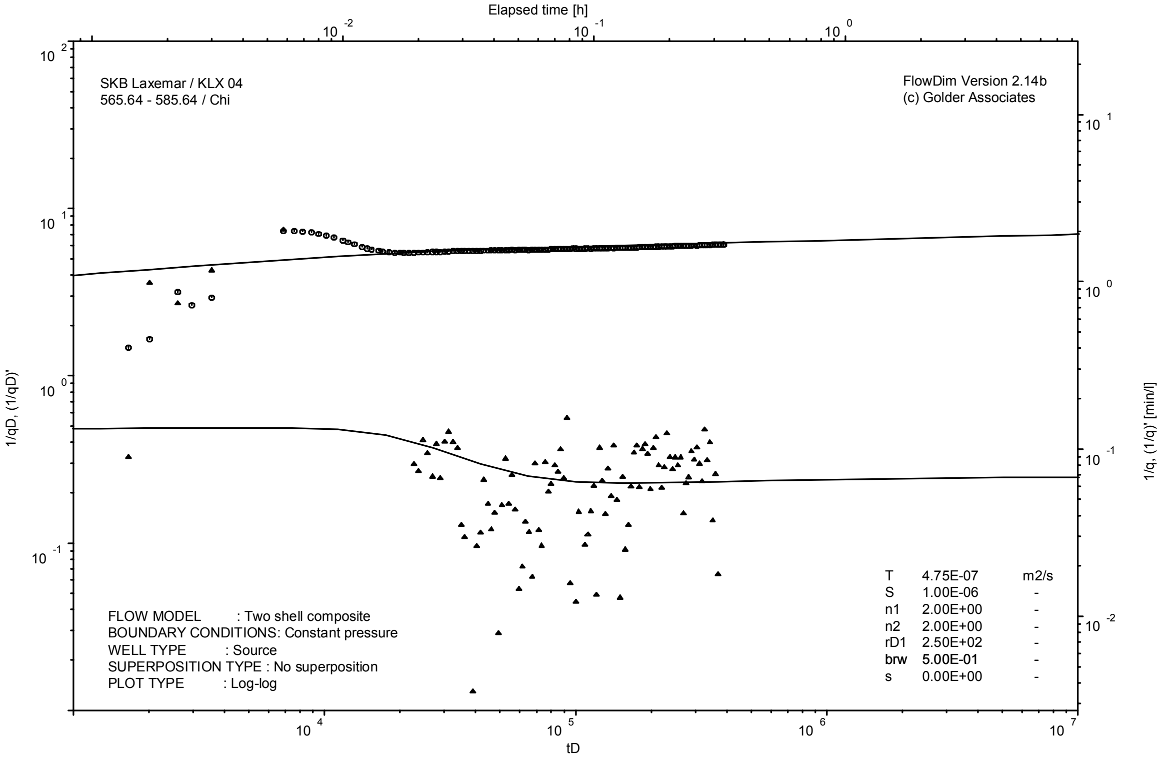
Analysis diagrams



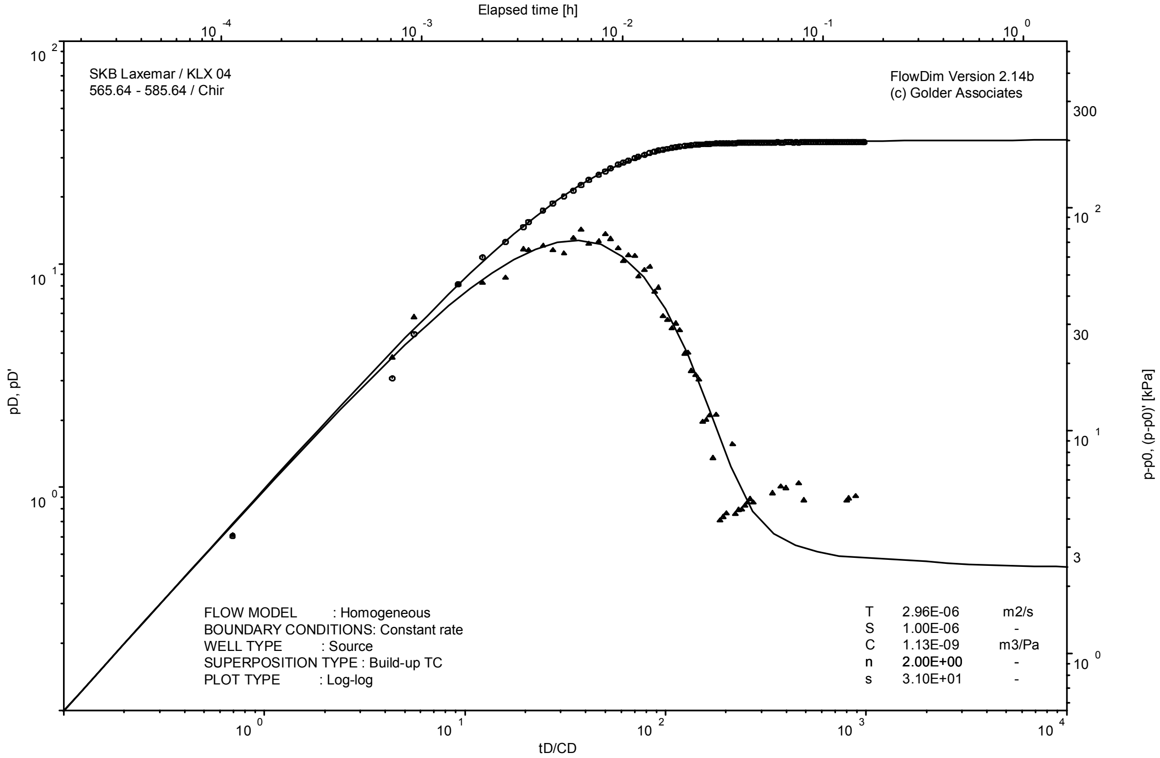
Pressure and flow rate vs. time; cartesian plot



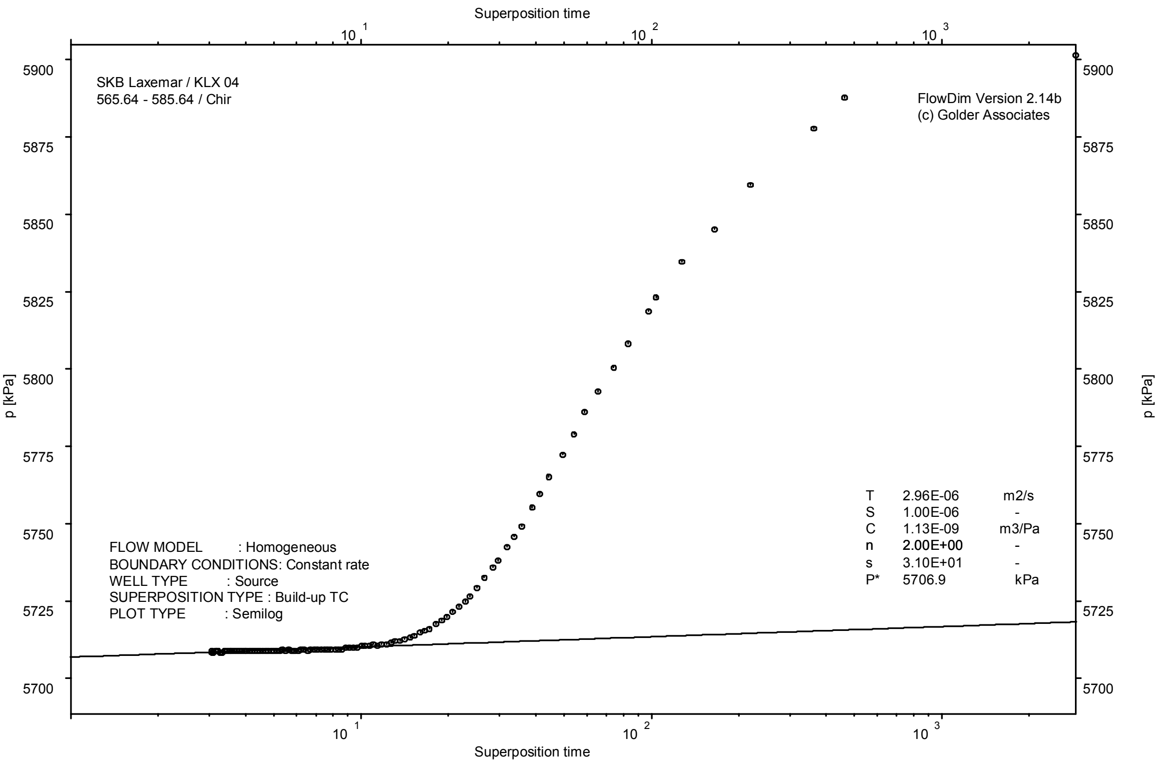
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

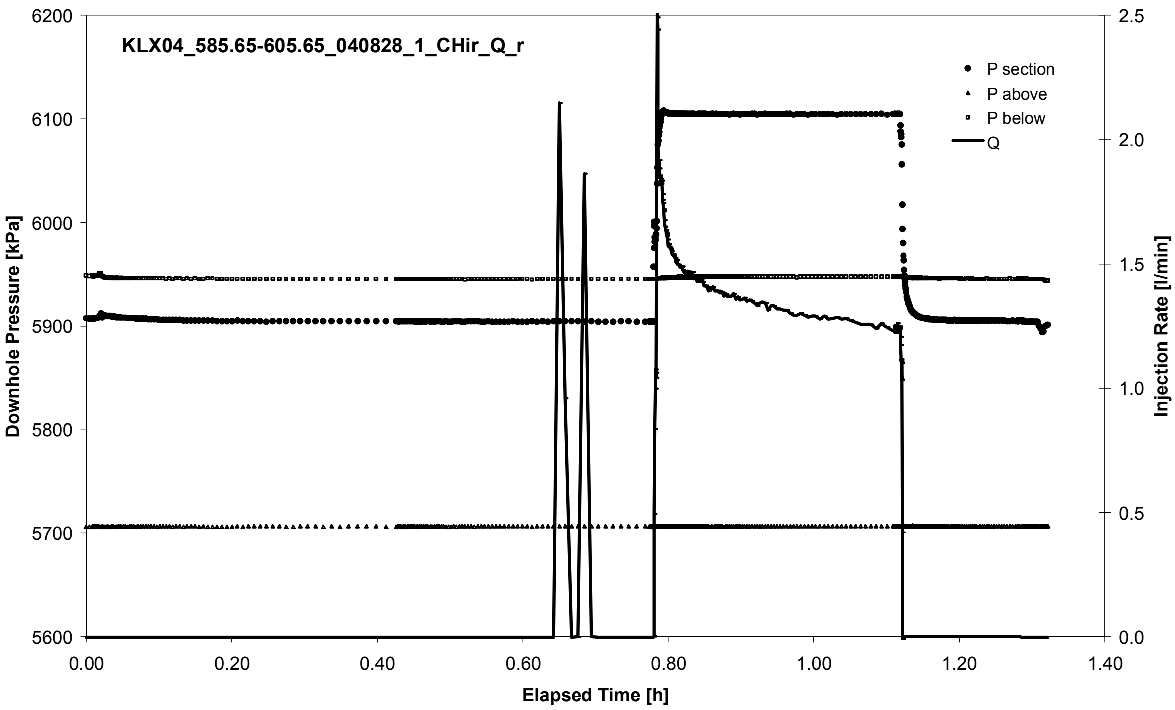


CHIR phase; HORNER match

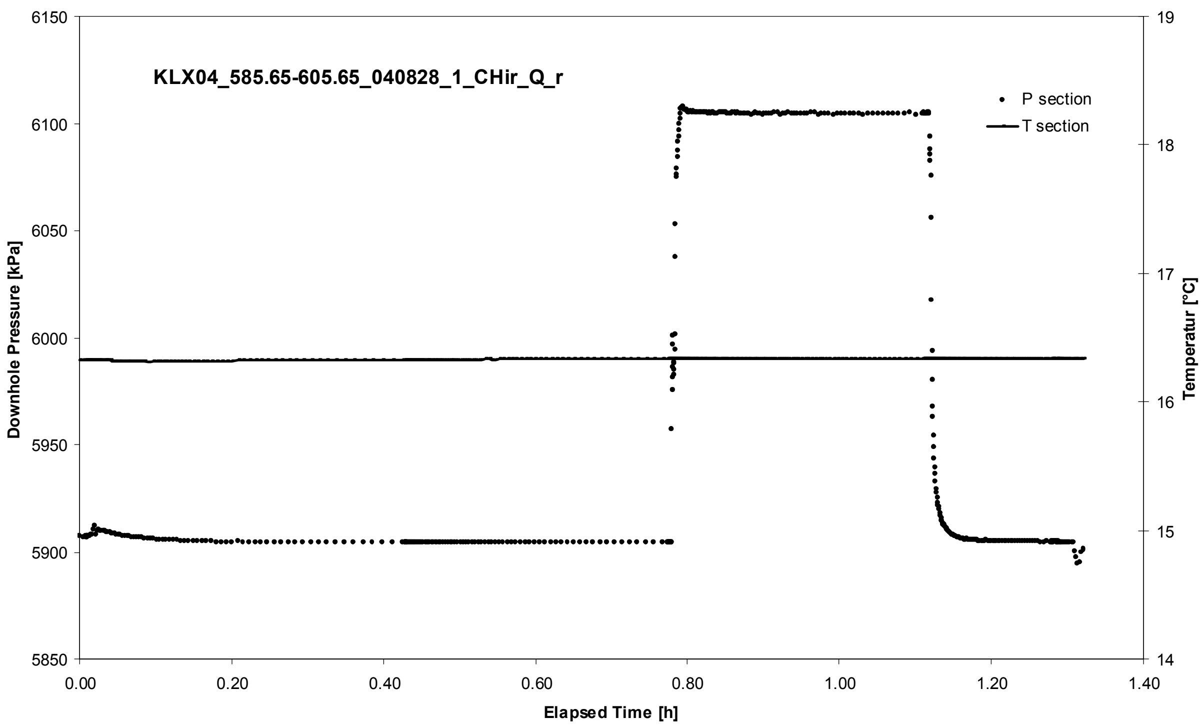
APPENDIX 2-34

Test 585.65 – 605.65 m

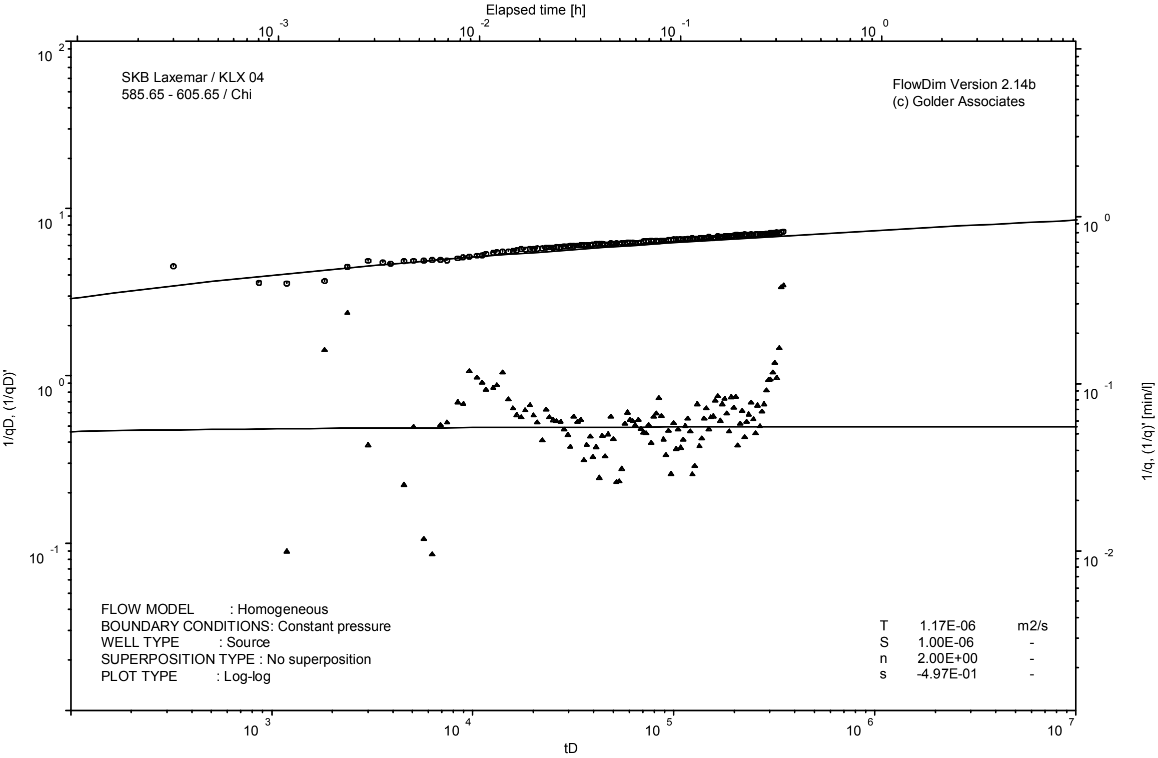
Analysis diagrams



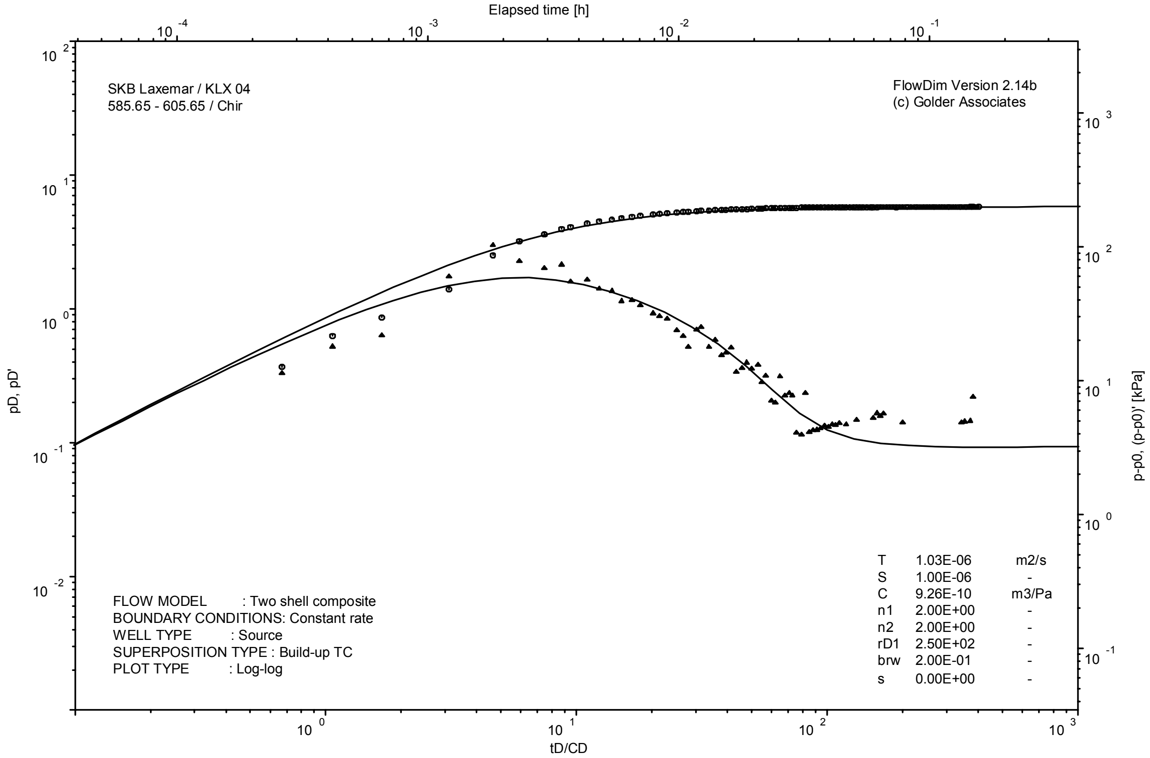
Pressure and flow rate vs. time; cartesian plot



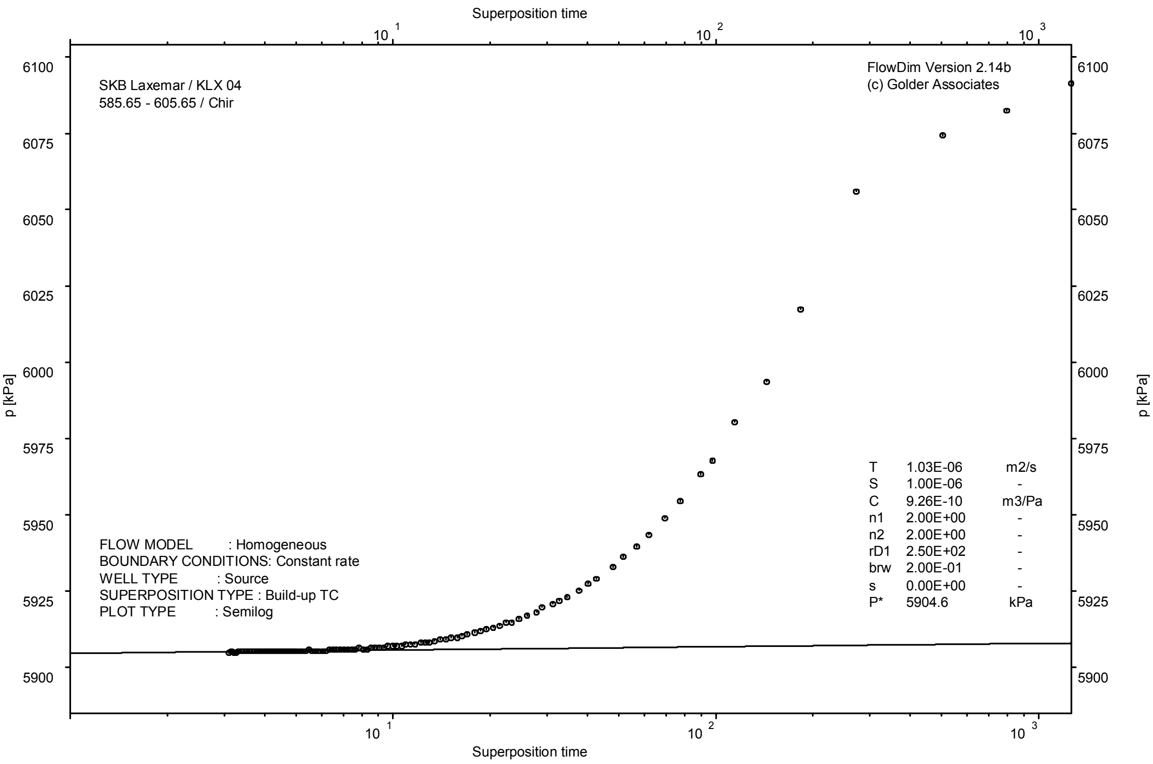
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

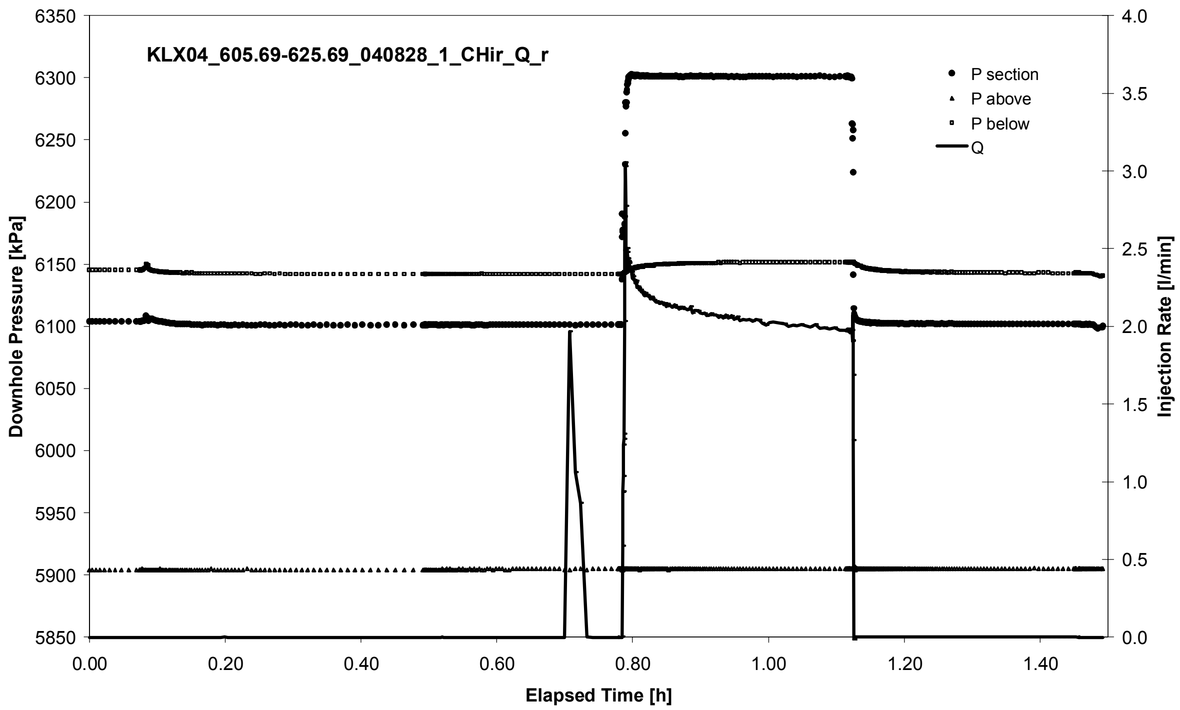


CHIR phase; HORNER match

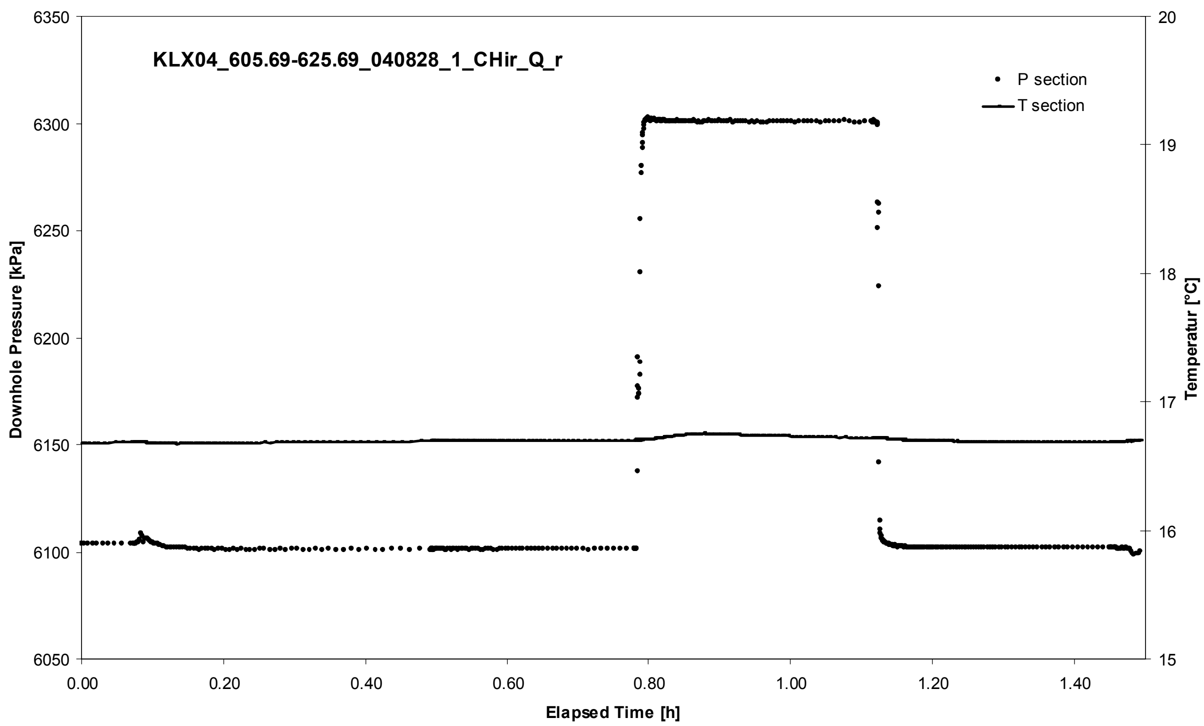
APPENDIX 2-35

Test 605.69 – 625.69 m

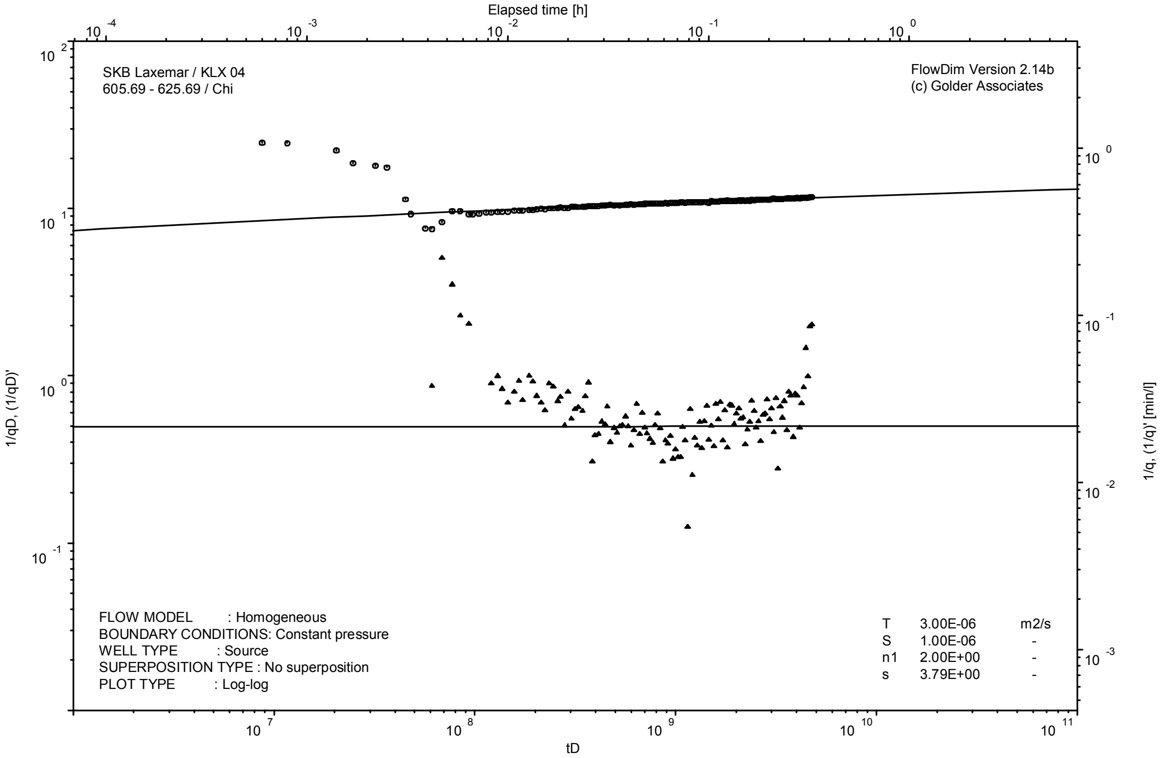
Analysis diagrams



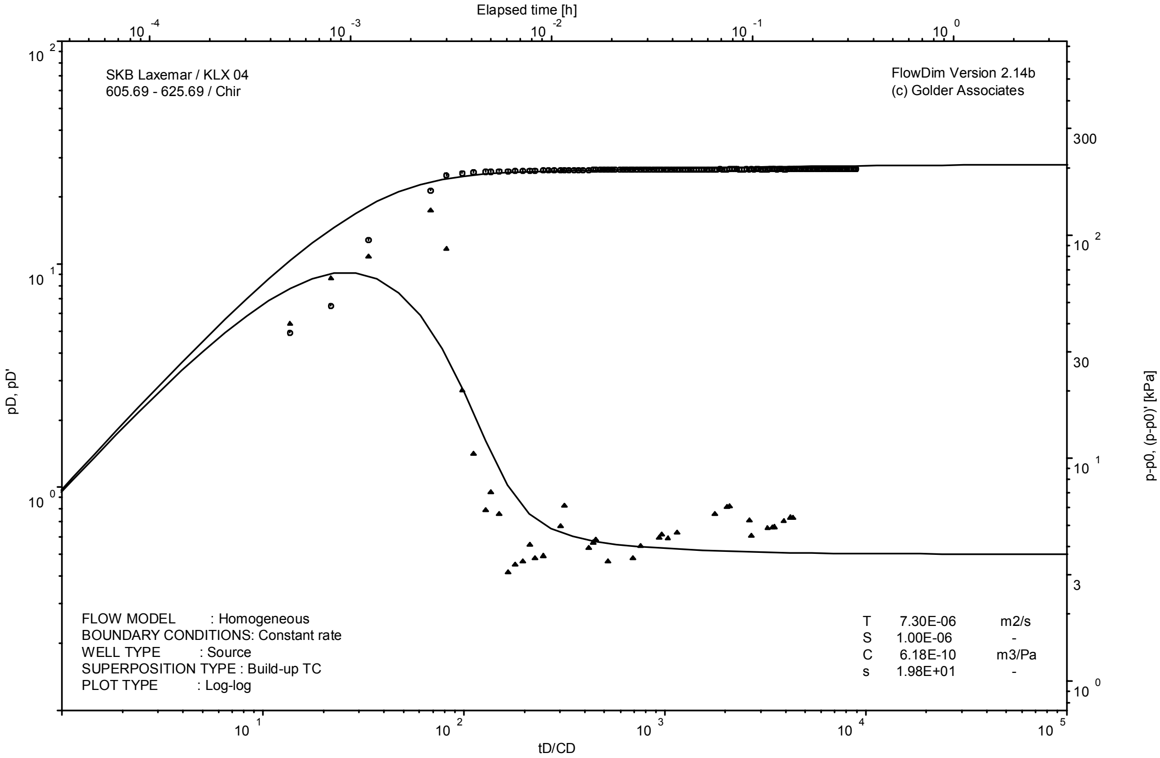
Pressure and flow rate vs. time; cartesian plot



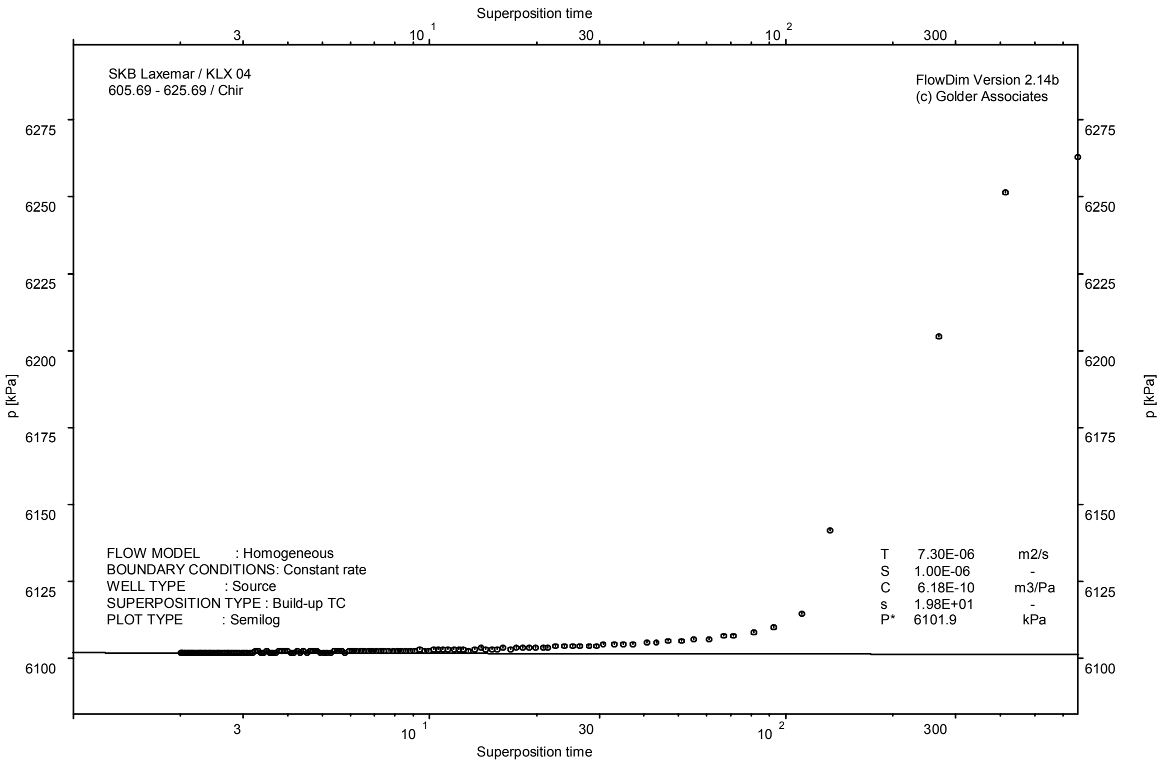
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

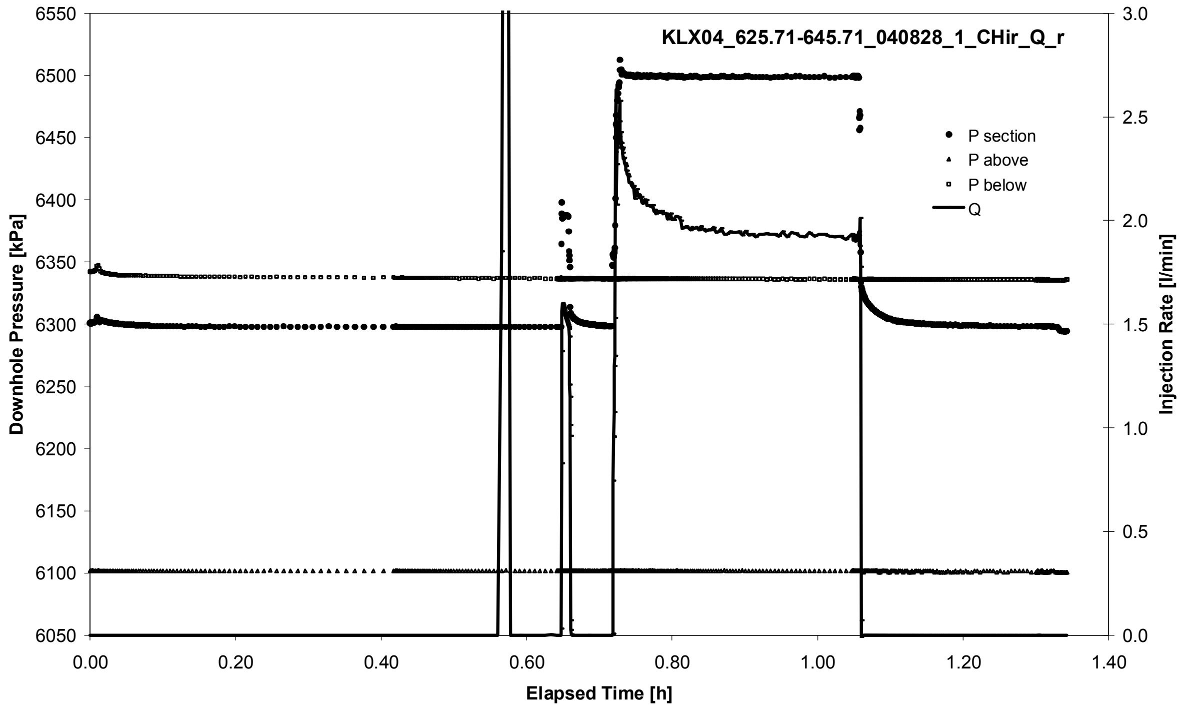


CHIR phase; HORNER match

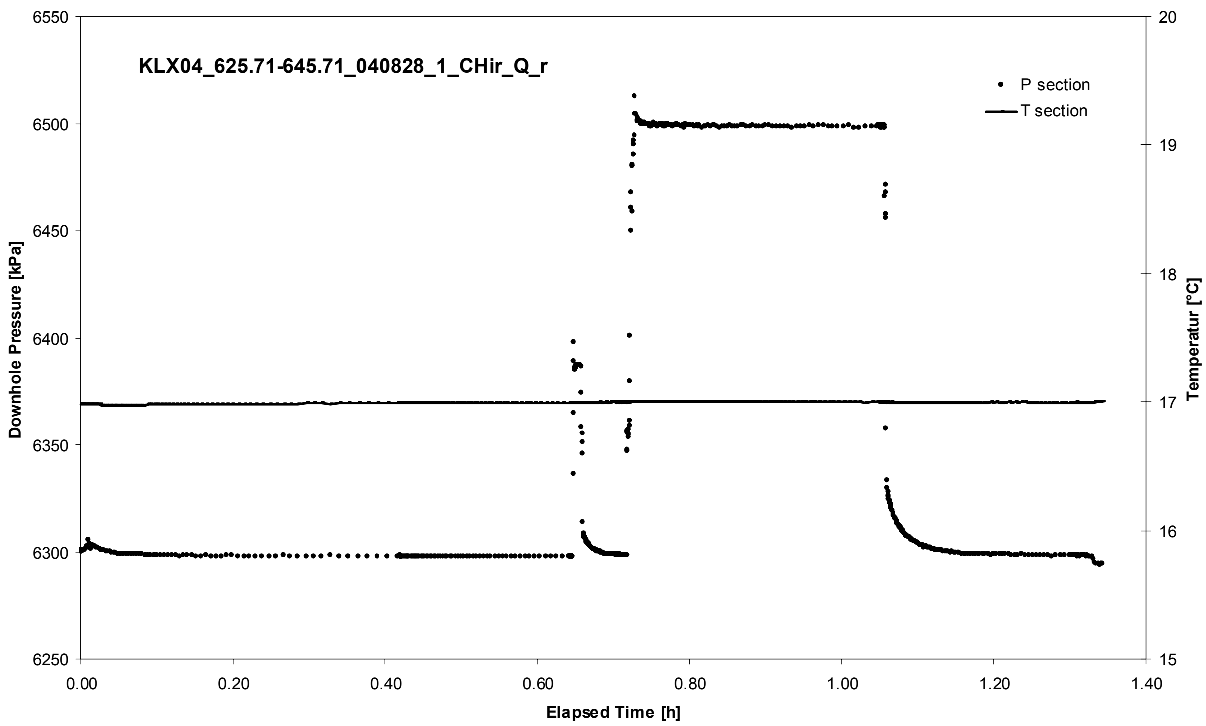
APPENDIX 2-36

Test 625.71 – 645.71 m

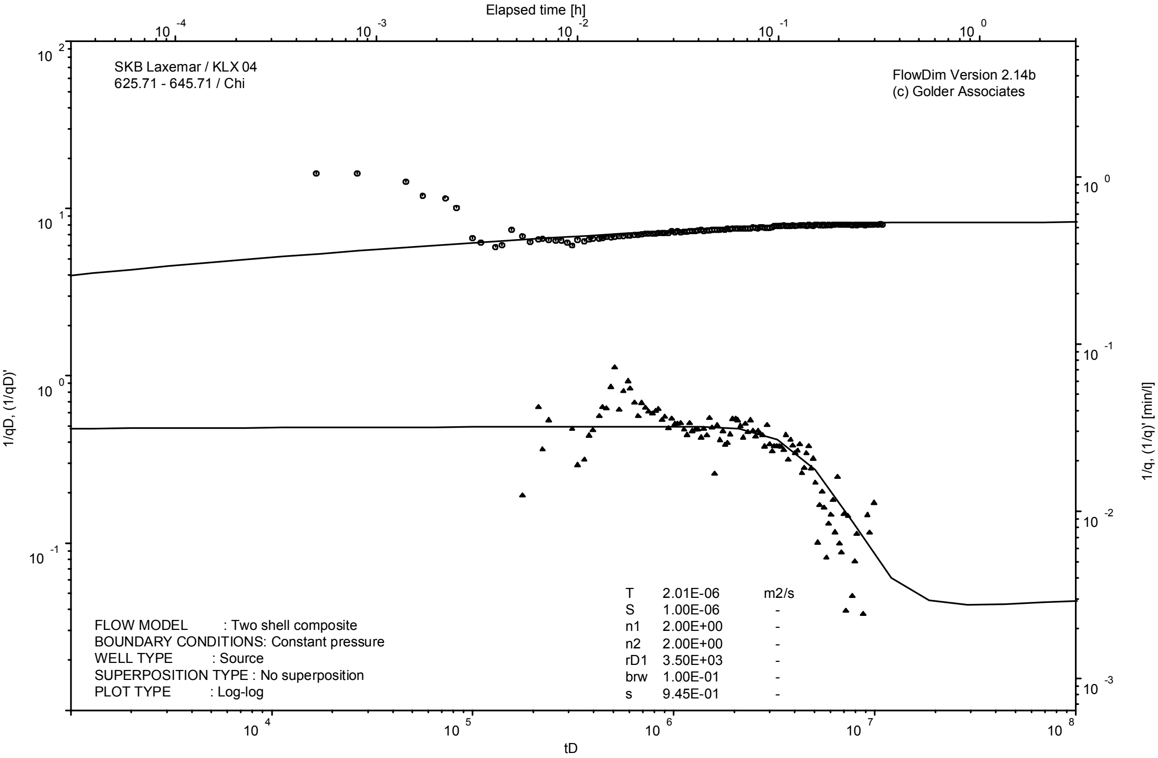
Analysis diagrams



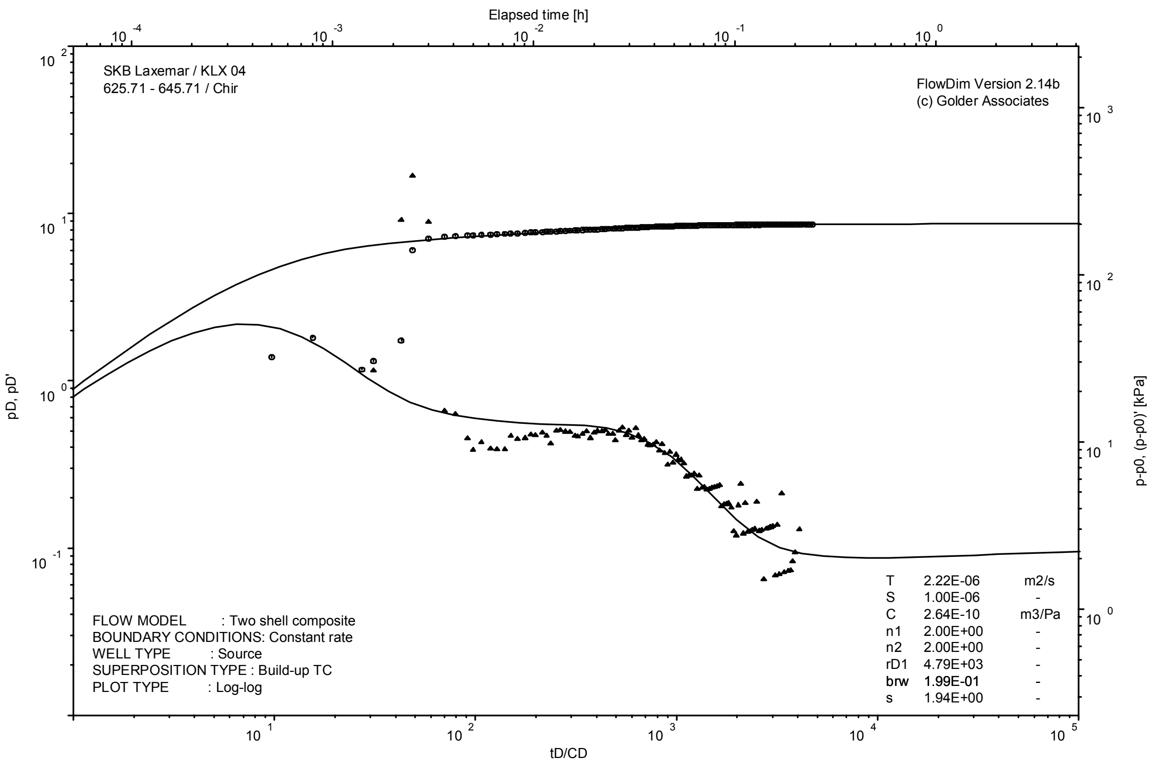
Pressure and flow rate vs. time; cartesian plot



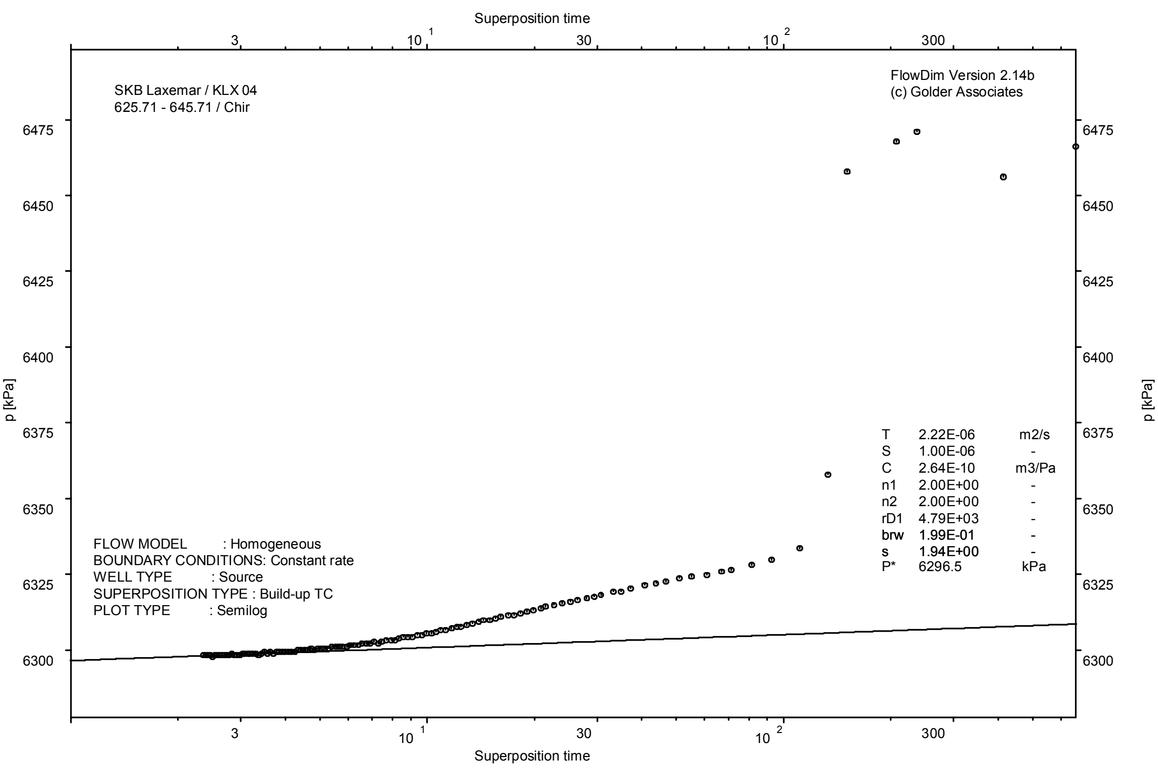
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

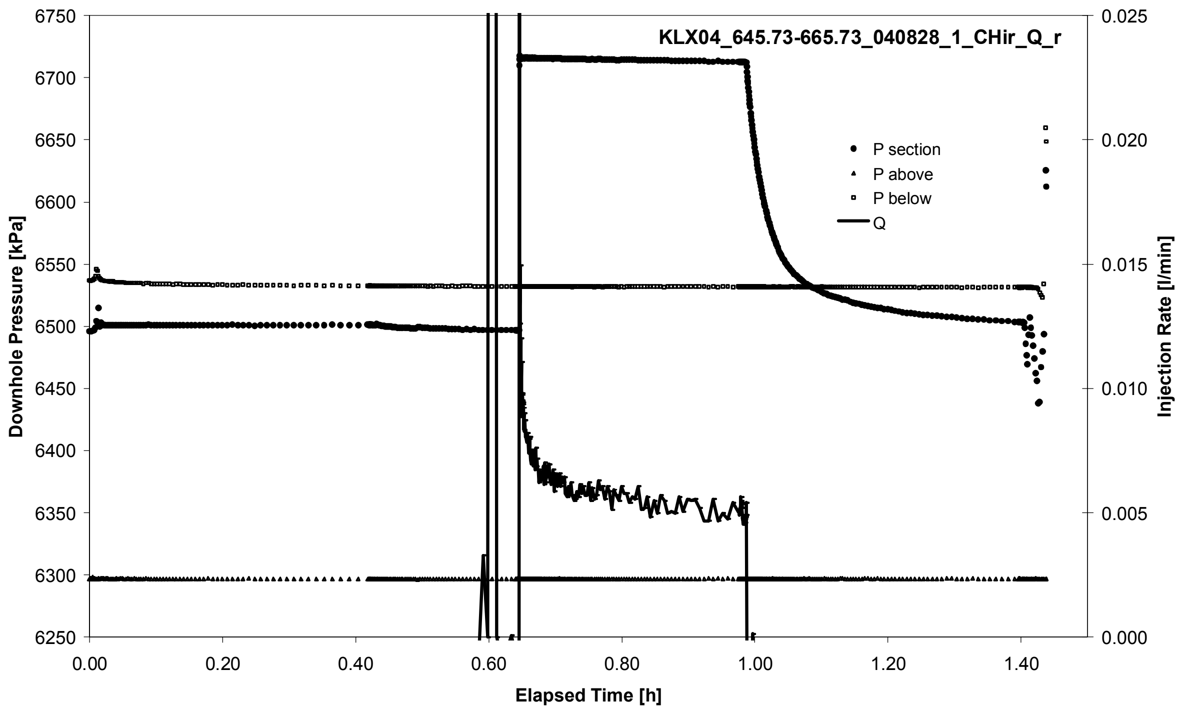


CHIR phase; HORNER match

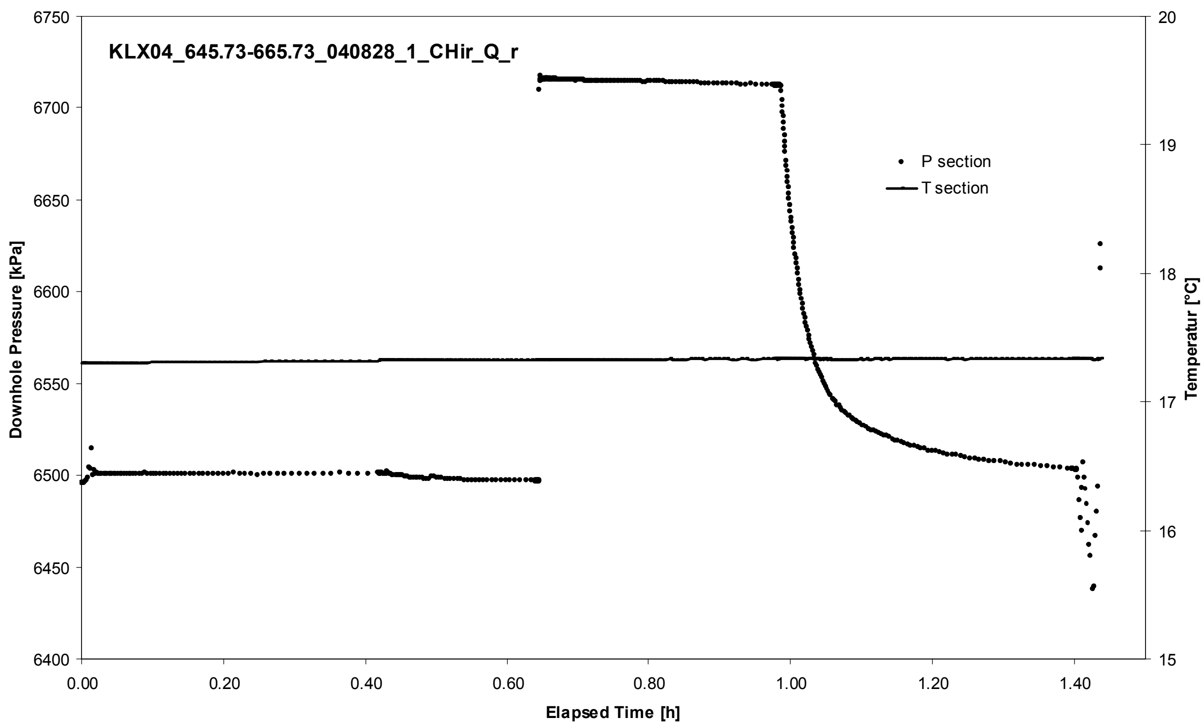
APPENDIX 2-37

Test 645.73 – 665.73 m

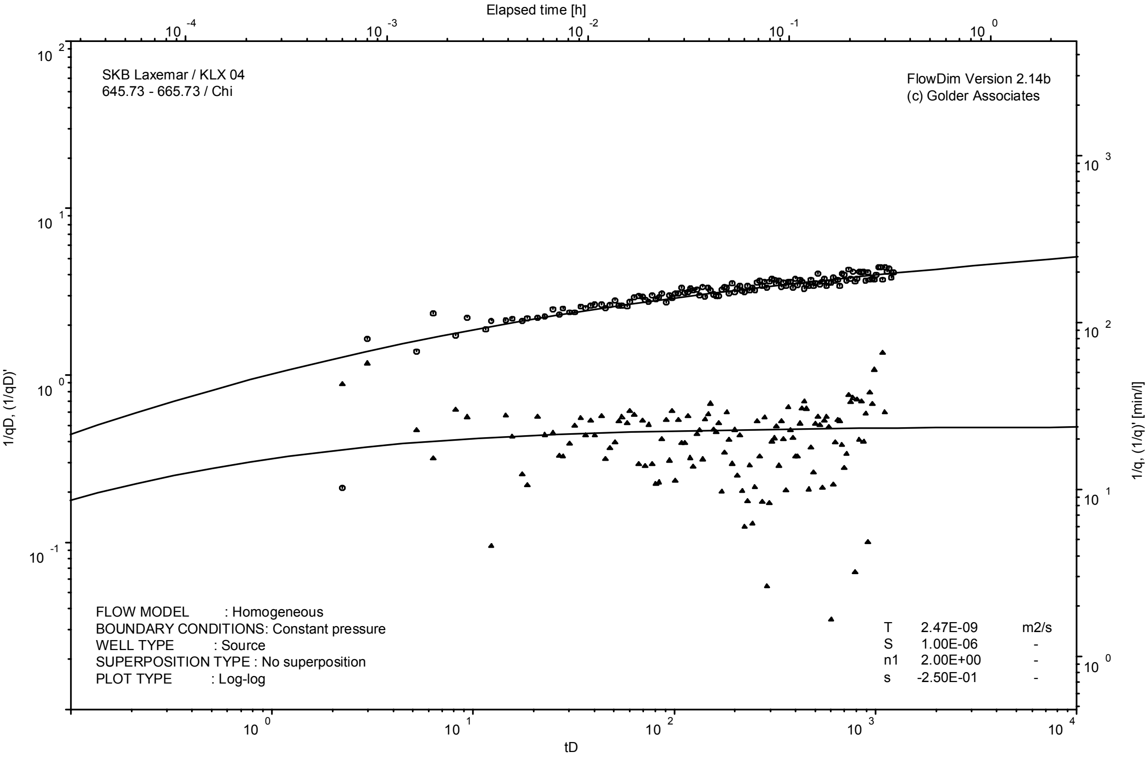
Analysis diagrams



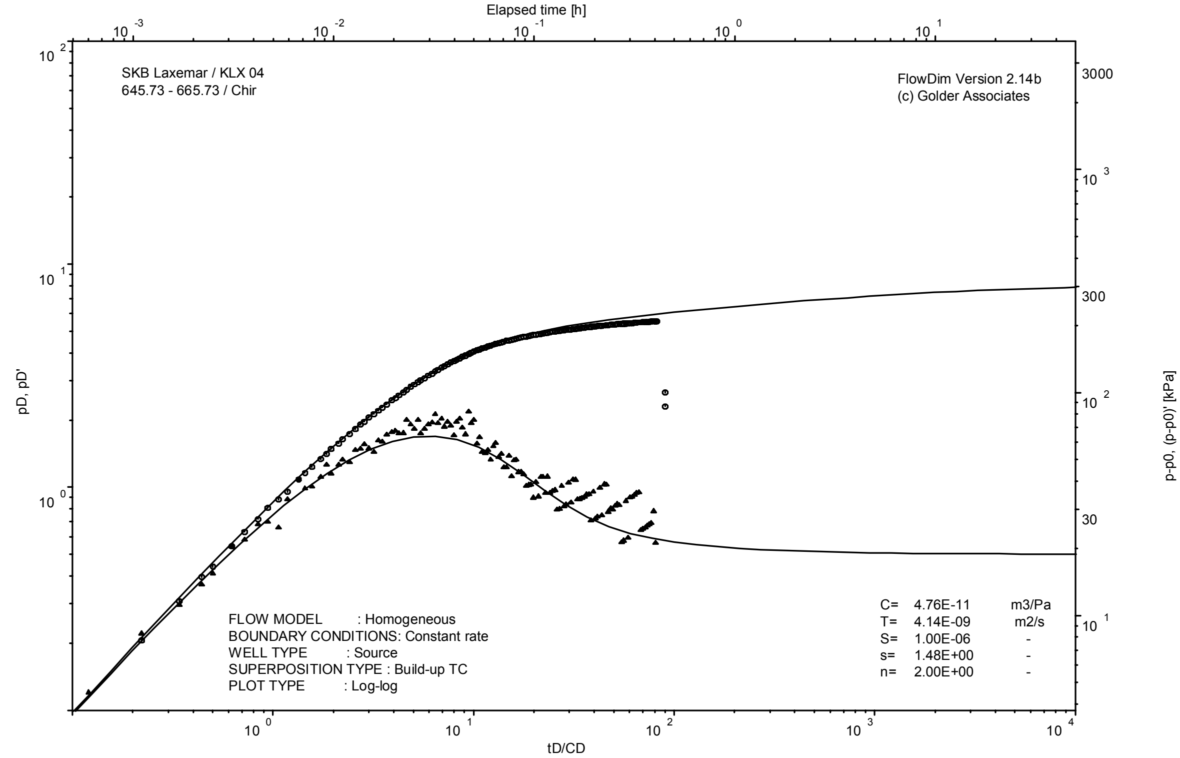
Pressure and flow rate vs. time; cartesian plot



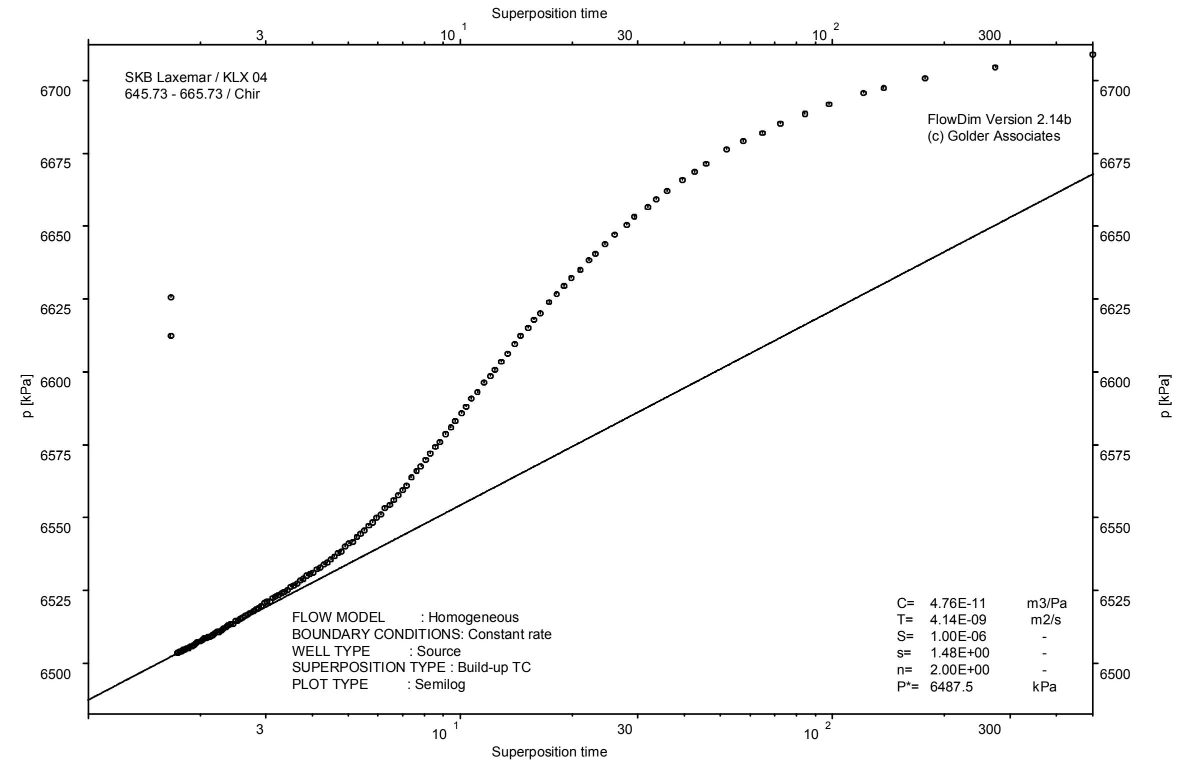
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

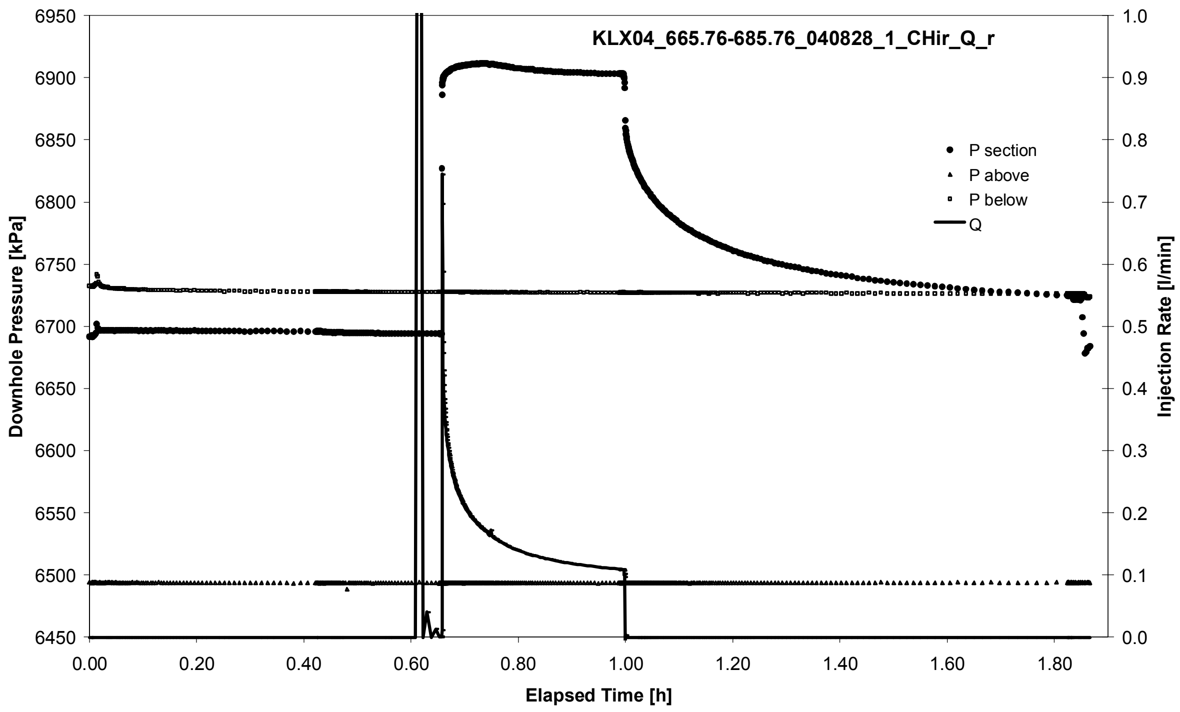


CHIR phase; HORNER match

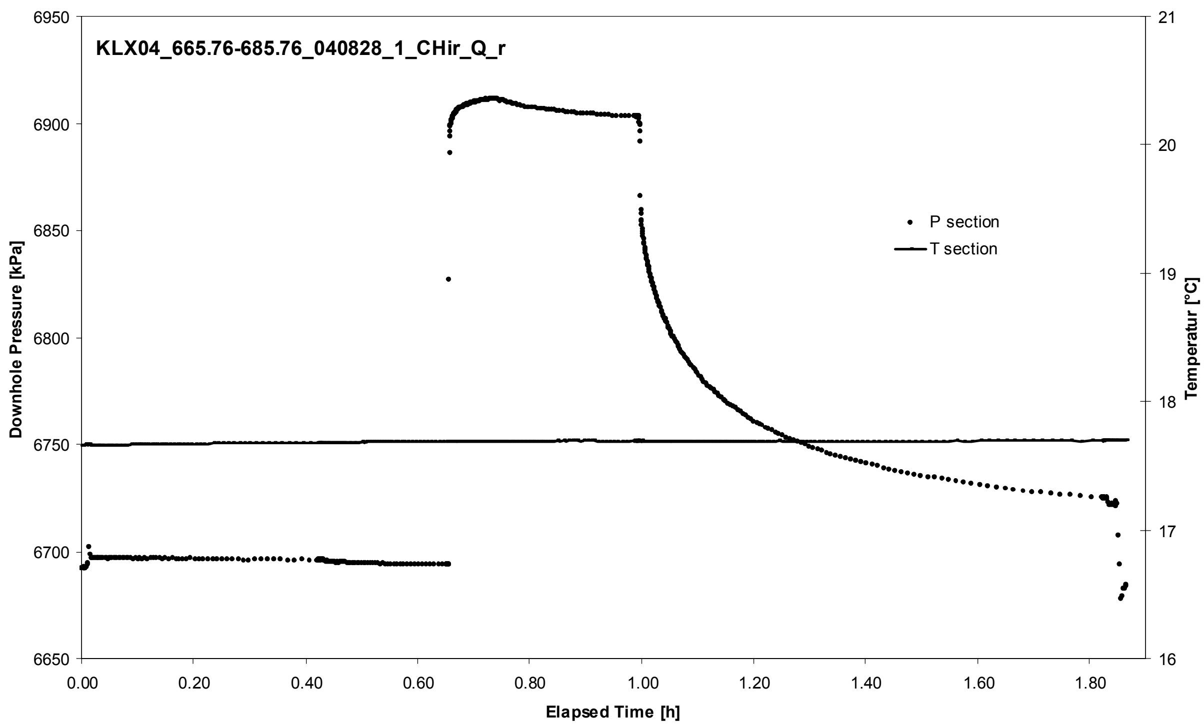
APPENDIX 2-38

Test 665.76 – 685.76 m

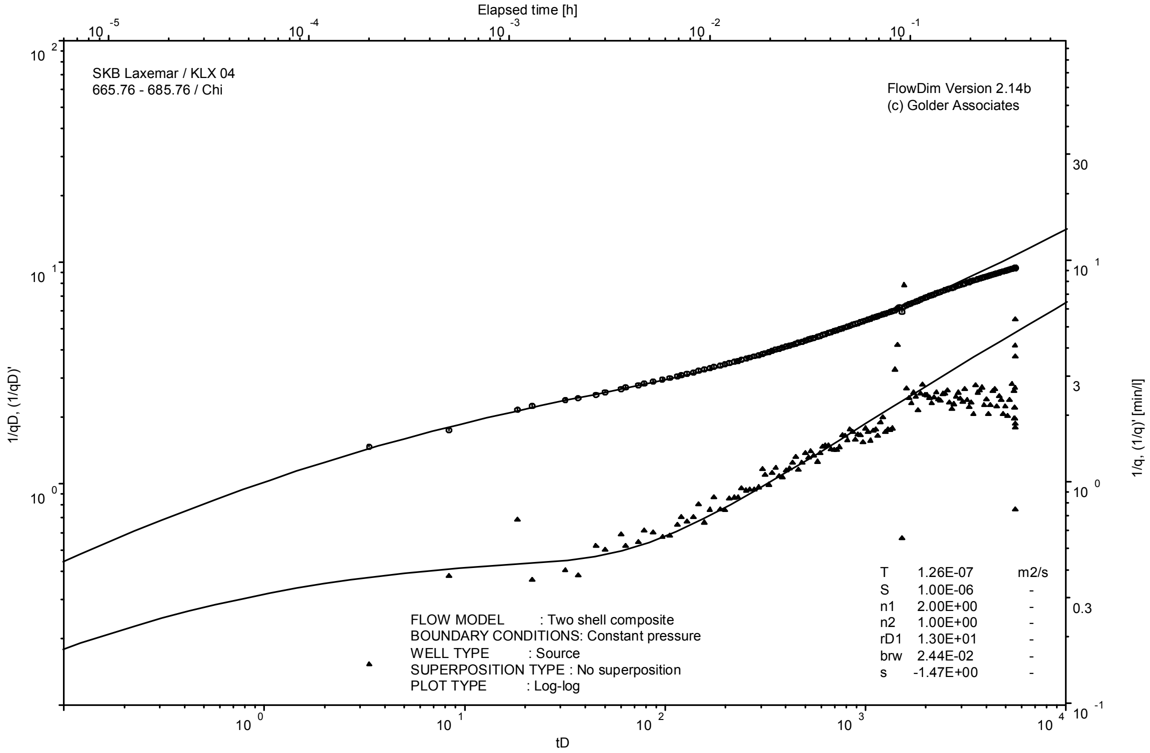
Analysis diagrams



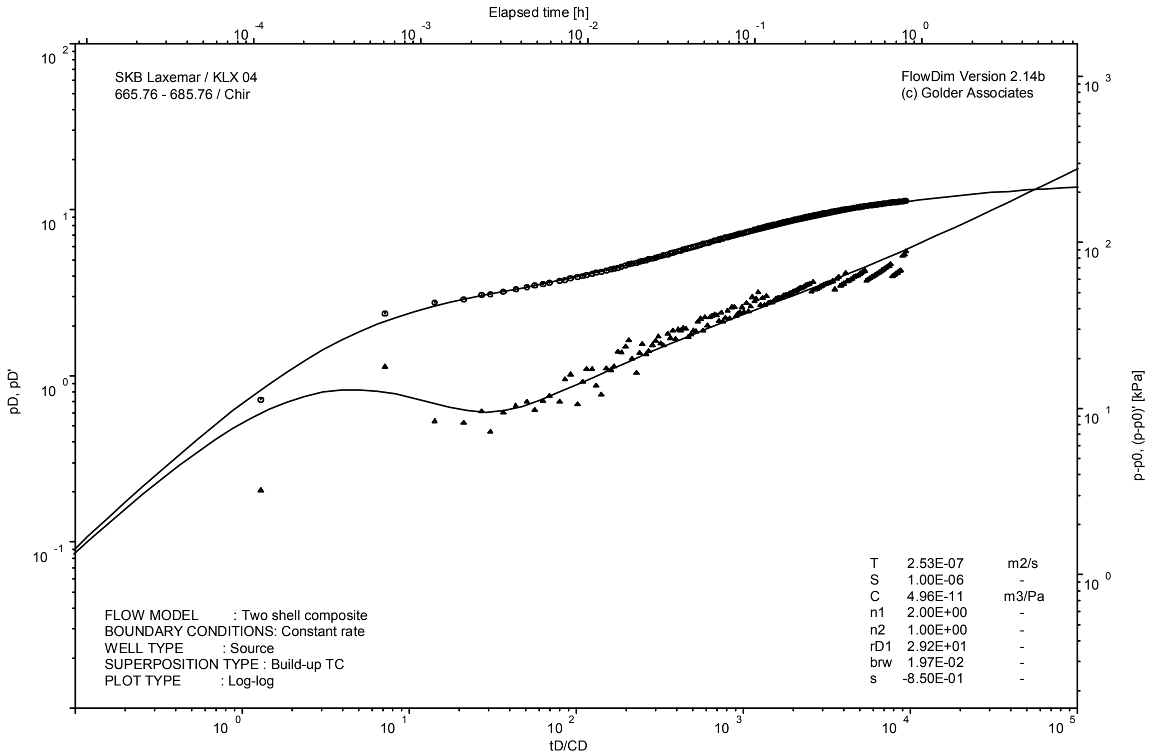
Pressure and flow rate vs. time; cartesian plot



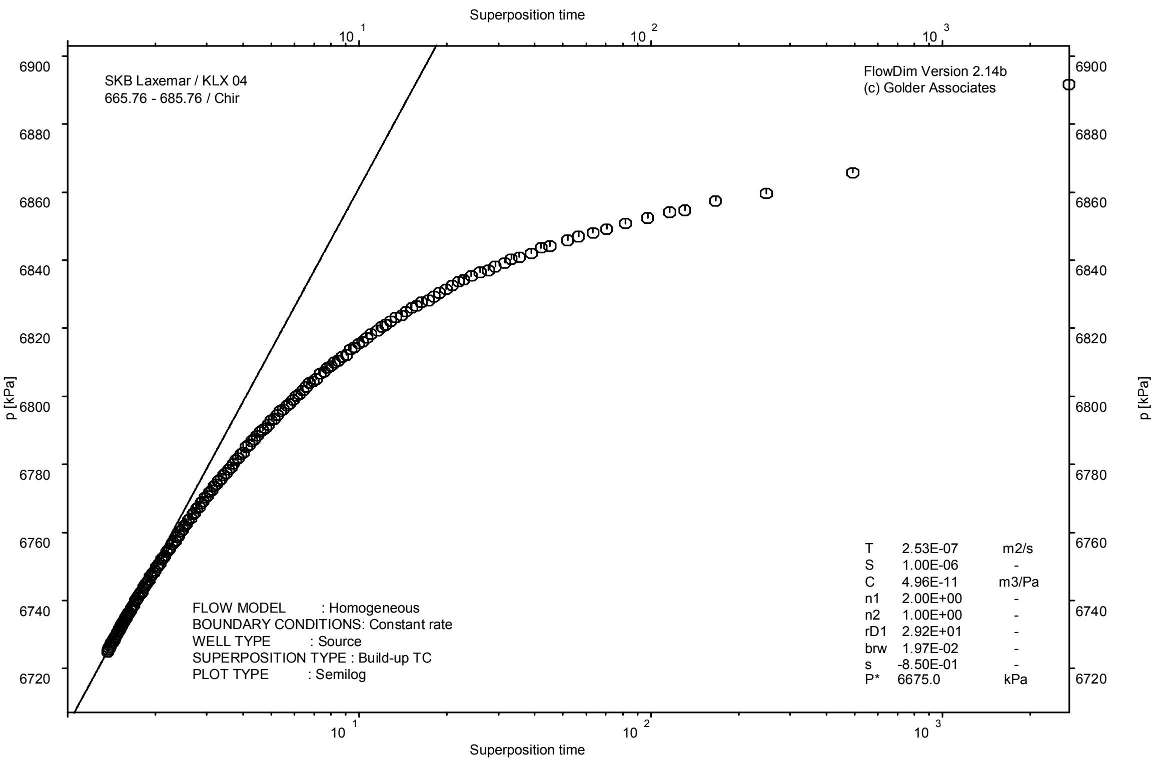
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

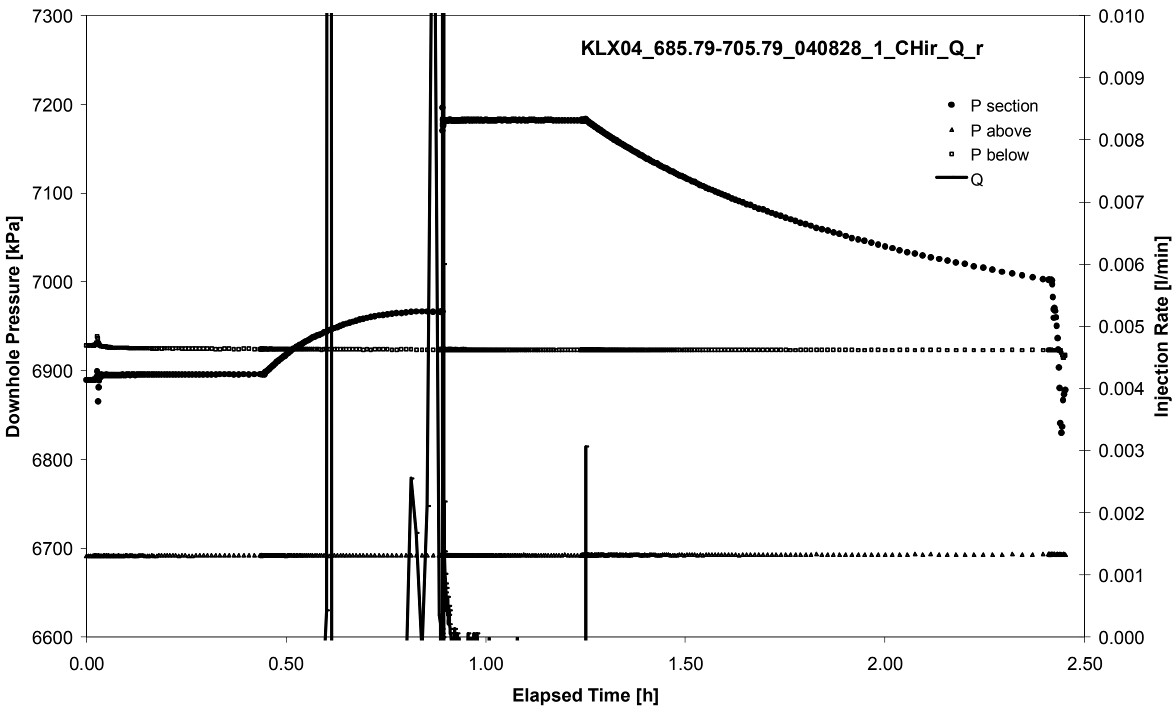


CHIR phase; HORNER match

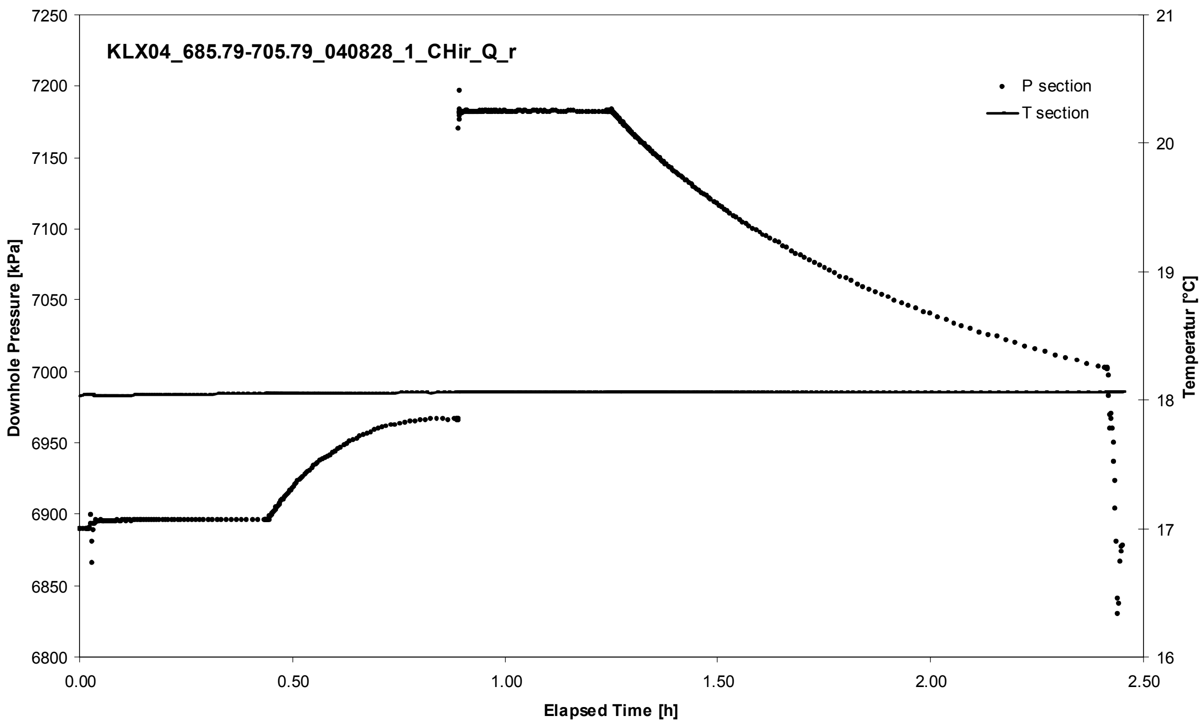
APPENDIX 2-39

Test 685.79 – 705.79 m

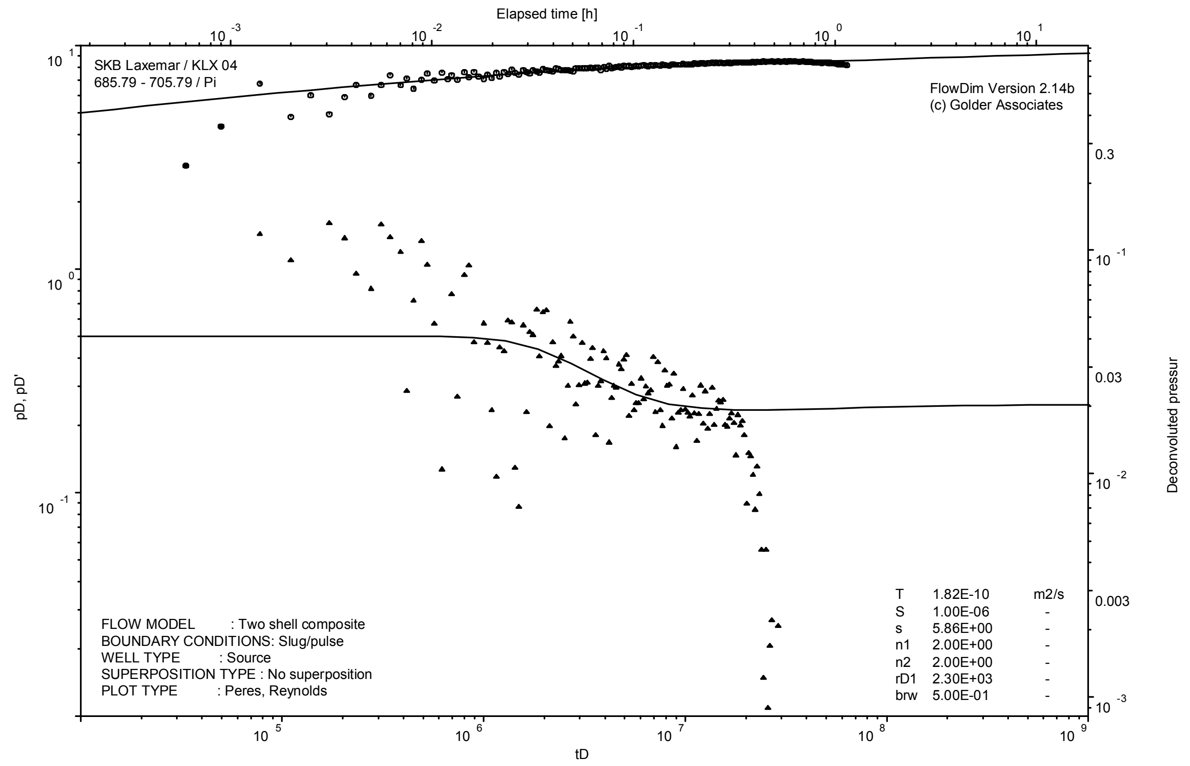
Analysis diagrams



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot

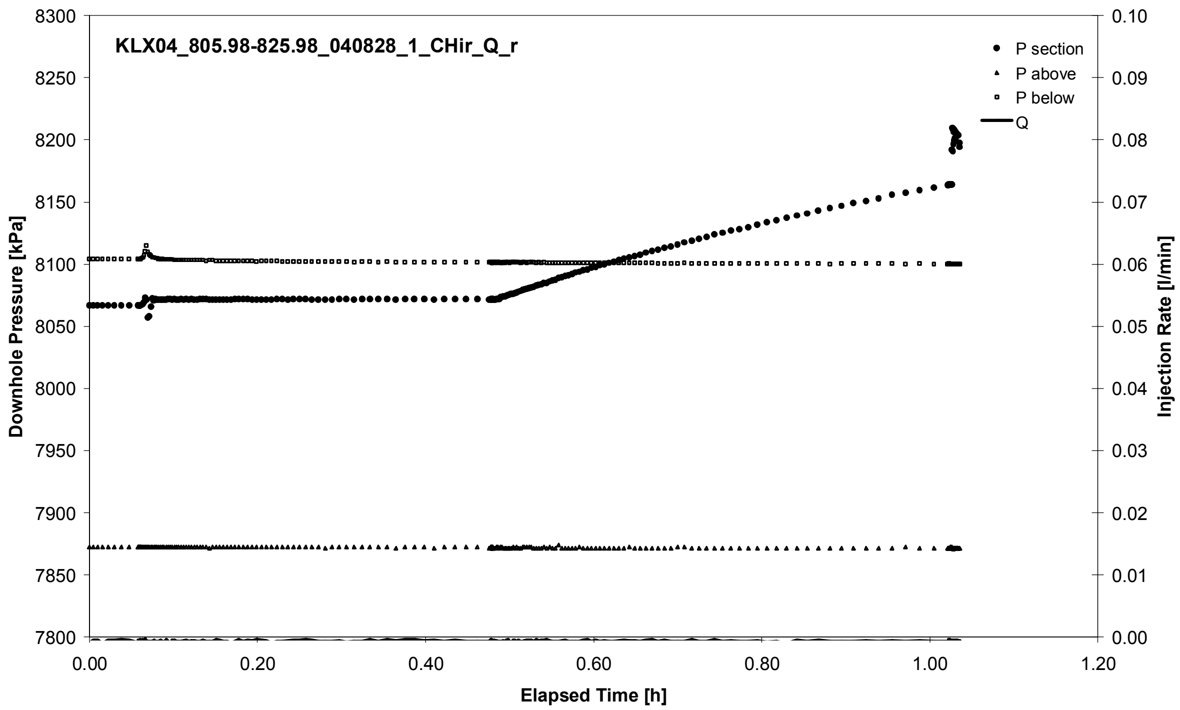


CHIR phase analysed as pulse injection; deconvolution match

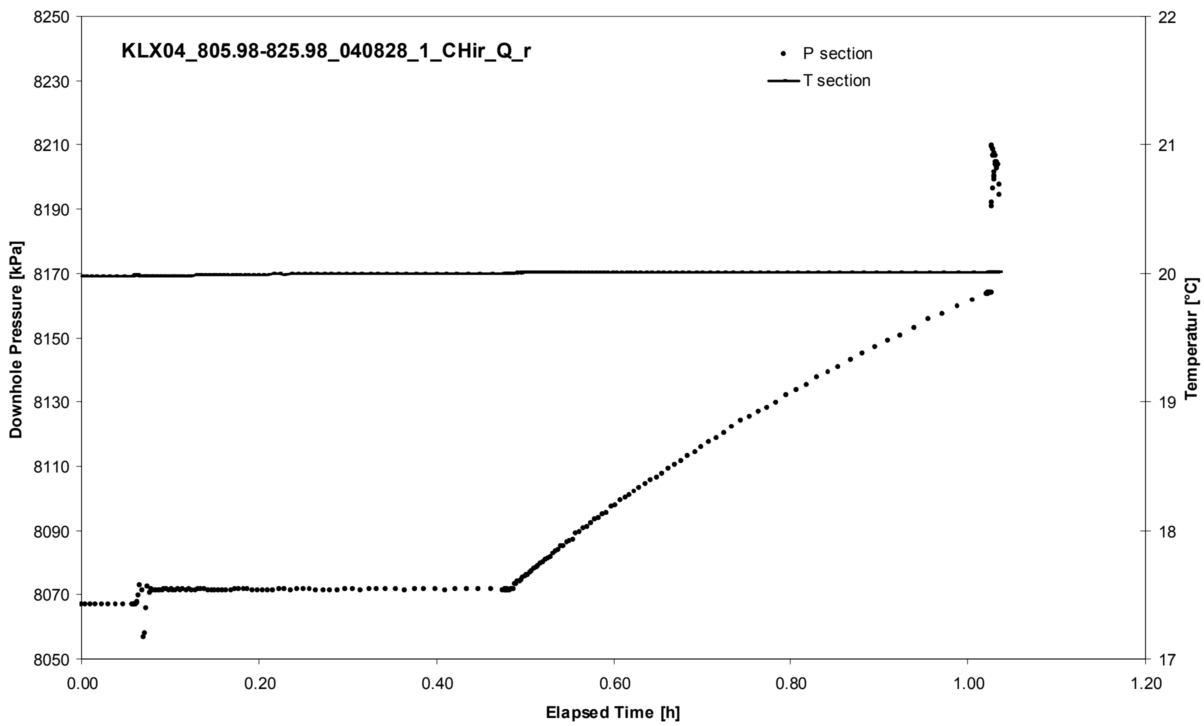
APPENDIX 2-40

Test 805.98 – 825.98 m

Analysis diagrams



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot

Not Analysed

CHI phase; log-log match

Not Analysed

CHIR phase; log-log match

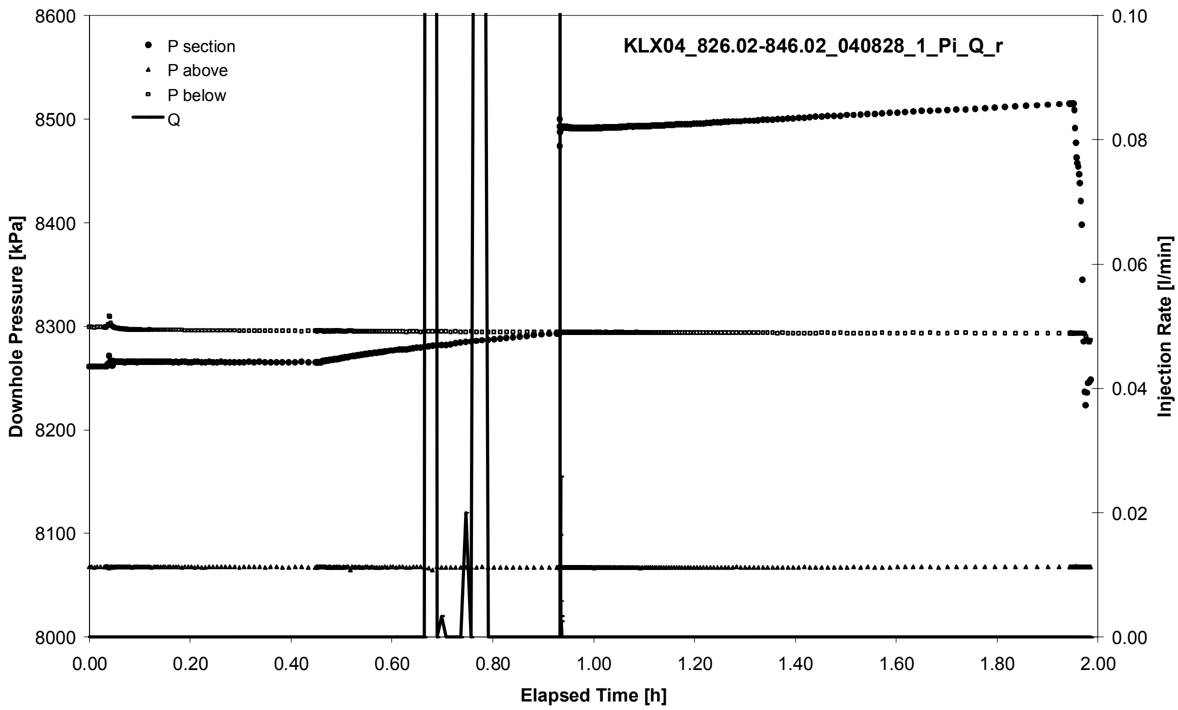
Not Analysed

CHIR phase; HORNER match

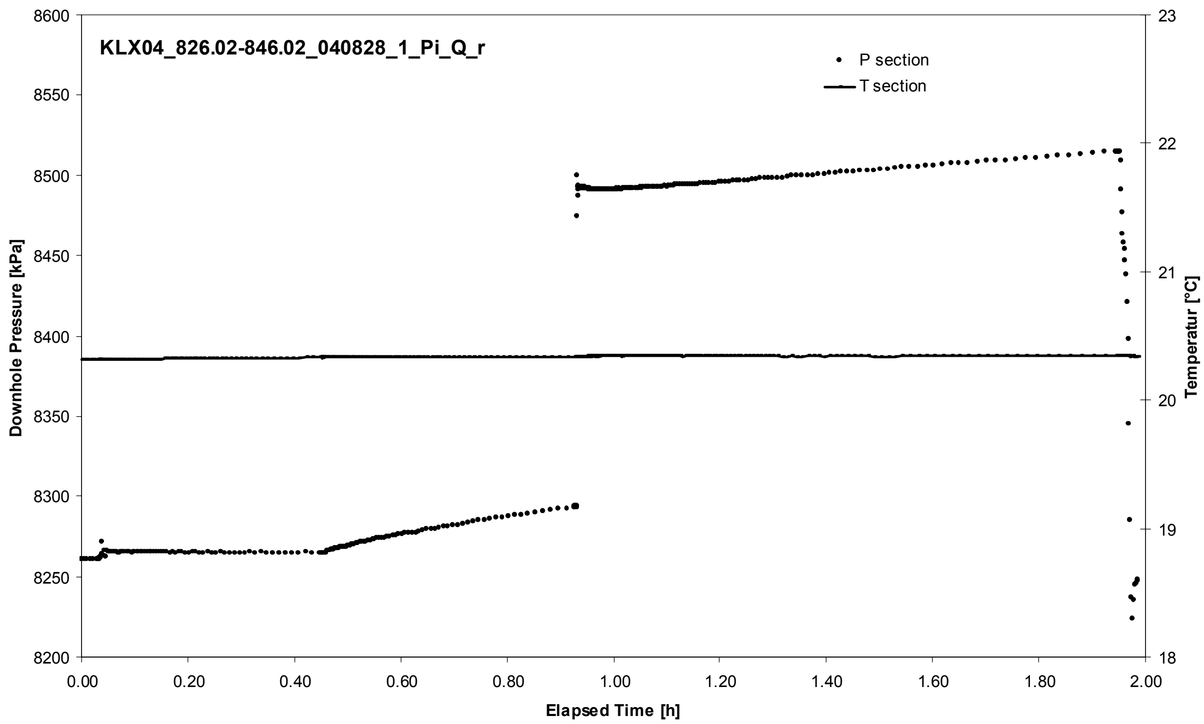
APPENDIX 2-41

Test 826.02 – 846.02 m

Analysis diagrams



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot

Not Analysed

CHI phase; log-log match

Not Analysed

CHIR phase; log-log match

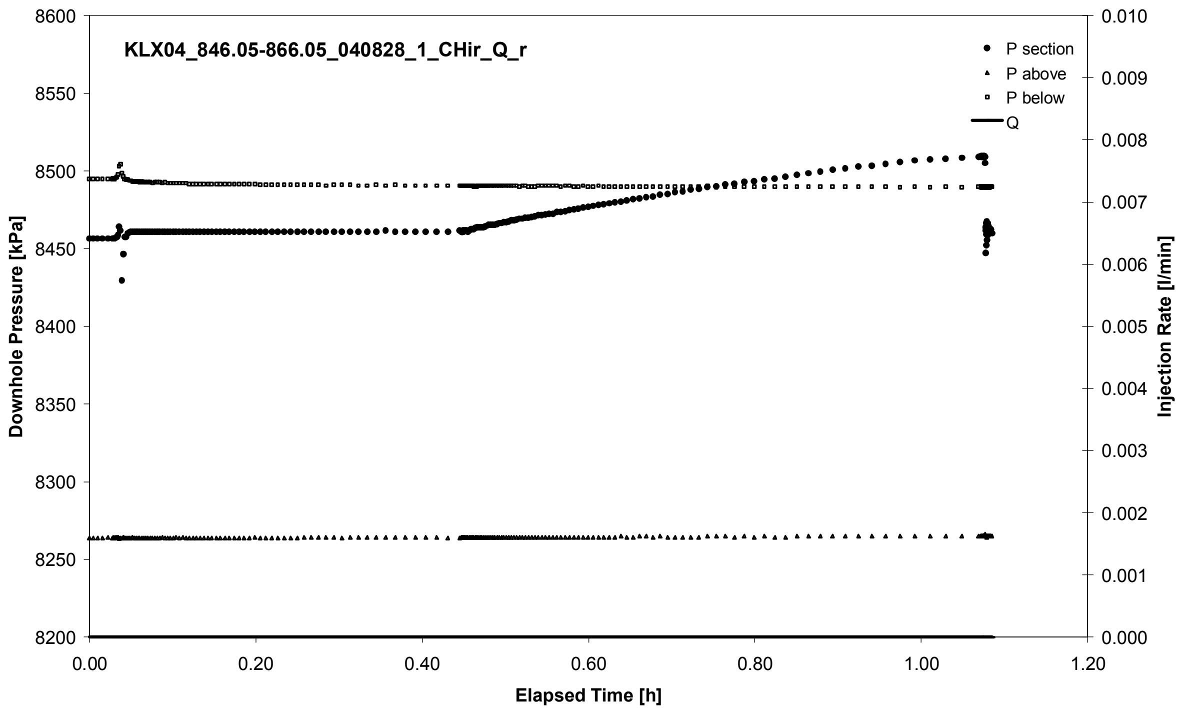
Not Analysed

CHIR phase; HORNER match

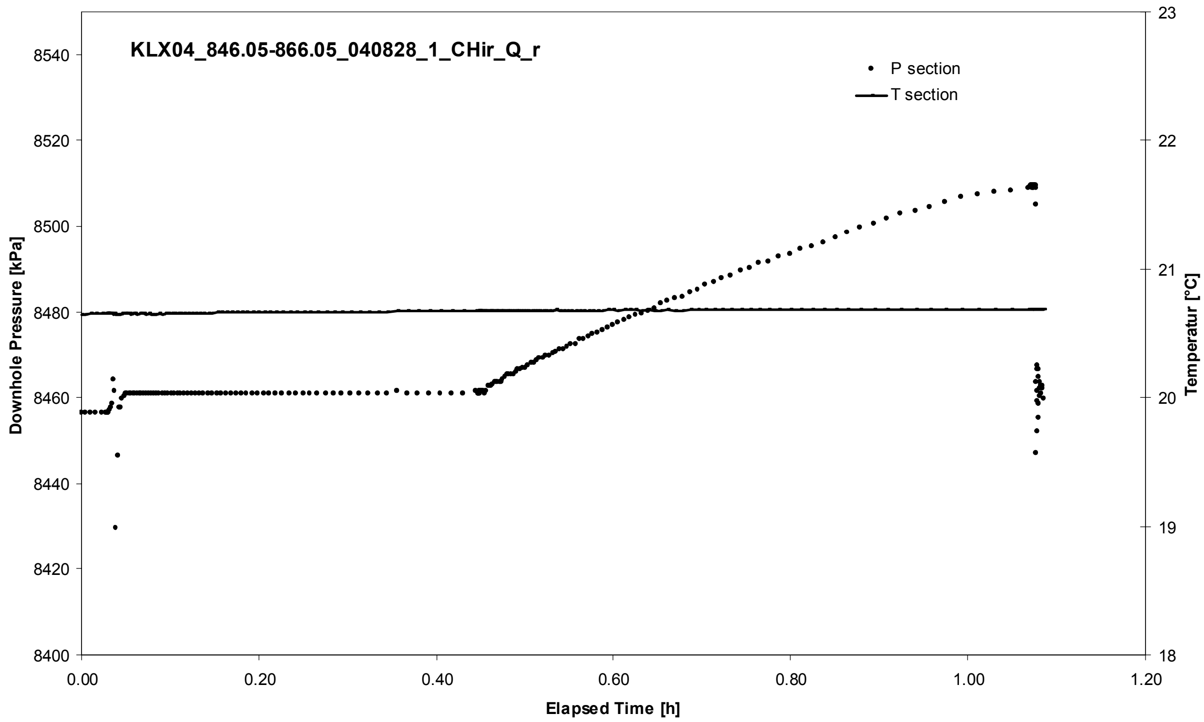
APPENDIX 2-42

Test 846.05 – 866.05 m

Analysis diagrams



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot

Not Analysed

CHI phase; log-log match

Not Analysed

CHIR phase; log-log match

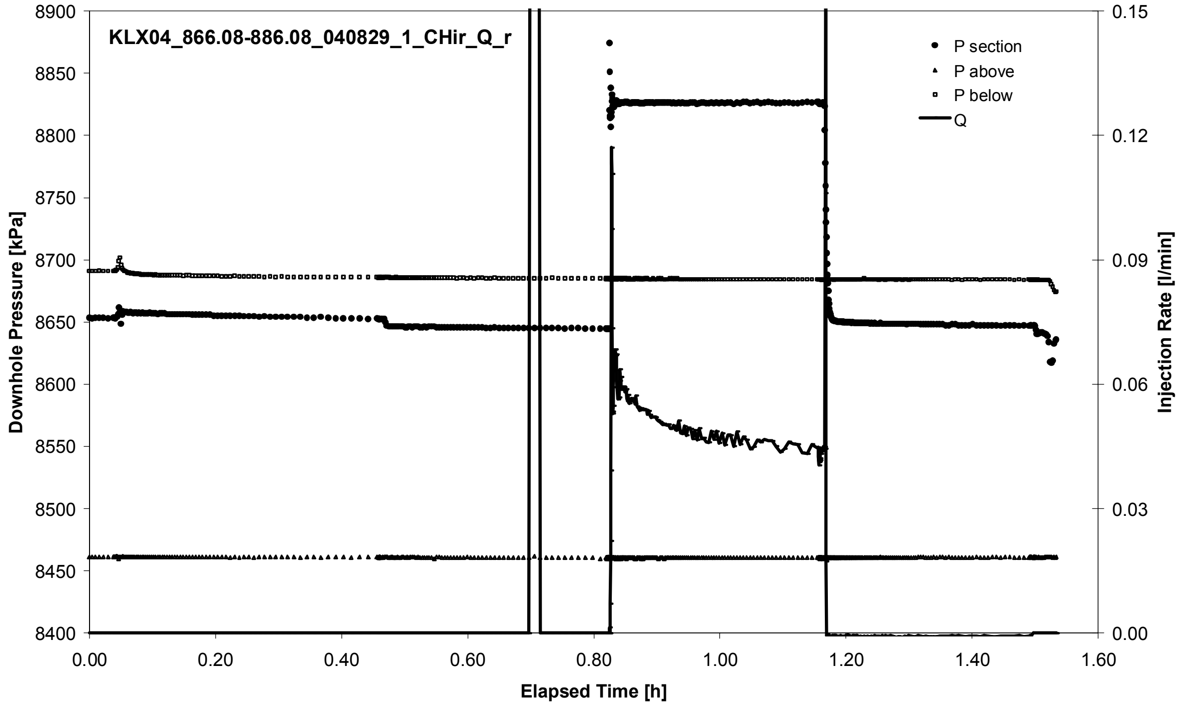
Not Analysed

CHIR phase; HORNER match

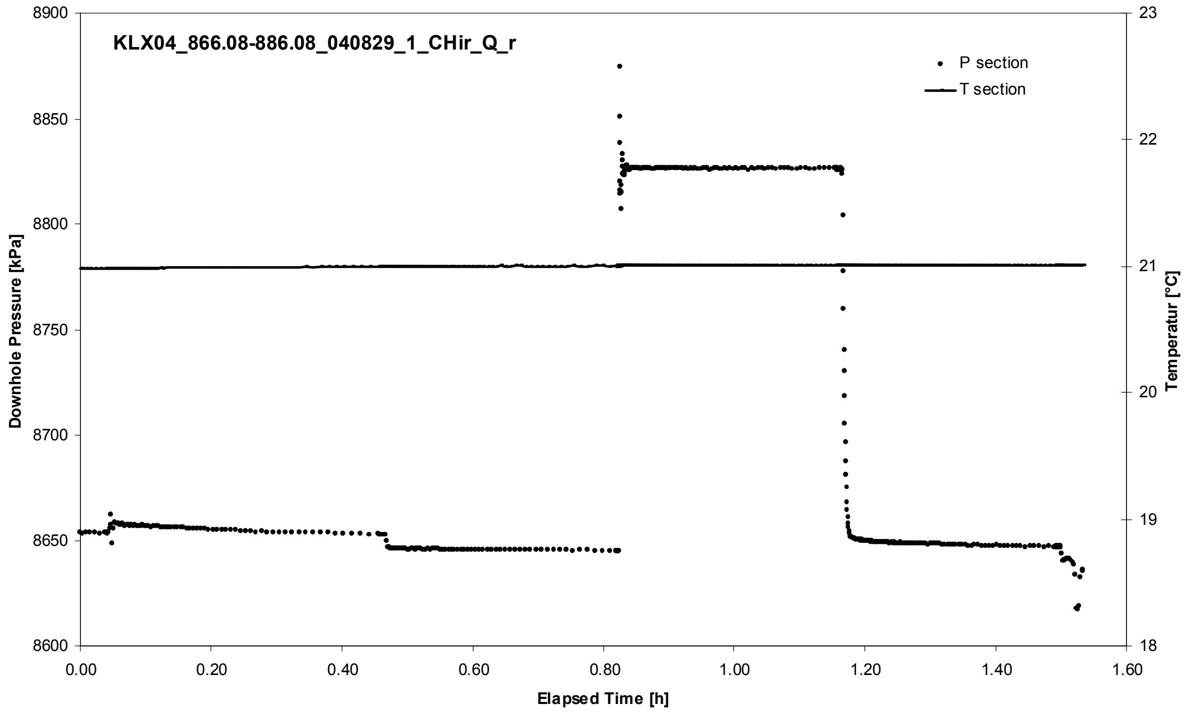
APPENDIX 2-43

Test 866.08 – 886.08 m

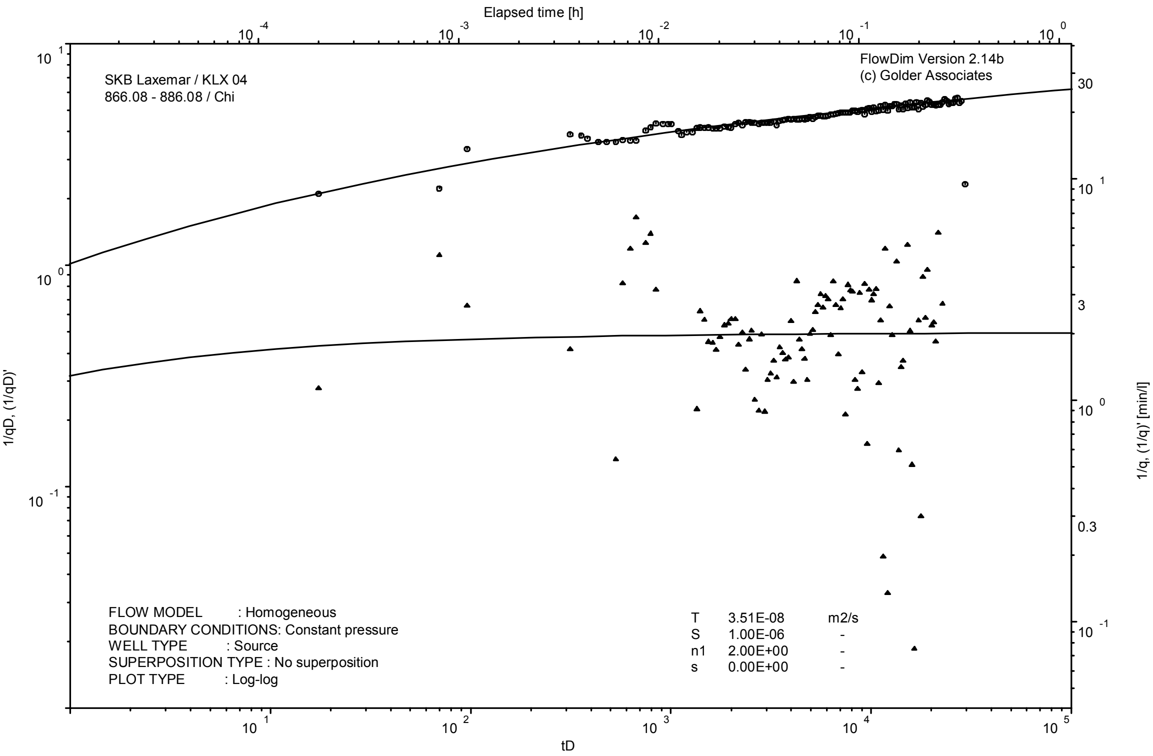
Analysis diagrams



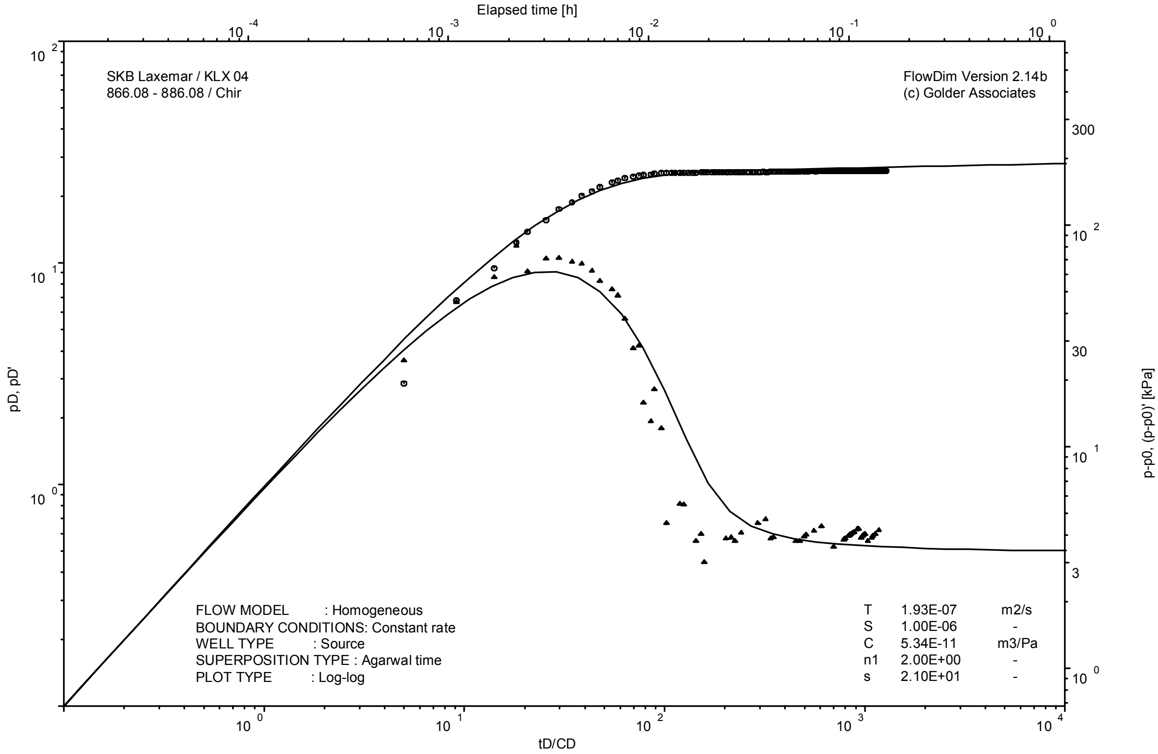
Pressure and flow rate vs. time; cartesian plot



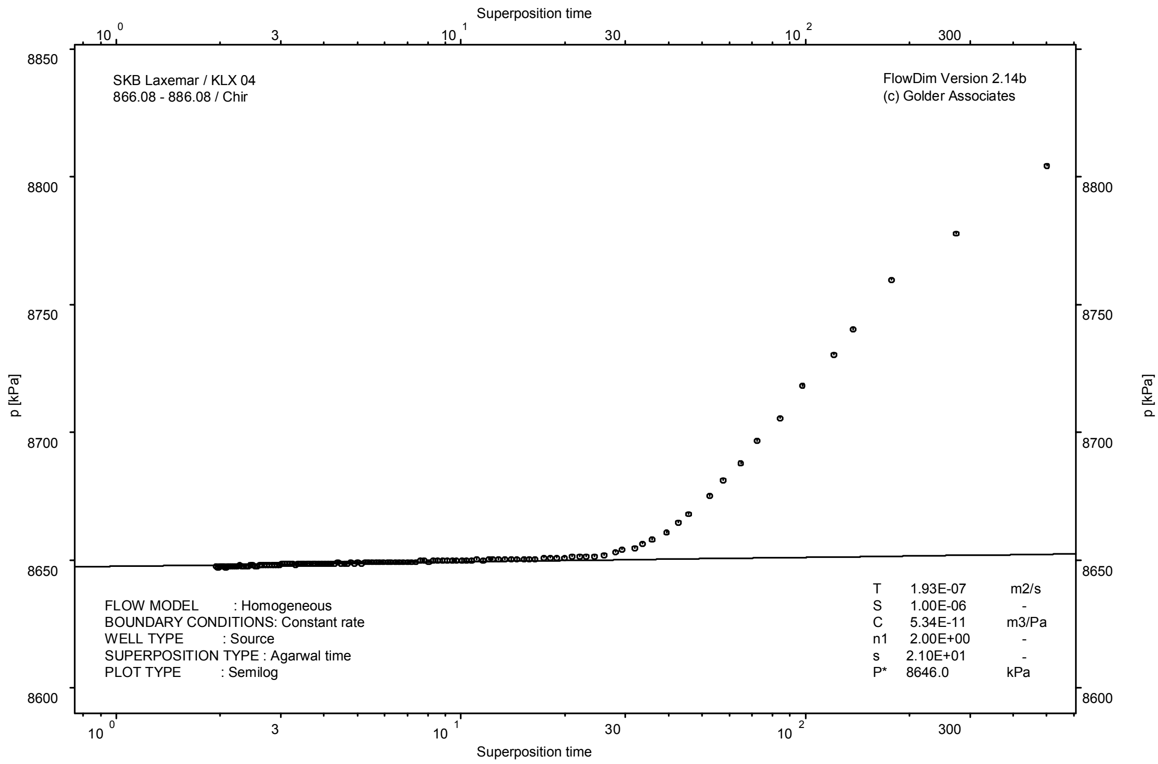
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

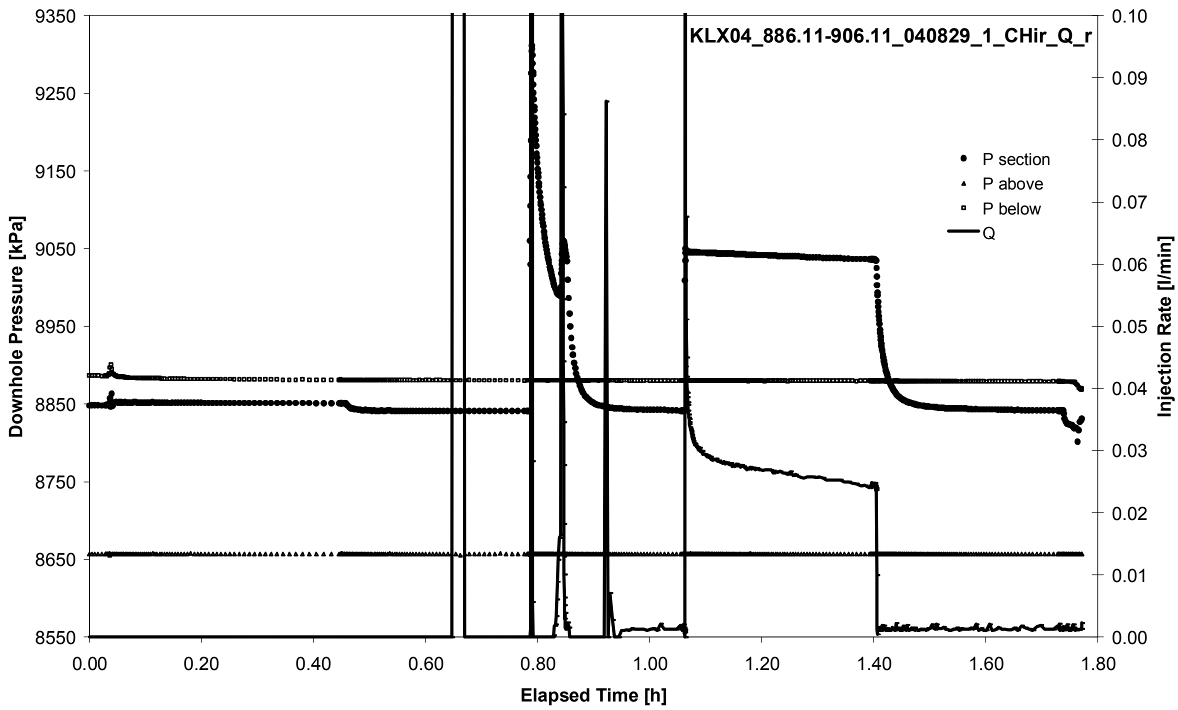


CHIR phase; HORNER match

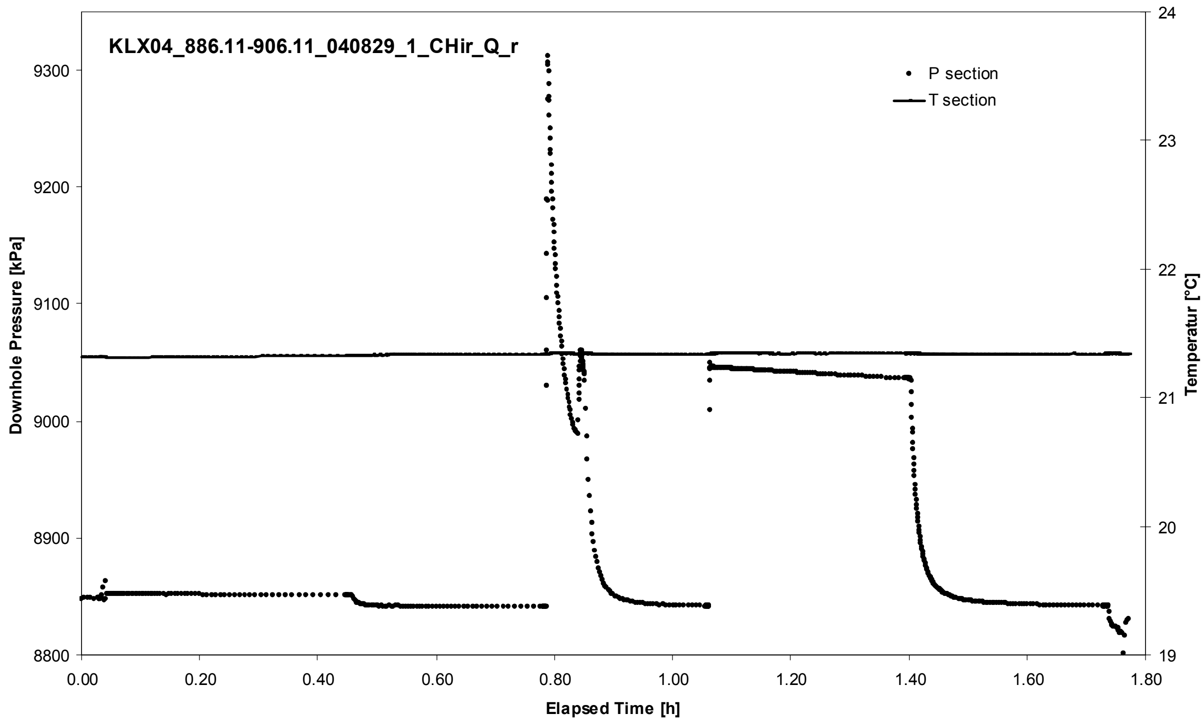
APPENDIX 2-44

Test 886.11 – 906.11 m

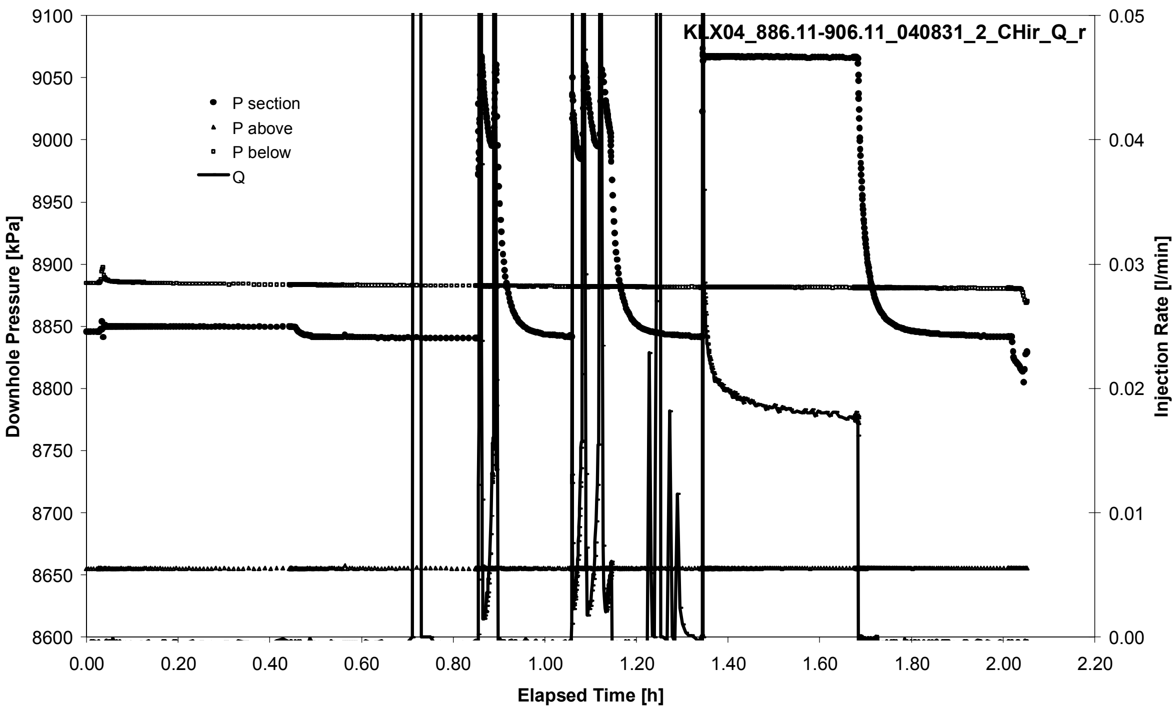
Analysis diagrams



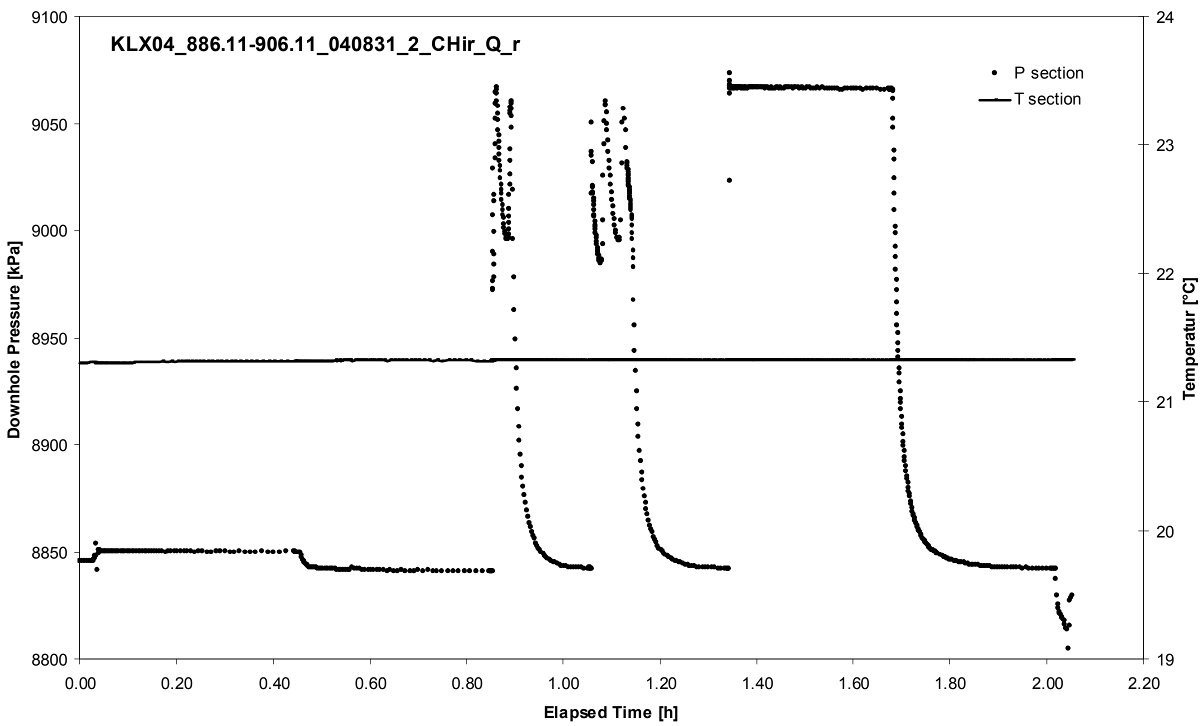
Pressure and flow rate vs. time; cartesian plot (test repeated)



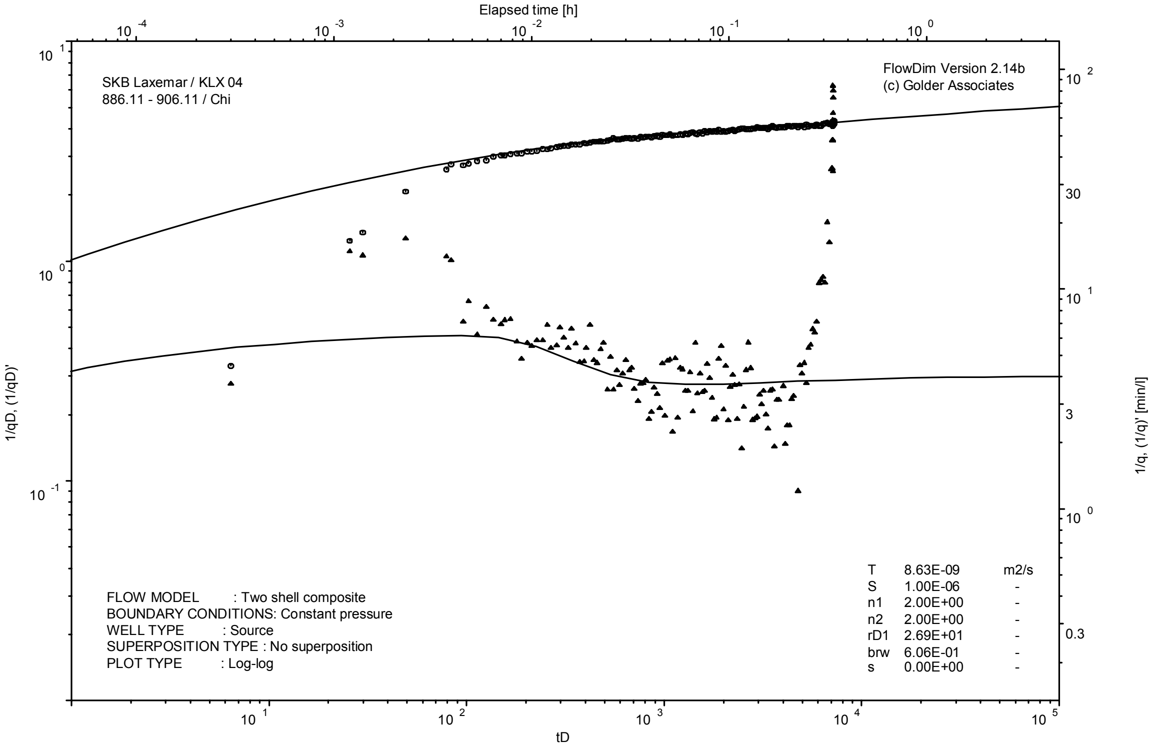
Interval pressure and temperature vs. time; cartesian plot (test repeated)



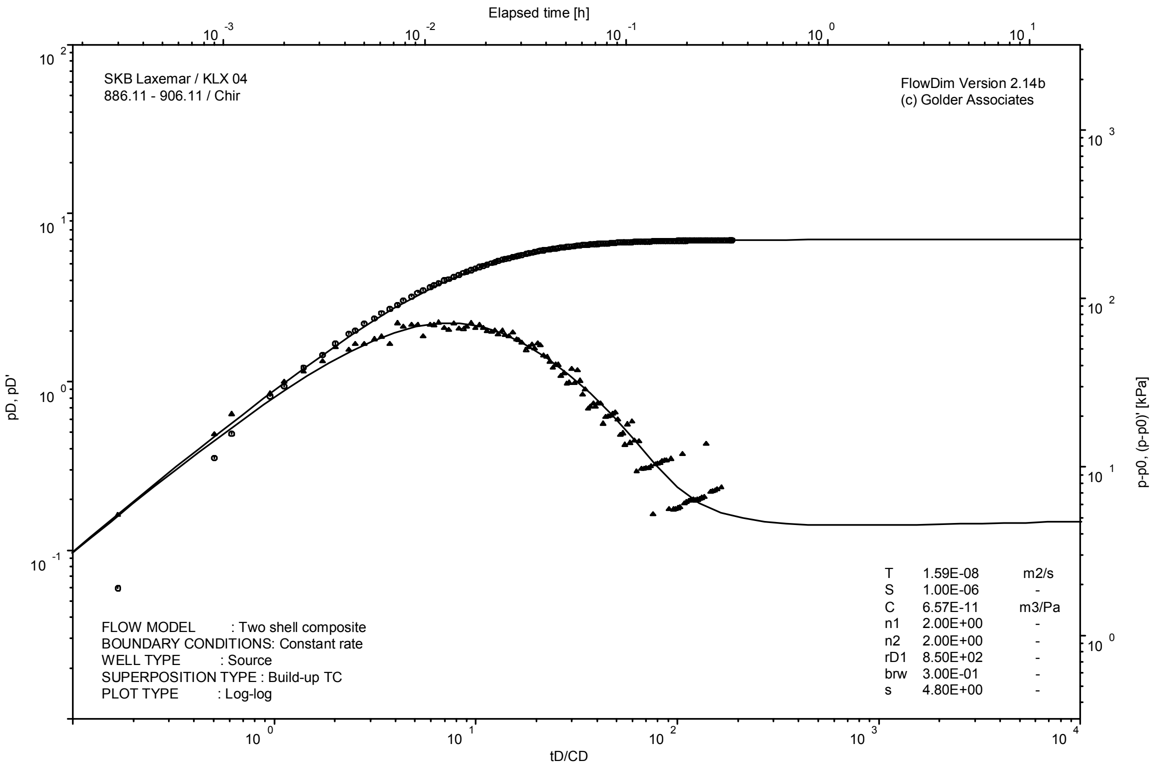
Pressure and flow rate vs. time; cartesian plot (analysed)



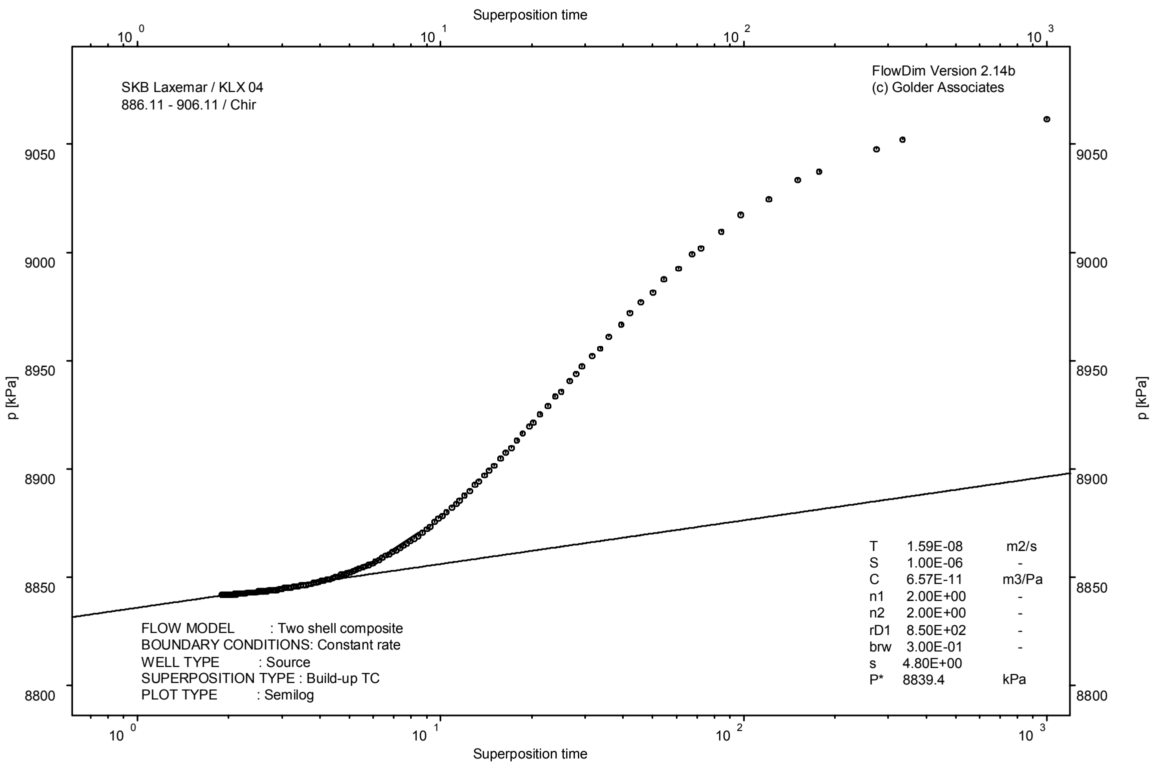
Interval pressure and temperature vs. time; cartesian plot (analysed)



CHI phase; log-log match



CHIR phase; log-log match

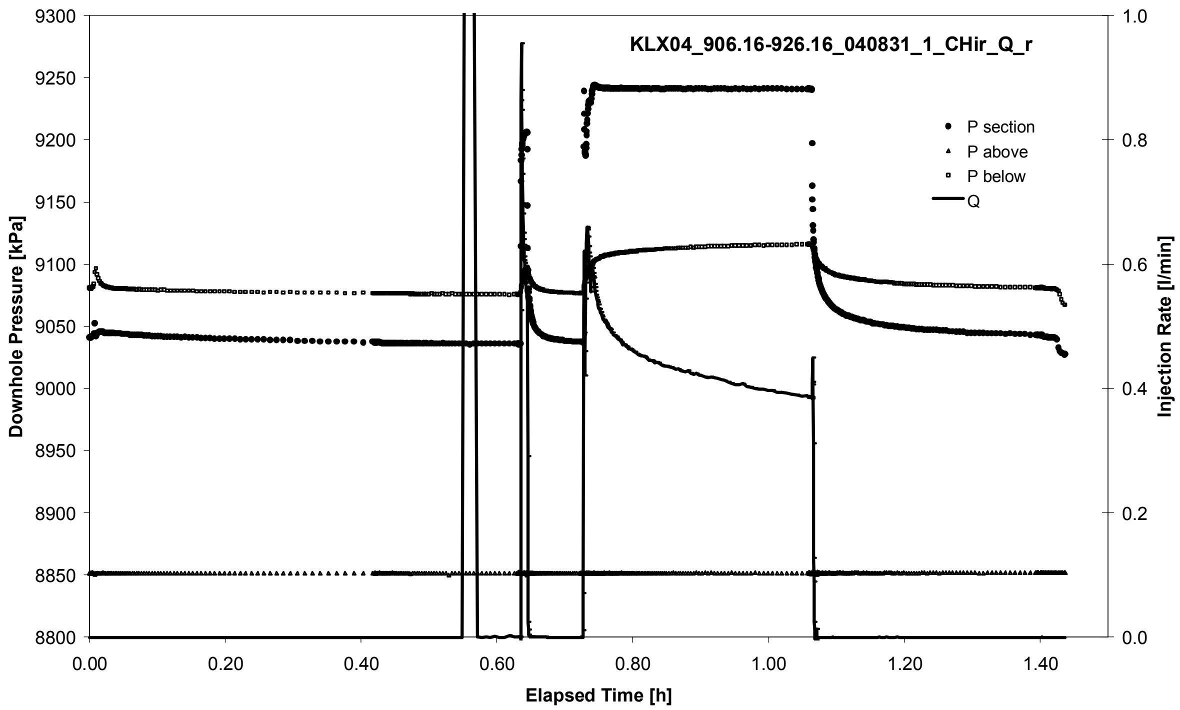


CHIR phase; HORNER match

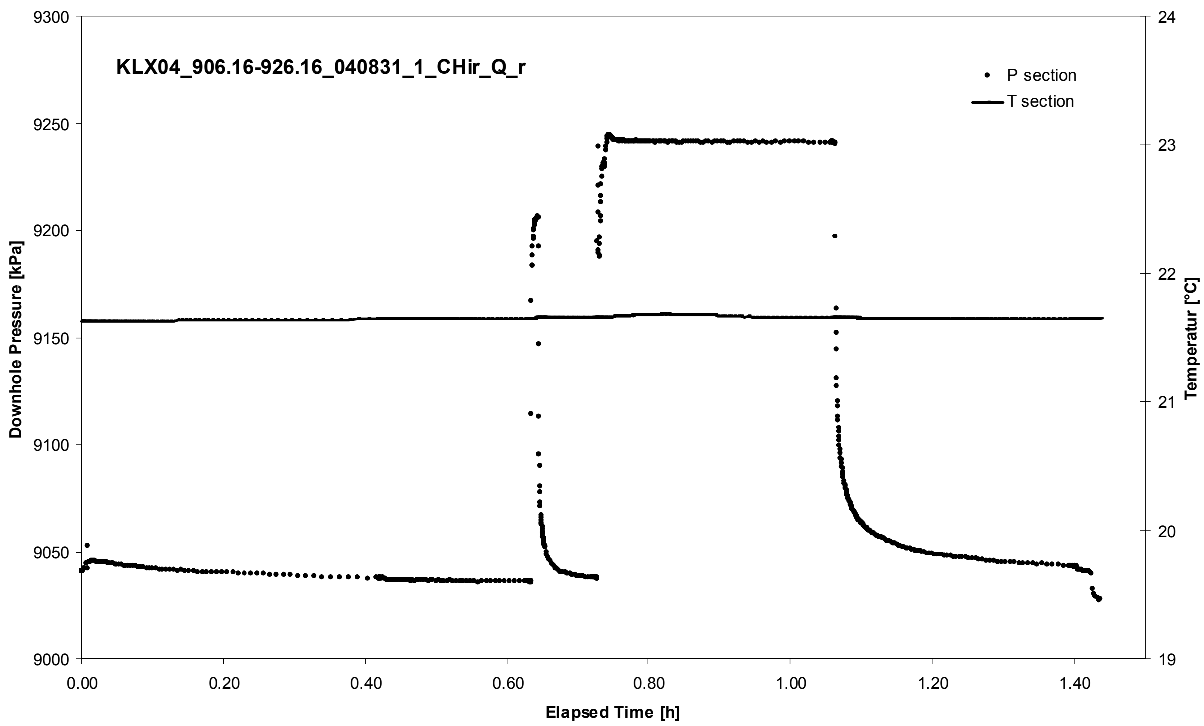
APPENDIX 2-45

Test 906.16 – 926.16 m

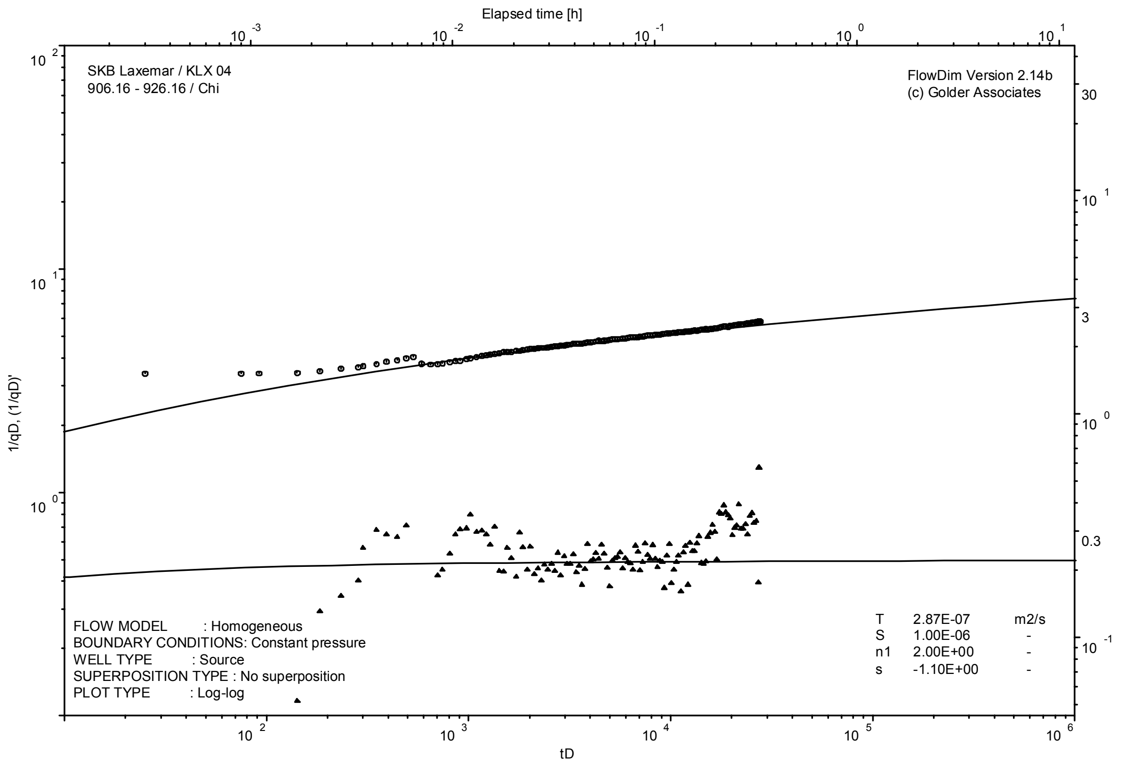
Analysis diagrams



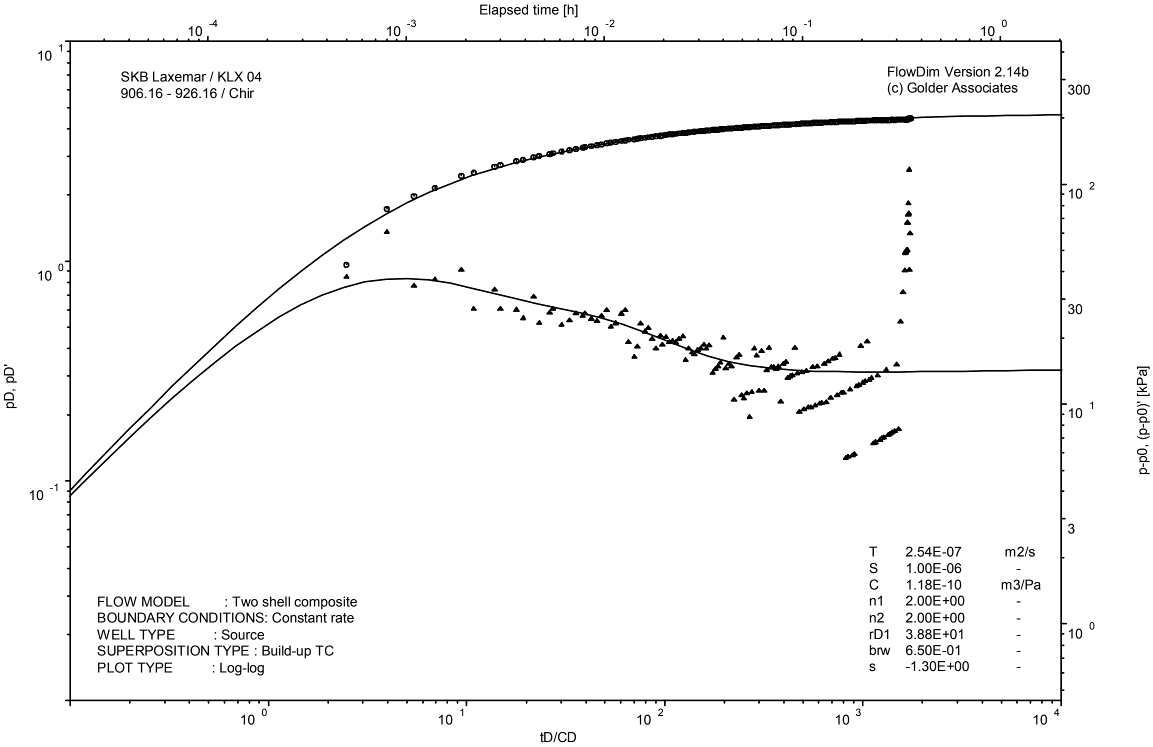
Pressure and flow rate vs. time; cartesian plot



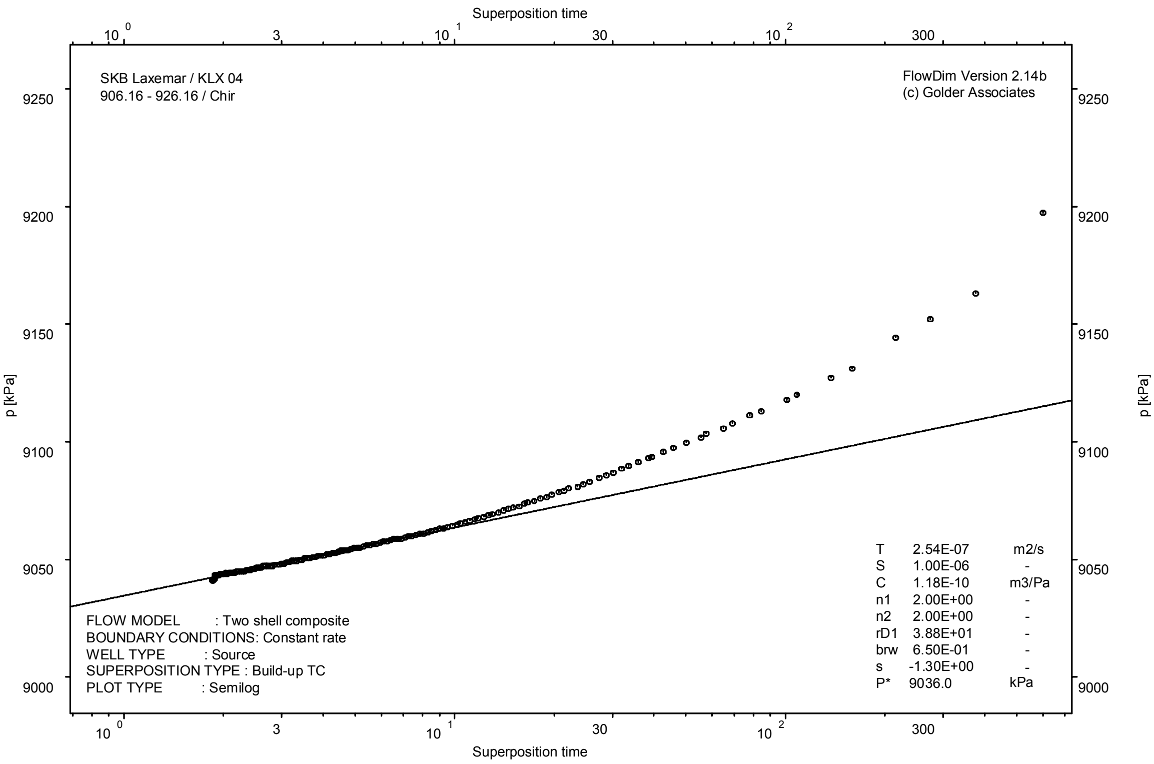
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

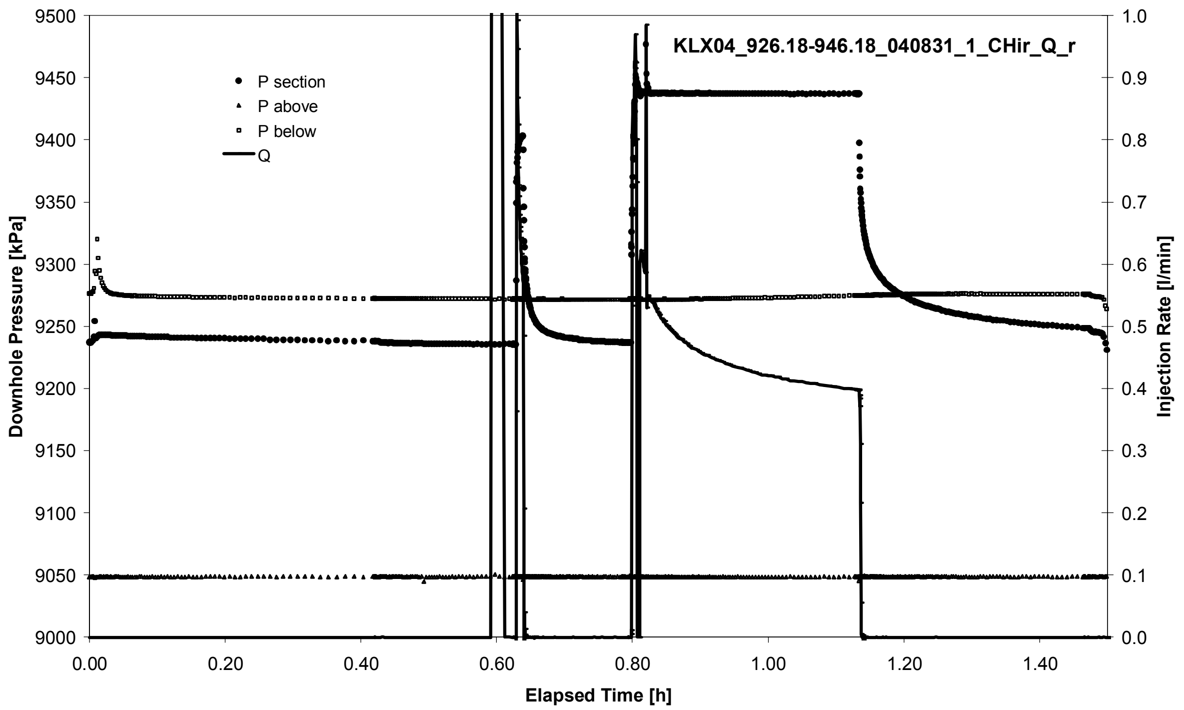


CHIR phase; HORNER match

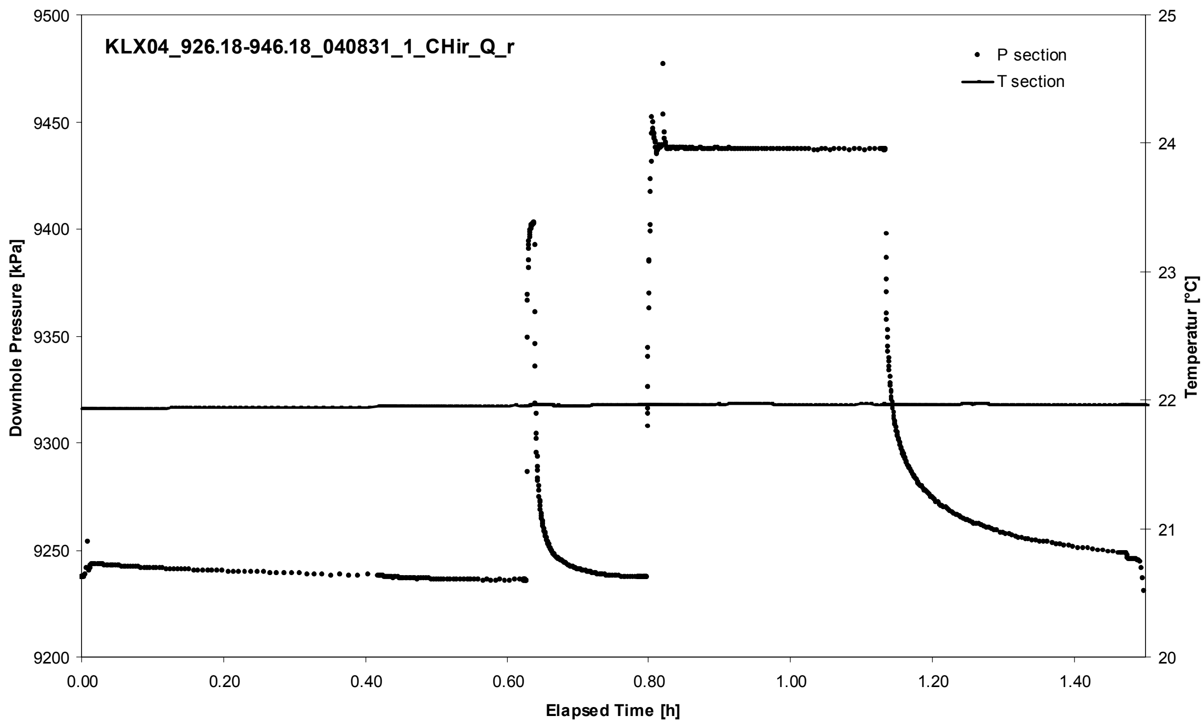
APPENDIX 2-46

Test 926.18 – 946.18 m

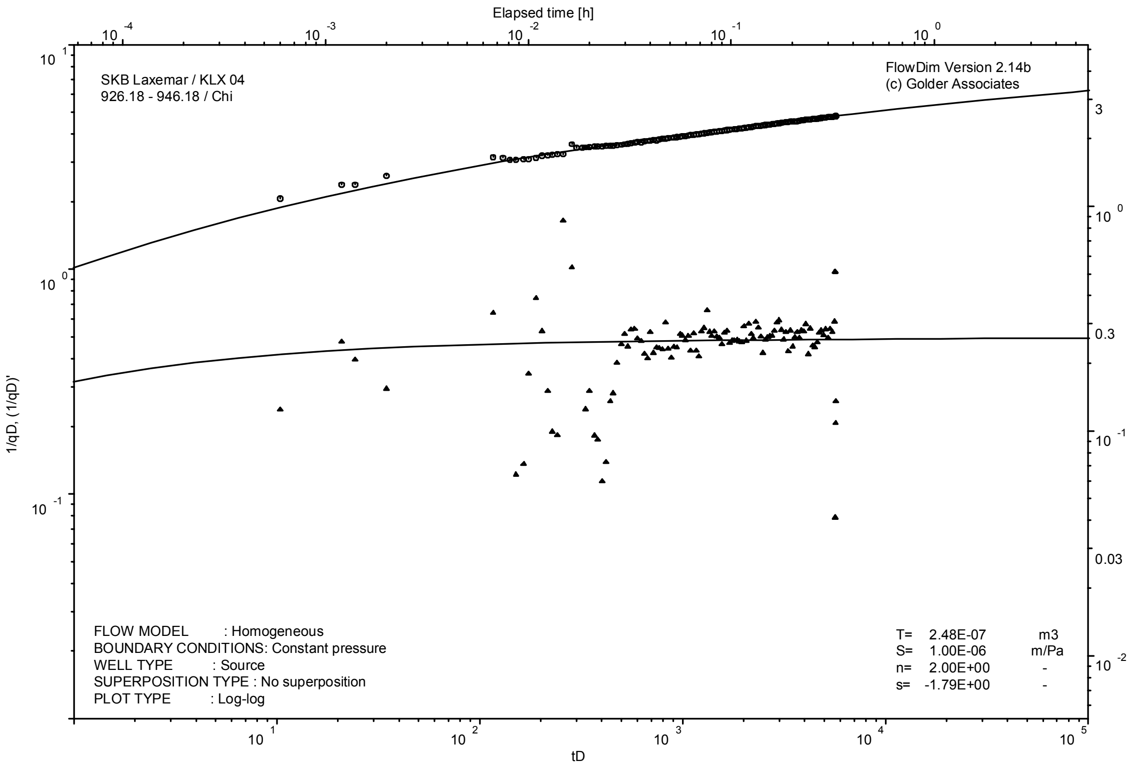
Analysis diagrams



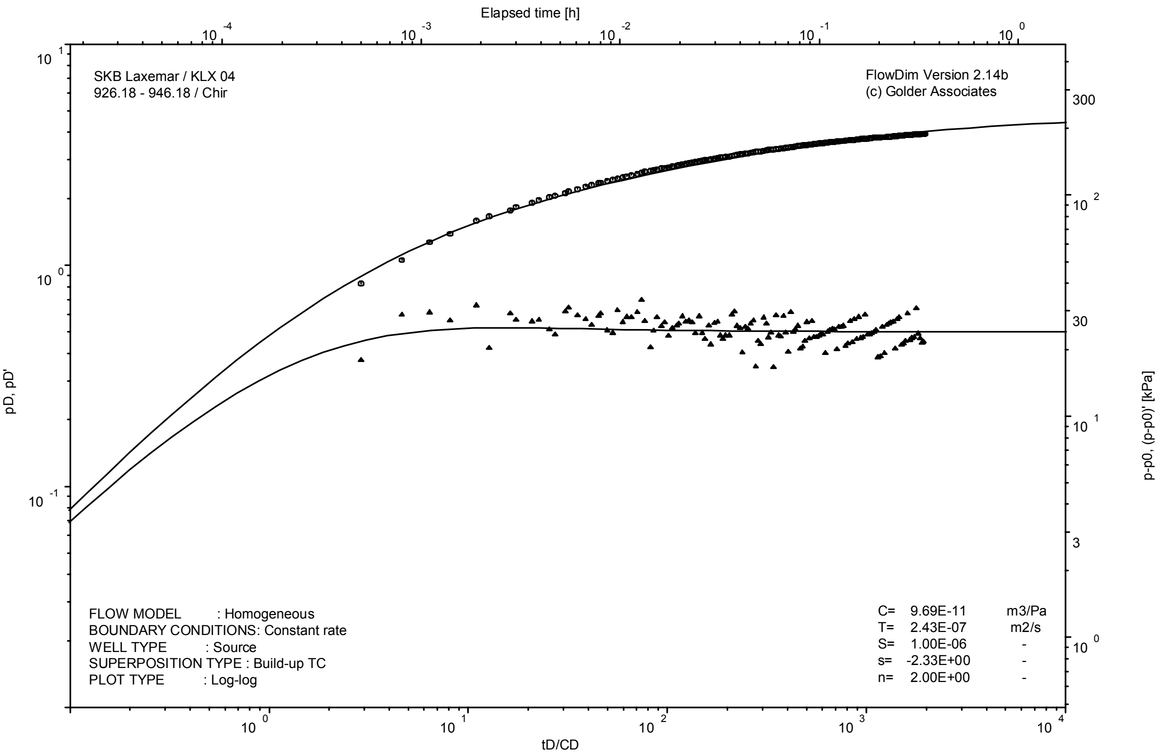
Pressure and flow rate vs. time; cartesian plot



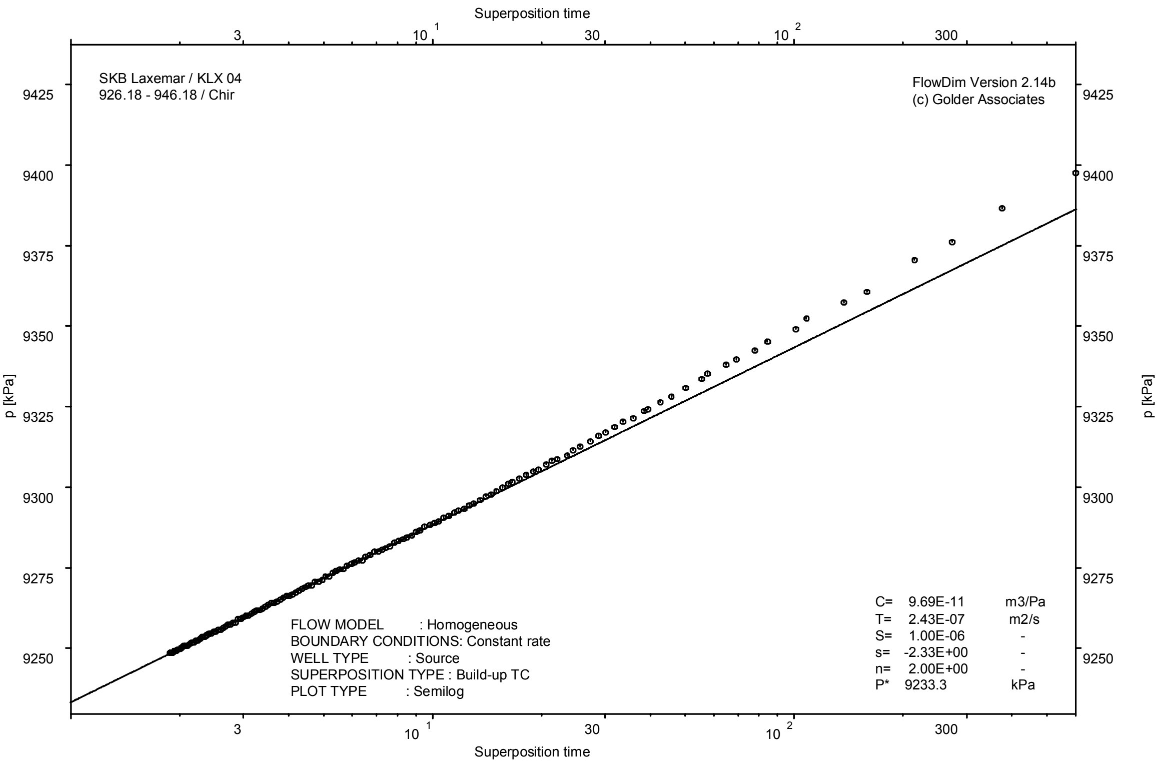
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

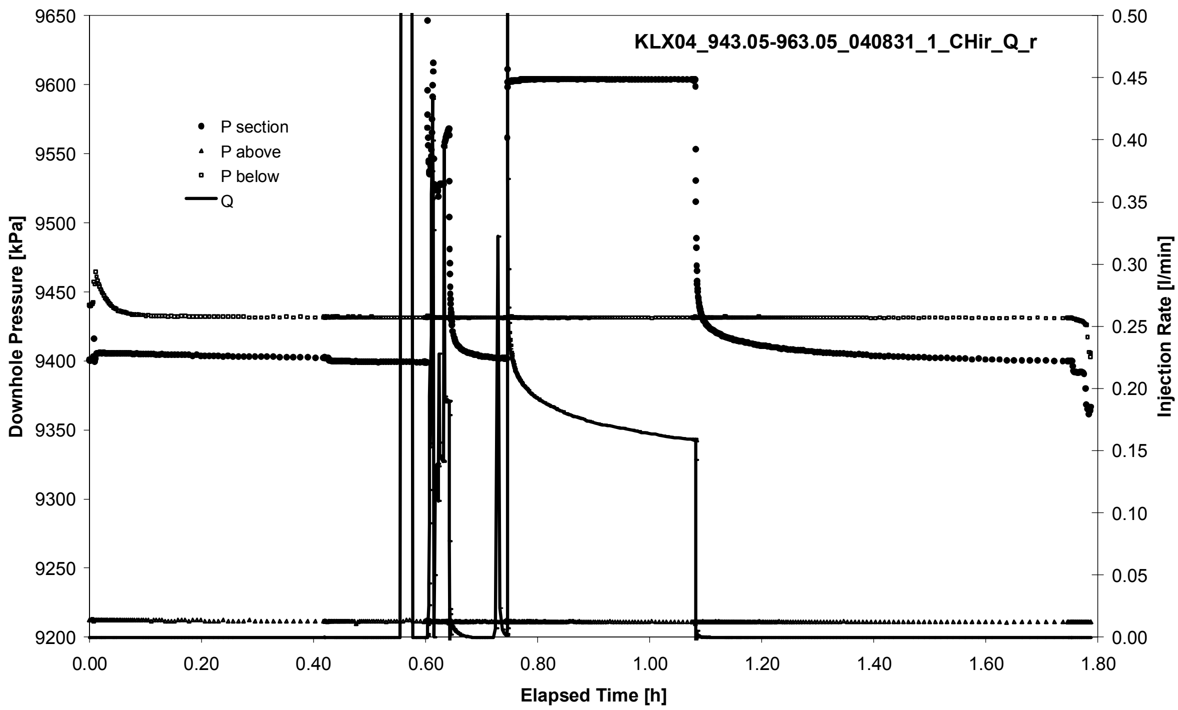


CHIR phase; HORNER match

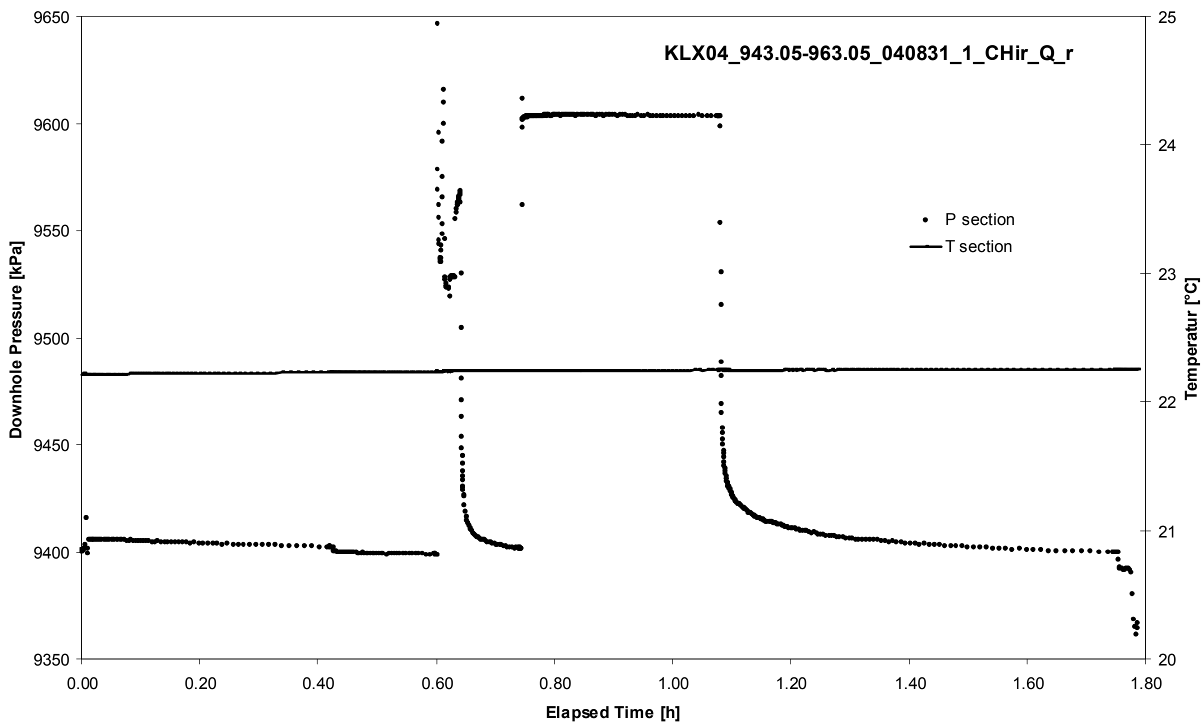
APPENDIX 2-47

Test 943.05 – 963.05 m

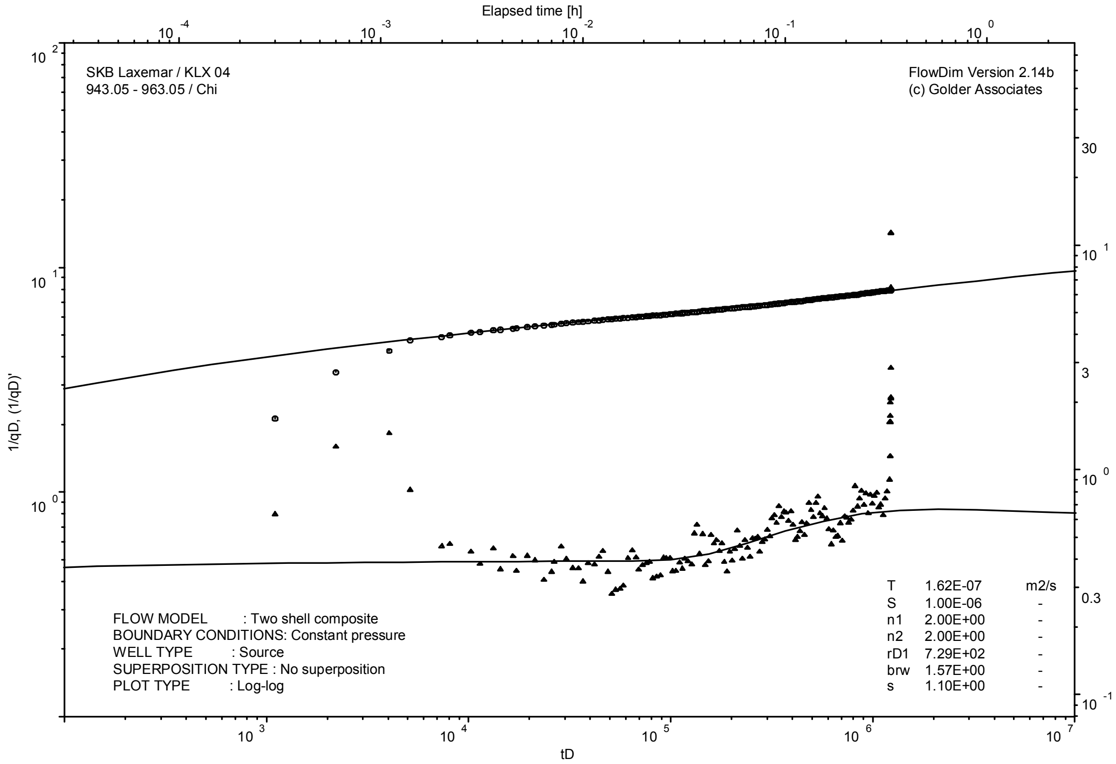
Analysis diagrams



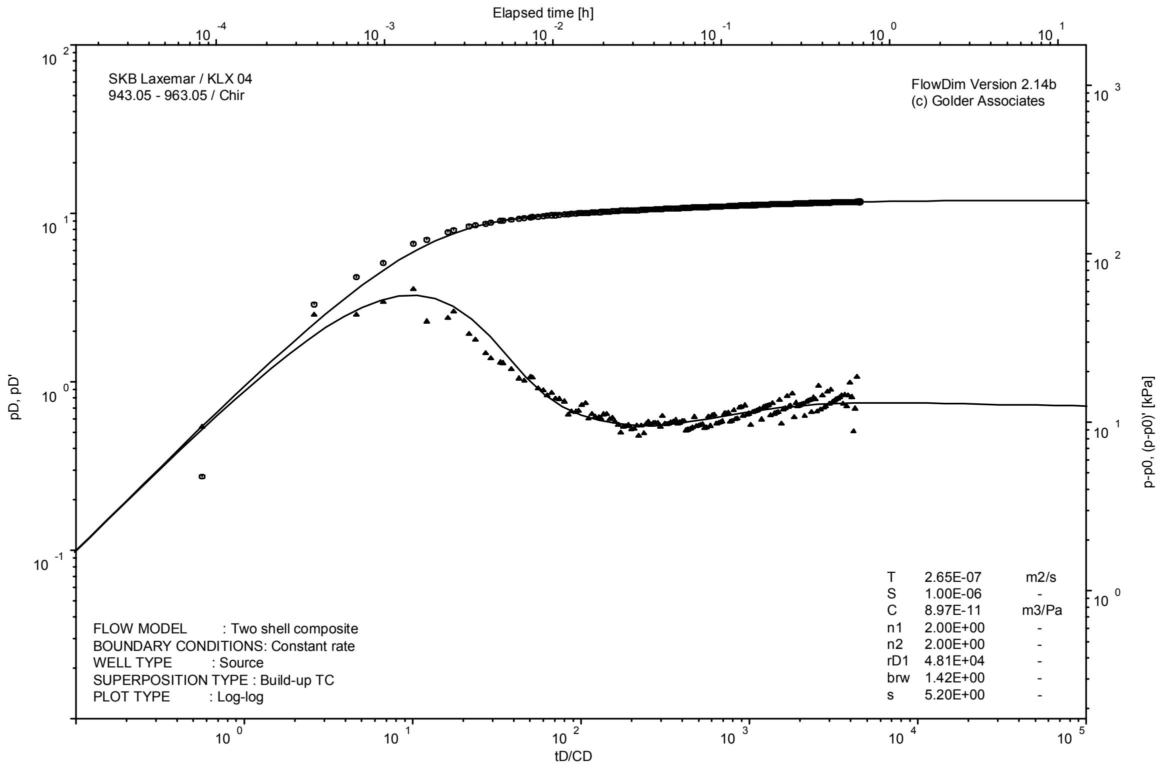
Pressure and flow rate vs. time; cartesian plot



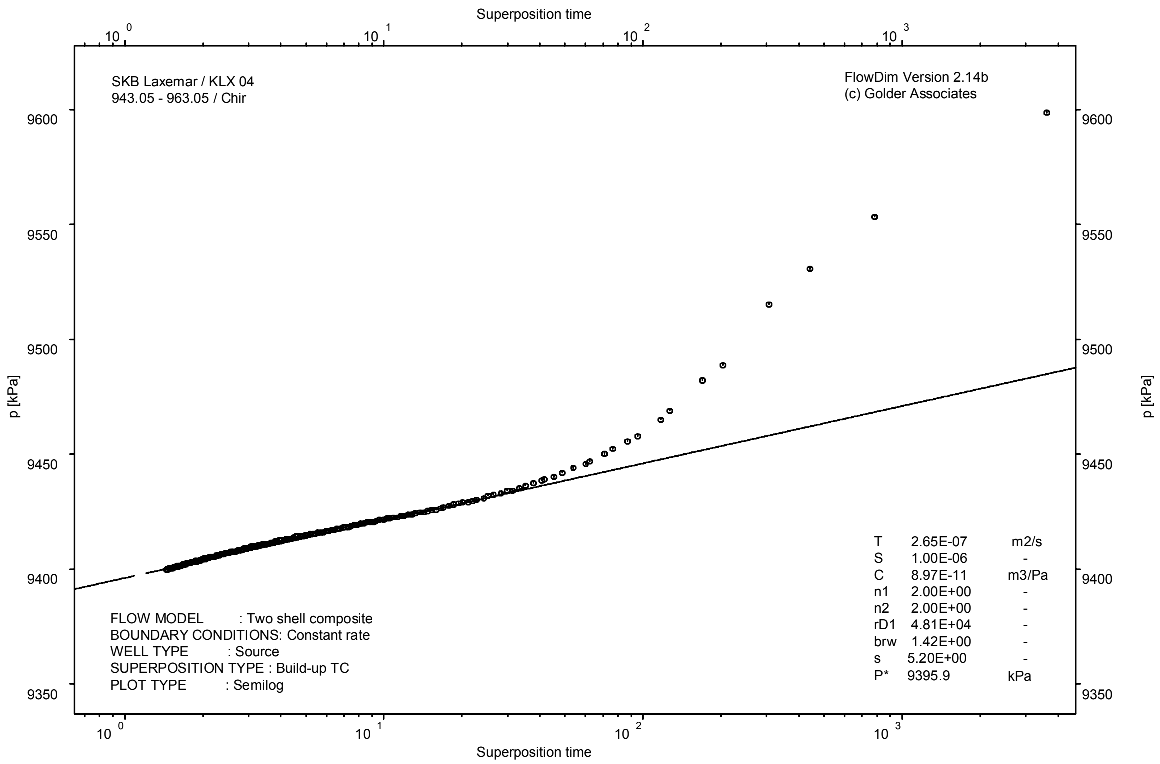
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

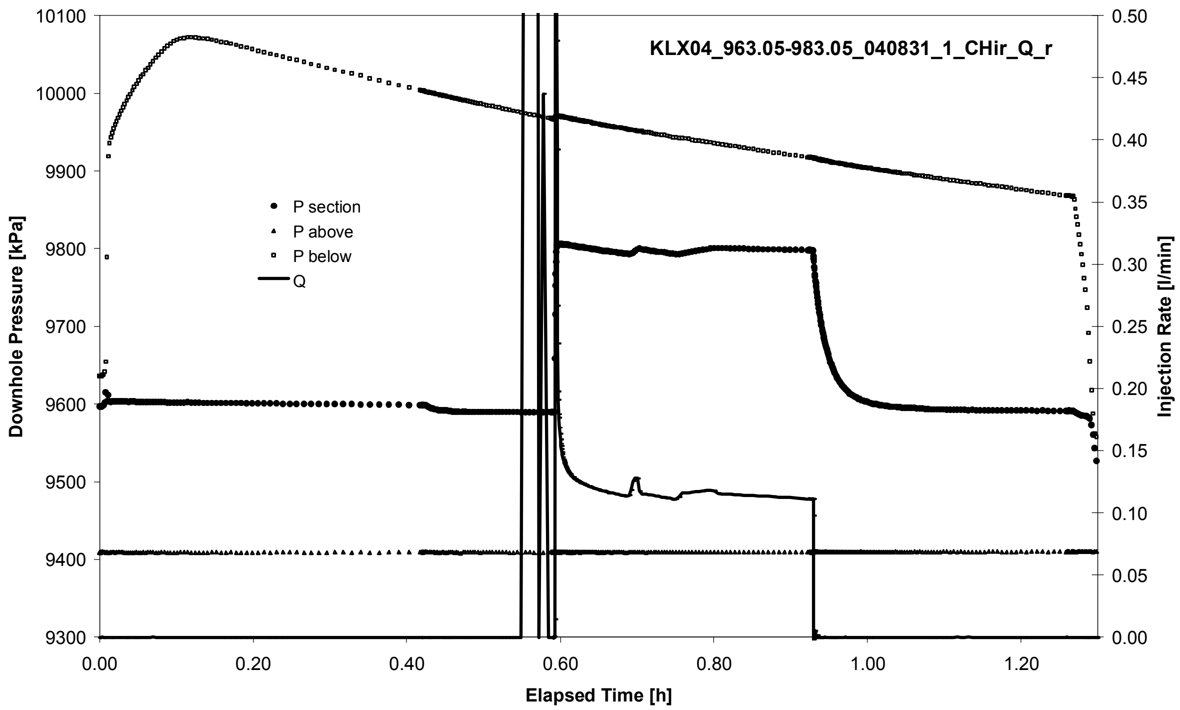


CHIR phase; HORNER match

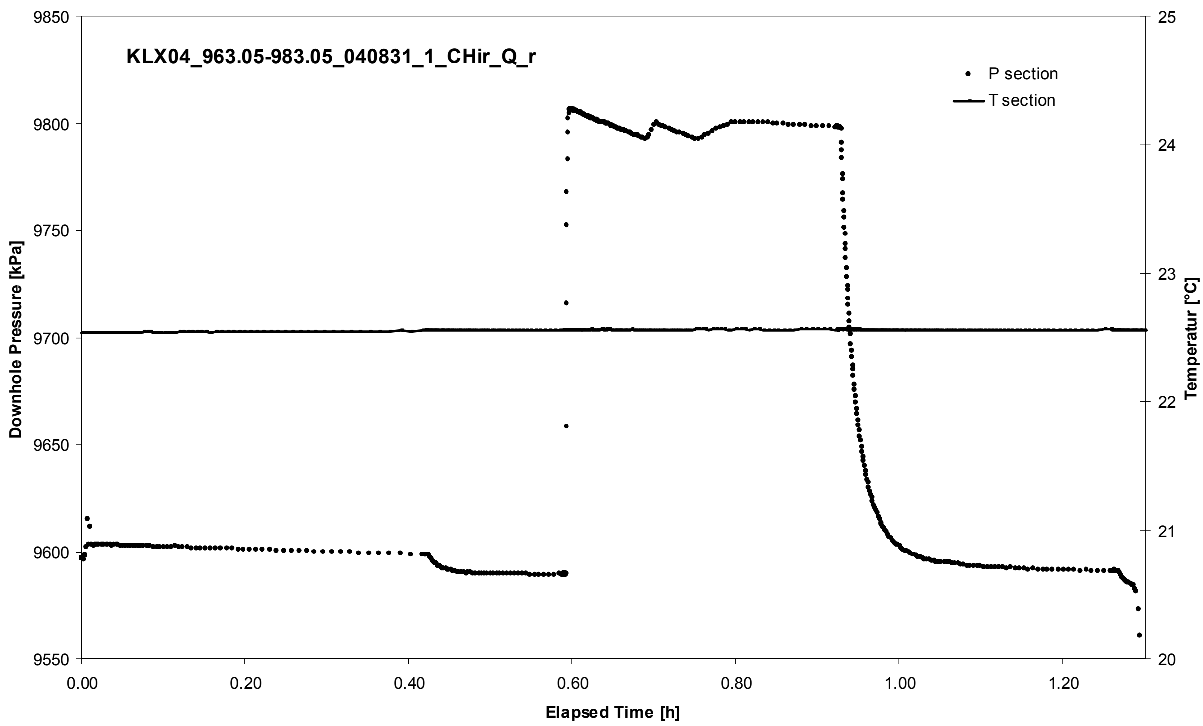
APPENDIX 2-48

Test 963.05 – 983.05 m

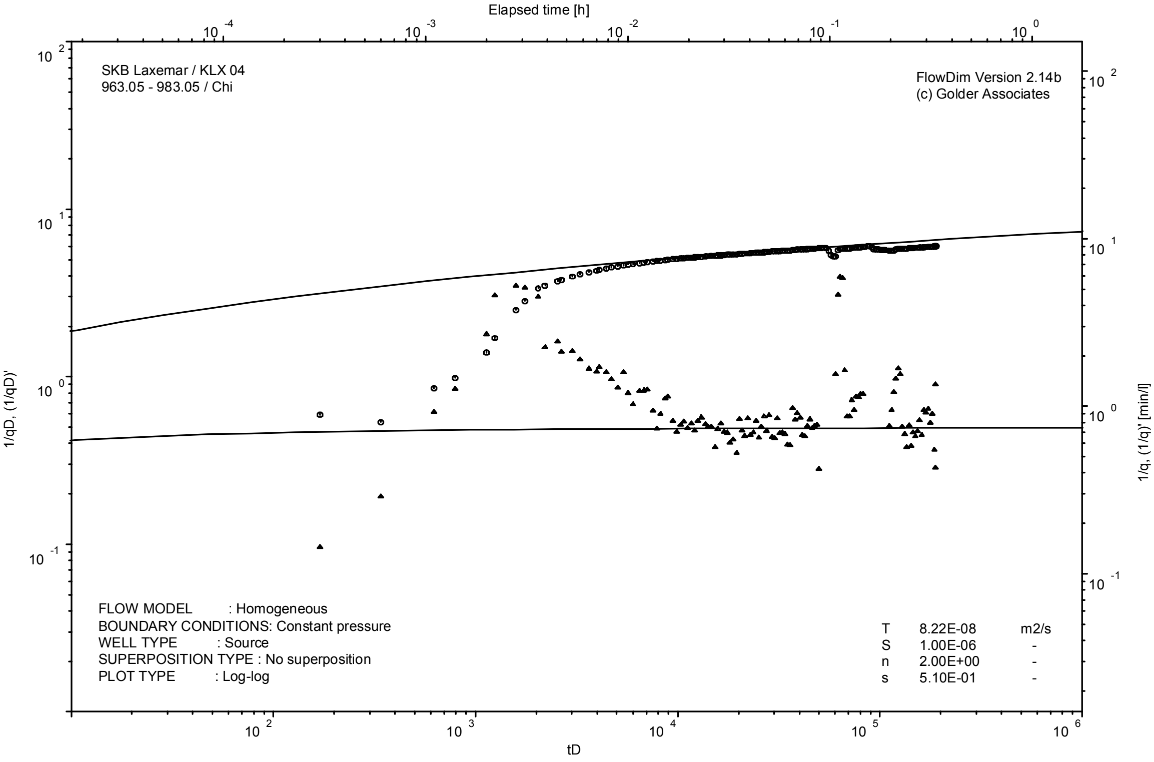
Analysis diagrams



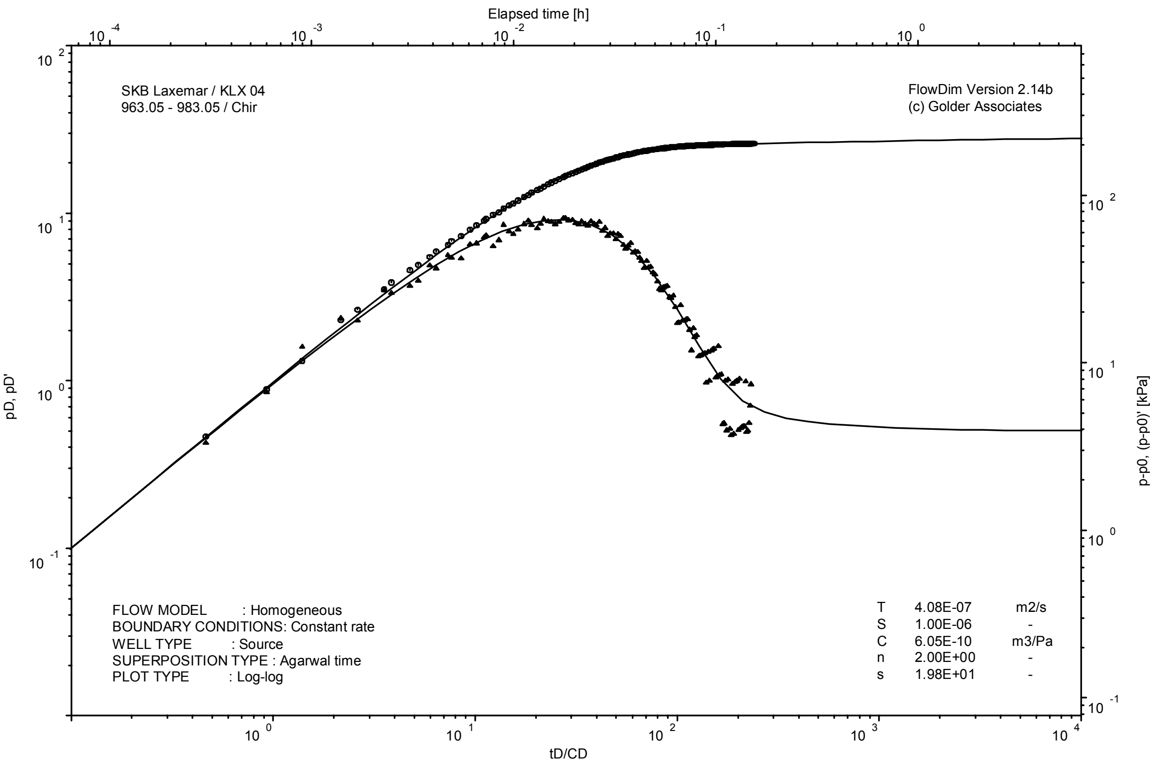
Pressure and flow rate vs. time; cartesian plot



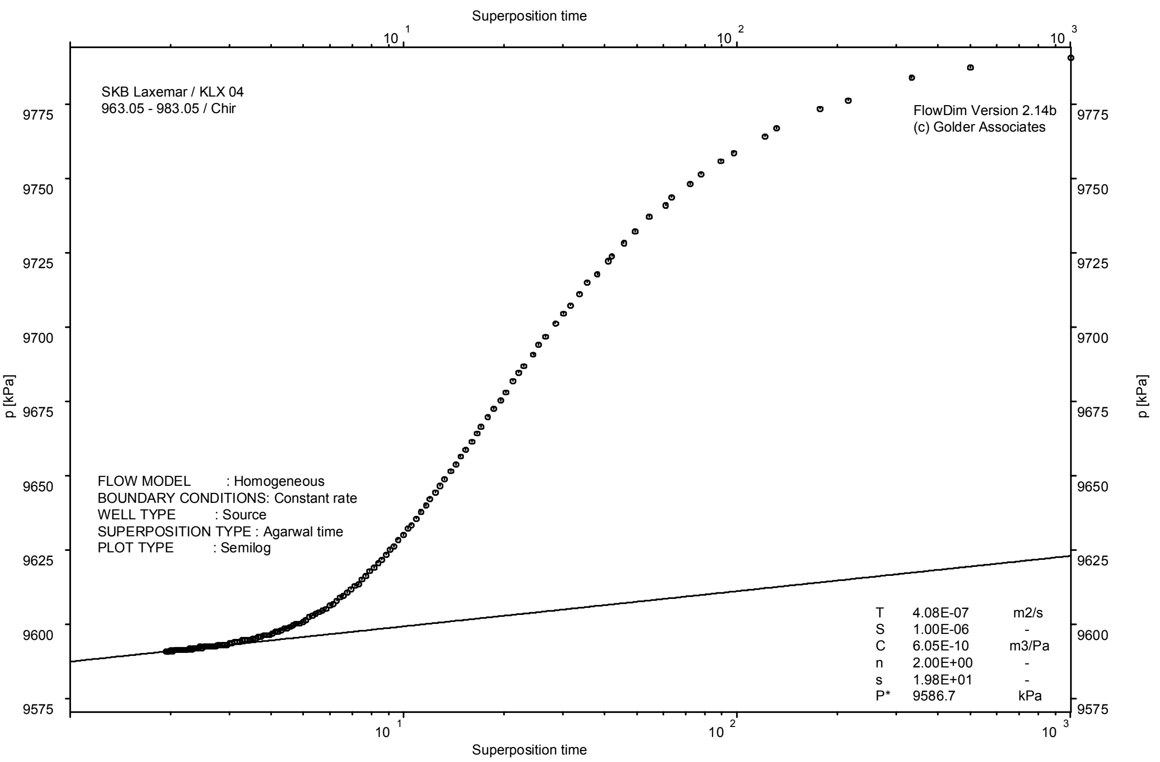
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

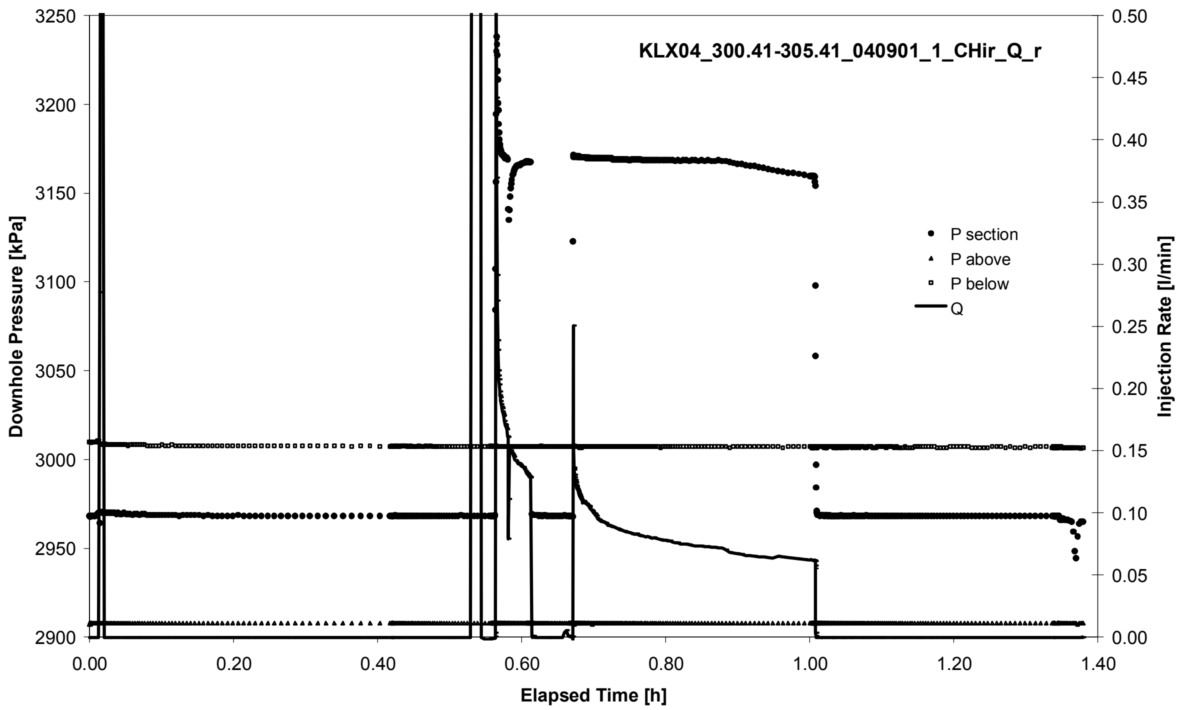


CHIR phase; HORNER match

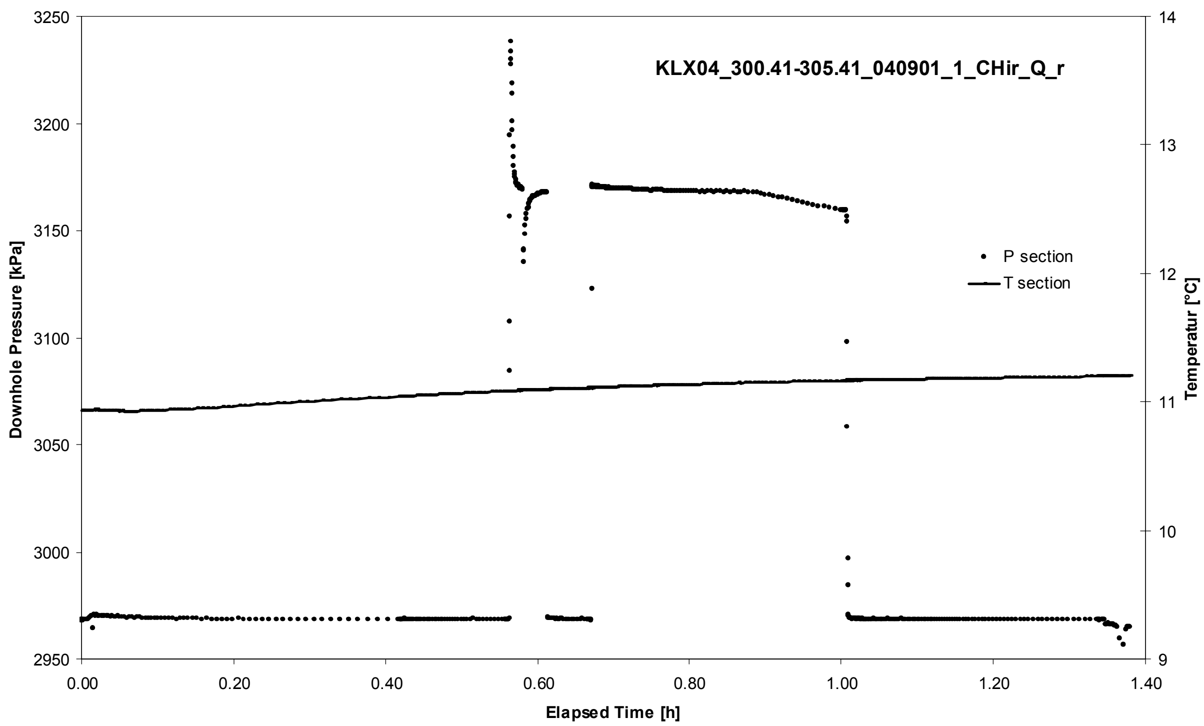
APPENDIX 2-49

Test 300.41 – 305.41 m

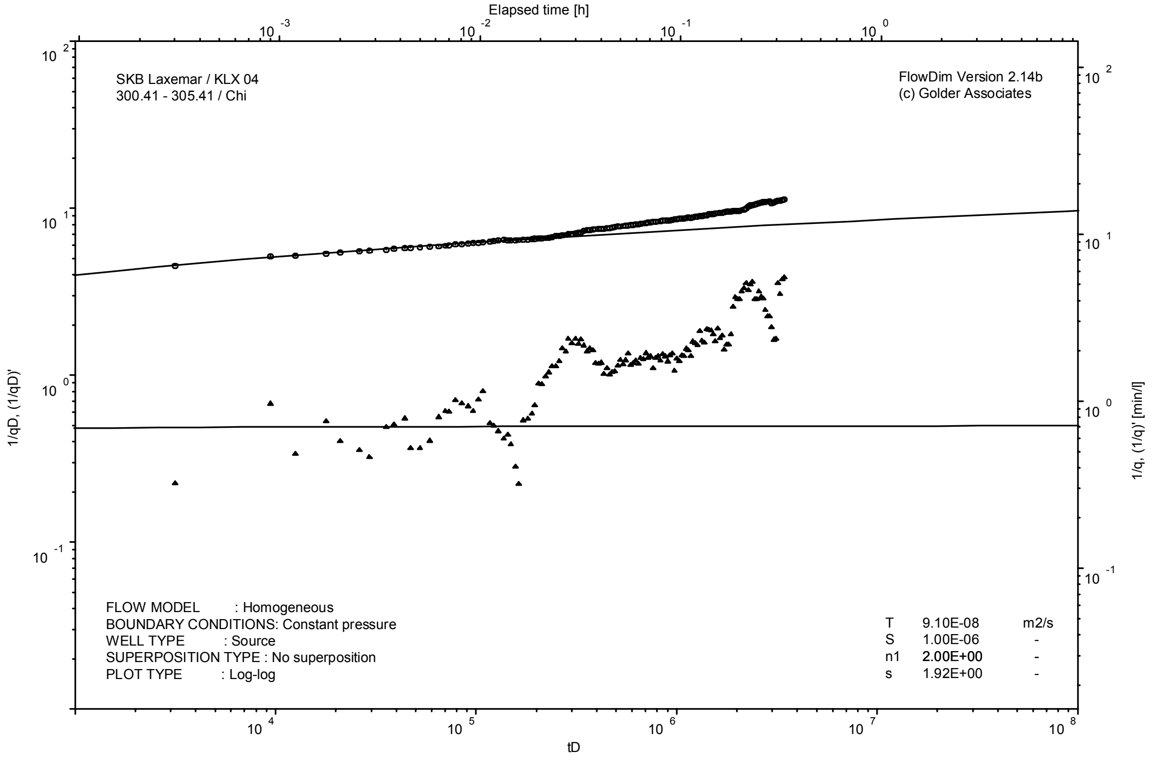
Analysis diagrams



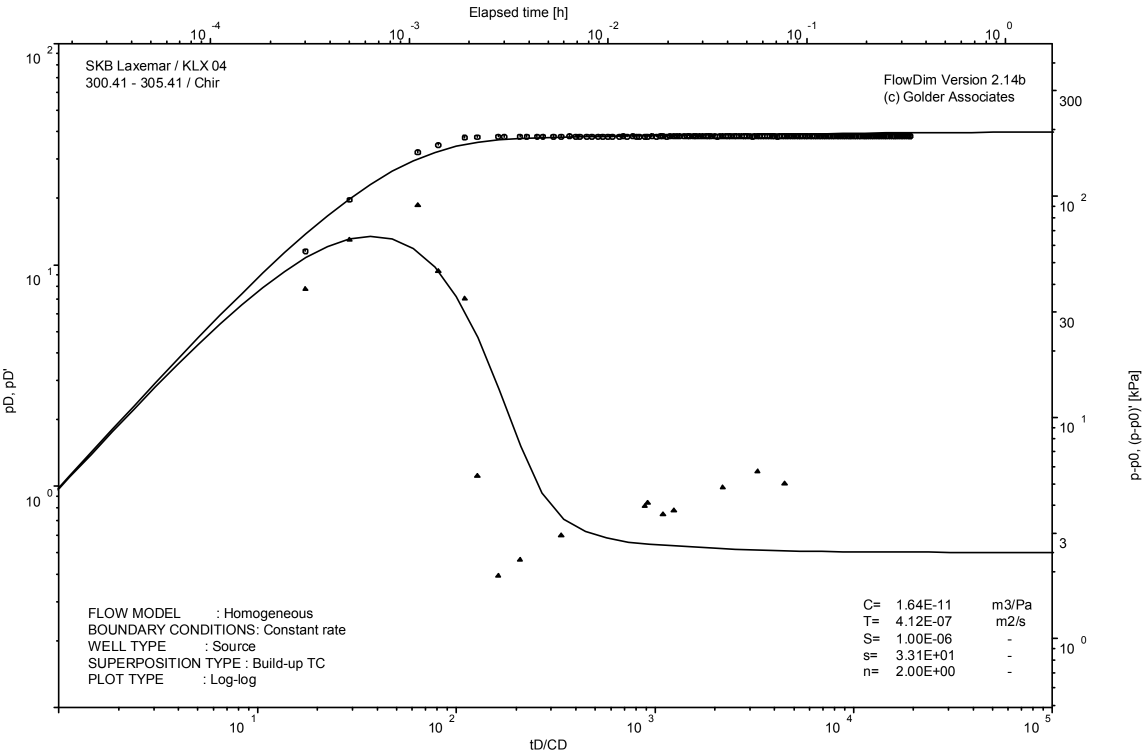
Pressure and flow rate vs. time; cartesian plot



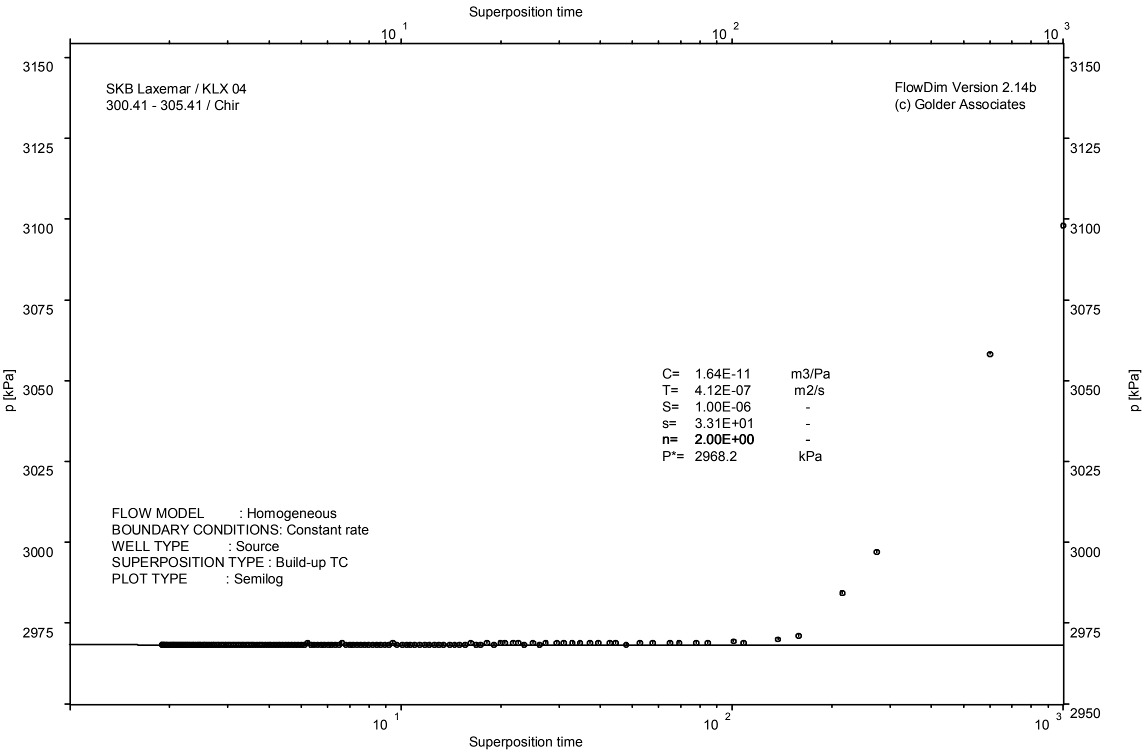
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

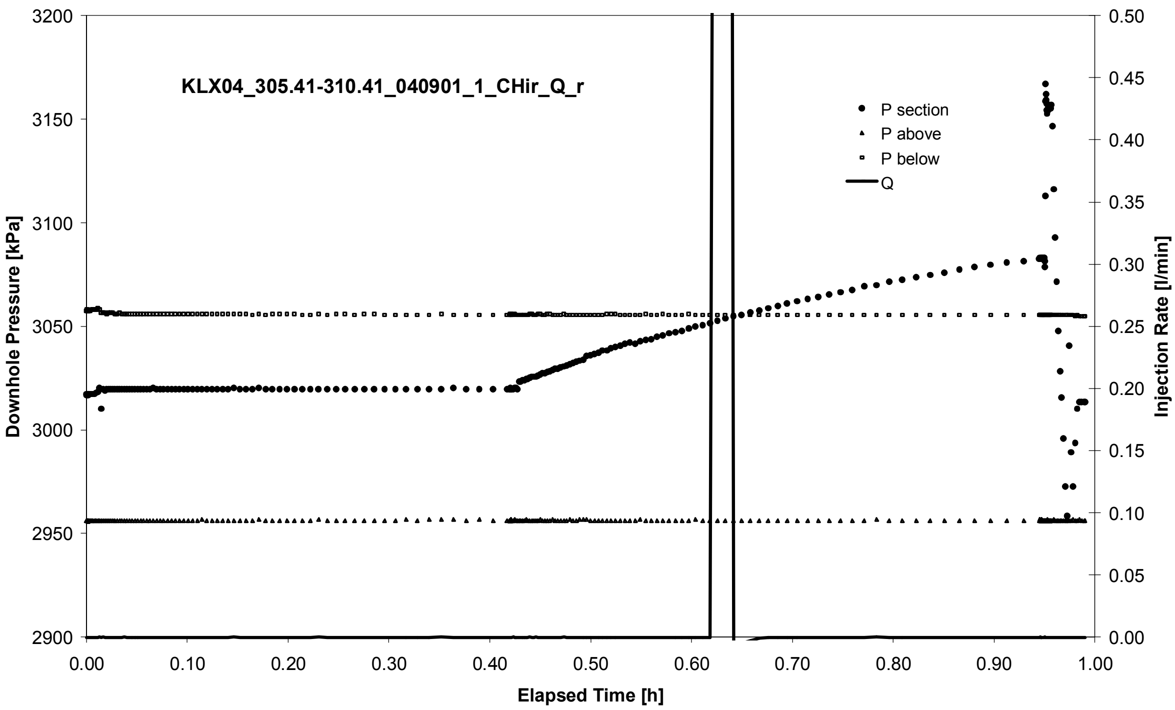


CHIR phase; HORNER match

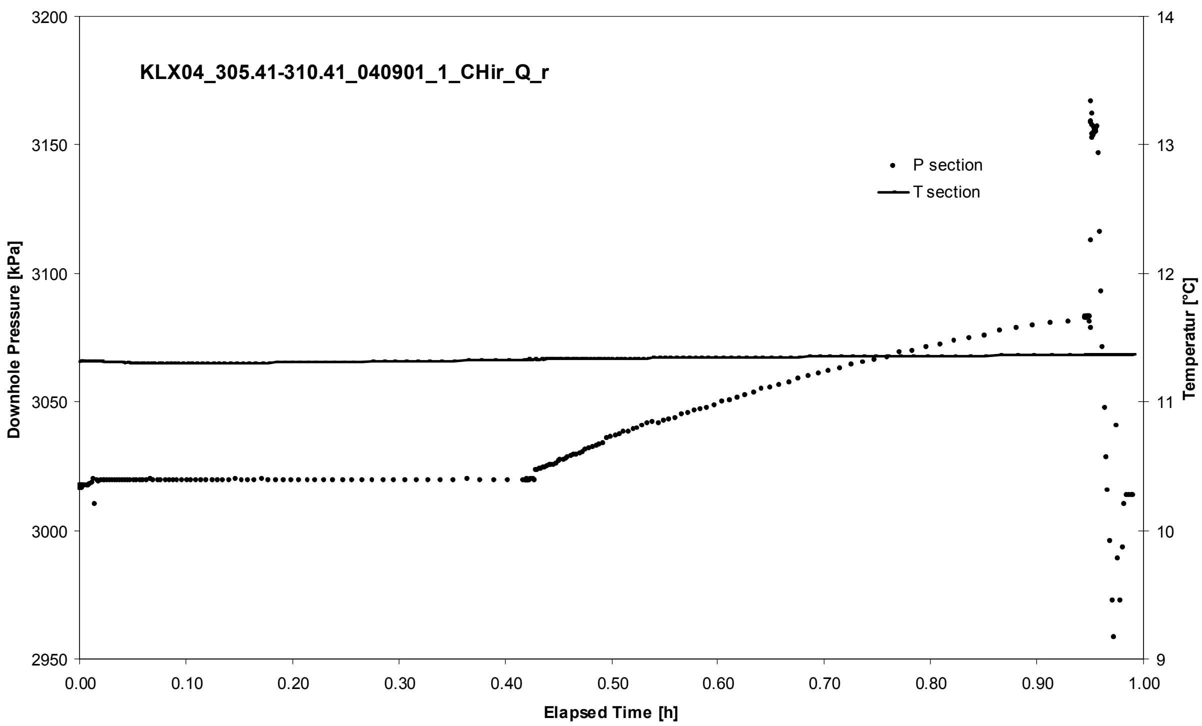
APPENDIX 2-50

Test 305.41 – 310.41 m

Analysis diagrams



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot

Not Analysed

CHI phase; log-log match

Not Analysed

CHIR phase; log-log match

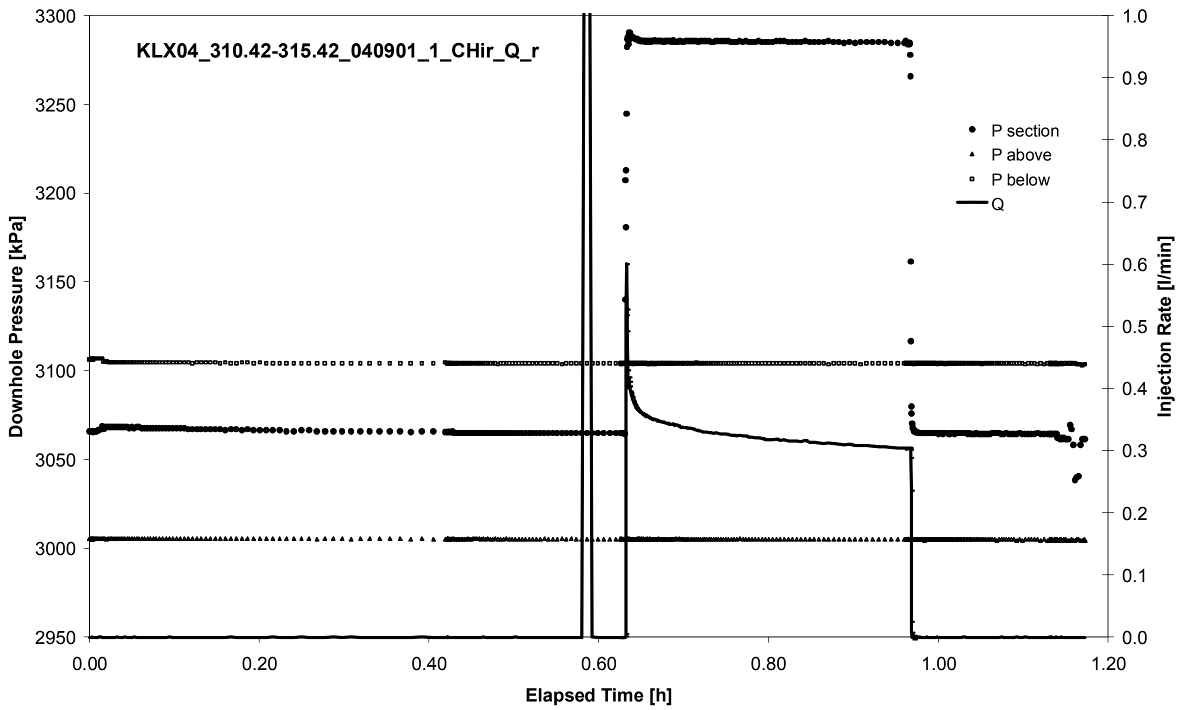
Not Analysed

CHIR phase; HORNER match

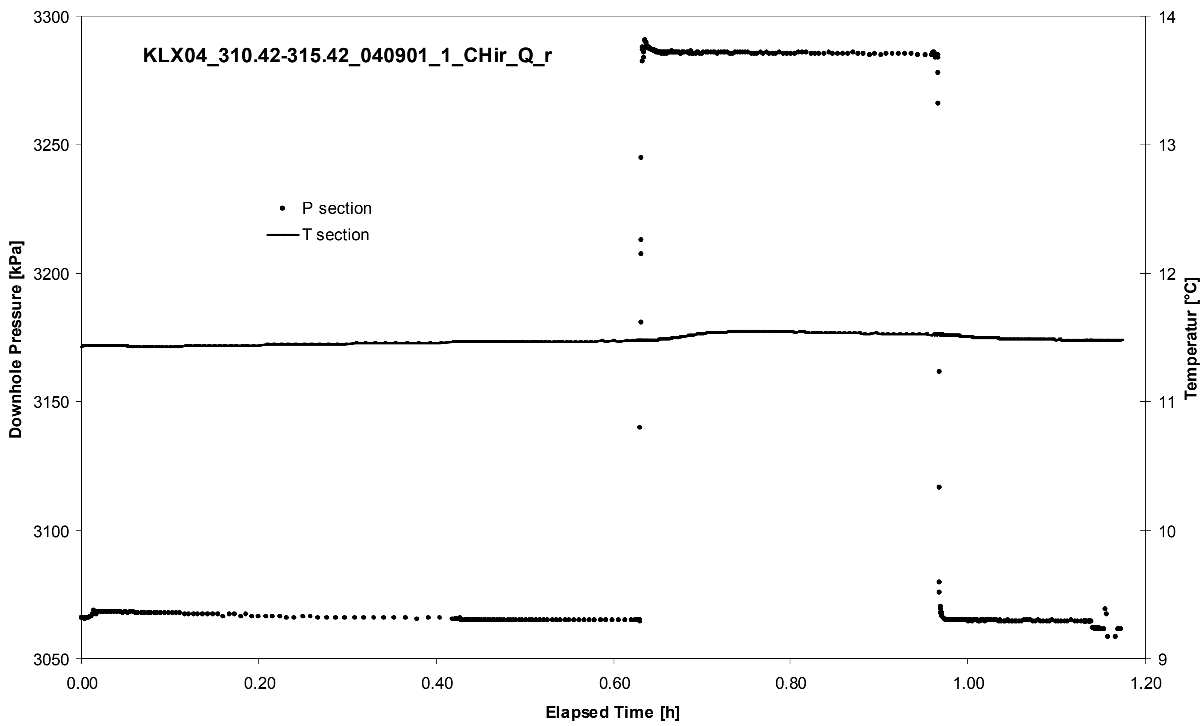
APPENDIX 2-51

Test 310.42 – 315.42 m

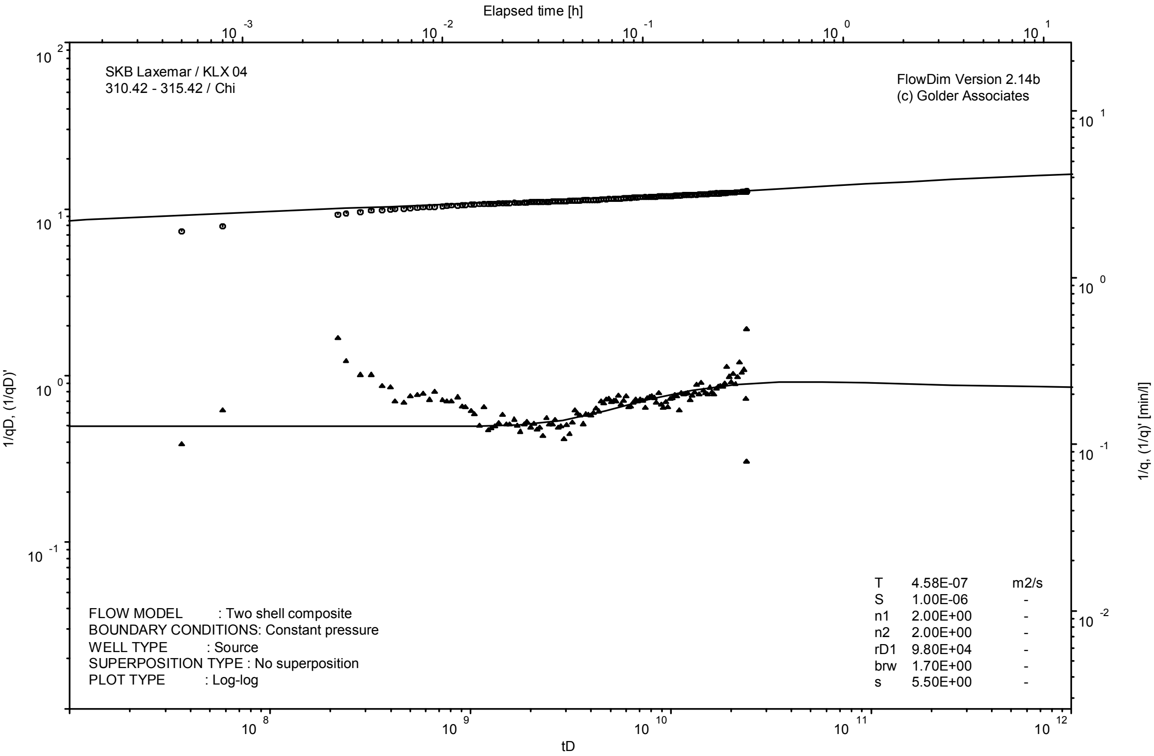
Analysis diagrams



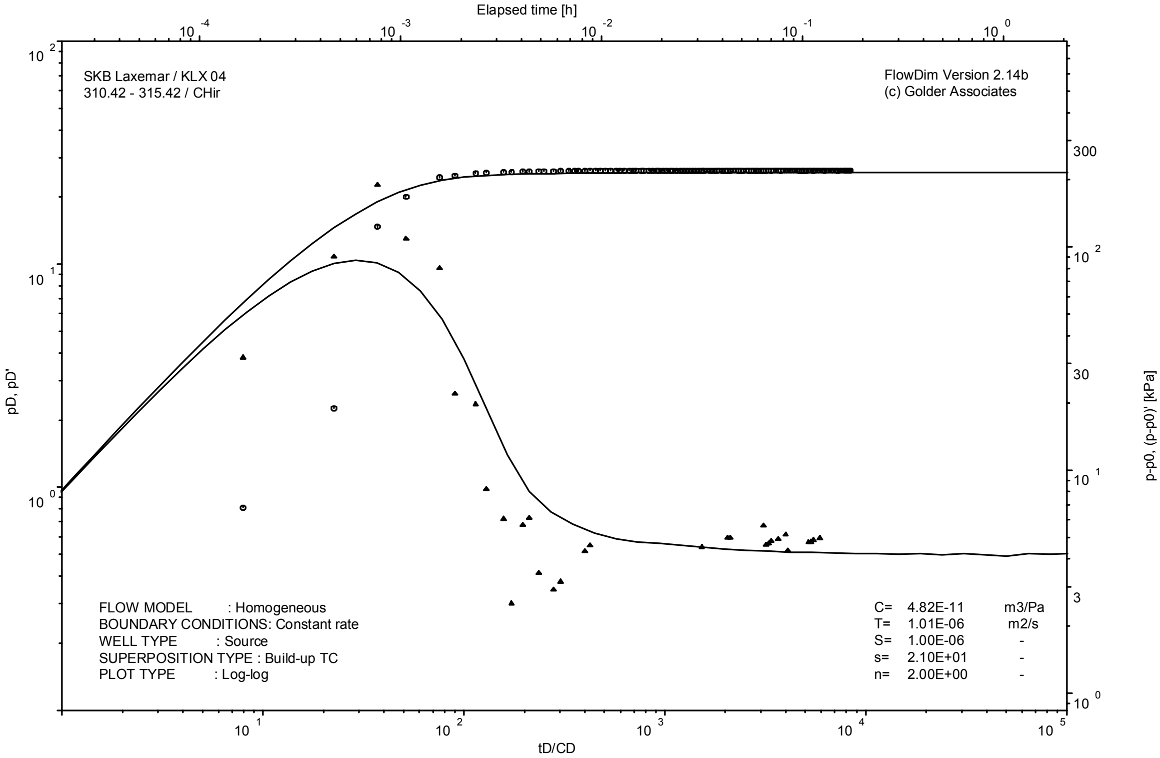
Pressure and flow rate vs. time; cartesian plot



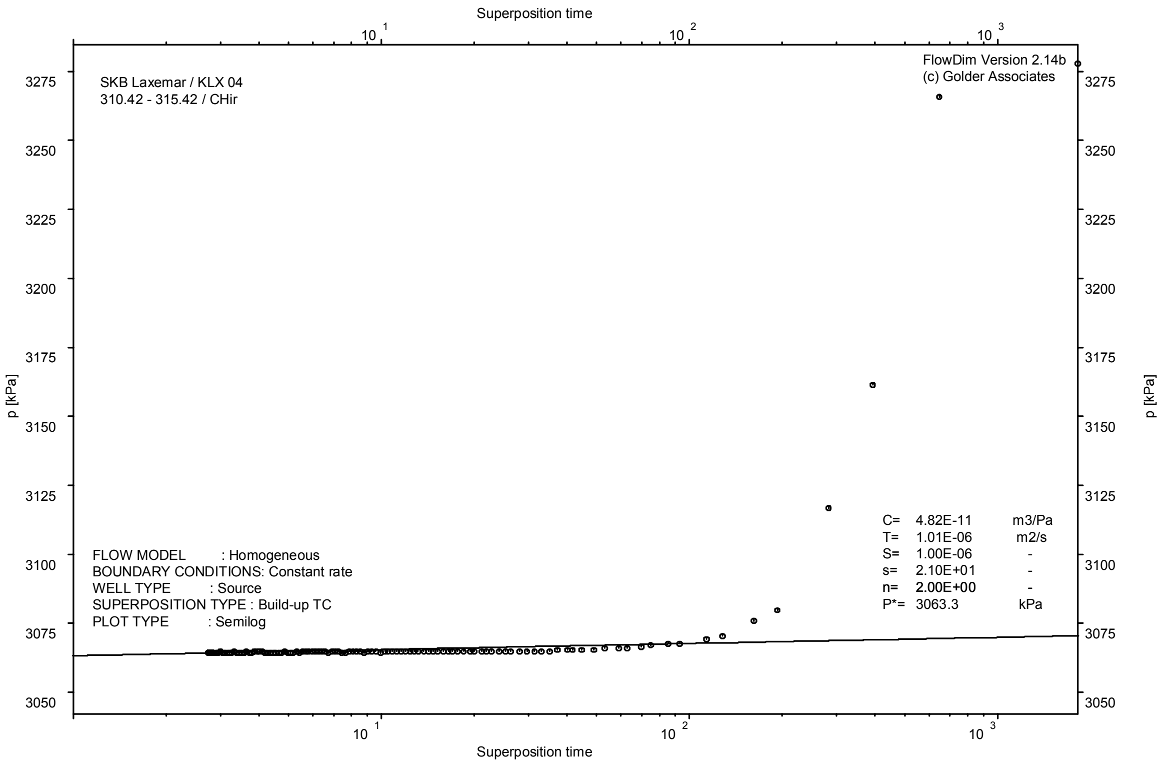
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

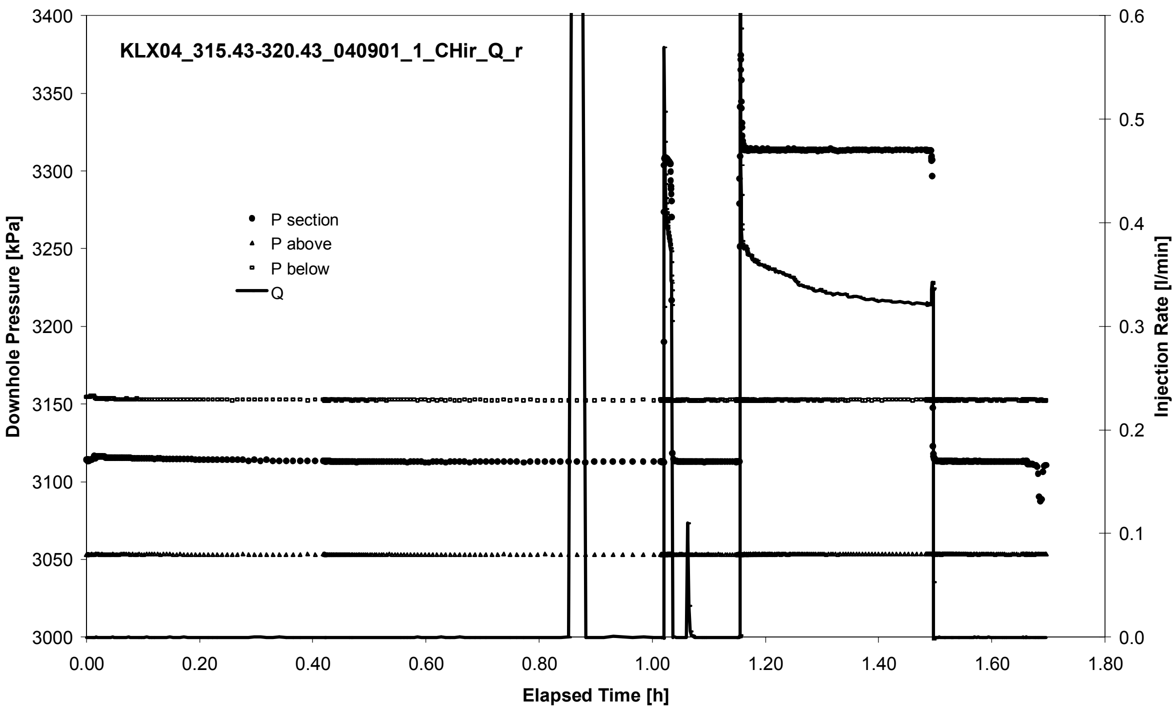


CHIR phase; HORNER match

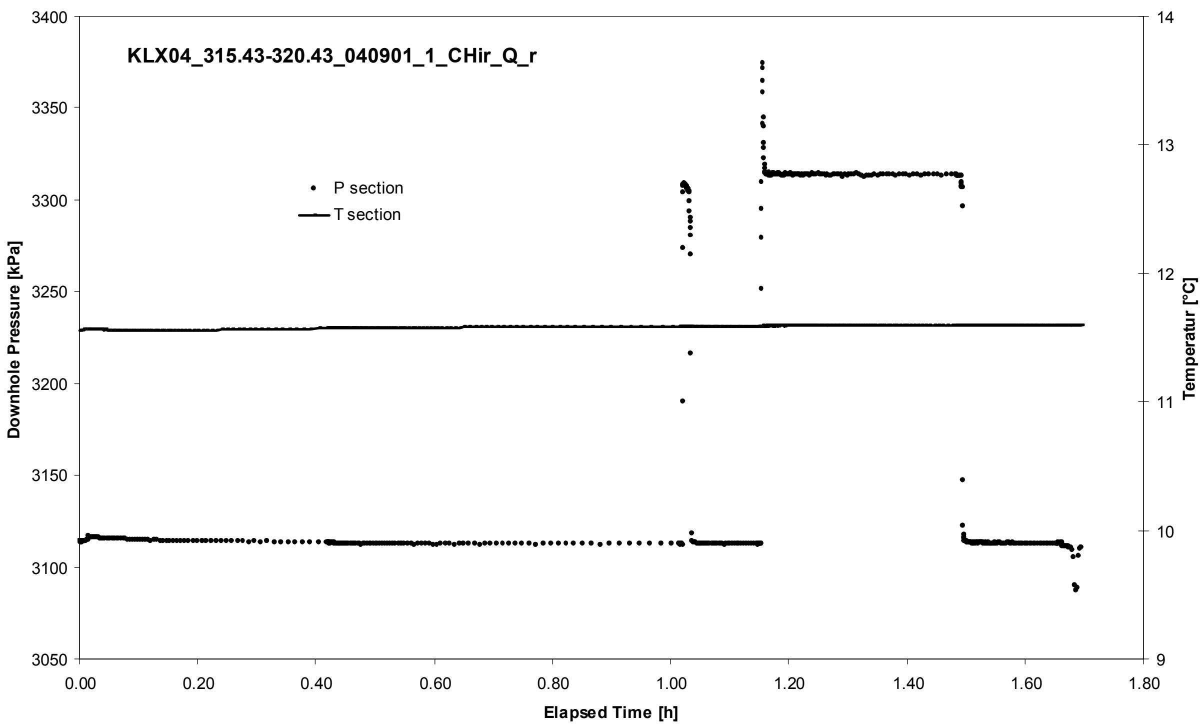
APPENDIX 2-52

Test 315.43 – 320.43 m

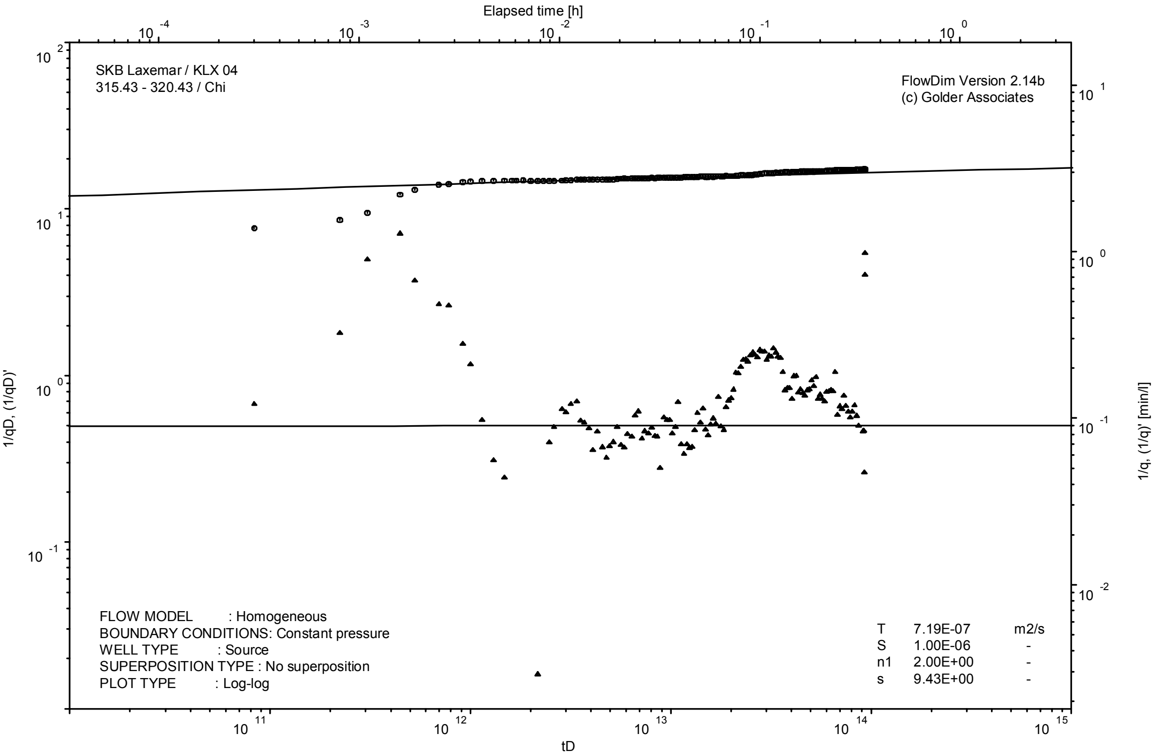
Analysis diagrams



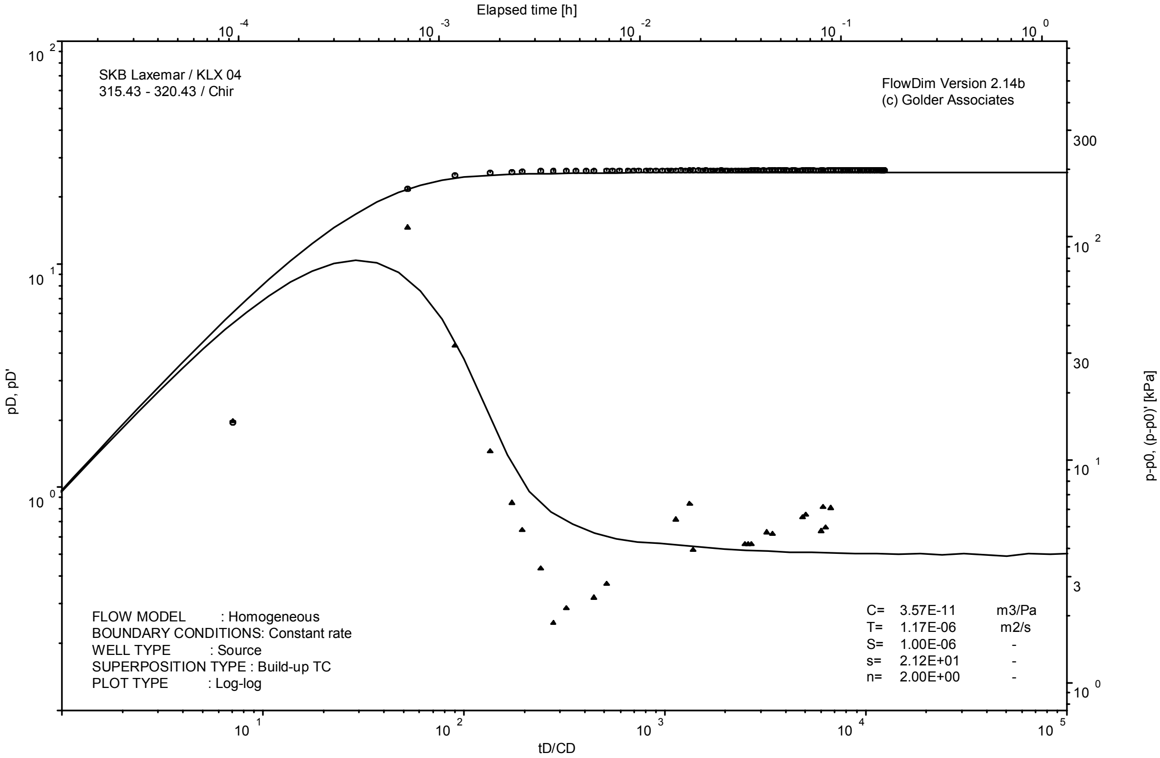
Pressure and flow rate vs. time; cartesian plot



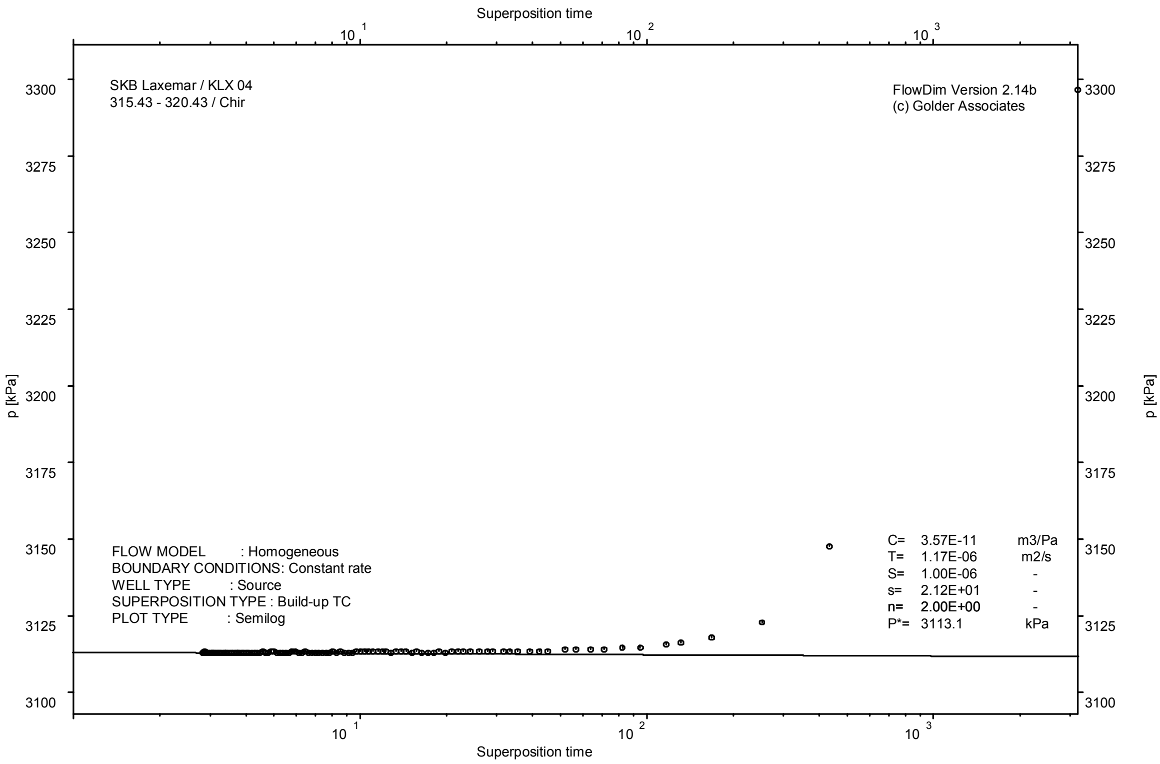
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

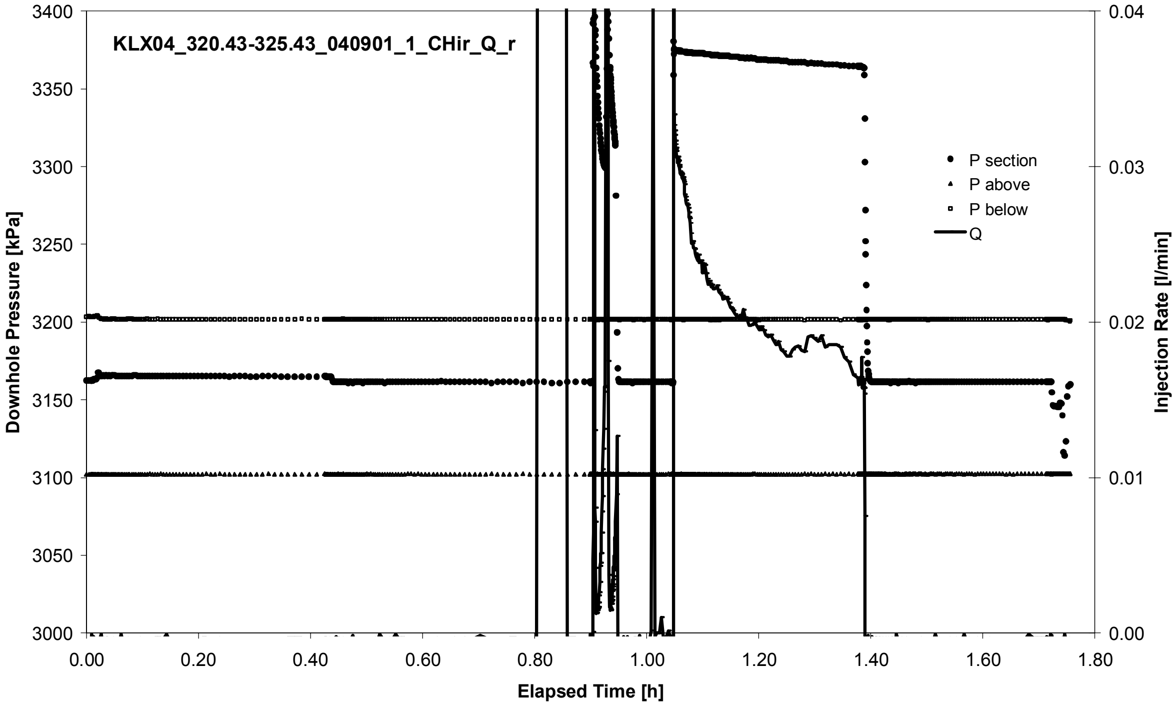


CHIR phase; HORNER match

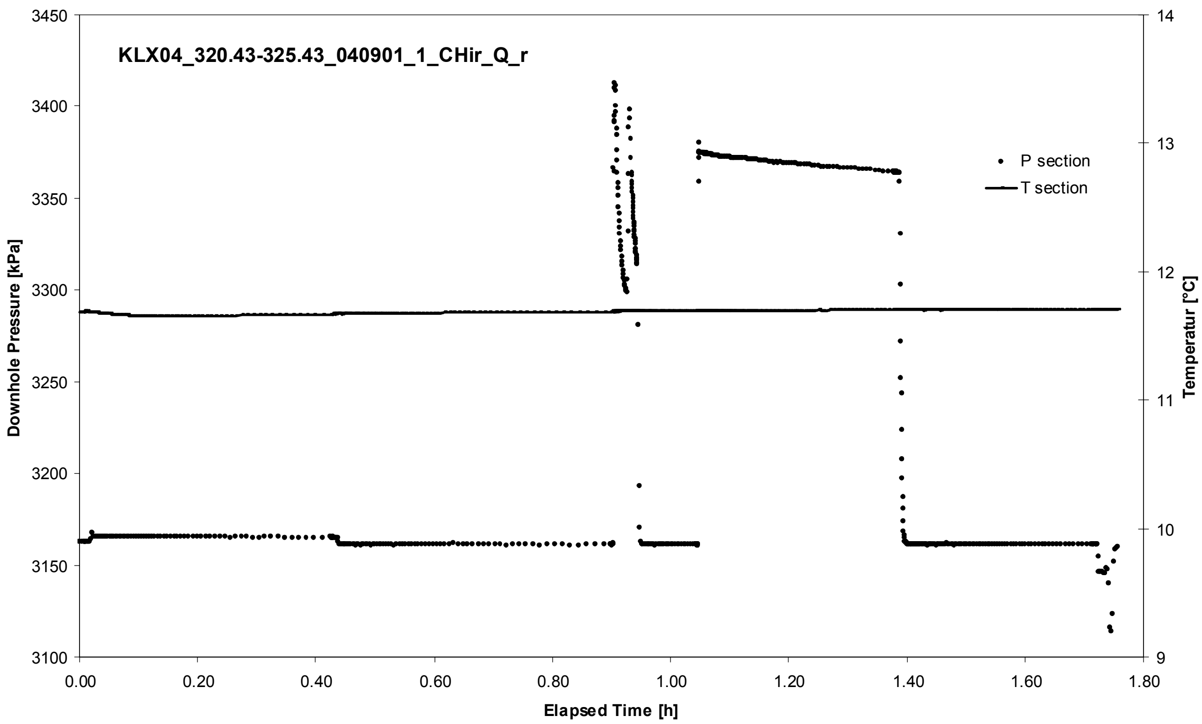
APPENDIX 2-53

Test 320.43 – 325.43 m

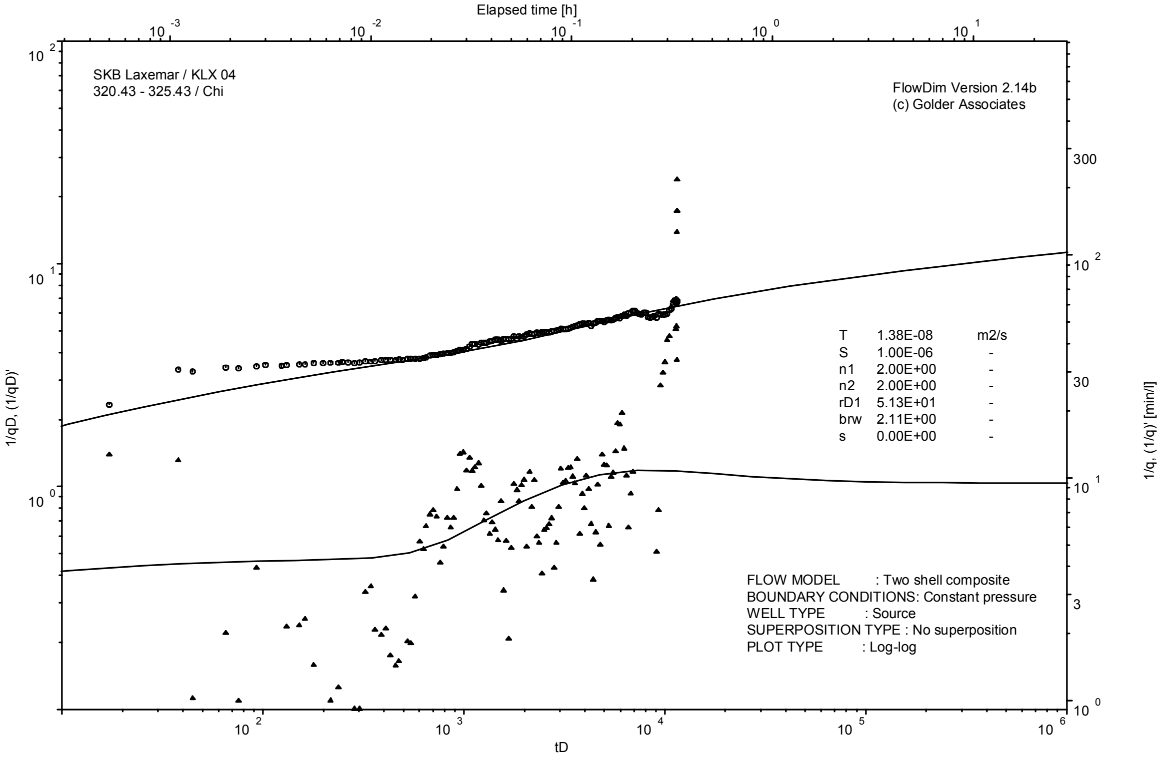
Analysis diagrams



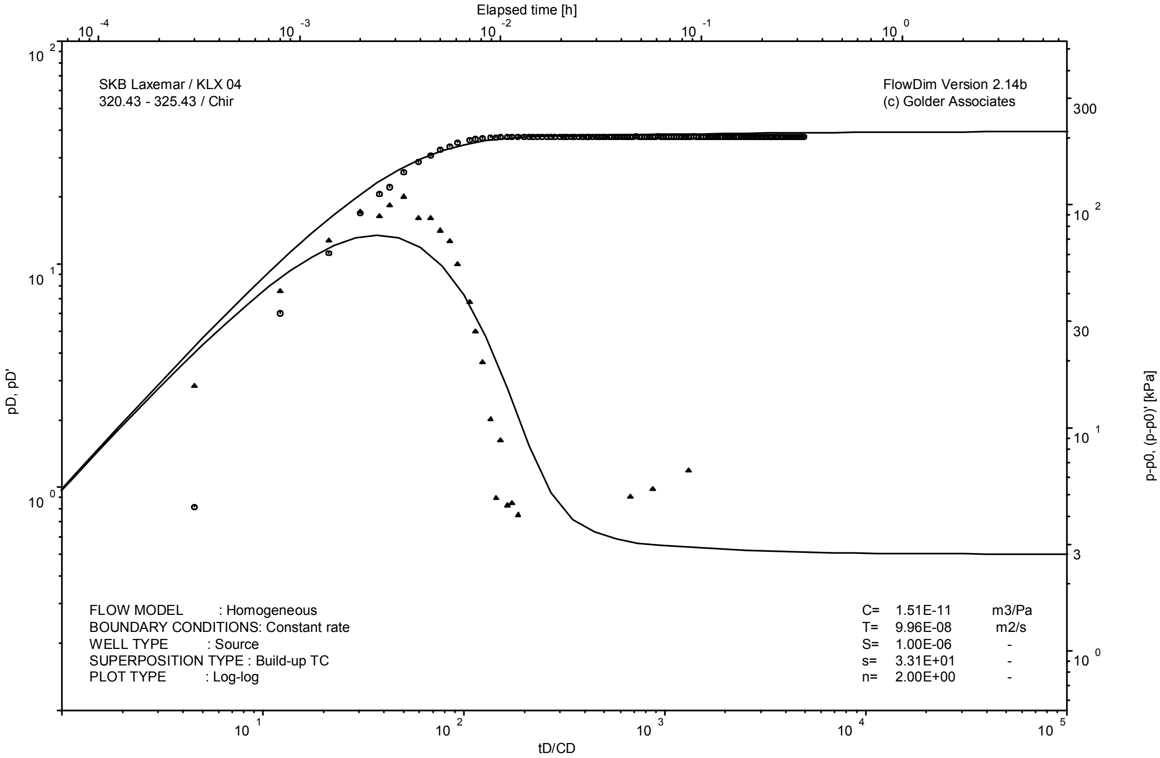
Pressure and flow rate vs. time; cartesian plot



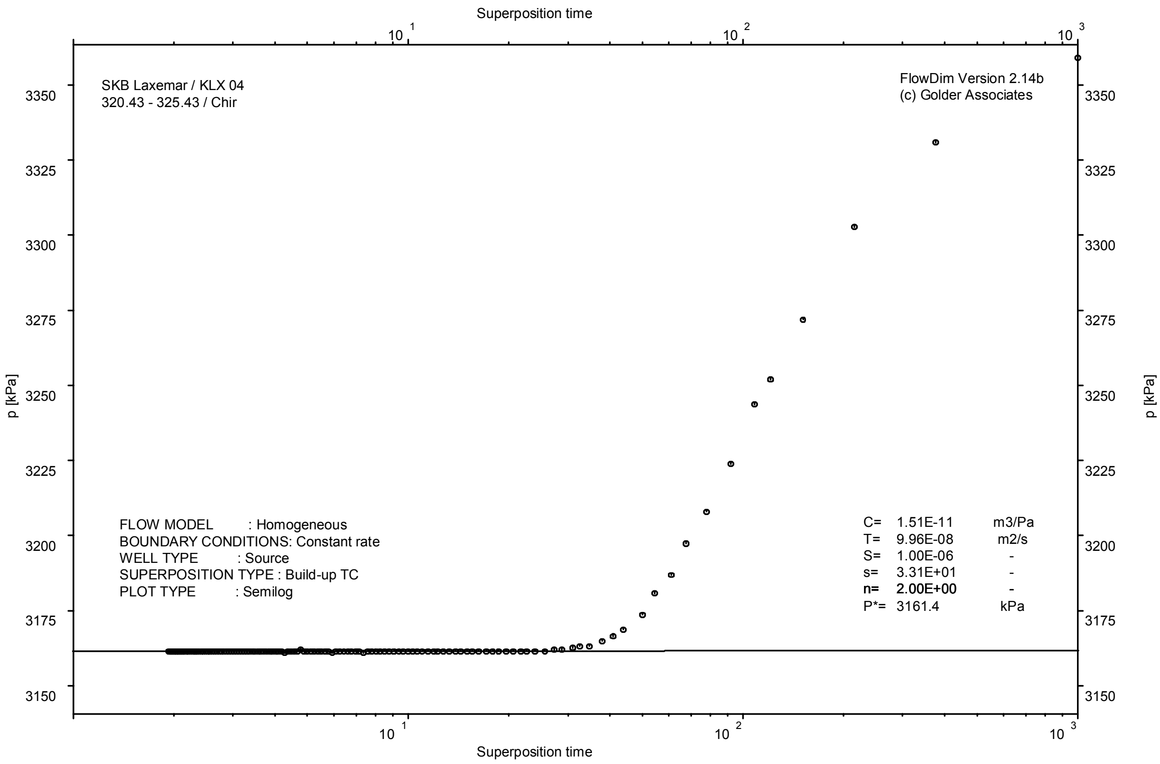
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

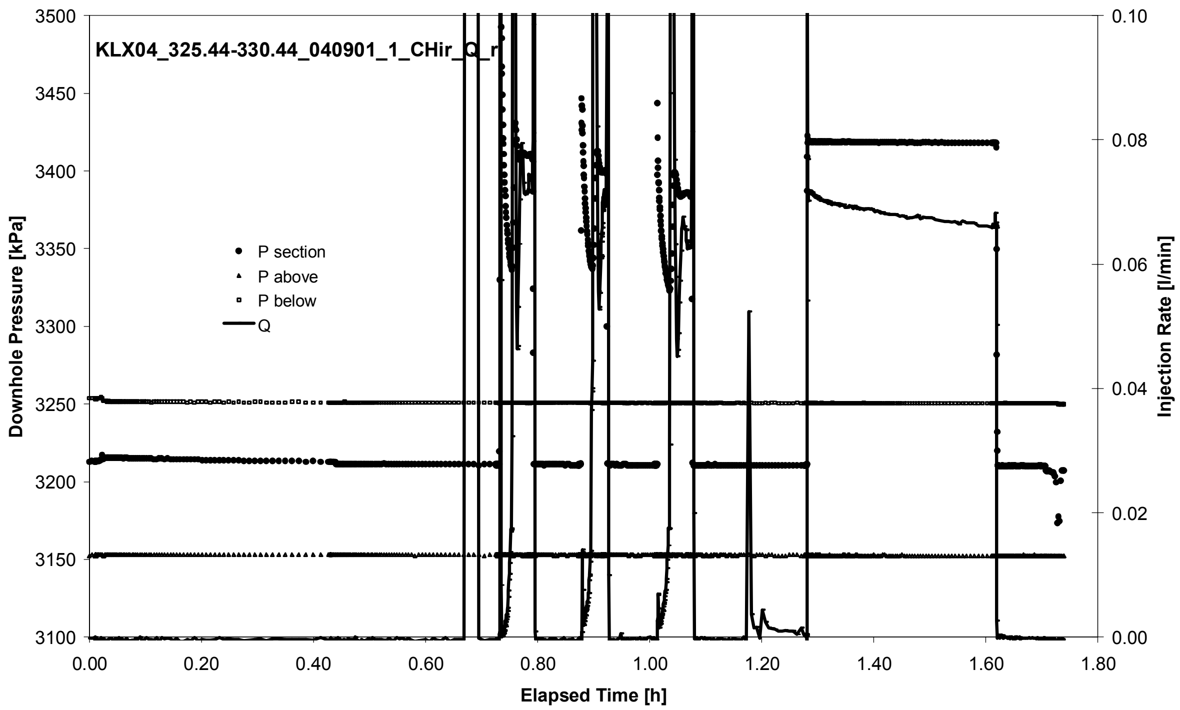


CHIR phase; HORNER match

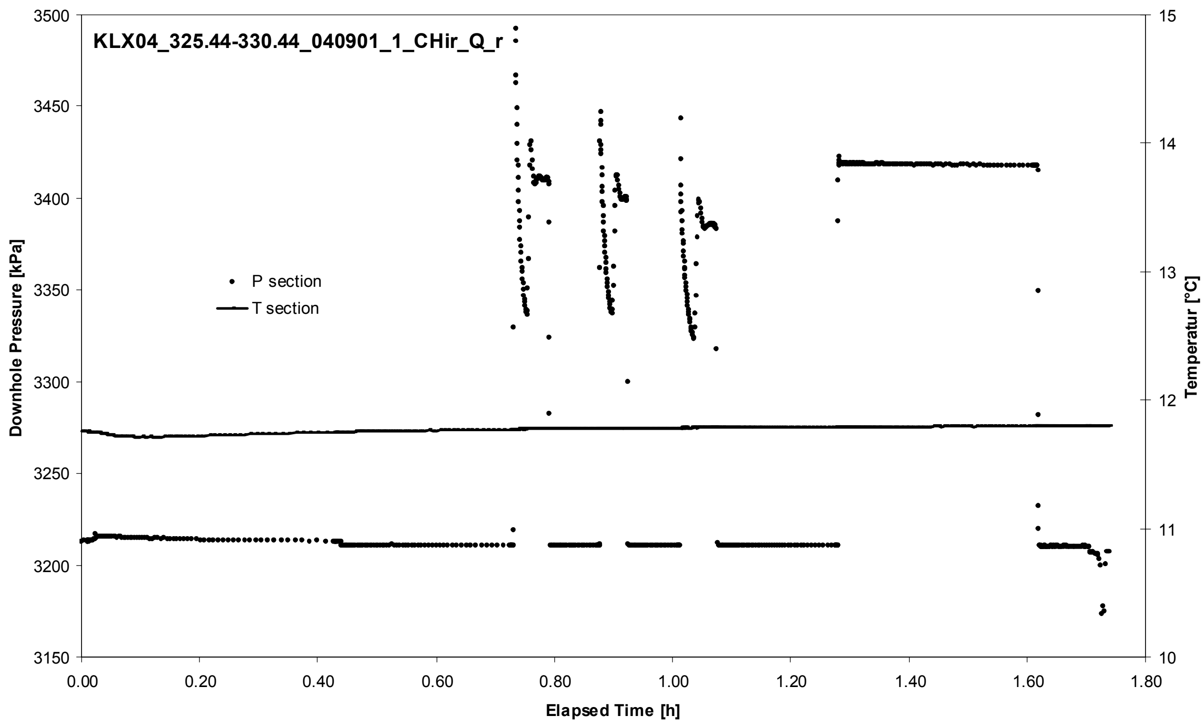
APPENDIX 2-54

Test 325.44 – 330.44 m

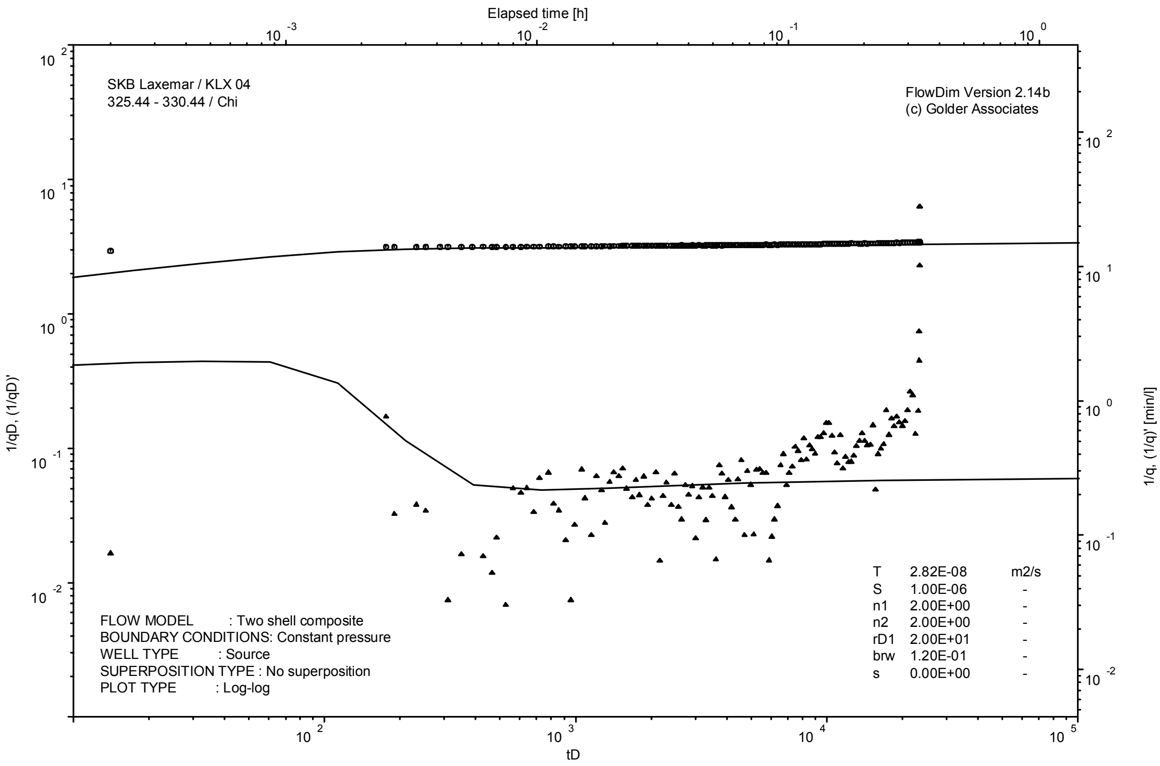
Analysis diagrams



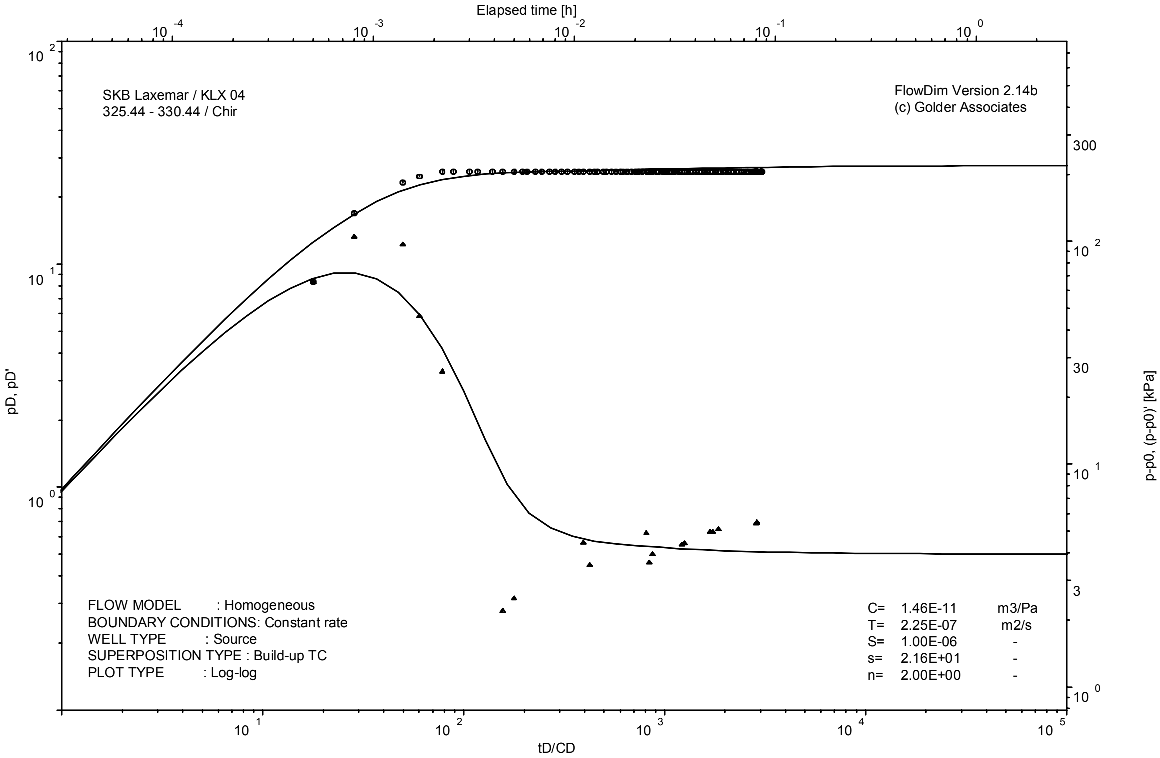
Pressure and flow rate vs. time; cartesian plot



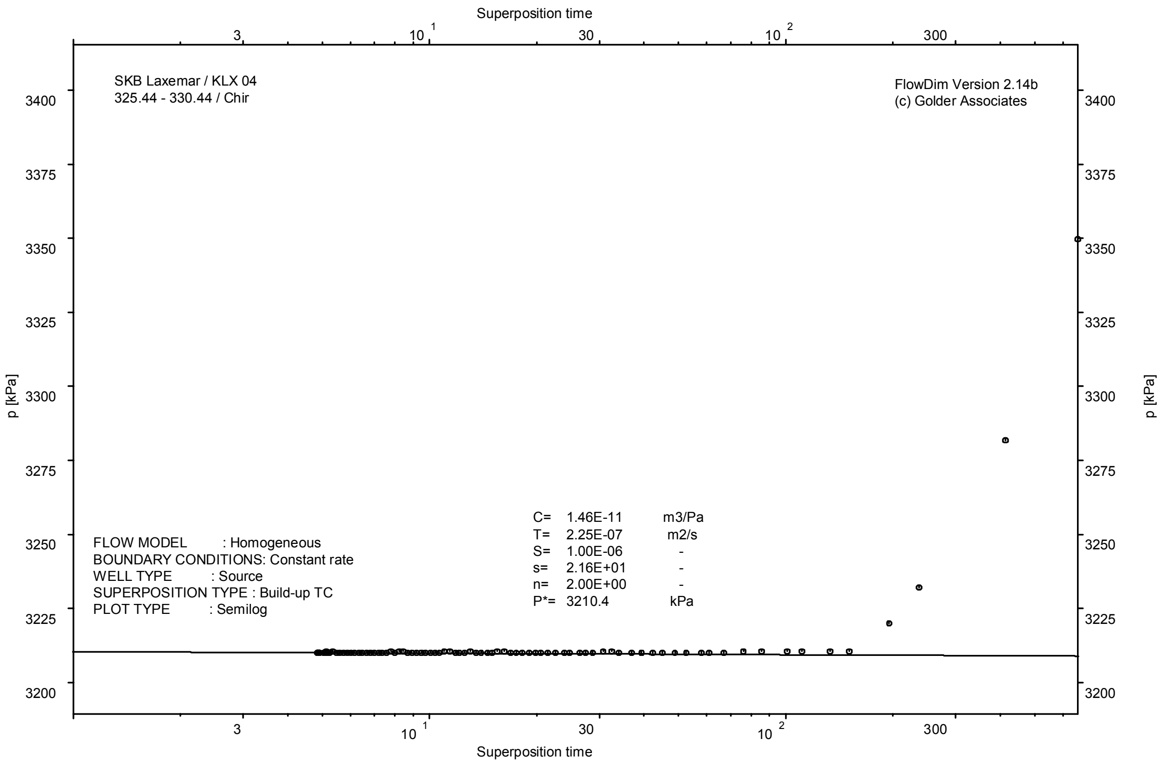
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

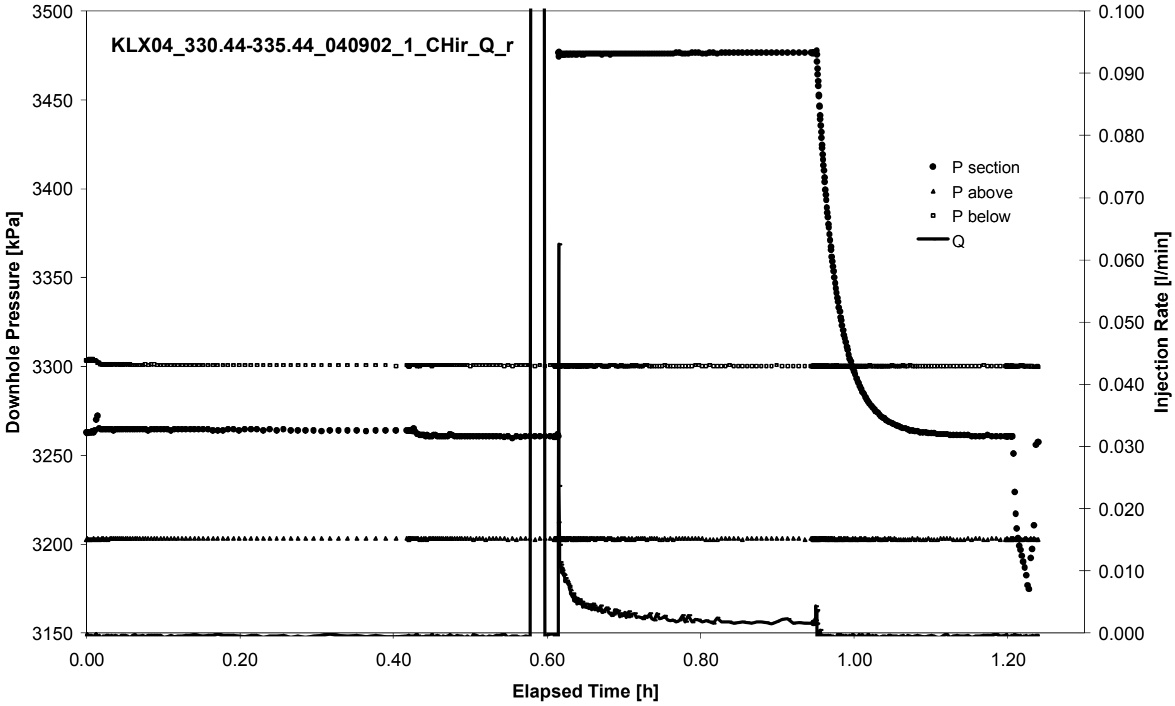


CHIR phase; HORNER match

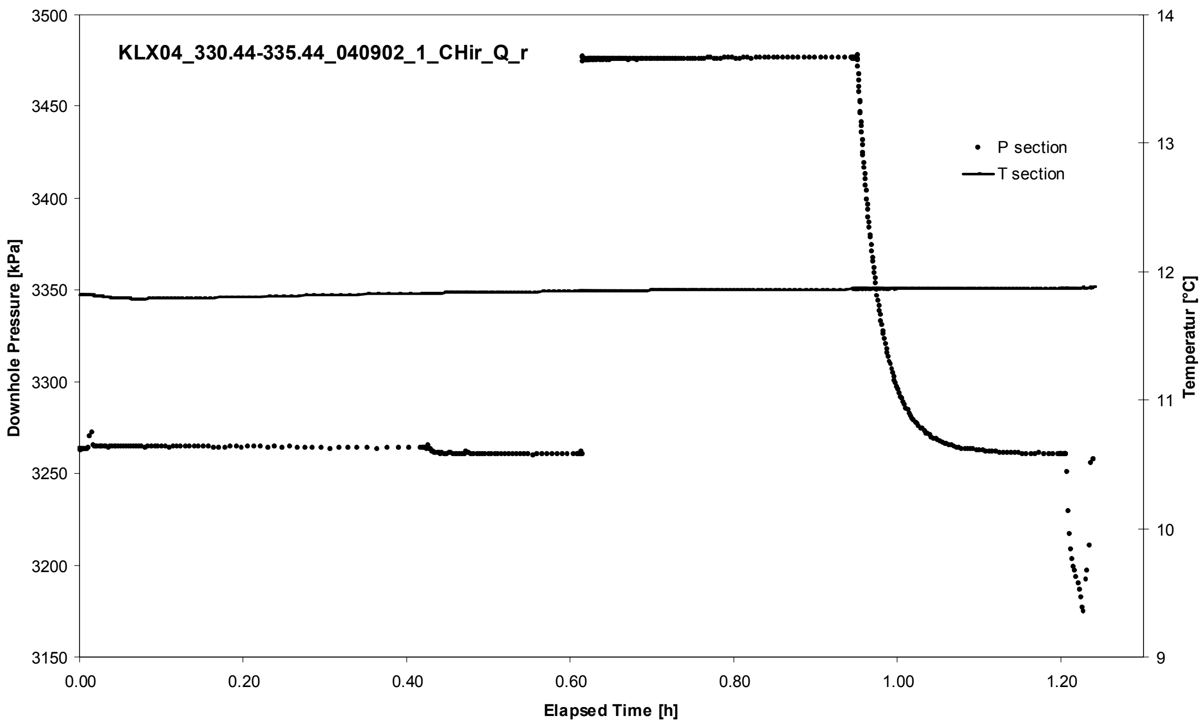
APPENDIX 2-55

Test 330.44 – 335.44 m

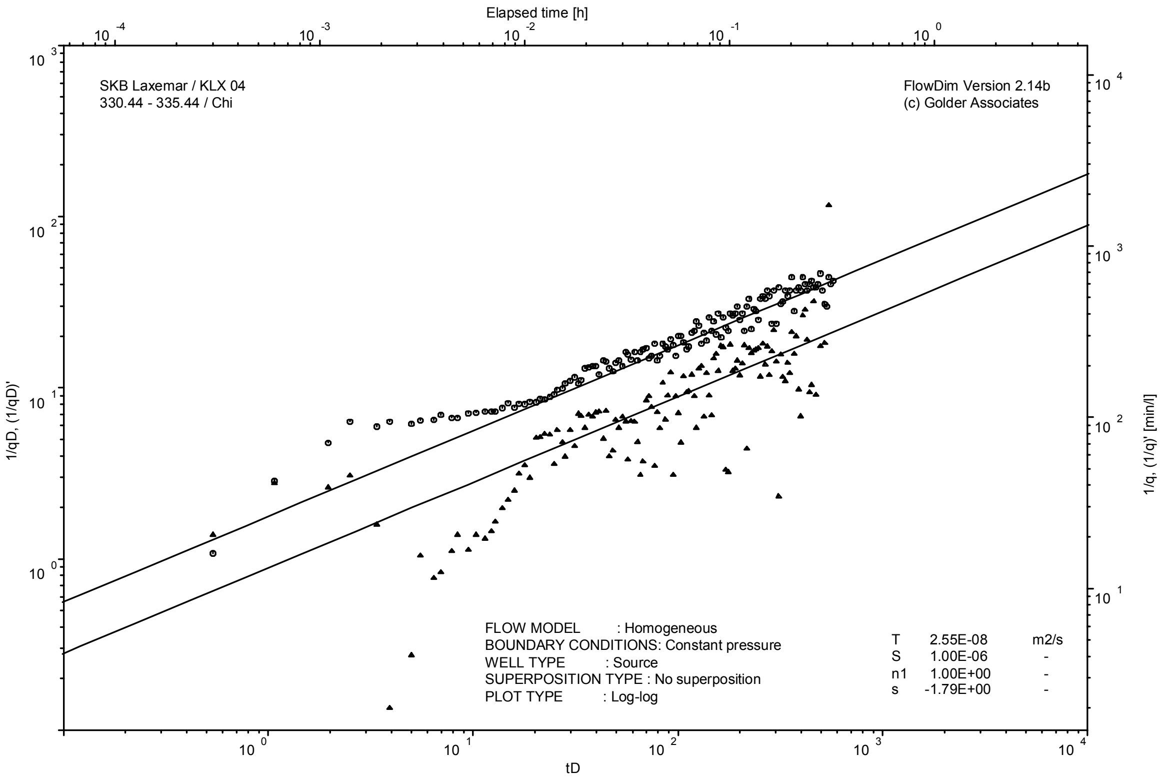
Analysis diagrams



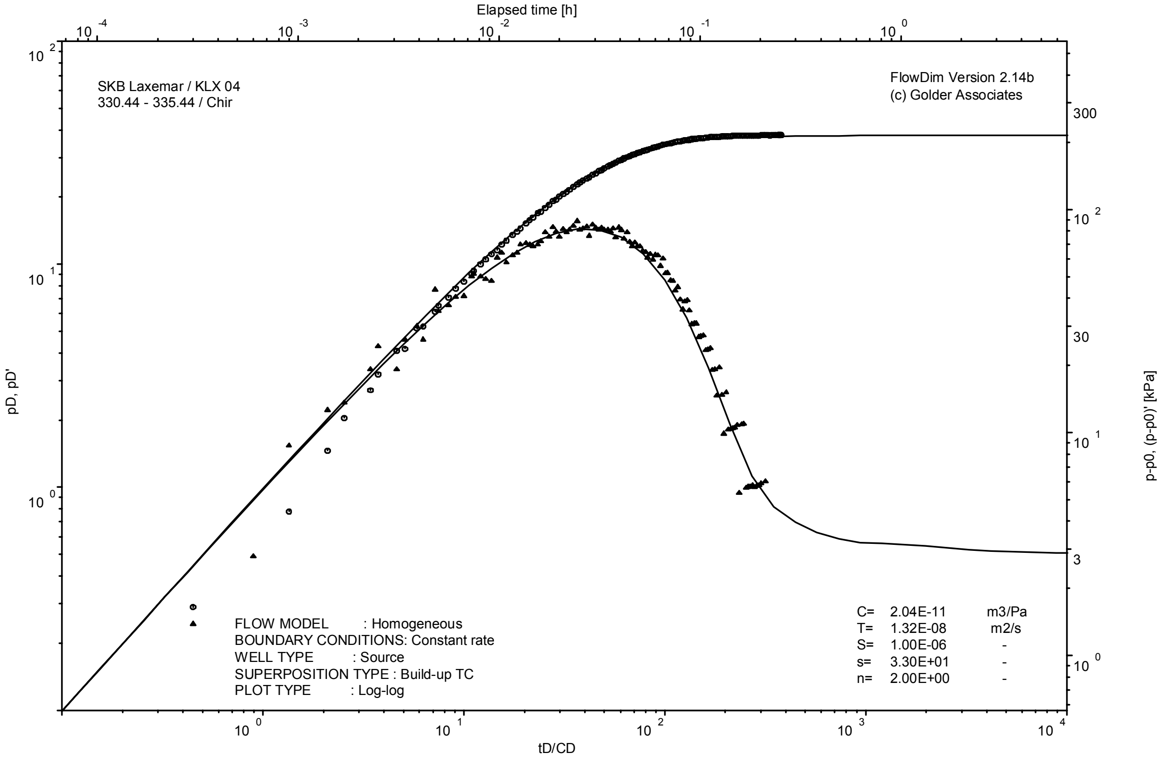
Pressure and flow rate vs. time; cartesian plot



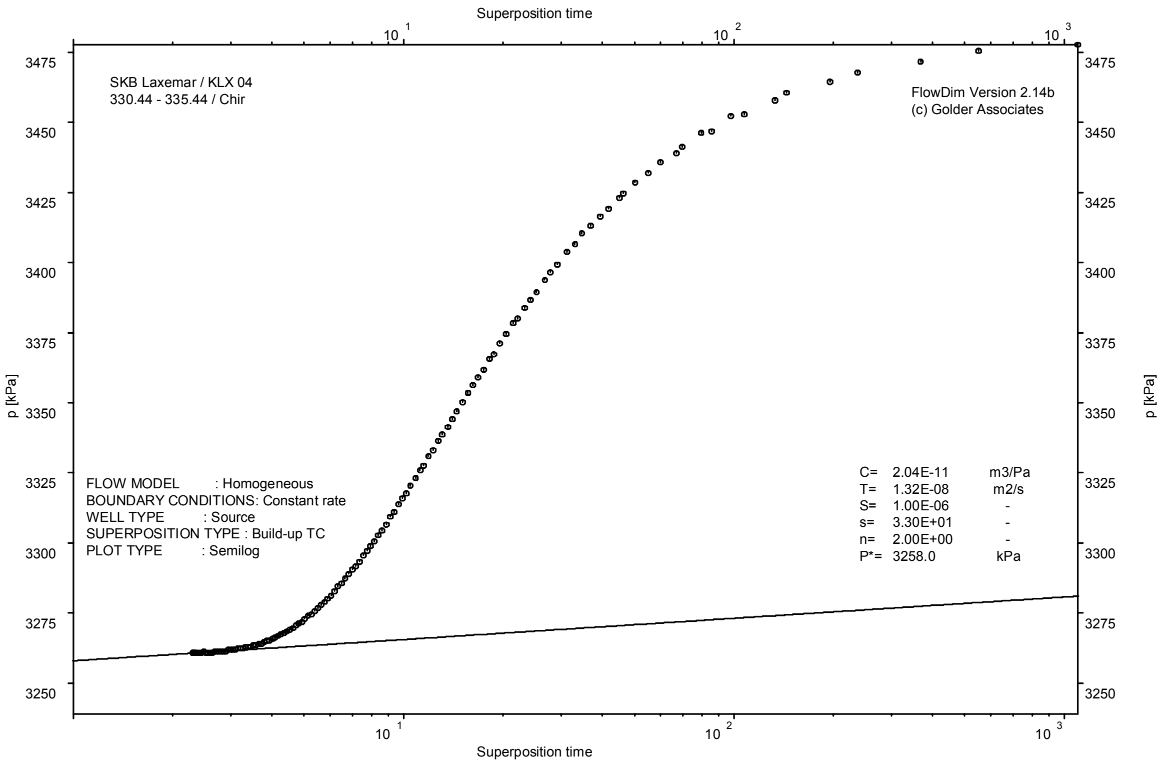
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

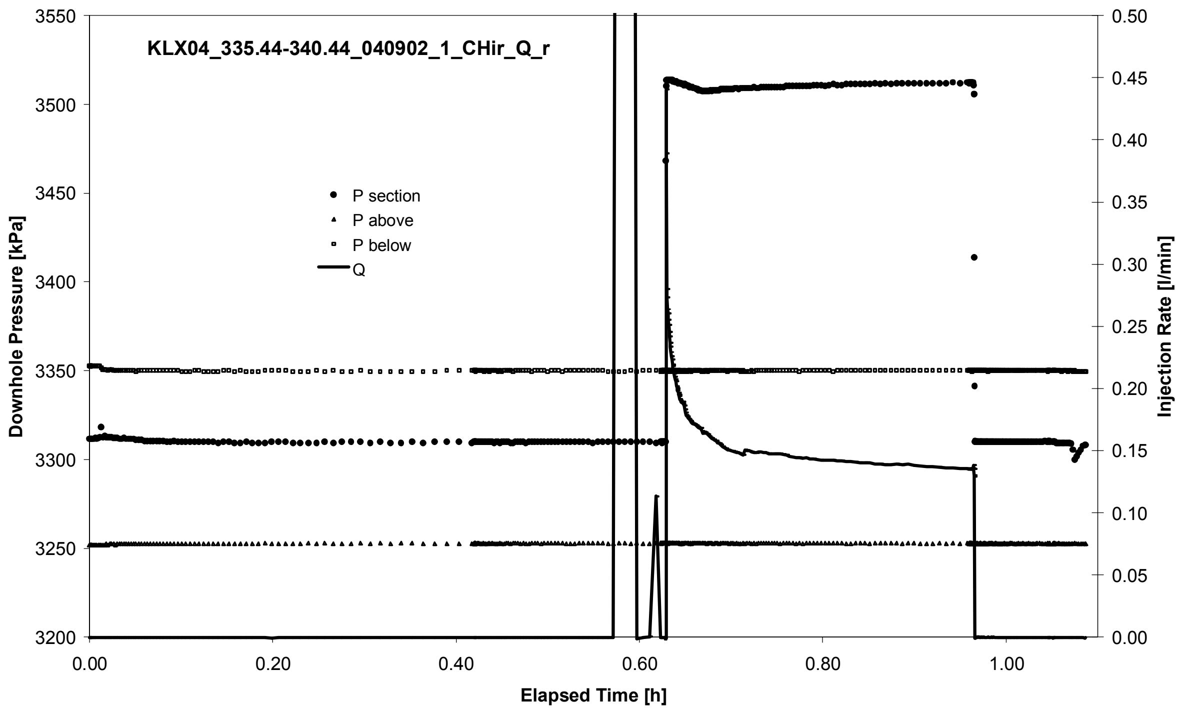


CHIR phase; HORNER match

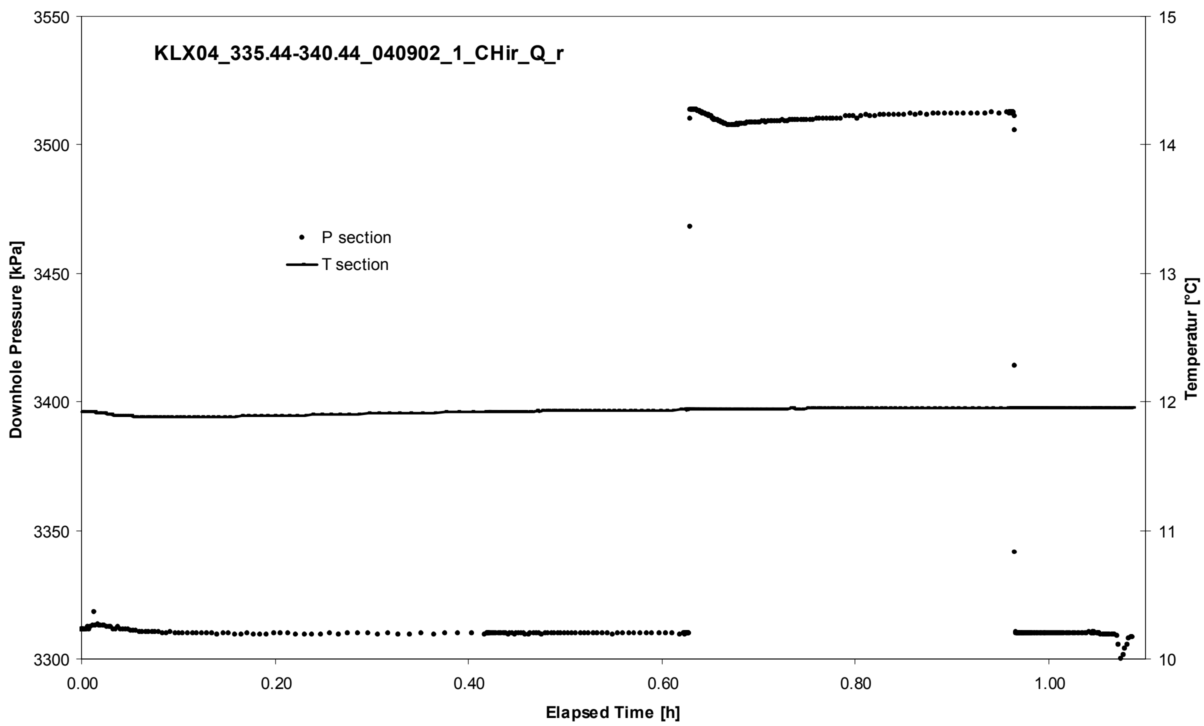
APPENDIX 2-56

Test 335.44 – 340.44 m

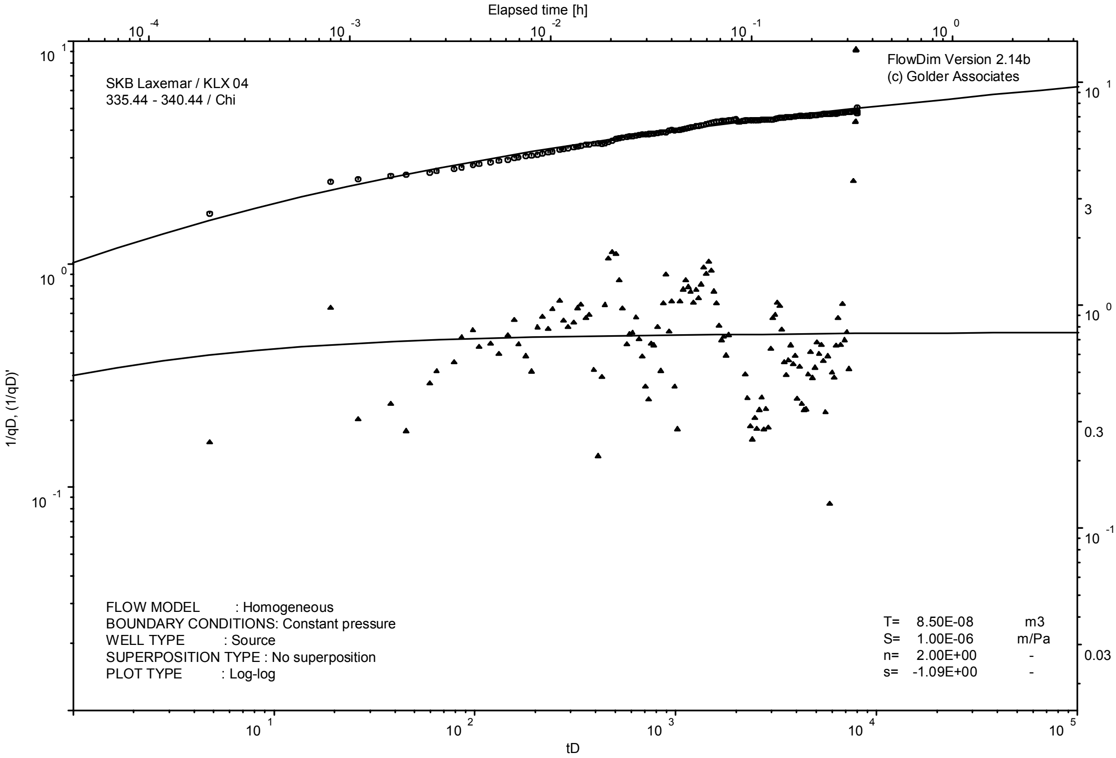
Analysis diagrams



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match

Not Analysed

CHIR phase; log-log match

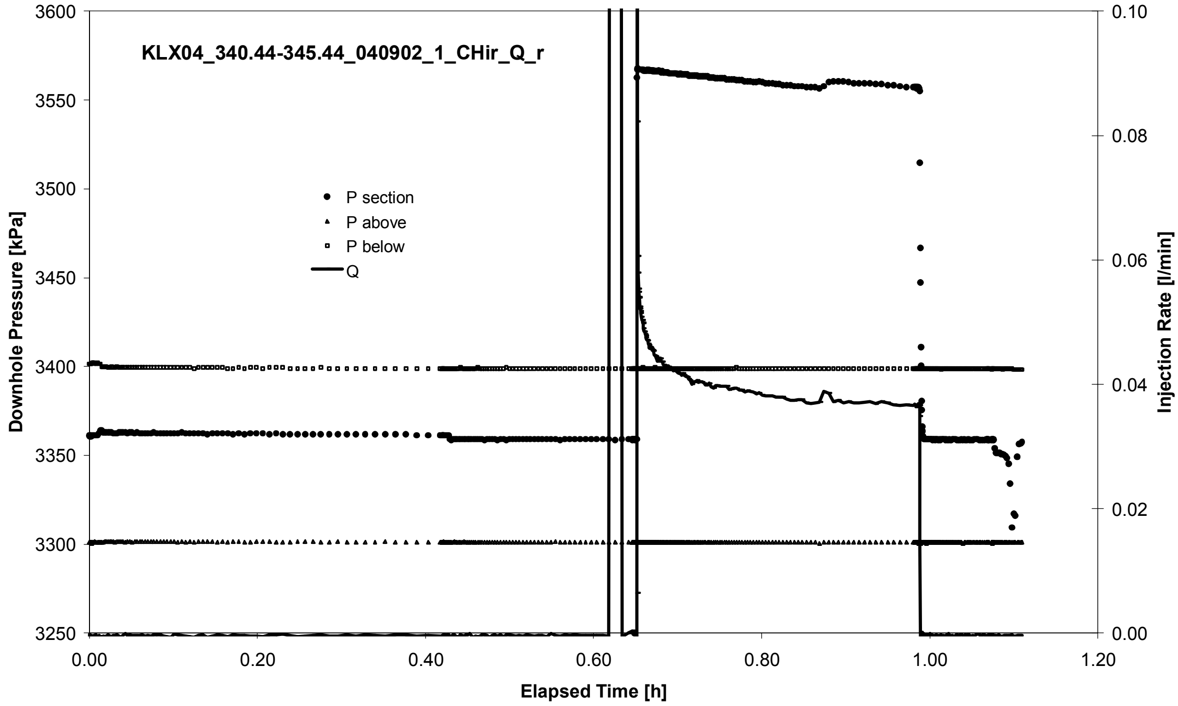
Not Analysed

CHIR phase; HORNER match

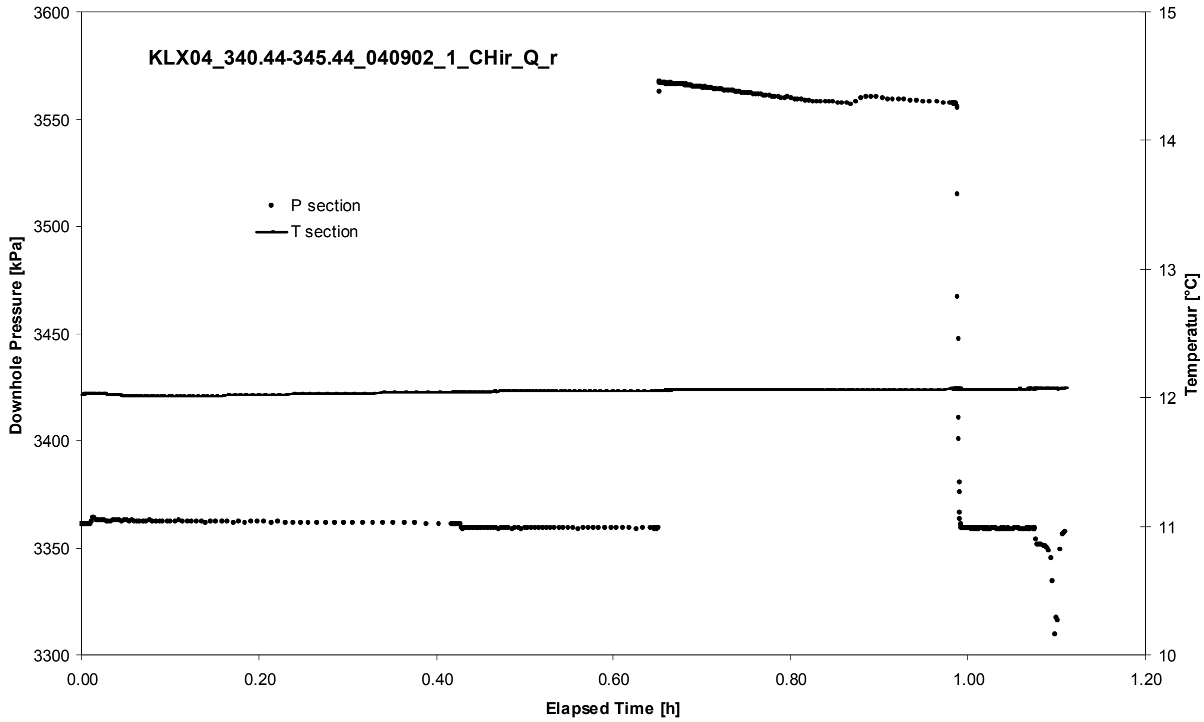
APPENDIX 2-57

Test 340.44 – 345.44 m

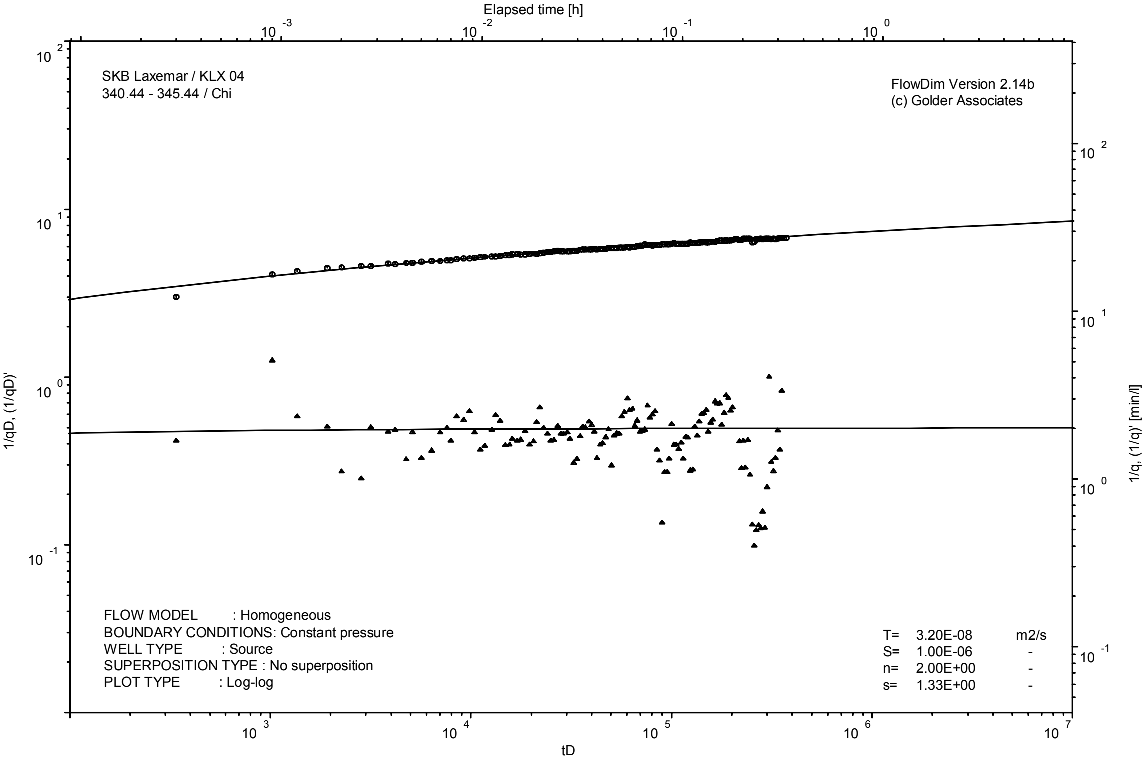
Analysis diagrams



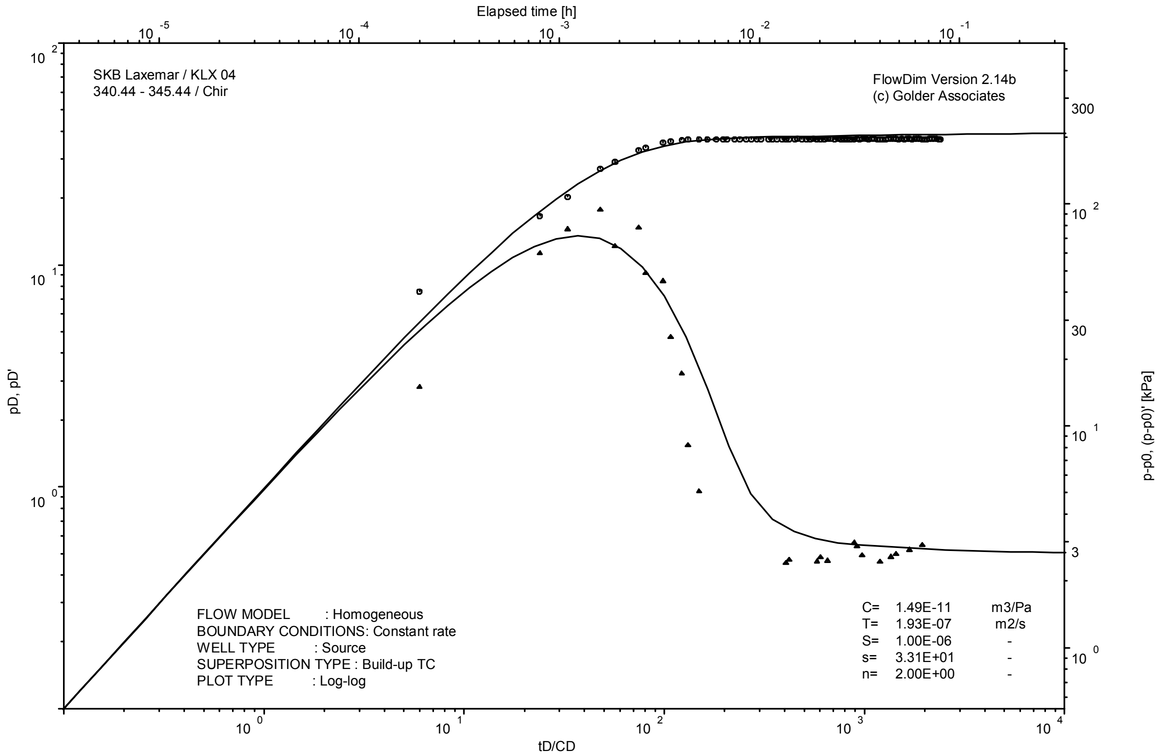
Pressure and flow rate vs. time; cartesian plot



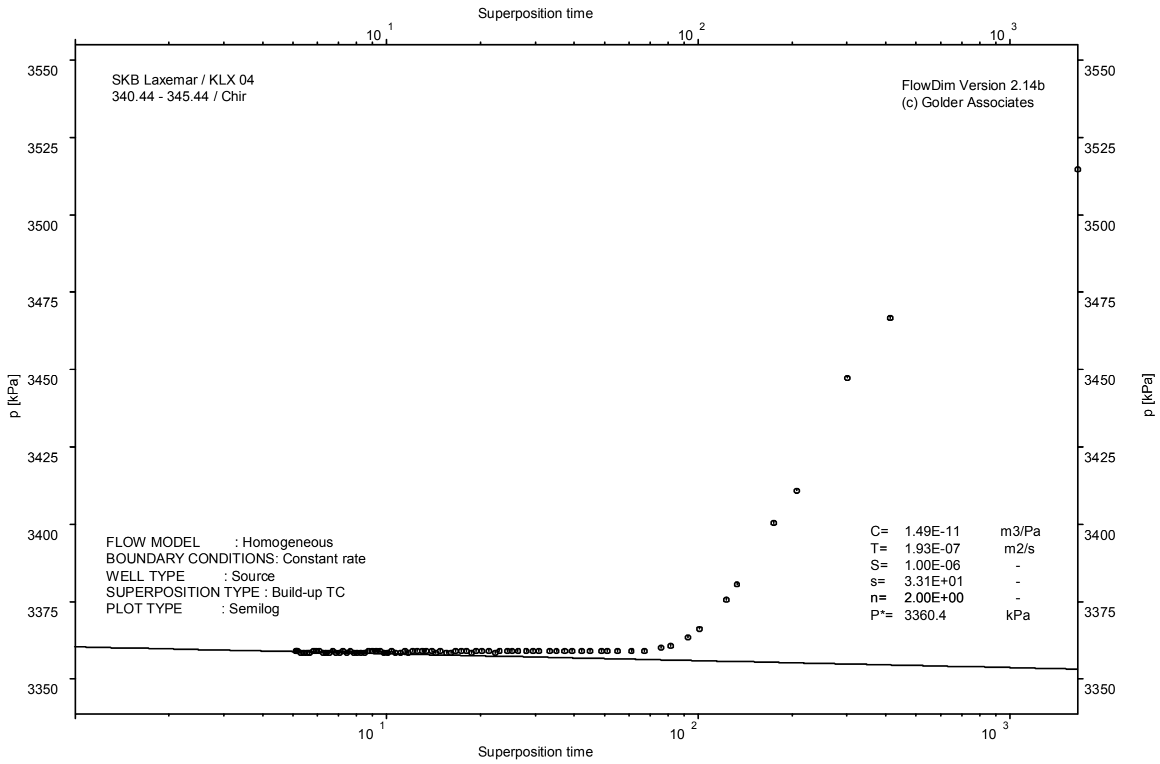
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

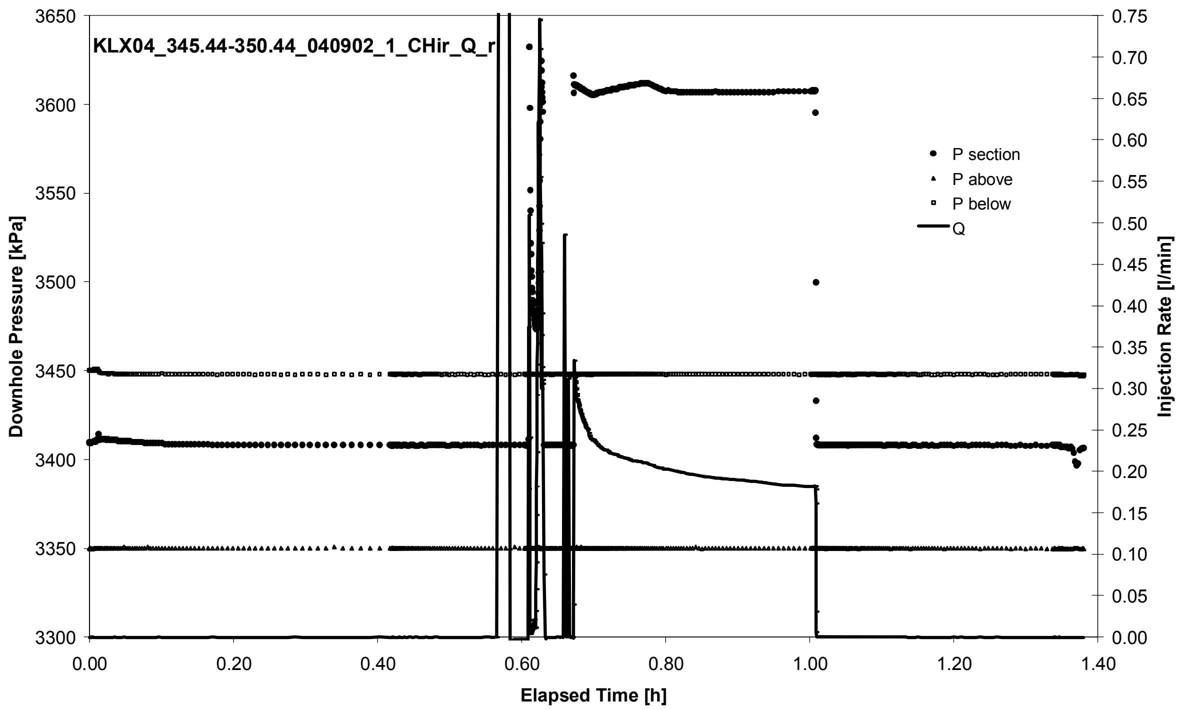


CHIR phase; HORNER match

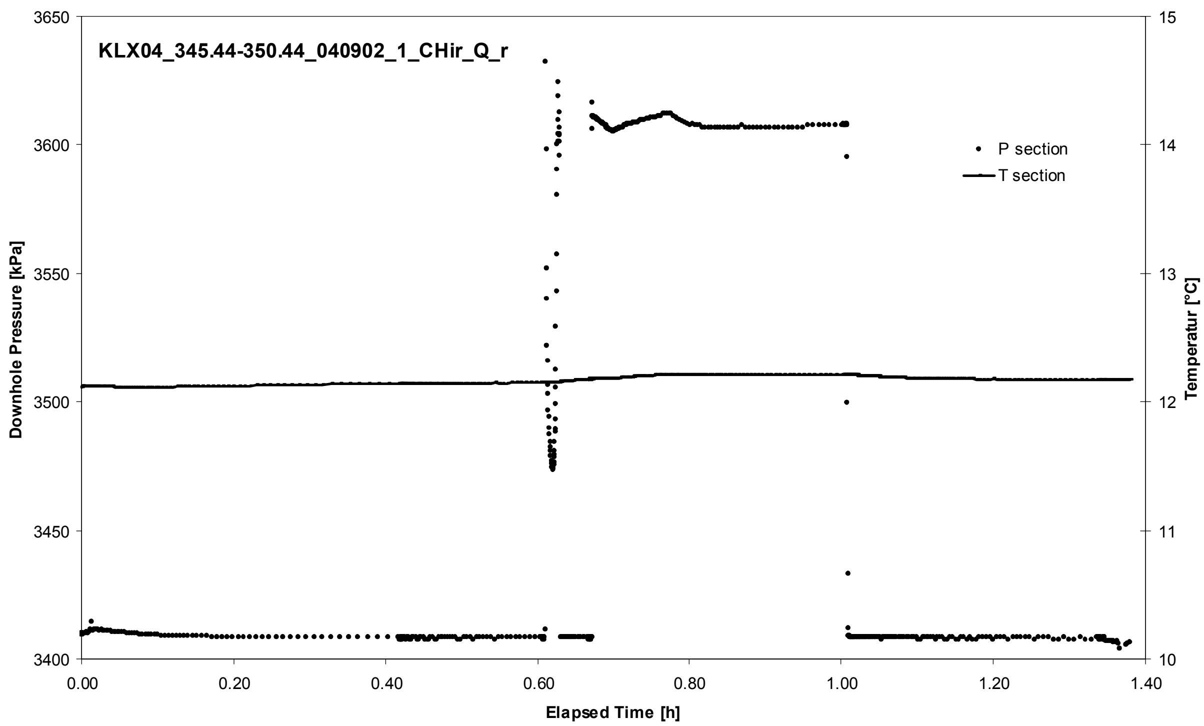
APPENDIX 2-58

Test 345.44 – 350.44 m

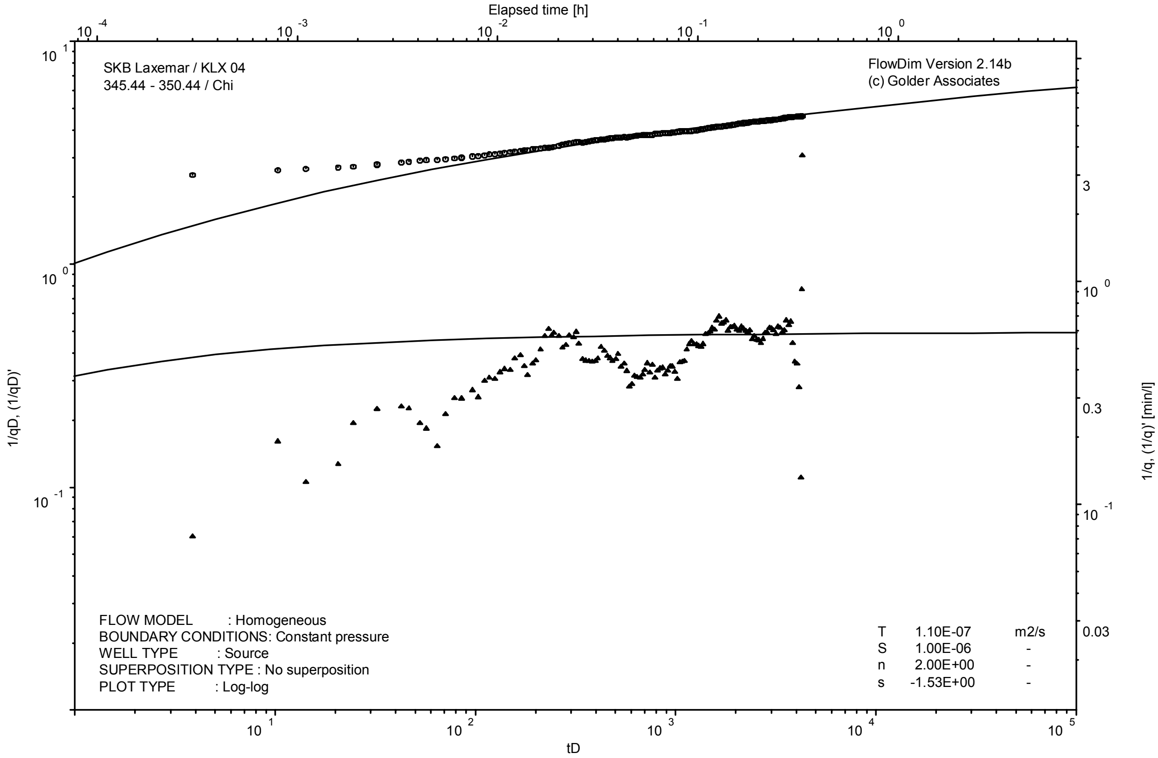
Analysis diagrams



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match

Not Analysed

CHIR phase; log-log match

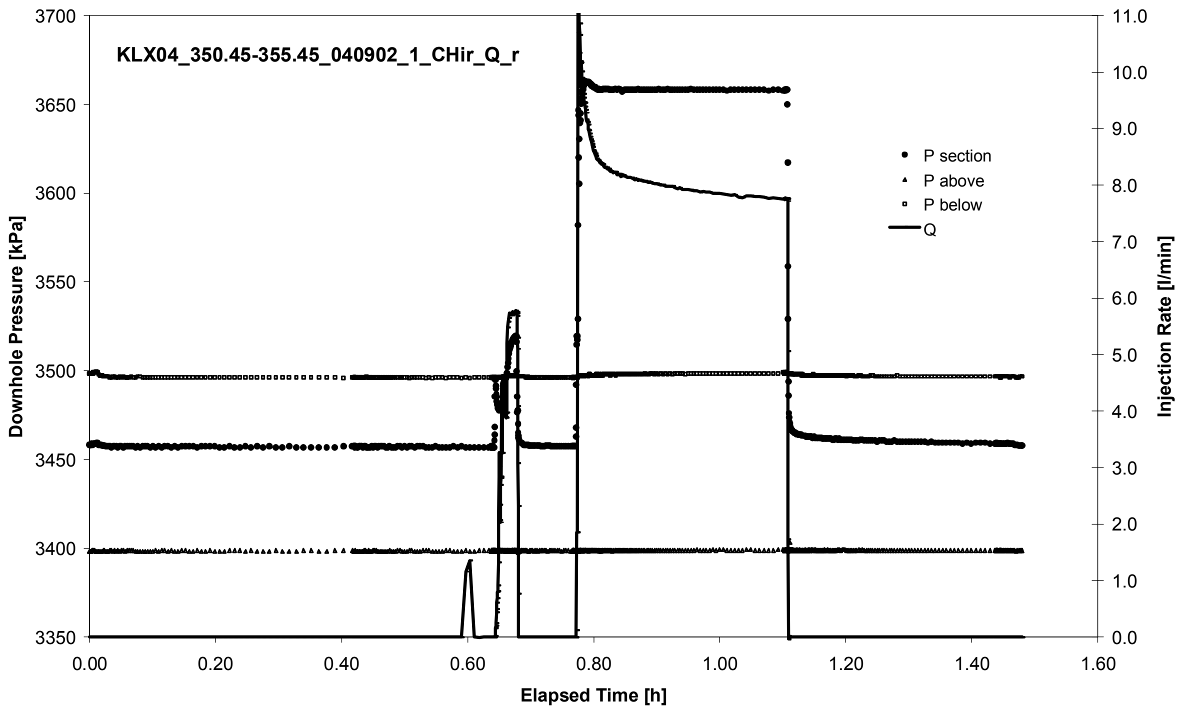
Not Analysed

CHIR phase; HORNER match

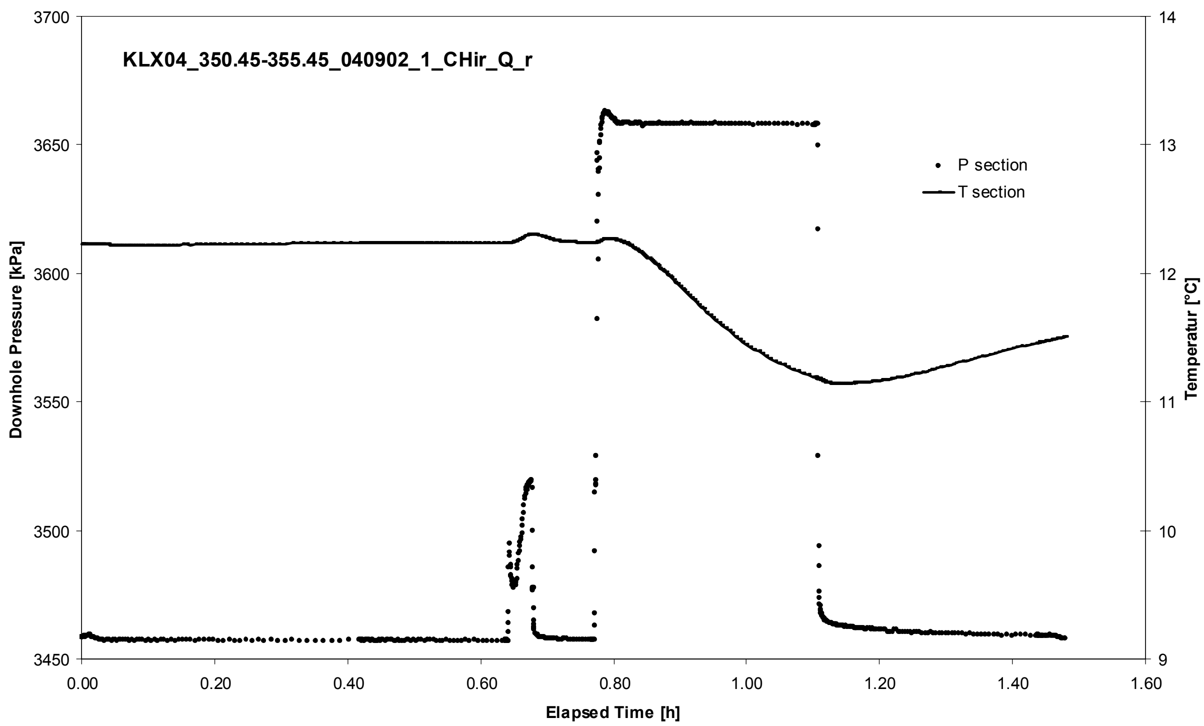
APPENDIX 2-59

Test 350.45 – 355.45 m

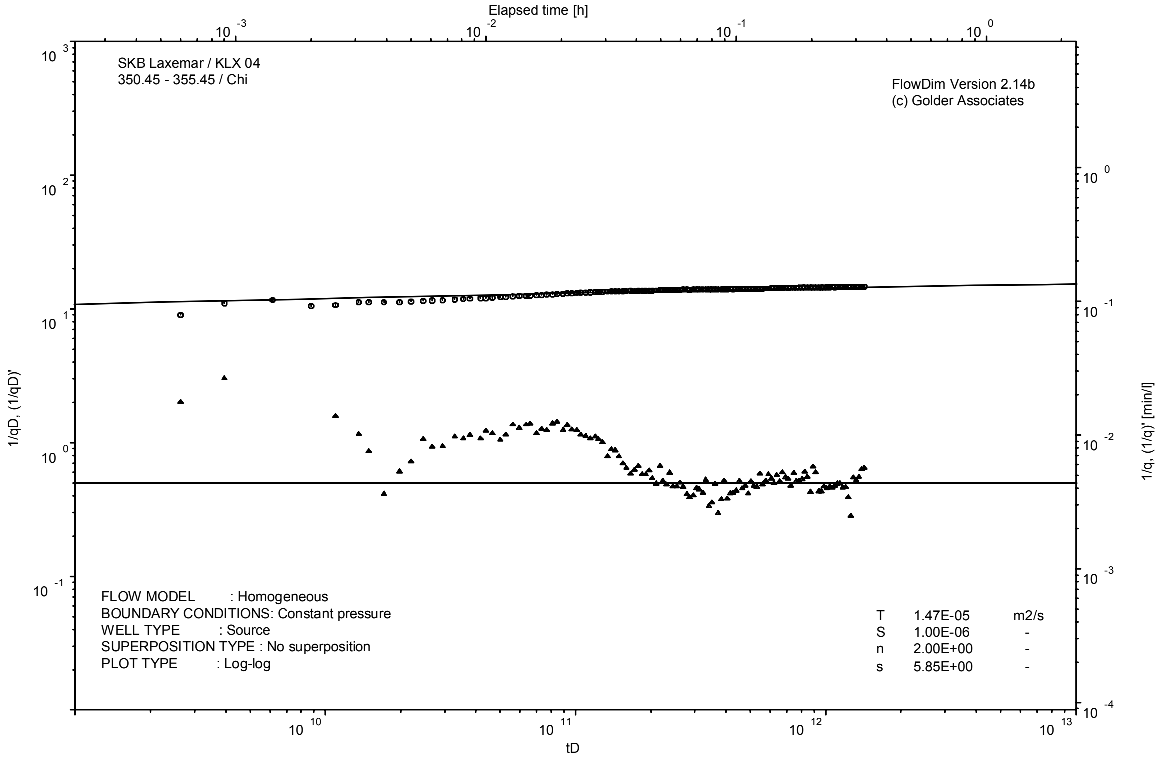
Analysis diagrams



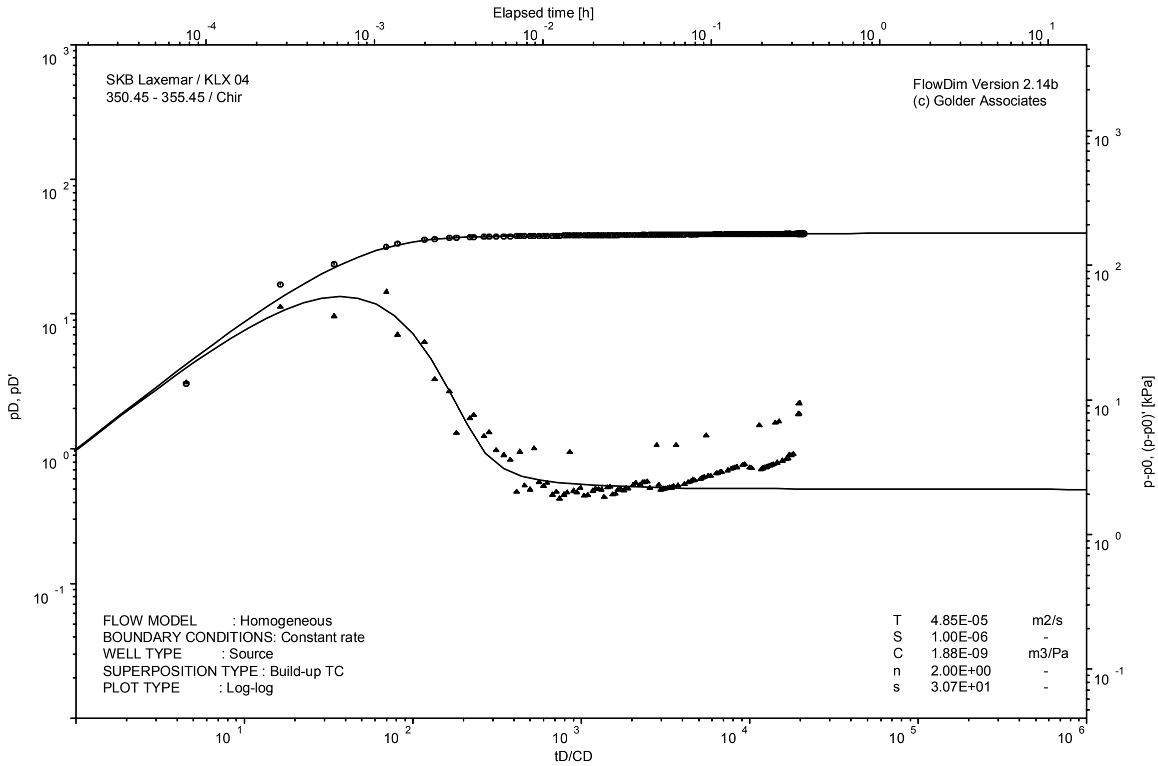
Pressure and flow rate vs. time; cartesian plot



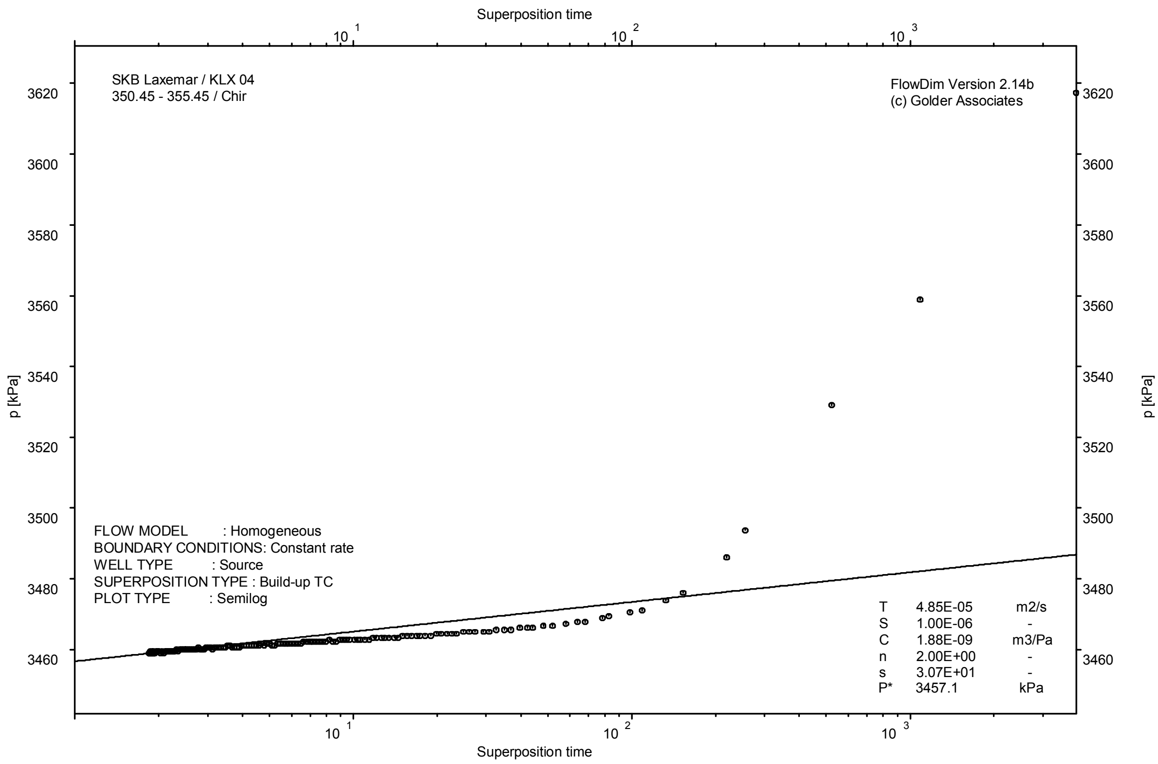
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

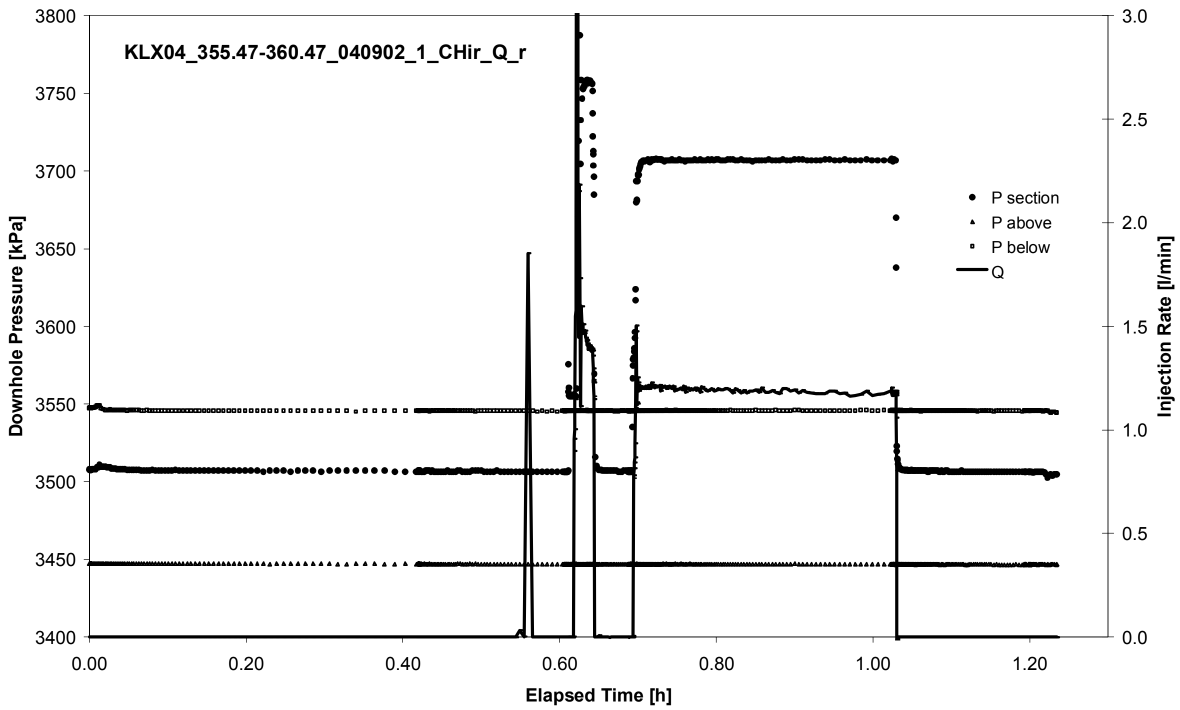


CHIR phase; HORNER match

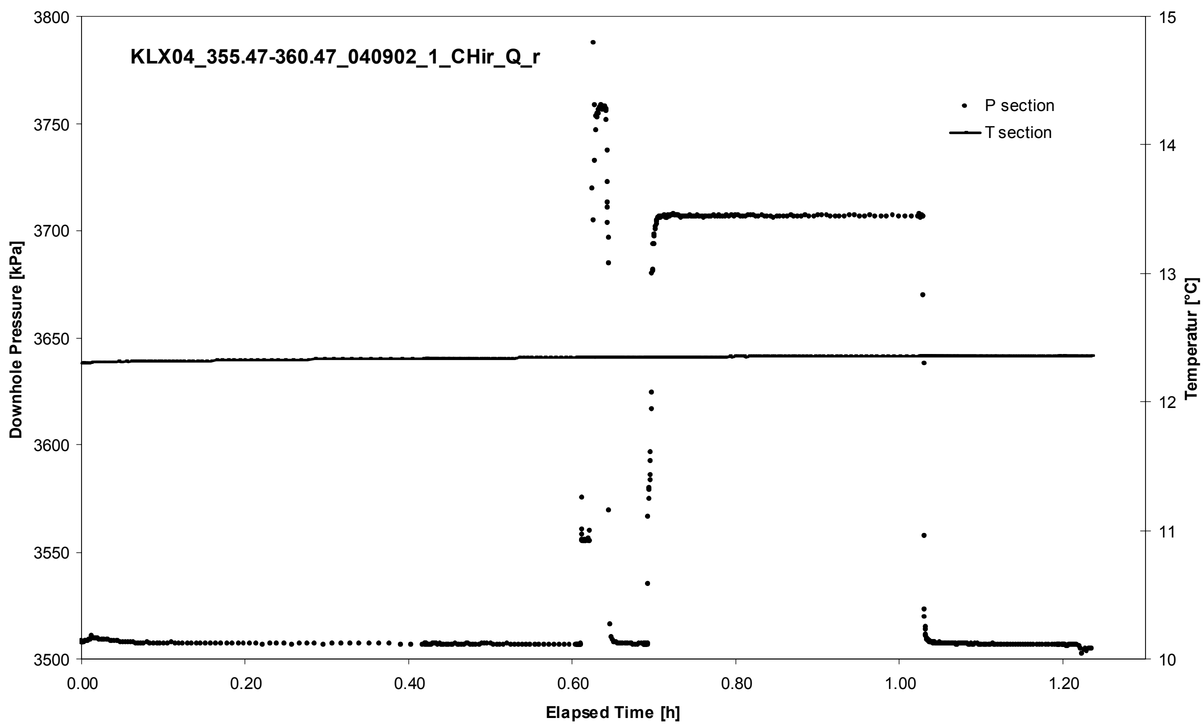
APPENDIX 2-60

Test 355.47 – 360.47 m

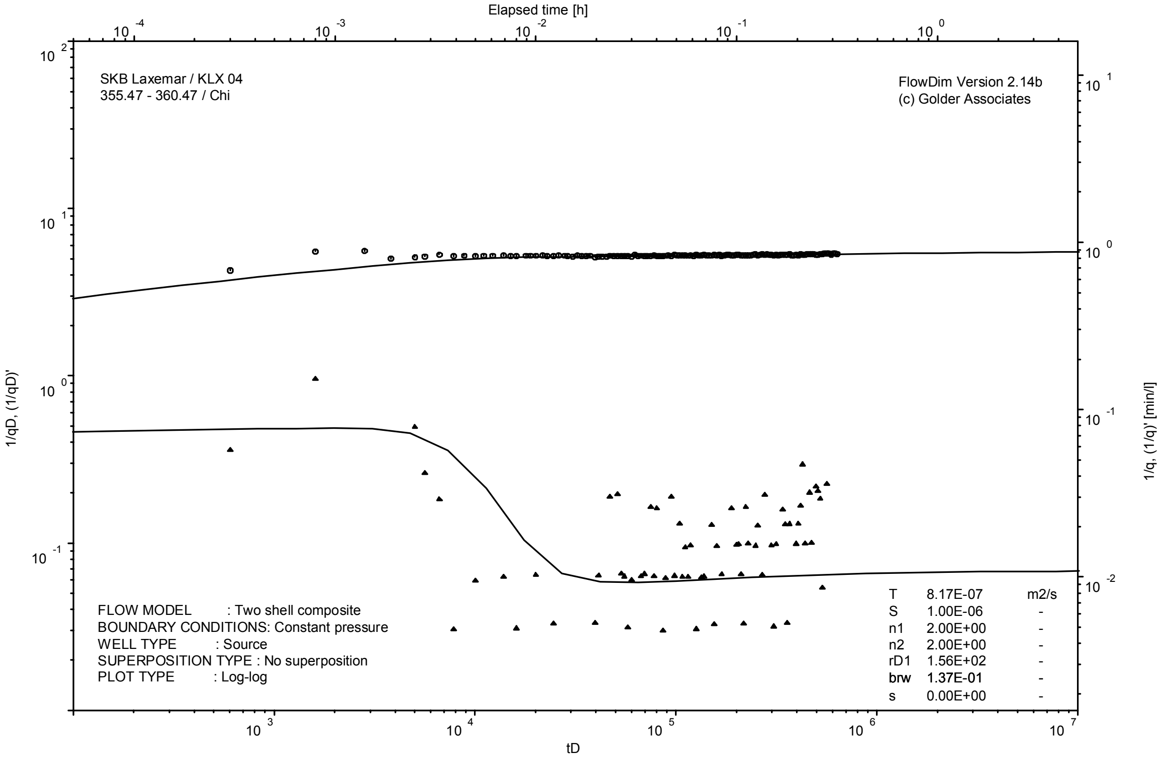
Analysis diagrams



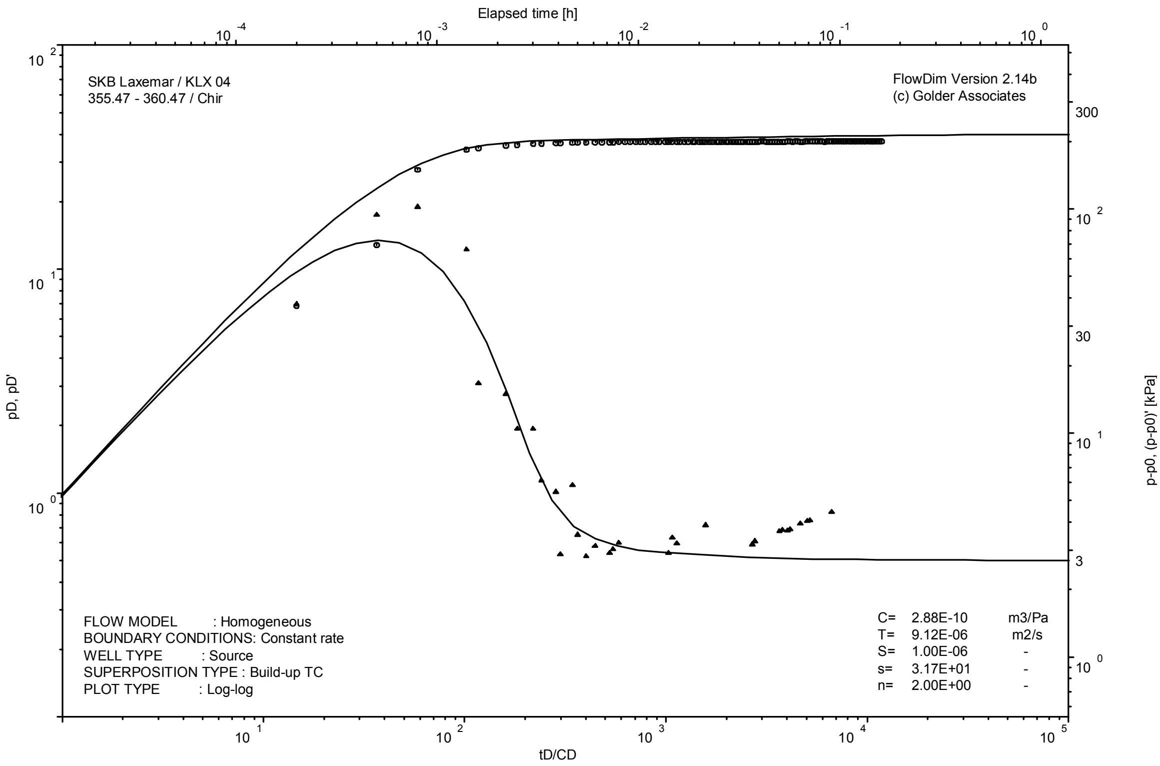
Pressure and flow rate vs. time; cartesian plot



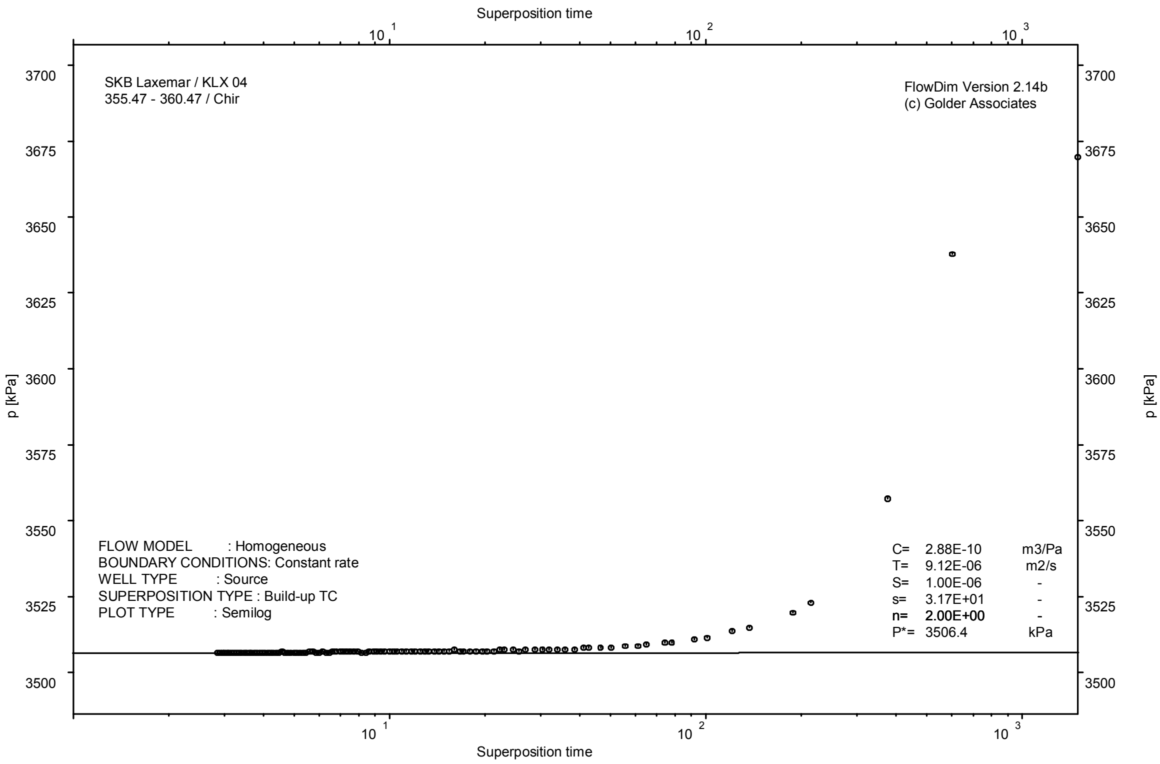
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

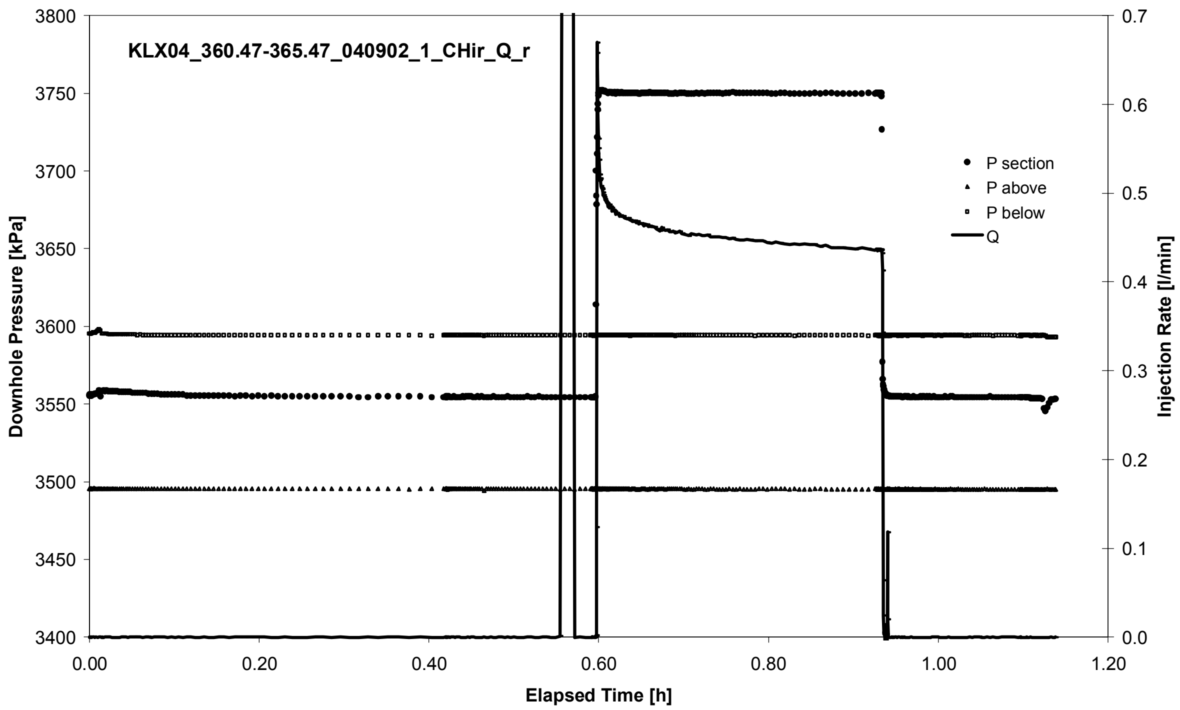


CHIR phase; HORNER match

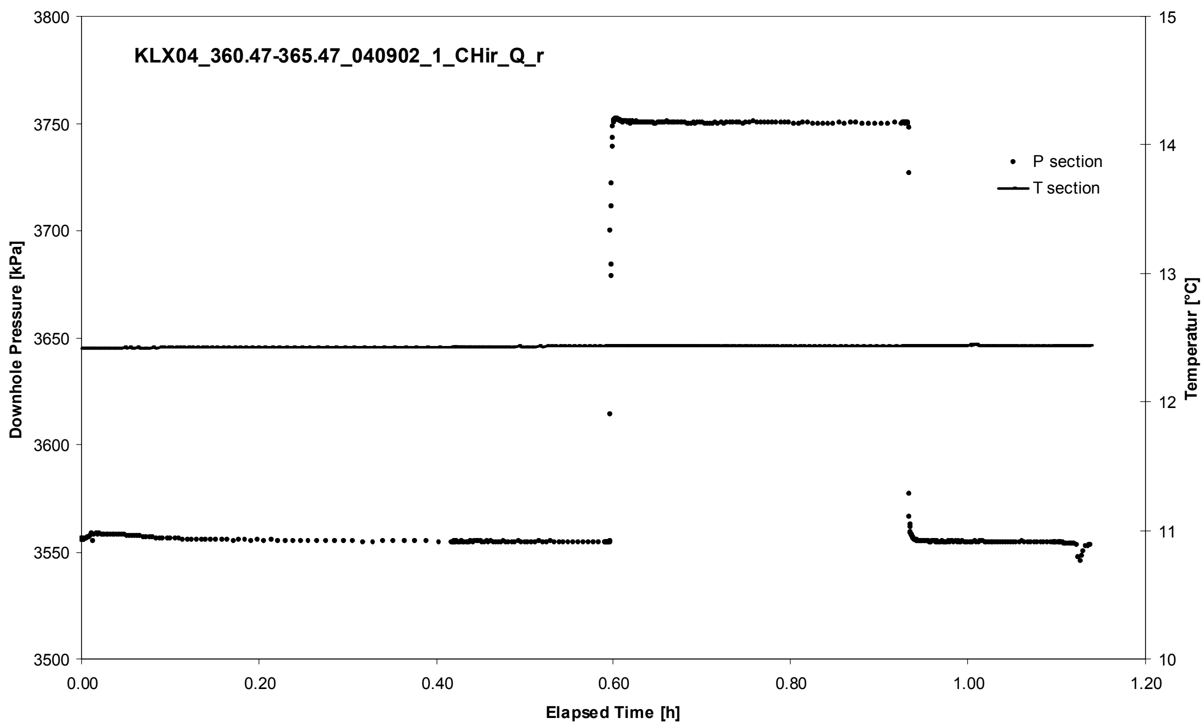
APPENDIX 2-61

Test 360.47 – 365.47 m

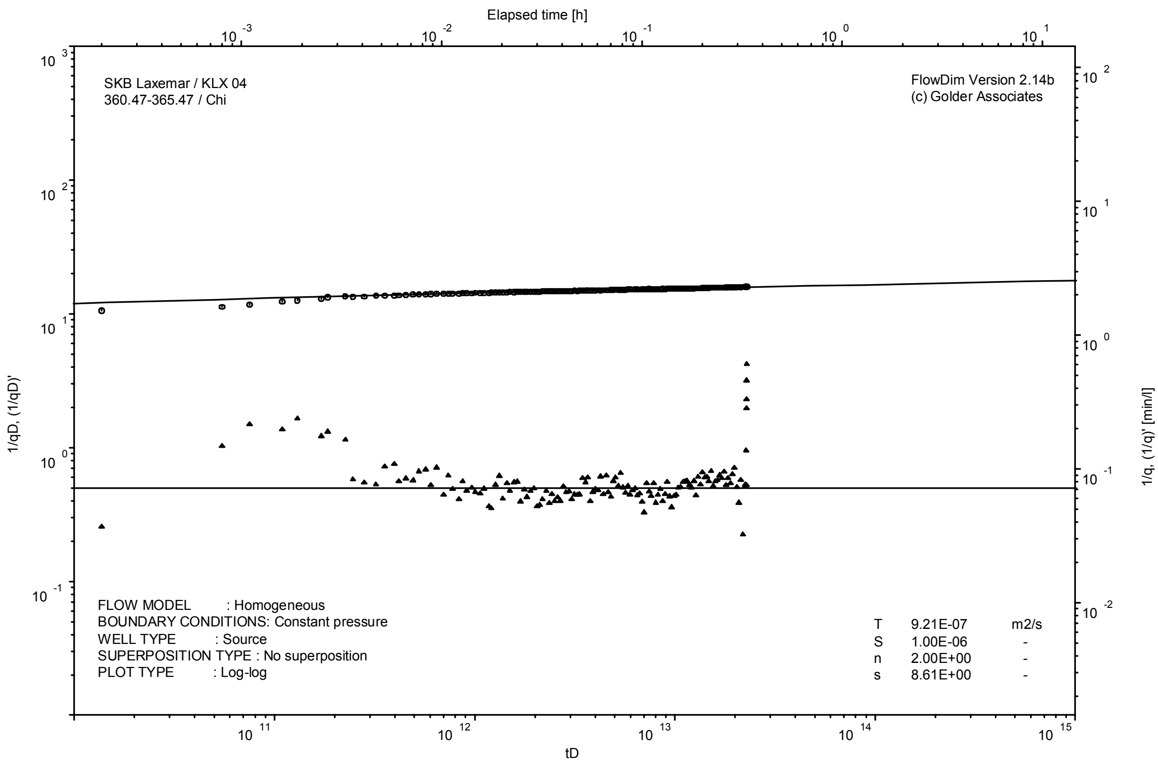
Analysis diagrams



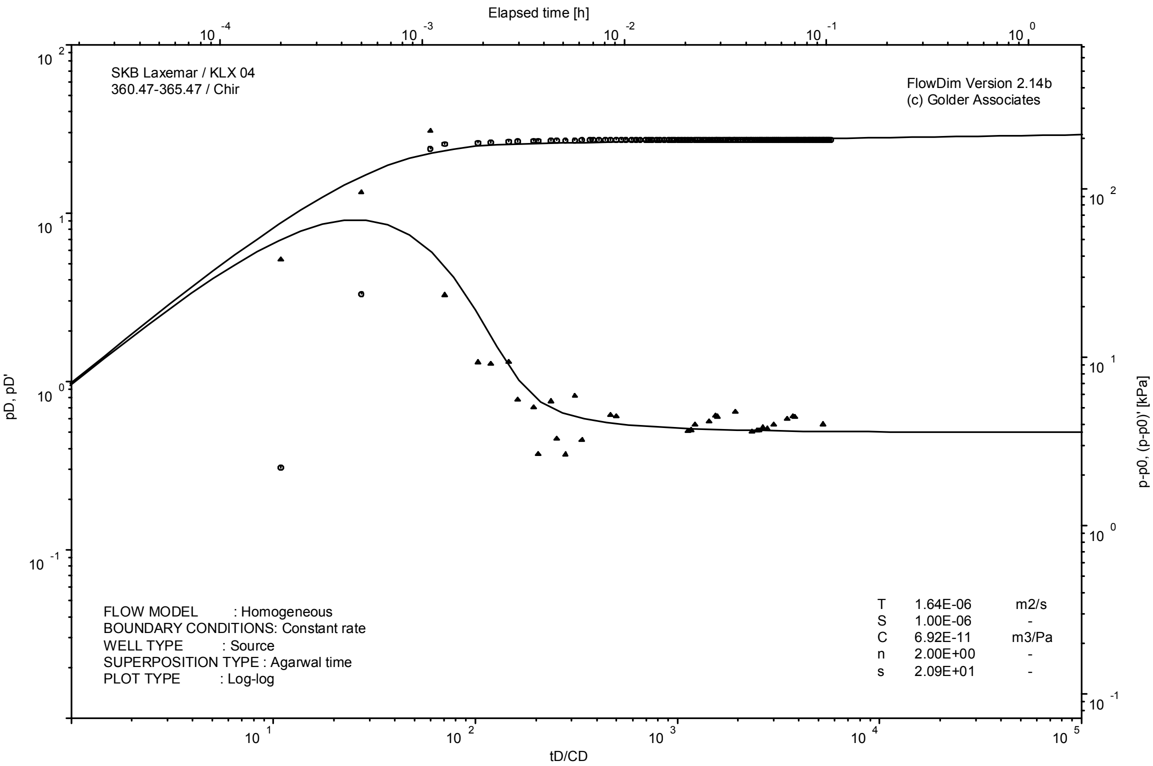
Pressure and flow rate vs. time; cartesian plot



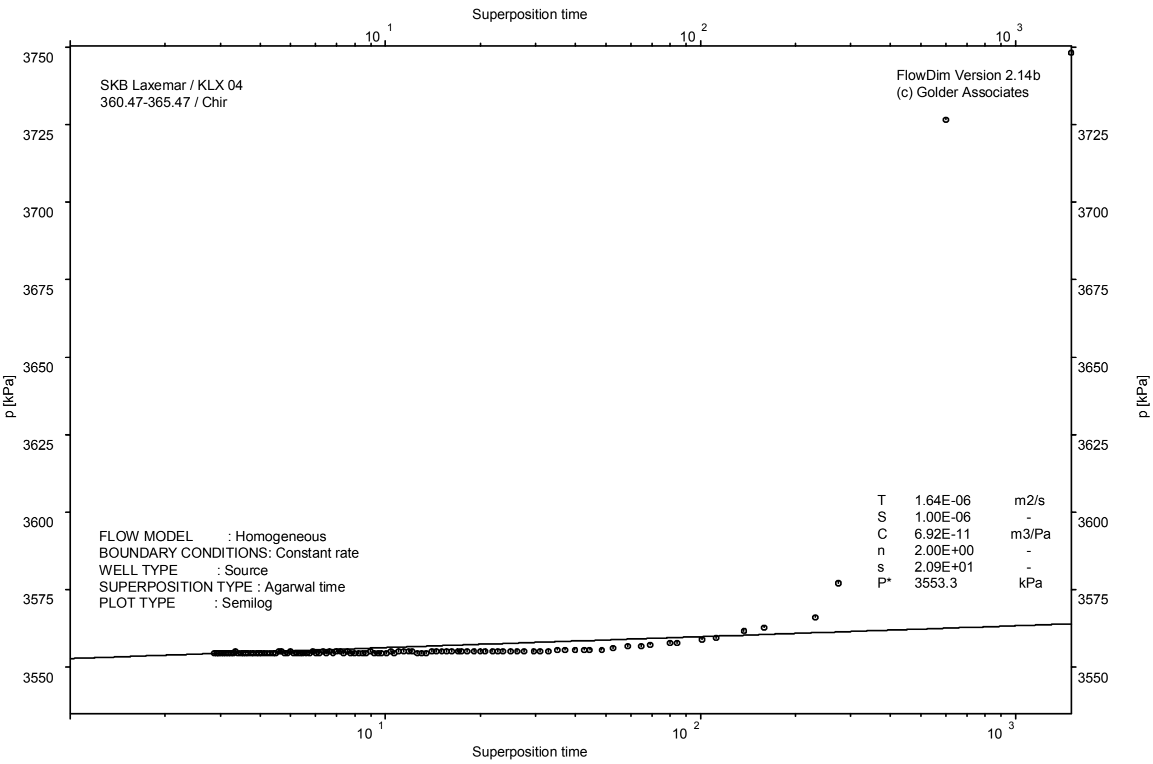
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

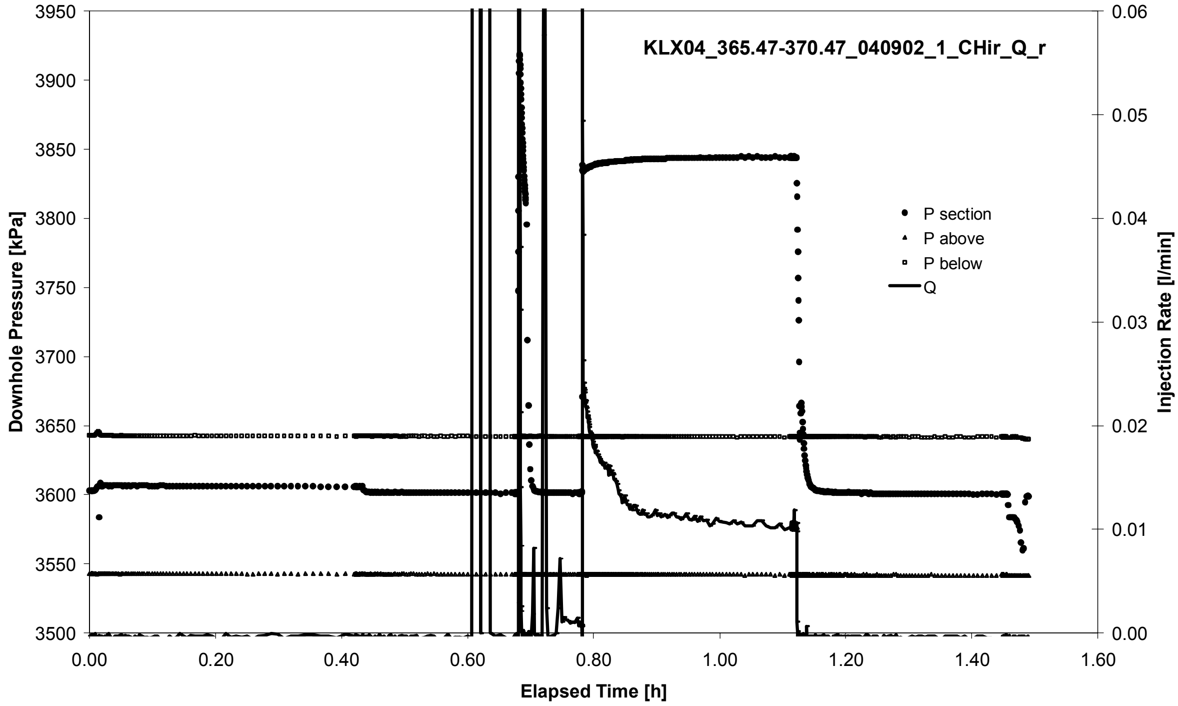


CHIR phase; HORNER match

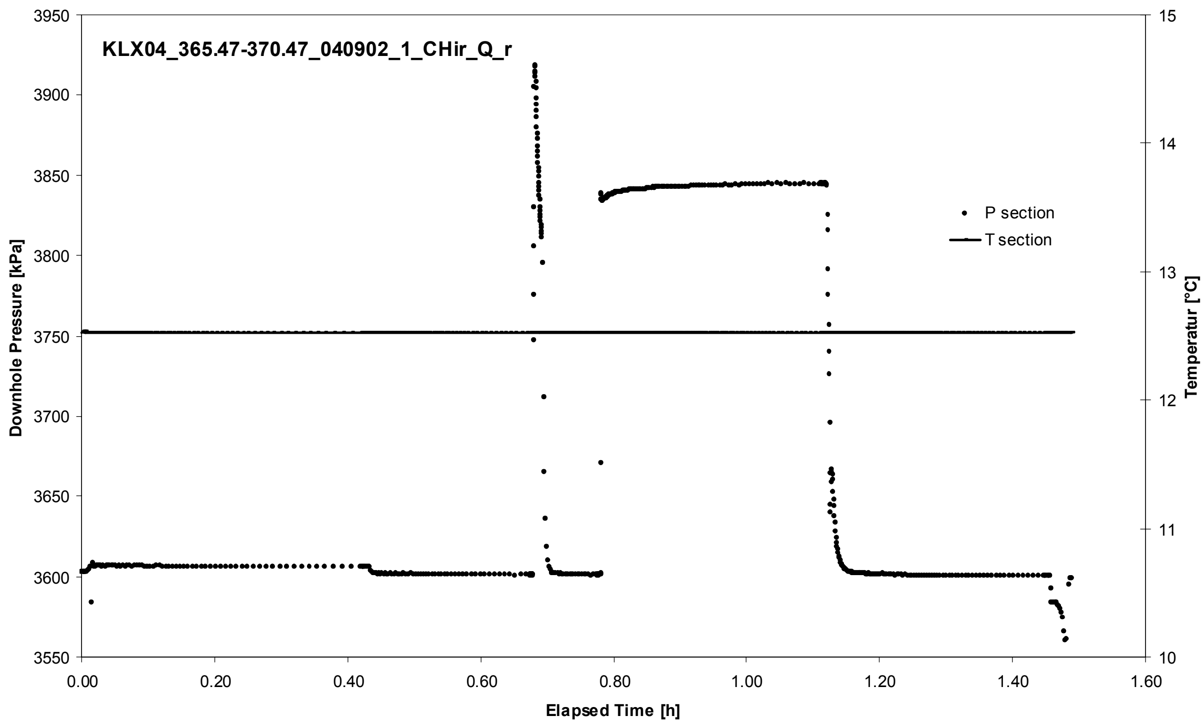
APPENDIX 2-62

Test 365.47 – 370.47 m

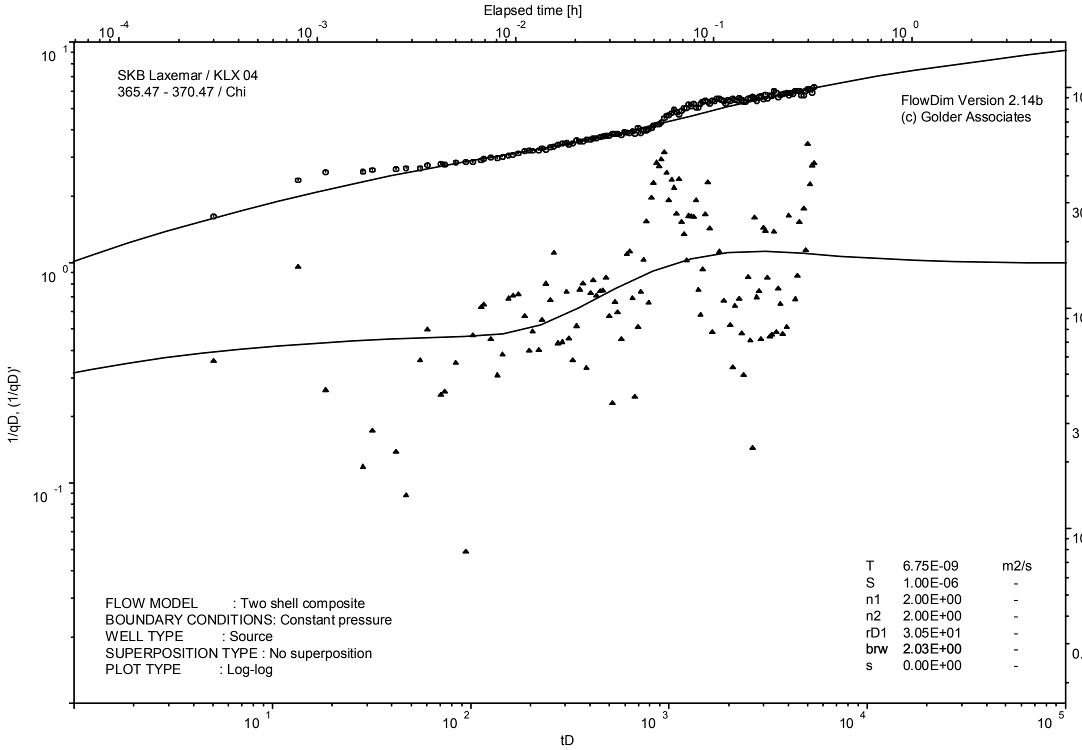
Analysis diagrams



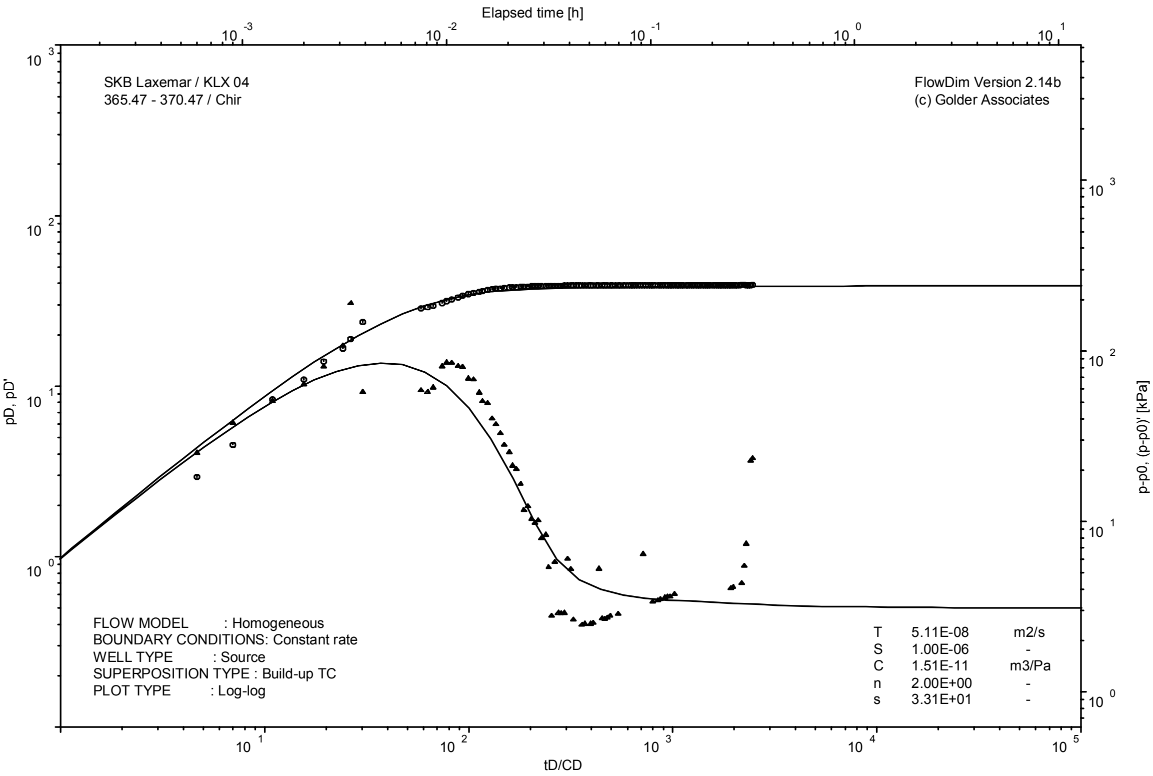
Pressure and flow rate vs. time; cartesian plot



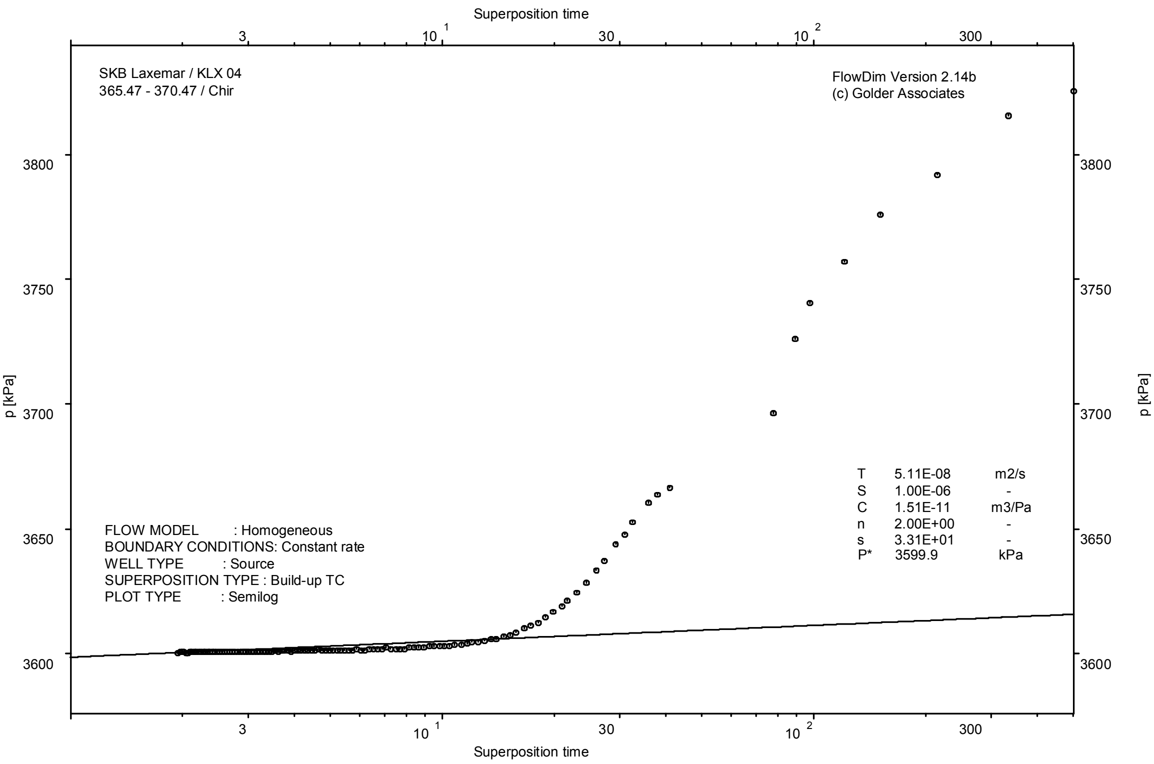
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

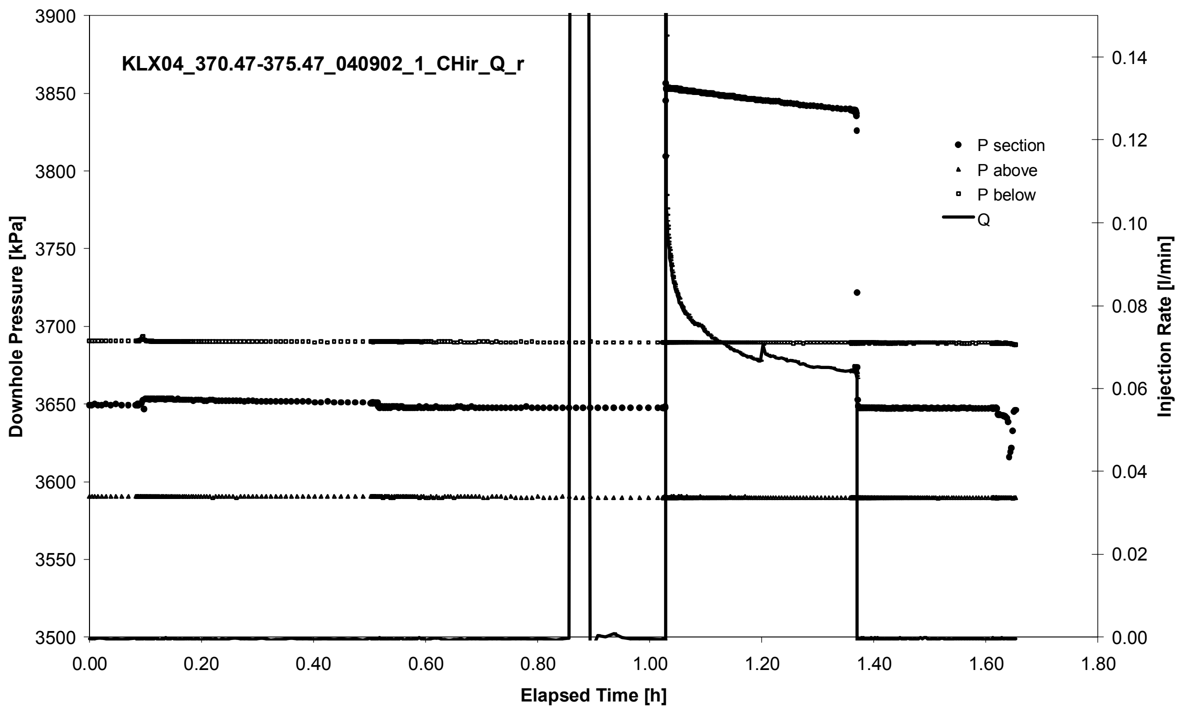


CHIR phase; HORNER match

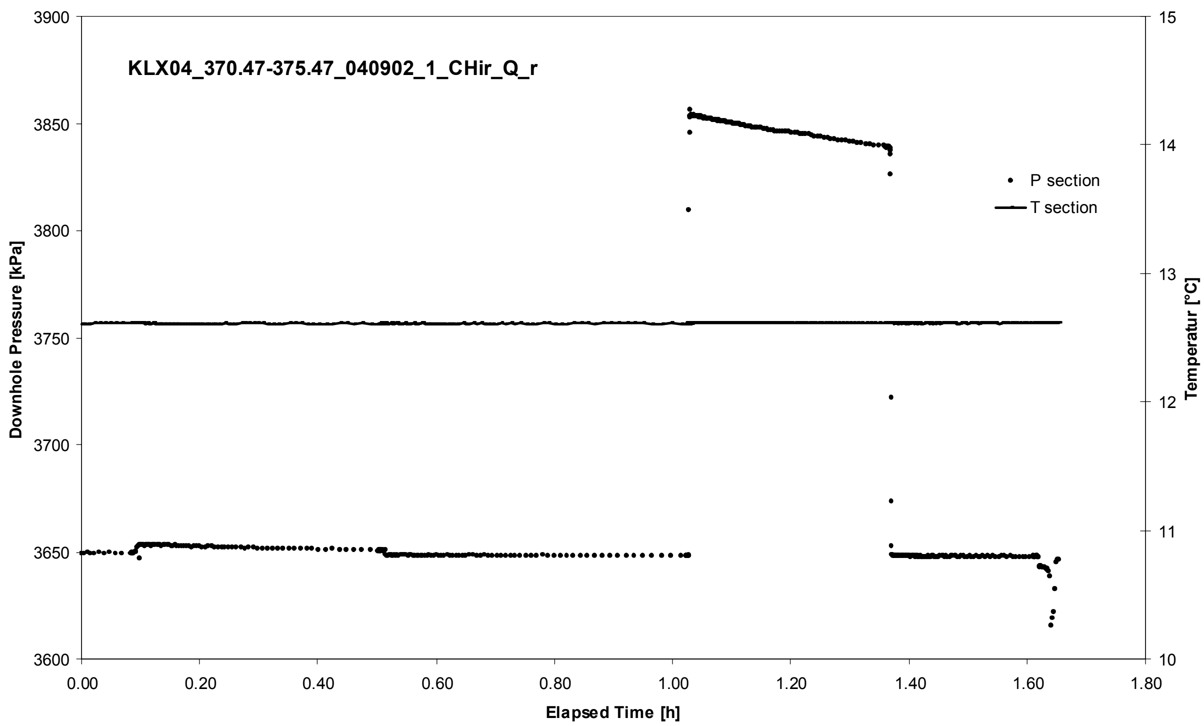
APPENDIX 2-63

Test 370.47 – 375.47 m

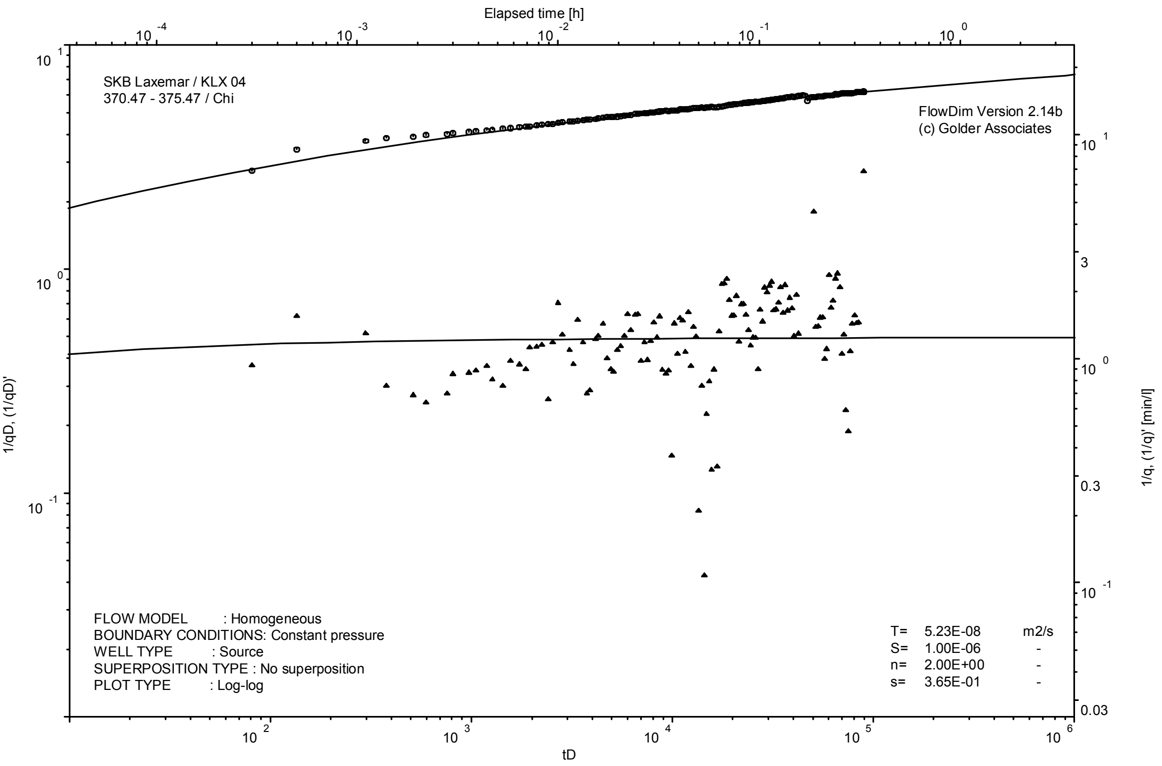
Analysis diagrams



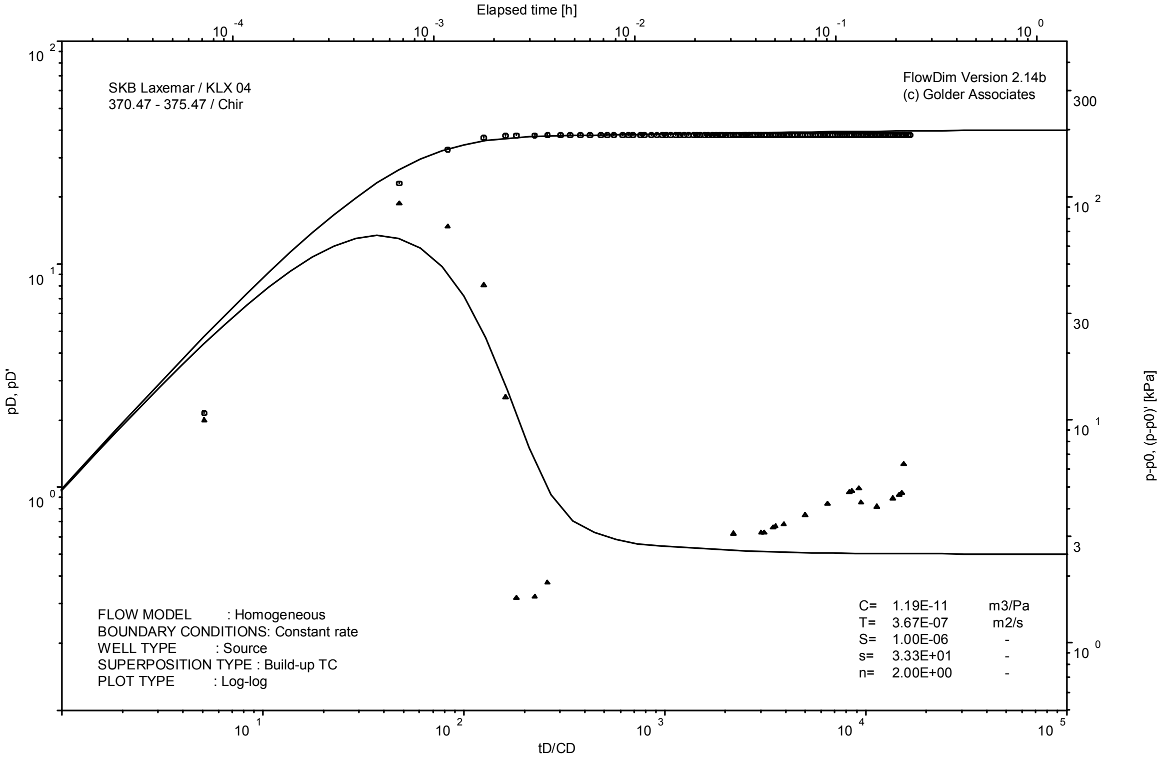
Pressure and flow rate vs. time; cartesian plot



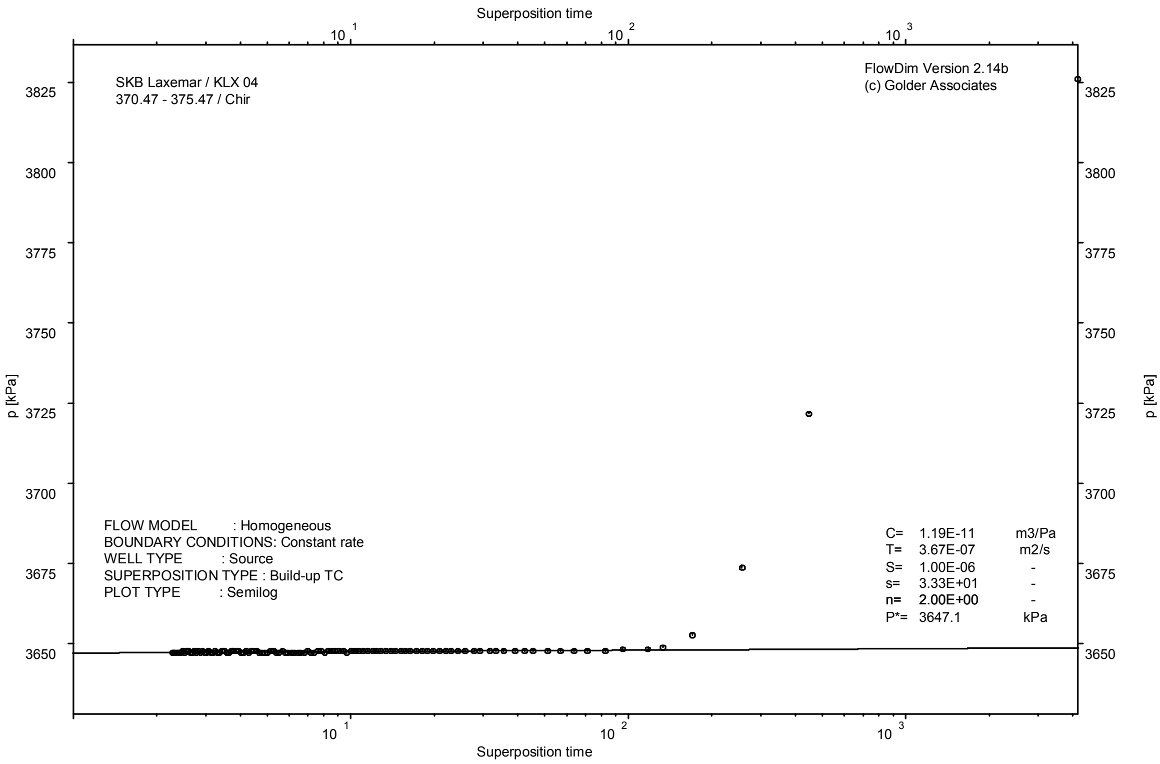
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

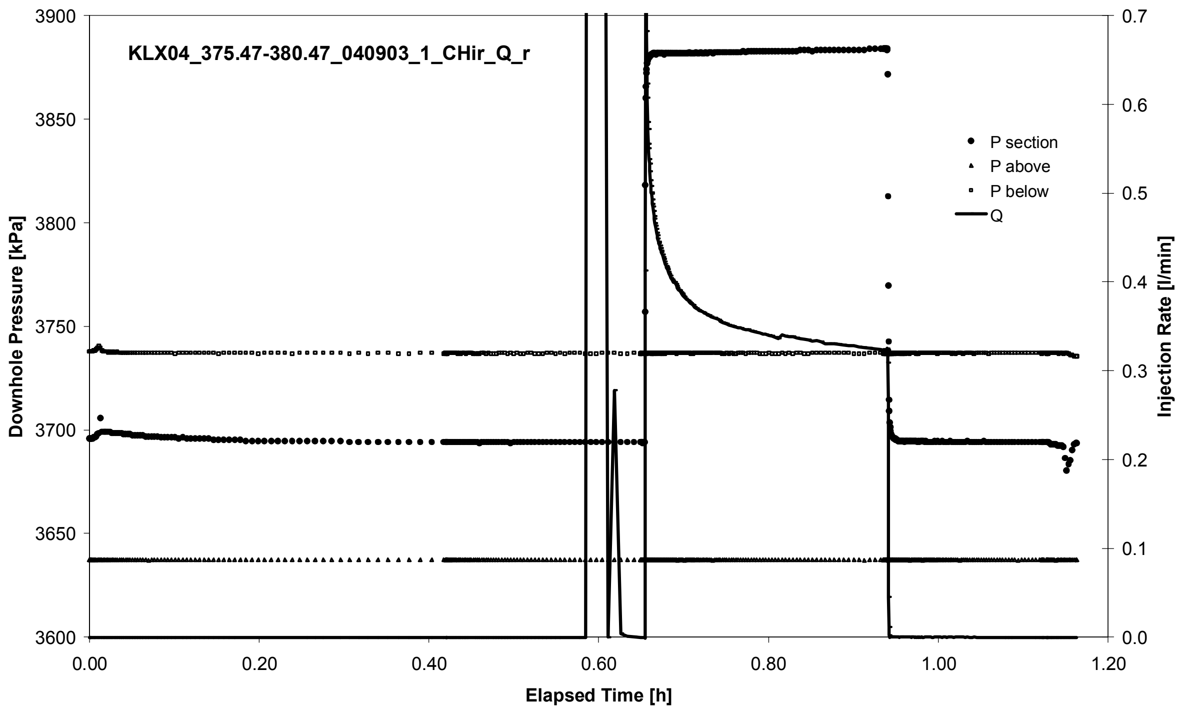


CHIR phase; HORNER match

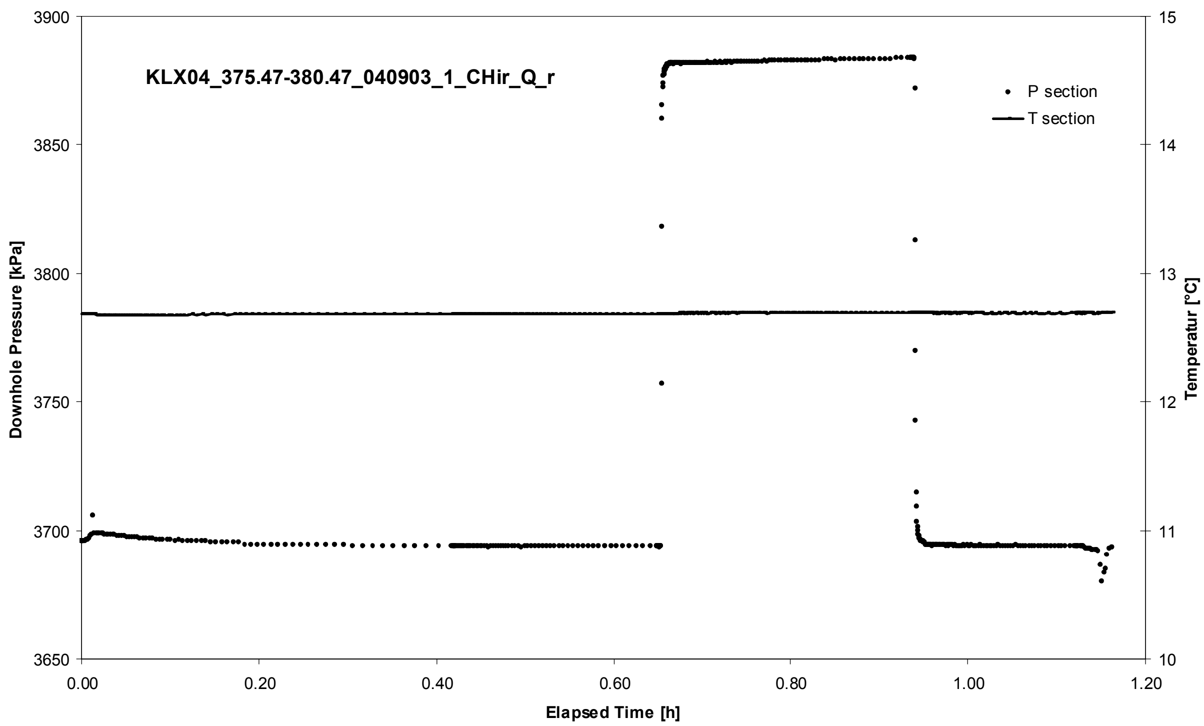
APPENDIX 2-64

Test 375.47 – 380.47 m

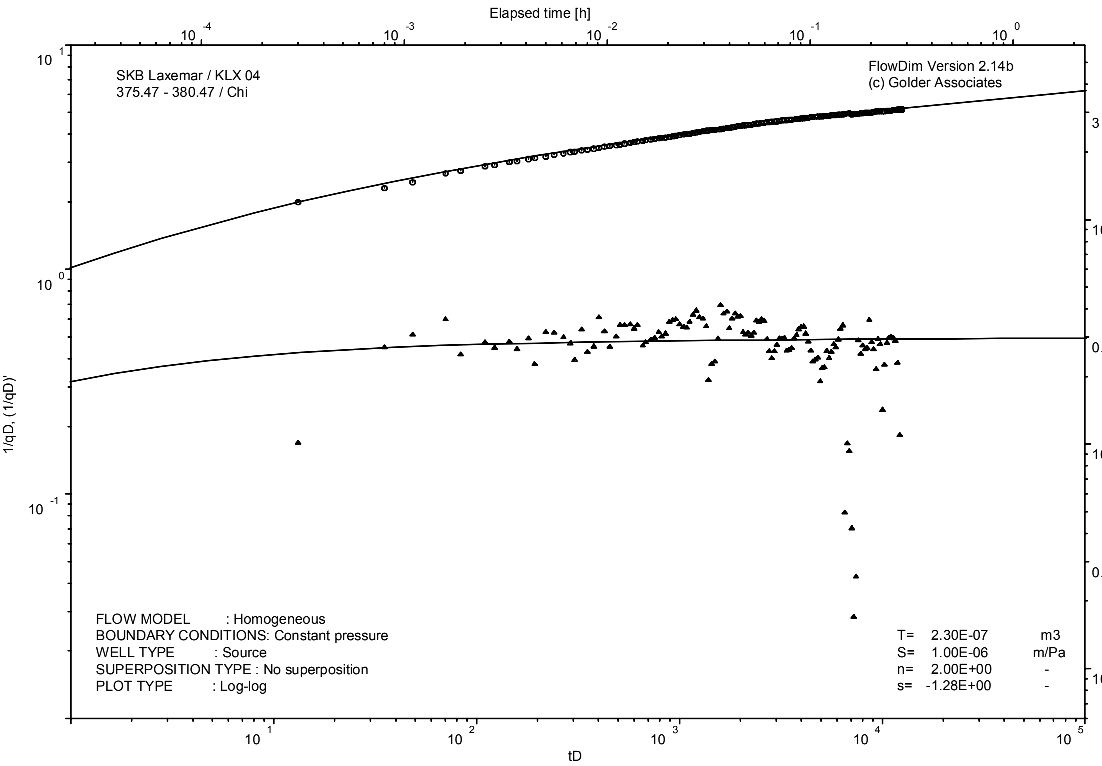
Analysis diagrams



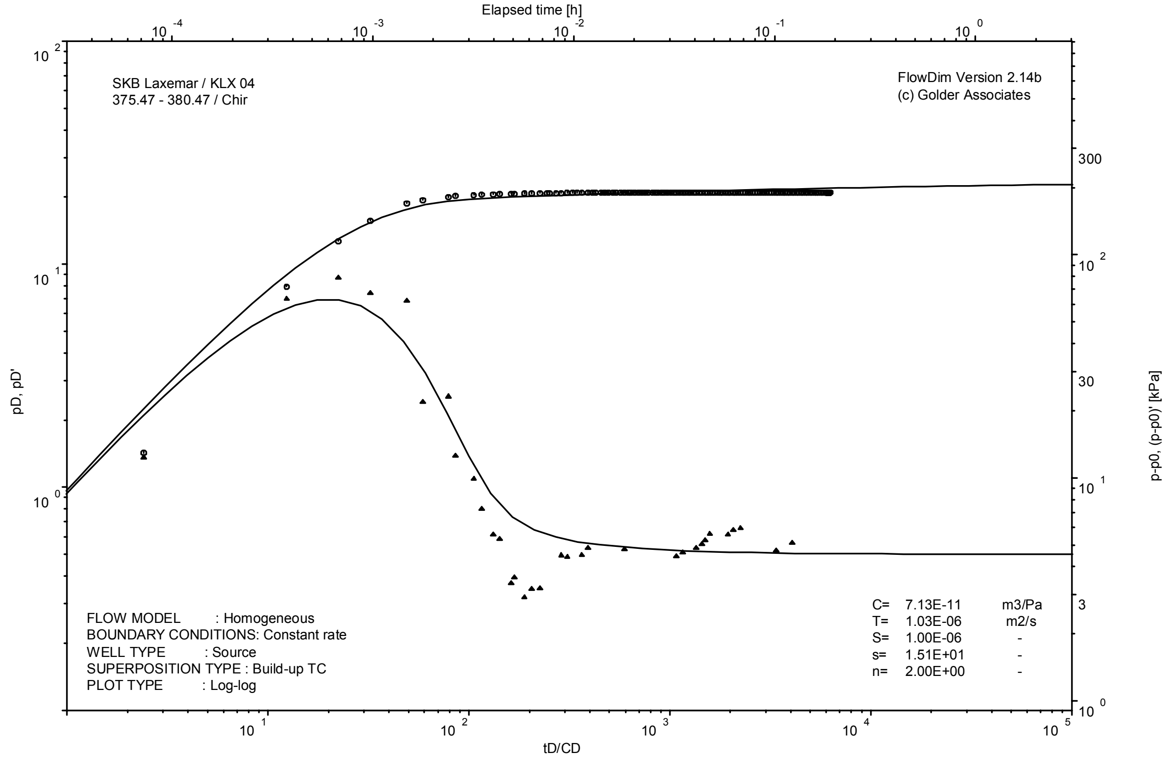
Pressure and flow rate vs. time; cartesian plot



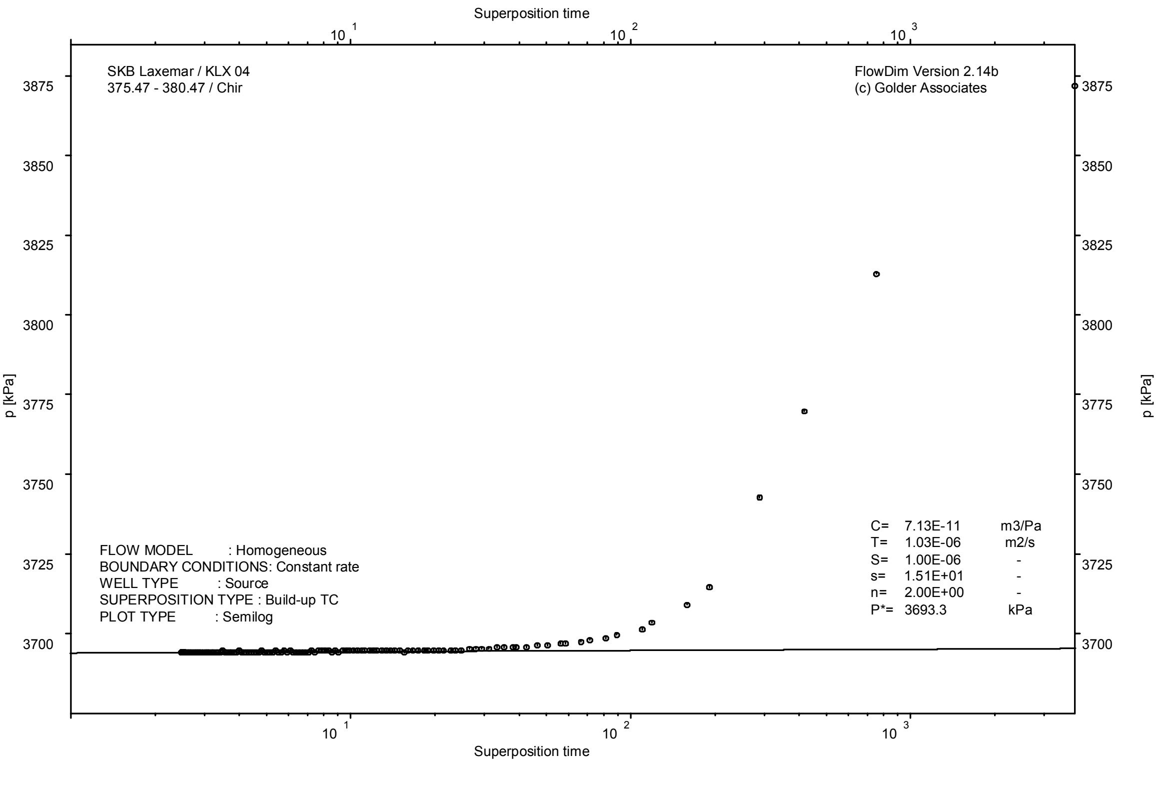
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

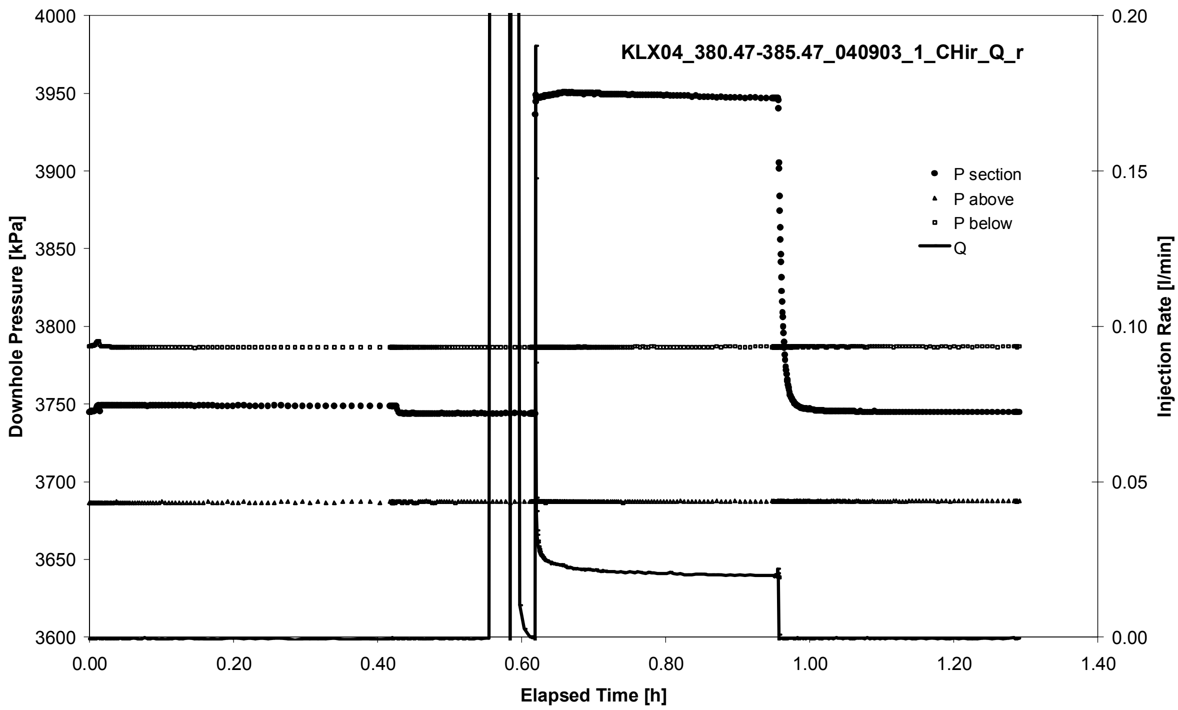


CHIR phase; HORNER match

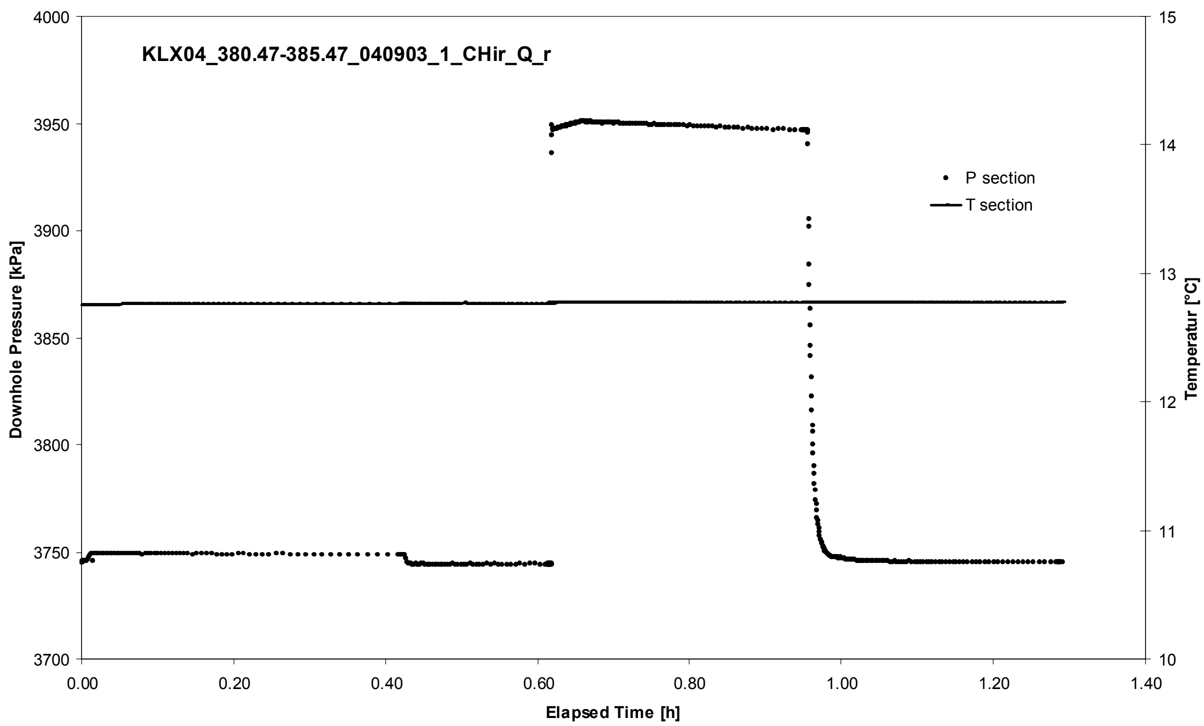
APPENDIX 2-65

Test 380.47 – 385.47 m

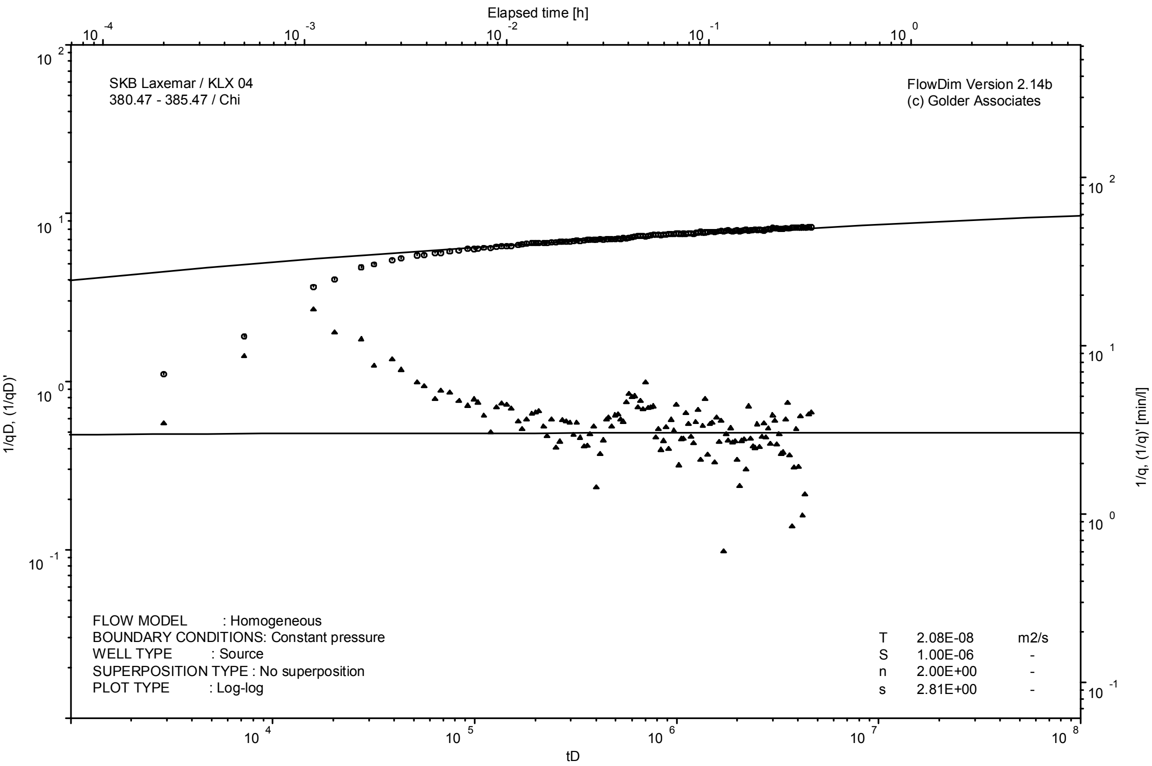
Analysis diagrams



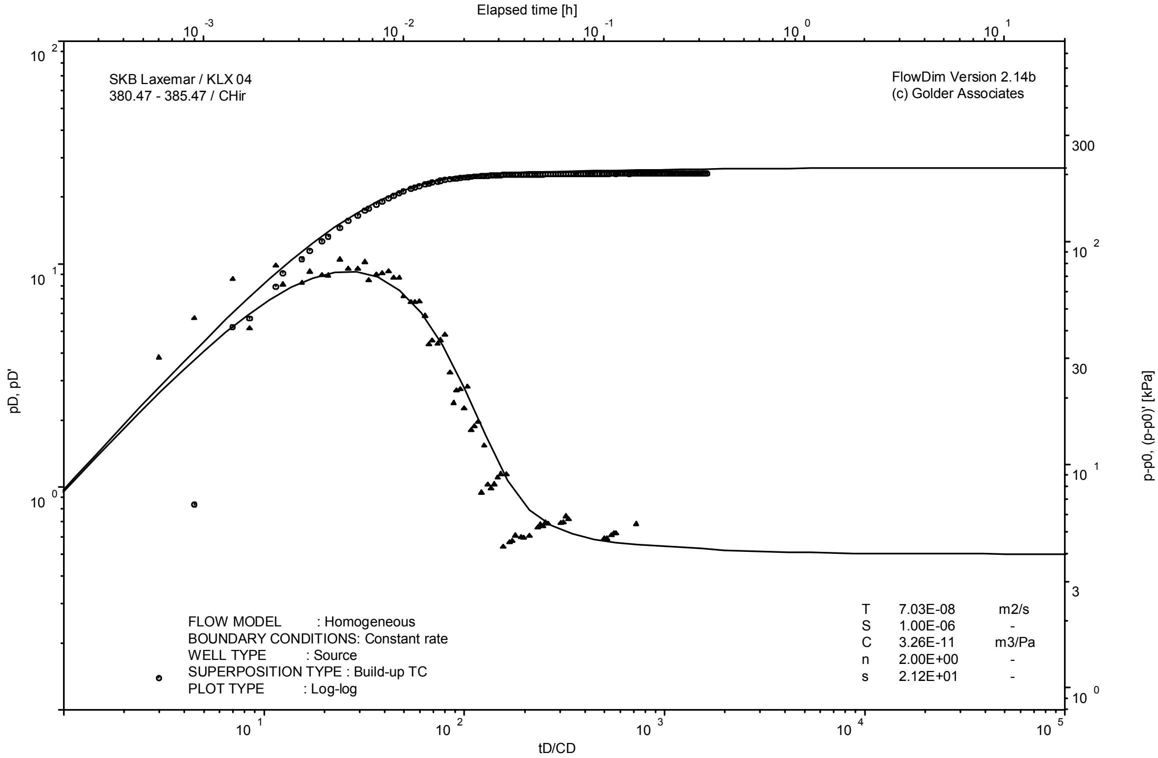
Pressure and flow rate vs. time; cartesian plot



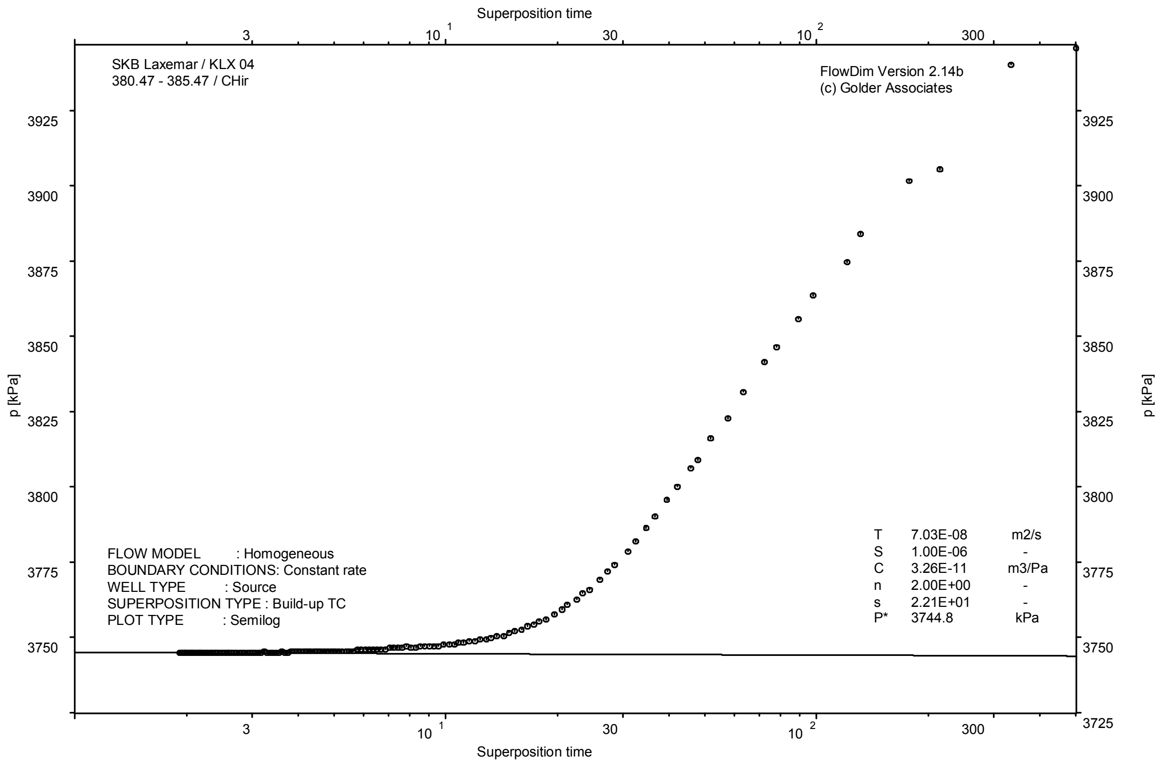
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

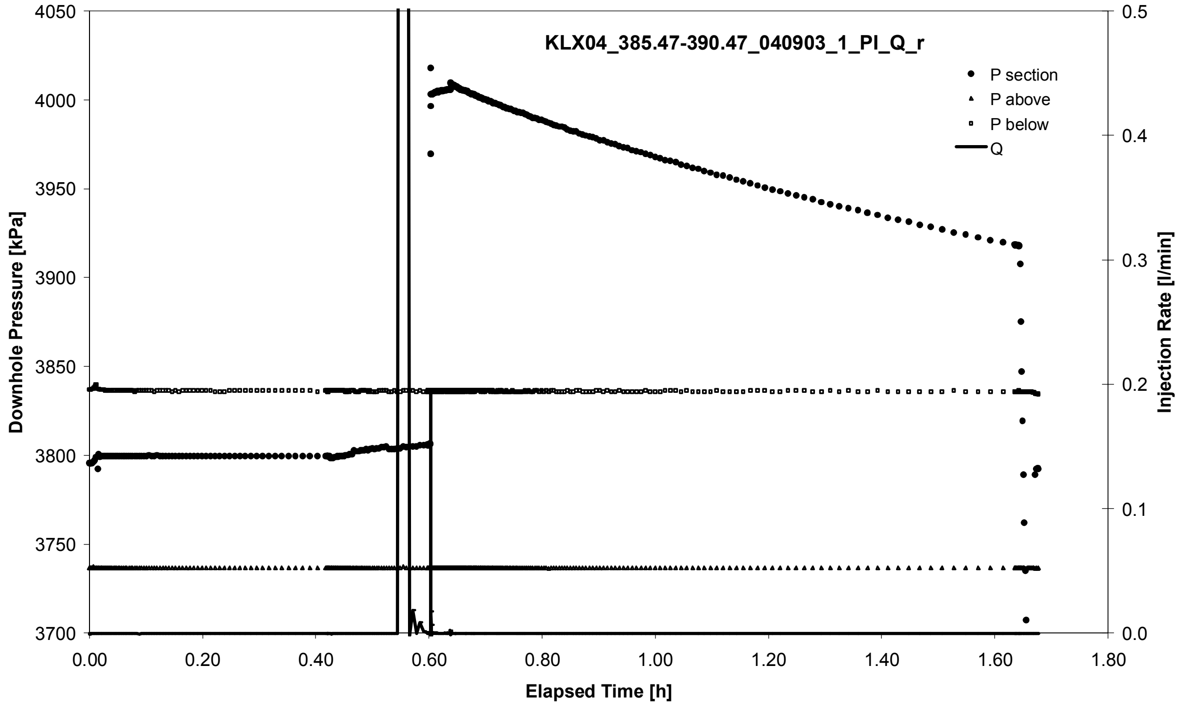


CHIR phase; HORNER match

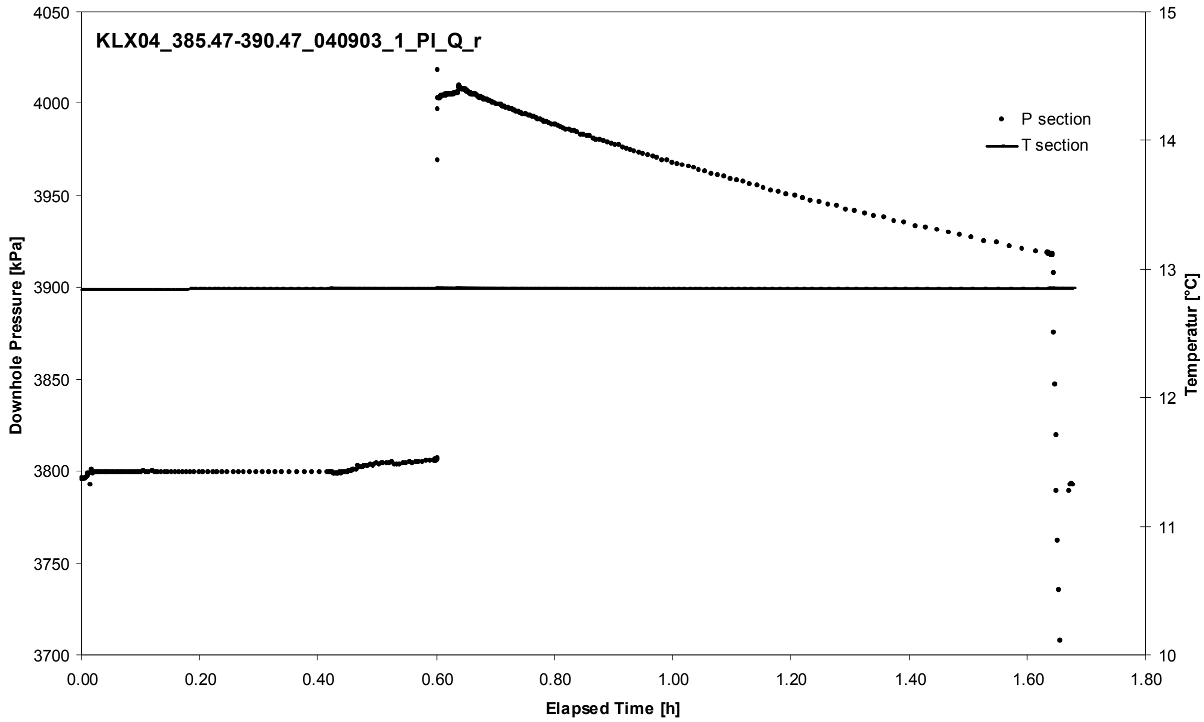
APPENDIX 2-66

Test 385.47 – 390.47 m

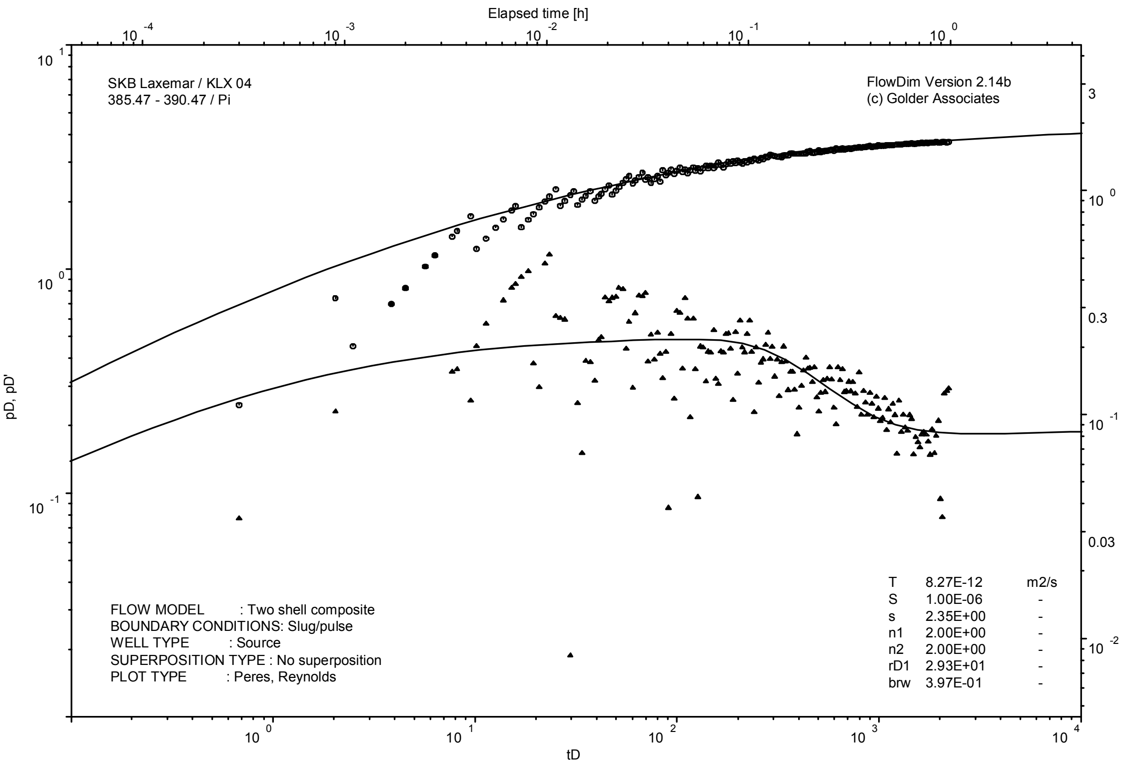
Analysis diagrams



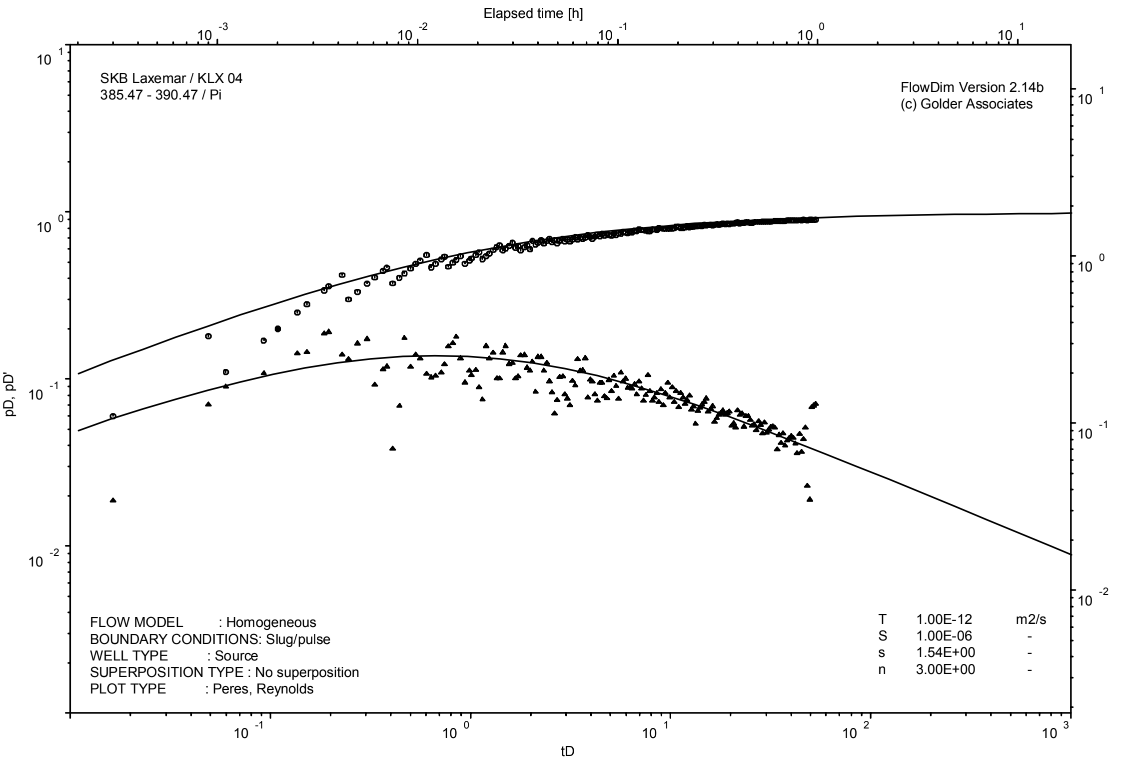
Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot



CHIR phase analysed as pulse injection; deconvolution match

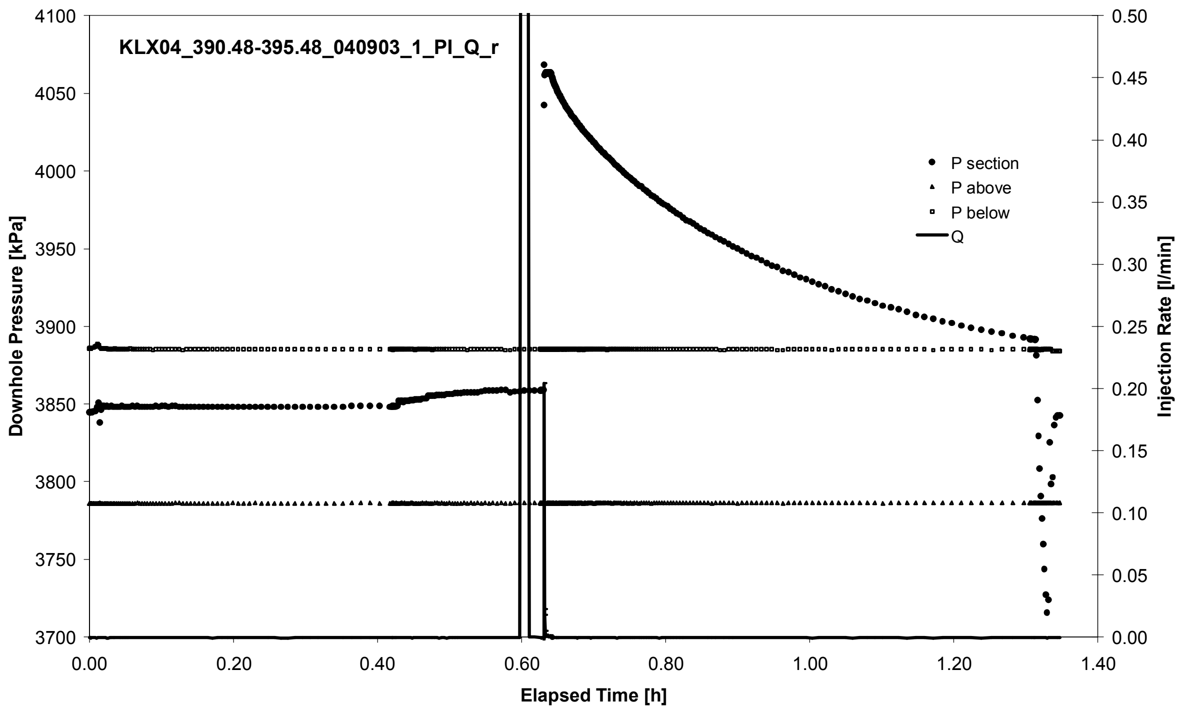


CHIR phase; alternative log-log match (n=3, spherical flow)

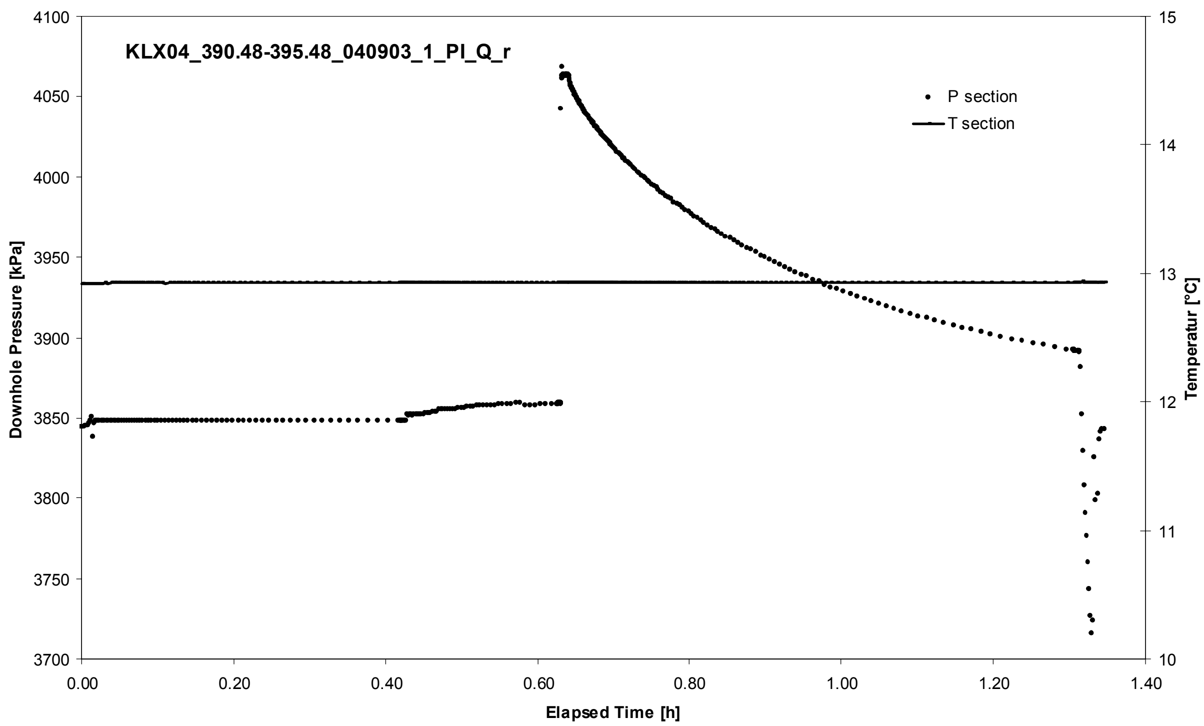
APPENDIX 2-67

Test 390.48 – 395.48 m

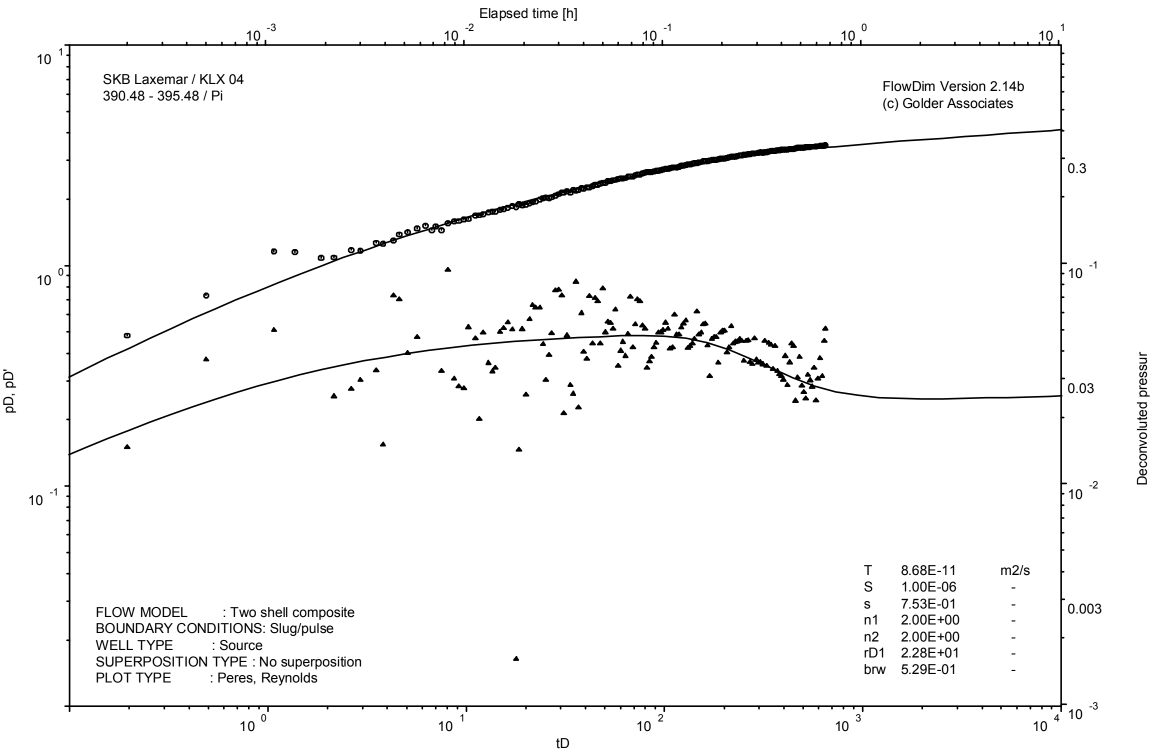
Analysis diagrams



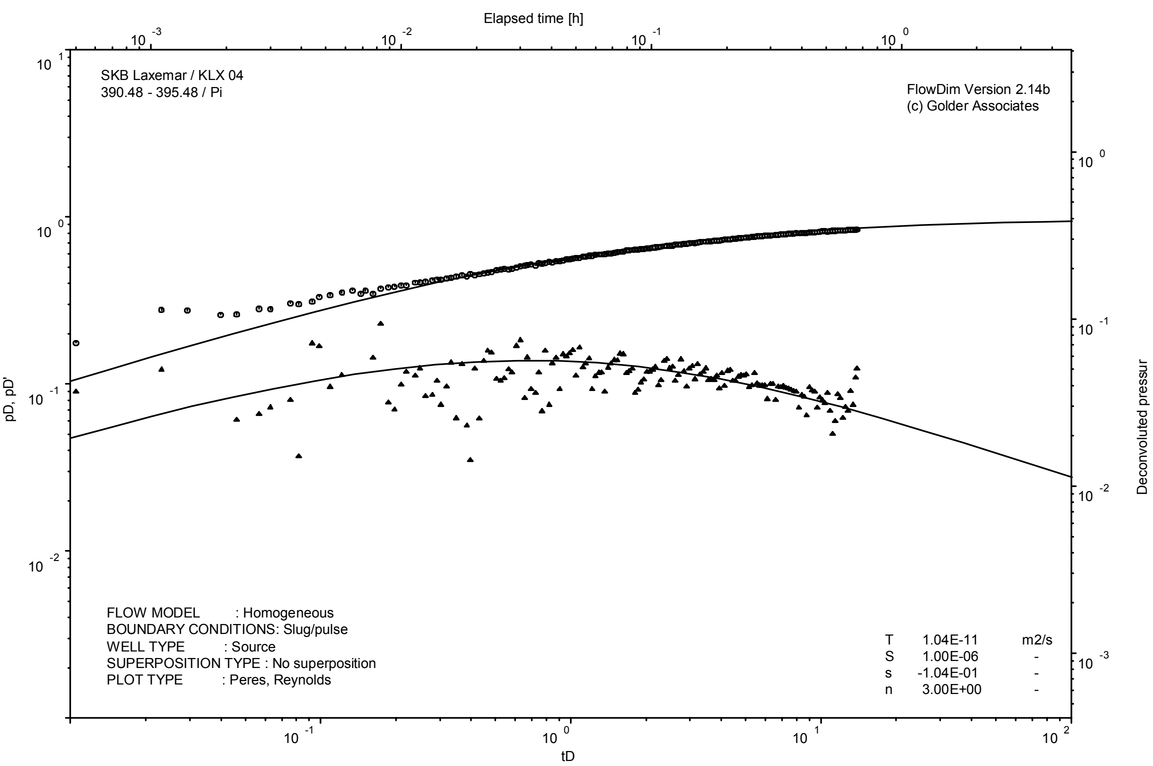
Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot



CHIR phase analysed as pulse injection; deconvolution match

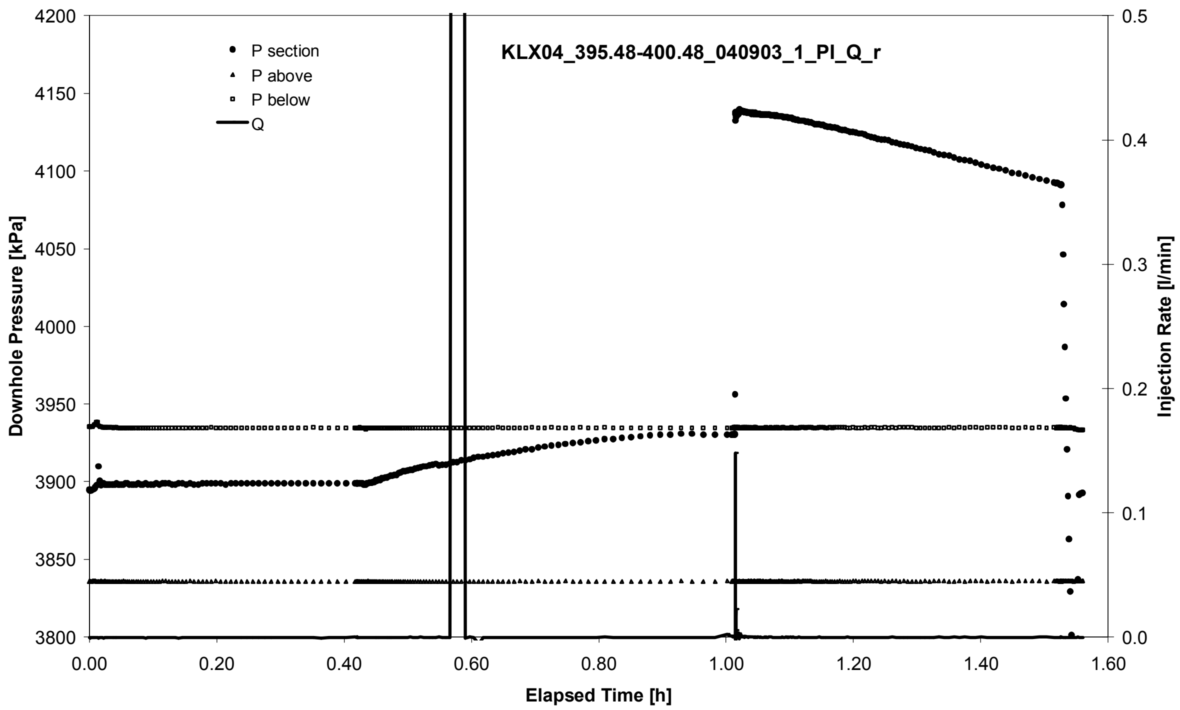


CHIR phase; alternative log-log match (n=3, spherical flow)

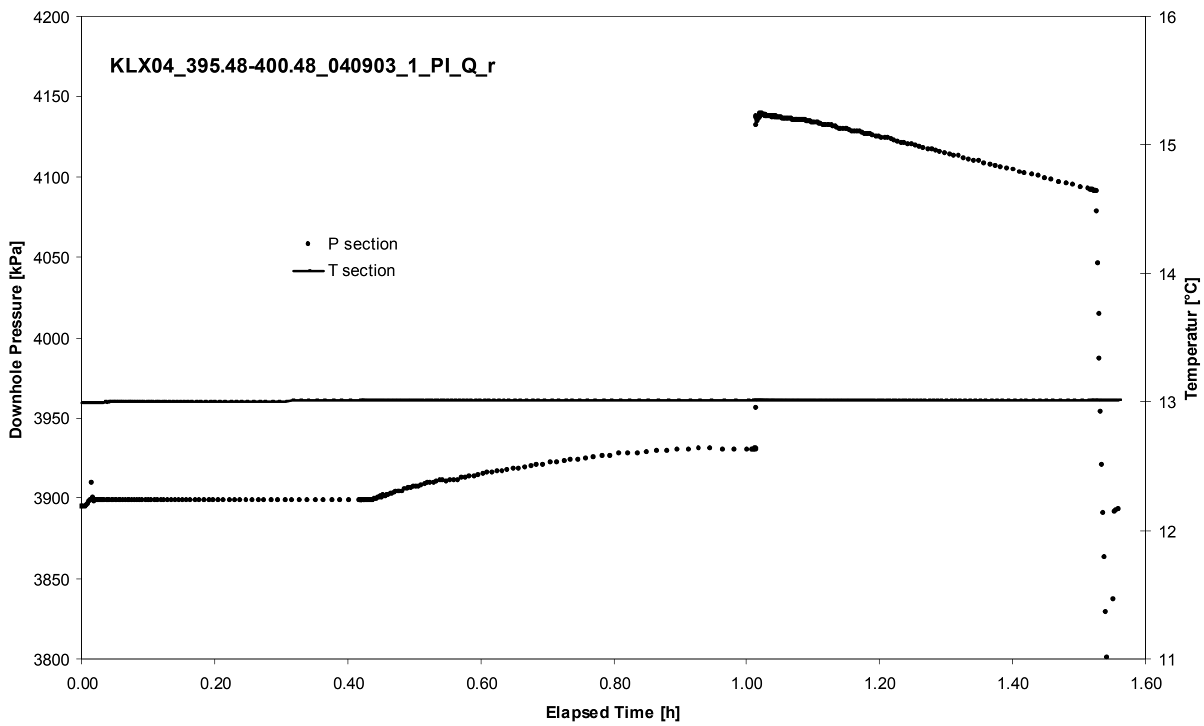
APPENDIX 2-68

Test 395.48 – 400.48 m

Analysis diagrams



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot

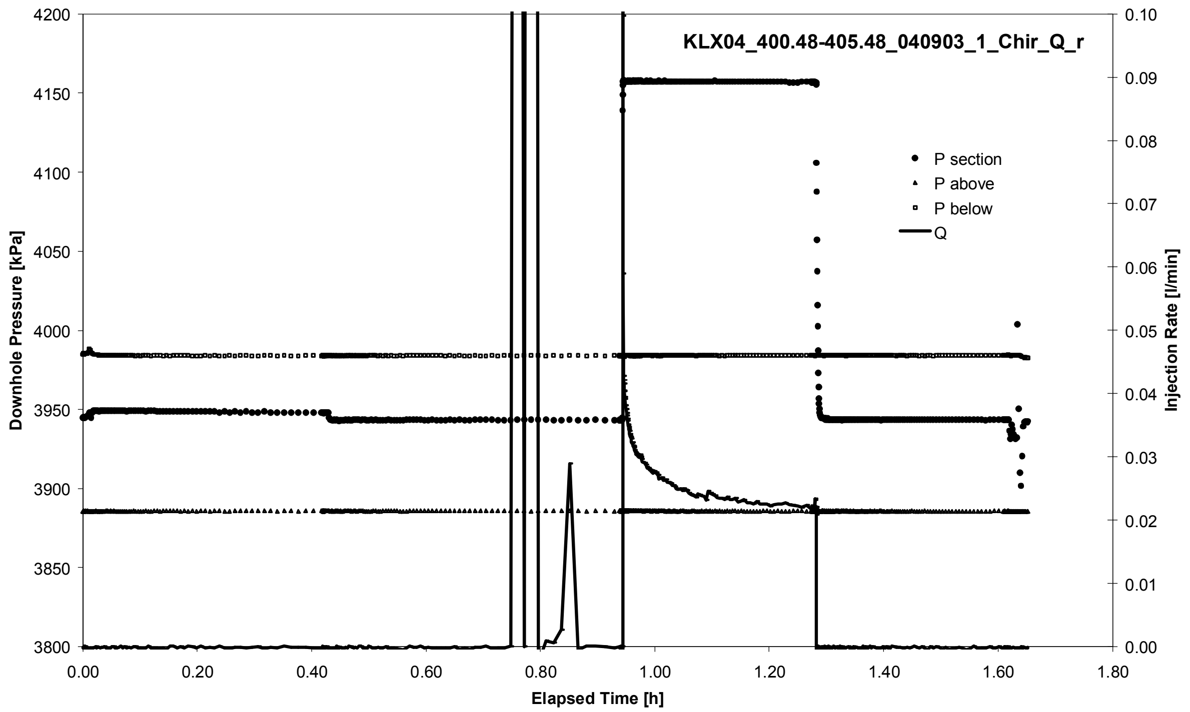
Not Analysed

CHIR phase analysed as pulse injection; deconvolution match

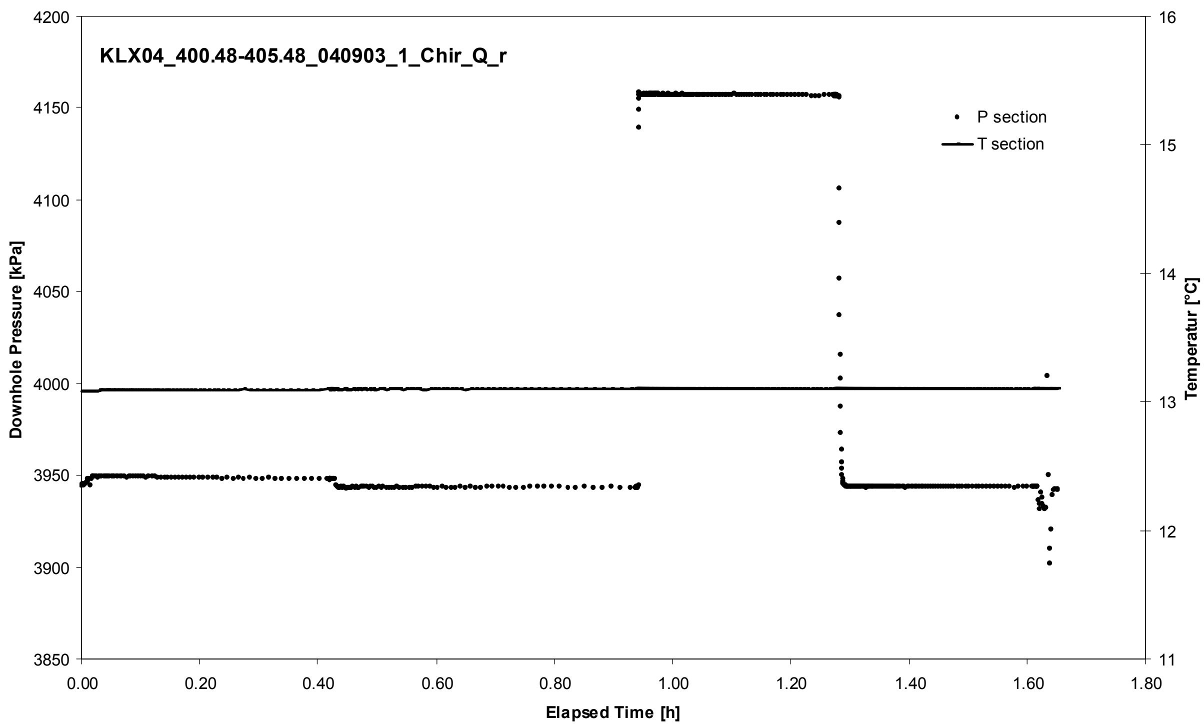
APPENDIX 2-69

Test 400.48 – 405.48 m

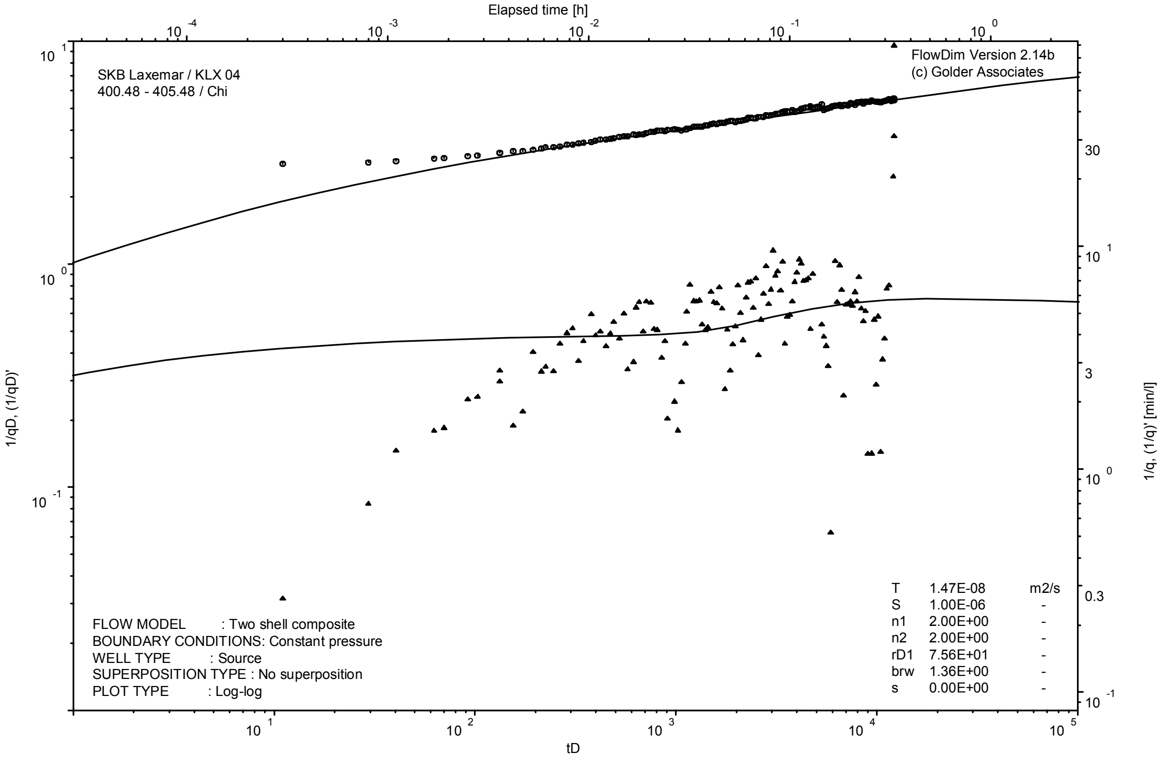
Analysis diagrams



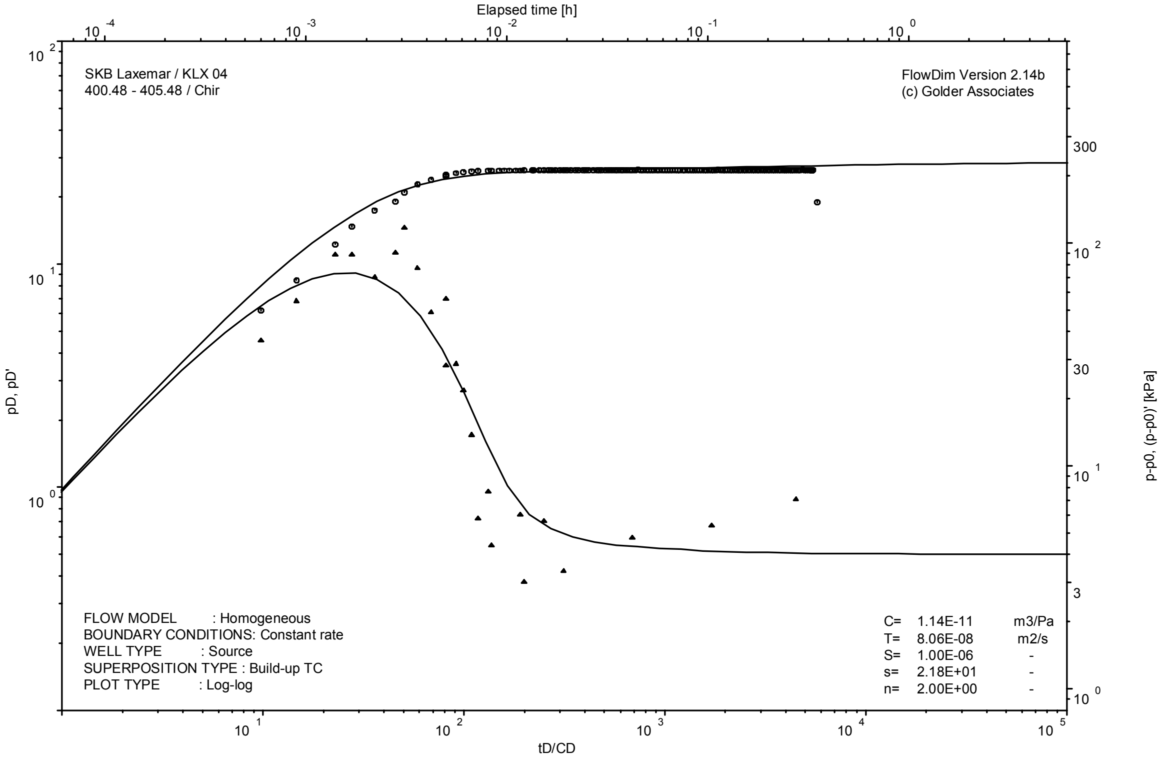
Pressure and flow rate vs. time; cartesian plot



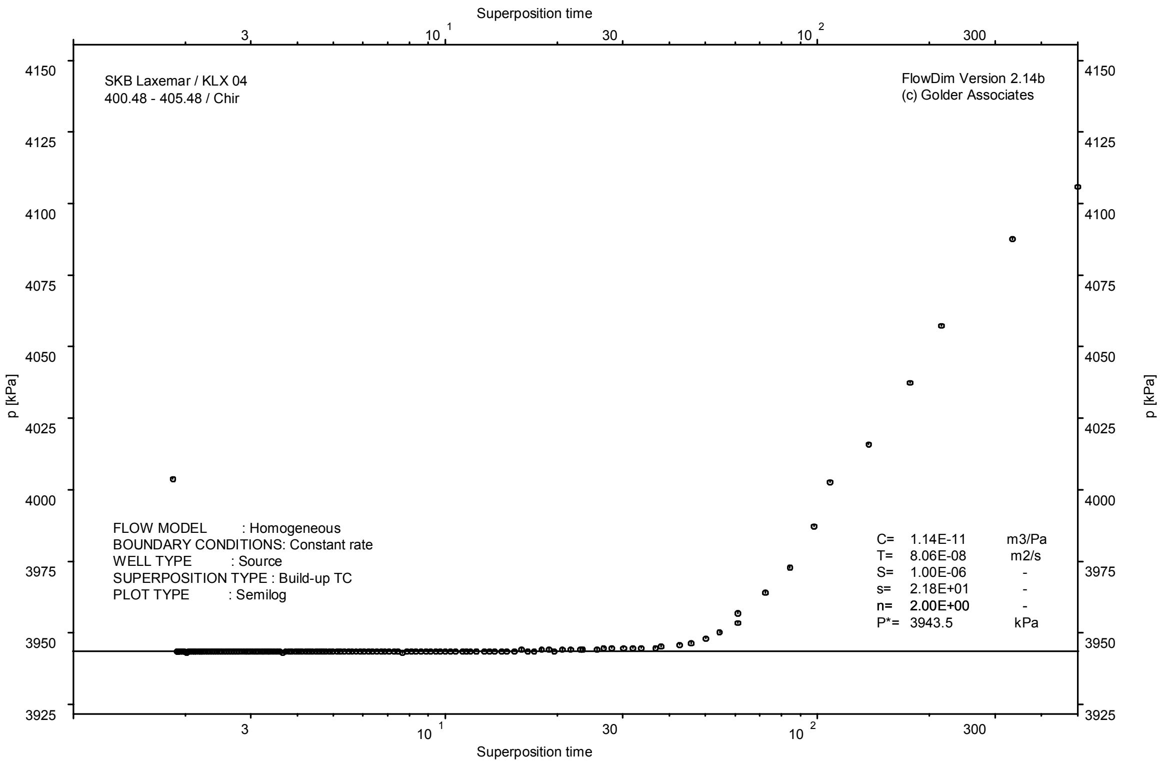
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

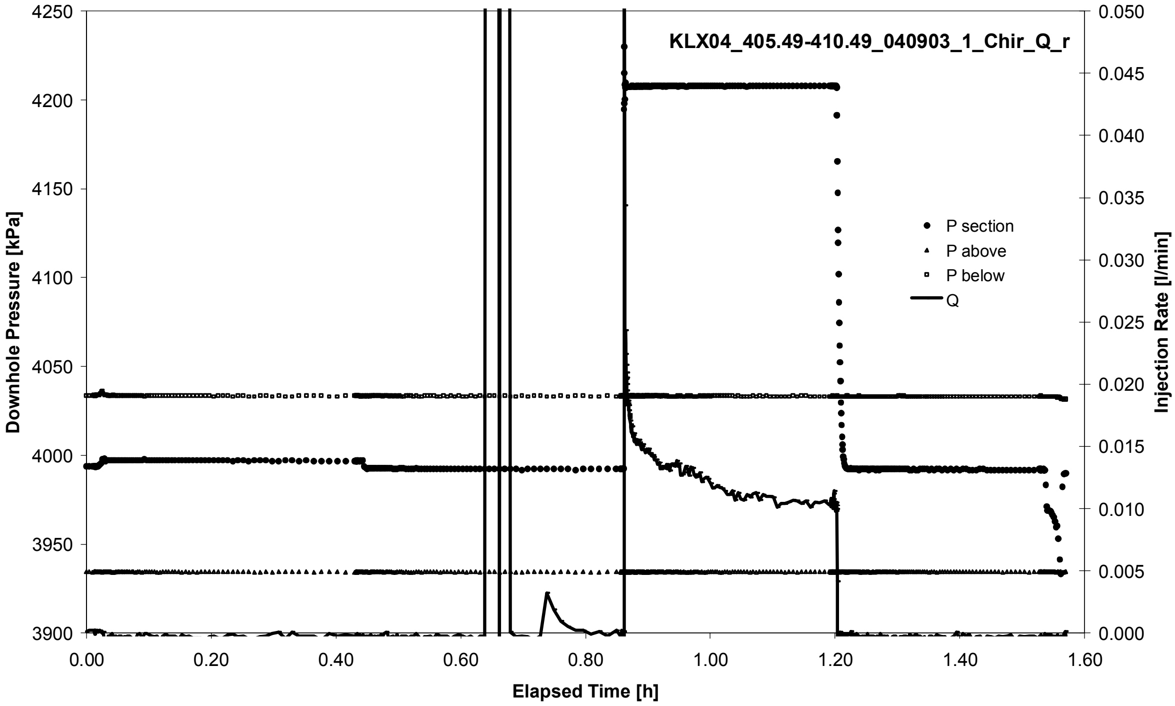


CHIR phase; HORNER match

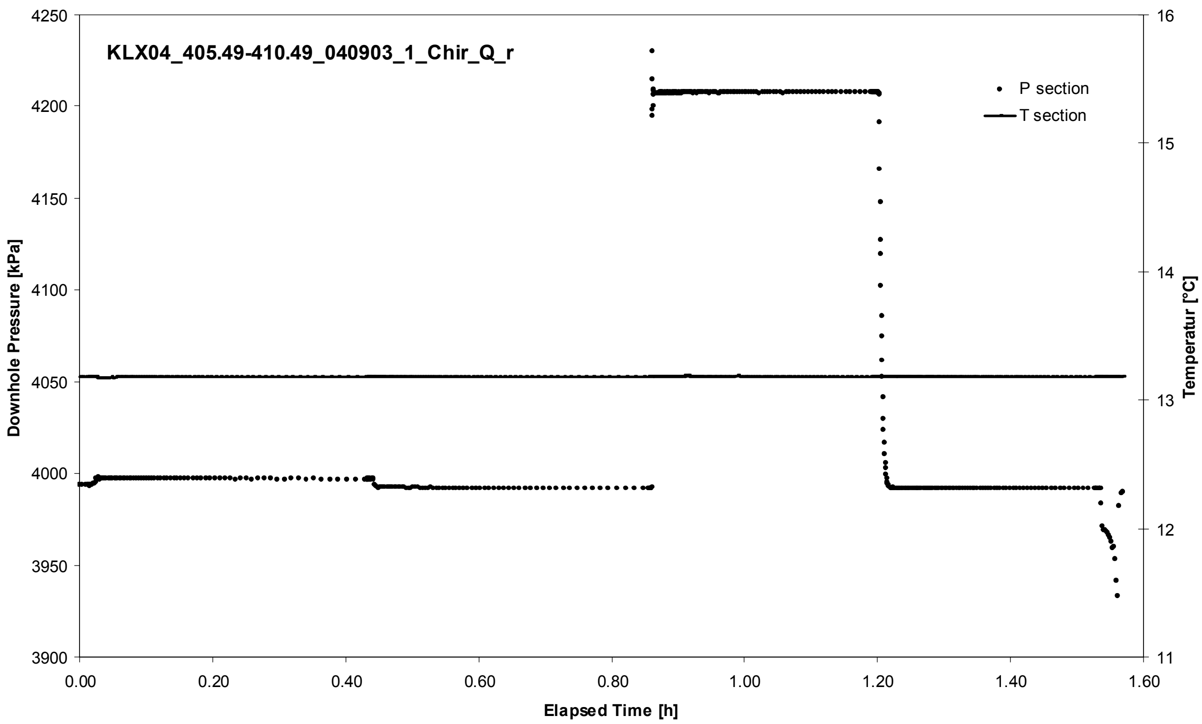
APPENDIX 2-70

Test 405.49 – 410.49 m

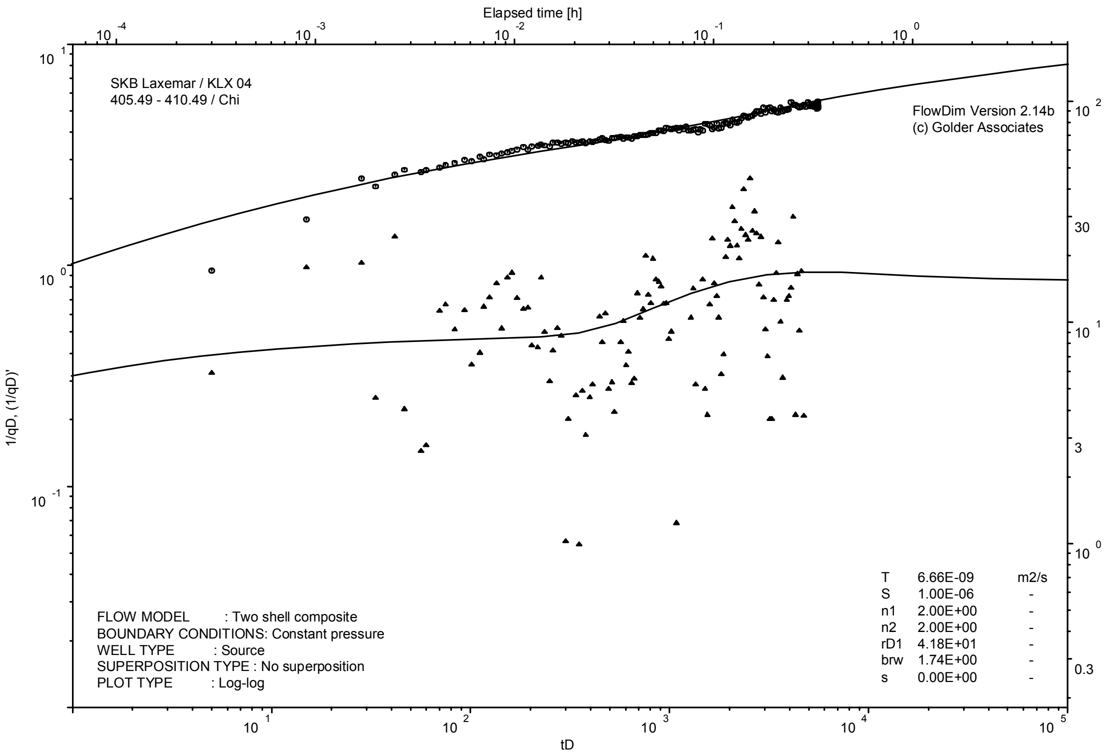
Analysis diagrams



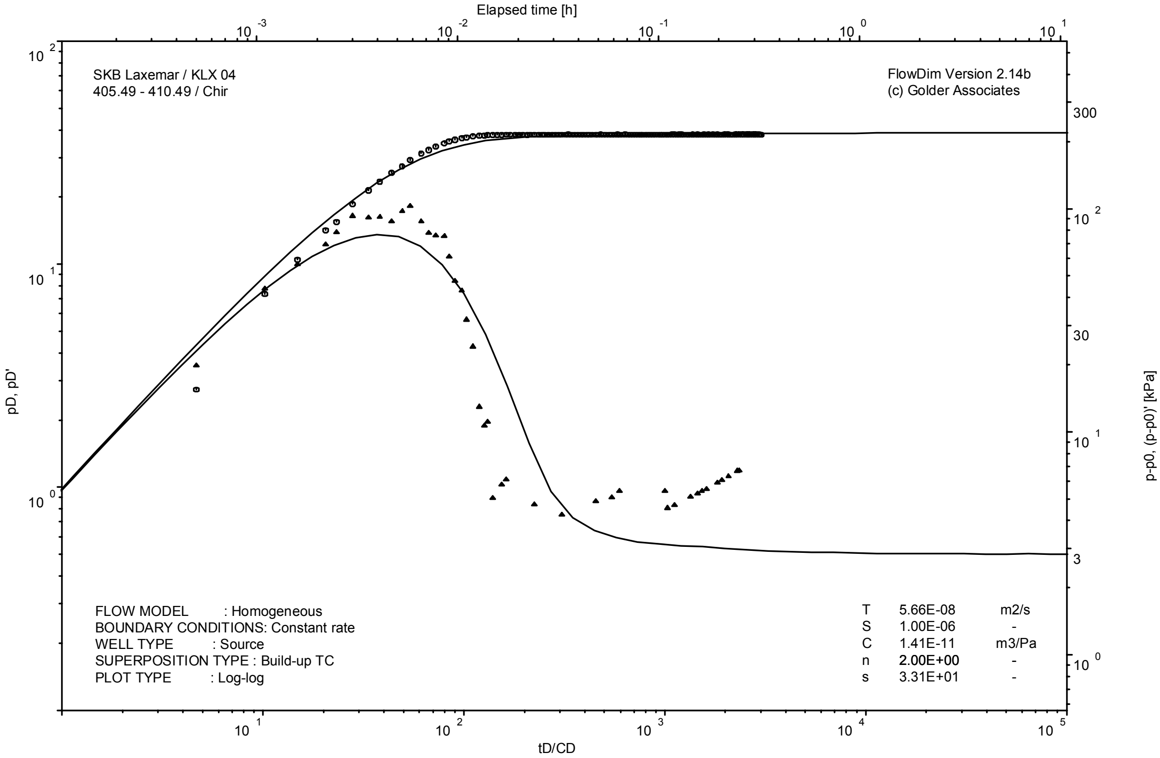
Pressure and flow rate vs. time; cartesian plot



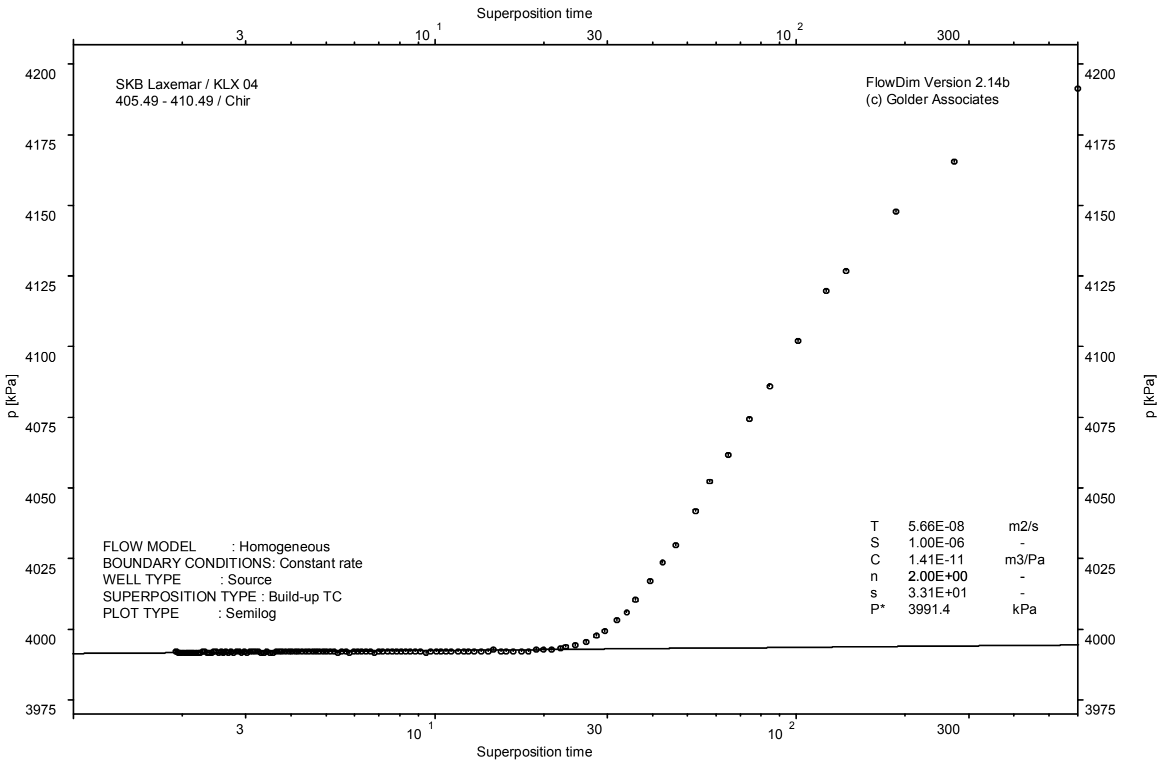
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

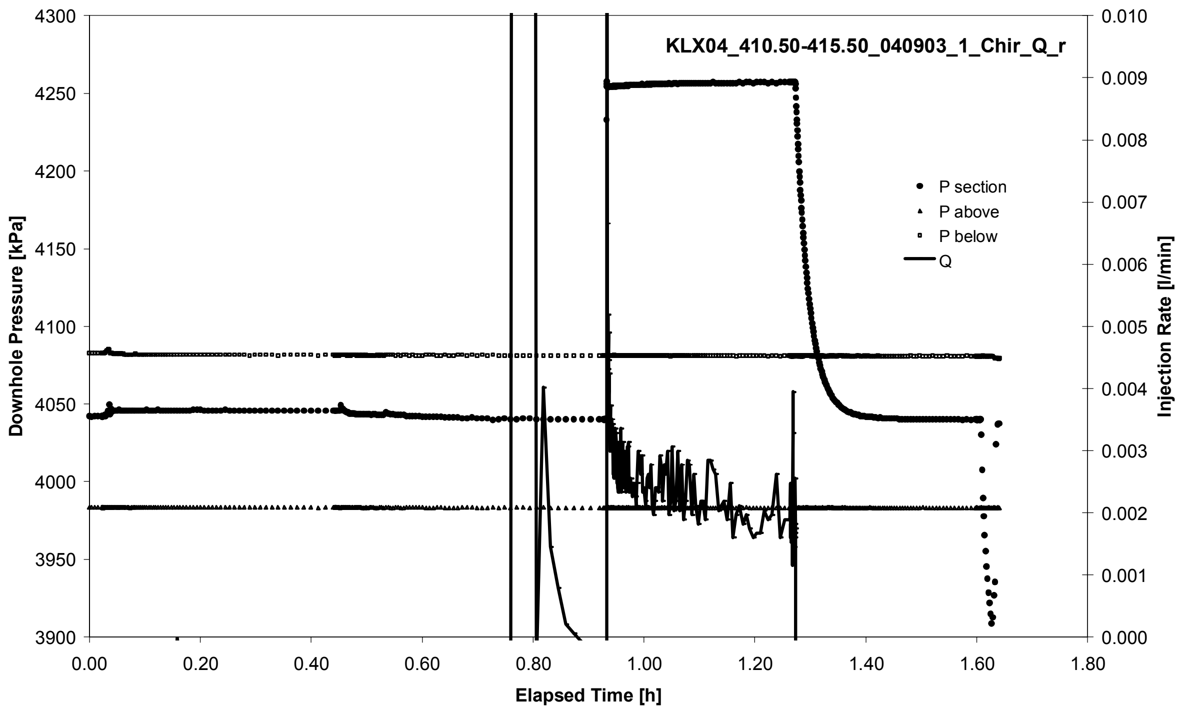


CHIR phase; HORNER match

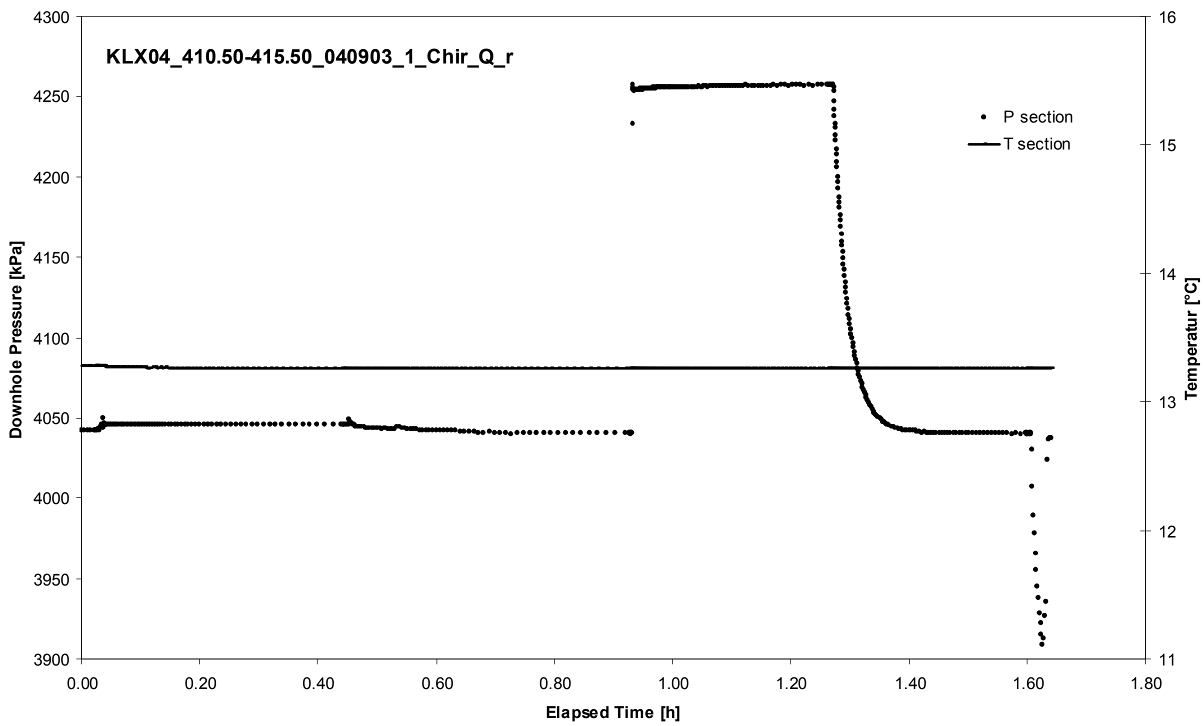
APPENDIX 2-71

Test 410.50 – 415.50 m

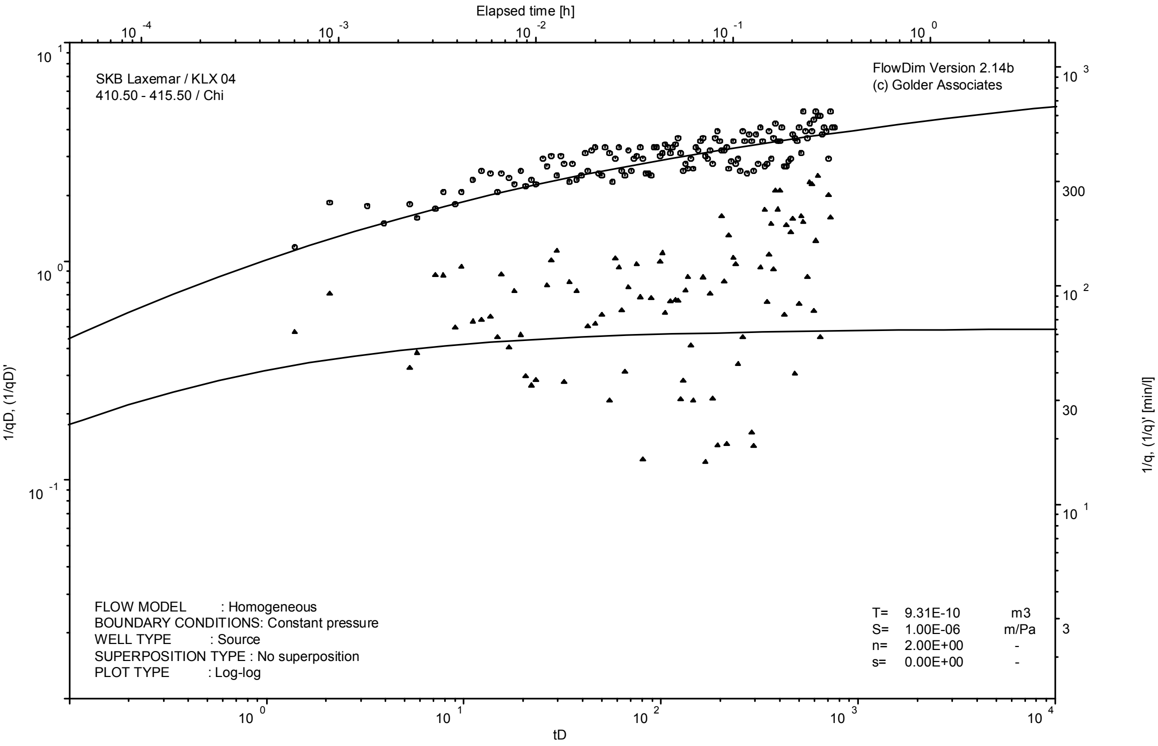
Analysis diagrams



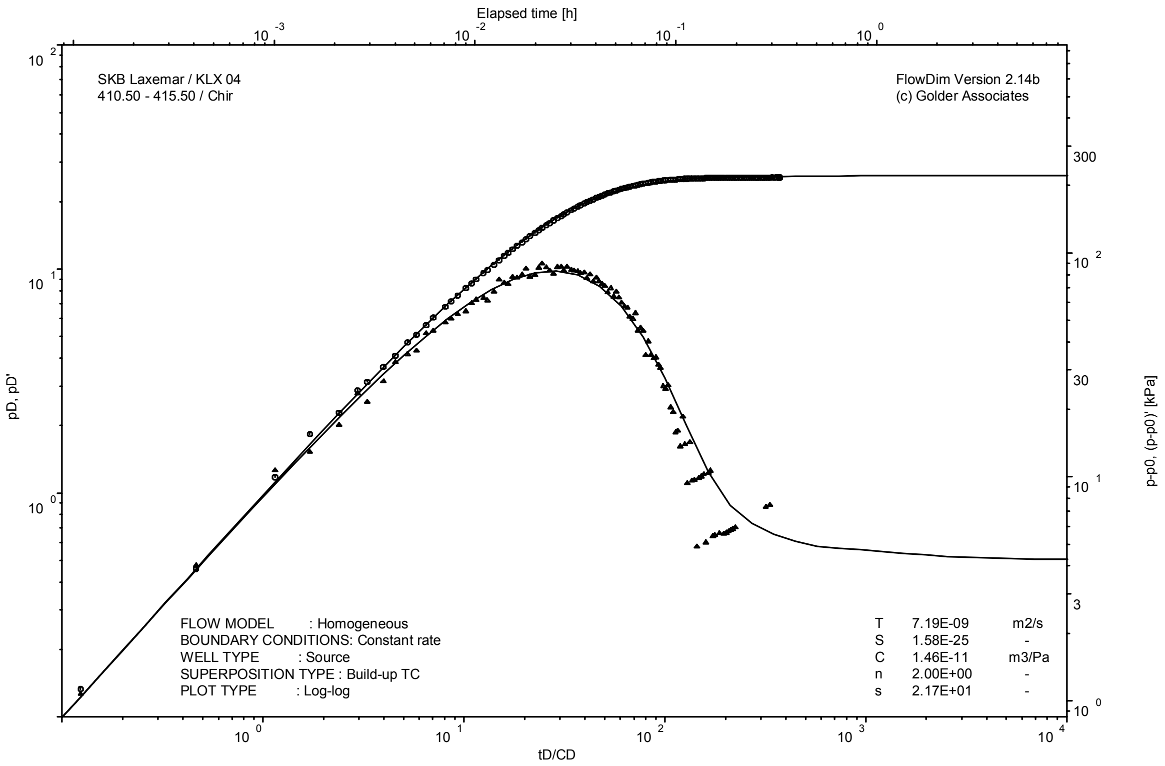
Pressure and flow rate vs. time; cartesian plot



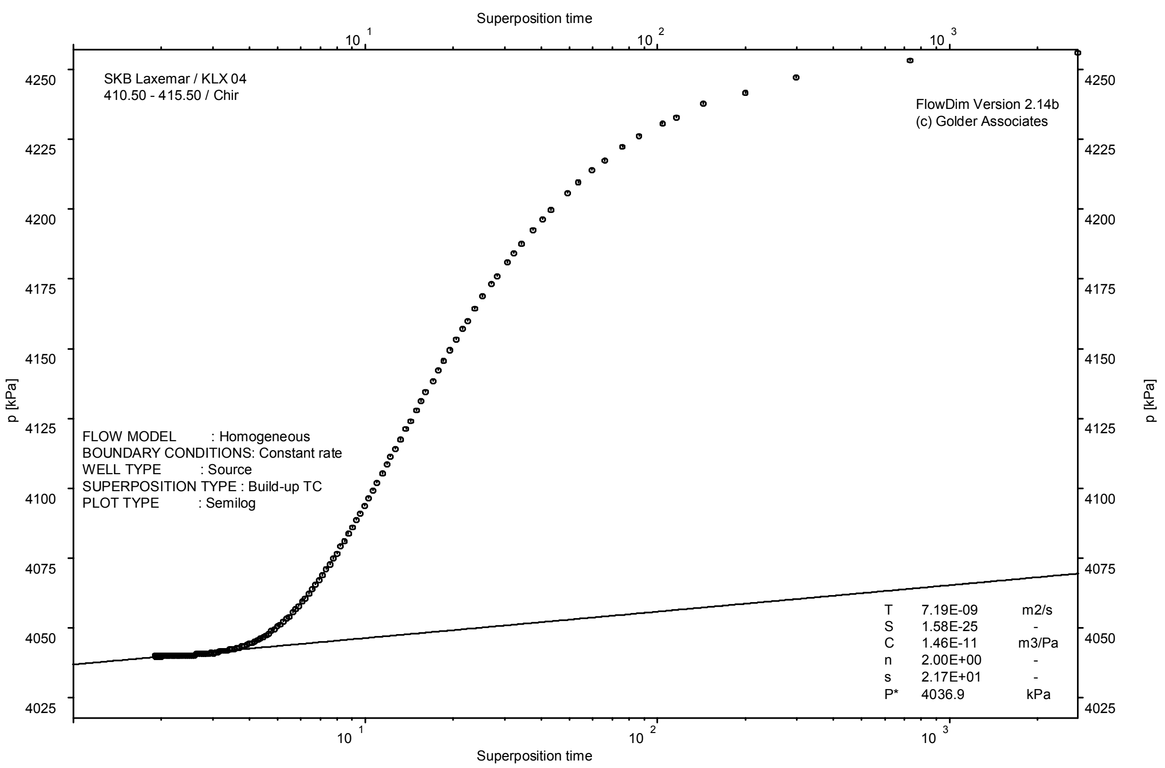
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

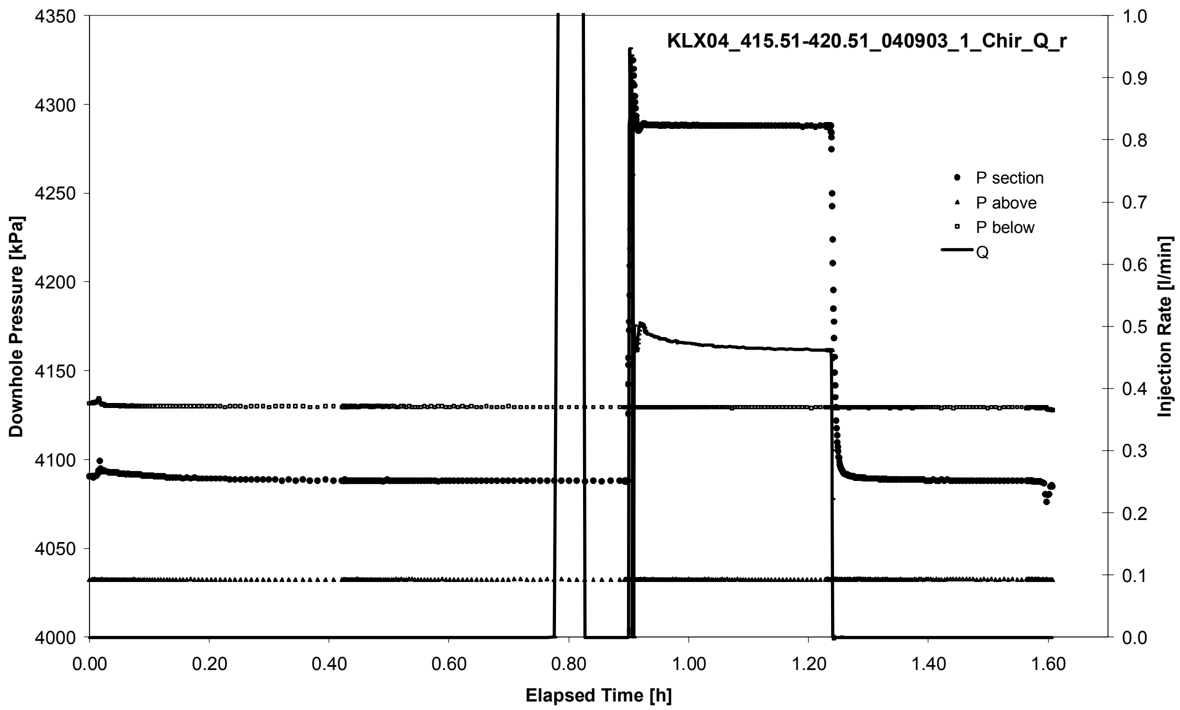


CHIR phase; HORNER match

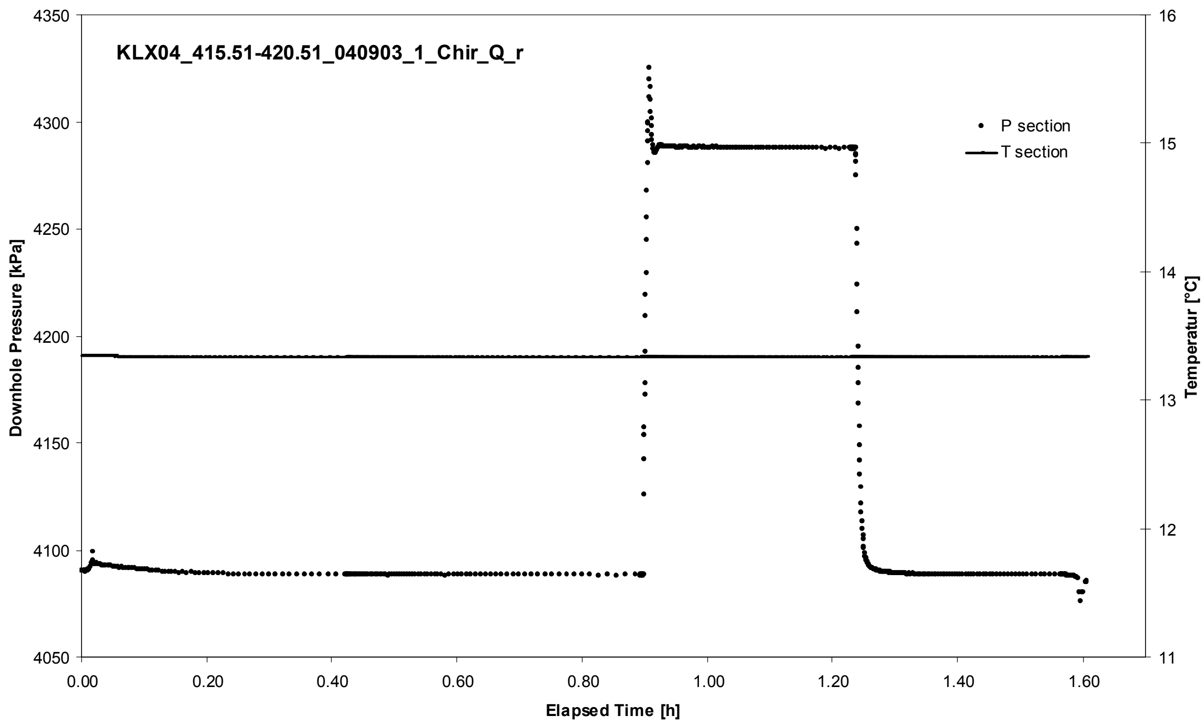
APPENDIX 2-72

Test 415.51 – 420.51 m

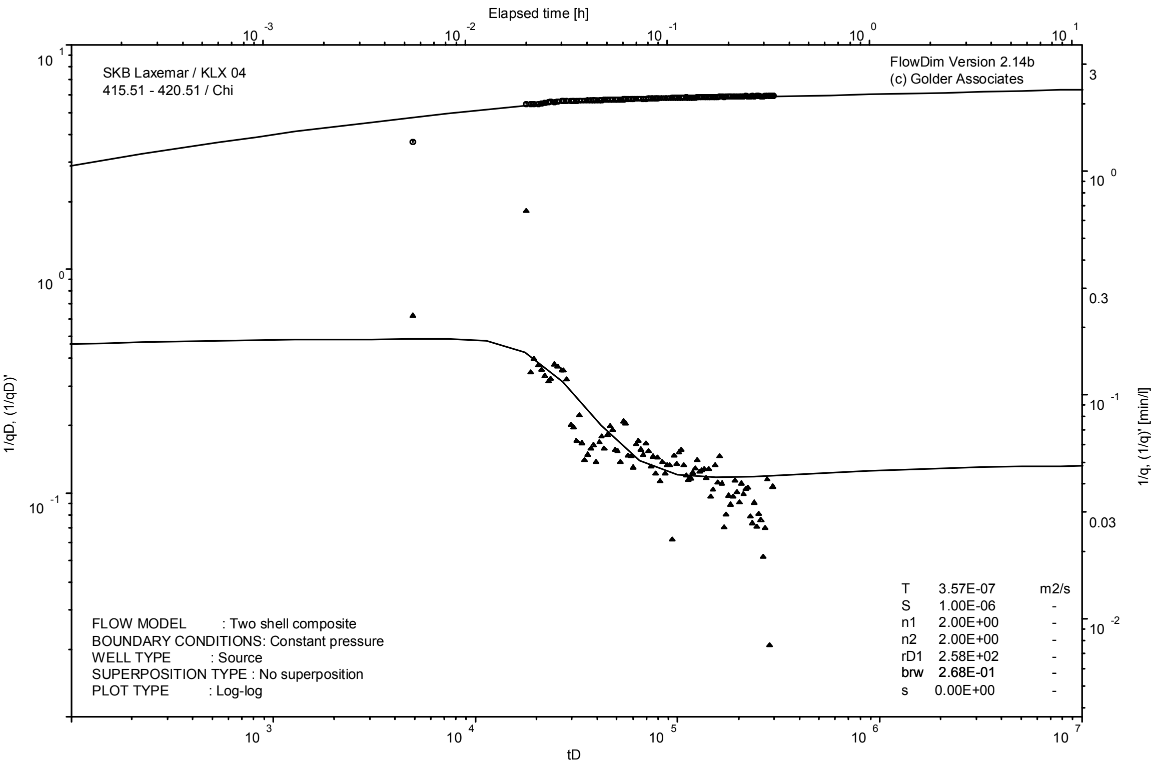
Analysis diagrams



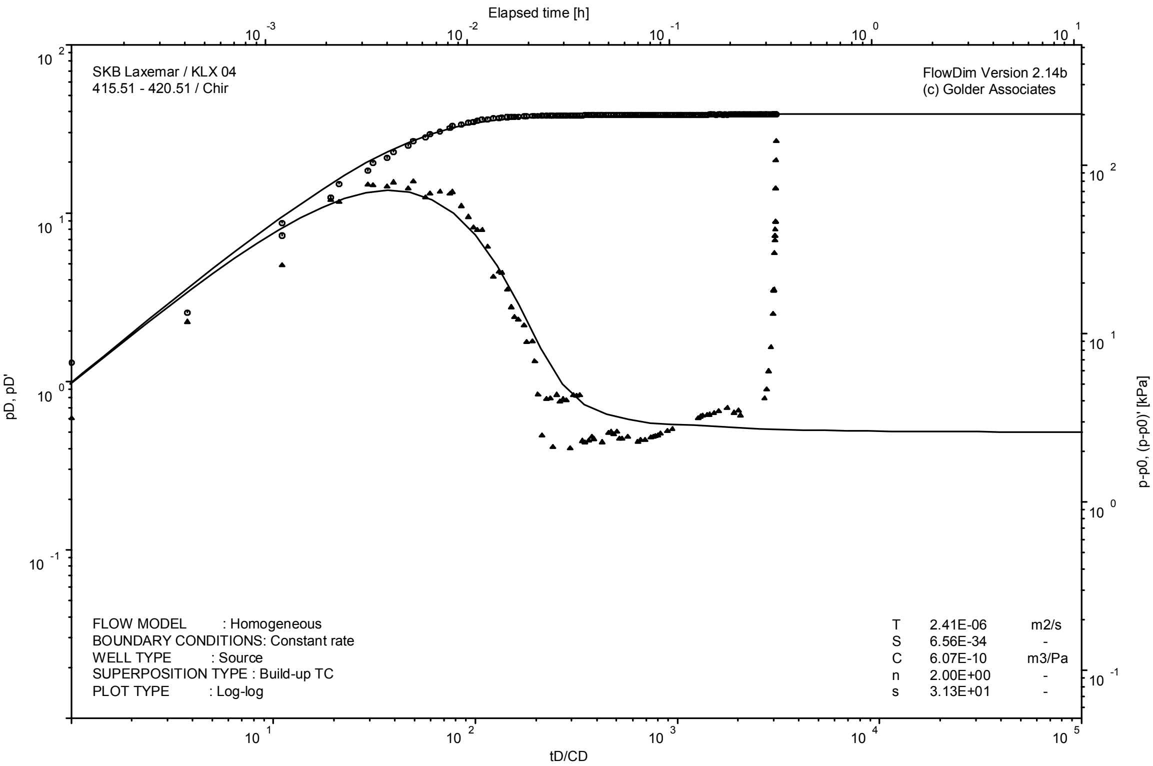
Pressure and flow rate vs. time; cartesian plot



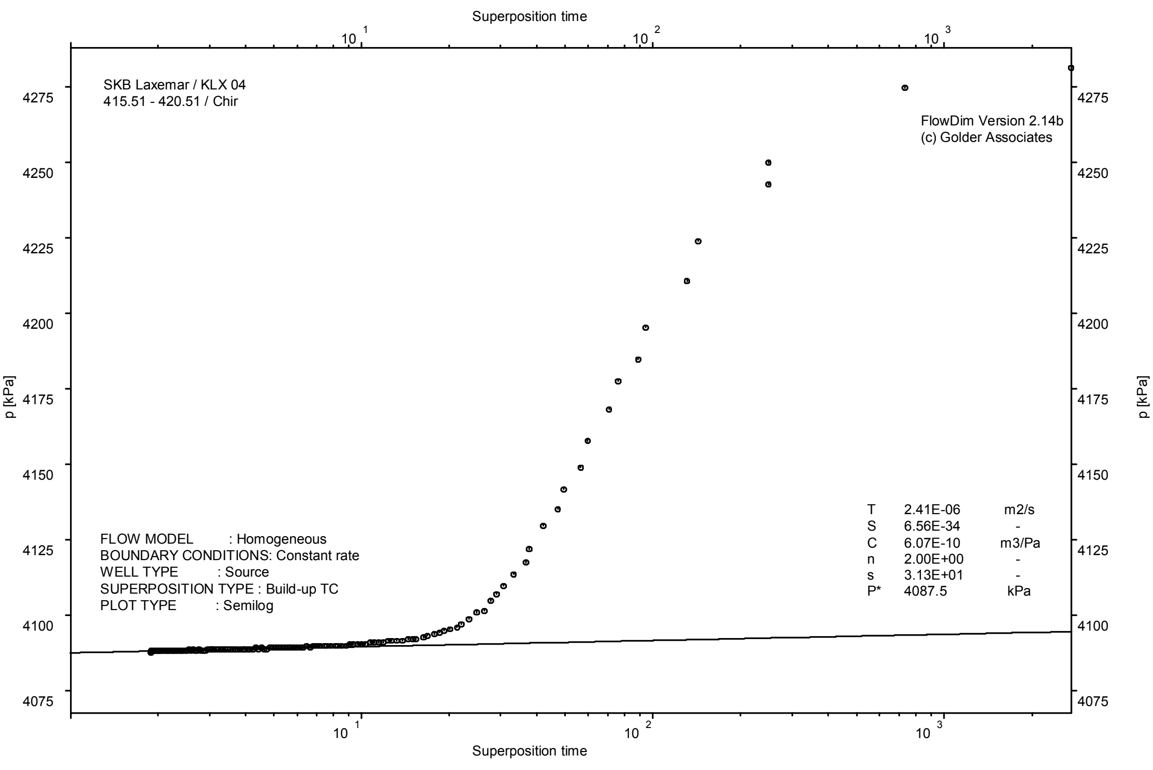
Interval pressure and temperature vs. time; cartesian plot



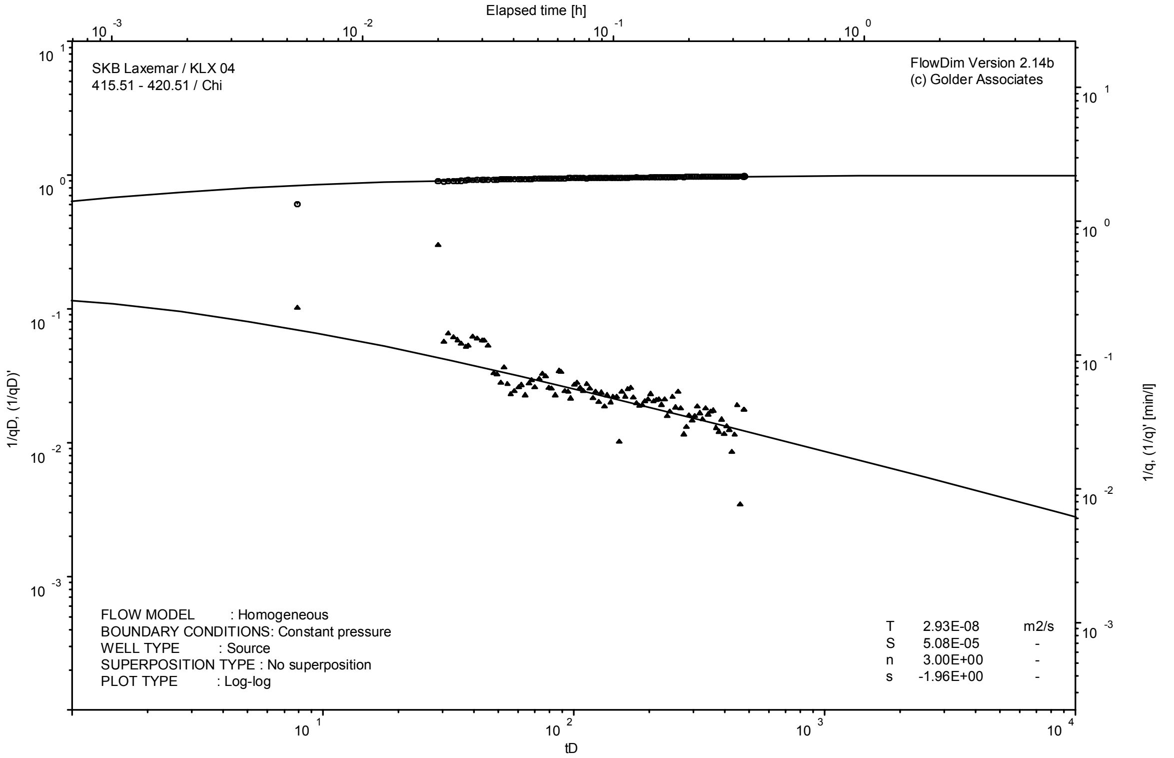
CHI phase; log-log match



CHIR phase; log-log match



CHIR phase; HORNER match

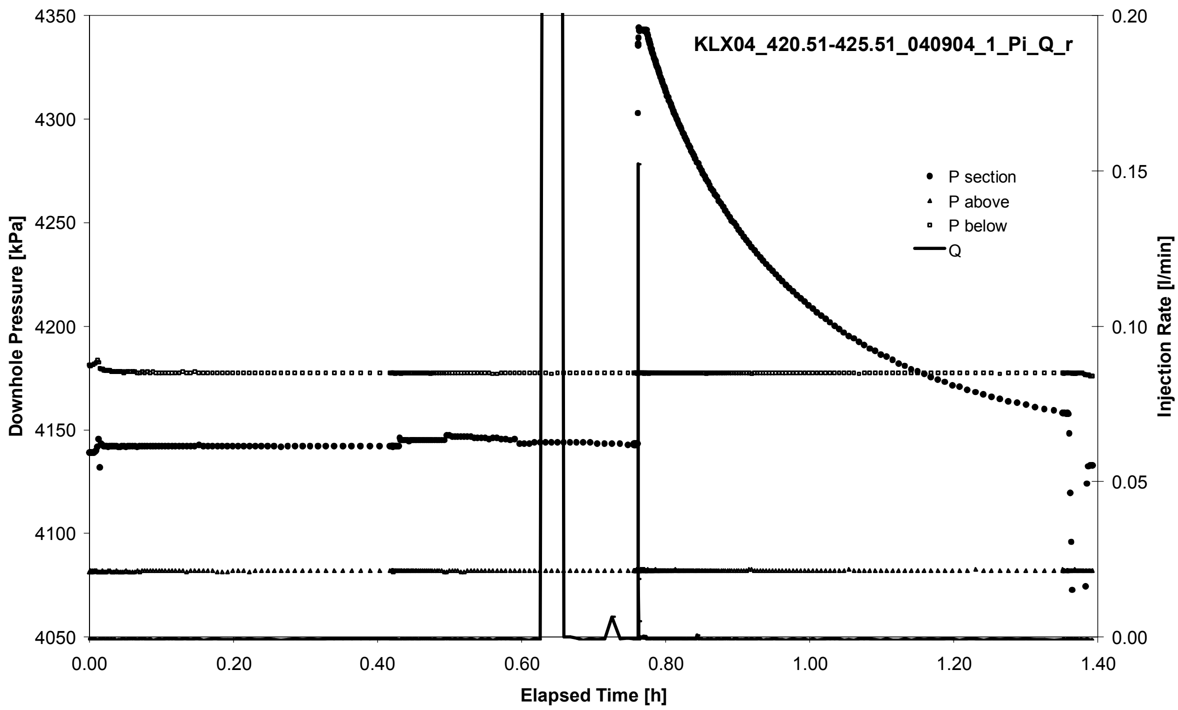


CHI phase; alternative log-log match (n=3, spherical flow)

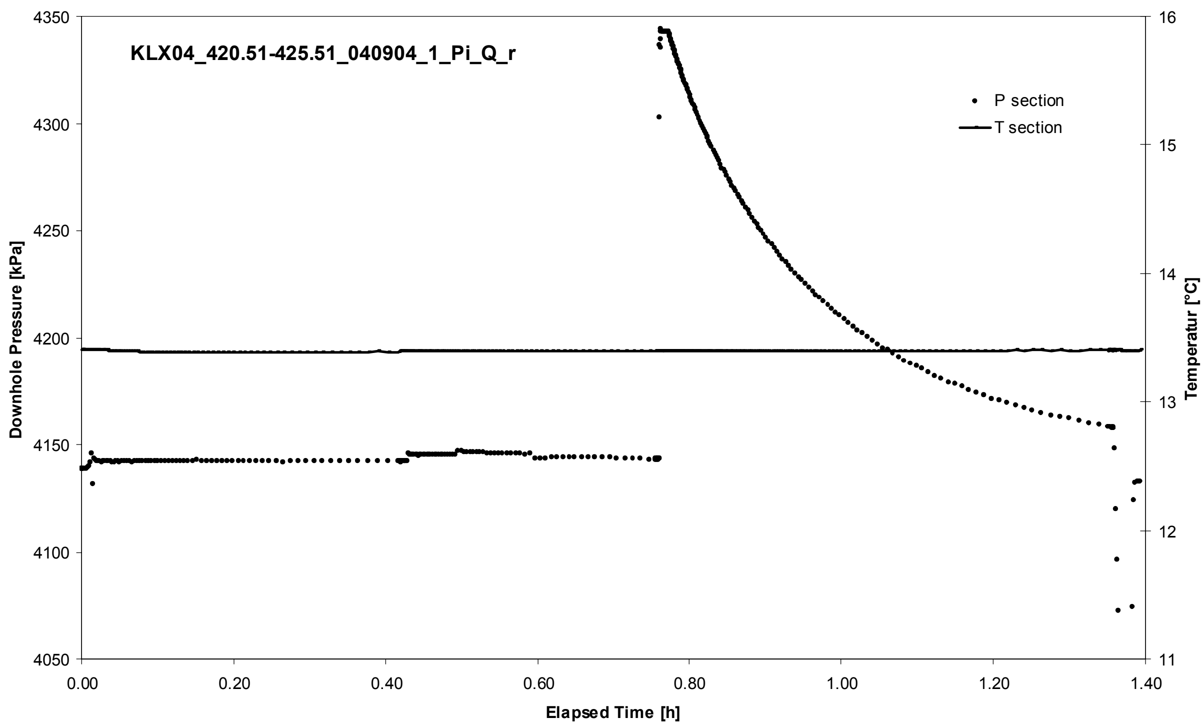
APPENDIX 2-73

Test 420.51 – 425.51 m

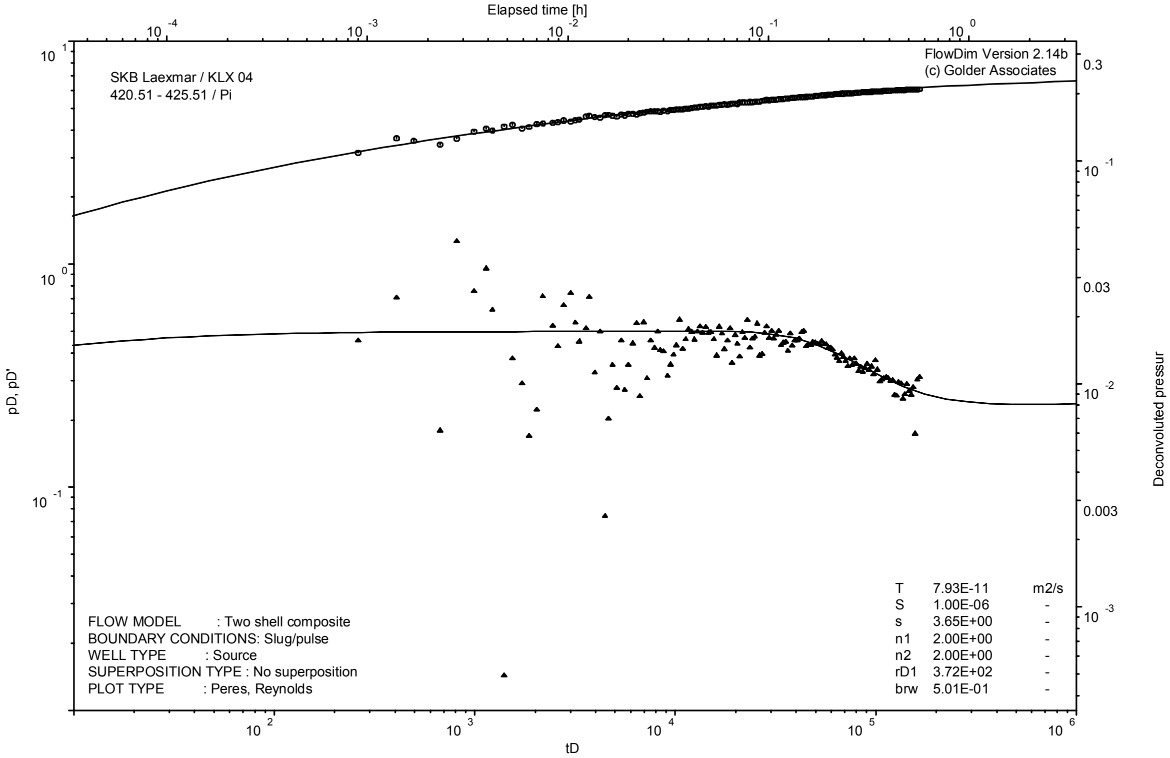
Analysis diagrams



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot

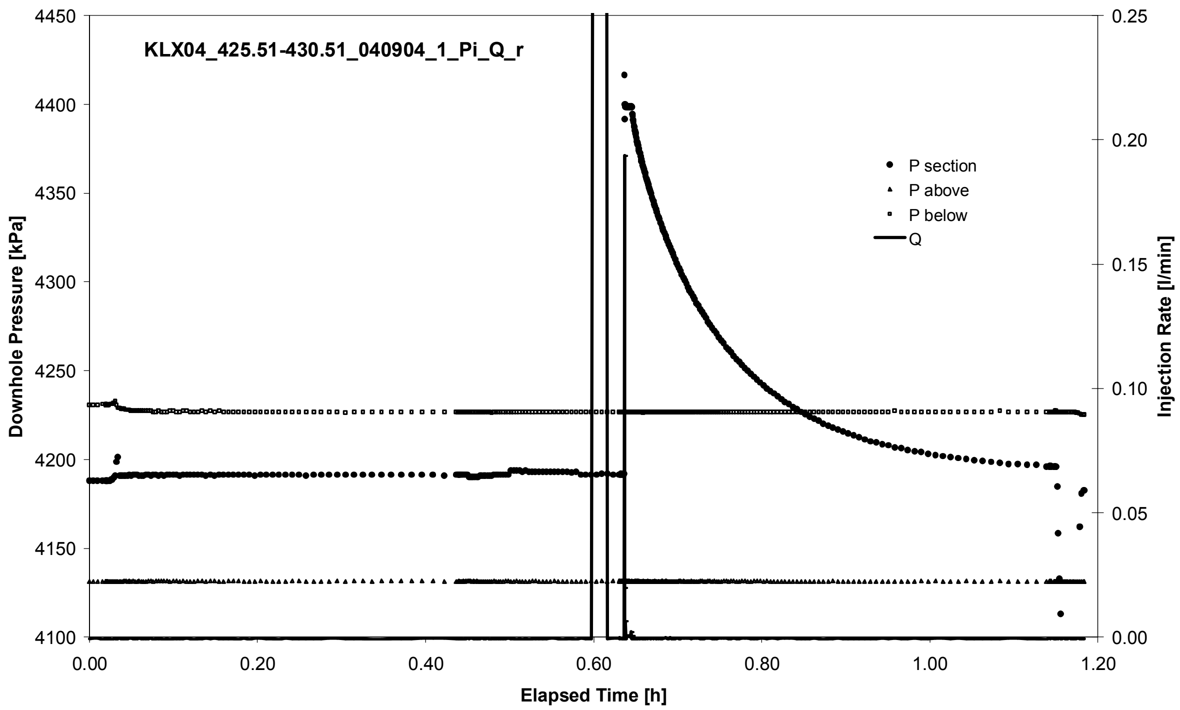


CHIR phase analysed as pulse injection; deconvolution match

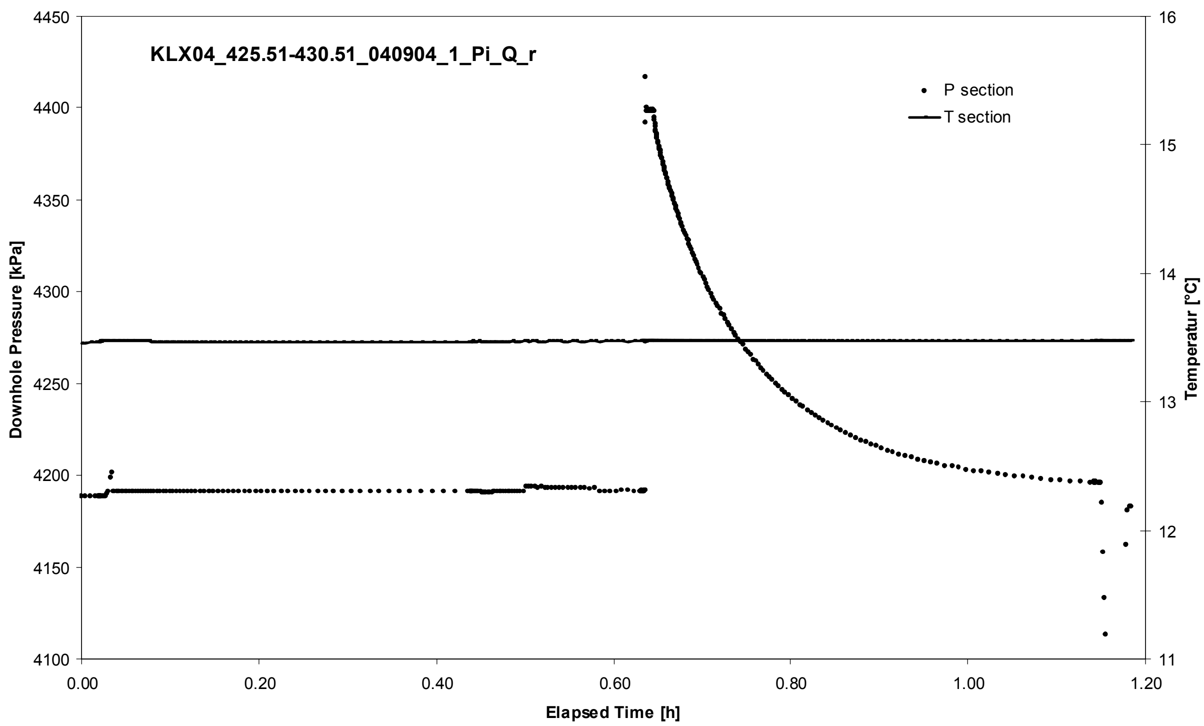
APPENDIX 2-74

Test 425.51 – 430.51 m

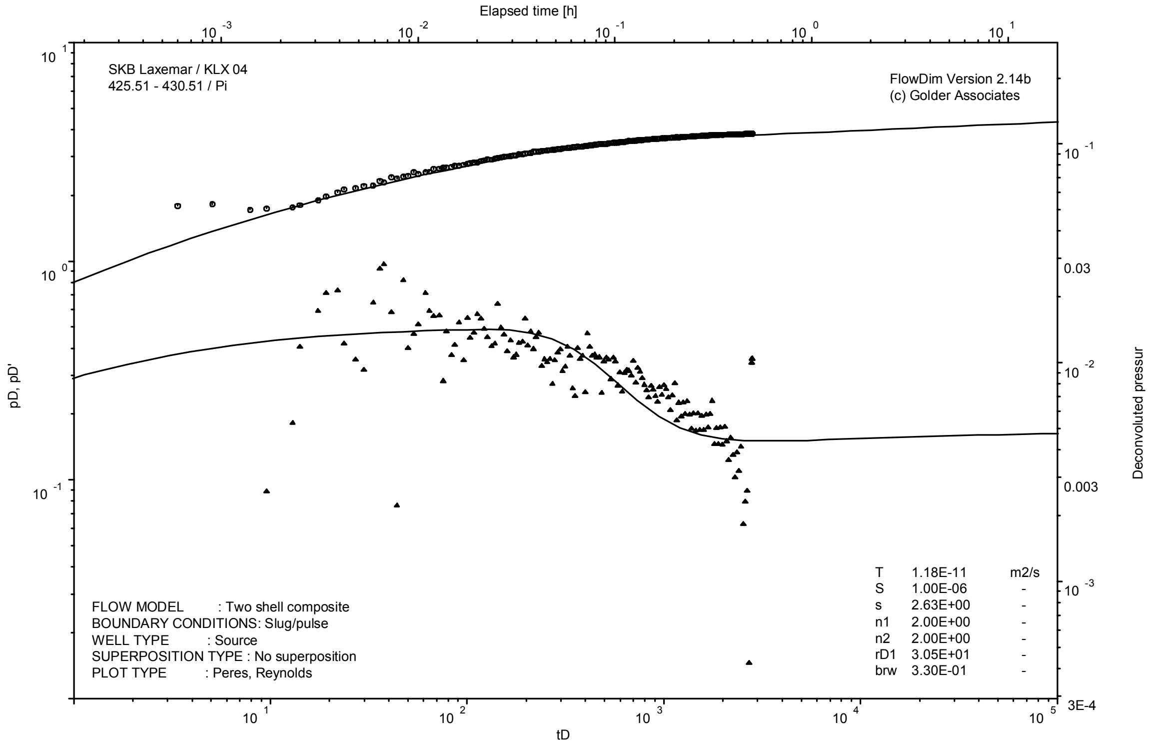
Analysis diagrams



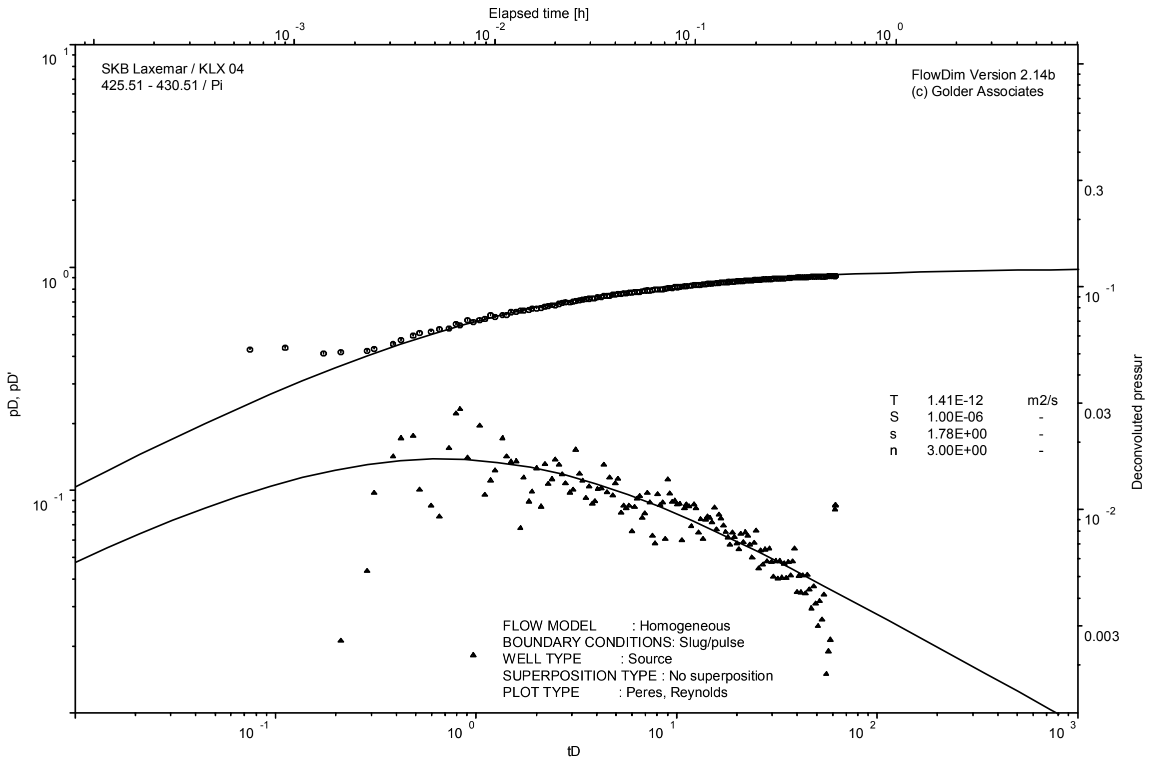
Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot



CHIR phase analysed as pulse injection; deconvolution match

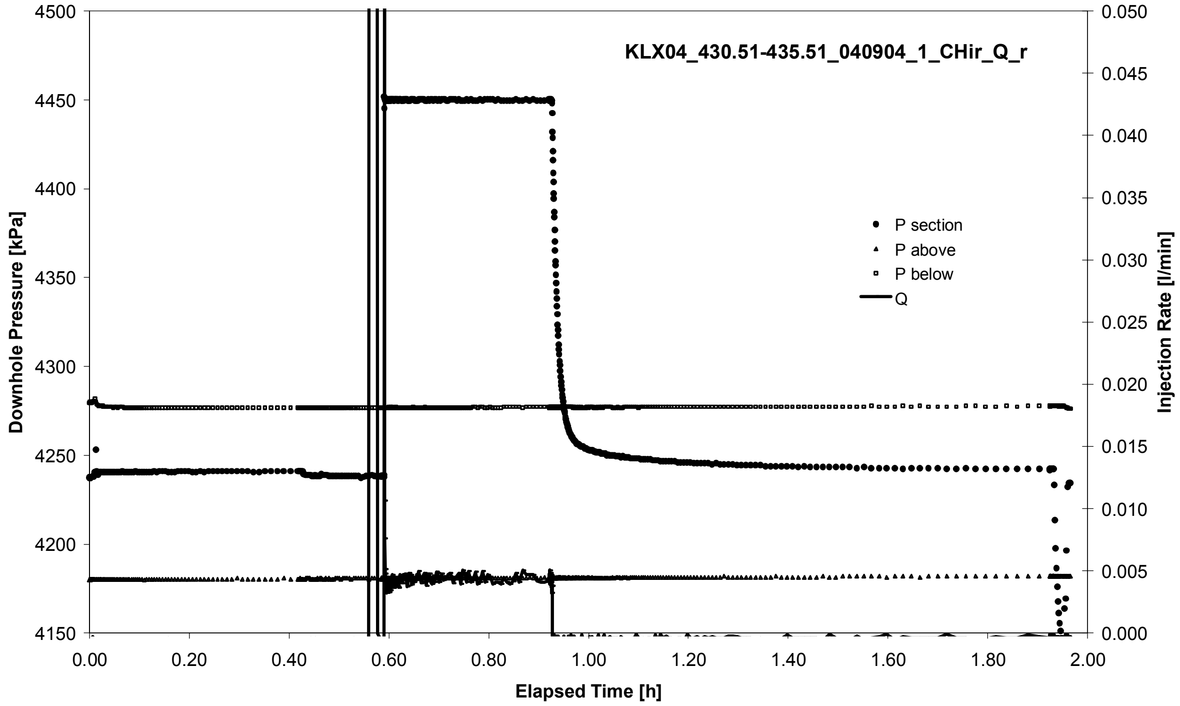


CHIR phase; alternative log-log match (n=3, spherical flow)

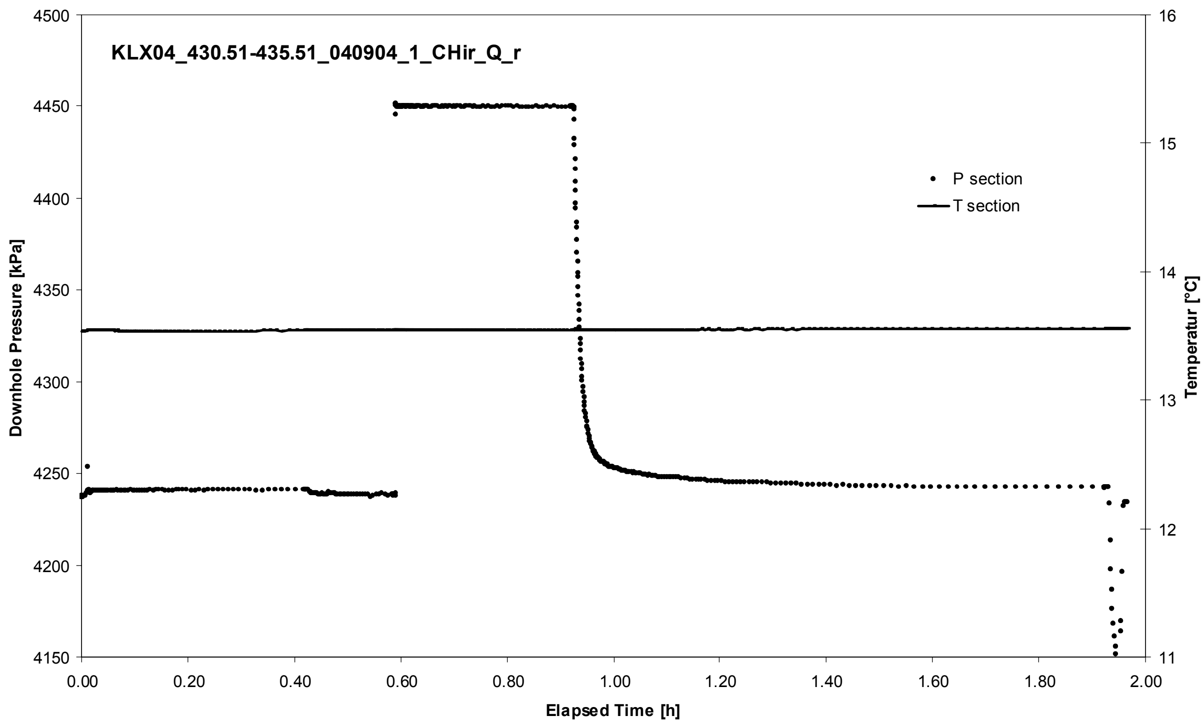
APPENDIX 2-75

Test 430.51 – 435.51 m

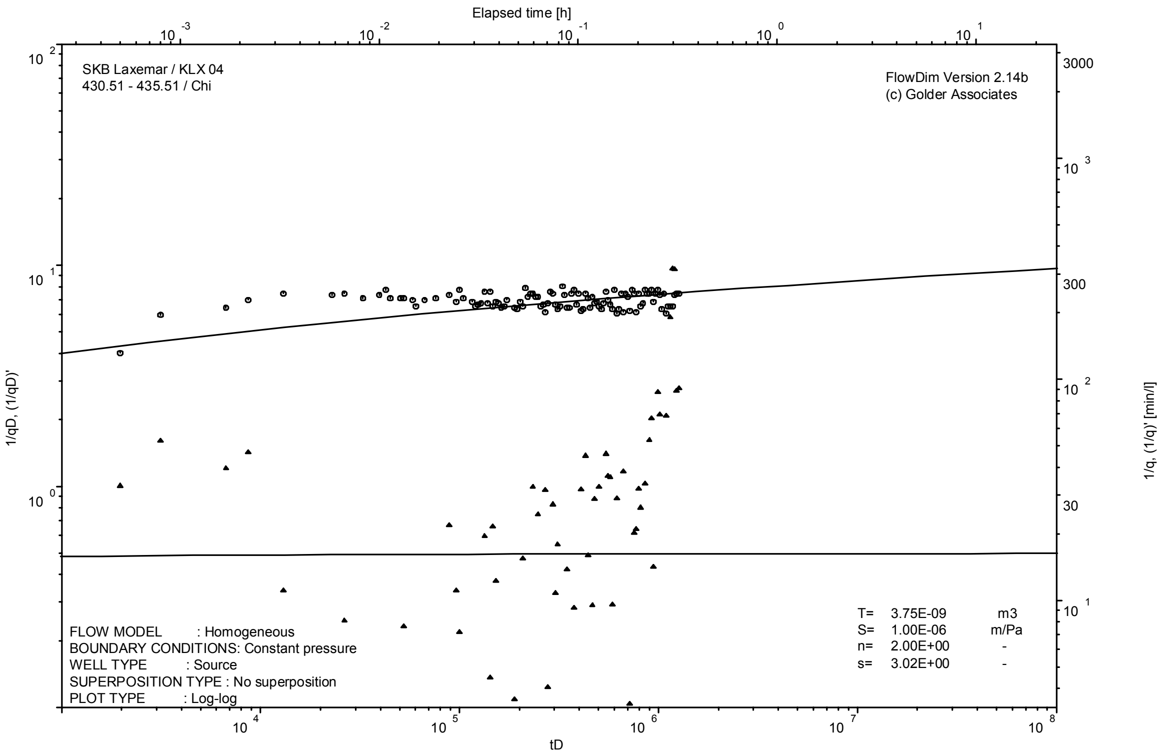
Analysis diagrams



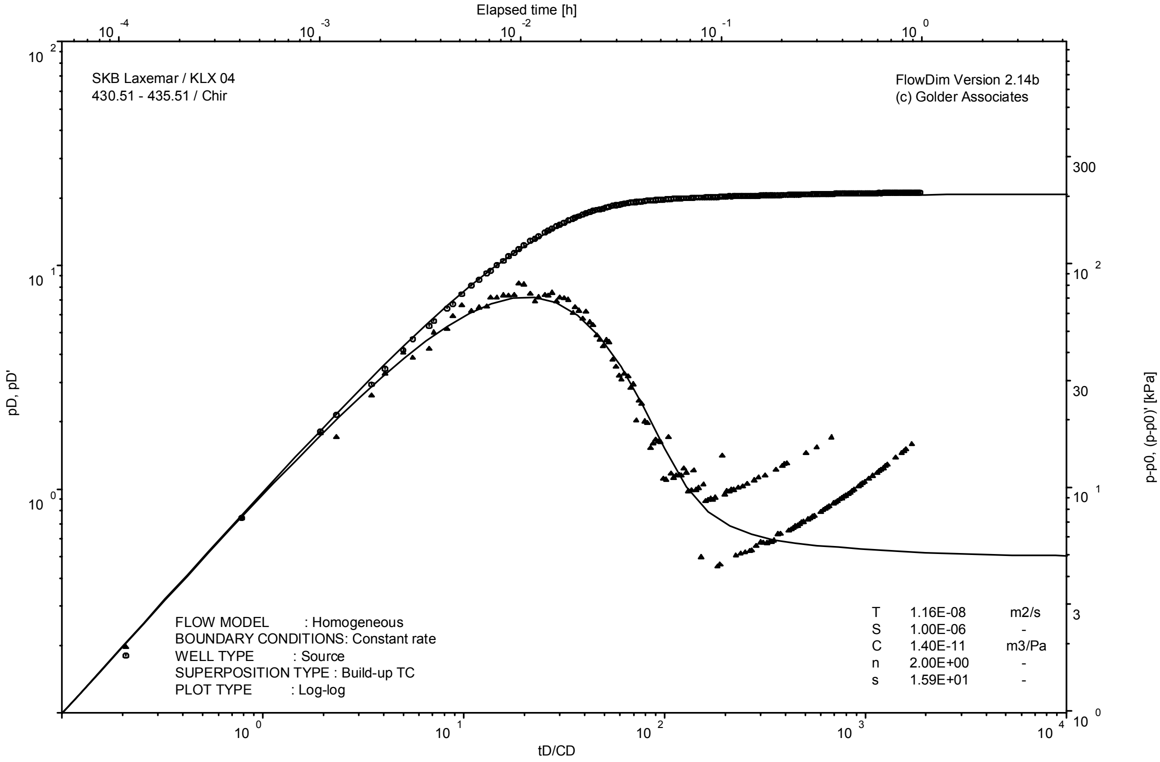
Pressure and flow rate vs. time; cartesian plot



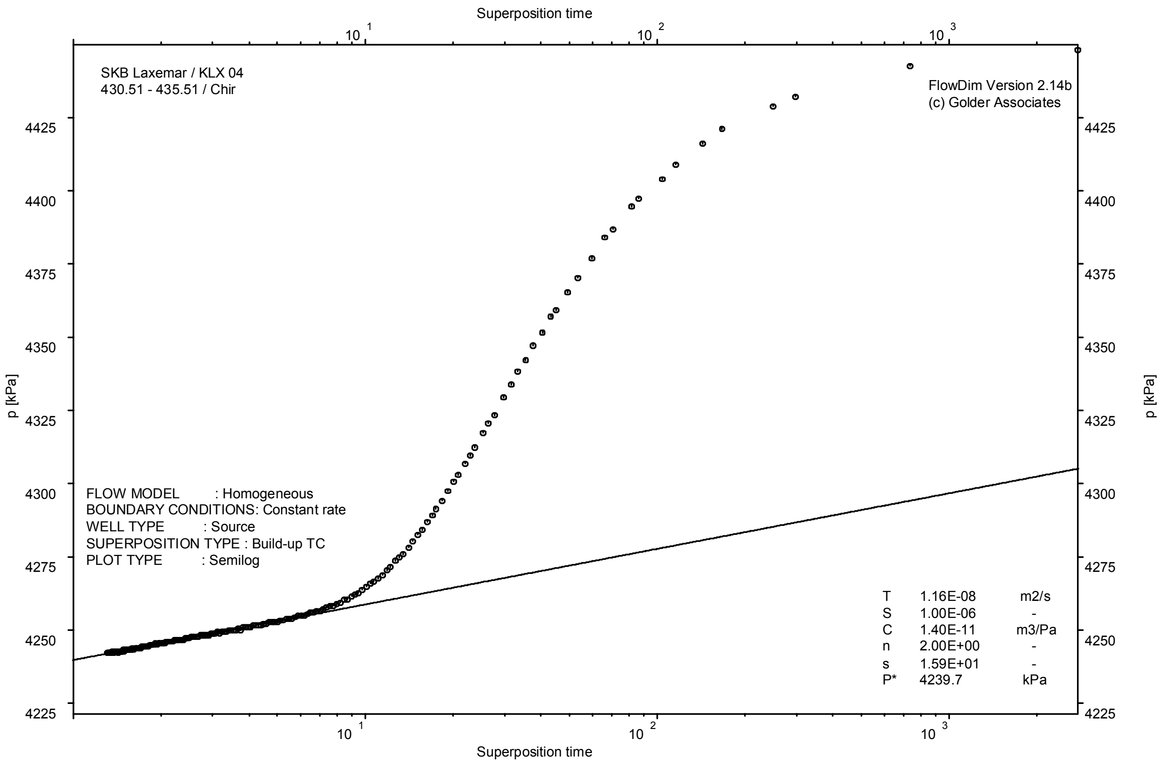
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

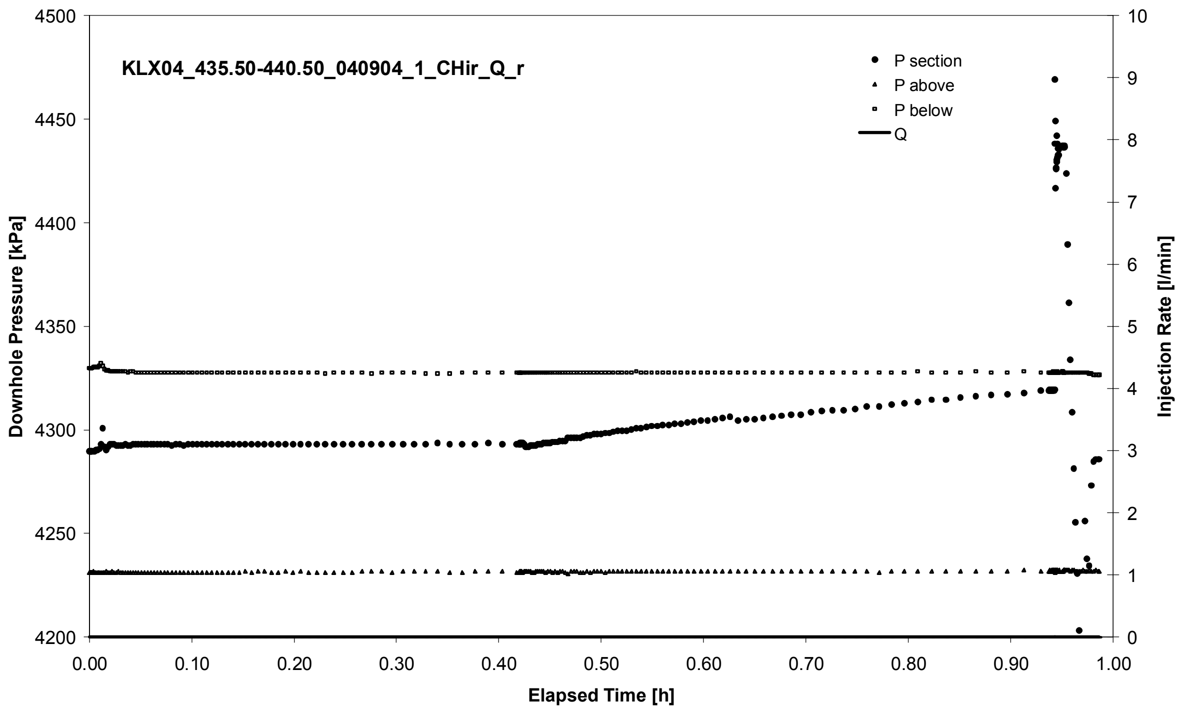


CHIR phase; HORNER match

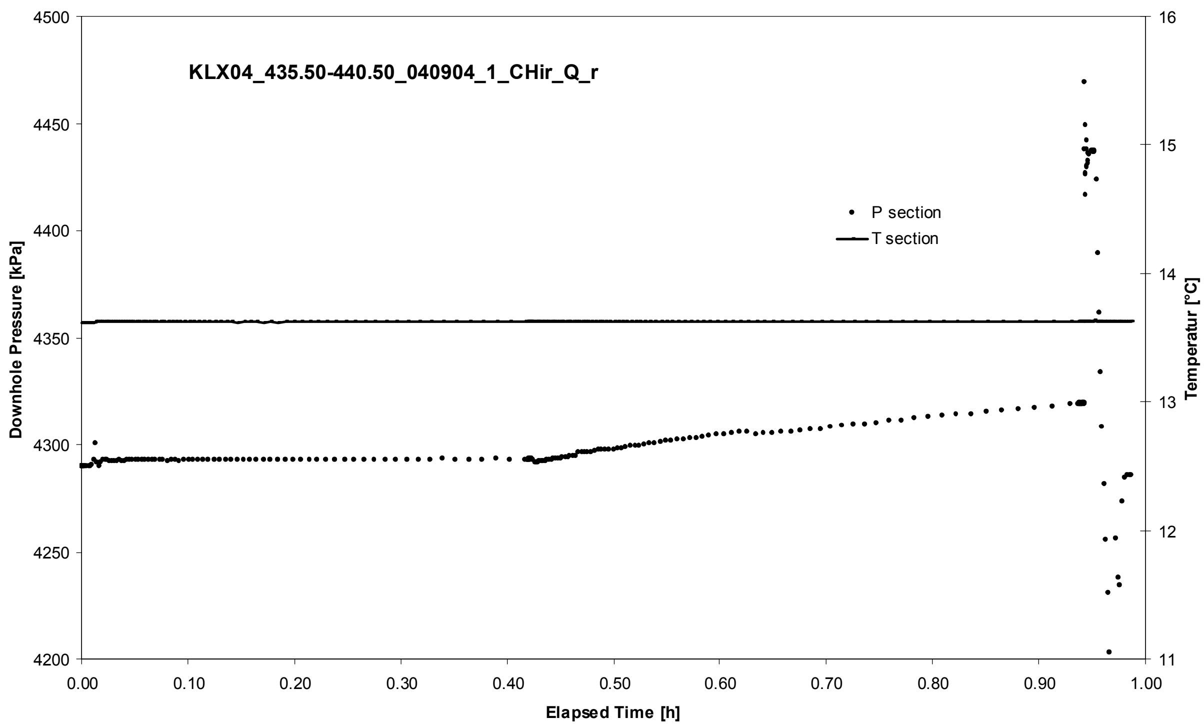
APPENDIX 2-76

Test 435.50 – 440.50 m

Analysis diagrams



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot

Not Analysed

CHI phase; log-log match

Not Analysed

CHIR phase; log-log match

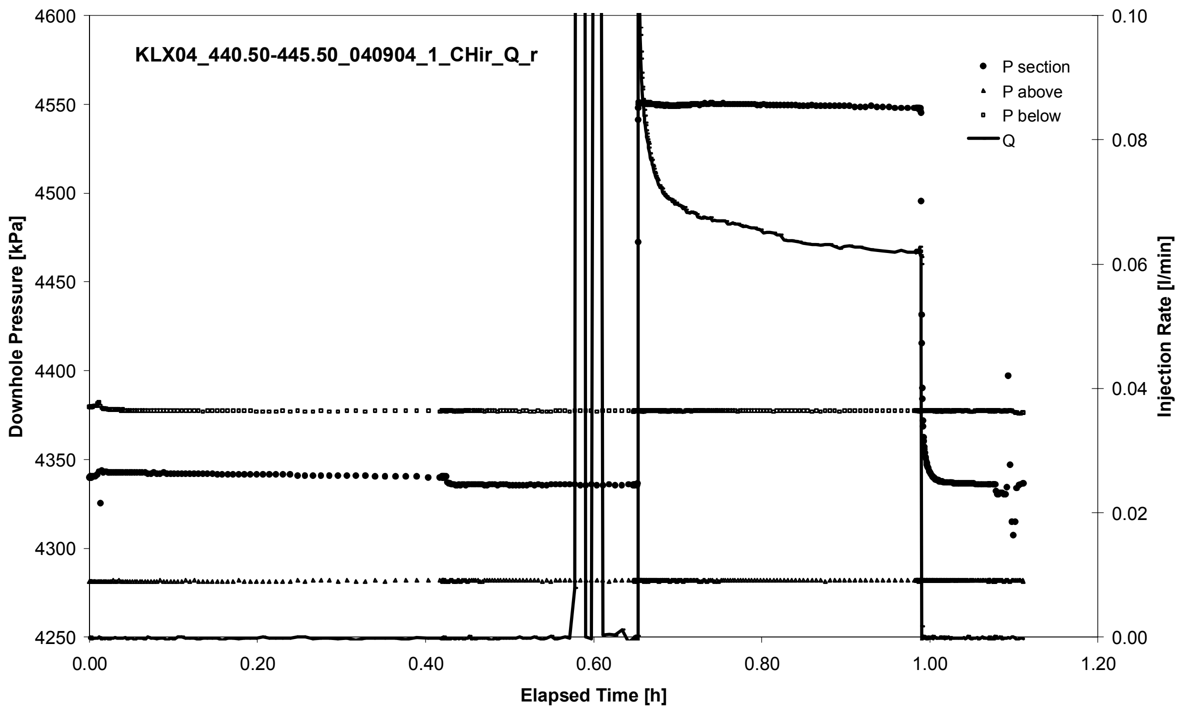
Not Analysed

CHIR phase; HORNER match

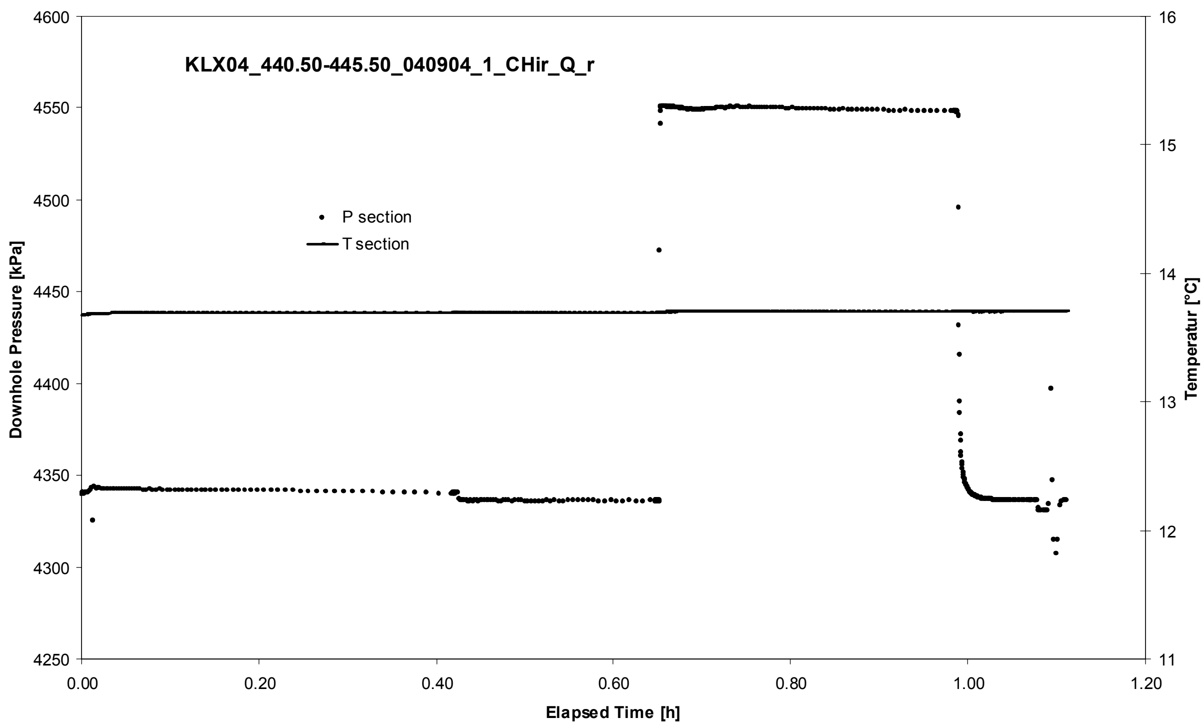
APPENDIX 2-77

Test 440.50 – 445.50 m

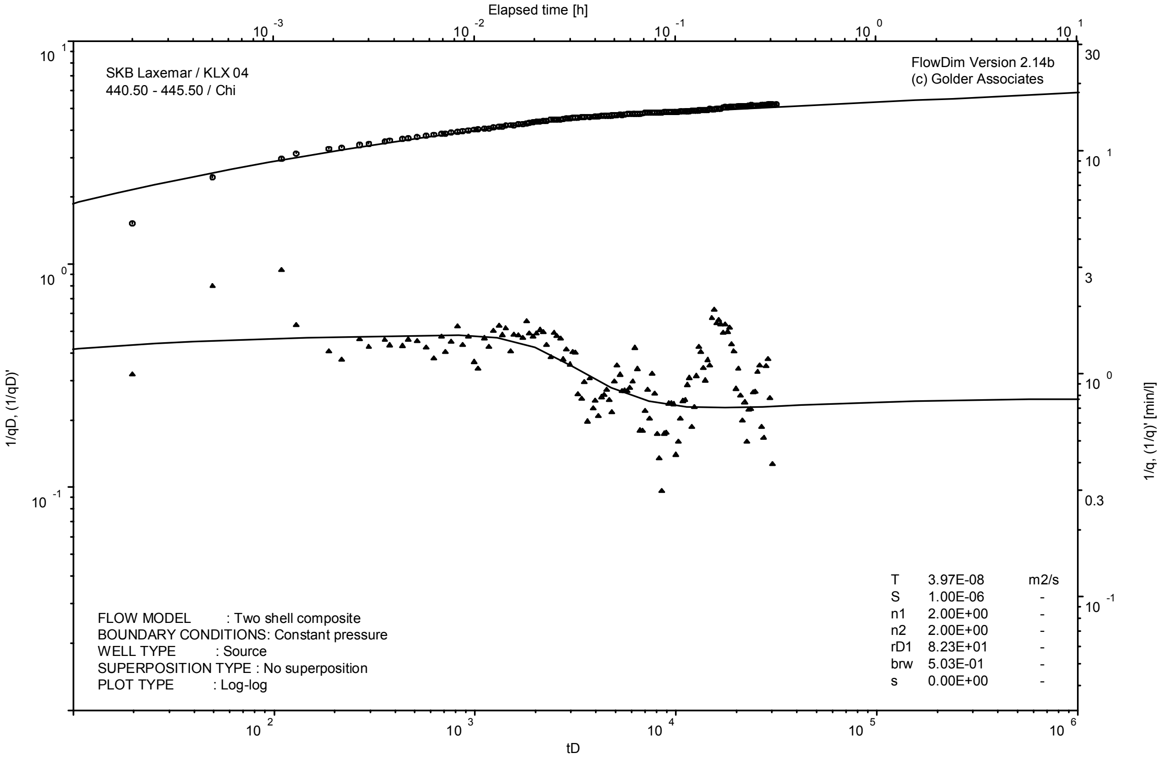
Analysis diagrams



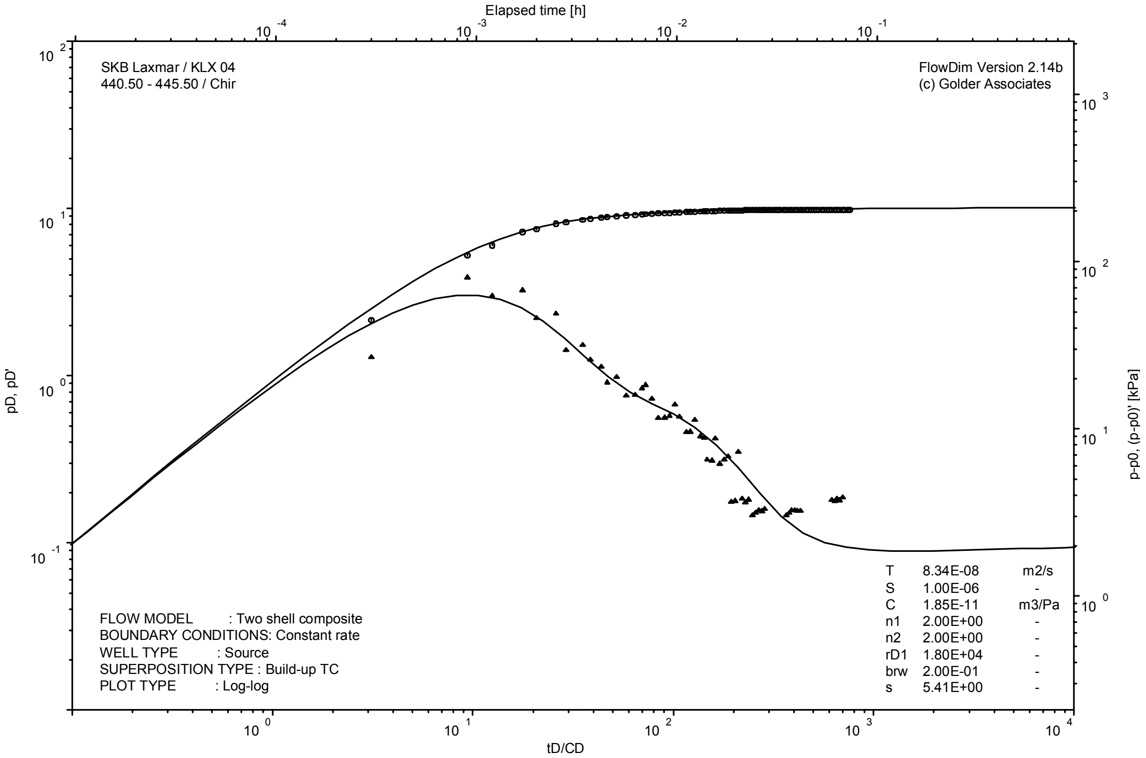
Pressure and flow rate vs. time; cartesian plot



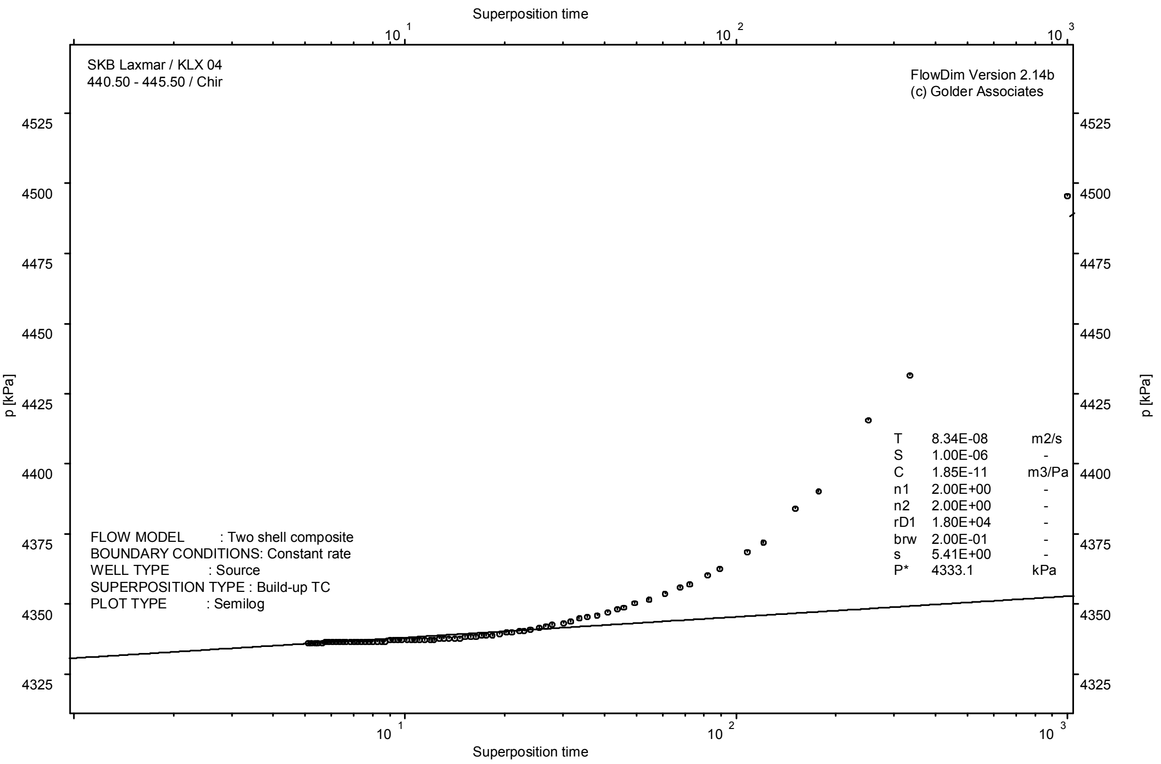
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

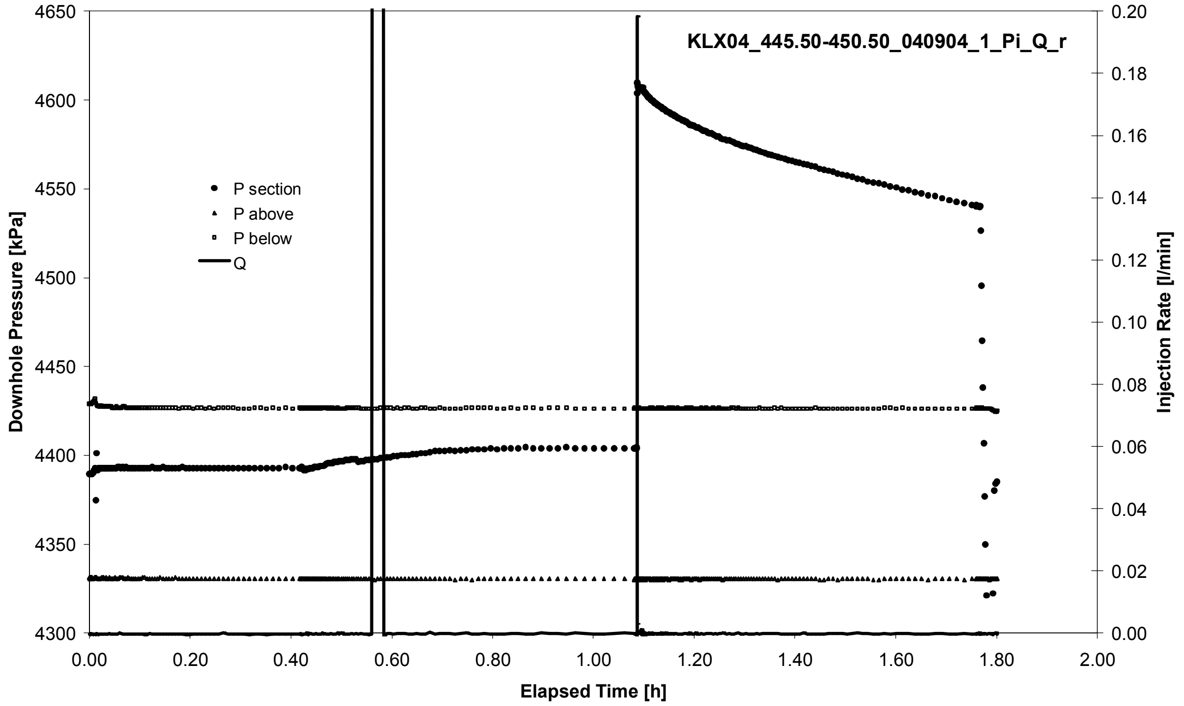


CHIR phase; HORNER match

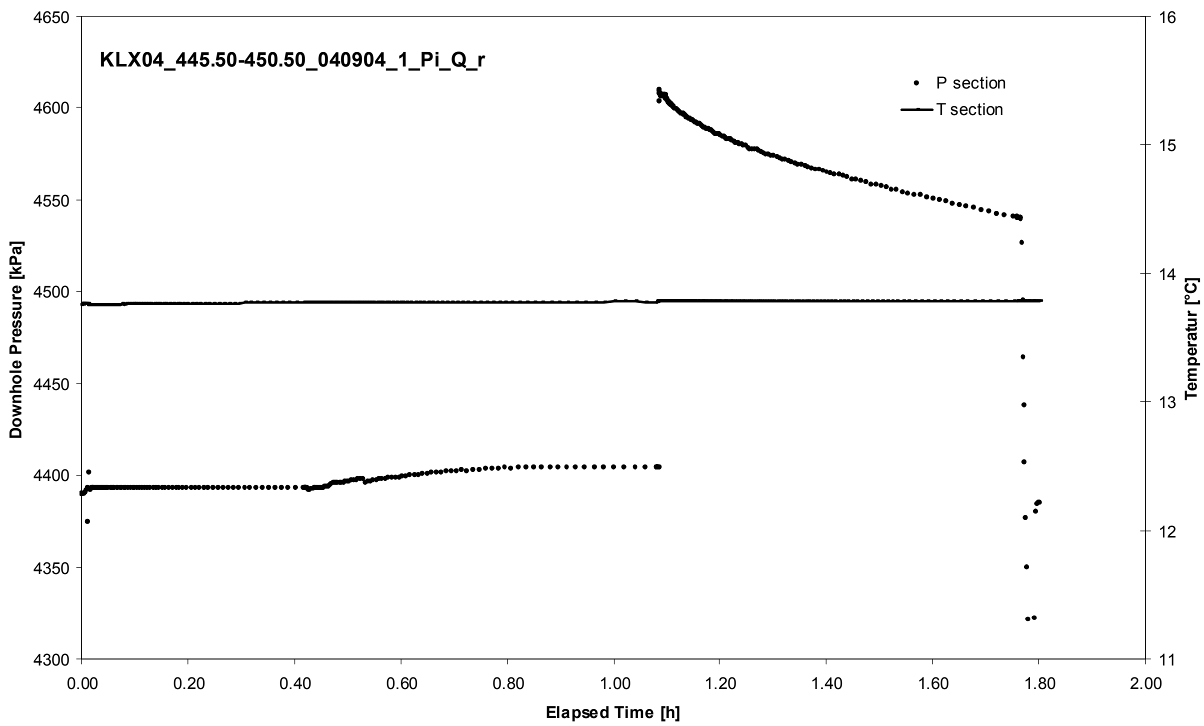
APPENDIX 2-78

Test 445.50 – 450.50 m

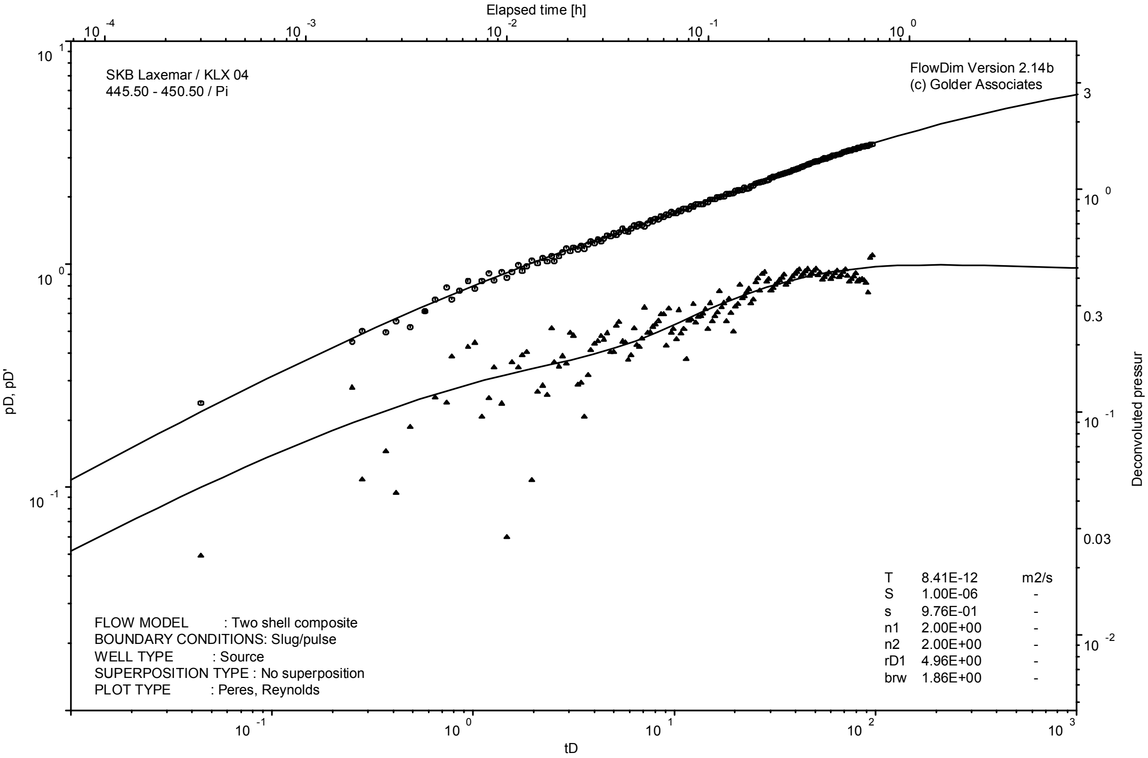
Analysis diagrams



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot

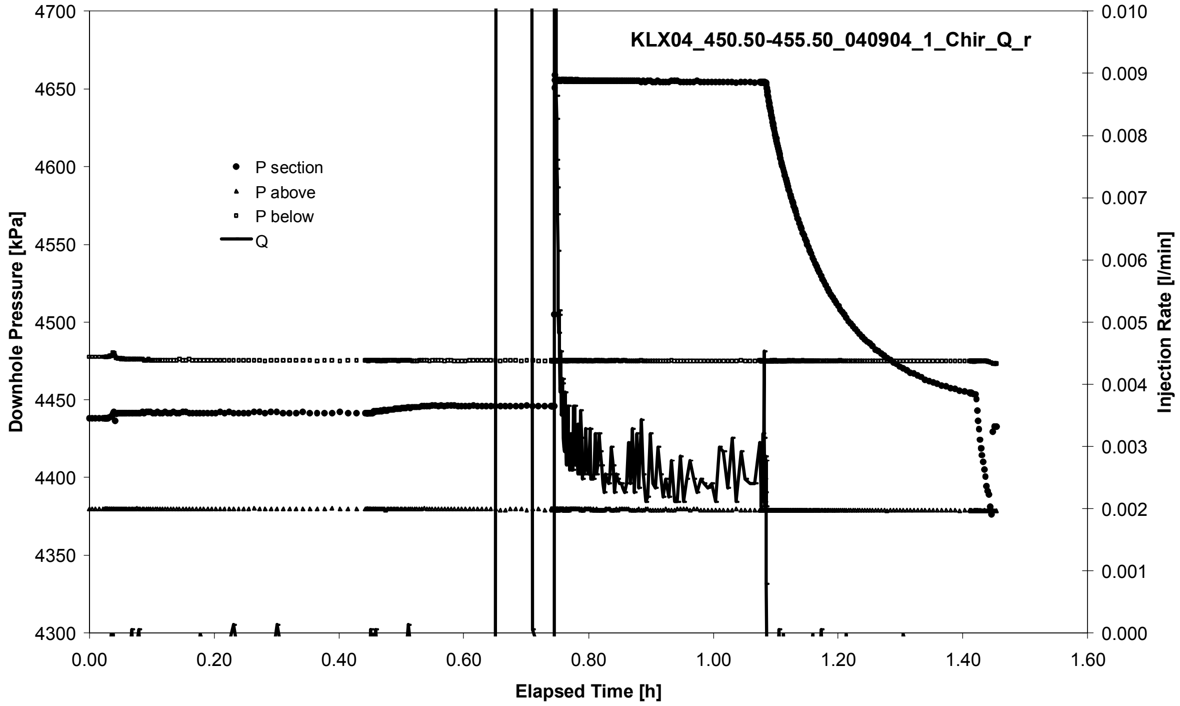


CHIR phase analysed as pulse injection; deconvolution match

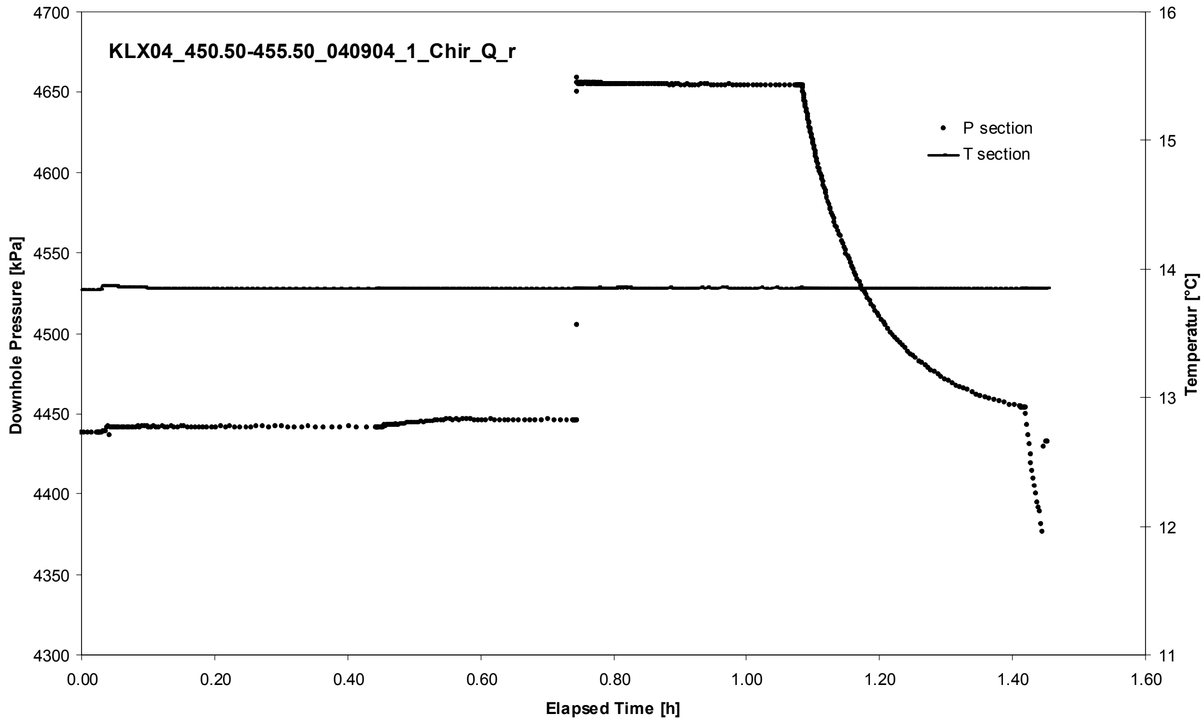
APPENDIX 2-79

Test 450.50 – 455.50 m

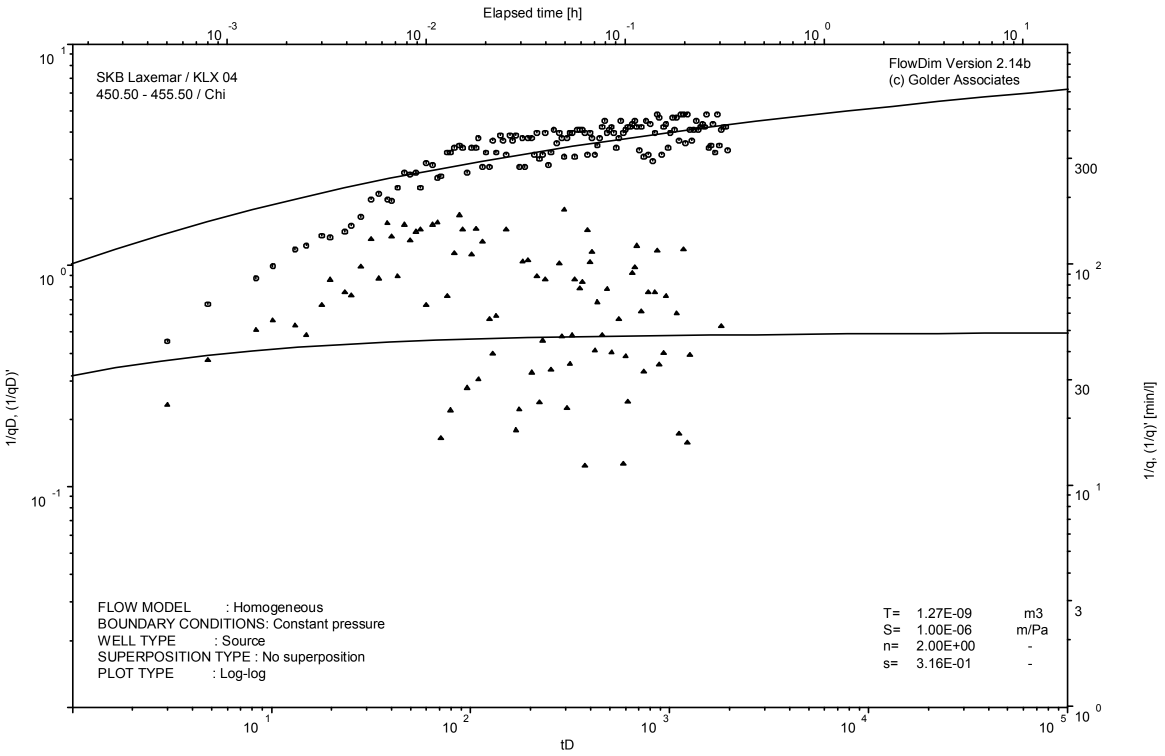
Analysis diagrams



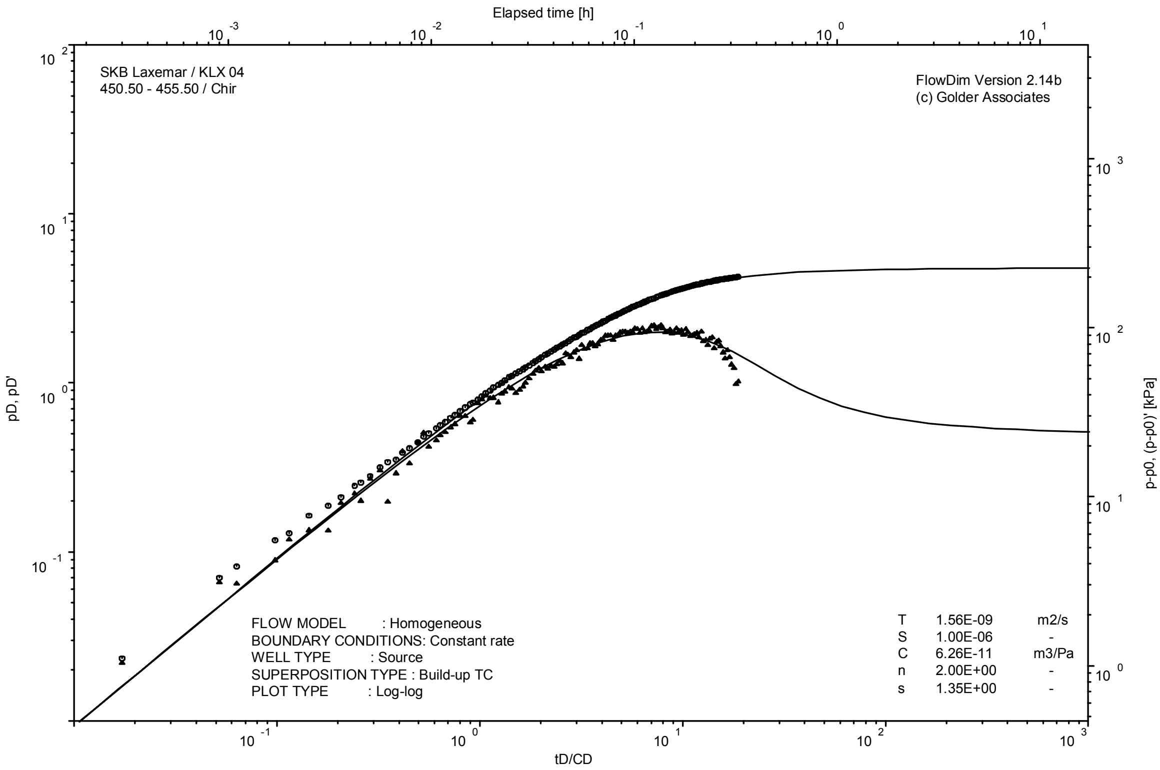
Pressure and flow rate vs. time; cartesian plot



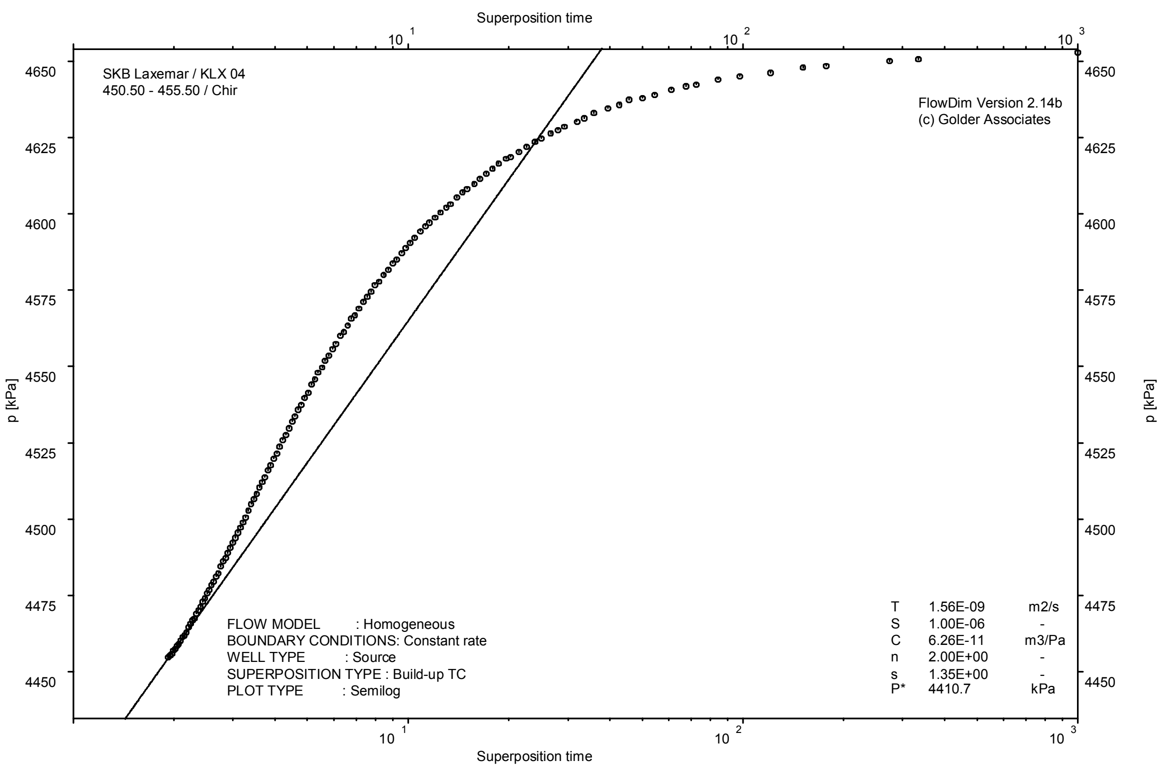
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

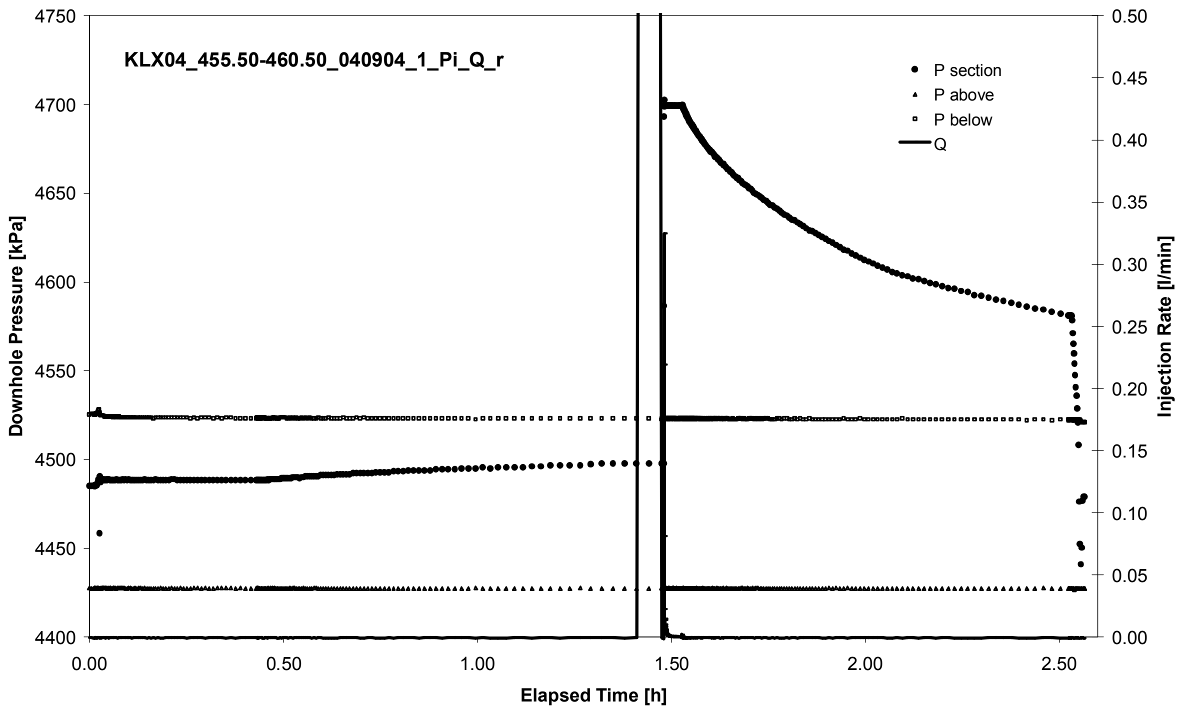


CHIR phase; HORNER match

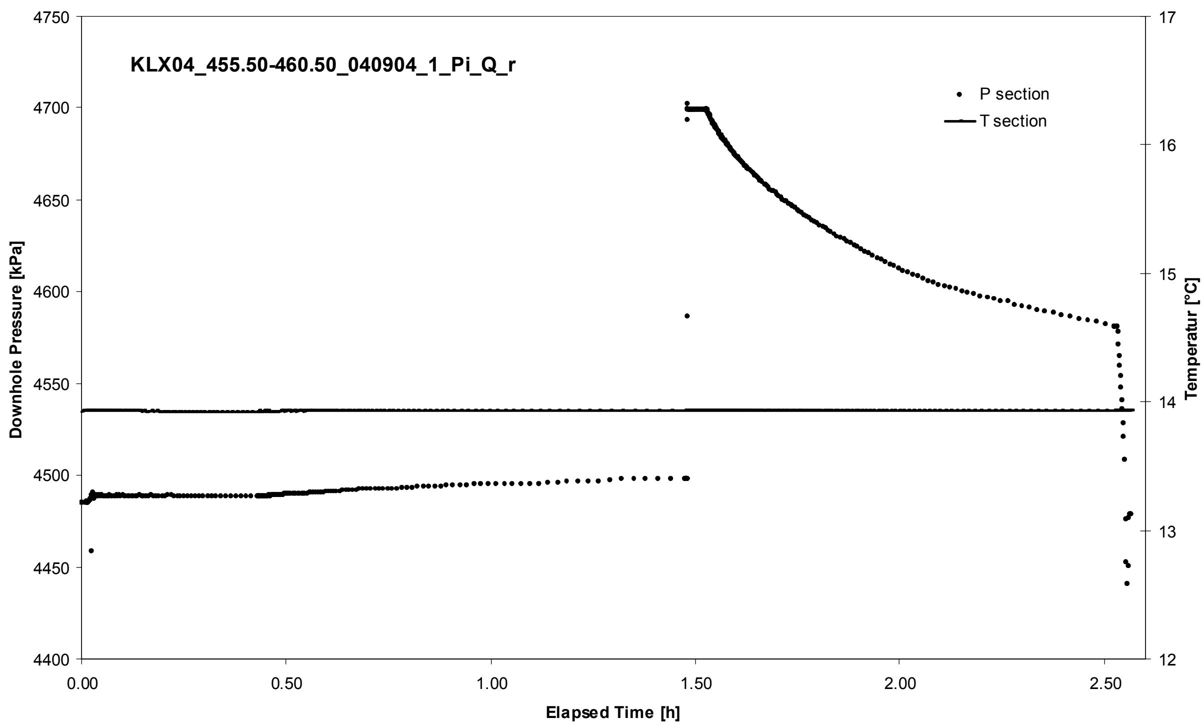
APPENDIX 2-80

Test 455.50 – 460.50 m

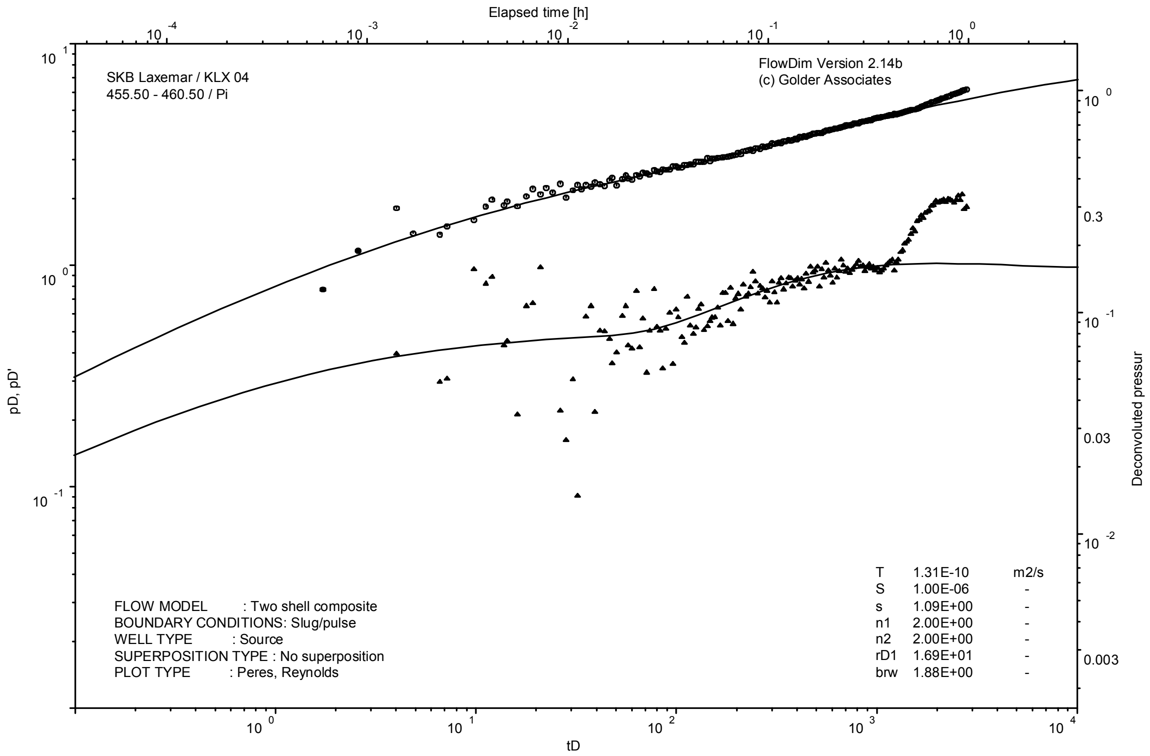
Analysis diagrams



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot

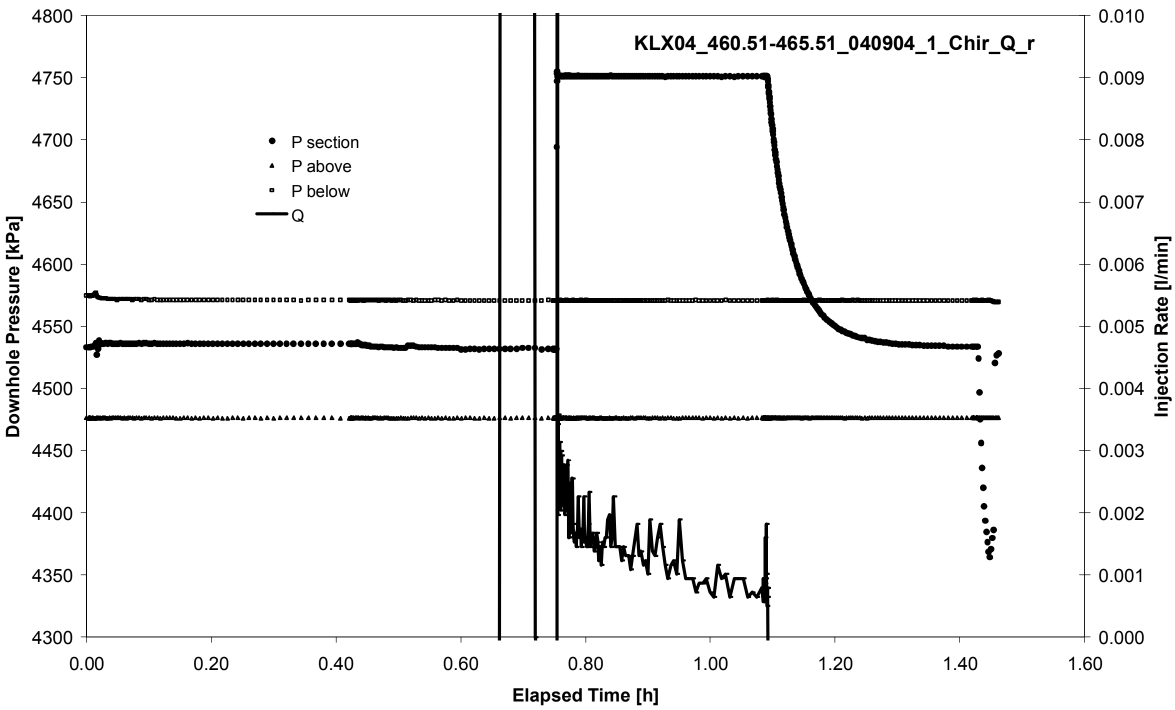


CHIR phase analysed as pulse injection; deconvolution match

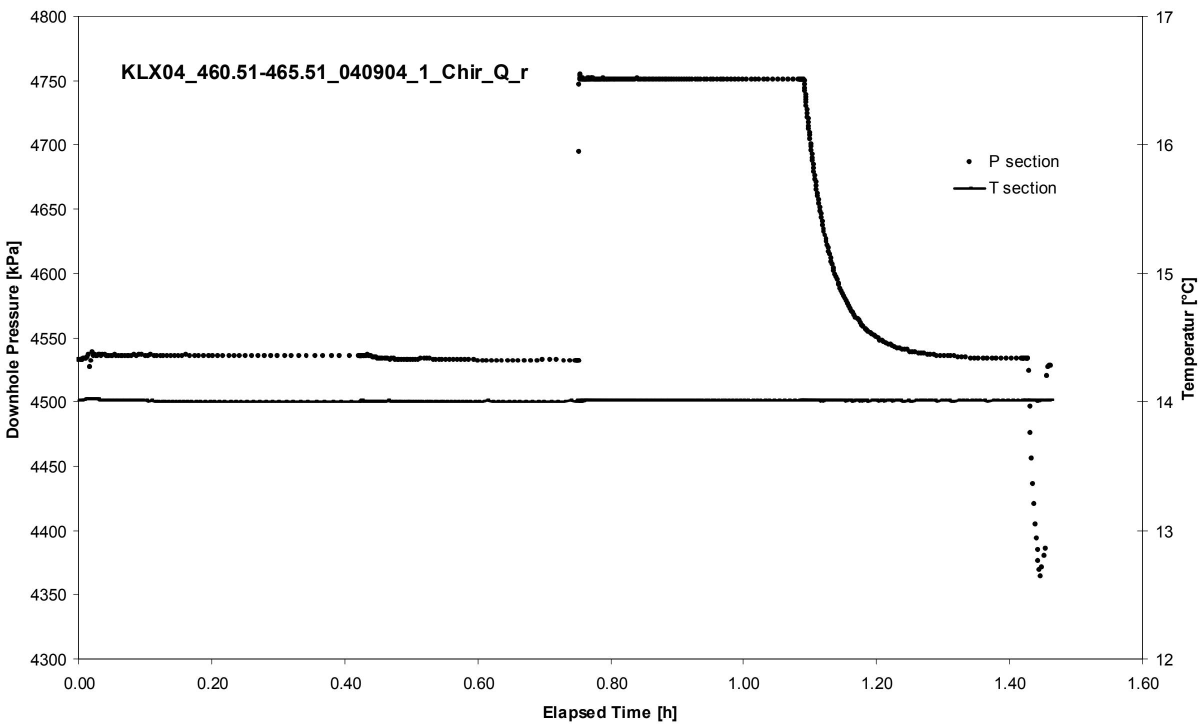
APPENDIX 2-81

Test 460.51 – 465.51 m

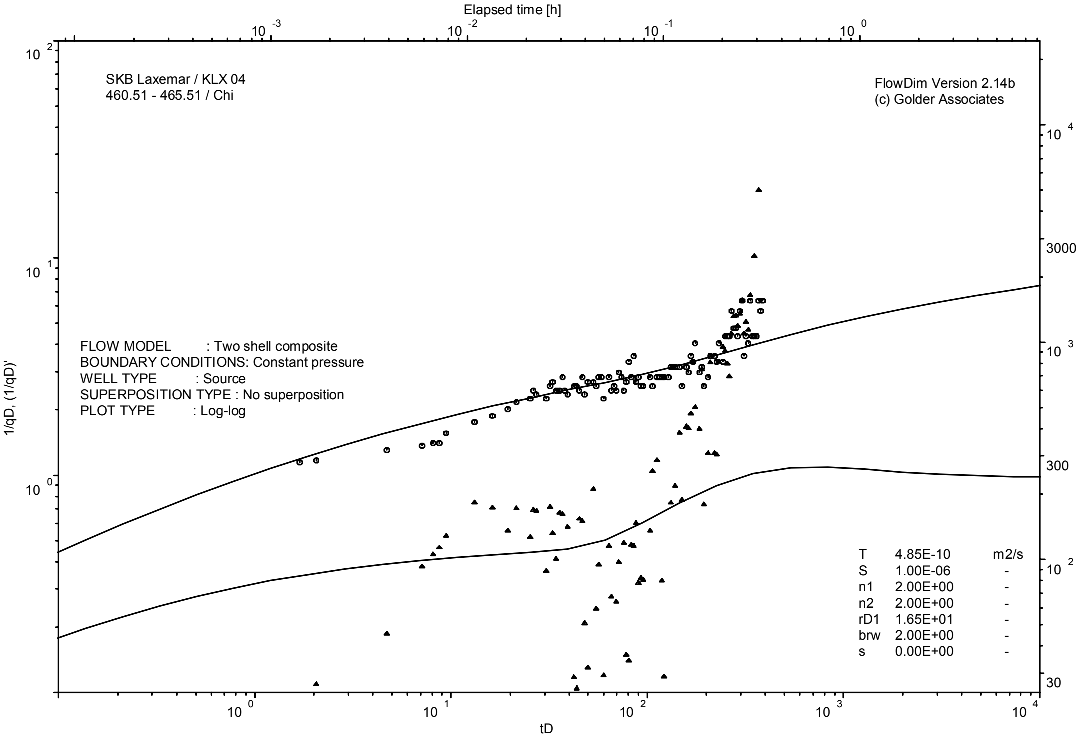
Analysis diagrams



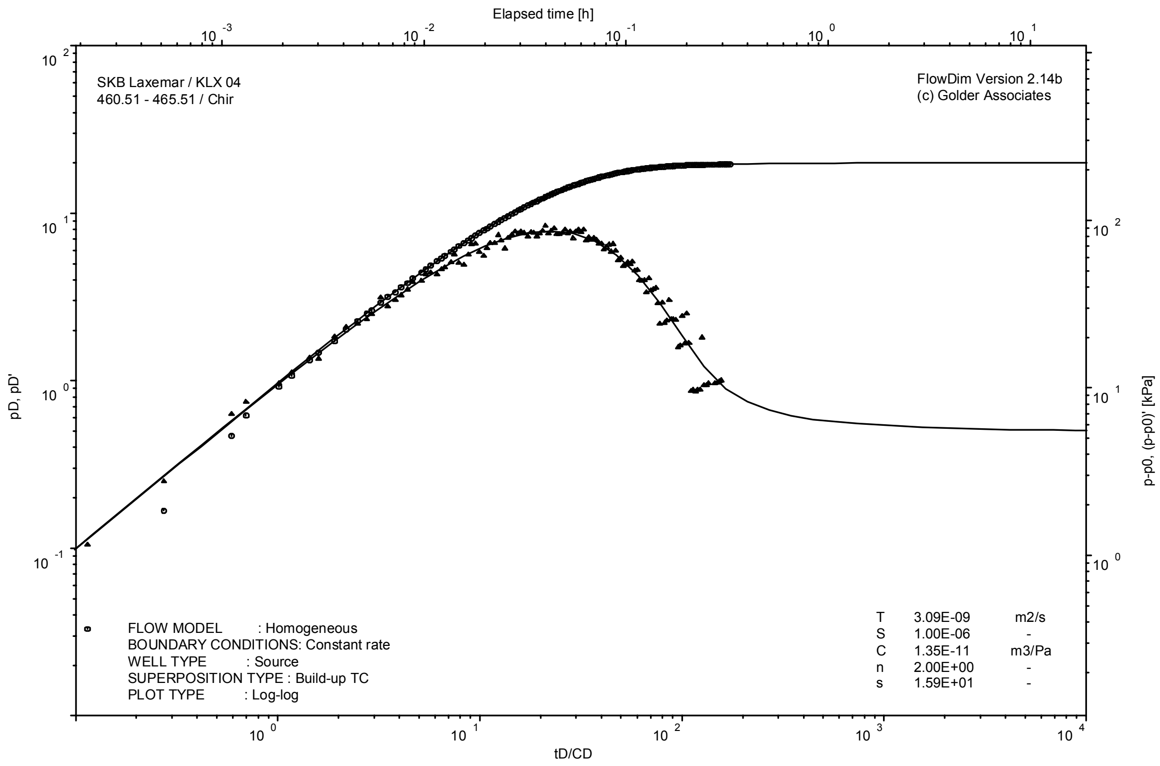
Pressure and flow rate vs. time; cartesian plot



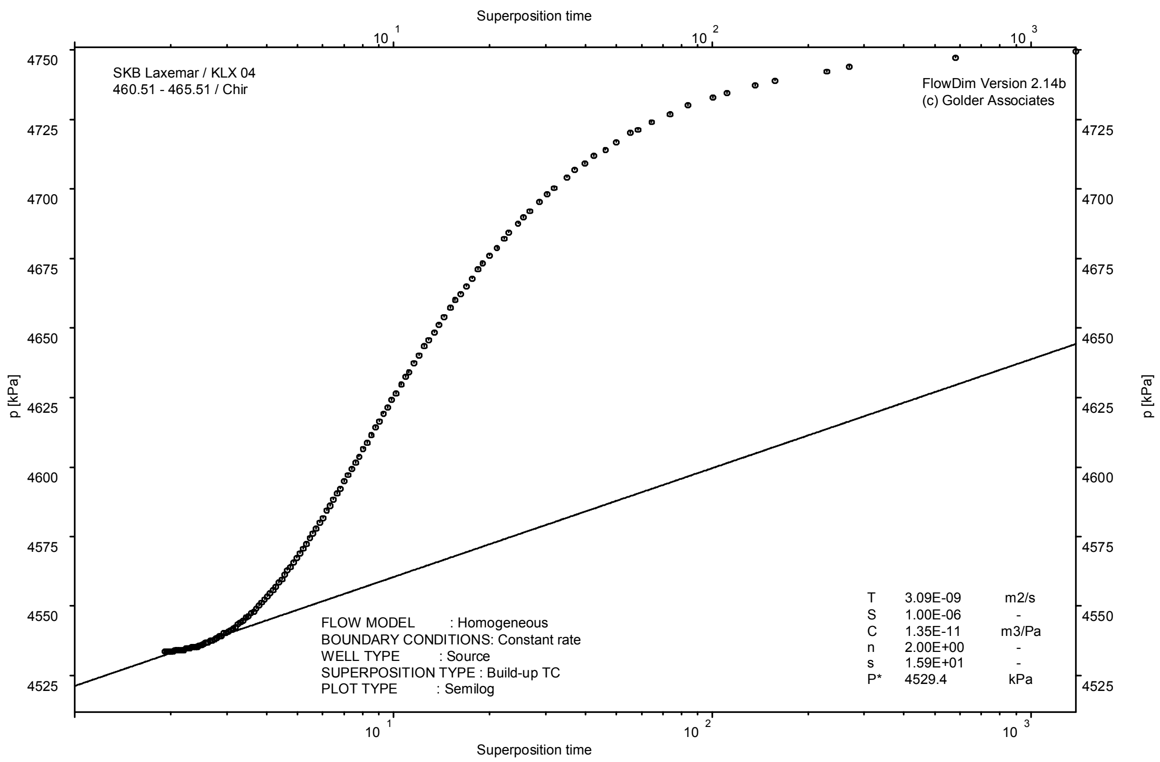
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

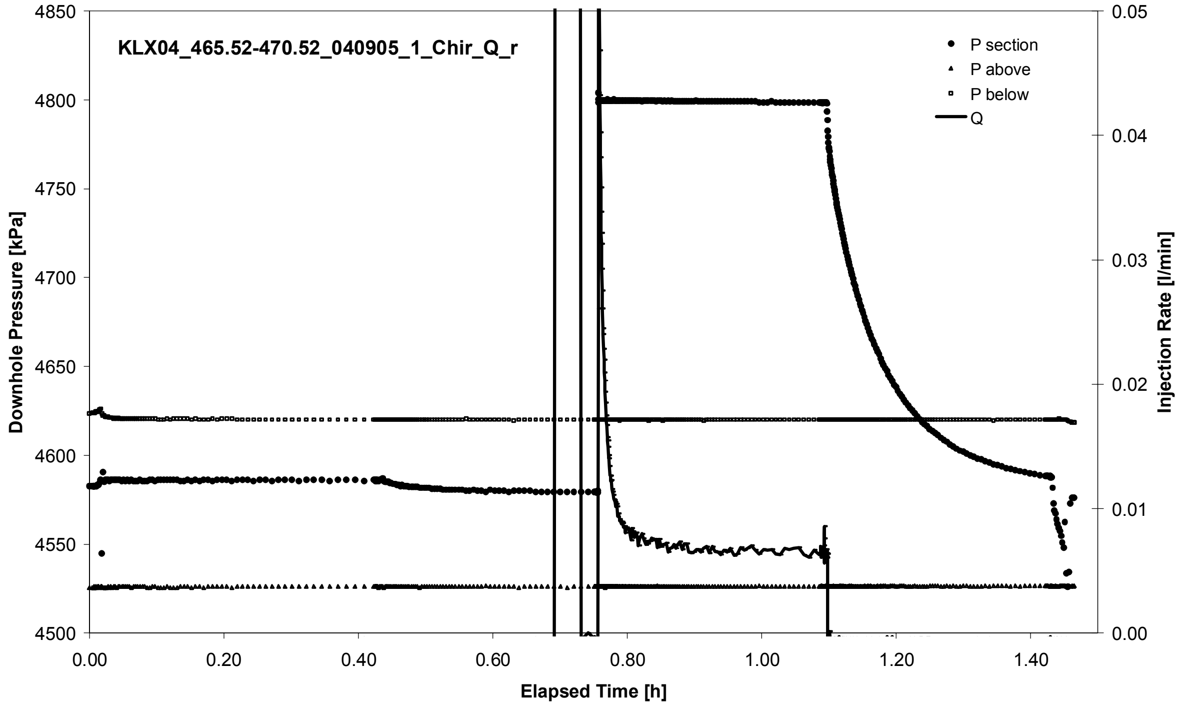


CHIR phase; HORNER match

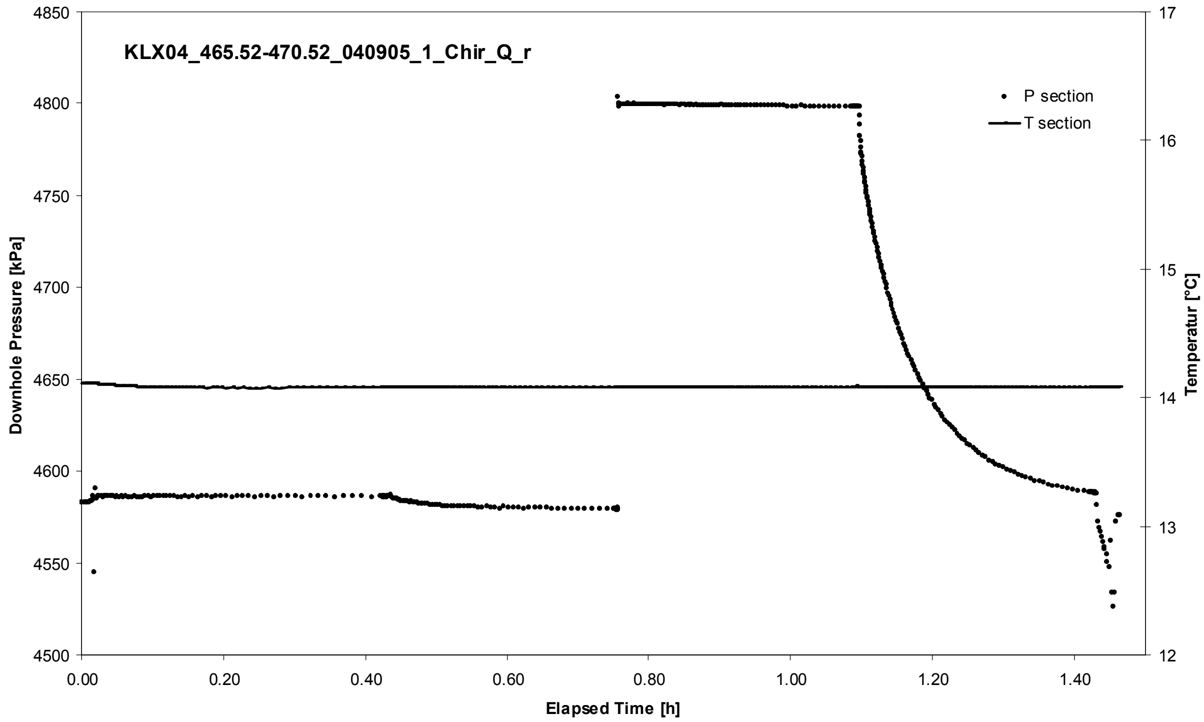
APPENDIX 2-82

Test 465.52 – 470.52 m

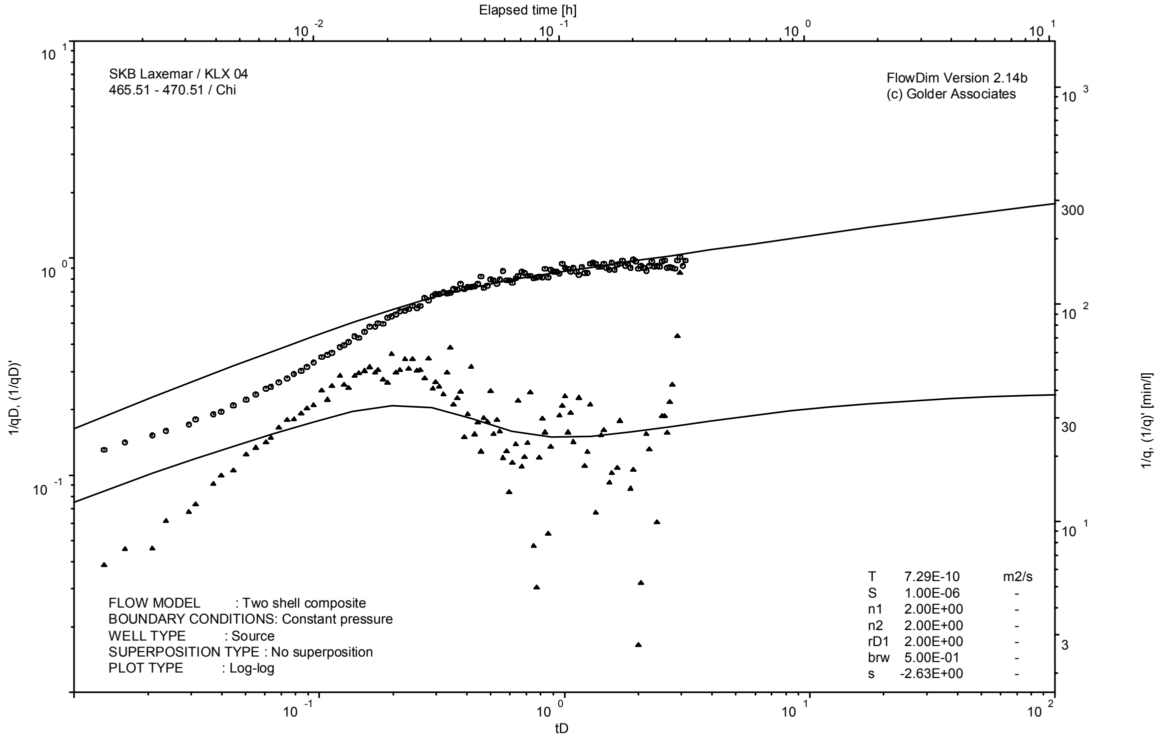
Analysis diagrams



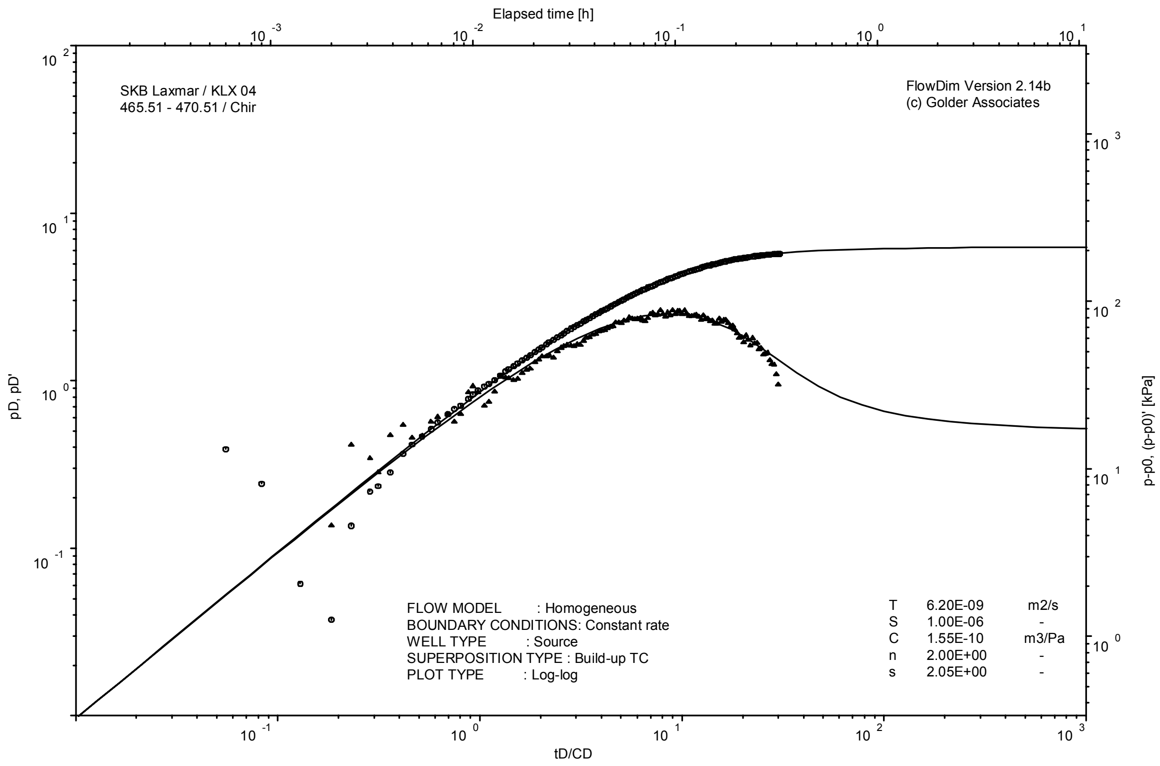
Pressure and flow rate vs. time; cartesian plot



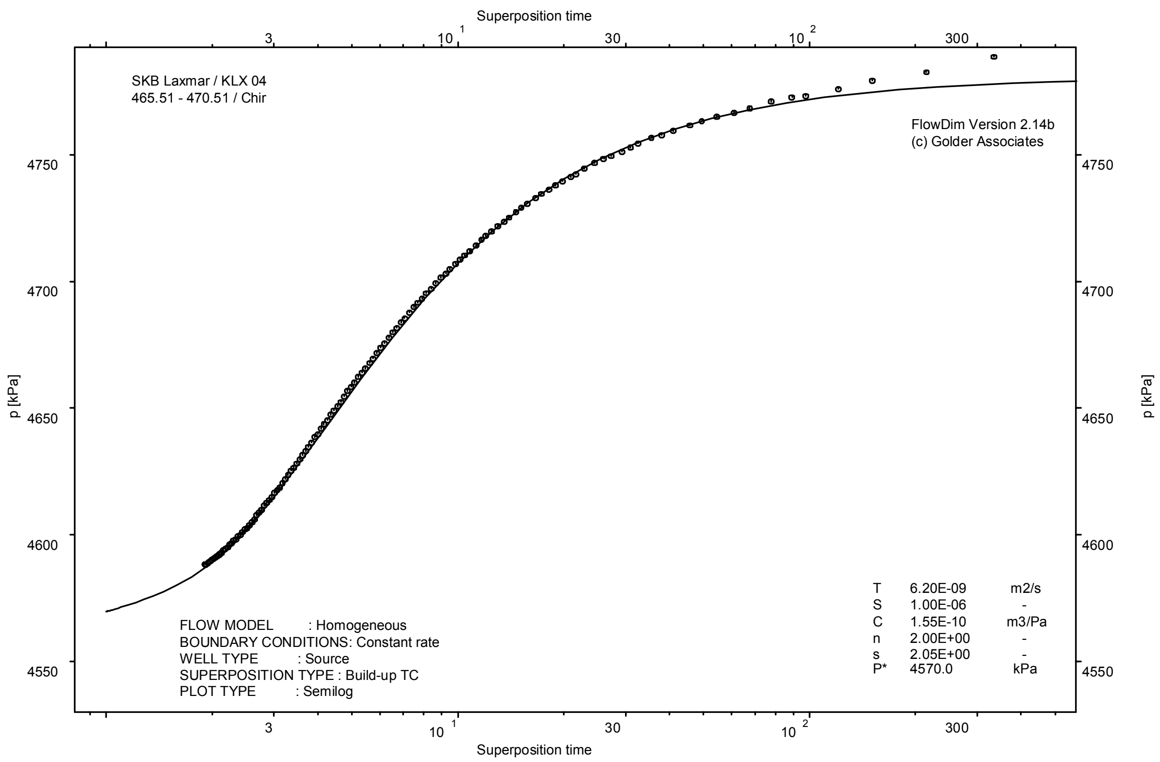
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

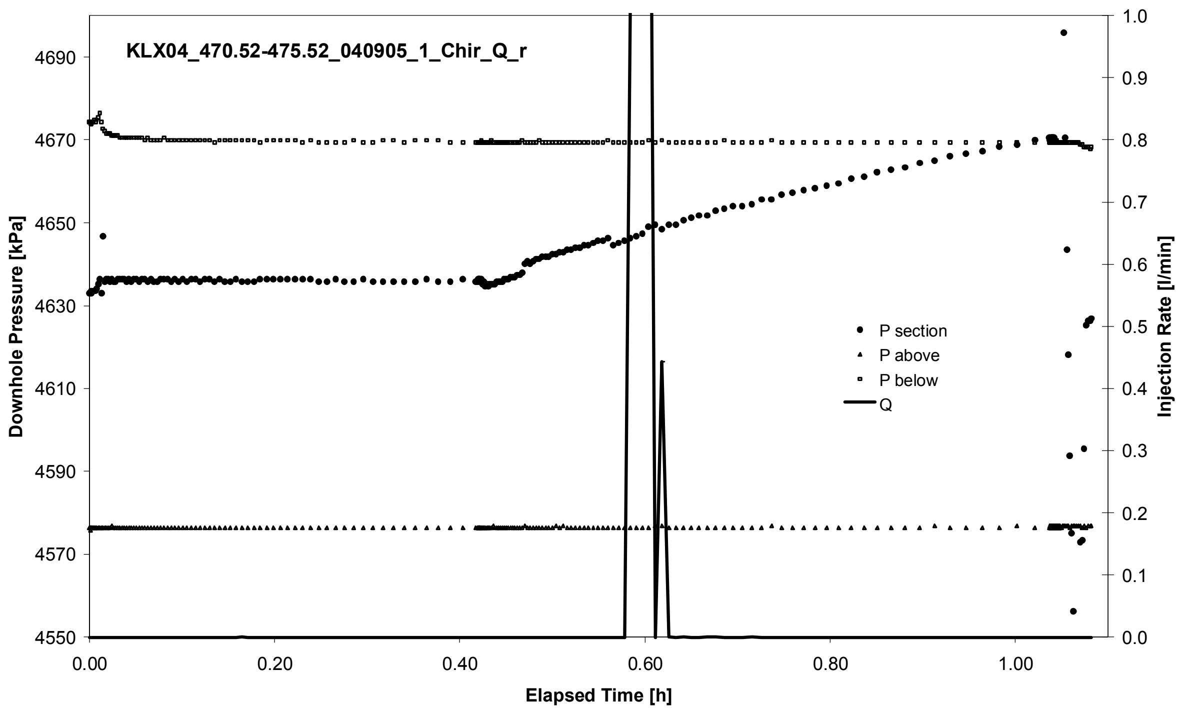


CHIR phase; HORNER match

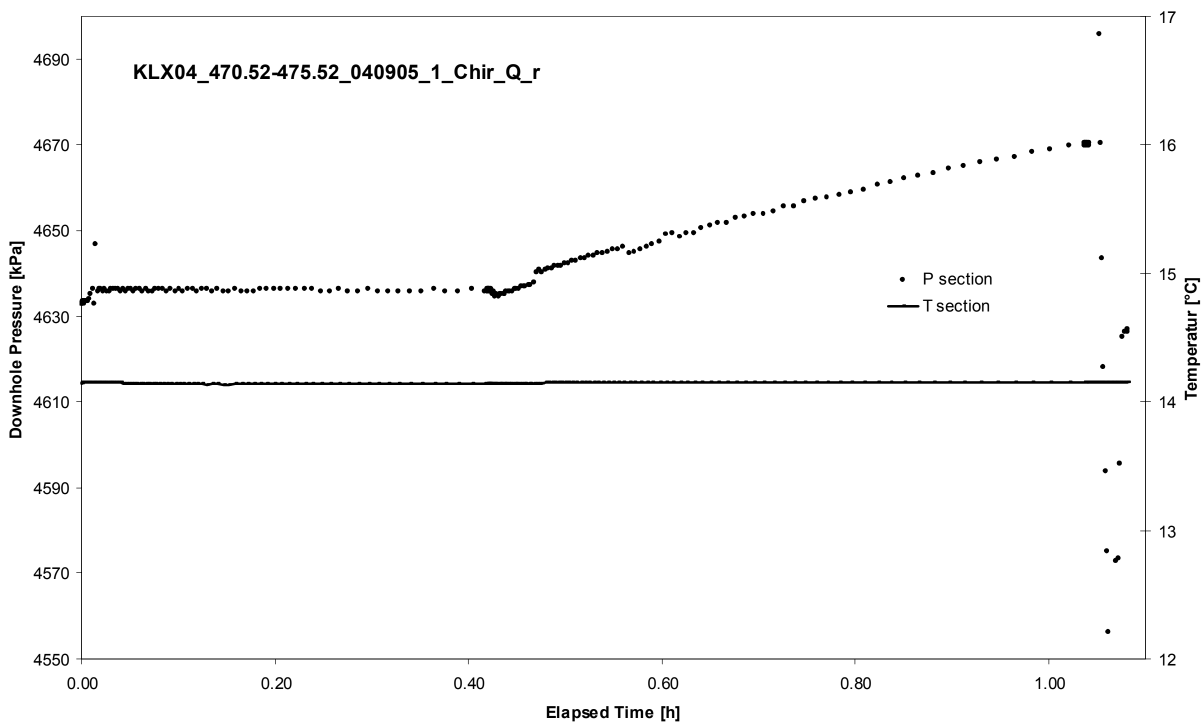
APPENDIX 2-83

Test 470.52 – 475.52 m

Analysis diagrams



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot

Not Analysed

CHI phase; log-log match

Not Analysed

CHIR phase; log-log match

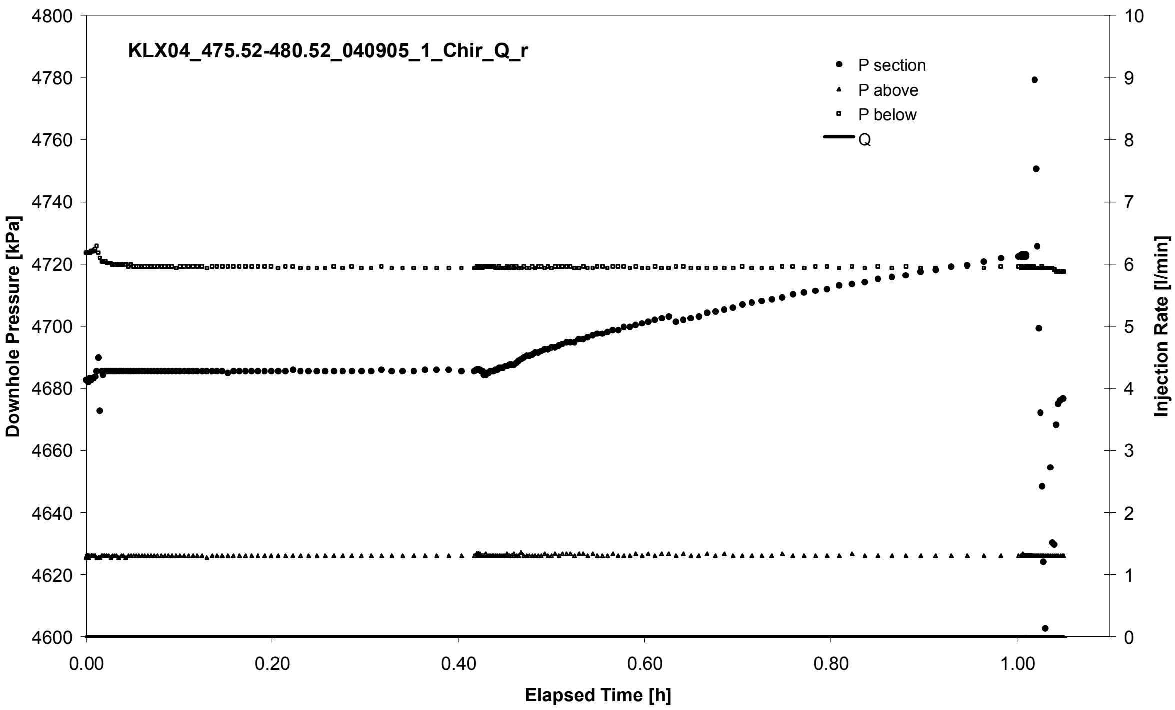
Not Analysed

CHIR phase; HORNER match

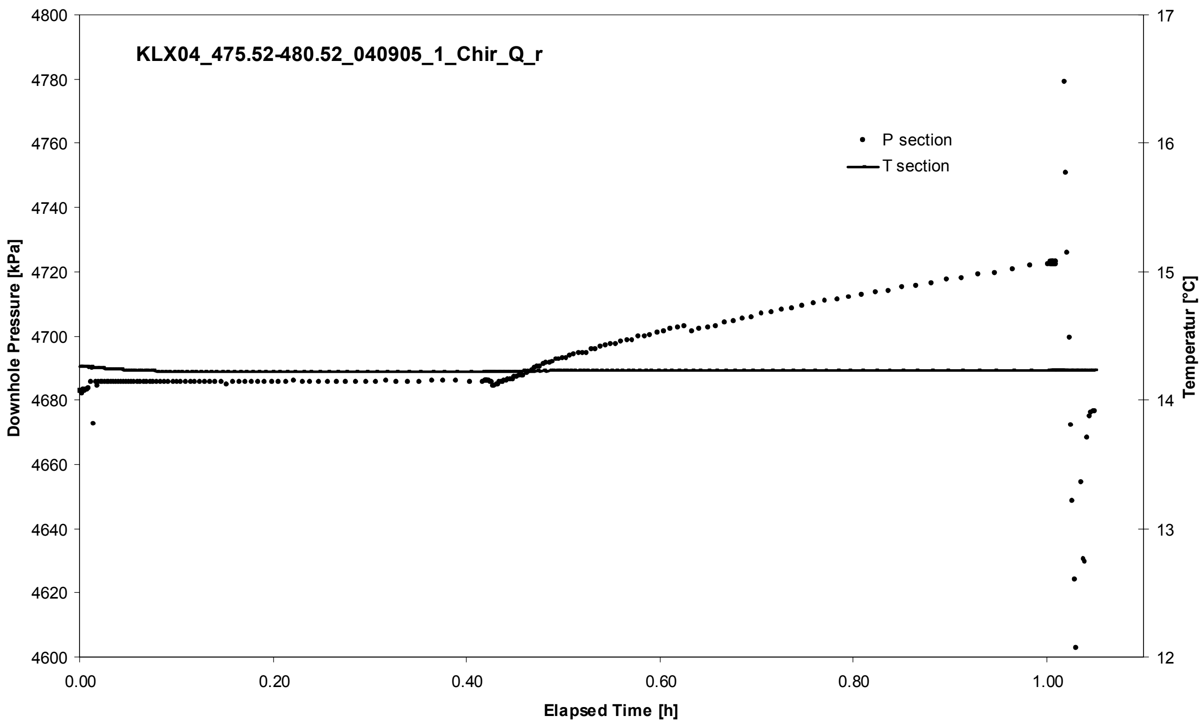
APPENDIX 2-84

Test 475.52 – 480.52 m

Analysis diagrams



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot

Not Analysed

CHI phase; log-log match

Not Analysed

CHIR phase; log-log match

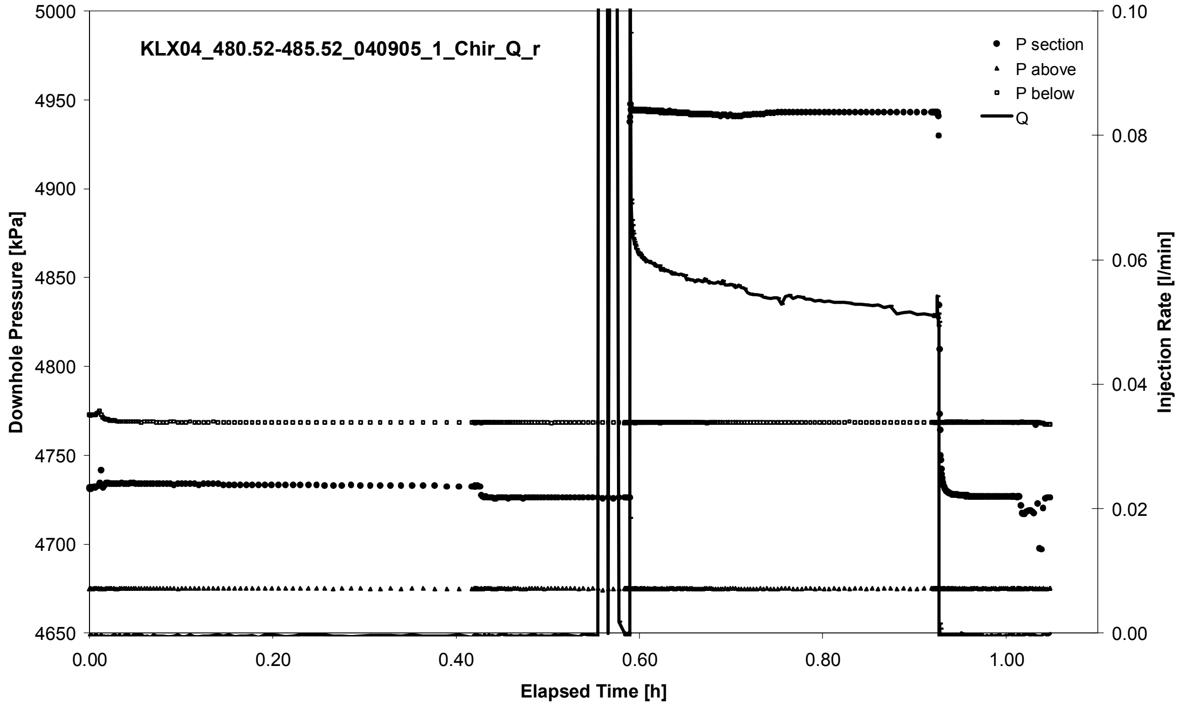
Not Analysed

CHIR phase; HORNER match

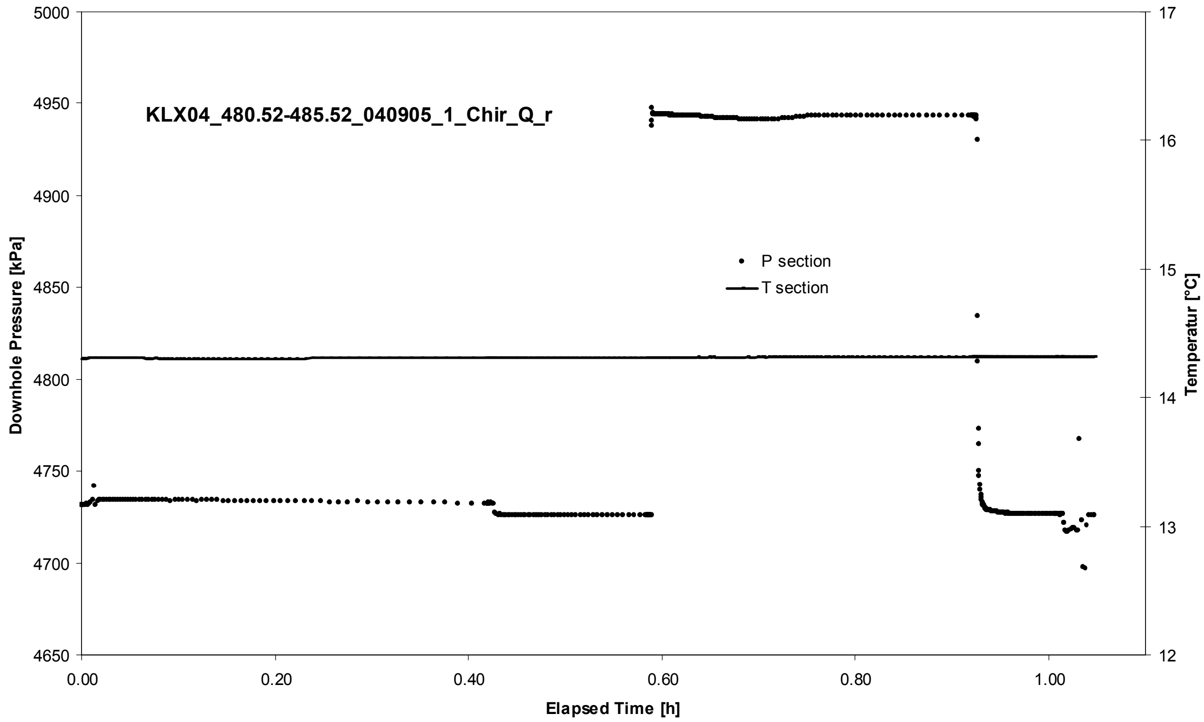
APPENDIX 2-85

Test 480.52 – 485.52 m

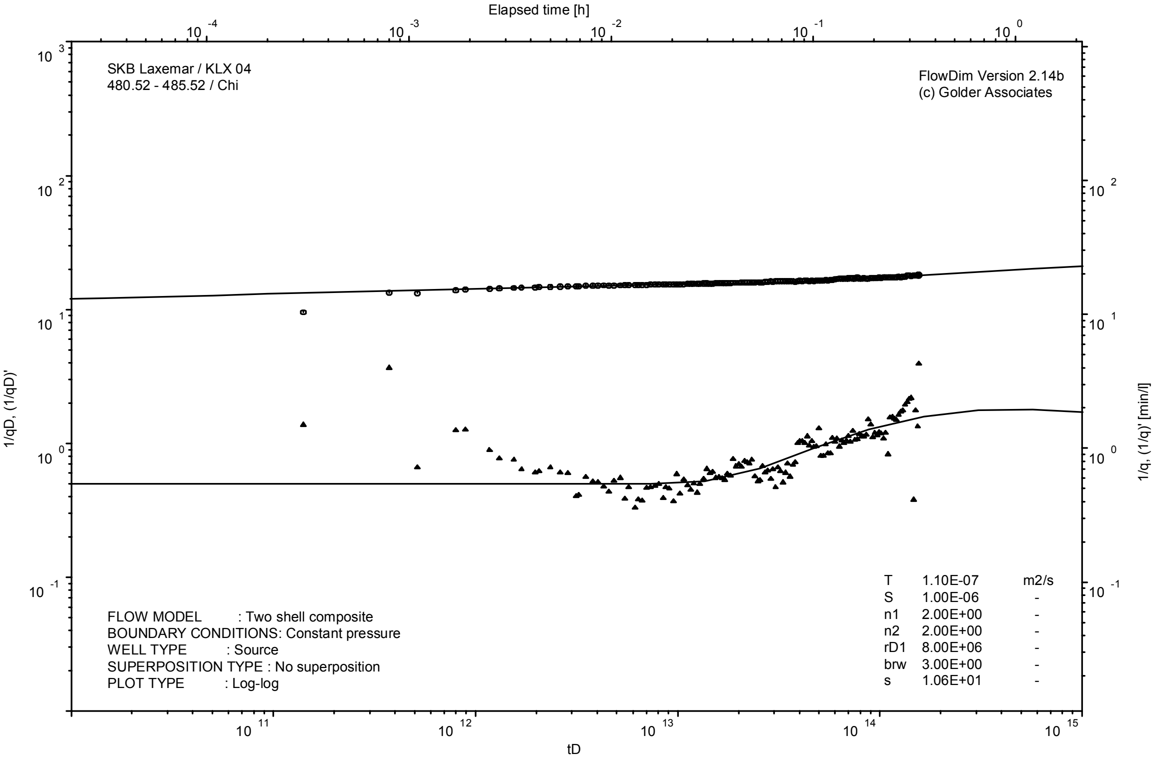
Analysis diagrams



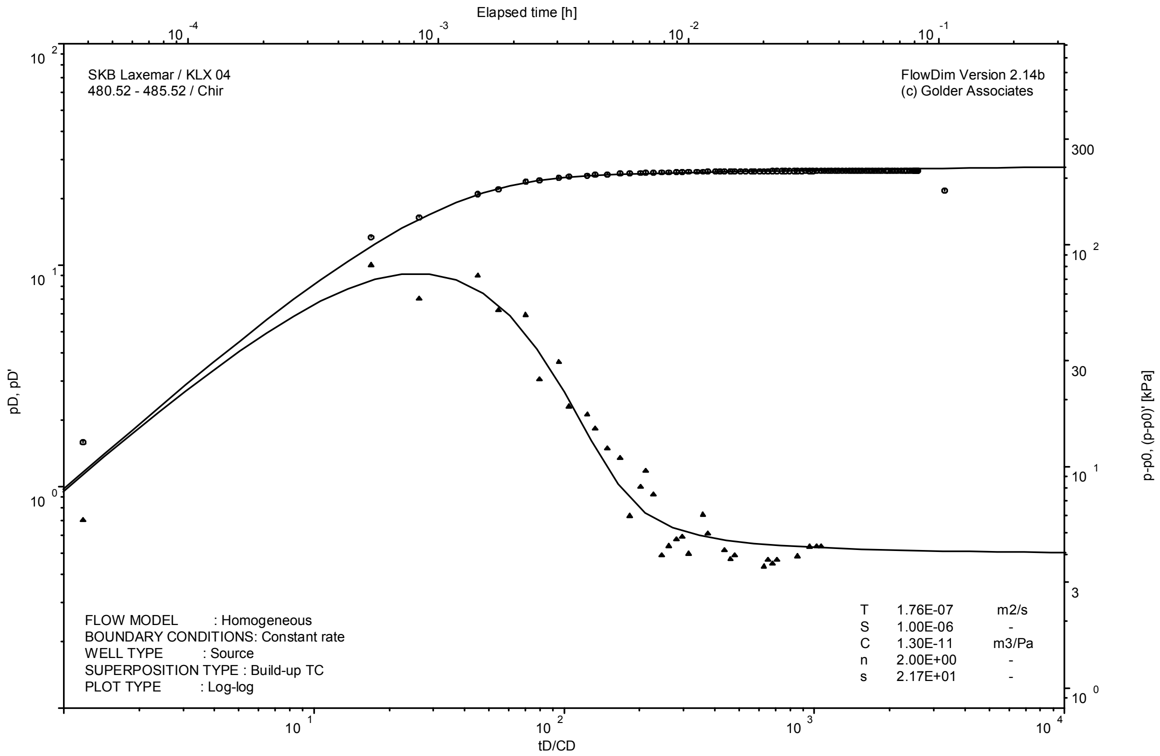
Pressure and flow rate vs. time; cartesian plot



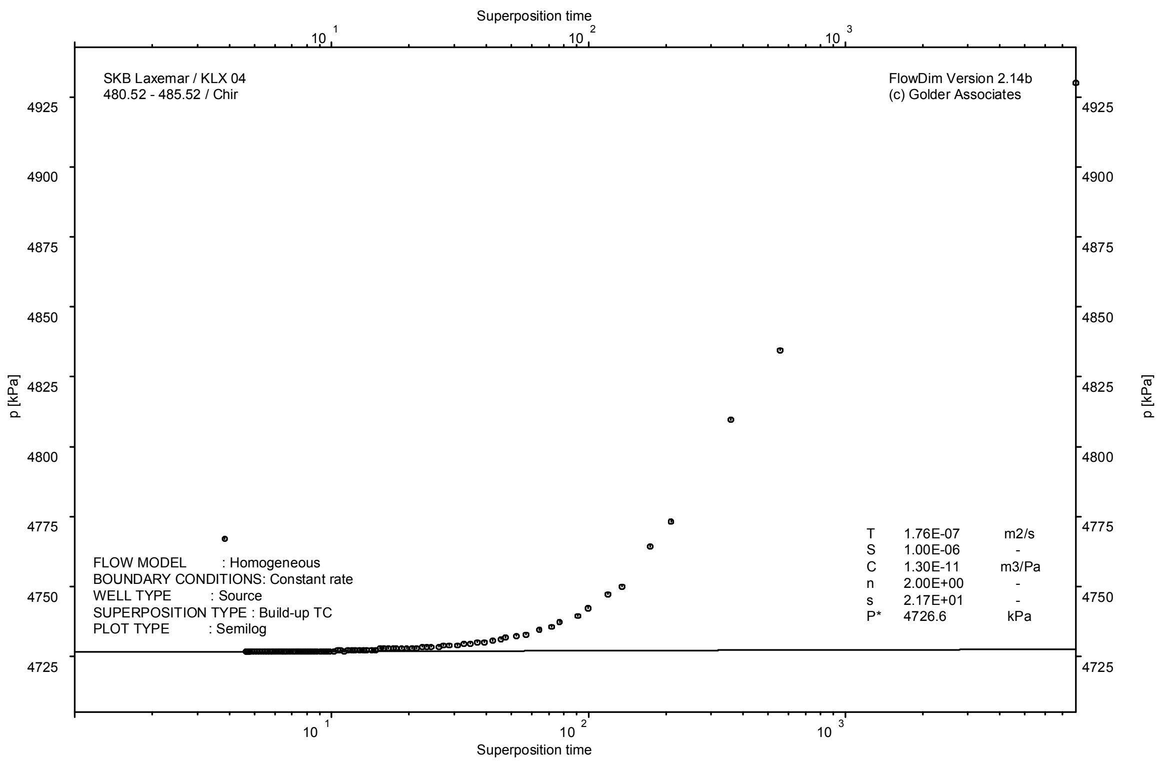
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

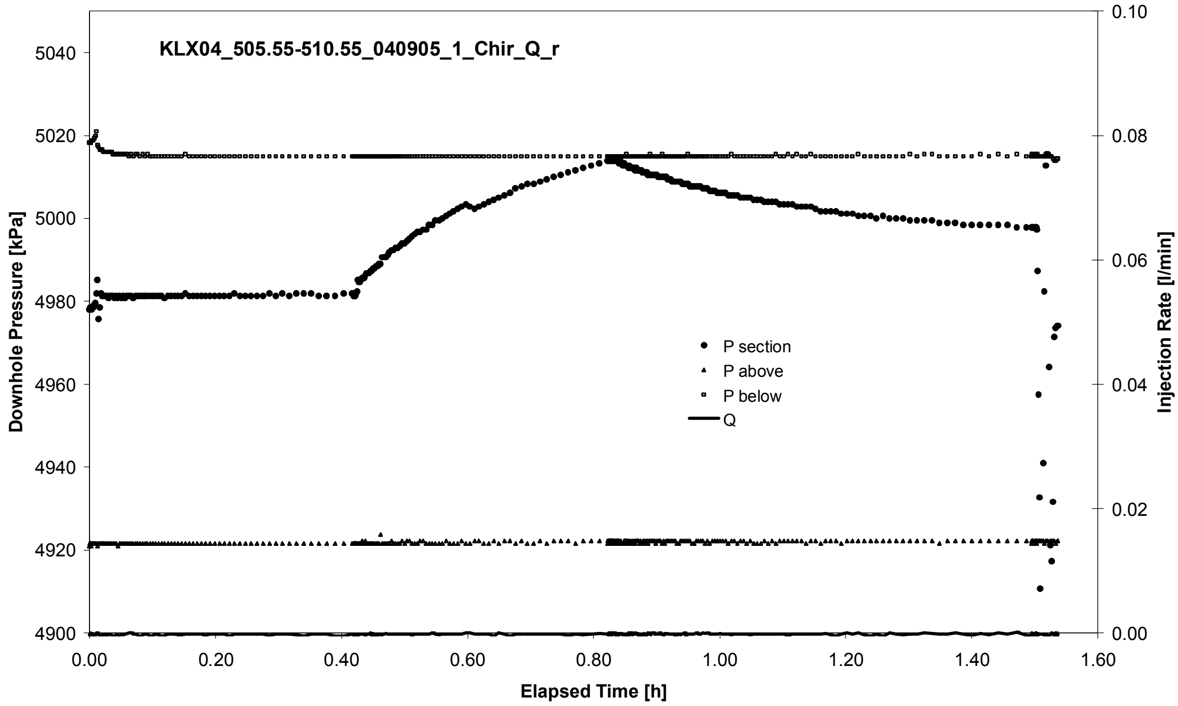


CHIR phase; HORNER match

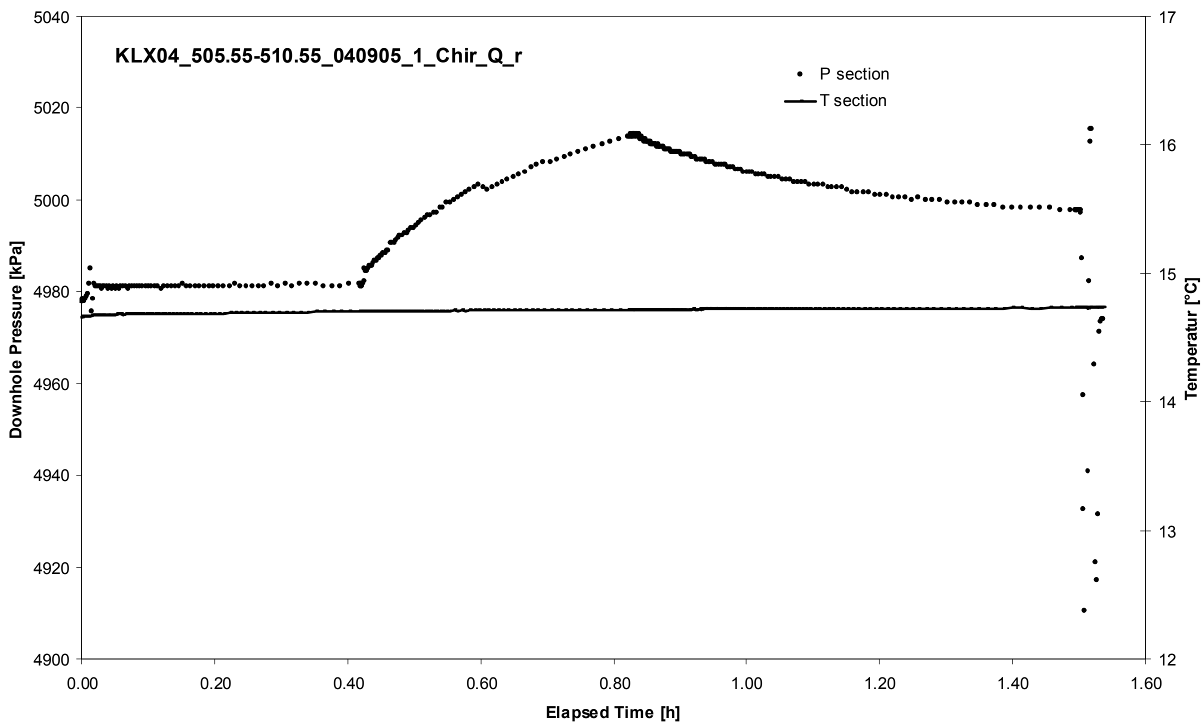
APPENDIX 2-86

Test 505.55 – 510.55 m

Analysis diagrams



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot

Not Analysed

CHI phase; log-log match

Not Analysed

CHIR phase; log-log match

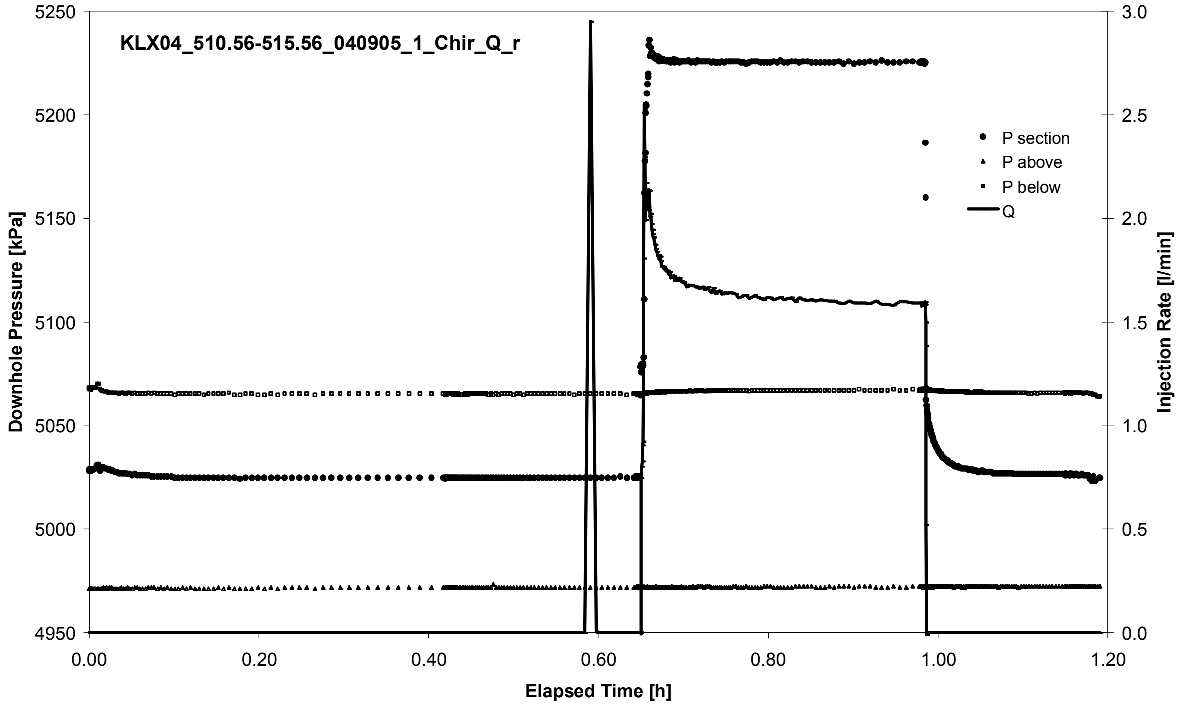
Not Analysed

CHIR phase; HORNER match

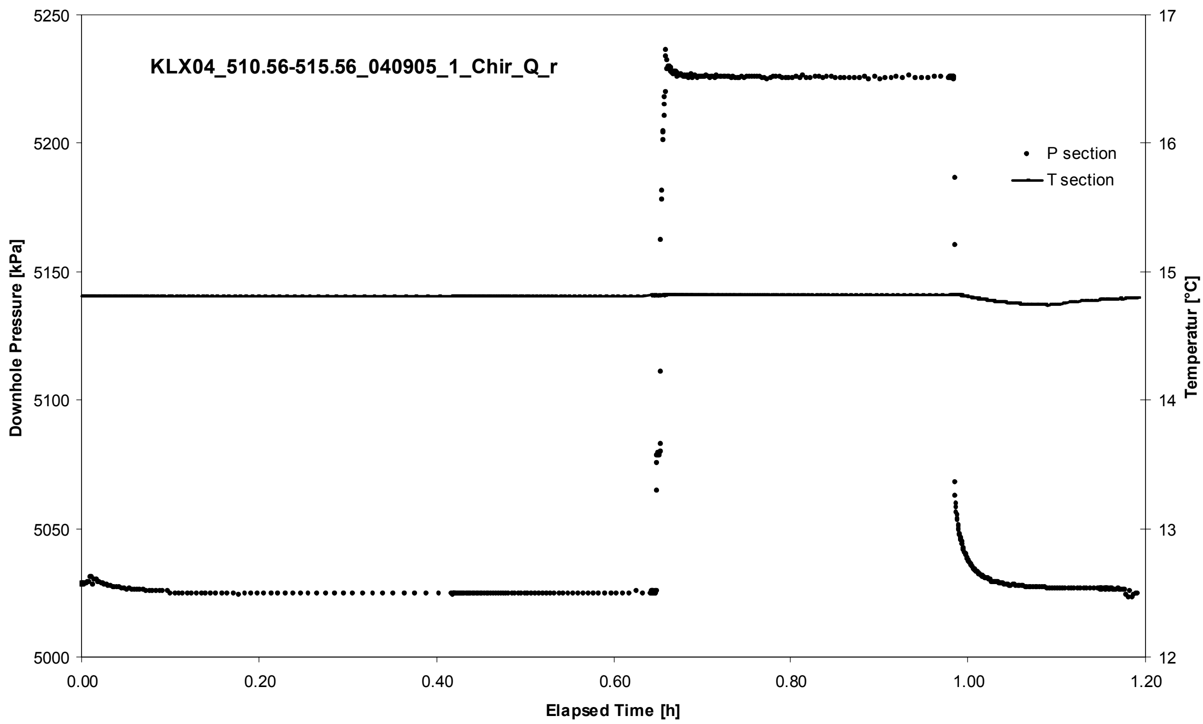
APPENDIX 2-87

Test 510.56 – 515.56 m

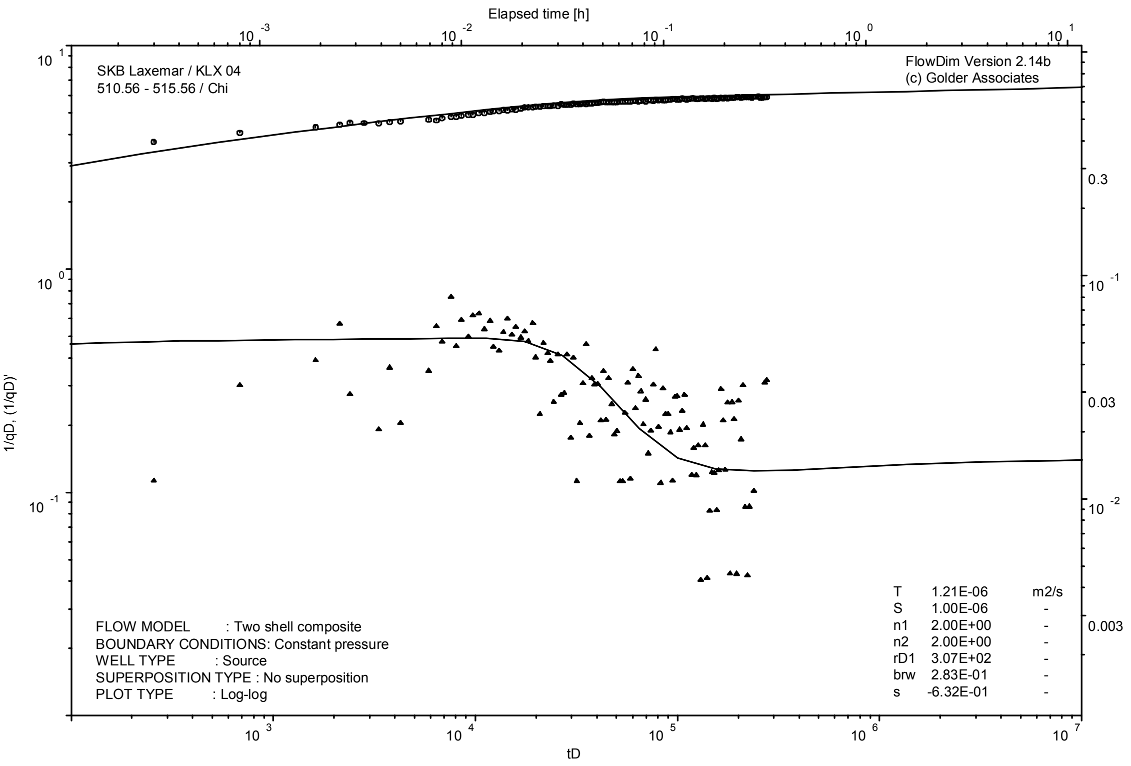
Analysis diagrams



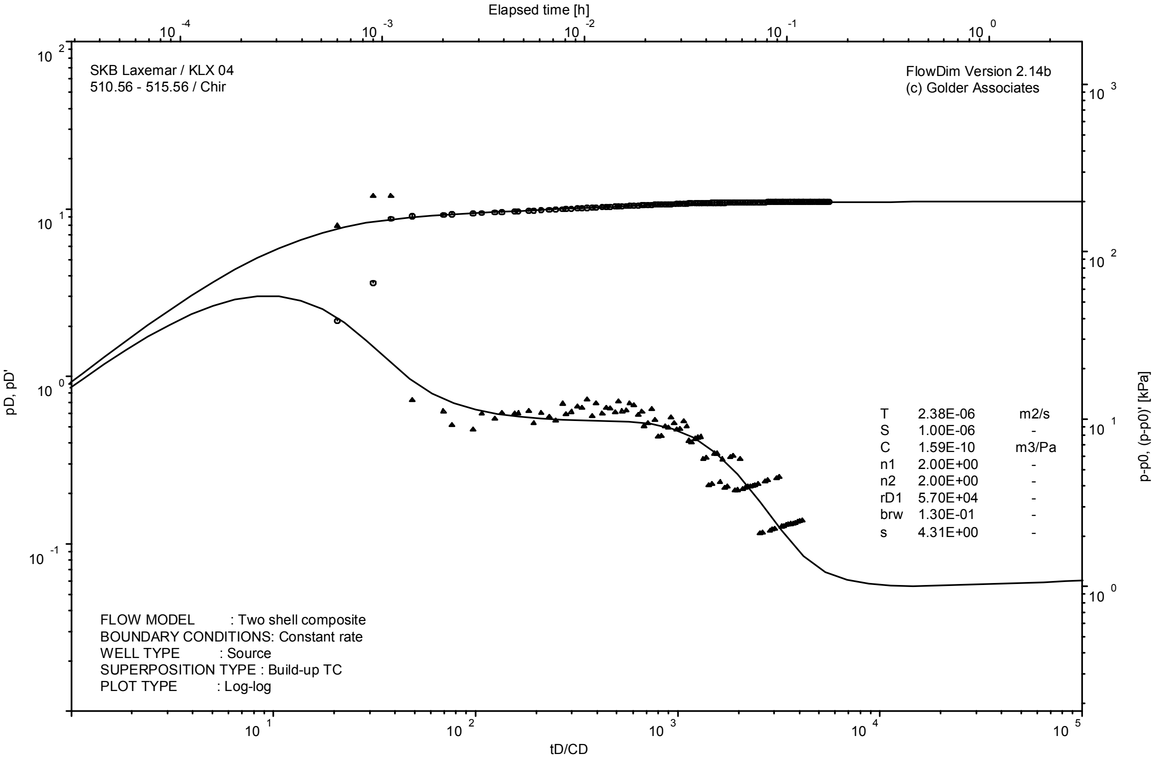
Pressure and flow rate vs. time; cartesian plot



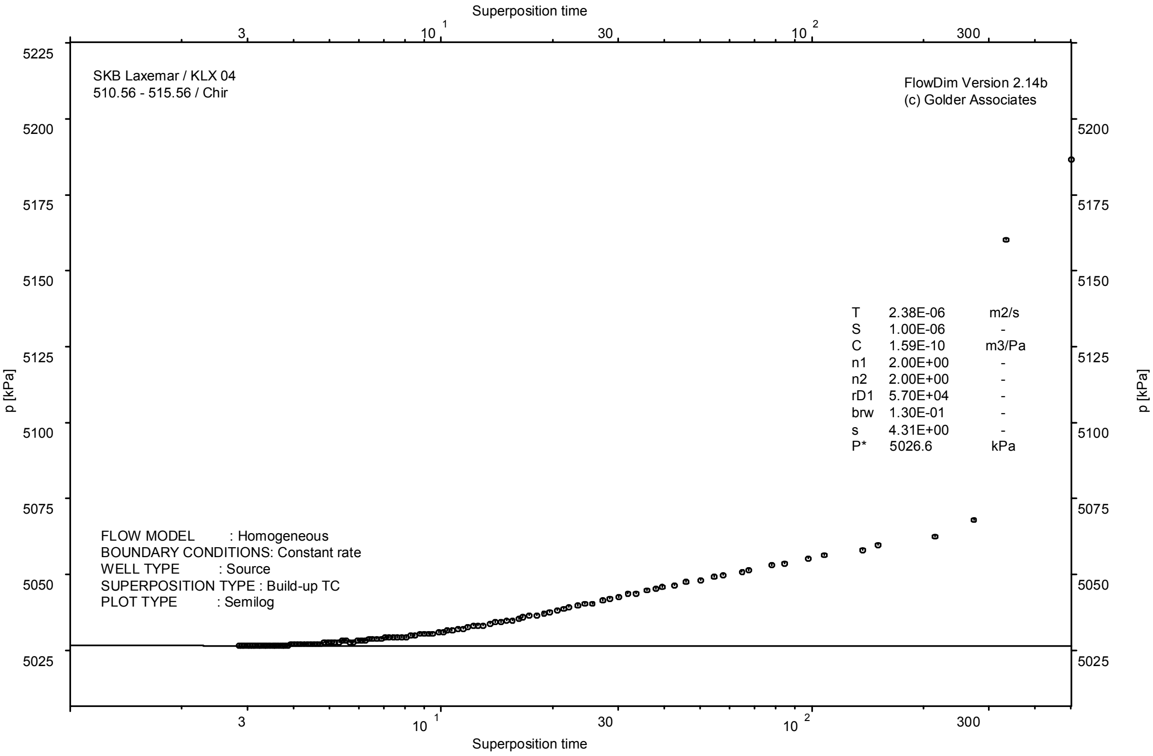
Interval pressure and temperature vs. time; cartesian plot



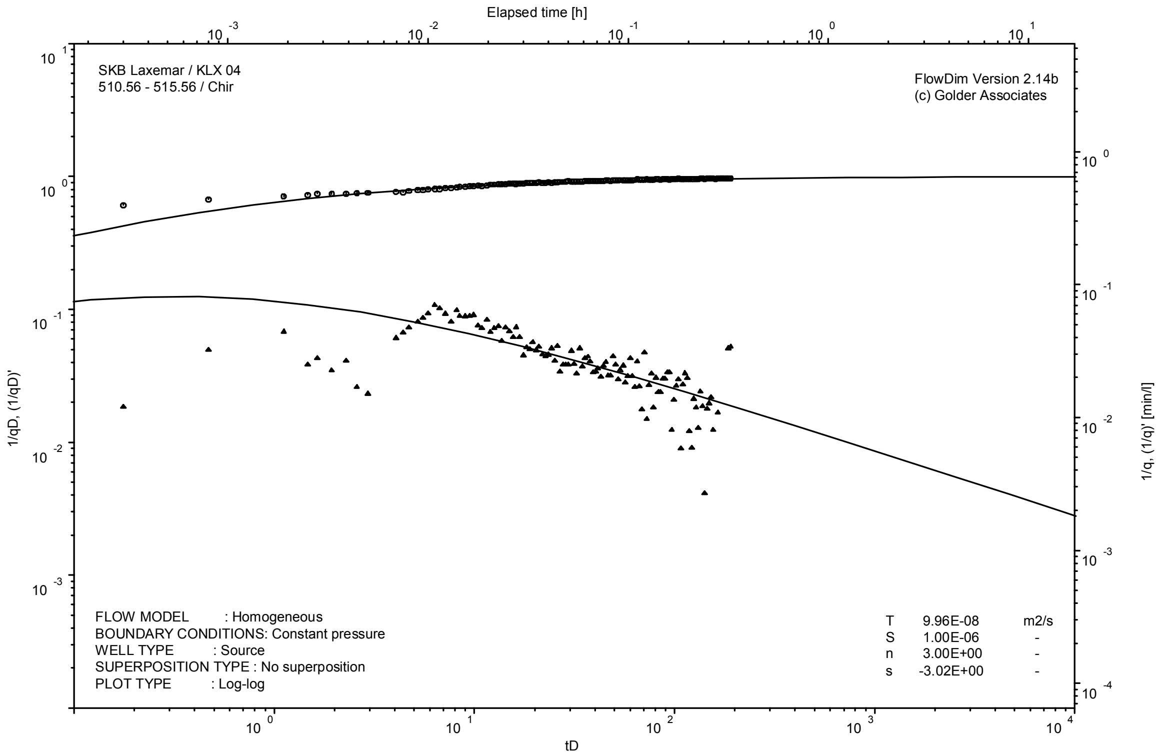
CHI phase; log-log match



CHIR phase; log-log match



CHIR phase; HORNER match

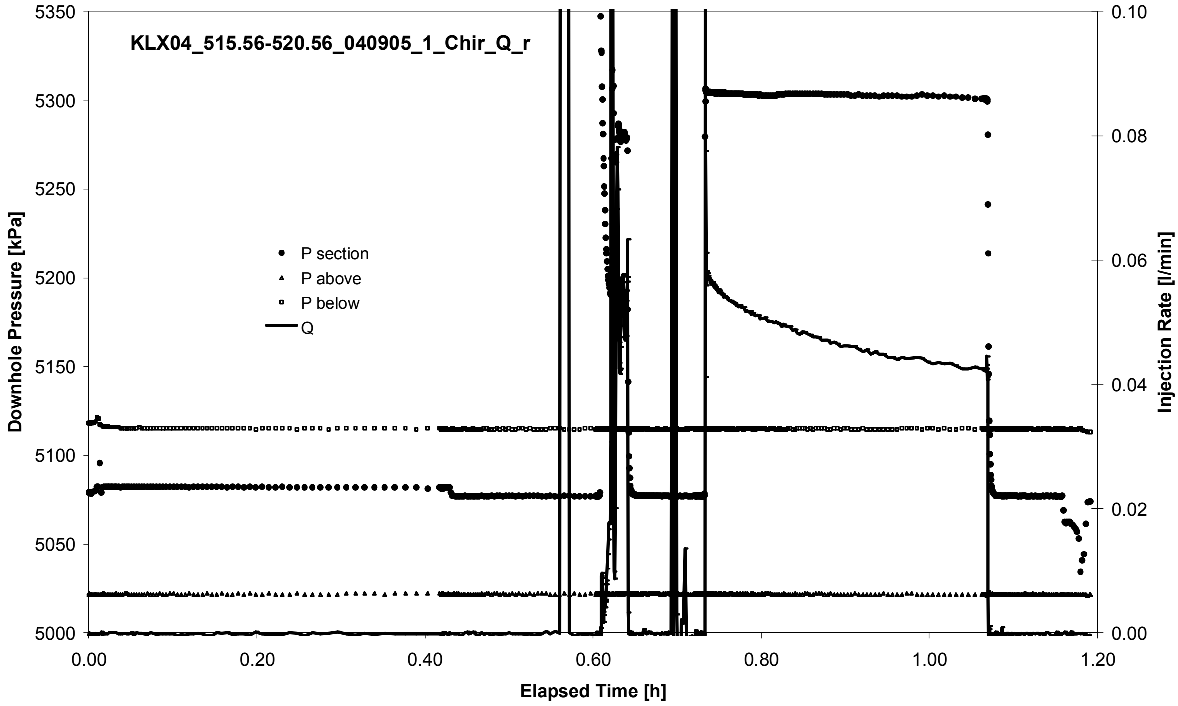


CHIR phase; alternative log-log match (n=3, spherical flow)

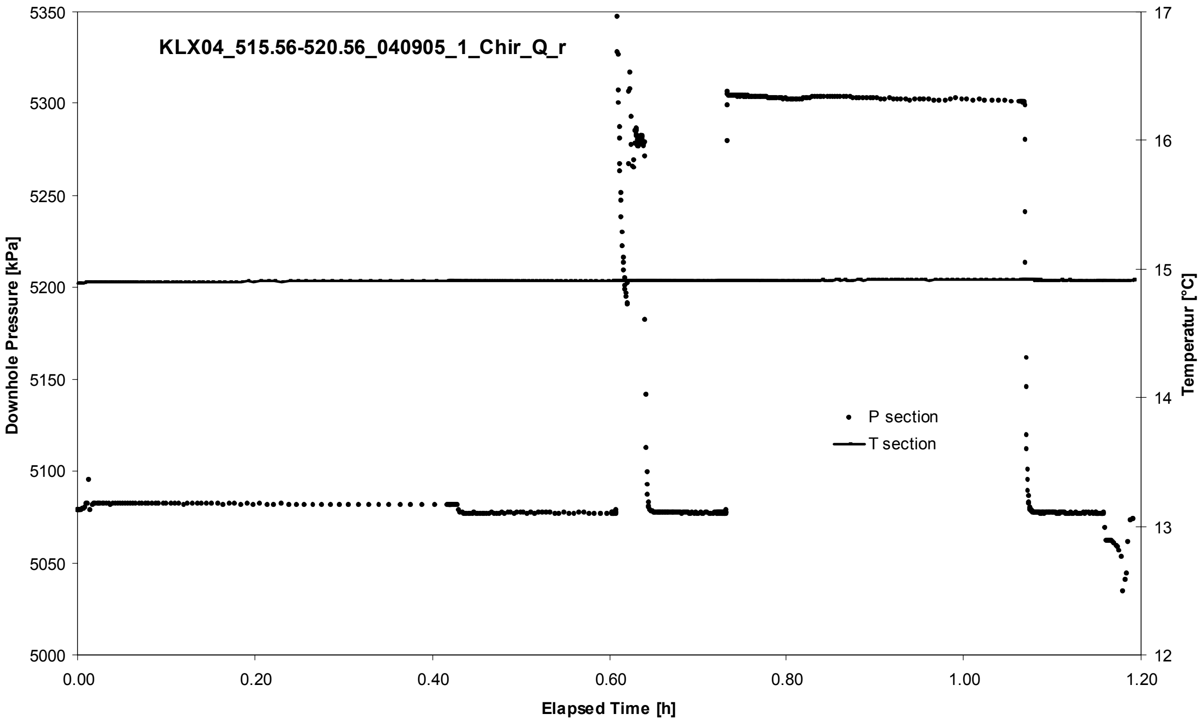
APPENDIX 2-88

Test 515.56 – 520.56 m

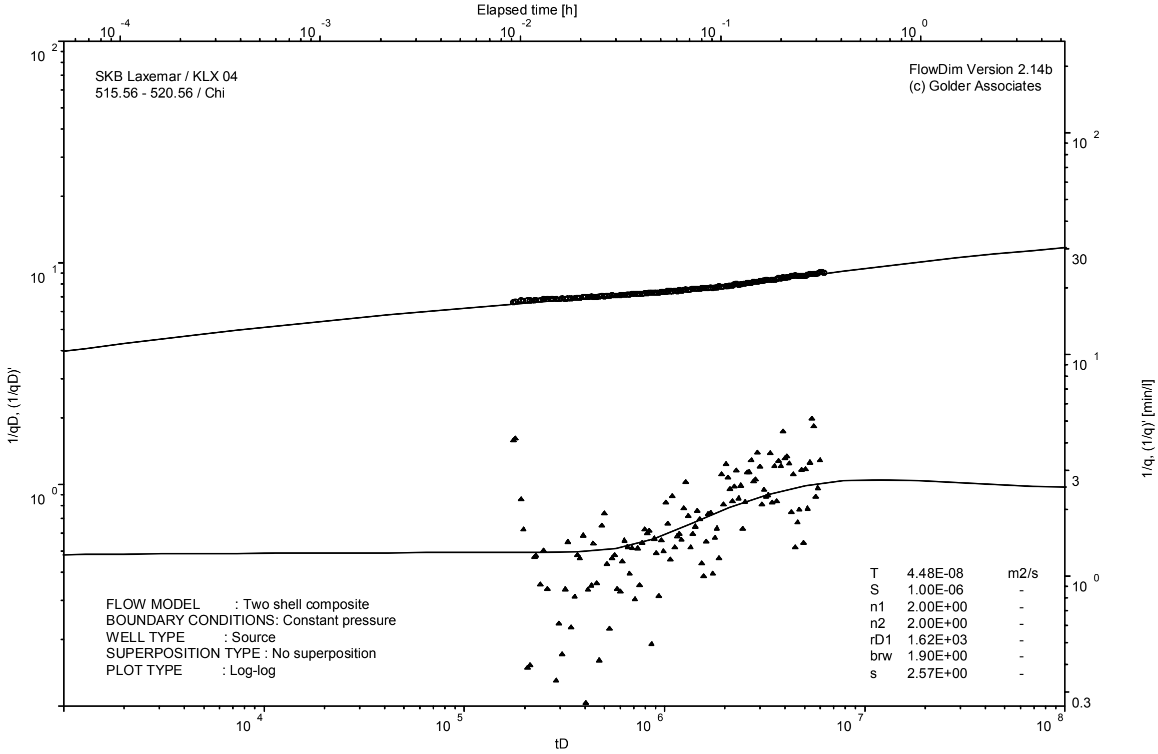
Analysis diagrams



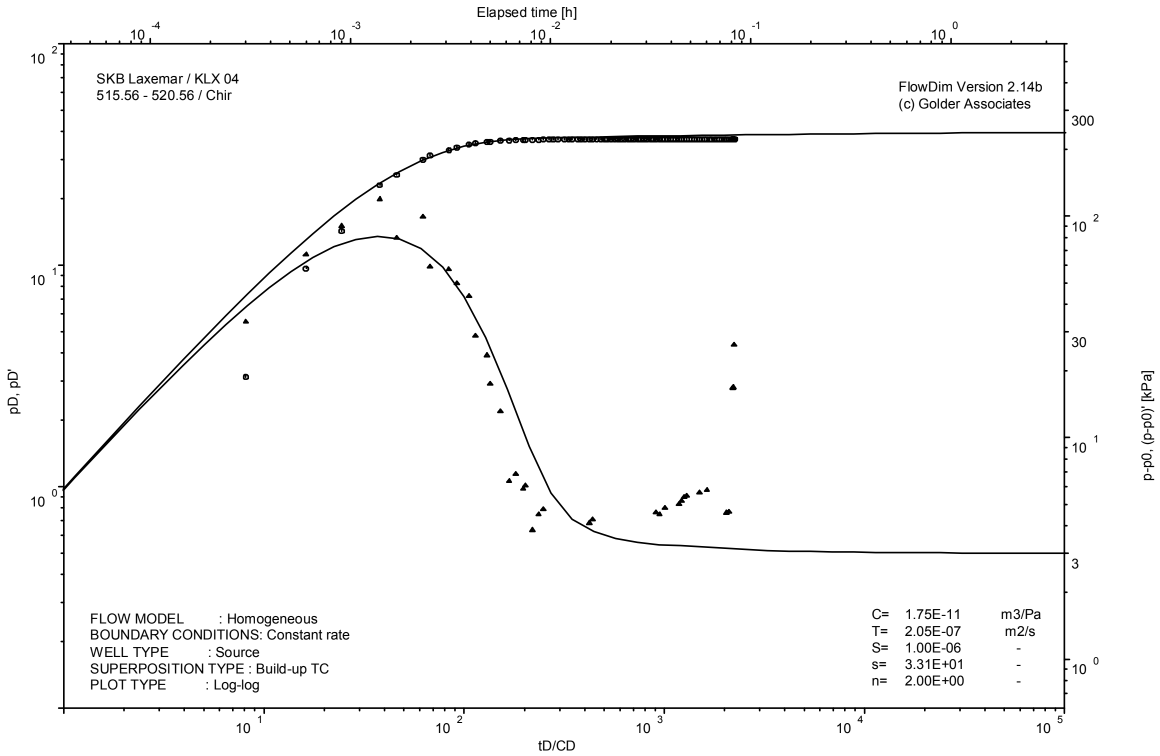
Pressure and flow rate vs. time; cartesian plot



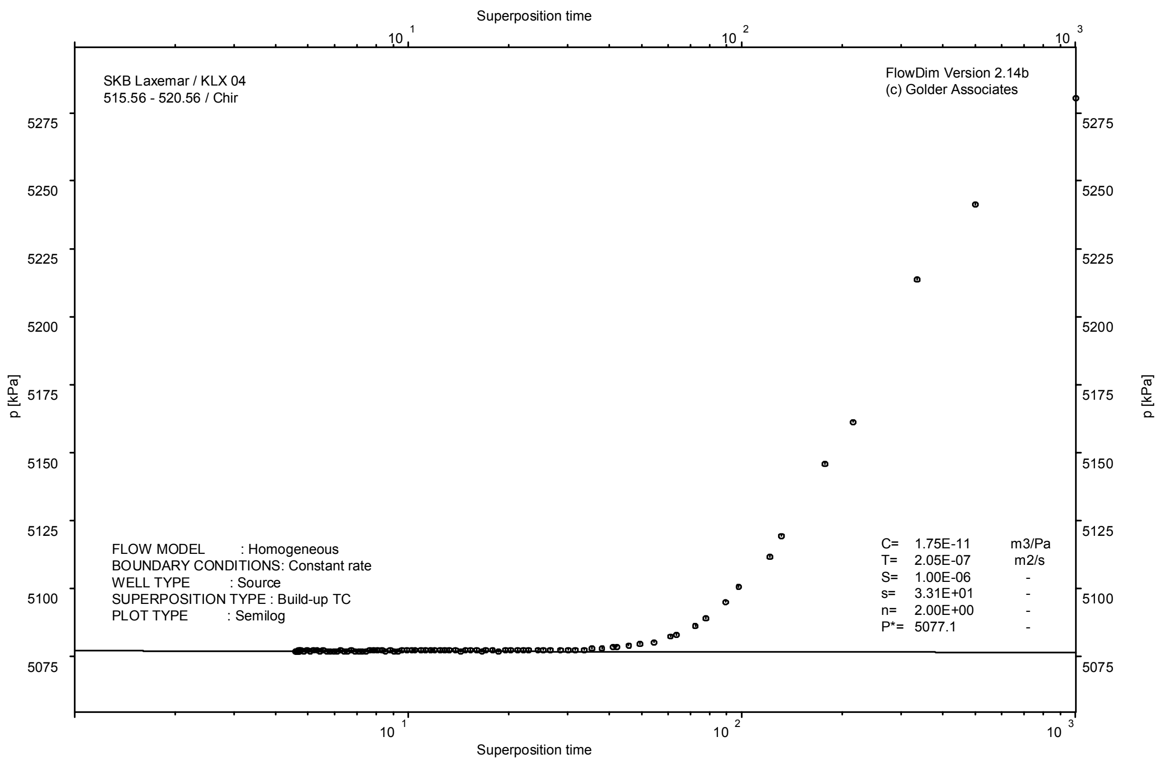
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

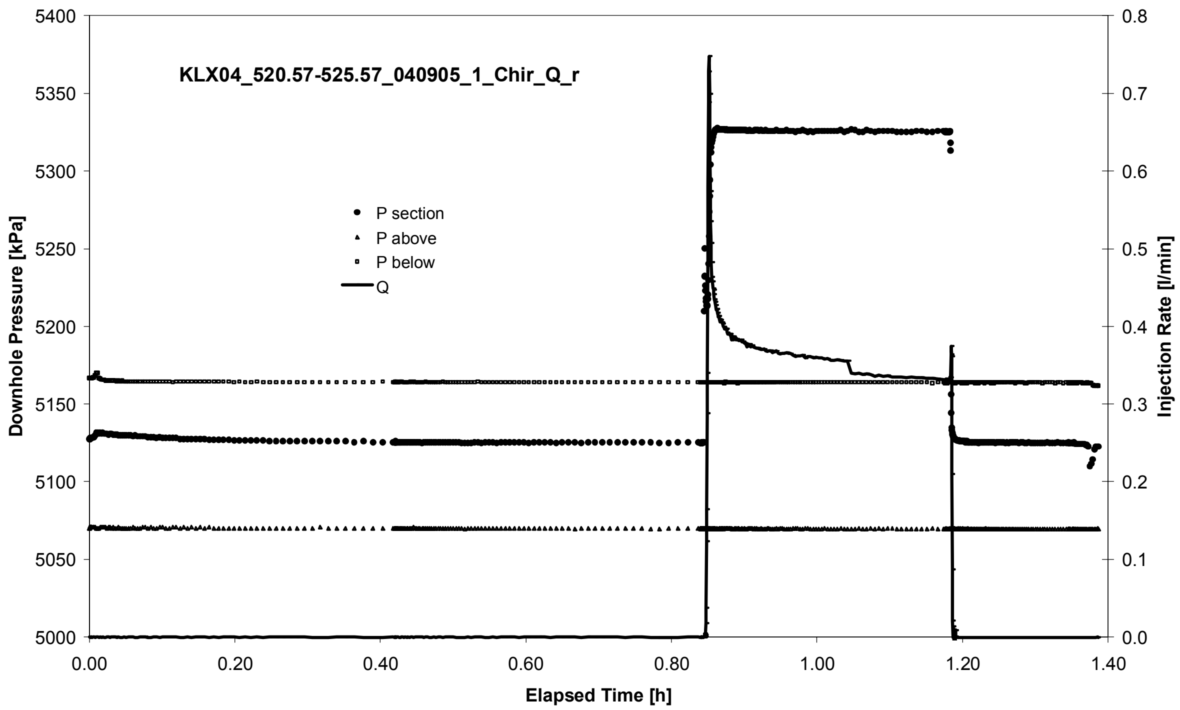


CHIR phase; HORNER match

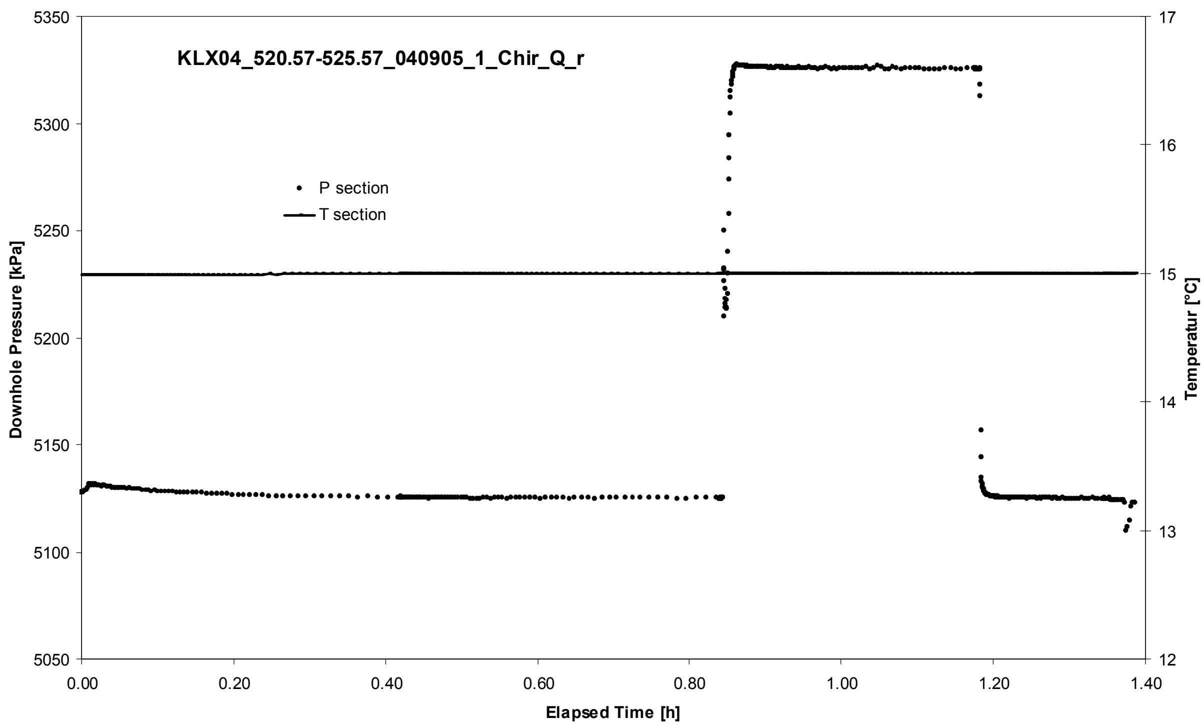
APPENDIX 2-89

Test 520.57 – 525.57 m

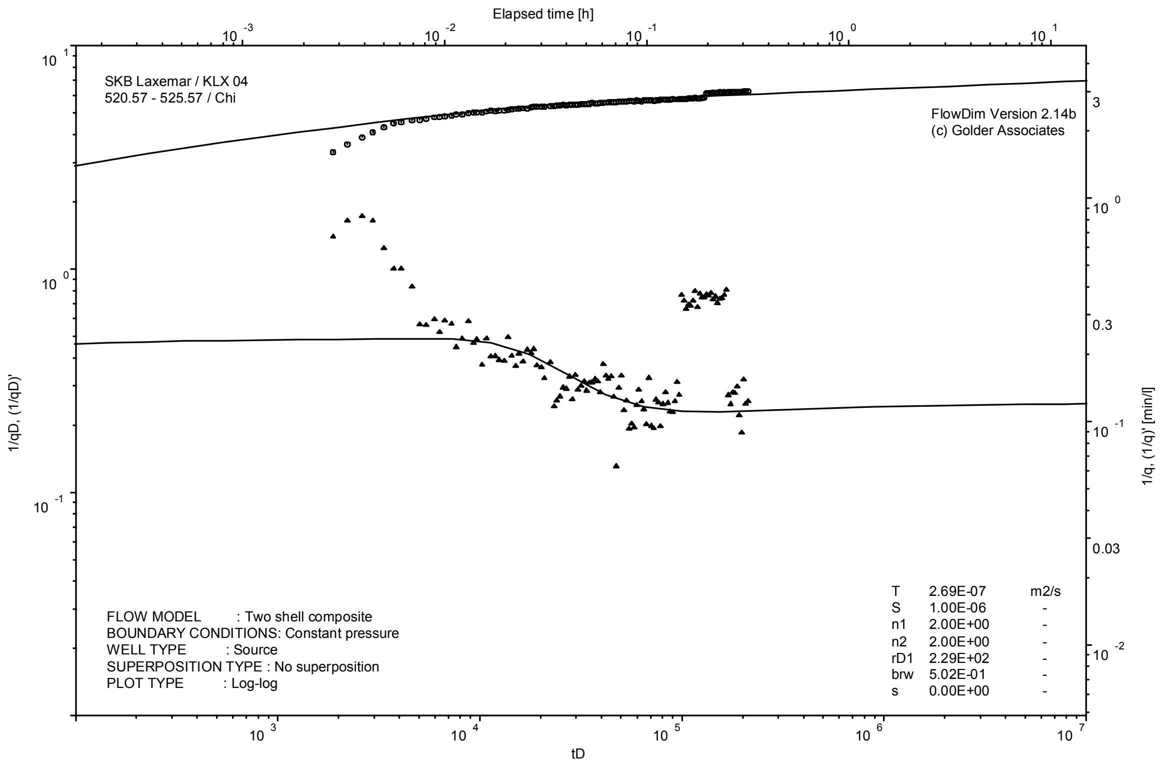
Analysis diagrams



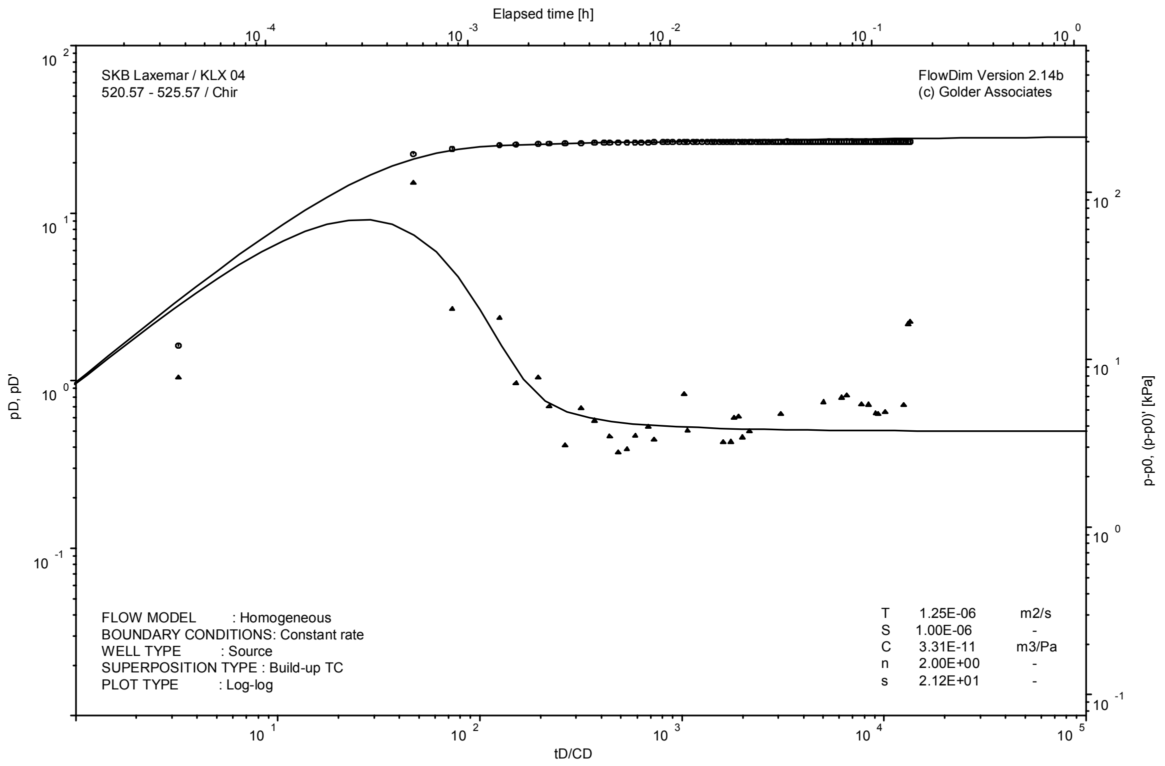
Pressure and flow rate vs. time; cartesian plot



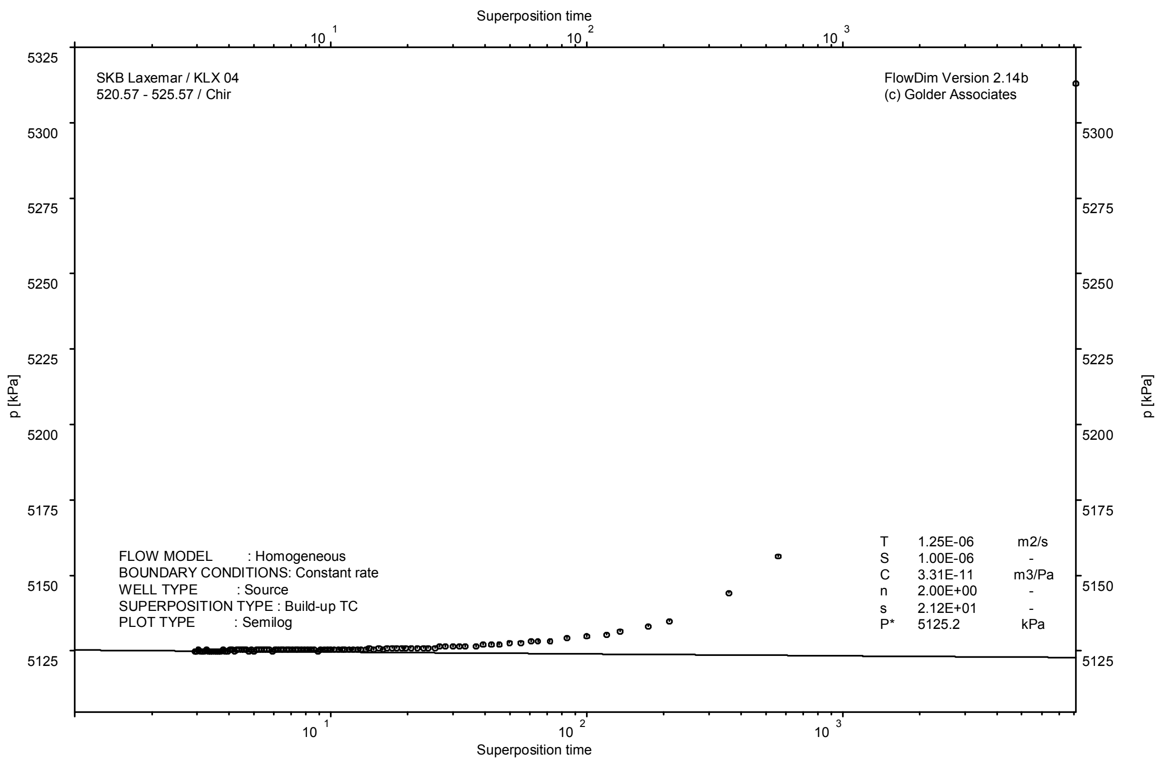
Interval pressure and temperature vs. time; cartesian plot



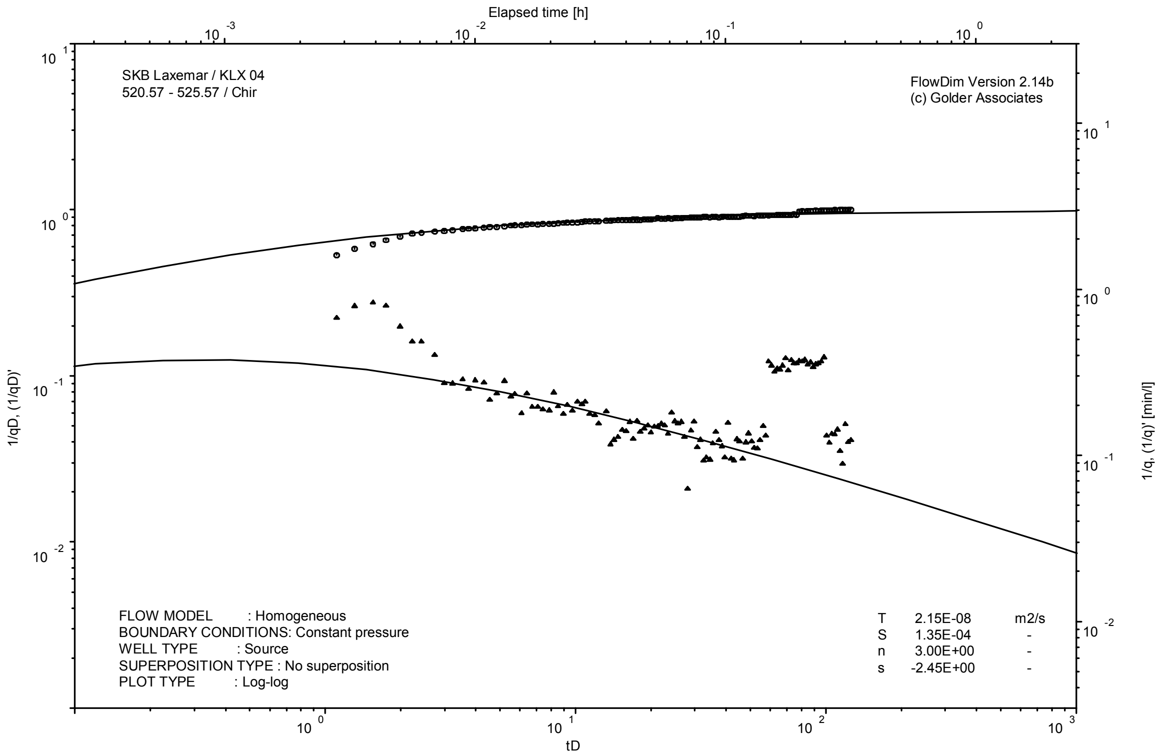
CHI phase; log-log match



CHIR phase; log-log match



CHIR phase; HORNER match

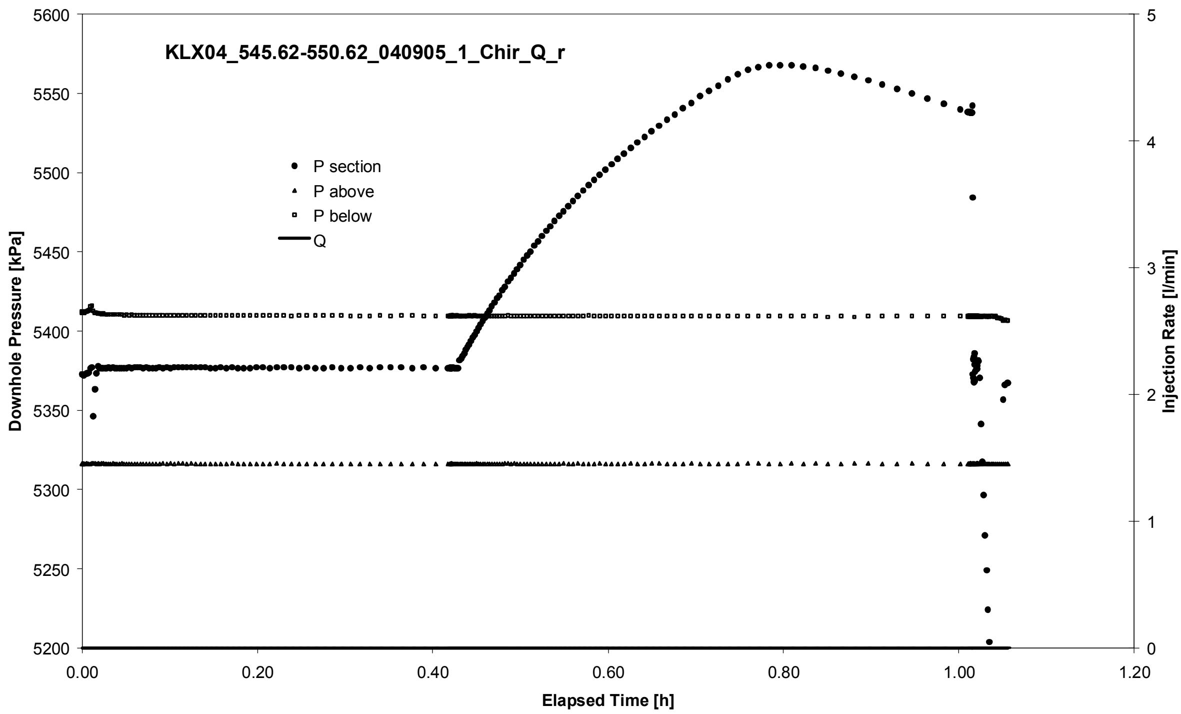


CHIR phase; alternative log-log match (n=3, spherical flow)

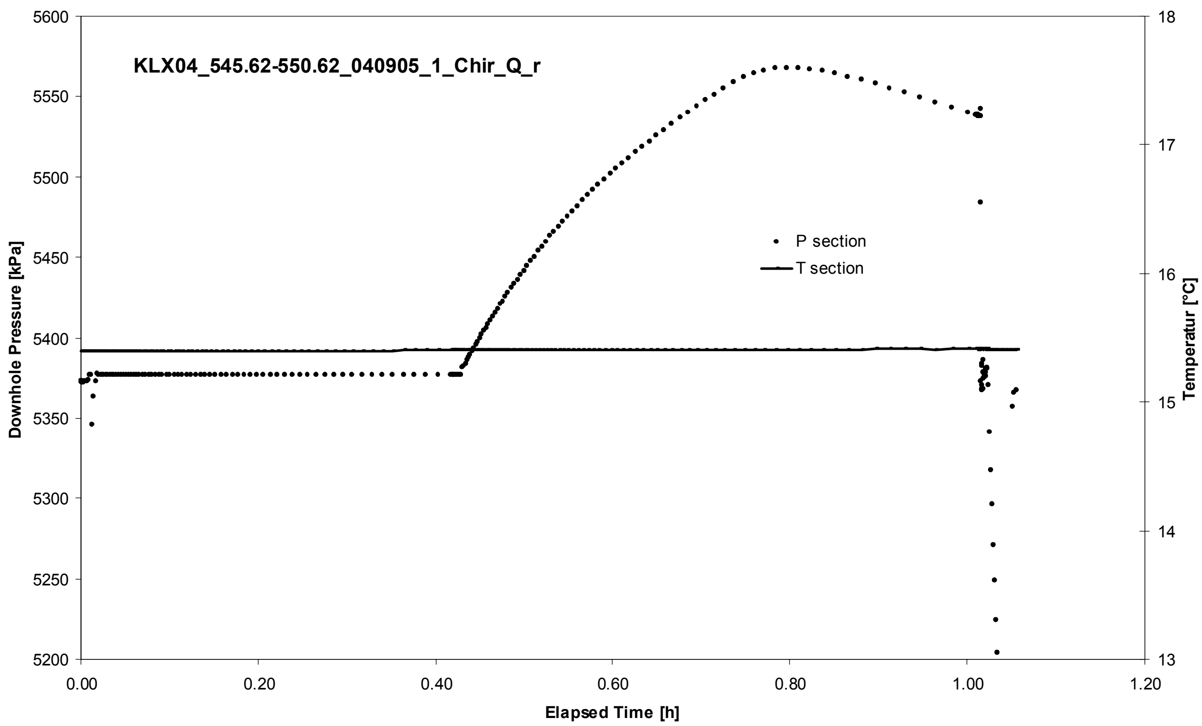
APPENDIX 2-90

Test 545.62 – 550.62 m

Analysis diagrams



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot

Not Analysed

CHI phase; log-log match

Not Analysed

CHIR phase; log-log match

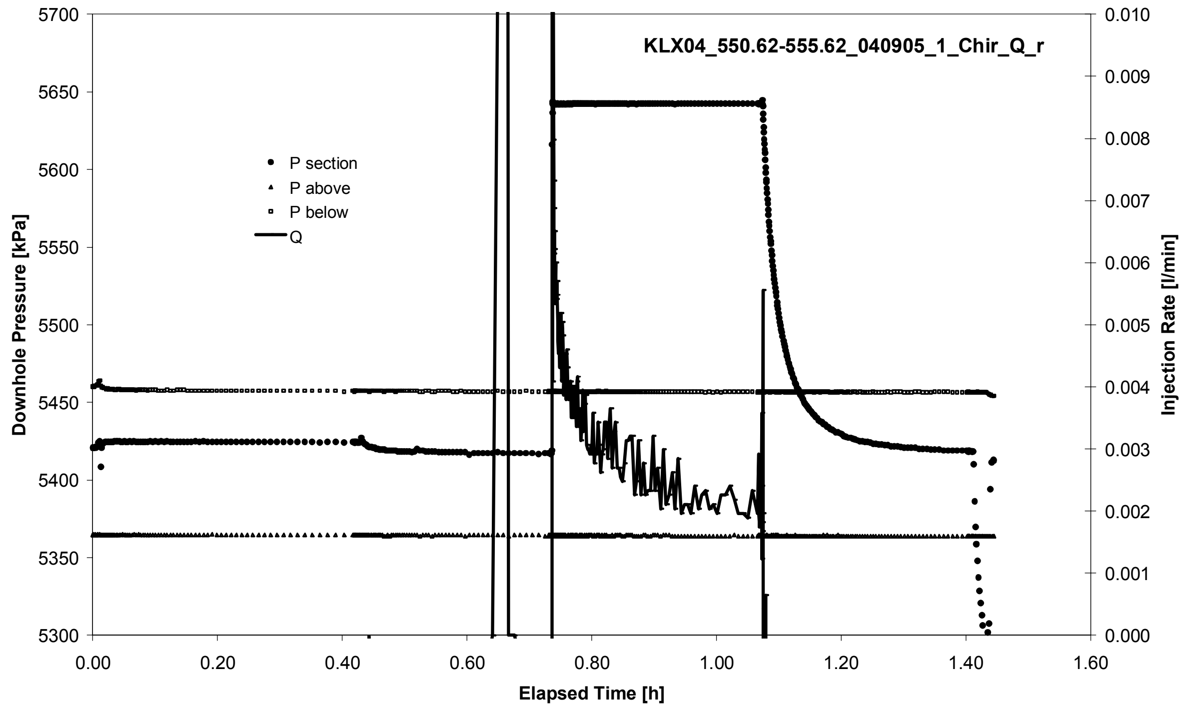
Not Analysed

CHIR phase; HORNER match

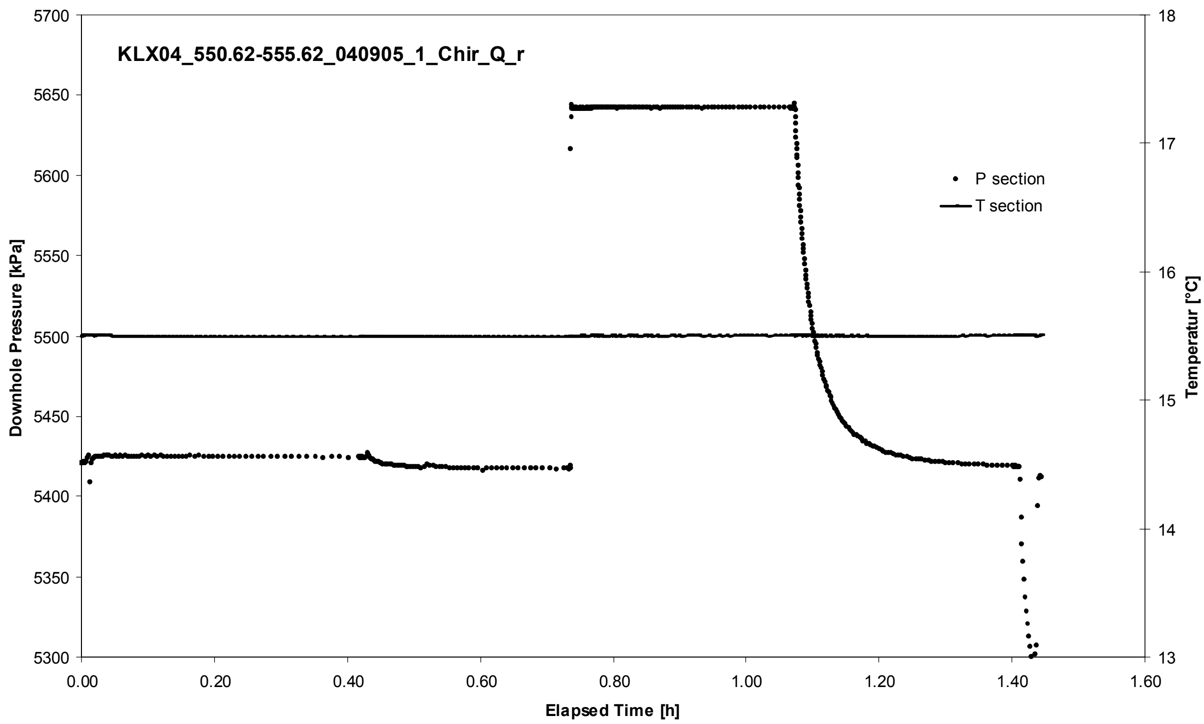
APPENDIX 2-91

Test 550.62 – 555.62 m

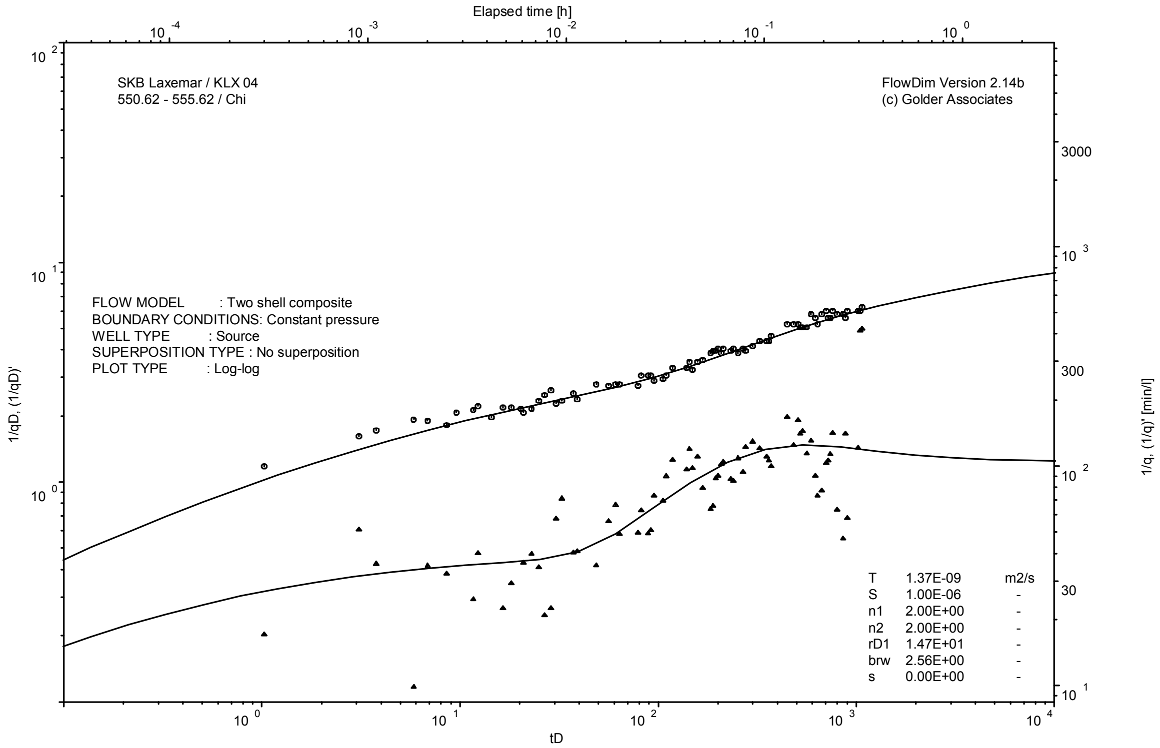
Analysis diagrams



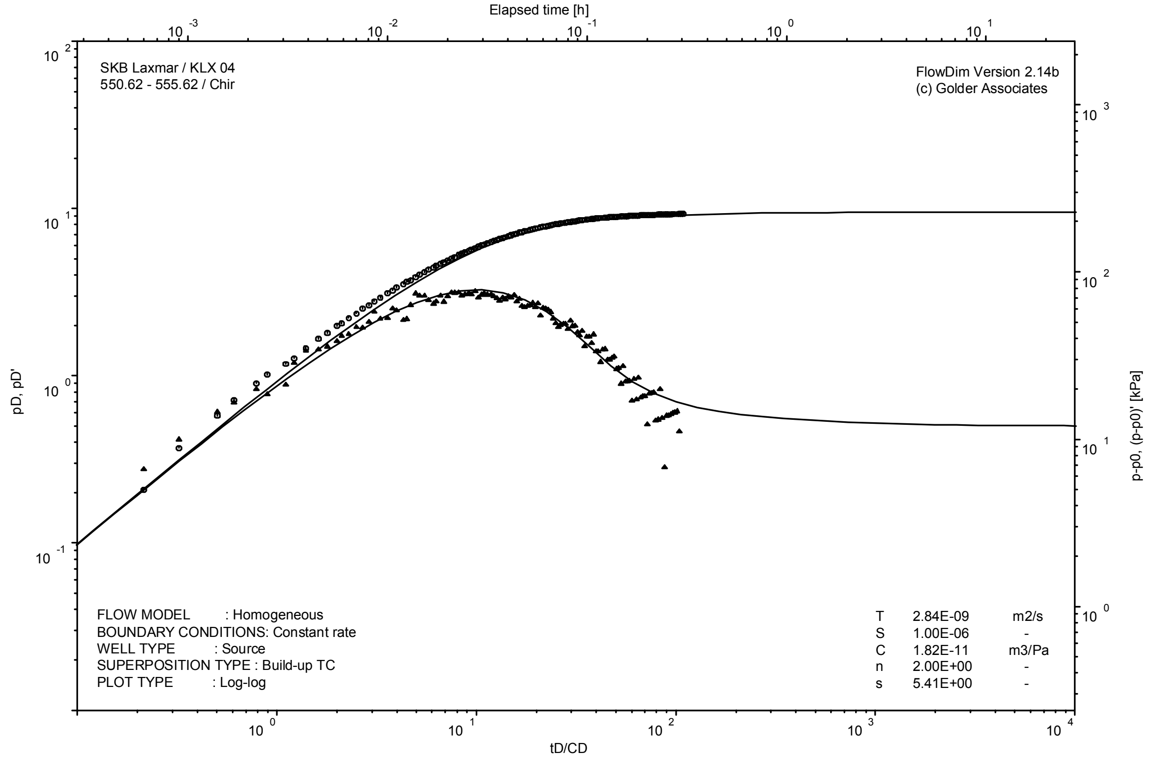
Pressure and flow rate vs. time; cartesian plot



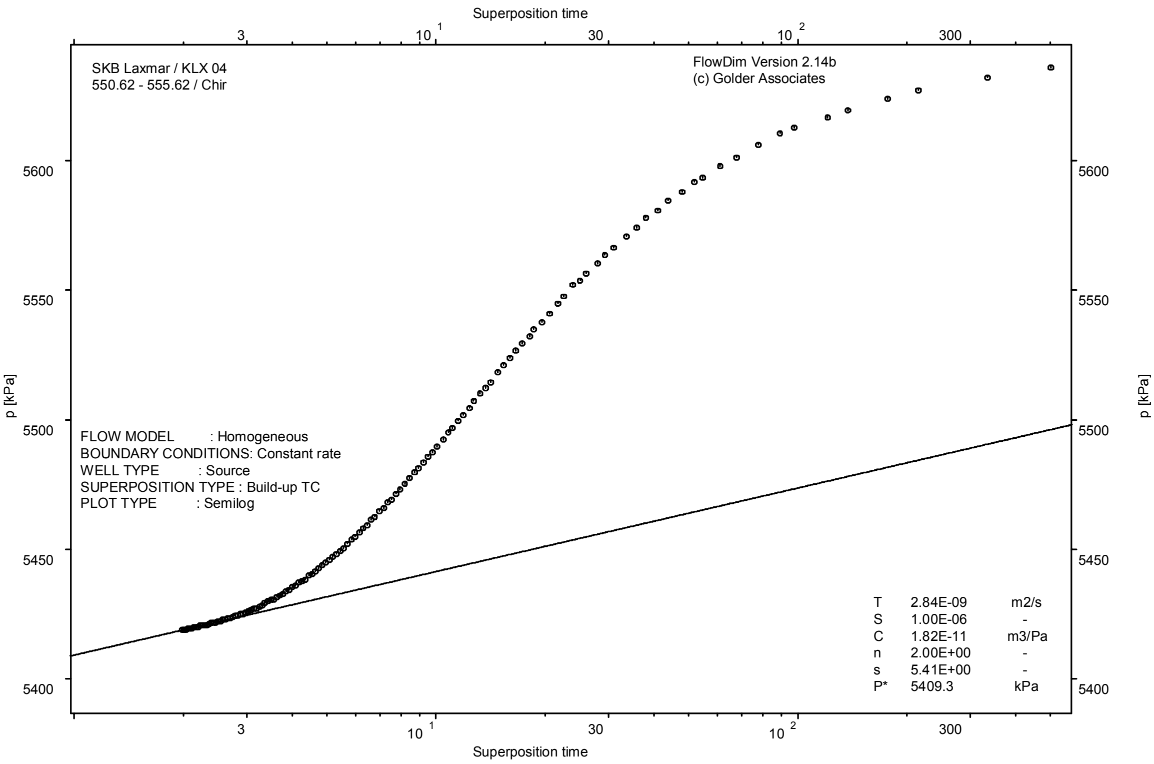
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

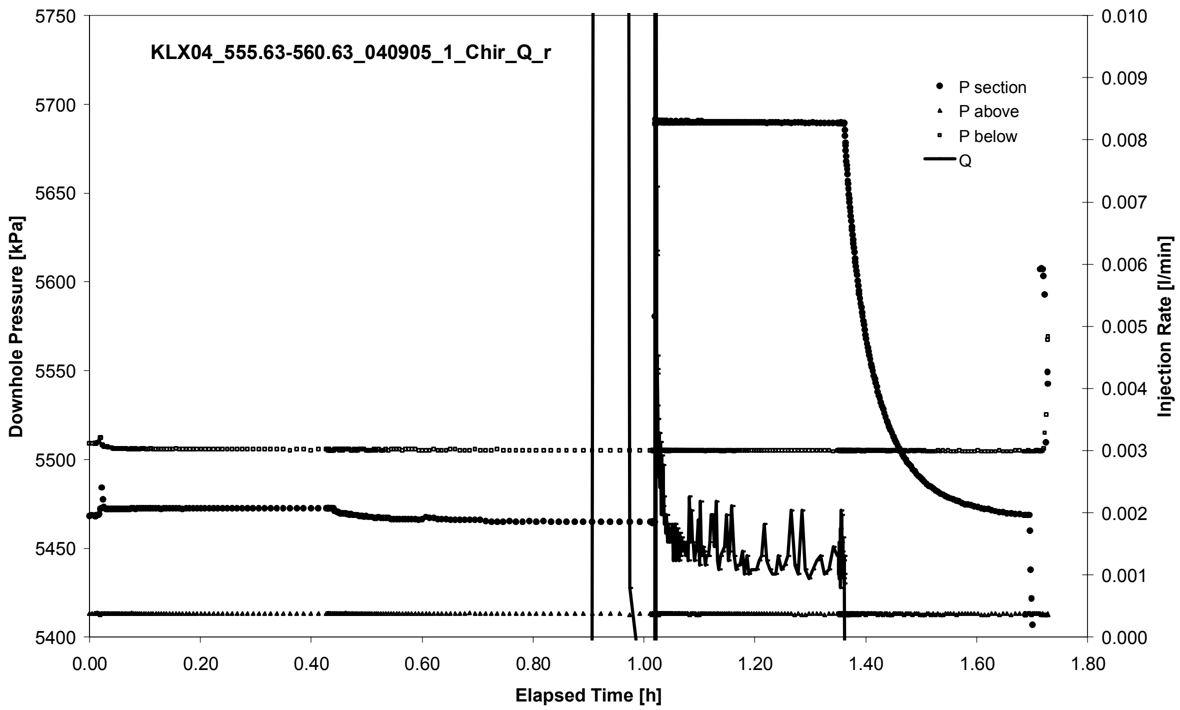


CHIR phase; HORNER match

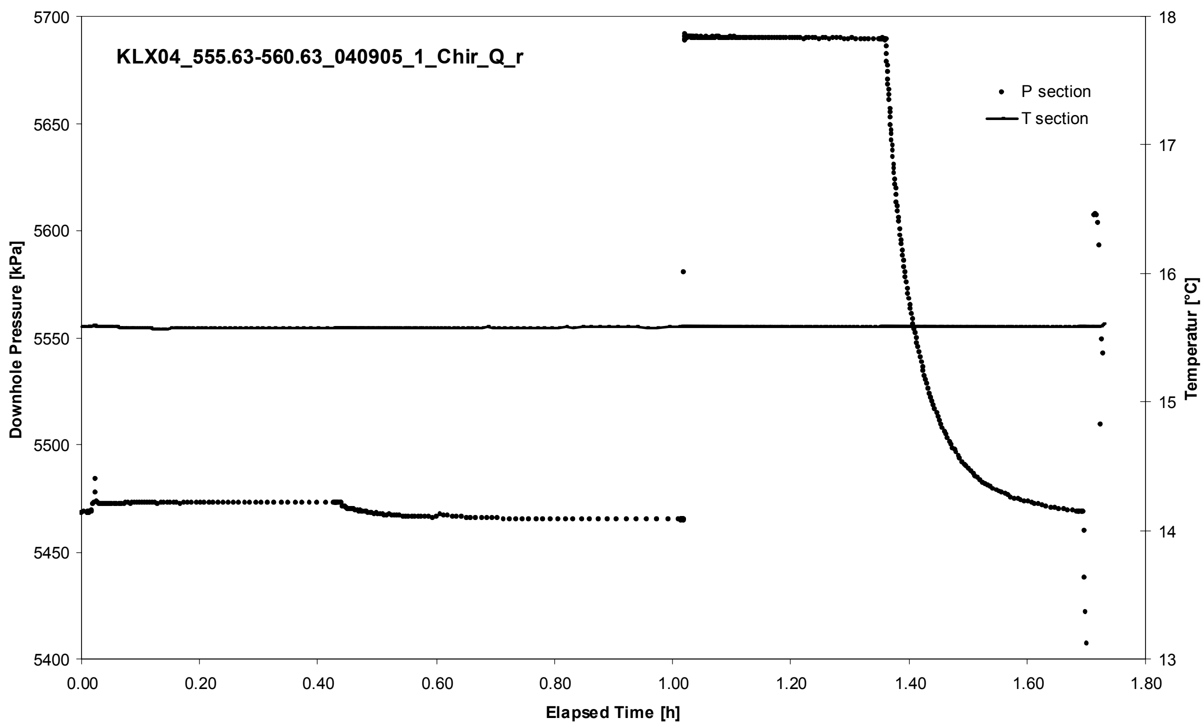
APPENDIX 2-92

Test 555.63 – 560.63 m

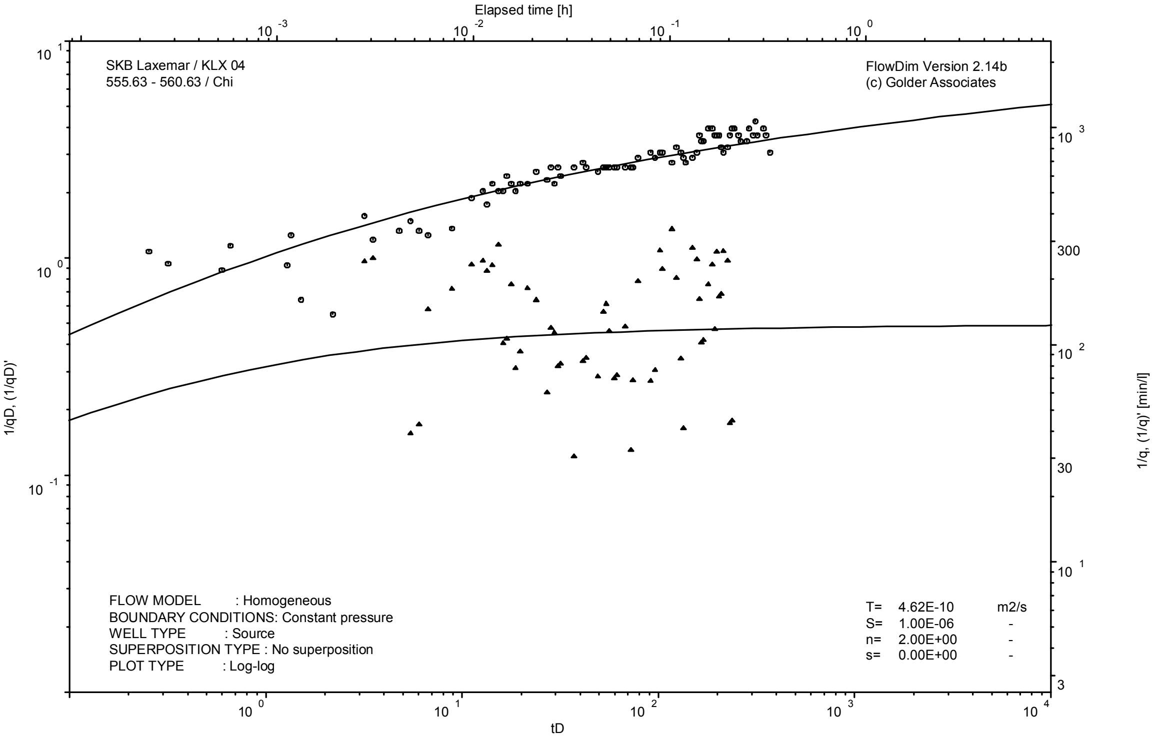
Analysis diagrams



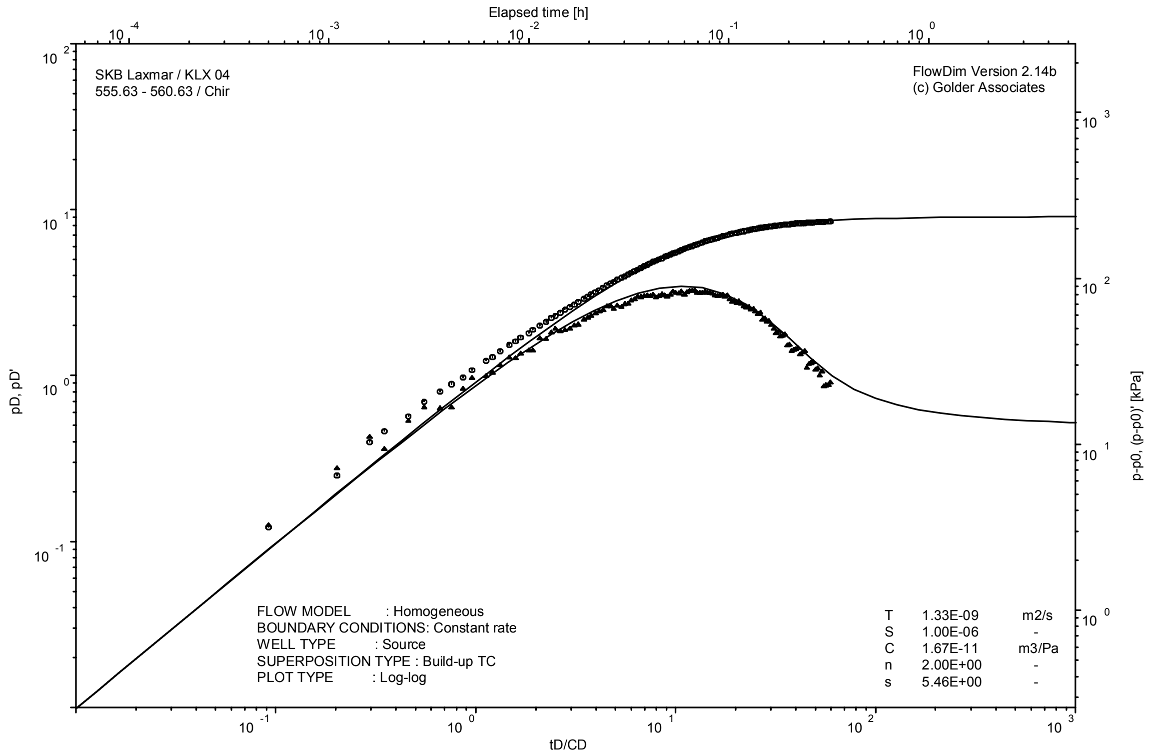
Pressure and flow rate vs. time; cartesian plot



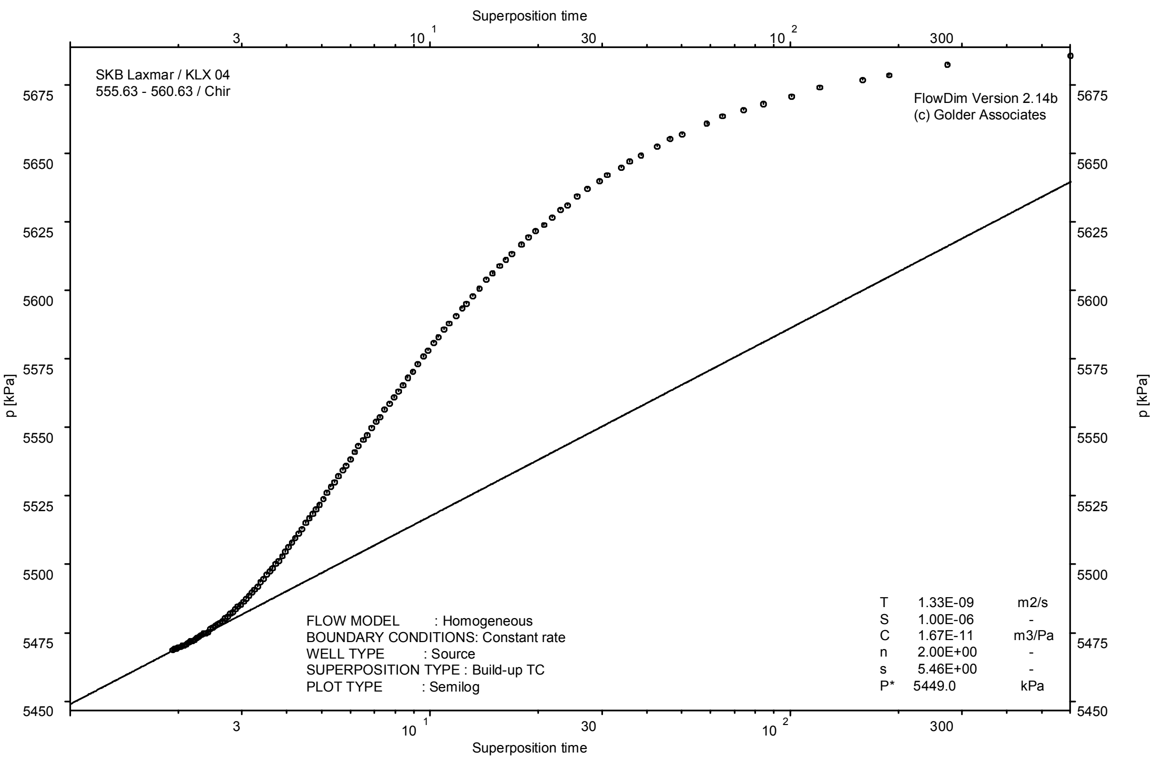
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

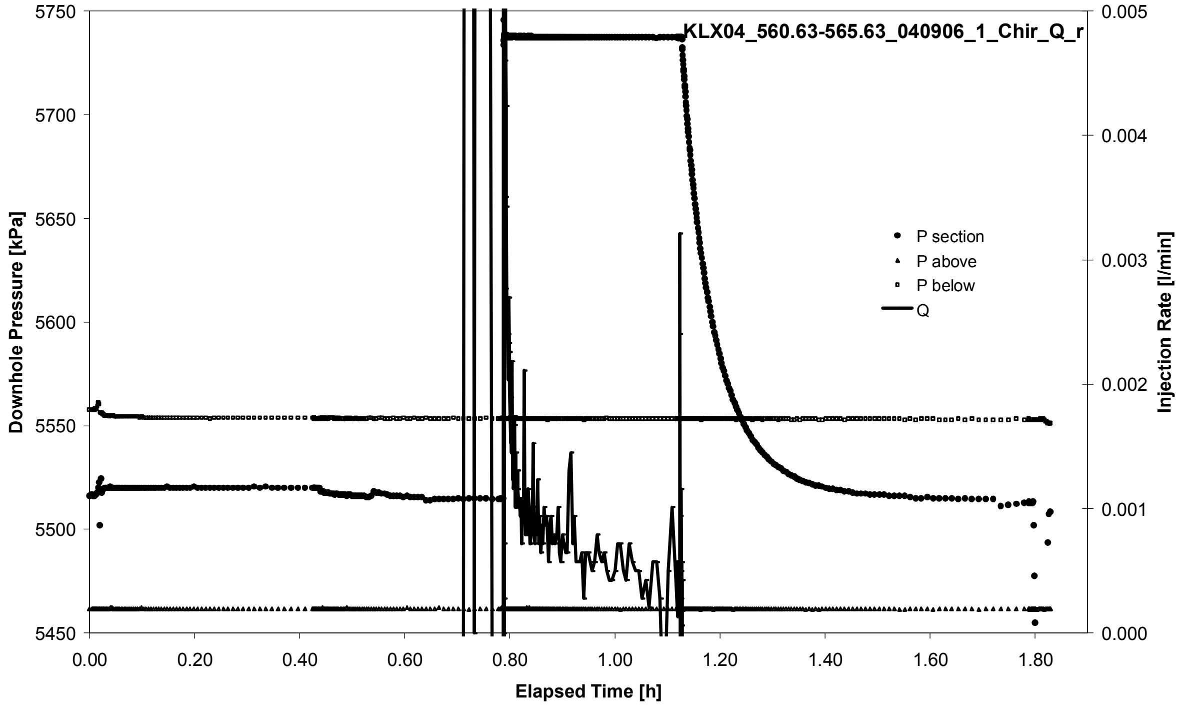


CHIR phase; HORNER match

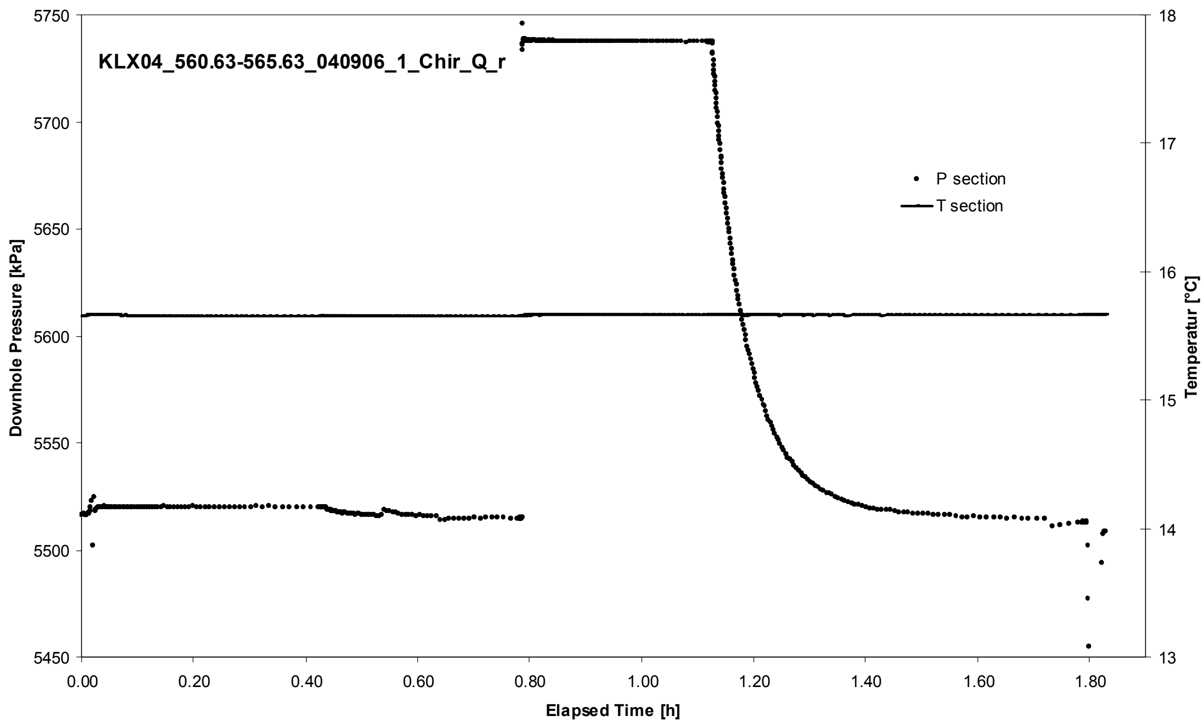
APPENDIX 2-93

Test 560.63 – 565.63 m

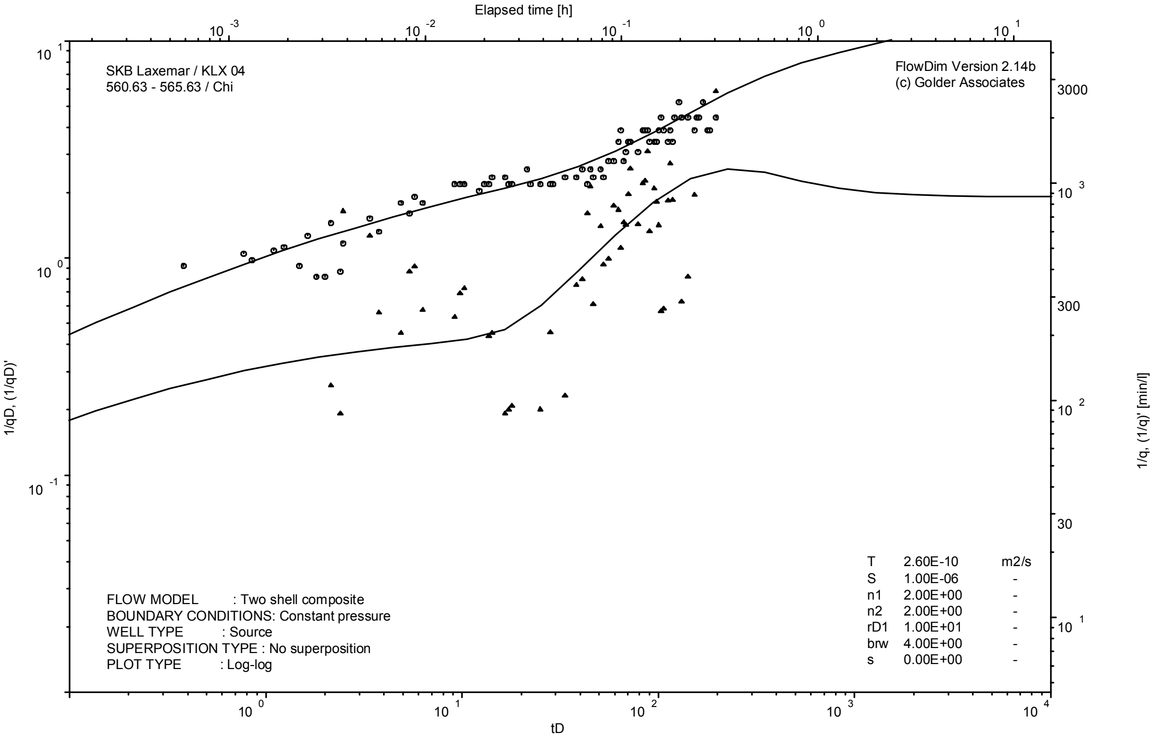
Analysis diagrams



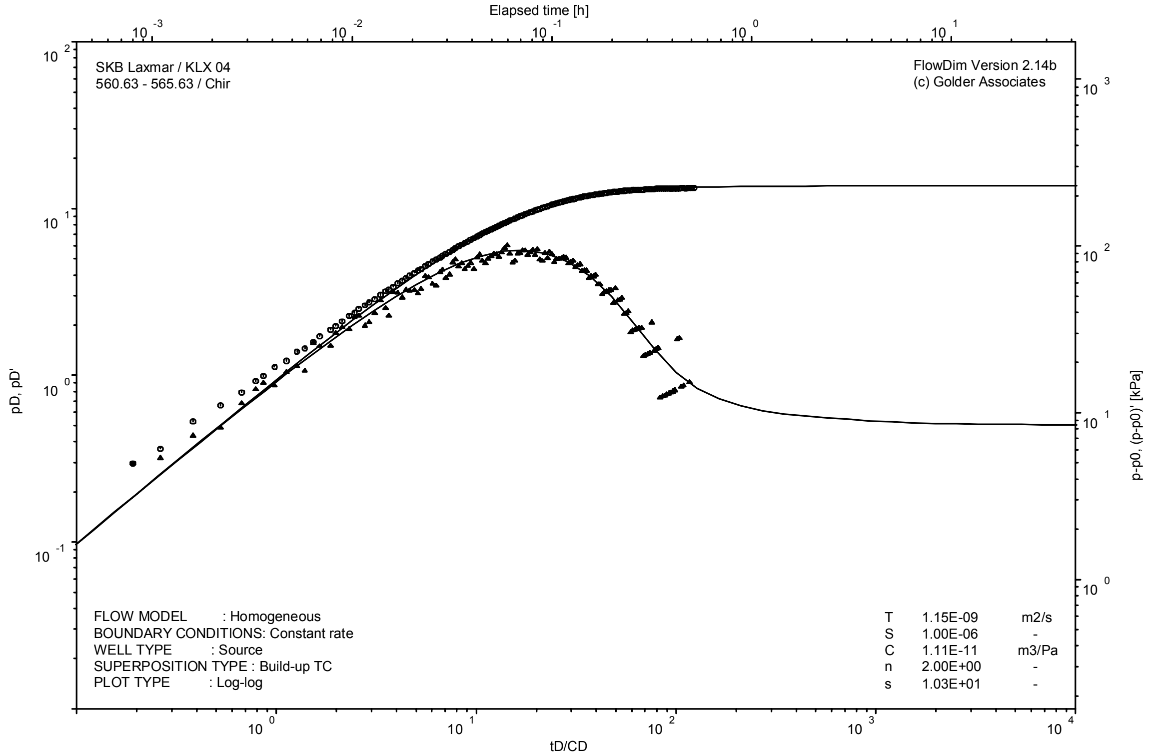
Pressure and flow rate vs. time; cartesian plot



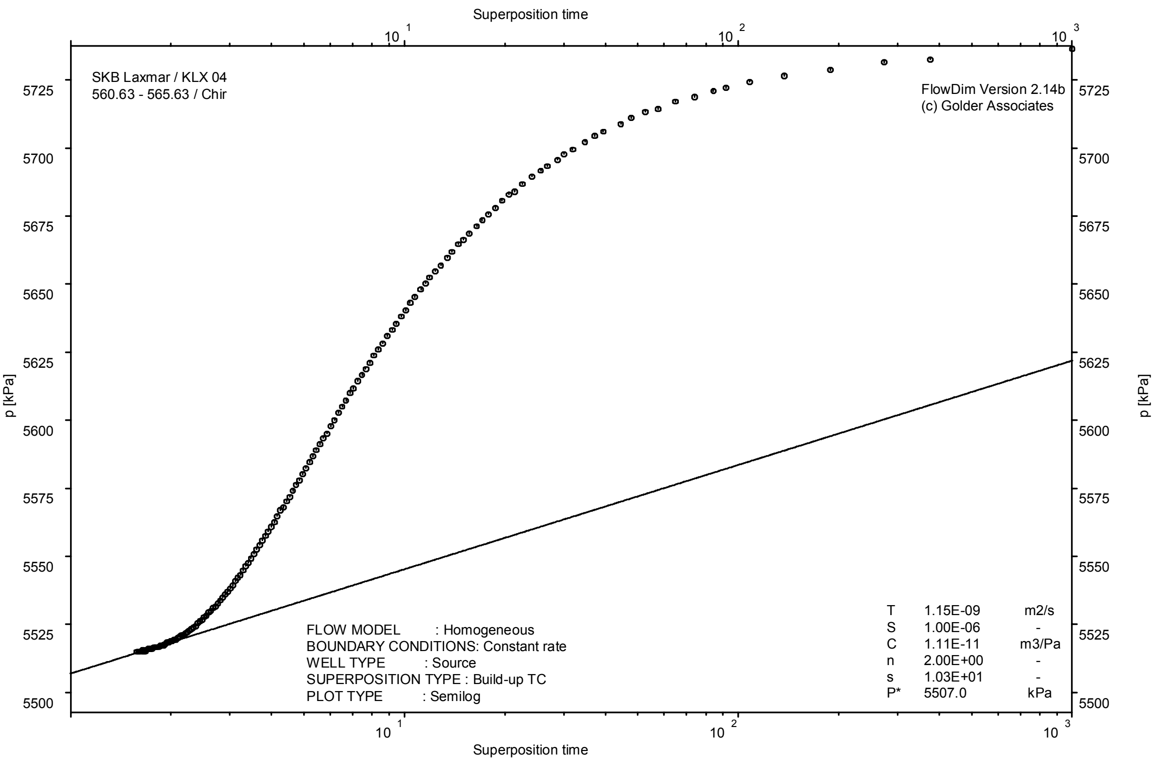
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

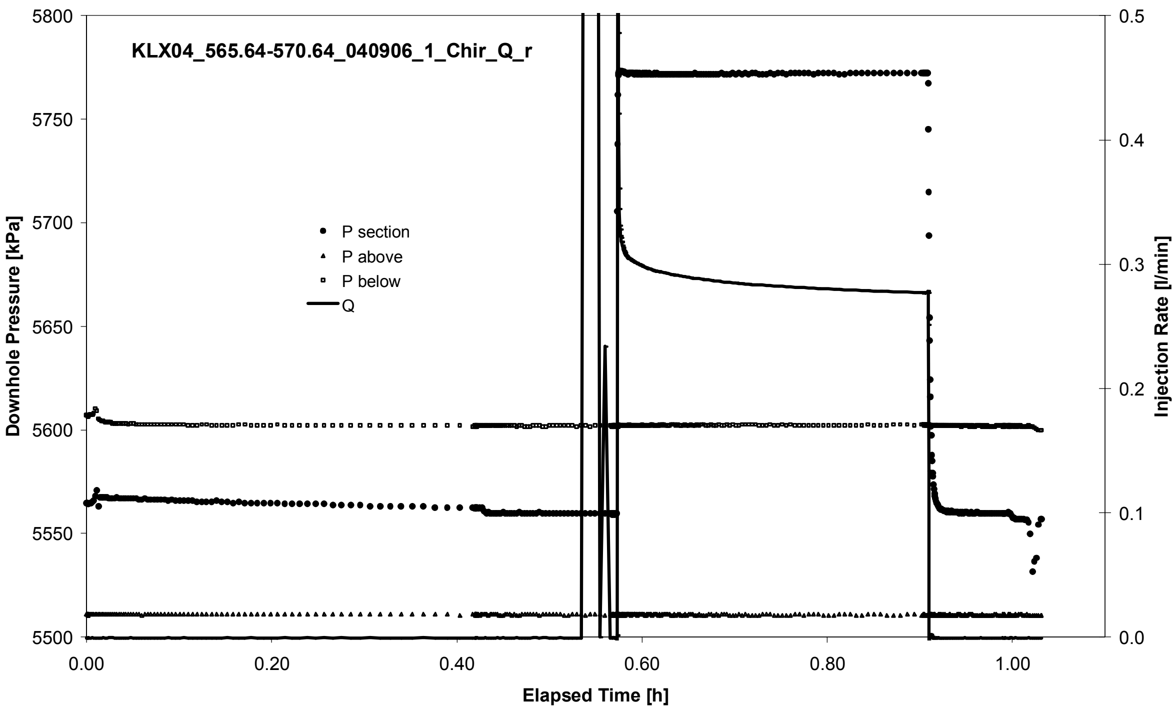


CHIR phase; HORNER match

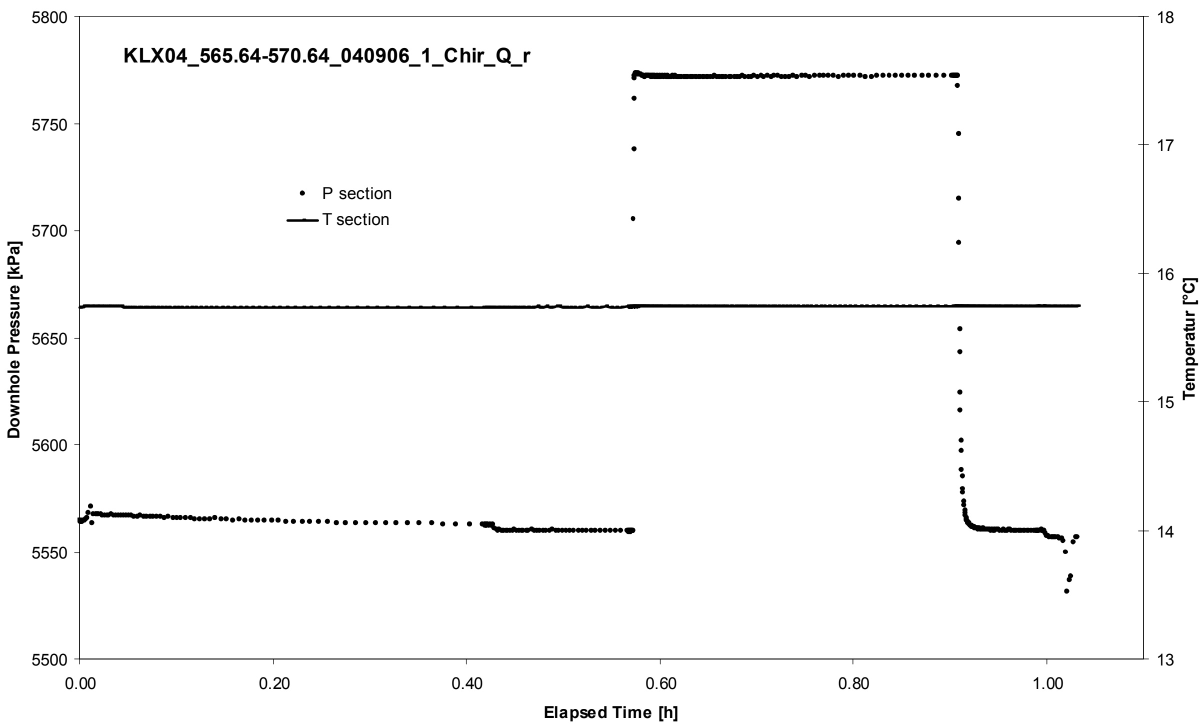
APPENDIX 2-94

Test 565.64 – 570.64 m

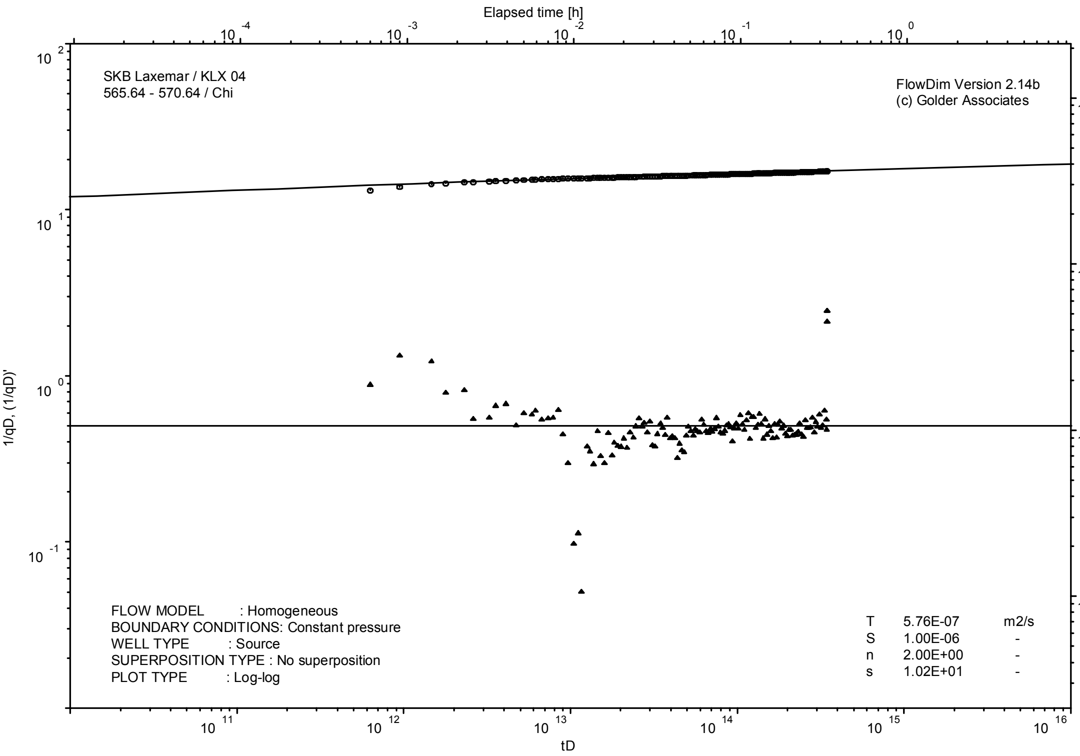
Analysis diagrams



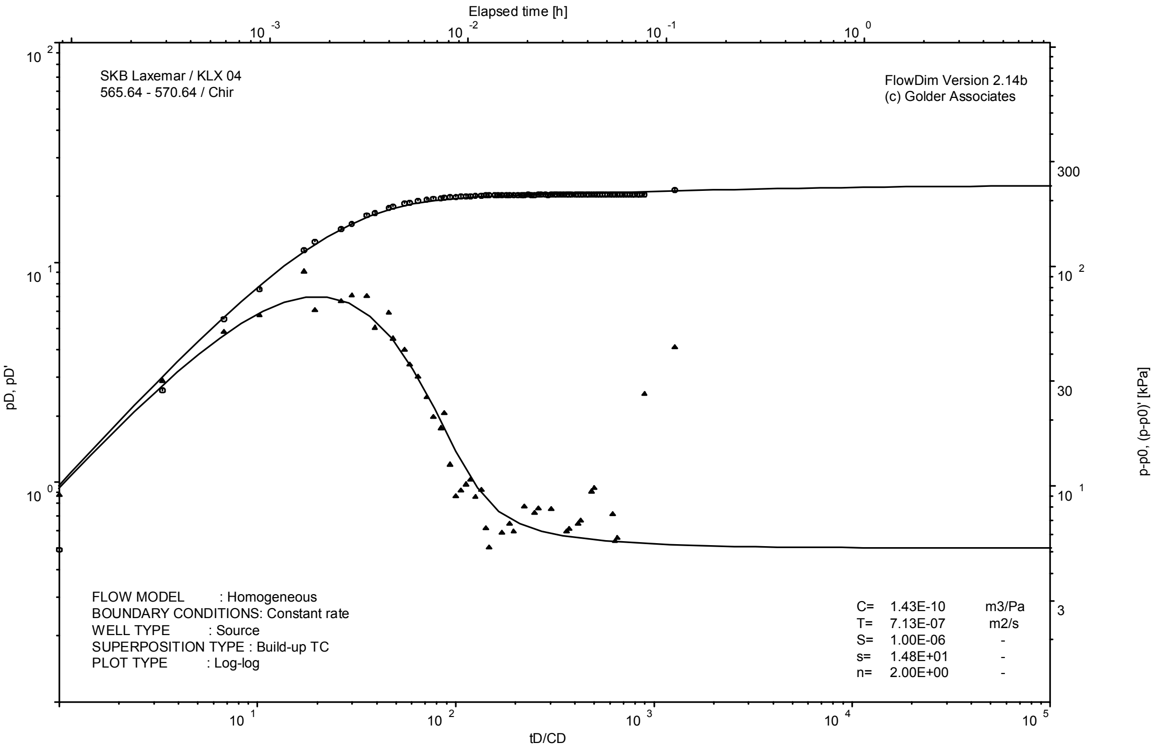
Pressure and flow rate vs. time; cartesian plot



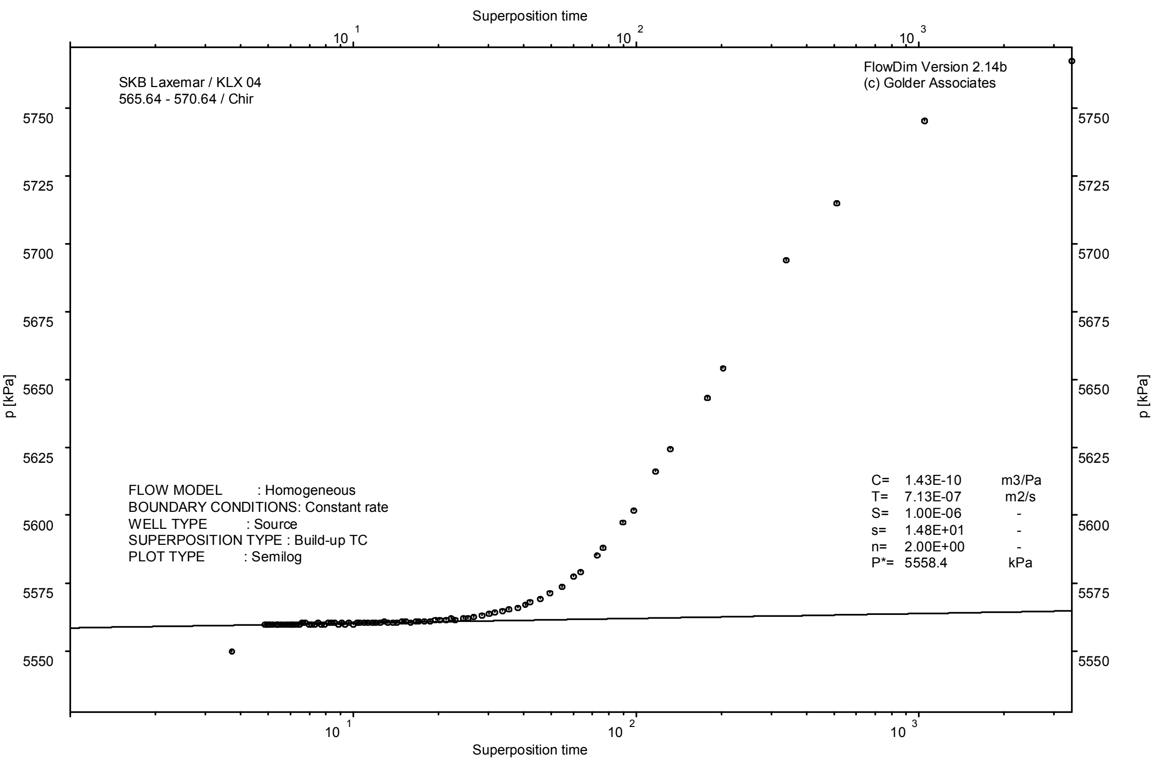
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

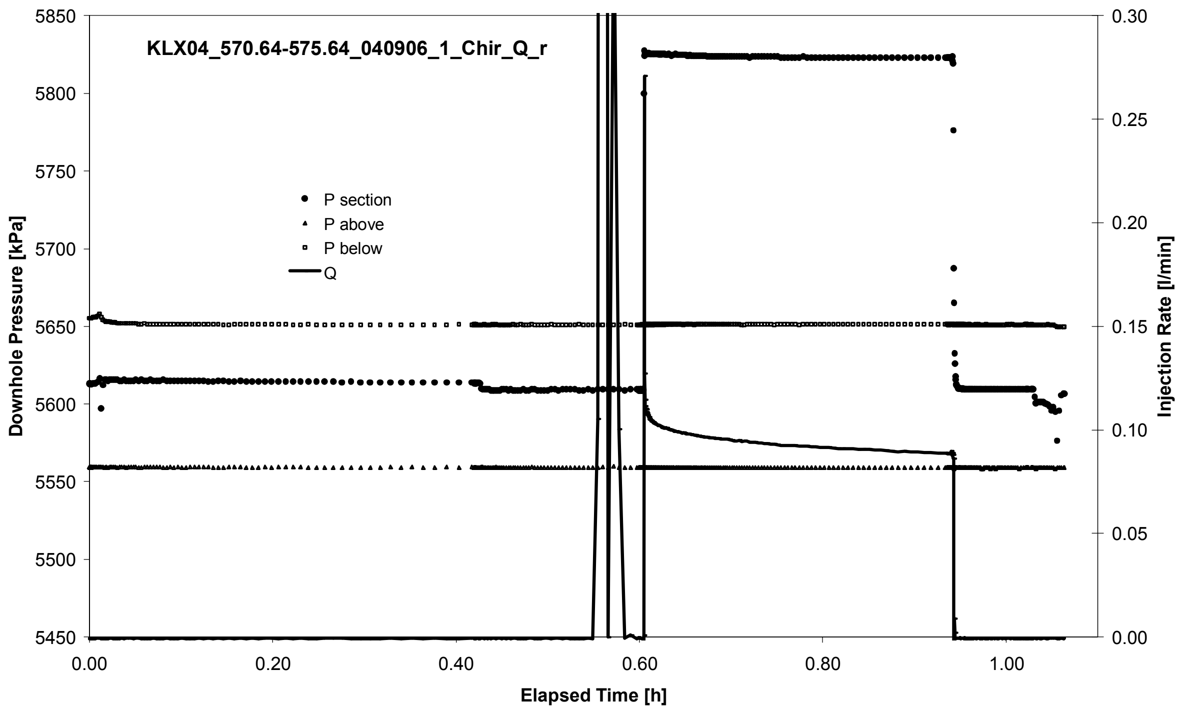


CHIR phase; HORNER match

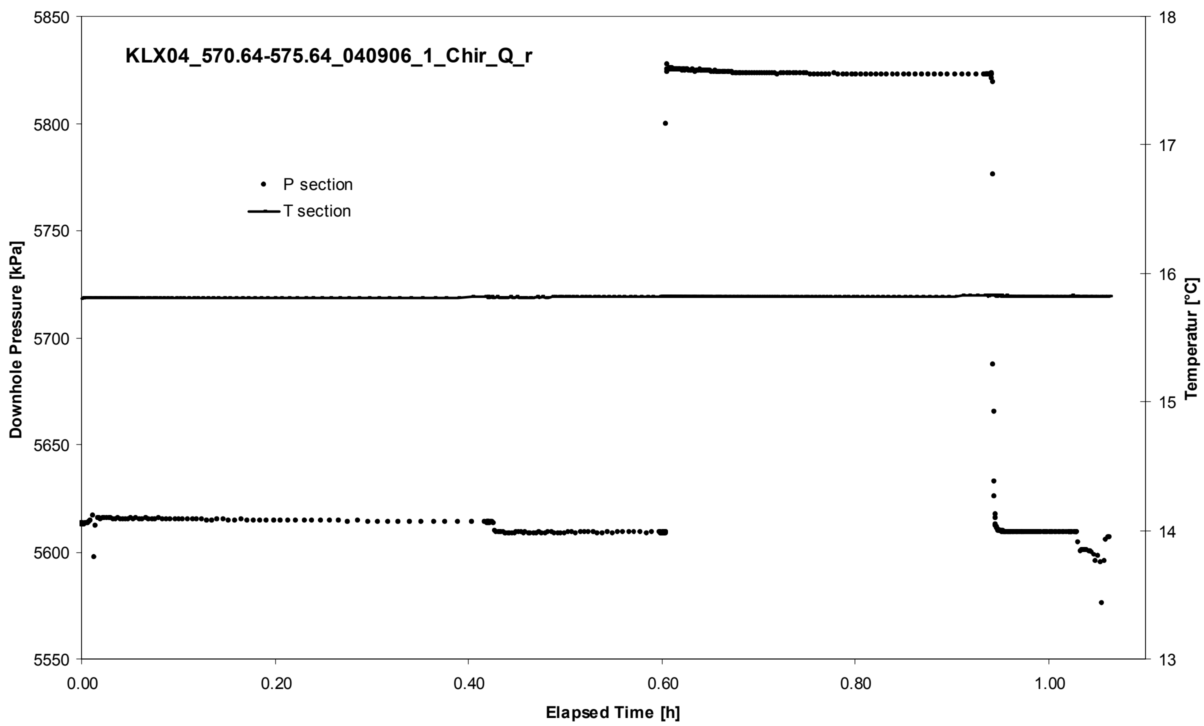
APPENDIX 2-95

Test 570.64 – 575.64 m

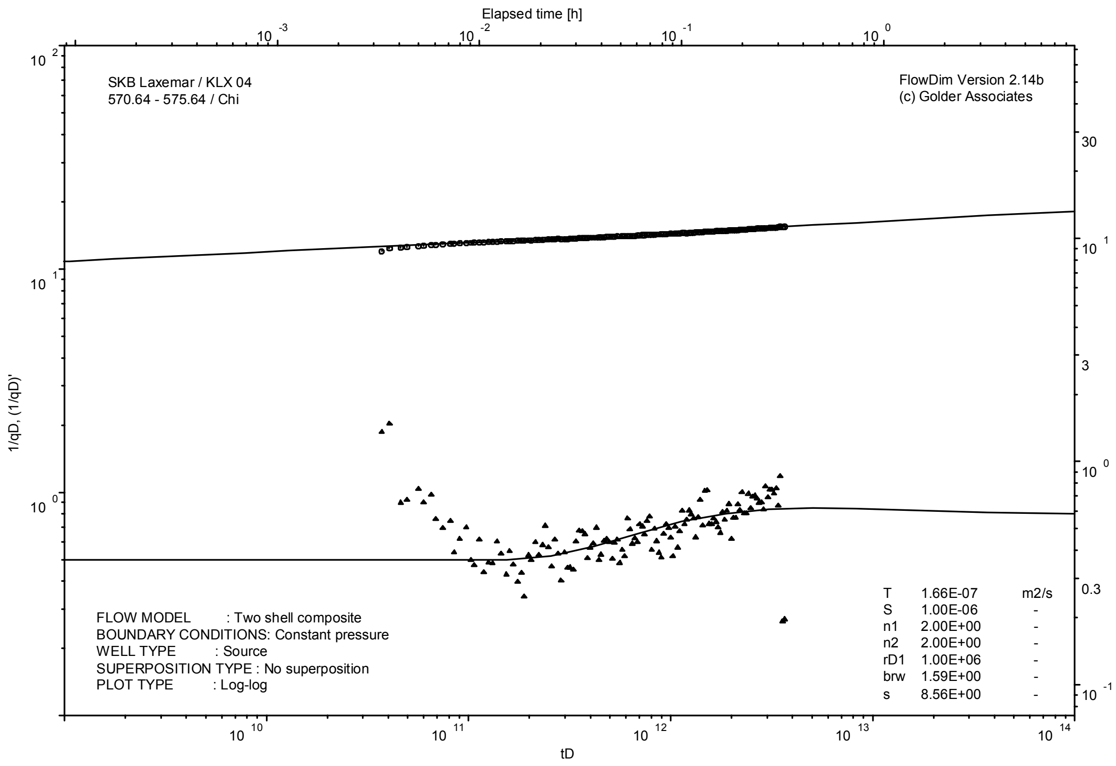
Analysis diagrams



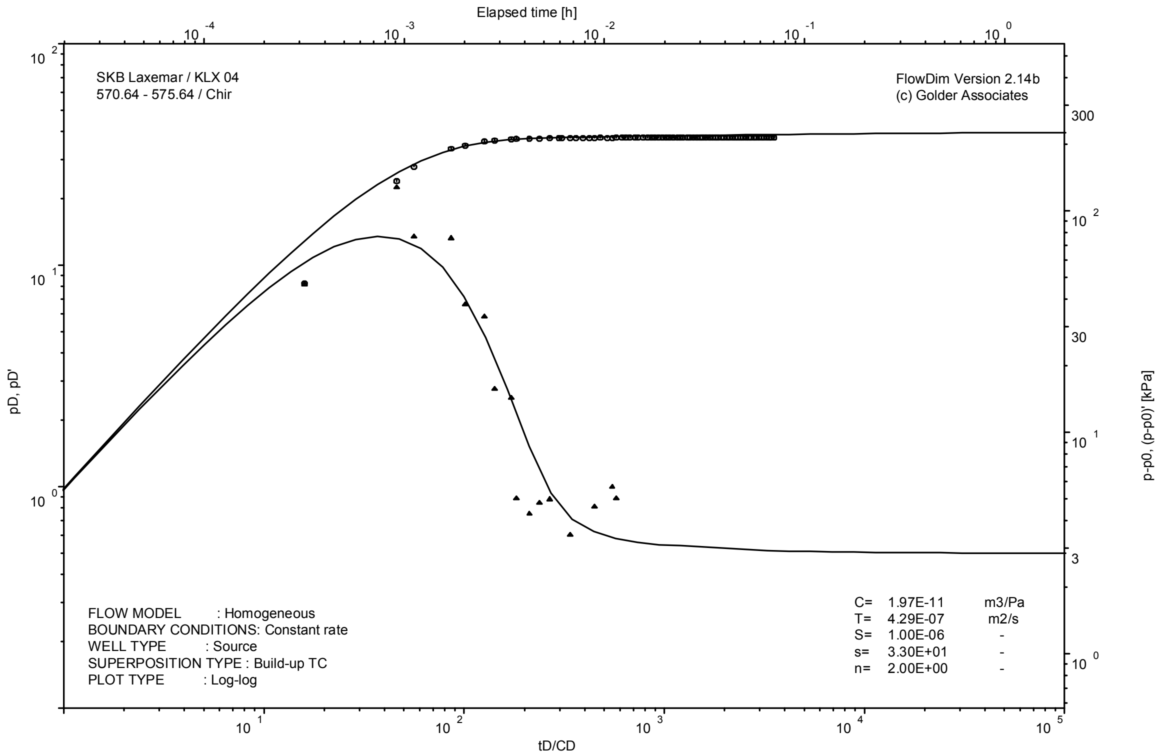
Pressure and flow rate vs. time; cartesian plot



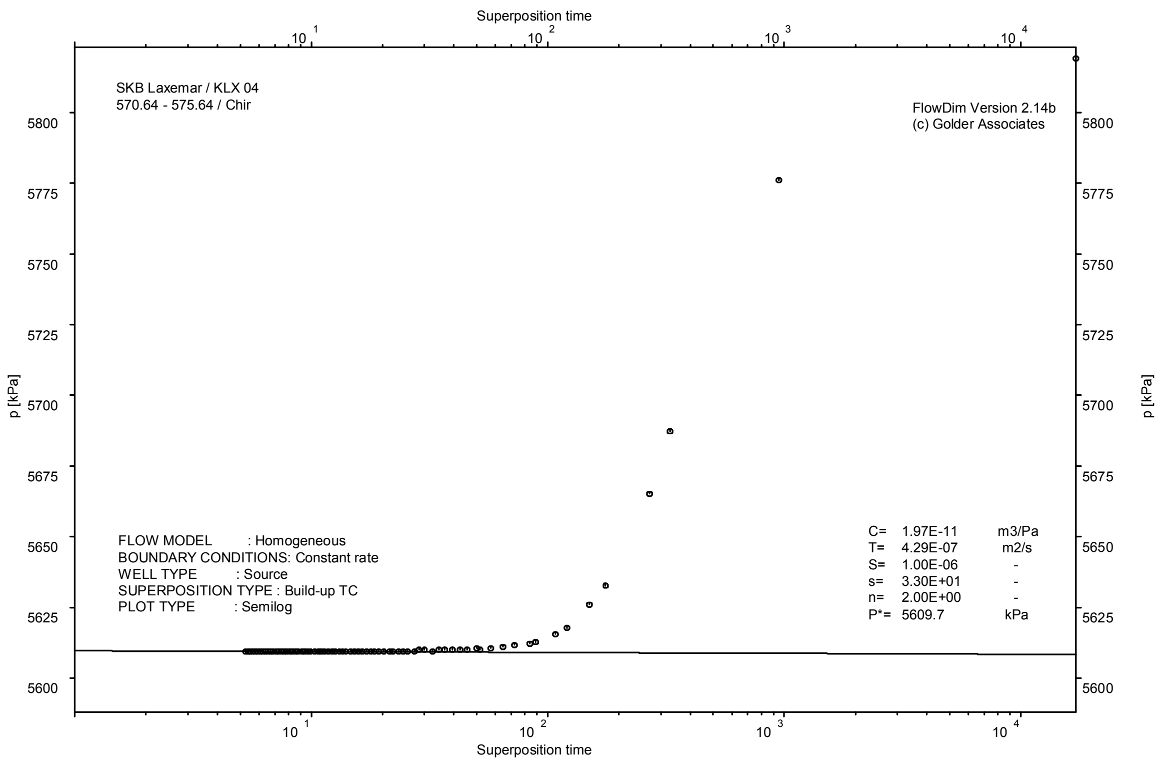
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

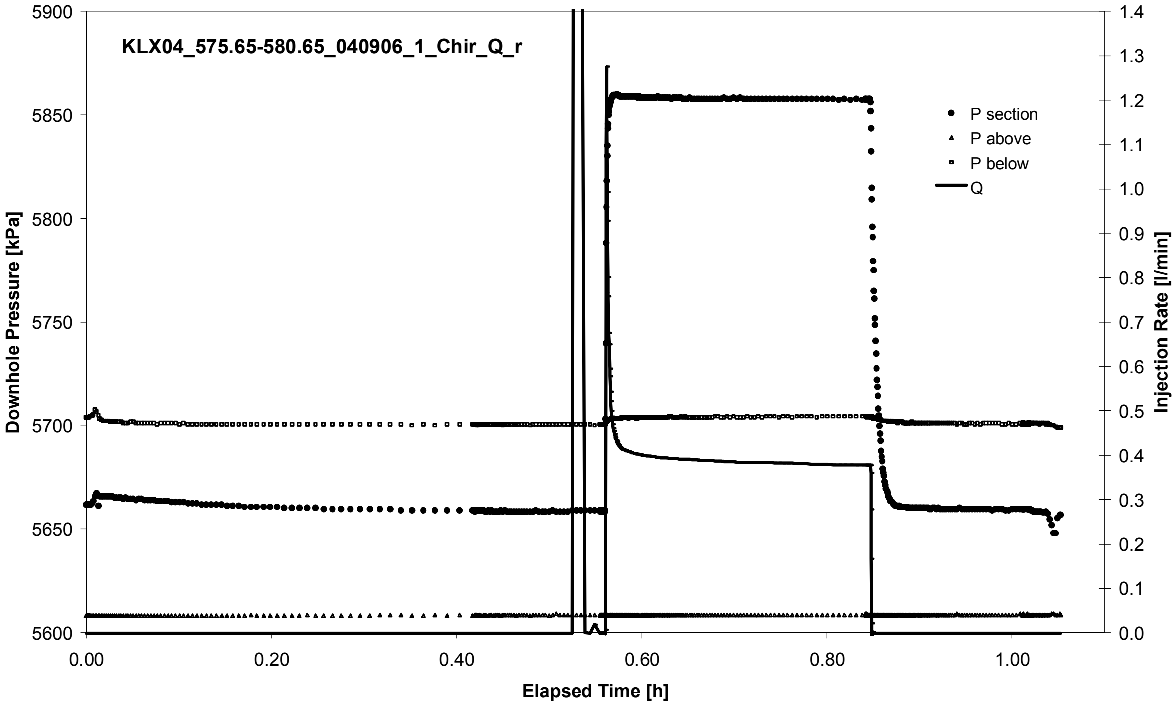


CHIR phase; HORNER match

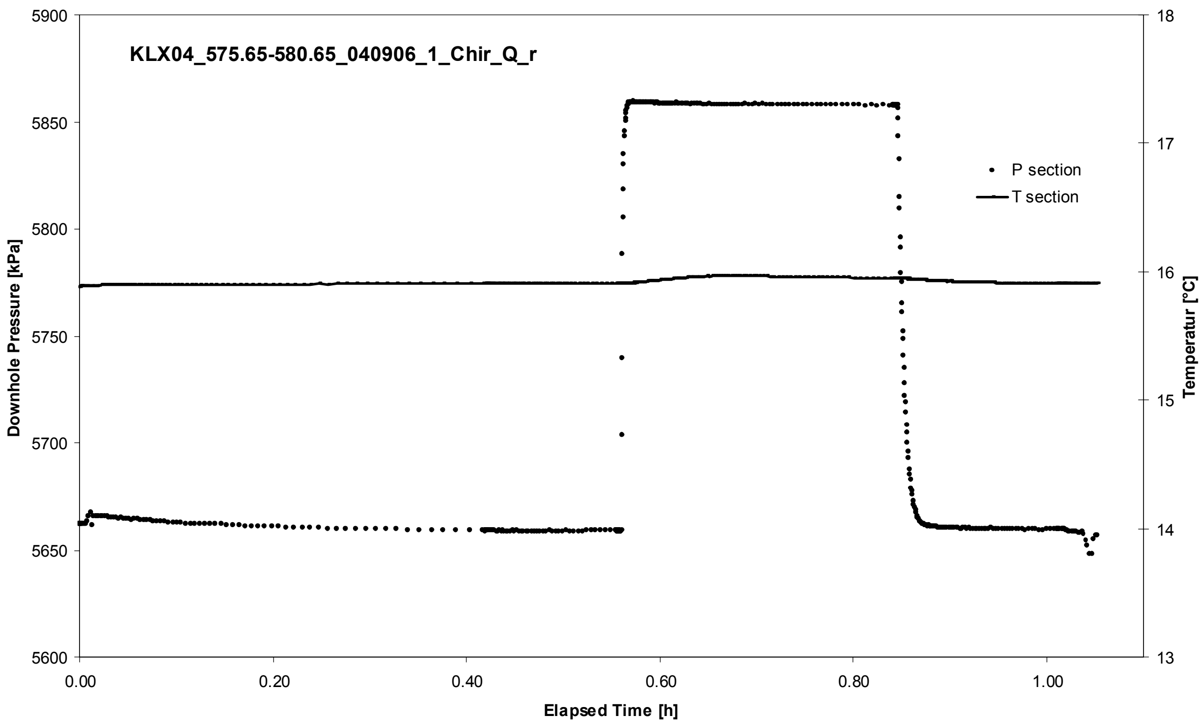
APPENDIX 2-96

Test 575.65 – 580.65 m

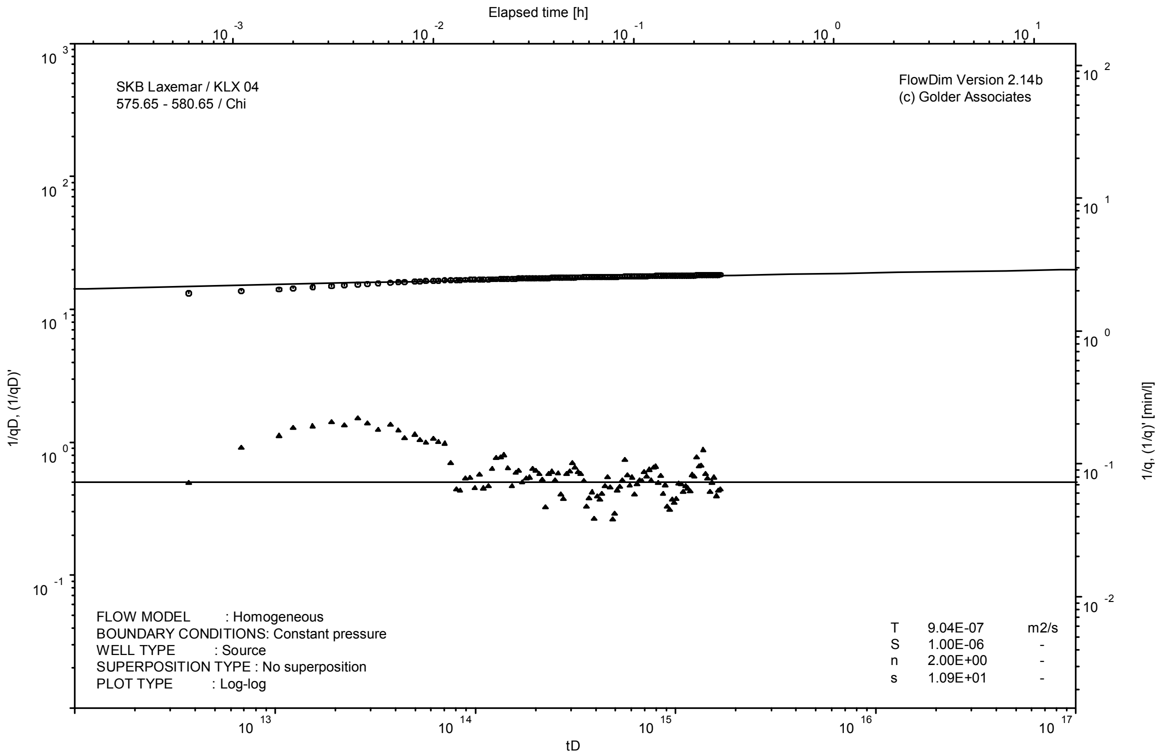
Analysis diagrams



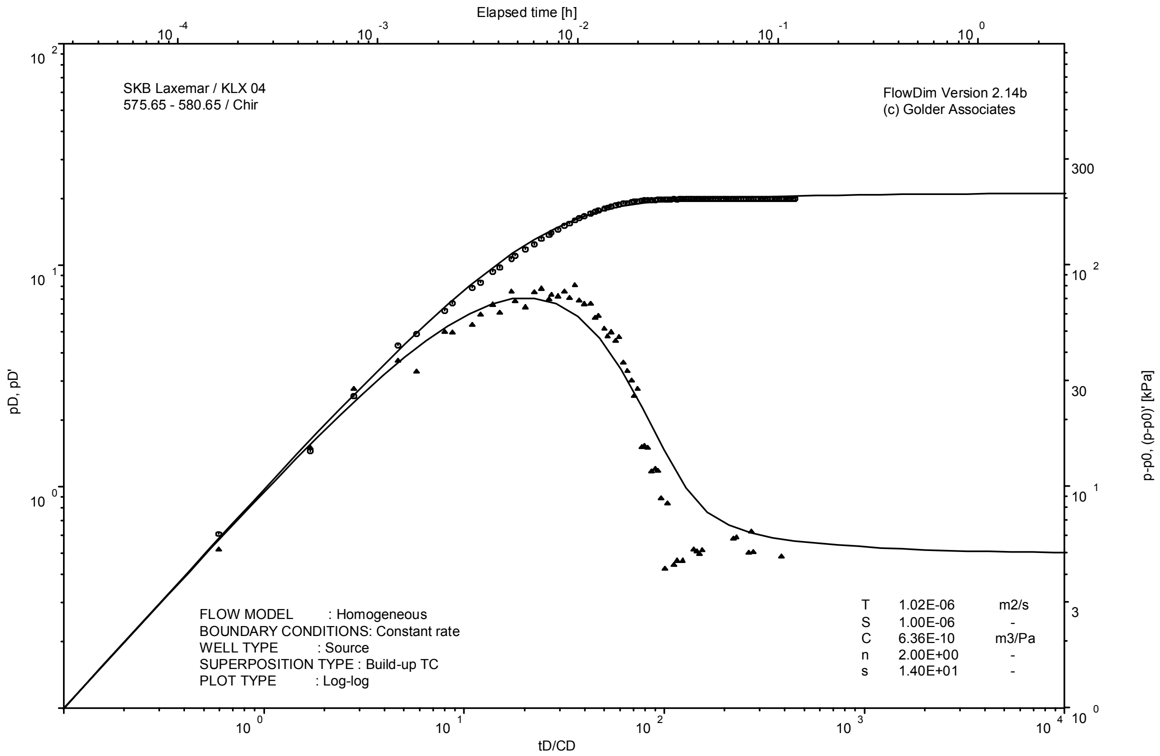
Pressure and flow rate vs. time; cartesian plot



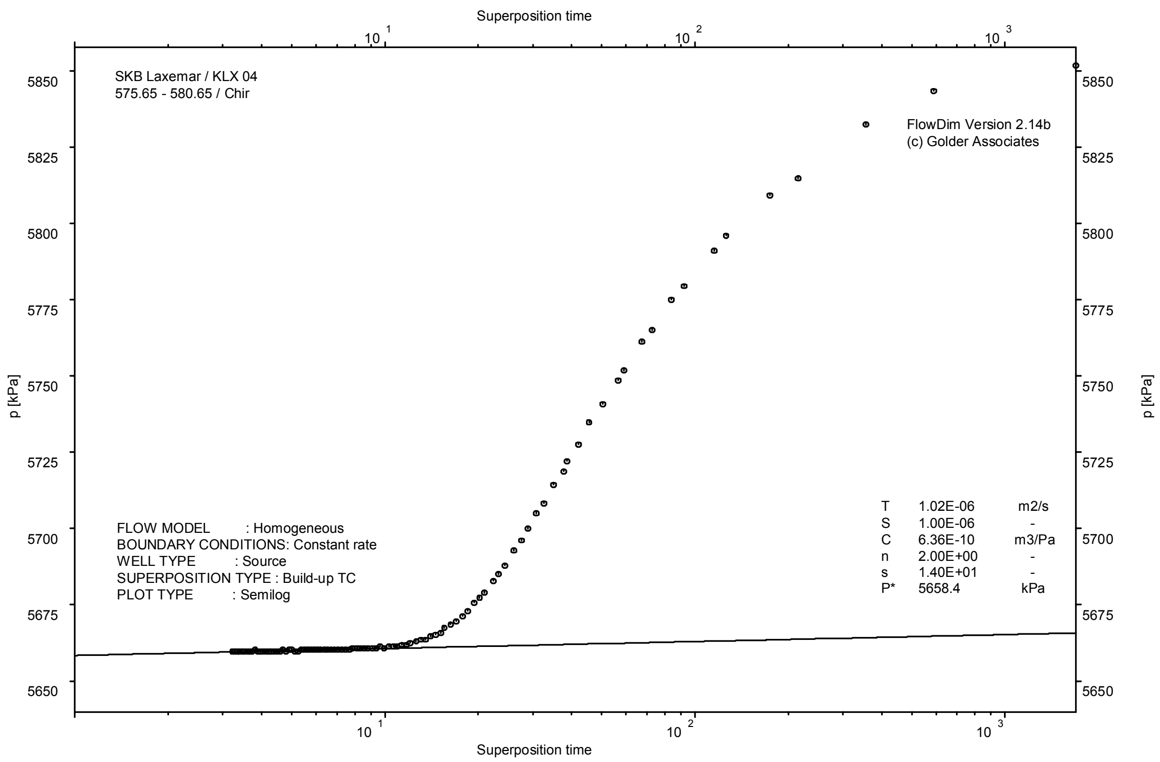
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

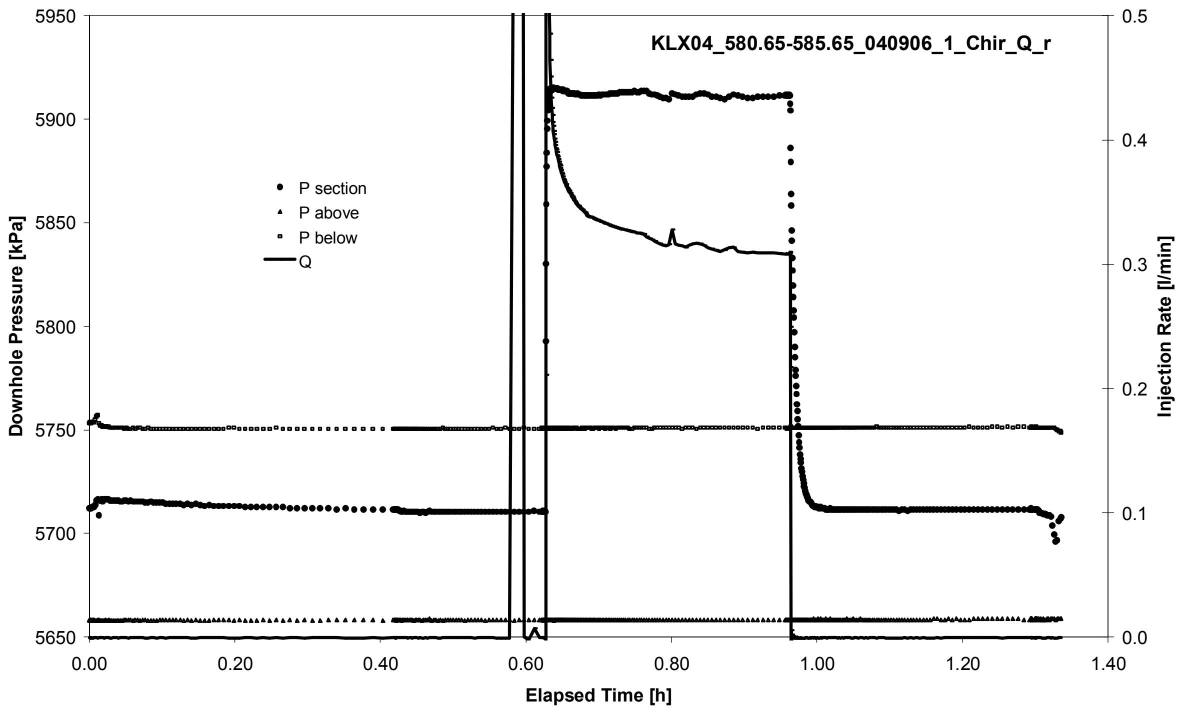


CHIR phase; HORNER match

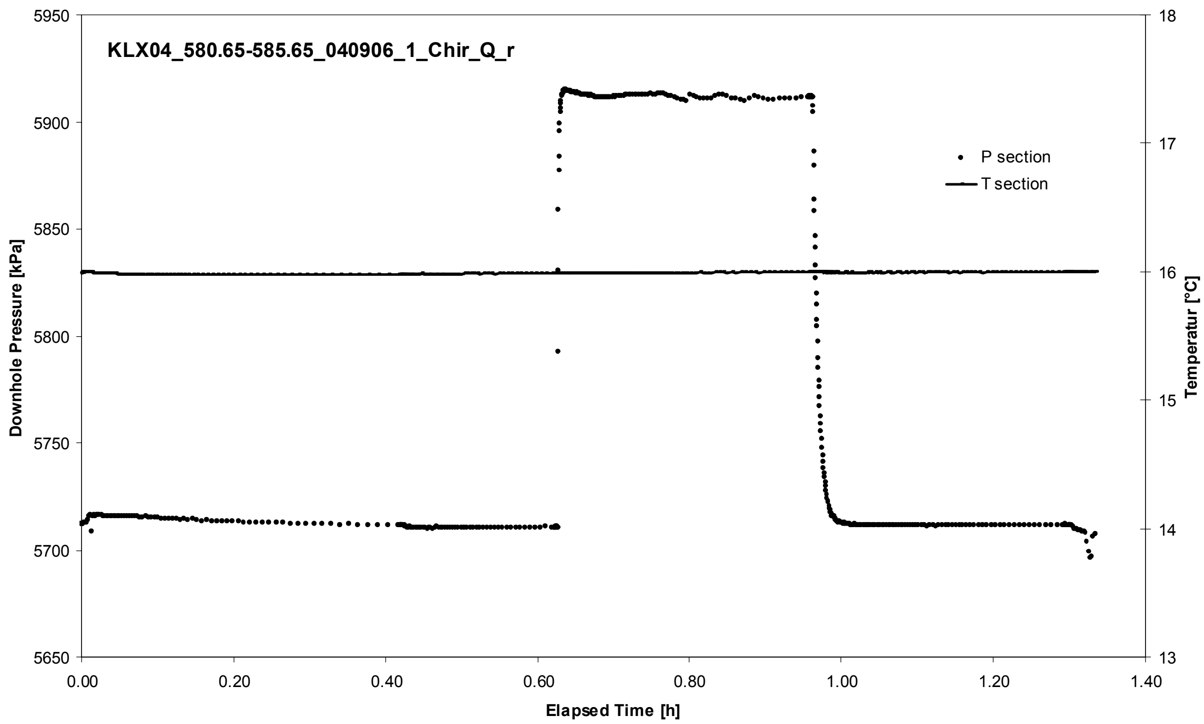
APPENDIX 2-97

Test 580.65 – 585.65 m

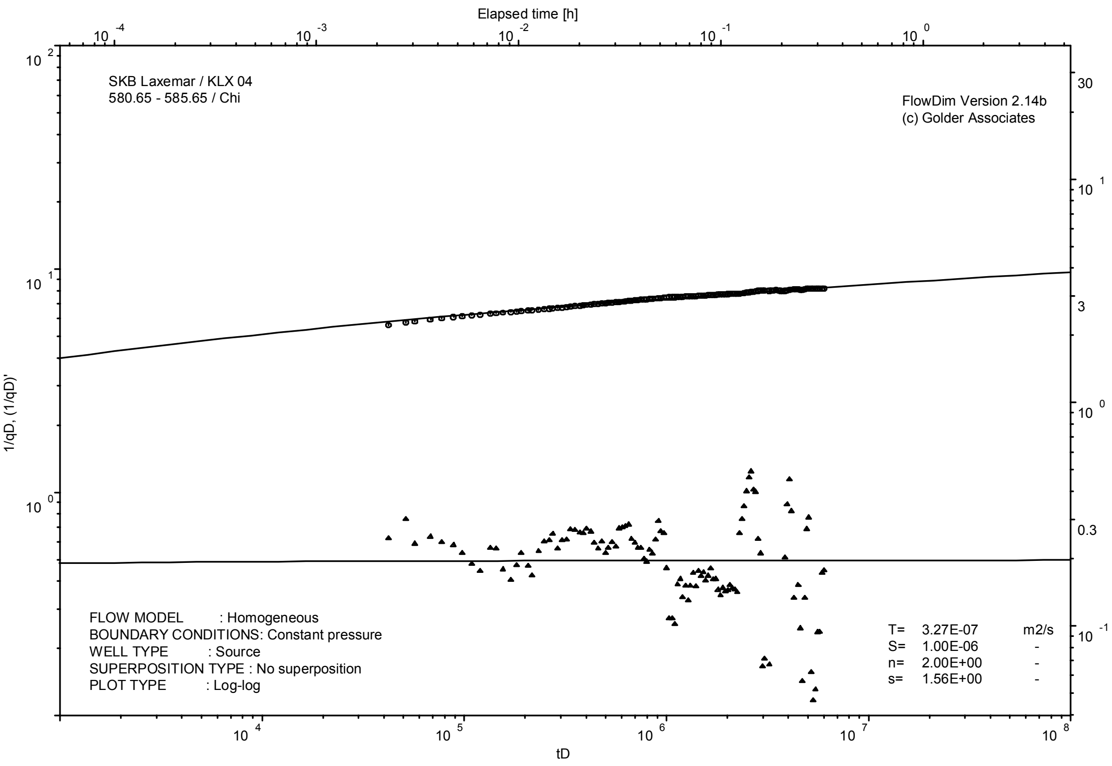
Analysis diagrams



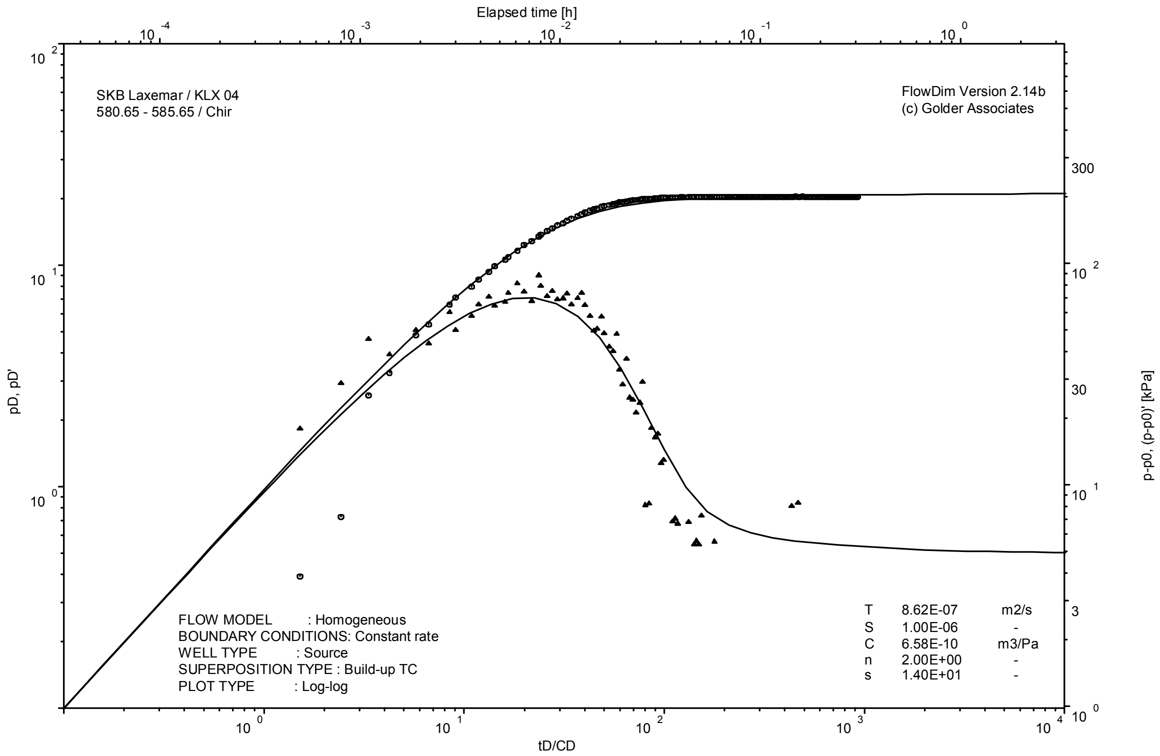
Pressure and flow rate vs. time; cartesian plot



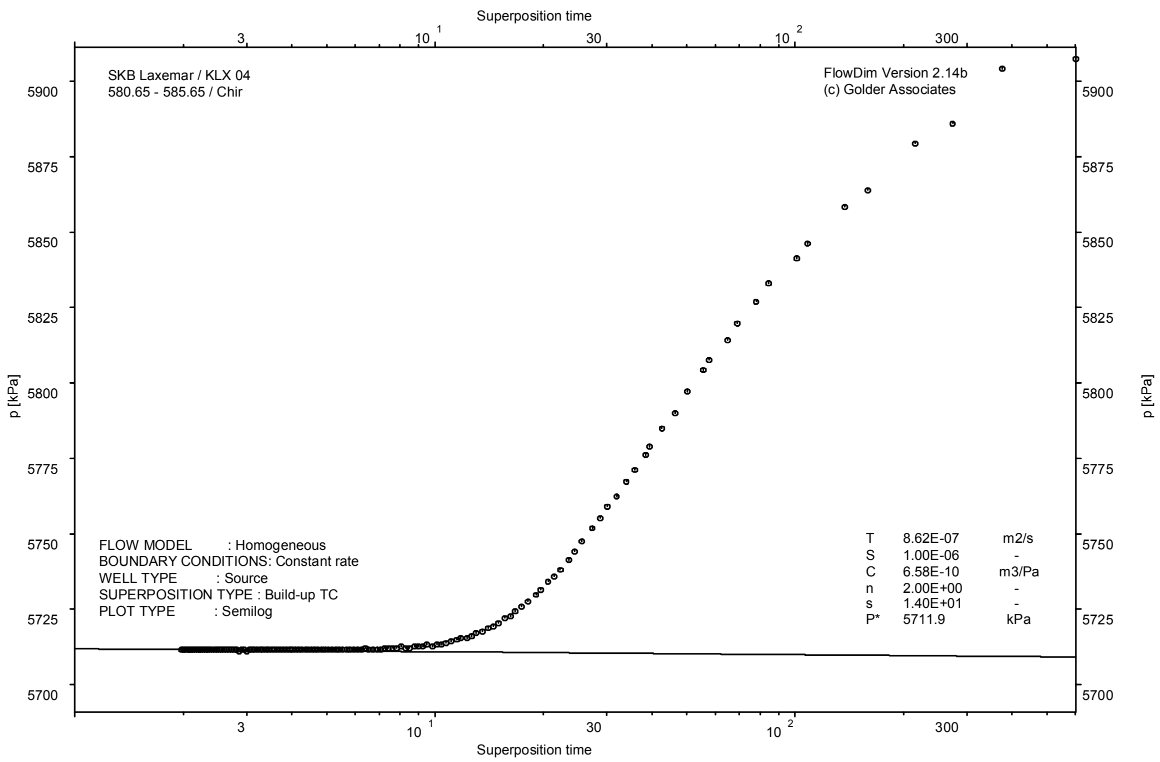
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

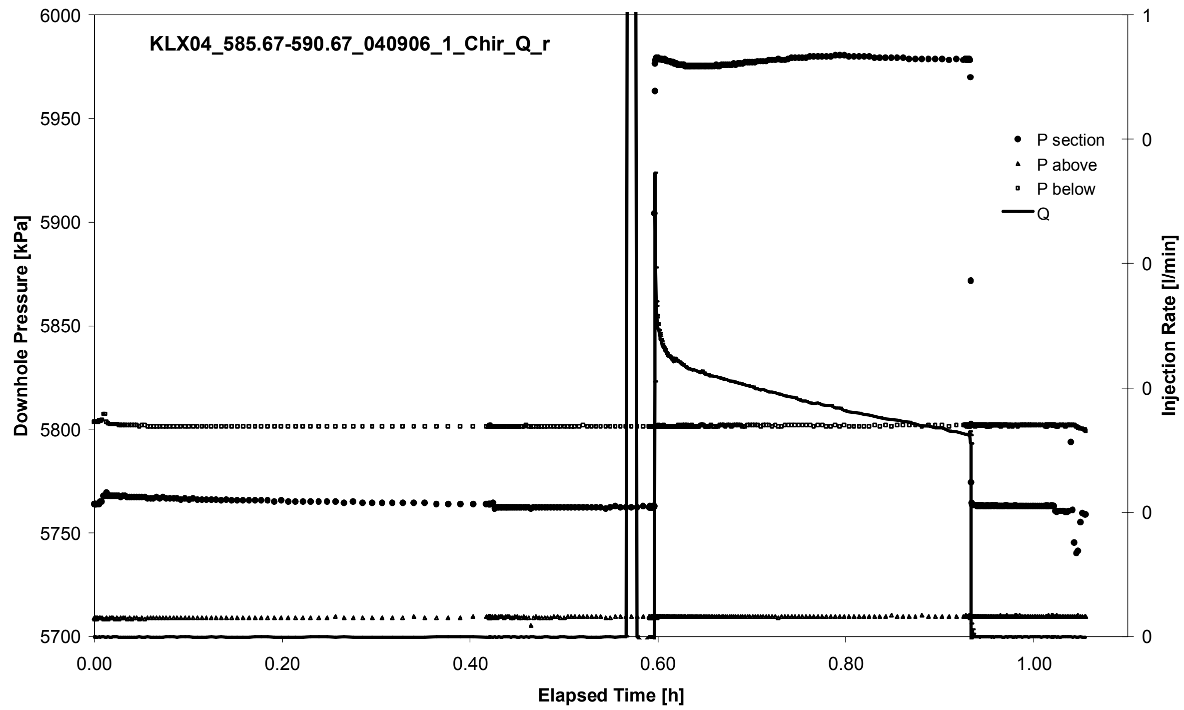


CHIR phase; HORNER match

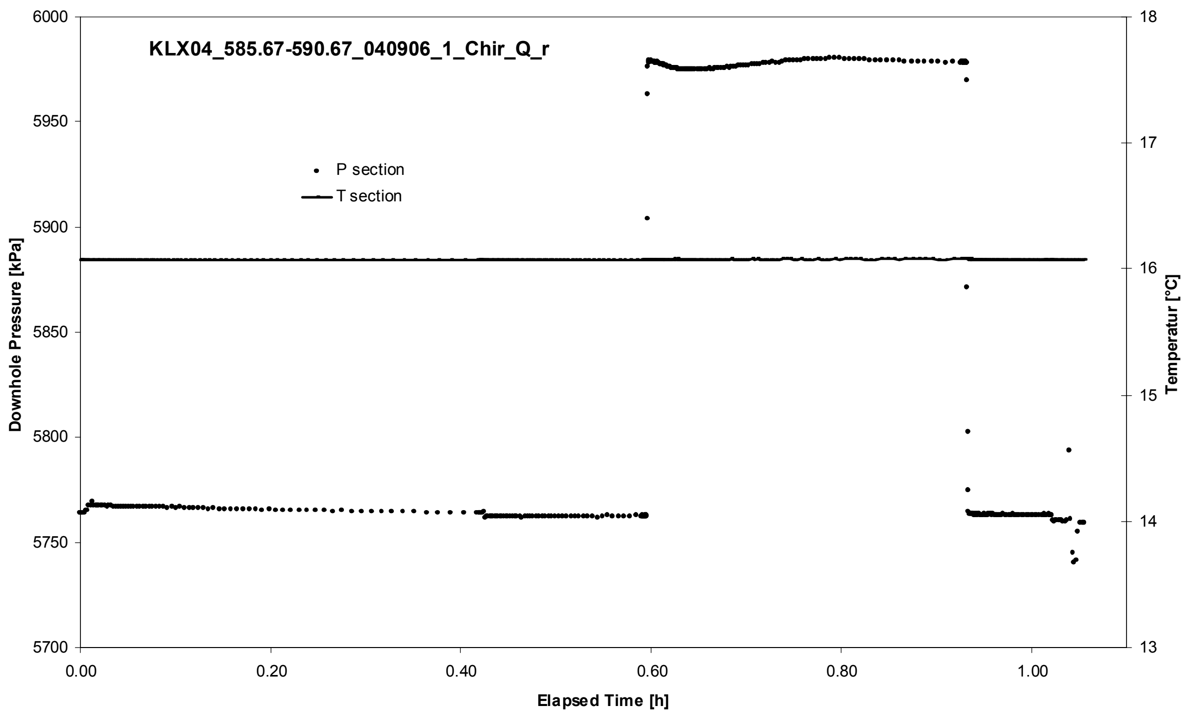
APPENDIX 2-98

Test 585.67 – 590.67 m

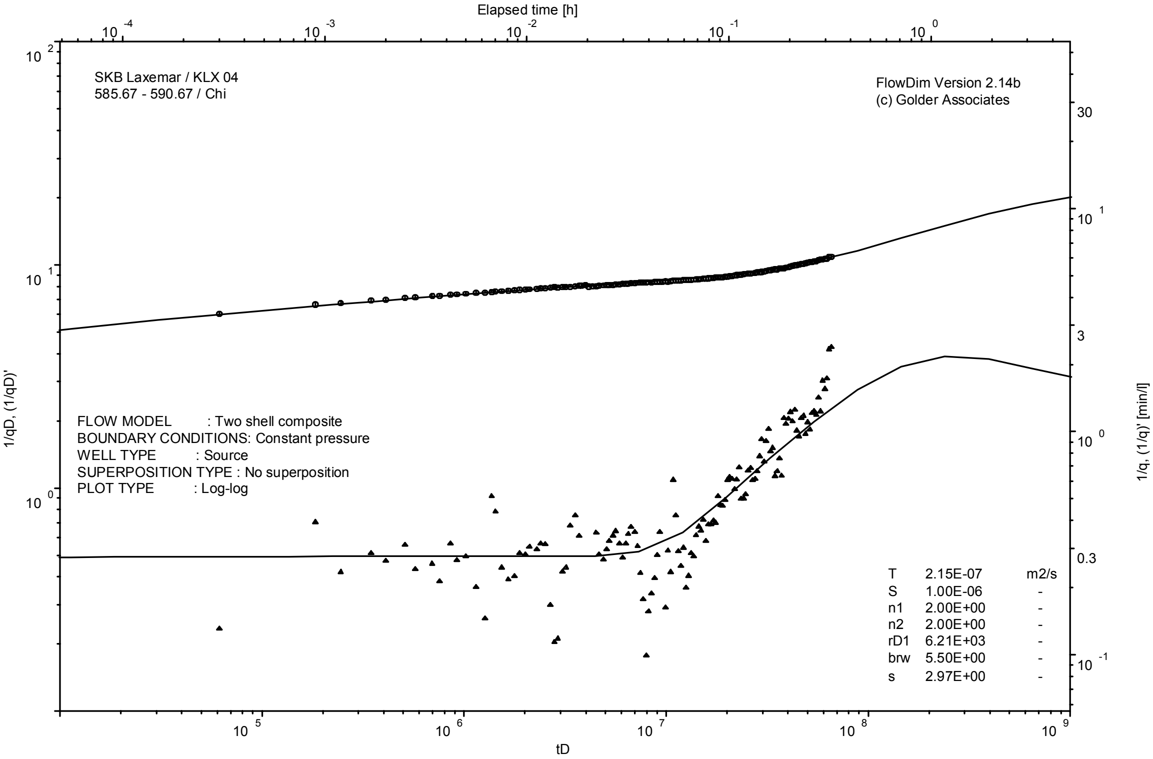
Analysis diagrams



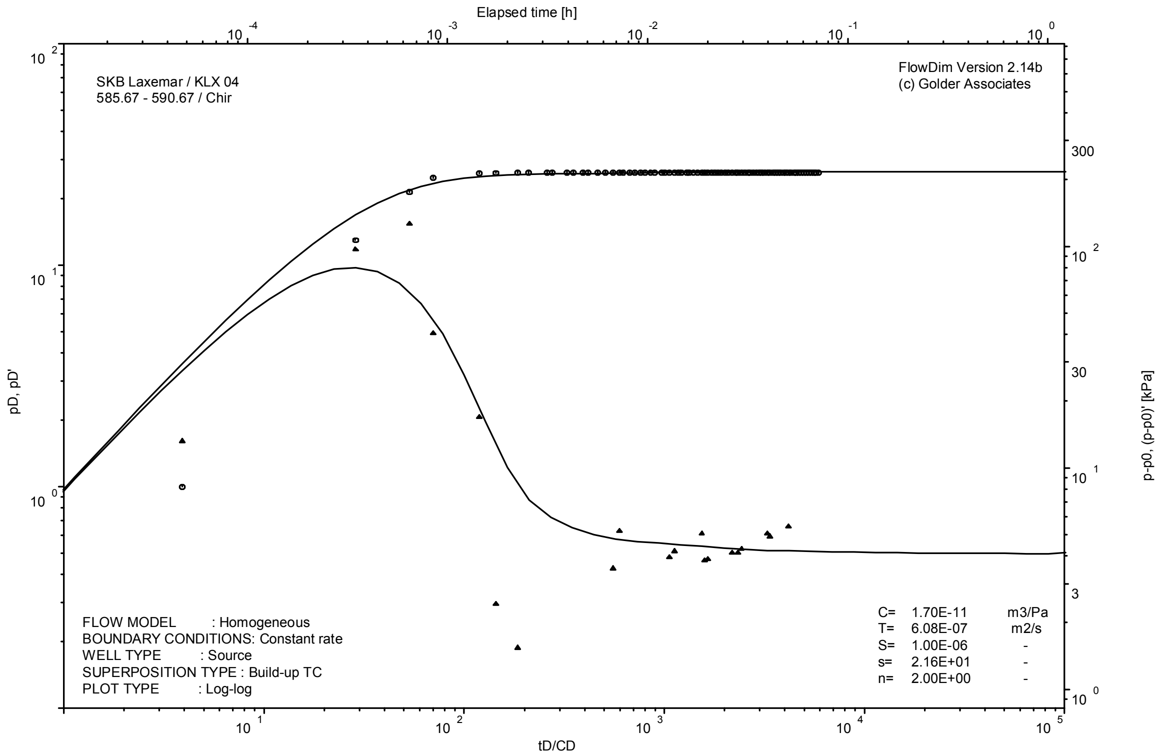
Pressure and flow rate vs. time; cartesian plot



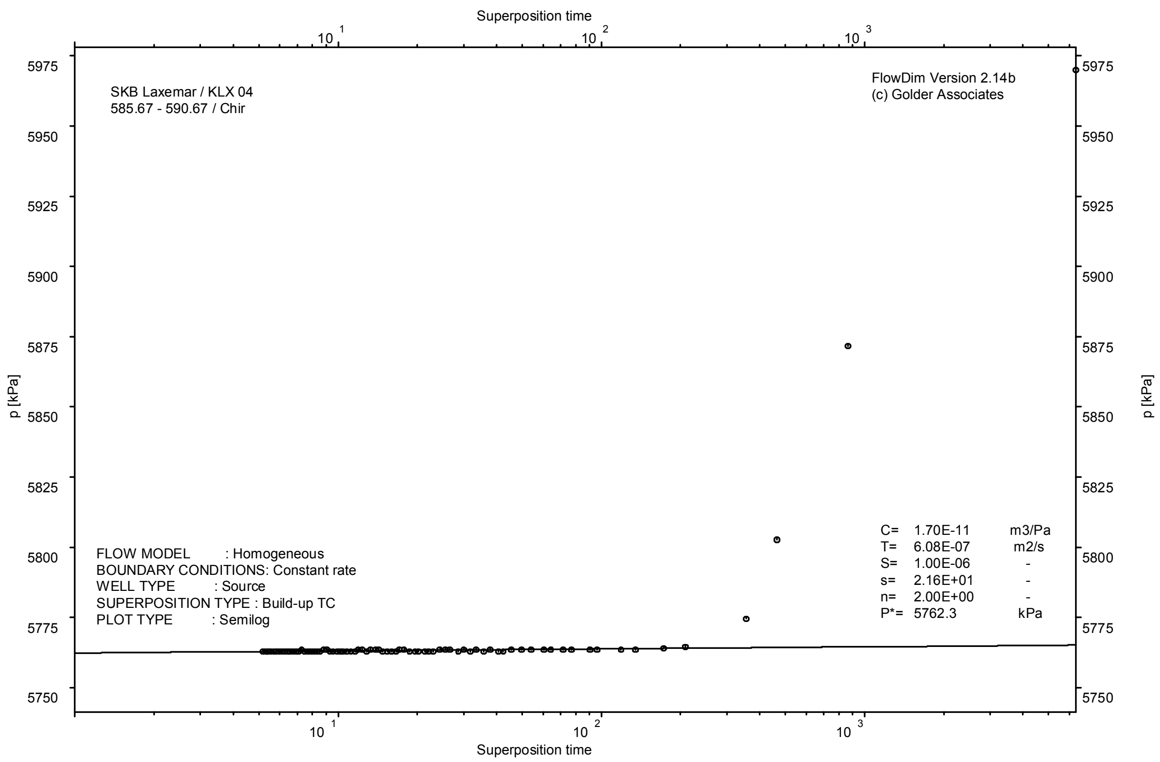
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

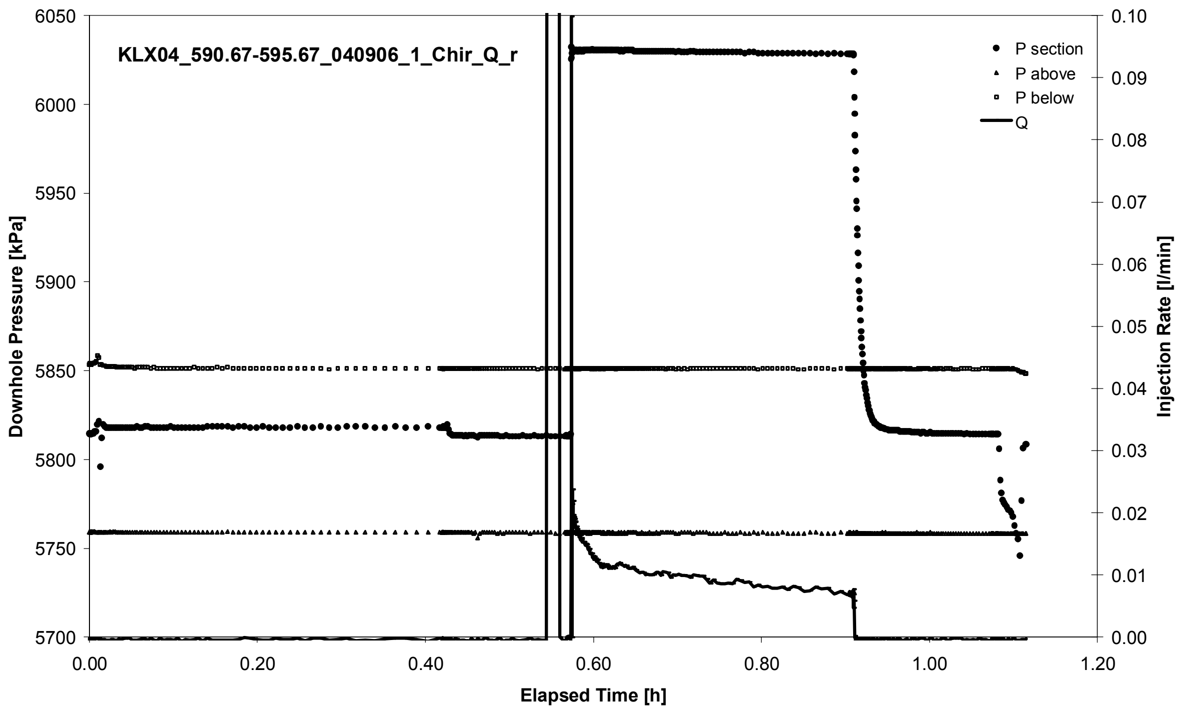


CHIR phase; HORNER match

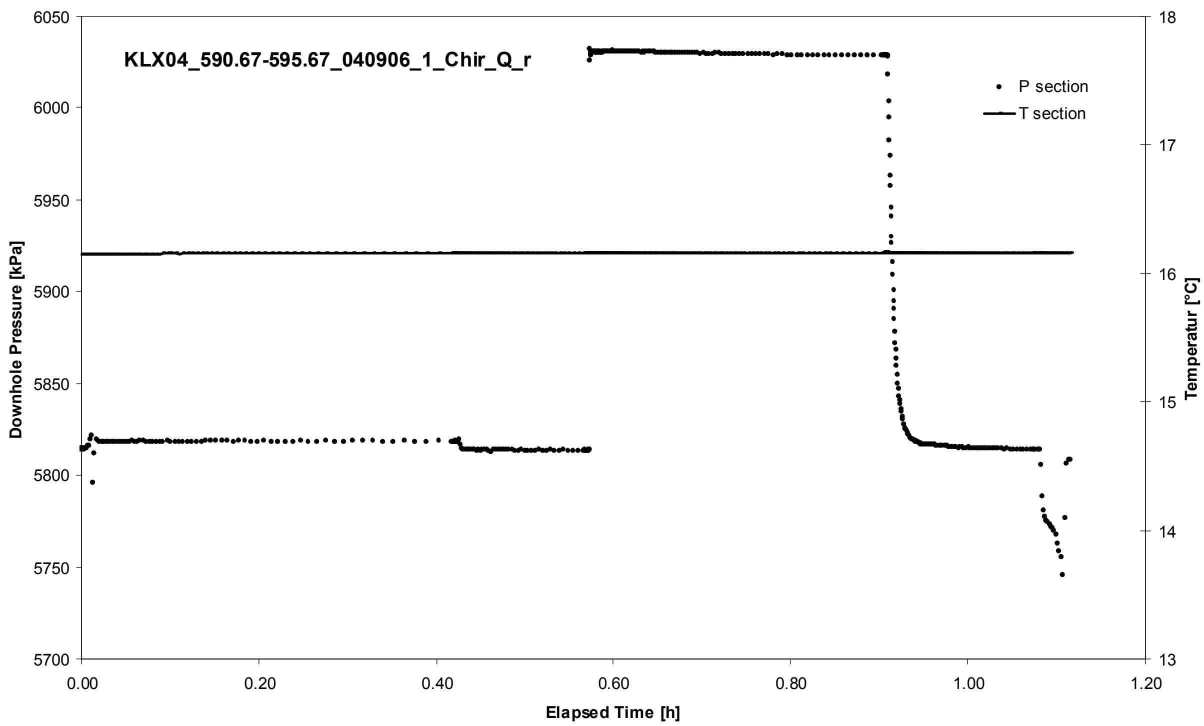
APPENDIX 2-99

Test 590.67 – 595.67 m

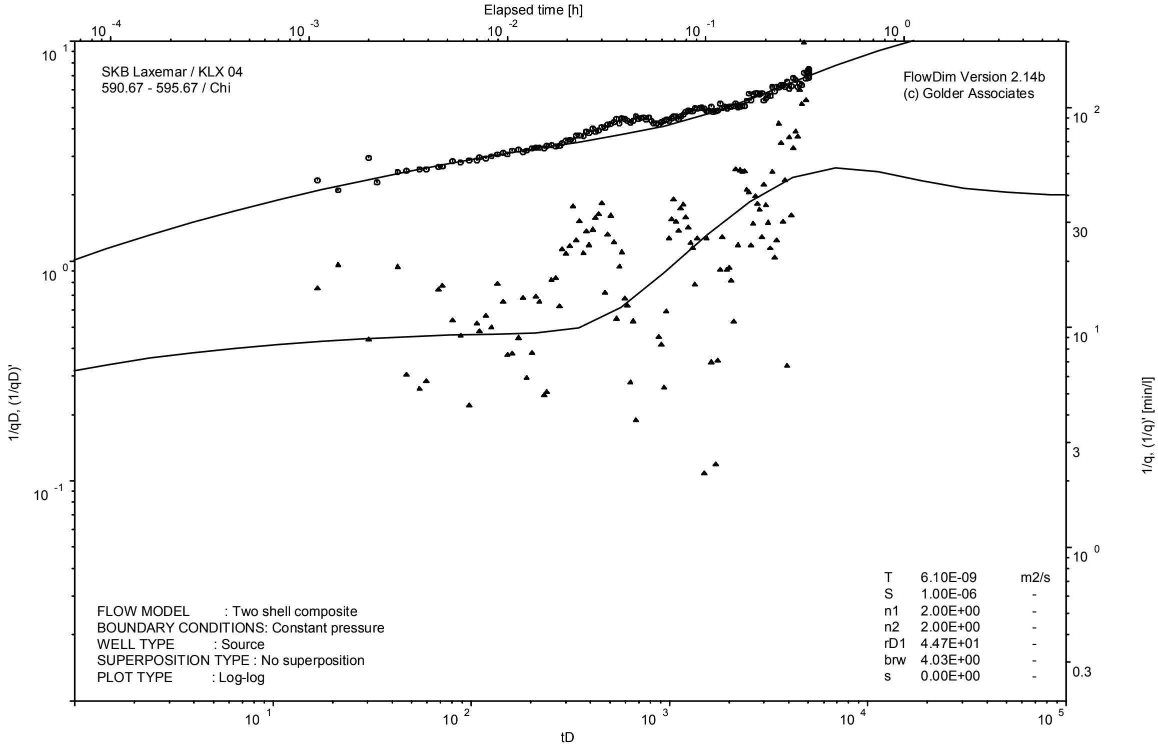
Analysis diagrams



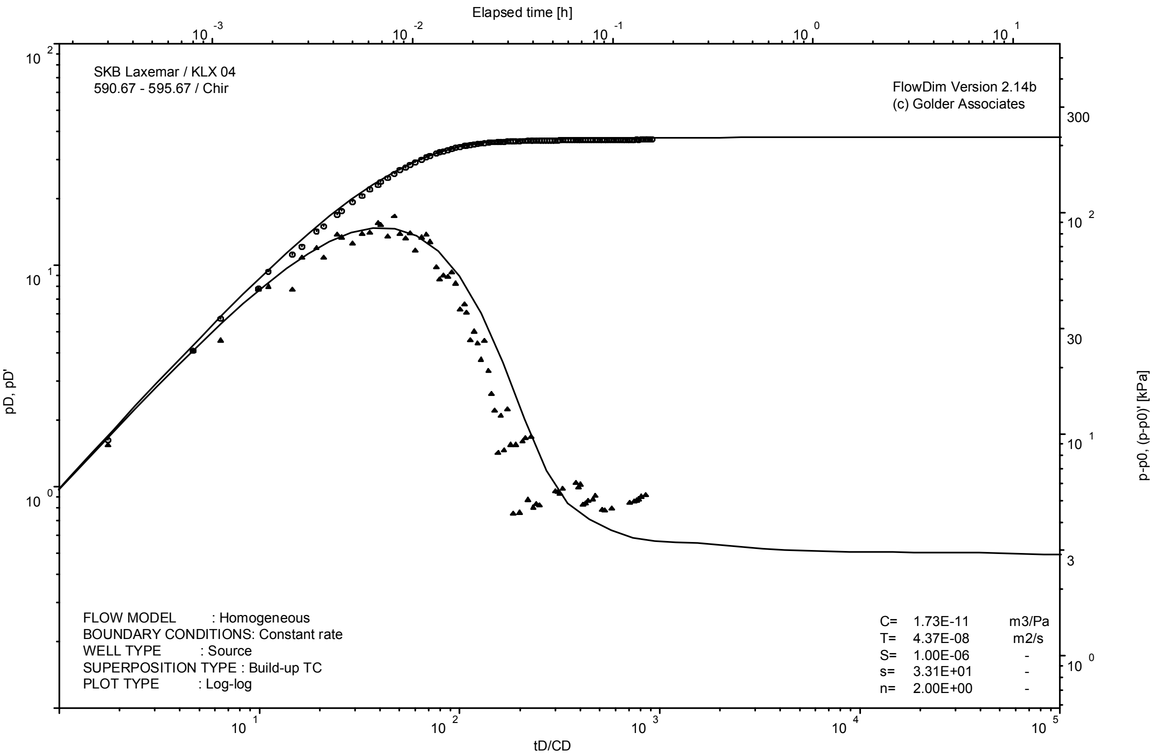
Pressure and flow rate vs. time; cartesian plot



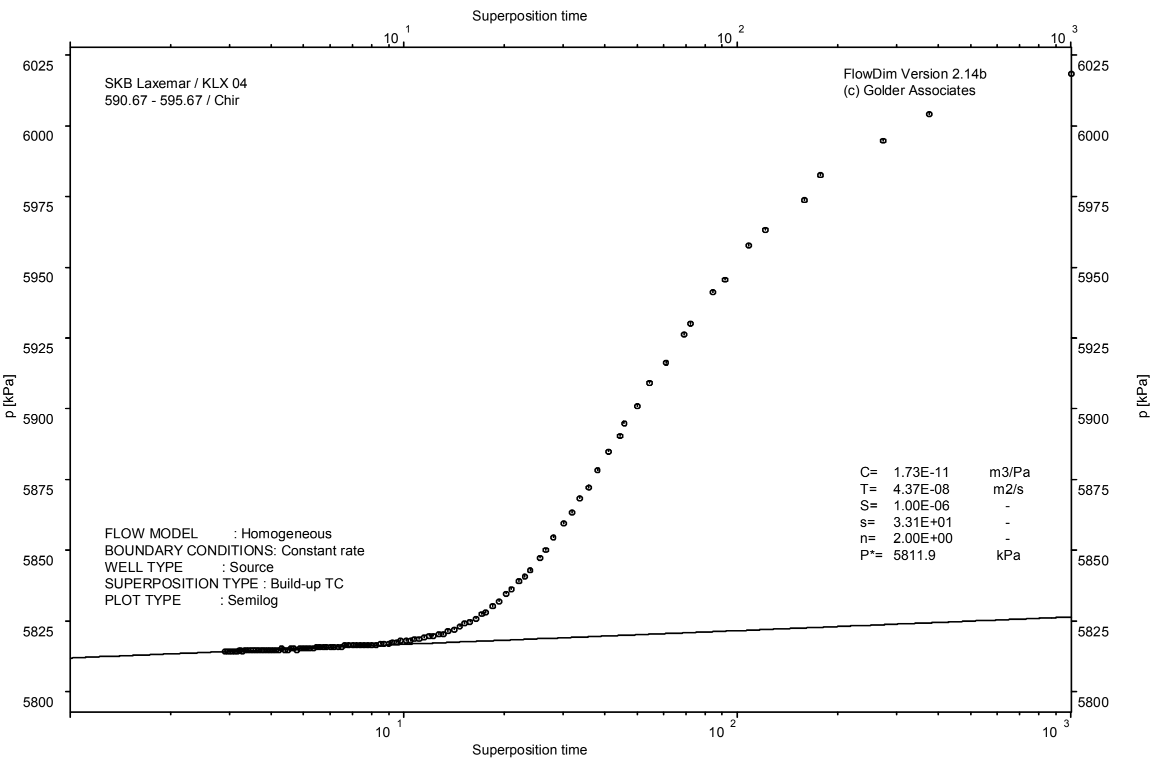
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

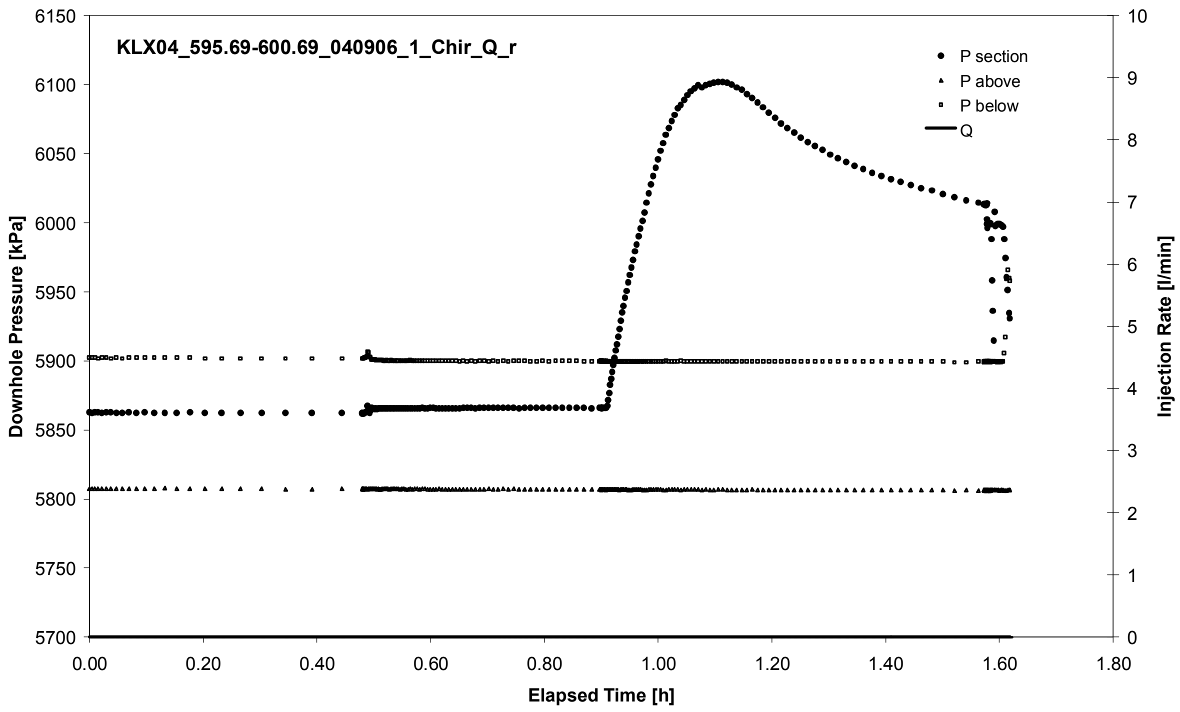


CHIR phase; HORNER match

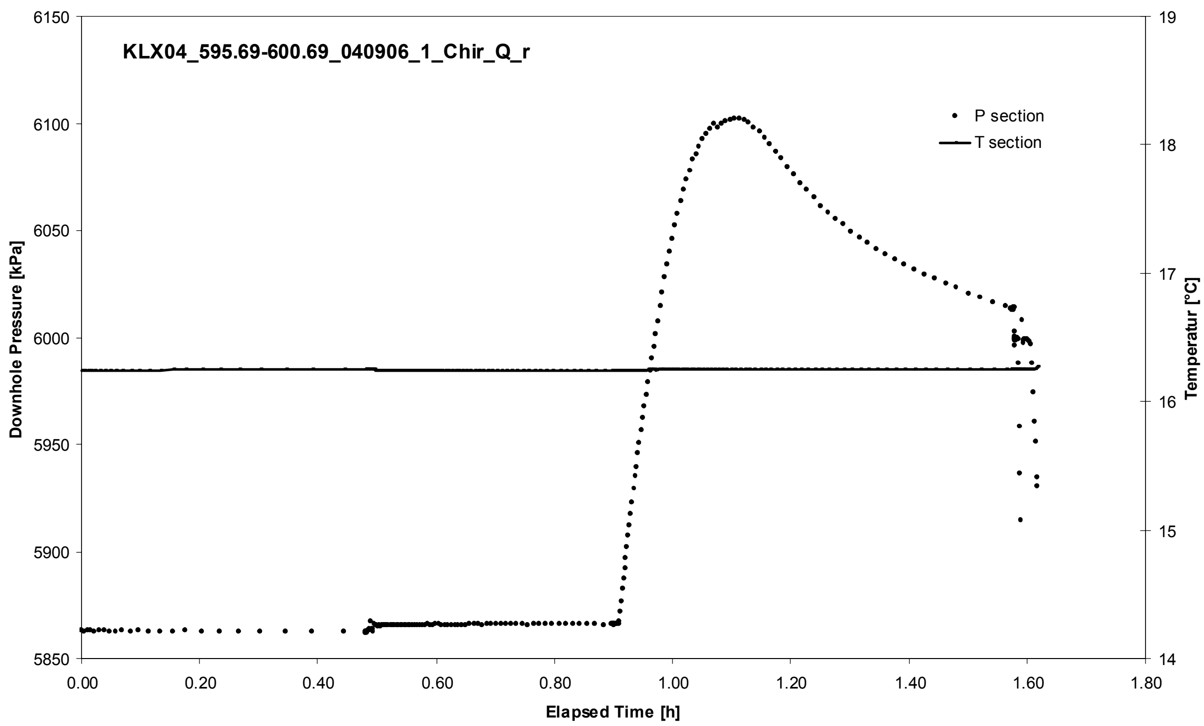
APPENDIX 2-100

Test 595.69 – 600.69 m

Analysis diagrams



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot

Not Analysed

CHI phase; log-log match

Not Analysed

CHIR phase; log-log match

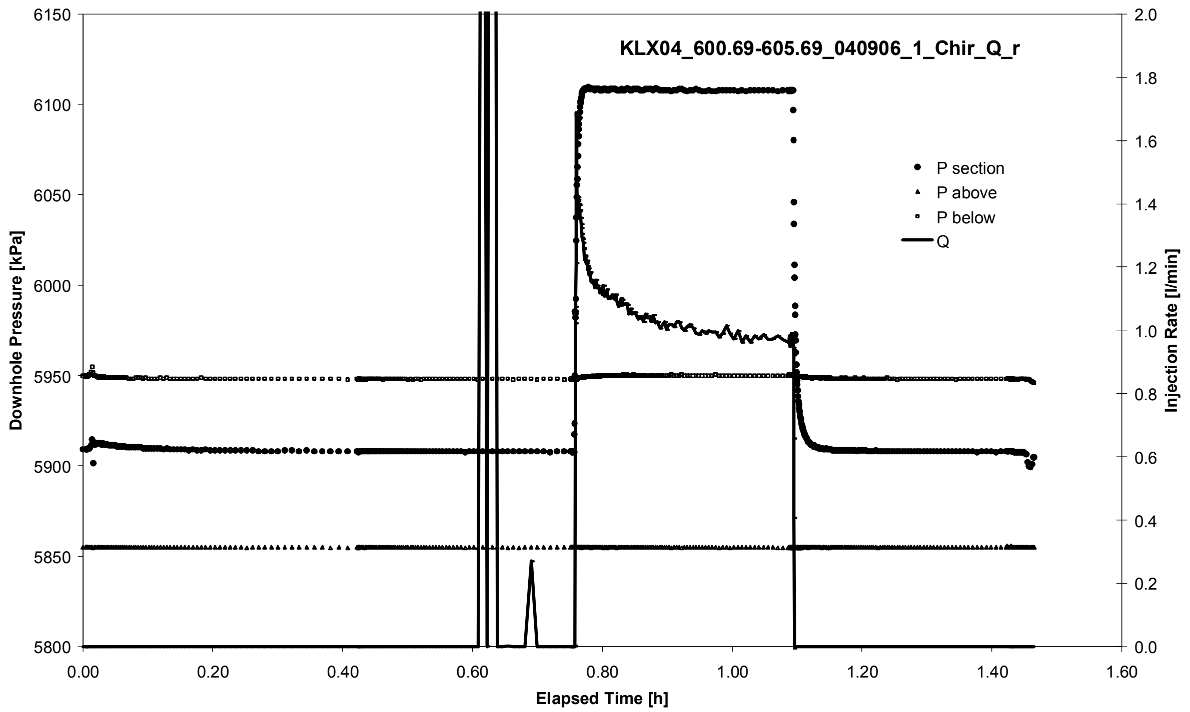
Not Analysed

CHIR phase; HORNER match

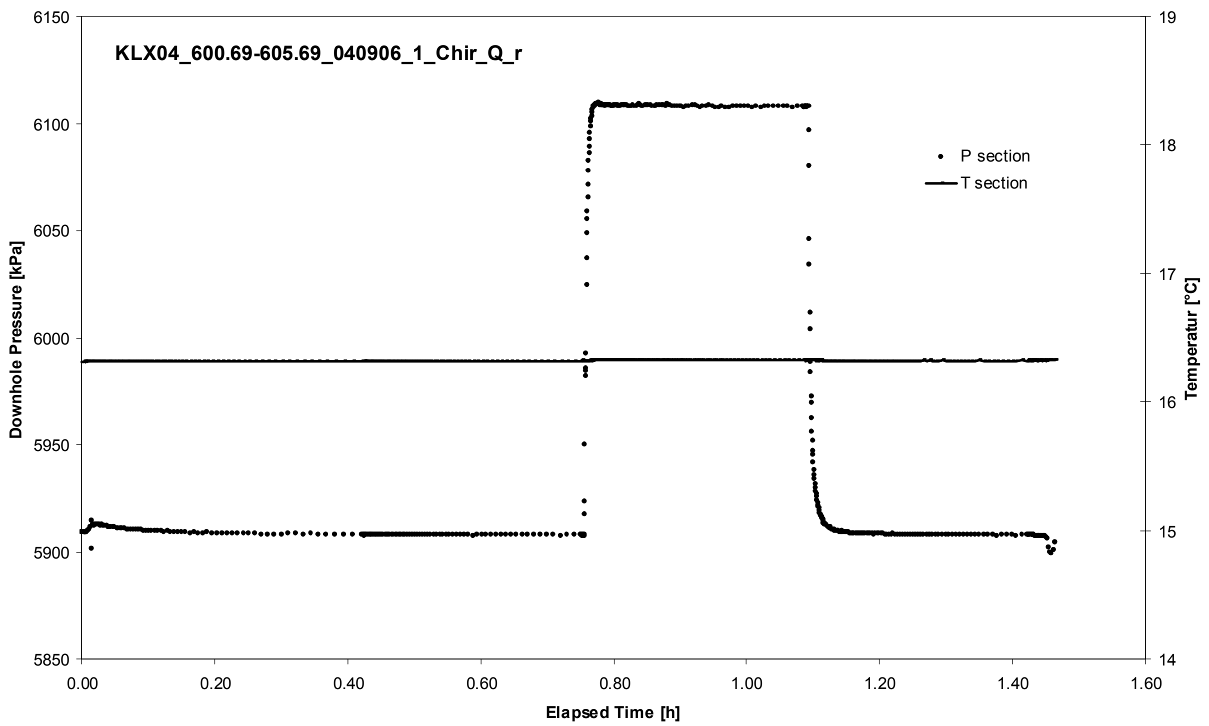
APPENDIX 2-101

Test 600.69 – 605.69 m

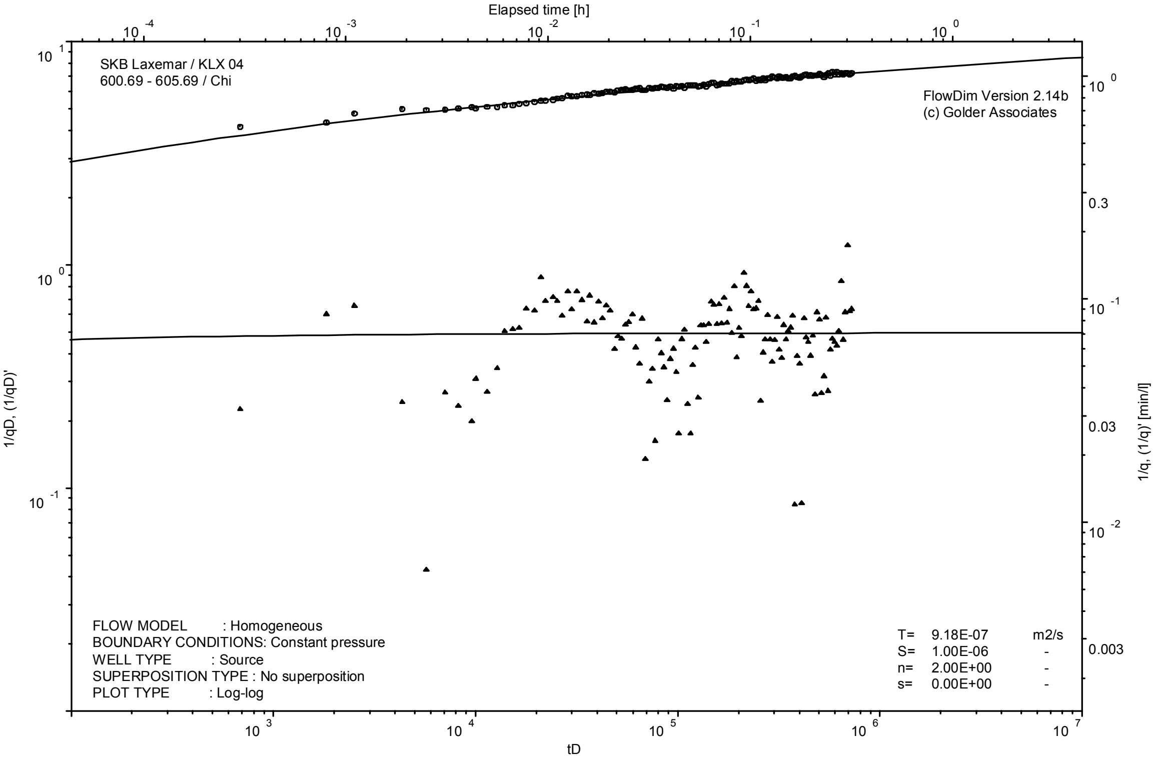
Analysis diagrams



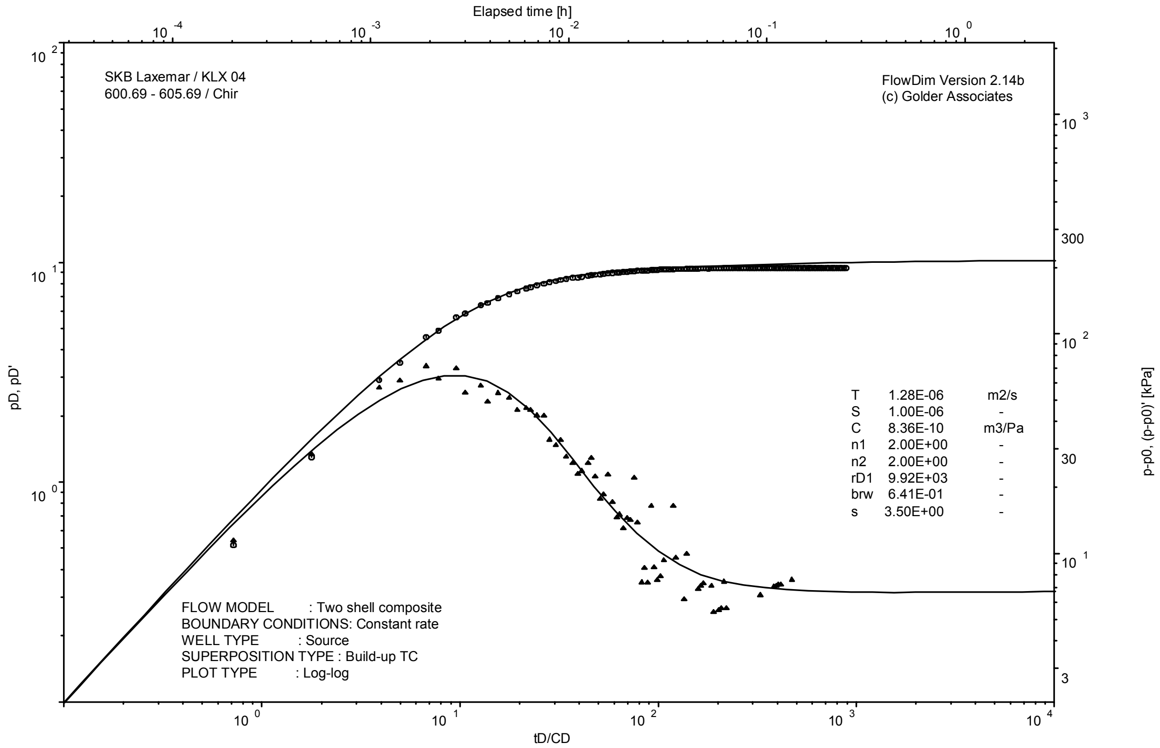
Pressure and flow rate vs. time; cartesian plot



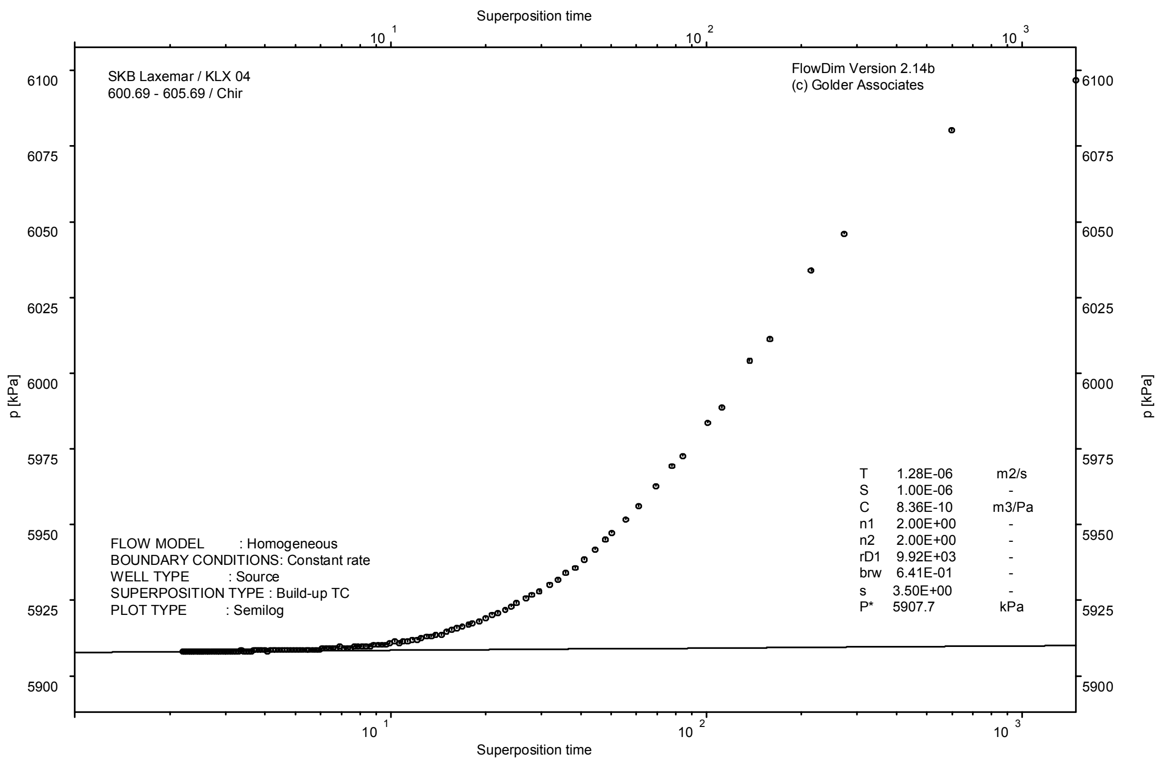
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

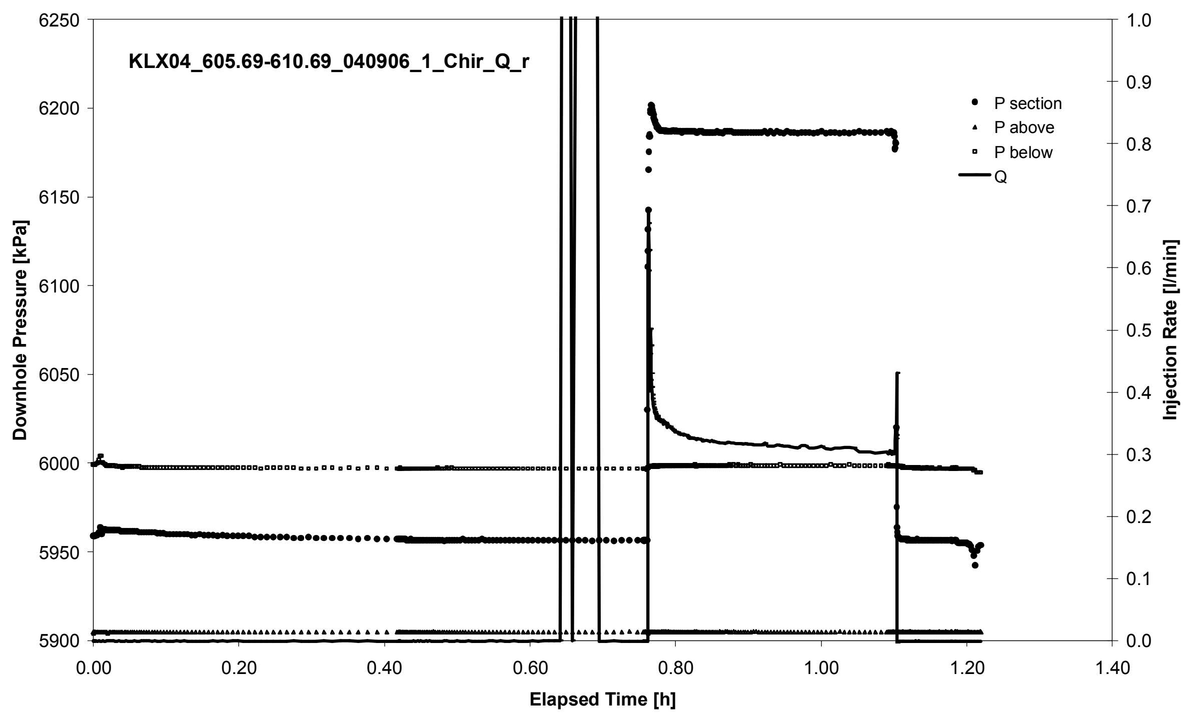


CHIR phase; HORNER match

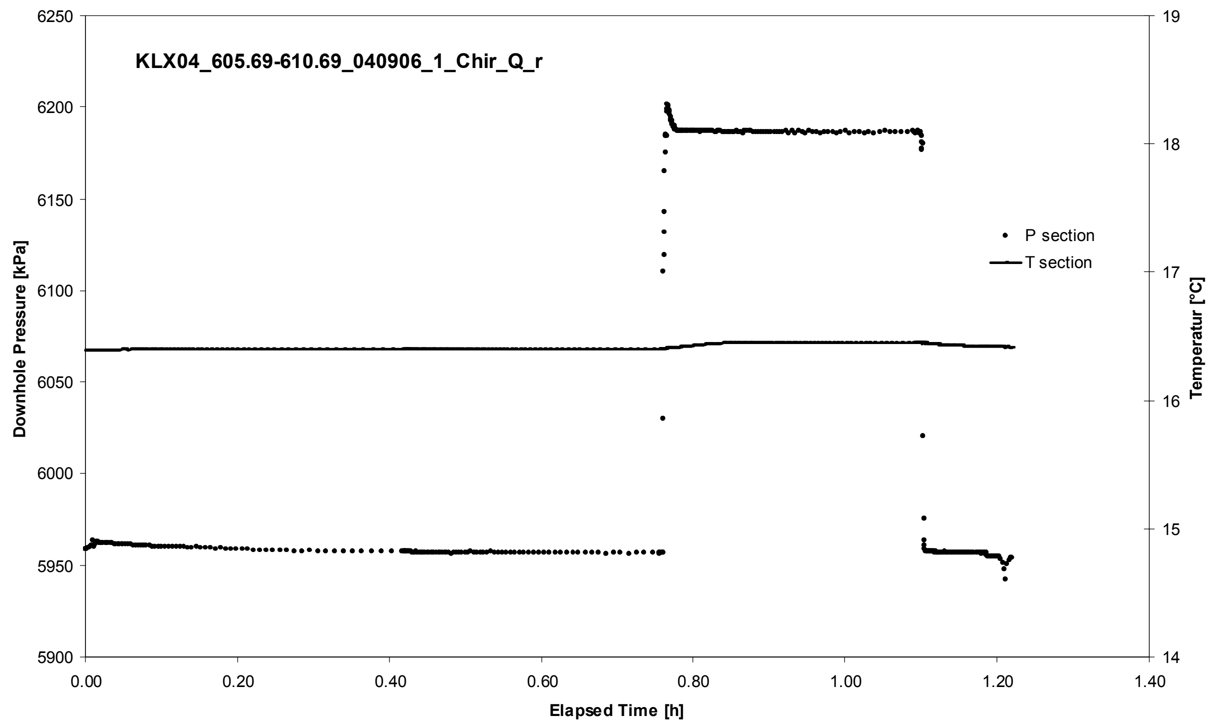
APPENDIX 2-102

Test 605.69 – 610.69 m

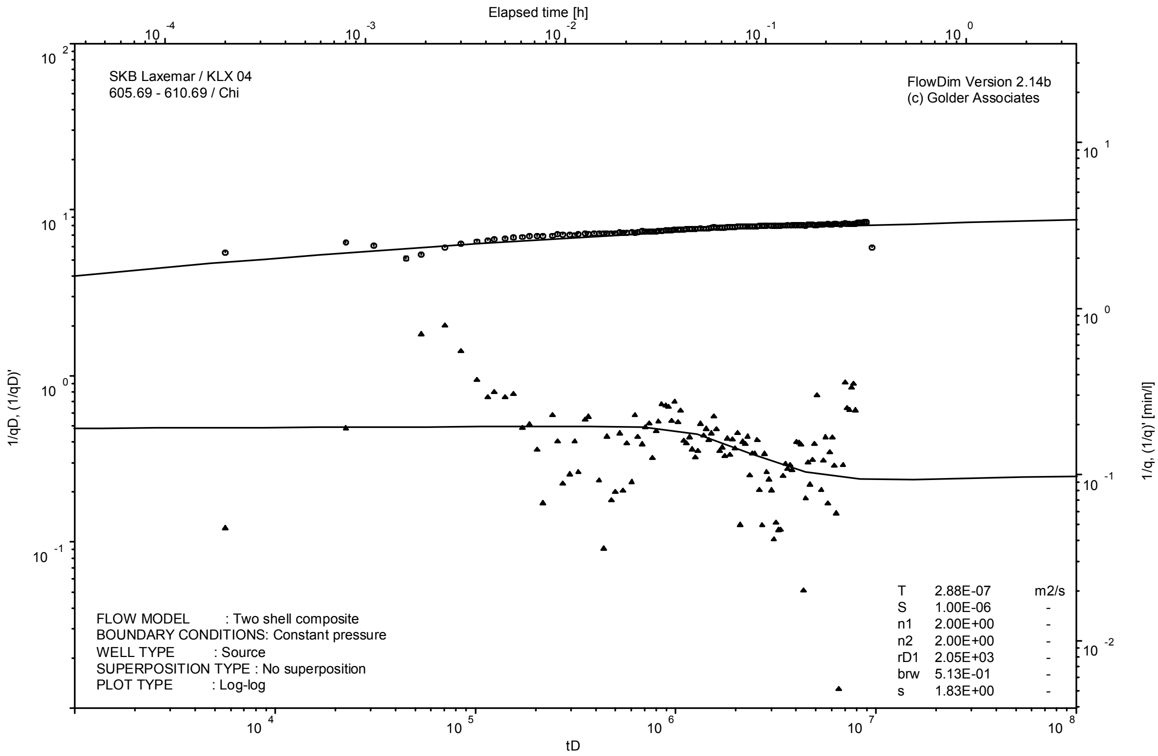
Analysis diagrams



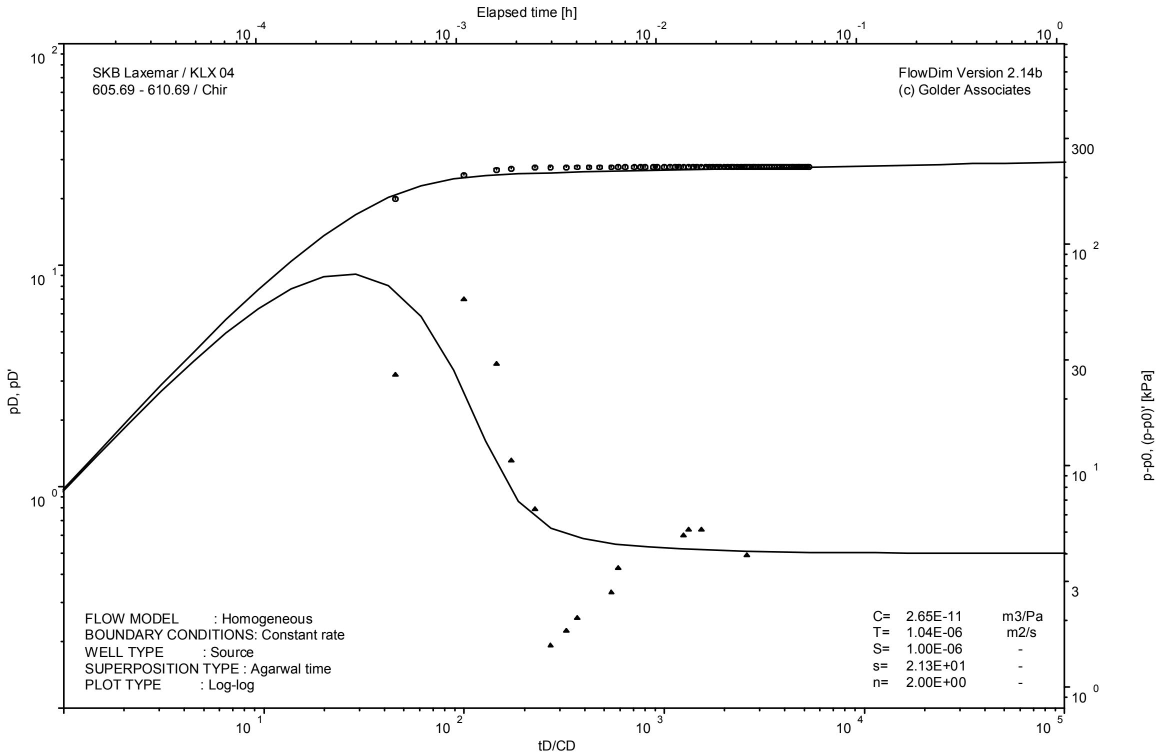
Pressure and flow rate vs. time; cartesian plot



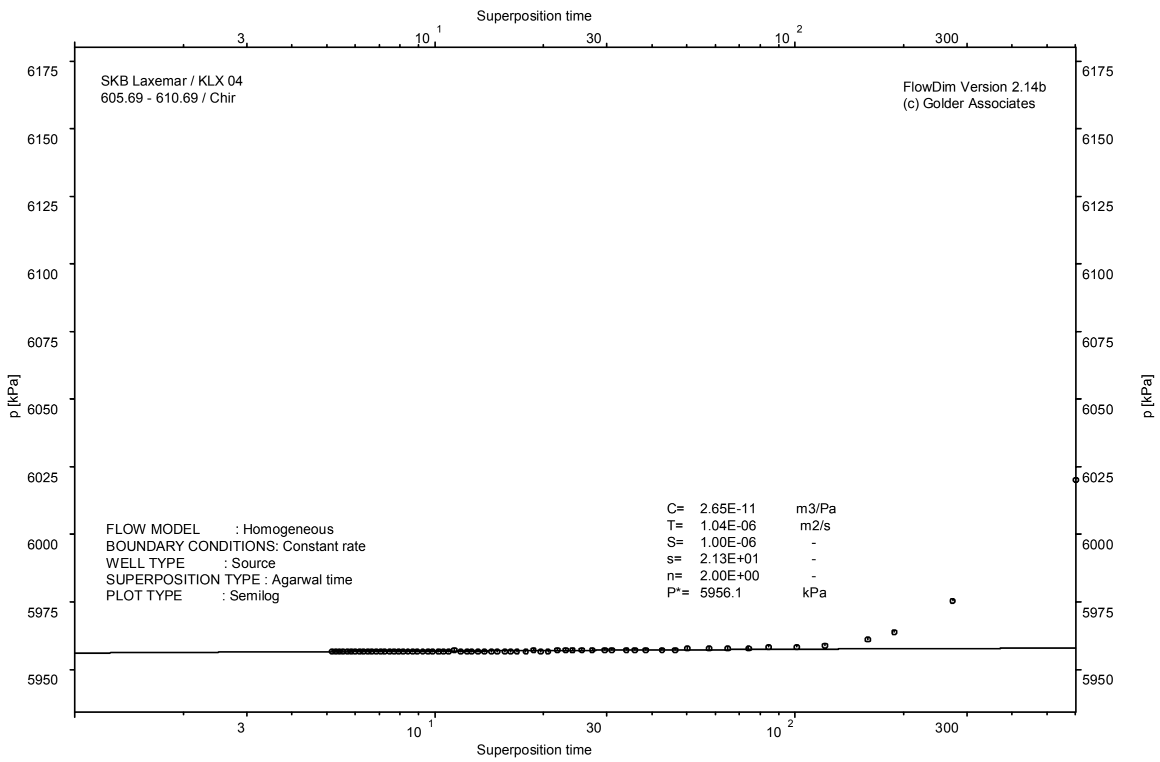
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

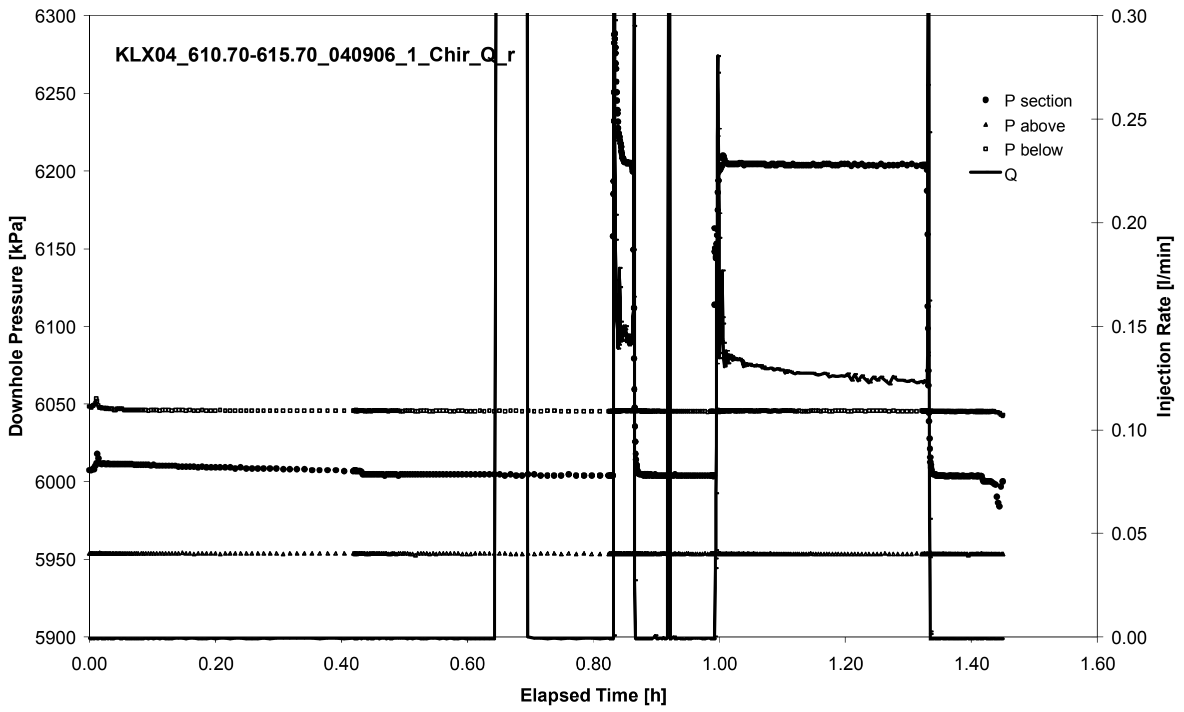


CHIR phase; HORNER match

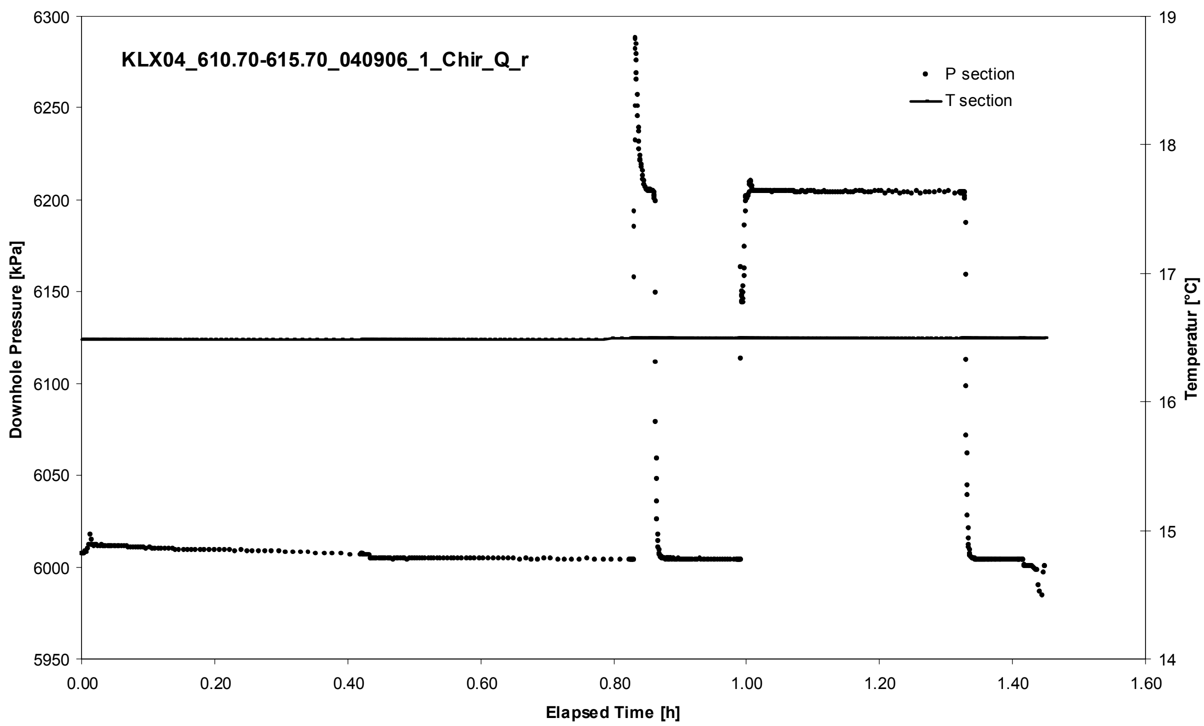
APPENDIX 2-103

Test 610.70 – 615.70 m

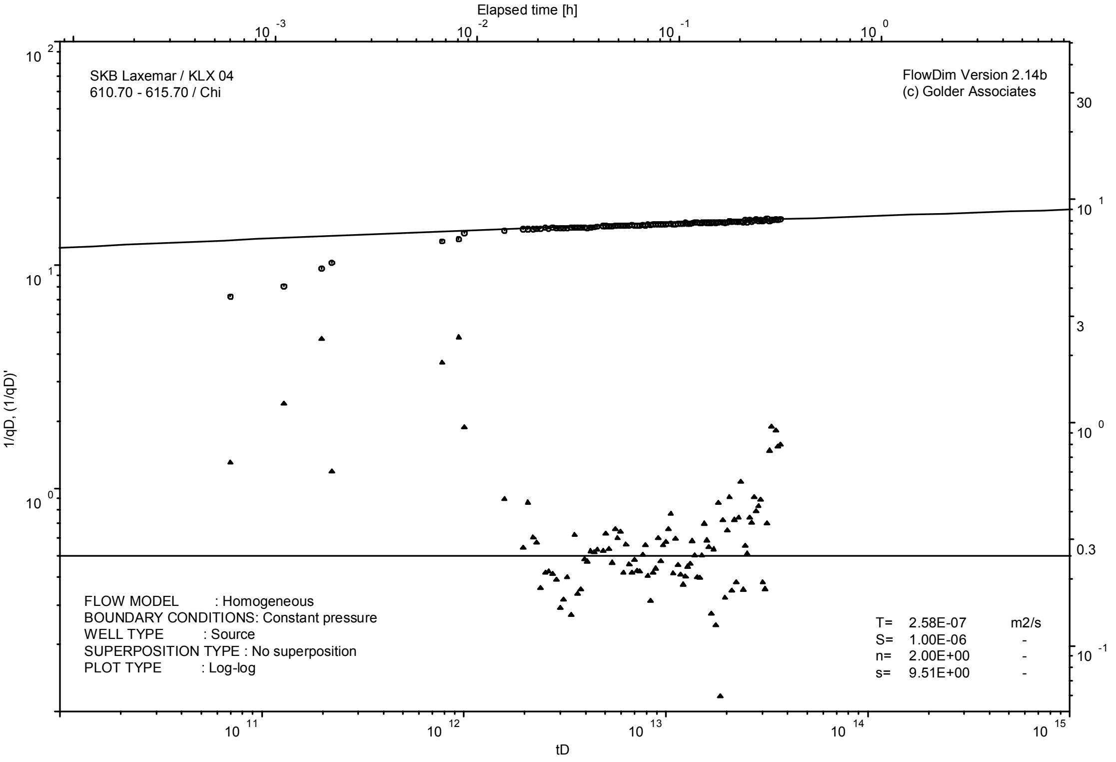
Analysis diagrams



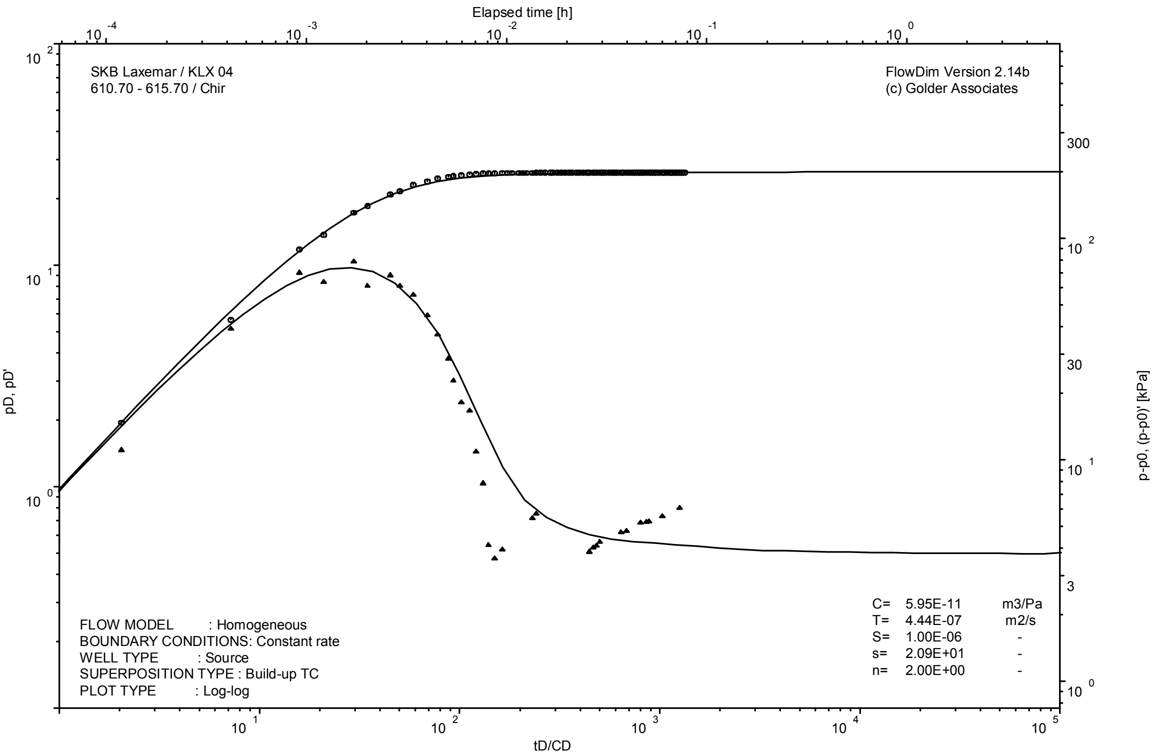
Pressure and flow rate vs. time; cartesian plot



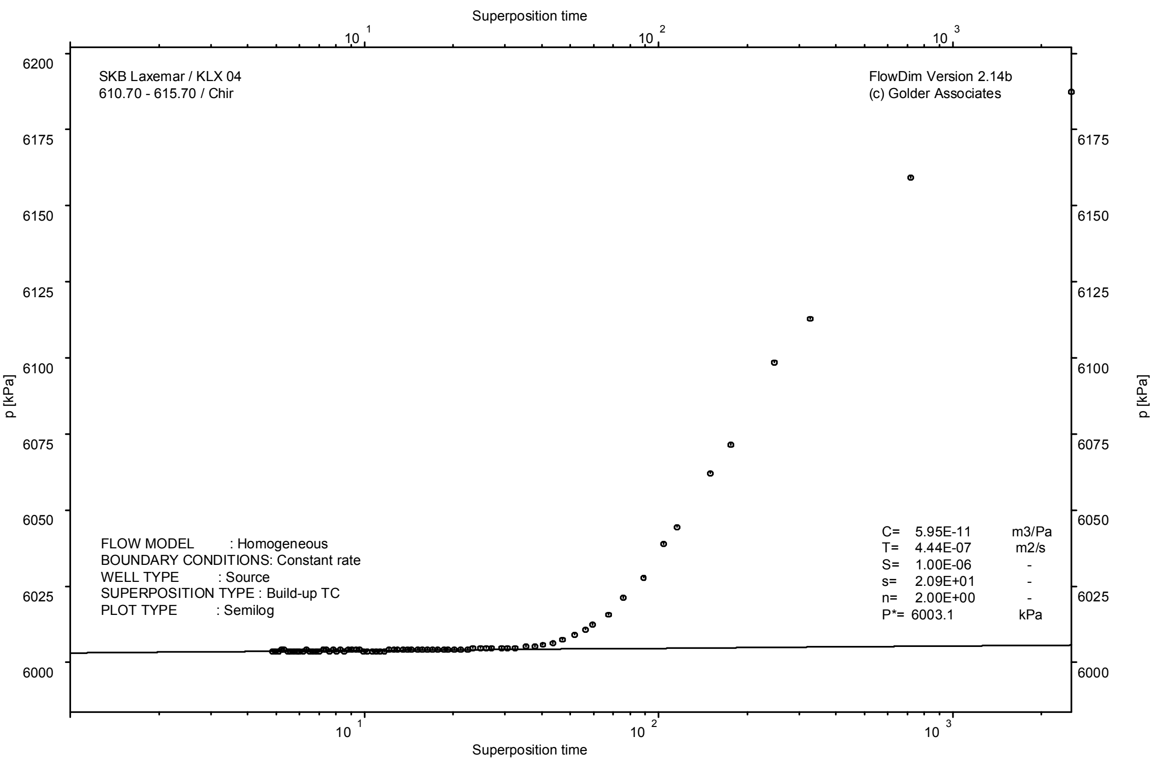
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

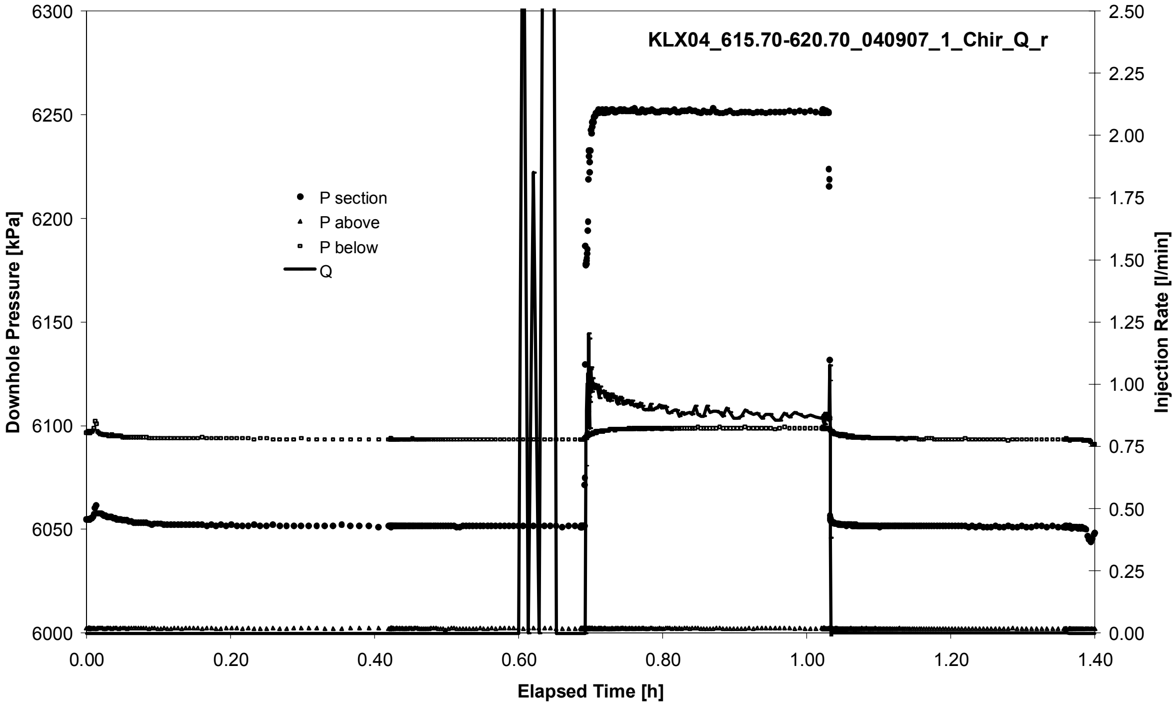


CHIR phase; HORNER match

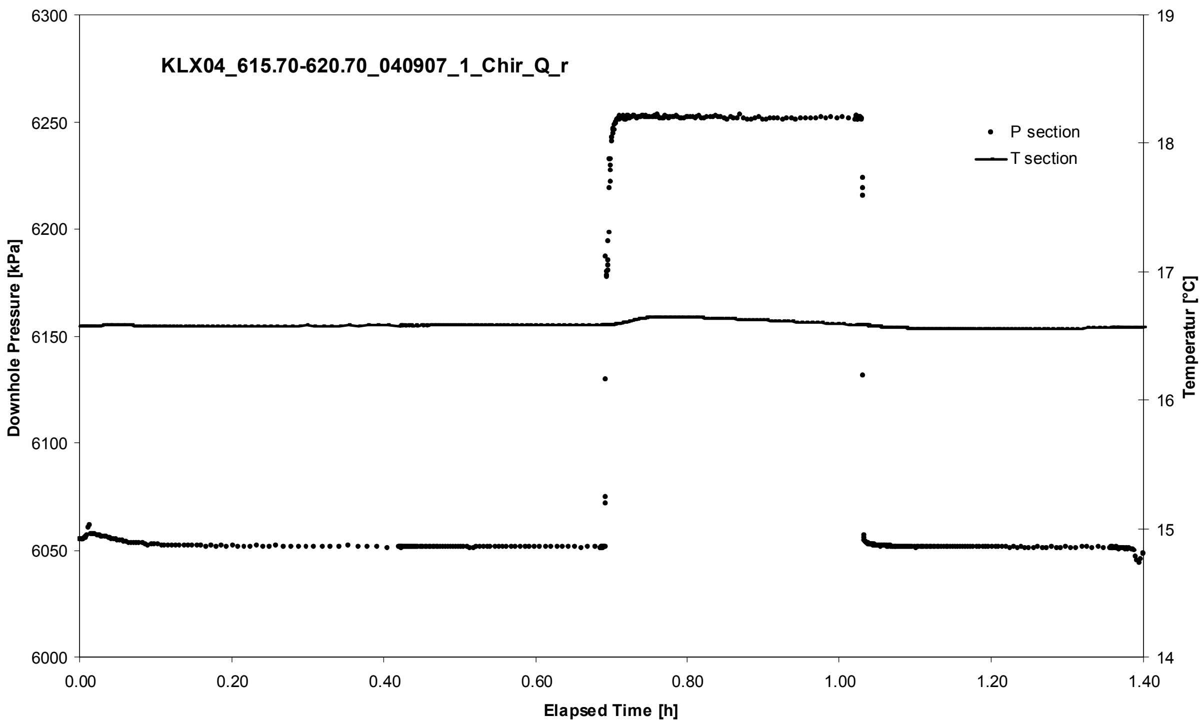
APPENDIX 2-104

Test 615.70 – 620.70 m

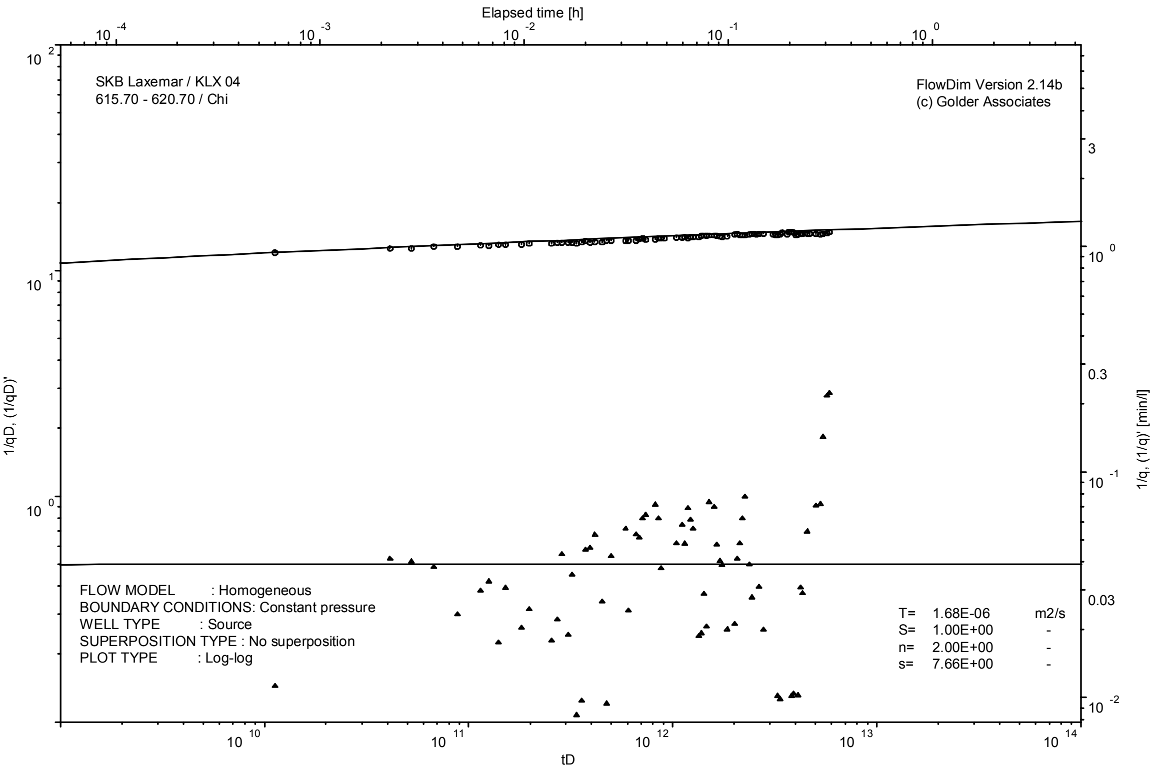
Analysis diagrams



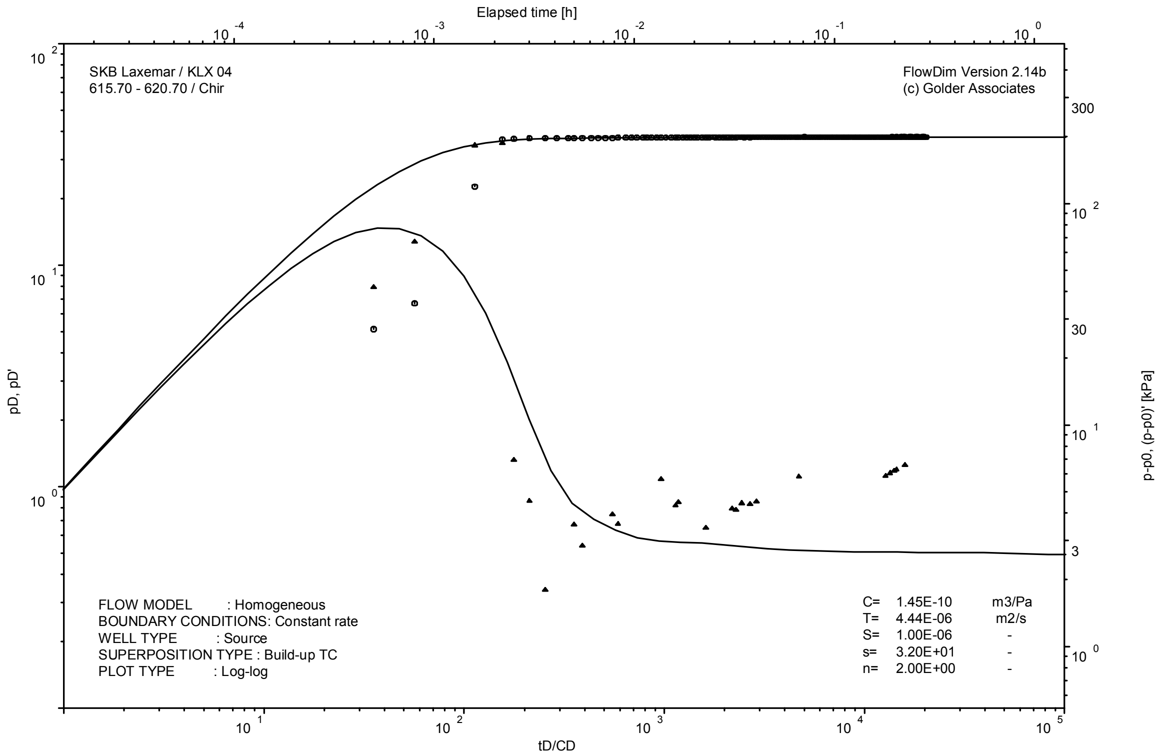
Pressure and flow rate vs. time; cartesian plot



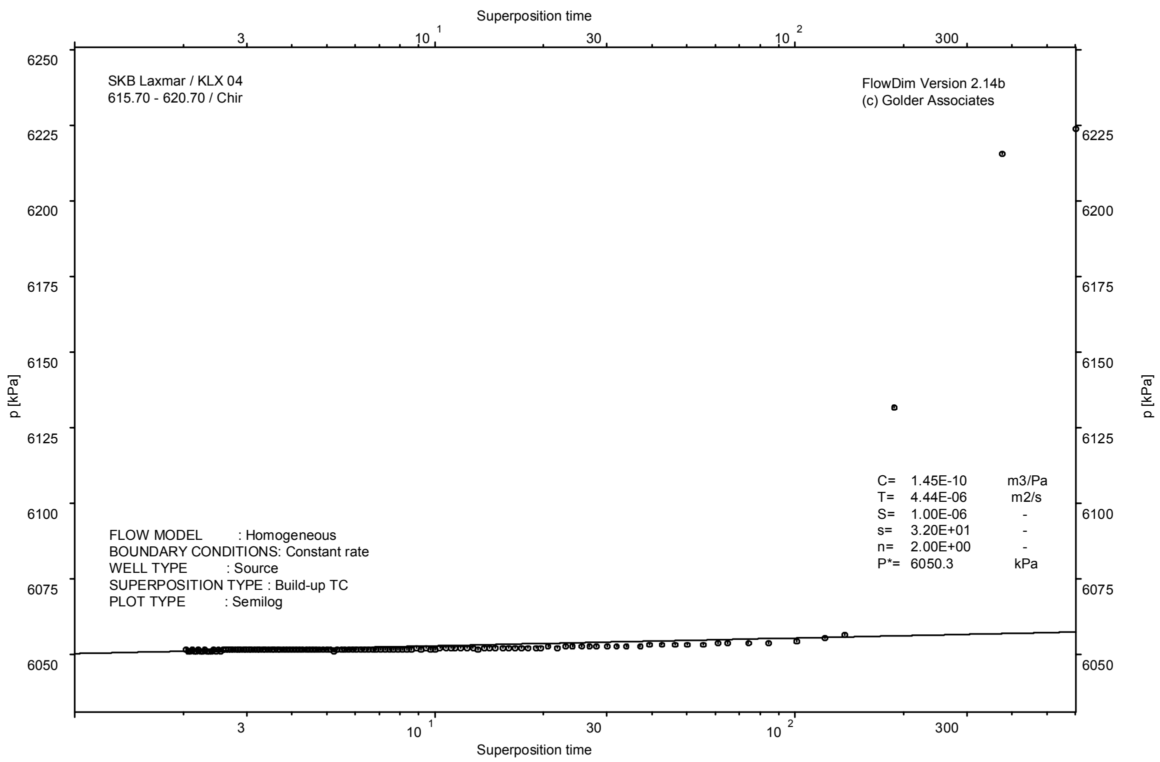
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

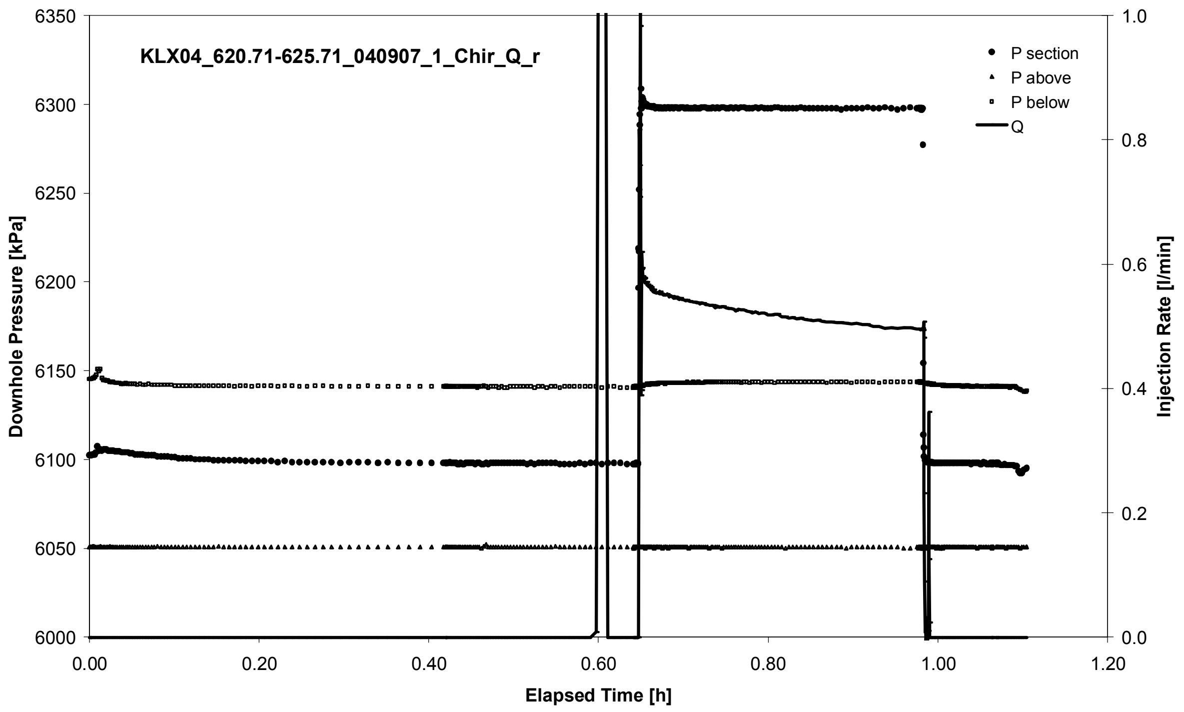


CHIR phase; HORNER match

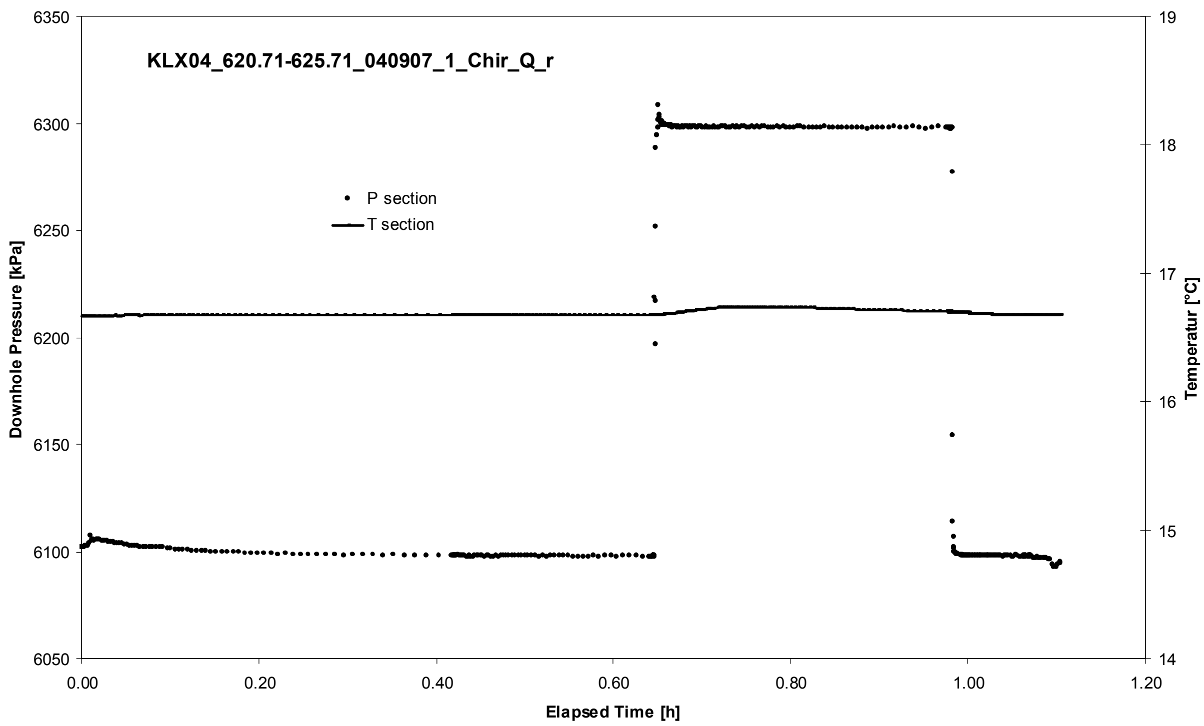
APPENDIX 2-105

Test 620.71 – 625.71 m

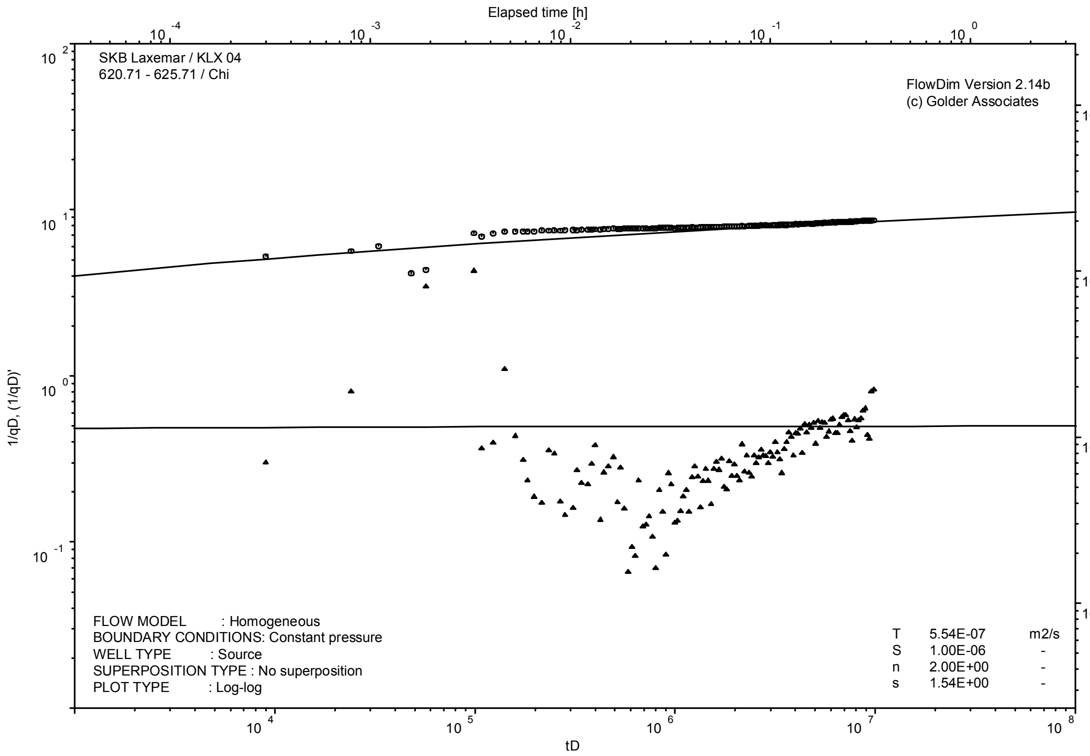
Analysis diagrams



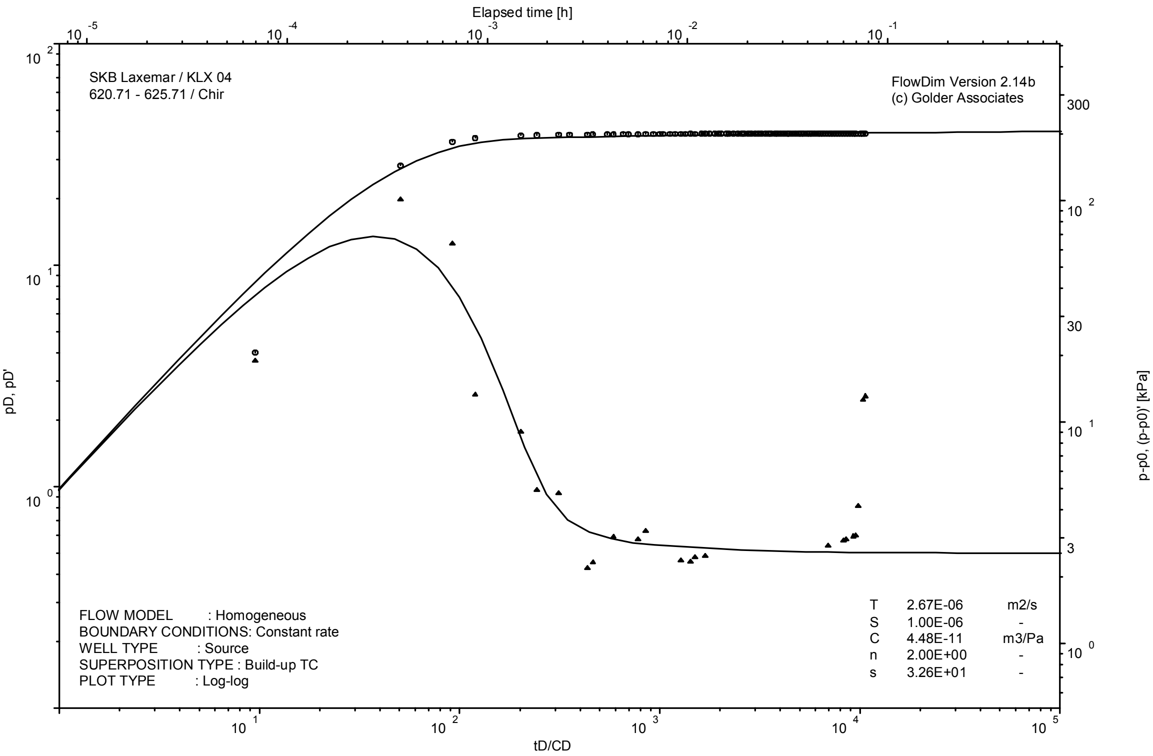
Pressure and flow rate vs. time; cartesian plot



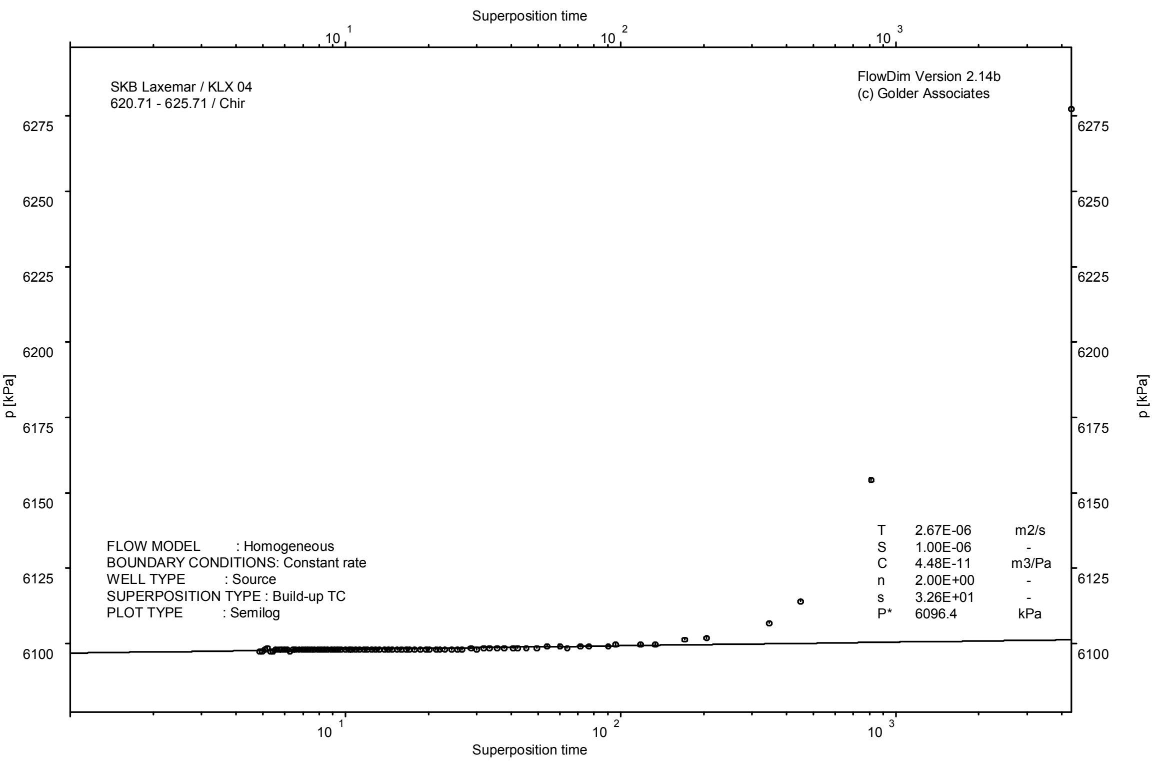
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

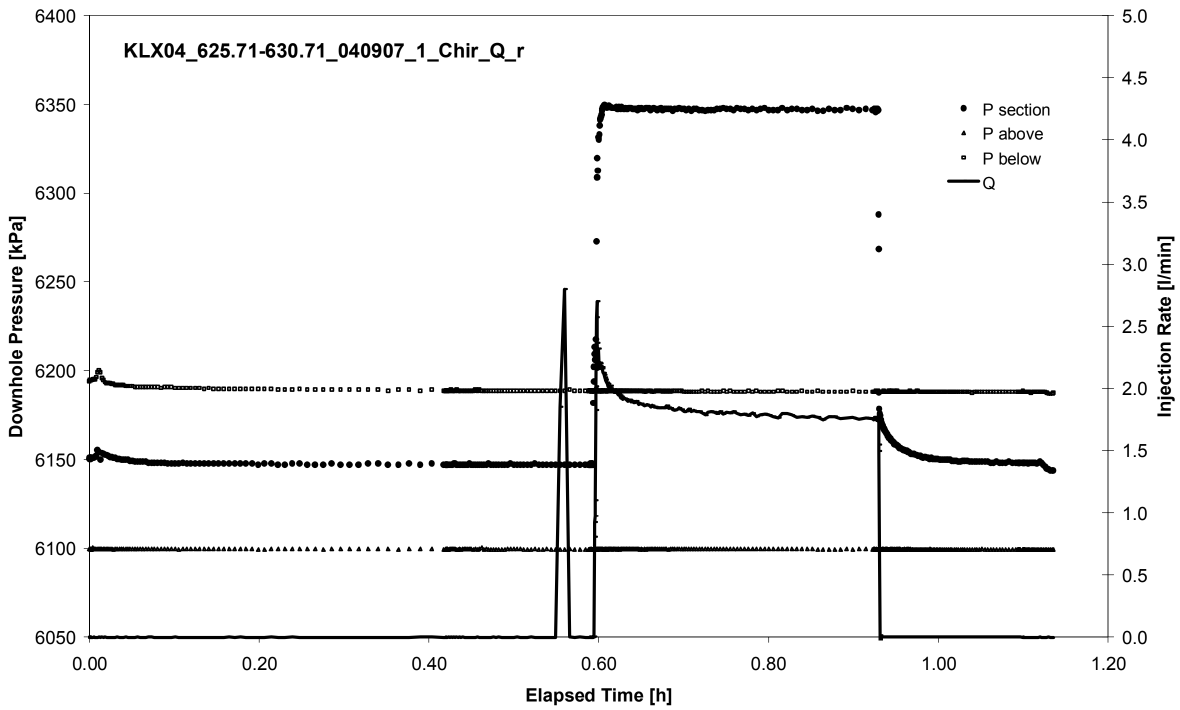


CHIR phase; HORNER match

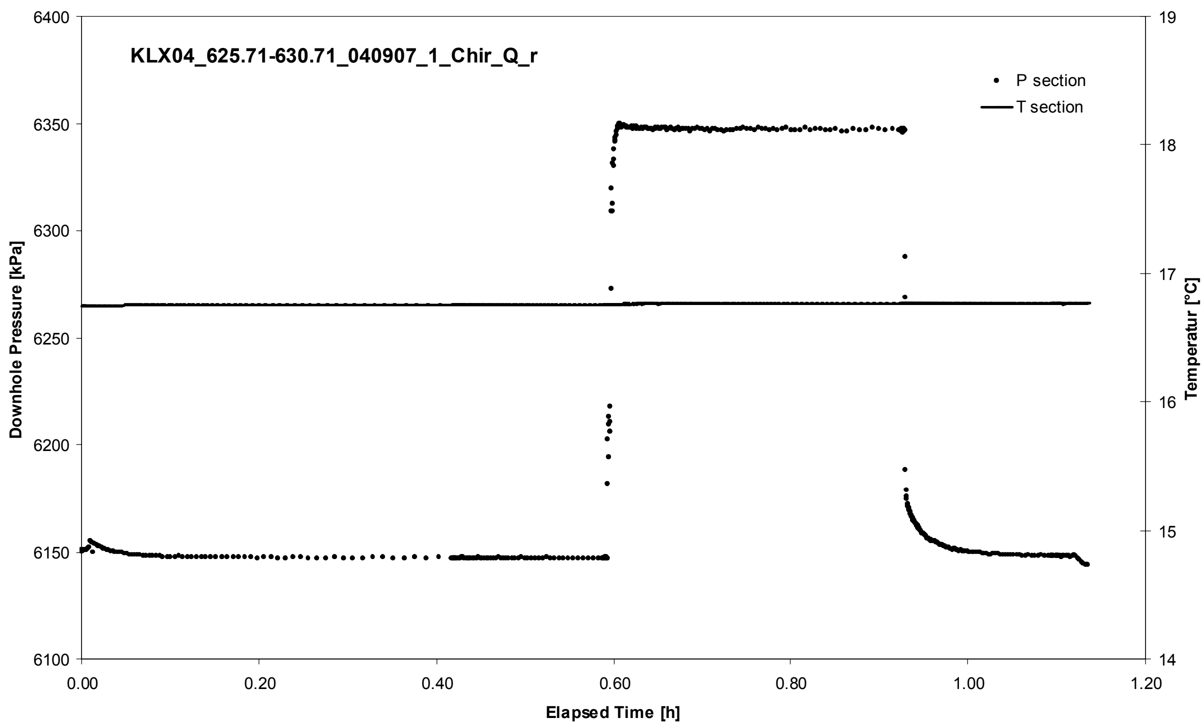
APPENDIX 2-106

Test 625.71 – 630.71 m

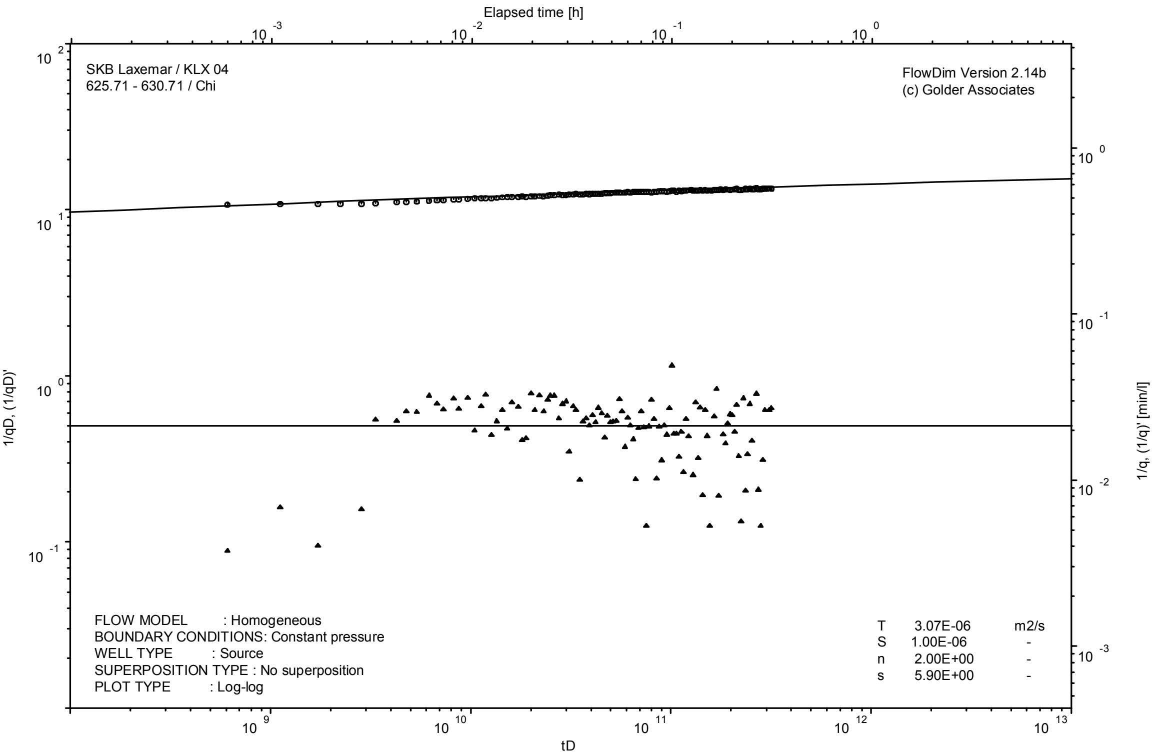
Analysis diagrams



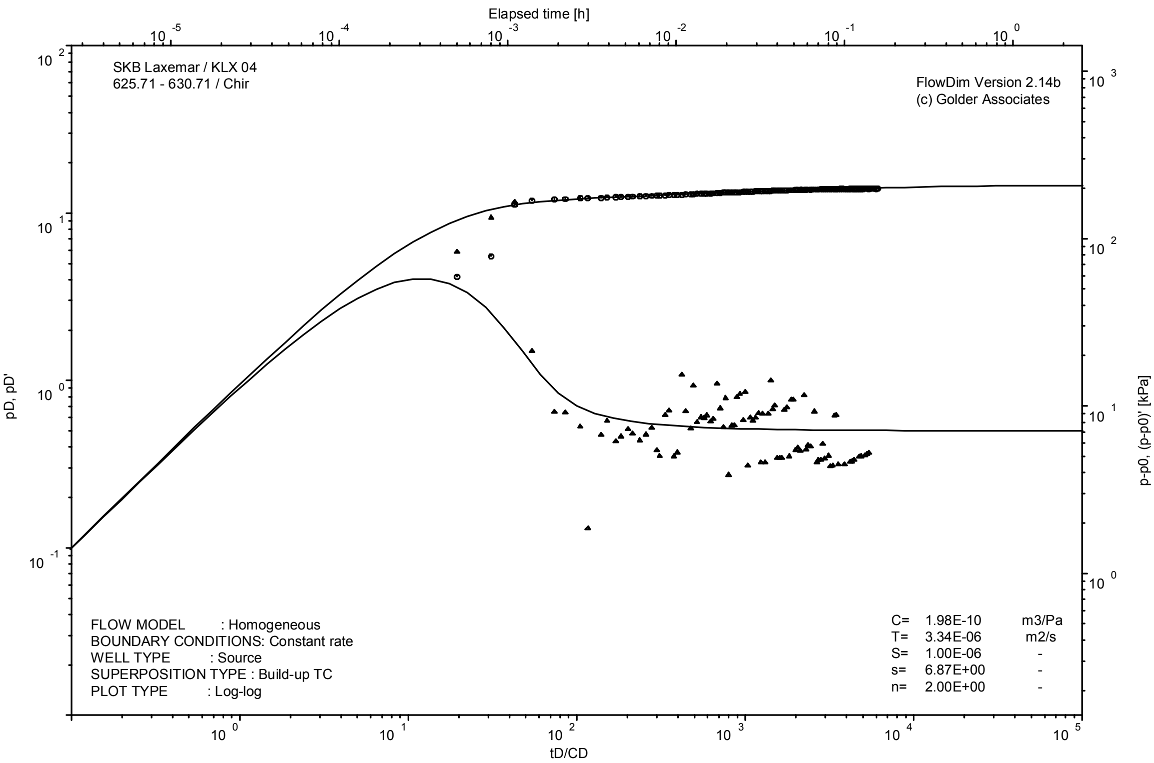
Pressure and flow rate vs. time; cartesian plot



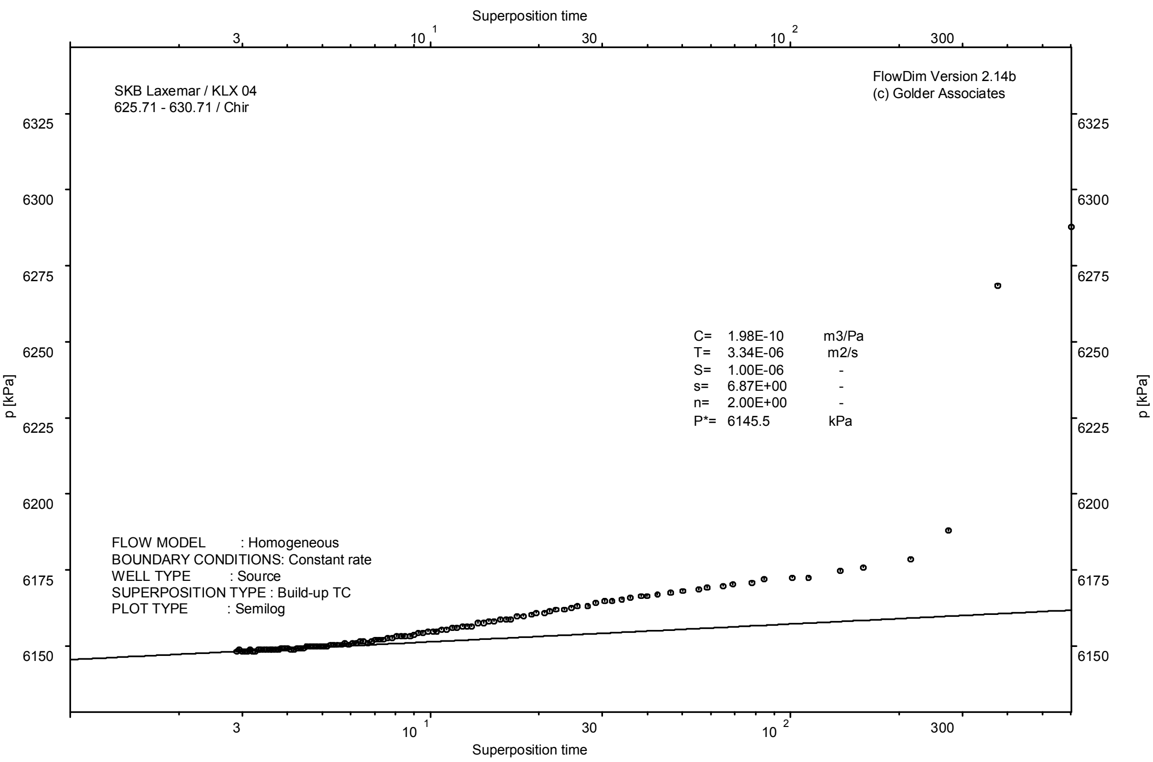
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

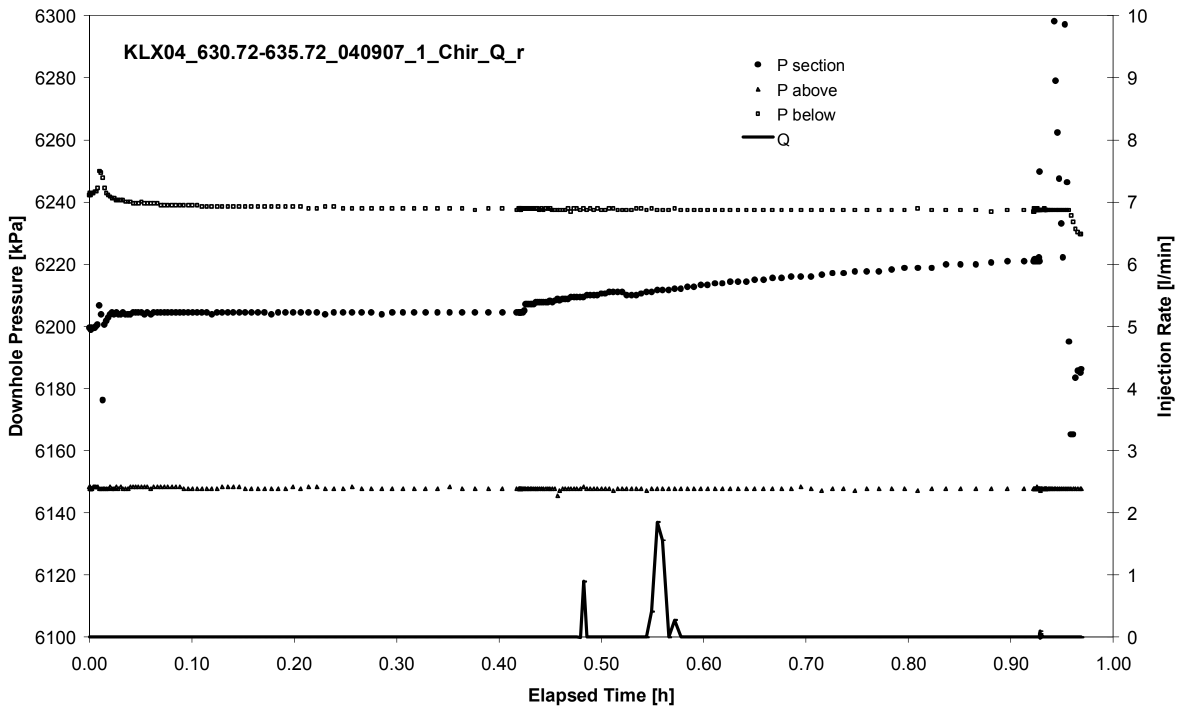


CHIR phase; HORNER match

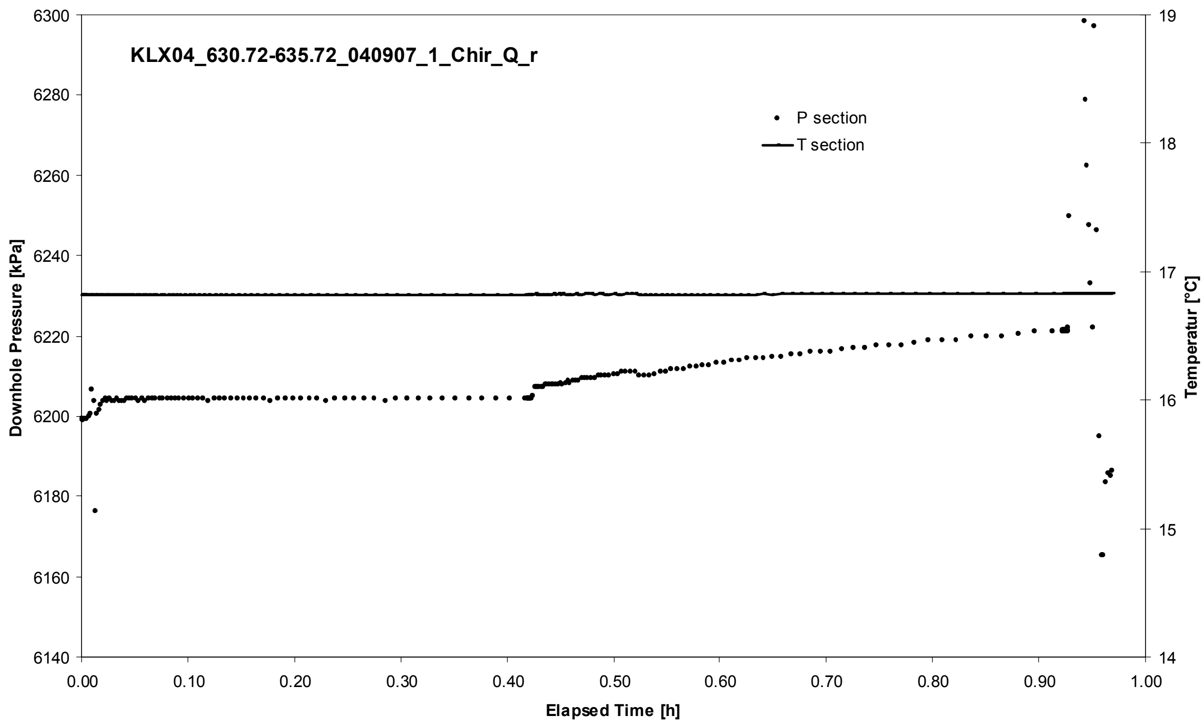
APPENDIX 2-107

Test 630.72 – 635.72 m

Analysis diagrams



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot

Not Analysed

CHI phase; log-log match

Not Analysed

CHIR phase; log-log match

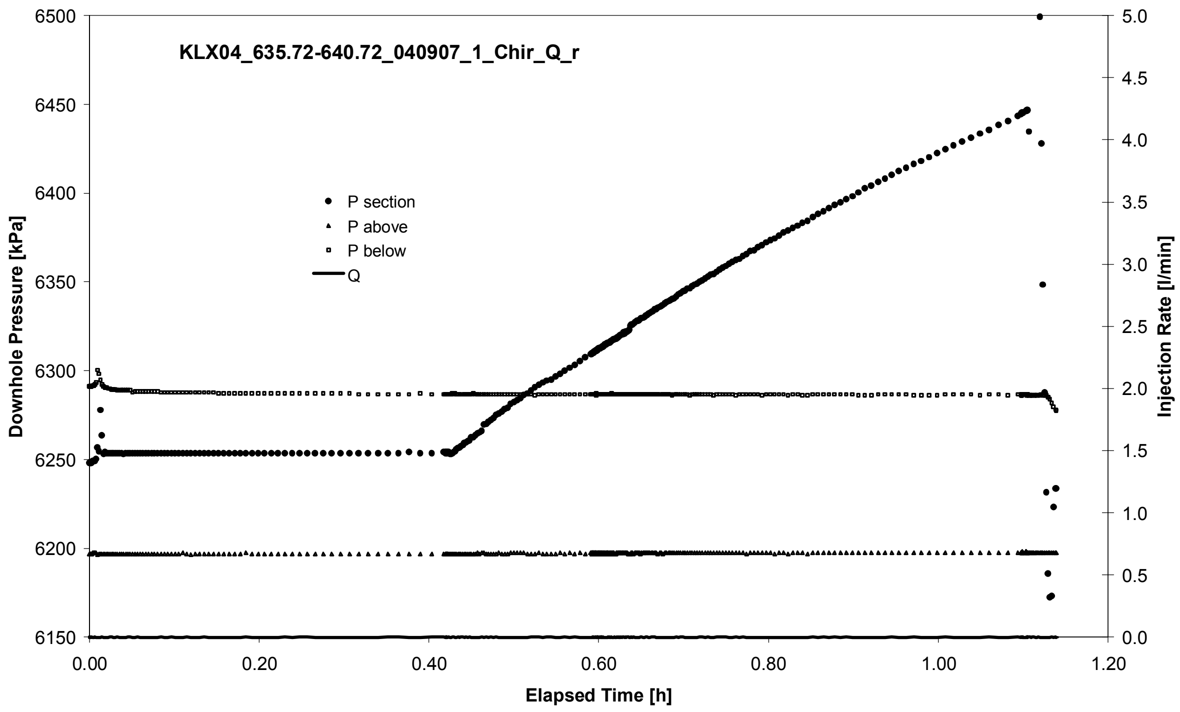
Not Analysed

CHIR phase; HORNER match

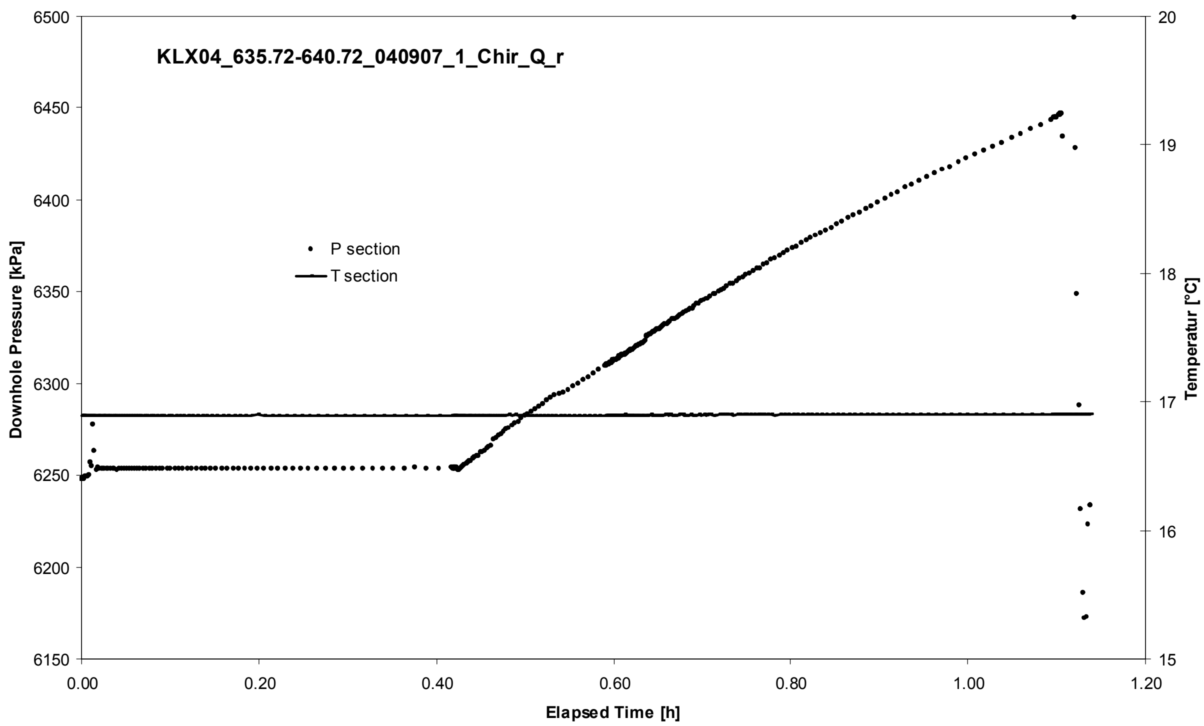
APPENDIX 2-108

Test 635.72 – 640.72 m

Analysis diagrams



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot

Not Analysed

CHI phase; log-log match

Not Analysed

CHIR phase; log-log match

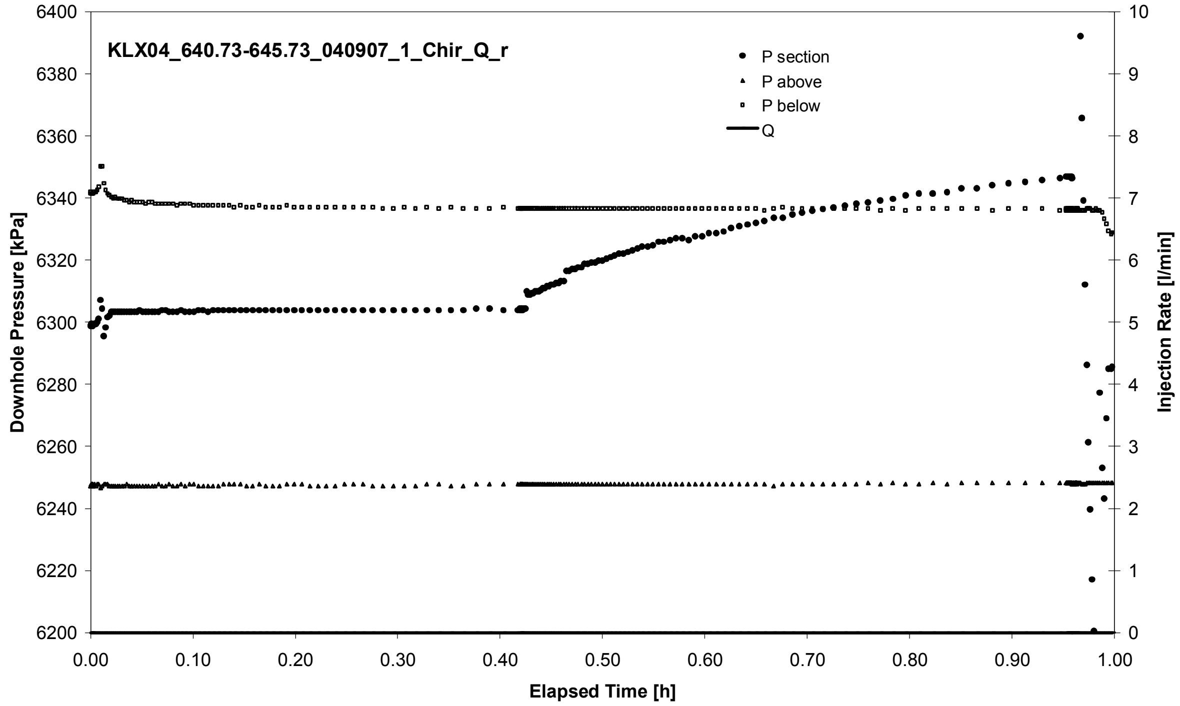
Not Analysed

CHIR phase; HORNER match

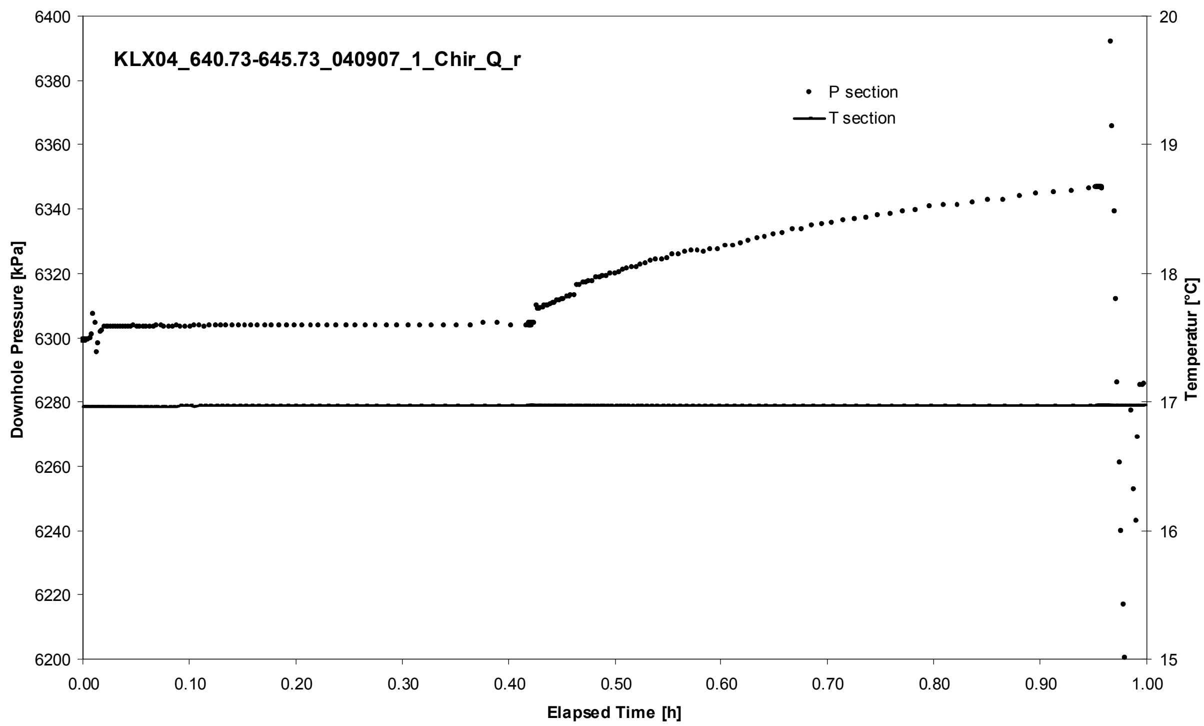
APPENDIX 2-109

Test 640.73 – 645.73 m

Analysis diagrams



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot

Not Analysed

CHI phase; log-log match

Not Analysed

CHIR phase; log-log match

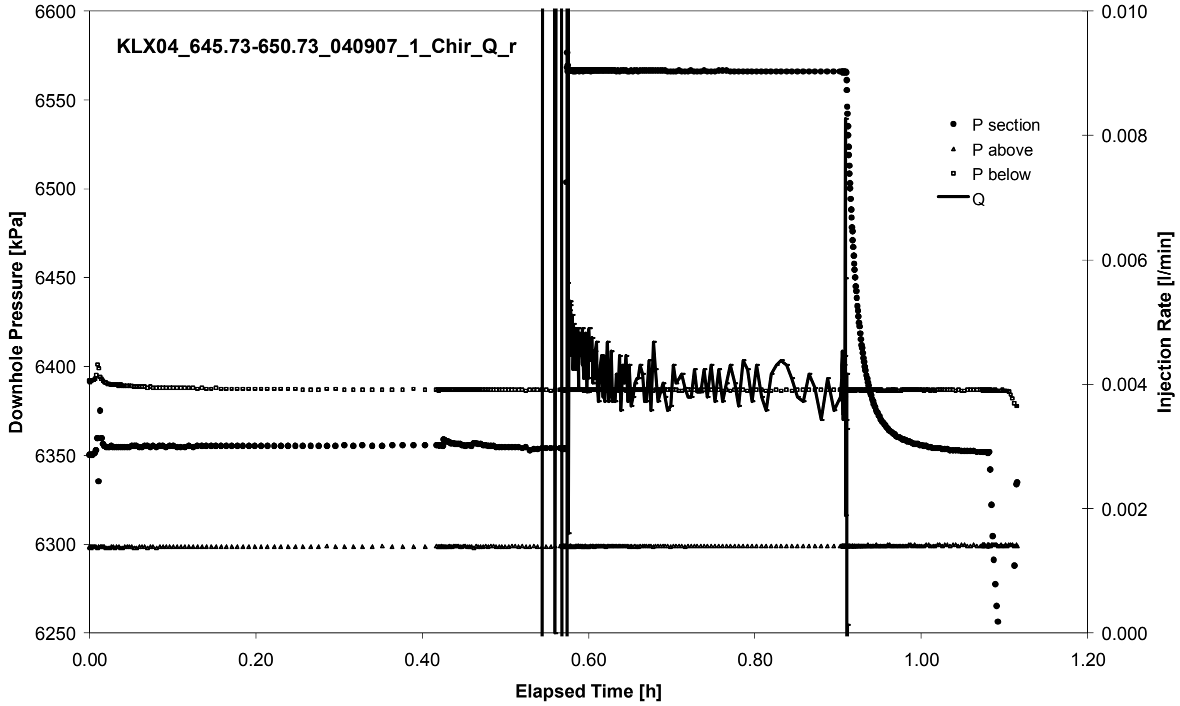
Not Analysed

CHIR phase; HORNER match

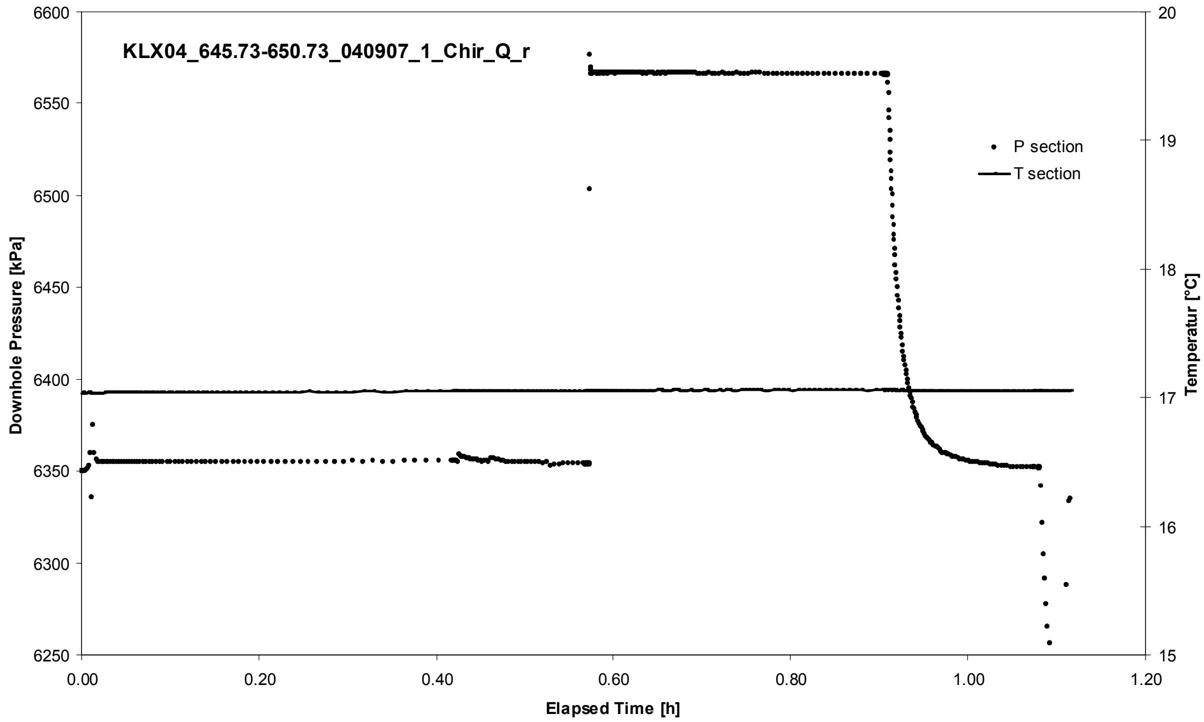
APPENDIX 2-110

Test 645.73 – 650.73 m

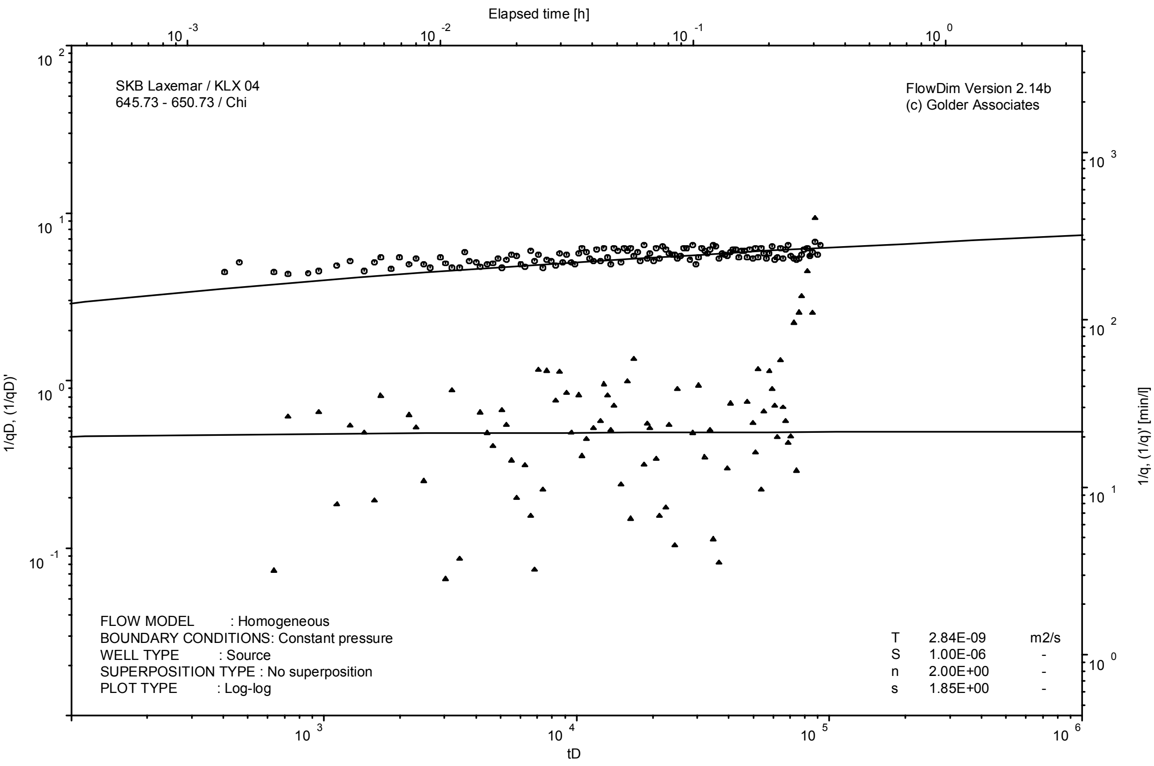
Analysis diagrams



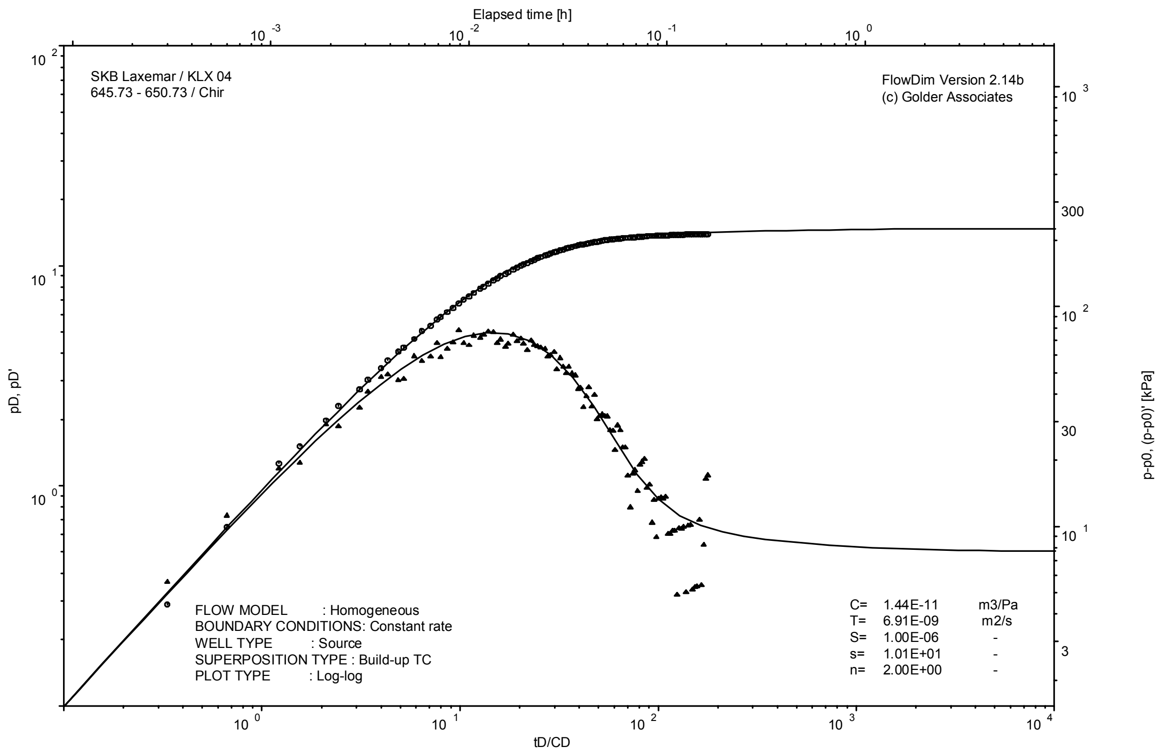
Pressure and flow rate vs. time; cartesian plot



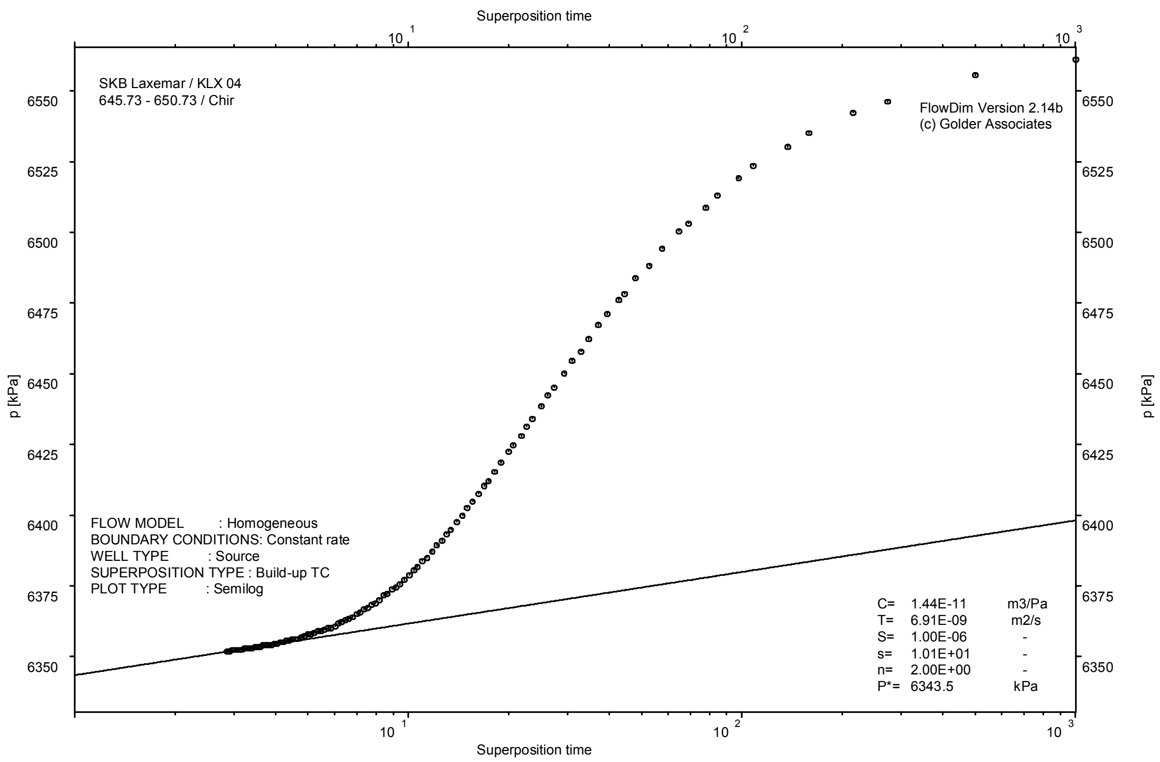
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

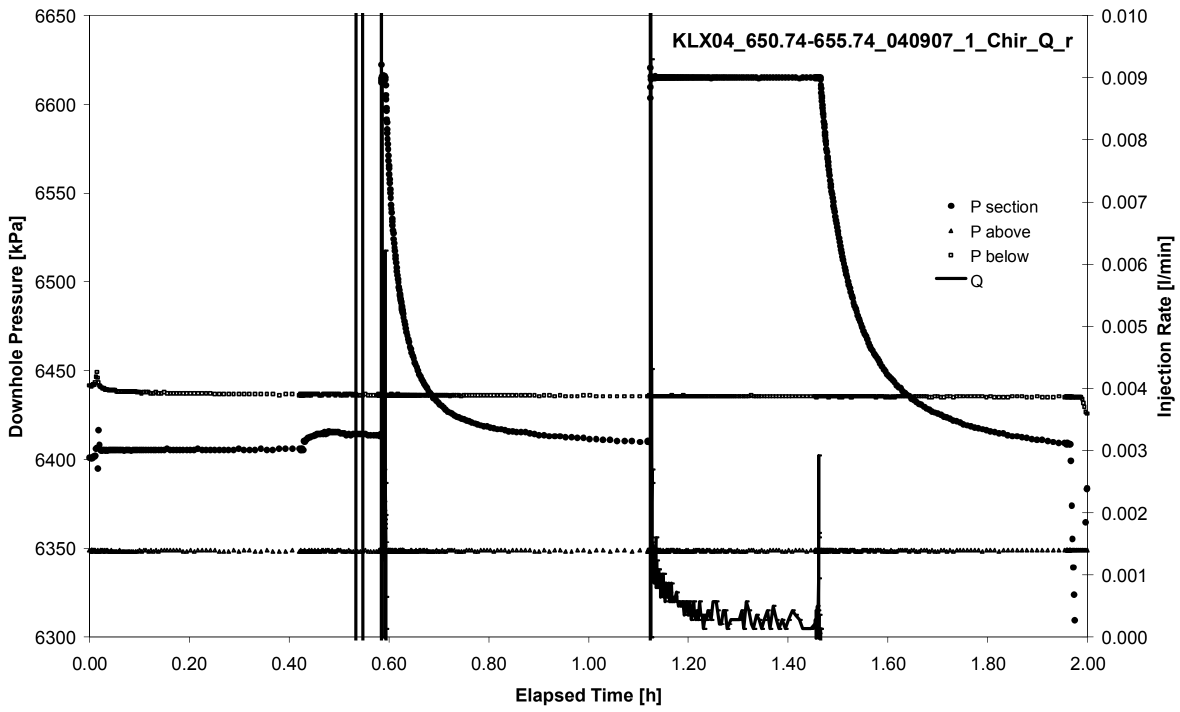


CHIR phase; HORNER match

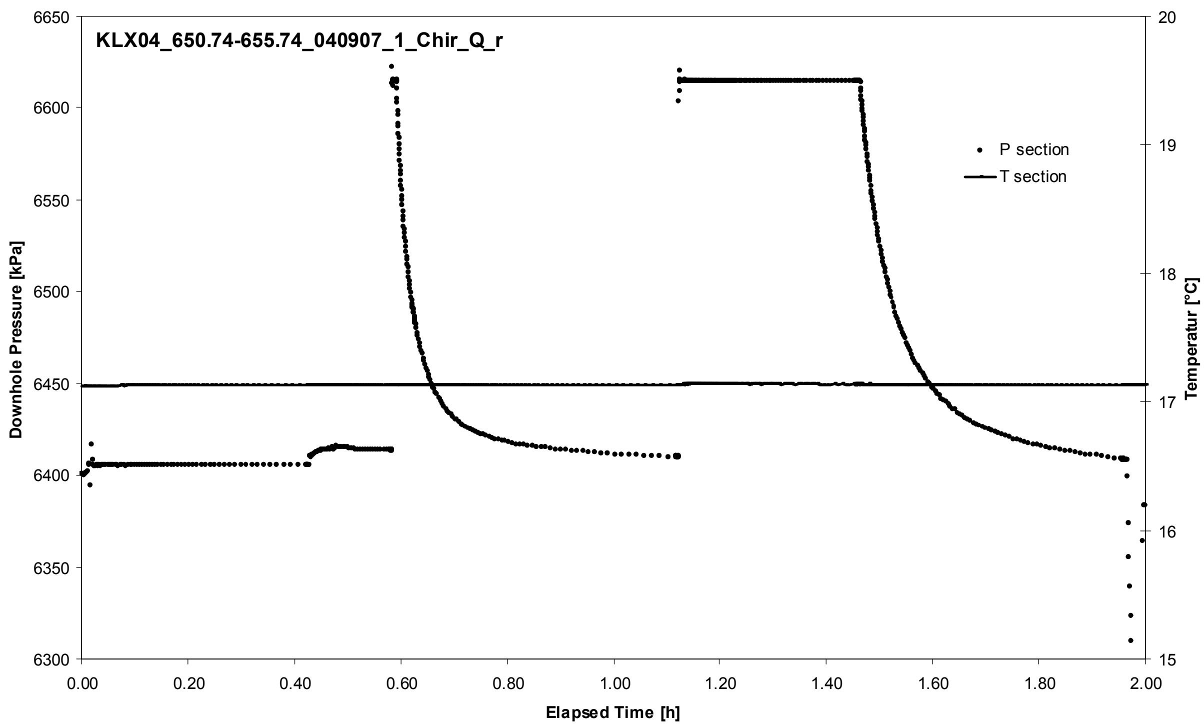
APPENDIX 2-111

Test 650.74 – 655.74 m

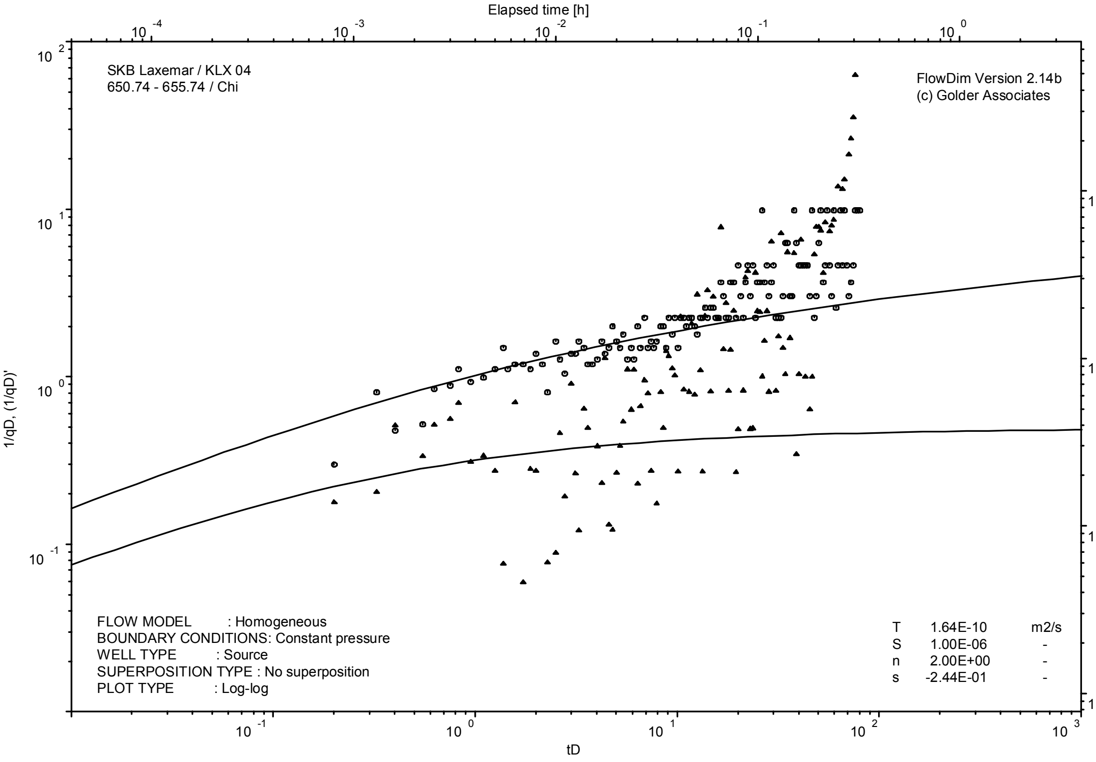
Analysis diagrams



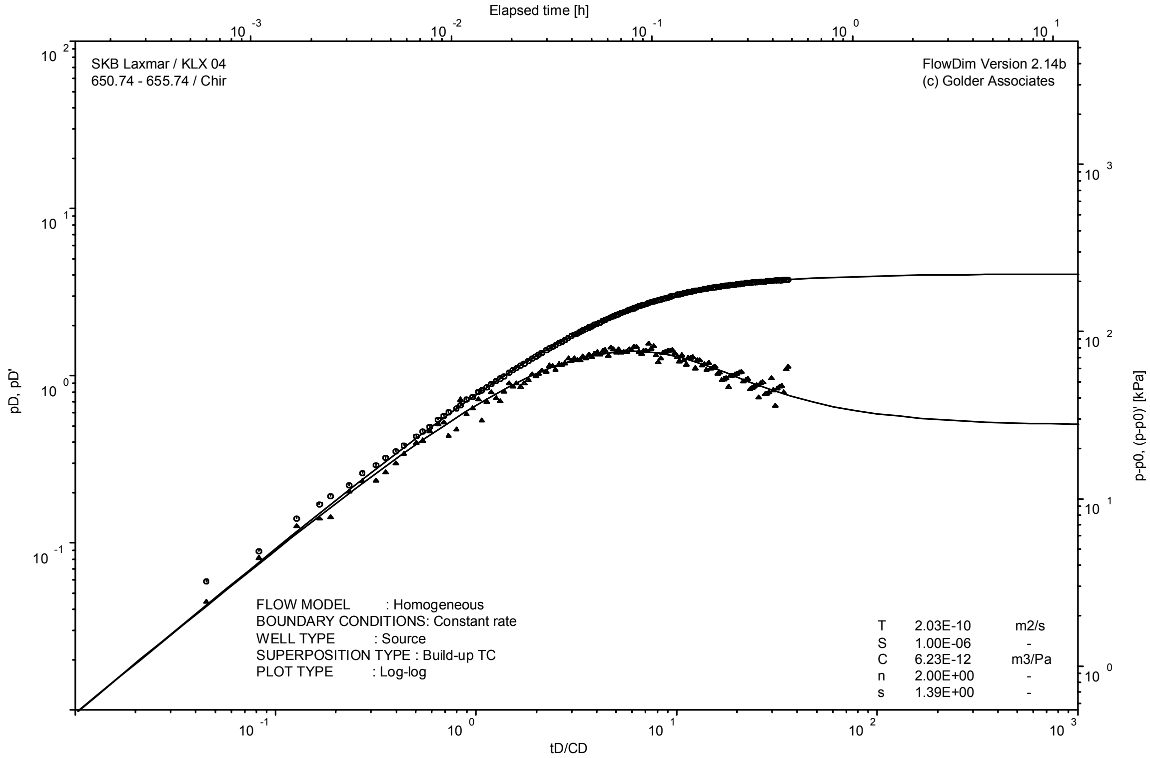
Pressure and flow rate vs. time; cartesian plot



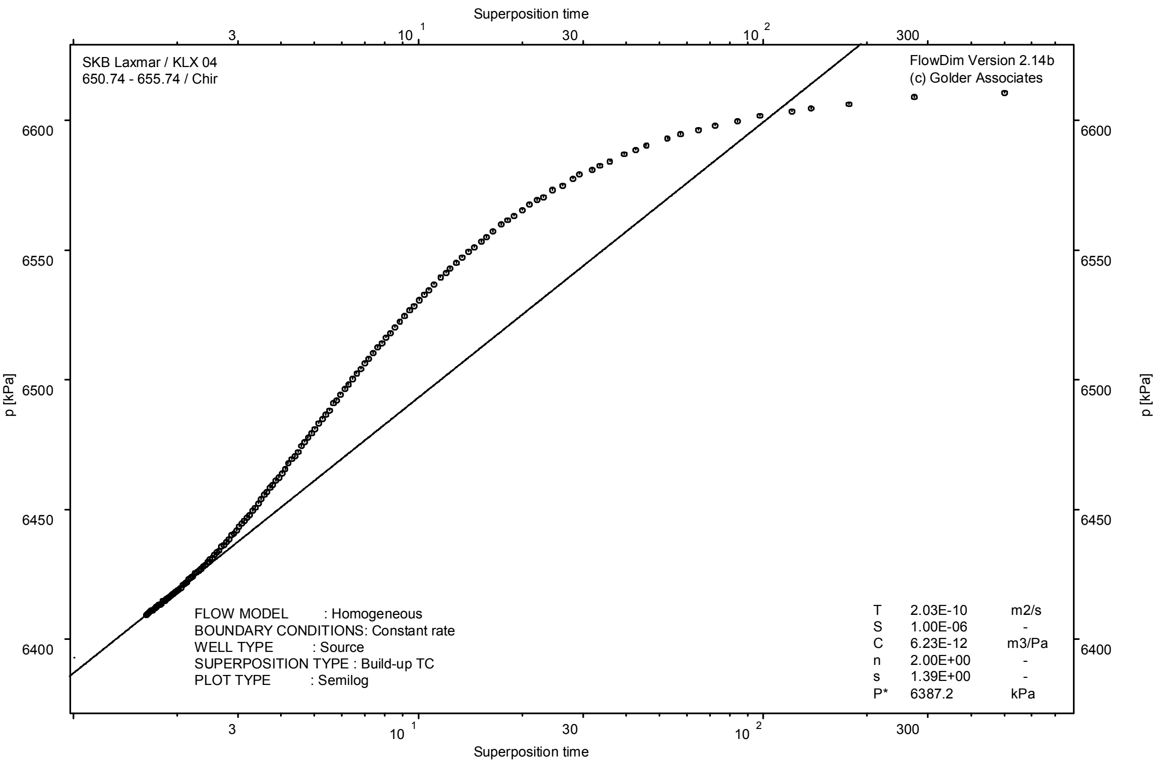
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

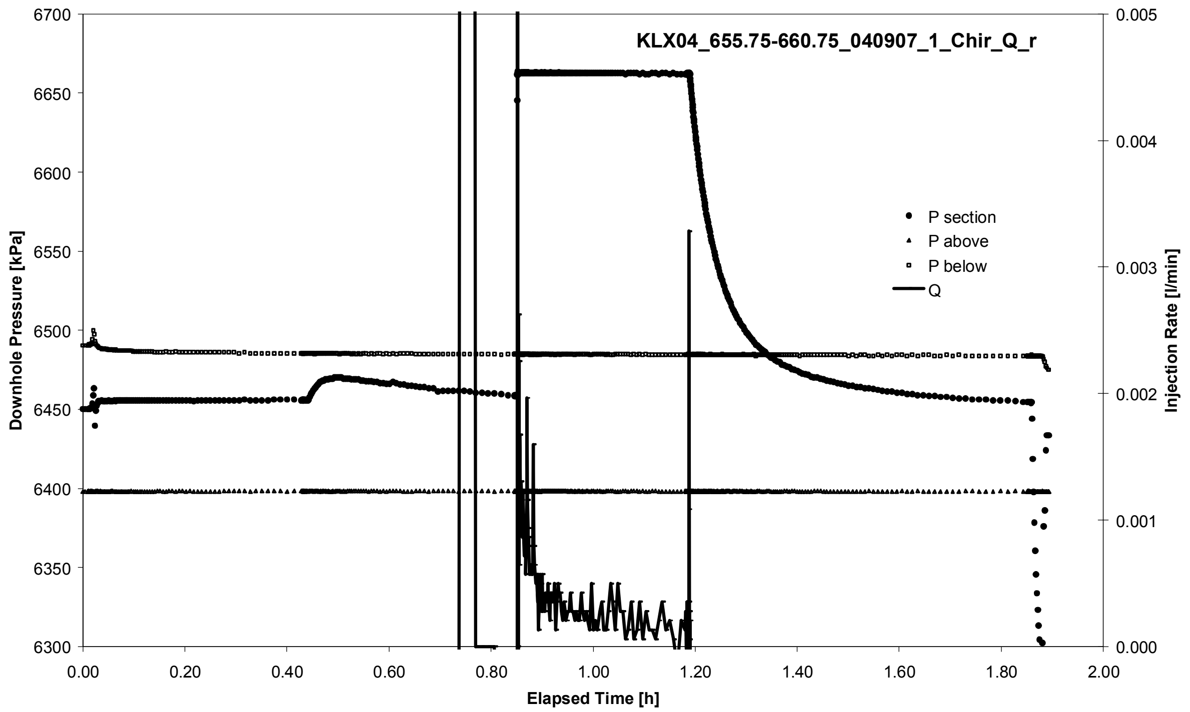


CHIR phase; HORNER match

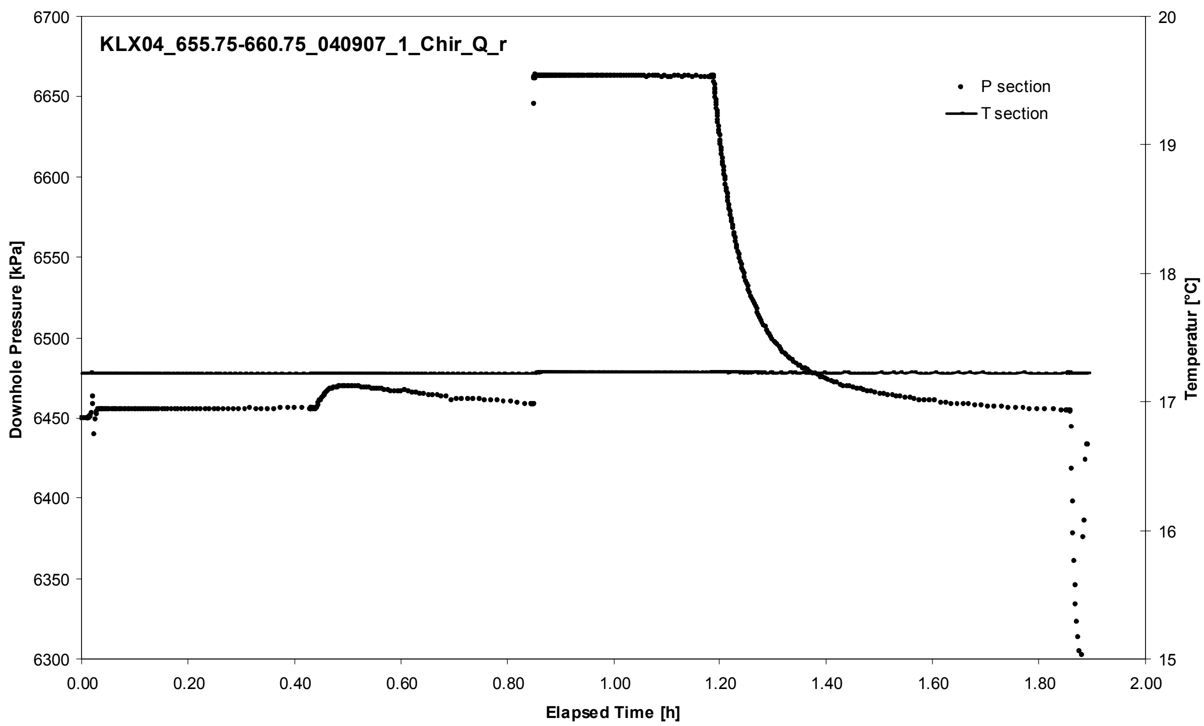
APPENDIX 2-112

Test 655.75 – 660.75 m

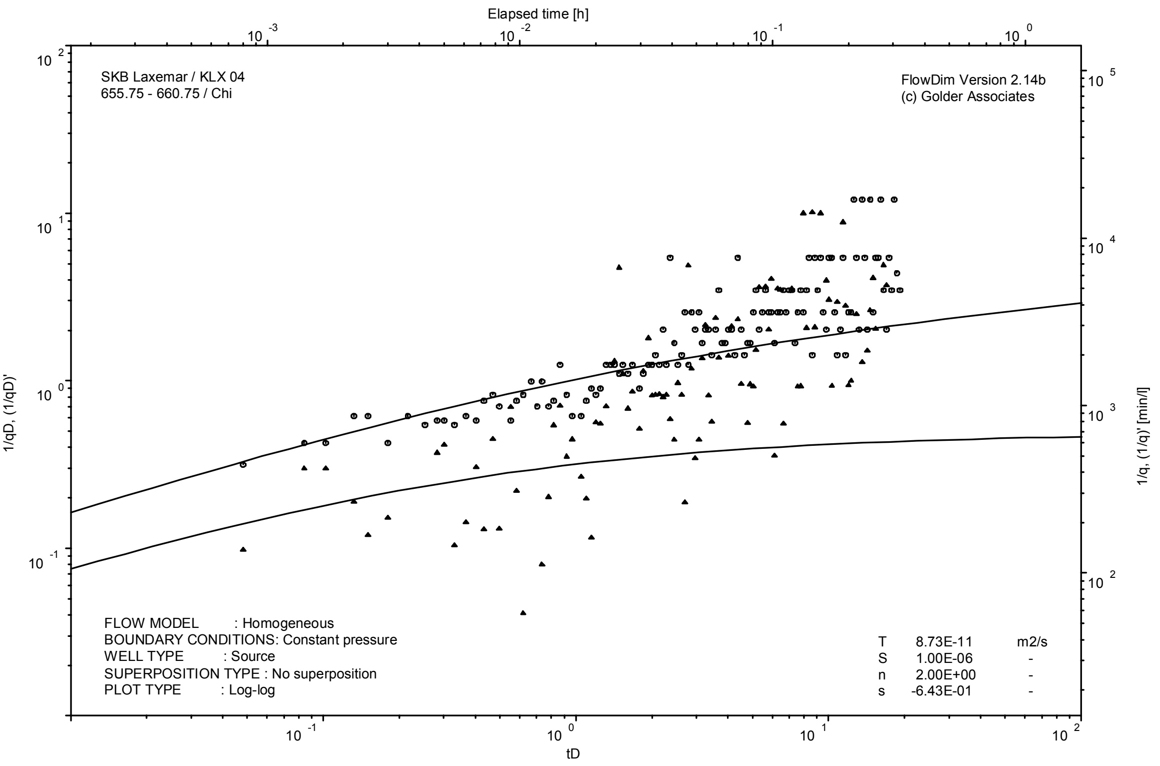
Analysis diagrams



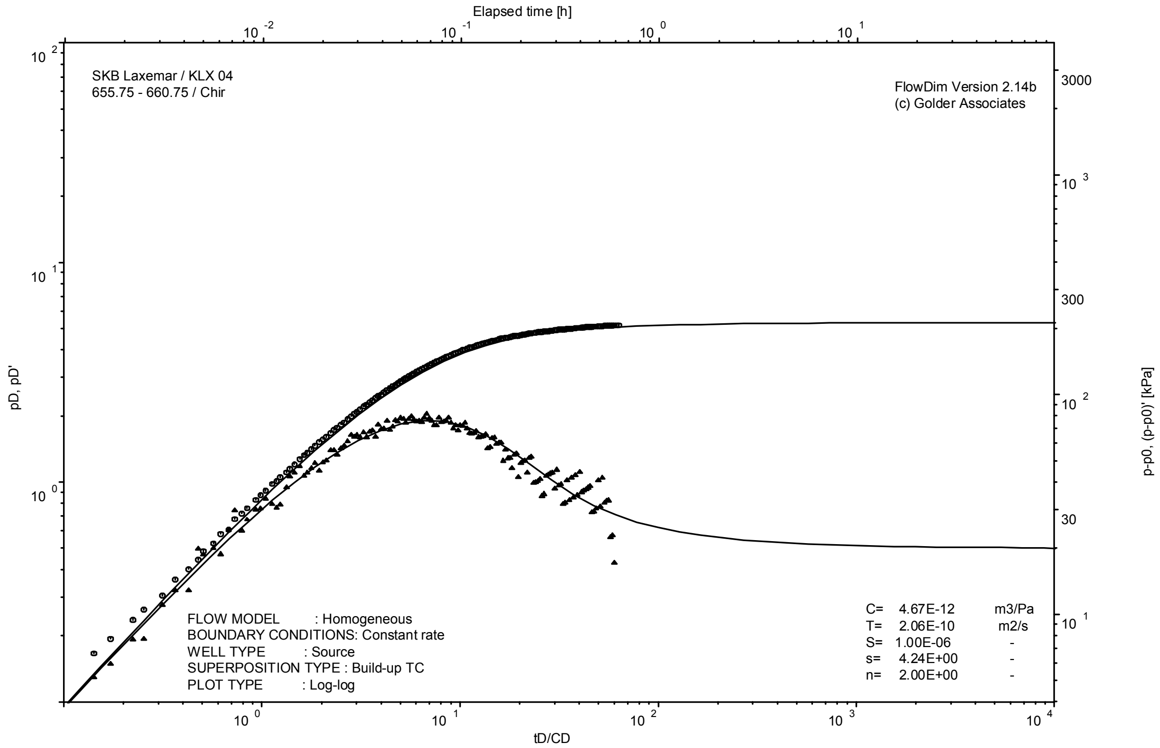
Pressure and flow rate vs. time; cartesian plot



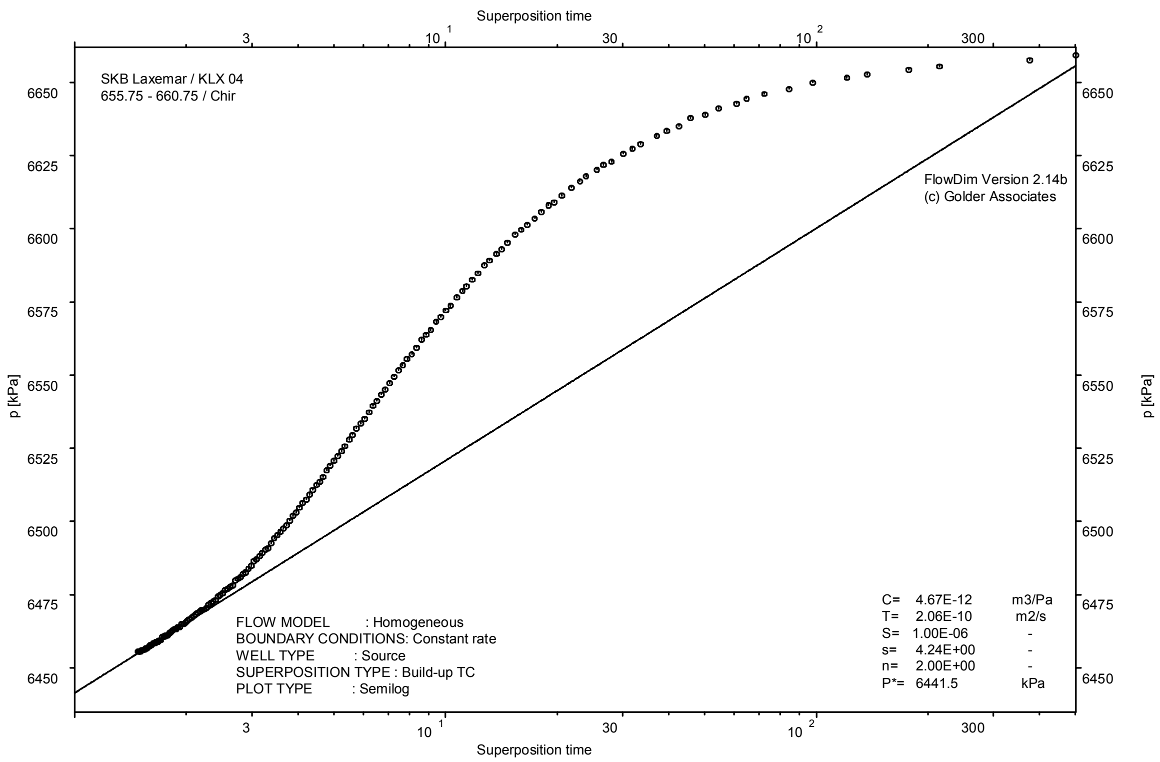
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

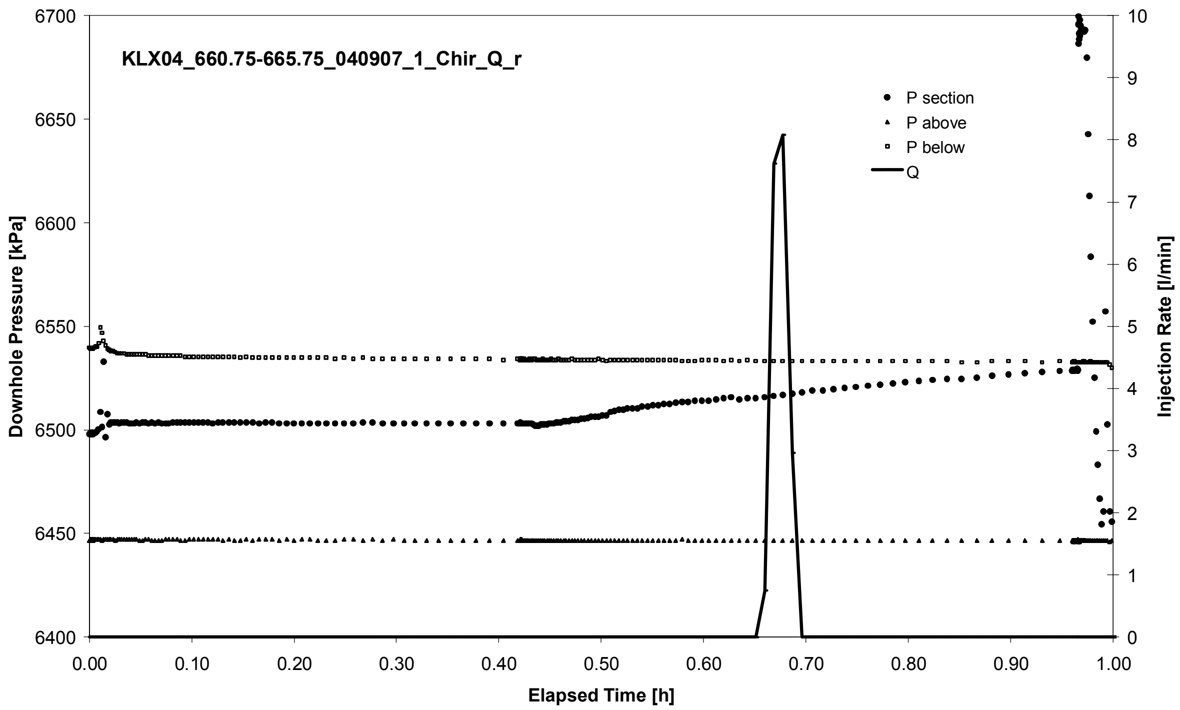


CHIR phase; HORNER match

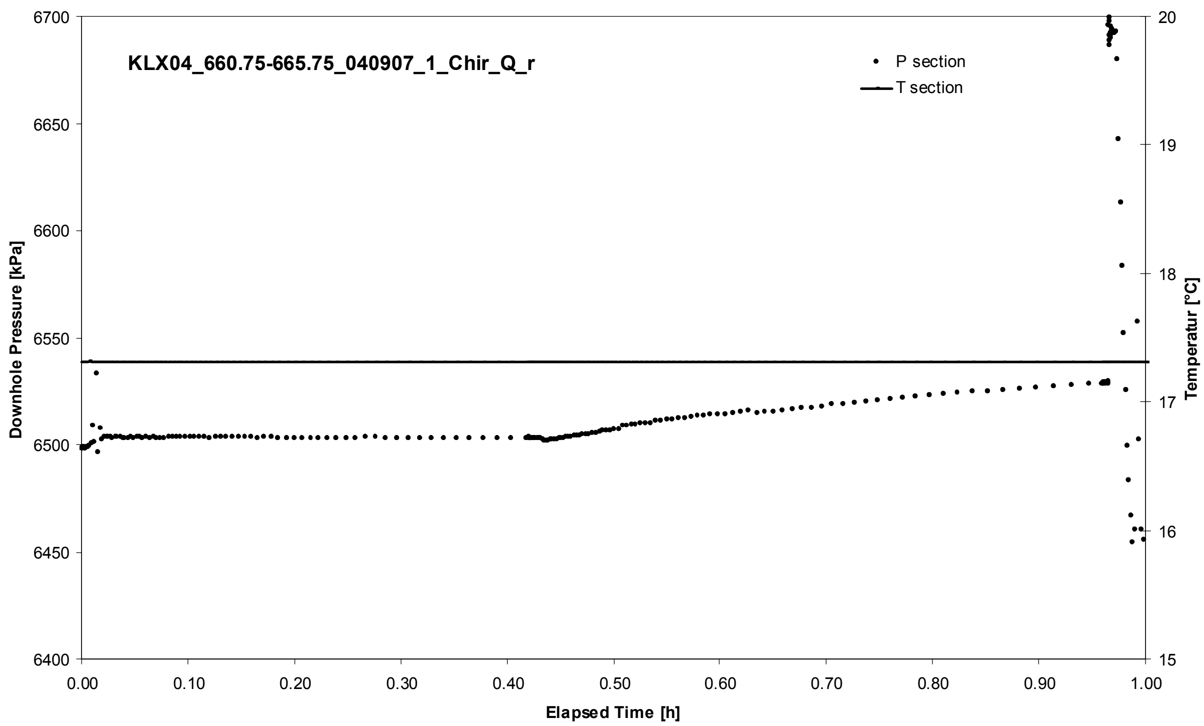
APPENDIX 2-113

Test 660.75 – 665.75 m

Analysis diagrams



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot

Not Analysed

CHI phase; log-log match

Not Analysed

CHIR phase; log-log match

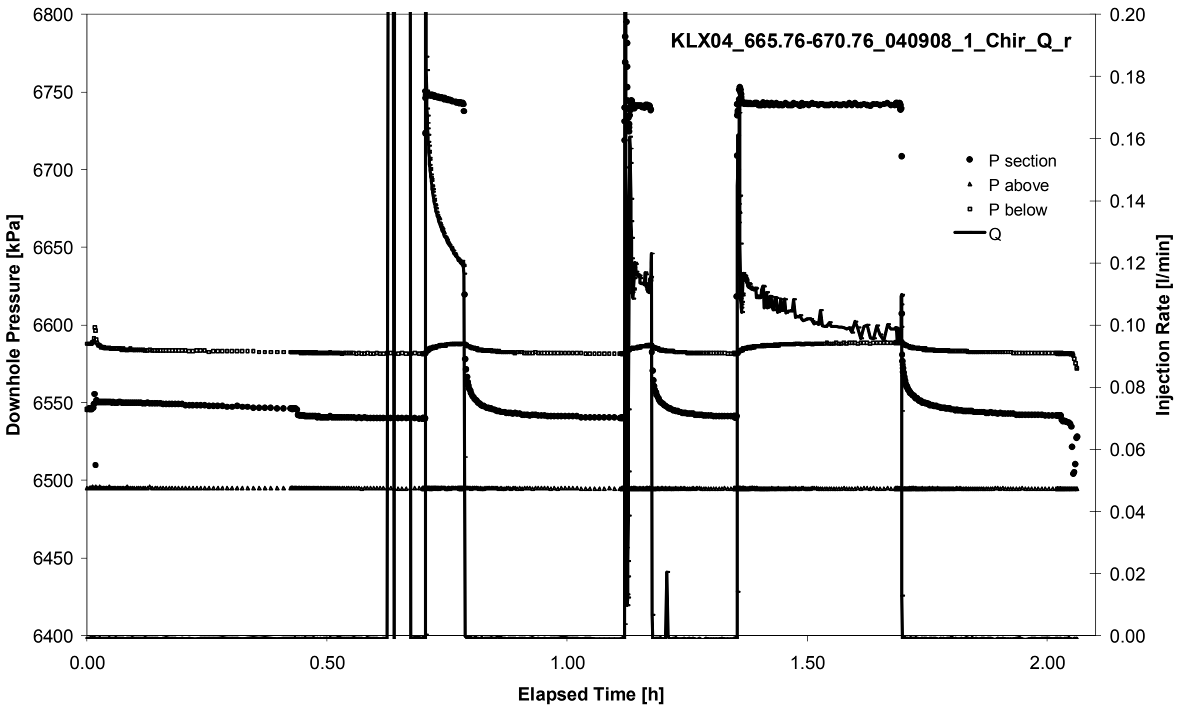
Not Analysed

CHIR phase; HORNER match

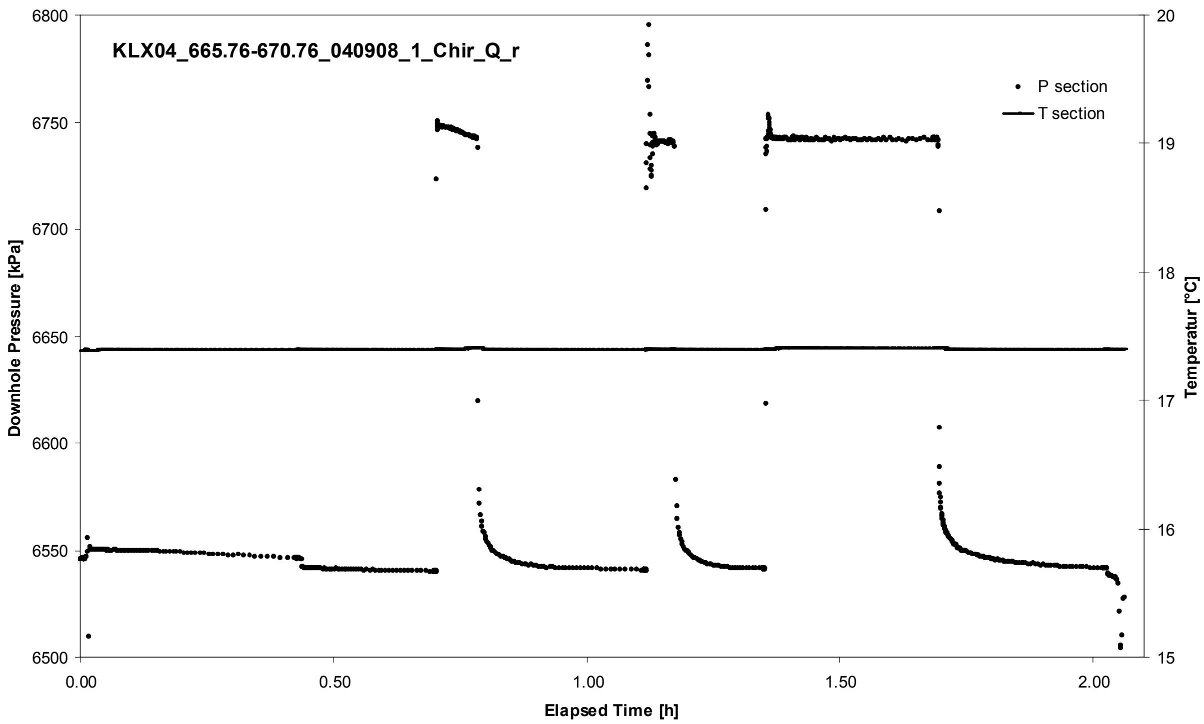
APPENDIX 2-114

Test 665.76 – 670.76 m

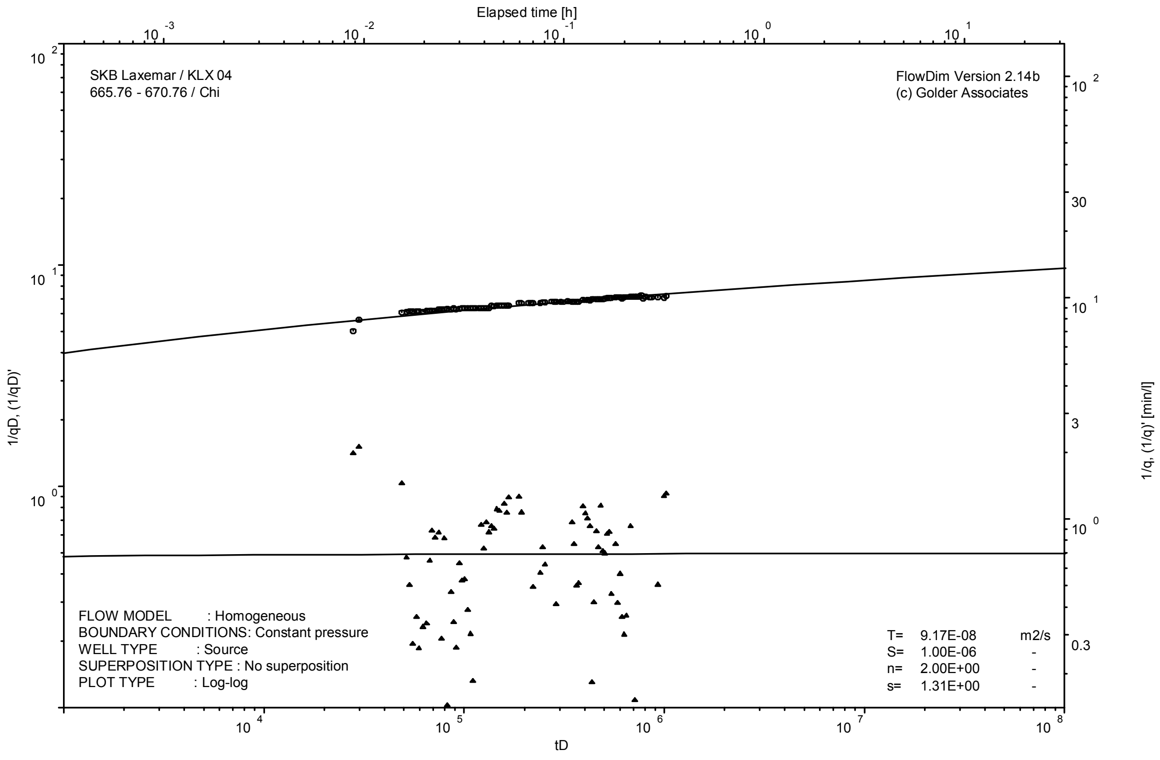
Analysis diagrams



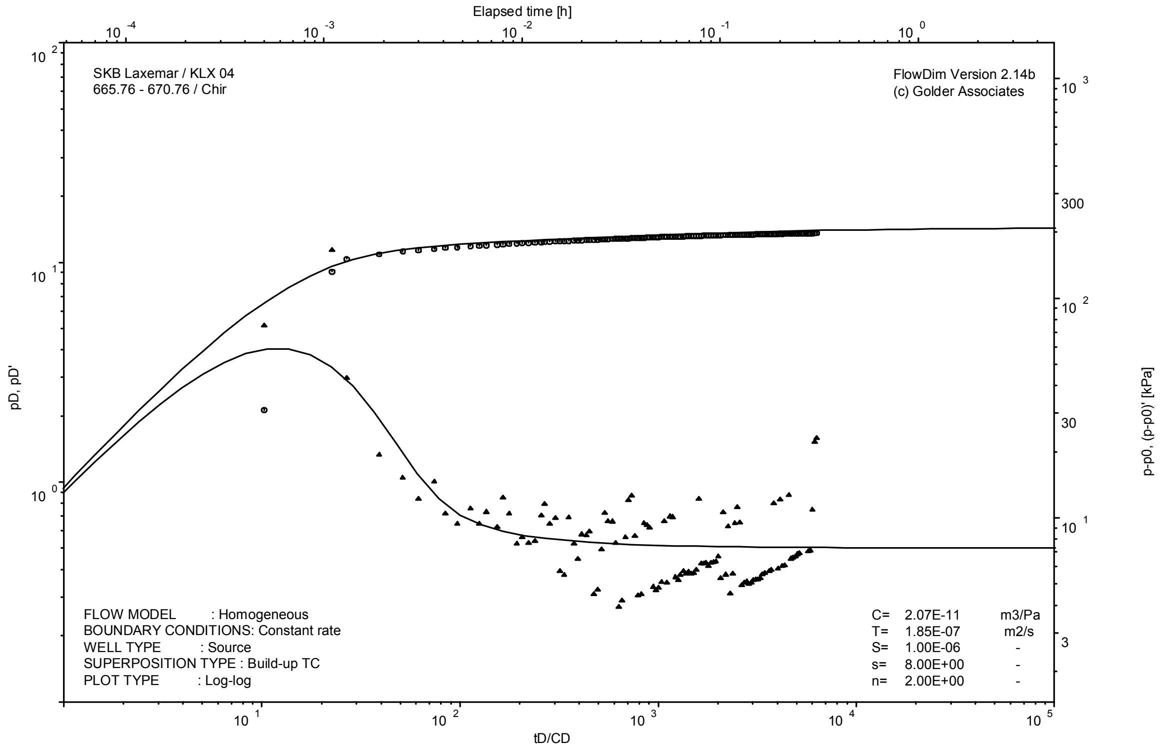
Pressure and flow rate vs. time; cartesian plot



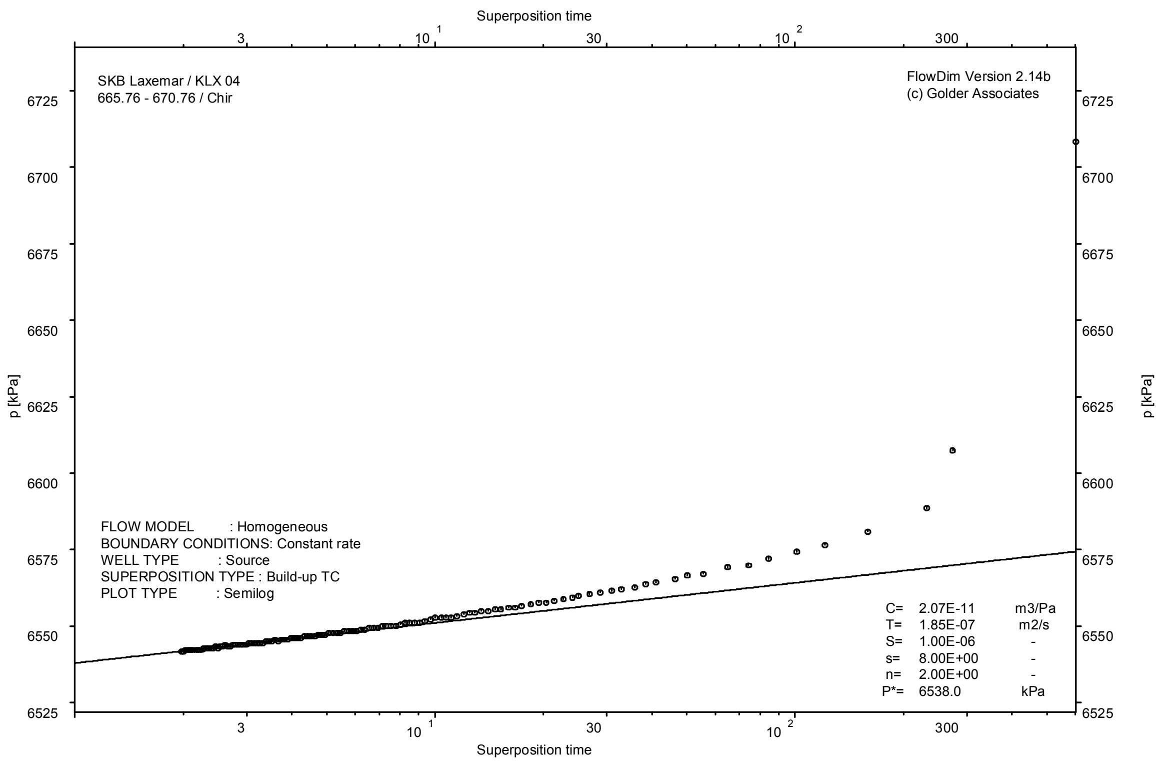
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

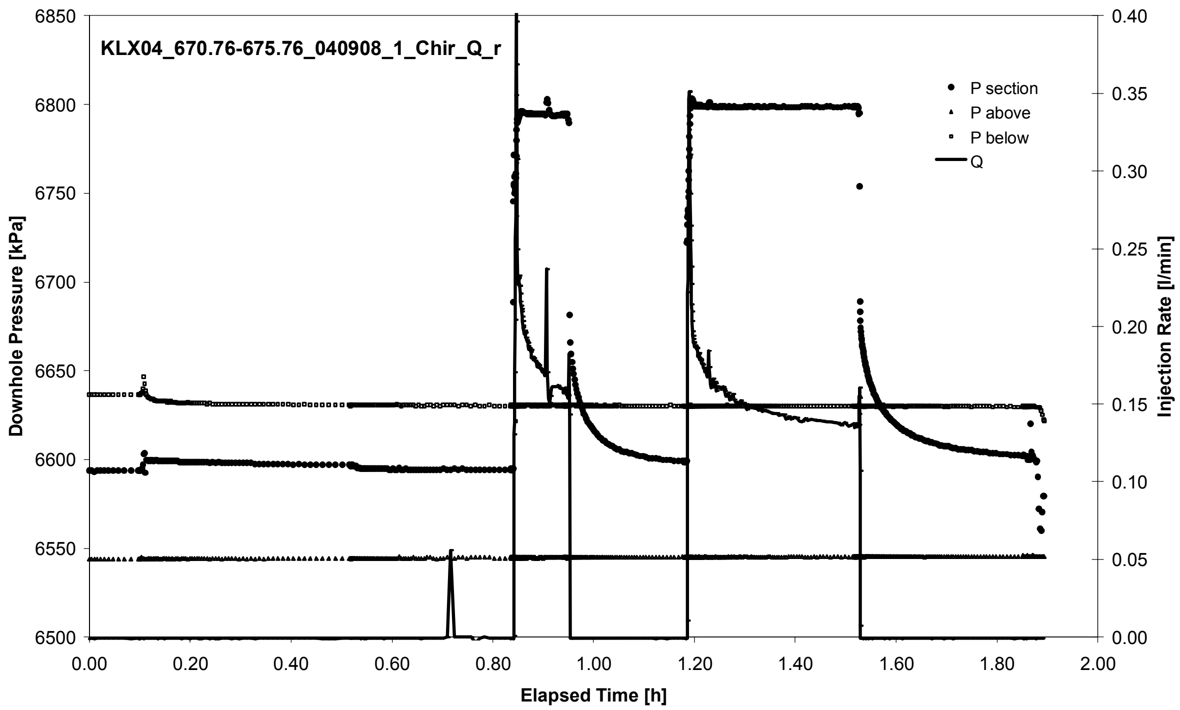


CHIR phase; HORNER match

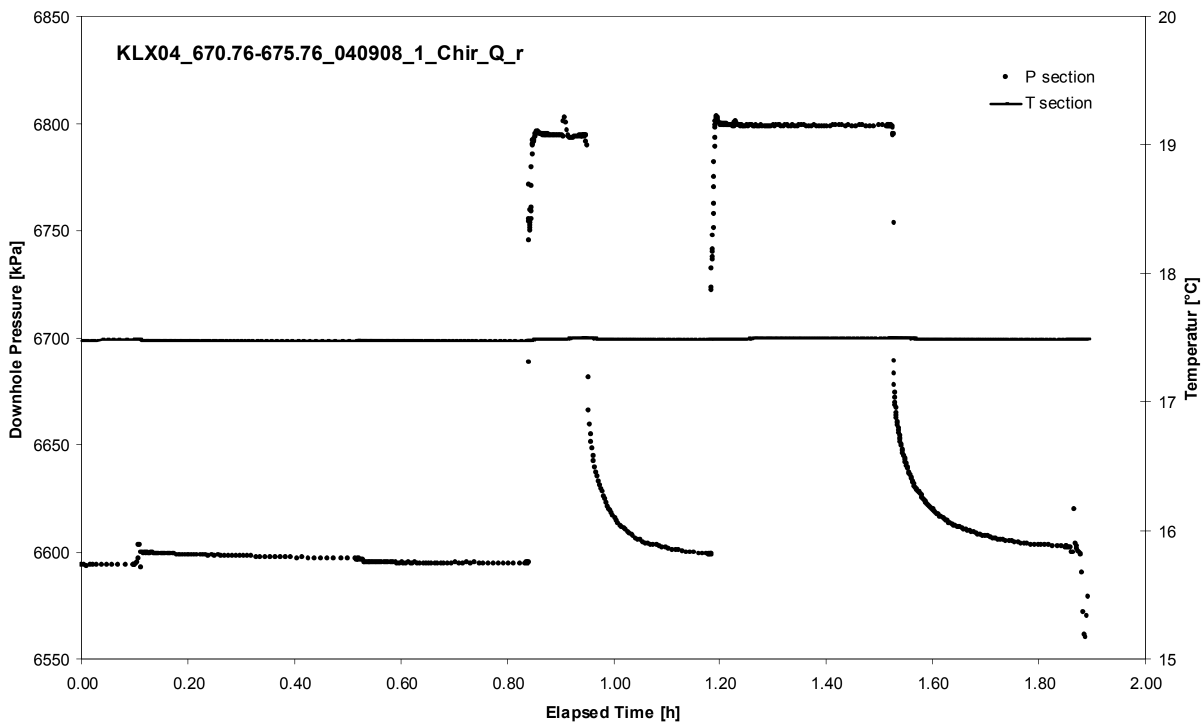
APPENDIX 2-115

Test 670.76-675.76 m

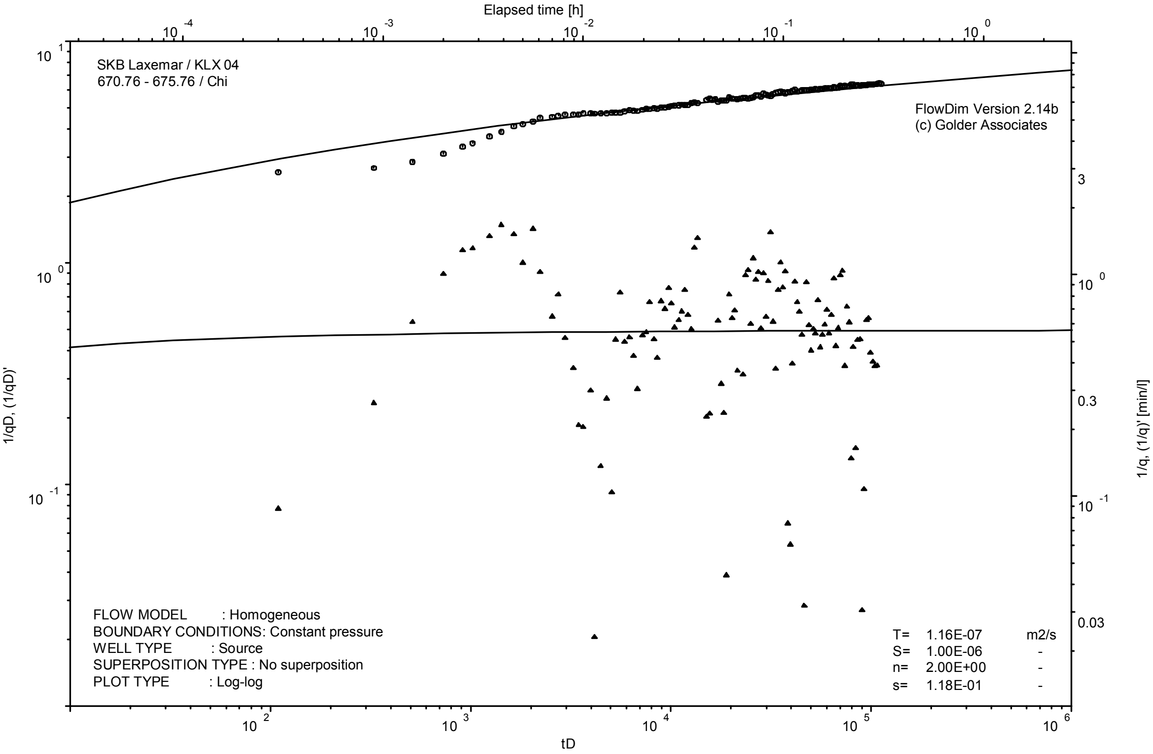
Analysis diagrams



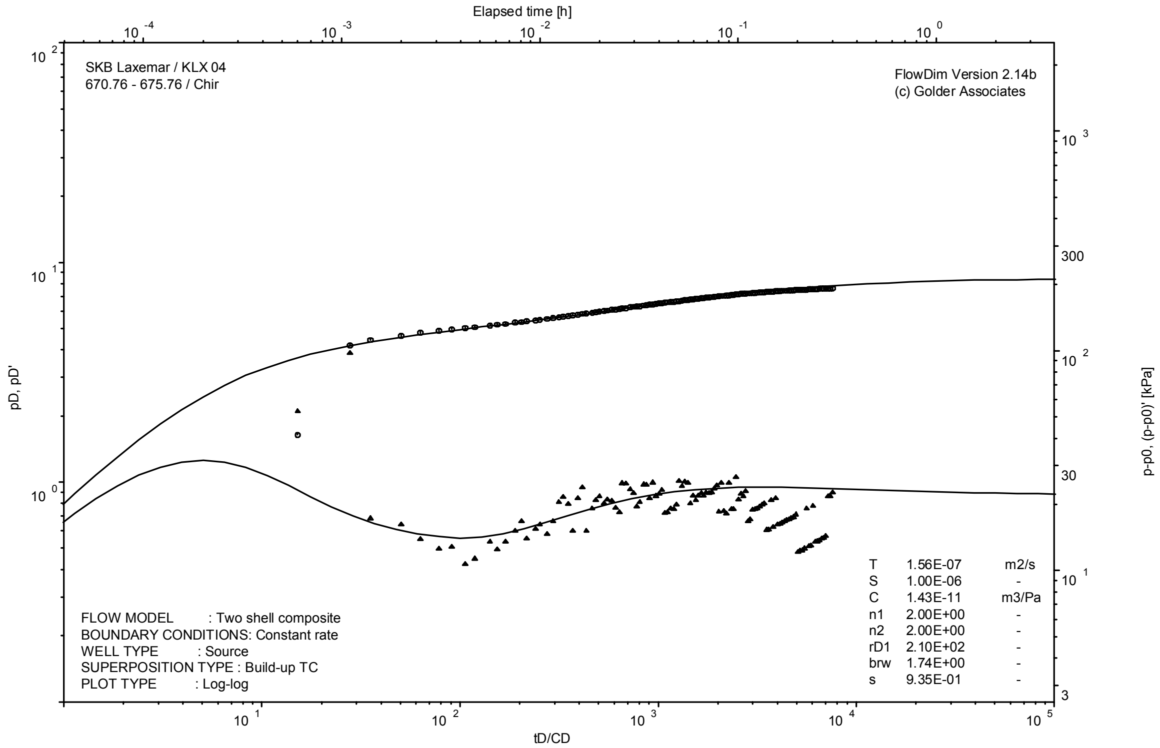
Pressure and flow rate vs. time; cartesian plot



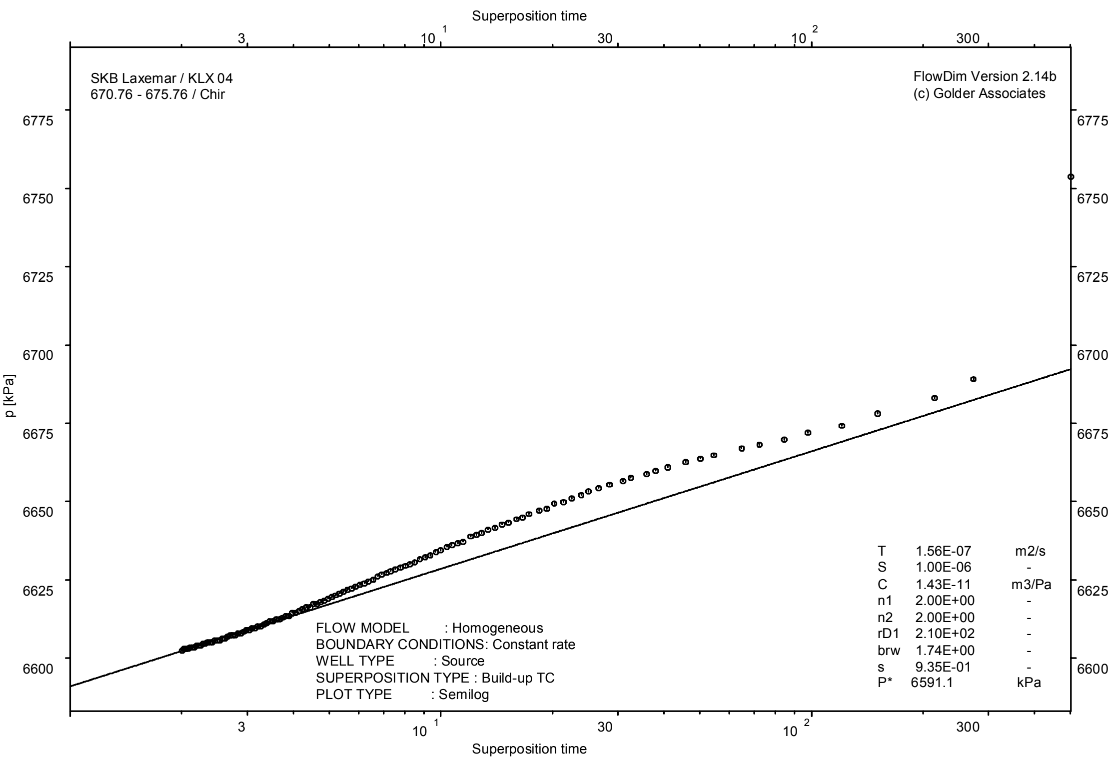
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

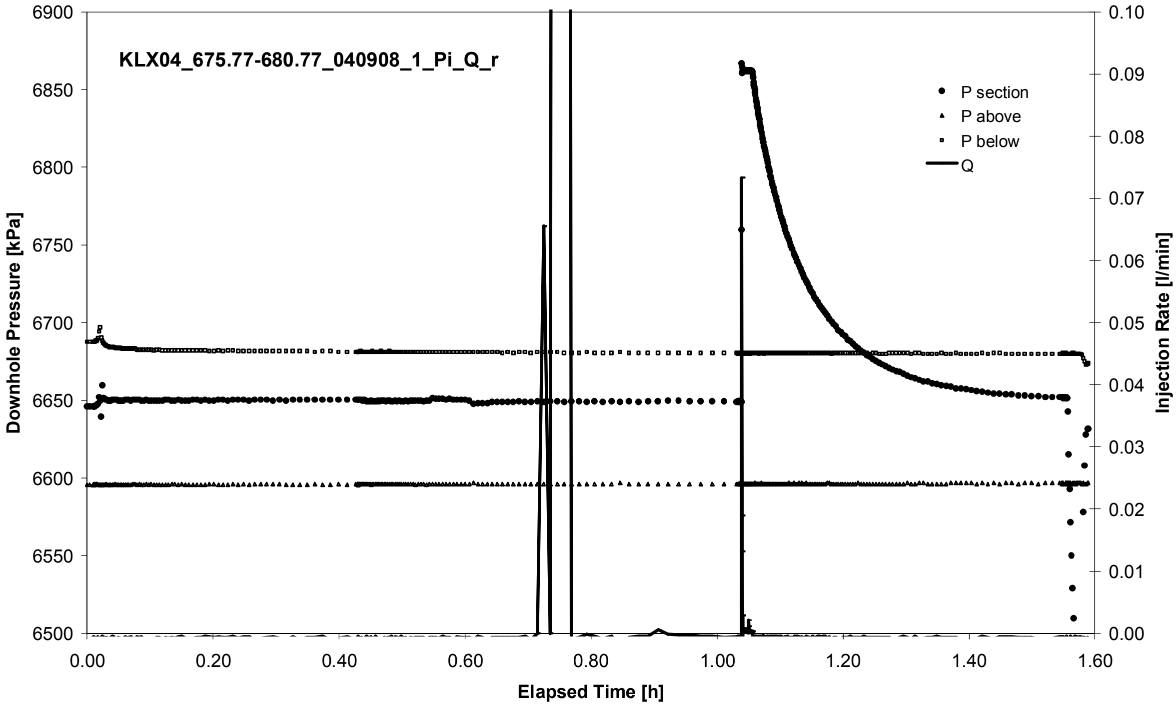


CHIR phase; HORNER match

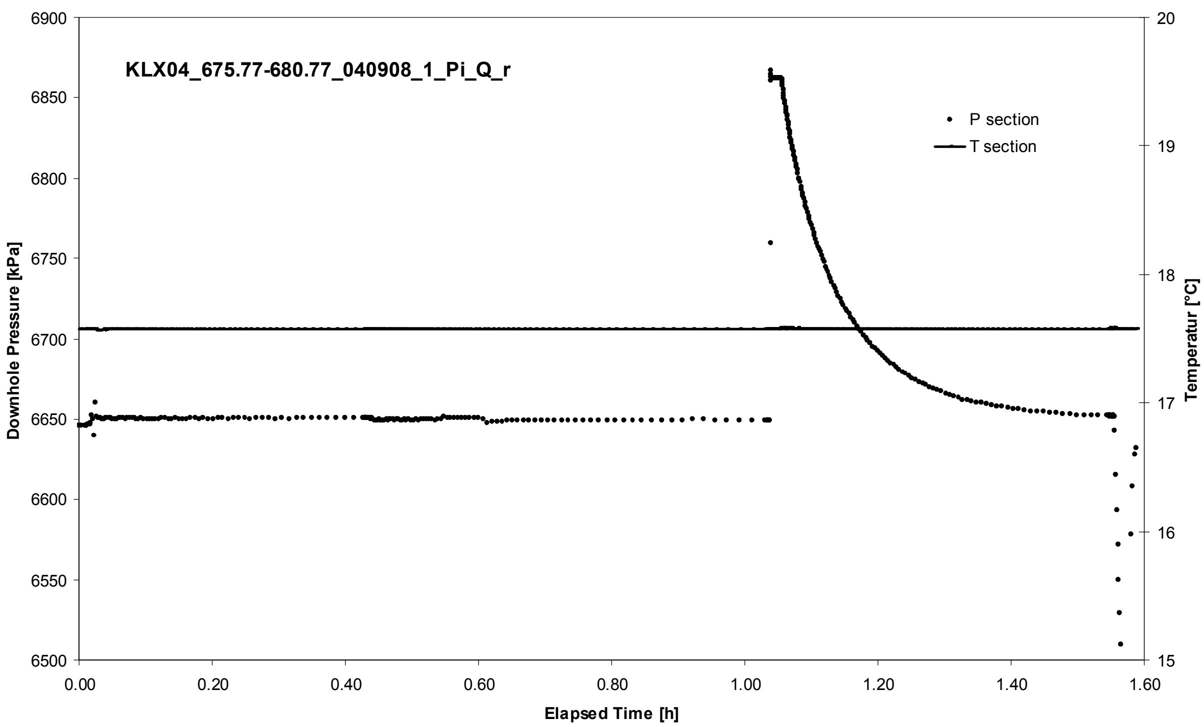
APPENDIX 2-116

Test 675.77 – 680.77 m

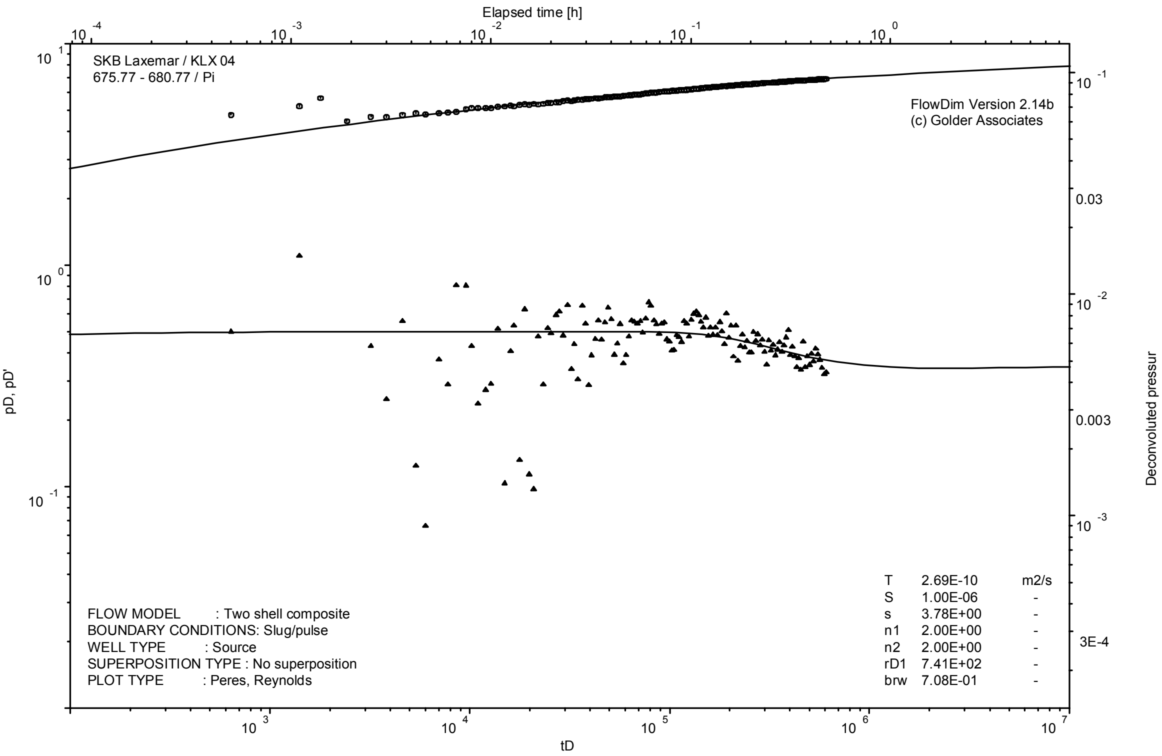
Analysis diagrams



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot

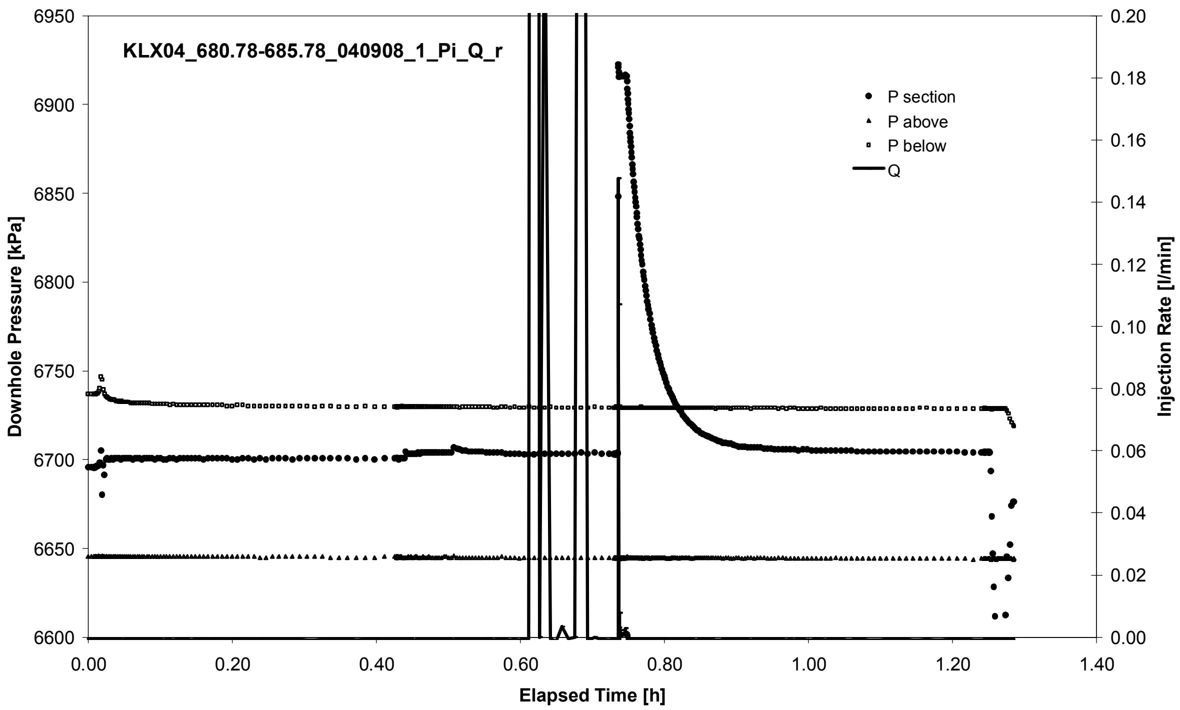


CHIR phase analysed as pulse injection; deconvolution match

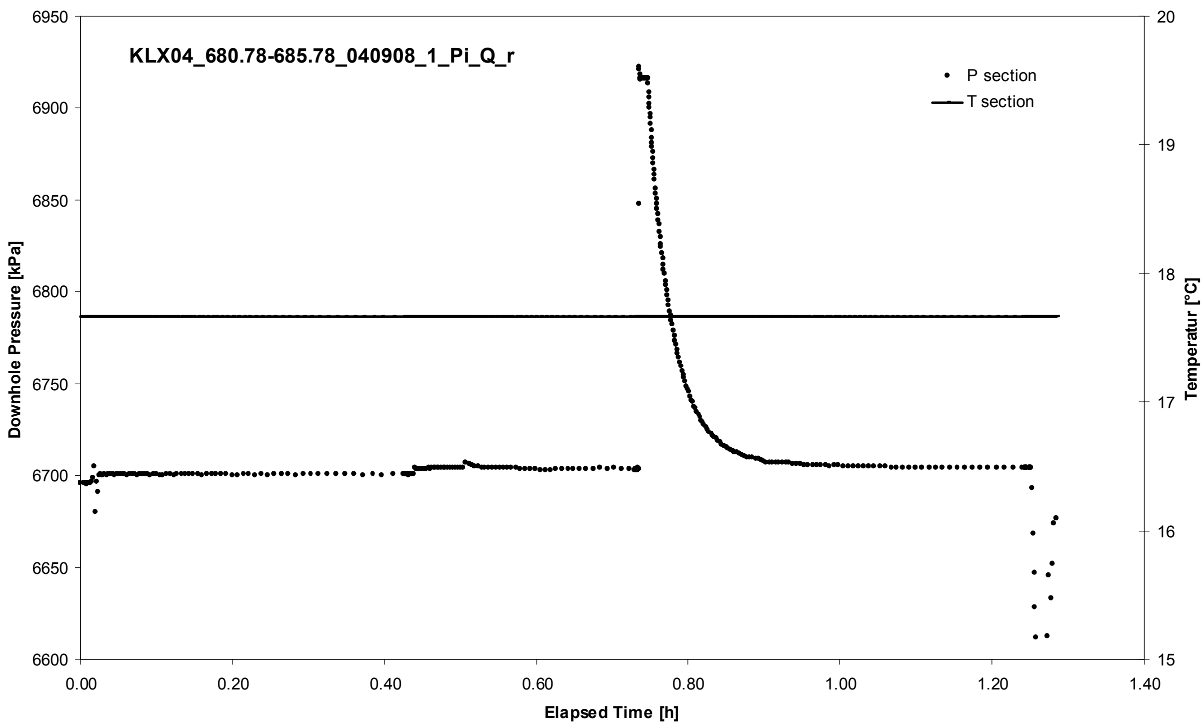
APPENDIX 2-117

Test 680.78 – 685.78 m

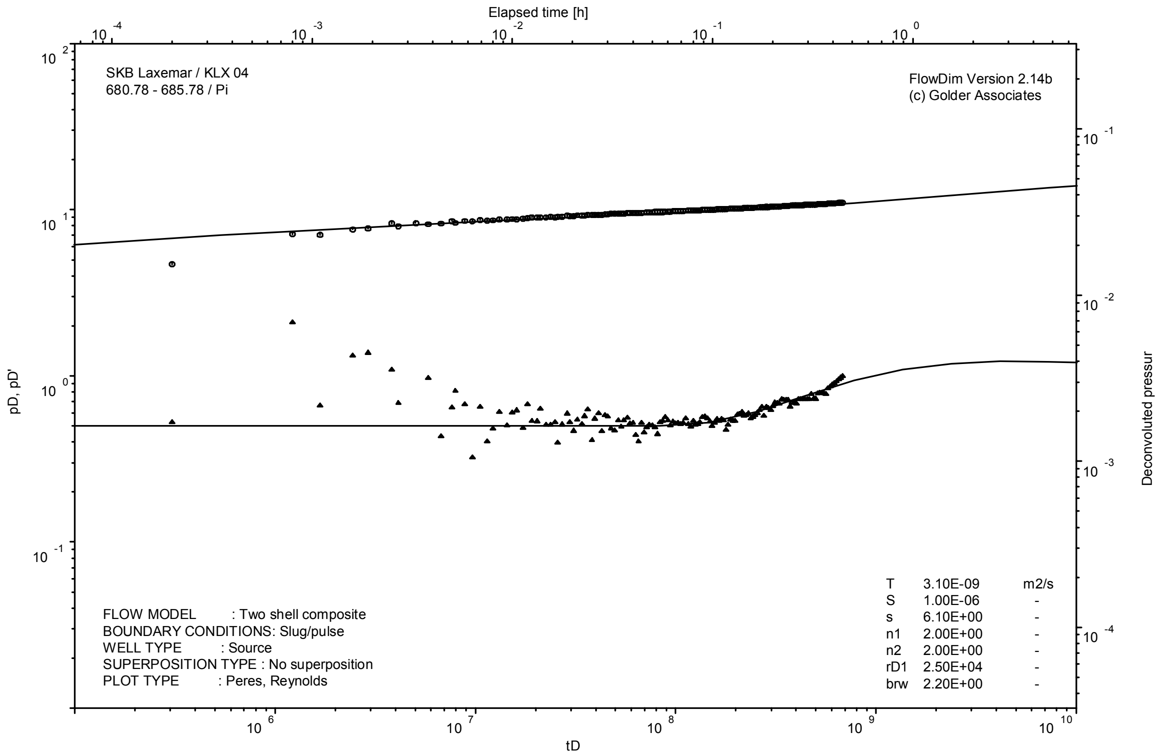
Analysis diagrams



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot



CHIR phase analysed as pulse injection; deconvolution match

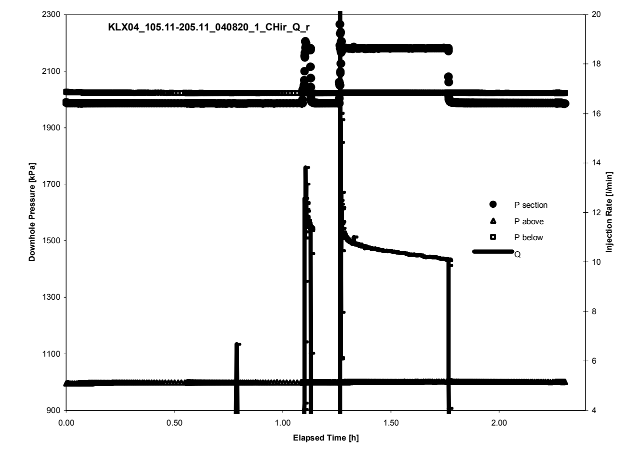
APPENDIX 3

Test Summary Sheets

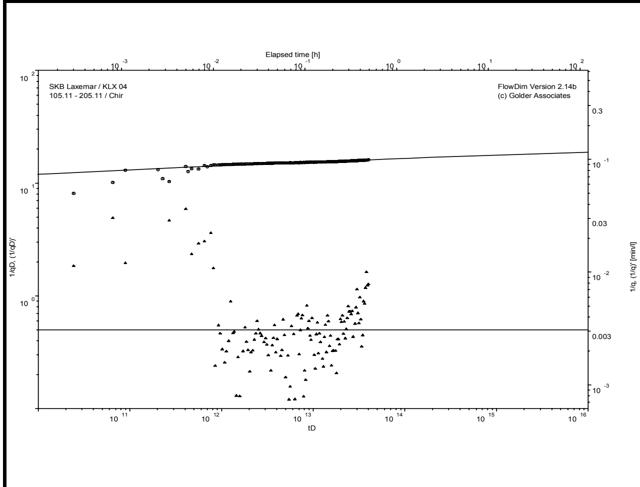
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040820 10:27
Test section from - to (m):	105.11-205.11 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

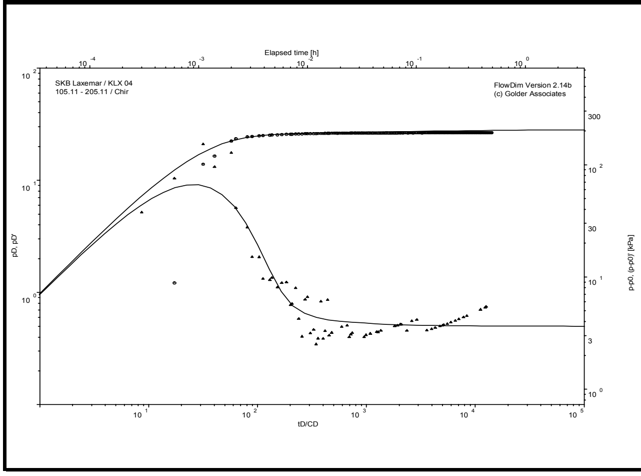
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	1986		
p_i (kPa) =	1986		
p_p(kPa) =	2181	p_F (kPa) =	1986
Q_p (m^3/s)=	1.68E-04		
tp (s) =	1800	t_F (s) =	1800
S el S^* (-)=	1.00E-04	S el S^* (-)=	1.00E-04
EC_w (mS/m)=			
$Temp_w$(gr C)=	9.7		
Derivative fact.=	0.02	Derivative fact.=	0.03
Results		**Results**	
Q/s (m^2/s)=	8.5E-06		
T_M (m^2/s)=	1.1E-05		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.71	dt_1 (min) =	0.68
dt_2 (min) =	16.93	dt_2 (min) =	10.69
T (m^2/s) =	2.2E-05	T (m^2/s) =	3.8E-03
S (-) =	1.0E-04	S (-) =	1.0E-04
K_s (m/s) =	2.2E-07	K_s (m/s) =	3.8E-05
S_s (1/m) =	1.0E-06	S_s (1/m) =	1.0E-06
C (m^3/Pa) =	NA	C (m^3/Pa) =	3.0E-09
C_D (-) =	NA	C_D (-) =	3.3E-03
ξ (-) =	9.4	ξ (-) =	21.3
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	0.71	C (m^3/Pa) =	3.0E-09
dt_2 (min) =	16.93	C_D (-) =	3.3E-03
T_T (m^2/s) =	2.2E-05	ξ (-) =	9.4
S (-) =	1.0E-04		
K_s (m/s) =	2.2E-07		
S_s (1/m) =	1.0E-06		

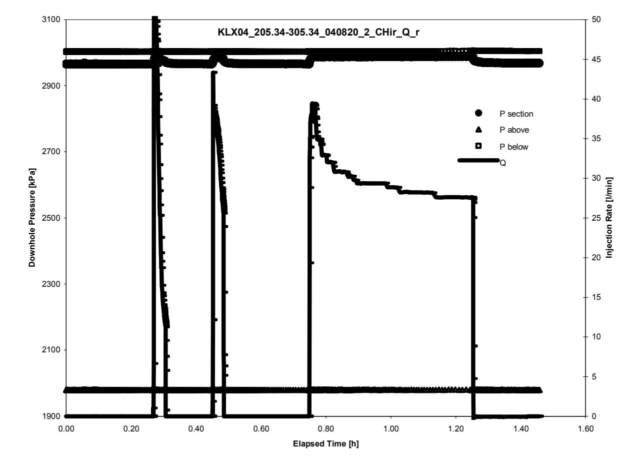
Comments:

The recommended transmissivity of 2.2E-5 m2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 8.0E-6 to 4.0E-5 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 1986.4 kPa.

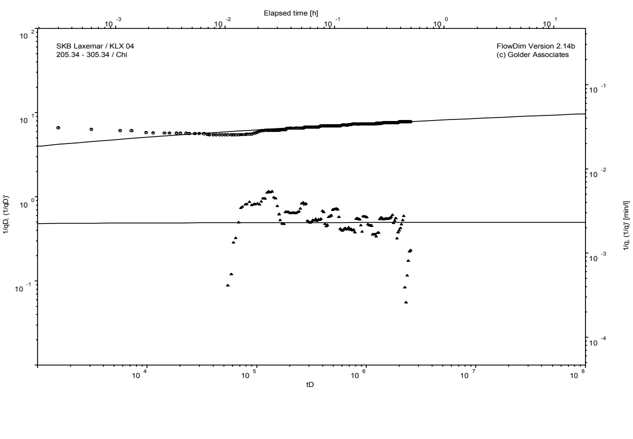
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	2
Borehole ID:	KLX04	Test start:	040820 16:11
Test section from - to (m):	205.34-305.34 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

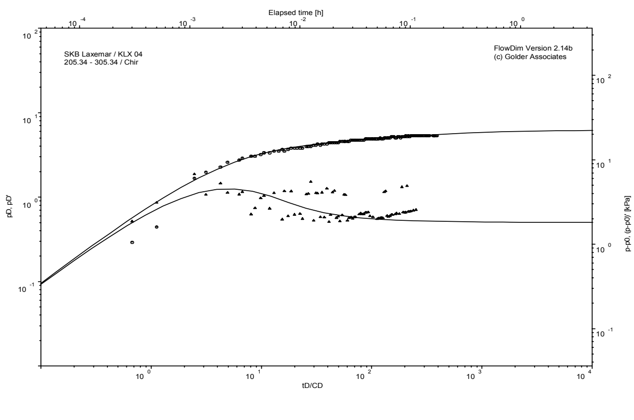
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	2965		
p_i (kPa) =	2966		
p_p(kPa) =	2987	p_F (kPa) =	2967
Q_p (m^3/s)=	4.60E-04		
tp (s) =	1800	t_F (s) =	600
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	11.3		
Derivative fact.=	0.18	Derivative fact.=	0.05
Results		**Results**	
Q/s (m^2/s)=	2.1E-04		
T_M (m^2/s)=	2.8E-04		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	5.17	dt_1 (min) =	1.87
dt_2 (min) =	24.47	dt_2 (min) =	4.77
T (m^2/s) =	2.7E-04	T (m^2/s) =	2.1E-04
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	2.7E-06	K_s (m/s) =	2.1E-06
S_s (1/m) =	1.0E-08	S_s (1/m) =	1.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	2.2E-07
C_D (-) =	NA	C_D (-) =	2.4E+01
ξ (-) =	-2.4	ξ (-) =	-3.9
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	1.87	C (m^3/Pa) =	2.2E-07
dt_2 (min) =	4.77	C_D (-) =	2.4E+01
T_T (m^2/s) =	2.1E-04	ξ (-) =	-3.9
S (-) =	1.0E-06		
K_s (m/s) =	2.1E-06		
S_s (1/m) =	1.0E-08		

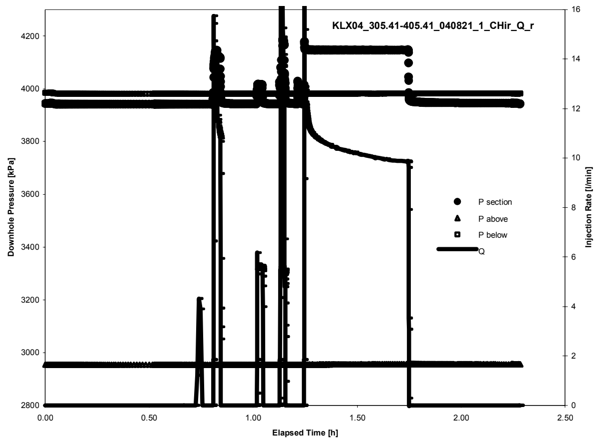
Comments:

The recommended transmissivity of 2.1E-4 m2/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 1.0E-4 to 4.0E-4 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 2966.1 kPa.

Test Summary Sheet

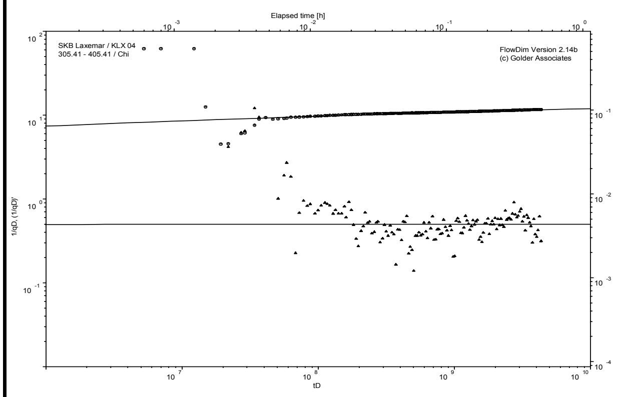
Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040821 08:14
Test section from - to (m):	305.41-405.41 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

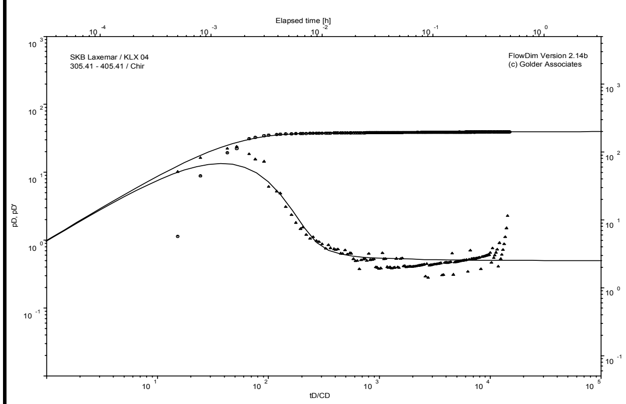


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	3944		
p_i (kPa) =	3943		
p_p(kPa) =	4146	p_F (kPa) =	3945
Q_p (m^3/s)=	1.64E-04		
tp (s) =	1800	t_F (s) =	1800
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	13.1		
Derivative fact.=	0.03	Derivative fact.=	0.18
Results		**Results**	
Q/s (m^2/s)=	7.9E-06		
T_M (m^2/s)=	1.0E-05		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	1.25	dt_1 (min) =	1.07
dt_2 (min) =	25.02	dt_2 (min) =	20.17
T (m^2/s) =	1.5E-05	T (m^2/s) =	5.4E-05
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	1.5E-07	K_s (m/s) =	5.4E-07
S_s (1/m) =	1.0E-08	S_s (1/m) =	1.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	4.1E-09
C_D (-) =	NA	C_D (-) =	4.5E-01
ξ (-) =	2.7	ξ (-) =	30.3
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Selected representative parameters.			
dt_1 (min) =	1.07	C (m^3/Pa) =	4.1E-09
dt_2 (min) =	20.17	C_D (-) =	4.5E-01
T_T (m^2/s) =	5.4E-05	ξ (-) =	30.3
S (-) =	1.0E-06		
K_s (m/s) =	5.4E-07		
S_s (1/m) =	1.0E-08		

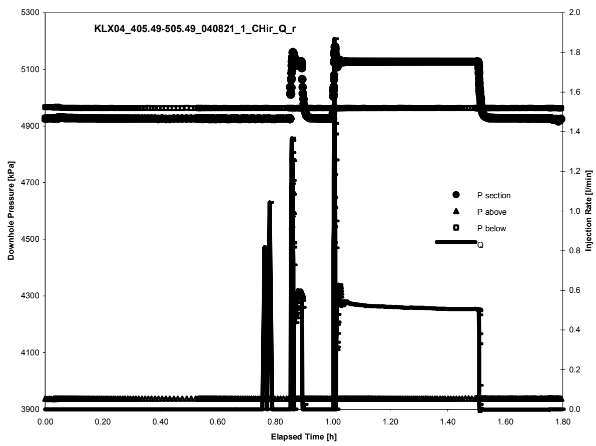
Comments:

The recommended transmissivity of 5.4E-5 m2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 7.5E-6 to 6.5E-5 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3943.1 kPa

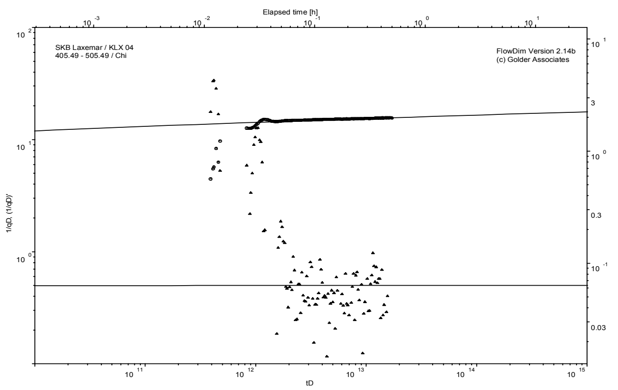
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040821 11:48
Test section from - to (m):	405.49-505.49 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

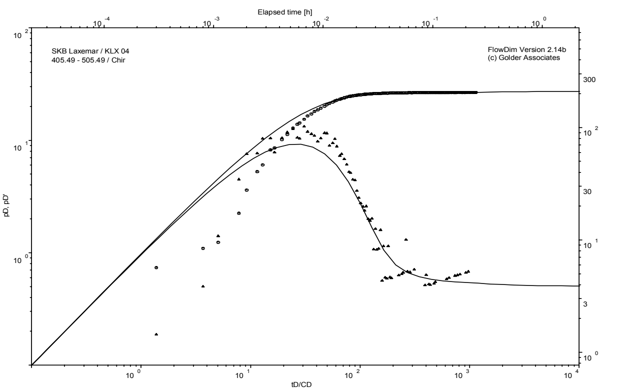
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	4926		
p_i (kPa) =	4926		
p_p(kPa) =	5126	p_F (kPa) =	4926
Q_p (m^3/s)=	8.41E-06		
tp (s) =	1800	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	14.6		
Derivative fact.=	0.02	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	4.1E-07		
T_M (m^2/s)=	5.4E-07		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	4.37	dt_1 (min) =	6.34
dt_2 (min) =	22.15	dt_2 (min) =	9.60
T (m^2/s) =	1.0E-06	T (m^2/s) =	1.8E-06
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	1.0E-08	K_s (m/s) =	1.8E-08
S_s (1/m) =	1.0E-08	S_s (1/m) =	1.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	8.9E-10
C_D (-) =	NA	C_D (-) =	9.8E-02
ξ (-) =	8.2	ξ (-) =	19.6
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	4.37	C (m^3/Pa) =	8.9E-10
dt_2 (min) =	22.15	C_D (-) =	9.8E-02
T_T (m^2/s) =	1.0E-06	ξ (-) =	8.2
S (-) =	1.0E-06		
K_s (m/s) =	1.0E-08		
S_s (1/m) =	1.0E-08		

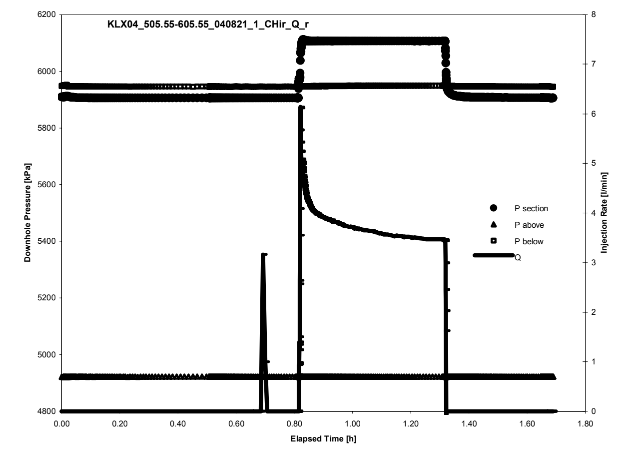
Comments:

The recommended transmissivity of 1.0E-6 m2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 5.0E-7 to 2.0E-6 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 4924.2 kPa.

Test Summary Sheet

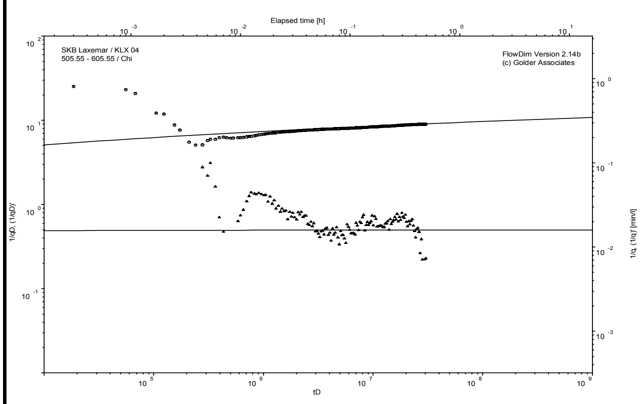
Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040821 14:57
Test section from - to (m):	505.55-605.55 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

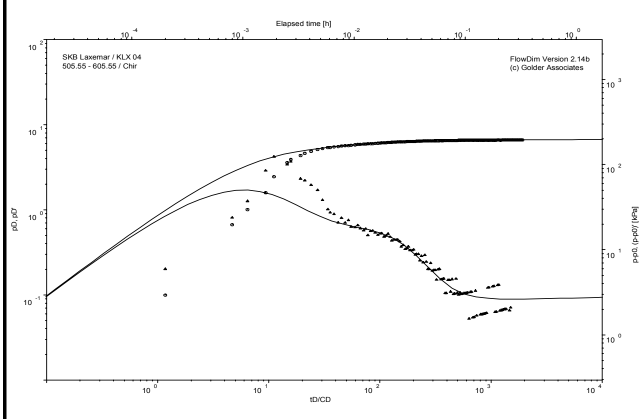


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	5909		
p_i (kPa) =	5906		
p_p(kPa) =	6106	p_F (kPa) =	5907
Q_p (m^3/s)=	5.78E-05		
tp (s) =	1800	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	16.3		
Derivative fact.=	0.07	Derivative fact.=	0.08
Results		**Results**	
Q/s (m^2/s)=	2.8E-06		
T_M (m^2/s)=	3.7E-06		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	3.37	dt_1 (min) =	0.56
dt_2 (min) =	8.18	dt_2 (min) =	1.12
T (m^2/s) =	4.1E-06	T (m^2/s) =	3.3E-06
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	4.1E-08	K_s (m/s) =	3.3E-08
S_s (1/m) =	1.0E-08	S_s (1/m) =	1.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.3E-09
C_D (-) =	NA	C_D (-) =	1.4E-01
ξ (-) =	0.9	ξ (-) =	-0.2
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	3.37	C (m^3/Pa) =	1.3E-09
dt_2 (min) =	8.18	C_D (-) =	1.4E-01
T_T (m^2/s) =	4.1E-06	ξ (-) =	0.9
S (-) =	1.0E-06		
K_s (m/s) =	4.1E-08		
S_s (1/m) =	1.0E-08		

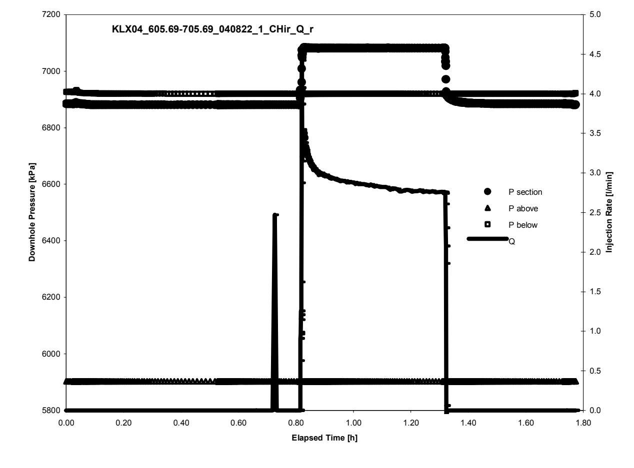
Comments:

The recommended transmissivity of 4.1E-6 m2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 1.0E-6 to 5.0E-6 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 5905.1 kPa.

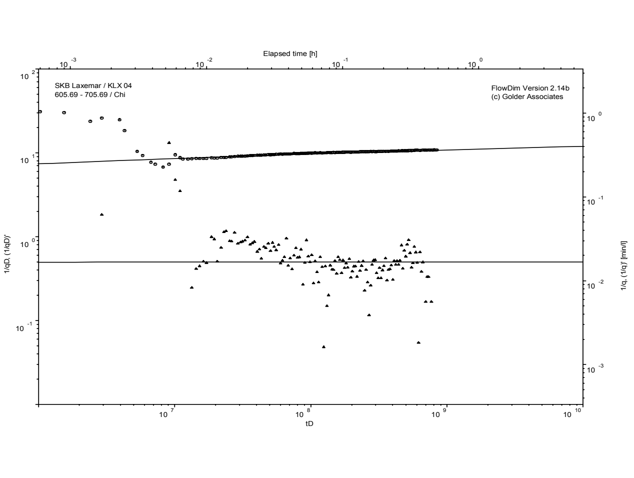
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	7
Borehole ID:	KLX04	Test start:	040822 08:12
Test section from - to (m):	605.69-705.69 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

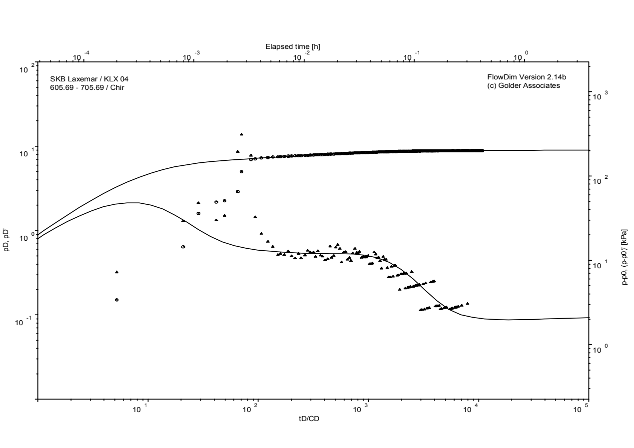
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	6884		
p_i (kPa) =	6881		
p_p(kPa) =	7082	p_F (kPa) =	6884
Q_p (m^3/s)=	4.60E-05		
tp (s) =	1800	t_F (s) =	1500
S el S* (-)=	1.00E-06	S el S* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	18.1		
Derivative fact.=	0.05	Derivative fact.=	0.05
Results		**Results**	
Q/s (m^2/s)=	2.2E-06		
T_M (m^2/s)=	2.9E-06		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	2.17	dt_1 (min) =	0.37
dt_2 (min) =	23.29	dt_2 (min) =	2.28
T (m^2/s) =	3.9E-06	T (m^2/s) =	3.3E-06
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	3.9E-08	K_s (m/s) =	3.3E-08
S_s (1/m) =	1.0E-08	S_s (1/m) =	1.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	2.9E-10
C_D (-) =	NA	C_D (-) =	3.2E-02
ξ (-) =	2.6	ξ (-) =	1.7
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	2.17	C (m^3/Pa) =	2.9E-10
dt_2 (min) =	23.29	C_D (-) =	3.2E-02
T_T (m^2/s) =	3.9E-06	ξ (-) =	2.6
S (-) =	1.0E-06		
K_s (m/s) =	3.9E-08		
S_s (1/m) =	1.0E-08		

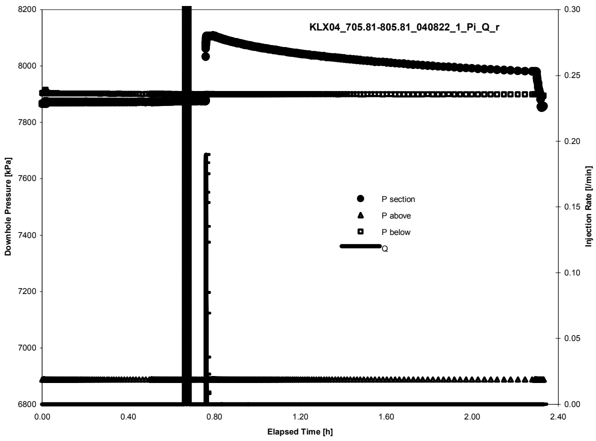
Comments:

The recommended transmissivity of 3.9E-6 m2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 2.0E-6 to 5.0E-6 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 6882.9 kPa.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Pi
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040822 11:37
Test section from - to (m):	705.81-805.81 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

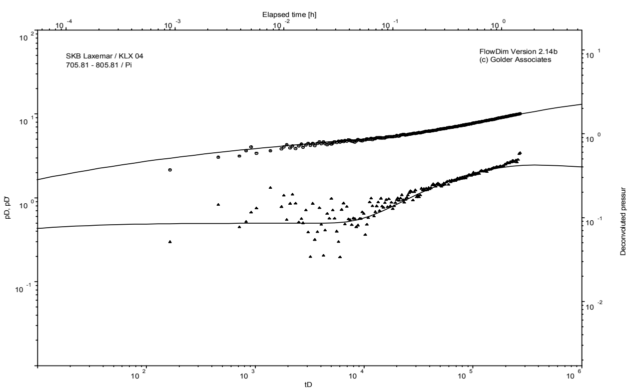


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	7866		
p_i (kPa) =	7876		
p_p(kPa) =	8104	p_F (kPa) =	7980
Q_p (m^3/s)=	-		
tp (s) =	-	t_F (s) =	5400
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	19.7		
Derivative fact.=	-	Derivative fact.=	0.14
Results		**Results**	
Q/s (m^2/s)=	NA		
T_M (m^2/s)=	NA		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	-	dt_1 (min) =	0.27
dt_2 (min) =	-	dt_2 (min) =	2.52
T (m^2/s) =	NA	T (m^2/s) =	3.5E-10
S (-) =	NA	S (-) =	1.0E-06
K_s (m/s) =	NA	K_s (m/s) =	3.5E-12
S_s (1/m) =	NA	S_s (1/m) =	1.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.4E-10
C_D (-) =	NA	C_D (-) =	1.5E-02
ξ (-) =	NA	ξ (-) =	2.7
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Log-Log plot incl. derivates- flow period

Not Analysed

Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	0.27	C (m^3/Pa) =	1.4E-10
dt_2 (min) =	2.52	C_D (-) =	1.5E-02
T_T (m^2/s) =	3.5E-10	ξ (-) =	2.7
S (-) =	1.0E-06		
K_s (m/s) =	3.5E-12		
S_s (1/m) =	1.0E-08		

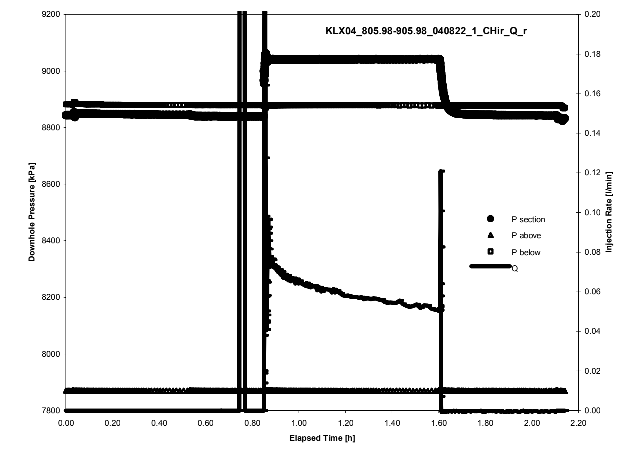
Comments:

The recommended transmissivity of 3.5E-10 m2/s was derived from the analysis of the Pi phase. It should be noted that due to the very low interval transmissivity the results are very uncertain. The confidence range for the interval transmissivity is estimated to be 8.0E-11 to 7.0E-10 m2/s. The flow dimension displayed during the test is 2. No static pressure could be derived.

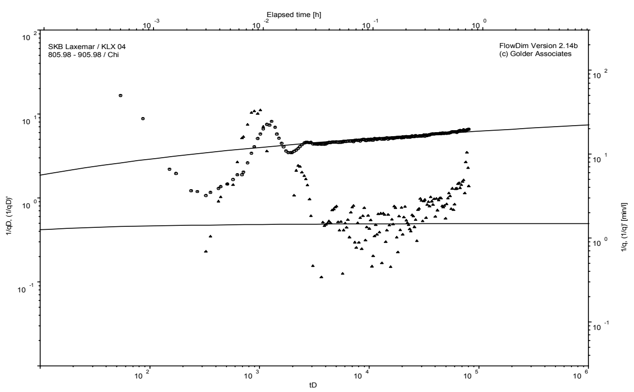
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040822 15:17
Test section from - to (m):	805.98-905.98 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

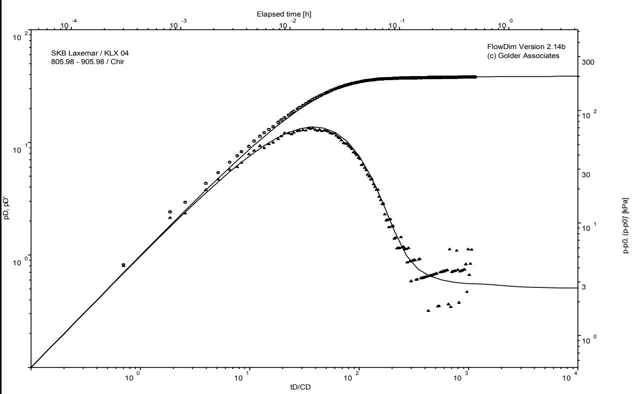
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	8844		
p_i (kPa) =	8840		
p_p(kPa) =	9040	p_F (kPa) =	8842
Q_p (m^3/s)=	8.57E-07		
tp (s) =	2700	t_F (s) =	1800
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	21.3		
Derivative fact.=	0.08	Derivative fact.=	0.09
Results		**Results**	
Q/s (m^2/s)=	4.2E-08		
T_M (m^2/s)=	5.5E-08		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	3.07	dt_1 (min) =	*
dt_2 (min) =	17.02	dt_2 (min) =	*
T (m^2/s) =	4.3E-08	T (m^2/s) =	3.0E-07
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	4.3E-10	K_s (m/s) =	3.0E-09
S_s (1/m) =	1.0E-08	S_s (1/m) =	1.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	3.0E-10
C_D (-) =	NA	C_D (-) =	3.3E-02
ξ (-) =	0.0	ξ (-) =	31.6
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	3.07	C (m^3/Pa) =	3.0E-10
dt_2 (min) =	17.02	C_D (-) =	3.3E-02
T_T (m^2/s) =	4.3E-08	ξ (-) =	0
S (-) =	1.0E-06		
K_s (m/s) =	4.3E-10		
S_s (1/m) =	1.0E-08		

Comments:

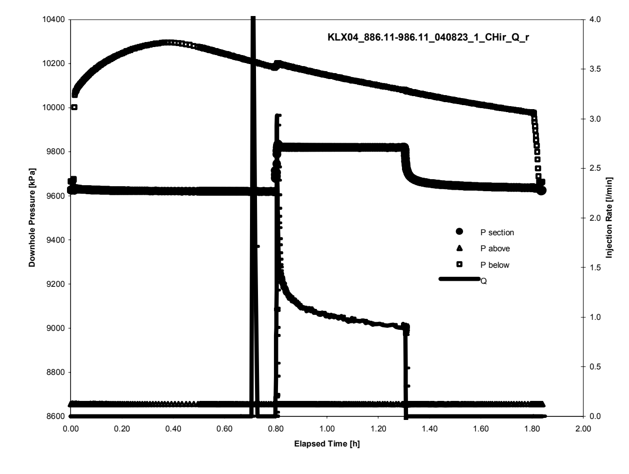
*: IARF not measured

The recommended transmissivity of 4.3E-8 m2/s was derived from the analysis of the CHi phase, which is the phase that shows infinite acting radial flow. The confidence range for the interval transmissivity is estimated to be 2.0E-8 to 8.0E-8 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 8838.7 kPa.

Test Summary Sheet

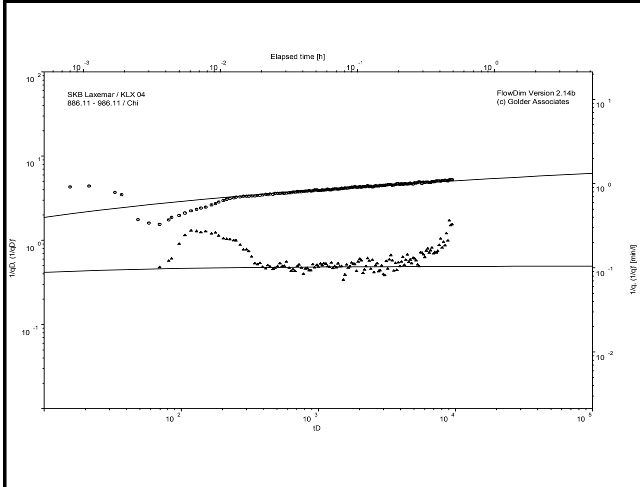
Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040823 08:00
Test section from - to (m):	886.11-986.11 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

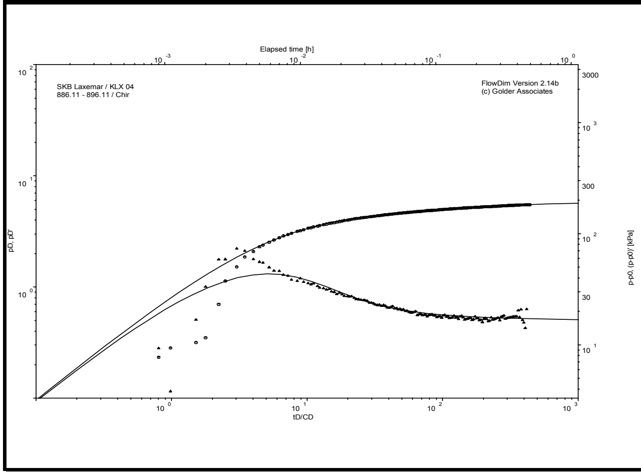


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	9627		
p_i (kPa) =	9620		
p_p(kPa) =	9819	p_F (kPa) =	9637
Q_p (m^3/s)=	1.49E-05		
tp (s) =	1800	t_F (s) =	1800
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	22.6		
Derivative fact.=	0.21	Derivative fact.=	0.18
Results		**Results**	
Q/s (m^2/s)=	7.4E-07		
T_M (m^2/s)=	9.6E-07		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	1.22	dt_1 (min) =	4.02
dt_2 (min) =	13.18	dt_2 (min) =	24.94
T (m^2/s) =	6.1E-07	T (m^2/s) =	8.2E-07
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	6.1E-09	K_s (m/s) =	8.2E-09
S_s (1/m) =	1.0E-08	S_s (1/m) =	1.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	2.1E-09
C_D (-) =	NA	C_D (-) =	2.3E-01
ξ (-) =	-2.2	ξ (-) =	-1.4
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Selected representative parameters.			
dt_1 (min) =	4.02	C (m^3/Pa) =	2.1E-09
dt_2 (min) =	24.94	C_D (-) =	2.3E-01
T_T (m^2/s) =	8.2E-07	ξ (-) =	-1.4
S (-) =	1.0E-06		
K_s (m/s) =	8.2E-09		
S_s (1/m) =	1.0E-08		

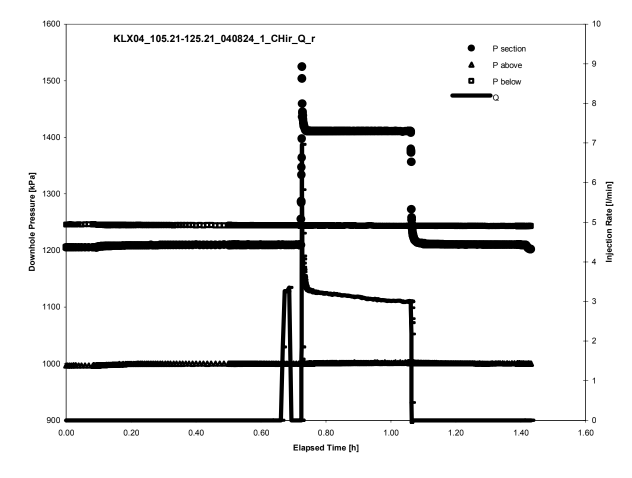
Comments:

The recommended transmissivity of 8.2E-7 m2/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 6.0E-7 to 1.0E-6 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 9623.8 kPa.

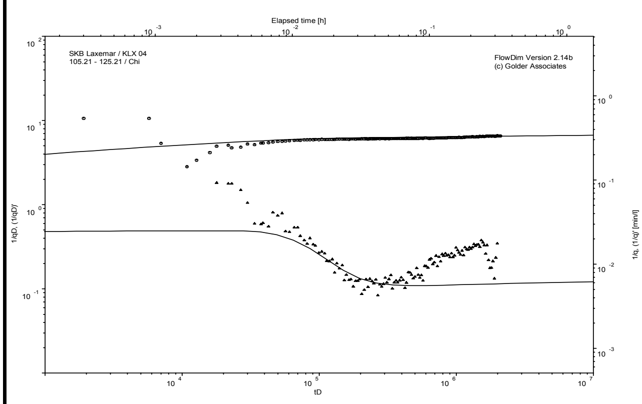
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040824 07:29
Test section from - to (m):	105.21-125.21 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

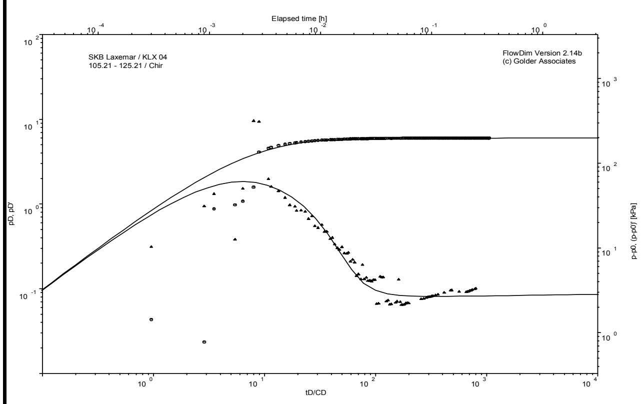
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	1205		
p_i (kPa) =	1209		
p_p(kPa) =	1410	p_F (kPa) =	1209
Q_p (m^3/s)=	5.00E-05		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	8.6		
Derivative fact.=	0.30	Derivative fact.=	0.05
Results		**Results**	
Q/s (m^2/s)=	2.4E-06		
T_M (m^2/s)=	2.6E-06		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	1.85	dt_1 (min) =	2.00
dt_2 (min) =	3.52	dt_2 (min) =	5.10
T (m^2/s) =	2.6E-06	T (m^2/s) =	2.5E-06
S (-) =	1.0E-04	S (-) =	1.0E-04
K_s (m/s) =	1.3E-07	K_s (m/s) =	1.2E-07
S_s (1/m) =	5.0E-06	S_s (1/m) =	5.0E-06
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.8E-09
C_D (-) =	NA	C_D (-) =	2.0E-03
ξ (-) =	2.3	ξ (-) =	2.3
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.			
dt_1 (min) =	1.85	C (m^3/Pa) =	1.8E-09
dt_2 (min) =	3.52	C_D (-) =	2.0E-03
T_T (m^2/s) =	2.6E-06	ξ (-) =	2.3
S (-) =	1.0E-04		
K_s (m/s) =	1.3E-07		
S_s (1/m) =	5.0E-06		

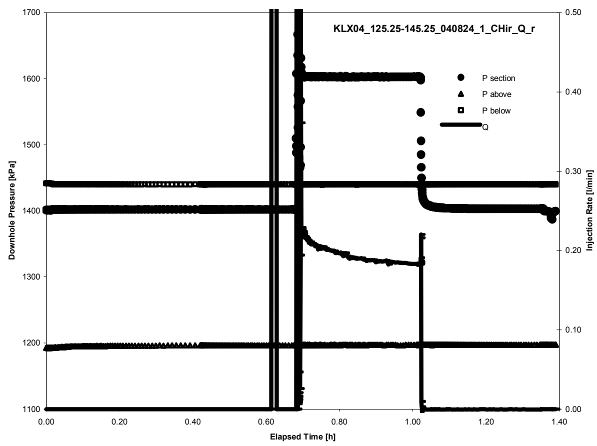
Comments:

The recommended transmissivity of 2.6E-6 m2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 9.0E-7 to 5.0E-6 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 1209.2 kPa.

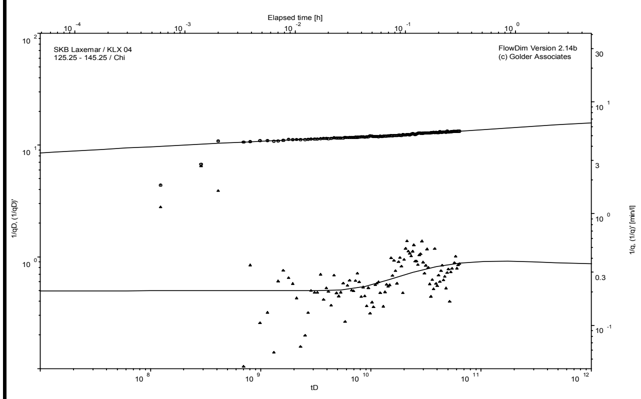
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040824 09:54
Test section from - to (m):	125.25-145.25 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

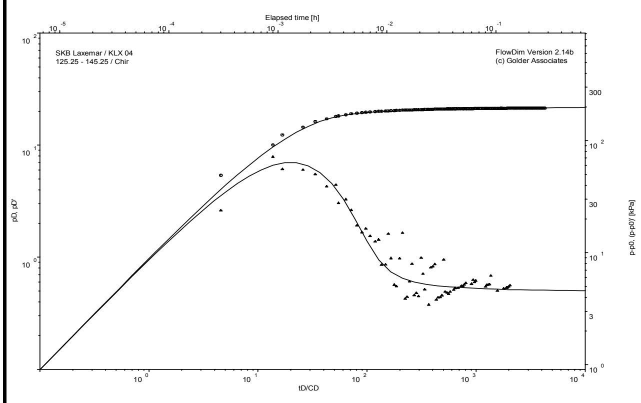
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	1401		
p_i (kPa) =	1402		
p_p(kPa) =	1602	p_F (kPa) =	1402
Q_p (m^3/s)=	3.05E-06		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-04	S el S^* (-)=	1.00E-04
EC_w (mS/m)=			
$Temp_w$(gr C)=	9		
Derivative fact.=	0.10	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	1.5E-07		
T_M (m^2/s)=	1.6E-07		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.62	dt_1 (min) =	1.85
dt_2 (min) =	2.03	dt_2 (min) =	8.08
T (m^2/s) =	3.2E-07	T (m^2/s) =	5.6E-07
S (-) =	1.0E-04	S (-) =	1.0E-04
K_s (m/s) =	1.6E-08	K_s (m/s) =	2.8E-08
S_s (1/m) =	5.0E-06	S_s (1/m) =	5.0E-06
C (m^3/Pa) =	NA	C (m^3/Pa) =	8.4E-11
C_D (-) =	NA	C_D (-) =	9.3E-05
ξ (-) =	8.5	ξ (-) =	17.3
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	1.85	C (m^3/Pa) =	8.4E-11
dt_2 (min) =	8.08	C_D (-) =	9.3E-05
T_T (m^2/s) =	5.6E-07	ξ (-) =	17.3
S (-) =	1.0E-04		
K_s (m/s) =	2.8E-08		
S_s (1/m) =	5.0E-06		

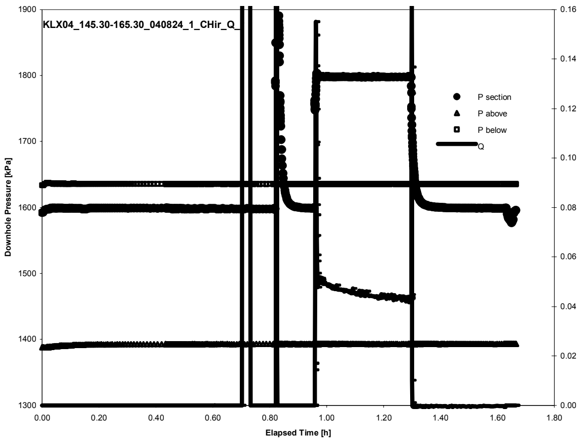
Comments:

The recommended transmissivity of 5.6E-7 m2/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 1.0E-7 to 7.0E-7 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 1402.5 kPa.

Test Summary Sheet

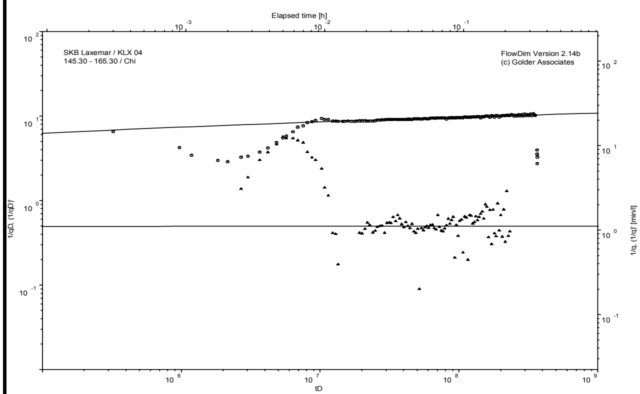
Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040824 21:02
Test section from - to (m):	145.30-165.30	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

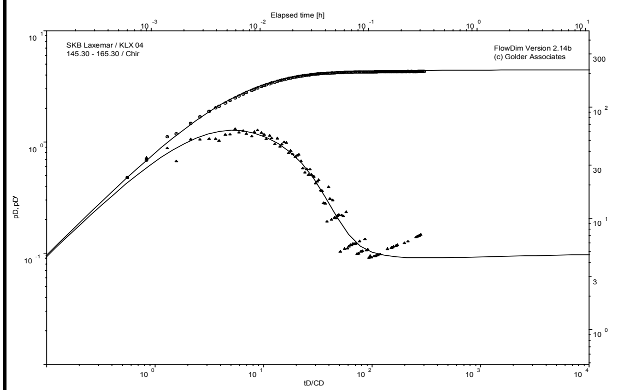


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	1597		
p_i (kPa) =	1598		
p_p(kPa) =	1798	p_F (kPa) =	1598
Q_p (m^3/s)=	7.20E-07		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-04	S el S^* (-)=	1.00E-04
EC_w (mS/m)=			
$Temp_w$(gr C)=	9.2		
Derivative fact.=	0.18	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	3.5E-08		
T_M (m^2/s)=	3.7E-08		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	1.12	dt_1 (min) =	*
dt_2 (min) =	10.84	dt_2 (min) =	*
T (m^2/s) =	5.8E-08	T (m^2/s) =	1.3E-07
S (-) =	1.0E-04	S (-) =	1.0E-04
K_s (m/s) =	2.9E-09	K_s (m/s) =	6.6E-09
S_s (1/m) =	5.0E-06	S_s (1/m) =	5.0E-06
C (m^3/Pa) =	NA	C (m^3/Pa) =	6.4E-11
C_D (-) =	NA	C_D (-) =	7.1E-05
ξ (-) =	6.8	ξ (-) =	2.5
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	1.12	C (m^3/Pa) =	6.4E-11
dt_2 (min) =	10.84	C_D (-) =	7.1E-05
T_T (m^2/s) =	5.8E-08	ξ (-) =	6.8
S (-) =	1.0E-04		
K_s (m/s) =	2.9E-09		
S_s (1/m) =	5.0E-06		

Comments:

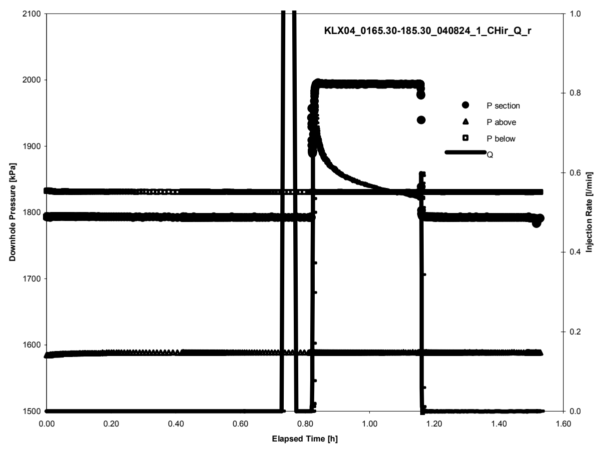
*: IARF not measured

The recommended transmissivity of 5.8E-8 m2/s was derived from the analysis of the Chi, which shows a clear infinite acting radial flow and the best derivative quality. The confidence range for the interval transmissivity is estimated to be 2.0E-8 to 7.0E-8 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 1597.2 kPa.

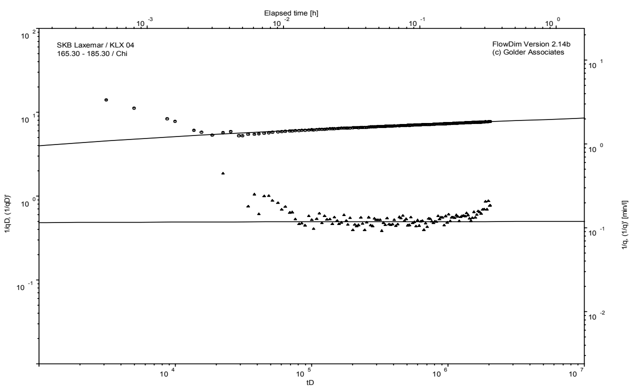
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040824 23:44
Test section from - to (m):	165.30-185.30 m	Responsible for test execution:	Jörg Böhner
Section diameter, 2·r_w (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

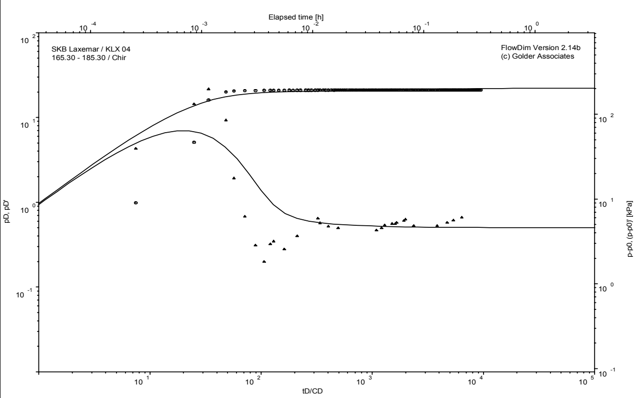
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	1793		
p_i (kPa) =	1793		
p_p(kPa) =	1993	p_F (kPa) =	1793
Q_p (m^3/s)=	8.97E-06		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-04	S el S^* (-)=	1.00E-04
EC_w (mS/m)=			
$Temp_w$(gr C)=	9.5		
Derivative fact.=	0.07	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	4.4E-07		
T_M (m^2/s)=	4.6E-07		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.78	dt_1 (min) =	0.67
dt_2 (min) =	14.23	dt_2 (min) =	7.92
T (m^2/s) =	5.4E-07	T (m^2/s) =	1.7E-06
S (-) =	1.0E-04	S (-) =	1.0E-04
K_s (m/s) =	2.7E-08	K_s (m/s) =	8.3E-08
S_s (1/m) =	5.0E-06	S_s (1/m) =	5.0E-06
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.3E-10
C_D (-) =	NA	C_D (-) =	1.4E-04
ξ (-) =	2.6	ξ (-) =	17.1
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	0.78	C (m^3/Pa) =	1.3E-10
dt_2 (min) =	14.23	C_D (-) =	1.4E-04
T_T (m^2/s) =	5.4E-07	ξ (-) =	2.6
S (-) =	1.0E-04		
K_s (m/s) =	2.7E-08		
S_s (1/m) =	5.0E-06		

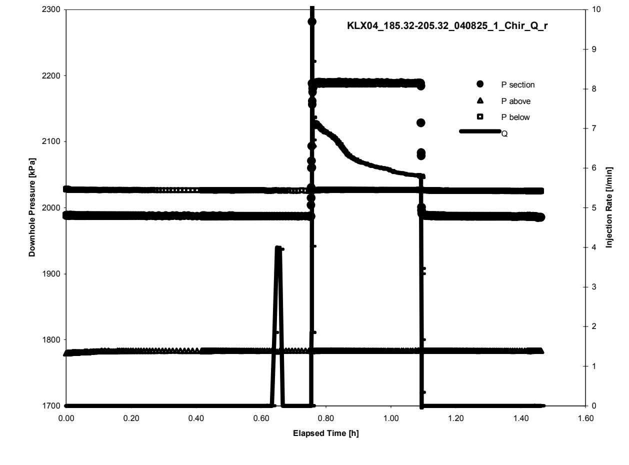
Comments:

The recommended transmissivity of 5.4E-7 m2/s was derived from the analysis of the Chi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 3.0E-7 to 7.0E-7 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 1792.2 kPa.

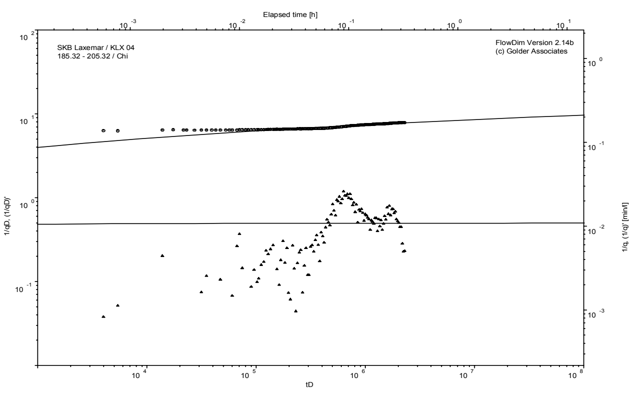
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040825 06:35
Test section from - to (m):	185.32-205.32 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

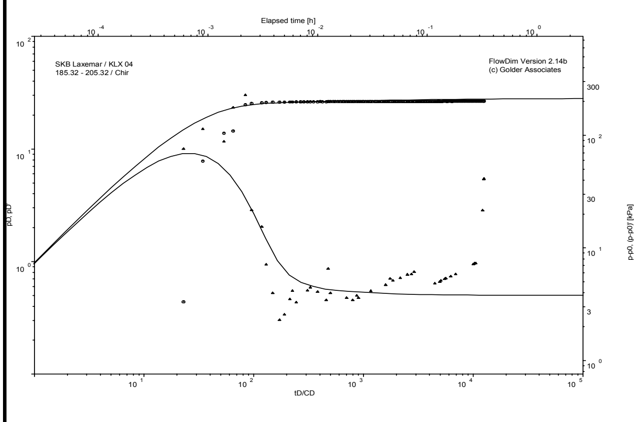
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	1988		
p_i (kPa) =	1987		
p_p(kPa) =	2188	p_F (kPa) =	1986
Q_p (m^3/s)=	9.69E-05		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-04	S el S^* (-)=	1.00E-04
EC_w (mS/m)=			
$Temp_w$(gr C)=	9.7		
Derivative fact.=	0	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	4.7E-06		
T_M (m^2/s)=	4.9E-06		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	8.28	dt_1 (min) =	0.79
dt_2 (min) =	12.48	dt_2 (min) =	8.87
T (m^2/s) =	5.9E-06	T (m^2/s) =	2.2E-05
S (-) =	1.0E-04	S (-) =	1.0E-04
K_s (m/s) =	3.0E-07	K_s (m/s) =	1.1E-06
S_s (1/m) =	5.0E-06	S_s (1/m) =	5.0E-06
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.3E-09
C_D (-) =	NA	C_D (-) =	1.4E-03
ξ (-) =	1.9	ξ (-) =	21.7
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.			
dt_1 (min) =	8.28	C (m^3/Pa) =	1.3E-09
dt_2 (min) =	12.48	C_D (-) =	1.4E-03
T_T (m^2/s) =	5.9E-06	ξ (-) =	1.9
S (-) =	1.0E-04		
K_s (m/s) =	3.0E-07		
S_s (1/m) =	5.0E-06		

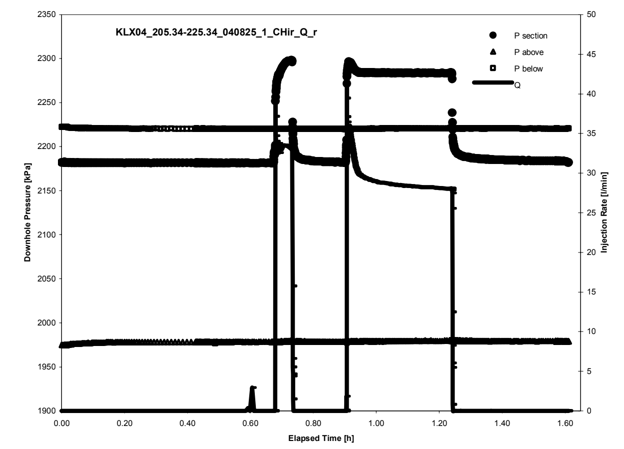
Comments:

The recommended transmissivity of 5.9E-6 m2/s was derived from the analysis of the CHi phase. The confidence range for the interval transmissivity is estimated to be 4.0E-6 to 2.0E-5 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 1985.7 kPa.

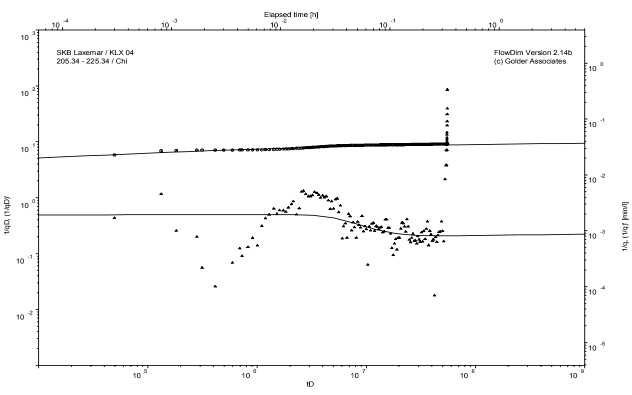
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040825 08:49
Test section from - to (m):	205.34-225.34 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

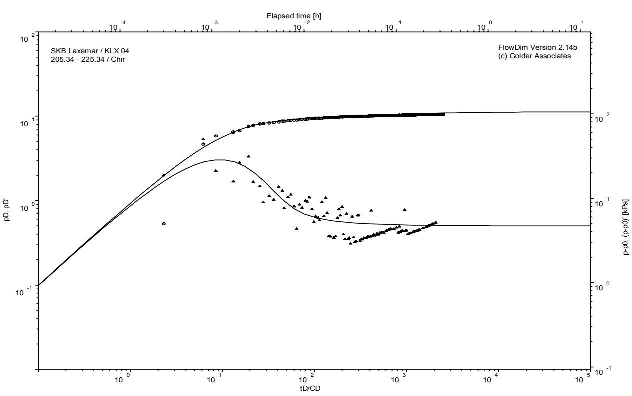
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	2182		
p_i (kPa) =	2182		
p_p(kPa) =	2283	p_F (kPa) =	2184
Q_p (m^3/s)=	4.67E-04		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	9.9		
Derivative fact.=	0.02	Derivative fact.=	0.03
Results		**Results**	
Q/s (m^2/s)=	4.5E-05		
T_M (m^2/s)=	4.7E-05		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	6.07	dt_1 (min) =	1.39
dt_2 (min) =	18.18	dt_2 (min) =	16.17
T (m^2/s) =	6.6E-05	T (m^2/s) =	8.1E-05
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	3.3E-06	K_s (m/s) =	4.0E-06
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	2.4E-08
C_D (-) =	NA	C_D (-) =	2.7E+00
ξ (-) =	0	ξ (-) =	1.8
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	1.39	C (m^3/Pa) =	2.4E-08
dt_2 (min) =	16.17	C_D (-) =	2.7E+00
T_T (m^2/s) =	8.1E-05	ξ (-) =	1.8
S (-) =	1.0E-06		
K_s (m/s) =	4.0E-06		
S_s (1/m) =	5.0E-08		

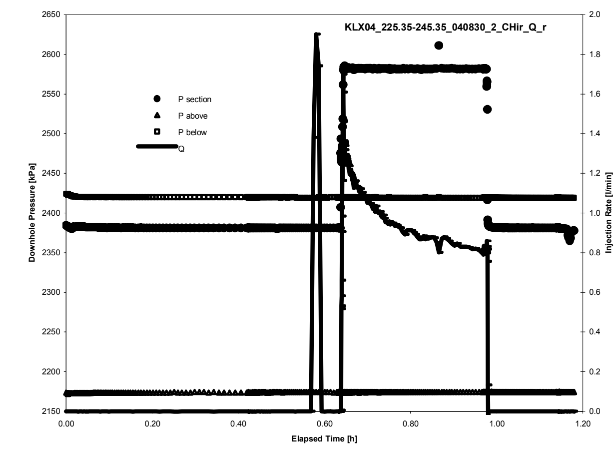
Comments:

The recommended transmissivity of 8.1E-5 m2/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 4.0E-5 to 9.0E-5 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 2181.6 kPa.

Test Summary Sheet

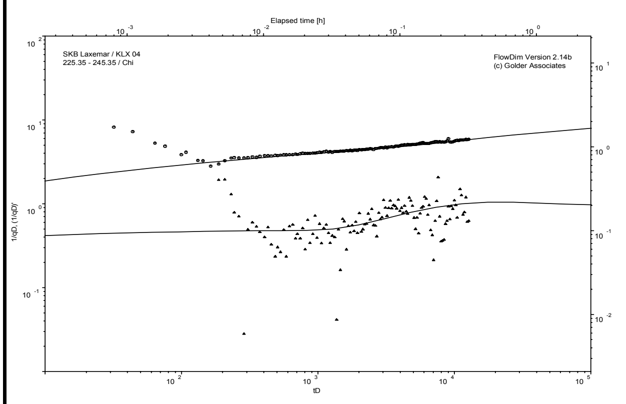
Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	2
Borehole ID:	KLX04	Test start:	040830 05:53
Test section from - to (m):	225.35-245.35	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

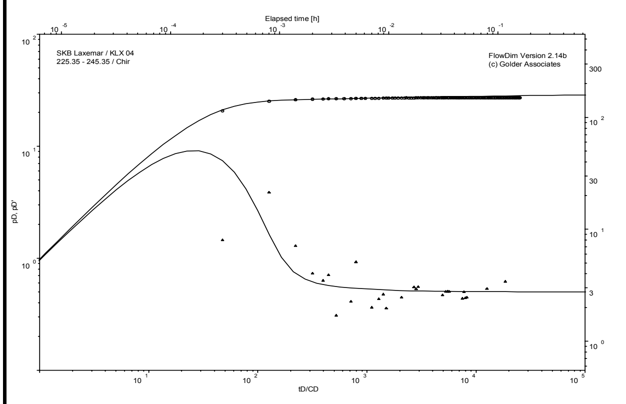


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	2383		
p_i (kPa) =	2381		
p_p(kPa) =	2582	p_F (kPa) =	2380
Q_p (m^3/s)=	1.37E-05		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	10.1		
Derivative fact.=	0.07	Derivative fact.=	0.04
Results		**Results**	
Q/s (m^2/s)=	6.7E-07		
T_M (m^2/s)=	7.0E-07		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.56	dt_1 (min) =	0.27
dt_2 (min) =	2.13	dt_2 (min) =	4.77
T (m^2/s) =	6.2E-07	T (m^2/s) =	4.5E-06
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	3.1E-08	K_s (m/s) =	2.2E-07
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	6.5E-11
C_D (-) =	NA	C_D (-) =	7.2E-03
ξ (-) =	-1.8	ξ (-) =	20.9
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	0.56	C (m^3/Pa) =	6.5E-11
dt_2 (min) =	2.13	C_D (-) =	7.2E-03
T_T (m^2/s) =	6.2E-07	ξ (-) =	-1.8
S (-) =	1.0E-06		
K_s (m/s) =	3.1E-08		
S_s (1/m) =	5.0E-08		

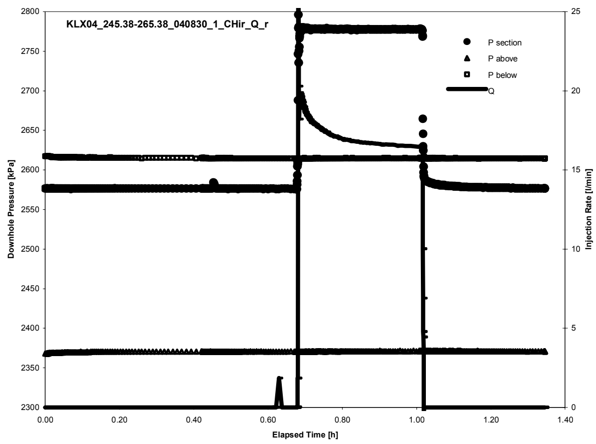
Comments:

The recommended transmissivity of 6.2E-7 m2/s was derived from the analysis of the CHi phase (inner zone), which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 3.0E-7 to 8.0E-7 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 2380.9 kPa.

Test Summary Sheet

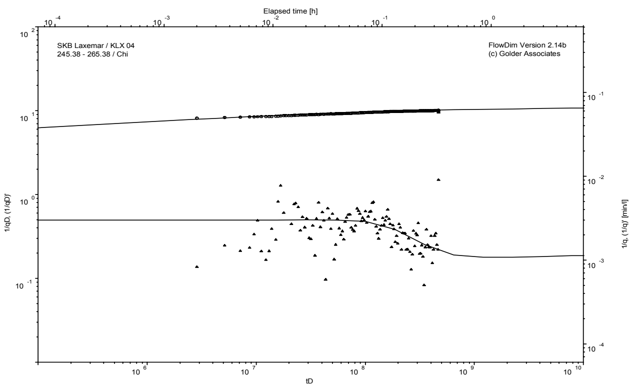
Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040830 07:53
Test section from - to (m):	245.38-265.38 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

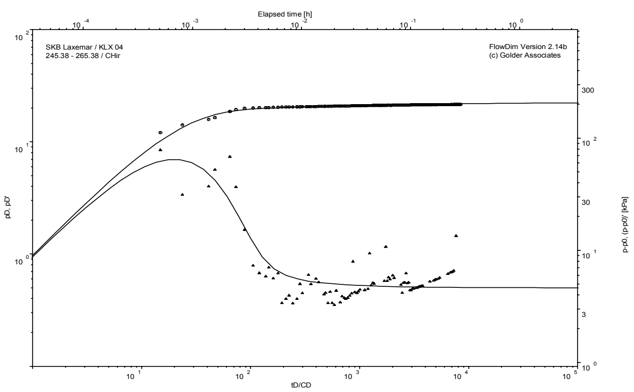


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	2576		
p_i (kPa) =	2576		
p_p(kPa) =	2777	p_F (kPa) =	2576
Q_p (m^3/s)=	2.73E-04		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	10.5		
Derivative fact.=	0.02	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	1.3E-05		
T_M (m^2/s)=	1.4E-05		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.43	dt_1 (min) =	0.58
dt_2 (min) =	4.10	dt_2 (min) =	9.05
T (m^2/s) =	2.1E-05	T (m^2/s) =	4.8E-05
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	1.1E-06	K_s (m/s) =	2.4E-06
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	3.8E-09
C_D (-) =	NA	C_D (-) =	4.2E-01
ξ (-) =	1.6	ξ (-) =	13.1
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	0.43	C (m^3/Pa) =	3.8E-09
dt_2 (min) =	4.10	C_D (-) =	4.2E-01
T_T (m^2/s) =	2.1E-05	ξ (-) =	1.6
S (-) =	1.0E-06		
K_s (m/s) =	1.1E-06		
S_s (1/m) =	5.0E-08		

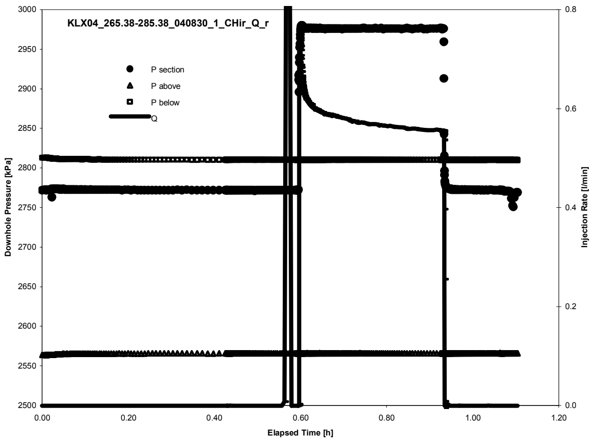
Comments:

The recommended transmissivity of 2.1E-5 m2/s was derived from the analysis of the CHi phase (inner zone), which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 9.0E-6 to 4.0E-5 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 2574.6 kPa.

Test Summary Sheet

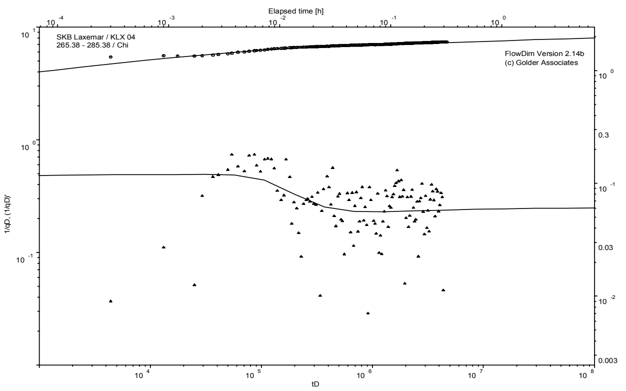
Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040830 09:53
Test section from - to (m):	265.38-285.38 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

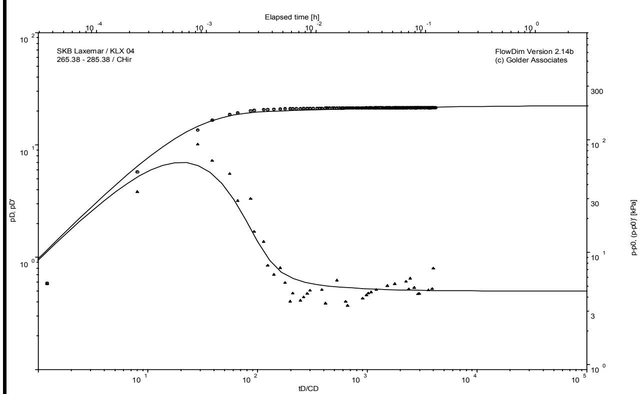


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	2772		
p_i (kPa) =	2772		
p_p(kPa) =	2976	p_F (kPa) =	2771
Q_p (m^3/s)=	9.17E-06		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	10.9		
Derivative fact.=	0.02	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	4.4E-07		
T_M (m^2/s)=	4.6E-07		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	1.73	dt_1 (min) =	0.53
dt_2 (min) =	16.17	dt_2 (min) =	6.87
T (m^2/s) =	1.1E-06	T (m^2/s) =	1.7E-06
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	5.3E-08	K_s (m/s) =	1.7E-08
S_s (1/m) =	5.0E-08	S_s (1/m) =	1.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.1E-10
C_D (-) =	NA	C_D (-) =	1.2E-02
ξ (-) =	1.2	ξ (-) =	14.9
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	0.53	C (m^3/Pa) =	1.1E-10
dt_2 (min) =	6.87	C_D (-) =	1.2E-02
T_T (m^2/s) =	1.7E-06	ξ (-) =	14.9
S (-) =	1.0E-06		
K_s (m/s) =	1.7E-08		
S_s (1/m) =	1.0E-08		

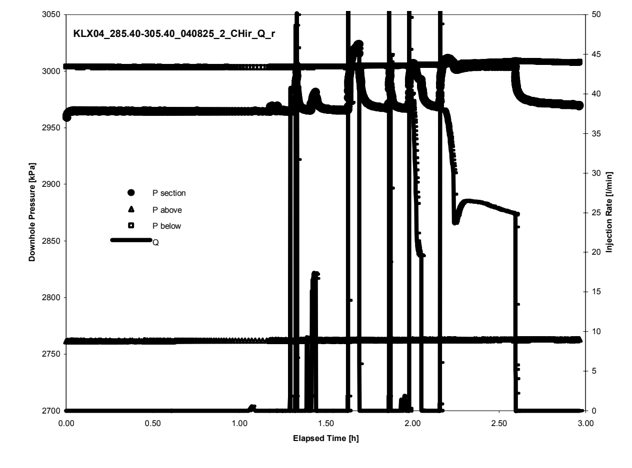
Comments:

The recommended transmissivity of 1.7E-6 m2/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 4.0E-7 to 2.0E-6 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 2771.1 kPa.

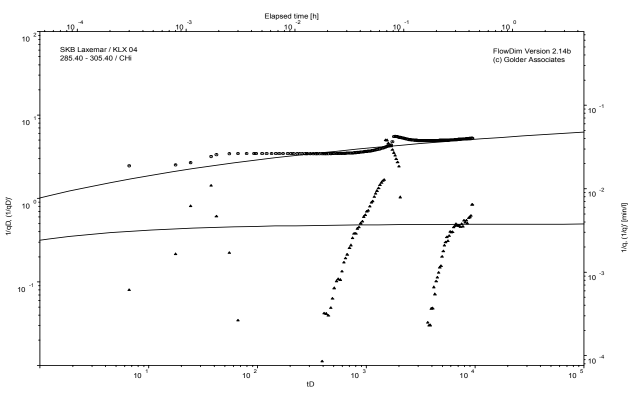
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	2
Borehole ID:	KLX04	Test start:	040825 22:12
Test section from - to (m):	285.40-305.40	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

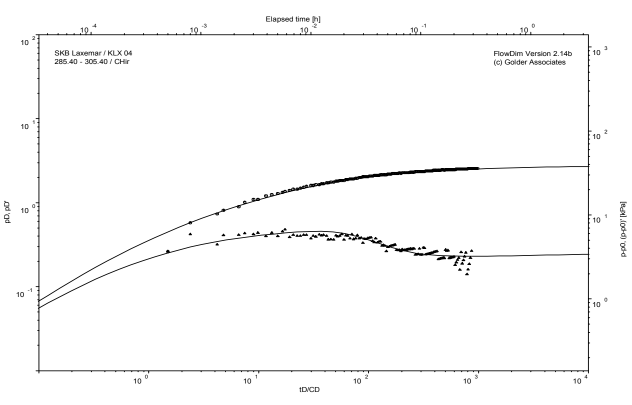
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	2962		
p_i (kPa) =	2968		
p_p(kPa) =	3004	p_F (kPa) =	2969
Q_p (m^3/s)=	4.12E-04		
tp (s) =	1560	t_F (s) =	1200
S el S* (-)=	1.00E-06	S el S* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	11.4		
Derivative fact.=	0.06	Derivative fact.=	0.21
Results		**Results**	
Q/s (m^2/s)=	1.1E-04		
T_M (m^2/s)=	1.2E-04		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	18.63	dt_1 (min) =	6.83
dt_2 (min) =	23.17	dt_2 (min) =	16.96
T (m^2/s) =	9.7E-05	T (m^2/s) =	5.1E-05
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	4.9E-06	K_s (m/s) =	2.6E-06
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	4.0E-08
C_D (-) =	NA	C_D (-) =	4.4E+00
ξ (-) =	-4.7	ξ (-) =	-5.9
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.			
dt_1 (min) =	6.83	C (m^3/Pa) =	4.0E-08
dt_2 (min) =	16.96	C_D (-) =	4.4E+00
T_T (m^2/s) =	5.1E-05	ξ (-) =	-5.9
S (-) =	1.0E-06		
K_s (m/s) =	2.6E-06		
S_s (1/m) =	5.0E-08		

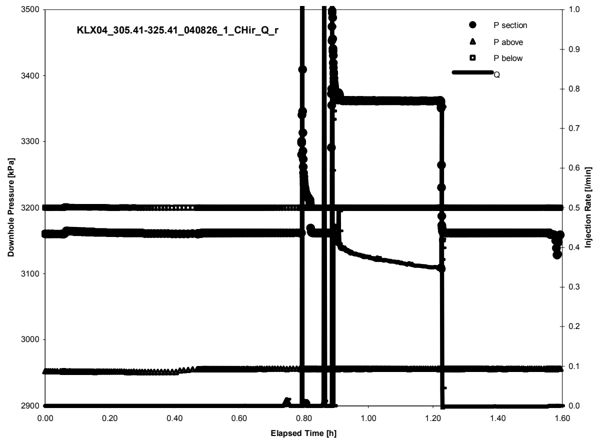
Comments:

The recommended transmissivity of 5.1E-5 m2/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 4.0E-5 to 2.0E-4 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 2967.6 kPa.

Test Summary Sheet

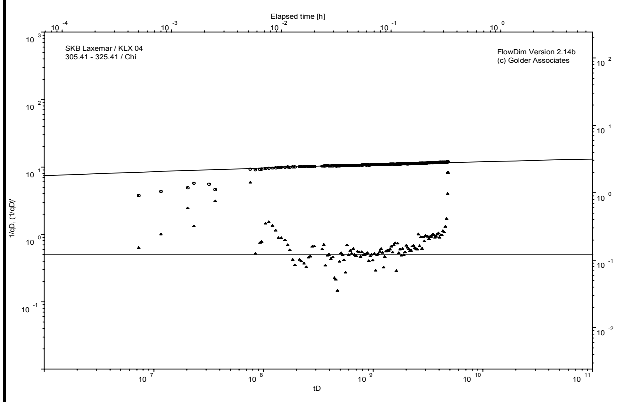
Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040826 02:27
Test section from - to (m):	305.41-325.41 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

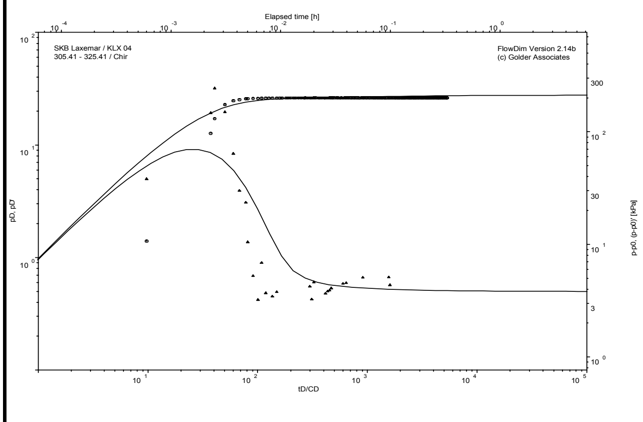


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	3160		
p_i (kPa) =	3161		
p_p(kPa) =	3362	p_F (kPa) =	3161
Q_p (m^3/s)=	5.80E-06		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	11.8		
Derivative fact.=	0.09	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	2.8E-07		
T_M (m^2/s)=	3.0E-07		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.91	dt_1 (min) =	1.73
dt_2 (min) =	7.85	dt_2 (min) =	5.93
T (m^2/s) =	5.4E-07	T (m^2/s) =	1.3E-06
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	2.7E-08	K_s (m/s) =	6.4E-08
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.8E-10
C_D (-) =	NA	C_D (-) =	2.0E-02
ξ (-) =	4.6	ξ (-) =	20.4
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Selected representative parameters.			
dt_1 (min) =	0.91	C (m^3/Pa) =	1.8E-10
dt_2 (min) =	7.85	C_D (-) =	2.0E-02
T_T (m^2/s) =	5.4E-07	ξ (-) =	4.6
S (-) =	1.0E-06		
K_s (m/s) =	2.7E-08		
S_s (1/m) =	5.0E-08		

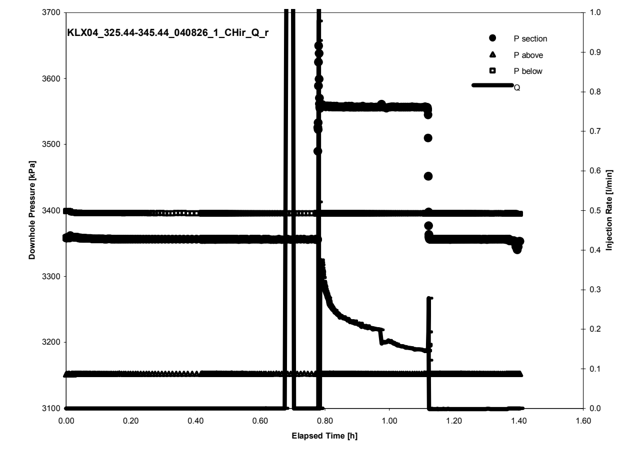
Comments:

The recommended transmissivity of 5.4E-7 m2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 2.0E-7 to 7.0E-7 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3161.4 kPa.

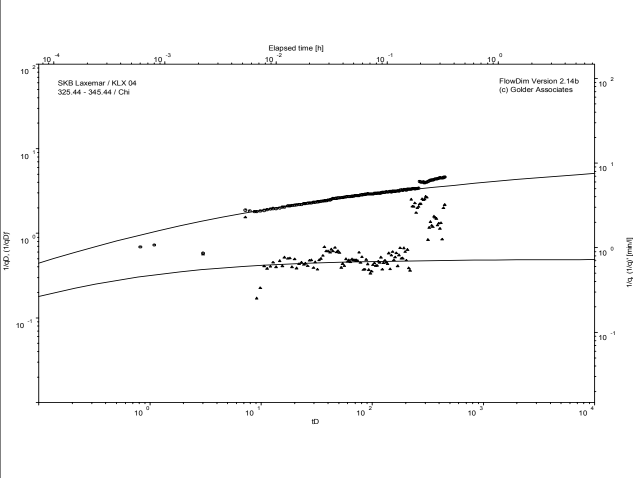
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040826 06:30
Test section from - to (m):	325.44-345.44	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

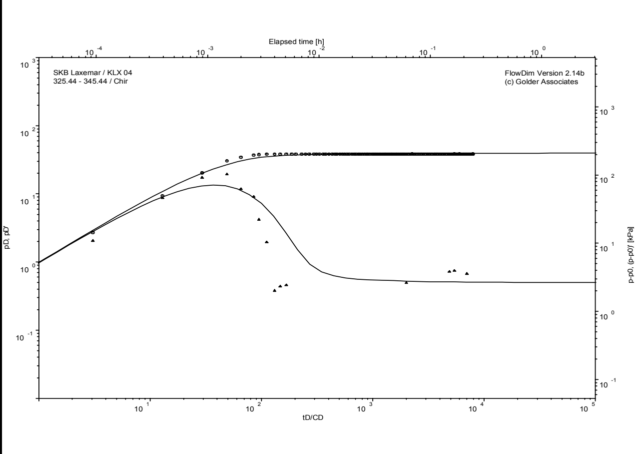
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	3358		
p_i (kPa) =	3356		
p_p(kPa) =	3556	p_F (kPa) =	3356
Q_p (m^3/s)=	2.43E-06		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	12.1		
Derivative fact.=	0.07	Derivative fact.=	0.04
Results		**Results**	
Q/s (m^2/s)=	1.2E-07		
T_M (m^2/s)=	1.2E-07		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.50	dt_1 (min) =	1.26
dt_2 (min) =	8.27	dt_2 (min) =	10.28
T (m^2/s) =	8.8E-08	T (m^2/s) =	1.0E-06
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	4.4E-09	K_s (m/s) =	5.2E-08
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	7.3E-11
C_D (-) =	NA	C_D (-) =	8.0E-03
ξ (-) =	-2.5	ξ (-) =	32.4
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.			
dt_1 (min) =	0.50	C (m^3/Pa) =	7.3E-11
dt_2 (min) =	8.27	C_D (-) =	8.0E-03
T_T (m^2/s) =	8.8E-08	ξ (-) =	-2.5
S (-) =	1.0E-06		
K_s (m/s) =	4.4E-09		
S_s (1/m) =	5.0E-08		

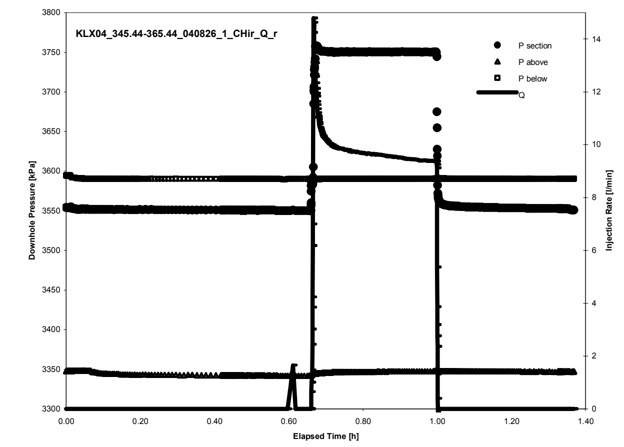
Comments:

The recommended transmissivity of 8.8E-8 m2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 7.0E-8 to 2.0E-7 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3355.9 kPa.

Test Summary Sheet

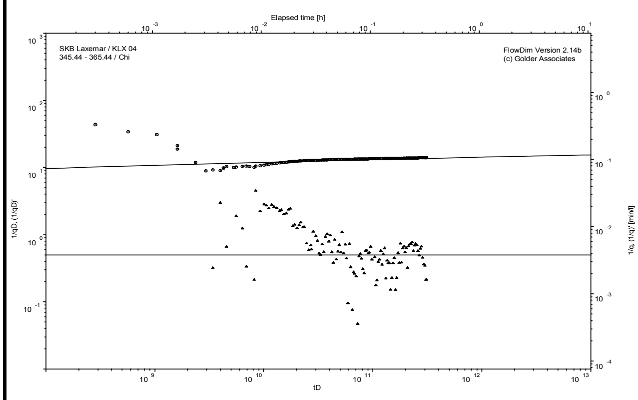
Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040826 08:37
Test section from - to (m):	345.44-365.44 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

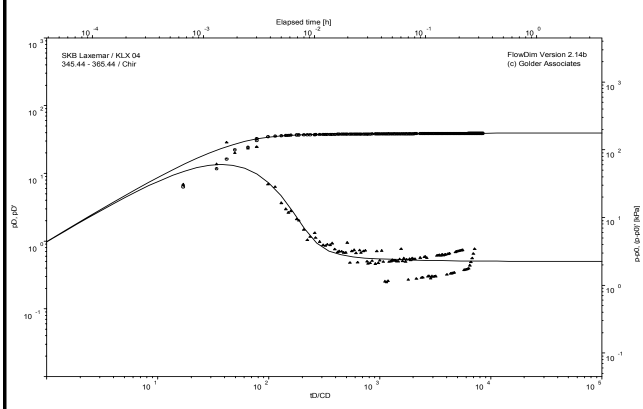


Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	3354		
p_i (kPa) =	3550		
p_p(kPa) =	3750	p_F (kPa) =	3553
Q_p (m^3/s)=	1.56E-04		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	12.4		
Derivative fact.=	0.02	Derivative fact.=	0.11
Results		**Results**	
Q/s (m^2/s)=	7.7E-06		
T_M (m^2/s)=	8.0E-06		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	2.67	dt_1 (min) =	1.46
dt_2 (min) =	18.17	dt_2 (min) =	15.37
T (m^2/s) =	1.7E-05	T (m^2/s) =	5.6E-05
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	8.6E-07	K_s (m/s) =	2.8E-06
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	5.0E-09
C_D (-) =	NA	C_D (-) =	5.5E-01
ξ (-) =	5.0	ξ (-) =	30.2
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Selected representative parameters.			
dt_1 (min) =	1.46	C (m^3/Pa) =	5.0E-09
dt_2 (min) =	15.37	C_D (-) =	5.5E-01
T_T (m^2/s) =	5.6E-05	ξ (-) =	30.2
S (-) =	1.0E-06		
K_s (m/s) =	2.8E-06		
S_s (1/m) =	5.0E-08		

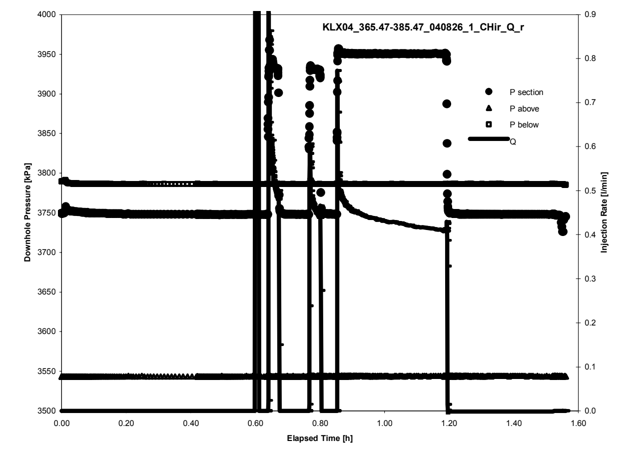
Comments:

The recommended transmissivity of 5.6E-5 m2/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 8.0E-6 to 6.0E-5 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3551.2 kPa.

Test Summary Sheet

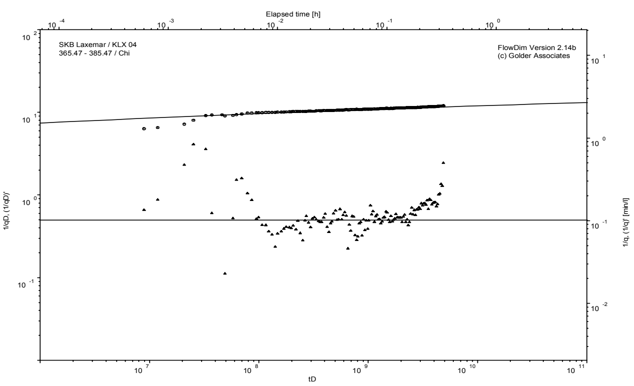
Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040826 10:38
Test section from - to (m):	365.47-385.47 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

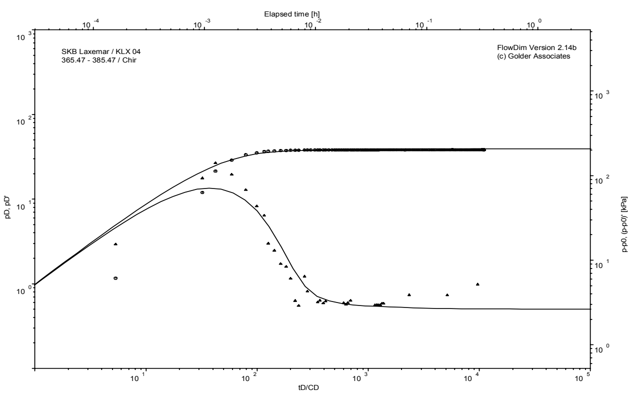


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	3749		
p_i (kPa) =	3748		
p_p(kPa) =	3950	p_F (kPa) =	3748
Q_p (m^3/s)=	6.80E-06		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	12.7		
Derivative fact.=	0.09	Derivative fact.=	0.03
Results		**Results**	
Q/s (m^2/s)=	3.3E-07		
T_M (m^2/s)=	3.5E-07		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.92	dt_1 (min) =	0.74
dt_2 (min) =	9.64	dt_2 (min) =	2.46
T (m^2/s) =	6.4E-07	T (m^2/s) =	2.2E-06
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	3.2E-08	K_s (m/s) =	1.1E-07
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.5E-10
C_D (-) =	NA	C_D (-) =	1.6E-02
ξ (-) =	4.6	ξ (-) =	32.0
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	0.92	C (m^3/Pa) =	1.5E-10
dt_2 (min) =	9.64	C_D (-) =	1.6E-02
T_T (m^2/s) =	6.4E-07	ξ (-) =	4.6
S (-) =	1.0E-06		
K_s (m/s) =	3.2E-08		
S_s (1/m) =	5.0E-08		

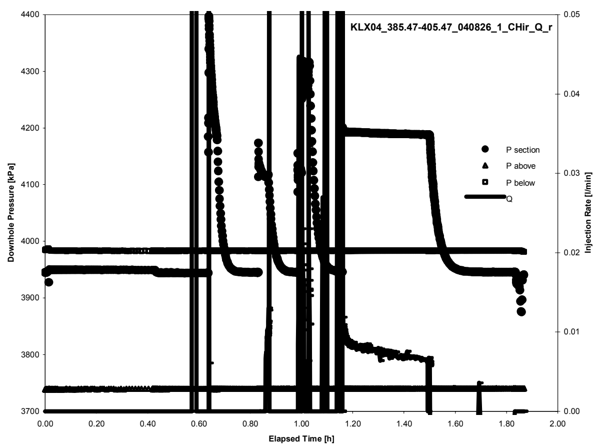
Comments:

The recommended transmissivity of 6.4E-7 m2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 2.0E-7 to 8.0E-7 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3748.2 kPa.

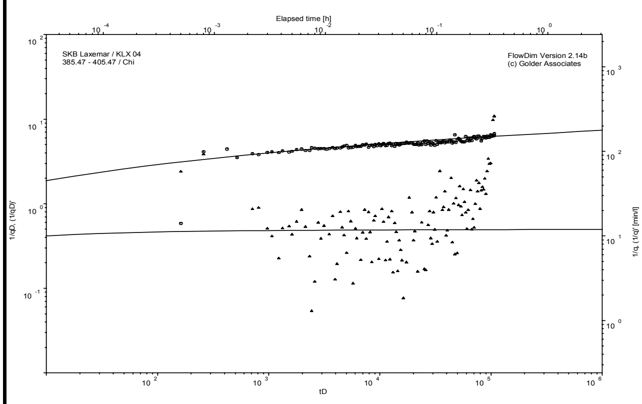
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040826 14:00
Test section from - to (m):	385.47-405.47 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

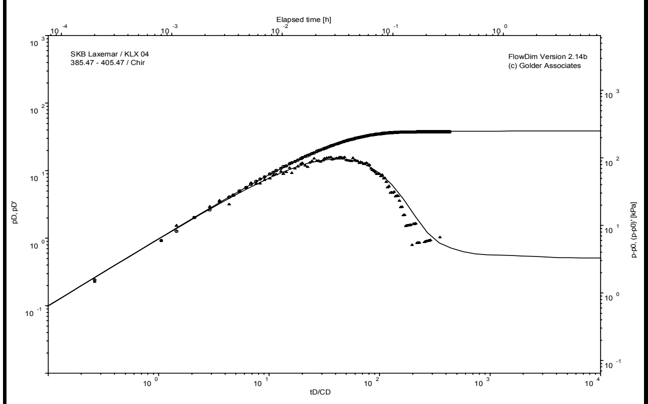
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	3946		
p_i (kPa) =	3945		
p_p(kPa) =	4188	p_F (kPa) =	3945
Q_p (m^3/s)=	1.07E-07		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	13.1		
Derivative fact.=	0.12	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	4.3E-09		
T_M (m^2/s)=	4.5E-09		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.40	dt_1 (min) =	*
dt_2 (min) =	5.77	dt_2 (min) =	*
T (m^2/s) =	4.4E-09	T (m^2/s) =	3.1E-08
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	2.2E-10	K_s (m/s) =	1.6E-09
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	5.5E-11
C_D (-) =	NA	C_D (-) =	6.0E-03
ξ (-) =	1.7	ξ (-) =	33.4
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	0.40	C (m^3/Pa) =	5.5E-11
dt_2 (min) =	5.77	C_D (-) =	6.0E-03
T_T (m^2/s) =	4.4E-09	ξ (-) =	1.7
S (-) =	1.0E-06		
K_s (m/s) =	2.2E-10		
S_s (1/m) =	5.0E-08		

Comments:

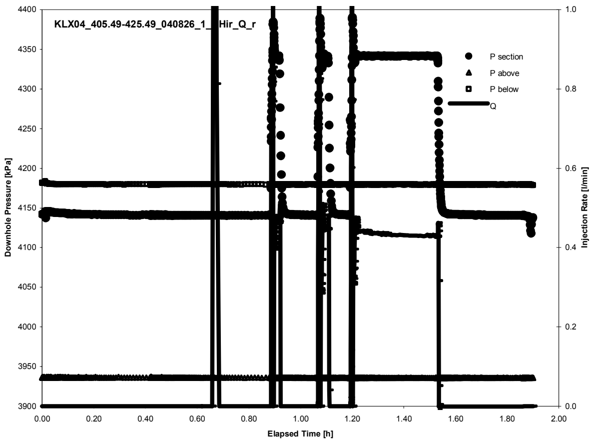
*: IARF not measured

The recommended transmissivity of 4.4E-9 m2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 2.0E-9 to 6.0E-9 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3943.6 kPa.

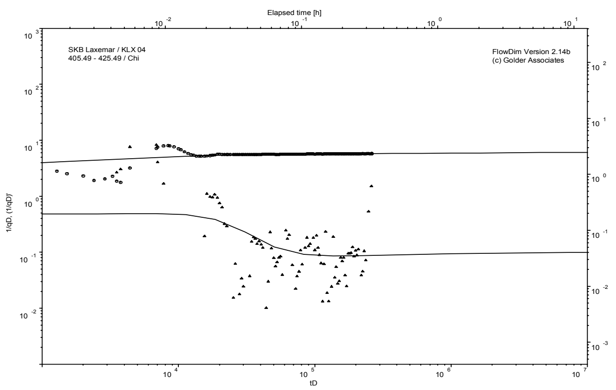
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040826 16:37
Test section from - to (m):	405.49-425.49 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

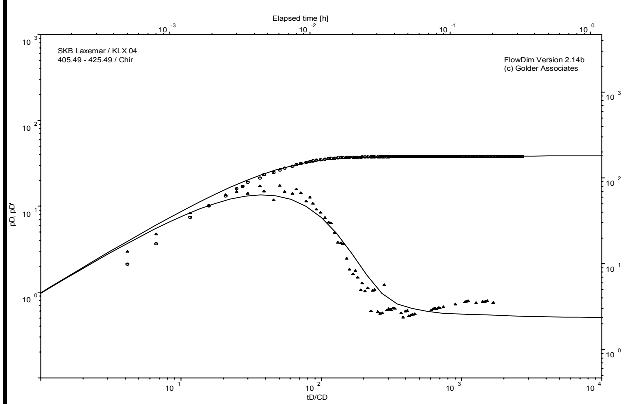
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	4142		
p_i (kPa) =	4141		
p_p(kPa) =	4341	p_F (kPa) =	4141
Q_p (m^3/s)=	7.17E-06		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	13.4		
Derivative fact.=	0.07	Derivative fact.=	0.04
Results		**Results**	
Q/s (m^2/s)=	3.5E-07		
T_M (m^2/s)=	3.7E-07		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	5.90	dt_1 (min) =	3.35
dt_2 (min) =	17.30	dt_2 (min) =	11.00
T (m^2/s) =	1.6E-06	T (m^2/s) =	2.5E-06
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	8.1E-08	K_s (m/s) =	1.2E-07
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	6.8E-10
C_D (-) =	NA	C_D (-) =	7.5E-02
ξ (-) =	0	ξ (-) =	30.1
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	
Selected representative parameters.			
dt_1 (min) =	3.35	C (m^3/Pa) =	6.84E-10
dt_2 (min) =	11.00	C_D (-) =	7.54E-02
T_T (m^2/s) =	2.5E-06	ξ (-) =	30.1
S (-) =	1.0E-06		
K_s (m/s) =	1.2E-07		
S_s (1/m) =	5.0E-08		

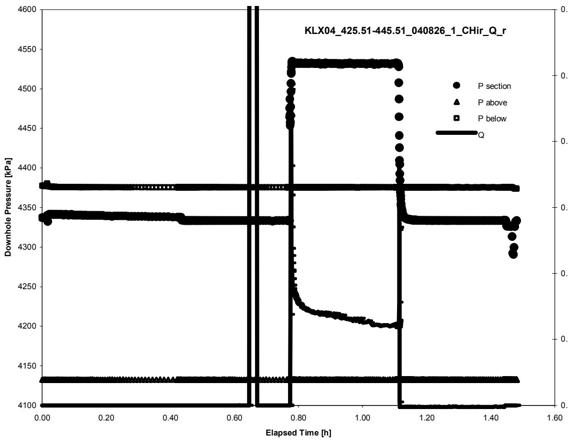
Comments:

The recommended transmissivity of 2.5E-6 m2/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 3.0E-7 to 4.0E-6 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 4139.8 kPa.

Test Summary Sheet

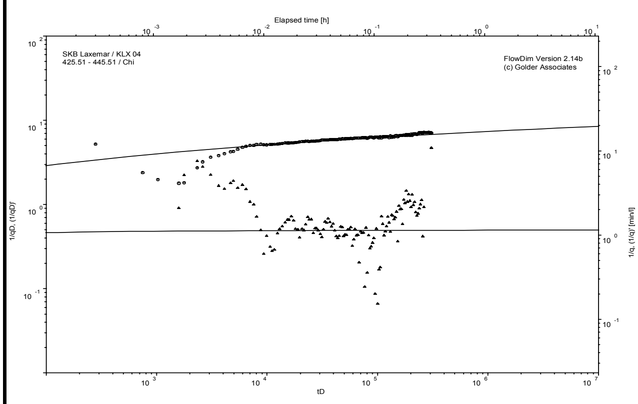
Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040826 19:32
Test section from - to (m):	425.51-445.51 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

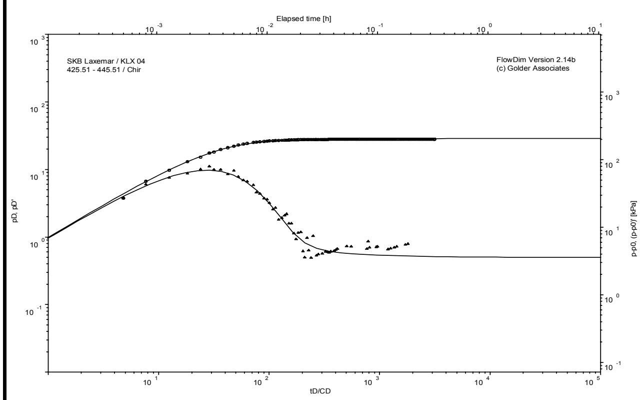


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	4337		
p_i (kPa) =	4333		
p_p(kPa) =	4532	p_F (kPa) =	4333
Q_p (m^3/s)=	1.00E-06		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	13.7		
Derivative fact.=	0.12	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	4.9E-08		
T_M (m^2/s)=	5.2E-08		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	1.22	dt_1 (min) =	2.26
dt_2 (min) =	6.28	dt_2 (min) =	11.28
T (m^2/s) =	5.7E-08	T (m^2/s) =	2.5E-07
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	2.9E-09	K_s (m/s) =	1.2E-08
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	6.0E-11
C_D (-) =	NA	C_D (-) =	6.6E-03
ξ (-) =	0.9	ξ (-) =	22.4
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	1.22	C (m^3/Pa) =	6.0E-11
dt_2 (min) =	6.28	C_D (-) =	6.6E-03
T_T (m^2/s) =	5.7E-08	ξ (-) =	0.9
S (-) =	1.0E-06		
K_s (m/s) =	2.9E-09		
S_s (1/m) =	5.0E-08		

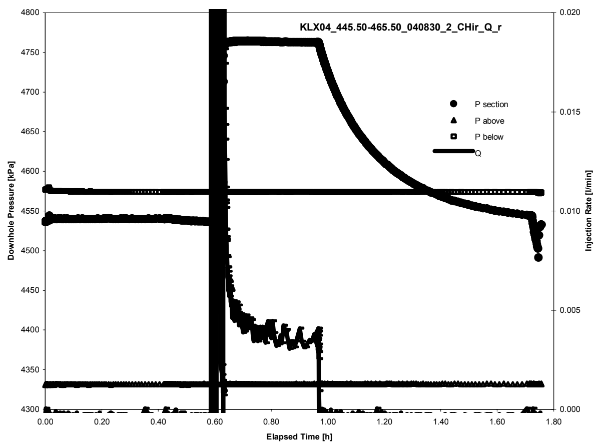
Comments:

The recommended transmissivity of 5.7E-8 m2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 3.0E-8 to 8.0E-8 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 4333.3 kPa.

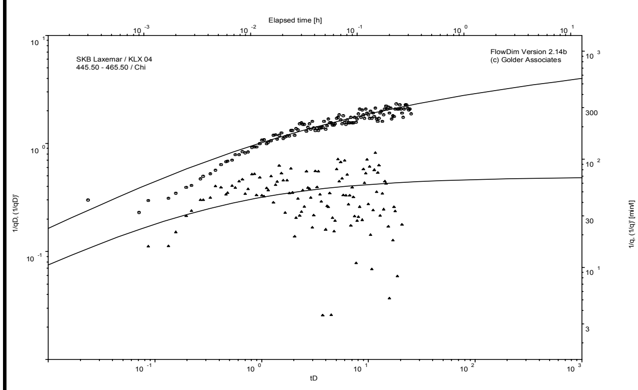
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	2
Borehole ID:	KLX04	Test start:	040830 16:11
Test section from - to (m):	445.50-465.50 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

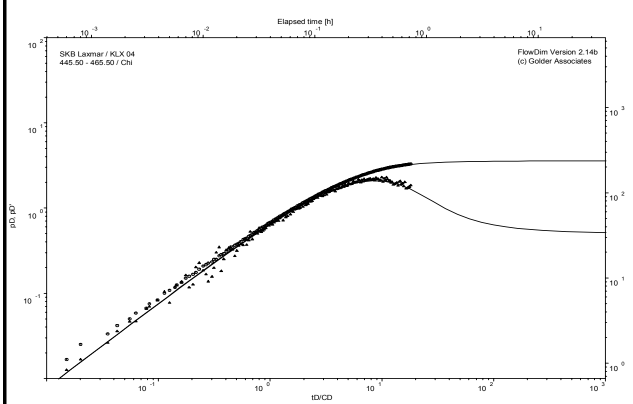
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	4537		
p_i (kPa) =	4536		
p_p(kPa) =	4762	p_F (kPa) =	4545
Q_p (m^3/s)=	5.23E-08		
tp (s) =	1200	t_F (s) =	2700
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	14.0		
Derivative fact.=	0.20	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	2.3E-09		
T_M (m^2/s)=	2.4E-09		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	5.38	dt_1 (min) =	*
dt_2 (min) =	11.17	dt_2 (min) =	*
T (m^2/s) =	8.2E-10	T (m^2/s) =	1.7E-09
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	4.1E-11	K_s (m/s) =	8.6E-11
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.6E-10
C_D (-) =	NA	C_D (-) =	1.7E-02
ξ (-) =	-1.6	ξ (-) =	0.88
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	5.38	C (m^3/Pa) =	1.6E-10
dt_2 (min) =	11.17	C_D (-) =	1.7E-02
T_T (m^2/s) =	8.2E-10	ξ (-) =	-1.6
S (-) =	1.0E-06		
K_s (m/s) =	4.1E-11		
S_s (1/m) =	5.0E-08		

Comments:

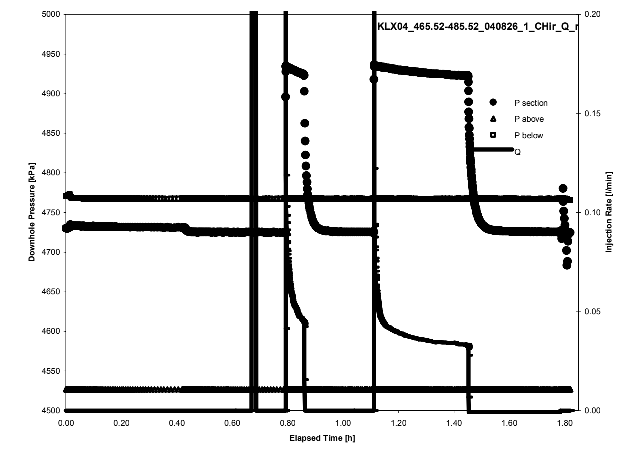
*: IARF not measured

The recommended transmissivity of 8.2E-10 m2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 7.0E-10 to 4.0E-9 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 4526.0 kPa.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040827 00:32
Test section from - to (m):	465.52-485.52 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

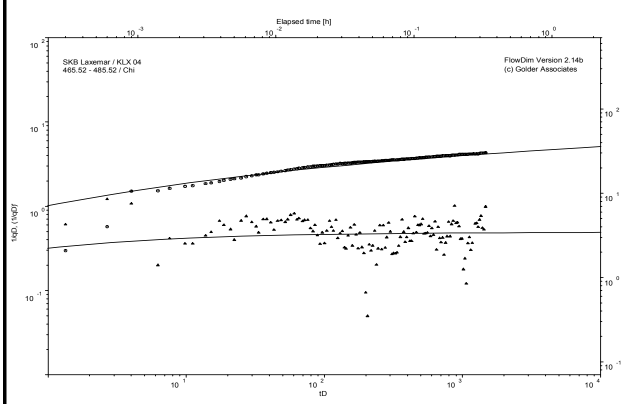
Linear plot Q and p



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	4730		
p_i (kPa) =	4725		
p_p(kPa) =	4922	p_F (kPa) =	4725
Q_p (m^3/s)=	5.33E-07		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	14.3		
Derivative fact.=	0.02	Derivative fact.=	0.02

Results		Results	
Q/s (m^2/s)=	2.7E-08		
T_M (m^2/s)=	2.8E-08		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	1.28	dt_1 (min) =	*
dt_2 (min) =	18.80	dt_2 (min) =	*
T (m^2/s) =	1.8E-08	T (m^2/s) =	1.0E-07
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	9.2E-10	K_s (m/s) =	1.0E-09
S_s (1/m) =	5.0E-08	S_s (1/m) =	1.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.5E-11
C_D (-) =	NA	C_D (-) =	1.6E-03
ξ (-) =	-1.2	ξ (-) =	14.7
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

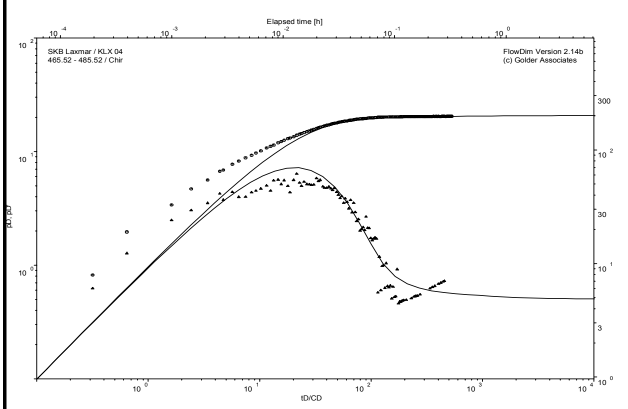
Log-Log plot incl. derivates- flow period



Selected representative parameters.

dt_1 (min) =	1.28	C (m^3/Pa) =	1.5E-11
dt_2 (min) =	18.80	C_D (-) =	1.6E-03
T_T (m^2/s) =	1.8E-08	ξ (-) =	-1.2
S (-) =	1.0E-06		
K_s (m/s) =	9.2E-10		
S_s (1/m) =	5.0E-08		

Log-Log plot incl. derivatives- recovery period



Comments:

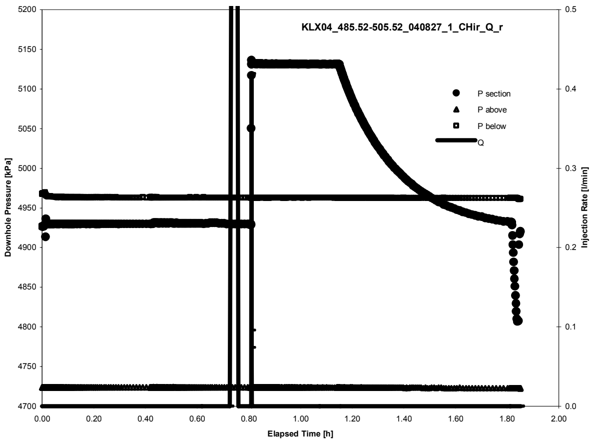
*: IARF not measured

The recommended transmissivity of 1.8E-8 m2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 8.0E-9 to 4.0E-8 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 4723.8 kPa.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Pi
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040827 06:38
Test section from - to (m):	485.52-505.52 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

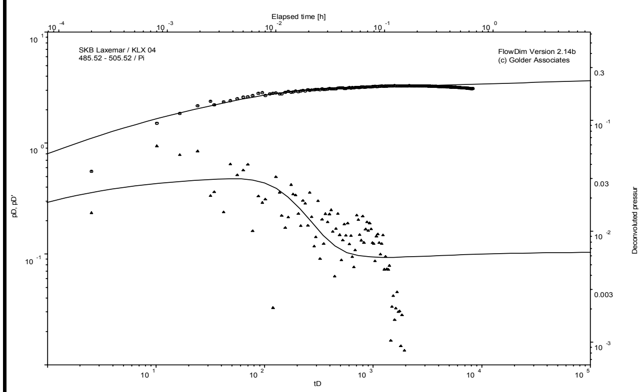


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	4928		
p_i (kPa) =	4929		
p_p(kPa) =	5131	p_F (kPa) =	4932
Q_p (m^3/s)=	-		
tp (s) =	-	t_F (s) =	2400
S el S^* (-)=	-	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	14.6		
Derivative fact.=	-	Derivative fact.=	0.10
Results		**Results**	
Q/s (m^2/s)=	NA		
T_M (m^2/s)=	NA		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	-	dt_1 (min) =	*
dt_2 (min) =	-	dt_2 (min) =	*
T (m^2/s) =	NA	T (m^2/s) =	2.1E-10
S (-) =	NA	S (-) =	1.0E-06
K_s (m/s) =	NA	K_s (m/s) =	1.1E-11
S_s (1/m) =	NA	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	3.0E-11
C_D (-) =	NA	C_D (-) =	3.3E-03
ξ (-) =	NA	ξ (-) =	1.6
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Log-Log plot incl. derivates- flow period

Not Analysed

Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	*	C (m^3/Pa) =	3.0E-11
dt_2 (min) =	*	C_D (-) =	3.3E-03
T_T (m^2/s) =	2.1E-10	ξ (-) =	1.6
S (-) =	1.0E-06		
K_s (m/s) =	1.1E-11		
S_s (1/m) =	5.0E-08		

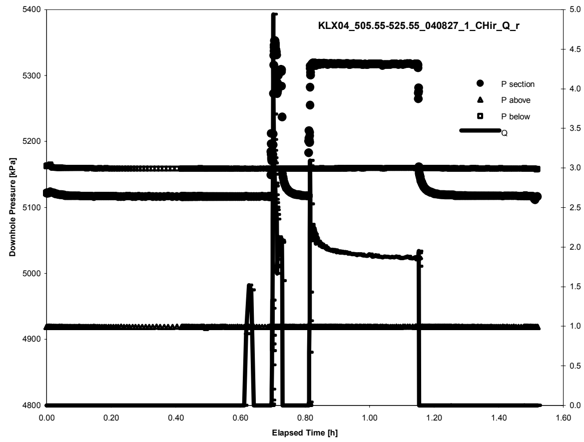
Comments:

The recommended transmissivity derived from the analysis is 2.1E-10 m2/s. It should be noted that due to the very low interval transmissivity the results are very uncertain. The confidence range for the interval transmissivity is estimated to be 1.0E-10 to 1.0E-9 m2/s. The analysis was conducted using a flow dimension of 2. No static pressure could be derived.

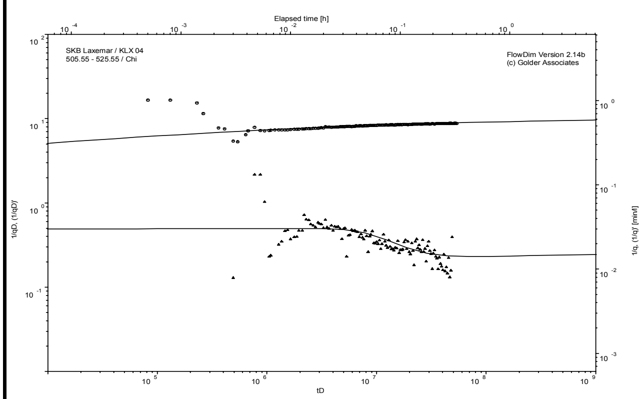
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040827 09:11
Test section from - to (m):	505.55-525.55 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

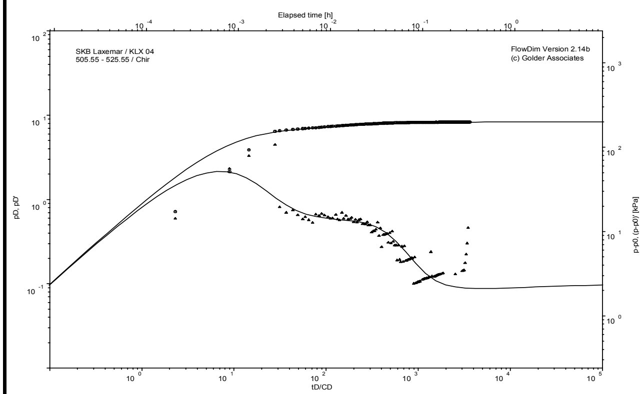
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	5117		
p_i (kPa) =	5117		
p_p(kPa) =	5317	p_F (kPa) =	5117
Q_p (m^3/s)=	3.08E-05		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	15.0		
Derivative fact.=	0.19	Derivative fact.=	0.05
Results		**Results**	
Q/s (m^2/s)=	1.5E-06		
T_M (m^2/s)=	1.6E-06		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.77	dt_1 (min) =	0.38
dt_2 (min) =	2.63	dt_2 (min) =	1.55
T (m^2/s) =	2.1E-06	T (m^2/s) =	2.1E-06
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	1.1E-07	K_s (m/s) =	1.0E-07
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	4.3E-10
C_D (-) =	NA	C_D (-) =	4.8E-02
ξ (-) =	1.7	ξ (-) =	1.5
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	0.38	C (m^3/Pa) =	4.3E-10
dt_2 (min) =	1.55	C_D (-) =	4.8E-02
T_T (m^2/s) =	2.1E-06	ξ (-) =	1.5
S (-) =	1.0E-06		
K_s (m/s) =	1.0E-07		
S_s (1/m) =	5.0E-08		

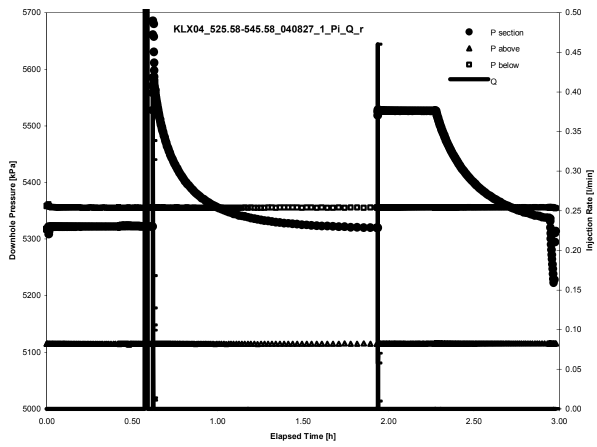
Comments:

The recommended transmissivity of 2.1E-6 m2/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 9.0E-7 to 3.0E-6 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 5115.3 kPa.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Pi
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040827 11:14
Test section from - to (m):	525.58-545.58 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

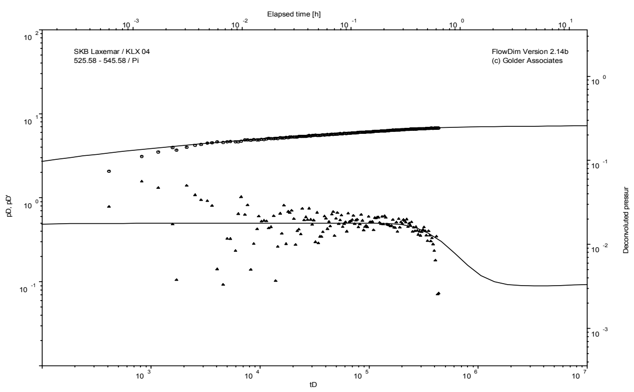


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	5320		
p_i (kPa) =	5320		
p_p(kPa) =	5522	p_F (kPa) =	5336
Q_p (m^3/s)=	-		
tp (s) =	-	t_F (s) =	4800
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	15.3		
Derivative fact.=	-	Derivative fact.=	0.05
Results		**Results**	
Q/s (m^2/s)=	NA		
T_M (m^2/s)=	NA		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	-	dt_1 (min) =	1.79
dt_2 (min) =	-	dt_2 (min) =	16.77
T (m^2/s) =	NA	T (m^2/s) =	4.1E-10
S (-) =	NA	S (-) =	1.0E-06
K_s (m/s) =	NA	K_s (m/s) =	2.0E-11
S_s (1/m) =	NA	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	3.4E-11
C_D (-) =	NA	C_D (-) =	3.7E-03
ξ (-) =	NA	ξ (-) =	3.3
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Log-Log plot incl. derivates- flow period

Not Analysed

Log-Log plot incl. derivatives- recovery period



Selected representative parameters.			
dt_1 (min) =	1.79	C (m^3/Pa) =	3.4E-11
dt_2 (min) =	16.77	C_D (-) =	3.7E-03
T_T (m^2/s) =	4.1E-10	ξ (-) =	3.3
S (-) =	1.0E-06		
K_s (m/s) =	2.0E-11		
S_s (1/m) =	5.0E-08		

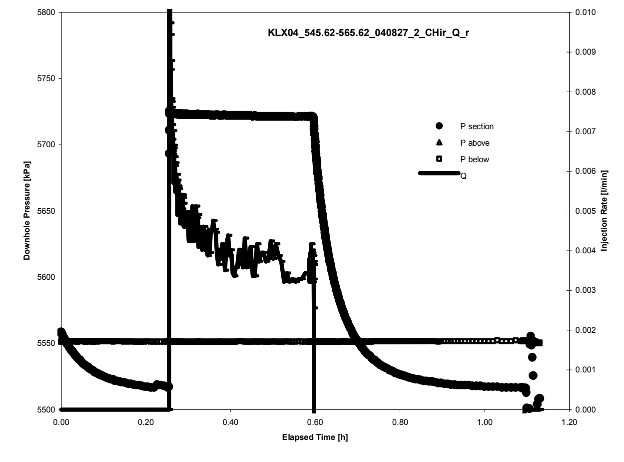
Comments:

The recommended transmissivity of 4.1E-10 m2/s was derived from the analysis of the Pi phase. Considering the inherent uncertainties related to the measurement (e.g. specially the measurement of the wellbore storage coefficient) and to the analysis process (e.g. numeric distortion when calculating the derivative and pressure history effects), the confidence range for the transmissivity is estimated to be 7E-11 to 7E-10 m2/s (the outer zone transmissivity is considered as most representative).The flow dimension displayed during the test is 2. No static pressure could be derived.

Test Summary Sheet

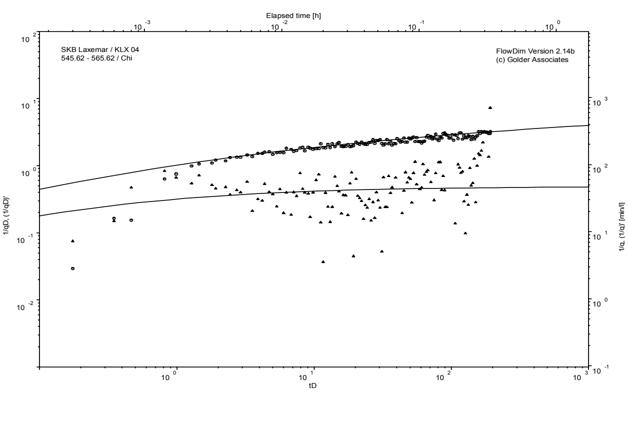
Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	2
Borehole ID:	KLX04	Test start:	040827 19:34
Test section from - to (m):	545.62-565.62 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

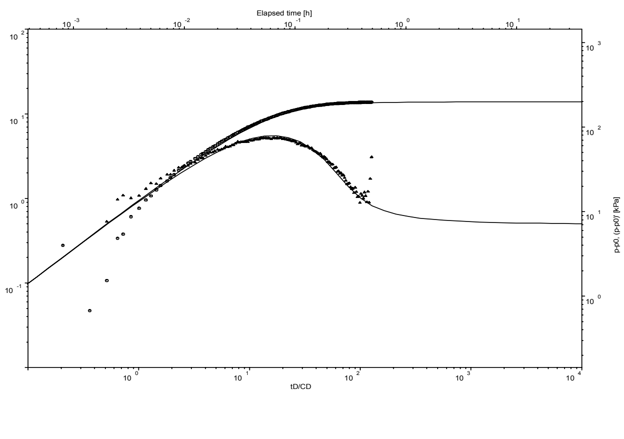


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	5513		
p_i (kPa) =	5517		
p_p(kPa) =	5721	p_F (kPa) =	5517
Q_p (m^3/s)=	5.72E-08		
tp (s) =	1200	t_F (s) =	1800
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	15.7		
Derivative fact.=	0.14	Derivative fact.=	
Results		**Results**	
Q/s (m^2/s)=	2.7E-09		
T_M (m^2/s)=	2.9E-09		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	2.93	dt_1 (min) =	*
dt_2 (min) =	14.40	dt_2 (min) =	*
T (m^2/s) =	1.3E-09	T (m^2/s) =	8.3E-09
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	6.6E-11	K_s (m/s) =	4.2E-10
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	7.4E-11
C_D (-) =	NA	C_D (-) =	8.2E-03
ξ (-) =	-0.9	ξ (-) =	9.3
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Selected representative parameters.			
dt_1 (min) =	2.93	C (m^3/Pa) =	7.4E-11
dt_2 (min) =	14.40	C_D (-) =	8.2E-03
T_T (m^2/s) =	1.3E-09	ξ (-) =	-0.9
S (-) =	1.0E-06		
K_s (m/s) =	6.6E-11		
S_s (1/m) =	5.0E-08		

Comments:

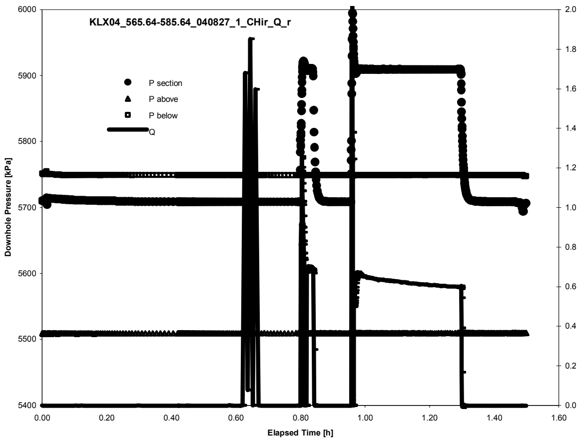
*: IARF not measured

The recommended transmissivity of 1.3E-9 m2/s was derived from the analysis of the CHi phase, because during the CHir phase no infinite acting radial flow was measured, so that the results for the transmissivity are very uncertain. The confidence range for the interval transmissivity is estimated to be 9.0E-10 to 3.0E-9 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 5509.9 kPa.

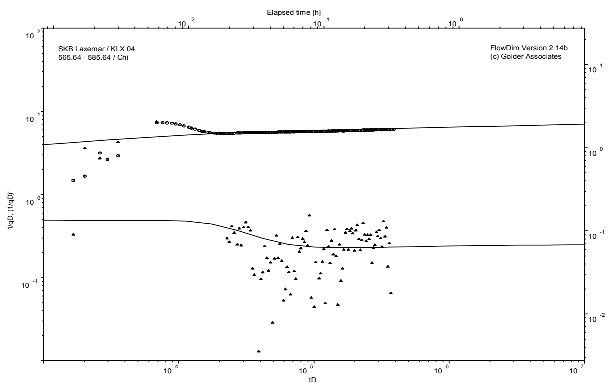
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040827 21:41
Test section from - to (m):	565.64-585.64 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

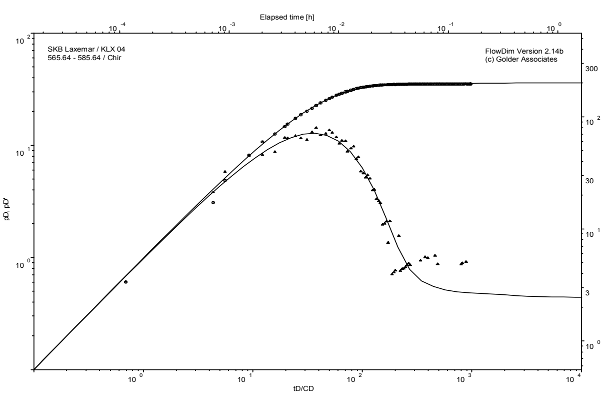
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	5710		
p_i (kPa) =	5708		
p_p(kPa) =	5909	p_F (kPa) =	5709
Q_p (m^3/s)=	1.00E-05		
tp (s) =	1200	t_F (s) =	600
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	16.0		
Derivative fact.=	0.02	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	4.9E-07		
T_M (m^2/s)=	5.1E-07		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	4.55	dt_1 (min) =	*
dt_2 (min) =	16.15	dt_2 (min) =	*
T (m^2/s) =	9.5E-07	T (m^2/s) =	3.0E-06
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	4.8E-08	K_s (m/s) =	1.5E-07
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.1E-09
C_D (-) =	NA	C_D (-) =	1.2E-01
ξ (-) =	0.0	ξ (-) =	31.0
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.			
dt_1 (min) =	4.55	C (m^3/Pa) =	1.1E-09
dt_2 (min) =	16.15	C_D (-) =	1.2E-01
T_T (m^2/s) =	9.5E-07	ξ (-) =	0.0
S (-) =	1.0E-06		
K_s (m/s) =	4.8E-08		
S_s (1/m) =	5.0E-08		

Comments:

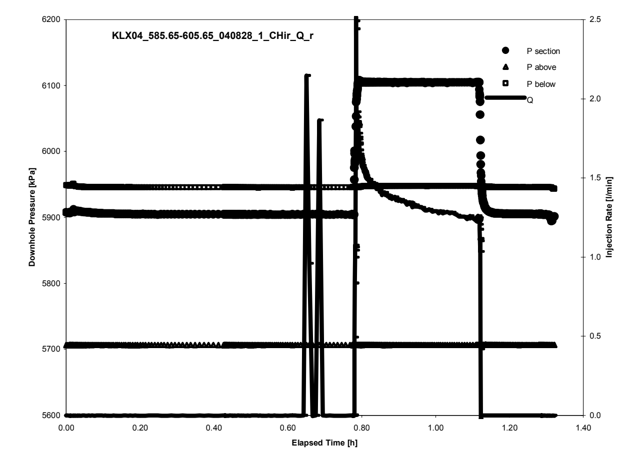
*: IARF not measured

The recommended transmissivity of 9.5E-7 m2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality and the most reliable results. The confidence range for the interval transmissivity is estimated to be 3.0E-7 to 1.0E-6 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 5706.9 kPa.

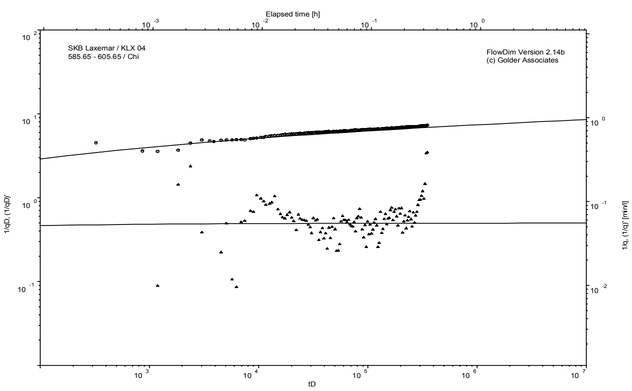
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040828 00:07
Test section from - to (m):	585.65-605.65 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

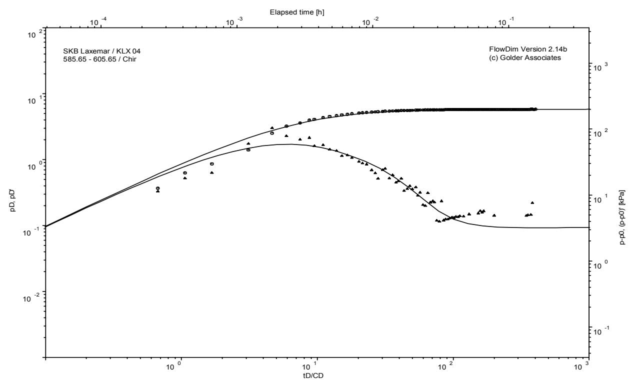
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	5907		
p_i (kPa) =	5904		
p_p(kPa) =	6104	p_F (kPa) =	5905
Q_p (m^3/s)=	2.07E-05		
tp (s) =	1200	t_F (s) =	600
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	16.3		
Derivative fact.=	0.09	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	1.0E-06		
T_M (m^2/s)=	1.1E-06		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	1.58	dt_1 (min) =	*
dt_2 (min) =	14.88	dt_2 (min) =	*
T (m^2/s) =	1.2E-06	T (m^2/s) =	5.2E-06
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	5.9E-08	K_s (m/s) =	2.6E-07
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	9.3E-10
C_D (-) =	NA	C_D (-) =	1.0E-01
ξ (-) =	-0.5	ξ (-) =	0.0
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	1.58	C (m^3/Pa) =	9.3E-10
dt_2 (min) =	14.88	C_D (-) =	1.0E-01
T_T (m^2/s) =	1.2E-06	ξ (-) =	-0.5
S (-) =	1.0E-06		
K_s (m/s) =	5.9E-08		
S_s (1/m) =	5.0E-08		

Comments:

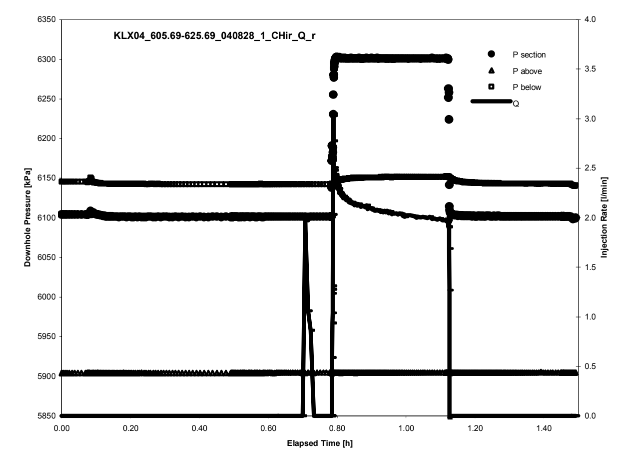
*: IARF not measured

The recommended transmissivity of 1.2E-6 m2/s was derived from the analysis of the CHi phase, which shows the best derivative quality. The confidence range for the interval transmissivity is estimated to be 8.0E-7 to 4.0E-6 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 5904.6 kPa.

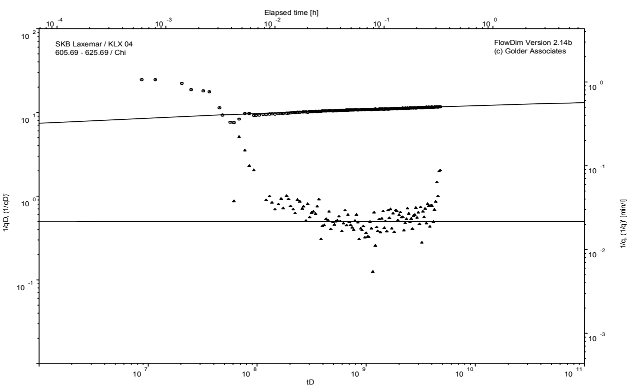
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040828 02:17
Test section from - to (m):	605.69-625.69 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

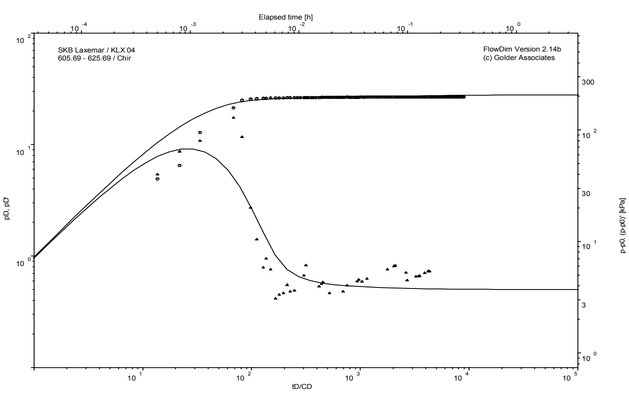
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	6104		
p_i (kPa) =	6101		
p_p(kPa) =	6301	p_F (kPa) =	6102
Q_p (m^3/s)=	3.28E-05		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	16.7		
Derivative fact.=	0.10	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	1.6E-06		
T_M (m^2/s)=	1.7E-06		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.20	dt_1 (min) =	1.00
dt_2 (min) =	14.70	dt_2 (min) =	5.93
T (m^2/s) =	3.0E-06	T (m^2/s) =	7.3E-06
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	1.5E-07	K_s (m/s) =	3.7E-07
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	6.2E-10
C_D (-) =	NA	C_D (-) =	6.8E-02
ξ (-) =	3.8	ξ (-) =	19.8
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.			
dt_1 (min) =	0.20	C (m^3/Pa) =	6.2E-10
dt_2 (min) =	14.70	C_D (-) =	6.8E-02
T_T (m^2/s) =	3.0E-06	ξ (-) =	3.8
S (-) =	1.0E-06		
K_s (m/s) =	1.5E-07		
S_s (1/m) =	5.0E-08		

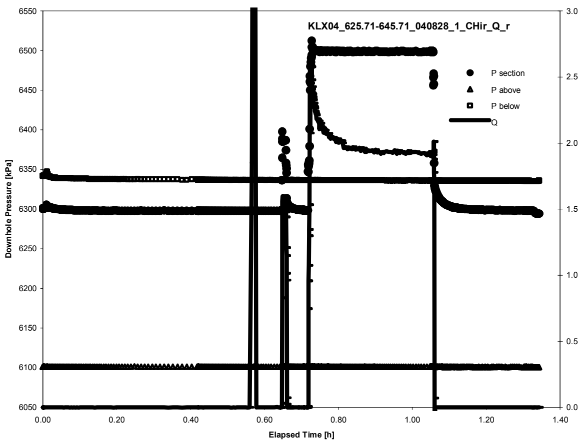
Comments:

The recommended transmissivity of 3.0E-6 m2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. It should be noted, that the results are uncertain, due to the connection to the lower section. The confidence range for the interval transmissivity is estimated to be 1.0E-6 to 6.0E-6 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 6101.9 kPa.

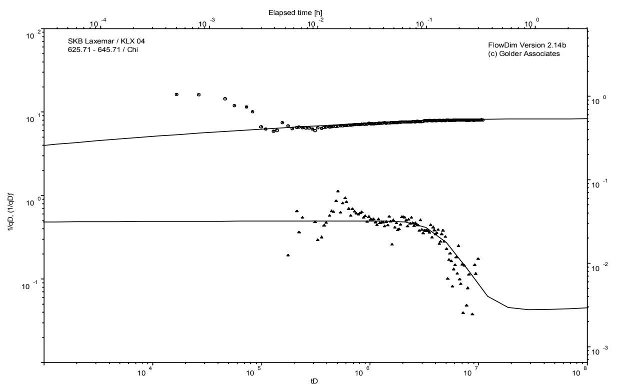
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040828 06:37
Test section from - to (m):	625.71-645.71 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

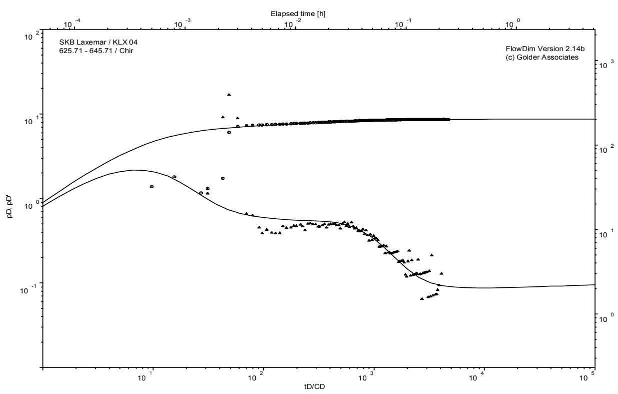
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	6301		
p_i (kPa) =	6298		
p_p(kPa) =	6499	p_F (kPa) =	6297
Q_p (m^3/s)=	3.22E-05		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	17.0		
Derivative fact.=	0.21	Derivative fact.=	0.10
Results		**Results**	
Q/s (m^2/s)=	1.6E-06		
T_M (m^2/s)=	1.6E-06		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	1.70	dt_1 (min) =	0.33
dt_2 (min) =	4.73	dt_2 (min) =	1.78
T (m^2/s) =	2.0E-06	T (m^2/s) =	2.2E-06
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	1.0E-07	K_s (m/s) =	1.1E-07
S_s (1/m) =	8.3E-09	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	2.6E-10
C_D (-) =	NA	C_D (-) =	2.9E-02
ξ (-) =	0.9	ξ (-) =	1.9
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	0.33	C (m^3/Pa) =	2.6E-10
dt_2 (min) =	1.78	C_D (-) =	2.9E-02
T_T (m^2/s) =	2.2E-06	ξ (-) =	1.9
S (-) =	1.0E-06		
K_s (m/s) =	1.1E-07		
S_s (1/m) =	5.0E-08		

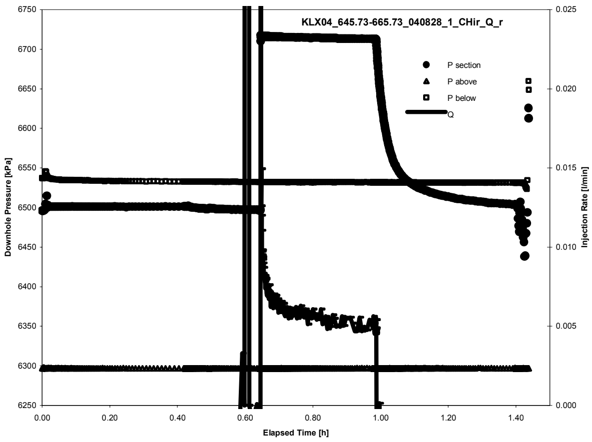
Comments:

The recommended transmissivity of 2.2E-6 m2/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 1.0E-6 to 4.0E-6 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 6296.5 kPa.

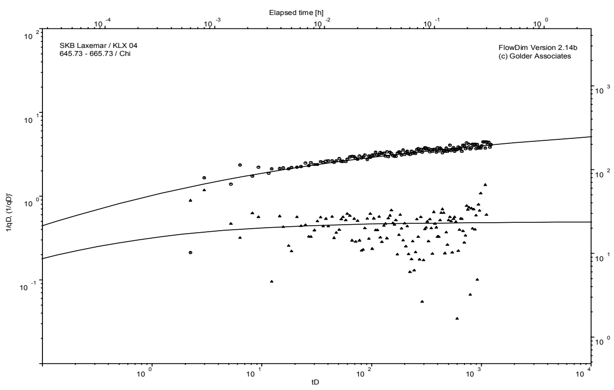
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040828 08:45
Test section from - to (m):	645.73-665.73 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

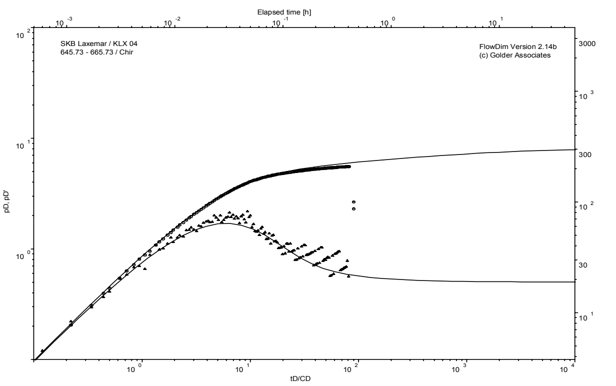
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	6497		
p_i (kPa) =	6497		
p_p(kPa) =	6712	p_F (kPa) =	6503
Q_p (m^3/s)=	8.33E-08		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	17.3		
Derivative fact.=	0.31	Derivative fact.=	0.01
Results		**Results**	
Q/s (m^2/s)=	3.8E-09		
T_M (m^2/s)=	4.0E-09		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	1.40	dt_1 (min) =	*
dt_2 (min) =	14.05	dt_2 (min) =	*
T (m^2/s) =	2.5E-09	T (m^2/s) =	4.1E-09
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	1.2E-10	K_s (m/s) =	2.1E-10
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	4.8E-11
C_D (-) =	NA	C_D (-) =	5.2E-03
ξ (-) =	-0.3	ξ (-) =	1.5
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	1.40	C (m^3/Pa) =	4.8E-11
dt_2 (min) =	14.05	C_D (-) =	5.2E-03
T_T (m^2/s) =	2.5E-09	ξ (-) =	-0.3
S (-) =	1.0E-06		
K_s (m/s) =	1.2E-10		
S_s (1/m) =	5.0E-08		

Comments:

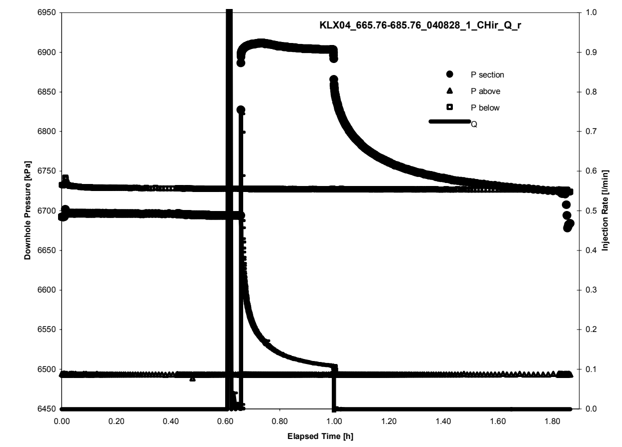
*: IARF not measured

The recommended transmissivity of 2.5E-9 m2/s was derived from the analysis of the CHi phase, because the CHir phase does not clearly show an infinite acting radial flow. The confidence range for the interval transmissivity is estimated to be 9.0E-10 to 4.0E-9 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 6487.5 kPa.

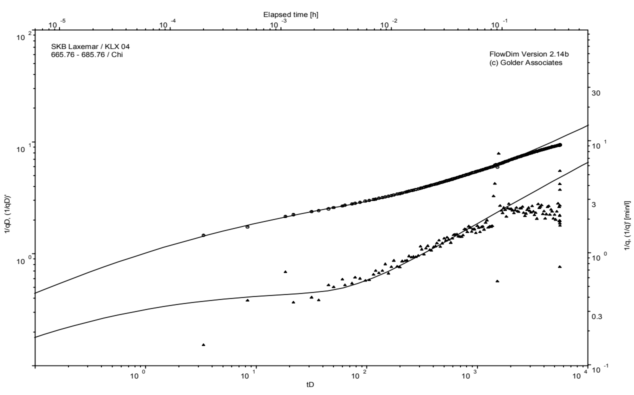
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040828 10:47
Test section from - to (m):	665.76-685.76 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

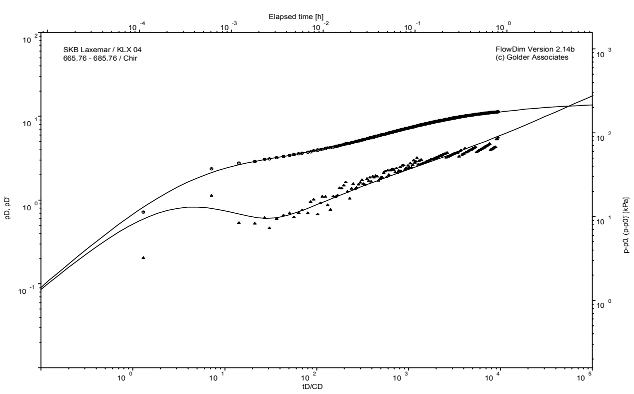
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	6692		
p_i (kPa) =	6694		
p_p(kPa) =	6903	p_F (kPa) =	6726
Q_p (m^3/s)=	1.68E-06		
tp (s) =	1200	t_F (s) =	1200
S el S* (-)=	1.00E-06	S el S* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	17.7		
Derivative fact.=	0.0	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	7.9E-08		
T_M (m^2/s)=	8.3E-08		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.08	dt_1 (min) =	0.07
dt_2 (min) =	0.23	dt_2 (min) =	0.22
T (m^2/s) =	1.3E-07	T (m^2/s) =	2.5E-07
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	6.3E-09	K_s (m/s) =	1.3E-08
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	5.0E-11
C_D (-) =	NA	C_D (-) =	5.5E-03
ξ (-) =	-1.5	ξ (-) =	-0.9
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.			
dt_1 (min) =	0.07	C (m^3/Pa) =	5.0E-11
dt_2 (min) =	0.22	C_D (-) =	5.5E-03
T_T (m^2/s) =	2.5E-07	ξ (-) =	-0.9
S (-) =	1.0E-06		
K_s (m/s) =	1.3E-08		
S_s (1/m) =	5.0E-08		

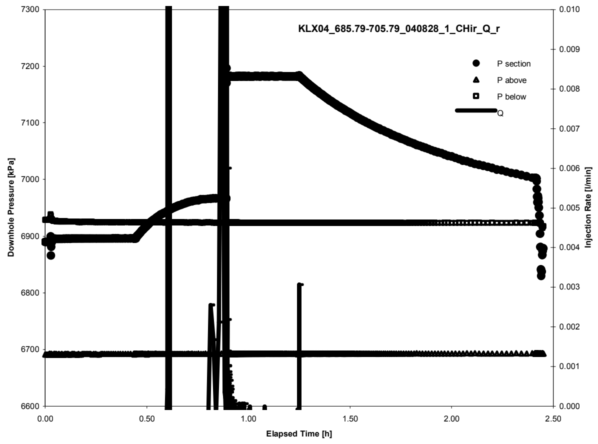
Comments:

The recommended transmissivity of 2.5E-7 m2/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. It should be noted that the results are uncertain due to the uncertainties concerning the flow dimension. The confidence range for the interval transmissivity is estimated to be 7.0E-8 to 5.0E-7 m2/s. The analysis was conducted assuming a flow dimension of 2 for the inner zone and a flow dimension of 1 for the outer zone. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 6675.0 kPa.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Pi
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040828 13:37
Test section from - to (m):	685.79-705.79 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

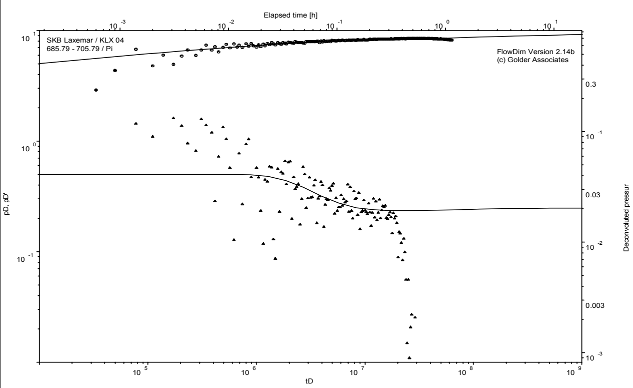
Linear plot Q and p



Log-Log plot incl. derivates- flow period

Not Analysed

Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	6889		
p_i (kPa) =	6967		
p_p(kPa) =	7182	p_F (kPa) =	7002
Q_p (m^3/s)=	0.00E+00		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	18.1		
Derivative fact.=	-	Derivative fact.=	0.26
Results		**Results**	
Q/s (m^2/s)=	NA		
T_M (m^2/s)=	NA		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	-	dt_1 (min) =	*
dt_2 (min) =	-	dt_2 (min) =	*
T (m^2/s) =	NA	T (m^2/s) =	1.8E-10
S (-) =	NA	S (-) =	1.0E-06
K_s (m/s) =	NA	K_s (m/s) =	9.0E-12
S_s (1/m) =	NA	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	3.4E-11
C_D (-) =	NA	C_D (-) =	3.8E-03
ξ (-) =	NA	ξ (-) =	5.9
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	
Selected representative parameters.			
dt_1 (min) =	*	C (m^3/Pa) =	3.4E-11
dt_2 (min) =	*	C_D (-) =	3.8E-03
T_T (m^2/s) =	1.8E-10	ξ (-) =	5.9
S (-) =	1.0E-06		
K_s (m/s) =	9.0E-12		
S_s (1/m) =	5.0E-08		

Comments:

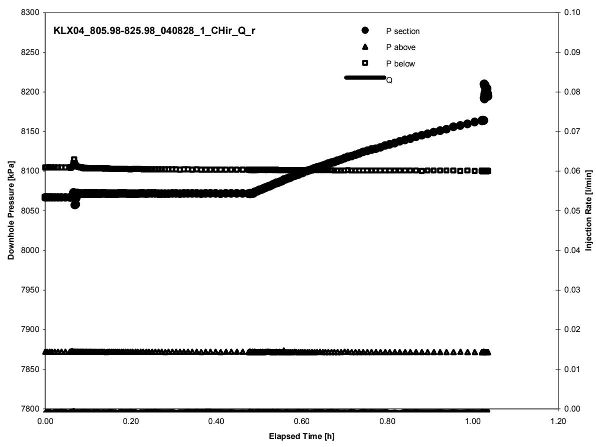
*: IARF not measured

The recommended transmissivity of 1.8E-10 m2/s was derived from the analysis of the Pi phase. Considering the inherent uncertainties related to the measurement (e.g. specially the measurement of the wellbore storage coefficient) and to the analysis process , the confidence range for the transmissivity is estimated to be 9E-11 to 6E-10 m2/s It should be noted that due to the very low interval transmissivity the results are very uncertain. The analysis was conducted using a flow dimension of 2. No static pressure could be derived.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040828 17:59
Test section from - to (m):	805.98-825.98 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	8067		
p_i (kPa) =	-		
p_p(kPa) =	-	p_F (kPa) =	-
Q_p (m^3/s)=	-		
tp (s) =	-	t_F (s) =	-
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	20.0		
Derivative fact.=	-	Derivative fact.=	-
Results		**Results**	
Q/s (m^2/s)=	NA		
T_M (m^2/s)=	NA		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	-	dt_1 (min) =	-
dt_2 (min) =	-	dt_2 (min) =	-
T (m^2/s) =	NA	T (m^2/s) =	NA
S (-) =	NA	S (-) =	NA
K_s (m/s) =	NA	K_s (m/s) =	NA
S_s (1/m) =	NA	S_s (1/m) =	NA
C (m^3/Pa) =	NA	C (m^3/Pa) =	NA
C_D (-) =	NA	C_D (-) =	NA
ξ (-) =	NA	ξ (-) =	NA
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Log-Log plot incl. derivates- flow period

Not Analysed

Log-Log plot incl. derivatives- recovery period

Not Analysed

Selected representative parameters.			
dt_1 (min) =	-	C (m^3/Pa) =	NA
dt_2 (min) =	-	C_D (-) =	NA
T_T (m^2/s) =	NA	ξ (-) =	NA
S (-) =	NA		
K_s (m/s) =	NA		
S_s (1/m) =	NA		

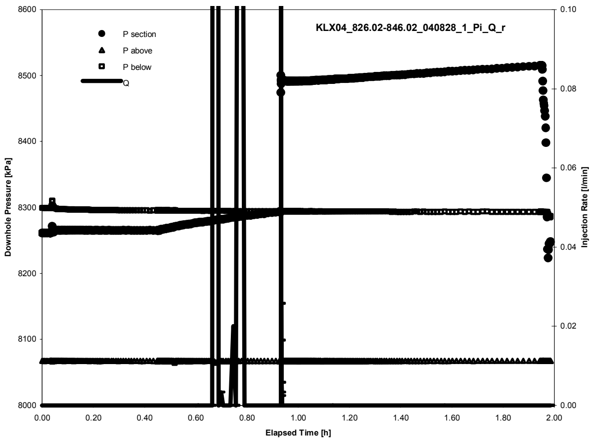
Comments:

Based on the test response (prolonged packer compliance) the interval transmissivity is lower than 1E-11 m2/s.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Pi
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040828 20:06
Test section from - to (m):	826.02-846.02 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	8261		
p_i (kPa) =	8293		
p_p(kPa) =	8492	p_F (kPa) =	8415
Q_p (m^3/s)=	-		
tp (s) =	60	t_F (s) =	3600
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	20.3		
Derivative fact.=	-	Derivative fact.=	-
Results		**Results**	
Q/s (m^2/s)=	NA		
T_M (m^2/s)=	NA		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	-	dt_1 (min) =	-
dt_2 (min) =	-	dt_2 (min) =	-
T (m^2/s) =	NA	T (m^2/s) =	NA
S (-) =	NA	S (-) =	NA
K_s (m/s) =	NA	K_s (m/s) =	NA
S_s (1/m) =	NA	S_s (1/m) =	NA
C (m^3/Pa) =	NA	C (m^3/Pa) =	NA
C_D (-) =	NA	C_D (-) =	NA
ξ (-) =	NA	ξ (-) =	NA
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Log-Log plot incl. derivates- flow period

Not Analysed

Log-Log plot incl. derivatives- recovery period

Not Analysed

Selected representative parameters.

dt_1 (min) =	-	C (m^3/Pa) =	NA
dt_2 (min) =	NA	C_D (-) =	NA
T_T (m^2/s) =	NA	ξ (-) =	NA
S (-) =	NA		
K_s (m/s) =	NA		
S_s (1/m) =	NA		

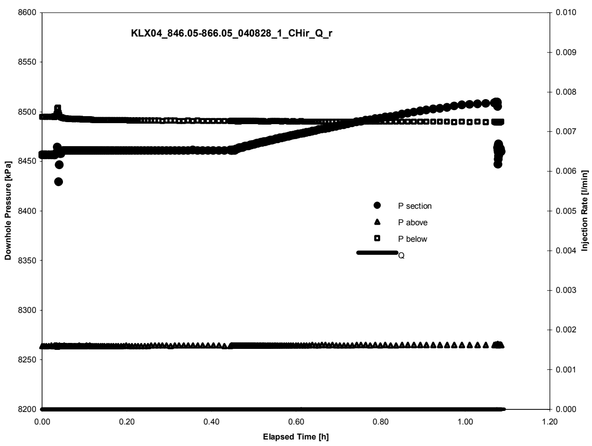
Comments:

Based on the test response (prolonged packer compliance) the interval transmissivity is lower than 1E-11 m2/s.
No further analysis recommended.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040828 22:55
Test section from - to (m):	846.05-866.05 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	8457		
p_i (kPa) =	-		
p_p(kPa) =	-	p_F (kPa) =	-
Q_p (m^3/s)=	-		
tp (s) =	-	t_F (s) =	-
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	20.7		
Derivative fact.=	-	Derivative fact.=	-
Results		**Results**	
Q/s (m^2/s)=	NA		
T_M (m^2/s)=	NA		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	-	dt_1 (min) =	-
dt_2 (min) =	-	dt_2 (min) =	-
T (m^2/s) =	NA	T (m^2/s) =	NA
S (-) =	NA	S (-) =	NA
K_s (m/s) =	NA	K_s (m/s) =	NA
S_s (1/m) =	NA	S_s (1/m) =	NA
C (m^3/Pa) =	NA	C (m^3/Pa) =	NA
C_D (-) =	NA	C_D (-) =	NA
ξ (-) =	NA	ξ (-) =	NA
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Log-Log plot incl. derivates- flow period

Not Analysed

Log-Log plot incl. derivatives- recovery period

Not Analysed

Selected representative parameters.

dt_1 (min) =	-	C (m^3/Pa) =	NA
dt_2 (min) =	-	C_D (-) =	NA
T_T (m^2/s) =	NA	ξ (-) =	NA
S (-) =	NA		
K_s (m/s) =	NA		
S_s (1/m) =	NA		

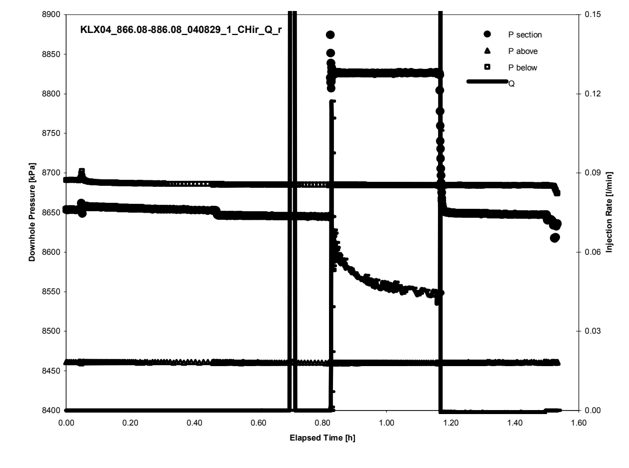
Comments:

Based on the test response (prolonged packer compliance) the interval transmissivity is lower than 1E-11 m2/s.
No further analysis recommended.

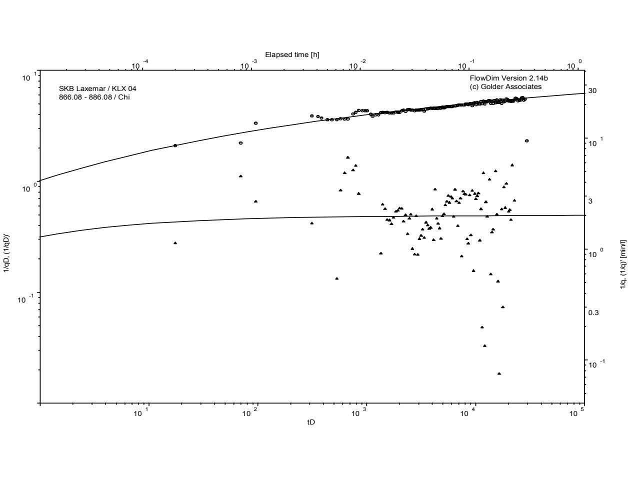
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040829 00:49
Test section from - to (m):	866.08-886.08 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

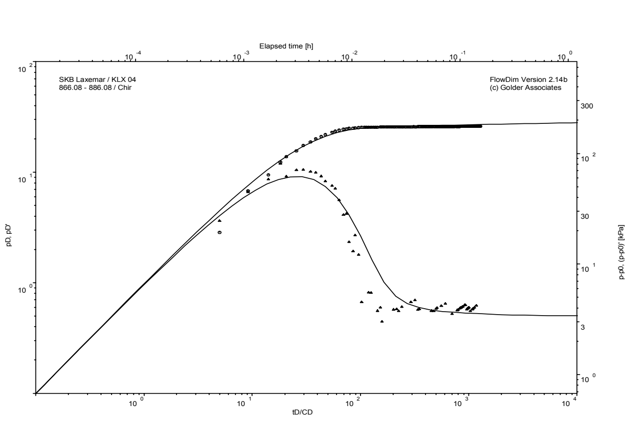
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	8653		
p_i (kPa) =	8645		
p_p(kPa) =	8826	p_F (kPa) =	8647
Q_p (m^3/s)=	7.42E-07		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	21.0		
Derivative fact.=	0.09	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	4.0E-08		
T_M (m^2/s)=	4.2E-08		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	1.06	dt_1 (min) =	3.26
dt_2 (min) =	10.78	dt_2 (min) =	8.13
T (m^2/s) =	3.5E-08	T (m^2/s) =	1.9E-07
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	1.8E-09	K_s (m/s) =	9.7E-09
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	5.3E-11
C_D (-) =	NA	C_D (-) =	5.9E-03
ξ (-) =	0.0	ξ (-) =	21.0
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.			
dt_1 (min) =	1.06	C (m^3/Pa) =	5.3E-11
dt_2 (min) =	10.78	C_D (-) =	5.9E-03
T_T (m^2/s) =	3.5E-08	ξ (-) =	0.0
S (-) =	1.0E-06		
K_s (m/s) =	1.8E-09		
S_s (1/m) =	5.0E-08		

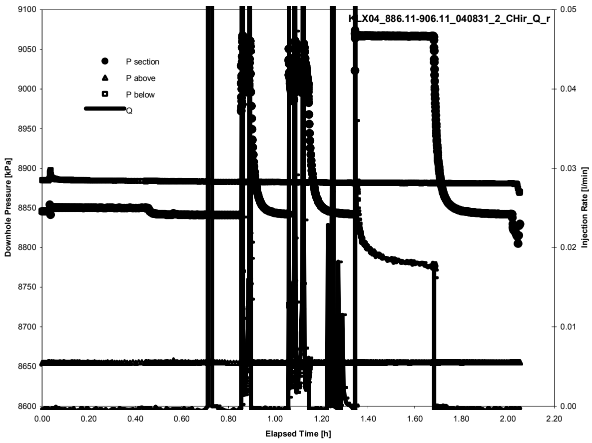
Comments:

The recommended transmissivity of 3.5E-8 m2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 8.0E-9 to 6.0E-8 m2/s. The analysis was conducted using a flow dimension of 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 8646.0 kPa.

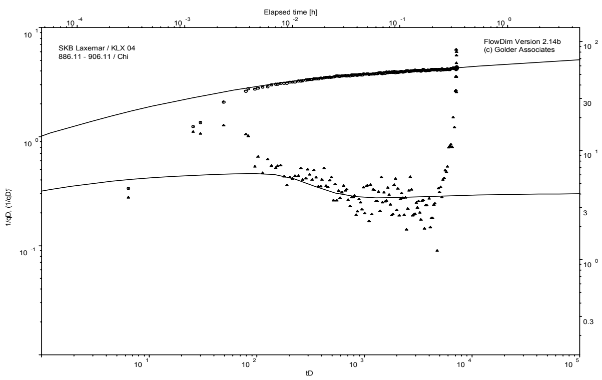
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	2
Borehole ID:	KLX04	Test start:	040831 01:49
Test section from - to (m):	886.11-906.11 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

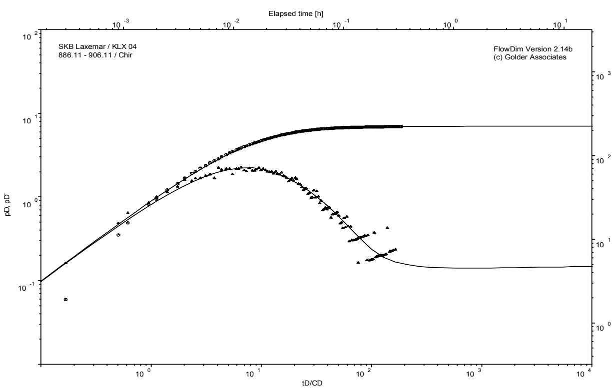
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	8846		
p_i (kPa) =	8842		
p_p(kPa) =	9066	p_F (kPa) =	8842
Q_p (m^3/s)=	2.83E-07		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	21.3		
Derivative fact.=	0.08	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	1.2E-08		
T_M (m^2/s)=	1.3E-08		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	2.59	dt_1 (min) =	*
dt_2 (min) =	7.48	dt_2 (min) =	*
T (m^2/s) =	1.4E-08	T (m^2/s) =	1.6E-08
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	7.1E-10	K_s (m/s) =	8.0E-10
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	8.7E-11
C_D (-) =	NA	C_D (-) =	9.6E-03
ξ (-) =	0.0	ξ (-) =	4.8
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.			
dt_1 (min) =	*	C (m^3/Pa) =	8.7E-11
dt_2 (min) =	*	C_D (-) =	9.6E-03
T_T (m^2/s) =	1.6E-08	ξ (-) =	4.8
S (-) =	1.0E-06		
K_s (m/s) =	8.0E-10		
S_s (1/m) =	5.0E-08		

Comments:

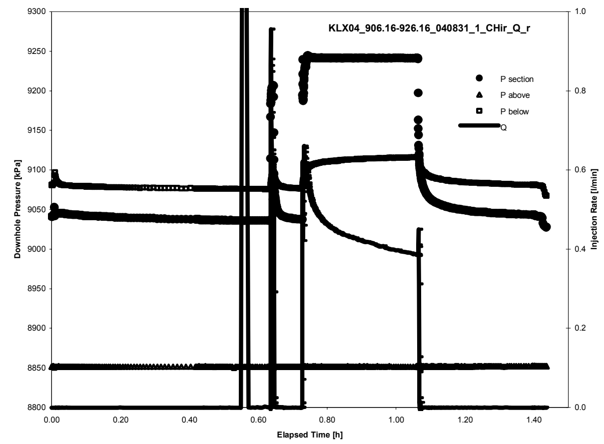
*: IARF not measured

The recommended transmissivity of 1.6E-8 m2/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 7.0E-9 to 4.0E-8 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 8839.4 kPa.

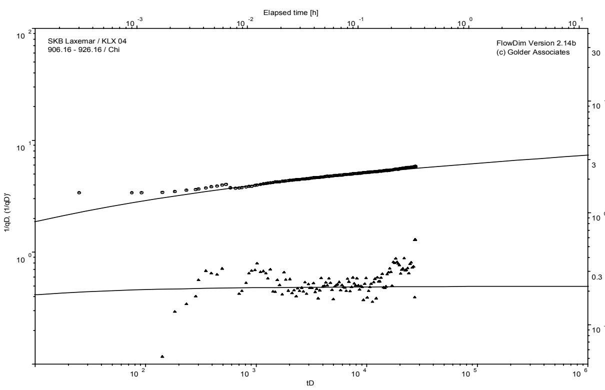
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040831 06:18
Test section from - to (m):	906.16-926.16 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

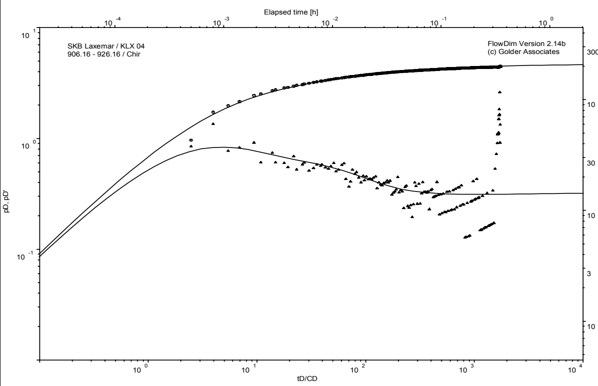
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	9045		
p_i (kPa) =	9038		
p_p(kPa) =	9240	p_F (kPa) =	9043
Q_p (m^3/s)=	6.43E-06		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	21.6		
Derivative fact.=	0.04	Derivative fact.=	
Results		**Results**	
Q/s (m^2/s)=	3.1E-07		
T_M (m^2/s)=	3.3E-07		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	1.17	dt_1 (min) =	4.18
dt_2 (min) =	10.47	dt_2 (min) =	14.42
T (m^2/s) =	2.9E-07	T (m^2/s) =	3.9E-07
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	1.4E-08	K_s (m/s) =	2.0E-08
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.2E-10
C_D (-) =	NA	C_D (-) =	1.3E-02
ξ (-) =	-1.1	ξ (-) =	-1.3
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	1.17	C (m^3/Pa) =	1.2E-10
dt_2 (min) =	10.47	C_D (-) =	1.3E-02
T_T (m^2/s) =	2.9E-07	ξ (-) =	-1.1
S (-) =	1.0E-06		
K_s (m/s) =	1.4E-08		
S_s (1/m) =	5.0E-08		

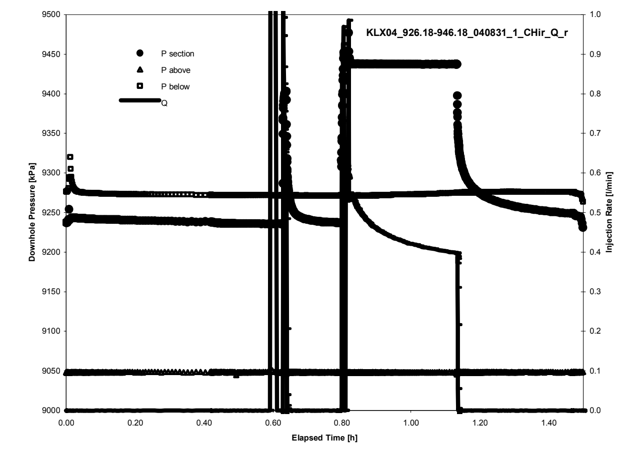
Comments:

The recommended transmissivity of 2.9E-7 m2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. Considering the uncertainties due to the connection to the lower zone, the confidence range for the interval transmissivity is estimated to be 5.0E-8 to 4.0E-7 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 9036.0 kPa.

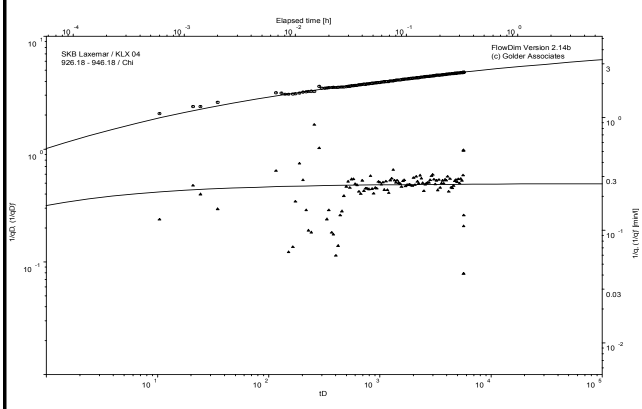
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040831 08:16
Test section from - to (m):	926.18-946.18 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

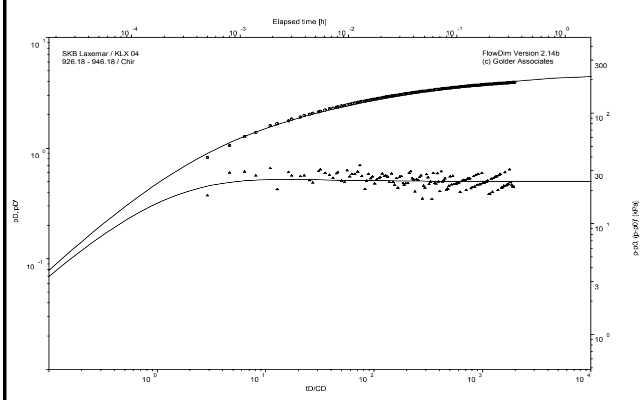
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	9240		
p_i (kPa) =	9237		
p_p(kPa) =	9437	p_F (kPa) =	9249
Q_p (m^3/s)=	6.62E-06		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	21.9		
Derivative fact.=	0.03	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	3.2E-07		
T_M (m^2/s)=	3.4E-07		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	1.72	dt_1 (min) =	0.17
dt_2 (min) =	18.90	dt_2 (min) =	18.83
T (m^2/s) =	2.5E-07	T (m^2/s) =	2.4E-07
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	1.2E-08	K_s (m/s) =	1.2E-08
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	9.7E-11
C_D (-) =	NA	C_D (-) =	1.1E-02
ξ (-) =	-1.8	ξ (-) =	-2.3
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	0.17	C (m^3/Pa) =	9.7E-11
dt_2 (min) =	18.83	C_D (-) =	1.1E-02
T_T (m^2/s) =	2.4E-07	ξ (-) =	-2.3
S (-) =	1.0E-06		
K_s (m/s) =	1.2E-08		
S_s (1/m) =	5.0E-08		

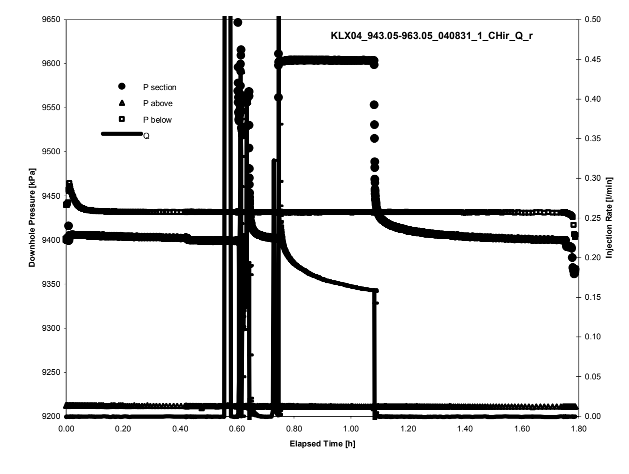
Comments:

The recommended transmissivity of 2.4E-7 m2/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. Considering the uncertainties due to the connection to the section above, the confidence range for the interval transmissivity is estimated to be 5.0E-8 to 4.0E-7 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 9233.3 kPa.

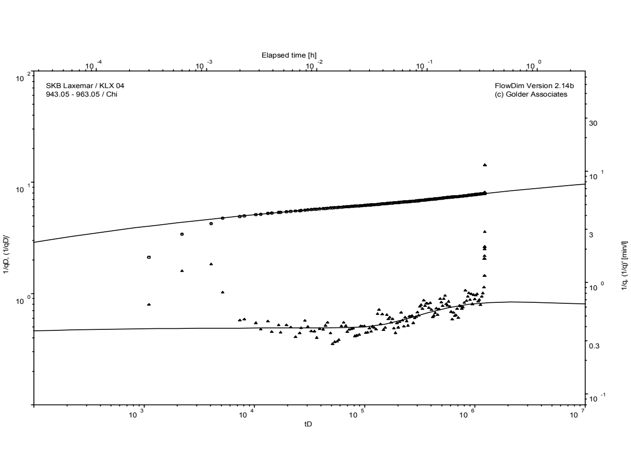
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040831 10:30
Test section from - to (m):	943.05-963.05 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

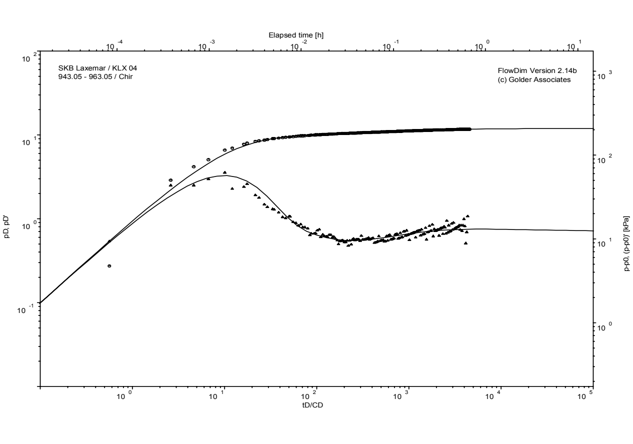
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	9399		
p_i (kPa) =	9401		
p_p(kPa) =	9603	p_F (kPa) =	9400
Q_p (m^3/s)=	2.62E-06		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	22.2		
Derivative fact.=	0.02	Derivative fact.=	0.10
Results		**Results**	
Q/s (m^2/s)=	1.3E-07		
T_M (m^2/s)=	1.3E-07		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.19	dt_1 (min) =	1.16
dt_2 (min) =	2.07	dt_2 (min) =	3.60
T (m^2/s) =	1.6E-07	T (m^2/s) =	2.7E-07
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	8.1E-09	K_s (m/s) =	1.3E-08
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	9.0E-11
C_D (-) =	NA	C_D (-) =	9.9E-03
ξ (-) =	1.1	ξ (-) =	5.2
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	1.16	C (m^3/Pa) =	9.0E-11
dt_2 (min) =	3.60	C_D (-) =	9.9E-03
T_T (m^2/s) =	2.7E-07	ξ (-) =	5.2
S (-) =	1.0E-06		
K_s (m/s) =	1.3E-08		
S_s (1/m) =	5.0E-08		

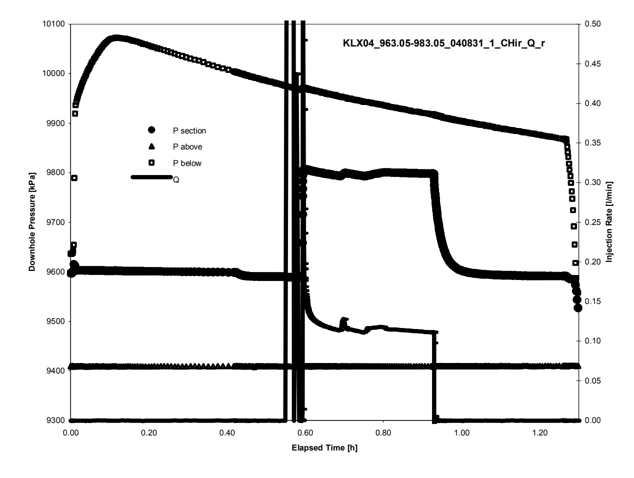
Comments:

The recommended transmissivity of 2.7E-7 m2/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 9.0E-8 to 4.0E-7 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 9395.9 kPa.

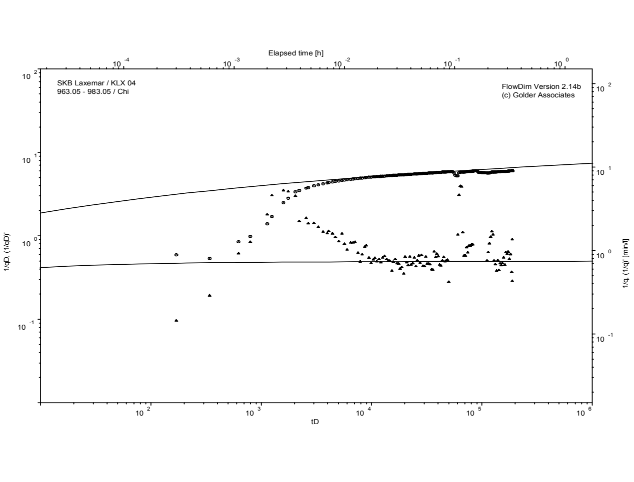
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040831 12:54
Test section from - to (m):	963.05-983.05 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

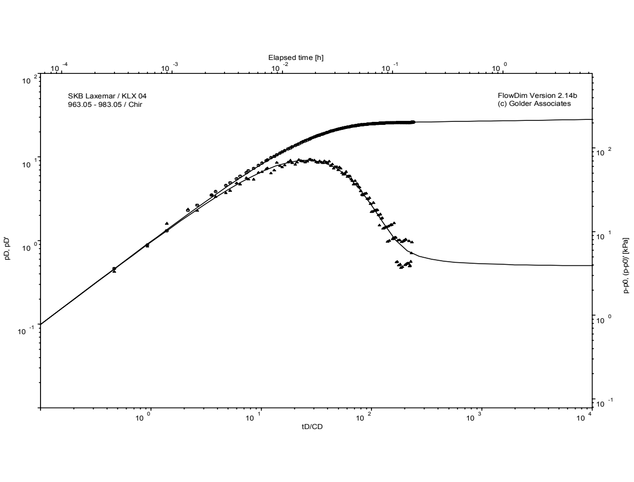
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	9601		
p_i (kPa) =	9589		
p_p(kPa) =	9799	p_F (kPa) =	9590
Q_p (m^3/s)=	1.85E-06		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	22.6		
Derivative fact.=	0.02	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	8.6E-08		
T_M (m^2/s)=	9.0E-08		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	1.13	dt_1 (min) =	*
dt_2 (min) =	16.24	dt_2 (min) =	*
T (m^2/s) =	8.2E-08	T (m^2/s) =	4.1E-07
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	4.1E-09	K_s (m/s) =	2.0E-08
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	6.1E-10
C_D (-) =	NA	C_D (-) =	6.7E-02
ξ (-) =	0.5	ξ (-) =	19.8
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	1.13	C (m^3/Pa) =	6.1E-10
dt_2 (min) =	16.24	C_D (-) =	6.7E-02
T_T (m^2/s) =	8.2E-08	ξ (-) =	0.5
S (-) =	1.0E-06		
K_s (m/s) =	4.1E-09		
S_s (1/m) =	5.0E-08		

Comments:

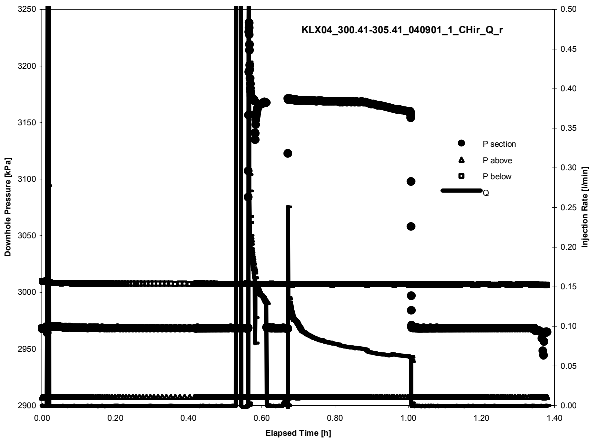
*: IARF not measured

The recommended transmissivity of 8.2E-8 m2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 5.0E-8 to 2.0E-7 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 9586.7 kPa.

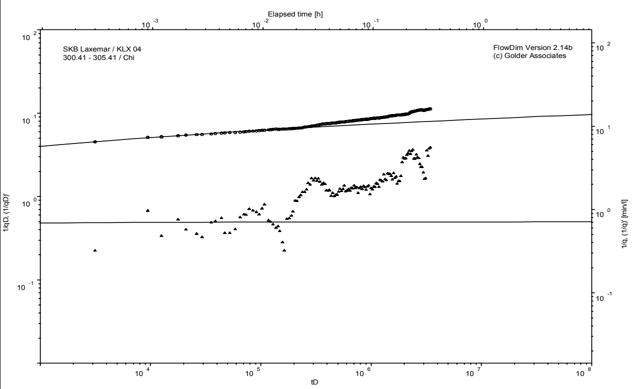
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040901 10:29
Test section from - to (m):	300.41-305.41 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

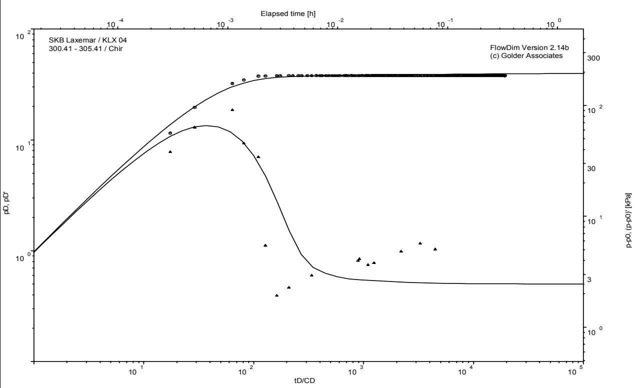
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	2969		
p_i (kPa) =	2968		
p_p(kPa) =	3160	p_F (kPa) =	2968
Q_p (m^3/s)=	1.03E-06		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	11.1		
Derivative fact.=	0.07	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	5.3E-08		
T_M (m^2/s)=	4.4E-08		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.07	dt_1 (min) =	10.02
dt_2 (min) =	1.04	dt_2 (min) =	14.04
T (m^2/s) =	9.1E-08	T (m^2/s) =	4.1E-07
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	1.8E-08	K_s (m/s) =	8.2E-08
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.6E-11
C_D (-) =	NA	C_D (-) =	1.8E-03
ξ (-) =	1.9	ξ (-) =	33.1
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	0.07	C (m^3/Pa) =	1.6E-11
dt_2 (min) =	1.04	C_D (-) =	1.8E-03
T_T (m^2/s) =	9.1E-08	ξ (-) =	1.9
S (-) =	1.0E-06		
K_s (m/s) =	1.8E-08		
S_s (1/m) =	2.0E-07		

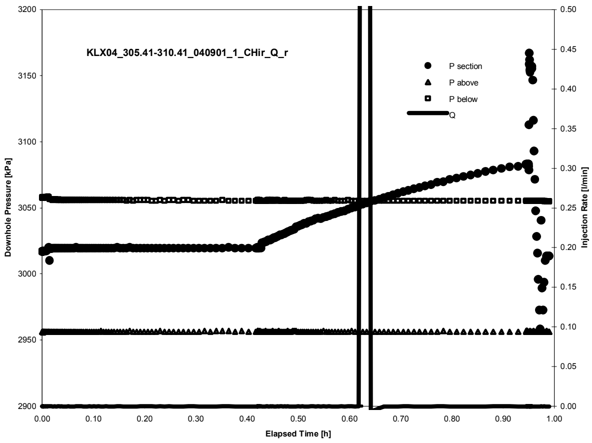
Comments:

The recommended transmissivity of 9.1E-8 m2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. It should be noted, that due to the above mentioned drop in flow, the results are very uncertain. The confidence range for the interval transmissivity is estimated to be 3.0E-8 to 2.0E-7 m2/s. The analysis was conducted using a flow dimension of 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 2968.2 kPa.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040901 13:06
Test section from - to (m):	305.41-310.41 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	3017		
p_i (kPa) =	-		
p_p(kPa) =	-	p_F (kPa) =	-
Q_p (m^3/s)=	-		
tp (s) =	-	t_F (s) =	-
S el S^* (-)=	-	S el S^* (-)=	-
EC_w (mS/m)=			
$Temp_w$(gr C)=	11.3		
Derivative fact.=	-	Derivative fact.=	-
Results		**Results**	
Q/s (m^2/s)=	NA		
T_M (m^2/s)=	NA		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	-	dt_1 (min) =	-
dt_2 (min) =	-	dt_2 (min) =	-
T (m^2/s) =	NA	T (m^2/s) =	NA
S (-) =	NA	S (-) =	NA
K_s (m/s) =	NA	K_s (m/s) =	NA
S_s (1/m) =	NA	S_s (1/m) =	NA
C (m^3/Pa) =	NA	C (m^3/Pa) =	NA
C_D (-) =	NA	C_D (-) =	NA
ξ (-) =	NA	ξ (-) =	NA
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Log-Log plot incl. derivates- flow period

Not Analysed

Log-Log plot incl. derivatives- recovery period

Not Analysed

Selected representative parameters.

dt_1 (min) =	NA	C (m^3/Pa) =	NA
dt_2 (min) =	NA	C_D (-) =	NA
T_T (m^2/s) =	NA	ξ (-) =	NA
S (-) =	NA		
K_s (m/s) =	NA		
S_s (1/m) =	NA		

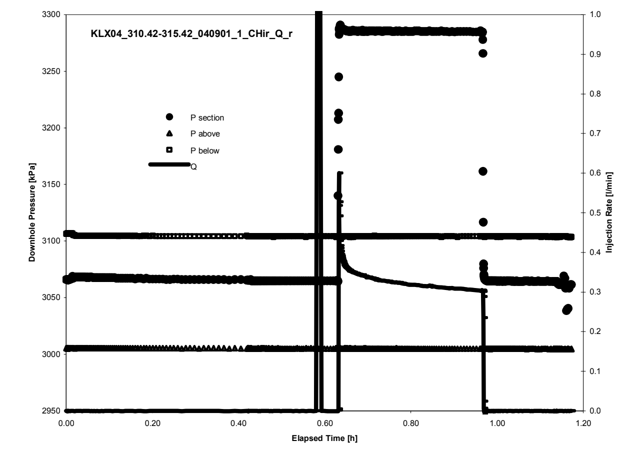
Comments:

Based on the test response (prolonged packer compliance) the interval transmissivity is lower than 1E-11 m2/s.

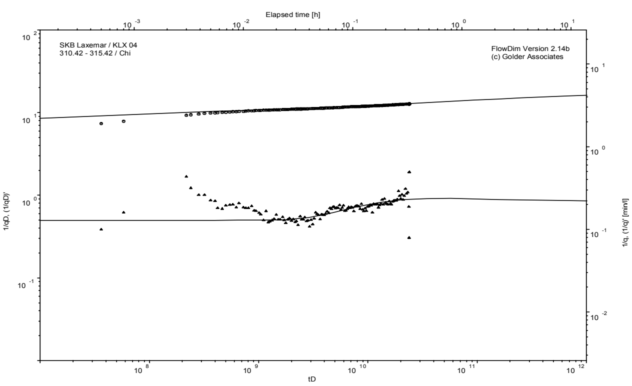
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040901 14:43
Test section from - to (m):	310.42-315.42 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

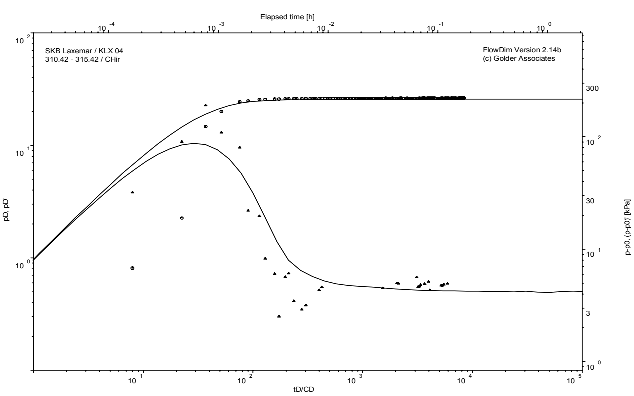
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	3066		
p_i (kPa) =	3065		
p_p(kPa) =	3285	p_F (kPa) =	3064
Q_p (m^3/s)=	5.00E-06		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	11.5		
Derivative fact.=	0.13	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	2.2E-07		
T_M (m^2/s)=	1.8E-07		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	1.01	dt_1 (min) =	0.41
dt_2 (min) =	2.50	dt_2 (min) =	7.33
T (m^2/s) =	4.6E-07	T (m^2/s) =	1.0E-06
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	9.2E-08	K_s (m/s) =	6.7E-08
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	4.8E-11
C_D (-) =	NA	C_D (-) =	5.3E-03
ξ (-) =	5.5	ξ (-) =	21.0
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.			
dt_1 (min) =	1.01	C (m^3/Pa) =	4.8E-11
dt_2 (min) =	2.50	C_D (-) =	5.3E-03
T_T (m^2/s) =	4.6E-07	ξ (-) =	5.5
S (-) =	1.0E-06		
K_s (m/s) =	9.2E-08		
S_s (1/m) =	2.0E-07		

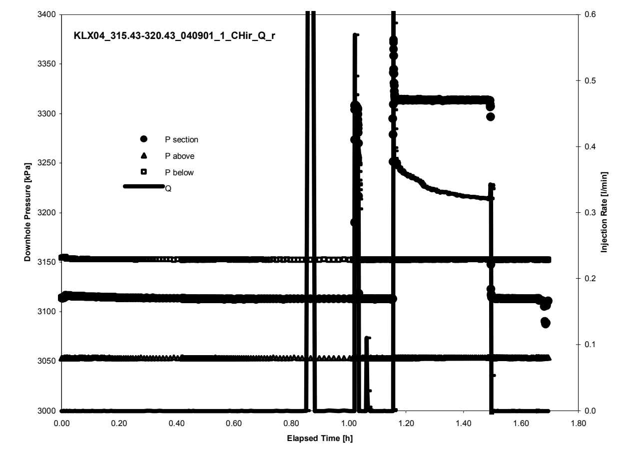
Comments:

The recommended transmissivity of 4.6E-7 m2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 1.0E-7 to 8.0E-7 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3063.3 kPa.

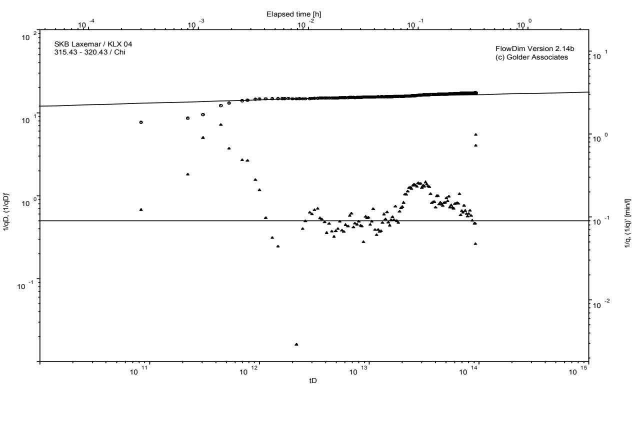
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040901 16:25
Test section from - to (m):	315.43-320.43 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

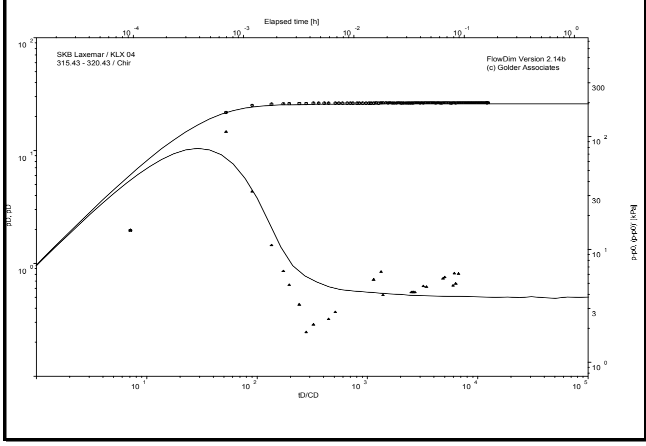
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	3114		
p_i (kPa) =	3113		
p_p(kPa) =	3314	p_F (kPa) =	3113
Q_p (m^3/s)=	5.37E-06		
tp (s) =	1200	t_F (s) =	600
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	11.6		
Derivative fact.=	0.10	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	2.6E-07		
T_M (m^2/s)=	2.2E-07		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.80	dt_1 (min) =	0.41
dt_2 (min) =	3.97	dt_2 (min) =	2.14
T (m^2/s) =	7.2E-07	T (m^2/s) =	1.2E-06
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	1.4E-07	K_s (m/s) =	2.3E-07
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	3.6E-11
C_D (-) =	NA	C_D (-) =	3.9E-03
ξ (-) =	9.4	ξ (-) =	21.2
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	0.80	C (m^3/Pa) =	3.6E-11
dt_2 (min) =	3.97	C_D (-) =	3.9E-03
T_T (m^2/s) =	7.2E-07	ξ (-) =	9.4
S (-) =	1.0E-06		
K_s (m/s) =	1.4E-07		
S_s (1/m) =	2.0E-07		

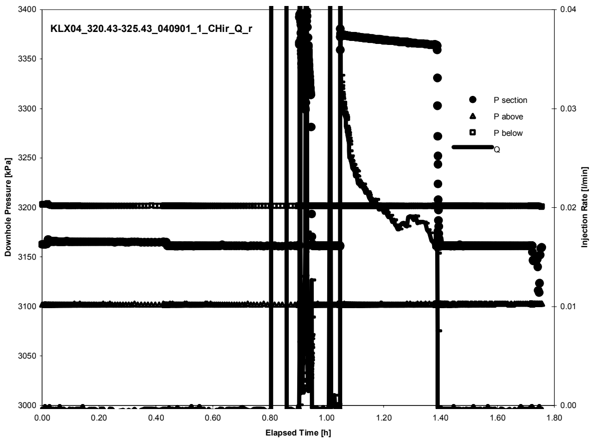
Comments:

The recommended transmissivity of 7.2E-7 m2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 2.0E-7 to 9.0E-7 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3113.1 kPa.

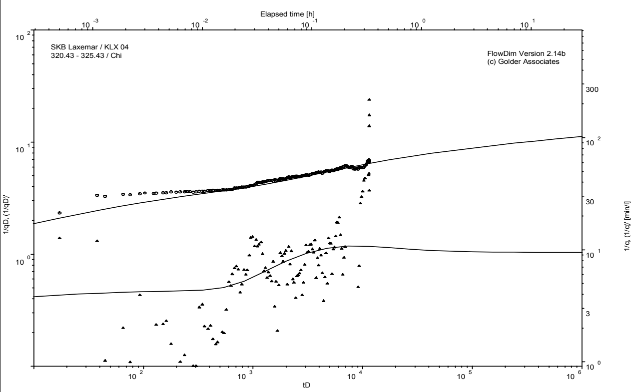
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040901 18:55
Test section from - to (m):	320.43-325.43 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

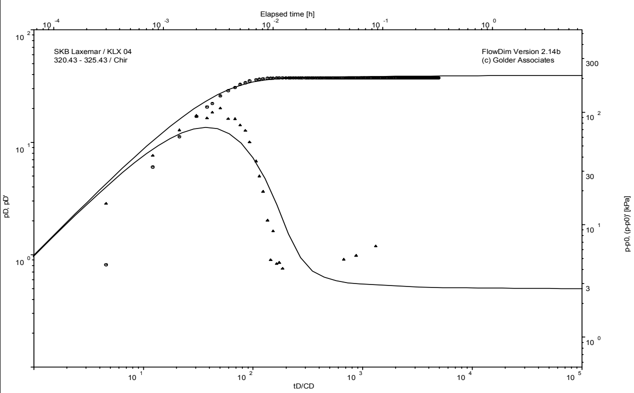
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	3162		
p_i (kPa) =	3161		
p_p(kPa) =	3363	p_F (kPa) =	3161
Q_p (m^3/s)=	2.72E-07		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	11.7		
Derivative fact.=	0.03	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	1.3E-08		
T_M (m^2/s)=	1.1E-08		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.16	dt_1 (min) =	2.57
dt_2 (min) =	1.05	dt_2 (min) =	5.33
T (m^2/s) =	1.4E-08	T (m^2/s) =	1.0E-07
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	2.8E-09	K_s (m/s) =	2.0E-08
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.5E-11
C_D (-) =	NA	C_D (-) =	1.7E-03
ξ (-) =	0.0	ξ (-) =	33.1
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	0.16	C (m^3/Pa) =	1.5E-11
dt_2 (min) =	1.05	C_D (-) =	1.7E-03
T_T (m^2/s) =	1.4E-08	ξ (-) =	0.0
S (-) =	1.0E-06		
K_s (m/s) =	2.8E-09		
S_s (1/m) =	2.0E-07		

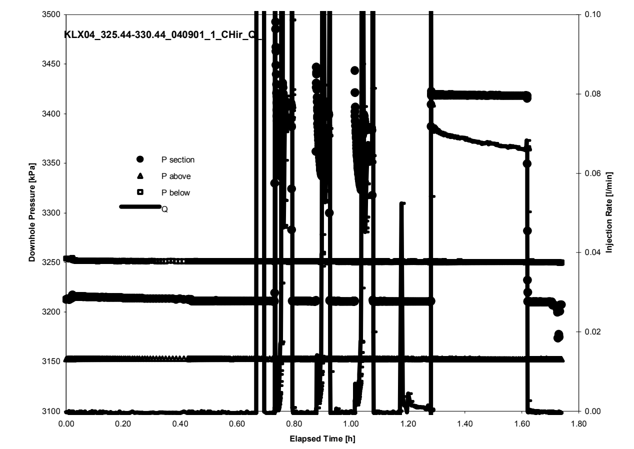
Comments:

The recommended transmissivity of 1.4E-8 m2/s was derived from the analysis of the CHi phase. The confidence range for the interval transmissivity is estimated to be 6.0E-9 to 4.0E-8 m2/s. The analysis was conducted using a flow dimension of 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3161.4 kPa.

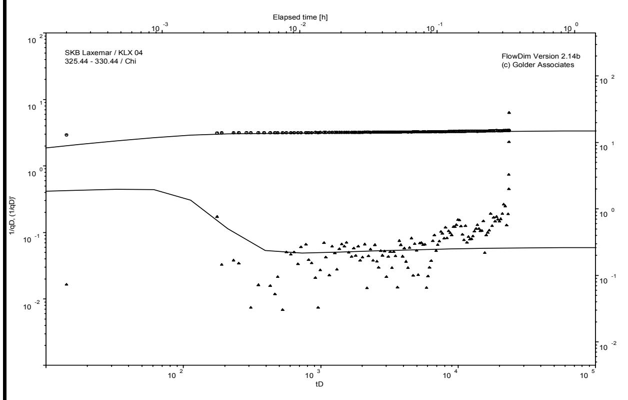
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040901 23:17
Test section from - to (m):	325.44-330.44 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

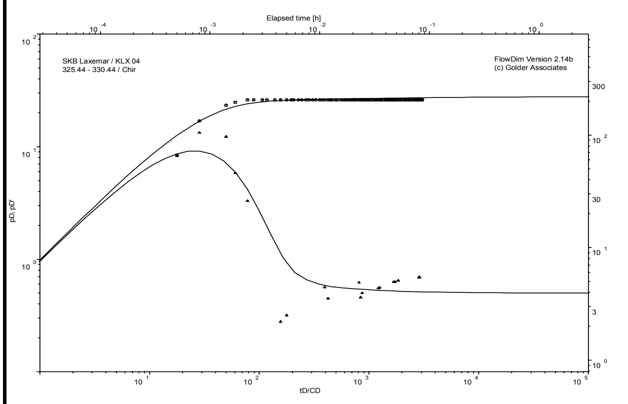
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	3213		
p_i (kPa) =	3211		
p_p(kPa) =	3418	p_F (kPa) =	3210
Q_p (m^3/s)=	1.10E-06		
tp (s) =	1200	t_F (s) =	300
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	11.8		
Derivative fact.=	0.09	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	5.2E-08		
T_M (m^2/s)=	4.3E-08		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.48	dt_1 (min) =	0.67
dt_2 (min) =	4.25	dt_2 (min) =	2.12
T (m^2/s) =	2.4E-07	T (m^2/s) =	2.3E-07
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	4.7E-08	K_s (m/s) =	4.5E-08
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.5E-11
C_D (-) =	NA	C_D (-) =	1.6E-03
ξ (-) =	0.0	ξ (-) =	21.6
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.			
dt_1 (min) =	0.67	C (m^3/Pa) =	1.5E-11
dt_2 (min) =	2.12	C_D (-) =	1.6E-03
T_T (m^2/s) =	2.3E-07	ξ (-) =	21.6
S (-) =	1.0E-06		
K_s (m/s) =	4.5E-08		
S_s (1/m) =	2.0E-07		

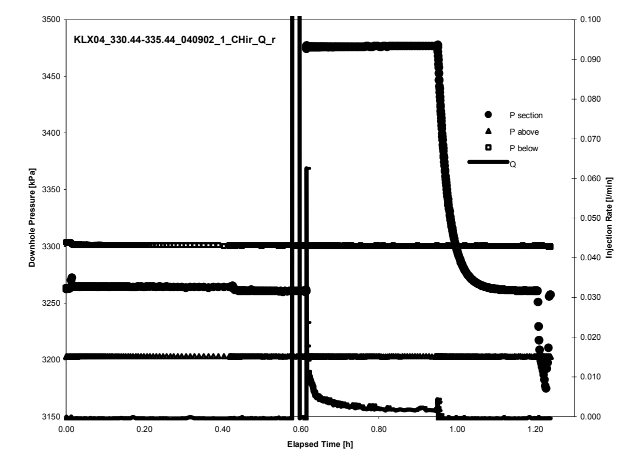
Comments:

The recommended transmissivity of 2.3E-7 m2/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 8.0E-8 to 5.0E-7 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3210.4 kPa.

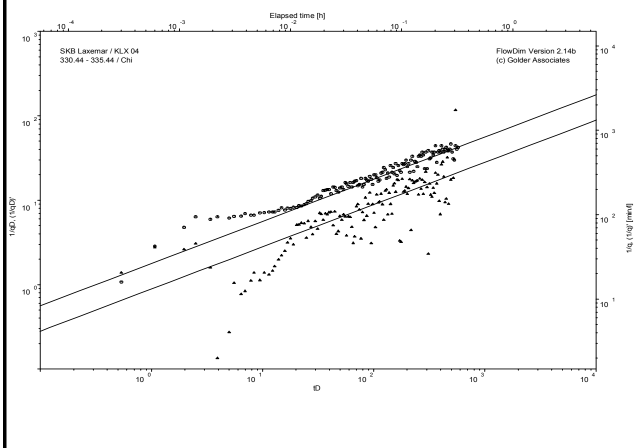
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040902 05:51
Test section from - to (m):	330.44-335.44 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

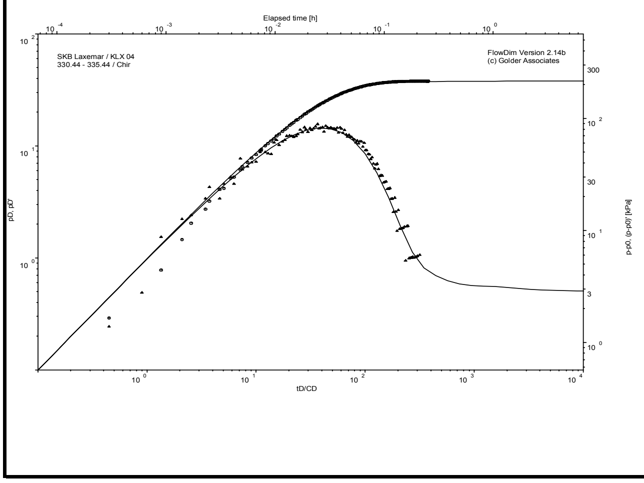
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	3263		
p_i (kPa) =	3261		
p_p(kPa) =	3477	p_F (kPa) =	3261
Q_p (m^3/s)=	2.50E-08		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	11.8		
Derivative fact.=	0.23	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	1.1E-09		
T_M (m^2/s)=	9.4E-10		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.92	dt_1 (min) =	*
dt_2 (min) =	14.36	dt_2 (min) =	*
T (m^2/s) =	2.6E-08	T (m^2/s) =	1.3E-08
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	5.1E-09	K_s (m/s) =	2.6E-09
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	2.0E-11
C_D (-) =	NA	C_D (-) =	2.2E-03
ξ (-) =	-1.8	ξ (-) =	33.0
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	*	C (m^3/Pa) =	2.0E-11
dt_2 (min) =	*	C_D (-) =	2.2E-03
T_T (m^2/s) =	1.3E-08	ξ (-) =	33.0
S (-) =	1.0E-06		
K_s (m/s) =	2.6E-09		
S_s (1/m) =	2.0E-07		

Comments:

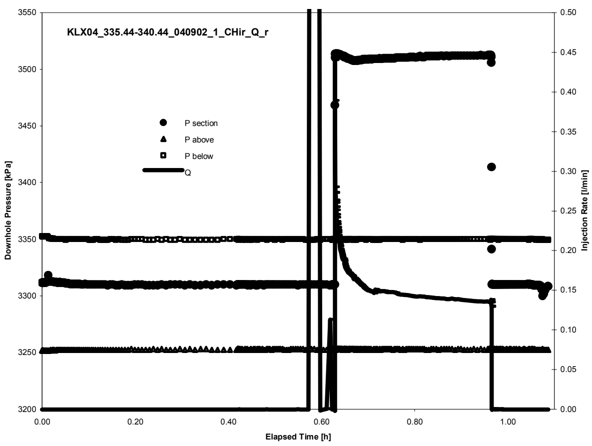
*: IARF not measured

The recommended transmissivity of 1.3E-8 m2/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. Concerning the uncertainties due to the low flow rate, the confidence range for the interval transmissivity is estimated to be 3.0E-9 to 4.0E-8 m2/s. The test data allow not allow for a specific determination of the flow dimension. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3258.0 kPa.

Test Summary Sheet

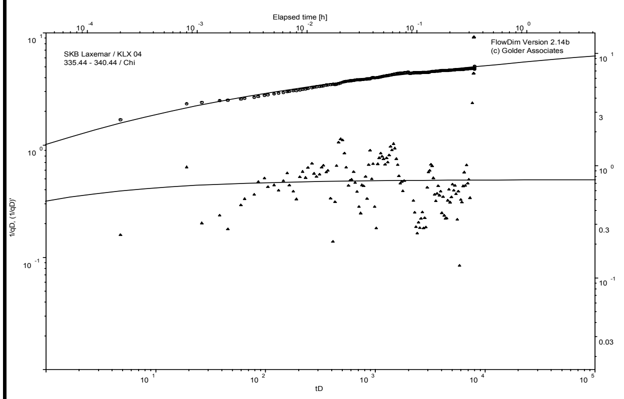
Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040902 07:47
Test section from - to (m):	335.44-340.44 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	3312		
p_i (kPa) =	3310		
p_p(kPa) =	3512	p_F (kPa) =	3309
Q_p (m^3/s)=	2.25E-06		
tp (s) =	1200	t_F (s) =	300
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	11.9		
Derivative fact.=	0.02	Derivative fact.=	-
Results		**Results**	
Q/s (m^2/s)=	1.1E-07		
T_M (m^2/s)=	9.0E-08		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.52	dt_1 (min) =	-
dt_2 (min) =	8.50	dt_2 (min) =	-
T (m^2/s) =	8.5E-08	T (m^2/s) =	NA
S (-) =	1.0E-06	S (-) =	NA
K_s (m/s) =	1.7E-08	K_s (m/s) =	NA
S_s (1/m) =	2.0E-07	S_s (1/m) =	NA
C (m^3/Pa) =	NA	C (m^3/Pa) =	NA
C_D (-) =	NA	C_D (-) =	NA
ξ (-) =	-1.1	ξ (-) =	NA
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period

Not Analysed

Selected representative parameters.			
dt_1 (min) =	0.52	C (m^3/Pa) =	NA
dt_2 (min) =	8.50	C_D (-) =	NA
T_T (m^2/s) =	8.5E-08	ξ (-) =	-1.1
S (-) =	1.0E-06		
K_s (m/s) =	1.7E-08		
S_s (1/m) =	2.0E-07		

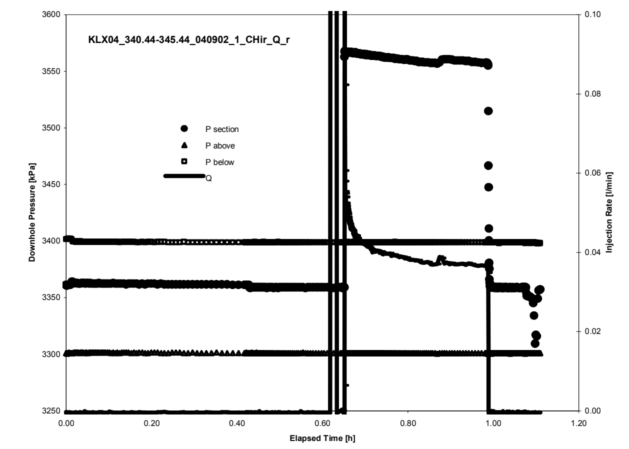
Comments:

The recommended transmissivity of 8.5E-8 m2/s was derived from the analysis of the CHi phase. The confidence range for the interval transmissivity is estimated to be 5.0E-8 to 3.0E-7 m2/s. The flow dimension displayed during the test is 2. Static pressure measured at the end of the recovery is 3309.9 kPa. The CHir phase shows very fast recovery, such that this phase is not analysable.

Test Summary Sheet

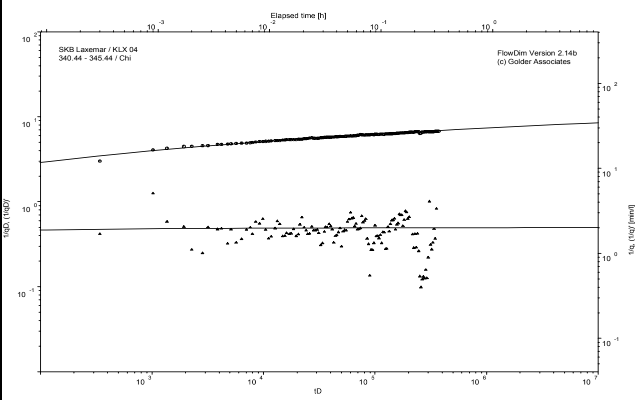
Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040902 09:24
Test section from - to (m):	340.44-345.44 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

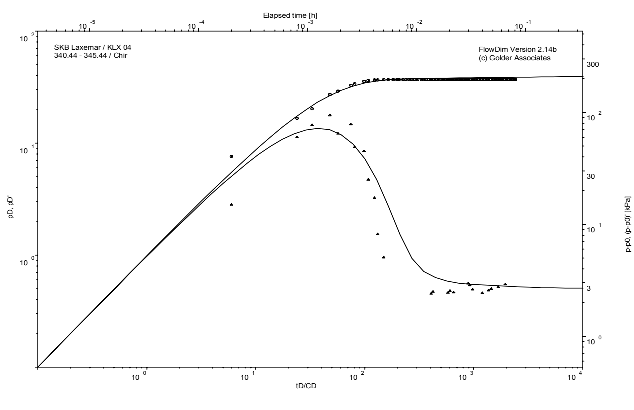


Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	3361		
p_i (kPa) =	3359		
p_p(kPa) =	3557	p_F (kPa) =	3359
Q_p (m^3/s)=	6.17E-07		
tp (s) =	1200	t_F (s) =	300
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	12		
Derivative fact.=	0.08	Derivative fact.=	0.04
Results		**Results**	
Q/s (m^2/s)=	3.1E-08		
T_M (m^2/s)=	2.5E-08		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.40	dt_1 (min) =	1.21
dt_2 (min) =	6.90	dt_2 (min) =	3.37
T (m^2/s) =	3.2E-08	T (m^2/s) =	1.9E-07
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	6.4E-09	K_s (m/s) =	3.9E-08
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.5E-11
C_D (-) =	NA	C_D (-) =	1.6E-03
ξ (-) =	1.3	ξ (-) =	33.1
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Selected representative parameters.			
dt_1 (min) =	0.40	C (m^3/Pa) =	1.5E-11
dt_2 (min) =	6.90	C_D (-) =	1.6E-03
T_T (m^2/s) =	3.2E-08	ξ (-) =	1.3
S (-) =	1.0E-06		
K_s (m/s) =	6.4E-09		
S_s (1/m) =	2.0E-07		

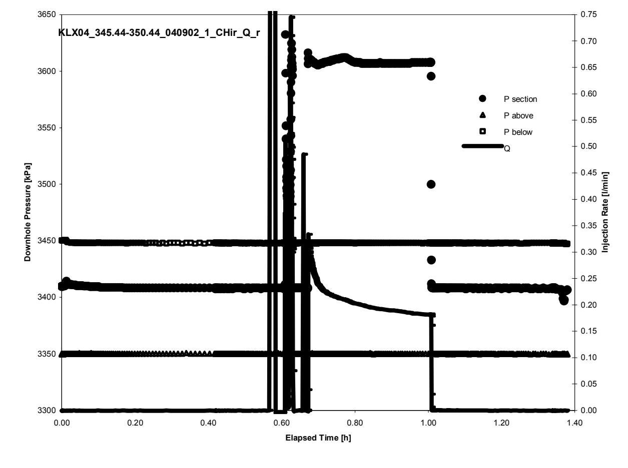
Comments:

The recommended transmissivity of 3.2E-8 m2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 1.0E-8 to 6.0E-8 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3360.4 kPa.

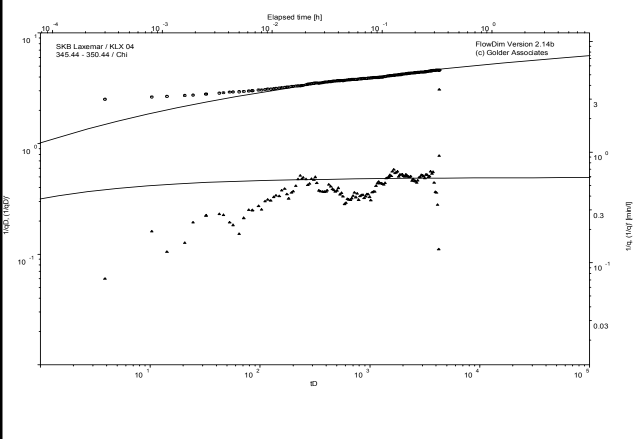
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040902 11:09
Test section from - to (m):	345.44-350.44 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period

Not Analysed

Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	3410		
p_i (kPa) =	3408		
p_p(kPa) =	3607	p_F (kPa) =	3408
Q_p (m^3/s)=	2.97E-06		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	12.1		
Derivative fact.=	0.09	Derivative fact.=	-
Results		**Results**	
Q/s (m^2/s)=	1.5E-07		
T_M (m^2/s)=	1.2E-07		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	7.27	dt_1 (min) =	-
dt_2 (min) =	17.03	dt_2 (min) =	-
T (m^2/s) =	1.1E-07	T (m^2/s) =	NA
S (-) =	1.0E-06	S (-) =	NA
K_s (m/s) =	2.2E-08	K_s (m/s) =	NA
S_s (1/m) =	2.0E-07	S_s (1/m) =	NA
C (m^3/Pa) =	NA	C (m^3/Pa) =	NA
C_D (-) =	NA	C_D (-) =	NA
ξ (-) =	-1.5	ξ (-) =	NA
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.			
dt_1 (min) =	7.27	C (m^3/Pa) =	NA
dt_2 (min) =	17.03	C_D (-) =	NA
T_T (m^2/s) =	1.1E-07	ξ (-) =	-1.5
S (-) =	1.0E-06		
K_s (m/s) =	2.2E-08		
S_s (1/m) =	2.0E-07		

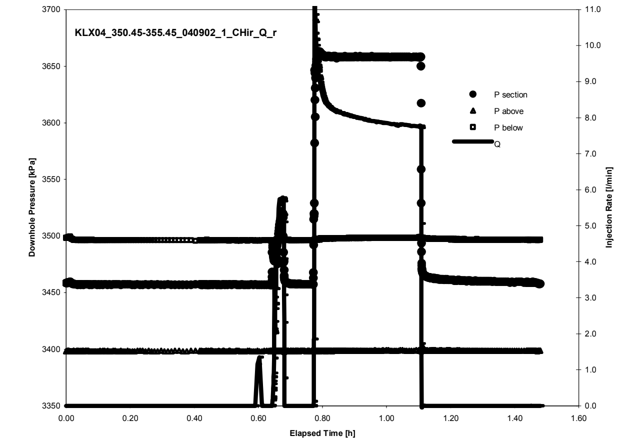
Comments:

The recommended transmissivity of 1.1E-7 m2/s was derived from the analysis of the CHi phase. The confidence range for the interval transmissivity is estimated to be 7.0E-8 to 4.0E-7 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at the end of the recovery is 3408.1 kPa.

Test Summary Sheet

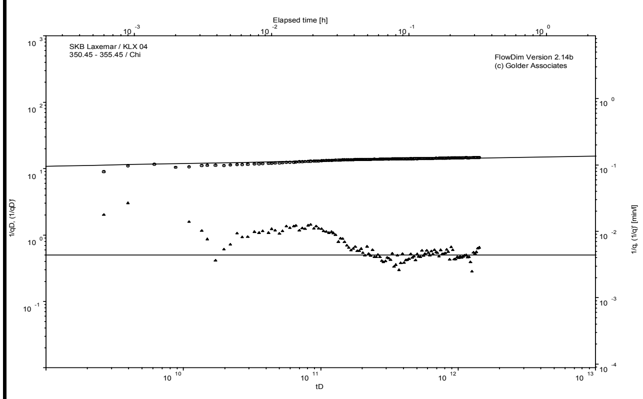
Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040902 13:20
Test section from - to (m):	350.45-355.45 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

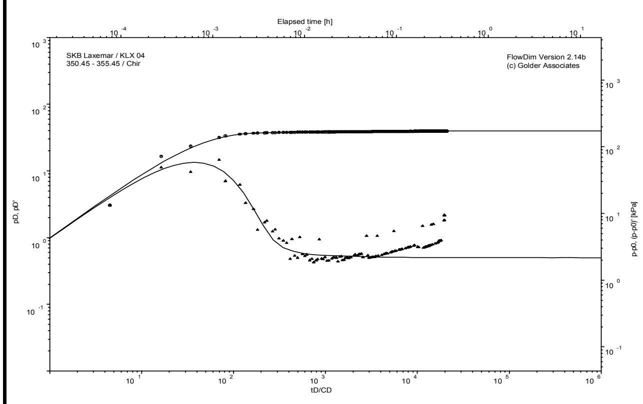


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	3458		
p_i (kPa) =	3457		
p_p(kPa) =	3658	p_F (kPa) =	3458
Q_p (m^3/s)=	1.29E-04		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	12.2		
Derivative fact.=	0.09	Derivative fact.=	0.05
Results		**Results**	
Q/s (m^2/s)=	6.3E-06		
T_M (m^2/s)=	5.2E-06		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	3.68	dt_1 (min) =	0.57
dt_2 (min) =	16.40	dt_2 (min) =	11.80
T (m^2/s) =	1.5E-05	T (m^2/s) =	4.9E-05
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	2.9E-06	K_s (m/s) =	9.7E-06
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.9E-09
C_D (-) =	NA	C_D (-) =	2.1E-01
ξ (-) =	5.9	ξ (-) =	30.7
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	3.68	C (m^3/Pa) =	1.9E-09
dt_2 (min) =	16.40	C_D (-) =	2.1E-01
T_T (m^2/s) =	1.5E-05	ξ (-) =	5.9
S (-) =	1.0E-06		
K_s (m/s) =	2.9E-06		
S_s (1/m) =	2.0E-07		

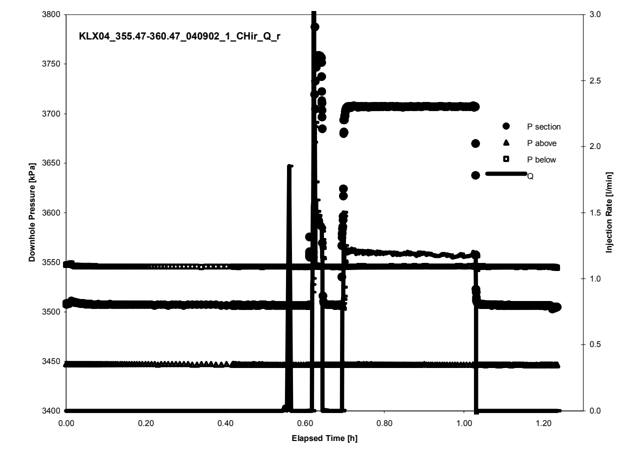
Comments:

The recommended transmissivity of 1.5E-5 m2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 6.0E-6 to 4.0E-5 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3457.1 kPa.

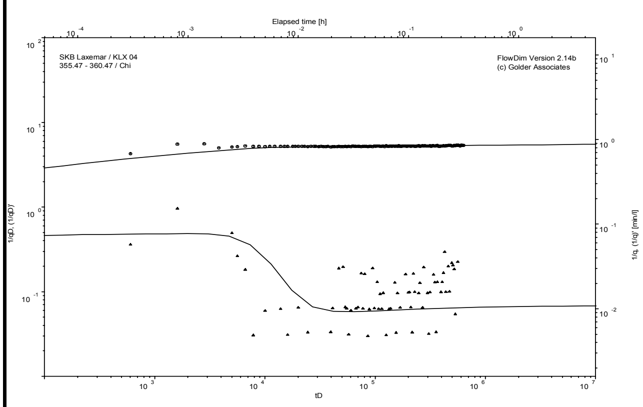
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040902 15:14
Test section from - to (m):	355.47-360.47	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

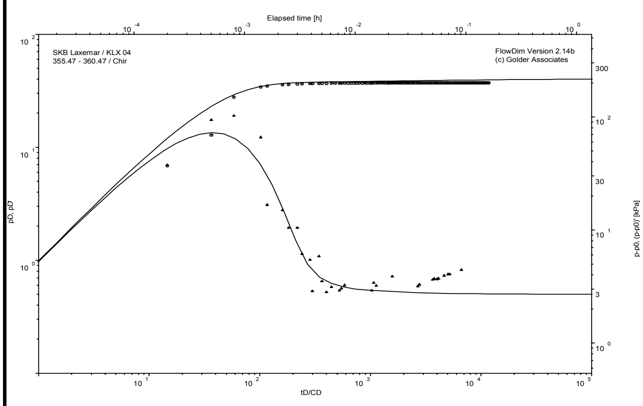
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	3508		
p_i (kPa) =	3507		
p_p(kPa) =	3707	p_F (kPa) =	3506
Q_p (m^3/s)=	1.98E-05		
tp (s) =	1200	t_F (s) =	600
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	12.4		
Derivative fact.=	0.11	Derivative fact.=	0.03
Results		**Results**	
Q/s (m^2/s)=	9.7E-07		
T_M (m^2/s)=	8.0E-07		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	1.23	dt_1 (min) =	0.85
dt_2 (min) =	8.03	dt_2 (min) =	3.40
T (m^2/s) =	6.0E-06	T (m^2/s) =	9.1E-06
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	1.2E-06	K_s (m/s) =	1.8E-06
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	2.9E-10
C_D (-) =	NA	C_D (-) =	3.2E-02
ξ (-) =	0.0	ξ (-) =	31.7
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	0.85	C (m^3/Pa) =	2.9E-10
dt_2 (min) =	3.40	C_D (-) =	3.2E-02
T_T (m^2/s) =	9.1E-06	ξ (-) =	31.7
S (-) =	1.0E-06		
K_s (m/s) =	1.8E-06		
S_s (1/m) =	2.0E-07		

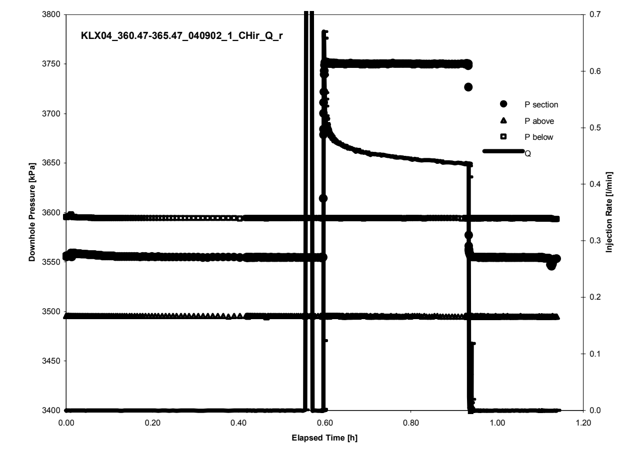
Comments:

The recommended transmissivity of 9.1E-6 m2/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 1.0E-6 to 1.0E-7 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3506.4 kPa.

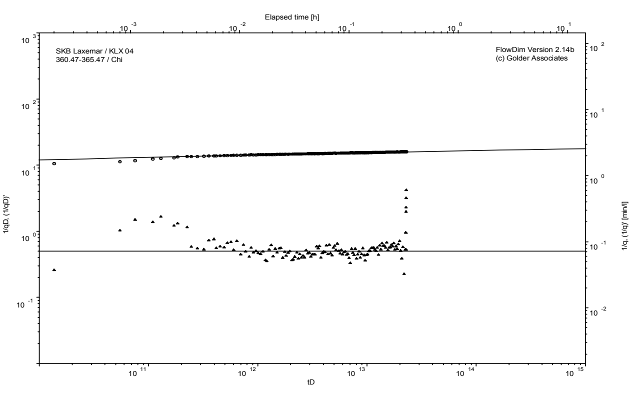
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040902 16:57
Test section from - to (m):	360.47-365.47 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

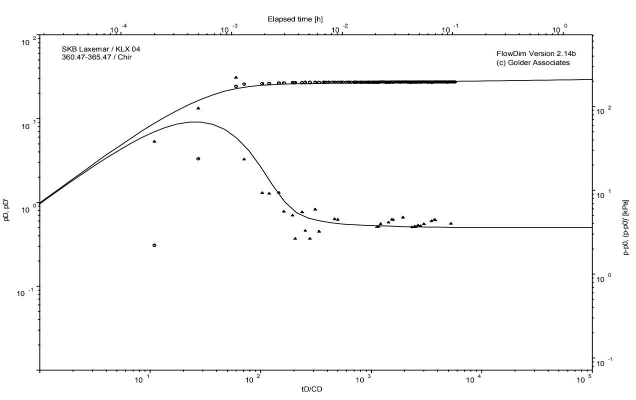
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	3556		
p_i (kPa) =	3555		
p_p(kPa) =	3749	p_F (kPa) =	3553
Q_p (m^3/s)=	7.27E-06		
tp (s) =	1200	t_F (s) =	600
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	12.4		
Derivative fact.=	0.13	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	3.7E-07		
T_M (m^2/s)=	3.0E-07		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.61	dt_1 (min) =	0.59
dt_2 (min) =	17.83	dt_2 (min) =	5.78
T (m^2/s) =	9.2E-07	T (m^2/s) =	1.6E-06
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	1.8E-07	K_s (m/s) =	3.3E-07
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	6.9E-11
C_D (-) =	NA	C_D (-) =	7.6E-03
ξ (-) =	8.6	ξ (-) =	20.9
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	0.61	C (m^3/Pa) =	6.9E-11
dt_2 (min) =	17.83	C_D (-) =	7.6E-03
T_T (m^2/s) =	9.2E-07	ξ (-) =	8.6
S (-) =	1.0E-06		
K_s (m/s) =	1.8E-07		
S_s (1/m) =	2.0E-07		

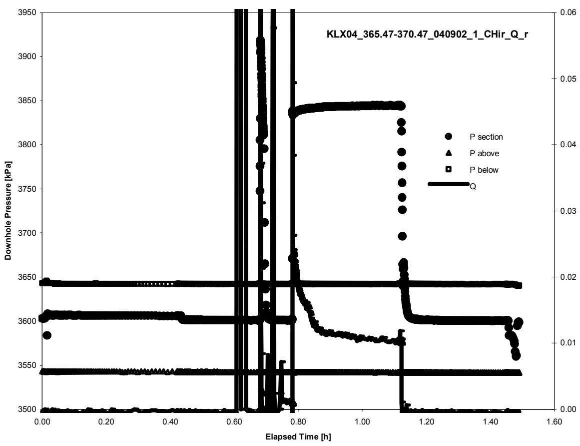
Comments:

The recommended transmissivity of 9.2E-7 m2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 5.0E-7 to 2.0E-6 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3553.3 kPa.

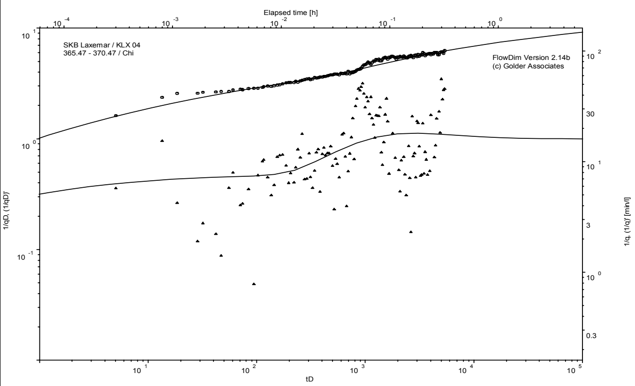
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040902 20:18
Test section from - to (m):	365.47-370.47	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

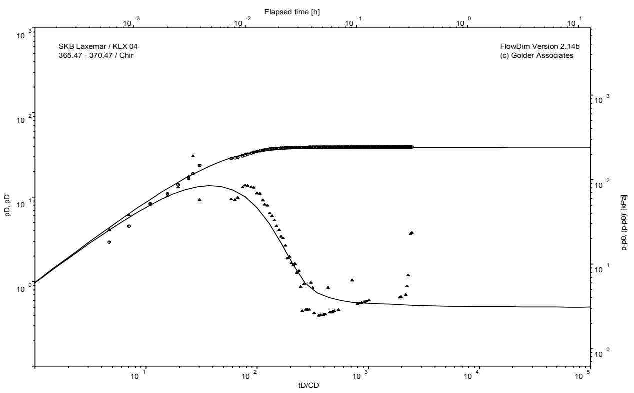
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	3602		
p_i (kPa) =	3602		
p_p(kPa) =	3844	p_F (kPa) =	3600
Q_p (m^3/s)=	1.83E-07		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	12.5		
Derivative fact.=	0.04	Derivative fact.=	0.04
Results		**Results**	
Q/s (m^2/s)=	7.4E-09		
T_M (m^2/s)=	6.1E-09		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	8.93	dt_1 (min) =	7.45
dt_2 (min) =	17.88	dt_2 (min) =	15.23
T (m^2/s) =	3.3E-09	T (m^2/s) =	5.1E-08
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	6.7E-10	K_s (m/s) =	1.0E-08
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.5E-11
C_D (-) =	NA	C_D (-) =	1.7E-03
ξ (-) =	0.0	ξ (-) =	33.1
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.			
dt_1 (min) =	8.93	C (m^3/Pa) =	1.5E-11
dt_2 (min) =	17.88	C_D (-) =	1.7E-03
T_T (m^2/s) =	3.3E-09	ξ (-) =	0.0
S (-) =	1.0E-06		
K_s (m/s) =	6.7E-10		
S_s (1/m) =	2.0E-07		

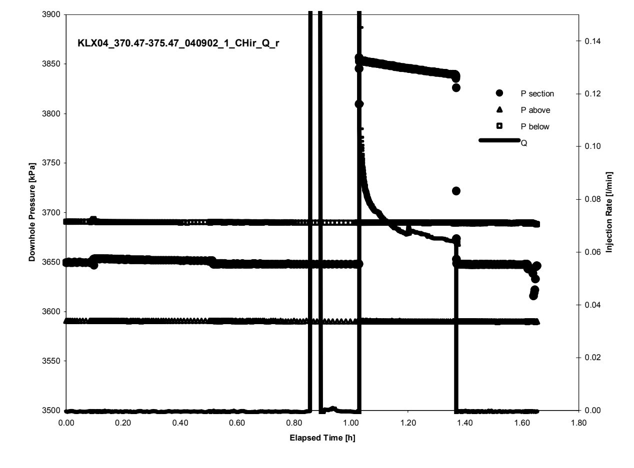
Comments:

The recommended transmissivity of 3.3E-9 m2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. Due to the poor data quality, the confidence range for the interval transmissivity is estimated to be 2.0E-9 to 4.0E-8 m2/s. The analysis was conducted using a flow dimension of 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3599.9 kPa.

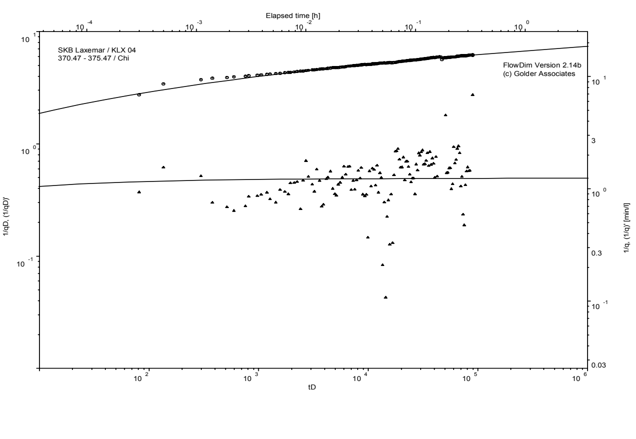
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040902 22:37
Test section from - to (m):	370.47 - 375.47 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

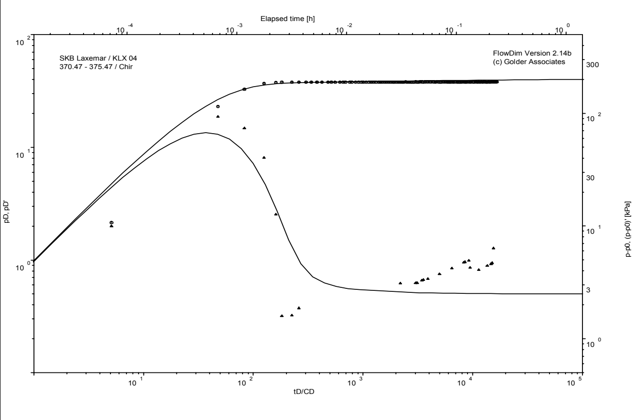
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	3649		
p_i (kPa) =	3647		
p_p(kPa) =	3839	p_F (kPa) =	3647
Q_p (m^3/s)=	1.07E-06		
tp (s) =	1200	t_F (s) =	900
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	12.6		
Derivative fact.=	0.02	Derivative fact.=	0.03
Results		**Results**	
Q/s (m^2/s)=	5.5E-08		
T_M (m^2/s)=	4.5E-08		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.95	dt_1 (min) =	*
dt_2 (min) =	5.75	dt_2 (min) =	*
T (m^2/s) =	5.2E-08	T (m^2/s) =	3.7E-07
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	1.0E-08	K_s (m/s) =	7.3E-08
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.2E-11
C_D (-) =	NA	C_D (-) =	1.3E-03
ξ (-) =	0.4	ξ (-) =	33.3
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.			
dt_1 (min) =	0.95	C (m^3/Pa) =	1.2E-11
dt_2 (min) =	5.75	C_D (-) =	1.3E-03
T_T (m^2/s) =	5.2E-08	ξ (-) =	0.4
S (-) =	1.0E-06		
K_s (m/s) =	1.0E-08		
S_s (1/m) =	2.0E-07		

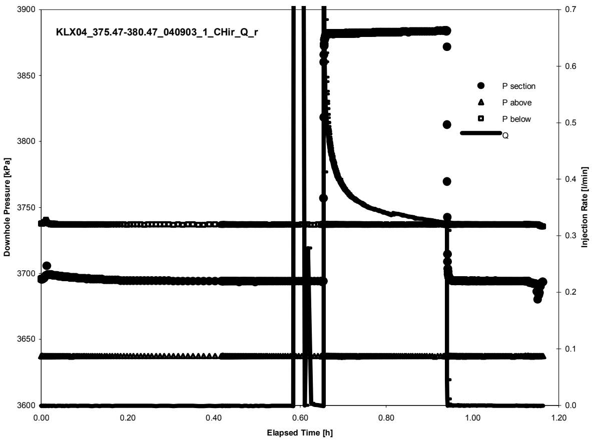
Comments:

The recommended transmissivity of 5.2E-8 m2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 3.0E-8 to 9.0E-8 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3647.1 kPa.

Test Summary Sheet

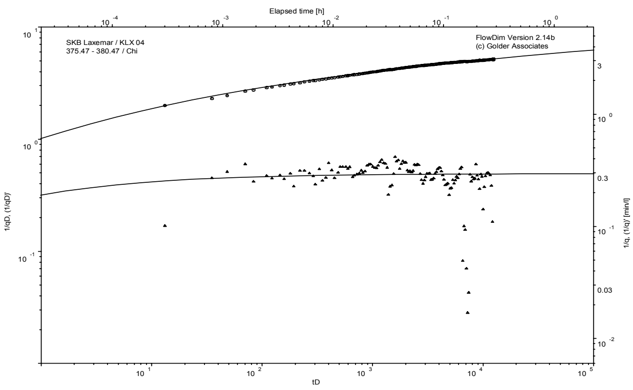
Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040903 05:55
Test section from - to (m):	375.47-380.47 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

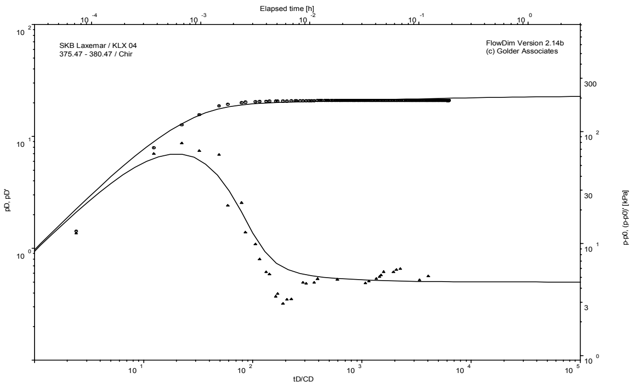


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	3698		
p_i (kPa) =	3694		
p_p(kPa) =	3884	p_F (kPa) =	3694
Q_p (m^3/s)=	5.38E-06		
tp (s) =	1020	t_F (s) =	660
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	12.7		
Derivative fact.=		Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	2.8E-07		
T_M (m^2/s)=	2.3E-07		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	1.03	dt_1 (min) =	0.71
dt_2 (min) =	15.45	dt_2 (min) =	2.61
T (m^2/s) =	2.3E-07	T (m^2/s) =	1.0E-06
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	4.6E-08	K_s (m/s) =	2.1E-07
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	7.1E-11
C_D (-) =	NA	C_D (-) =	7.9E-03
ξ (-) =	-1.3	ξ (-) =	15.1
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	1.03	C (m^3/Pa) =	7.1E-11
dt_2 (min) =	15.45	C_D (-) =	7.9E-03
T_T (m^2/s) =	2.3E-07	ξ (-) =	-1.3
S (-) =	1.0E-06		
K_s (m/s) =	4.6E-08		
S_s (1/m) =	2.0E-07		

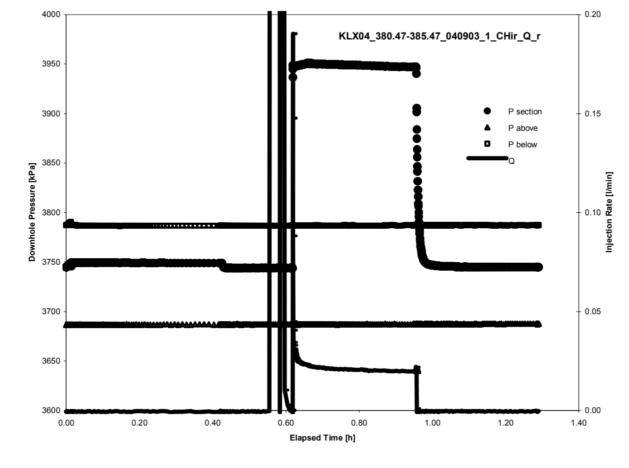
Comments:

The recommended transmissivity of 2.5E-7 m2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 9.0E-8 to 4.0E-7 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3693.3 kPa.

Test Summary Sheet

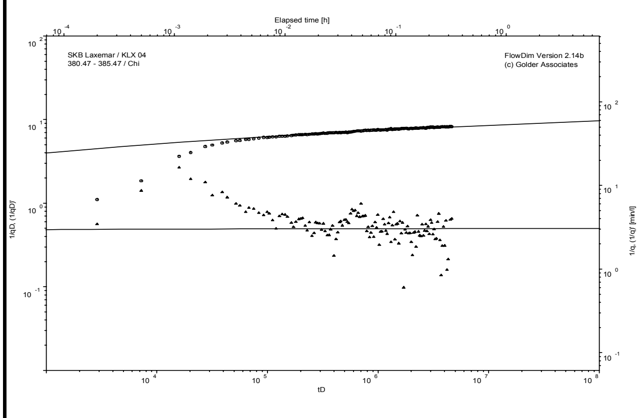
Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040903 07:31
Test section from - to (m):	380.47-385.47 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

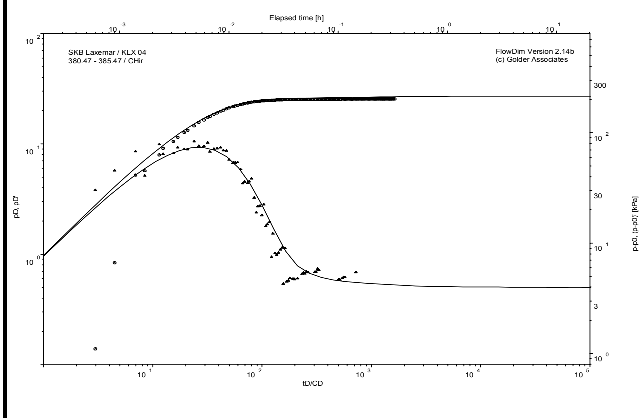


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	3745		
p_i (kPa) =	3744		
p_p(kPa) =	3947	p_F (kPa) =	3694
Q_p (m^3/s)=	3.30E-07		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	12.8		
Derivative fact.=	0.11	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	1.6E-08		
T_M (m^2/s)=	1.3E-08		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	3.28	dt_1 (min) =	*
dt_2 (min) =	16.23	dt_2 (min) =	*
T (m^2/s) =	2.1E-08	T (m^2/s) =	7.0E-08
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	4.2E-09	K_s (m/s) =	1.4E-08
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	3.3E-11
C_D (-) =	NA	C_D (-) =	3.6E-03
ξ (-) =	2.8	ξ (-) =	21.2
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	3.28	C (m^3/Pa) =	3.3E-11
dt_2 (min) =	16.23	C_D (-) =	3.6E-03
T_T (m^2/s) =	2.1E-08	ξ (-) =	2.8
S (-) =	1.0E-06		
K_s (m/s) =	4.2E-09		
S_s (1/m) =	2.0E-07		

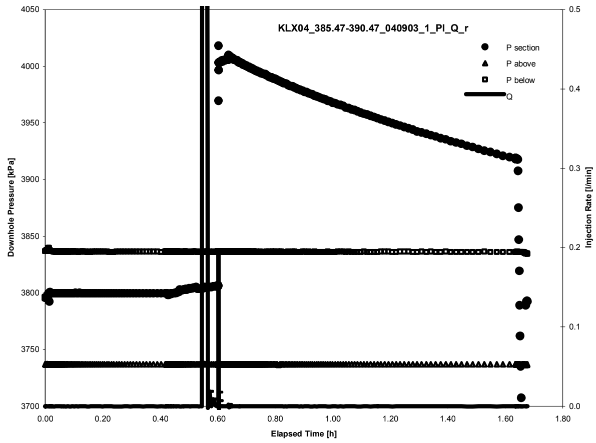
Comments:

The recommended transmissivity of 2.1E-8 m2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 9.0E-9 to 4.0E-8 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3744.8 kPa.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	PI
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040903 09:25
Test section from - to (m):	385.47-390.47 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

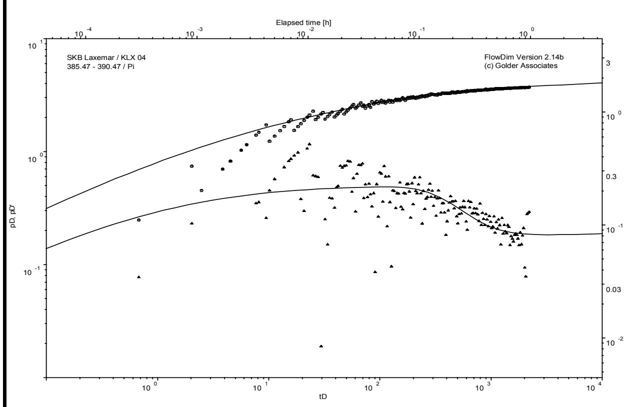


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	3797		
p_i (kPa) =	3807		
p_p(kPa) =	4009	p_F (kPa) =	3918
Q_p (m^3/s)=	-		
tp (s) =	-	t_F (s) =	3600
S el S^* (-)=	-	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	12.9		
Derivative fact.=	-	Derivative fact.=	0.12
Results		**Results**	
Q/s (m^2/s)=	NA		
T_M (m^2/s)=	NA		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	-	dt_1 (min) =	*
dt_2 (min) =	-	dt_2 (min) =	*
T (m^2/s) =	NA	T (m^2/s) =	8.3E-12
S (-) =	NA	S (-) =	1.0E-06
K_s (m/s) =	NA	K_s (m/s) =	1.7E-12
S_s (1/m) =	NA	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	8.5E-12
C_D (-) =	NA	C_D (-) =	9.4E-04
ξ (-) =	NA	ξ (-) =	2.4
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Log-Log plot incl. derivates- flow period

Not Analysed

Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	*	C (m^3/Pa) =	8.5E-12
dt_2 (min) =	*	C_D (-) =	9.4E-04
T_T (m^2/s) =	8.3E-12	ξ (-) =	2.4
S (-) =	1.0E-06		
K_s (m/s) =	1.7E-12		
S_s (1/m) =	2.0E-07		

Comments:

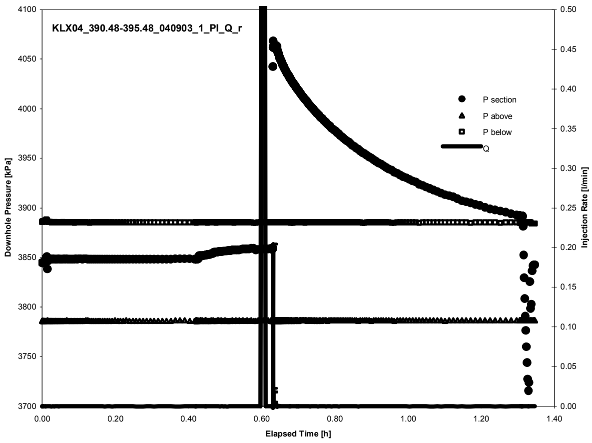
*: IARF not measured

The recommended transmissivity of 8.3E-12 m2/s was derived from the analysis of the PI phase, assuming a flow dimension of 2. Considering the inherent uncertainties related to the measurement (e.g. specially the measurement of the wellbore storage coefficient) and to the analysis process (e.g. numeric distortion when calculating the derivative and pressure history effects), the confidence range for the transmissivity is estimated to be 7E-12 to 5E-11 m2/s. No static pressure could be derived.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Pi
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040903 12:21
Test section from - to (m):	390.48-395.48 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

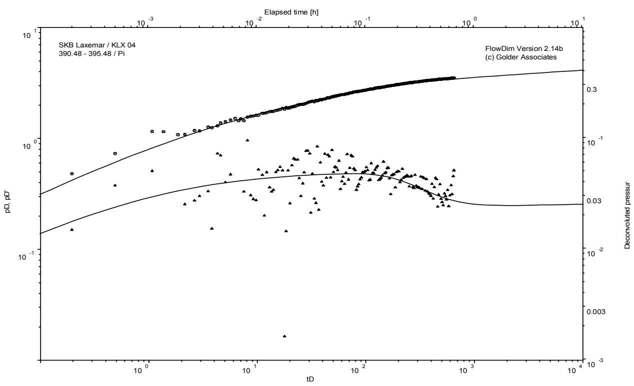
Linear plot Q and p



Log-Log plot incl. derivates- flow period

Not Analysed

Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	3845		
p_i (kPa) =	3859		
p_p(kPa) =	4061	p_F (kPa) =	3892
Q_p (m^3/s)=	-		
tp (s) =	-	t_F (s) =	2400
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	12.9		
Derivative fact.=	-	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	NA		
T_M (m^2/s)=	NA		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	-	dt_1 (min) =	*
dt_2 (min) =	-	dt_2 (min) =	*
T (m^2/s) =	NA	T (m^2/s) =	8.7E-11
S (-) =	NA	S (-) =	1.0E-06
K_s (m/s) =	NA	K_s (m/s) =	1.7E-11
S_s (1/m) =	NA	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	2.0E-11
C_D (-) =	NA	C_D (-) =	2.1E-03
ξ (-) =	NA	ξ (-) =	0.8
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	*	C (m^3/Pa) =	2.0E-11
dt_2 (min) =	*	C_D (-) =	2.1E-03
T_T (m^2/s) =	8.7E-11	ξ (-) =	0.8
S (-) =	1.0E-06		
K_s (m/s) =	1.7E-11		
S_s (1/m) =	2.0E-07		

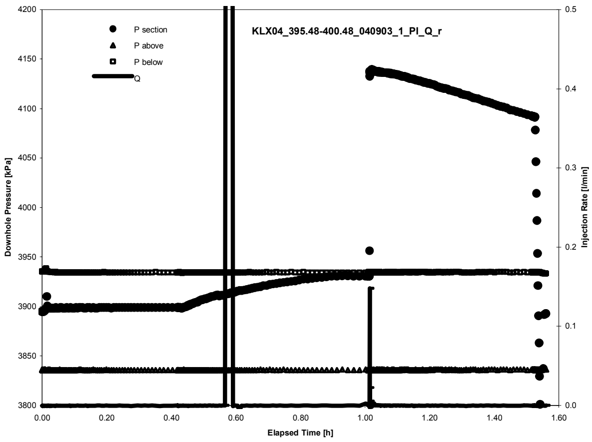
Comments:

The recommended transmissivity of 8.7E-11 m2/s was derived from the analysis of the PI phase assuming a flow dimension of 2. Considering the inherent uncertainties related to the measurement (e.g. specially the measurement of the wellbore storage coefficient) and to the analysis process (e.g. numeric distortion when calculating the derivative and pressure history effects), the confidence range for the transmissivity is estimated to be 7E-11 to 4E-10 m2/s. No static pressure could be derived.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	PI
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040903 14:09
Test section from - to (m):	395.48-400.48 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	3895		
p_i (kPa) =	3930		
p_p(kPa) =	4138	p_F (kPa) =	4091
Q_p (m^3/s)=	-		
tp (s) =	-	t_F (s) =	1800
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	13.0		
Derivative fact.=	-	Derivative fact.=	-
Results		**Results**	
Q/s (m^2/s)=	NA		
T_M (m^2/s)=	NA		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	-	dt_1 (min) =	-
dt_2 (min) =	-	dt_2 (min) =	-
T (m^2/s) =	NA	T (m^2/s) =	NA
S (-) =	NA	S (-) =	NA
K_s (m/s) =	NA	K_s (m/s) =	NA
S_s (1/m) =	NA	S_s (1/m) =	NA
C (m^3/Pa) =	NA	C (m^3/Pa) =	NA
C_D (-) =	NA	C_D (-) =	NA
ξ (-) =	NA	ξ (-) =	NA
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Log-Log plot incl. derivates- flow period

Not Analysed

Log-Log plot incl. derivatives- recovery period

Not Analysed

Selected representative parameters.

dt_1 (min) =	-	C (m^3/Pa) =	NA
dt_2 (min) =	-	C_D (-) =	NA
T_T (m^2/s) =	NA	ξ (-) =	NA
S (-) =	NA		
K_s (m/s) =	NA		
S_s (1/m) =	NA		

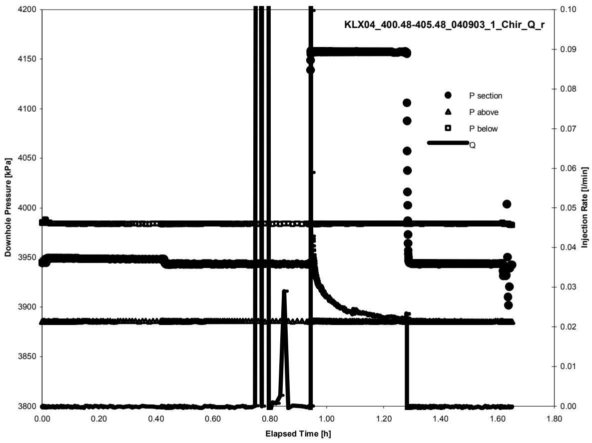
Comments:

Based on the measured test data, the interval transmissivity is lower than 1E-10 m2/s.
No further analysis recommended.

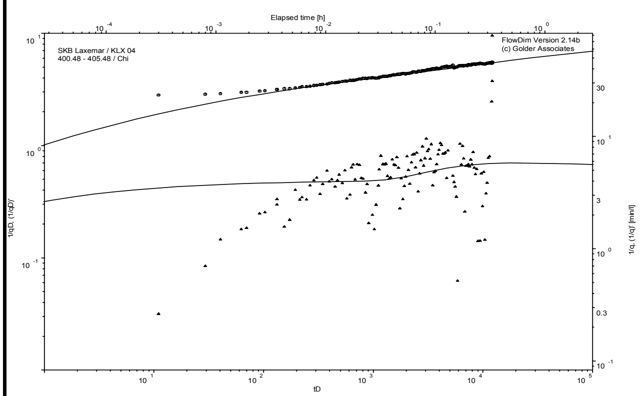
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040903 16:10
Test section from - to (m):	400.48-405.48 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

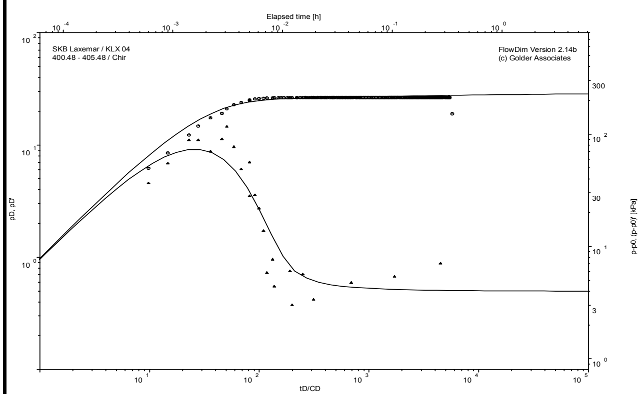
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	3946		
p_i (kPa) =	3944		
p_p(kPa) =	4156	p_F (kPa) =	3943
Q_p (m^3/s)=	3.67E-07		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	13.1		
Derivative fact.=	0.04	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	1.7E-08		
T_M (m^2/s)=	1.4E-08		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	11.45	dt_1 (min) =	2.53
dt_2 (min) =	16.57	dt_2 (min) =	6.28
T (m^2/s) =	1.5E-08	T (m^2/s) =	8.1E-08
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	3.0E-09	K_s (m/s) =	1.6E-08
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.1E-11
C_D (-) =	NA	C_D (-) =	1.3E-03
ξ (-) =	0.0	ξ (-) =	21.8
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	11.45	C (m^3/Pa) =	1.1E-11
dt_2 (min) =	16.57	C_D (-) =	1.3E-03
T_T (m^2/s) =	1.5E-08	ξ (-) =	0.0
S (-) =	1.0E-06		
K_s (m/s) =	3.0E-09		
S_s (1/m) =	2.0E-07		

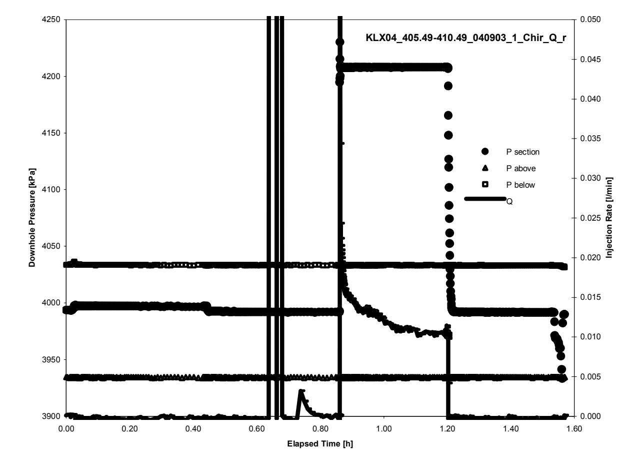
Comments:

The recommended transmissivity of 1.5E-8 m2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 7.0E-9 to 4.0E-8 m2/s. The analysis was conducted using a flow dimension of 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3943.5 kPa.

Test Summary Sheet

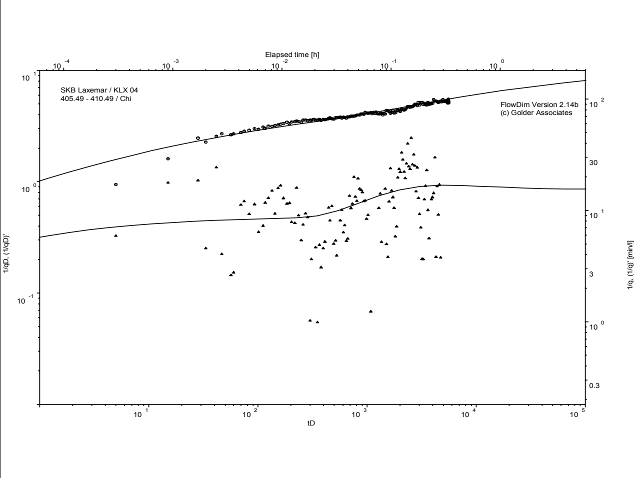
Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040903 18:30
Test section from - to (m):	405.49-410.49	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

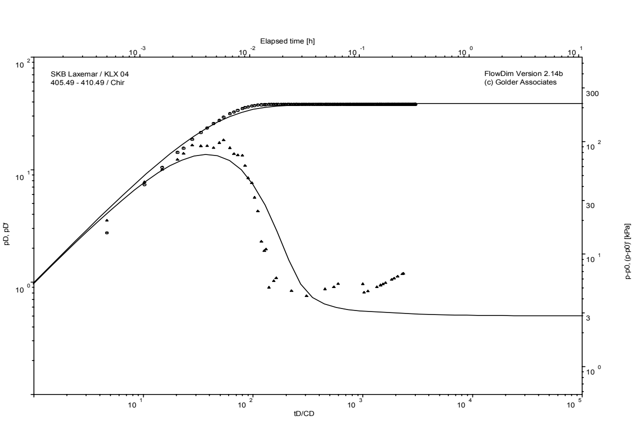


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	3992		
p_i (kPa) =	3992		
p_p(kPa) =	4207	p_F (kPa) =	3991
Q_p (m^3/s)=	1.78E-07		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	13.2		
Derivative fact.=	0.06	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	8.1E-09		
T_M (m^2/s)=	6.7E-09		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	12.38	dt_1 (min) =	2.92
dt_2 (min) =	16.62	dt_2 (min) =	7.20
T (m^2/s) =	6.7E-09	T (m^2/s) =	5.7E-08
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	1.3E-09	K_s (m/s) =	1.1E-08
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.4E-11
C_D (-) =	NA	C_D (-) =	1.6E-03
ξ (-) =	0.0	ξ (-) =	33.1
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Selected representative parameters.			
dt_1 (min) =	12.38	C (m^3/Pa) =	1.4E-11
dt_2 (min) =	16.62	C_D (-) =	1.6E-03
T_T (m^2/s) =	6.7E-09	ξ (-) =	0.0
S (-) =	1.0E-06		
K_s (m/s) =	1.3E-09		
S_s (1/m) =	2.0E-07		

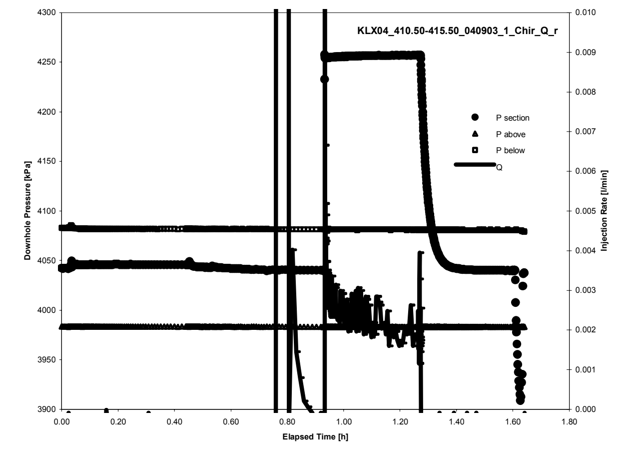
Comments:

The recommended transmissivity of 6.7E-9 m2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 2.0E-9 to 8.0E-9 m2/s. The analysis was conducted using a flow dimension of 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3991.4 kPa.

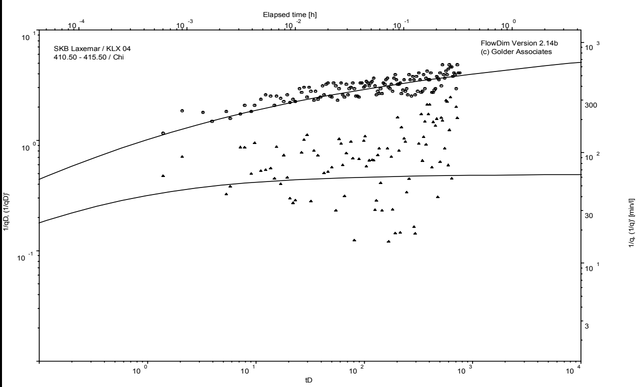
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040903 21:22
Test section from - to (m):	410.50-415.50	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

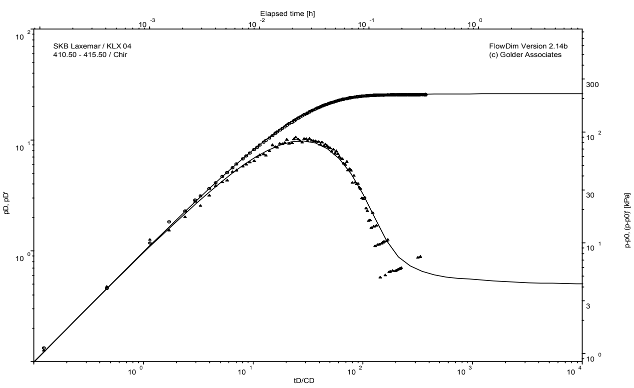
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	4042		
p_i (kPa) =	4040		
p_p(kPa) =	4257	p_F (kPa) =	4040
Q_p (m^3/s)=	3.33E-08		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	13.3		
Derivative fact.=	0.20	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	1.5E-09		
T_M (m^2/s)=	1.2E-09		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	3.67	dt_1 (min) =	*
dt_2 (min) =	10.92	dt_2 (min) =	*
T (m^2/s) =	9.3E-10	T (m^2/s) =	7.2E-09
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	1.9E-10	K_s (m/s) =	1.4E-09
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.5E-11
C_D (-) =	NA	C_D (-) =	1.6E-03
ξ (-) =	0.0	ξ (-) =	21.7
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.			
dt_1 (min) =	3.67	C (m^3/Pa) =	1.5E-11
dt_2 (min) =	10.92	C_D (-) =	1.6E-03
T_T (m^2/s) =	9.3E-10	ξ (-) =	0.0
S (-) =	1.0E-06		
K_s (m/s) =	1.9E-10		
S_s (1/m) =	2.0E-07		

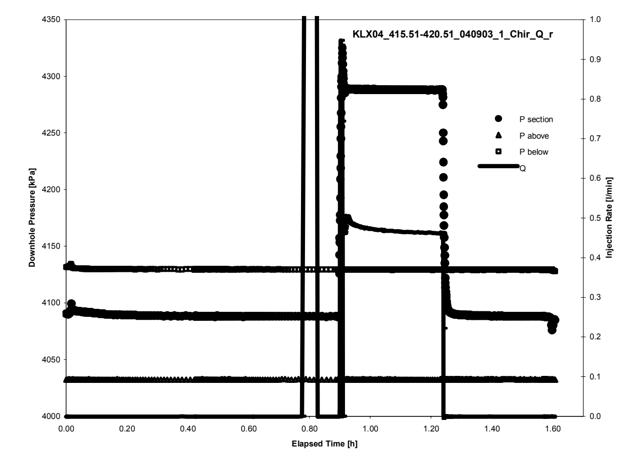
Comments:

The recommended transmissivity of 9.3E-10 m2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 8.0E-10 to 3.0E-9 m2/s. The analysis was conducted using a flow dimension of 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 4036.9 kPa.

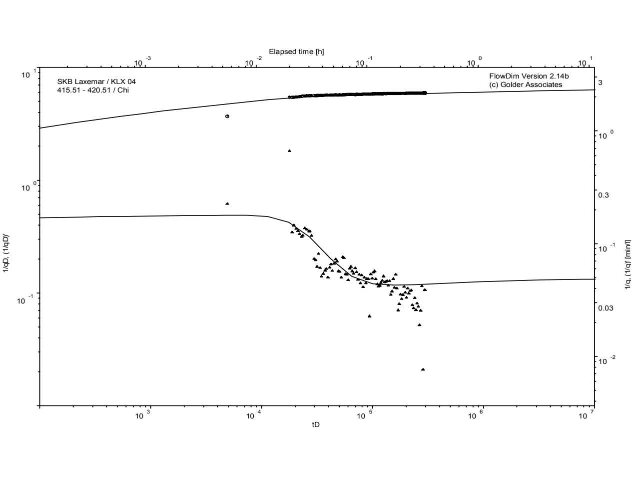
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040903 23.32
Test section from - to (m):	415.51-420.51 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

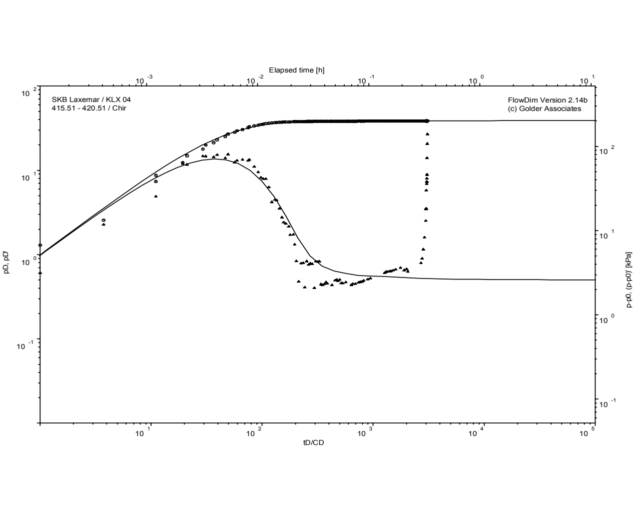
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	4090		
p_i (kPa) =	4088		
p_p(kPa) =	4288	p_F (kPa) =	4088
Q_p (m^3/s)=	7.67E-06		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	13.3		
Derivative fact.=	0.11	Derivative fact.=	0.05
Results		**Results**	
Q/s (m^2/s)=	3.8E-07		
T_M (m^2/s)=	3.1E-07		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	7.82	dt_1 (min) =	3.17
dt_2 (min) =	12.97	dt_2 (min) =	12.52
T (m^2/s) =	1.4E-06	T (m^2/s) =	2.4E-06
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	2.8E-07	K_s (m/s) =	4.8E-07
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	6.1E-10
C_D (-) =	NA	C_D (-) =	6.7E-02
ξ (-) =	0.0	ξ (-) =	31.3
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	3.17	C (m^3/Pa) =	6.1E-10
dt_2 (min) =	12.52	C_D (-) =	6.7E-02
T_T (m^2/s) =	2.4E-06	ξ (-) =	31.3
S (-) =	1.0E-06		
K_s (m/s) =	4.8E-07		
S_s (1/m) =	2.0E-07		

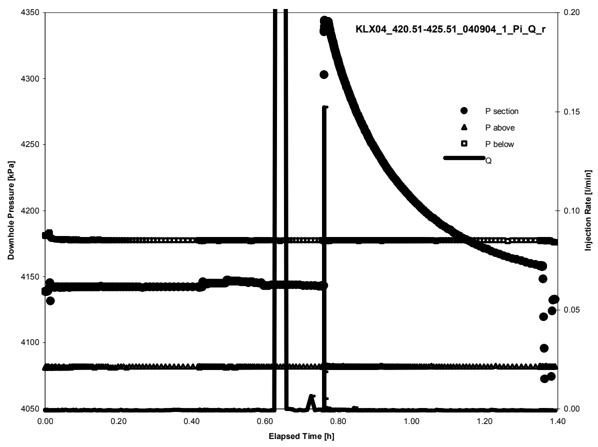
Comments:

The recommended transmissivity of 2.4E-6 m2/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. It should be noted that due to the above mentioned uncertainties regarding the flow dimension, the results are uncertain. The confidence range for the interval transmissivity is estimated to be 7.0E-7 to 5.0E-6 m2/s. The analysis was conducted using a flow dimension of 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 4087.5 kPa.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Pi
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040904 06:01
Test section from - to (m):	420.51-425.51 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

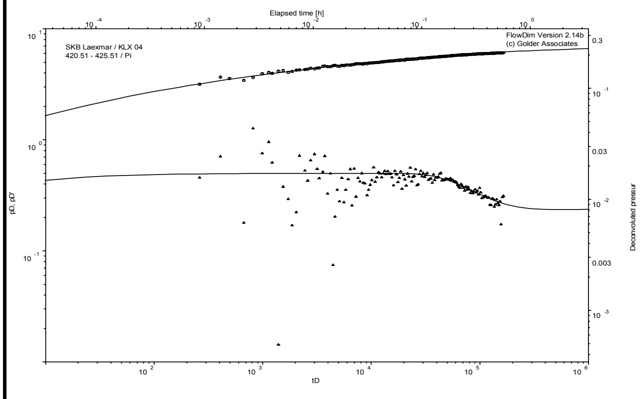


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	4139		
p_i (kPa) =	4143		
p_p(kPa) =	4343	p_F (kPa) =	4158
Q_p (m^3/s)=	-		
tp (s) =	-	t_F (s) =	2100
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	13.4		
Derivative fact.=	-	Derivative fact.=	0.09
Results		**Results**	
Q/s (m^2/s)=	NA		
T_M (m^2/s)=	NA		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	-	dt_1 (min) =	0.65
dt_2 (min) =	-	dt_2 (min) =	6.22
T (m^2/s) =	NA	T (m^2/s) =	7.9E-11
S (-) =	NA	S (-) =	1.0E-06
K_s (m/s) =	NA	K_s (m/s) =	1.6E-11
S_s (1/m) =	NA	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	6.3E-12
C_D (-) =	NA	C_D (-) =	6.9E-04
ξ (-) =	NA	ξ (-) =	3.7
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Log-Log plot incl. derivates- flow period

Not Analysed

Log-Log plot incl. derivatives- recovery period



Selected representative parameters.			
dt_1 (min) =	0.65	C (m^3/Pa) =	6.3E-12
dt_2 (min) =	6.22	C_D (-) =	6.9E-04
T_T (m^2/s) =	7.9E-11	ξ (-) =	3.6
S (-) =	1.0E-06		
K_s (m/s) =	1.6E-11		
S_s (1/m) =	2.0E-07		

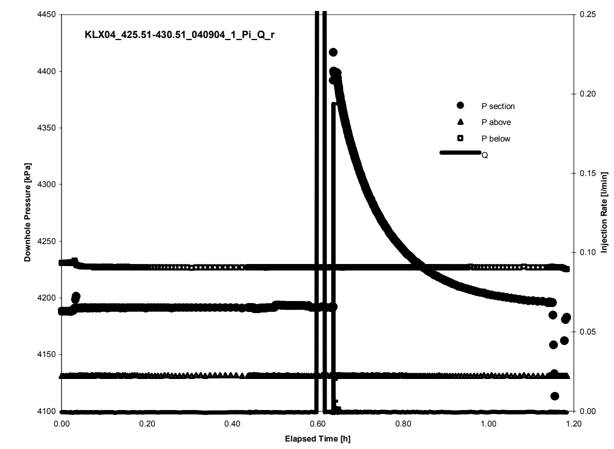
Comments:

The recommended transmissivity of 7.9E-11 m2/s was derived from the analysis of the CHir phase assuming a flow dimension of 2. Considering the inherent uncertainties related to the measurement (e.g. specially the measurement of the wellbore storage coefficient) and to the analysis process (e.g. numeric distortion when calculating the derivative and pressure history effects), the confidence range for the transmissivity is estimated to be 5E-11t o 3E-10 m2/s. No static pressure could be derived.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Pi
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040904 07:55
Test section from - to (m):	425.51-430.51 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

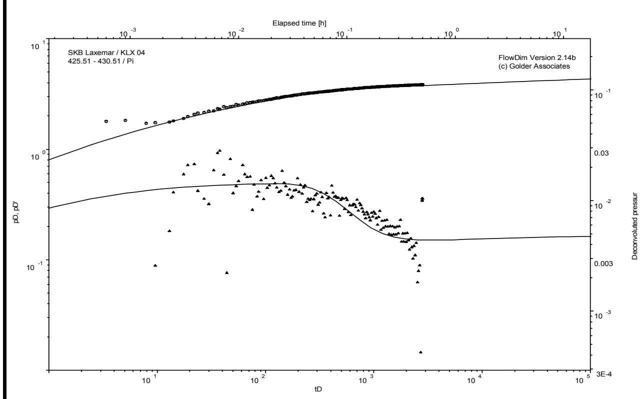


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	4188		
p_i (kPa) =	4192		
p_p(kPa) =	4398	p_F (kPa) =	4196
Q_p (m^3/s)=	-		
tp (s) =	-	t_F (s) =	1800
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	13.5		
Derivative fact.=	-	Derivative fact.=	0.03
Results		**Results**	
Q/s (m^2/s)=	NA		
T_M (m^2/s)=	NA		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	-	dt_1 (min) =	*
dt_2 (min) =	-	dt_2 (min) =	*
T (m^2/s) =	NA	T (m^2/s) =	1.2E-11
S (-) =	NA	S (-) =	1.0E-06
K_s (m/s) =	NA	K_s (m/s) =	2.4E-12
S_s (1/m) =	NA	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	7.9E-13
C_D (-) =	NA	C_D (-) =	8.7E-05
ξ (-) =	NA	ξ (-) =	2.6
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Log-Log plot incl. derivates- flow period

Not Analysed

Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	*	C (m^3/Pa) =	7.9E-13
dt_2 (min) =	*	C_D (-) =	8.7E-05
T_T (m^2/s) =	1.2E-11	ξ (-) =	2.6
S (-) =	1.0E-06		
K_s (m/s) =	2.4E-12		
S_s (1/m) =	2.0E-07		

Comments:

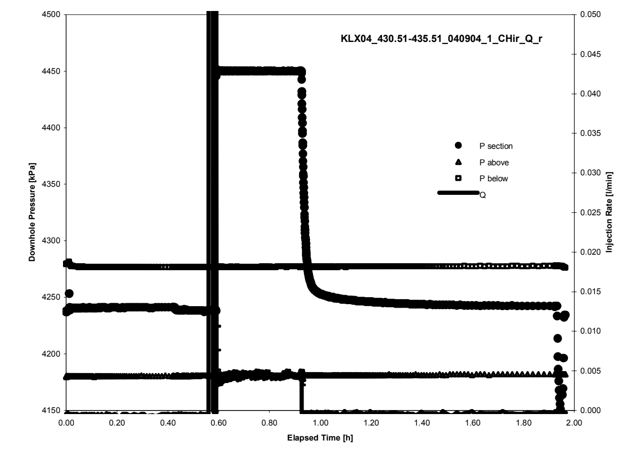
*: IARF not measured

The recommended transmissivity of 1.2E-11 m2/s was derived from the analysis of the PI phase assuming a flow dimension of 2. Considering the inherent uncertainties related to the measurement (e.g. specially the measurement of the wellbore storage coefficient) and to the analysis process (e.g. numeric distortion when calculating the derivative and pressure history effects), the confidence range for the transmissivity is estimated to be 8E-12 to 7E-11 m2/s. No static pressure could be derived.

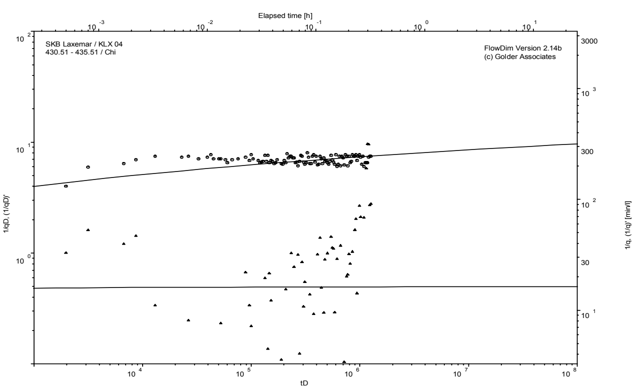
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040904 09:37
Test section from - to (m):	430.51-435.51 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

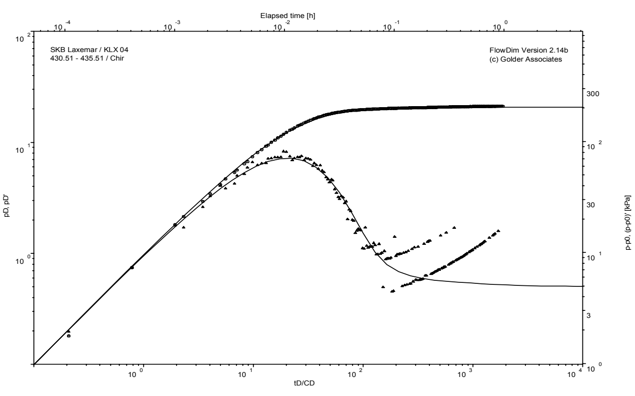
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	4237		
p_i (kPa) =	4238		
p_p(kPa) =	4450	p_F (kPa) =	4242
Q_p (m^3/s)=	6.67E-08		
tp (s) =	1200	t_F (s) =	3600
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	13.5		
Derivative fact.=	0.20	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	3.1E-09		
T_M (m^2/s)=	2.5E-09		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	3.17	dt_1 (min) =	*
dt_2 (min) =	8.92	dt_2 (min) =	*
T (m^2/s) =	3.8E-09	T (m^2/s) =	1.2E-08
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	7.5E-10	K_s (m/s) =	2.3E-09
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.4E-11
C_D (-) =	NA	C_D (-) =	1.5E-03
ξ (-) =	3.0	ξ (-) =	15.9
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.			
dt_1 (min) =	*	C (m^3/Pa) =	1.4E-11
dt_2 (min) =	*	C_D (-) =	1.5E-03
T_T (m^2/s) =	1.2E-08	ξ (-) =	15.9
S (-) =	1.0E-06		
K_s (m/s) =	2.3E-09		
S_s (1/m) =	2.0E-07		

Comments:

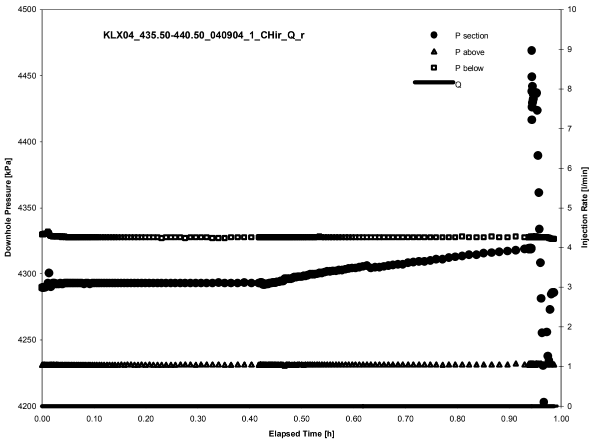
*: IARF not measured

The recommended transmissivity of 1.2E-8 m2/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. Considering the low interval transmissivity the confidence range for the interval transmissivity is estimated to be 5.0E-9 to 3.0E-8 m2/s. The analysis was conducted using a flow dimension of 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 4239.7 kPa.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040904 12:31
Test section from - to (m):	435.50-440.50 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	4289		
p_i (kPa) =	-		
p_p(kPa) =	-	p_F (kPa) =	-
Q_p (m^3/s)=	-		
tp (s) =	-	t_F (s) =	-
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	13.6		
Derivative fact.=	-	Derivative fact.=	-
Results		**Results**	
Q/s (m^2/s)=	NA		
T_M (m^2/s)=	NA		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	-	dt_1 (min) =	-
dt_2 (min) =	-	dt_2 (min) =	-
T (m^2/s) =	NA	T (m^2/s) =	NA
S (-) =	NA	S (-) =	NA
K_s (m/s) =	NA	K_s (m/s) =	NA
S_s (1/m) =	NA	S_s (1/m) =	NA
C (m^3/Pa) =	NA	C (m^3/Pa) =	NA
C_D (-) =	NA	C_D (-) =	NA
ξ (-) =	NA	ξ (-) =	NA
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Log-Log plot incl. derivates- flow period

Not Analysed

Log-Log plot incl. derivatives- recovery period

Not Analysed

Selected representative parameters.

dt_1 (min) =	-	C (m^3/Pa) =	NA
dt_2 (min) =	-	C_D (-) =	NA
T_T (m^2/s) =	NA	ξ (-) =	NA
S (-) =	NA		
K_s (m/s) =	NA		
S_s (1/m) =	NA		

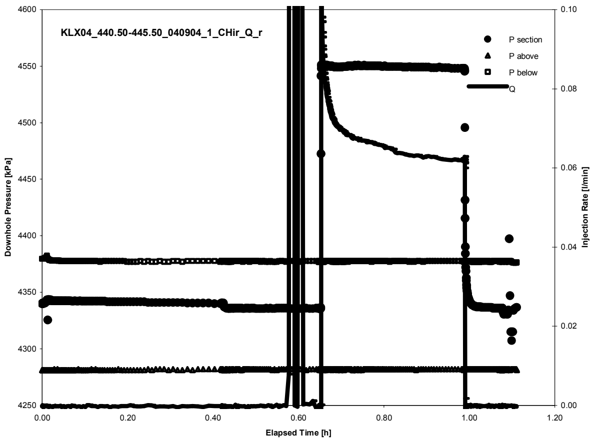
Comments:

Based on the test response (prolonged packer compliance) the interval transmissivity is lower than 1E-11 m2/s.
No further analysis recommended.

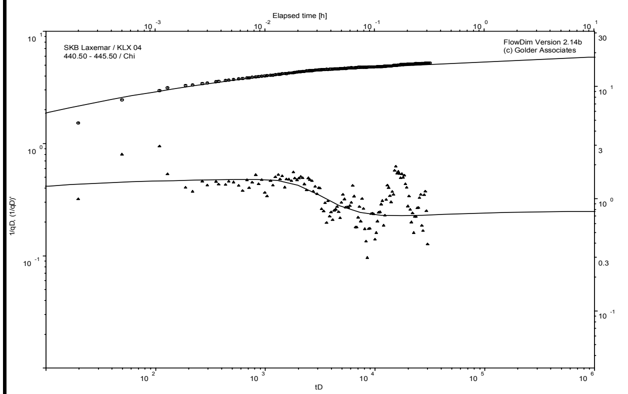
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040904 14:00
Test section from - to (m):	440.50-445.50 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

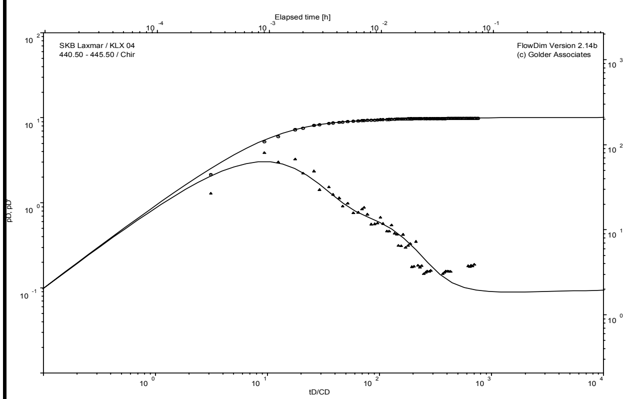
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	4340		
p_i (kPa) =	4337		
p_p(kPa) =	4548	p_F (kPa) =	4336
Q_p (m^3/s)=	1.03E-06		
tp (s) =	1200	t_F (s) =	300
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	13.7		
Derivative fact.=	0.05	Derivative fact.=	0.03
Results		**Results**	
Q/s (m^2/s)=	4.8E-08		
T_M (m^2/s)=	4.0E-08		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.16	dt_1 (min) =	*
dt_2 (min) =	0.83	dt_2 (min) =	*
T (m^2/s) =	4.0E-08	T (m^2/s) =	8.3E-08
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	7.9E-09	K_s (m/s) =	1.7E-08
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.9E-11
C_D (-) =	NA	C_D (-) =	2.0E-03
ξ (-) =	0.0	ξ (-) =	5.4
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.			
dt_1 (min) =	0.16	C (m^3/Pa) =	1.9E-11
dt_2 (min) =	0.83	C_D (-) =	2.0E-03
T_T (m^2/s) =	4.0E-08	ξ (-) =	0.0
S (-) =	1.0E-06		
K_s (m/s) =	7.9E-09		
S_s (1/m) =	2.0E-07		

Comments:

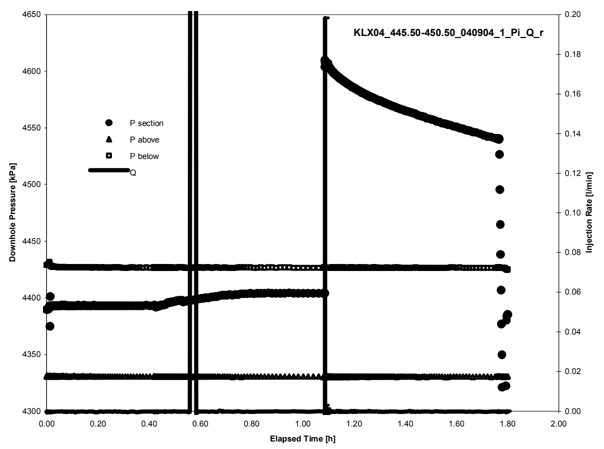
*: IARF not measured

The recommended transmissivity of 4.0E-8 m2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 1.0E-8 to 8.0E-8 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 4333.1 kPa.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Pi
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040904 15:38
Test section from - to (m):	445.50-450.50 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

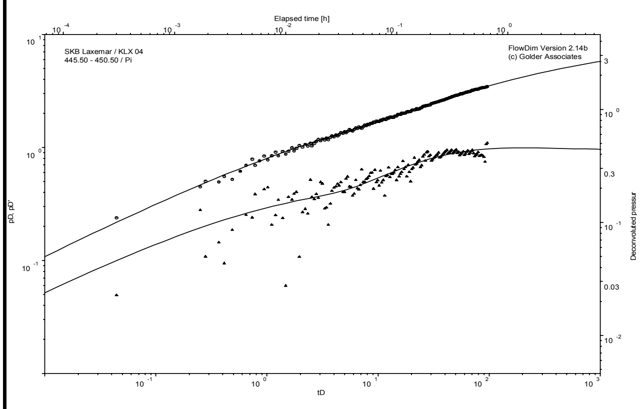


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	4389		
p_i (kPa) =	4404		
p_p(kPa) =	4607	p_F (kPa) =	4504
Q_p (m^3/s)=	-		
tp (s) =	-	t_F (s) =	2400
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	13.8		
Derivative fact.=	-	Derivative fact.=	0.07
Results		**Results**	
Q/s (m^2/s)=	NA		
T_M (m^2/s)=	NA		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	-	dt_1 (min) =	23.78
dt_2 (min) =	-	dt_2 (min) =	36.53
T (m^2/s) =	NA	T (m^2/s) =	8.4E-12
S (-) =	NA	S (-) =	1.0E-06
K_s (m/s) =	NA	K_s (m/s) =	1.7E-12
S_s (1/m) =	NA	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	8.9E-12
C_D (-) =	NA	C_D (-) =	9.8E-04
ξ (-) =	NA	ξ (-) =	1.0
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Log-Log plot incl. derivates- flow period

Not Analysed

Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	23.78	C (m^3/Pa) =	8.9E-12
dt_2 (min) =	36.53	C_D (-) =	9.8E-04
T_T (m^2/s) =	8.4E-12	ξ (-) =	1.0
S (-) =	1.0E-06		
K_s (m/s) =	1.7E-12		
S_s (1/m) =	2.0E-07		

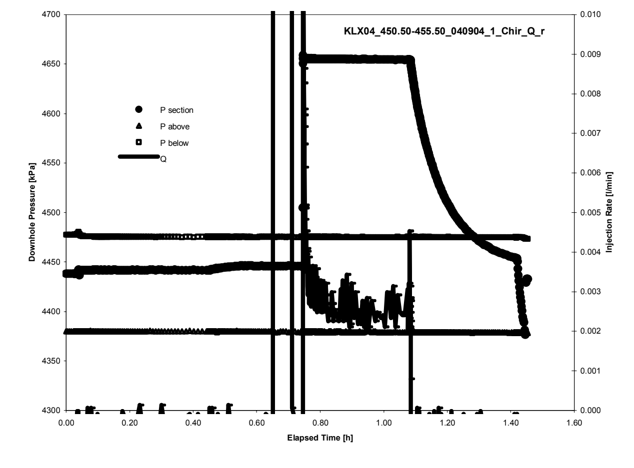
Comments:

The recommended transmissivity of 8.4E-12 m2/s was derived from the analysis of the PI phase assuming a flow dimension of 2. Considering the inherent uncertainties related to the measurement (e.g. specially the measurement of the wellbore storage coefficient) and to the analysis process (e.g. numeric distortion when calculating the derivative and pressure history effects), the confidence range for the transmissivity is estimated to be 1E-12 to 1E-11 m2/s. No static pressure could be derived.

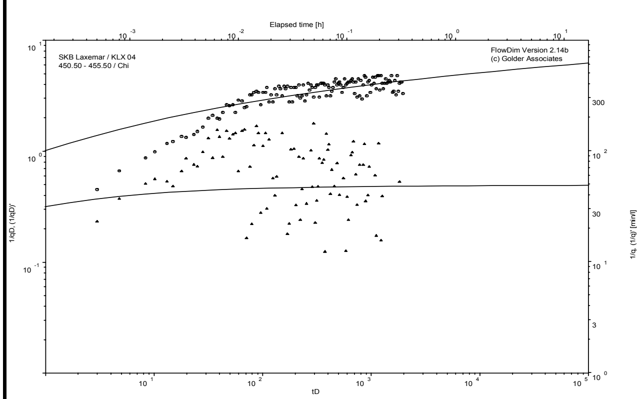
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040904 18:04
Test section from - to (m):	450.50-455.50 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

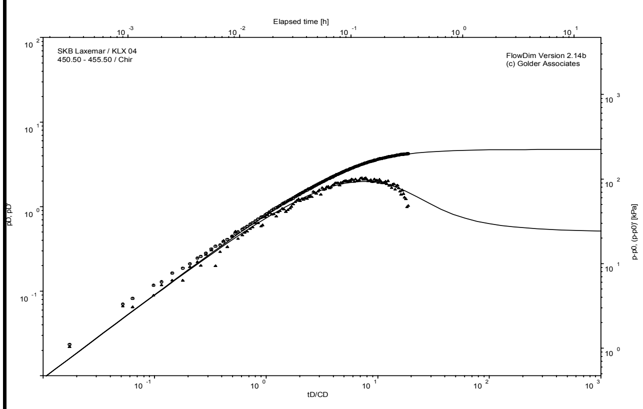
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	4438		
p_i (kPa) =	4445		
p_p(kPa) =	4653	p_F (kPa) =	4454
Q_p (m^3/s)=	4.33E-08		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	13.9		
Derivative fact.=	0.20	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	2.0E-09		
T_M (m^2/s)=	1.7E-09		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	3.25	dt_1 (min) =	*
dt_2 (min) =	9.38	dt_2 (min) =	*
T (m^2/s) =	1.3E-09	T (m^2/s) =	1.6E-09
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	2.5E-10	K_s (m/s) =	3.1E-10
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	6.3E-11
C_D (-) =	NA	C_D (-) =	6.9E-03
ξ (-) =	0.3	ξ (-) =	1.4
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	*	C (m^3/Pa) =	6.3E-11
dt_2 (min) =	*	C_D (-) =	6.9E-03
T_T (m^2/s) =	1.6E-09	ξ (-) =	1.4
S (-) =	1.0E-06		
K_s (m/s) =	3.1E-10		
S_s (1/m) =	2.0E-07		

Comments:

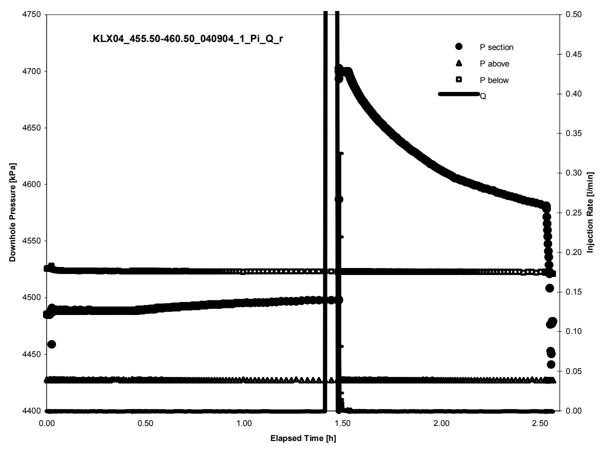
*: IARF not measured

The recommended transmissivity of 1.6E-9 m2/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 8.0E-10 to 4.0E-9 m2/s. The analysis was conducted assuming a flow dimension of 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 4410.7 kPa.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Pi
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040904 20:00
Test section from - to (m):	455.50-460.50	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

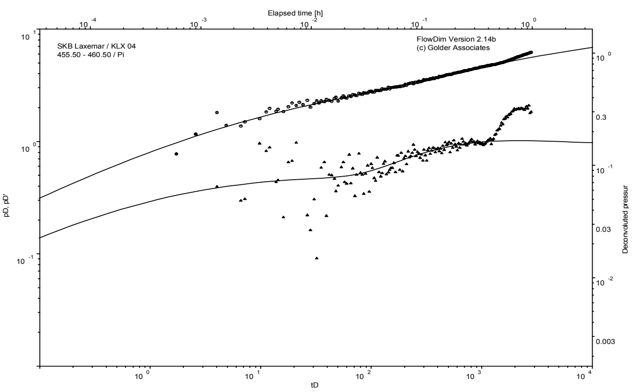


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	4485		
p_i (kPa) =	4497		
p_p(kPa) =	4699	p_F (kPa) =	4582
Q_p (m^3/s)=	-		
tp (s) =	-	t_F (s) =	3600
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	13.9		
Derivative fact.=	-	Derivative fact.=	0.09
Results		**Results**	
Q/s (m^2/s)=	NA		
T_M (m^2/s)=	NA		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	-	dt_1 (min) =	16.12
dt_2 (min) =	-	dt_2 (min) =	26.78
T (m^2/s) =	NA	T (m^2/s) =	1.3E-10
S (-) =	NA	S (-) =	1.0E-06
K_s (m/s) =	NA	K_s (m/s) =	2.6E-11
S_s (1/m) =	NA	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	4.9E-11
C_D (-) =	NA	C_D (-) =	5.4E-03
ξ (-) =	NA	ξ (-) =	1.1
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Log-Log plot incl. derivates- flow period

Not Analysed

Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	16.12	C (m^3/Pa) =	4.9E-11
dt_2 (min) =	26.78	C_D (-) =	5.4E-03
T_T (m^2/s) =	1.3E-10	ξ (-) =	1.1
S (-) =	1.0E-06		
K_s (m/s) =	2.6E-11		
S_s (1/m) =	2.0E-07		

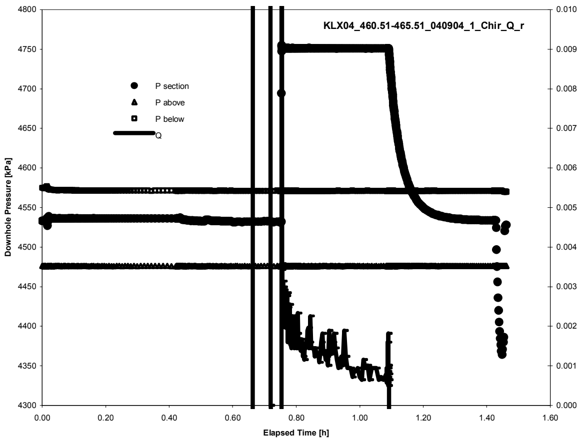
Comments:

The recommended transmissivity of 1.3E-10 m2/s was derived from the analysis of the Pi phase. It should be noted that due to the very low interval transmissivity the results are very uncertain. Considering the inherent uncertainties related to the measurement (e.g. specially the measurement of the wellbore storage coefficient) and to the analysis process (e.g. numeric distortion when calculating the derivative and pressure history effects), the confidence range for the transmissivity is estimated to be 3E-11 to 3E-10 m2/s. The analysis was conducted using a flow dimension of 2. No static pressure could be derived.

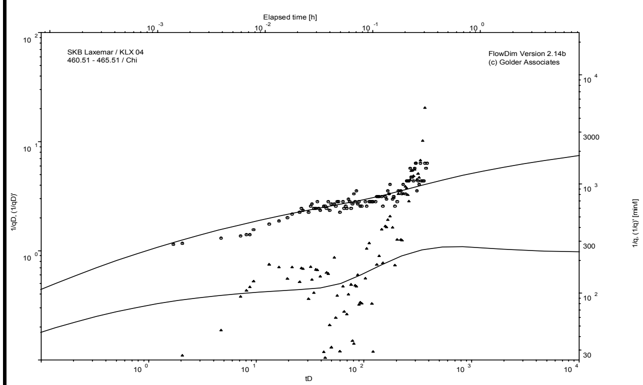
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040904 23:06
Test section from - to (m):	460.51-465.51	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

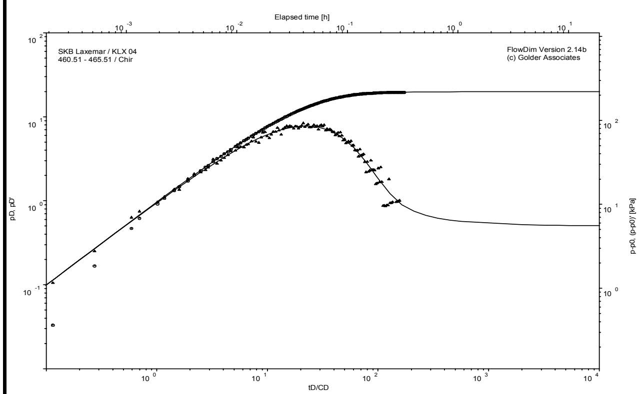
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	4533		
p_i (kPa) =	4531		
p_p(kPa) =	4751	p_F (kPa) =	4533
Q_p (m^3/s)=	1.00E-08		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	14.0		
Derivative fact.=	0.20	Derivative fact.=	0.01
Results		**Results**	
Q/s (m^2/s)=	4.5E-10		
T_M (m^2/s)=	3.7E-10		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.97	dt_1 (min) =	*
dt_2 (min) =	2.32	dt_2 (min) =	*
T (m^2/s) =	4.9E-10	T (m^2/s) =	3.1E-09
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	9.7E-11	K_s (m/s) =	6.2E-10
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.4E-11
C_D (-) =	NA	C_D (-) =	1.5E-03
ξ (-) =	0.0	ξ (-) =	15.9
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	*	C (m^3/Pa) =	1.4E-11
dt_2 (min) =	*	C_D (-) =	1.5E-03
T_T (m^2/s) =	3.1E-09	ξ (-) =	15.9
S (-) =	1.0E-06		
K_s (m/s) =	6.2E-10		
S_s (1/m) =	2.0E-07		

Comments:

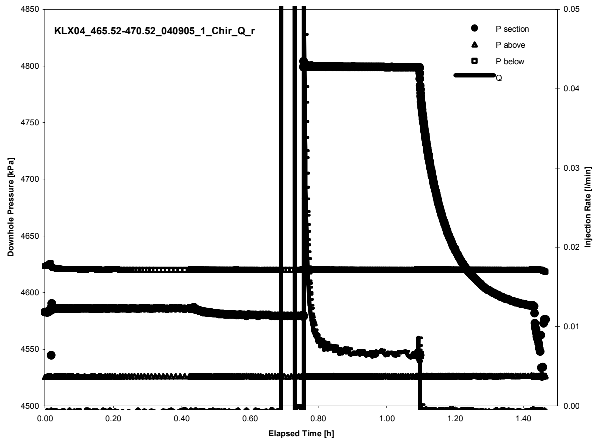
*: IARF not measured

The recommended transmissivity of 3.1E-9 m2/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. Concerning the low interval transmissivity, the confidence range for the interval transmissivity is estimated to be 6.0E-10 to 4.0E-9 m2/s. The analysis was conducted using a flow dimension of 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 4529.4 kPa.

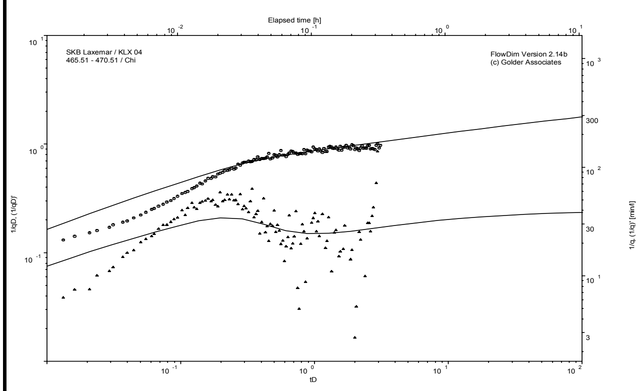
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040905 01:16
Test section from - to (m):	465.52 - 470.52	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

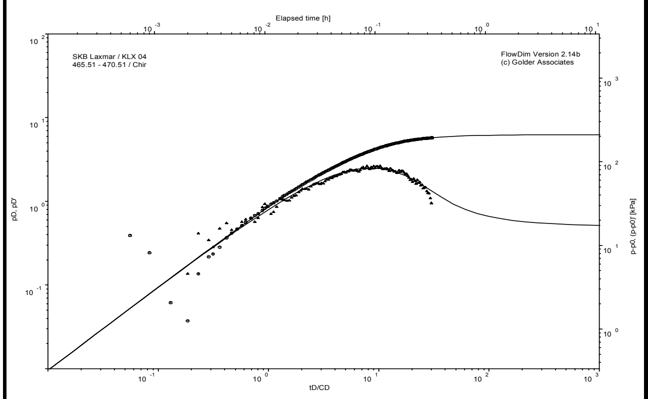
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	4583		
p_i (kPa) =	4580		
p_p(kPa) =	4799	p_F (kPa) =	4589
Q_p (m^3/s)=	1.08E-07		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	14.1		
Derivative fact.=	0.12	Derivative fact.=	0.03
Results		**Results**	
Q/s (m^2/s)=	4.9E-09		
T_M (m^2/s)=	4.0E-09		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	4.46	dt_1 (min) =	*
dt_2 (min) =	8.92	dt_2 (min) =	*
T (m^2/s) =	1.5E-09	T (m^2/s) =	6.2E-09
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	2.9E-10	K_s (m/s) =	1.2E-09
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.6E-10
C_D (-) =	NA	C_D (-) =	1.7E-02
ξ (-) =	-2.6	ξ (-) =	2.1
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.			
dt_1 (min) =	*	C (m^3/Pa) =	1.6E-10
dt_2 (min) =	*	C_D (-) =	1.7E-02
T_T (m^2/s) =	6.2E-09	ξ (-) =	2.1
S (-) =	1.0E-06		
K_s (m/s) =	1.2E-09		
S_s (1/m) =	2.0E-07		

Comments:

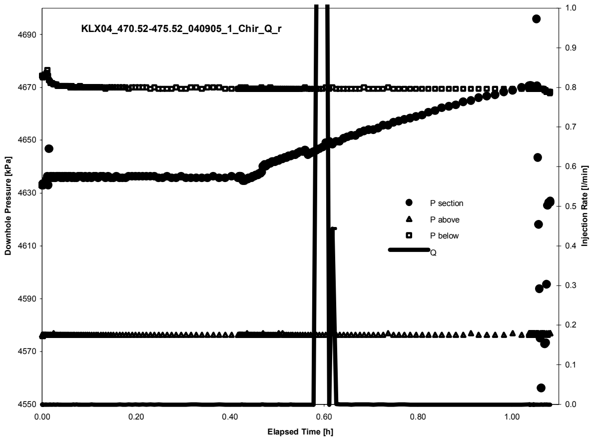
*: IARF not measured

The recommended transmissivity of 6.2E-9 m2/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. Considering the uncertainties concerning the flow dimension, the confidence range for the interval transmissivity is estimated to be 7.0E-10 to 7.0E-9 m2/s. The analysis was conducted assuming a flow dimension of 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 4570.1 kPa.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040905 05:46
Test section from - to (m):	470.52-475.52 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p



Log-Log plot incl. derivates- flow period

Not Analysed

Log-Log plot incl. derivatives- recovery period

Not Analysed

Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	4634		
p_i (kPa) =	-		
p_p(kPa) =	-	p_F (kPa) =	-
Q_p (m^3/s)=	-		
tp (s) =	-	t_F (s) =	-
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	14.2		
Derivative fact.=	-	Derivative fact.=	-
Results		**Results**	
Q/s (m^2/s)=	NA		
T_M (m^2/s)=	NA		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	-	dt_1 (min) =	-
dt_2 (min) =	-	dt_2 (min) =	-
T (m^2/s) =	NA	T (m^2/s) =	NA
S (-) =	NA	S (-) =	NA
K_s (m/s) =	NA	K_s (m/s) =	NA
S_s (1/m) =	NA	S_s (1/m) =	NA
C (m^3/Pa) =	NA	C (m^3/Pa) =	NA
C_D (-) =	NA	C_D (-) =	NA
ξ (-) =	NA	ξ (-) =	NA
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.			
dt_1 (min) =	-	C (m^3/Pa) =	NA
dt_2 (min) =	-	C_D (-) =	NA
T_T (m^2/s) =	NA	ξ (-) =	NA
S (-) =	NA		
K_s (m/s) =	NA		
S_s (1/m) =	NA		

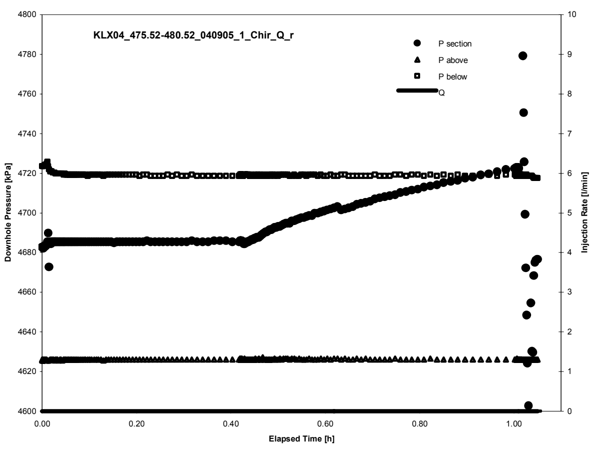
Comments:

Based on the test response (prolonged packer compliance) the interval transmissivity is lower than 1E-11 m2/s.
No further analysis recommended.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040905 07:27
Test section from - to (m):	475.52-480.52 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	4683		
p_i (kPa) =	-		
p_p(kPa) =	-	p_F (kPa) =	-
Q_p (m^3/s)=	-		
tp (s) =	-	t_F (s) =	-
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	14.2		
Derivative fact.=	-	Derivative fact.=	-
Results		**Results**	
Q/s (m^2/s)=	NA		
T_M (m^2/s)=	NA		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	-	dt_1 (min) =	-
dt_2 (min) =	-	dt_2 (min) =	-
T (m^2/s) =	NA	T (m^2/s) =	NA
S (-) =	NA	S (-) =	NA
K_s (m/s) =	NA	K_s (m/s) =	NA
S_s (1/m) =	NA	S_s (1/m) =	NA
C (m^3/Pa) =	NA	C (m^3/Pa) =	NA
C_D (-) =	NA	C_D (-) =	NA
ξ (-) =	NA	ξ (-) =	NA
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Log-Log plot incl. derivates- flow period

Not Analysed

Log-Log plot incl. derivatives- recovery period

Not Analysed

Selected representative parameters.

dt_1 (min) =	-	C (m^3/Pa) =	NA
dt_2 (min) =	-	C_D (-) =	NA
T_T (m^2/s) =	NA	ξ (-) =	NA
S (-) =	NA		
K_s (m/s) =	NA		
S_s (1/m) =	NA		

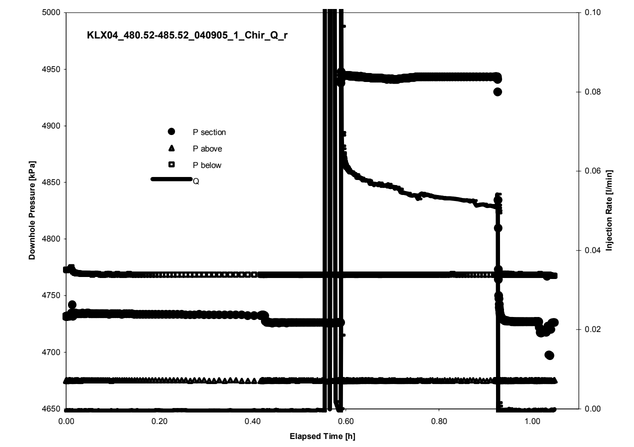
Comments:

Based on the test response (prolonged packer compliance) the interval transmissivity is lower than 1E-11 m2/s.
No further analysis recommended.

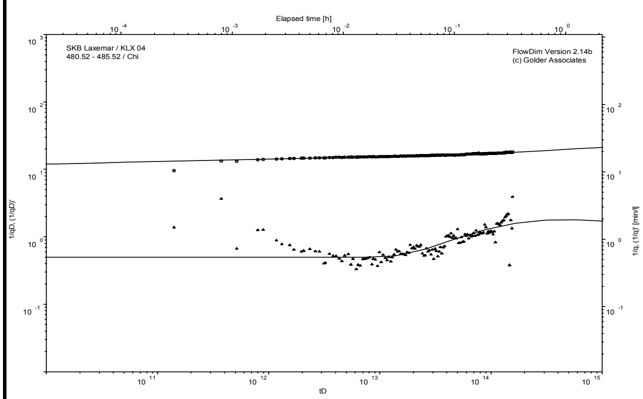
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040905 08:57
Test section from - to (m):	480.52-485.52 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

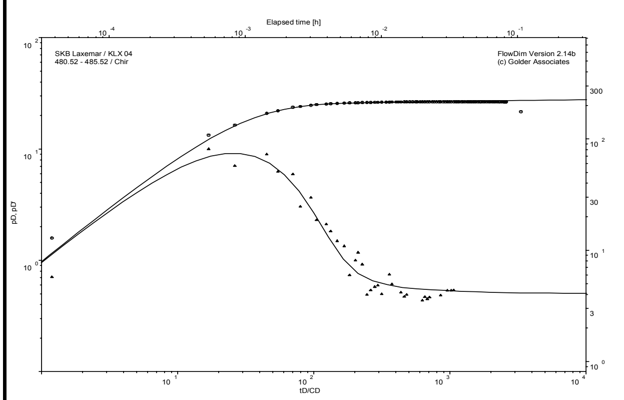
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	4732		
p_i (kPa) =	4726		
p_p(kPa) =	4943	p_F (kPa) =	4727
Q_p (m^3/s)=	8.50E-07		
tp (s) =	1200	t_F (s) =	300
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	14.3		
Derivative fact.=	0.19	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	3.8E-08		
T_M (m^2/s)=	3.2E-08		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.49	dt_1 (min) =	0.72
dt_2 (min) =	1.72	dt_2 (min) =	2.04
T (m^2/s) =	1.1E-07	T (m^2/s) =	1.8E-07
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	2.2E-08	K_s (m/s) =	3.5E-08
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.3E-11
C_D (-) =	NA	C_D (-) =	1.4E-03
ξ (-) =	10.6	ξ (-) =	21.7
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	0.49	C (m^3/Pa) =	1.3E-11
dt_2 (min) =	1.72	C_D (-) =	1.4E-03
T_T (m^2/s) =	1.1E-07	ξ (-) =	10.6
S (-) =	1.0E-06		
K_s (m/s) =	2.2E-08		
S_s (1/m) =	2.0E-07		

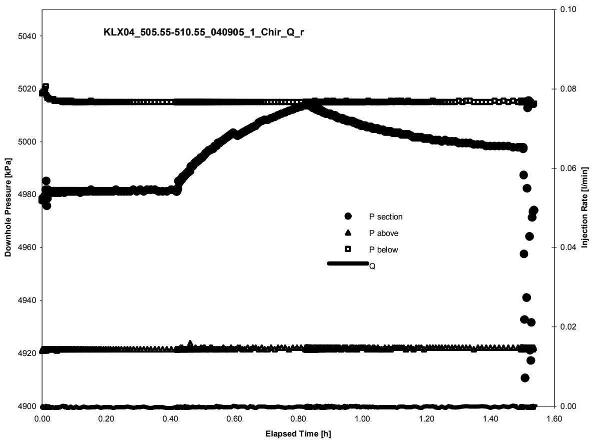
Comments:

The recommended transmissivity of 1.1E-7 m2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 7.0E-8 to 4.0E-7 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 4726.6 kPa.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040905 10:34
Test section from - to (m):	505.55-510.55	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	4977		
p_i (kPa) =	-		
p_p(kPa) =	-	p_F (kPa) =	-
Q_p (m^3/s)=	-		
tp (s) =	-	t_F (s) =	-
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	14.7		
Derivative fact.=	-	Derivative fact.=	-
Results		**Results**	
Q/s (m^2/s)=	NA		
T_M (m^2/s)=	NA		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	-	dt_1 (min) =	-
dt_2 (min) =	-	dt_2 (min) =	-
T (m^2/s) =	NA	T (m^2/s) =	NA
S (-) =	NA	S (-) =	NA
K_s (m/s) =	NA	K_s (m/s) =	NA
S_s (1/m) =	NA	S_s (1/m) =	NA
C (m^3/Pa) =	NA	C (m^3/Pa) =	NA
C_D (-) =	NA	C_D (-) =	NA
ξ (-) =	NA	ξ (-) =	NA
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Log-Log plot incl. derivates- flow period

Not Analysed

Log-Log plot incl. derivatives- recovery period

Not Analysed

Selected representative parameters.

dt_1 (min) =	-	C (m^3/Pa) =	NA
dt_2 (min) =	-	C_D (-) =	NA
T_T (m^2/s) =	NA	ξ (-) =	NA
S (-) =	NA		
K_s (m/s) =	NA		
S_s (1/m) =	NA		

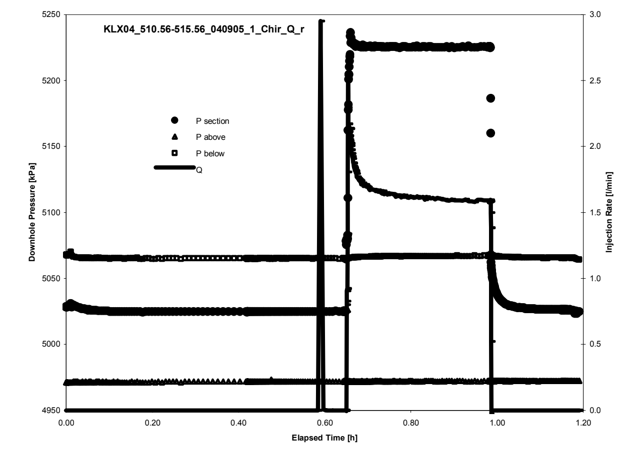
Comments:

Based on the test response (prolonged packer compliance) the interval transmissivity is lower than 1E-11 m2/s.
No further analysis recommended.

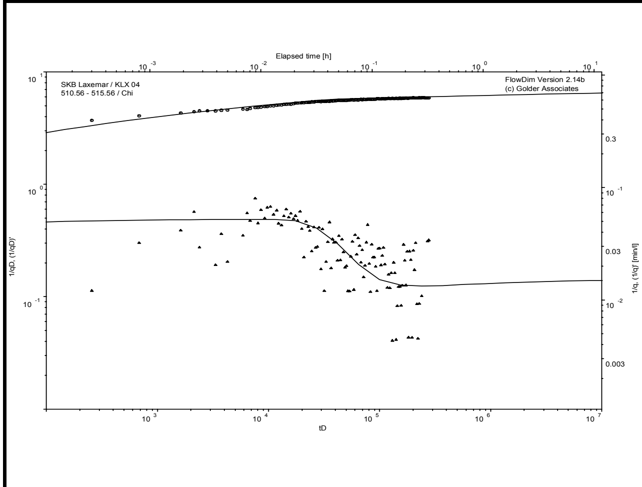
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040905 12:46
Test section from - to (m):	510.56-515.56 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

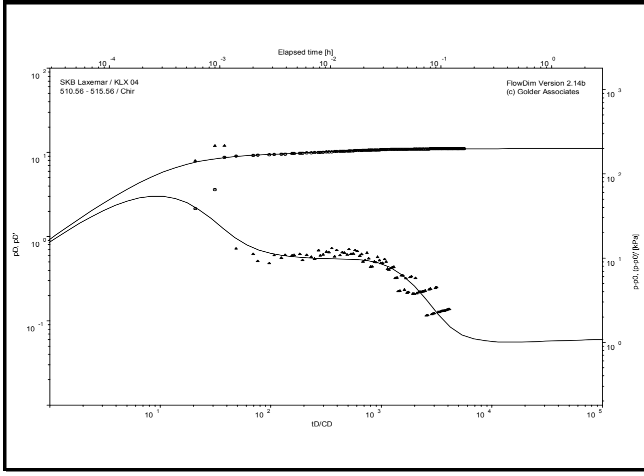
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	5029		
p_i (kPa) =	5025		
p_p(kPa) =	5226	p_F (kPa) =	5026
Q_p (m^3/s)=	2.66E-05		
tp (s) =	1200	t_F (s) =	600
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	14.8		
Derivative fact.=	0.07	Derivative fact.=	0.06
Results		**Results**	
Q/s (m^2/s)=	1.3E-06		
T_M (m^2/s)=	1.1E-06		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.48	dt_1 (min) =	0.19
dt_2 (min) =	1.28	dt_2 (min) =	1.24
T (m^2/s) =	1.2E-06	T (m^2/s) =	2.4E-06
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	2.4E-07	K_s (m/s) =	4.8E-07
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.6E-10
C_D (-) =	NA	C_D (-) =	1.8E-02
ξ (-) =	-0.6	ξ (-) =	4.3
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	0.19	C (m^3/Pa) =	1.6E-10
dt_2 (min) =	1.24	C_D (-) =	1.8E-02
T_T (m^2/s) =	2.4E-06	ξ (-) =	4.3
S (-) =	1.0E-06		
K_s (m/s) =	4.8E-07		
S_s (1/m) =	2.0E-07		

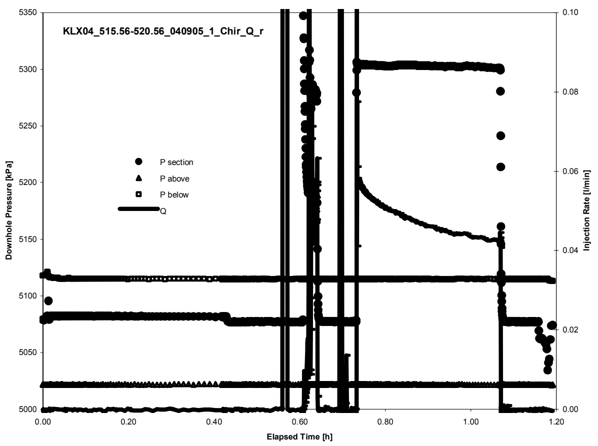
Comments:

The recommended transmissivity of 2.4E-6 m2/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 9.0E-7 to 5.0E-6 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 5026.6 kPa.

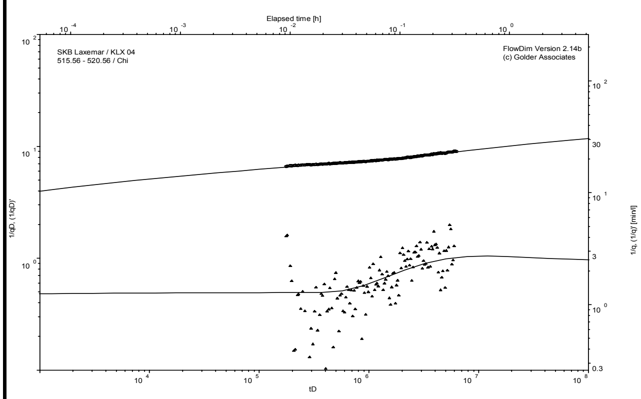
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040905 14:22
Test section from - to (m):	515.56-520.56 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

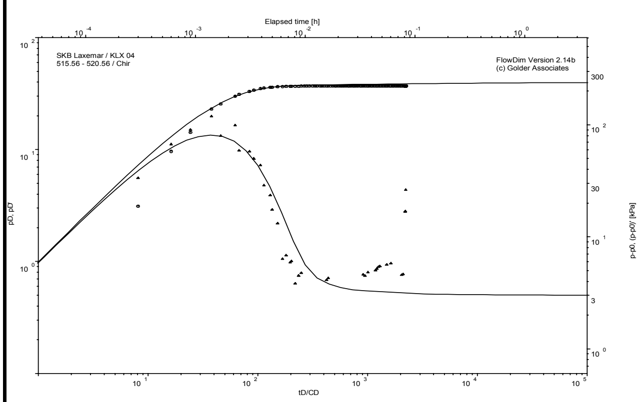
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	5079		
p_i (kPa) =	5077		
p_p(kPa) =	5301	p_F (kPa) =	5077
Q_p (m^3/s)=	6.83E-07		
tp (s) =	1200	t_F (s) =	300
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	14.9		
Derivative fact.=	0.03	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	3.0E-08		
T_M (m^2/s)=	2.5E-08		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	15.17	dt_1 (min) =	2.10
dt_2 (min) =	18.77	dt_2 (min) =	3.62
T (m^2/s) =	4.5E-08	T (m^2/s) =	2.1E-07
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	9.0E-09	K_s (m/s) =	4.1E-08
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.8E-11
C_D (-) =	NA	C_D (-) =	1.9E-03
ξ (-) =	2.6	ξ (-) =	33.1
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.			
dt_1 (min) =	15.17	C (m^3/Pa) =	1.8E-11
dt_2 (min) =	18.77	C_D (-) =	1.9E-03
T_T (m^2/s) =	4.5E-08	ξ (-) =	2.6
S (-) =	1.0E-06		
K_s (m/s) =	9.0E-09		
S_s (1/m) =	2.0E-07		

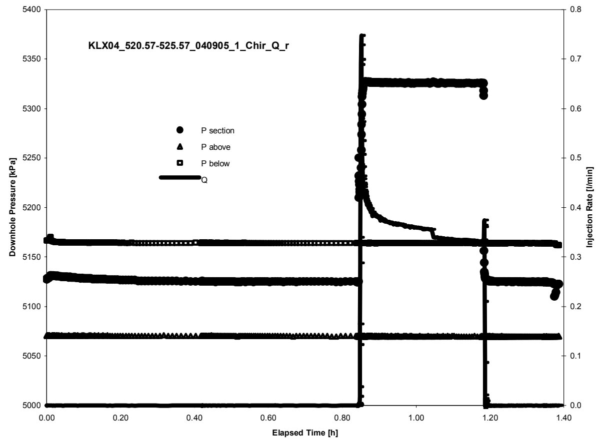
Comments:

The recommended transmissivity of 4.5E-8 m2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 9.0E-9 to 5.0E-8 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 5077.1 kPa.

Test Summary Sheet

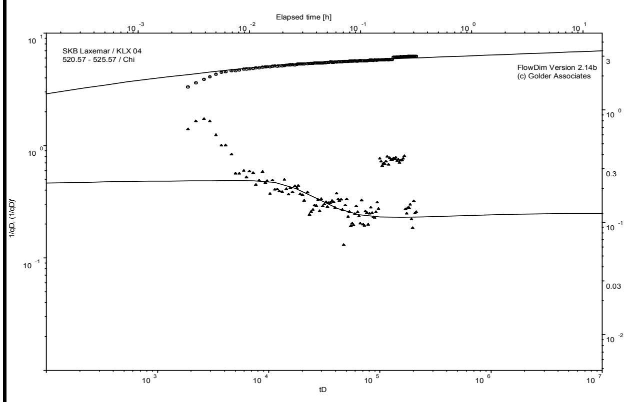
Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040905 16:01
Test section from - to (m):	520.57-525.57 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

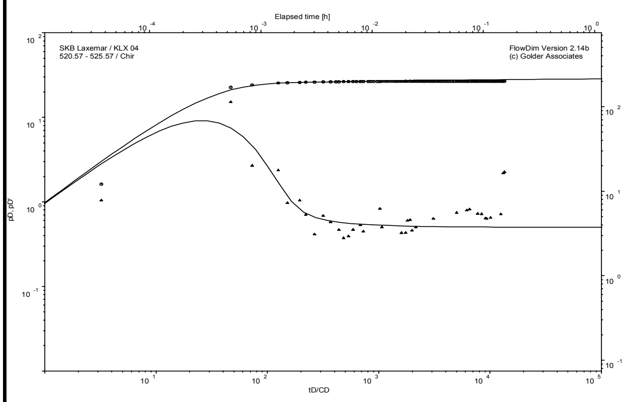


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	5128		
p_i (kPa) =	5124		
p_p(kPa) =	5325	p_F (kPa) =	5124
Q_p (m^3/s)=	5.55E-06		
tp (s) =	1200	t_F (s) =	600
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	15.0		
Derivative fact.=	0.11	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	2.7E-07		
T_M (m^2/s)=	2.2E-07		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.56	dt_1 (min) =	0.30
dt_2 (min) =	1.24	dt_2 (min) =	4.50
T (m^2/s) =	2.7E-07	T (m^2/s) =	1.3E-06
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	5.4E-08	K_s (m/s) =	2.5E-07
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	3.3E-11
C_D (-) =	NA	C_D (-) =	3.6E-03
ξ (-) =	0.0	ξ (-) =	21.2
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	0.56	C (m^3/Pa) =	3.3E-11
dt_2 (min) =	1.24	C_D (-) =	3.6E-03
T_T (m^2/s) =	2.7E-07	ξ (-) =	0.0
S (-) =	1.0E-06		
K_s (m/s) =	5.4E-08		
S_s (1/m) =	2.0E-07		

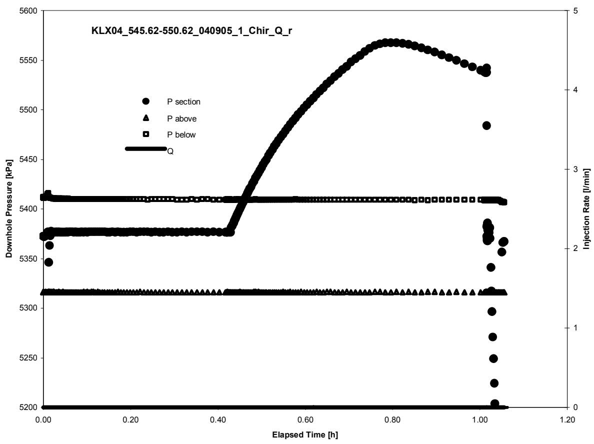
Comments:

The recommended transmissivity of 2.7E-7 m2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 9.0E-8 to 5.0E-7 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 5125.2 kPa.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040905 18:19
Test section from - to (m):	545.62-550.62 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	5372		
p_i (kPa) =	-		
p_p(kPa) =	-	p_F (kPa) =	-
Q_p (m^3/s)=	-		
tp (s) =	-	t_F (s) =	-
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	15.4		
Derivative fact.=	-	Derivative fact.=	-
Results		**Results**	
Q/s (m^2/s)=	NA		
T_M (m^2/s)=	NA		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	-	dt_1 (min) =	-
dt_2 (min) =	-	dt_2 (min) =	-
T (m^2/s) =	NA	T (m^2/s) =	NA
S (-) =	NA	S (-) =	NA
K_s (m/s) =	NA	K_s (m/s) =	NA
S_s (1/m) =	NA	S_s (1/m) =	NA
C (m^3/Pa) =	NA	C (m^3/Pa) =	NA
C_D (-) =	NA	C_D (-) =	NA
ξ (-) =	NA	ξ (-) =	NA
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Log-Log plot incl. derivates- flow period

Not Analysed

Log-Log plot incl. derivatives- recovery period

Not Analysed

Selected representative parameters.

dt_1 (min) =	-	C (m^3/Pa) =	NA
dt_2 (min) =	-	C_D (-) =	NA
T_T (m^2/s) =	NA	ξ (-) =	NA
S (-) =	NA		
K_s (m/s) =	NA		
S_s (1/m) =	NA		

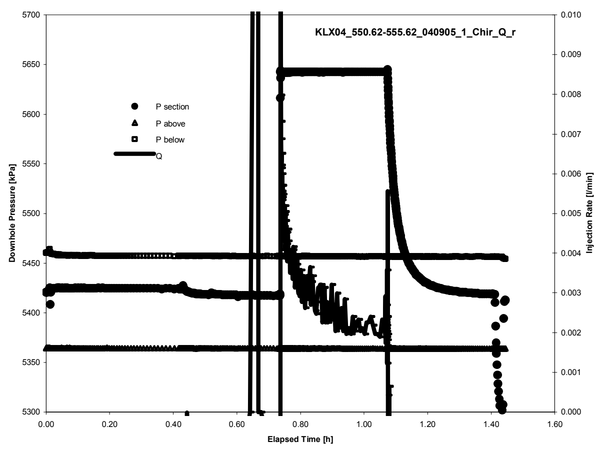
Comments:

Based on the test response (prolonged packer compliance) the interval transmissivity is lower than 1E-11 m2/s.
No further analysis recommended.

Test Summary Sheet

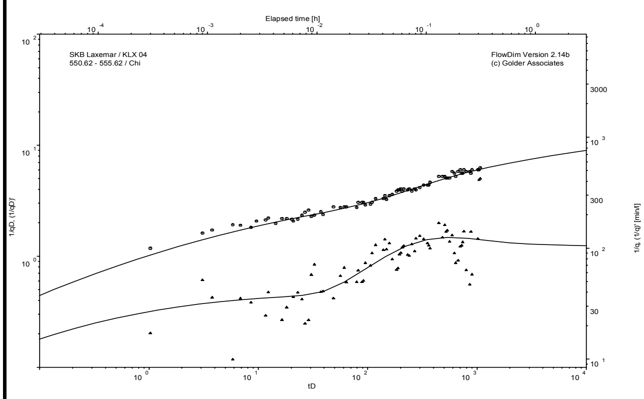
Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040905 20:03
Test section from - to (m):	550.62-555.62 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

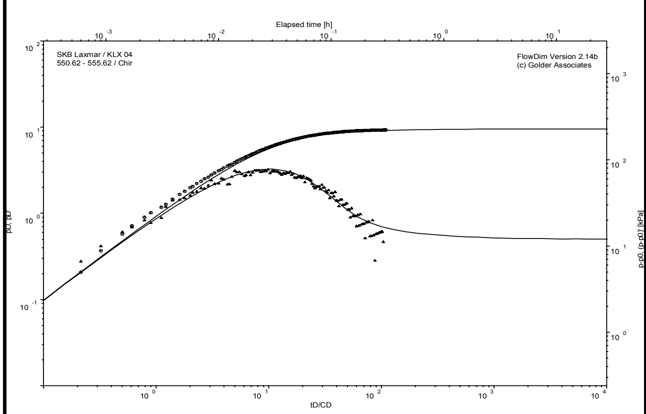


Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	5421		
p_i (kPa) =	5417		
p_p(kPa) =	5641	p_F (kPa) =	5418
Q_p (m^3/s)=	3.83E-08		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	15.5		
Derivative fact.=	0.18	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	1.7E-09		
T_M (m^2/s)=	1.4E-09		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.15	dt_1 (min) =	*
dt_2 (min) =	0.68	dt_2 (min) =	*
T (m^2/s) =	1.4E-09	T (m^2/s) =	2.8E-09
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	2.7E-10	K_s (m/s) =	5.7E-10
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.8E-11
C_D (-) =	NA	C_D (-) =	2.0E-03
ξ (-) =	0.0	ξ (-) =	5.4
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Selected representative parameters.			
dt_1 (min) =	*	C (m^3/Pa) =	1.8E-11
dt_2 (min) =	*	C_D (-) =	2.0E-03
T_T (m^2/s) =	2.8E-09	ξ (-) =	5.4
S (-) =	1.0E-06		
K_s (m/s) =	5.7E-10		
S_s (1/m) =	2.0E-07		

Comments:

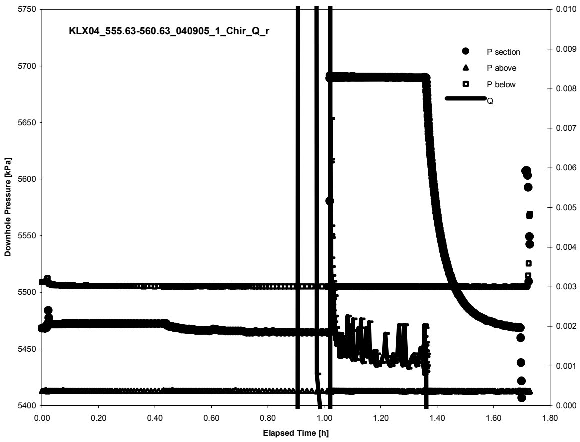
*: IARF not measured

The recommended transmissivity of 2.8E-9 m2/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. It should be noted that due to the low flow rate the results are uncertain. The confidence range for the interval transmissivity is estimated to be 7.0E-10 to 4.0E-9 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 5409.3 kPa.

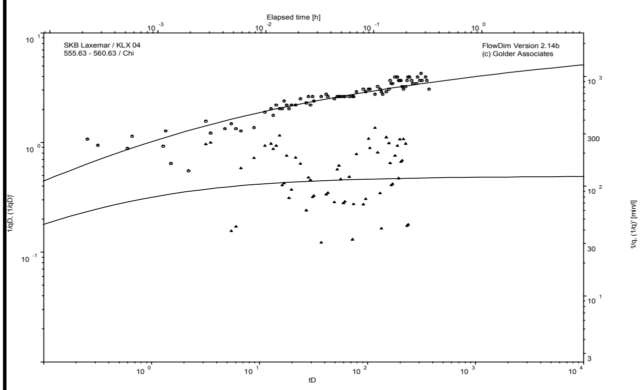
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040905 22:33
Test section from - to (m):	555.63-560.63	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

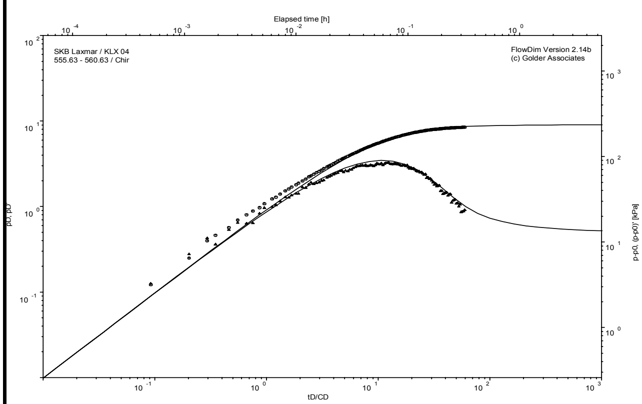
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	5468		
p_i (kPa) =	5464		
p_p(kPa) =	5689	p_F (kPa) =	5468
Q_p (m^3/s)=	1.67E-08		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	15.6		
Derivative fact.=	0.20	Derivative fact.=	0.05
Results		**Results**	
Q/s (m^2/s)=	7.3E-10		
T_M (m^2/s)=	6.0E-10		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	2.95	dt_1 (min) =	*
dt_2 (min) =	8.93	dt_2 (min) =	*
T (m^2/s) =	4.6E-10	T (m^2/s) =	1.3E-09
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	9.2E-11	K_s (m/s) =	2.7E-10
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.7E-11
C_D (-) =	NA	C_D (-) =	1.8E-03
ξ (-) =	0.0	ξ (-) =	5.5
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	*	C (m^3/Pa) =	1.7E-11
dt_2 (min) =	*	C_D (-) =	1.8E-03
T_T (m^2/s) =	1.3E-09	ξ (-) =	5.5
S (-) =	1.0E-06		
K_s (m/s) =	2.7E-10		
S_s (1/m) =	2.0E-07		

Comments:

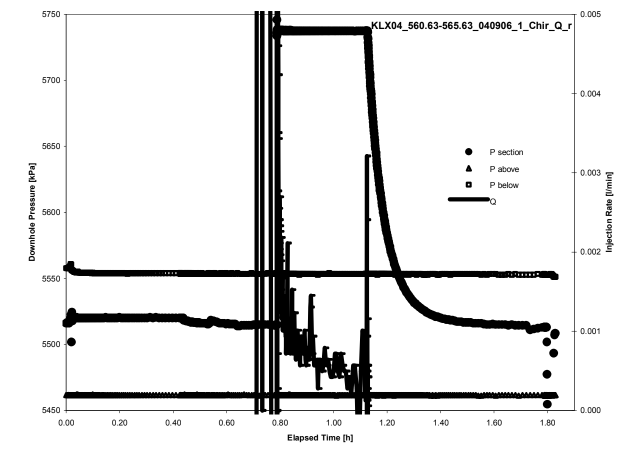
*: IARF not measured

The recommended transmissivity of 1.3E-9 m2/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. Due to the low flow rate and the uncertainties concerning the flow dimension, the results are relative uncertain. The confidence range for the interval transmissivity is estimated to be 5.0E-10 to 3.0E-9 m2/s. The analysis was conducted assuming a flow dimension of 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 5449.9 kPa.

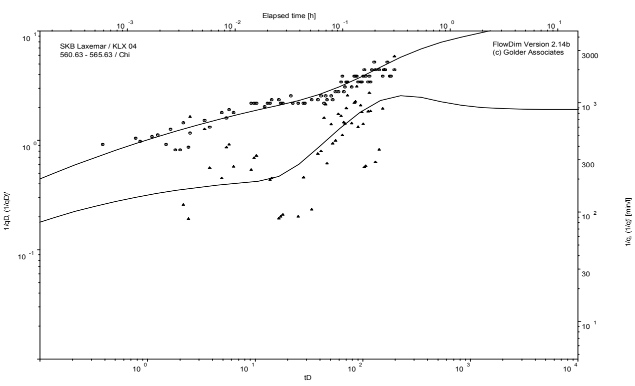
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040906 00:46
Test section from - to (m):	560.63-565.63	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

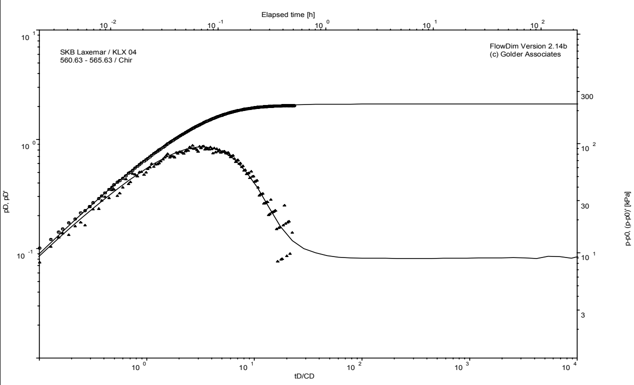
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	5517		
p_i (kPa) =	5515		
p_p(kPa) =	5736	p_F (kPa) =	5514
Q_p (m^3/s)=	7.00E-09		
tp (s) =	1200	t_F (s) =	2400
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	15.7		
Derivative fact.=	0.15	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	3.1E-10		
T_M (m^2/s)=	2.6E-10		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	*	dt_1 (min) =	*
dt_2 (min) =	*	dt_2 (min) =	*
T (m^2/s) =	2.6E-10	T (m^2/s) =	1.2E-09
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	5.2E-11	K_s (m/s) =	2.3E-10
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.1E-11
C_D (-) =	NA	C_D (-) =	1.2E-03
ξ (-) =	0.0	ξ (-) =	10.3
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.			
dt_1 (min) =	*	C (m^3/Pa) =	1.1E-11
dt_2 (min) =	*	C_D (-) =	1.2E-03
T_T (m^2/s) =	1.2E-09	ξ (-) =	10.3
S (-) =	1.0E-06		
K_s (m/s) =	2.3E-10		
S_s (1/m) =	2.0E-07		

Comments:

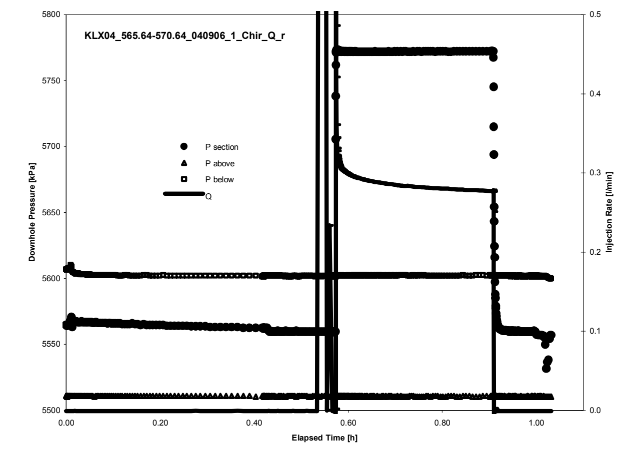
*: IARF not measured

The recommended transmissivity of 1.2E-9 m2/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. It should be noted that due to the very low flow rate and uncertainties concerning the flow dimension, the results are uncertain. The confidence range for the interval transmissivity is estimated to be 1.0E-10 to 2.0E-9 m2/s. The analysis was conducted assuming a flow dimension of 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 5507.0 kPa.

Test Summary Sheet

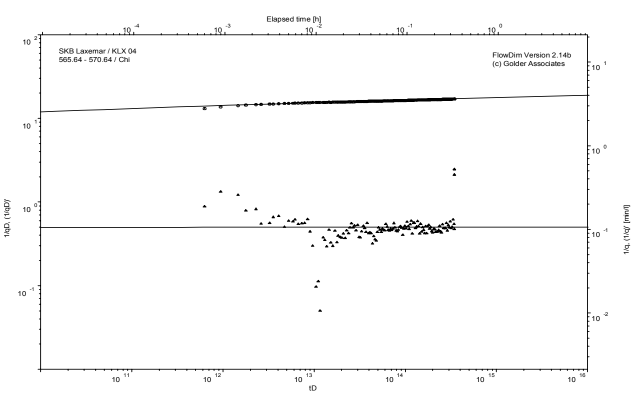
Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040906 06:09
Test section from - to (m):	565.64-570.64 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

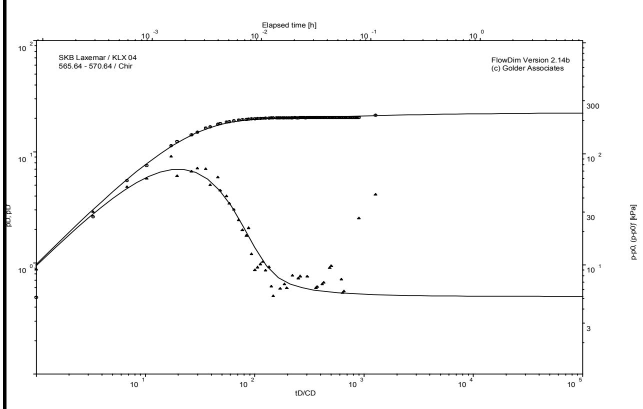


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	5565		
p_i (kPa) =	5559		
p_p(kPa) =	5772	p_F (kPa) =	5560
Q_p (m^3/s)=	4.62E-06		
tp (s) =	1200	t_F (s) =	300
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	15.7		
Derivative fact.=	0.04	Derivative fact.=	0.01
Results		**Results**	
Q/s (m^2/s)=	2.1E-07		
T_M (m^2/s)=	1.8E-07		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	1.54	dt_1 (min) =	1.30
dt_2 (min) =	19.73	dt_2 (min) =	3.40
T (m^2/s) =	5.8E-07	T (m^2/s) =	7.1E-07
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	1.2E-07	K_s (m/s) =	1.4E-07
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.4E-10
C_D (-) =	NA	C_D (-) =	1.6E-02
ξ (-) =	10.2	ξ (-) =	14.8
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Selected representative parameters.			
dt_1 (min) =	1.54	C (m^3/Pa) =	1.4E-10
dt_2 (min) =	19.73	C_D (-) =	1.6E-02
T_T (m^2/s) =	5.8E-07	ξ (-) =	10.5
S (-) =	1.0E-06		
K_s (m/s) =	1.2E-07		
S_s (1/m) =	2.0E-07		

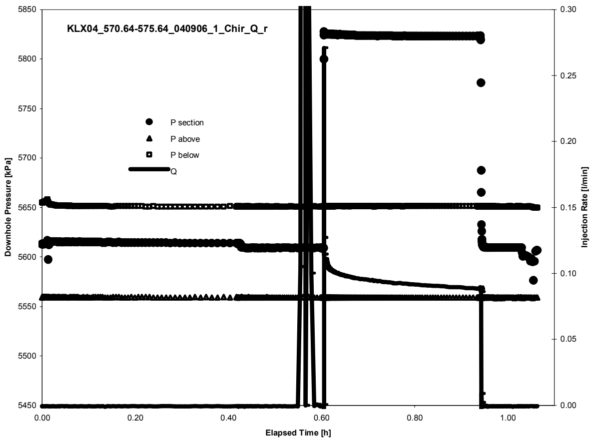
Comments:

The recommended transmissivity of 5.8E-7 m2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 3.0E-7 to 6.0E-7 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 5558.4 kPa.

Test Summary Sheet

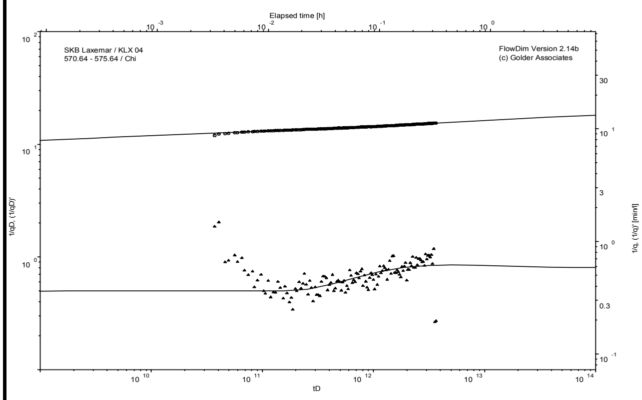
Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040906 07:42
Test section from - to (m):	570.64-575.64 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

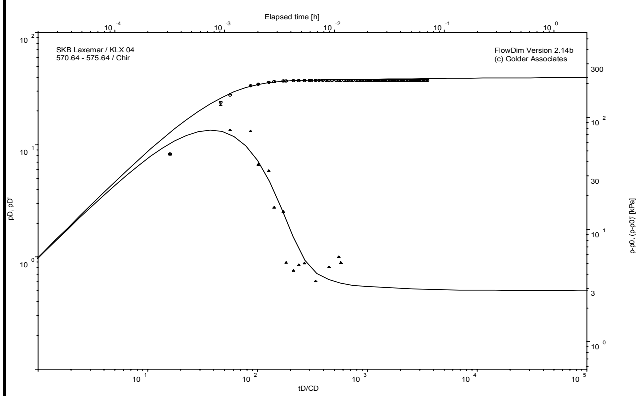


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	5613		
p_i (kPa) =	5607		
p_p(kPa) =	5823	p_F (kPa) =	5609
Q_p (m^3/s)=	1.47E-06		
tp (s) =	1200	t_F (s) =	300
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	15.8		
Derivative fact.=	0.06	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	6.7E-08		
T_M (m^2/s)=	5.5E-08		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.54	dt_1 (min) =	*
dt_2 (min) =	1.37	dt_2 (min) =	*
T (m^2/s) =	1.7E-07	T (m^2/s) =	4.3E-07
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	3.3E-08	K_s (m/s) =	8.6E-08
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	2.0E-11
C_D (-) =	NA	C_D (-) =	2.2E-03
ξ (-) =	8.6	ξ (-) =	33.0
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	0.54	C (m^3/Pa) =	2.0E-11
dt_2 (min) =	1.37	C_D (-) =	2.2E-03
T_T (m^2/s) =	1.7E-07	ξ (-) =	8.6
S (-) =	1.0E-06		
K_s (m/s) =	3.3E-08		
S_s (1/m) =	2.0E-07		

Comments:

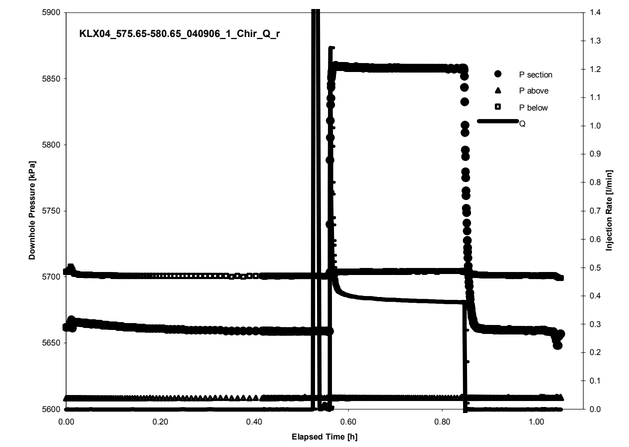
*: IARF not measured

The recommended transmissivity of 1.7E-7 m2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 7.0E-8 to 4.0E-7 m2/s. The analysis was conducted assuming a flow dimension of 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 5609.7 kPa.

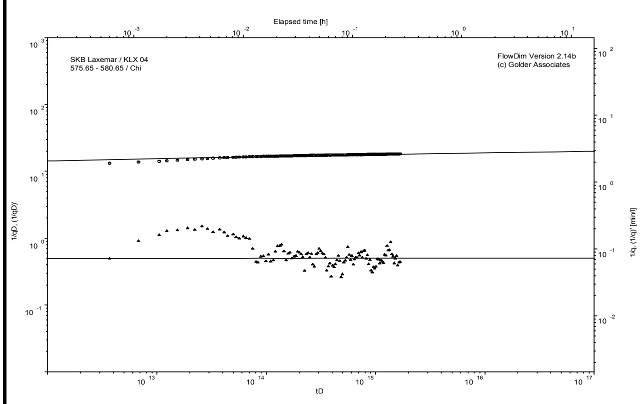
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040906 09:15
Test section from - to (m):	575.65-580.65 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

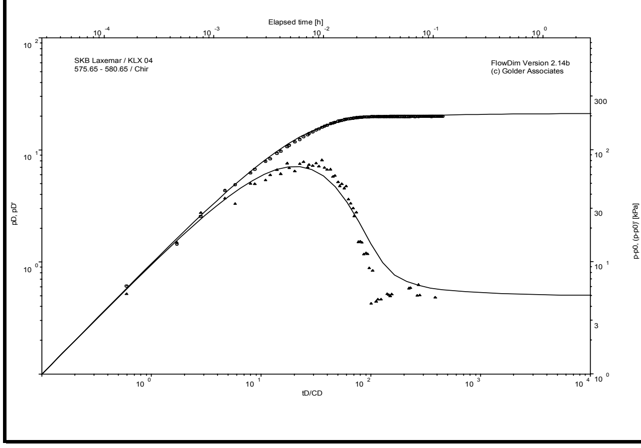
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	5662		
p_i (kPa) =	5659		
p_p(kPa) =	5857	p_F (kPa) =	5660
Q_p (m^3/s)=	6.30E-06		
tp (s) =	1020	t_F (s) =	600
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	15.9		
Derivative fact.=	0.02	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	3.1E-07		
T_M (m^2/s)=	2.6E-07		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.87	dt_1 (min) =	4.40
dt_2 (min) =	14.80	dt_2 (min) =	6.24
T (m^2/s) =	9.0E-07	T (m^2/s) =	1.0E-06
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	1.8E-07	K_s (m/s) =	2.0E-07
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	6.4E-10
C_D (-) =	NA	C_D (-) =	7.0E-02
ξ (-) =	10.9	ξ (-) =	14.0
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	0.87	C (m^3/Pa) =	6.4E-10
dt_2 (min) =	14.80	C_D (-) =	7.0E-02
T_T (m^2/s) =	9.0E-07	ξ (-) =	10.9
S (-) =	1.0E-06		
K_s (m/s) =	1.8E-07		
S_s (1/m) =	2.0E-07		

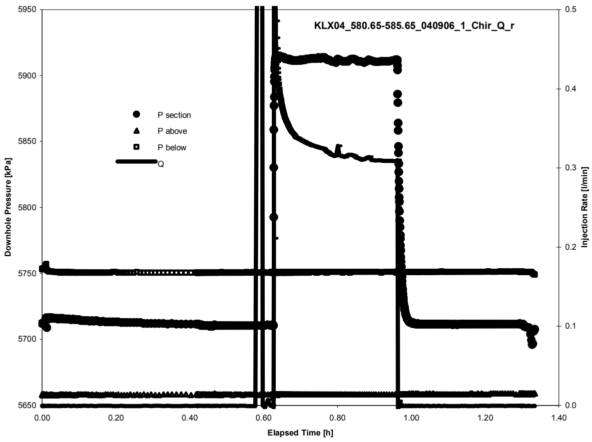
Comments:

The recommended transmissivity of 9.0E-7 m2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 6.0E-7 to 2.0E-6 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 5658.4 kPa.

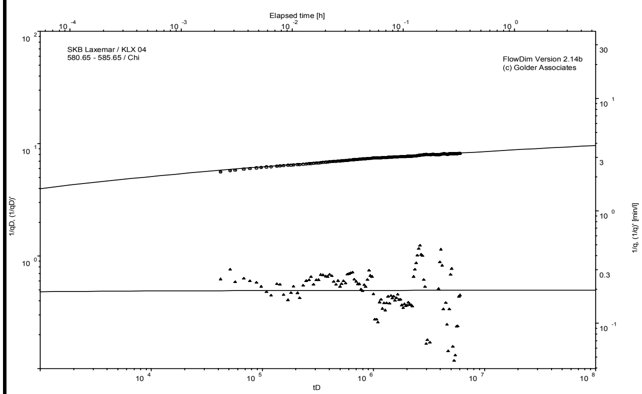
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040906 10:50
Test section from - to (m):	580.65-585.65 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

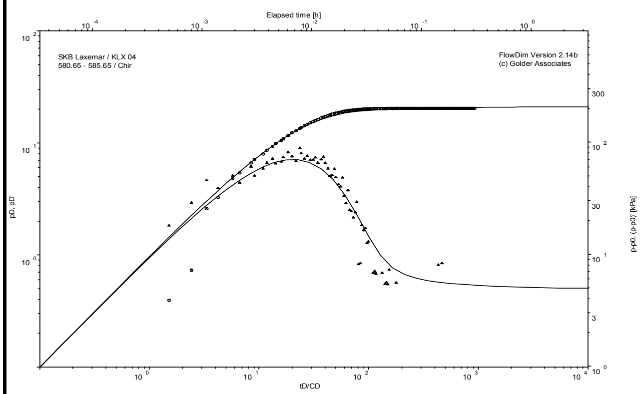
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	5713		
p_i (kPa) =	5710		
p_p(kPa) =	5911	p_F (kPa) =	5712
Q_p (m^3/s)=	5.13E-06		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	16.0		
Derivative fact.=	0.02	Derivative fact.=	0.01
Results		**Results**	
Q/s (m^2/s)=	2.5E-07		
T_M (m^2/s)=	2.1E-07		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.35	dt_1 (min) =	*
dt_2 (min) =	5.35	dt_2 (min) =	*
T (m^2/s) =	3.3E-07	T (m^2/s) =	8.6E-07
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	6.5E-08	K_s (m/s) =	1.7E-07
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	6.6E-10
C_D (-) =	NA	C_D (-) =	7.3E-02
ξ (-) =	1.6	ξ (-) =	14.0
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	0.35	C (m^3/Pa) =	6.6E-10
dt_2 (min) =	5.35	C_D (-) =	7.3E-02
T_T (m^2/s) =	3.3E-07	ξ (-) =	1.6
S (-) =	1.0E-06		
K_s (m/s) =	6.5E-08		
S_s (1/m) =	2.0E-07		

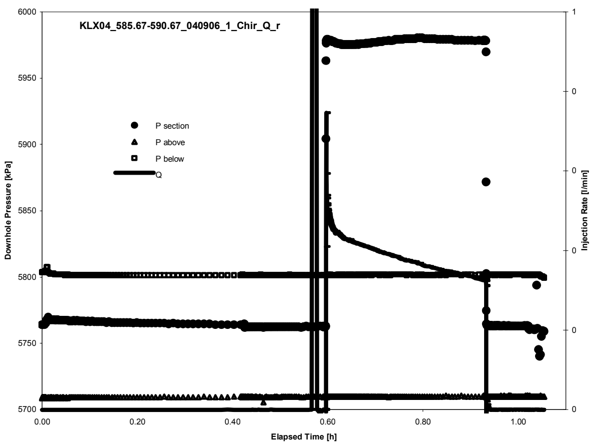
Comments:

The recommended transmissivity of 3.3E-7 m2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 8.0E-8 to 6.0E-7 m2/s. The analysis was conducted assuming a flow dimension of 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 5711.9 kPa.

Test Summary Sheet

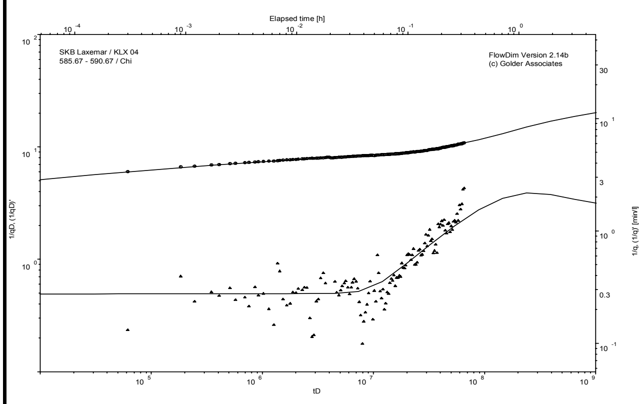
Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040906 13:11
Test section from - to (m):	585.67-590.67 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

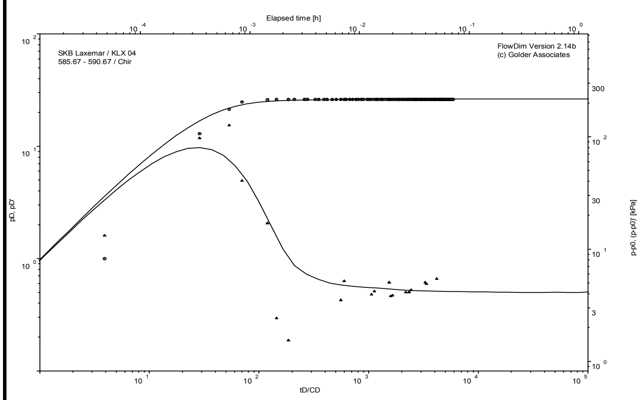


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	5764		
p_i (kPa) =	5762		
p_p(kPa) =	5979	p_F (kPa) =	5763
Q_p (m^3/s)=	2.72E-06		
tp (s) =	1200	t_F (s) =	300
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	16.1		
Derivative fact.=	0.02	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	1.2E-07		
T_M (m^2/s)=	1.0E-07		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.07	dt_1 (min) =	0.77
dt_2 (min) =	2.12	dt_2 (min) =	2.45
T (m^2/s) =	2.2E-07	T (m^2/s) =	6.1E-07
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	4.3E-08	K_s (m/s) =	1.2E-07
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.7E-11
C_D (-) =	NA	C_D (-) =	1.9E-03
ξ (-) =	3.0	ξ (-) =	21.6
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	0.07	C (m^3/Pa) =	1.7E-11
dt_2 (min) =	2.12	C_D (-) =	1.9E-03
T_T (m^2/s) =	2.2E-07	ξ (-) =	3.0
S (-) =	1.0E-06		
K_s (m/s) =	4.3E-08		
S_s (1/m) =	2.0E-07		

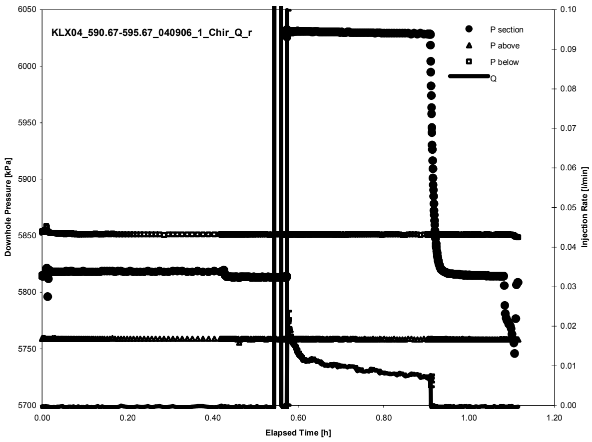
Comments:

The recommended transmissivity of 2.2E-7 m2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 8.0E-8 to 5.0E-7 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 5762.3 kPa.

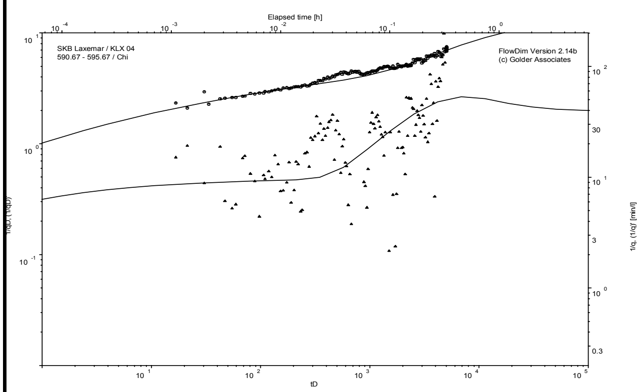
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040906 14:45
Test section from - to (m):	590.67-595.67 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

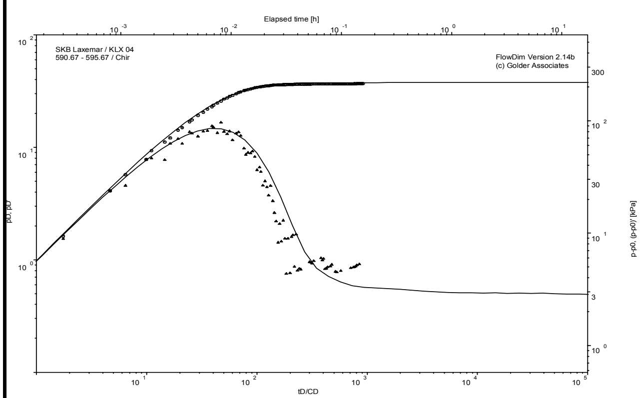
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	5815		
p_i (kPa) =	5814		
p_p(kPa) =	6027	p_F (kPa) =	5814
Q_p (m^3/s)=	1.17E-07		
tp (s) =	1200	t_F (s) =	600
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	16.1		
Derivative fact.=	0.06	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	5.4E-09		
T_M (m^2/s)=	4.4E-09		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	*	dt_1 (min) =	*
dt_2 (min) =	*	dt_2 (min) =	*
T (m^2/s) =	6.1E-09	T (m^2/s) =	4.4E-08
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	1.2E-09	K_s (m/s) =	8.7E-09
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.7E-11
C_D (-) =	NA	C_D (-) =	1.9E-03
ξ (-) =	0.0	ξ (-) =	33.1
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	
Selected representative parameters.			
dt_1 (min) =	*	C (m^3/Pa) =	1.7E-11
dt_2 (min) =	*	C_D (-) =	1.9E-03
T_T (m^2/s) =	6.1E-09	ξ (-) =	0.0
S (-) =	1.0E-06		
K_s (m/s) =	1.2E-09		
S_s (1/m) =	2.0E-07		

Comments:

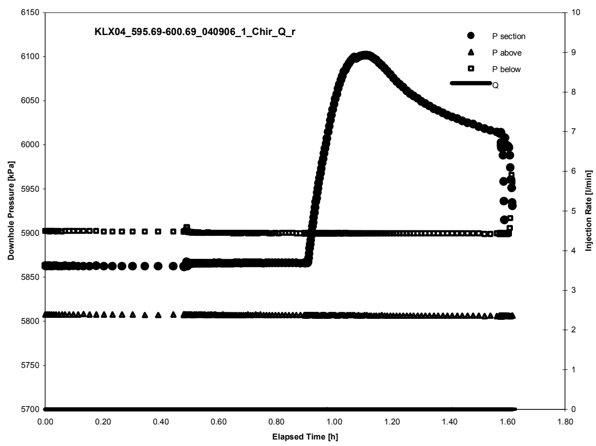
*: IARF not measured

The recommended transmissivity of 6.1E-9 m2/s was derived from the analysis of the CHi phase. Due to the fast recovery and the noisy data of the Chi phase, the results are uncertain. The confidence range for the interval transmissivity is estimated to be 1.0E-9 to 9.0E-9 m2/s. The analysis was conducted assuming a flow dimension of 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 5811.9 kPa.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040906 16:36
Test section from - to (m):	595.69-600.69 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	5862		
p_i (kPa) =	-		
p_p(kPa) =	-	p_F (kPa) =	-
Q_p (m^3/s)=	-		
tp (s) =	-	t_F (s) =	-
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	16.2		
Derivative fact.=	-	Derivative fact.=	-
Results		**Results**	
Q/s (m^2/s)=	NA		
T_M (m^2/s)=	NA		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	-	dt_1 (min) =	-
dt_2 (min) =	-	dt_2 (min) =	-
T (m^2/s) =	NA	T (m^2/s) =	NA
S (-) =	NA	S (-) =	NA
K_s (m/s) =	NA	K_s (m/s) =	NA
S_s (1/m) =	NA	S_s (1/m) =	NA
C (m^3/Pa) =	NA	C (m^3/Pa) =	NA
C_D (-) =	NA	C_D (-) =	NA
ξ (-) =	NA	ξ (-) =	NA
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Log-Log plot incl. derivates- flow period

Not Analysed

Log-Log plot incl. derivatives- recovery period

Not Analysed

Selected representative parameters.			
dt_1 (min) =	-	C (m^3/Pa) =	NA
dt_2 (min) =	-	C_D (-) =	NA
T_T (m^2/s) =	NA	ξ (-) =	NA
S (-) =	NA		
K_s (m/s) =	NA		
S_s (1/m) =	NA		

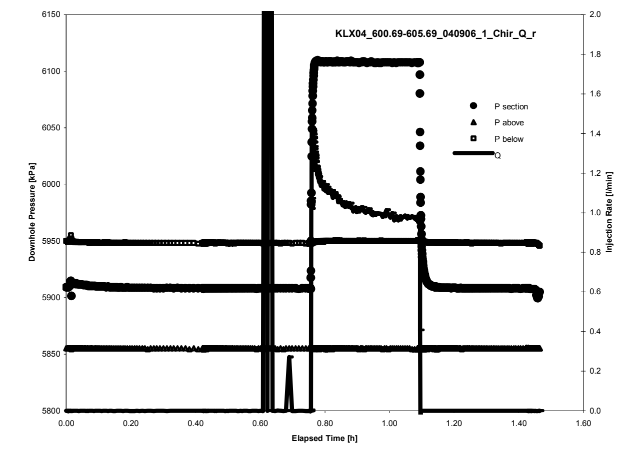
Comments:

Based on the test response (prolonged packer compliance) the interval transmissivity is lower than 1E-11 m2/s.

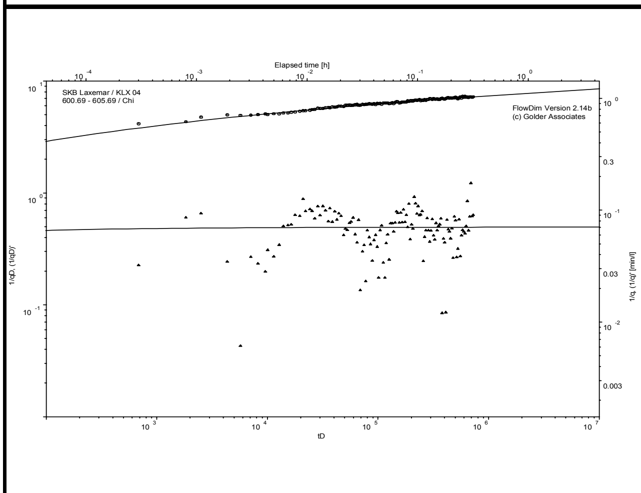
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040906 18:42
Test section from - to (m):	600.69-605.69	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

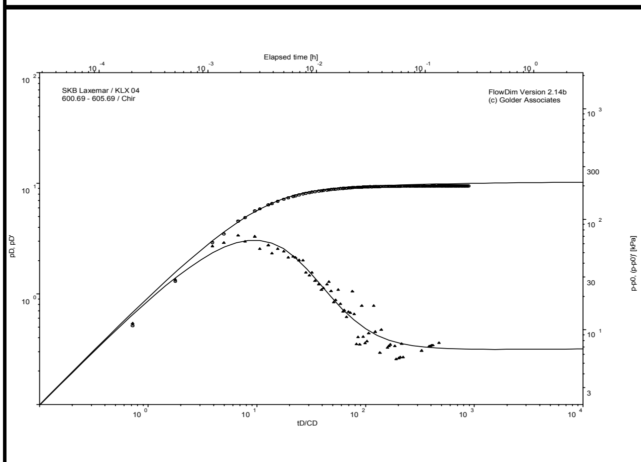
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	5909		
p_i (kPa) =	5908		
p_p(kPa) =	6107	p_F (kPa) =	5908
Q_p (m^3/s)=	1.60E-05		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	16.3		
Derivative fact.=	0.13	Derivative fact.=	0.01
Results		**Results**	
Q/s (m^2/s)=	7.9E-07		
T_M (m^2/s)=	6.5E-07		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	2.83	dt_1 (min) =	3.15
dt_2 (min) =	16.46	dt_2 (min) =	8.04
T (m^2/s) =	9.2E-07	T (m^2/s) =	1.3E-06
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	1.8E-07	K_s (m/s) =	2.6E-07
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	8.4E-10
C_D (-) =	NA	C_D (-) =	9.2E-02
ξ (-) =	0.0	ξ (-) =	3.5
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.			
dt_1 (min) =	2.83	C (m^3/Pa) =	8.4E-10
dt_2 (min) =	16.46	C_D (-) =	9.2E-02
T_T (m^2/s) =	9.2E-07	ξ (-) =	0.0
S (-) =	1.0E-06		
K_s (m/s) =	1.8E-07		
S_s (1/m) =	2.0E-07		

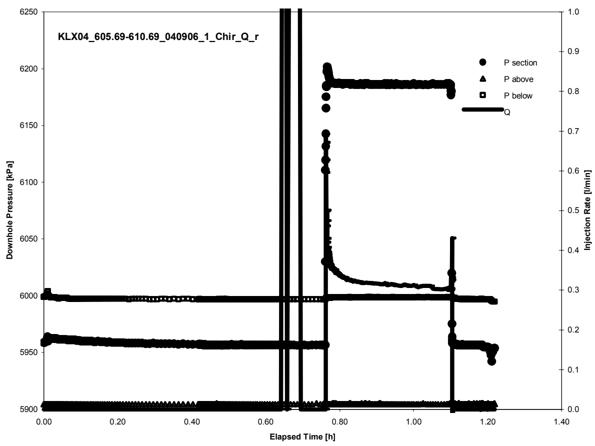
Comments:

The recommended transmissivity of 9.2E-7 m2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 7.0E-7 to 3.0E-6 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 5907.7 kPa.

Test Summary Sheet

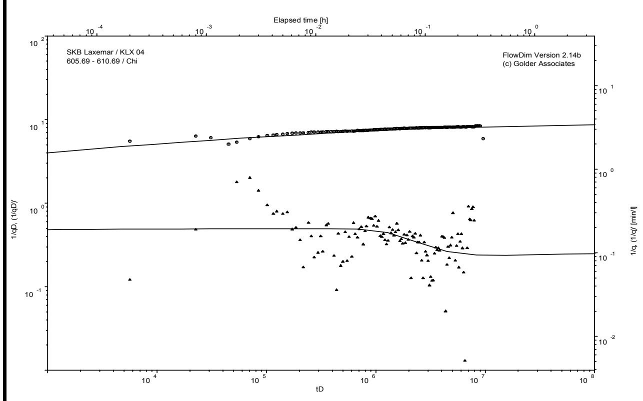
Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040906 20:57
Test section from - to (m):	605.69-610.69	Responsible for test execution:	Jörg Böhner
Section diameter, 2·r_w (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

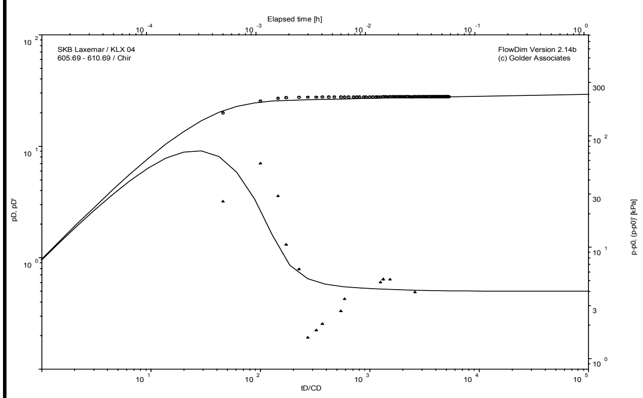


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	5959		
p_i (kPa) =	5956		
p_p(kPa) =	6186	p_F (kPa) =	5956
Q_p (m^3/s)=	5.05E-06		
tp (s) =	1200	t_F (s) =	300
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	16.4		
Derivative fact.=	0.05	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	2.2E-07		
T_M (m^2/s)=	1.8E-07		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.78	dt_1 (min) =	*
dt_2 (min) =	2.33	dt_2 (min) =	*
T (m^2/s) =	2.9E-07	T (m^2/s) =	1.0E-06
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	5.8E-08	K_s (m/s) =	2.1E-07
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	2.7E-11
C_D (-) =	NA	C_D (-) =	2.9E-03
ξ (-) =	1.8	ξ (-) =	21.3
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	0.78	C (m^3/Pa) =	2.7E-11
dt_2 (min) =	2.33	C_D (-) =	2.9E-03
T_T (m^2/s) =	2.9E-07	ξ (-) =	1.8
S (-) =	1.0E-06		
K_s (m/s) =	5.8E-08		
S_s (1/m) =	2.0E-07		

Comments:

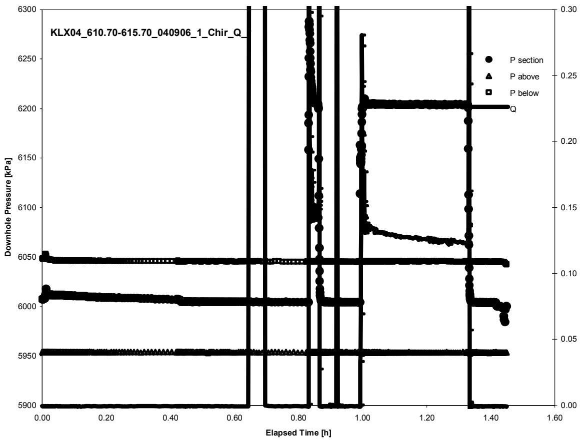
*: IARF not measured

The recommended transmissivity of 2.9E-7 m2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 1.0E-7 to 7.0E-7 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 5956.1 kPa.

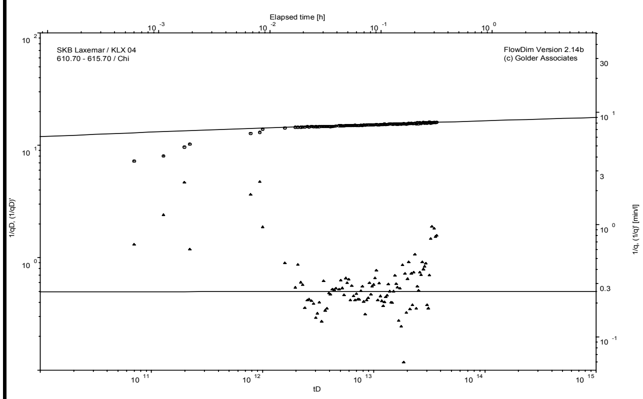
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040906 22:41
Test section from - to (m):	610.70-615.70	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

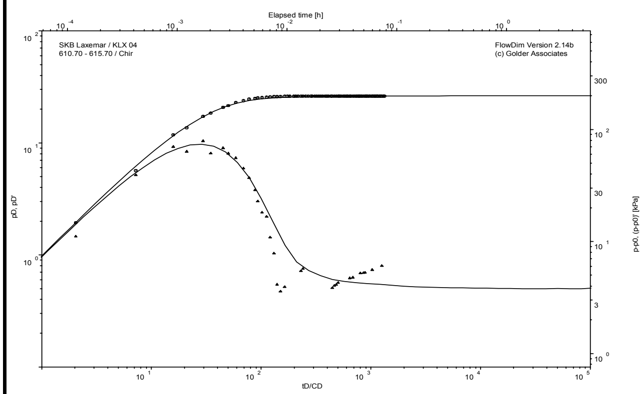
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	6008		
p_i (kPa) =	6004		
p_p(kPa) =	6203	p_F (kPa) =	6003
Q_p (m^3/s)=	2.07E-06		
tp (s) =	1200	t_F (s) =	300
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	16.5		
Derivative fact.=	0.12	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	1.0E-07		
T_M (m^2/s)=	8.4E-08		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	2.03	dt_1 (min) =	1.63
dt_2 (min) =	8.87	dt_2 (min) =	3.59
T (m^2/s) =	2.6E-07	T (m^2/s) =	4.4E-07
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	5.2E-08	K_s (m/s) =	8.9E-08
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	6.0E-11
C_D (-) =	NA	C_D (-) =	6.6E-03
ξ (-) =	9.5	ξ (-) =	20.9
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	2.03	C (m^3/Pa) =	6.0E-11
dt_2 (min) =	8.87	C_D (-) =	6.6E-03
T_T (m^2/s) =	2.6E-07	ξ (-) =	9.5
S (-) =	1.0E-06		
K_s (m/s) =	5.2E-08		
S_s (1/m) =	2.0E-07		

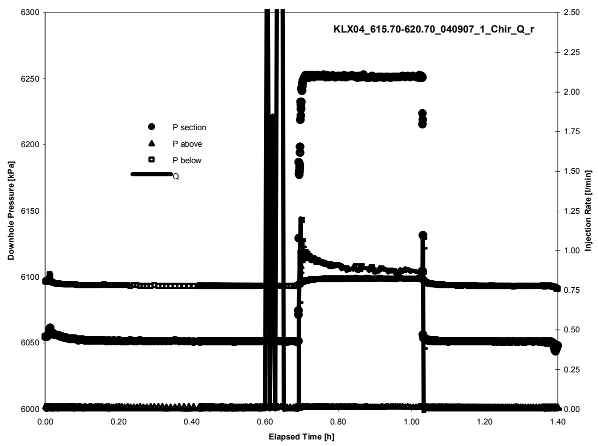
Comments:

The recommended transmissivity of 2.6E-7 m2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 9.0E-8 to 6.0E-7 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 6003.1 kPa.

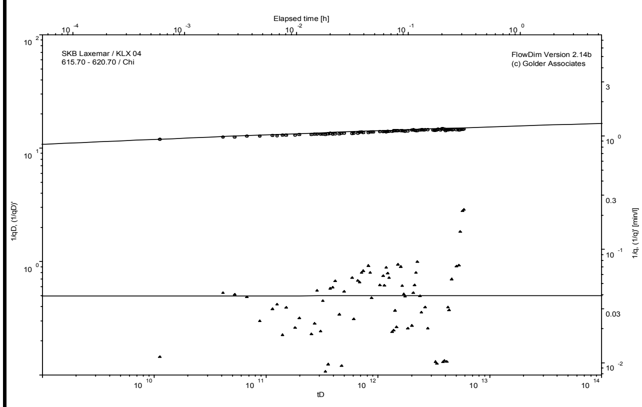
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040907 00:39
Test section from - to (m):	615.70-620.70	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

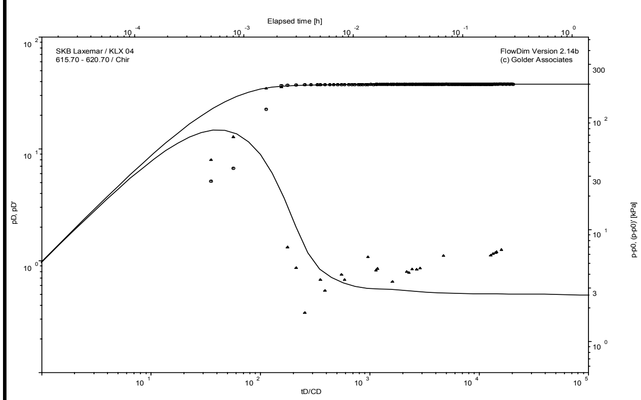
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	6055		
p_i (kPa) =	6052		
p_p(kPa) =	6251	p_F (kPa) =	6051
Q_p (m^3/s)=	1.45E-05		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	16.6		
Derivative fact.=	0.10	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	7.1E-07		
T_M (m^2/s)=	5.9E-07		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	1.03	dt_1 (min) =	0.82
dt_2 (min) =	7.62	dt_2 (min) =	4.00
T (m^2/s) =	1.7E-06	T (m^2/s) =	4.4E-06
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	3.4E-07	K_s (m/s) =	8.9E-07
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.5E-10
C_D (-) =	NA	C_D (-) =	1.6E-02
ξ (-) =	7.7	ξ (-) =	32.0
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	1.03	C (m^3/Pa) =	1.5E-10
dt_2 (min) =	7.62	C_D (-) =	1.6E-02
T_T (m^2/s) =	1.7E-06	ξ (-) =	7.7
S (-) =	1.0E-06		
K_s (m/s) =	3.4E-07		
S_s (1/m) =	2.0E-07		

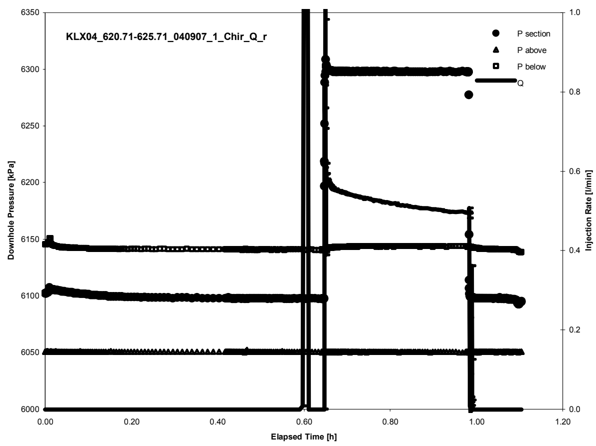
Comments:

The recommended transmissivity of 1.7E-6 m2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 6.0E-7 to 4.0E-6 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 6050.3 kPa

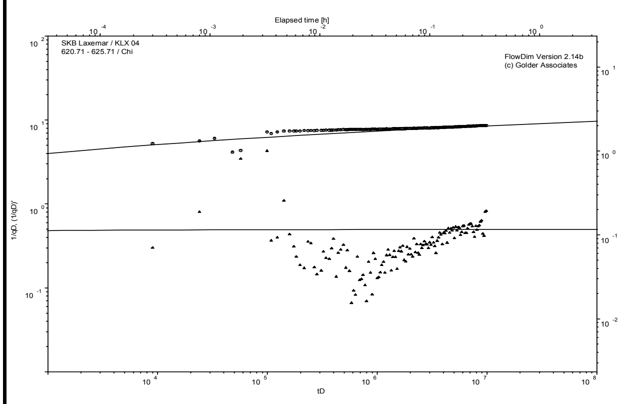
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040907 06:12
Test section from - to (m):	620.71-625.71 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

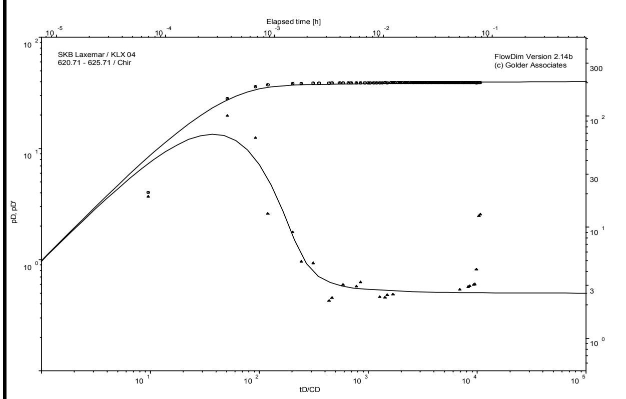
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	6102		
p_i (kPa) =	6097		
p_p(kPa) =	6298	p_F (kPa) =	6098
Q_p (m^3/s)=	8.25E-06		
tp (s) =	1200	t_F (s) =	300
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	16.7		
Derivative fact.=	0.09	Derivative fact.=	0.04
Results		**Results**	
Q/s (m^2/s)=	4.0E-07		
T_M (m^2/s)=	3.3E-07		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	10.61	dt_1 (min) =	0.34
dt_2 (min) =	16.57	dt_2 (min) =	3.02
T (m^2/s) =	5.5E-07	T (m^2/s) =	2.7E-06
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	1.1E-07	K_s (m/s) =	5.3E-07
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	4.5E-11
C_D (-) =	NA	C_D (-) =	4.9E-03
ξ (-) =	1.5	ξ (-) =	32.6
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	10.61	C (m^3/Pa) =	4.5E-11
dt_2 (min) =	16.57	C_D (-) =	4.9E-03
T_T (m^2/s) =	5.5E-07	ξ (-) =	1.5
S (-) =	1.0E-06		
K_s (m/s) =	1.1E-07		
S_s (1/m) =	2.0E-07		

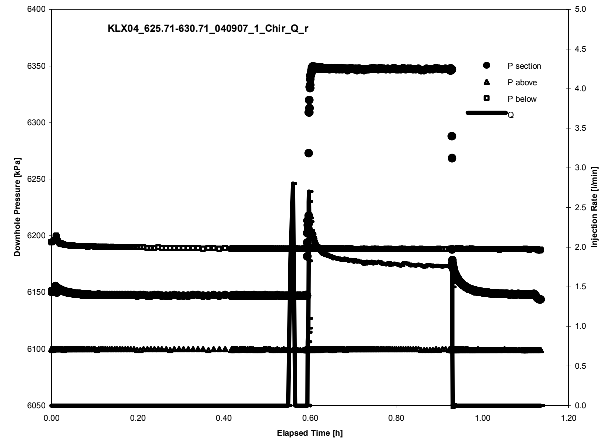
Comments:

The recommended transmissivity of 5.5E-7 m2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 2.0E-7 to 9.0E-7 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 6096.4 kPa.

Test Summary Sheet

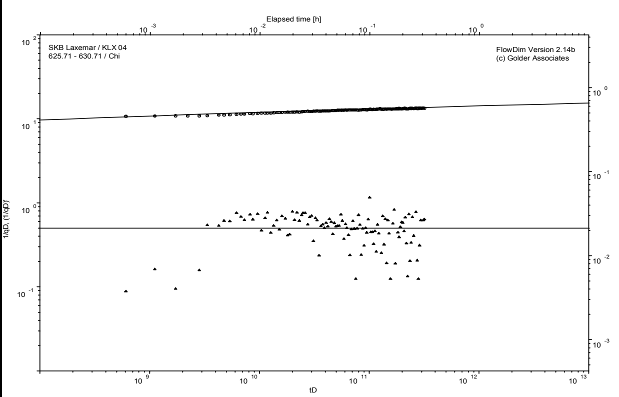
Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040907 07:41
Test section from - to (m):	625.71-630.71 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

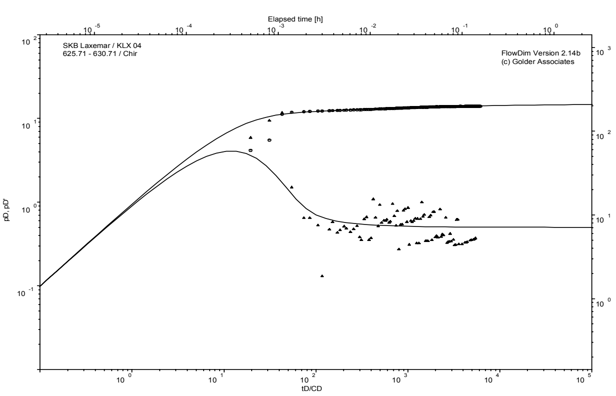


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	6151		
p_i (kPa) =	6147		
p_p(kPa) =	6347	p_F (kPa) =	6148
Q_p (m^3/s)=	2.93E-05		
tp (s) =	1200	t_F (s) =	600
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	16.8		
Derivative fact.=	0.09	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	1.4E-06		
T_M (m^2/s)=	1.2E-06		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	3.70	dt_1 (min) =	0.26
dt_2 (min) =	12.28	dt_2 (min) =	4.45
T (m^2/s) =	3.1E-06	T (m^2/s) =	3.3E-06
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	6.1E-07	K_s (m/s) =	6.7E-07
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	2.0E-10
C_D (-) =	NA	C_D (-) =	2.2E-02
ξ (-) =	5.9	ξ (-) =	6.9
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	3.70	C (m^3/Pa) =	2.0E-10
dt_2 (min) =	12.28	C_D (-) =	2.2E-02
T_T (m^2/s) =	3.1E-06	ξ (-) =	5.9
S (-) =	1.0E-06		
K_s (m/s) =	6.1E-07		
S_s (1/m) =	2.0E-07		

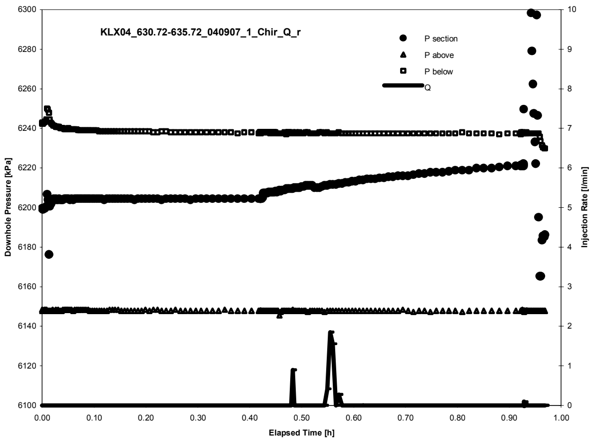
Comments:

The recommended transmissivity of 3.1E-6 m2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 9.0E-7 to 6.0E-6 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 6145.4 kPa.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040907 09:16
Test section from - to (m):	630.72-635.72 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	6199		
p_i (kPa) =	-		
p_p(kPa) =	-	p_F (kPa) =	-
Q_p (m^3/s)=	-		
tp (s) =	-	t_F (s) =	-
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	16.8		
Derivative fact.=	-	Derivative fact.=	-
Results		**Results**	
Q/s (m^2/s)=	NA		
T_M (m^2/s)=	NA		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	-	dt_1 (min) =	-
dt_2 (min) =	-	dt_2 (min) =	-
T (m^2/s) =	NA	T (m^2/s) =	NA
S (-) =	NA	S (-) =	NA
K_s (m/s) =	NA	K_s (m/s) =	NA
S_s (1/m) =	NA	S_s (1/m) =	NA
C (m^3/Pa) =	NA	C (m^3/Pa) =	NA
C_D (-) =	NA	C_D (-) =	NA
ξ (-) =	NA	ξ (-) =	NA
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Log-Log plot incl. derivates- flow period

Not Analysed

Log-Log plot incl. derivatives- recovery period

Not Analysed

Selected representative parameters.

dt_1 (min) =	-	C (m^3/Pa) =	NA
dt_2 (min) =	-	C_D (-) =	NA
T_T (m^2/s) =	NA	ξ (-) =	NA
S (-) =	NA		
K_s (m/s) =	NA		
S_s (1/m) =	NA		

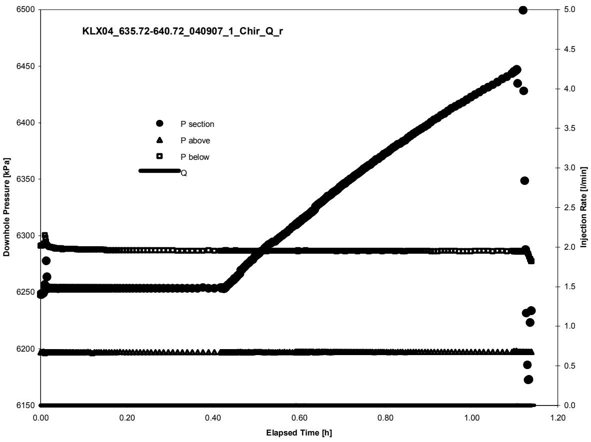
Comments:

Based on the test response (prolonged packer compliance) the interval transmissivity is lower than 1E-11 m2/s.
No further analysis recommended.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	0
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040907 10:44
Test section from - to (m):	635.72-640.72 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	6248		
p_i (kPa) =	-		
p_p(kPa) =	-	p_F (kPa) =	-
Q_p (m^3/s)=	-		
tp (s) =	-	t_F (s) =	-
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	16.9		
Derivative fact.=	-	Derivative fact.=	-
Results		**Results**	
Q/s (m^2/s)=	NA		
T_M (m^2/s)=	NA		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	-	dt_1 (min) =	-
dt_2 (min) =	-	dt_2 (min) =	-
T (m^2/s) =	NA	T (m^2/s) =	NA
S (-) =	NA	S (-) =	NA
K_s (m/s) =	NA	K_s (m/s) =	NA
S_s (1/m) =	NA	S_s (1/m) =	NA
C (m^3/Pa) =	NA	C (m^3/Pa) =	NA
C_D (-) =	NA	C_D (-) =	NA
ξ (-) =	NA	ξ (-) =	NA
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Log-Log plot incl. derivates- flow period

Not Analysed

Log-Log plot incl. derivatives- recovery period

Not Analysed

Selected representative parameters.

dt_1 (min) =	-	C (m^3/Pa) =	NA
dt_2 (min) =	-	C_D (-) =	NA
T_T (m^2/s) =	NA	ξ (-) =	NA
S (-) =	NA		
K_s (m/s) =	NA		
S_s (1/m) =	NA		

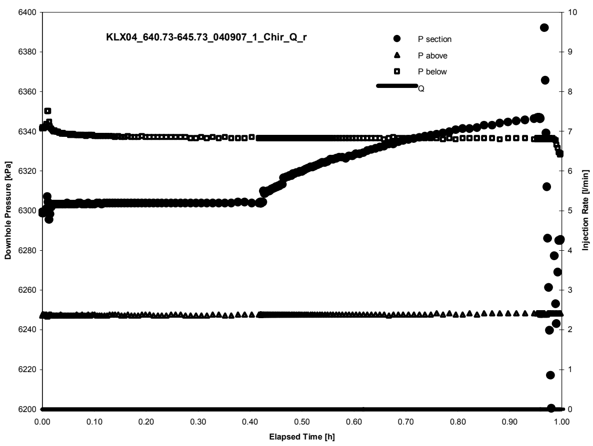
Comments:

Based on the test response (prolonged packer compliance) the interval transmissivity is lower than 1E-11 m2/s.
No further analysis recommended.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040907 12:29
Test section from - to (m):	640.73-645.73 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	6299		
p_i (kPa) =	-		
p_p(kPa) =	-	p_F (kPa) =	-
Q_p (m^3/s)=	-		
tp (s) =	-	t_F (s) =	-
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	17.0		
Derivative fact.=	-	Derivative fact.=	-
Results		**Results**	
Q/s (m^2/s)=	NA		
T_M (m^2/s)=	NA		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	-	dt_1 (min) =	-
dt_2 (min) =	-	dt_2 (min) =	-
T (m^2/s) =	NA	T (m^2/s) =	NA
S (-) =	NA	S (-) =	NA
K_s (m/s) =	NA	K_s (m/s) =	NA
S_s (1/m) =	NA	S_s (1/m) =	NA
C (m^3/Pa) =	NA	C (m^3/Pa) =	NA
C_D (-) =	NA	C_D (-) =	NA
ξ (-) =	NA	ξ (-) =	NA
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Log-Log plot incl. derivates- flow period

Not Analysed

Log-Log plot incl. derivatives- recovery period

Not Analysed

Selected representative parameters.			
dt_1 (min) =	-	C (m^3/Pa) =	NA
dt_2 (min) =	-	C_D (-) =	NA
T_T (m^2/s) =	NA	ξ (-) =	NA
S (-) =	NA		
K_s (m/s) =	NA		
S_s (1/m) =	NA		

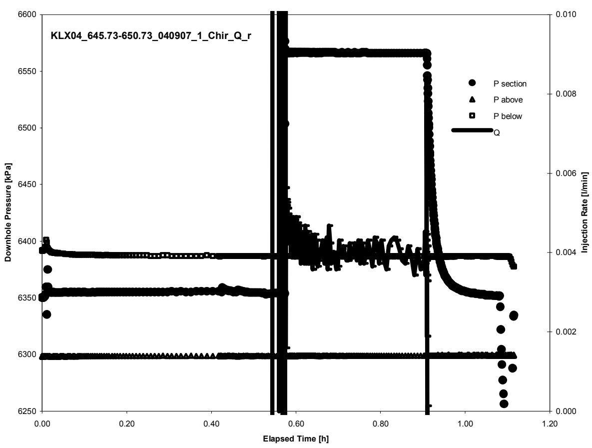
Comments:

Based on the test response (prolonged packer compliance) the interval transmissivity is lower than 1E-11 m2/s.
No further analysis recommended.

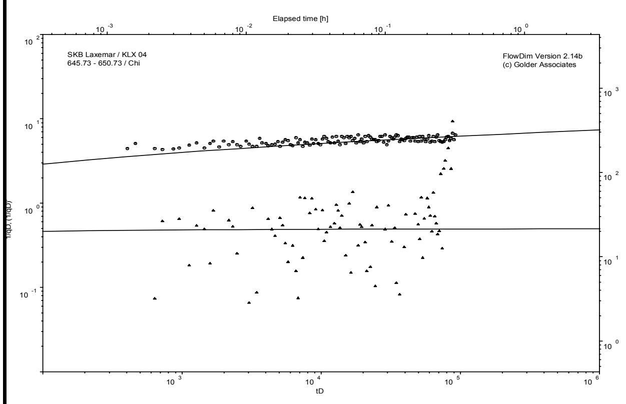
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040907 14:03
Test section from - to (m):	645.73-650.73 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

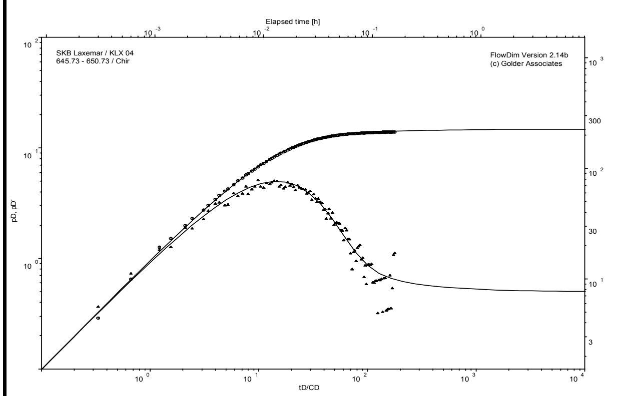
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	6350		
p_i (kPa) =	6354		
p_p(kPa) =	6566	p_F (kPa) =	6352
Q_p (m^3/s)=	6.67E-08		
tp (s) =	1200	t_F (s) =	600
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	17.1		
Derivative fact.=	0.23	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	3.1E-09		
T_M (m^2/s)=	2.5E-09		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.92	dt_1 (min) =	*
dt_2 (min) =	10.33	dt_2 (min) =	*
T (m^2/s) =	2.8E-09	T (m^2/s) =	6.9E-09
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	5.7E-10	K_s (m/s) =	1.4E-09
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.4E-11
C_D (-) =	NA	C_D (-) =	1.6E-03
ξ (-) =	1.9	ξ (-) =	10.1
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.			
dt_1 (min) =	0.92	C (m^3/Pa) =	1.4E-11
dt_2 (min) =	10.33	C_D (-) =	1.6E-03
T_T (m^2/s) =	2.8E-09	ξ (-) =	1.9
S (-) =	1.0E-06		
K_s (m/s) =	5.7E-10		
S_s (1/m) =	2.0E-07		

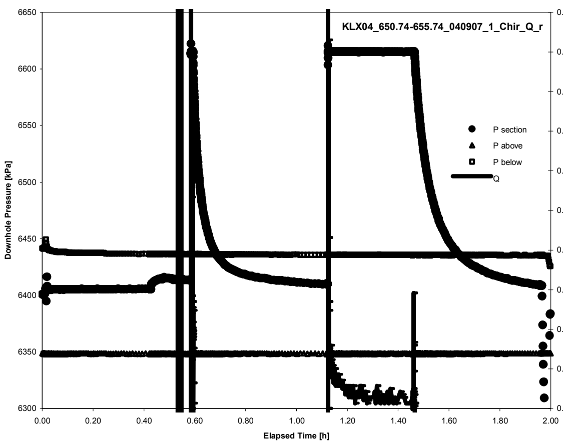
Comments:

The recommended transmissivity of 2.8E-9 m2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 7.0E-10 to 5.0E-9 m2/s. The analysis was conducted assuming a flow dimension of 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 6343.5 kPa.

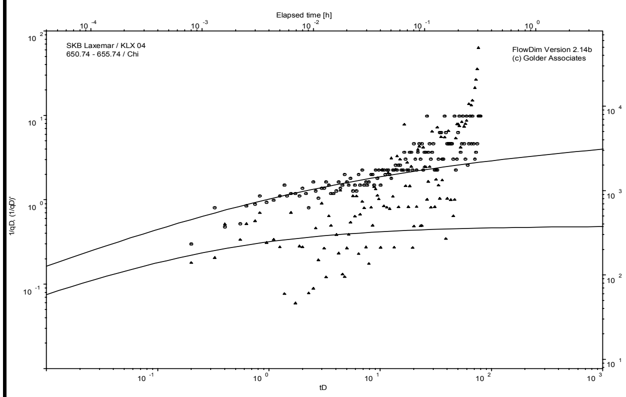
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040907 15:37
Test section from - to (m):	650.74-655.74	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

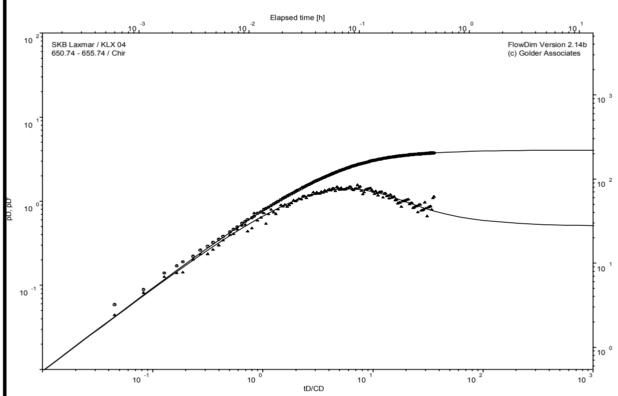
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	6405		
p_i (kPa) =	6410		
p_p(kPa) =	6614	p_F (kPa) =	6408
Q_p (m^3/s)=	5.00E-09		
tp (s) =	1200	t_F (s) =	1800
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	17.1		
Derivative fact.=	0.20	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	2.4E-10		
T_M (m^2/s)=	2.0E-10		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	*	dt_1 (min) =	*
dt_2 (min) =	*	dt_2 (min) =	*
T (m^2/s) =	1.6E-10	T (m^2/s) =	2.0E-10
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	3.3E-11	K_s (m/s) =	4.1E-11
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	6.2E-12
C_D (-) =	NA	C_D (-) =	6.9E-04
ξ (-) =	-0.2	ξ (-) =	1.4
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	*	C (m^3/Pa) =	6.2E-12
dt_2 (min) =	*	C_D (-) =	6.9E-04
T_T (m^2/s) =	2.0E-10	ξ (-) =	1.4
S (-) =	1.0E-06		
K_s (m/s) =	4.1E-11		
S_s (1/m) =	2.0E-07		

Comments:

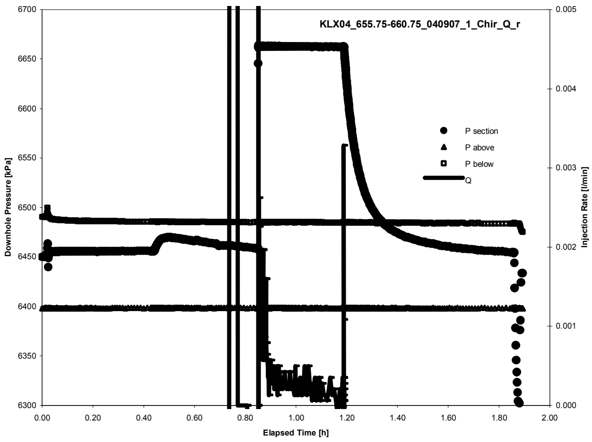
*: IARF not measured

The recommended transmissivity of 2.0E-10 m^2/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. It should be noted that due to the very small transmissivity the results are uncertain..The confidence range for the interval transmissivity is estimated to be 8.0E-11 to 6.0E-10 m^2/s. The analysis was conducted assuming a flow dimension of 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 6387.2 kPa.

Test Summary Sheet

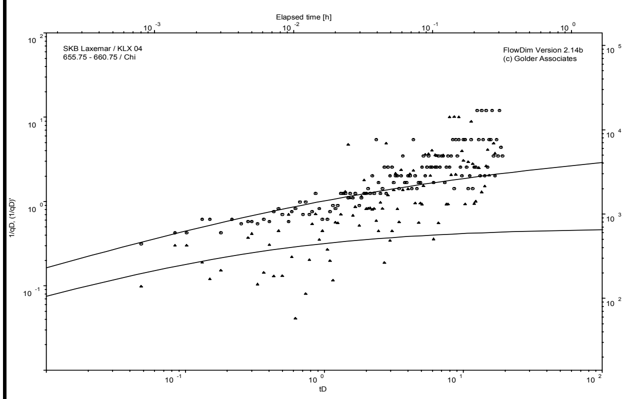
Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040907 18:17
Test section from - to (m):	655.75-660.75 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

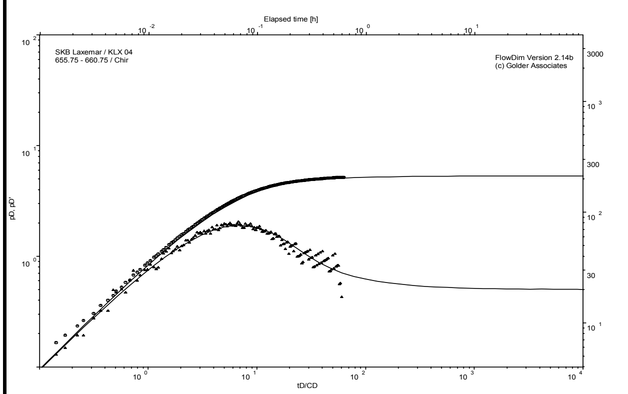


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	6450		
p_i (kPa) =	6458		
p_p(kPa) =	6662	p_F (kPa) =	6455
Q_p (m^3/s)=	3.42E-09		
tp (s) =	1200	t_F (s) =	2400
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	17.2		
Derivative fact.=	0.20	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	1.6E-10		
T_M (m^2/s)=	1.4E-10		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	*	dt_1 (min) =	*
dt_2 (min) =	*	dt_2 (min) =	*
T (m^2/s) =	8.7E-11	T (m^2/s) =	2.1E-10
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	1.7E-11	K_s (m/s) =	4.1E-11
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	4.7E-12
C_D (-) =	NA	C_D (-) =	5.1E-04
ξ (-) =	-0.6	ξ (-) =	4.2
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	*	C (m^3/Pa) =	4.7E-12
dt_2 (min) =	*	C_D (-) =	5.1E-04
T_T (m^2/s) =	2.1E-10	ξ (-) =	4.2
S (-) =	1.0E-06		
K_s (m/s) =	4.1E-11		
S_s (1/m) =	2.0E-07		

Comments:

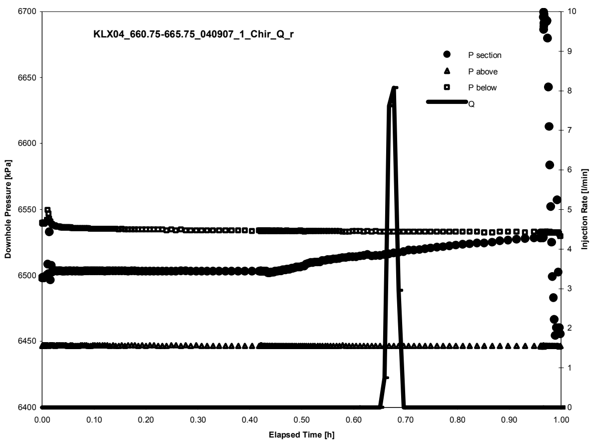
*: IARF not measured

The recommended transmissivity of 2.1E-10 m2/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. It should be noted that due to the very small transmissivity the results are uncertain. The confidence range for the interval transmissivity is estimated to be 7.0E-11 to 6.0E-10 m2/s. The analysis was conducted assuming a flow dimension of 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 6441.5 kPa.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040907 22:36
Test section from - to (m):	660.75-665.75	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	6498		
p_i (kPa) =	-		
p_p(kPa) =	-	p_F (kPa) =	-
Q_p (m^3/s)=	-		
tp (s) =	-	t_F (s) =	-
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	17.3		
Derivative fact.=	-	Derivative fact.=	-
Results		**Results**	
Q/s (m^2/s)=	NA		
T_M (m^2/s)=	NA		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	-	dt_1 (min) =	-
dt_2 (min) =	-	dt_2 (min) =	-
T (m^2/s) =	NA	T (m^2/s) =	NA
S (-) =	NA	S (-) =	NA
K_s (m/s) =	NA	K_s (m/s) =	NA
S_s (1/m) =	NA	S_s (1/m) =	NA
C (m^3/Pa) =	NA	C (m^3/Pa) =	NA
C_D (-) =	NA	C_D (-) =	NA
ξ (-) =	NA	ξ (-) =	NA
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Log-Log plot incl. derivates- flow period

Not Analysed

Log-Log plot incl. derivatives- recovery period

Not Analysed

Selected representative parameters.			
dt_1 (min) =	-	C (m^3/Pa) =	NA
dt_2 (min) =	-	C_D (-) =	NA
T_T (m^2/s) =	NA	ξ (-) =	NA
S (-) =	NA		
K_s (m/s) =	NA		
S_s (1/m) =	NA		

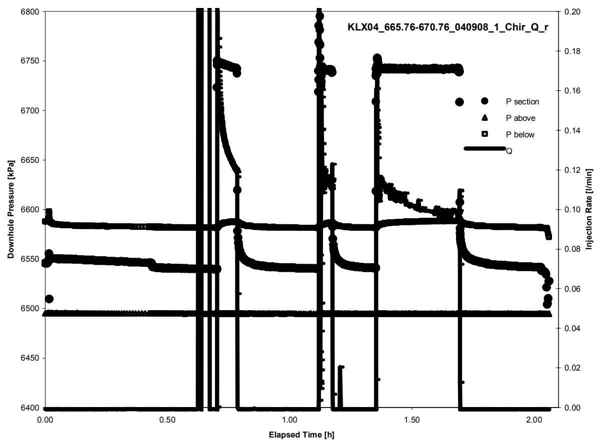
Comments:

Based on the test response (prolonged packer compliance) the interval transmissivity is lower than 1E-11 m2/s.
No further analysis recommended.

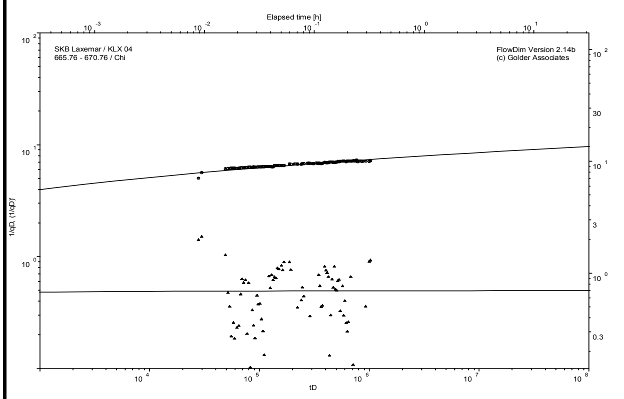
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040908 00:22
Test section from - to (m):	665.76-670.76	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

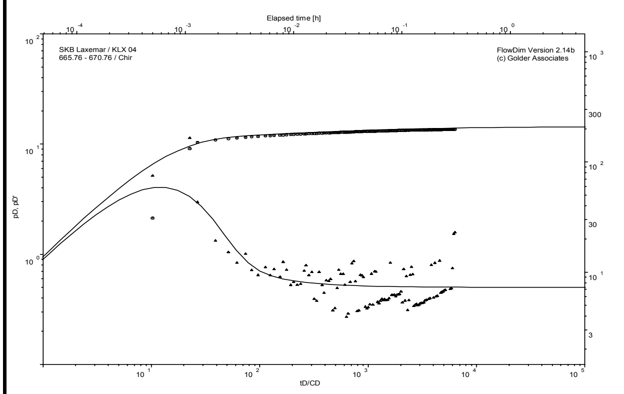
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	6546		
p_i (kPa) =	6540		
p_p(kPa) =	6742	p_F (kPa) =	6541
Q_p (m^3/s)=	1.63E-06		
tp (s) =	19.8	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	17.4		
Derivative fact.=	0.04	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	7.9E-08		
T_M (m^2/s)=	6.5E-08		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	4.68	dt_1 (min) =	0.60
dt_2 (min) =	10.87	dt_2 (min) =	17.11
T (m^2/s) =	9.2E-08	T (m^2/s) =	1.9E-07
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	1.8E-08	K_s (m/s) =	3.7E-08
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	2.1E-11
C_D (-) =	NA	C_D (-) =	2.3E-03
ξ (-) =	1.3	ξ (-) =	8.0
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	0.60	C (m^3/Pa) =	2.1E-11
dt_2 (min) =	17.11	C_D (-) =	2.3E-03
T_T (m^2/s) =	1.9E-07	ξ (-) =	8.0
S (-) =	1.0E-06		
K_s (m/s) =	3.7E-08		
S_s (1/m) =	2.0E-07		

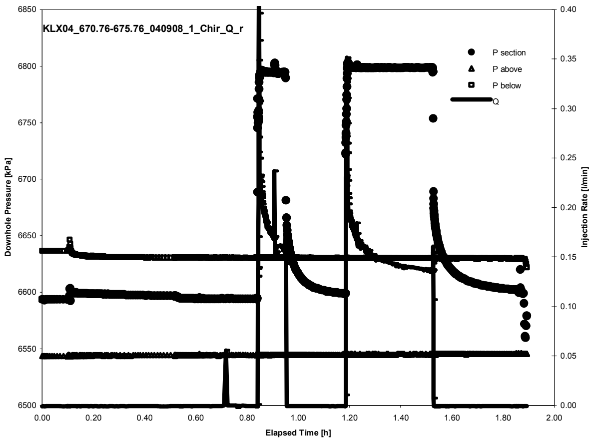
Comments:

The recommended transmissivity of 1.9E-7 m2/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 8.0E-8 to 5.0E-7 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 6538.0 kPa.

Test Summary Sheet

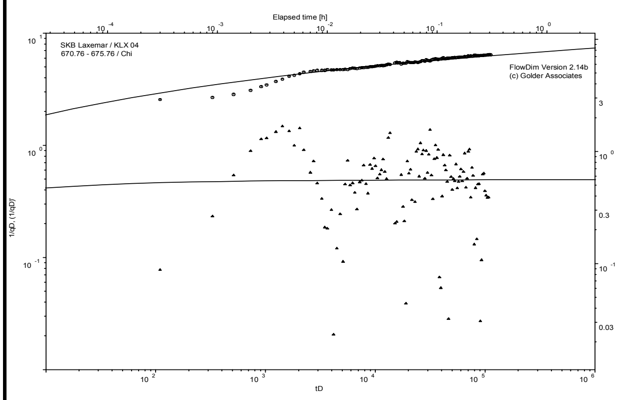
Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040908 10:39
Test section from - to (m):	670.76-675.76	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

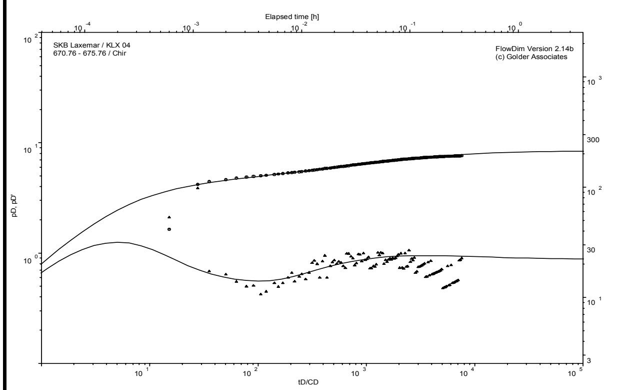


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	6593		
p_i (kPa) =	6599		
p_p(kPa) =	6798	p_F (kPa) =	6601
Q_p (m^3/s)=	2.27E-06		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	17.5		
Derivative fact.=	0.04	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	1.1E-07		
T_M (m^2/s)=	9.2E-08		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	1.18	dt_1 (min) =	0.15
dt_2 (min) =	12.77	dt_2 (min) =	0.37
T (m^2/s) =	1.2E-07	T (m^2/s) =	1.6E-07
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	2.3E-08	K_s (m/s) =	3.1E-08
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.4E-11
C_D (-) =	NA	C_D (-) =	1.6E-03
ξ (-) =	0.1	ξ (-) =	0.9
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	0.15	C (m^3/Pa) =	1.4E-11
dt_2 (min) =	0.37	C_D (-) =	1.6E-03
T_T (m^2/s) =	1.6E-07	ξ (-) =	0.9
S (-) =	1.0E-06		
K_s (m/s) =	3.1E-08		
S_s (1/m) =	2.0E-07		

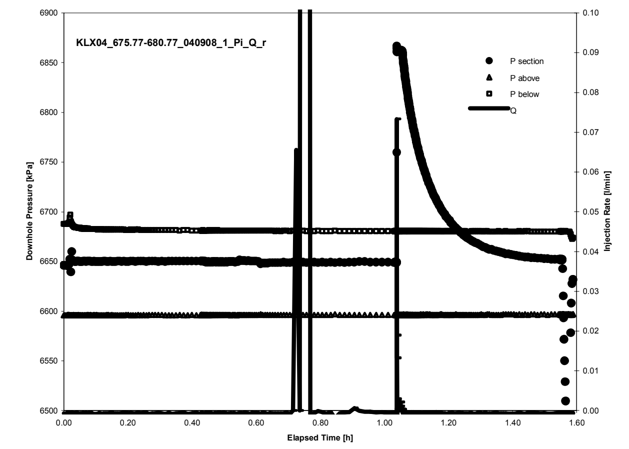
Comments:

The recommended transmissivity of 1.6E-7 m2/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 8.0E-8 to 4.0E-7 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 6591.1 kPa.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Pi
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040908 14:10
Test section from - to (m):	675.77-680.77 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

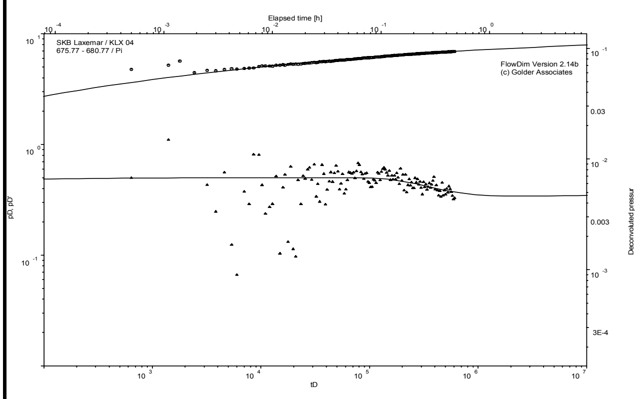


Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	6646		
p_i (kPa) =	6648		
p_p(kPa) =	6861	p_F (kPa) =	6651
Q_p (m^3/s)=	-		
tp (s) =	-	t_F (s) =	1800
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	17.6		
Derivative fact.=	-	Derivative fact.=	0.04
Results		**Results**	
Q/s (m^2/s)=	NA		
T_M (m^2/s)=	NA		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	-	dt_1 (min) =	0.65
dt_2 (min) =	-	dt_2 (min) =	6.93
T (m^2/s) =	NA	T (m^2/s) =	2.7E-10
S (-) =	NA	S (-) =	1.0E-06
K_s (m/s) =	NA	K_s (m/s) =	5.4E-11
S_s (1/m) =	NA	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	8.4E-12
C_D (-) =	NA	C_D (-) =	9.3E-04
ξ (-) =	NA	ξ (-) =	3.8
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Log-Log plot incl. derivates- flow period

Not Analysed

Log-Log plot incl. derivatives- recovery period



Selected representative parameters.			
dt_1 (min) =	0.65	C (m^3/Pa) =	8.4E-12
dt_2 (min) =	6.93	C_D (-) =	9.3E-04
T_T (m^2/s) =	2.7E-10	ξ (-) =	3.8
S (-) =	1.0E-06		
K_s (m/s) =	5.4E-11		
S_s (1/m) =	2.0E-07		

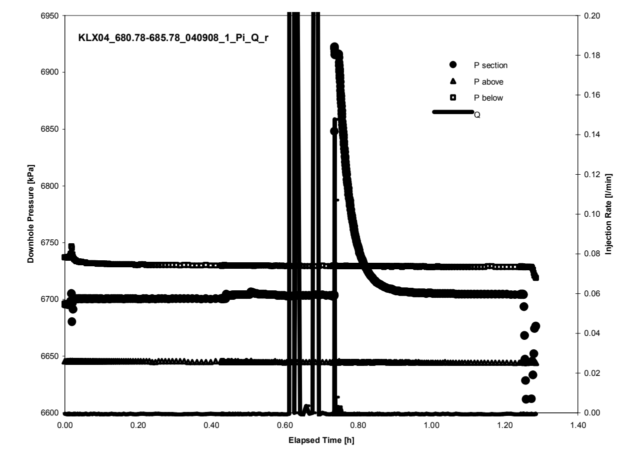
Comments:

The recommended transmissivity of 2.7E-10 m2/s was derived from the analysis of the Pi phase. The confidence range for the interval transmissivity is estimated to be 8.0E-11 to 6.0E-10 m2/s. It should be noted that due to the very low interval transmissivity the results are very uncertain. The flow dimension displayed during the test is 2. No static pressure could be derived.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Pi
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	040908 16:18
Test section from - to (m):	680.78-685.78 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

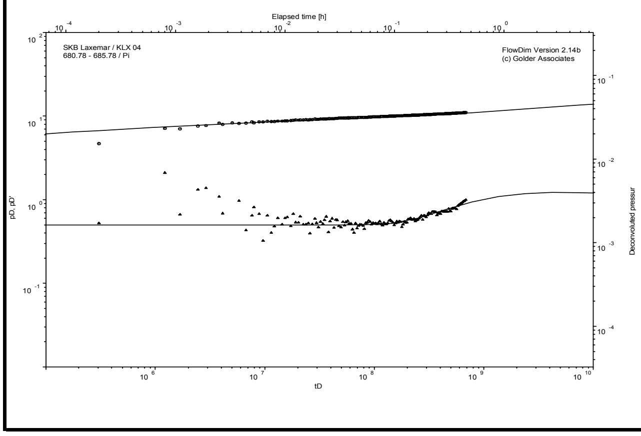


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	6695		
p_i (kPa) =	6703		
p_p(kPa) =	6915	p_F (kPa) =	6703
Q_p (m^3/s)=	-		
tp (s) =	-	t_F (s) =	1800
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	17.7		
Derivative fact.=	-	Derivative fact.=	0.11
Results		**Results**	
Q/s (m^2/s)=	NA		
T_M (m^2/s)=	NA		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	-	dt_1 (min) =	0.56
dt_2 (min) =	-	dt_2 (min) =	5.20
T (m^2/s) =	NA	T (m^2/s) =	3.1E-09
S (-) =	NA	S (-) =	1.0E-06
K_s (m/s) =	NA	K_s (m/s) =	6.2E-10
S_s (1/m) =	NA	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	2.3E-11
C_D (-) =	NA	C_D (-) =	2.6E-03
ξ (-) =	NA	ξ (-) =	6.1
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Log-Log plot incl. derivates- flow period

Not Analysed

Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	0.56	C (m^3/Pa) =	2.3E-11
dt_2 (min) =	5.20	C_D (-) =	2.6E-03
T_T (m^2/s) =	3.1E-09	ξ (-) =	6.1
S (-) =	1.0E-06		
K_s (m/s) =	6.2E-10		
S_s (1/m) =	2.0E-07		

Comments:

The recommended transmissivity of 3.1E-9 m2/s was derived from the analysis of the Pi phase. Considering the inherent uncertainties related to the measurement (e.g. specially the measurement of the wellbore storage coefficient) and to the analysis process (e.g. numeric distortion when calculating the derivative and pressure history effects), the confidence range for the transmissivity is estimated to be 5E-10 to 5E-9 m2/s. The flow dimension displayed during the test is 2. No static pressure could be derived.

APPENDIX 4

Nomenclature

The following symbols are extracted from the more comprehensive list of symbols provided by SKB. Only the symbols that were used or deemed to be used in the future in the context of test analysis are presented.

Character	Explanation	Dimension	Unit
b	Aquifer thickness (Thickness of 2D formation)	[L]	m
L_w	Test section length.	[L]	m
r_w	Borehole, well or soil pipe radius in test section.	[L]	m
r_D	Dimensionless radius, $r_D=r/r_w$	-	-
Q_p	Flow in test section immediately before stop of flow. Stabilised pump flow in flow logging.	$[L^3/T]$	m^3/s
Q_m	Arithmetical mean flow during perturbation phase.	$[L^3/T]$	m^3/s
V	Volume	$[L^3]$	m^3
V_w	Water volume in test section.	$[L^3]$	m^3
V_p	Total water volume injected/pumped during perturbation phase.	$[L^3]$	m^3
t	Time	[T]	hour,min,s
t_0	Duration of rest phase before perturbation phase.	[T]	s
t_p	Duration of perturbation phase. (from flow start as far as p_p).	[T]	s
t_F	Duration of recovery phase (from p_p to p_F).	[T]	s
t_1, t_2 etc	Times for various phases during a hydro test.	[T]	hour,min,s
dt	Running time from start of flow phase and recovery phase respectively.	[T]	s
dt_e	$dt_e = (dt \cdot tp) / (dt + tp)$ Agarwal equivalent time with dt as running time for recovery phase.	[T]	s
t_D	$t_D = T{\cdot}t / (S{\cdot} r_w^2)$. Dimensionless time	-	-
p	Static pressure; including non-dynamic pressure which depends on water velocity. Dynamic pressure is normally ignored in estimating the potential in groundwater flow relations.	$[M/(LT)^2]$	kPa
p_a	Atmospheric pressure	$[M/(LT)^2]$	kPa
p_t	Absolute pressure; $p_t=p_a+p_g$	$[M/(LT)^2]$	kPa
p_g	Gauge pressure; Difference between absolute pressure and atmospheric pressure.	$[M/(LT)^2]$	kPa
p_0	Initial pressure before test begins, prior to packer expansion.	$[M/(LT)^2]$	kPa
p_i	Pressure in measuring section before start of flow.	$[M/(LT)^2]$	kPa
p_f	Pressure during perturbation phase.	$[M/(LT)^2]$	kPa
p_s	Pressure during recovery.	$[M/(LT)^2]$	kPa
p_p	Pressure in measuring section before flow stop.	$[M/(LT)^2]$	kPa
p_F	Pressure in measuring section at end of recovery.	$[M/(LT)^2]$	kPa
p_D	$p_D=2\pi{\cdot}T{\cdot}p/(Q{\cdot}\rho_w g)$, Dimensionless pressure	-	-
dp	Pressure difference, drawdown of pressure surface between two points of time.	$[M/(LT)^2]$	kPa
dp_f	$dp_f = p_i - p_f$ or $= p_f - p_i$, drawdown/pressure increase of pressure surface between two points of time during perturbation phase. dp_f usually expressed positive.	$[M/(LT)^2]$	kPa
dp_s	$dp_s = p_s - p_p$ or $= p_p - p_s$, pressure increase/drawdown of pressure surface between two points of time during recovery phase. dp_s usually expressed positive.	$[M/(LT)^2]$	kPa
dp_p	$dp_p = p_i - p_p$ or $= p_p - p_i$, **maximal** pressure increase/drawdown of pressure surface between two points of time during perturbation phase. dp_p expressed positive.	$[M/(LT)^2]$	kPa
dp_F	$dp_F = p_p - p_F$ or $= p_F - p_p$, **maximal** pressure increase/drawdown of pressure surface between two points of time during recovery phase. dp_F expressed positive.	$[M/(LT)^2]$	kPa

H	Total head; (potential relative a reference level) (indication of h for phase as for p). $H=h_e+h_p+h_v$	[L]	m
h	Groundwater pressure level (hydraulic head (piezometric head; possible to use for level observations in boreholes, static head)); (indication of h for phase as for p). $h=h_e+h_p$	[L]	m
h_e	Height of measuring point (Elevation head); Level above reference level for measuring point.	[L]	m
s_p	Drawdown in measuring section before flow stop.	[L]	m
h_0	Initial above reference level before test begins, prior to packer expansion.	[L]	m
h_i	Level above reference level in measuring section before start of flow.	[L]	m
h_f	Level above reference level during perturbation phase.	[L]	m
h_s	Level above reference level during recovery phase.	[L]	m
h_p	Level above reference level in measuring section before flow stop.	[L]	m
h_F	Level above reference level in measuring section at end of recovery.	[L]	m
dh	Level difference, drawdown of water level between two points of time.	[L]	m
dh_f	$dh_f = h_i - h_f$ or $= h_f - h_i$, drawdown/pressure increase of pressure surface between two points of time during perturbation phase. dh_f usually expressed positive.	[L]	m
dh_s	$dh_s = h_s - h_p$ or $= h_p - h_s$, pressure increase/drawdown of pressure surface between two points of time during recovery phase. dh_s usually expressed positive.	[L]	m
dh_p	$dh_p = h_i - h_p$ or $= h_p - h_i$, maximal pressure increase/drawdown of pressure surface between two points of time during perturbation phase. dh_p expressed positive.	[L]	m
dh_F	$dh_F = h_p - h_F$ or $= h_F - h_p$, maximal pressure increase/drawdown of pressure surface between two points of time during perturbation phase. dh_F expressed positive.	[L]	m
Te_w	Temperature in the test section (taken from temperature logging). Temperature		^oC
Te_{w0}	Temperature in the test section during undisturbed conditions (taken from temperature logging). Temperature		^oC
g	Constant of gravitation (9.81 $m*s^{-2}$) (Acceleration due to gravity)	$[L/T^2]$	m/s^2
π	Constant (approx 3.1416).	[-]	
r	Residual. $r= p_c-p_m$, $r= h_c-h_m$, etc. Difference between measured data (p_m, h_m, etc) and estimated data (p_c, h_c, etc)		
Q/s	Specific capacity $s=dp_p$ or $s=s_p=h_0-h_p$ (open borehole)	$[L^2/T]$	m^2/s
D	Interpreted flow dimension according to Barker, 1988.	[-]	-
dt_1	Time of starting for semi-log or log-log evaluated characteristic counted from start of flow phase and recovery phase respectively.	[T]	s
dt_2	End of time for semi-log or log-log evaluated characteristic counted from start of flow phase and recovery phase respectively.	[T]	s
T	Transmissivity	$[L^2/T]$	m^2/s
T_M	Transmissivity according to Moye (1967)	$[L^2/T]$	m^2/s
T_S	Transmissivity evaluated from slug test	$[L^2/T]$	m^2/s
T_{Sf}, T_{Lf}	Transient evaluation based on semi-log or log-log diagram for perturbation phase in injection or pumping.	$[L^2/T]$	m^2/s
T_{Ss}, T_{Ls}	Transient evaluation based on semi-log or log-log diagram for recovery phase in injection or pumping.	$[L^2/T]$	m^2/s

T_T	Transient evaluation (log-log or lin-log). Judged best evaluation of T_{Sf}, T_{Lf}, T_{Ss}, T_{Ls}	$[L^2/T]$	m^2/s
T_{NLR}	Evaluation based on non-linear regression.	$[L^2/T]$	m^2/s
S	Storage coefficient, (Storativity)	[-]	-
S*	Assumed storage coefficient	[-]	-
S_f	Fracture storage coefficient	[-]	-
S_m	Matrix storage coefficient	[-]	-
S_{NLR}	Storage coefficient, evaluation based on non-linear regression	[-]	-
S_s	Specific storage coefficient; confined storage.	[1/L]	1/m
S_s*	Assumed specific storage coefficient; confined storage.	[1/L]	1/m
ξ	Skin factor	[-]	-
ξ*	Assumed skin factor	[-]	-
C	Wellbore storage coefficient	$[(LT^2)\cdot M^2]$	m^3/Pa
C_D	$C_D = C\cdot\rho_w g/(2\pi\cdot S\cdot r_w^2)$, Dimensionless wellbore storage coefficient	[-]	-
ω	$\omega = S_f/(S_f + S_m)$, storage ratio (Storativity ratio); the ratio of storage coefficient between that of the fracture and total storage.	[-]	-
λ	$\lambda = \alpha\cdot(K_m/K_f)\cdot r_w^2$ interporosity flow coefficient.	[-]	-
T_{GRF}	Transmissivity interpreted using the GRF method	$[L^2/T]$	m^2/s
S_{GRF}	Storage coefficient interpreted using the GRF method	[1/L]	1/m
D_{GRF}	Flow dimension interpreted using the GRF method	[-]	-
c_w	Water compressibility; corresponding to β in hydrogeological literature.	$[(LT^2)/M]$	1/Pa
c_r	Pore-volume compressibility, (rock compressibility); Corresponding to α/n in hydrogeological literature.	$[(LT^2)/M]$	1/Pa
c_t	$c_t = c_r + c_w$, total compressibility; compressibility per volumetric unit of rock obtained through multiplying by the total porosity, n. (Presence of gas or other fluids can be included in c_t if the degree of saturation (volume of respective fluid divided by n) of the pore system of respective fluid is also included)	$[(LT^2)/M]$	1/Pa
n	Total porosity	-	-
ρ	Density	$[M/L^3]$	$kg/(m^3)$
ρ_w	Fluid density in measurement section during pumping/injection	$[M/L^3]$	$kg/(m^3)$
μ	Dynamic viscosity	[M/LT]	Pa s
μ_w	Dynamic viscosity (Fluid density in measurement section during pumping/injection)	[M/LT]	Pa s

(Simplified version v1.2)

SICADA/Data Import Template

File Identity	
Created By	Reinder van der Wall
Created	2004-10-07 16:14

Activity Type	KLX04 KLX04 - Injection test	**Project**	AP PS 400-04-75

Activity Information						Additional Activity Data						
						C10	P20	P200	P220	R110	R25	R90
Idcode	**Start Date**	**Stop Date**	**Secup (m)**	**Seclow (m)**	**Section No**	**Company**	**Field crew manager**	**Field crew**	**Person evaluating data**	**Field Notes ID**	**Report**	**Quality plan**
KLX04	2004-08-17 09:00	2004-09-08 19:00	105,11	986,11		Golder	Nils Rahm, Jörg Böhner, Stephan Rohs	Nils Rahm, Jörg Böhner, Stephan Rohs, Tomas Cronquist, Karsten Ebeling, Matthäus Zieger	Cristian Enachescu, Jörg Böhner, Stephan Rohs			

Instructions

SICADA Data Import Template (simplified version)

This template should be used to supply information for the creation of new activities of a certain type (activity type), along with associated measurement data, in the SICADA database.

Information about the selected activity type that this template is intended for is included at the top of this worksheet.

Cells that have a red marker in its upper right corner have a description associated with it. Either select or move the mouse over the cell to see the text.

The Activity Data Sheet

For each activity to be created, supply information in the columns Idcode, Start Date, Stop Date, Secup, Seclow and Section No.

Additional activity attributes should be provided for each created activity. Please enter the appropriate activity attributes for each activity with appropriate information.

The selected set of additional activity attributes included in this file is choosen when this file is generated from SICADA.

The Data Table Sheet(s)

Measurement data associated to each created activity can be supplied. Each data table has its own worksheet in this Excel workbook.

The selected set of tables (and columns) included in this file is choosen when this file is generated from SICADA. The pre-filled set of tables (worksheets) and columns should not be altered to guarantee that this file can be imported to SICADA when completed.

Each entered data row must be connected to an activity. The connection is done by supplying values for idcode, start_date, stop_date, secup, seclow and section_no on each data row. It is convenient to copy these values from the corresponding activity row in the Activity Data worksheet.

Information about each table and its columns can be found in the respective worksheet.

List of idcodes and possibly other check values follows below - please do NOT edit.

idcode

Table	plu_s_hole_test_d
	PLU Injection and pumping, General information

Column	Datatype	Unit	Column Description
site	CHAR		Investigation site name
activity_type	CHAR		Activity type code
start_date	DATE		Date (yymmdd hh:mm:ss)
stop_date	DATE		Date (yymmdd hh:mm:ss)
project	CHAR		project code
idcode	CHAR		Object or borehole identification code
secup	FLOAT	m	Upper section limit (m)
seclow	FLOAT	m	Lower section limit (m)
section_no	INTEGER	number	Section number
test_type	CHAR		Test type code (1-7), see table description
formation_type	CHAR		1: Rock, 2: Soil (superficial deposits)
start_flow_period	DATE	yyyymmdd	Date & time of pumping/injection start (YYYY-MM-DD hh:mm:ss)
stop_flow_period	DATE	yyyymmdd	Date & time of pumping/injection stop (YYYY-MM-DD hh:mm:ss)
mean_flow_rate_qm	FLOAT	m**3/s	Arithmetic mean flow rate of the pumping/injection
flow_rate_end_qp	FLOAT	m**3/s	Flow rate at the end of the flowing period
value_type_qp	CHAR		0:true value,-1<lower meas.limit1:>upper meas.limit
q_measl__l	FLOAT	m**3/s	Estimated lower measurement limit of flow rate
q_measl__u	FLOAT	m**3/s	Estimated upper measurement limit of flow rate
tot_volume_vp	FLOAT	m**3	Total volume of pumped(positive) or injected(negative) water
dur_flow_phase_tp	FLOAT	s	Time for the flowing phase of the test
dur_rec_phase_tf	FLOAT	s	Time for the recovery phase of the test
initial_head_hi	FLOAT	m	Initial formation head, see table description
head_at_flow_end_h	FLOAT	m	Hydraulic head at end of flow phase, see table description
final_head_hf	FLOAT	m	Hydraulic head at end of recovery phase,see table descript.
initial_press_pi	FLOAT	kPa	Initial formation pressure. Actual formation pressure
press_at_flow_end_p	FLOAT	kPa	Pressure at the end of flow phase, see table description.
final_press_pf	FLOAT	kPa	Final pressure at the end of the recovery, see table descr.
fluid_temp_tew	FLOAT	oC	Section fluid temperature, see table description
fluid_elcond_ecw	FLOAT	mS/m	Section fluid el. conduvtivity,see table description
fluid_salinity_tdsw	FLOAT	mg/l	Total salinity of section fluid based on EC,see table descr.
fluid_salinity_tdswm	FLOAT	mg/l	Tot. section fluid salinity based on water sampling,see...
reference	CHAR		SKB report No for reports describing data and evaluation
comments	VARCHAR		Short comment to data
error_flag	CHAR		If error_flag = "*" then an error occured and an error
in_use	CHAR		If in_use = "*" then the activity has been selected as
sign	CHAR		Signature for QA data accknowledge (QA - OK)
lp	FLOAT	m	Hydraulic point of application

KLX04

idcode	start_date	stop_date	secup	seclow	section_no	test_type	formation_type	start_flow_period	stop_flow_period	mean_flow_rate_qm	flow_rate_end_qp	value_type_qp	q_measl__l	q_measl__u	tot_volume_vp
KLX04	2004-08-20 10:27:00	2004-08-20 12:44:00	105,11	205,11		3	1	2004-08-20 11:42:26	2004-08-20 12:12:41	1,74E-04	1,68E-04	0	1,6667E-08	8,3333E-04	3,14E-01
KLX04	2004-08-20 16:11:00	2004-08-20 17:40:00	205,34	305,34		3	1	2004-08-20 16:58:23	2004-08-20 17:28:38	4,93E-04	4,60E-04	0	1,6667E-08	8,3333E-04	1,13E+00
KLX04	2004-08-21 08:14:00	2004-08-21 10:33:00	305,41	405,41		3	1	2004-08-21 09:30:55	2004-08-21 10:01:12	1,72E-04	1,64E-04	0	1,6667E-08	8,3333E-04	3,10E-01
KLX04	2004-08-21 11:48:00	2004-08-21 13:37:00	405,49	505,49		3	1	2004-08-21 12:50:05	2004-08-21 13:20:25	8,76E-06	8,41E-06	0	1,6667E-08	8,3333E-04	1,58E-02
KLX04	2004-08-21 14:57:00	2004-08-21 16:40:00	505,55	605,55		3	1	2004-08-21 15:48:02	2004-08-21 16:18:18	6,18E-05	5,78E-05	0	1,6667E-08	8,3333E-04	1,11E-01
KLX04	2004-08-22 08:12:00	2004-08-22 10:00:00	605,69	705,69		3	1	2004-08-22 09:03:35	2004-08-22 09:33:53	4,78E-05	4,60E-05	0	1,6667E-08	8,3333E-04	8,60E-02
KLX04	2004-08-22 11:37:00	2004-08-22 13:58:00	705,81	805,81		4	1	2004.08.22 12;24:16	2004-08-22 12:24:36	-	-	-1	1,6667E-08	8,3333E-04	-
KLX04	2004-08-22 15:17:00	2004-08-22 17:25:00	805,98	905,98		3	1	2004-08-22 16:08:56	2004-08-22 16:54:23	1,01E-06	8,57E-07	0	1,6667E-08	8,3333E-04	2,73E-03
KLX04	2004-08-23 08:00:00	2004-08-23 09:51:00	886,11	986,11		3	1	2004-08-23 08:49:50	2004-08-23 09:20:11	1,50E-05	1,49E-05	0	1,6667E-08	8,3333E-04	2,69E-02
KLX04	2004-08-24 07:29:00	2004-08-24 08:56:00	105,21	125,21		3	1	2004-08-24 08:14:56	2004-08-24 08:35:12	5,23E-05	5,00E-05	0	1,6667E-08	8,3333E-04	6,28E-02
KLX04	2004-08-24 09:54:00	2004-08-24 11:20:00	125,25	145,25		3	1	2004-08-24 10:38:02	2004-08-24 10:58:26	3,13E-06	3,05E-06	0	1,6667E-08	8,3333E-04	3,76E-03
KLX04	2004-08-24 21:02:00	2004-08-24 22:45:00	145,30	165,30		3	1	2004-08-24 22:03:09	2004-08-24 22:23:32	8,02E-07	7,20E-07	0	1,6667E-08	8,3333E-04	9,62E-04
KLX04	2004-08-24 23:44:00	2004-08-25 01:17:00	165,30	185,30		3	1	2004-08-25 00:35:37	2004-08-25 00:55:55	9,70E-06	8,97E-06	0	1,6667E-08	8,3333E-04	1,16E-02
KLX04	2004-08-25 06:35:00	2004-08-25 08:06:00	185,32	205,32		3	1	2004-08-25 07:24:25	2004-08-25 07:44:44	1,05E-04	9,69E-05	0	1,6667E-08	8,3333E-04	1,25E-01
KLX04	2004-08-25 08:49:00	2004-08-25 10:25:00	205,34	225,34		3	1	2004-08-25 09:44:02	2004-08-25 10:04:17	4,84E-04	4,67E-04	0	1,6667E-08	8,3333E-04	5,80E-01
KLX04	2004-08-30 05:53:00	2004-08-30 07:04:00	225,35	245,35		3	1	2004-08-30 06:32:00	2004-08-30 06:52:23	1,58E-05	1,37E-05	0	1,6667E-08	8,3333E-04	1,89E-02
KLX04	2004-08-30 07:53:00	2004-08-30 09:17:00	245,38	265,38		3	1	2004-08-30 08:34:57	2004-08-30 08:55:15	2,85E-04	2,73E-04	0	1,6667E-08	8,3333E-04	3,42E-01
KLX04	2004-08-30 09:53:00	2004-08-30 10:59:00	265,38	285,38		3	1	2004-08-30 10:29:15	2004-08-30 10:49:28	9,62E-06	9,17E-06	0	1,6667E-08	8,3333E-04	1,15E-02
KLX04	2004-08-25 22:12:00	2004-08-26 01:14:00	285,40	305,40		3	1	2004-08-26 00:26:00	2004-08-26 00:52:20	4,60E-04	4,12E-04	0	1,6667E-08	8,3333E-04	7,18E-01
KLX04	2004-08-26 02:27:00	2004-08-26 03:59:00	305,41	325,41		3	1	2004-08-26 03:21:52	2004-08-26 03:42:12	6,27E-06	5,80E-06	0	1,6667E-08	8,3333E-04	7,52E-03
KLX04	2004-08-26 06:30:00	2004-08-26 07:55:00	325,44	345,44		3	1	2004-08-26 07:18:17	2004-08-26 07:38:44	3,52E-06	2,43E-06	0	1,6667E-08	8,3333E-04	4,22E-03
KLX04	2004-08-26 08:37:00	2004-08-26 09:59:00	345,44	365,44		3	1	2004-08-26 09:17:04	2004-08-26 09:37:29	1,63E-04	1,56E-04	0	1,6667E-08	8,3333E-04	1,95E-01
KLX04	2004-08-26 10:38:00	2004-08-26 12:11:00	365,47	385,47		3	1	2004-08-26 11:29:44	2004-08-26 11:50:06	7,25E-06	6,80E-06	0	1,6667E-08	8,3333E-04	8,70E-03
KLX04	2004-08-26 14:00:00	2004-08-26 15:52:00	385,47	405,47		3	1	2004-08-26 15:10:51	2004-08-26 15:31:20	1,28E-07	1,07E-07	0	1,6667E-08	8,3333E-04	1,54E-04
KLX04	2004-08-26 16:37:00	2004-08-26 18:31:00	405,49	425,49		3	1	2004-08-26 17:49:03	2004-08-26 18:09:22	7,33E-06	7,17E-06	0	1,6667E-08	8,3333E-04	8,80E-03
KLX04	2004-08-26 19:32:00	2004-08-26 17:56:00	425,51	445,51		3	1	2004-08-26 20:20:37	2004-08-26 20:41:00	1,13E-06	1,00E-06	0	1,6667E-08	8,3333E-04	1,36E-03
KLX04	2004-08-30 16:11:00	2004-08-30 17:46:00	445,50	465,50		3	1	2004-08-30 16:49:39	2004-08-30 17:09:58	7,27E-08	5,23E-08	0	1,6667E-08	8,3333E-04	8,72E-05
KLX04	2004-08-27 00:32:00	2004-08-27 02:22:00	465,52	485,52		3	1	2004-08-27 01:39:56	2004-08-27 02:00:23	6,50E-07	5,33E-07	0	1,6667E-08	8,3333E-04	7,80E-04
KLX04	2004-08-27 06:38:00	2004-08-27 08:29:00	485,52	505,52		4	1	2004-08-27 07:26:53	-	-	-	-1	1,6667E-08	8,3333E-04	-
KLX04	2004-08-27 09:11:00	2004-08-27 10:42:00	505,55	525,55		3	1	2004-08-27 10:00:59	2004-08-27 10:21:18	3,21E-05	3,08E-05	0	1,6667E-08	8,3333E-04	3,85E-02
KLX04	2004-08-27 11:14:00	2004-08-27 14:13:00	525,58	545,58		4	1	2004-08-27 13:11:31	2004-08-27 13:11:41	-	-	-1	1,6667E-08	8,3333E-04	-
KLX04	2004-08-27 19:34:00	2004-08-27 20:42:00	545,62	565,62		3	1	2004-08-27 19:50:18	2004-08-27 20:10:51	7,63E-08	5,72E-08	0	1,6667E-08	8,3333E-04	9,16E-05
KLX04	2004-08-27 21:41:00	2004-08-27 23:14:00	565,64	585,64		3	1	2004-08-27 22:42:05	2004-08-27 23:02:29	1,06E-05	1,00E-05	0	1,6667E-08	8,3333E-04	1,27E-02
KLX04	2004-08-28 00:07:00	2004-08-28 01:30:00	585,65	605,65		3	1	2004-08-28 00:58:22	2004-08-28 01:18:44	2,27E-05	2,07E-05	0	1,6667E-08	8,3333E-04	2,72E-02
KLX04	2004-08-28 02:17:00	2004-08-28 03:46:00	605,69	625,69		3	1	2004-08-28 03:04:45	2004-08-28 03:25:06	3,45E-05	3,28E-05	0	1,6667E-08	8,3333E-04	4,14E-02
KLX04	2004-08-28 06:37:00	2004-08-28 07:58:00	625,71	645,71		3	1	2004-08-28 07:21:13	2004-08-28 07:41:32	3,30E-05	3,22E-05	0	1,6667E-08	8,3333E-04	3,96E-02
KLX04	2004-08-28 08:45:00	2004-08-28 10:12:00	645,73	665,73		3	1	2004-08-28 09:25:14	2004-08-28 09:45:44	9,97E-08	8,33E-08	0	1,6667E-08	8,3333E-04	1,20E-04
KLX04	2004-08-28 10:47:00	2004-08-28 12:39:00	665,76	685,76		3	1	2004-08-28 11:27:39	2004-08-28 11:48:03	2,55E-06	1,68E-06	0	1,6667E-08	8,3333E-04	3,06E-03
KLX04	2004-08-28 13:37:00	2004-08-28 17:56:00	685,79	705,79		4	1	2004-08-28 14:31:35	2004-08-28 14:53:16	-	-	-1	1,6667E-08	8,3333E-04	-
KLX04	2004-08-28 17:59:00	2004-08-28 19:02:00	805,98	825,98		-	1	-	-	-	-	-1	1,6667E-08	8,3333E-04	-
KLX04	2004-08-28 20:06:00	2004-08-28 22:06:00	826,02	846,02		-	1	2004-08-28 21:03:31	2004-08-28 21:03:46	-	-	-1	1,6667E-08	8,3333E-04	-
KLX04	2004-08-28 22:56:00	2004-08-29 00:01:00	846,05	866,05		-	1	-	-	-	-	-1	1,6667E-08	8,3333E-04	-
KLX04	2004-08-29 00:49:00	2004-08-29 02:21:00	866,08	886,08		3	1	2004-08-29 01:39:09	2004-08-29 01:59:38	8,37E-07	7,42E-07	0	1,6667E-08	8,3333E-04	1,00E-03
KLX04	2004-08-31 01:49:00	2004-08-31 03:53:00	886,11	906,11		3	1	2004-08-31 03:11:00	2004-08-31 03:21:22	3,27E-07	2,83E-07	0	1,6667E-08	8,3333E-04	3,92E-04
KLX04	2004-08-31 06:18:00	2004-08-31 07:44:00	906,16	926,16		3	1	2004-08-31 07:02:19	2004-08-31 07:22:27	7,25E-06	6,43E-06	0	1,6667E-08	8,3333E-04	8,70E-03
KLX04	2004-08-31 08:16:00	2004-08-31 09:46:00	926,18	946,18		3	1	2004-08-31 09:04:37	2004-08-31 09:24:45	7,50E-06	6,62E-06	0	1,6667E-08	8,3333E-04	9,00E-03
KLX04	2004-08-31 10:30:00	2004-08-31 12:17:00	943,05	963,05		3	1	2004-08-31 11:15:34	2004-08-31 11:35:44	2,95E-06	2,62E-06	0	1,6667E-08	8,3333E-04	3,54E-03
KLX04	2004-08-31 12:54:00	2004-08-31 14:12:00	963,05	983,05		3	1	2004-08-31 13:29:00	2004-08-31 13:50:20	2,03E-06	1,85E-06	0	1,6667E-08	8,3333E-04	2,44E-03
KLX04	2004-09-01 10:29:00	2004-09-01 11:53:00	300,41	305,41		3	1	2004-09-01 11:10:16	2004-09-01 11:30:23	1,29E-06	1,03E-06	0	1,6667E-08	8,3333E-04	1,55E-03
KLX04	2004-09-01 13:06:00	2004-09-01 14:06:00	305,41	310,41		7	1	-	-	-	-	-1	1,6667E-08	8,3333E-04	-
KLX04	2004-09-01 14:43:00	2004-09-01 15:53:00	310,42	315,42		3	1	2004-09-01 15:21:46	2004-09-01 15:41:56	5,42E-06	5,00E-06	0	1,6667E-08	8,3333E-04	6,50E-03
KLX04	2004-09-01 16:25:00	2004-09-01 18:07:00	315,43	320,43		3	1	2004-09-01 17:35:10	2004-09-01 17:55:31	5,63E-06	5,37E-06	0	1,6667E-08	8,3333E-04	6,75E-03
KLX04	2004-09-01 18:55:00	2004-09-01 20:40:00	320,43	325,43		3	1	2004-09-01 19:58:52	2004-09-01 20:19:21	3,45E-07	2,72E-07	0	1,6667E-08	8,3333E-04	4,14E-04
KLX04	2004-09-01 23:17:00	2004-09-02 01:02:00	325,44	330,44		3	1	2004-09-02 00:35:16	2004-09-02 00:55:31	1,14E-06	1,10E-06	0	1,6667E-08	8,3333E-04	1,36E-03
KLX04	2004-09-02 05:51:00	2004-09-02 07:06:00	330,44	335,44		3	1	2004-09-02 06:29:11	2004-09-02 06:49:22	4,81E-08	2,50E-08	0	1,6667E-08	8,3333E-04	5,77E-05

idcode	start_date	stop_date	secup	seclow	section_no	test_type	formation_type	start_flow_period	stop_flow_period	mean_flow_rate_qm	flow_rate_end_qp	value_type_qp	q_measl__l	q_measl__u	tot_volume_vp
KLX04	2004-09-02 07:47:00	2004-09-02 08:52:00	335,44	340,44		3	1	2004-09-02 08:25:33	2004-09-02 08:45:38	2,48E-06	2,25E-06	0	1,6667E-08	8,3333E-04	2,98E-03
KLX04	2004-09-02 09:24:00	2004-09-02 10:30:00	340,44	345,44		3	1	2004-09-02 10:03:44	2004-09-02 10:23:56	6,56E-07	6,17E-07	0	1,6667E-08	8,3333E-04	7,88E-04
KLX04	2004-09-02 11:09:00	2004-09-02 12:32:00	345,44	350,44		3	1	2004-09-02 11:46:21	2004-09-02 12:10:31	3,40E-06	2,97E-06	0	1,6667E-08	8,3333E-04	4,08E-03
KLX04	2004-09-02 13:20:00	2004-09-02 14:50:00	350,45	355,45		3	1	2004-09-02 14:07:08	2004-09-02 14:27:13	1,35E-04	1,29E-04	0	1,6667E-08	8,3333E-04	1,62E-01
KLX04	2004-09-02 15:14:00	2004-09-02 16:28:00	355,47	360,47		3	1	2004-09-02 15:56:46	2004-09-02 16:16:59	3,15E-05	1,98E-05	0	1,6667E-08	8,3333E-04	3,78E-02
KLX04	2004-09-02 16:57:00	2004-09-02 18:05:00	360,47	365,47		3	1	2004-09-02 17:33:00	2004-09-02 17:53:20	7,55E-06	7,27E-06	0	1,6667E-08	8,3333E-04	9,06E-03
KLX04	2004-09-02 20:18:00	2004-09-02 21:54:00	365,47	370,47		3	1	2004-09-02 21:12:00	2004-09-02 21:32:00	2,03E-07	1,83E-07	0	1,6667E-08	8,3333E-04	2,44E-04
KLX04	2004-09-02 22:37:00	2004-09-03 00:16:00	370,47	375,47		3	1	2004-09-02 23:39:00	2004-09-02 23:59:20	1,17E-06	1,07E-06	0	1,6667E-08	8,3333E-04	1,41E-03
KLX04	2004-09-03 05:55:00	2004-09-03 07:02:00	375,47	380,47		3	1	2004-09-03 06:35:37	2004-09-03 06:52:42	5,97E-06	5,38E-06	0	1,6667E-08	8,3333E-04	6,09E-03
KLX04	2004-09-03 07:31:00	2004-09-03 08:50:00	380,47	385,47		3	1	2004-09-03 08:08:54	2004-09-03 08:29:14	3,57E-07	3,30E-07	0	1,6667E-08	8,3333E-04	4,28E-04
KLX04	2004-09-03 09:25:00	2004-09-03 11:06:00	385,47	390,47		4	1	2004-09-03 10:01:50	2004-09-03 10:04:25	4,25E-05	-	-1	1,6667E-08	8,3333E-04	-
KLX04	2004-09-03 12:21:00	2004-09-03 13:42:00	390,48	395,48		4	1	2004-09-03 12:59:13	2004-09-03 13:00:10	4,25E-05	-	-1	1,6667E-08	8,3333E-04	-
KLX04	2004-09-03 14:09:00	2004-09-03 15:43:00	395,48	400,48		4	1	2004-09-03 15:10:54	2004-09-03 15:11:21	-	-	-1	1,6667E-08	8,3333E-04	-
KLX04	2004-09-03 16:10:00	2004-09-03 17:50:00	400,48	405,48		3	1	2004-09-03 17:07:29	2004-09-03 17:27:59	4,13E-07	3,67E-07	0	1,6667E-08	8,3333E-04	4,96E-04
KLX04	2004-09-03 18:30:00	2004-09-03 20:05:00	405,49	410,49		3	1	2004-09-03 19:22:36	2004-09-03 19:43:04	2,05E-07	1,78E-07	0	1,6667E-08	8,3333E-04	2,46E-04
KLX04	2004-09-03 21:22:00	2004-09-03 23:01:00	410,50	415,50		3	1	2004-09-03 22:18:59	2004-09-03 22:39:19	3,83E-08	3,33E-08	0	1,6667E-08	8,3333E-04	4,60E-05
KLX04	2004-09-03 23:32:00	2004-09-04 01:10:00	415,51	420,51		3	1	2004-09-04 00:27:53	2004-09-04 00:48:13	8,00E-06	7,67E-06	0	1,6667E-08	8,3333E-04	9,60E-03
KLX04	2004-09-04 06:01:00	2004-09-04 07:25:00	420,51	425,51		4	1	2004-09-04 06:47:14	2004-09-04 06:48:00	-	-	-1	1,6667E-08	8,3333E-04	-
KLX04	2004-09-04 07:55:00	2004-09-04 09:07:00	425,51	430,51		4	1	2004-09-04 08:34:02	2004-09-04 08:34:35	4,25E-05	-	-1	1,6667E-08	8,3333E-04	-
KLX04	2004-09-04 09:37:00	2004-09-04 11:35:00	430,51	435,51		3	1	2004-09-04 10:13:13	2004-09-04 10:33:25	7,17E-08	6,67E-08	0	1,6667E-08	8,3333E-04	8,60E-05
KLX04	2004-09-04 12:31:00	2004-09-04 13:31:00	435,50	440,50		-	1	-	-	-	-	-1	1,6667E-08	8,3333E-04	-
KLX04	2004-09-04 14:00:00	2004-09-04 15:07:00	440,50	445,50		3	1	2004-09-04 14:40:25	2004-09-04 15:00:37	1,10E-06	1,03E-06	0	1,6667E-08	8,3333E-04	1,32E-03
KLX04	2004-09-04 15:38:00	2004-09-04 17:26:00	445,50	450,50		4	1	2004-09-04 16:43:31	2004-09-04 16:44:09	-	-	-1	1,6667E-08	8,3333E-04	-
KLX04	2004-09-04 18:04:00	2004-09-04 19:32:00	450,50	455,50		3	1	2004-09-04 18:49:55	2004-09-04 19:10:15	4,73E-08	4,33E-08	0	1,6667E-08	8,3333E-04	5,67E-05
KLX04	2004-09-04 20:00:00	2004-09-04 22:34:00	455,50	460,50		4	1	2004-09-04 21:29:51	2004-09-04 21:32:23	4,25E-05	3,75E-05	0	1,6667E-08	8,3333E-04	-
KLX04	2004-09-04 23:06:00	2004-09-05 00:34:00	460,51	465,51		3	1	2004-09-04 23:52:15	2004-09-05 00:12:35	2,18E-08	1,00E-08	-1	1,6667E-08	8,3333E-04	2,62E-05
KLX04	2004-09-05 01:16:00	2004-09-05 02:44:00	465,52	470,52		3	1	2002-09-05 02:01:56	2004-09-05 02:22:16	1,33E-07	1,08E-07	0	1,6667E-08	8,3333E-04	1,60E-04
KLX04	2004-09-05 05:46:00	2004-09-05 06:52:00	470,52	475,52		-	1	-	-	-	-	-1	1,6667E-08	8,3333E-04	-
KLX04	2004-09-05 07:27:00	2004-09-05 08:31:00	475,52	480,52		-	1	-	-	-	-	-1	1,6667E-08	8,3333E-04	-
KLX04	2004-09-05 08:57:00	2004-09-05 10:00:00	480,52	485,52		3	1	2004-09-05 09:33:24	2004-09-05 09:53:29	9,17E-07	8,50E-07	0	1,6667E-08	8,3333E-04	1,10E-03
KLX04	2004-09-05 10:34:00	2004-09-05 12:04:00	505,55	510,55		-	1	-	-	-	-	-1	1,6667E-08	8,3333E-04	-
KLX04	2004-09-05 12:46:00	2004-09-05 13:58:00	510,56	515,56		3	1	2004-09-05 13:25:58	2004-09-05 13:46:04	2,74E-05	2,66E-05	0	1,6667E-08	8,3333E-04	3,29E-02
KLX04	2004-09-05 14:22:00	2004-09-05 15:33:00	515,56	520,56		3	1	2004-09-05 15:06:28	2004-09-05 15:26:39	7,83E-07	6,83E-07	0	1,6667E-08	8,3333E-04	9,40E-04
KLX04	2004-09-05 16:01:00	2004-09-05 17:23:00	520,57	525,57		3	1	2004-09-05 16:51:30	2004-09-05 17:11:50	6,00E-06	5,55E-06	0	1,6667E-08	8,3333E-04	7,20E-03
KLX04	2004-09-05 18:19:00	2004-09-05 19:22:00	545,62	550,62		-	1	-	-	-	-	-1	1,6667E-08	8,3333E-04	-
KLX04	2004-09-05 20:03:00	2004-09-05 21:40:00	550,62	555,62		3	1	2004-09-05 20:48:07	2004-09-05 21:08:27	4,33E-08	3,83E-08	0	1,6667E-08	8,3333E-04	5,20E-05
KLX04	2004-09-05 22:33:00	2004-09-06 00:16:00	555,63	560,63		3	1	2004-09-05 23:34:38	2004-09-05 23:54:38	2,17E-08	1,67E-08	0	1,6667E-08	8,3333E-04	2,60E-05
KLX04	2004-09-06 00:46:00	2004-09-06 02:36:00	560,63	565,63		3	1	2004-09-06 01:33:54	2004-09-06 01:54:14	1,23E-08	7,00E-09	-1	1,6667E-08	8,3333E-04	1,48E-05
KLX04	2004-09-06 06:09:00	2004-09-06 07:11:00	565,64	570,64		3	1	2004-09-06 06:44:23	2004-09-06 07:04:33	4,75E-06	4,62E-06	0	1,6667E-08	8,3333E-04	5,70E-03
KLX04	2004-09-06 07:42:00	2004-09-06 08:46:00	570,64	575,64		3	1	2004-09-06 08:19:27	2004-09-06 08:39:42	1,57E-06	1,47E-06	0	1,6667E-08	8,3333E-04	1,88E-03
KLX04	2004-09-06 09:15:00	2004-09-06 10:19:00	575,65	580,65		3	1	2004-09-06 09:49:56	2004-09-06 10:07:05	6,48E-06	6,30E-06	0	1,6667E-08	8,3333E-04	6,61E-03
KLX04	2004-09-06 10:50:00	2004-09-06 12:10:00	580,65	585,65		3	1	2004-09-06 11:28:56	2004-09-06 11:49:03	5,42E-06	5,13E-06	0	1,6667E-08	8,3333E-04	6,50E-03
KLX04	2004-09-06 13:11:00	2004-09-06 14:14:00	585,67	590,67		3	1	2004-09-06 13:47:12	2004-09-06 14:07:21	3,20E-06	2,72E-06	0	1,6667E-08	8,3333E-04	3,84E-03
KLX04	2004-09-06 14:45:00	2004-09-06 15:51:00	590,67	595,67		3	1	2004-09-06 15:19:57	2004-09-06 15:40:15	1,50E-07	1,17E-07	0	1,6667E-08	8,3333E-04	1,80E-04
KLX04	2004-09-06 16:36:00	2004-09-06 18:14:00	595,69	600,69		-	1	-	-	-	-	-1	1,6667E-08	8,3333E-04	-
KLX04	2004-09-06 18:42:00	2004-09-06 20:11:00	600,69	605,69		3	1	2004-09-06 19:29:12	2004-09-06 19:49:32	1,73E-05	1,60E-05	0	1,6667E-08	8,3333E-04	2,08E-02
KLX04	2004-09-06 20:57:00	2004-09-06 22:11:00	605,69	610,69		3	1	2004-09-06 21:44:09	2004-09-06 22:04:09	5,37E-06	5,05E-06	0	1,6667E-08	8,3333E-04	6,44E-03
KLX04	2004-09-06 22:41:00	2004-09-07 00:09:00	610,70	615,70		3	1	2004-09-06 23:41:48	2004-09-07 00:02:08	2,15E-06	2,07E-06	0	1,6667E-08	8,3333E-04	2,58E-03
KLX04	2004-09-07 00:39:00	2004-09-07 02:03:00	615,70	620,70		3	1	2004-09-07 01:21:18	2004-09-07 01:41:38	1,50E-05	1,45E-05	0	1,6667E-08	8,3333E-04	1,80E-02
KLX04	2004-09-07 06:12:00	2004-09-07 07:18:00	620,71	625,71		3	1	2004-09-07 06:51:08	2004-09-07 07:11:16	8,73E-06	8,25E-06	0	1,6667E-08	8,3333E-04	1,05E-02
KLX04	2004-09-07 07:41:00	2004-09-07 08:49:00	625,71	630,71		3	1	2004-09-07 08:17:39	2004-09-07 08:37:46	3,04E-05	2,93E-05	0	1,6667E-08	8,3333E-04	3,65E-02
KLX04	2004-09-07 09:16:00	2004-09-07 10:14:00	630,72	635,72		-	1	-	-	-	-	-1	1,6667E-08	8,3333E-04	-
KLX04	2004-09-07 10:44:00	2004-09-07 11:53:00	635,72	640,72		-	1	-	-	-	-	-1	1,6667E-08	8,3333E-04	-
KLX04	2004-09-07 12:29:00	2004-09-07 13:28:00	640,73	645,73		-	1	-	-	-	-	-1	1,6667E-08	8,3333E-04	-
KLX04	2004-09-07 14:03:00	2004-09-07 15:10:00	645,73	650,73		3	1	2004-09-07 14:37:55	2004-09-07 14:58:07	6,67E-08	6,67E-08	0	1,6667E-08	8,3333E-04	8,00E-05

idcode	start_date	stop_date	secup	seclow	section_no	test_type	formation_type	start_flow_period	stop_flow_period	mean_flow_rate_qm	flow_rate_end_qp	value_type_qp	q_measl__l	q_measl__u	tot_volume_vp
KLX04	2004-09-07 15:37:00	2004-09-07 17:37:00	650,74	655,74		3	1	2004-09-07 16:45:26	2004-09-07 17:05:46	6,67E-09	5,00E-09	-1	1,6667E-08	8,3333E-04	8,00E-06
KLX04	2004-09-07 18:17:00	2004-09-07 20:10:00	655,75	660,75		3	1	2004-09-07 19:08:10	2004-09-07 19:28:30	5,00E-09	3,42E-09	-1	1,6667E-08	8,3333E-04	6,00E-06
KLX04	2004-09-07 22:36:00	2004-09-07 23:37:00	660,75	665,75		-	1	-	-	-	-	-1	1,6667E-08	8,3333E-04	-
KLX04	2004-09-08 00:22:00	2004-09-08 01:45:00	665,76	670,76		3	1	2004-09-08 01:22:44	2004-09-08 01:23:04	1,72E-06	1,63E-06	0	1,6667E-08	8,3333E-04	3,40E-05
KLX04	2004-09-08 10:39:00	2004-09-08 12:33:00	670,76	675,76		3	1	2004-09-08 11:50:47	2004-09-08 12:11:07	2,52E-06	2,27E-06	0	1,6667E-08	8,3333E-04	3,02E-03
KLX04	2004-09-08 14:10:00	2004-09-08 15:44:00	675,77	680,77		4	1	2004-09-08 15:12:27	-	-	-	-1	1,6667E-08	8,3333E-04	-
KLX04	2004-09-08 16:18:00	2004-09-08 17:35:00	680,78	685,78		4	1	2004-09-08 17:02:52	-	-	-	-1	1,6667E-08	8,3333E-04	-

KLX04

dur_flow_phase_tp	dur_rec_phase_tf	initial_head_hi	head_at_flow_end_hp	final_head_hf	initial_press_pi	press_at_flow_end_pp	final_press_pf	fluid_temp_tew	fluid_elcond_ecw	fluid_salinity_tdsw	fluid_salinity_tdswm	reference	comments	lp
1800	1800			13,51	1986	2181	1986	9,7						155,1
1800	600			13,64	2966	2987	2967	11,3						255,3
1800	1800			13,61	3943	4146	3945	13,1						355,4
1800	1200			13,97	4926	5126	4926	14,6						455,5
1800	1200			14,35	5906	6106	5907	16,3						555,6
1800	1500			14,40	6881	7082	6884	18,1						655,7
-	5400			-	7876	8104	7980	19,7						755,8
2700	1800			14,81	8840	9040	8842	21,3						856,0
1800	1800			15,32	9620	9819	9637	22,6						936,1
1200	1200			13,67	1209	1410	1209	8,6						115,21
1200	1200			13,52	1402	1602	1402	9,0						135,25
1200	1200			13,35	1598	1798	1598	9,2						155,3
1200	1200			13,41	1793	1993	1793	9,5						175,3
1200	1200			13,22	1987	2188	1986	9,7						195,32
1200	1200			13,28	2182	2283	2184	9,9						215,34
1200	1200			13,53	2381	2582	2380	10,1						235,35
1200	1200			13,50	2576	2777	2576	10,5						255,38
1200	1200			13,63	2772	2976	2771	10,9						275,38
1560	1200			13,70	2968	3004	2969	11,4						295,4
1200	1200			13,57	3161	3362	3161	11,8						315,41
1200	1200			13,46	3356	3556	3356	12,1						335,44
1200	1200			13,46	3550	3750	3553	12,4						355,44
1200	1200			13,60	3748	3950	3748	12,7						375,47
1200	1200			13,60	3945	4188	3945	13,1						395,47
1200	1200			13,67	4141	4341	4141	13,4						415,49
1200	1200			13,46	4333	4532	4333	13,7						435,51
1200	2700			13,19	4536	4762	4545	14,0						455,5
1200	1200			13,42	4725	4922	4725	14,3						475,52
-	-			-	4929	5131	4932	14,6						495,52
1200	1200			13,47	5117	5317	5117	15,0						515,55
-	-			-	5320	5522	5336	15,3						535,58
1200	1800			13,81	5517	5721	5517	15,7						555,62
1200	600			13,96	5708	5909	5709	16,0						575,64
1200	600			14,20	5904	6104	5905	16,3						595,65
1200	1200			14,37	6101	6301	6102	16,7						615,69
1200	1200			14,28	6298	6499	6297	17,0						635,71
1200	1200			13,84	6497	6712	6503	17,3						655,73
1200	1200			13,03	6694	6903	6726	17,7						675,76
1200	1200			-	6967	7182	7002	18,1						695,79
-	-			-	8067	-	-	20,0						815,98
60	3600			-	8293	8492	8415	20,3						836,02
-	-			-	8457	-	-	20,7						856,05
1200	1200			14,92	8645	8826	8647	21,0						876,08
1200	1200			14,75	8842	9066	8842	21,3						896,11
1200	1200			14,89	9038	9240	9043	21,6						916,16
1200	1200			15,14	9237	9437	9249	21,9						936,18
1200	1200			14,97	9401	9603	9400	22,2						953,05
1200	1200			14,58	9589	9799	9590	22,6						973,05
1200	1200			13,79	2968	3160	2968	11,1						302,91
-	-			-	3017	-	-	11,3						307,91
1200	1200			13,52	3065	3285	3064	11,5						312,92
1200	600			13,61	3113	3314	3113	11,6						317,93
1200	1200			13,55	3161	3363	3161	11,7						322,93
1200	300			13,56	3211	3418	3210	11,8						327,94
1200	1200			13,44	3261	3477	3261	11,8						332,94

dur_flow_phase_tp	dur_rec_phase_tf	initial_head_hi	head_at_flow_end_hp	final_head_hf	initial_press_pi	press_at_flow_end_pp	final_press_pf	fluid_temp_tew	fluid_elcond_ecw	fluid_salinity_tdsw	fluid_salinity_tdswm	reference	comments	lp
1200	300			13,75	3310	3512	3309	11,9						337,94
1200	300			13,92	3359	3557	3359	12,0						342,94
1200	1200			13,80	3408	3607	3408	12,1						347,94
1200	1200			13,81	3457	3658	3458	12,2						352,95
1200	600			13,84	3507	3707	3506	12,4						357,97
1200	600			13,64	3555	3749	3553	12,4						362,97
1200	1200			13,42	3602	3844	3600	12,5						367,97
1200	900			13,25	3647	3839	3647	12,6						372,97
1020	660			12,98	3694	3884	3694	12,7						377,97
1200	1200			13,25	3744	3947	3649	12,8						382,97
155	3600			-	3807	4009	3918	12,9						387,97
57	2400			-	3859	4061	3892	12,9						392,98
27	1800			-	3930	4138	4091	13,0						397,98
1200	1200			13,58	3944	4156	3943	13,1						402,98
1200	1200			13,48	3992	4207	3991	13,2						407,99
1200	1200			13,13	4040	4257	4040	13,3						413
1200	1200			13,30	4088	4288	4088	13,3						418,01
46	2100			-	4143	4343	4158	13,4						423,01
33	1800			-	4192	4398	4196	13,5						428,01
1200	3600			13,87	4238	4450	4242	13,5						433,01
-	-			-	4289	-	-	13,6						438
1200	300			13,45	4337	4548	4336	13,7						443
38	2400			-	4404	4607	4504	13,8						448
1200	1200			11,40	4445	4653	4454	13,9						453
152	3600			-	4497	4699	4582	13,9						458
1200	1200			13,53	4531	4751	4533	14,0						463,01
1200	1200			12,68	4580	4799	4589	14,1						468,02
-	-			-	4634	-	-	14,2						473,02
-	-			-	4683	-	-	14,2						478,02
1200	300			13,71	4726	4943	4727	14,3						483,02
-	-			-	4977	-	-	14,7						508,05
1200	600			14,38	5025	5226	5026	14,8						513,06
1200	300			14,55	5077	5301	5077	14,9						518,06
1200	600			14,46	5124	5325	5124	15,0						523,07
-	-			-	5372	-	-	15,4						548,12
1200	1200			13,51	5417	5641	5418	15,5						553,12
1200	1200			12,57	5464	5689	5468	15,6						558,13
1200	2400			13,50	5515	5736	5514	15,7						563,13
1200	300			13,75	5559	5772	5560	15,7						568,14
1200	300			14,00	5607	5823	5609	15,8						573,14
1020	600			13,98	5659	5857	5660	15,9						578,15
1200	1200			14,46	5710	5911	5712	16,0						583,15
1200	300			14,60	5762	5979	5763	16,1						588,17
1200	600			14,68	5814	6027	5814	16,1						593,17
-	-			-	5862	-	-	16,2						598,19
1200	1200			14,47	5908	6107	5908	16,3						603,19
1200	300			14,43	5956	6186	5956	16,4						608,19
1200	300			14,24	6004	6203	6003	16,5						613,20
1200	1200			14,07	6052	6251	6051	16,6						618,20
1200	300			13,79	6097	6298	6098	16,7						623,21
1200	600			13,81	6147	6347	6148	16,8						628,21
-	-			-	6199	-	-	16,8						633,22
-	-			-	6248	-	-	16,9						638,22
-	-			-	6299	-	-	17,0						643,23
1200	600			14,08	6354	6566	6352	17,1						648,23

dur_flow_phase_tp	dur_rec_phase_tf	initial_head_hi	head_at_flow_end_hp	final_head_hf	initial_press_pi	press_at_flow_end_pp	final_press_pf	fluid_temp_tew	fluid_elcond_ecw	fluid_salinity_tdsw	fluid_salinity_tdswm	reference	comments	lp
1200	1800			13,55	6410	6614	6408	17,1						653,24
1200	2400			14,10	6458	6662	6455	17,2						658,25
-	-			-	6498	-	-	17,3						663,25
20	1200			14,05	6540	6742	6541	17,4						668,26
1200	1200			14,42	6599	6798	6601	17,5						673,26
-	1800			-	6648	6861	6651	17,6						678,27
-	1800			-	6703	6915	6703	17,7						683,28

Table	plu_s_hole_test_ed1
	PLU Single hole tests, pumping/injection. Basic evaluation

Column	Datatype	Unit	Column Description
site	CHAR		Investigation site name
activity_type	CHAR		Activity type code
start_date	DATE		Date (yymmdd hh:mm:ss)
stop_date	DATE		Date (yymmdd hh:mm:ss)
project	CHAR		project code
idcode	CHAR		Object or borehole identification code
secup	FLOAT	m	Upper section limit (m)
seclow	FLOAT	m	Lower section limit (m)
section_no	INTEGER	number	Section number
test_type	CHAR		Test type code (1-7), see table description!
formation_type	CHAR		Formation type code. 1: Rock, 2: Soil (superficial deposits)
lp	FLOAT	m	Hydraulic point of application
seclen_class	FLOAT	m	Planned ordinary test interval during test campaign.
spec_capacity_q_s	FLOAT	m**2/s	Specific capacity (Q/s) of test section, see table descript.
value_type_q_s	CHAR		0:true value,-1:Q/s<lower meas.limit,1:Q/s>upper meas.limit
transmissivity_tq	FLOAT	m**2/s	Tranmissivity based on Q/s, see table description
value_type_tq	CHAR		0:true value,-1:TQ<lower meas.limit,1:TQ>upper meas.limit.
bc_tq	CHAR		Best choice code. 1 means TQ is best choice of T, else 0
transmissivity_moye	FLOAT	m**2/s	Transmissivity,TM, based on Moye (1967)
bc_tm	CHAR		Best choice code. 1 means Tmoye is best choice of T, else 0
value_type_tm	CHAR		0:true value,-1:TM<lower meas.limit,1:TM>upper meas.limit.
hydr_cond_moye	FLOAT	m**2/s	K_M: Hydraulic conductivity based on Moye (1967)
formation_width_b	FLOAT	m	b:Interpreted formation thickness repr. for evaluated T/TB
width_of_channel_b	FLOAT	m	B:Interpreted width of formation with evaluated TB
tb	FLOAT	m**3/s	TB:T=transmissivity,B=width of formation,see description
l_measl_tb	FLOAT	m**3/s	Estimated lower meas. limit for evaluated TB,see description
u_measl_tb	FLOAT	m**3/s	Estimated upper meas. limit of evaluated TB,see description
sb	FLOAT	m	SB:S=storativity,B=width of formation,1Dmodel,see descript.
assumed_sb	FLOAT	m	SB* : Assumed SB,S=storativity,B=width of formation,see...
leakage_factor_lf	FLOAT	m	Lf:1D model for evaluation of Leakage factor
transmissivity_tt	FLOAT	m**2/s	T=transmissivity, 2D model, see table description
value_type_tt	CHAR		0:true value,-1:TT<lower meas.limit,1:TT>upper meas.limit,
bc_tt	CHAR		Best choice code. 1 means TT is best choice of T, else 0
l_measl_q_s	FLOAT	m**2/s	Estimated lower meas. limit for evaluated T,see table descr.
u_measl_q_s	FLOAT	m**2/s	Estimated upper meas. limit for evaluated T,see description
storativity_s	FLOAT		2D model for evaluation of S=storativity,see table descript.

assumed_s	FLOAT		Assumed Storativity,2D model evaluation,see table descr.
leakage_koeff	FLOAT	1/s	K'/b':2Dmodel evaluation of leakage coefficient,see desc.
hydr_cond_ks	FLOAT	m**2/s	Ks:3D model evaluation of hydraulic conductivity,see desc.
value_type_ks	CHAR		0:true value,-1:Ks<lower meas.limit,1:Ks>upper meas.limit,
l_meas_limit_ks	FLOAT	m**2/s	Estimated lower meas.limit for evaluated Ks, see table desc.
u_meas_limit_ks	FLOAT	m**2/s	Estimated upper meas.limit for evaluated Ks,see table descr.
spec_storage_ss	FLOAT	1/m	Ss:Specific storage,3Dmodel evaluation,see table descr.
assumed_ss	FLOAT	1/m	Assumed Spec.storage,3D model evaluation,see table des.
c	FLOAT	m**3/pa	C: Wellbore storage coefficient
cd	FLOAT		CD: Dimensionless wellbore storage constant
skin	FLOAT		Skin factor
stor_ratio	FLOAT		Storativity ratio
interflow_coeff	FLOAT		Interporosity flow coefficient
dt1	FLOAT	s	Estimated start time of evaluation, see table description
dt2	FLOAT	s	Estimated stop time of evaluation. see table description
transmissivity_t_ilr	FLOAT	m**2/s	T_ILR Transmissivity based on None Linear Regression...
storativity_s_ilr	FLOAT		S_ILR=storativity based on None Linear Regression,see..
value_type_t_ilr	CHAR		0:true value,-1:T_ILR<lower meas.limit,1:>upper meas.limit
bc_t_ilr	CHAR		Best choice code. 1 means T_ILR is best choice of T, else 0
c_ilr	FLOAT	m**3/pa	Wellbore storage coefficient, based on ILR, see descr.
cd_ilr	FLOAT		Dimensionless wellbore storage constant, see table descrip.
skin_ilr	FLOAT		Skin factor based on Non Linear Regression,see desc.
stor_ratio_ilr	FLOAT		Storativity ratio based on Non Linear Regression, see descr.
interflow_coeff_ilr	FLOAT		Interporosity flow coefficient based on Non Linear Regr....
transmissivity_t_grf	FLOAT	m**2/s	T_GRF:Transmissivity based on Gen.Rad. Flow,see...
value_type_t_grf	CHAR		0:true value,-1:T_GRF<lower meas.limit,1:>upper meas.limit
bc_t_grf	CHAR		Best choice code. 1 means T_GRF is best choice of T, else 0
storativity_s_grf	FLOAT		S_GRF:Storativity basd on Gen. Rad.Flow, see table descri.
flow_dim_grf	FLOAT		Flow dimesion based on Gen. Rad.Flow. interpretation model
comment	VARCHAR	no_unit	Short comment to the evaluated parameters
error_flag	CHAR		If error_flag = "*" then an error occured and an error
in_use	CHAR		If in_use = "*" then the activity has been selected as
sign	CHAR		Signature for QA data accknowledge (QA - OK)

idcode	start_date	stop_date	secup	seclow	section_no	test_type	formation_type	lp	seclen_class	spec_capacity_q_s	value_type_q_s
KLX04	2004-08-20 10:27	2004-08-20 12:44	105,11	205,11		3	1	155,11	100	8,45E-06	0
KLX04	2004-08-20 16:11	2004-08-20 17:40	205,34	305,34		3	1	255,34	100	2,15E-04	0
KLX04	2004-08-21 08:14	2004-08-21 10:33	305,41	405,41		3	1	355,41	100	7,93E-06	0
KLX04	2004-08-21 11:48	2004-08-21 13:37	405,49	505,49		3	1	455,49	100	4,12E-07	0

KLX04	2004-08-21 14:57	2004-08-21 16:40	505,55	605,55		3	1	555,55	100	2,83E-06	0
KLX04	2004-08-22 08:12	2004-08-22 10:00	605,69	705,69		3	1	655,69	100	2,24E-06	0
KLX04	2004-08-22 11:37	2004-08-22 13:58	705,81	805,81		4	1	755,81	100	#SAKNAS!	-1
KLX04	2004-08-22 15:17	2004-08-22 17:25	805,98	905,98		3	1	855,98	100	4,21E-08	0
KLX04	2004-08-23 08:00	2004-08-23 09:51	886,11	986,11		3	1	936,11	100	7,36E-07	0
KLX04	2004-08-24 07:29	2004-08-24 08:56	105,21	125,21		3	1	115,21	20	2,44E-06	0
KLX04	2004-08-24 09:54	2004-08-24 11:20	125,25	145,25		3	1	135,25	20	1,50E-07	0
KLX04	2004-08-24 21:02	2004-08-24 22:45	145,30	165,30		3	1	155,30	20	3,53E-08	0
KLX04	2004-08-24 23:44	2004-08-25 01:17	165,30	185,30		3	1	175,30	20	4,40E-07	0
KLX04	2004-08-25 06:35	2004-08-25 08:06	185,32	205,32		3	1	195,32	20	4,73E-06	0
KLX04	2004-08-25 08:49	2004-08-25 10:25	205,34	225,34		3	1	215,34	20	4,54E-05	0
KLX04	2004-08-30 05:53	2004-08-30 07:04	225,35	245,35		3	1	235,35	20	6,67E-07	0
KLX04	2004-08-30 07:53	2004-08-30 09:17	245,38	265,38		3	1	255,38	20	1,33E-05	0
KLX04	2004-08-30 09:53	2004-08-30 10:59	265,38	285,38		3	1	275,38	20	4,41E-07	0
KLX04	2004-08-25 22:12	2004-08-26 01:14	285,40	305,40		3	1	295,40	20	1,12E-04	0
KLX04	2004-08-26 02:27	2004-08-26 03:59	305,41	325,41		3	1	315,41	20	2,83E-07	0
KLX04	2004-08-26 06:30	2004-08-26 07:55	325,44	345,44		3	1	335,44	20	1,19E-07	0
KLX04	2004-08-26 08:37	2004-08-26 09:59	345,44	365,44		3	1	355,44	20	7,67E-06	0
KLX04	2004-08-26 10:38	2004-08-26 12:11	365,47	385,47		3	1	375,47	20	3,30E-07	0
KLX04	2004-08-26 14:00	2004-08-26 15:52	385,47	405,47		3	1	395,47	20	4,31E-09	0
KLX04	2004-08-26 16:37	2004-08-26 18:31	405,49	425,49		3	1	415,49	20	3,52E-07	0
KLX04	2004-08-26 19:32	2004-08-26 17:56	425,51	445,51		3	1	435,51	20	4,93E-08	0
KLX04	2004-08-30 16:11	2004-08-30 17:46	445,50	465,50		3	1	455,50	20	2,27E-09	0
KLX04	2004-08-27 00:32	2004-08-27 02:22	465,52	485,52		3	1	475,52	20	2,66E-08	0
KLX04	2004-08-27 06:38	2004-08-27 08:29	485,52	505,52		4	1	495,52	20	#SAKNAS!	-1
KLX04	2004-08-27 09:11	2004-08-27 10:42	505,55	525,55		3	1	515,55	20	1,51E-06	0
KLX04	2004-08-27 11:14	2004-08-27 14:13	525,58	545,58		4	1	535,58	20	#SAKNAS!	-1
KLX04	2004-08-27 19:34	2004-08-27 20:42	545,62	565,62		3	1	555,62	20	2,75E-09	0
KLX04	2004-08-27 21:41	2004-08-27 23:14	565,64	585,64		3	1	575,64	20	4,88E-07	0
KLX04	2004-08-28 00:07	2004-08-28 01:30	585,65	605,65		3	1	595,65	20	1,02E-06	0
KLX04	2004-08-28 02:17	2004-08-28 03:46	605,69	625,69		3	1	615,69	20	1,61E-06	0
KLX04	2004-08-28 06:37	2004-08-28 07:58	625,71	645,71		3	1	635,71	20	1,57E-06	0
KLX04	2004-08-28 08:45	2004-08-28 10:12	645,73	665,73		3	1	655,73	20	3,80E-09	0
KLX04	2004-08-28 10:47	2004-08-28 12:39	665,76	685,76		3	1	675,76	20	7,90E-08	0
KLX04	2004-08-28 13:37	2004-08-28 17:56	685,79	705,79		4	1	695,79	20	#SAKNAS!	-1
KLX04	2004-08-28 17:59	2004-08-28 19:02	805,98	825,98		-	1	815,98	20	#SAKNAS!	-1
KLX04	2004-08-28 20:06	2004-08-28 22:06	826,02	846,02		-	1	836,02	20	#SAKNAS!	-1
KLX04	2004-08-28 22:56	2004-08-29 00:01	846,05	866,05		-	1	856,05	20	#SAKNAS!	-1
KLX04	2004-08-29 00:49	2004-08-29 02:21	866,08	886,08		3	1	876,08	20	4,02E-08	0
KLX04	2004-08-31 01:49	2004-08-31 03:53	886,11	906,11		3	1	896,11	20	1,24E-08	0
KLX04	2004-08-31 06:18	2004-08-31 07:44	906,16	926,16		3	1	916,16	20	3,12E-07	0
KLX04	2004-08-31 08:16	2004-08-31 09:46	926,18	946,18		3	1	936,18	20	3,25E-07	0

KLX04	2004-08-31 10:30	2004-08-31 12:17	943,05	963,05		3	1	953,05	20	1,27E-07	0
KLX04	2004-08-31 12:54	2004-08-31 14:12	963,05	983,05		3	1	973,05	20	8,64E-08	0
KLX04	2004-09-01 10:29	2004-09-01 11:53	300,41	305,41		3	1	302,91	5	5,28E-08	0
KLX04	2004-09-01 13:06	2004-09-01 14:06	305,41	310,41		7	1	307,91	5	#SAKNAS!	-1
KLX04	2004-09-01 14:43	2004-09-01 15:53	310,42	315,42		3	1	312,92	5	2,23E-07	0
KLX04	2004-09-01 16:25	2004-09-01 18:07	315,43	320,43		3	1	317,93	5	2,62E-07	0
KLX04	2004-09-01 18:55	2004-09-01 20:40	320,43	325,43		3	1	322,93	5	1,32E-08	0
KLX04	2004-09-01 23:17	2004-09-02 01:02	325,44	330,44		3	1	327,94	5	5,21E-08	0
KLX04	2004-09-02 05:51	2004-09-02 07:06	330,44	335,44		3	1	332,94	5	1,14E-09	0
KLX04	2004-09-02 07:47	2004-09-02 08:52	335,44	340,44		3	1	337,94	5	1,09E-07	0
KLX04	2004-09-02 09:24	2004-09-02 10:30	340,44	345,44		3	1	342,94	5	3,06E-08	0
KLX04	2004-09-02 11:09	2004-09-02 12:32	345,44	350,44		3	1	347,94	5	1,46E-07	0
KLX04	2004-09-02 13:20	2004-09-02 14:50	350,45	355,45		3	1	352,95	5	6,31E-06	0
KLX04	2004-09-02 15:14	2004-09-02 16:28	355,47	360,47		3	1	357,97	5	9,73E-07	0
KLX04	2004-09-02 16:57	2004-09-02 18:05	360,47	365,47		3	1	362,97	5	3,67E-07	0
KLX04	2004-09-02 20:18	2004-09-02 21:54	365,47	370,47		3	1	367,97	5	7,43E-09	0
KLX04	2004-09-02 22:37	2004-09-03 00:16	370,47	375,47		3	1	372,97	5	5,45E-08	0
KLX04	2004-09-03 05:55	2004-09-03 07:02	375,47	380,47		3	1	377,97	5	2,78E-07	0
KLX04	2004-09-03 07:31	2004-09-03 08:50	380,47	385,47		3	1	382,97	5	1,59E-08	0
KLX04	2004-09-03 09:25	2004-09-03 11:06	385,47	390,47		4	1	387,97	5	#SAKNAS!	-1
KLX04	2004-09-03 12:21	2004-09-03 13:42	390,48	395,48		4	1	392,98	5	#SAKNAS!	-1
KLX04	2004-09-03 14:09	2004-09-03 15:43	395,48	400,48		4	1	397,98	5	#SAKNAS!	-1
KLX04	2004-09-03 16:10	2004-09-03 17:50	400,48	405,48		3	1	402,98	5	1,70E-08	0
KLX04	2004-09-03 18:30	2004-09-03 20:05	405,49	410,49		3	1	407,99	5	8,14E-09	0
KLX04	2004-09-03 21:22	2004-09-03 23:01	410,50	415,50		3	1	413,00	5	1,51E-09	0
KLX04	2004-09-03 23:32	2004-09-04 01:10	415,51	420,51		3	1	418,01	5	3,76E-07	0
KLX04	2004-09-04 06:01	2004-09-04 07:25	420,51	425,51		4	1	423,01	5	#SAKNAS!	-1
KLX04	2004-09-04 07:55	2004-09-04 09:07	425,51	430,51		4	1	428,01	5	#SAKNAS!	-1
KLX04	2004-09-04 09:37	2004-09-04 11:35	430,51	435,51		3	1	433,01	5	3,08E-09	0
KLX04	2004-09-04 12:31	2004-09-04 13:31	435,50	440,50		-	1	438,00	5	#SAKNAS!	-1
KLX04	2004-09-04 14:00	2004-09-04 15:07	440,50	445,50		3	1	443,00	5	4,80E-08	0
KLX04	2004-09-04 15:38	2004-09-04 17:26	445,50	450,50		4	1	448,00	5	#SAKNAS!	-1
KLX04	2004-09-04 18:04	2004-09-04 19:32	450,50	455,50		3	1	453,00	5	2,04E-09	0
KLX04	2004-09-04 20:00	2004-09-04 22:34	455,50	460,50		4	1	458,00	5	#SAKNAS!	-1
KLX04	2004-09-04 23:06	2004-09-05 00:34	460,51	465,51		3	1	463,01	5	4,46E-10	0
KLX04	2004-09-05 01:16	2004-09-05 02:44	465,52	470,52		3	1	468,02	5	4,85E-09	0
KLX04	2004-09-05 05:46	2004-09-05 06:52	470,52	475,52		-	1	473,02	5	#SAKNAS!	-1
KLX04	2004-09-05 07:27	2004-09-05 08:31	475,52	480,52		-	1	478,02	5	#SAKNAS!	-1
KLX04	2004-09-05 08:57	2004-09-05 10:00	480,52	485,52		3	1	483,02	5	3,84E-08	0
KLX04	2004-09-05 10:34	2004-09-05 12:04	505,55	510,55		-	1	508,05	5	#SAKNAS!	-1
KLX04	2004-09-05 12:46	2004-09-05 13:58	510,56	515,56		3	1	513,06	5	1,30E-06	0
KLX04	2004-09-05 14:22	2004-09-05 15:33	515,56	520,56		3	1	518,06	5	2,99E-08	0

KLX04	2004-09-05 16:01	2004-09-05 17:23	520,57	525,57		3	1	523,07	5	2,71E-07	0
KLX04	2004-09-05 18:19	2004-09-05 19:22	545,62	550,62		-	1	548,12	5	#SAKNAS!	-1
KLX04	2004-09-05 20:03	2004-09-05 21:40	550,62	555,62		3	1	553,12	5	1,68E-09	0
KLX04	2004-09-05 22:33	2004-09-06 00:16	555,63	560,63		3	1	558,13	5	7,27E-10	0
KLX04	2004-09-06 00:46	2004-09-06 02:36	560,63	565,63		3	1	563,13	5	3,11E-10	0
KLX04	2004-09-06 06:09	2004-09-06 07:11	565,64	570,64		3	1	568,14	5	2,13E-07	0
KLX04	2004-09-06 07:42	2004-09-06 08:46	570,64	575,64		3	1	573,14	5	6,66E-08	0
KLX04	2004-09-06 09:15	2004-09-06 10:19	575,65	580,65		3	1	578,15	5	3,12E-07	0
KLX04	2004-09-06 10:50	2004-09-06 12:10	580,65	585,65		3	1	583,15	5	2,51E-07	0
KLX04	2004-09-06 13:11	2004-09-06 14:14	585,67	590,67		3	1	588,17	5	1,23E-07	0
KLX04	2004-09-06 14:45	2004-09-06 15:51	590,67	595,67		3	1	593,17	5	5,37E-09	0
KLX04	2004-09-06 16:36	2004-09-06 18:14	595,69	600,69		-	1	598,19	5	#SAKNAS!	-1
KLX04	2004-09-06 18:42	2004-09-06 20:11	600,69	605,69		3	1	603,19	5	7,89E-07	0
KLX04	2004-09-06 20:57	2004-09-06 22:11	605,69	610,69		3	1	608,19	5	2,15E-07	0
KLX04	2004-09-06 22:41	2004-09-07 00:09	610,70	615,70		3	1	613,20	5	1,02E-07	0
KLX04	2004-09-07 00:39	2004-09-07 02:03	615,70	620,70		3	1	618,20	5	7,12E-07	0
KLX04	2004-09-07 06:12	2004-09-07 07:18	620,71	625,71		3	1	623,21	5	4,03E-07	0
KLX04	2004-09-07 07:41	2004-09-07 08:49	625,71	630,71		3	1	628,21	5	1,44E-06	0
KLX04	2004-09-07 09:16	2004-09-07 10:14	630,72	635,72		-	1	633,22	5	#SAKNAS!	-1
KLX04	2004-09-07 10:44	2004-09-07 11:53	635,72	640,72		-	1	638,22	5	#SAKNAS!	-1
KLX04	2004-09-07 12:29	2004-09-07 13:28	640,73	645,73		-	1	643,23	5	#SAKNAS!	-1
KLX04	2004-09-07 14:03	2004-09-07 15:10	645,73	650,73		3	1	648,23	5	3,08E-09	0
KLX04	2004-09-07 15:37	2004-09-07 17:37	650,74	655,74		3	1	653,24	5	2,40E-10	0
KLX04	2004-09-07 18:17	2004-09-07 20:10	655,75	660,75		3	1	658,25	5	1,64E-10	0
KLX04	2004-09-07 22:36	2004-09-07 23:37	660,75	665,75		-	1	663,25	5	#SAKNAS!	-1
KLX04	2004-09-08 00:22	2004-09-08 01:45	665,76	670,76		3	1	668,26	5	7,93E-08	0
KLX04	2004-09-08 10:39	2004-09-08 12:33	670,76	675,76		3	1	673,26	5	1,12E-07	0
KLX04	2004-09-08 14:10	2004-09-08 15:44	675,77	680,77		4	1	678,27	5	#SAKNAS!	-1
KLX04	2004-09-08 16:18	2004-09-08 17:35	680,78	685,78		4	1	683,28	5	#SAKNAS!	-1

transmissivity_tq	value_type_tq	bc_tq	transmissivity_moye	bc_tm	value_type_tm	hydr_cond_moye	formation_width_b	width_of_channel_b	tb	l_measl_tb	u_measl_tb	sb	assumed_sb	leakage_factor_lf	transmissivity_tt	value_type_tt	bc_tt
			1,10E-05	0	0	1,10E-07									2,20E-05	0	1
			2,80E-04	0	0	2,80E-06									2,10E-04	0	1
			1,03E-05	0	0	1,03E-07									5,35E-05	0	1
			5,37E-07	0	0	5,37E-09									1,00E-06	0	1

			3,69E-06	0	0	3,69E-08									4,10E-06	0	1
			2,92E-06	0	0	2,92E-08									3,90E-06	0	1
			#SAKNAS!	0	-1	########									3,50E-10	0	1
			5,48E-08	0	0	5,48E-10									4,30E-08	0	1
			9,58E-07	0	0	9,58E-07									8,20E-07	0	1
			2,55E-06	0	0	1,28E-07									2,60E-06	0	1
			1,56E-07	0	0	7,80E-09									5,60E-07	0	1
			3,69E-08	0	0	1,85E-09									5,80E-08	0	1
			4,60E-07	0	0	2,30E-08									5,40E-07	0	1
			4,95E-06	0	0	2,48E-07									5,90E-06	0	1
			4,75E-05	0	0	2,38E-06									8,10E-05	0	1
			6,98E-07	0	0	3,49E-08									6,20E-07	0	1
			1,39E-05	0	0	6,95E-07									2,10E-05	0	1
			4,61E-07	0	0	2,31E-08									1,70E-06	0	1
			1,17E-04	0	0	5,85E-06									5,10E-05	0	1
			2,96E-07	0	0	1,48E-08									5,40E-07	0	1
			1,25E-07	0	0	6,25E-09									8,80E-08	0	1
			8,02E-06	0	0	4,01E-07									5,60E-05	0	1
			3,45E-07	0	0	1,73E-08									6,40E-07	0	1
			4,50E-09	0	0	2,25E-10									4,40E-09	0	1
			3,68E-07	0	0	1,84E-08									2,50E-06	0	1
			5,16E-08	0	0	2,58E-09									5,70E-08	0	1
			2,37E-09	0	0	1,19E-10									8,20E-10	0	1
			2,78E-08	0	0	1,39E-09									1,80E-08	0	1
			#SAKNAS!	0	-1	########									2,10E-10	0	1
			1,58E-06	0	0	7,90E-08									2,10E-06	0	1
			#SAKNAS!	0	-1	########									4,10E-10	0	1
			2,88E-09	0	0	1,44E-10									1,30E-09	0	1
			5,11E-07	0	0	2,56E-08									9,50E-07	0	1
			1,06E-06	0	0	5,30E-08									1,20E-06	0	1
			1,68E-06	0	0	8,40E-08									3,00E-06	0	1
			1,64E-06	0	0	8,20E-08									2,20E-06	0	1
			3,98E-09	0	0	1,99E-10									2,50E-09	0	1
			8,27E-08	0	0	4,14E-09									2,50E-07	0	1
			#SAKNAS!	0	-1	########									1,80E-10	0	1
			#SAKNAS!	0	-1	########									########	-1	1
			#SAKNAS!	0	-1	########									########	-1	1
			#SAKNAS!	0	-1	########									########	-1	1
			4,21E-08	0	0	2,11E-09									3,50E-08	0	1
			1,30E-08	0	0	6,50E-10									1,60E-08	0	1
			3,27E-07	0	0	1,64E-08									2,90E-07	0	1
			3,40E-07	0	0	1,70E-08									2,40E-07	0	1

			1,33E-07	0	0	6,65E-09									2,70E-07	0	1
			9,04E-08	0	0	4,52E-09									8,20E-08	0	1
			4,36E-08	0	0	8,72E-09									9,10E-08	0	1
			#SAKNAS!	0	-1	########									########	-1	1
			1,84E-07	0	0	3,68E-08									4,58E-07	0	1
			2,16E-07	0	0	4,32E-08									7,19E-07	0	1
			1,09E-08	0	0	2,18E-09									1,38E-08	0	1
			4,30E-08	0	0	8,61E-09									2,30E-07	0	1
			9,37E-10	0	0	1,87E-10									1,32E-08	0	1
			9,02E-08	0	0	1,80E-08									8,50E-08	0	1
			2,52E-08	0	0	5,04E-09									3,20E-08	0	1
			1,21E-07	0	0	2,41E-08									1,10E-07	0	1
			5,21E-06	0	0	1,04E-06									1,47E-05	0	1
			8,03E-07	0	0	1,61E-07									9,10E-06	0	1
			3,03E-07	0	0	6,07E-08									9,21E-07	0	1
			6,13E-09	0	0	1,23E-09									3,30E-09	0	1
			4,50E-08	0	0	9,00E-09									5,23E-08	0	1
			2,29E-07	0	0	4,59E-08									2,30E-07	0	1
			1,32E-08	0	0	2,63E-09									2,08E-08	0	1
			#SAKNAS!	0	-1	########									8,30E-12	0	1
			#SAKNAS!	0	-1	########									8,70E-11	0	1
			#SAKNAS!	0	-1	########									########	-1	1
			1,40E-08	0	0	2,80E-09									1,50E-08	0	1
			6,72E-09	0	0	1,34E-09									6,70E-09	0	1
			1,24E-09	0	0	2,49E-10									9,31E-10	0	1
			3,10E-07	0	0	6,21E-08									2,41E-06	0	1
			#SAKNAS!	0	-1	########									7,93E-11	0	1
			#SAKNAS!	0	-1	########									1,20E-11	0	1
			2,55E-09	0	0	5,09E-10									1,16E-08	0	1
			#SAKNAS!	0	-1	########									########	-1	1
			3,97E-08	0	0	7,93E-09									3,97E-08	0	1
			#SAKNAS!	0	-1	########									8,40E-12	0	1
			1,69E-09	0	0	3,37E-10									1,56E-09	0	1
			#SAKNAS!	0	-1	########									1,30E-10	0	1
			3,68E-10	0	0	7,36E-11									3,09E-09	0	1
			4,01E-09	0	0	8,01E-10									6,20E-09	0	1
			#SAKNAS!	0	-1	########									########	-1	1
			#SAKNAS!	0	-1	########									########	-1	1
			3,17E-08	0	0	6,34E-09									1,10E-07	0	1
			#SAKNAS!	0	-1	########									########	-1	1
			1,07E-06	0	0	2,14E-07									2,38E-06	0	1
			2,47E-08	0	0	4,94E-09									4,50E-08	0	1

			2,24E-07	0	0	4,47E-08									2,69E-07	0	1
			#SAKNAS!	0	-1	########									########	-1	1
			1,39E-09	0	0	2,77E-10									2,84E-09	0	1
			6,00E-10	0	0	1,20E-10									1,33E-09	0	1
			2,56E-10	0	0	5,13E-11									1,15E-09	0	1
			1,76E-07	0	0	3,51E-08									5,76E-07	0	1
			5,50E-08	0	0	1,10E-08									1,66E-07	0	1
			2,58E-07	0	0	5,15E-08									9,04E-07	0	1
			2,07E-07	0	0	4,14E-08									3,27E-07	0	1
			1,01E-07	0	0	2,03E-08									2,15E-07	0	1
			4,44E-09	0	0	8,87E-10									6,10E-09	0	1
			#SAKNAS!	0	-1	########									########	-1	1
			6,51E-07	0	0	1,30E-07									9,18E-07	0	1
			1,78E-07	0	0	3,56E-08									2,88E-07	0	1
			8,41E-08	0	0	1,68E-08									2,58E-07	0	1
			5,88E-07	0	0	1,18E-07									1,68E-06	0	1
			3,32E-07	0	0	6,65E-08									5,54E-07	0	1
			1,19E-06	0	0	2,38E-07									3,07E-06	0	1
			#SAKNAS!	0	-1	########									########	-1	1
			#SAKNAS!	0	-1	########									########	-1	1
			#SAKNAS!	0	-1	########									########	-1	1
			2,55E-09	0	0	5,09E-10									2,84E-09	0	1
			1,98E-10	0	0	3,97E-11									2,03E-10	0	1
			1,36E-10	0	0	2,71E-11									2,06E-10	0	1
			#SAKNAS!	0	-1	########									########	-1	1
			6,55E-08	0	0	1,31E-08									1,85E-07	0	1
			9,22E-08	0	0	1,84E-08									1,56E-07	0	1
			#SAKNAS!	0	-1	########									2,69E-10	0	1
			#SAKNAS!	0	-1	########									3,10E-09	0	1

l_measl_q_s	u_measl_q_s	storativity_s	assumed_s	leakage_koeff	hydr_cond_ks	value_type_ks	l_meas_limit_ks	u_meas_limit_ks	spec_storage_ss	assumed_ss	c	cd	skin	stor_ratio	interflow_coeff
8,00E-06	4,00E-05	1,00E-04	1,00E-04								3,00E-09	3,30E-03	9,40E+00		
1,00E-04	4,00E-04	1,00E-06	1,00E-06								2,20E-07	2,40E+01	-3,90E+00		
7,50E-06	6,50E-05	1,00E-06	1,00E-06								4,10E-09	4,50E-01	2,70E+00		
5,00E-07	2,00E-06	1,00E-06	1,00E-06								8,90E-10	9,80E-02	8,20E+00		

1,00E-06	5,00E-06	1,00E-06	1,00E-06								1,30E-09	1,40E-01	9,00E-01		
2,00E-06	5,00E-06	1,00E-06	1,00E-06								2,90E-10	3,20E-02	2,60E+00		
8,00E-11	7,00E-10	1,00E-06	1,00E-06								1,40E-10	1,50E-02	2,70E+00		
2,00E-08	8,00E-08	1,00E-06	1,00E-06								3,00E-10	3,30E-02	0,00E+00		
6,00E-07	1,00E-06	1,00E-06	1,00E-06								2,10E-09	2,30E-01	-1,40E+00		
9,00E-07	5,00E-06	1,00E-04	1,00E-04								1,80E-09	2,00E-03	2,30E+00		
1,00E-07	7,00E-07	1,00E-04	1,00E-04								8,40E-11	9,30E-05	1,73E+01		
2,00E-08	7,00E-08	1,00E-04	1,00E-04								6,40E-11	7,10E-05	6,80E+00		
3,00E-07	7,00E-07	1,00E-04	1,00E-04								1,30E-10	1,40E-04	2,60E+00		
4,00E-06	2,00E-05	1,00E-04	1,00E-04								1,30E-09	1,40E-03	1,90E+00		
4,00E-05	9,00E-05	1,00E-06	1,00E-06								2,40E-08	2,70E+00	1,80E+00		
3,00E-07	8,00E-07	1,00E-06	1,00E-06								6,50E-11	7,20E-03	-1,80E+00		
9,00E-06	4,00E-05	1,00E-06	1,00E-06								3,80E-09	4,20E-01	1,60E+00		
4,00E-07	2,00E-06	1,00E-06	1,00E-06								1,10E-10	1,20E-02	1,49E+01		
4,00E-05	2,00E-04	1,00E-06	1,00E-06								4,00E-08	4,40E+00	-5,90E+00		
2,00E-07	7,00E-07	1,00E-06	1,00E-06								1,80E-10	2,00E-02	4,60E+00		
7,00E-08	2,00E-07	1,00E-06	1,00E-06								7,30E-11	8,00E-03	-2,50E+00		
8,00E-06	6,00E-05	1,00E-06	1,00E-06								5,00E-09	5,50E-01	3,02E+01		
2,00E-07	8,00E-07	1,00E-06	1,00E-06								1,50E-10	1,60E-02	4,60E+00		
2,00E-09	6,00E-09	1,00E-06	1,00E-06								5,50E-11	6,00E-03	1,70E+00		
3,00E-07	4,00E-06	1,00E-06	1,00E-06								6,84E-10	7,54E-02	3,01E+01		
3,00E-08	8,00E-08	1,00E-06	1,00E-06								6,00E-11	6,60E-03	9,00E-01		
7,00E-10	4,00E-09	1,00E-06	1,00E-06								1,57E-10	1,73E-02	-1,60E+00		
8,00E-09	4,00E-08	1,00E-06	1,00E-06								1,45E-11	1,60E-03	-1,16E+00		
1,00E-10	1,00E-09	1,00E-06	1,00E-06								3,00E-11	3,30E-03	1,60E+00		
9,00E-07	3,00E-06	1,00E-06	1,00E-06								4,30E-10	4,80E-02	1,50E+00		
7,00E-11	7,00E-10	1,00E-06	1,00E-06								3,40E-11	3,70E-03	3,30E+00		
9,00E-10	3,00E-09	1,00E-06	1,00E-06								7,44E-11	8,20E-03	-9,00E-01		
3,00E-07	1,00E-06	1,00E-06	1,00E-06								1,10E-09	1,20E-01	0,00E+00		
8,00E-07	4,00E-06	1,00E-06	1,00E-06								9,30E-10	1,00E-01	-5,00E-01		
1,00E-06	6,00E-06	1,00E-06	1,00E-06								6,20E-10	6,80E-02	3,80E+00		
1,00E-06	4,00E-06	1,00E-06	1,00E-06								2,60E-10	2,90E-02	1,90E+00		
9,00E-10	4,00E-09	1,00E-06	1,00E-06								4,80E-11	5,20E-03	-3,00E-01		
7,00E-08	5,00E-07	1,00E-06	1,00E-06								5,00E-11	5,50E-03	-9,00E-01		
9,00E-11	6,00E-10	1,00E-06	1,00E-06								3,40E-11	3,80E-03	5,90E+00		
########	########	########	1,00E-06								########	#SAKNAS!	#SAKNAS!		
########	########	########	1,00E-06								########	#SAKNAS!	#SAKNAS!		
########	########	########	1,00E-06								########	#SAKNAS!	#SAKNAS!		
8,00E-09	6,00E-08	1,00E-06	1,00E-06								5,30E-11	5,90E-03	0,00E+00		
7,00E-09	4,00E-08	1,00E-06	1,00E-06								8,70E-11	9,60E-03	4,80E+00		
5,00E-08	4,00E-07	1,00E-06	1,00E-06								1,20E-10	1,30E-02	-1,10E+00		
5,00E-08	4,00E-07	1,00E-06	1,00E-06								9,70E-11	1,10E-02	-2,30E+00		

9,00E-08	4,00E-07	1,00E-06	1,00E-06								9,00E-11	9,90E-03	5,20E+00		
5,00E-08	2,00E-07	1,00E-06	1,00E-06								6,10E-10	6,70E-02	5,00E-01		
3,00E-08	2,00E-07	1,00E-06	1,00E-06								1,64E-11	1,81E-03	1,92E+00		
########	########	########	1,00E-06								########	#SAKNAS!	#SAKNAS!		
1,00E-07	8,00E-07	1,00E-06	1,00E-06								4,82E-11	5,31E-03	5,50E+00		
2,00E-07	9,00E-07	1,00E-06	1,00E-06								3,57E-11	3,93E-03	9,40E+00		
6,00E-09	4,00E-08	1,00E-06	1,00E-06								1,51E-11	1,66E-03	0,00E+00		
8,00E-08	5,00E-07	1,00E-06	1,00E-06								1,46E-11	1,61E-03	2,16E+01		
3,00E-09	4,00E-08	1,00E-06	1,00E-06								2,04E-11	2,25E-03	3,30E+01		
5,00E-08	3,00E-07	1,00E-06	1,00E-06								########	#SAKNAS!	-1,10E+00		
1,00E-08	6,00E-08	1,00E-06	1,00E-06								1,49E-11	1,64E-03	1,30E+00		
7,00E-08	4,00E-07	1,00E-06	1,00E-06								########	#SAKNAS!	-1,50E+00		
6,00E-06	4,00E-05	1,00E-06	1,00E-06								1,88E-09	2,07E-01	5,90E+00		
1,00E-06	9,00E-06	1,00E-06	1,00E-06								2,88E-10	3,17E-02	3,17E+01		
5,00E-07	2,00E-07	1,00E-06	1,00E-06								6,92E-11	7,63E-03	8,60E+00		
2,00E-09	4,00E-08	1,00E-06	1,00E-06								1,51E-11	1,66E-03	0,00E+00		
3,00E-08	9,00E-08	1,00E-06	1,00E-06								1,19E-11	1,31E-03	4,00E-01		
9,00E-08	4,00E-07	1,00E-06	1,00E-06								7,13E-11	7,86E-03	-1,30E+00		
9,00E-09	4,00E-08	1,00E-06	1,00E-06								3,26E-11	3,59E-03	2,80E+00		
7,00E-12	5,00E-11	1,00E-06	1,00E-06								8,50E-12	9,37E-04	2,30E+00		
7,00E-11	4,00E-10	1,00E-06	1,00E-06								1,95E-11	2,15E-03	8,00E-01		
########	########	1,00E-06	1,00E-06								########	#SAKNAS!	#SAKNAS!		
7,00E-09	4,00E-08	1,00E-06	1,00E-06								1,14E-11	1,26E-03	0,00E+00		
2,00E-09	8,00E-09	1,00E-06	1,00E-06								1,41E-11	1,55E-03	0,00E+00		
8,00E-09	3,00E-09	1,00E-06	1,00E-06								1,46E-11	1,61E-03	0,00E+00		
7,00E-07	5,00E-06	1,00E-06	1,00E-06								6,07E-10	6,69E-02	3,13E+01		
5,00E-11	3,00E-10	1,00E-06	1,00E-06								6,27E-12	6,91E-04	3,60E+00		
8,00E-12	7,00E-11	1,00E-06	1,00E-06								7,91E-13	8,72E-05	2,60E+00		
5,00E-09	3,00E-08	1,00E-06	1,00E-06								1,40E-11	1,54E-03	1,59E+01		
########	########	########	1,00E-06								########	#SAKNAS!	#SAKNAS!		
1,00E-08	8,00E-08	1,00E-06	1,00E-06								1,85E-11	2,04E-03	0,00E+00		
1,00E-12	1,00E-11	########	1,00E-06								8,93E-12	9,84E-04	1,00E+00		
8,00E-10	4,00E-09	1,00E-06	1,00E-06								6,26E-11	6,90E-03	1,40E+00		
3,00E-11	3,00E-10	########	1,00E-06								4,92E-11	5,42E-03	1,10E+00		
6,00E-10	4,00E-09	1,00E-06	1,00E-06								1,35E-11	1,49E-03	1,59E+01		
7,00E-10	7,00E-09	1,00E-06	1,00E-06								1,55E-10	1,71E-02	2,10E+00		
########	########	########	1,00E-06								########	#SAKNAS!	#SAKNAS!		
########	########	########	1,00E-06								########	#SAKNAS!	#SAKNAS!		
7,00E-08	4,00E-07	1,00E-06	1,00E-06								1,30E-11	1,43E-03	1,06E+01		
########	########	########	1,00E-06								########	#SAKNAS!	#SAKNAS!		
9,00E-07	5,00E-06	1,00E-06	1,00E-06								1,59E-10	1,75E-02	4,30E+00		
9,00E-09	5,00E-08	1,00E-06	1,00E-06								1,75E-11	1,93E-03	2,60E+00		

9,00E-08	5,00E-07	1,00E-06	1,00E-06								3,31E-11	3,65E-03	0,00E+00		
########	########	########	1,00E-06								########	#SAKNAS!	#SAKNAS!		
7,00E-10	4,00E-09	1,00E-06	1,00E-06								1,82E-11	2,01E-03	5,41E+00		
5,00E-10	3,00E-09	1,00E-06	1,00E-06								1,67E-11	1,84E-03	5,46E+00		
1,00E-10	2,00E-09	1,00E-06	1,00E-06								1,11E-11	1,22E-03	1,03E+01		
3,00E-07	6,00E-07	1,00E-06	1,00E-06								1,43E-10	1,58E-02	1,05E+01		
7,00E-08	4,00E-07	1,00E-06	1,00E-06								1,97E-11	2,17E-03	8,60E+00		
6,00E-07	2,00E-06	1,00E-06	1,00E-06								6,36E-10	7,01E-02	1,09E+01		
8,00E-08	6,00E-07	1,00E-06	1,00E-06								6,58E-10	7,25E-02	1,60E+00		
8,00E-08	5,00E-07	1,00E-06	1,00E-06								1,70E-11	1,87E-03	3,00E+00		
1,00E-09	9,00E-09	1,00E-06	1,00E-06								1,73E-11	1,91E-03	0,00E+00		
########	########	########	1,00E-06								########	#SAKNAS!	#SAKNAS!		
7,00E-07	3,00E-06	1,00E-06	1,00E-06								8,36E-10	9,21E-02	0,00E+00		
1,00E-07	7,00E-07	1,00E-06	1,00E-06								2,65E-11	2,92E-03	1,80E+00		
9,00E-08	6,00E-07	1,00E-06	1,00E-06								5,95E-11	6,56E-03	9,50E+00		
6,00E-07	4,00E-06	1,00E-06	1,00E-06								1,45E-10	1,60E-02	7,70E+00		
2,00E-07	9,00E-07	1,00E-06	1,00E-06								4,48E-11	4,94E-03	1,50E+00		
9,00E-07	6,00E-06	1,00E-06	1,00E-06								1,98E-10	2,18E-02	5,90E+00		
########	########	########	1,00E-06								########	#SAKNAS!	#SAKNAS!		
########	########	########	1,00E-06								########	#SAKNAS!	#SAKNAS!		
########	########	########	1,00E-06								########	#SAKNAS!	#SAKNAS!		
7,00E-10	5,00E-09	1,00E-06	1,00E-06								1,44E-11	1,59E-03	1,90E+00		
8,00E-11	6,00E-10	1,00E-06	1,00E-06								6,23E-12	7,67E-04	2,40E+00		
7,00E-11	6,00E-10	1,00E-06	1,00E-06								4,67E-12	5,15E-04	4,20E+00		
########	########	########	1,00E-06								########	#SAKNAS!	#SAKNAS!		
8,00E-08	5,00E-07	1,00E-06	1,00E-06								2,07E-11	2,28E-03	8,00E+00		
8,00E-08	4,00E-08	1,00E-06	1,00E-06								1,43E-11	1,58E-03	9,00E-01		
8,00E-11	6,00E-10	########	1,00E-06								8,44E-12	9,30E-04	3,80E+00		
5,00E-10	5,00E-09	########	1,00E-06								2,33E-11	2,57E-03	6,10E+00		

dt1	dt2	transmissivity_t_ilr	storativity_s_ilr	value_type_t_ilr	bc_t_ilr	c_ilr	cd_ilr	skin_ilr	stor_ratio_ilr	interflow_coeff_ilr	transmissivity_t_grf	value_type_t_grf	bc_t_grf	storativity_s_grf	flow_dim_grf	comment
43	1016															
112	286															
75	1512															
262	1329															

202	491
130	1397
16	151
184	1021
241	1496
111	211
111	485
67	650
47	854
497	749
83	970
34	128
26	246
32	412
410	1018
55	471
30	496
88	922
55	578
24	346
201	660
73	377
323	670
77	1128
########	#SAKNAS!
23	93
107	1006
176	864
273	969
95	893
12	882
20	107
84	843
4	13
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########	#SAKNAS!
########	#SAKNAS!
64	647
########	#SAKNAS!
70	628
10	1130

70	216
68	974
4	62
########	#SAKNAS!
61	150
48	238
10	63
40	127
########	#SAKNAS!
31	510
24	414
436	1022
221	984
51	204
37	1070
536	1073
57	345
62	927
197	974
########	#SAKNAS!
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########	#SAKNAS!
687	994
743	997
220	655
190	751
39	373
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########	#SAKNAS!
########	#SAKNAS!
10	50
1427	2192
########	#SAKNAS!
967	1607
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########	#SAKNAS!
########	#SAKNAS!
29	103
########	#SAKNAS!
11	74
910	1126

34	74
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########	#SAKNAS!
########	#SAKNAS!
92	1184
33	82
52	888
21	321
4	127
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########	#SAKNAS!
170	988
47	140
122	532
62	457
637	994
222	737
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########	#SAKNAS!
55	620
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########	#SAKNAS!
########	#SAKNAS!
36	1027
9	22
39	416
34	312