P-08-57

Oskarshamn site investigation

Transient evaluation of PFL pumping tests

Subarea Laxemar and Simpevarp

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Abstract

Hydraulic pumping tests have been performed at Laxemar, Simpevarp and Ävrö in 32 boreholes. The pumping tests were conducted in the frame of difference flow logging (PFL pumping tests) as open borehole tests. During the pumping phases the pressure in the active boreholes was monitored. The tests are part of the general program for site investigations and specifically for the subareas Laxemar and Simpevarp. The hydraulic testing programme has the aim to characterise the rock with respect to its hydraulic properties. Data is subsequently delivered for the site descriptive model.

This report describes the results and transient data evaluation of the 32 pumping tests which were performed between 2003 and 2008. The recorded data of the conducted pumping tests were delivered by SKB.

Sammanfattning

Hydrauliska pumping tester har utförts i 32 borrhål i Laxemark, Simpevarp och Ävrö. Pumptesterna utfördes i anslutning till differens flödesloggning (PFL) i öppna borrhålstester. Under pumpfasen loggades tryckförändringen i borrhålet. Testerna ingår i en del av SKB:s platsundersökningar, specifikt för delområdena Laxemar och Simpevarp. Hydraultestprogrammet har som mål att karakterisera berget med avseende på dess hydrauliska egenskaper. Data från testerna används för den platsbeskrivande modelleringen av området.

Denna rapport redovisar resultaten och transient data utvärdering av de 32 pumptesterna som utfördes mellan 2003 och 2008. Tryckdata från pumptesterna levererades från SKB.

Contents

Appendices attached on CD

1 Introduction

A general program for site investigations presenting survey methods has been prepared /SKB 2001/ as well as a site specific program for the investigations in the Simpevarp area /SKB 2002/ and a program specifically for the Oskarshamn location /SKB 2005/.

This document reports the results gained by the evaluation of already existing difference flow logging (PFL) pumping test data, performed in 32 different boreholes which were one of the activities performed within the site investigation at Oskarshamn. The data evaluation work was carried out in accordance with activity plan AP PS 400-08-14. Controlling documents for performing this activity are listed In Table 1-1. Both, activity plan and method descriptions are SKB's internal controlling documents.

Hydraulic pumping tests have been performed for SKB in 32 boreholes at the Laxemar, Simpevarp areas in open boreholes in the frame of difference flow logging (PFL). The pumping tests have been performed in the time range from 2003 to 2008. Monitoring of flow rates and pressures in the pumped boreholes were carried out for SKB by a contractor. These data were delivered by SKB for further analyses.

Measurements were carried out between 2003 and 2008 following the methodologies described in SKB MD 326.001 (flow logging with single hole pumping tests) and relevant activity plans (SKB internal controlling documents) specifying in detail the pumping test campaigns. Data and results were delivered to the SKB site characterization database SICADA where they are traceable by the activity plan number.

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 transient data evaluation and results of pumping tests in 32 boreholes in the Laxemar, Simpevarp area. The analysis was conducted by Golder Associates AB and Golder Associates GmbH.

The boreholes are situated in the Laxemar, Simpevarp and Ävrö areas west and east of the nuclear power plant of Simpevarp. Technical borehole information is obtained from the SICADA database of SKB.

The location of the tested boreholes is shown in Figure 1-1.

Table 1-1. Controlling documents for the performance of the activity.

Activity plan	Number	Version
Transient utvärdering av PFL pumptester	AP PS 400-08-14	1.0
Method descriptions	**Number**	**Version**
Instruktion för analys av hydrauliska injections- och enhålspumptester	SKB MD 320.004	2.0
Metodbeskrivning för hydrauliska enhålspumptester	SKB MD 321.003	1.0
Instruktion för rengöring av borrhålsutrustning och viss markbaserad utrustning.	SKB MD 600.004	1.0
Inleverans av data	SKB SD-111	1.0
Framtagande och hantering av P-rapporter	SKB SDK-107	1.0
Hantering av primärdata vid platsundersökningar	SKB SDP-508	1.0

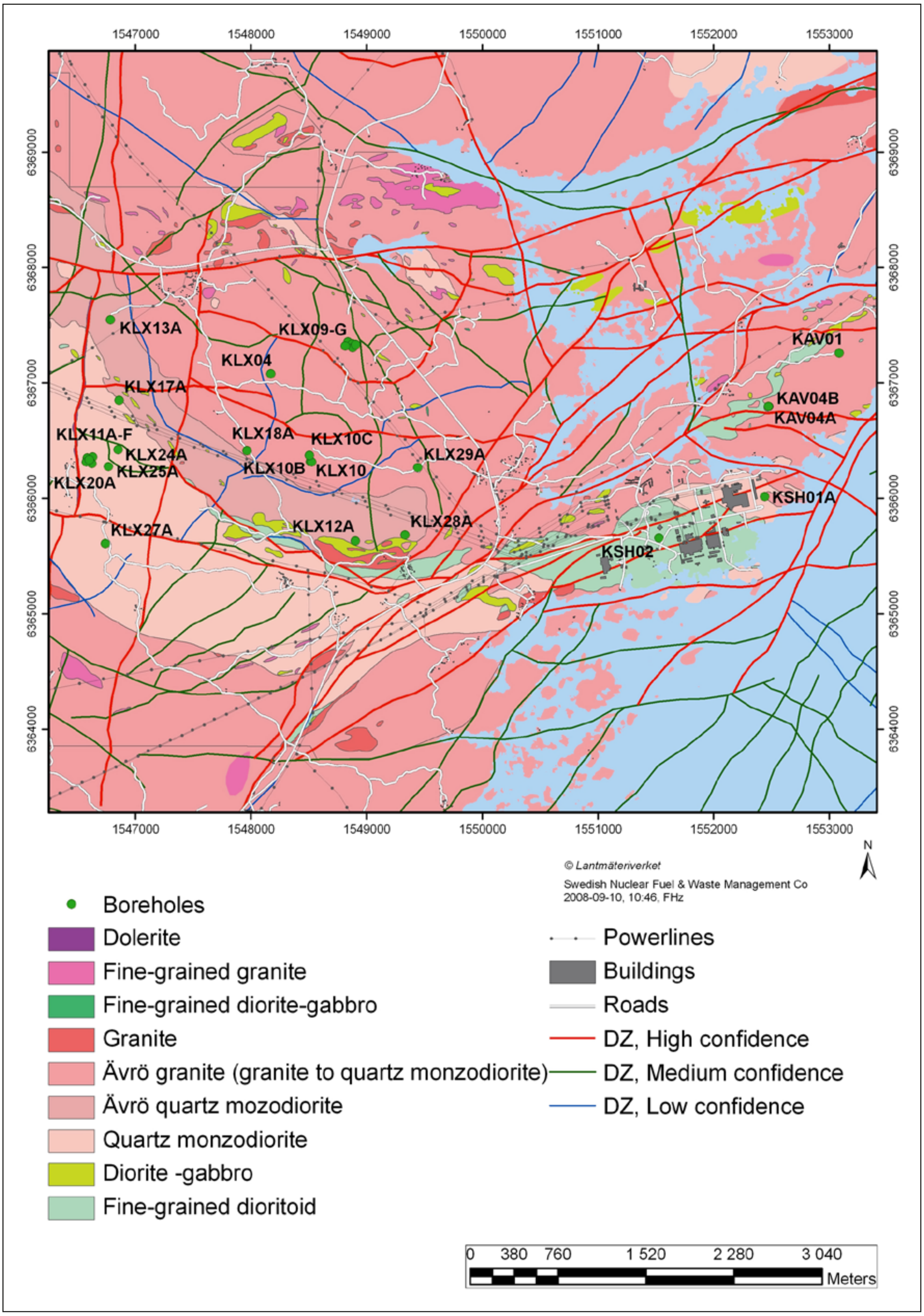

Figure 1-1. *Borehole location map.*

2 Objective and scope

The major objective of the performed testing program was to resolve the hydraulic properties transmissivity and hydraulic conductivity of the fracture network and the rock mass around the boreholes. A special objective of the transient evaluation of both phases (perturbation and recovery periods) of each of the constant rate pumping tests is to provide additional information such as transmissivity, flow regimes and hydraulic boundaries. The scope of work consisted of preparation and analysis of data of pumping tests in 32 boreholes.

The following pumping tests were performed between 2003 and 2008.

Table 2-1. Performed test programme of PFL test analysed in this report.

Borehole	Year	Activity plan No.	P-rapport No.	Duration Pumping [h]	Duration Recovery [h]
KAV01	2004	AP PS 400-03-085	P-04-213	102.65	22.75
KAV04A	2004	AP PS 400-04-035	P-04-216	131.35	15.08
KAV04B	2004	AP PS 400-04-035	P-04-216	20.57	16.32
KLX04	2004	AP PS 400-04-066	P-05-68	165.65	23.72
KLX09	2006	AP PS 400-05-107	P-06-164	187.70	55.32
KLX09B	2006	AP PS 400-05-106	P-06-199	141.47	72.2
KLX09C	2006	AP PS 400-05-106	P-06-199	138.27	97.42
KLX09D	2006	AP PS 400-05-106	P-06-199	141.12	67.77
KLX09E	2006	AP PS 400-05-106	P-06-199	141.58	75.87
KLX09F	2006	AP PS 400-05-106	P-06-199	143.12	48.62
KLX09G	2006	AP PS 400-06-084	P-06-229	51.68	87.63
KLX10	2005	AP PS 400-05-082	P-06-58	188.83	235.17
KLX10B	2006	AP PS 400-06-084	P-06-229	48.98	146.50
KLX10C	2006	AP PS 400-06-084	P-06-229	51.10	65.45
KLX11A	2006	AP PS 400-06-079	P-07-24	126.25	45.68
KLX11B	2006	AP PS 400-06-087	P-07-64	189.33	72.97
KLX11C	2006	AP PS 400-06-087	P-07-64	44.85	26.50
KLX11D	2006	AP PS 400-06-087	P-07-64	142.02	94.68
KLX11E	2006	AP PS 400-06-087	P-07-64	160.25	80.80
KLX11F	2006	AP PS 400-06-087	P-07-64	44.08	81.83
KLX12A	2006	AP PS 400-06-048	P-06-185	121.72	88.85
KLX13A	2006	AP PS 400-06-080	P-06-245	117.25	22.07
KLX17A	2007	AP PS 400-06-119	P-07-34	116.35	71.33
KLX18A	2006	AP PS 400-06-070	P-06-184	167.98	152.80
KLX20A	2006	AP PS 400-06-071	P-06-183	97.73	236.68
KLX24A	2006	AP PS 400-06-092	P-06-246	71.23	237.58
KLX25A	2006	AP PS 400-06-092	P-06-246	49.88	24.00
KLX27A	2008	AP PS 400-07-057	P-08-22	152.67	159.58
KLX28A	2006	AP PS 400-06-106	P-07-17	40.43	24.62
KLX29A	2006	AP PS 400-06-106	P-07-17	23.30	17.33
KSH01A	2003	AP PS 400-02-030	P-03-70	168.27	23.12
KSH02	2003	AP PS 400-03-033	P-03-110	217.20	51.05

2.1 Pumped boreholes

Technical data of the pumped boreholes are shown in Appendix 4. The reference point in the boreholes is the centre of top of casing (ToC), given as Elevation in the 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.

2.2 Tests

The tests performed in the 32 boreholes are listed in Table 2-2. They were conducted according to the relevant Activity Plans (SKB internal document). All tests were conducted as constant rate pumping tests, primarily intended to perform difference flow logging (PFL pumping tests). All pumping test data were provided by SKB.

It should be noted that upper limit of the test section is always defined as bottom of casing respectively bottom of cone if the cone is directly connected to the casing.

Table 2-2. Tests performed.

Bh ID	Test section (mbToC)	Test type*	Test no	Test start Date, time (yyyy-mm-dd hh:mm:ss)	Test stop Date, time (yyyy-mm-dd hh:mm:ss)
KAV01	70.04–757.31	1B	1	2004-02-18 16:25:51	2004-02-26 14:46:42
KAV04A	100.95–1,004.00	1B	1	2004-06-10 12:24:29	2004-06-16 14:55:24
KAV04B	11.52–101.03	1B	1	2004-06-16 17:18:30	2004-06-18 06:11:46
KLX04	101.43–993.49	1B	1	2004-07-29 09:56:34	2004-08-06 12:08:04
KLX09	11.95–880.38	1B	1	2006-05-11 20:27:18	2006-05-23 16:47:46
KLX09B	10.74–100.22	1B	1	2006-02-21 10:45:25	2006-04-09 11:50:36
KLX09C	9.00–120.05	1B	1	2006-02-16 14:14:37	2006-04-10 15:03:40
KLX09D	9.75–121.02	1B	1	2006-02-17 09:50:03	2006-04-08 16:13:03
KLX09E	9.00–120.00	1B	1	2006-02-18 10:20:24	2006-04-10 08:32:58
KLX09F	9.00–152.30	1B	1	2006-02-20 10:21:50	2006-04-11 09:05:58
KLX09G	9.30–100.10	1B	1	2006-07-12 14:07:45	2006-07-19 06:00:00
KLX10	12.10–1,001.20	1B	1	2005-12-10 11:10:26	2005-12-31 07:35:00
KLX10B	9.00–50.25	1B	1	2006-07-18 15:01:58	2006-07-27 14:19:30
KLX10C	9.00–146.25	1B	1	2006-07-24 12:59:28	2006-07-30 06:58:30

Bh ID	Test section (mbToC)	Test type*	Test no	Test start Date, time (yyyy-mm-dd hh:mm:ss)	Test stop Date, time (yyyy-mm-dd hh:mm:ss)
KLX11A	12.05–992.29	1B	1	2006-10-29 08:56:03	2006-11-13 10:50:43
KLX11B	2.54–100.20	1B	1	2006-09-04 15:01:10	2006-10-22 15:57:36
KLX11C	2.00–120.15	1B	1	2006-09-06 10:14:06	2006-10-20 13:00:39
KLX11D	2.00–120.35	1B	1	2006-09-07 16:48:38	2006-10-21 09:42:16
KLX11E	2.00–121.30	1B	1	2006-09-22 14:47:36	2006-10-02 15:53:02
KLX11F	2.00–120.05	1B	1	2006-10-16 10:16:54	2006-10-21 16:45:09
KLX12A	17.92–602.29	1B	1	2006-06-09 16:05:49	2006-06-19 08:54:00
KLX13A	11.75–595.85	1B	1	2006-09-24 14:30:44	2006-10-01 11:24:02
KLX17A	11.95–701.08	1B	1	2006-12-10 16:56:53	2007-01-11 14:01:10
KLX18A	11.83–611.28	1B	1	2006-07-07 12:05:53	2006-07-22 00:00:00
KLX20A	100.90–457.92	1B	1	2006-06-18 09:17:06	2006-07-11 09:35:00
KLX24A	2.41–100.17	1B	1	2006-08-23 11:10:48	2006-09-06 14:20:00
KLX25A	2.20–50.24	1B	1	2006-08-16 15:53:42	2006-08-20 10:55:04
KLX27A	14.76–650.56	1B	1	2007-12-15 10:52:33	2008-01-16 11:21:00
KLX28A	5.10–80.23	1B	1	2006-11-24 11:28:37	2006-11-27 08:48:02
KLX29A	2.35–60.25	1B	1	2006-11-27 14:00:11	2006-11-29 08:56:00
KSH01A	12.10–1,003.00	1B	1	2003-02-20 14:05:33	2003-03-02 14:54:32
KSH02	80.00–1,001.11	1B	1	2003-07-09 11:57:09	2003-07-22 16:15:28

* 1B: pumping test-submersible pump.

3 Equipment

3.1 Description of equipment/interpretation tools

As the pumping tests were not performed by Golder, only a generalized description of the used PFL equipment is given. For further information about the equipment and performance of the individual tests see the relevant reports mentioned in Table 5-1.

Unlike traditional types of borehole flowmeters which are measuring the total cumulative flow rate along the borehole, the difference flowmeter measures the flow rate into or out of limited sections of the borehole. The advantage of measuring the flow rate in isolated sections is a better detection of incremental changes of flow along the hydraulic profile of a borehole, which are typically very small and can easily be missed using traditional types of flowmeters.

Rubber disks at both ends of the downhole tool are used to isolate the flow rate in the test section from the flow rate in the rest of the borehole. The flow inside the test section is led through a separate tube and passes through the area where the flow sensors are located. The flow along the borehole outside of the isolated test section passes through the test section by a bypass pipe and is discharged at the upper end of the downhole tool. This entire structure is named the flow guide.

In addition to the main focus of measuring the flow of distinct sections of the borehole, the total flow of the borehole was measured as well. In the following, the transient pumping test analyses are based on the total flow rate and the total drawdown measured in the open borehole during performance of the PFL pumping tests.

3.2 Sensors

No information is given about technical specification of the used sensors and when the last calibration of sensors was performed. It is assumed that actual calibration values were taken from the calibration protocols and inserted to the data acquisition system.

3.3 Data acquisition system

Pressure and flow data are logged in stand alone logger system. No further detailed information about the data acquisition system were obtained in the frame of the project.

4 Execution

4.1 General

As the pumping tests were not performed by Golder, it is just assumed that testing was carried out according to SKB's methodology as outlined in the internal SKB document SKB MD 326.001. The overall activity has to involve the following components:

- Preparations.
- Function control of transducers and data system.
- Pump testing in connection to difference flow logging.
- Analyses of hydraulic tests.
- Reporting.

The basic testing sequence for the pumping tests was to perform a constant head and rate withdrawal followed by a pressure recovery.

4.2 Preparations

As the pumping tests were not performed by Golder, no description about performed testing preparations can be given for the pumping tests.

4.3 Execution of field work

4.3.1 Test principle

The pumping tests were conducted as constant flow rate tests (CRw phase) followed by a pressure recovery period (CRwr phase). The intention was to achieve a drawdown of approximately 10 m. The actual durations of the phases are shown in Table 2-1.

4.3.2 Test procedure

A test cycle includes the following phases: 1) Transfer of down-hole equipment into the borehole. 2) Pressure stabilisation. 3) Constant rate withdrawal. 4) Pressure recovery. 5) Running the equipment out of the borehole. The pumping tests have been carried out by applying a constant rate withdrawal with a drawdown up to approximately 10. The flow rates and the drawdowns at the end of the perturbation phase are summarised in Table 4-1.

Before start of the pumping tests, approximately stable pressure conditions prevailed in the test section. After the perturbation period, the pressure recovery in each section was measured. Tidal effects were observed as disturbances of the pressure responses only at the end of some recovery phases. No information about eventual major rainfall during performance of the pumping tests which may have disturbed the measurements was obtained.

Table 4-1. Final flow rate and drawdown of pumping tests.

Bh ID	Section [mbToC]	Final flow rate [L/min]	Drawdown* [m]
KAV01	70.04–757.31	18.7	9.96
KAV04A	100.95–1,004.00	10.6	10.00
KAV04B	11.52–101.03	23.4	10.11
KLX04	101.43–993.49	49.1	6.67
KLX09	11.95–880.38	66.7	4.85
KLX09B	10.74–100.22	9.8	10.10
KLX09C	9.00–120.05	31.7	5.20
KLX09D	9.75–121.02	13.9	9.50
KLX09E	9.00–120.00	31.25	5.50
KLX09F	9.00–152.30	33.3	3.62
KLX09G	9.30–100.10	8.2	7.91
KLX10	12.10–1,001.20	87.0	6.93
KLX10B	9.00–50.25	27.8	9.87
KLX10C	9.00–146.25	6.77	10.38
KLX11A	12.05–992.29	34.0	10.74
KLX11B	2.54–100.20	16.0	9.40
KLX11C	2.00–120.15	1.75	10.74
KLX11D	2.00–120.35	21.1	10.83
KLX11E	2.00–121.30	2.26	9.70
KLX11F	2.00–120.05	22.8	12.38
KLX12A	17.92–602.29	6.25	9.56
KLX13A	11.75–595.85	39.0	10.03
KLX17A	11.95–701.08	14.2	10.28
KLX18A	11.83–611.28	11.68	10.14
KLX20A	100.90–457.92	6.74	10.10
KLX24A	2.41–100.17	15.84	9.78
KLX25A	2.20–50.24	0.75	4.62
KLX27A	14.76–650.56	13.9	13.96
KLX28A	5.10–80.23	1.45	10.62
KLX29A	2.35–60.25	9.6	5.24
KSH01A	12.10–1,003.00	3.1	10.34
KSH02	80.00–1,001.11	3.28	10.54

* Pressure difference just before start and immediately before stop of pumping.

4.4 Data handling/post processing

SKB was responsible for recording and collecting the data of the pumping boreholes. SKB delivered the pressure data in *.csv format files. These files were imported and processed to Excel for further evaluation and analysis. The unit of the relevant pressure data was meter above sea level (m.a.s.l.). To analysis the data with the corresponding software the pressure was converted into Kilopascal (kPa). Finally, the test data were exported from Excel in *.txt format. These files were also used for the subsequent test analysis. Flow rate information was delivered by SKB in *.dat format files. These files were used as input files for the analysis and additionally used for calculating a mean flow rate for comparative steady state calculations.

4.5 Analyses and interpretations

4.5.1 Analysis software

The pumping tests were analysed using a type curve matching method. The analyses were performed using Paradigm's test analysis program Interpret 2008. Interpret 2008 is an interactive program that uses a constant rate solution to provide optimized hydraulic parameters for a wide range of potential reservoir models. Some of the features of Interpret 2008 include extensive superposition of constant rate events, non-linear regression and multi-event rate normalized plots. Multi-event plots allow the relevant phases to be presented on a single plot to evaluate for consistency of the formation response throughout the test. Additionally, it can accommodate changing wellbore storage and skin between the test periods.

4.5.2 Analysis approach

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

4.5.3 Analysis methodology

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

- 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 m tching 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/.

4.5.4 Correlation between Storativity and Skin factor

For the analysis of the conducted hydraulic tests a storativity of $1 \cdot 10^{-6}$ is assumed (SKB MD 320.004). Based on these assumptions the skin will be calculated. In the following the correlation between storativity and skin for the relevant test phases will be explained in greater detail.

The wellbore storage coefficient (C) is determined by matching the early time data with the corresponding type curve. The derived C-value is introduced in the equation of the type curve parameter:

$$(C_D e^{2\xi})_M = \frac{C \rho g}{2\pi r_w^2 S} e^{2\xi}$$

The equation above has two unknowns, the storativity (S) and the skin factor (ξ) which expresses the fact that for the case of constant rate and pressure recovery tests the storativity and the skin factor are 100% correlated. Therefore, the equation can only be either solved for skin by assuming that the storativity is known or solved for storativity by assuming the skin as known.

In case of the present analyses the porosity (ϕ) instead of the storativity was used as an input parameter for the transient test analyses in Interpret 2008. The relationship between the porosity and storativity is given by following equation:

$$S = \phi \ c_t \ h \rho \ g$$

S Storativity assumed $1 \cdot 10^{-6}$

c_t total compressibility as sum of the compressibility of water ($5 \cdot 10^{-10}$ 1/Pa) and rock compressibility ($1 \cdot 10^{-10}$ 1/Pa)

h length of section in m

ρ density of water assumed to 1,000 kg/m³

g gravity constant 9.81 m/s²

4.5.5 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/.

4.5.6 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.

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. All tests were analysed using a flow dimension of two (radial flow).

4.5.7 Calculation of the static formation pressure and equivalent freshwater head

The static formation pressure (p*) measured at transducer depth, was derived from the pressure recovery (CRwr) following the constant pressure injection phase by using:

(1) straight line extrapolation in cases infinite acting radial flow (IARF) occurred,

(2) type curve extrapolation in cases infinite acting radial flow (IARF) is unclear or was not reached.

The equivalent freshwater head (expressed in meters above sea level) was calculated from the extrapolated static formation pressure p* derived from the analysis (see chapter 4.4).

4.5.8 Determination of the ri-index and calculation of the radius of influence (ri)

The analysis provides also the radius of influence and the ri-index, which describes the late time behaviour of the derivative (see also SKB MD320.004).

RI-Index

The determination of the ri-Index is based on the shape of the derivative plotted in log-log coordinates and describes the behaviour of the derivative after the time t_2, representing the end of the near wellbore response. The ri-index also describes the flow regime at the end of the test. Following ri-indices can be assigned:

- ri-index = 0: The middle and late time derivative shows a horizontal stabilization. This pressure response indicates that the size of the hydraulic feature is greater than the radius of influence. The calculated radius of influence is based on the entire test time t_P and t_s, respectively.
- ri-index = 1: The derivative shows an upward trend at late times, indicating a decrease of transmissivity or a barrier boundary at some distance from the borehole. The size of the hydraulic feature near the borehole is estimated as the radius of influence based on dt_2.
- ri-index = –1: The derivative shows a downward trend at late times, indicating an increase of transmissivity or a constant head boundary at some distance from the borehole. The size of the hydraulic feature near the borehole is estimated as the radius of influence based on dt_2.

If no radial flow stabilization can be observed the ri-index is based on the flow regime at the end of the test: i.e. ri-index = 1 for tests with a derivative showing an upward trend at the end and a ri-index= –1 for tests with a derivative showing a downward trend. In such cases the calculated radius of influence is based on the entire test time t_P.

Calculation of the radius of influence

The radius of influence (ri) is calculated as follows:

$$r_i = \sqrt{\frac{2.25T_T}{S^*} \cdot t} \text{ [m]}$$

T_T recommended inner zone transmissivity [m²/s]

t time when hydraulic formation properties changes (see previous chapter) [s]

S^* for the calculation of the ri the storage coefficient (S) is estimated from the transmissivity /Rhen et al. 2006/:

$S^* = 0.0007 \cdot T_T^{0.5}$ [–]

4.5.9 Derivation of the recommended transmissivity and the confidence range

In most of the cases all test phases were analysed (CRw and CRwr). Depending on the data quality of the CRw phase, only the subsequent CRwr phase was analysed. 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 the recommended transmissivity value is chosen from the test phase that shows the best data and derivative quality, which is in all cases the CRwr phase. In cases when a composite flow model was deemed to be most representative for the hydraulic behaviour of the specific test section, than the most representative zone transmissivity was selected as recommended value.

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.

4.6 Nonconformities

No information about nonconformities which may happened during performance of the pumping tests were obtained from SKB.

5 Results

In the following, results of the pumping tests conducted in 32 boreholes are presented and analysed. First, the previously performed steady state evaluations of the pumping tests according to the relevant P-rapports are summarized in Table 5-1. The calculation methods are indicated in the column headers. The results of the performed transient analyses are given as general comments to test performance, 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 summarized in the Tables 6-1 to 6-3 of the synthesis chapter and in the summary sheets (Appendix 2). No information about disturbing activities like heavy rainfall were obtained with the data. The only disturbing effects observed were caused by tidal influence, which have a minor influence at the late part of some recovery phases and were not accounted for in the analyses.

Table 5-1. Results from previous steady state and transient calculations.

Borehole	Activity plan No.	P-rapport No.	Transmissivity [m²/s] (Dupuit)	Transmissivity [m²/s] (Moye)	Transmissivity [m²/s] (Jacob/Horner)
KAV01	AP PS 400-03-085	P-04-213	$3.17 \cdot 10^{-6}$	$5.31 \cdot 10^{-6}$	$3.848 \cdot 10^{-5}$
KAV04A	AP PS 400-04-035	P-04-216	$1.75 \cdot 10^{-5}$	$2.92 \cdot 10^{-5}$	$2.36 \cdot 10^{-5}$
KAV04B	AP PS 400-04-035	P-04-216	$3.83 \cdot 10^{-5}$	$4.93 \cdot 10^{-5}$	$3.01 \cdot 10^{-5}$
KLX04	AP PS 400-04-066	P-05-68	$1.19 \cdot 10^{-4}$	$1.99 \cdot 10^{-4}$	$1.40 \cdot 10^{-4}$
KLX09	AP PS 400-05-107	P-06-164	$2.3 \cdot 10^{-4}$	$3.7 \cdot 10^{-4}$	–
KLX09B	AP PS 400-05-106	P-06-199	$1.6 \cdot 10^{-5}$	$2.1 \cdot 10^{-5}$	–
KLX09C	AP PS 400-05-106	P-06-199	$1.0 \cdot 10^{-4}$	$1.3 \cdot 10^{-4}$	–
KLX09D	AP PS 400-05-106	P-06-199	$2.3 \cdot 10^{-5}$	$3.1 \cdot 10^{-5}$	–
KLX09E	AP PS 400-05-106	P-06-199	$8.7 \cdot 10^{-5}$	$1.2 \cdot 10^{-4}$	–
KLX09F	AP PS 400-05-106	P-06-199	$1.6 \cdot 10^{-4}$	$2.2 \cdot 10^{-4}$	–
KLX09G	AP PS 400-06-084	P-06-229	$1.72 \cdot 10^{-5}$	$2.23 \cdot 10^{-5}$	–
KLX10	AP PS 400-05-082	P-06-58	$2.1 \cdot 10^{-4}$	$3.5 \cdot 10^{-4}$	–
KLX10B	AP PS 400-06-084	P-06-229	$4.64 \cdot 10^{-5}$	$5.45 \cdot 10^{-5}$	–
KLX10C	AP PS 400-06-084	P-06-229	$1.11 \cdot 10^{-5}$	$1.52 \cdot 10^{-5}$	–
KLX11A	AP PS 400-06-079	P-07-24	$5.53 \cdot 10^{-5}$	$9.32 \cdot 10^{-5}$	–
KLX11B	AP PS 400-06-087	P-07-64	$2.8 \cdot 10^{-5}$	$3.7 \cdot 10^{-5}$	–
KLX11C	AP PS 400-06-087	P-07-64	$2.9 \cdot 10^{-6}$	$3.9 \cdot 10^{-6}$	–
KLX11D	AP PS 400-06-087	P-07-64	$3.6 \cdot 10^{-5}$	$4.8 \cdot 10^{-5}$	–
KLX11E	AP PS 400-06-087	P-07-64	$3.8 \cdot 10^{-6}$	$5.1 \cdot 10^{-6}$	–
KLX11F	AP PS 400-06-087	P-07-64	$3.9 \cdot 10^{-5}$	$5.2 \cdot 10^{-5}$	–
KLX12A	AP PS 400-06-048	P-06-185	$1.1 \cdot 10^{-5}$	$1.8 \cdot 10^{-5}$	–
KLX13A	AP PS 400-06-080	P-06-245	$6.42 \cdot 10^{-5}$	$1.03 \cdot 10^{-4}$	–
KLX17A	AP PS 400-06-119	P-07-34	$2.34 \cdot 10^{-5}$	$3.81 \cdot 10^{-5}$	–
KLX18A	AP PS 400-06-070	P-06-184	$1.9 \cdot 10^{-5}$	$3.1 \cdot 10^{-5}$	–
KLX20A	AP PS 400-06-071	P-06-183	$1.1 \cdot 10^{-5}$	$1.7 \cdot 10^{-5}$	–
KLX24A	AP PS 400-06-092	P-06-246	$2.6 \cdot 10^{-5}$	$3.5 \cdot 10^{-5}$	–
KLX25A	AP PS 400-06-092	P-06-246	$2.6 \cdot 10^{-6}$	$3.1 \cdot 10^{-6}$	–
KLX27A	AP PS 400-07-057	P-08-22	$2.29 \cdot 10^{-5}$	$3.70 \cdot 10^{-5}$	–
KLX28A	AP PS 400-06-106	P-07-17	$2.31 \cdot 10^{-6}$	$2.93 \cdot 10^{-6}$	–
KLX29A	AP PS 400-06-106	P-07-17	$3.03 \cdot 10^{-5}$	$3.72 \cdot 10^{-5}$	–
KSH01A	AP PS 400-02-030	P-03-70	$5.1 \cdot 10^{-6}$	$8.6 \cdot 10^{-6}$	$2.8 \cdot 10^{-6}$
KSH02	AP PS 400-03-033	P-03-110	$5.2 \cdot 10^{-6}$	$8.7 \cdot 10^{-6}$	$2.9 \cdot 10^{-6}$

5.1 Transient analysis results of the pumping tests

5.1.1 Pumping test KAV01 (Section 70.04–757.31)

Comments to test

The test was conducted as a pumping test (CRw) with an average flow rate of 18.9 l/min, followed by a pressure recovery phase (CRwr). The maximum drawdown just before stop of flowing was about 9.9 m (97.9 kPa). The flow rate during the pumping phase and the resulting drawdown indicate a medium to high transmissivity. After approx. 102.7 hours of pumping the pump was stopped. The subsequent recovery phase was measured for about 23 hours. Approx. 10 hours after pump start the CRw phase shows a straight line. (it is assumed that the water level in the borehole reaches the intake of the submersible pump and no further drawdown was possible). The CRwr phase shows no problems and is adequate for quantitative analysis. Due to the minor quality of the data of the CRw phase, the results of this phase should be regarded as less reliable.

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 CRw derivative is very noisy and radial flow behaviour cannot be seen clearly. However, a homogeneous radial flow model with wellbore storage and skin was chosen for the analysis. The derivative of the CRwr phase shows a change in slope at early times. This behaviour was interpreted as an increase in wellbore storage caused by a volume change. At middle time the derivative shows a short horizontal stabilization and an upward trend at late time, indicating a decrease in transmissivity. A two shell composite flow model was used for the analysis of the CRwr phase. To match the early time data of the derivative a model for changing wellbore storage based on /Hegeman et al. 1993/ was applied. The analysis is presented in Appendix 1-1.

Selected representative parameters

The recommended transmissivity of $7.4 \cdot 10^{-5}$ m^2/s was derived from the analysis of the CRwr phase (inner zone), which shows a better data and derivative quality. The confidence range for the transmissivity is estimated to be $1.0 \cdot 10^{-5}$ to $1.0 \cdot 10^{-4}$ m^2/s (this range encompasses the outer zone transmissivity). The flow dimension displayed during the test is 2. The static ground water level was derived from the CRwr phase using type curve extrapolation in the Horner plot to a value of 1.92 m.a.s.l.

The analysis of the CRw and CRwr phases show some inconsistency regarding the chosen flow model. This inconsistency is most likely attributed to the poor data quality of the CRw phase. However, regarding the derived transmissivities (CRw and inner zone of CRwr) both analyses show consistency.

No further analysis is recommended.

5.1.2 Pumping test KAV04A (Section 100.95–1004.00)

Comments to test

The test was conducted as a pumping test (CRw) with an average flow rate of 12.6 l/min, followed by a pressure recovery phase (CRwr). The maximum drawdown just before stop of flowing was about 10.0 m (98.1 kPa). The flow rate during the pumping phase and the resulting drawdown indicate a medium to high transmissivity. After approx. 131.4 hours of pumping the pump was stopped. The subsequent recovery phase was measured for about 15 hours. Approx. 20 hours after pump start the CRw phase shows a straight line (it is assumed that the water level in the borehole reaches the intake of the submersible pump and no further drawdown was possible). The CRwr phase shows a change in recovery slope relatively short after start of this phase. It is assumed that this effect is caused by a change in wellbore storage due to a change in volume. However, the data quality of the CRwr phase is of good quality and therefore 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 CRw derivative is very noisy and a flow model cannot be determined. However, a homogeneous radial flow model with wellbore storage and skin was chosen for the analysis. The derivative of the CRwr phase shows a change in slope at early times. This behaviour was interpreted as an increase in wellbore storage caused by a volume change. At middle time the derivative shows a short horizontal stabilization and an upward trend at late time, indicating a decrease in transmissivity. A two shell composite flow model was used for the analysis of the CRwr phase. To match the early time data of the derivative a model for changing wellbore storage based on /Hegeman et al. 1993/ was applied. The analysis is presented in Appendix 1-1.

Selected representative parameters

The recommended transmissivity of $6.8 \cdot 10^{-5}$ m^2/s was derived from the analysis of the CRwr phase (inner zone), which shows a better data and derivative quality. The confidence range for the transmissivity is estimated to be $1.0 \cdot 10^{-5}$ to $1.0 \cdot 10^{-4}$ m^2/s. The flow dimension displayed during the test is 2. The static ground water level was derived from the CRwr phase using type curve extrapolation in the Horner plot to a value of 4.79 m.a.s.l.

The analysis of the CRw and CRwr phases show some inconsistency regarding the chosen flow model. This inconsistency is most likely attributed to the poor data quality of the CRw phase. However, regarding the derived transmissivities (CRw and inner zone of CRwr) both analyses show consistency.

No further analysis is recommended.

5.1.3 Pumping test KAV04B (Section 11.52–101.03)

Comments to test

The test was conducted as a pumping test (CRw) with an average flow rate of 26.3 l/min, followed by a pressure recovery phase (CRwr). The maximum drawdown just before stop of flowing was about 10.1 m (99.2 kPa). The flow rate during the pumping phase and the resulting drawdown indicate a relative high transmissivity. After approx. 21 hours of pumping the pump was stopped. The subsequent recovery phase was measured for about 16 hours. The Crw phase shows some oscillations in the recorded pressure. This adds uncertainty to the analyses and the results should be regarded as an order of magnitude, only. The CRwr phase shows no problems and is adequate for quantitative analyses.

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 CRw derivative is noisy and a flow model cannot be determined. However, a homogeneous radial flow model with wellbore storage and skin was chosen for the analysis. The derivative of the CRwr phase shows short horizontal stabilization at middle times followed by an upward trend at late times. This behaviour is consistent with a decrease in transmissivity at some distance from the borehole. Therefore, a two shell composite flow model was used for the analysis. The analysis is presented in Appendix 1-3.

Selected representative parameters

The recommended transmissivity of $9.6 \cdot 10^{-5}$ m^2/s was derived from the analysis of the CRwr phase (inner zone), which shows a horizontal stabilization. The confidence range for the transmissivity is estimated to be $1.0 \cdot 10^{-5}$ to $2.0 \cdot 10^{-4}$ m^2/s (this range encompasses the outer zone transmissivity). The flow dimension displayed during the test is 2. The static ground water level was derived from the CRwr phase using type curve extrapolation in the Horner plot to a value of 4.18 m.a.s.l.

The analysis of the CRw and CRwr phases some inconsistency regarding the chosen flow model. This inconsistency can be explained by the poor data quality of the CRw phase. However, regarding the derived transmissivities (CRw and inner zone of CRwr) both analyses show consistency.

No further analysis is recommended.

5.1.4 Pumping test KLX04 (Section 101.43–993.49)

Comments to test

The test consists of a pump phase (CRw) with an average flow rate of 55.4 l/min, followed by a pressure recovery phase (CRwr). The maximum drawdown just before stop of flowing was about 6.99 m (65.5 kPa). The flow rate during the pumping phase and the resulting drawdown indicate a relative high transmissivity. After approx. 166 hours of pumping the pump was stopped. The subsequent recovery phase was measured for about 24 hours. For the analyses of the CRw phase only the first 24 hours were used, because after this time period the recorded pressure shows a straight line (it is assumed that the water level in the borehole reaches the intake of the submersible pump and no further drawdown was possible). Apart from this both phases show no problems and are adequate for quantitative analyses.

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 derivatives of the CRw and CRwr phases show a short horizontal stabilization at middle times, followed by an upward trend at late times. Therefore, a two shell composite flow model with decreasing transmissivity at some distance from the borehole was used for the analyses of both phases. The analysis is presented in Appendix 1-4.

Selected representative parameters

The recommended transmissivity of $3.3 \cdot 10^{-4}$ m^2/s was derived from the analysis of the CRwr phase (inner zone), which shows a better derivative quality. The confidence range for the transmissivity is estimated to be $5.0 \cdot 10^{-5}$ to $5.0 \cdot 10^{-4}$ m^2/s (this range encompasses the outer zone transmissivities of both phases). The flow dimension displayed during the test is 2. The static ground water level was derived from the CRwr phase using straight line extrapolation in the Horner plot to a value of 13.44 m.a.s.l.

The analyses of both phases show good consistency. No further analysis is recommended.

5.1.5 Pumping test KLX09 (Section 11.95–880.38)

Comments to test

The test consists of a pump phase (CRw) with an average flow rate of 70.0 l/min, followed by a pressure recovery phase (CRwr). The maximum drawdown just before stop of flowing was about 4.85 m (47.6 kPa). The flow rate during the pumping phase and the resulting drawdown indicate a high transmissivity. After approx. 188 hours of pumping the pump was stopped.

The subsequent recovery phase was measured for about 55 hours. For the analyses of the CRw phase only the first 21 hours were used, because after this time period the recorded pressure shows a straight line (it is assumed that the water level in the borehole reaches the intake of the submersible pump and no further drawdown was possible). Apart from this both phases show no problems and are adequate for quantitative analyses.

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 derivatives of the CRw and CRwr phases show a short horizontal stabilization at middle times, followed by an upward trend at late times. Therefore, a two shell composite flow model with decreasing transmissivity at some distance from the borehole was used for the analyses of both phases. The analysis is presented in Appendix 1-5.

Selected representative parameters

The recommended transmissivity of $5.4 \cdot 10^{-4}$ m^2/s was derived from the analysis of the CRwr phase (inner zone), which shows a better derivative quality. The confidence range for the transmissivity is estimated to be $1.0 \cdot 10^{-4}$ to $8.0 \cdot 10^{-4}$ m^2/s. The flow dimension displayed during the test is 2. The static ground water level was derived from the CRwr phase using type curve extrapolation in the Horner plot to a value of 13.36 m.a.s.l.

The analyses of both phases show good consistency. No further analysis is recommended.

5.1.6 Pumping test KLX09B (Section 10.74–120.22)

Comments to test

The test consists of a pump phase (CRw) with an average flow rate of 9.8 l/min, followed by a pressure recovery phase (CRwr). The maximum drawdown just before stop of flowing was about 10.1 m (99.1 kPa). The flow rate during the pumping phase and the resulting drawdown indicate a medium transmissivity. After approx. 141 hours of pumping the pump was stopped. The subsequent recovery phase was measured for about 72 hours. Only the first part of the CRw phase was analysed as no pressure data were available for the main part. The data show fast recovery and oscillations, which were caused by tidal effects throughout the recovery phase.

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 CRw phase shows a relative noisy derivative. However, a homogeneous radial flow model with wellbore storage and skin was used for the analysis. The derivative of the CRwr phase shows a flat part at middle and late times, which is characteristic for a flow dimension of two (radial flow). A homogeneous radial flow model with wellbore storage and skin was used for the analysis. The analysis is presented in Appendix 1-6.

Selected representative parameters

The recommended transmissivity of $8.5 \cdot 10^{-5}$ m^2/s was derived from the analysis of the CRwr phase. The confidence range for the transmissivity is estimated to be $1.0 \cdot 10^{-5}$ to $1.0 \cdot 10^{-4}$ m^2/s. A flow dimension of 2 was assumed. The static ground water level was derived from the CRwr phase using straight line extrapolation in the Horner plot to a value of 13.86 m.a.s.l.

Both phases show a high positive skin. This may be caused by non-Darcy flow effects in the borehole and in the formation near the borehole wall. The derived transmissivities of both phases show consistency. No further analysis is recommended.

5.1.7 Pumping test KLX09C (Section 9.00–120.05)

Comments to test

The test consists of a pump phase (CRw) with an average flow rate of 29.2 l/min, followed by a pressure recovery phase (CRwr). The maximum drawdown just before stop of flowing was about 5.2 m (51.0 kPa). The flow rate during the pumping phase and the resulting drawdown indicate a medium to high transmissivity. After approx. 138 hours of pumping the pump was stopped. The subsequent recovery phase was measured for about 97 hours. Due to the poor data quality of the CRw phase only the subsequent recovery phase was analysed. The CRwr phase shows oscillations induced by tidal effects but is still adequate for qualitative analyses.

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 CRwr phase shows steep downward trend at early times, which is indicative for a high positive skin. At middle times the derivative shows a short horizontal stabilization followed by an upward trend and a second stabilization. A two shell composite flow model with decreasing transmissivity at some distance from the borehole was used for the analysis. The analysis is presented in Appendix 1-7.

Selected representative parameters

The recommended transmissivity of $5.3 \cdot 10^{-4}$ m^2/s was derived from the analysis of the CRwr phase (inner zone). The confidence range for the transmissivity is estimated to be $1.0 \cdot 10^{-4}$ to $7.0 \cdot 10^{-4}$ m^2/s. The flow dimension displayed during the test is 2. The static ground water level was derived from the CRwr phase using type curve extrapolation in the Horner plot to a value of 13.79 m.a.s.l.

No further analysis is recommended.

5.1.8 Pumping test KLX09D (Section 9.75–121.02)

Comments to test

The test consists of a pump phase (CRw) with an average flow rate of 14.0 l/min, followed by a pressure recovery phase (CRwr). The maximum drawdown just before stop of flowing was about 9.5 m (93.2 kPa). The flow rate during the pumping phase and the resulting drawdown indicate a medium transmissivity. After approx. 141 hours of pumping the pump was stopped. The subsequent recovery phase was measured for about 68 hours. Only the first part of the CRw phase was analysed, due to missing pressure data for the subsequent period. The Crw phase shows a fast pressure decrease. Because of this the data quality is relatively poor, which leads to ambiguity to the analyses of the Crw phase. The CRwr 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 CRw phase shows a relative noisy derivative. However, a homogeneous radial flow model with wellbore storage and skin was used for the analysis. The derivative of the CRwr phase shows a horizontal stabilization at middle times and an upward trend at late times, indicating a change in transmissivity. The CRwr phase was matched using a two shell composite flow model with a decrease in transmissivity at some distance from the borehole. The analysis is presented in Appendix 1-8.

Selected representative parameters

The recommended transmissivity of $7.8 \cdot 10^{-5}$ m^2/s was derived from the analysis of the CRwr phase (inner zone), which shows the best data and derivative quality. The confidence range for the transmissivity is estimated to be $2.0 \cdot 10^{-5}$ to $1.0 \cdot 10^{-4}$ m^2/s (this range includes the transmissivity of the outer zone). The flow dimension during the test is 2. The static ground water level was derived from the CRwr phase using type curve extrapolation in the Horner plot to a value of 13.93 m.a.s.l.

Both phases show some inconsistency regarding the derived flow models. This can be attributed to the poor data quality of the CRw phase. However, regarding the derived transmissivities both phases show consistency.

No further analysis is recommended.

5.1.9 Pumping test KLX09E (Section 9.00–120.00)

Comments to test

The test consists of a pump phase (CRw) with an average flow rate of 31.5 l/min, followed by a pressure recovery phase (CRwr). The maximum drawdown just before stop of flowing was about 6.50 m (53.9 kPa). The flow rate during the pumping phase and the resulting drawdown indicate a relative high transmissivity. After approx. 141 hours of pumping the pump was stopped. The subsequent recovery phase was measured for about 76 hours. For the analyses of the CRw phase only the first 20 hours were used. With the exception of the noise in the CRw phase, both phases show no problems and are adequate for quantitative analyses.

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 derivatives of the CRw and CRwr phases show a short horizontal stabilization at middle times, followed by an upward trend at late times. Therefore, a two shell composite flow model with decreasing transmissivity at some distance from the borehole was used for the analyses of both phases. The analysis is presented in Appendix 1-9.

Selected representative parameters

The recommended transmissivity of $2.6 \cdot 10^{-4}$ m^2/s was derived from the analysis of the CRwr phase (inner zone), which shows a better derivative quality. The confidence range for the transmissivity is estimated to be $9.0 \cdot 10^{-5}$ to $4.0 \cdot 10^{-4}$ m^2/s (this range encompasses the outer zone transmissivities of both phases). The flow dimension displayed during the test is 2. The static ground water level was derived from the CRwr phase using straight line extrapolation in the Horner plot to a value of 13.51 m.a.s.l.

The analyses of both phases show good consistency. No further analysis is recommended.

5.1.10 Pumping test KLX09F (Section 9.00–152.30)

Comments to test

The test consists of a pump phase (CRw) with an average flow rate of 33.3 l/min, followed by a pressure recovery phase (CRwr). The maximum drawdown just before stop of flowing was about 3.62 m (35.5 kPa). The flow rate during the pumping phase and the resulting drawdown indicate a relative high transmissivity. After approx. 143 hours of pumping the pump was stopped. The subsequent recovery phase was measured for about 49 hours. For the analyses of the CRw phase only the first 23 hours were used as about 40 hours of data were missing. The recovery 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 derivatives of the CRw and CRwr phases show a short horizontal stabilization at middle times, followed by an upward trend and a second stabilization at late times. Therefore, a two shell composite flow model with decreasing transmissivity at some distance from the borehole was used for the analyses of both phases. The analysis is presented in Appendix 1-10.

Selected representative parameters

The recommended transmissivity of $4.3 \cdot 10^{-4}$ m²/s was derived from the analysis of the CRwr phase (inner zone), which shows a better derivative quality. The confidence range for the transmissivity is estimated to be $1.0 \cdot 10^{-4}$ to $6.0 \cdot 10^{-4}$ m²/s (this range encompasses the outer zone transmissivities of both phases). The flow dimension displayed during the test is 2. The static ground water level was derived from the CRwr phase using straight line extrapolation in the Horner plot to a value of 14.14 m.a.s.l.

The analyses of both phases show good consistency. No further analysis is recommended.

5.1.11 Pumping test KLX09G (Section 9.30–100.10)

Comments to test

The test consists of a pump phase (CRw) with an average flow rate of 7.7 l/min, followed by a pressure recovery phase (CRwr). The maximum drawdown just before stop of flowing was about 7.9 m (77.6 kPa). The flow rate during the pumping phase and the resulting drawdown indicate a medium transmissivity. After approx. 52 hours of pumping the pump was stopped. The subsequent recovery phase was measured for about 88 hours. Only the first part of the CRw phase was analysed. Both phases show a relative fast pressure decrease and increase, respectively, at the beginning of each phase. Because of this the data quality is relatively poor, which adds uncertainty to the analyses.

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 Crw and CRwr phase show a relative noisy derivative. However, both phases were matched using a homogeneous radial flow model with wellbore storage and skin. The analysis is presented in Appendix 1-11.

Selected representative parameters

The recommended transmissivity of $6.5 \cdot 10^{-5}$ m²/s was derived from the analysis of the CRwr phase. The confidence range for the transmissivity is estimated to be $1.0 \cdot 10^{-5}$ to $9.0 \cdot 10^{-5}$ m²/s. A flow dimension of 2 was assumed. The static ground water level was derived from the CRwr phase using straight line extrapolation in the Horner plot to a value of 12.61 m.a.s.l.

Both phases show a high positive skin. This may be caused by non-Darcy flow effects in the formation. The derived transmissivities of both phases show good consistency.

No further analysis is recommended.

5.1.12 Pumping test KLX10 (Section 12.10–1,001.20)

Comments to test

The test consists of a pump phase (CRw) with an average flow rate of 90.3 l/min, followed by a pressure recovery phase (CRwr). The maximum drawdown just before stop of flowing was about 6.93 m (68.0 kPa). The flow rate during the pumping phase and the resulting drawdown indicate a high transmissivity. After approx. 188 hours of pumping the pump was stopped.

The subsequent recovery phase was measured for about 235 hours. For the analyses of the CRw phase only the first 18 hours were used, because after this time period the recorded pressure shows a straight line (it is assumed that the water level in the borehole reaches the intake of the submersible pump and no further drawdown was possible). Apart from this both phases show no problems and are adequate for quantitative analyses.

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 derivatives of the CRw and CRwr phases show a short horizontal stabilization at middle times, followed by an upward trend at late times. Therefore, a two shell composite flow model with decreasing transmissivity at some distance from the borehole was used for the analyses of both phases. The analysis is presented in Appendix 1-12.

Selected representative parameters

The recommended transmissivity of $5.3 \cdot 10^{-4}$ m^2/s was derived from the analysis of the CRwr phase (inner zone), which shows a slight better derivative quality. The confidence range for the transmissivity is estimated to be $1.0 \cdot 10^{-4}$ to $8.0 \cdot 10^{-4}$ m^2/s. The flow dimension displayed during the test is 2. The static ground water level was derived from the CRwr phase using straight line extrapolation in the Horner plot to a value of 13.20 m.a.s.l.

The analyses of both phases show good consistency. No further analysis is recommended.

5.1.13 Pumping test KLX10B (Section 9.00–50.25)

Comments to test

The test consists of a pump phase (CRw) with an average flow rate of 22.0 l/min, followed by a pressure recovery phase (CRwr). The maximum drawdown just before stop of flowing was about 9.9 m (96.8 kPa). The flow rate during the pumping phase and the resulting drawdown indicate a medium transmissivity. After approx. 49 hours of pumping the pump was stopped and the recovery phase was started. After about 20 hours, pumping was continued for another 20 hours with an average flow rate of 12 l/min followed by a subsequent second recovery phase. Only the first recovery phase was analysed. The recorded data of the CRw phase is relatively noisy, but still amenable for a qualitative analysis. The CRwr 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 CRw phase shows a relative noisy derivative. However, it seems to stabilize at middle and late times and a homogeneous radial flow model with wellbore storage and skin was used for the analysis. The derivative of the CRwr phase shows a horizontal stabilization at middle times and a slight upward trend at late times, indicating a change in transmissivity. The CRwr phase was matched using a two shell composite flow model with a decrease in transmissivity at some distance from the borehole. The analysis is presented in Appendix 1-13.

Selected representative parameters

The recommended transmissivity of $2.7 \cdot 10^{-4}$ m^2/s was derived from the analysis of the CRwr phase (inner zone), which shows the better data and derivative quality. The confidence range for the transmissivity is estimated to be $1.0 \cdot 10^{-5}$ to $4.0 \cdot 10^{-4}$ m^2/s (this range includes the transmissivity of the outer zone). The flow dimension during the test is 2. The static ground water level was derived from the CRwr phase using straight line extrapolation in the Horner plot to a value of 11.62 m.a.s.l.

Both phases show some inconsistency regarding the derived flow models and the high positive skin derived from the CRwr phase. The different flow models can be attributed to the poor data quality of the CRw phase. Non-Darcy flow effects can cause the high positive skin. However, regarding the derived transmissivities both phases show consistency.

No further analysis is recommended.

5.1.14 Pumping test KLX10C (Section 9.00–146.25)

Comments to test

The test consists of a pumping test phase (CRw) with an average flow rate of 6.6 l/min, followed by a pressure recovery phase (CRwr). The maximum drawdown just before stop of flowing was about 10.4 m (101.8 kPa). The flow rate during the pumping phase and the resulting drawdown indicate a medium transmissivity. After approx. 51 hours of pumping the pump was stopped. The subsequent recovery phase was measured for about 65 hours. Due to insufficient data
quality, the first part of each phase was analysed, 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 CRw and CRwr phase shows a steep downward trend at middle and late times. This behaviour is indicative for a transition from wellbore dominated flow to pure formation flow. No radial flow was reached. However, a homogeneous radial flow model was assumed for the analyses of both phases. The analysis is presented in Appendix 1-14.

Selected representative parameters

The recommended transmissivity of $2.5 \cdot 10^{-5}$ m²/s was derived from the analysis of the CRwr phase, which shows a slight better data and derivative quality. The confidence range for the transmissivity is estimated to be $9.0 \cdot 10^{-6}$ to $6.0 \cdot 10^{-4}$ m²/s A flow dimension of 2 was assumed. The static ground water level was derived from the CRwr phase using type curve extrapolation in the Horner plot to a value of 12.21 m.a.s.l.

The analyses of both phases show consistency. No further analysis is recommended.

5.1.15 Pumping test KLX11A (Section 12.05–992.29)

Comments to test

The test consists of a pump phase (CRw) with an average flow rate of 39.9 l/min, followed by a pressure recovery phase (CRwr). The maximum drawdown just before stop of flowing was about 10.7 m (105.4 kPa). The flow rate during the pumping phase and the resulting drawdown indicate a medium to high transmissivity. After approx. 126 hours of pumping the pump was stopped. The subsequent recovery phase was measured for about 46 hours. For the analyses of the CRw phase only the first 2 hours were used, because after this time period the recorded pressure shows a straight line (it is assumed that the water level in the borehole reaches the intake of the submersible pump and no further drawdown was possible). The CRwr 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 derivatives of the CRw shows a continuous downward trend at late time. This indicates a transition from borehole dominated flow to pure formation flow. No radial flow was reached. A homogeneous radial flow model with wellbore storage and skin was assumed for the analysis. The derivative of the CRwr phases show a short horizontal stabilization at middle times, followed by an upward trend at late times. Therefore, a two shell composite flow model with decreasing transmissivity at some distance from the borehole was used for the analyses of both phases. The analysis is presented in Appendix 1-15.

Selected representative parameters

The recommended transmissivity of $1.2 \cdot 10^{-4}$ m^2/s was derived from the analysis of the CRwr phase (inner zone), which shows a short horizontal stabilization. The confidence range for the transmissivity is estimated to be $5.0 \cdot 10^{-5}$ to $4.0 \cdot 10^{-4}$ m^2/s. The flow dimension displayed during the test is 2. The static ground water level was derived from the CRwr phase using type curve extrapolation in the Horner plot to a value of 13.85 m.a.s.l.

The analyses of both phases show some inconsistencies regarding the chosen flow model. This discrepancy can be explained by the short analysable CRw phase where no radial flow was reached. No further analysis is recommended.

5.1.16 Pumping test KLX11B (Section 2.54–100.20)

Comments to test

The test consists of a pump phase (CRw) with an average flow rate of 17.0 l/min, followed by a pressure recovery phase (CRwr). The maximum drawdown just before stop of flowing was about 9.4 m (92.2 kPa). The flow rate during the pumping phase and the resulting drawdown indicate a medium transmissivity. After approx. 189 hours of pumping the pump was stopped. The subsequent recovery phase was measured for about 73 hours. For the analyses of the CRw phase only the first part was used, because after this time period the recorded pressure shows a straight line (it is assumed that the water level in the borehole reaches the intake of the submersible pump and no further drawdown was possible).

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 CRw phase shows a noisy derivative and no flow model could be determined. However, a homogeneous radial flow model with wellbore storage and skin was used for the analysis. The derivative of the CRwr phase shows a horizontal stabilization at middle times and an upward trend at late times, indicating a change in transmissivity. The CRwr phase was matched using a two shell composite flow model with a decrease in transmissivity at some distance from the borehole. The analysis is presented in Appendix 1-16.

Selected representative parameters

The recommended transmissivity of $8.2 \cdot 10^{-5}$ m^2/s was derived from the analysis of the CRwr phase (inner zone), which shows the better data and derivative quality. The confidence range for the transmissivity is estimated to be $1.0 \cdot 10^{-5}$ to $1.0 \cdot 10^{-4}$ m^2/s. The flow dimension during the test is 2. The static ground water level was derived from the CRwr phase using type curve extrapolation in the Horner plot to a value of 10.29 m.a.s.l.

Both phases show some inconsistency regarding the derived flow models, which can be attributed to the poor data quality of the CRw phase. However, regarding the derived transmissivities both phases show consistency.

No further analysis is recommended.

5.1.17 Pumping test KLX11C (Section 2.00–120.15)

Comments to test

The test consists of a pump phase (CRw) with an average flow rate of 2.0 l/min, followed by a pressure recovery phase (CRwr). The maximum drawdown just before stop of flowing was about 11.7 m (115.2 kPa). The flow rate during the pumping phase and the resulting drawdown indicate a medium to high transmissivity. After approx. 45 hours of pumping the pump was stopped. The subsequent recovery phase was measured for about 27 hours. Due to the poor data quality of the CRw phase only the subsequent recovery phase was analysed. The CRwr phase shows no problems and is adequate for qualitative analyses.

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 CRwr phase was matched using a two shell composite flow model with increasing transmissivity at some distance from the borehole. The analysis is presented in Appendix 1-17.

Selected representative parameters

The recommended transmissivity of $4.6 \cdot 10^{-6}$ m^2/s was derived from the analysis of the CRwr phase (inner zone). The confidence range for the transmissivity is estimated to be $2.0 \cdot 10^{-6}$ to $4.0 \cdot 10^{-5}$ m^2/s (this range encompasses the outer zone transmissivity). A flow dimension of 2 was assumed. The static ground water level was derived from the CRwr phase using type curve extrapolation in the Horner plot to a value of 12.85 m.a.s.l.

No further analysis is recommended.

5.1.18 Pumping test KLX11D (Section 2.00–120.35)

Comments to test

The test consists of a pump phase (CRw) with an average flow rate of 22.5 l/min, followed by a pressure recovery phase (CRwr). The maximum drawdown just before stop of flowing was about 10.8 m (106.2 kPa). The flow rate during the pumping phase and the resulting drawdown indicate a medium transmissivity. After approx. 142 hours of pumping the pump was stopped. The subsequent recovery phase was measured for about 95 hours. For the analyses of the CRw phase only the first 3 hours were analysable, because after this time period the recorded pressure shows a straight line (it is assumed that the water level in the borehole reaches the intake of the submersible pump and no further drawdown was possible). The CRwr 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 CRw phase shows a very noisy derivative and a flow model cannot be detemined. However, a homogeneous radial flow model with wellbore storage and skin was used for the analysis. The derivative of the CRwr phase shows a horizontal stabilization at middle times and an upward trend at late times with a new stabilization at a higher level, indicating a change in transmissivity. The CRwr phase was matched using a two shell composite flow model with a decrease in transmissivity at some distance from the borehole. The analysis is presented in Appendix 1-18.

Selected representative parameters

The recommended transmissivity of $6.2 \cdot 10^{-5}$ m²/s was derived from the analysis of the CRwr phase (inner zone), which shows a better data and derivative quality. The confidence range for the transmissivity is estimated to be $2.0 \cdot 10^{-5}$ to $9.0 \cdot 10^{-5}$ m²/s. The flow dimension displayed during the test is 2. The static ground water level was derived from the CRwr phase using straight line extrapolation in the Horner plot to a value of 13.95 m.a.s.l.

Both phases show some inconsistency regarding the derived flow models, which can be attributed to the poor data quality of the CRw phase. However, regarding the derived transmissivities both phases show consistency.

No further analysis is recommended.

5.1.19 Pumping test KLX11E (Section 2.00–121.30)

Comments to test

The test consists of a pump phase (CRw) with an average flow rate of 2.2 l/min, followed by a pressure recovery phase (CRwr). The maximum drawdown just before stop of flowing was about 9.7 m (95.2 kPa). The flow rate during the pumping phase and the resulting drawdown indicate a medium transmissivity. After approx. 160 hours of pumping the pump was stopped. The subsequent recovery phase was measured for about 81 hours. For the analyses of the CRw phase only the first part was used, due to missing pressure data. In addition, the data of the CRw phase is very noisy. Therefore the results should be regarded as an order of magnitude, only. The CRwr 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 CRw phase shows a very noisy derivative. However, a homogeneous radial flow model with wellbore storage and skin was used for the analysis. The derivative of the CRwr phase shows a horizontal stabilization at middle times followed by an upward trend at late times. This is indicative for a change in transmissivity. The CRwr phase was matched using a two shell composite flow model with a decrease in transmissivity at some distance from the borehole. The analysis is presented in Appendix 1-19.

Selected representative parameters

The recommended transmissivity of $7.0 \cdot 10^{-6}$ m²/s was derived from the analysis of the CRwr phase (inner zone), which shows the best derivative quality. The confidence range for the transmissivity is estimated to be $2.0 \cdot 10^{-6}$ to $1.0 \cdot 10^{-5}$ m²/s. The flow dimension displayed during the test is 2. The static ground water level was derived from the CRwr phase using type curve extrapolation in the Horner plot to a value of 14.46 m.a.s.l.

Both phases show some inconsistency regarding the derived flow models, which is attributed to the poor data quality of the CRw phase. However, regarding the derived transmissivities both phases show consistency.

No further analysis is recommended.

5.1.20 Pumping test KLX11F (Section 2.00–120.05)

Comments to test

The test consists of a pump phase (CRw) with an average flow rate of 25.8 l/min, followed by a pressure recovery phase (CRwr). The maximum drawdown just before stop of flowing was about 12.4 m (121.5 kPa). The flow rate during the pumping phase and the resulting drawdown indicate a medium to high transmissivity. After approx. 44 hours of pumping the pump was stopped. The subsequent recovery phase was measured for about 82 hours, but shows several pressure changes which are considered being induced by unnatural effects (e.g. movement of the sensor). For the analyses of the CRw phase only the first part was analysable. The first 20 hours of the CRwr phase 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 CRw phase shows a horizontal stabilization at middle and late times, indicating radial flow. A homogeneous radial flow model with wellbore storage and skin was used for the analysis. The derivative of the CRwr phase shows a horizontal stabilization at middle times followed by a downward trend at late times. This is indicative for a change in transmissivity. The CRwr phase was matched using a two shell composite flow model with an increase in transmissivity at some distance from the borehole. The analysis is presented in Appendix 1-20.

Selected representative parameters

The recommended transmissivity of $2.1 \cdot 10^{-5}$ m^2/s was derived from the analysis of the CRwr phase (inner zone), which shows a better data and derivative quality. The confidence range for the transmissivity is estimated to be $9.0 \cdot 10^{-6}$ to $7.0 \cdot 10^{-5}$ m^2/s. The flow dimension displayed during the test is 2. The static ground water level was derived from the CRwr phase using straight line extrapolation in the Horner plot to a value of 12.55 m.a.s.l.

Both phases show some inconsistency regarding the derived flow models, which is attributed to the short analysable part of the Crw phase. However, regarding the derived near wellbore transmissivities both phases show consistency.

No further analysis is recommended.

5.1.21 Pumping test KLX12A (Section 17.92–602.29)

Comments to test

The test consists of a pump phase (CRw) with an average flow rate of 6.7 l/min, followed by a pressure recovery phase (CRwr). The maximum drawdown just before stop of flowing was about 9.6 m (93.8 kPa). The flow rate during the pumping phase and the resulting drawdown indicate a medium transmissivity. After approx. 122 hours of pumping the pump was stopped. The subsequent recovery phase was measured for about 89 hours. The recorded pressure data of the Crw phase shows after approx. 0.5 hours a straight line. It is assumed that the water level reaches the intake of the pump and no further drawdown was possible. Therefore, the CRw phase was not analysable. The CRwr phase shows no problems and is adequate for qualitative analyses.

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 CRwr phase shows flat part at middle and late times indicating radial flow. It was matched using a homogeneous radial flow model with wellbore storage and skin. The analysis is presented in Appendix 1-21.

Selected representative parameters

The recommended transmissivity of $2.3 \cdot 10^{-5}$ m²/s was derived from the analysis of the CRwr phase. The confidence range for the transmissivity is estimated to be $8.0 \cdot 10^{-6}$ to $5.0 \cdot 10^{-5}$ m²/s. The flow dimension displayed during the test is 2. The static ground water level was derived from the CRwr phase using straight line extrapolation in the Horner plot to a value of 10.50 m.a.s.l.

No further analysis is recommended.

5.1.22 Pumping test KLX13A (Section 11.75–595.85)

Comments to test

The test consists of a pump phase (CRw) with an average flow rate of 48.3 l/min, followed by a pressure recovery phase (CRwr). The maximum drawdown just before stop of flowing was about 10.03 m (98.4 kPa). The flow rate during the pumping phase and the resulting drawdown indicate a medium to high transmissivity. After approx. 117 hours of pumping the pump was stopped. The subsequent recovery phase was measured for about 22 hours. For the analyses of the CRw phase only the first 13 hours were used, because after this time period the recorded pressure shows a straight line. (it is assumed that the water level in the borehole reaches the intake of the submersible pump and no further drawdown was possible). Apart from this both phases show no problems and are adequate for quantitative analyses.

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 derivatives of both phases show a short horizontal stabilization at middle times, followed by a considerable upward trend. At late times the derivatives show a new horizontal stabilization at a higher level. A two shell composite flow model with decreasing transmissivity at some distance from the borehole was used to match the data. The analysis is presented in Appendix 1-22.

Selected representative parameters

The recommended transmissivity of $3.5 \cdot 10^{-5}$ m²/s was derived from the analysis of the CRwr phase (outer zone), which is deemed to be representative for the formation. The confidence range for the transmissivity is estimated to be $9.0 \cdot 10^{-6}$ to $6.0 \cdot 10^{-5}$ m²/s. The flow dimension displayed during the test is 2. The static ground water level was derived from the CRwr phase using straight line extrapolation in the Horner plot to a value of 14.15 m.a.s.l.

The analyses of both phases show good consistency. No further analysis is recommended.

5.1.23 Pumping test KLX17A (Section 11.95–701.08)

Comments to test

The test consists of a pumping test phase (CRw) with an average flow rate of 15.7 l/min, followed by a pressure recovery phase (CRwr). The maximum drawdown just before stop of flowing was about 10.3 m (100.9 kPa). The flow rate during the pumping phase and the resulting drawdown indicate a medium transmissivity. After approx. 116 hours of pumping the pump was stopped. The subsequent recovery phase was measured for about 71 hours. No analysable flow period was identified during the CRw phase. The CRwr phase shows some oscilliations at middle times. However, the recovery phase is still amenable for 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 derivative of the CRwr phase is flat at middle and late times indicating radial flow. Therefore it was matched using a homogeneous radial flow model with wellbore storage and skin. The analysis is presented in Appendix 1-23.

Selected representative parameters

The recommended transmissivity of $5.2 \cdot 10^{-5}$ m^2/s was derived from the analysis of the CRwr phase. The confidence range for the transmissivity is estimated to be $1.0 \cdot 10^{-5}$ to $9.0 \cdot 10^{-5}$ m^2/s. The flow dimension displayed during the test is 2. The static ground water level was derived from the CRwr phase using straight line extrapolation in the Horner plot to a value of 17.34 m.a.s.l.

No further analysis is recommended.

5.1.24 Pumping test KLX18A (Section 11.83–611.28)

Comments to test

The test consists of a pump phase (CRw) with an average flow rate of 14.2 l/min, followed by a pressure recovery phase (CRwr). The maximum drawdown just before stop of flowing was about 10.1 m (99.5 kPa). The flow rate during the pumping phase and the resulting drawdown indicate a medium transmissivity. After approx. 168 hours of pumping the pump was stopped. The subsequent recovery phase was measured for about 153 hours. No analysable flow period was identified during the CRw phase. The CRwr phase shows no problems and is adequate for quantitative analysis though it is affected by tidal effects.

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 of the CRwr phase shows a flat part at middle and late times and was matched using a homogeneous radial flow model with wellbore storage and skin. The analysis is presented in Appendix 1-24.

Selected representative parameters

The recommended transmissivity of $4.1 \cdot 10^{-5}$ m^2/s was derived from the analysis of the CRwr phase. The confidence range for the transmissivity is estimated to be $1.0 \cdot 10^{-5}$ to $9.0 \cdot 10^{-5}$ m^2/s The flow dimension displayed during the test is 2. The static ground water level was derived from the CRwr phase using straight line extrapolation in the Horner plot to a value of 11.48 m.a.s.l.

No further analysis is recommended.

5.1.25 Pumping test KLX20A (Section 100.90–457.92)

Comments to test

The test consists of a pump phase (CRw) with an average flow rate of 9.9 l/min, followed by a pressure recovery phase (CRwr). The maximum drawdown just before stop of flowing was about 10.1 m (99.9 kPa). The flow rate during the pumping phase and the resulting drawdown indicate a medium transmissivity. After approx. 98 hours of pumping the pump was stopped. The subsequent recovery phase was measured for about 27 hours. No analysable flow period was identified during the CRw phase. The CRwr phase shows no problems and is adequate for quantitative analysis though it is affected by tidal effects.

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 CRwr phase was shows a continuous upward trend at middle and late times, indicating a transition from wellbore dominated flow to pure formation flow. At late times the derivative is noisy and no flow model can be determined. A homogeneous radial flow model with wellbore storage and skin was used for the analysis, which is presented in Appendix 1-25.

Selected representative parameters

The recommended transmissivity of $2.4 \cdot 10^{-5}$ m²/s was derived from the analysis of the CRwr phase. The confidence range for the transmissivity is estimated to be $9.0 \cdot 10^{-6}$ to $9.0 \cdot 10^{-5}$ m^2/s. A flow dimension of 2 was assumed. The static ground water level was derived from the CRwr phase using type curve extrapolation in the Horner plot to a value of 13.51 m.a.s.l.

No further analysis is recommended.

5.1.26 Pumping test KLX24A (Section 2.41–100.17)

Comments to test

The test consists of a pump phase (CRw) with an average flow rate of 16.6 l/min, followed by a pressure recovery phase (CRwr). The maximum drawdown just before stop of flowing was about 9.8 m (95.6 kPa). The flow rate during the pumping phase and the resulting drawdown indicate a medium transmissivity. After approx. 71 hours of pumping the pump was stopped. The subsequent recovery phase was measured for about 238 hours, but only the first 15 hours are analysable. Due to the poor data quality of the CRw phase, no analysable flow period was identified. However, the first 13 hours of the CRwr phase 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 CRwr phase shows a horizontal stabilization at middle times, followed by a slight upward trend at late times. A two shell composite flow model with decreasing transmissivity was used for the analysis, which is presented in Appendix 1-26.

Selected representative parameters

The recommended transmissivity of $5.8 \cdot 10^{-5}$ m^2/s was derived from the analysis of the CRwr phase (inner zone). The confidence range for the transmissivity is estimated to be $1.0 \cdot 10^{-5}$ to $9.0 \cdot 10^{-5}$ m^2/s. The flow dimension displayed during the test is 2. The static ground water level was derived from the CRwr phase using straight line extrapolation in the Horner plot to a value of 11.54 m.a.s.l.

No further analysis is recommended.

5.1.27 Pumping test KLX25A (Section 2.20–50.24)

Comments to test

The test consists of a pump phase (CRw) with an average flow rate of 1.2 l/min, followed by a pressure recovery phase (CRwr). The maximum drawdown just before stop of flowing was about 4.6 m (45.3 kPa). The flow rate during the pumping phase and the resulting drawdown indicate a medium transmissivity. After approx. 50 hours of pumping the pump was stopped.

The subsequent recovery phase was measured for about 24 hours. No analysable flow period was identified during the CRw phase. The CRwr 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 CRwr phase shows a horizontal stabilization at middle times, followed by a slight upward trend at late times. The analysis was conducted using a two shell composite flow model with decreasing transmissivity at some distance from the borehole. The analysis is presented in Appendix 1-27.

Selected representative parameters

The recommended transmissivity of $7.1 \cdot 10^{-6}$ m^2/s was derived from the analysis of the CRwr phase (inner zone). The confidence range for the transmissivity is estimated to be $1.0 \cdot 10^{-6}$ to $1.0 \cdot 10^{-5}$ m^2/s (this range includes the outer zone transmissivity). The flow dimension displayed during the test is 2. The static ground water level was derived from the CRwr phase using straight line extrapolation in the Horner plot to a value of 14.44 m.a.s.l.

No further analysis is recommended.

5.1.28 Pumping test KLX27A (Section 77.02–650.56)

Comments to test

The test consists of a pump phase (CRw) with an average flow rate of 16.5 l/min, followed by a pressure recovery phase (CRwr). The maximum drawdown just before stop of flowing was about 10.0 m (98.2 kPa). The flow rate during the pumping phase and the resulting drawdown indicate a medium transmissivity. After approx. 153 hours of pumping the pump was stopped. The subsequent recovery phase was measured for about 160 hours. After approx. 0.6 hours pumping the recorded pressure data shows a straight line. Therefore, the CRw phase is not analysable. The CRwr 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 CRwr phase was matched using a homogeneous radial flow model with wellbore storage and skin. The analysis is presented in Appendix 1-28.

Selected representative parameters

The recommended transmissivity of $2.9 \cdot 10^{-5}$ m^2/s was derived from the analysis of the CRwr phase. The confidence range for the transmissivity is estimated to be $7.0 \cdot 10^{-6}$ to $6.0 \cdot 10^{-5}$ m^2/s. A flow dimension of 2 was assumed. The static ground water level was derived from the CRwr phase using straight line extrapolation in the Horner plot to a value of 11.01 m.a.s.l.

No further analysis is recommended.

5.1.29 Pumping test KLX28A (Section 5.10–80.23)

Comments to test

The test consists of a pump phase (CRw) with an average flow rate of 2.1 l/min, followed by a pressure recovery phase (CRwr). The maximum drawdown just before stop of flowing was about 10.6 m (104.2 kPa). The flow rate during the pumping phase and the resulting drawdown indicate a medium transmissivity. After approx. 40 hours of pumping the pump was stopped.

The subsequent recovery phase was measured for about 24.6 hours. After approx. 0.2 hours pumping the recorded pressure data shows a straight line. Therefore, the CRw phase is not analysable. The CRwr 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 derivative of the CRwr phase shows a horizontal stabilization at middle times followed by an upward trend at late times. This behaviour is consistent with a decrease of transmissivity at some distance from the borehole. The analysis is presented in Appendix 1-29.

Selected representative parameters

The recommended transmissivity of $4.6 \cdot 10^{-6}$ m^2/s was derived from the analysis of the CRwr phase (inner zone). The confidence range for the transmissivity is estimated to be $8.0 \cdot 10^{-7}$ to $7.0 \cdot 10^{-6}$ m^2/s. The flow dimension displayed during the test is 2. The static ground water level was derived from the CRwr phase using type curve extrapolation in the Horner plot to a value of 9.04 m.a.s.l.

No further analysis is recommended.

5.1.30 Pumping test KLX29A (Section 2.35–60.25)

Comments to test

The test consists of a pump phase (CRw) with an average flow rate of 14.1 l/min, followed by a pressure recovery phase (CRwr). The maximum drawdown just before stop of flowing was about 5.2 m (51.4 kPa). The flow rate during the pumping phase and the resulting drawdown indicate a medium transmissivity. After approx. 23.3 hours of pumping the pump was stopped. The subsequent recovery phase was measured for about 17.3 hours. The recorded pressure data of the CRw phase is very noisy. Because of this, the CRw phase was not analysed. The CRwr 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 derivative of the CRwr phase shows a horizontal stabilization at middle times followed by an upward trend at late times. This behaviour is consistent with a decrease of transmissivity at some distance from the borehole. The analysis is presented in Appendix 1-30.

Selected representative parameters

The recommended transmissivity of $2.3 \cdot 10^{-5}$ m^2/s was derived from the analysis of the CRwr phase (outer zone), which is deemed to be representative for the formation. The confidence range for the transmissivity is estimated to be $5.0 \cdot 10^{-6}$ to $4.0 \cdot 10^{-5}$ m^2/s. The flow dimension displayed during the test is 2. The static ground water level was derived from the CRwr phase using type curve extrapolation in the Horner plot to a value of 9.26 m.a.s.l.

No further analysis is recommended.

5.1.31 Pumping test KSH01A (Section 2.35–60.25)

Comments to test

The test consists of a pump phase (CRw) with an average flow rate of 3.4 l/min, followed by a pressure recovery phase (CRwr). The maximum drawdown just before stop of flowing was about 10.3 m (101.4 kPa). The flow rate during the pumping phase and the resulting drawdown indicate a medium transmissivity. After approx. 168.3 hours of pumping the pump was stopped. The subsequent recovery phase was measured for about 23.1 hours. Due to a lack of pressure data during early time and bad data quality at all, the CRw phase was not analysable. The CRwr 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 derivative of the CRwr phase shows a horizontal stabilization at middle times followed by an upward trend at late times. This behaviour is consistent with a decrease of transmissivity at some distance from the borehole. The analysis is presented in Appendix 1-31.

Selected representative parameters

The recommended transmissivity of $8.2 \cdot 10^{-6}$ m^2/s was derived from the analysis of the CRwr phase (inner zone), which shows a horizontal stabilization. The confidence range for the transmissivity is estimated to be $1.0 \cdot 10^{-6}$ to $1.0 \cdot 10^{-5}$ m^2/s. The flow dimension displayed during the test is 2. The static ground water level was derived from the CRwr phase using straight line extrapolation in the Horner plot to a value of 1.95 m.a.s.l.

No further analysis is recommended.

5.1.32 Pumping test KSH02 (Section 80.00–1,001.11)

Comments to test

The test consists of a pump phase (CRw) with an average flow rate of 3.6 l/min, followed by a pressure recovery phase (CRwr). The maximum drawdown just before stop of flowing was about 10.5 m (103.4 kPa). The flow rate during the pumping phase and the resulting drawdown indicate a medium transmissivity. After approx. 217 hours of pumping the pump was stopped. The subsequent recovery phase was measured for about 51 hours. Due to fast drawdown and no analysable pressure change during the pumping phase, the CRw phase was not analysed. The CRwr 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 derivative of the CRwr phase shows a horizontal stabilization at middle times followed by an upward trend at late times. This behaviour is consistent with a decrease of transmissivity at some distance from the borehole. The analysis is presented in Appendix 1-31.

Selected representative parameters

The recommended transmissivity of $1.3 \cdot 10^{-5}$ m^2/s was derived from the analysis of the CRwr phase (inner zone), which shows a horizontal stabilization. The confidence range for the transmissivity is estimated to be $2.0 \cdot 10^{-6}$ to $3.0 \cdot 10^{-5}$ m^2/s (this range encompasses the outer zone transmissivity). The flow dimension displayed during the test is 2. The static ground water level was derived from the CRwr phase using straight line extrapolation in the Horner plot to a value of –0.40 m.a.s.l.

No further analysis is recommended.

6 Summary and conclusions

The summary and conclusions chapter summarizes the basic test parameters and analysis results.

6.1 Summary of results

Table 6-1. General test data from the pumping tests.

Borehole ID	Borehole Secup (m)	Borehole Seclow (m)	Date and time Test start YYYYMMDD hh:mm	Date and time Test stop YYYYMMDD hh:mm	Q_p (m^3/s)	Q_m (m^3/s)	tp (s)	t_F (s)	h_i (m.a.s.l.)	h_p (m.a.s.l.)	h_F (m.a.s.l.)	Test phases measured Analysed test phases marked bold
KAV01	70.04	757.31	20040218 16:25	20040226 14:46	3.11E–04	3.13E–04	369,540	81,882	1.31	–8.66	–0.55	**CRw / CRwr**
KAV04A	100.95	1,004.00	20040610 12:24	20040616 14:55	1.77E–04	2.10E–04	472,860	54,324	1.25	–8.75	–4.29	**CRw / CRwr**
KAV04B	11.52	101.03	20040616 17:18	20040618 06:11	3.90E–04	4.38E–04	74,040	58,726	3.55	–6.56	2.61	**CRw / CRwr**
KLX04	101.43	993.49	20040729 09:56	20040806 12:08	8.18E–04	9.23E–04	596,340	85,386	13.66	6.99	11.64	**CRw / CRwr**
KLX09	11.95	880.38	20060511 20:27	20060523 16:47	1.11E–03	1.17E–03	675,720	199,126	13.19	8.34	13.30	**CRw / CRwr**
KLX09B	10.74	100.22	20060221 10:45	20060409 11:50	1.63E–04	1.64E–04	509,280	259,916	13.42	3.32	13.53	**CRw / CRwr**
KLX09C	9.00	120.05	20060216 14:14	20060410 15:03	5.28E–04	4.86E–04	497,761	350,719	13.52	8.32	13.14	CRw / **CRwr**
KLX09D	9.75	121.02	20060217 09:50	20060408 16:13	2.32E–04	2.33E–04	508,020	243,941	13.03	3.53	13.68	**CRw / CRwr**
KLX09E	9.00	120.00	20060218 10:20	20060410 08:32	5.21E–04	5.25E–04	509,700	273,120	13.03	7.53	12.94	**CRw / CRwr**
KLX09F	9.00	152.30	20060220 10:21	20060411 09:05	5.55E–04	5.55E–04	515,220	175,020	13.64	10.02	13.46	**CRw / CRwr**
KLX09G	9.30	100.10	20060712 14:07	20060719 06:00	1.37E–04	1.28E–04	186,060	315,480	12.67	4.76	12.37	**CRw / CRwr**
KLX10	12.10	1,001.20	20051210 11:10	20051231 07:35	1.45E–03	1.50E–03	679,800	846,600	12.73	5.80	12.74	**CRw / CRwr**
KLX10B	9.00	50.25	20060718 15:01	20060727 14:19	4.63E–04	3.66E–04	176,340	527,370	11.62	1.75	11.33	**CRw / CRwr**
KLX10C	9.00	146.25	20060724 12:59	20060730 06:58	1.13E–04	1.10E–04	183,960	235,590	11.46	1.08	11.49	**CRw / CRwr**
KLX11A	12.05	992.29	20061029 08:56	20061113 10:50	5.67E–04	6.65E–04	454,500	164,489	13.20	2.46	11.95	**CRw / CRwr**
KLX11B	2.54	100.20	20060904 15:01	20061022 15:57	2.67E–04	2.83E–04	681,600	262,680	10.04	0.64	9.78	**CRw / CRwr**

Borehole ID	Borehole Secup (m)	Borehole Seclow (m)	Date and time Test start YYYYMMDD hh:mm	Date and time Test stop YYYYMMDD hh:mm	Q_p (m³/s)	Q_m (m³/s)	tp (s)	t_F (s)	h_i (m.a.s.l.)	h_p (m.a.s.l.)	h_F (m.a.s.l.)	Test phases measured Analysed test phases marked bold
KLX11C	2.00	120.15	20060906 10:14	20061020 13:00	2.92E–05	3.38E–05	161,460	95,428	12.55	0.80	12.53	CRw / **CRwr**
KLX11D	2.00	120.35	20060907 16:48	20061021 09:42	3.52E–04	3.74E–04	511,260	340,880	11.91	1.08	12.64	**CRw / CRwr**
KLX11E	2.00	121.30	20060922 14:47	20061002 15:53	3.77E–05	3.68E–05	576,900	290,882	9.62	0.00	14.38	**CRw / CRwr**
KLX11F	2.00	120.05	20061016 10:16	20061021 16:45	3.80E–04	4.29E–04	158,700	294,609	12.73	0.35	12.89	**CRw / CRwr**
KLX12A	17.92	602.29	20060609 16:05	20060619 08:54	1.04E–04	1.12E–04	438,180	319,860	10.66	1.10	10.16	CRw / **CRwr**
KLX13A	11.75	595.85	20060924 14:30	20061001 11:24	6.50E–04	8.06E–04	422,100	79,442	13.48	3.45	6.61	**CRw / CRwr**
KLX17A	11.95	701.08	20061210 16:56	20070111 14:01	2.37E–04	2.62E–04	418,860	256,780	16.57	6.29	16.81	CRw / **CRwr**
KLX18A	11.83	611.28	20060707 12:05	20060722 00:00	1.95E–04	2.37E–04	604,740	550,080	11.74	1.60	11.06	CRw / **CRwr**
KLX20A	100.90	457.92	20060618 09:17	20060711 09:35	1.12E–04	1.65E–04	351,840	852,060	13.72	3.62	13.34	CRw / **CRwr**
KLX24A	2.41	100.17	20060823 11:10	20060906 14:20	2.64E–04	2.76E–04	256,440	855,300	10.01	0.22	9.96	CRw / **CRwr**
KLX25A	2.20	50.24	20060816 15:53	20060820 10:55	1.25E–05	1.94E–05	179,580	86,404	14.64	10.02	13.73	CRw / **CRwr**
KLX27A	14.76	650.56	20071215 10:52	20080116 11:21	2.32E–04	2.76E–04	549,600	574,500	10.69	0.68	10.54	CRw / **CRwr**
KLX28A	5.10	80.23	20061124 11:28	20061127 08:48	2.42E–05	3.47E–05	145,560	88,622	8.99	–1.63	7.04	CRw / **CRwr**
KLX29A	2.35	60.25	20061127 14:00	20061129 08:56	1.60E–04	2.35E–04	83,880	62,400	9.44	4.20	8.95	CRw / **CRwr**
KSH01A	12.10	1,003.00	20030220 14:05	20030302 14:54	5.00E–06	8.33E–06	605,880	83,192	0.12	–10.22	–2.48	CRw / **CRwr**
KSH02	80.00	1,001.11	20030709 11:57	20030722 16:15	5.19E–06	8.59E–06	781,920	183,808	–0.67	–11.21	–2.32	CRw / **CRwr**

Nomenclature

Q_p	Flow in test section immediately before stop of flow [m³/s].
Q_m	Arithmetical mean flow during perturbation phase [m³/s].
t_p	Duration of perturbation phase [s].
t_f	Duration of recovery phase [s].
h_i	Pressure in test section before start of flowing [m.a.s.l.].
h_p	Pressure in test section before stop of flowing [m.a.s.l.].
h_F	Pressure in test section at the end of the recovery [m.a.s.l.].
Test phases	CRw: constant rate pump (withdrawal) phase.
	CRwr: recovery phase following the constant rate pump (withdrawal) phase.

Table 6-2. Results from analysis of the pumping tests.

Interval position			Stationary flow parameters		Transient analysis													
					Flow regime		Formation parameters											
Borehole	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	h_{wif}
ID	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	m.a.s.l.
KAV01	70.04	757.31	3.1E–05	4.6E–05	WBS2	WBS22	6.2E–05	#NV	7.4E–05	1.7E–05	7.4E–05	1.0E–05	1.0E–04	2.2E–06	–2.2	24.60	45.00	1.92
KAV04A	100.95	1,004.00	1.8E–05	2.6E–05	WBS2	WBS22	8.8E–05	#NV	6.8E–05	3.4E–06	6.8E–05	1.0E–05	1.0E–04	4.8E–06	–2.9	37.20	68.40	4.79
KAV04B	11.52	101.03	3.9E–05	5.0E–05	WBS2	WBS22	7.9E–05	#NV	9.6E–05	1.6E–05	9.6E–05	1.0E–05	2.0E–04	3.6E–07	–1.1	7.80	16.20	4.18
KLX04	101.43	993.49	1.2E–04	1.8E–04	WBS22	WBS22	2.0E–04	7.0E–05	3.3E–04	8.0E–05	3.3E–04	5.0E–05	5.0E–04	3.2E–06	–2.8	12.60	20.40	13.44
KLX09	11.95	880.38	2.3E–04	3.4E–04	WBS22	WBS22	3.8E–04	8.8E–05	5.4E–04	1.1E–04	5.4E–04	1.0E–04	8.0E–04	5.2E–06	–1.4	12.00	22.20	13.36
KLX09B	10.74	100.22	1.6E–05	2.1E–05	WBS2	WBS2	1.1E–04	#NV	8.5E–05	#NV	8.5E–05	1.0E–05	1.0E–04	4.5E–07	13.8	#NV	#NV	13.86
KLX09C	9.00	120.05	1.0E–04	1.3E–04	#NV	WBS22	#NV	#NV	5.3E–04	1.1E–04	5.3E–04	1.0E–04	7.0E–04	4.3E–07	13.1	3.60	7.20	13.79
KLX09D	9.75	121.02	2.4E–05	3.2E–05	WBS2	WBS22	7.4E–05	#NV	7.8E–05	3.7E–05	7.8E–05	2.0E–05	1.0E–04	3.6E–07	12.5	23.40	63.00	13.93
KLX09E	9.00	120.00	9.5E–05	1.2E–04	WBS22	WBS22	1.7E–04	9.6E–05	2.6E–04	9.5E–05	2.6E–04	9.0E–05	4.0E–04	8.7E–07	1.9	12.60	28.80	13.51
KLX09F	9.00	152.30	1.5E–04	2.1E–04	WBS22	WBS22	1.6E–04	1.3E–04	4.3E–04	1.1E–04	4.3E–04	1.0E–04	6.0E–04	5.9E–07	–1.2	3.00	7.80	14.14
KLX09G	9.30	100.10	1.7E–05	2.2E–05	WBS2	WBS2	6.7E–05	#NV	6.5E–05	#NV	6.5E–05	1.0E–05	9.0E–05	4.7E–07	13.5	#NV	#NV	12.61
KLX10	12.10	1,001.20	2.1E–04	3.2E–04	WBS22	WBS22	3.7E–04	8.4E–05	5.3E–04	1.2E–04	5.3E–04	1.0E–04	8.0E–04	2.5E–06	–3.2	7.20	12.00	13.20
KLX10B	9.00	50.25	4.7E–05	5.4E–05	WBS2	WBS22	1.2E–04	#NV	2.7E–04	1.1E–04	2.7E–04	1.0E–05	4.0E–04	3.7E–07	29.9	23.40	75.60	11.62
KLX10C	9.00	146.25	1.1E–05	1.5E–05	WBS2	WBS2	2.4E–05	#NV	2.5E–05	#NV	2.5E–05	9.0E–06	6.0E–04	5.5E–07	3.9	#NV	#NV	12.21
KLX11A	12.05	992.29	5.3E–05	8.0E–05	WBS2	WBS22	1.0E–04	#NV	1.2E–04	2.7E–05	1.2E–04	5.0E–05	4.0E–04	3.4E–06	–1.0	61.80	105.60	13.85
KLX11B	2.54	100.20	2.8E–05	3.7E–05	WBS2	WBS22	4.6E–05	#NV	8.2E–05	3.1E–05	8.2E–05	1.0E–05	1.0E–04	5.1E–07	3.5	19.20	64.80	10.29
KLX11C	2.00	120.15	2.5E–06	3.3E–06	#NV	WBS22	#NV	#NV	4.6E–06	2.3E–05	4.6E–06	2.0E–06	4.0E–05	5.2E–07	3.0	#NV	#NV	12.85
KLX11D	2.00	120.35	3.2E–05	4.3E–05	WBS2	WBS22	7.7E–05	#NV	6.2E–05	2.5E–05	6.2E–05	2.0E–05	9.0E–05	6.5E–07	–1.8	13.20	31.20	13.95
KLX11E	2.00	121.30	3.9E–06	5.2E–06	WBS2	WBS22	6.6E–06	#NV	7.0E–06	5.6E–07	7.0E–06	2.0E–06	1.0E–05	4.3E–07	2.2	187.80	690.00	14.46
KLX11F	2.00	120.05	3.1E–05	4.1E–05	WBS2	WBS22	2.1E–05	#NV	2.1E–05	5.9E–05	2.1E–05	9.0E–06	7.0E–05	5.3E–07	–6.1	1.20	13.20	12.55
KLX12A	17.92	602.29	1.1E–05	1.6E–05	#NV	WBS2	#NV	#NV	2.3E–05	#NV	2.3E–05	8.0E–06	5.0E–05	3.8E–06	2.1	#NV	#NV	10.50
KLX13A	11.75	595.85	6.5E–05	9.3E–05	WBS22	WBS22	1.6E–03	3.4E–05	3.5E–03	3.5E–05	3.5E–05	9.0E–06	6.0E–05	2.8E–05	–2.2	168.00	930.00	14.15
KLX17A	11.95	701.08	2.3E–05	3.4E–05	#NV	WBS2	#NV	#NV	5.2E–05	#NV	5.2E–05	1.0E–05	9.0E–05	3.9E–06	3.3	322.20	3,600.00	17.34
KLX18A	11.83	611.28	1.9E–05	2.8E–05	#NV	WBS2	#NV	#NV	4.1E–05	#NV	4.1E–05	1.0E–05	9.0E–05	3.8E–06	2.7	126.00	2,349.60	11.48
KLX20A	100.90	457.92	1.1E–05	1.5E–05	#NV	WBS2	#NV	#NV	2.4E–05	#NV	2.4E–05	9.0E–06	9.0E–05	3.8E–06	4.0	#NV	#NV	13.51

Interval position			Stationary flow parameters		Transient analysis													
					Flow regime		Formation parameters											
Borehole	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	h_{wif}
ID	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	m.a.s.l.
KLX24A	2.41	100.17	2.7E–05	3.5E–05	#NV	WBS22	#NV	#NV	5.8E–05	3.2E–05	5.8E–05	1.0E–05	9.0E–05	3.3E–07	5.3	27.00	77.40	11.54
KLX25A	2.20	50.24	2.7E–06	3.2E–06	#NV	WBS22	#NV	#NV	7.1E–06	2.4E–06	7.1E–06	1.0E–06	1.0E–05	1.1E–06	–4.0	68.40	210.00	14.44
KLX27A	14.76	650.56	2.3E–05	3.3E–05	#NV	WBS2	#NV	#NV	2.9E–05	#NV	2.9E–05	7.0E–06	6.0E–05	3.9E–05	–3.3	#NV	#NV	11.01
KLX28A	5.10	80.23	2.3E–06	2.9E–06	#NV	WBS22	#NV	#NV	4.6E–06	8.6E–07	4.6E–06	8.0E–07	7.0E–06	6.3E–07	–3.1	15.00	749.40	9.04
KLX29A	2.35	60.25	3.1E–05	3.7E–05	#NV	WBS22	#NV	#NV	1.4E–04	2.3E–05	2.3E–05	5.0E–06	4.0E–05	1.7E–06	–3.2	#NV	#NV	9.26
KSH01A	12.10	1,003.00	5.0E–06	8.3E–06	#NV	WBS22	#NV	#NV	8.2E–06	2.0E–06	8.2E–06	1.0E–06	1.0E–05	4.0E–06	–2.8	192.00	342.00	1.95
KSH02	80.00	1,001.11	5.2E–06	7.8E–06	#NV	WBS22	#NV	#NV	1.3E–05	3.4E–06	1.3E–05	2.0E–06	3.0E–05	3.8E–06	0.9	417.60	754.80	–0.40

Nomenclature

Q/s	Specific capacity.
T_M	Transmissivity according to /Moye 1967/.
Flow regime	The flow regime description refers to the recommended model used in the transient analysis. WBS denotes wellbore storage and skin and is followed by a set of numbers describing the flow dimension used in the analysis (1 = linear flow, 2 = radial flow, 3 = spherical flow). If only one number is used (e.g. WBS2 or 2) a homogeneous flow model (1 composite zone) was used in the analysis, if two numbers are given (WBS22 or 22) a 2 zones composite model was used.
T_f	Transmissivity derived from the analysis of the perturbation phase (CRw). In case a homogeneous flow model was used only one T_f value is reported, in case a two zone composite flow model was used both T_{f1} (inner zone) and T_{f2} (outer zone) are given.
Ts	Transmissivity derived from the analysis of the recovery phase (CRwr). In case a homogeneous flow model was used only one T_s value is reported, in case a two zone composite flow model was used both T_{s1} (inner zone) and T_{s2} (outer zone) are given.
T_T	Recommended transmissivity.
T_{TMIN} / T_{TMAX}	Confidence range lower/upper limit.
C	Wellbore storage coefficient.
ξ	Skin factor (calculated based on a Storativity of $1 \cdot 10^{-6}$; see chapter 4.5.4).
dt_1 / dt_2	Estimated start/stop time of evaluation for the recommended transmissivity (T_T).
h_{wif}	Static fresh-water head.
#NV	Not analysed/no values.

Table 6.3. Results from the ri-index calculation of (see Chapter 4.5.8 for details).

Borehole ID	Recommended transmissivity T_T (m²/s)	Calculated Storativity S* based on Rhen et al. (–)	Time t for radius of influence calculation (s)	ri-index (–)	Radius of Influence (m)
KAV01	7.38E–05	6.01E–06	2,700	1	273.05
KAV04A	6.80E–05	5.77E–06	4,104	1	329.82
KAV04B	9.56E–05	6.84E–06	972	1	174.78
KLX04	3.30E–04	1.27E–05	1,224	1	267.34
KLX09	5.40E–04	1.63E–05	1,332	1	315.42
KLX09B	8.50E–05	6.45E–06	259,916	0	2,775.32
KLX09C	5.30E–04	1.61E–05	432	1	178.79
KLX09D	7.84E–05	6.20E–06	3,780	1	327.99
KLX09E	2.61E–04	1.13E–05	1,728	1	299.55
KLX09F	4.32E–04	1.45E–05	468	1	176.82
KLX09G	6.54E–05	5.66E–06	315,480	0	2,863.67
KLX10	5.33E–04	1.62E–05	720	1	231.15
KLX10B	2.71E–04	1.15E–05	4,536	1	489.92
KLX10C	2.50E–05	3.50E–06	235,590	–1	1,945.83
KLX11A	1.22E–04	7.73E–06	6,336	1	474.29
KLX11B	8.15E–05	6.32E–06	3,888	1	335.89
KLX11C	4.60E–06	1.50E–06	#NV	–1	#NV
KLX11D	6.16E–05	5.49E–06	1,872	1	217.32
KLX11E	6.98E–06	1.85E–06	41,400	1	592.93
KLX11F	2.06E–05	3.18E–06	792	–1	107.49
KLX12A	2.30E–05	3.36E–06	319,860	0	2,220.52
KLX13A	3.47E–05	4.12E–06	#NV	1	#NV
KLX17A	5.23E–05	5.06E–06	216,000	0	2,240.76
KLX18A	4.09E–05	4.48E–06	140,976	0	1,702.34
KLX20A	2.44E–05	3.46E–06	852,060	0	3,678.11
KLX24A	5.82E–05	5.34E–06	4,644	1	337.46
KLX25A	7.13E–06	1.87E–06	12,600	1	328.85
KLX27A	2.86E–05	3.74E–06	574,500	0	3,142.53
KLX28A	4.55E–06	1.49E–06	44,964	1	555.24
KLX29A	2.26E–05	3.33E–06	#NV	1	#NV
KSH01A	8.20E–06	2.00E–06	20,520	1	434.59
KSH02	1.34E–05	2.56E–06	45,288	1	729.98

6.2 Correlation analysis

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

6.2.1 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 for the pumping tests (see following Figure 6-5).

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

6.2.2 Comparison between the matched and theoretical wellbore storage coefficient

The wellbore storage coefficient describes the capacity of the borehole to store fluid as a result of a unit pressure change in the interval. For a open system the theoretical storage coefficient is calculated as follows:

$$C = \frac{\pi \, r_w^2}{\rho \; g}$$

For the pumping tests the theoretical wellbore storage was calculated based on the casing diameter, because the water level changes during the pumping test are taking place in this part of the borehole. The resulting theoretical wellbore storage ranges between $4.6 \cdot 10^{-7}$ and $2.1 \cdot 10^{-6}$ m^3/Pa.

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.

Figure 6-2 presents a cross-plot of the matched and theoretical wellbore storage coefficients.

The comparison shows relative good consistency between both kinds of wellbore storages. Two exceptions are the derived wellbore storages from the analysis of the pumping tests conducted in borehole KLX13A and KLX27A, which show considerable higher values than the theoretical wellbore storage.

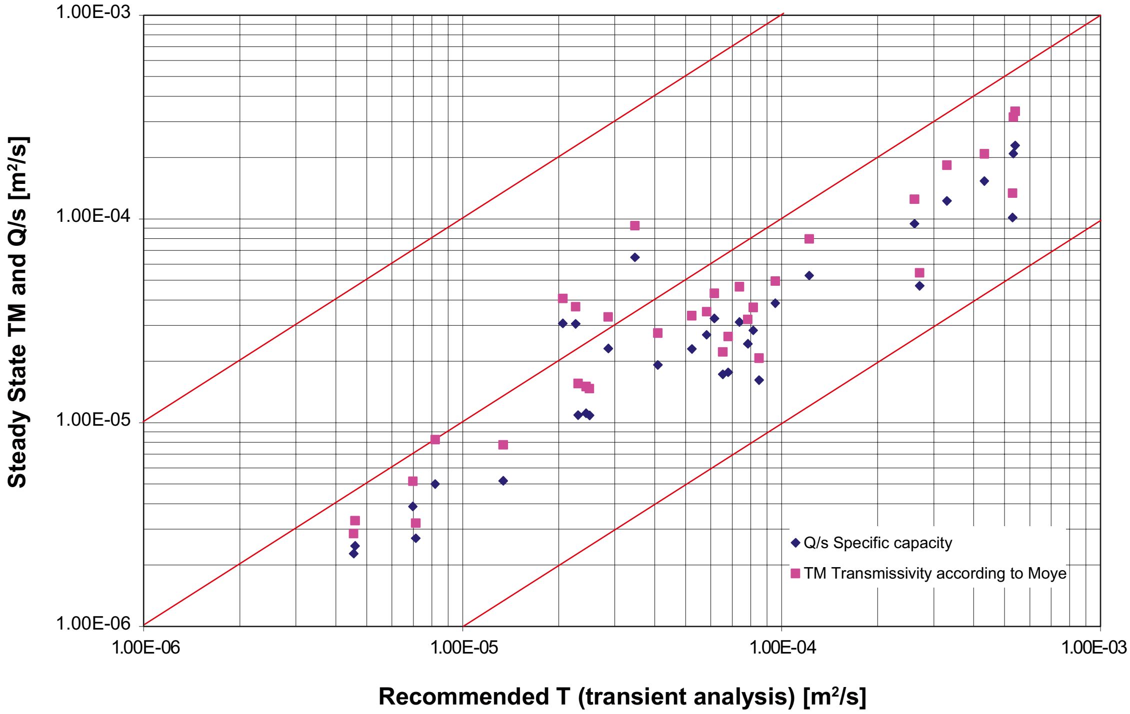

Figure 6-1. *Correlation analysis of transmissivities derived by steady state and transient methods for the pump tests.*

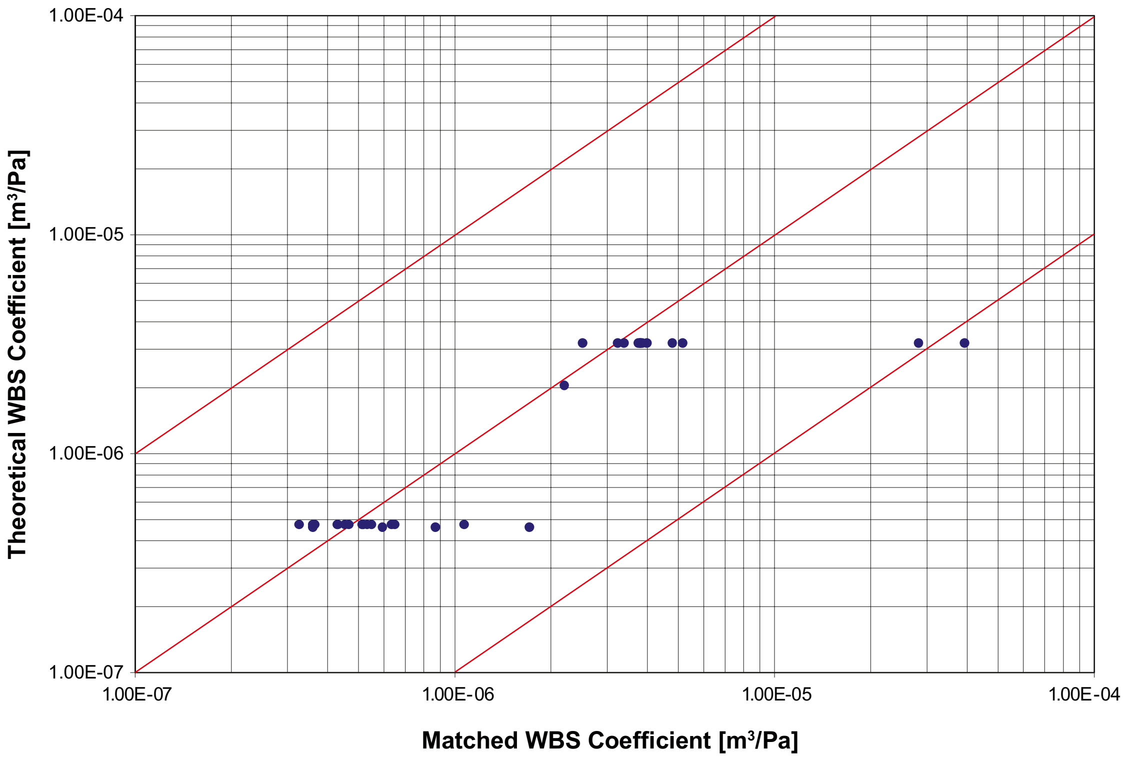

Figure 6-2. *Correlation analysis of transmissivities derived by steady state and transient methods for the pump tests.*

7 References

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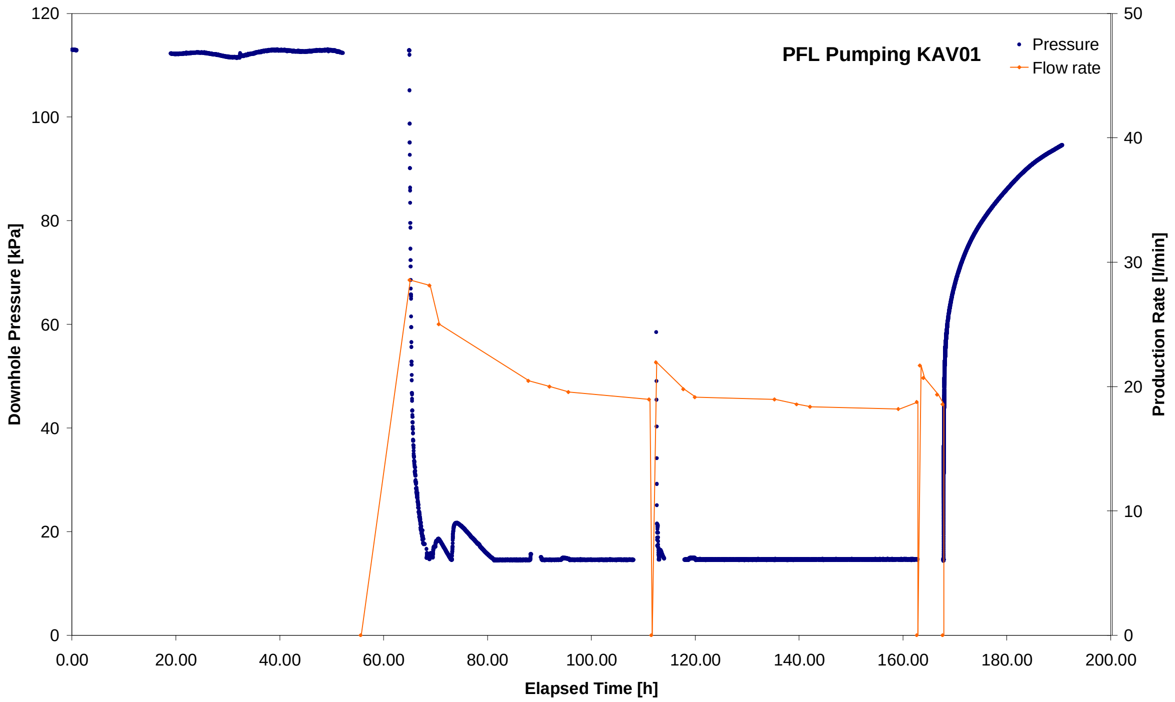
APPENDIX 1

Analysis diagrams

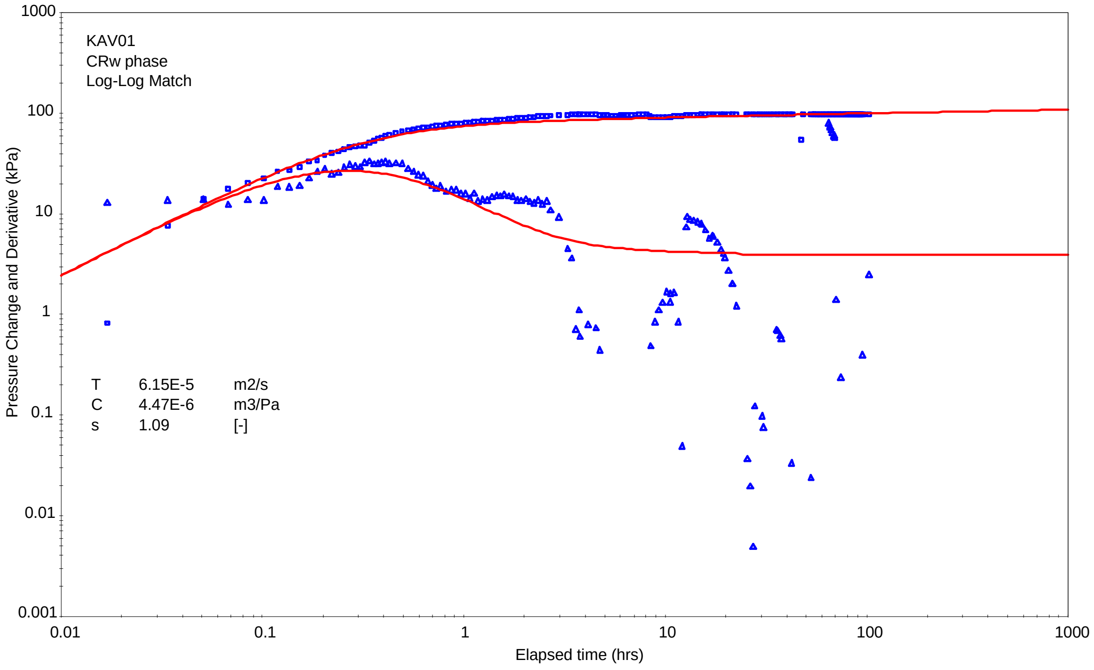
APPENDIX 1-1

PFL Pumptest KAV01

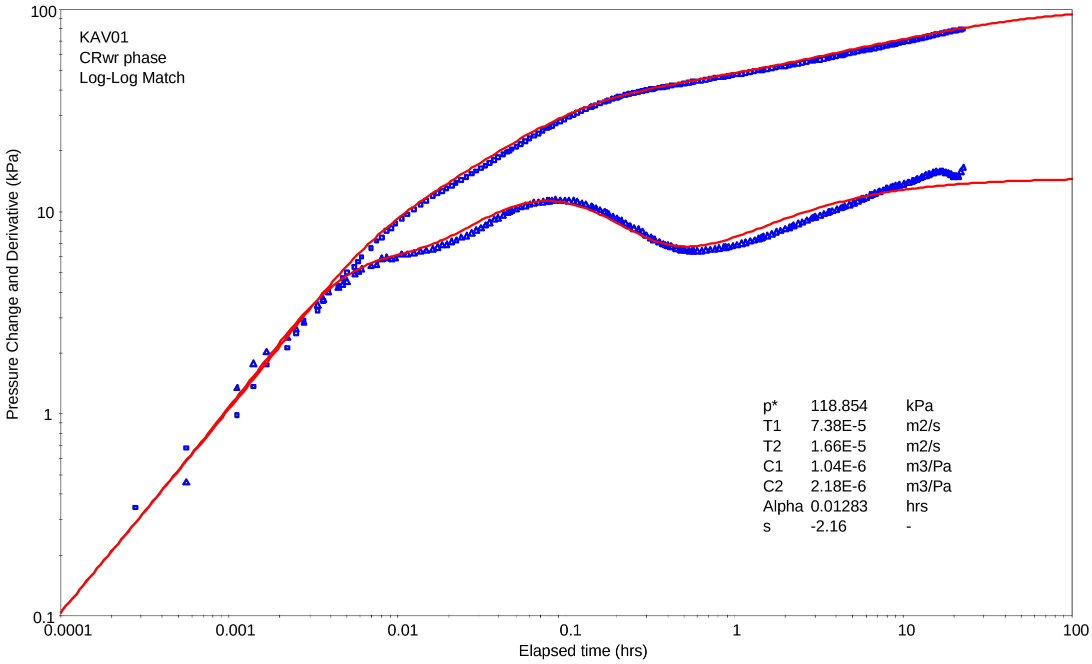
Analysis diagrams



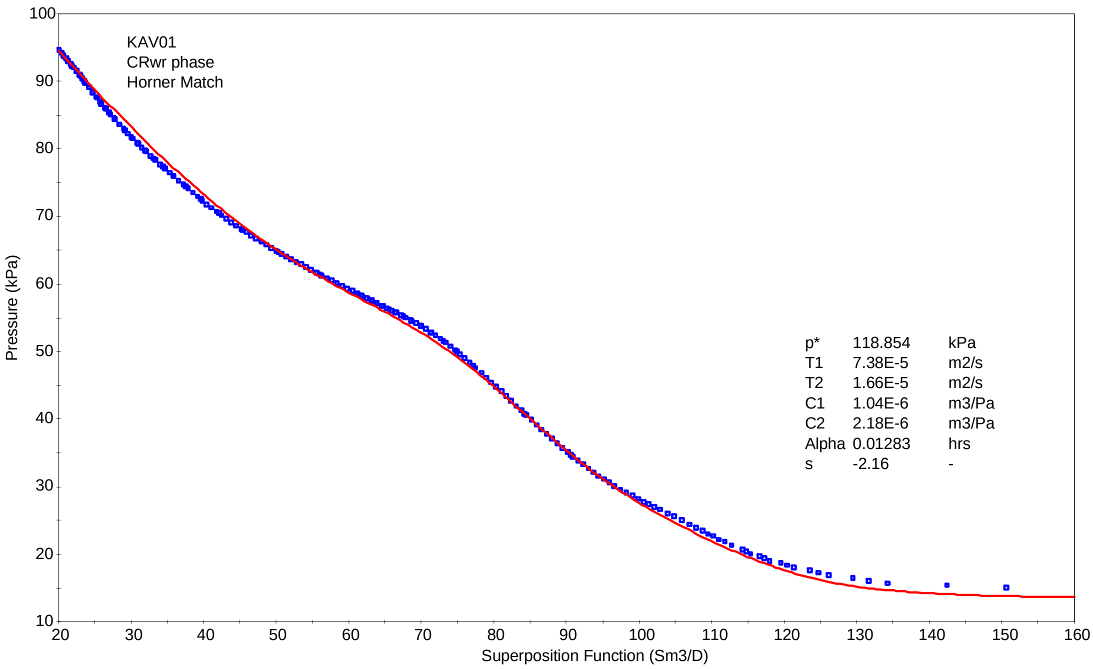
Pressure and flow rate vs. time; cartesian plot



CRw phase; log-log match



CRwr phase; log-log match

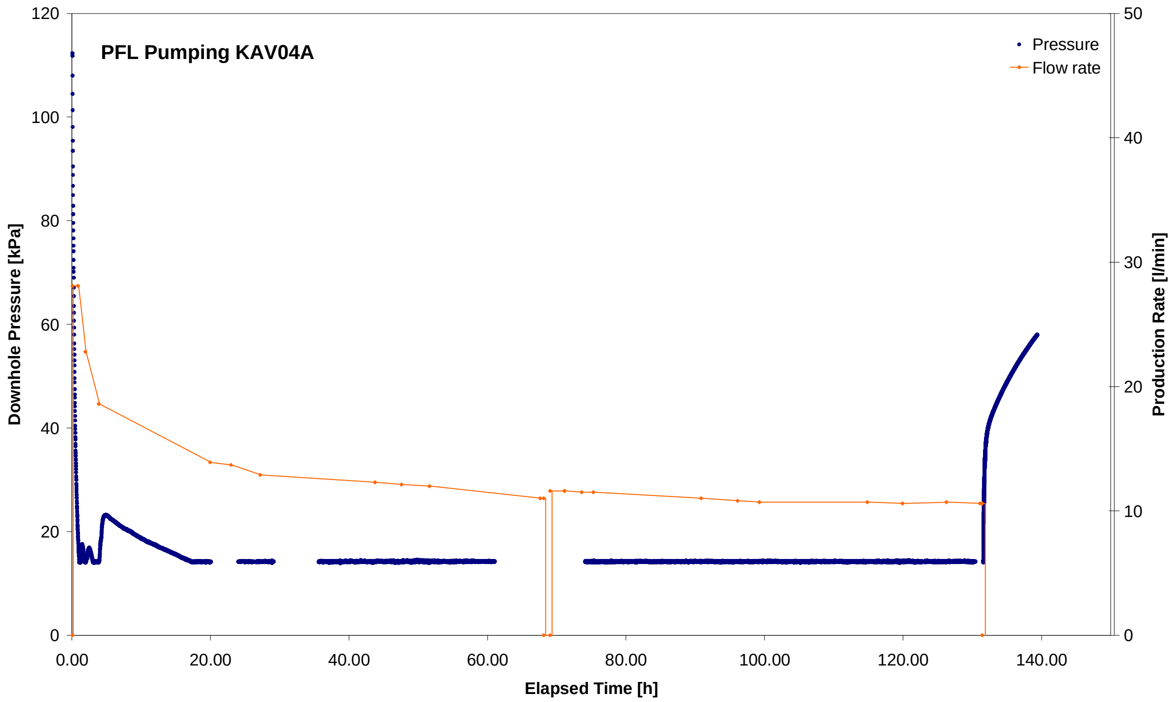


CRwr phase; HORNER match

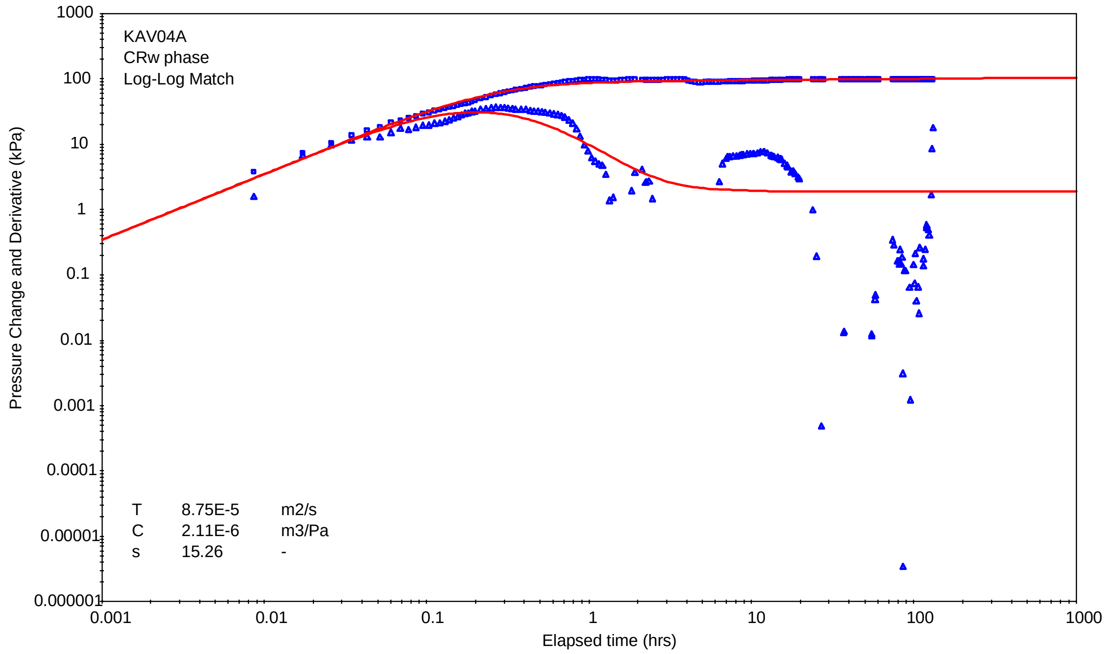
APPENDIX 1-2

PFL Pumptest KAV04A

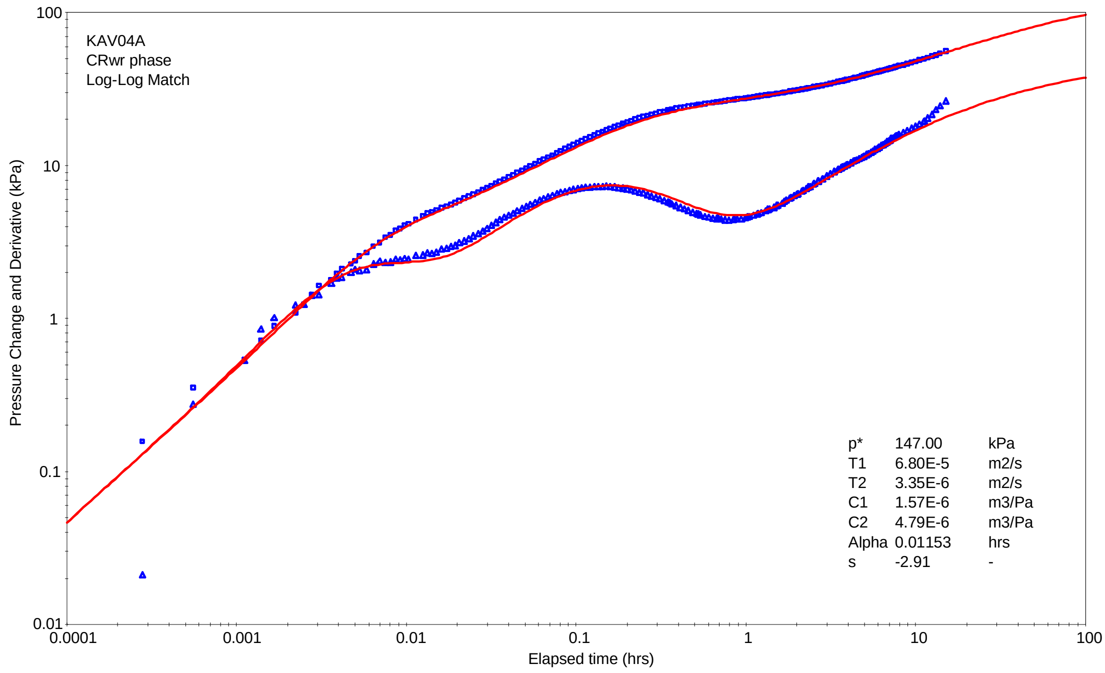
Analysis diagrams



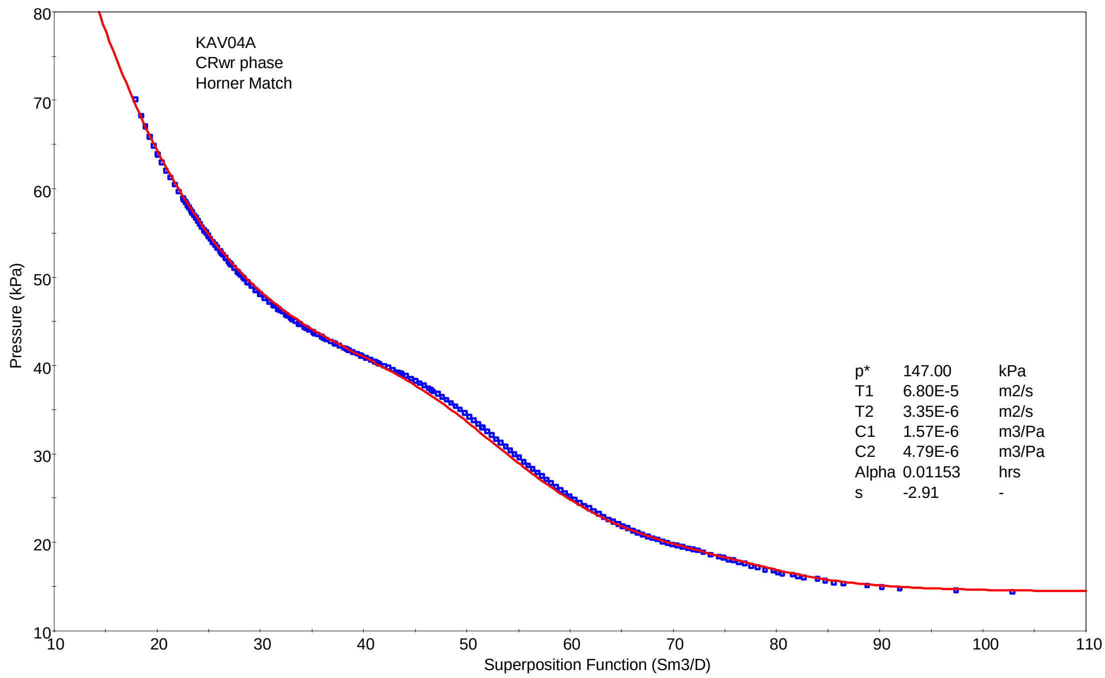
Pressure and flow rate vs. time; cartesian plot



CRw phase; log-log match



CRwr phase; log-log match

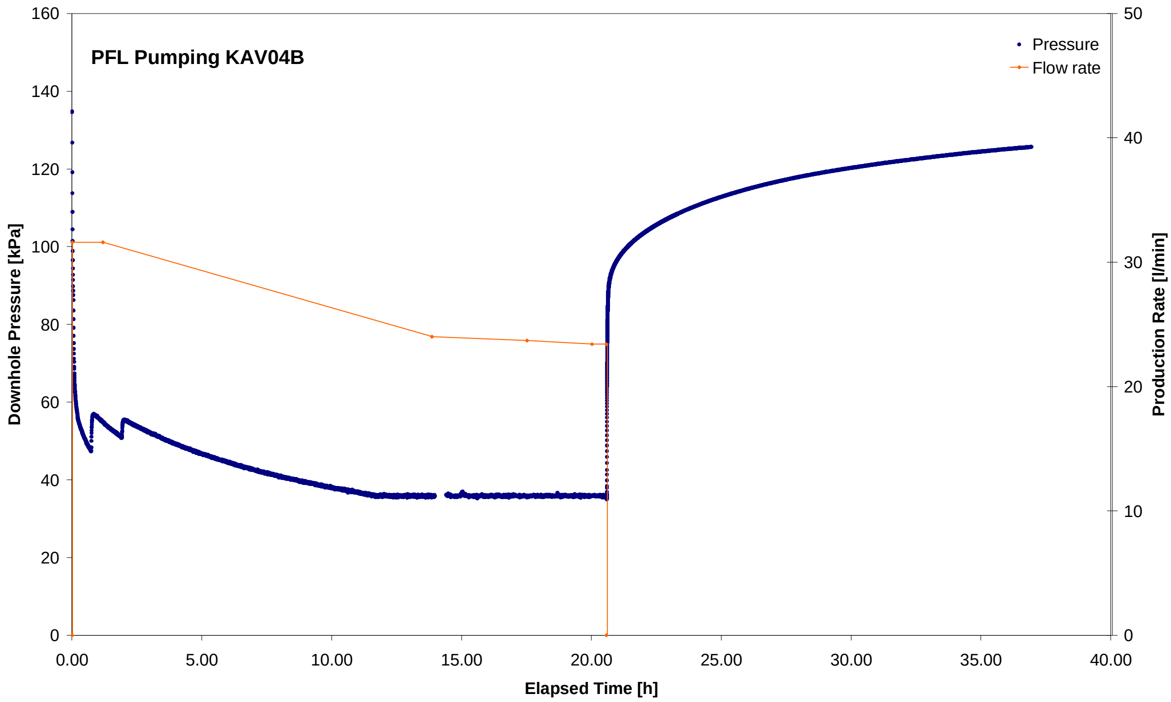


CRwr phase; HORNER match

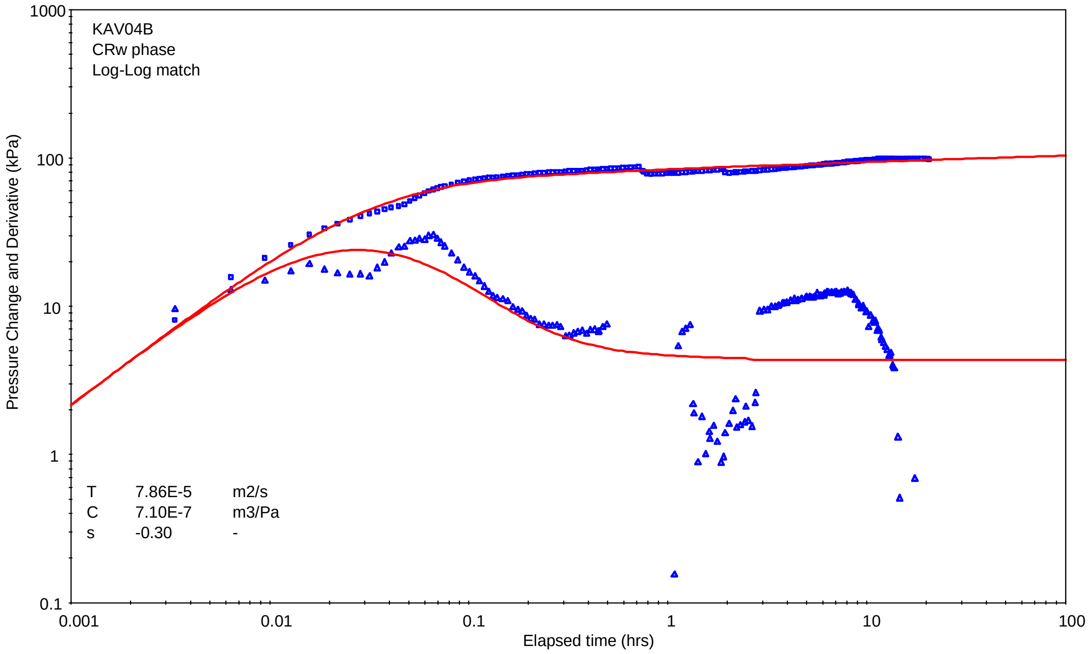
APPENDIX 1-3

PFL Pumptest KAV04B

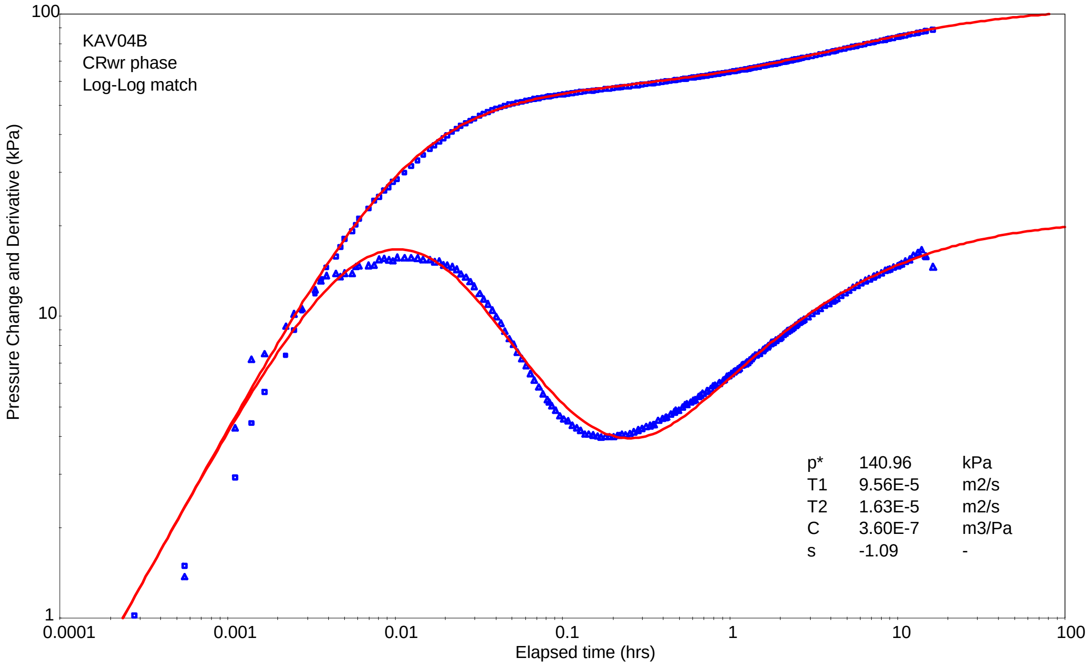
Analysis diagrams



Pressure and flow rate vs. time; cartesian plot



CRw phase; log-log match



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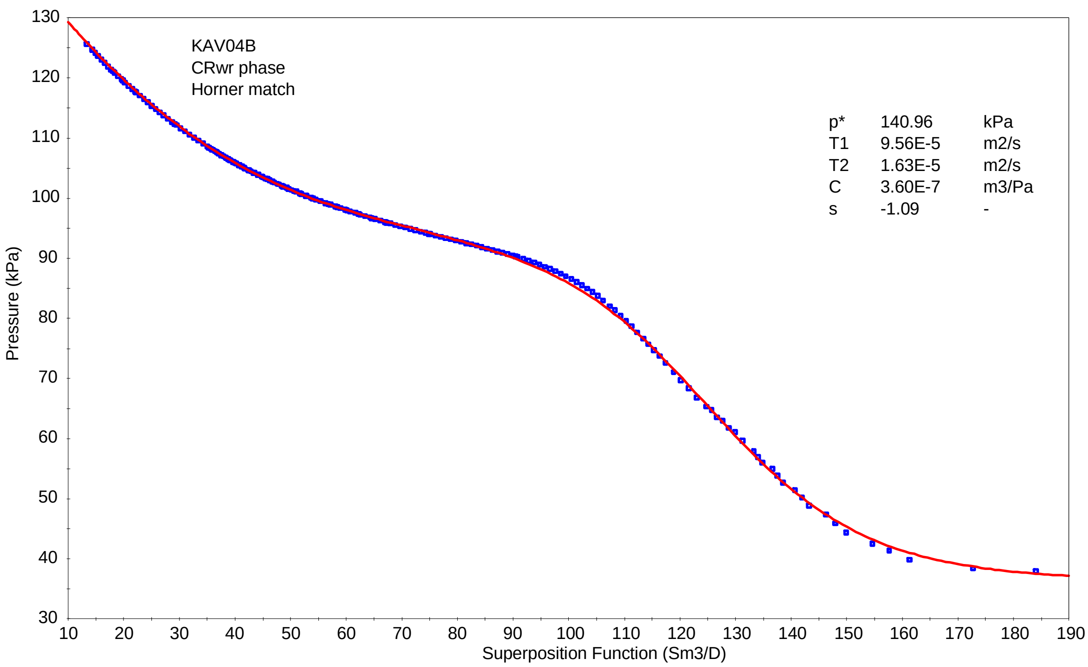
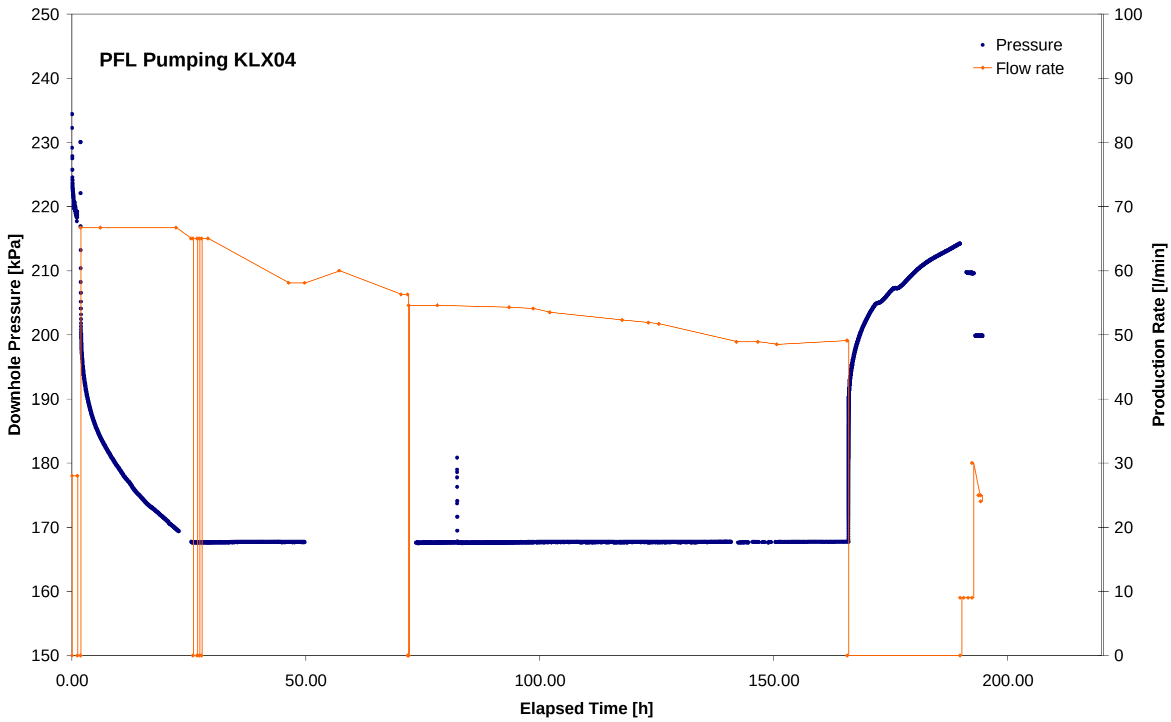


CRwr phase; HORNER match

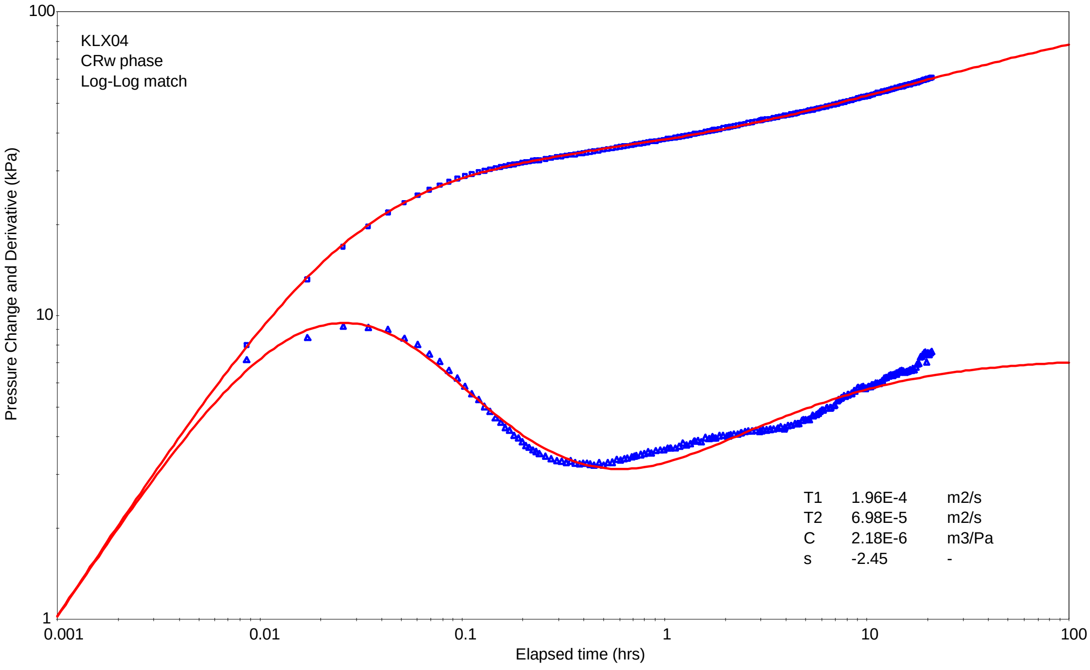
APPENDIX 1-4

PFL Pumptest KLX04

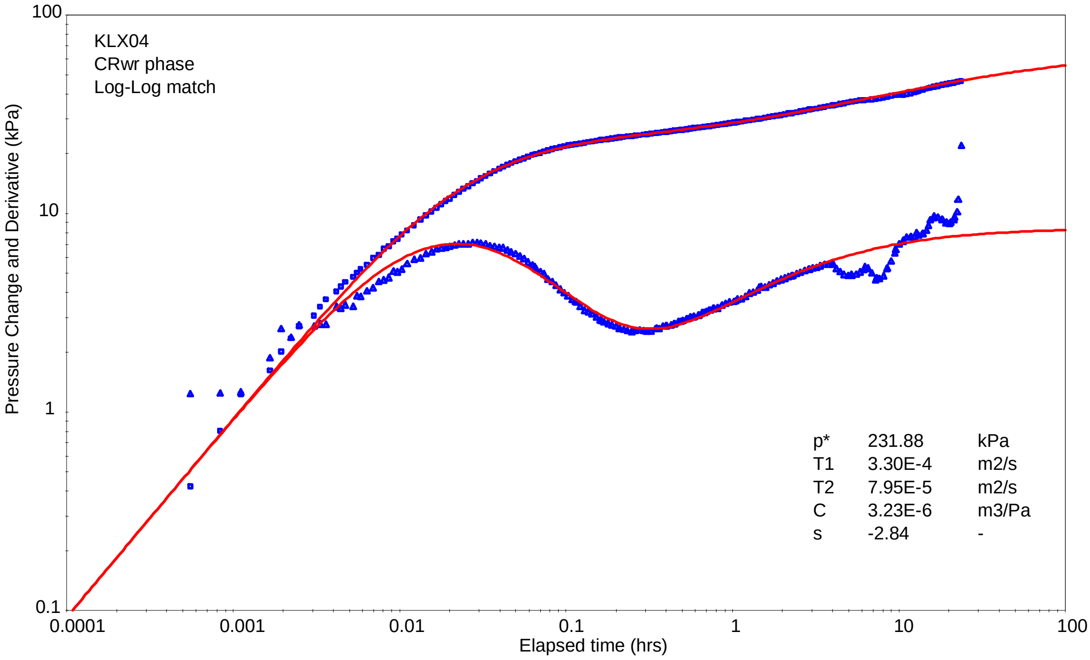
Analysis diagrams



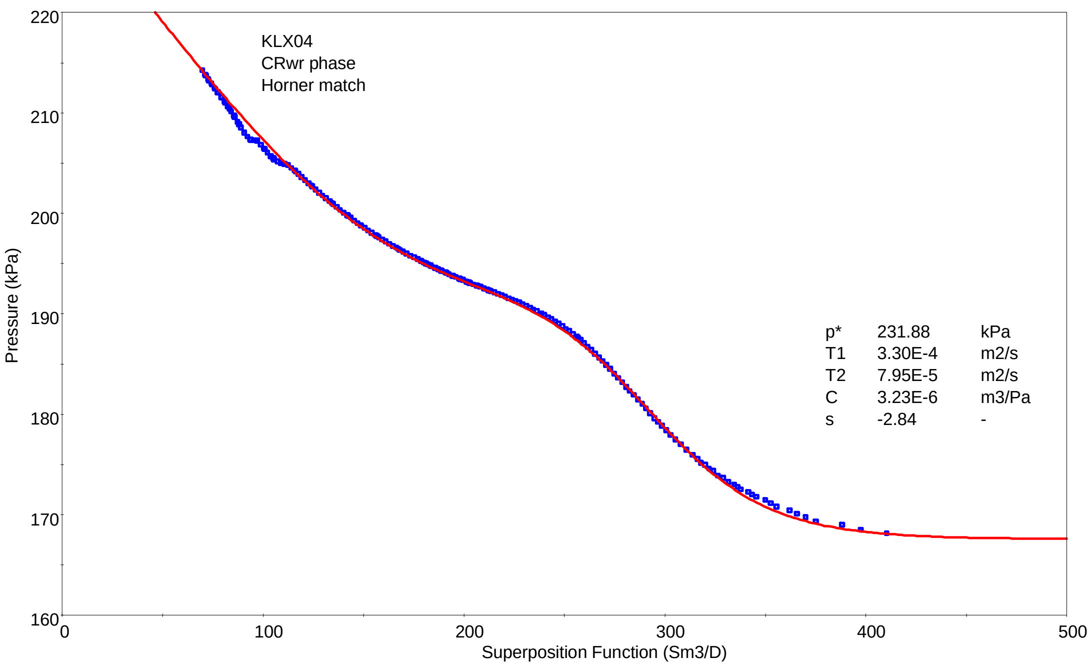
Pressure and flow rate vs. time; cartesian plot



CRw phase; log-log match



CRwr phase; log-log match

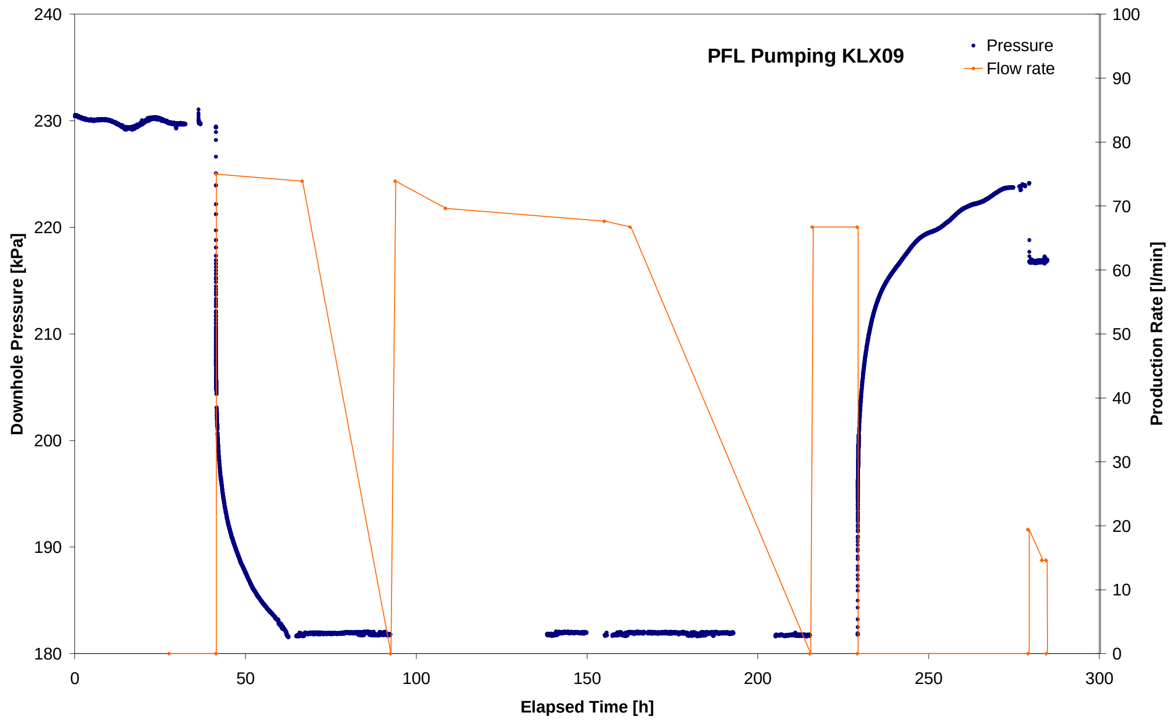


CRwr phase; HORNER match

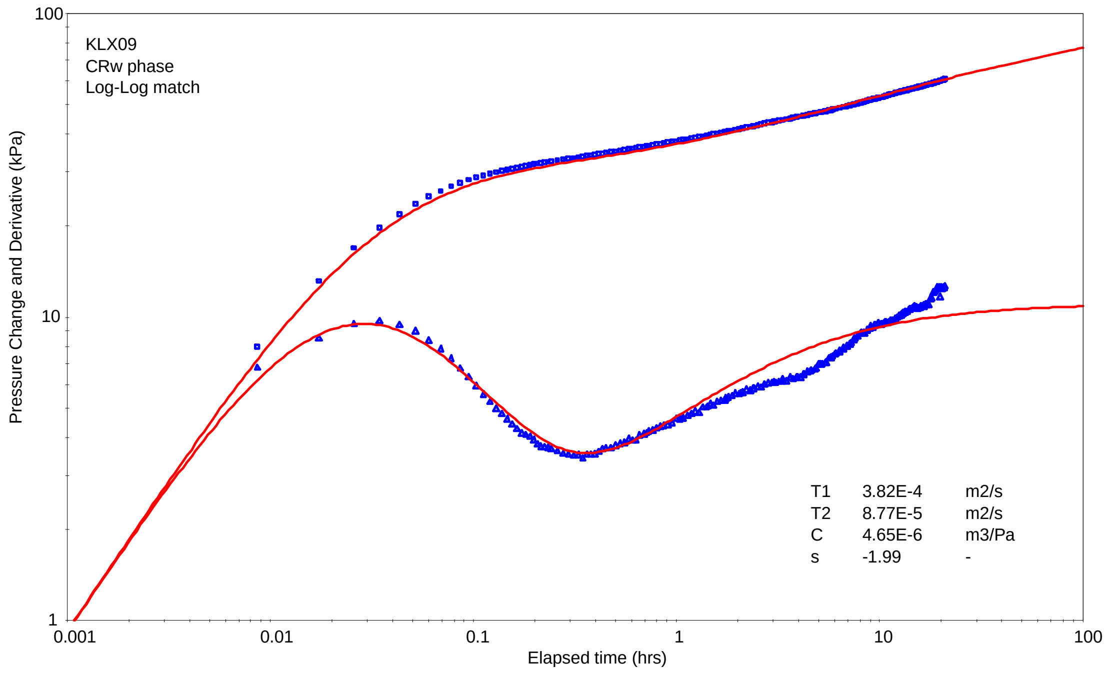
APPENDIX 1-5

PFL Pumptest KLX09

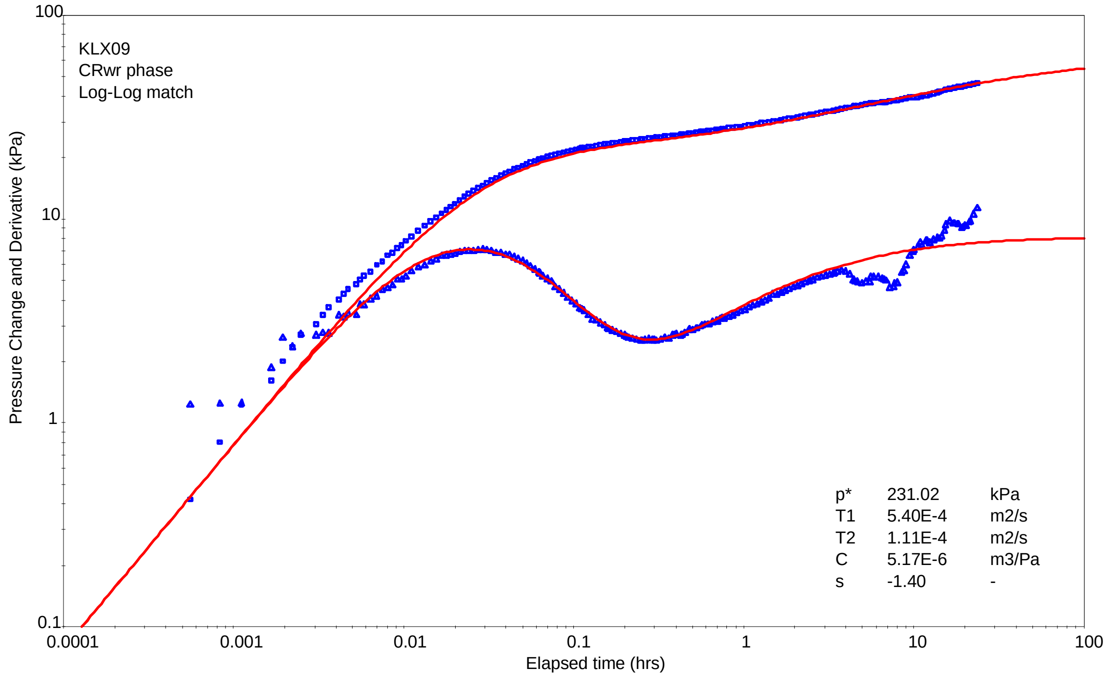
Analysis diagrams



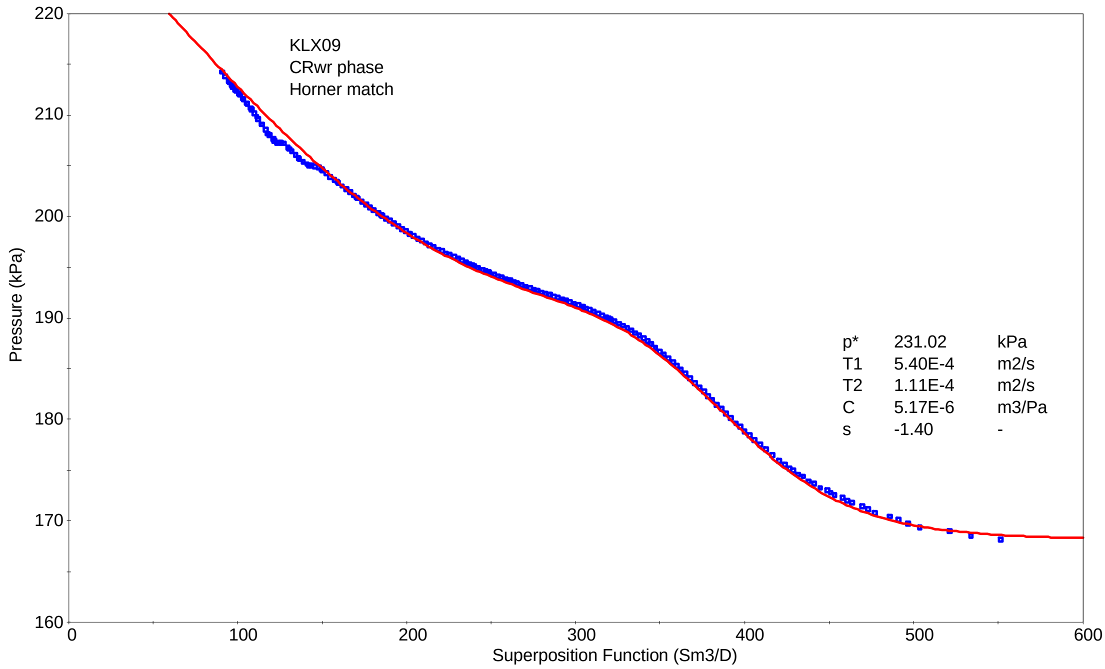
Pressure and flow rate vs. time; cartesian plot



CRw phase; log-log match



CRwr phase; log-log match

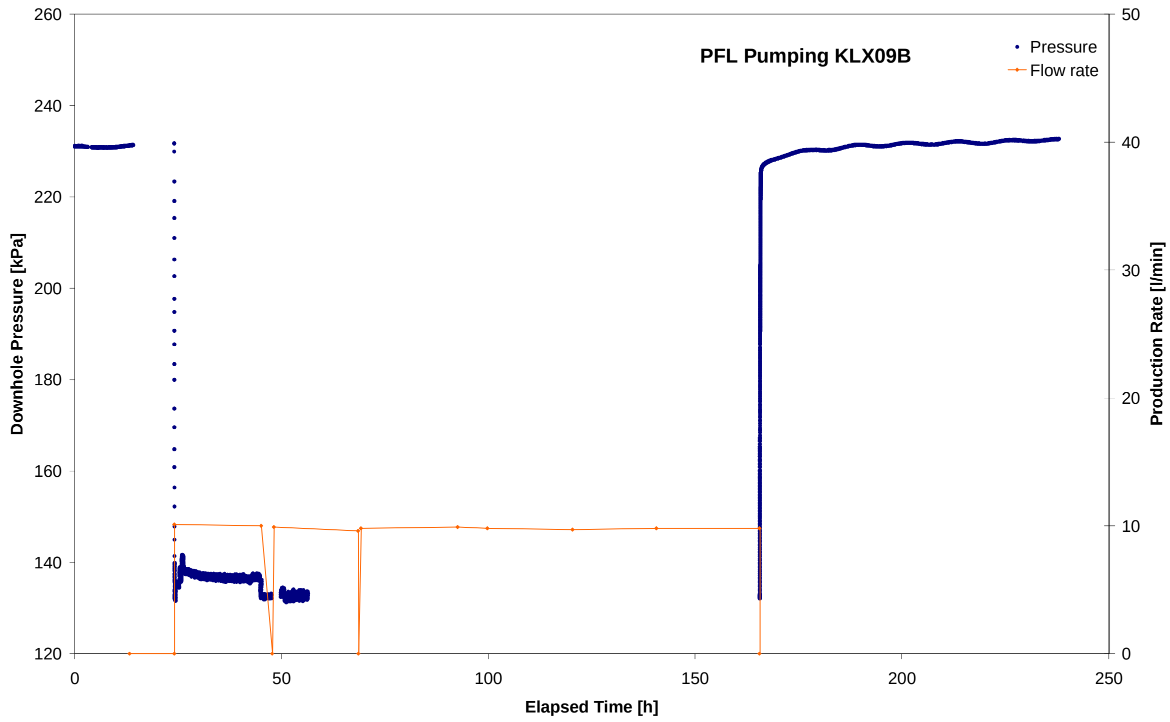


CRwr phase; HORNER match

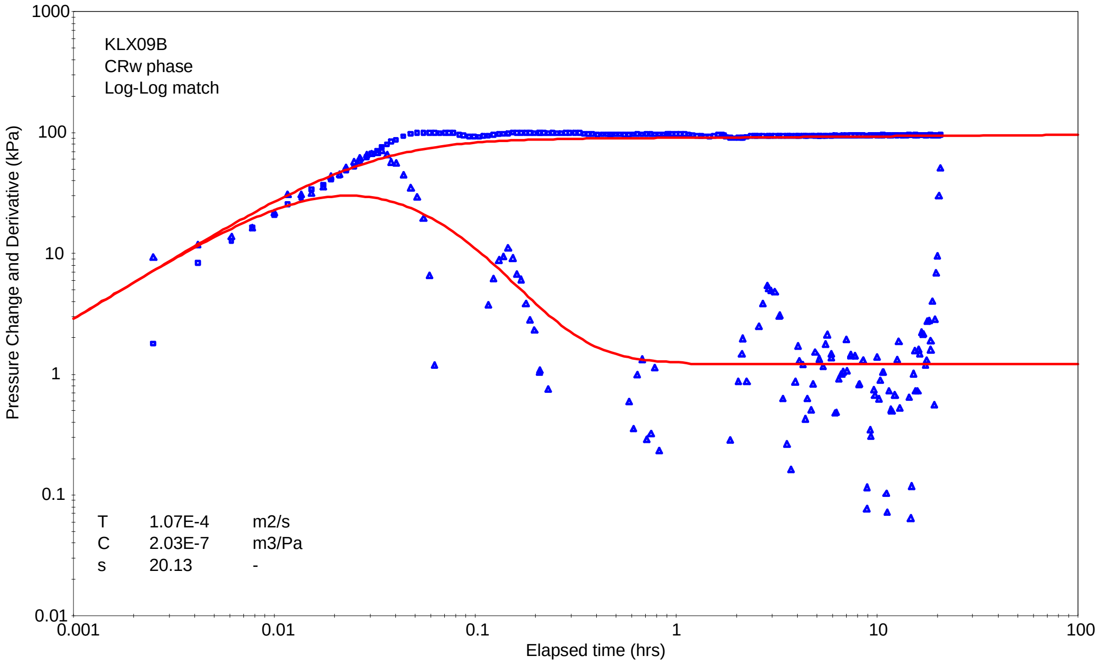
APPENDIX 1-6

PFL Pumptest KLX09B

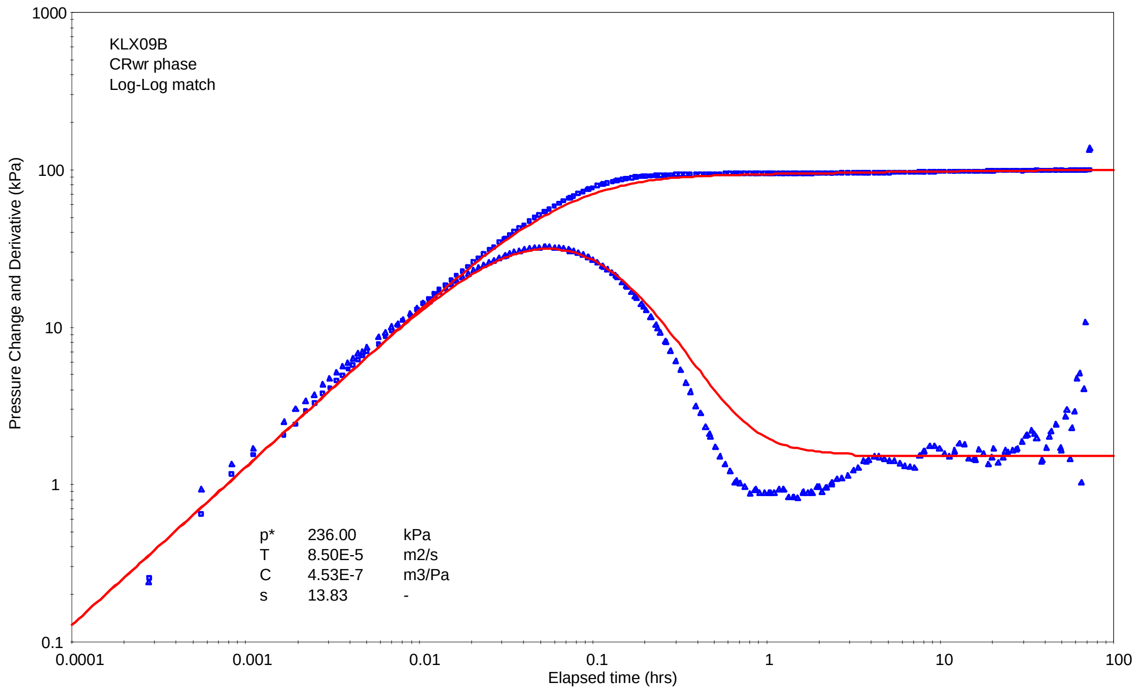
Analysis diagrams



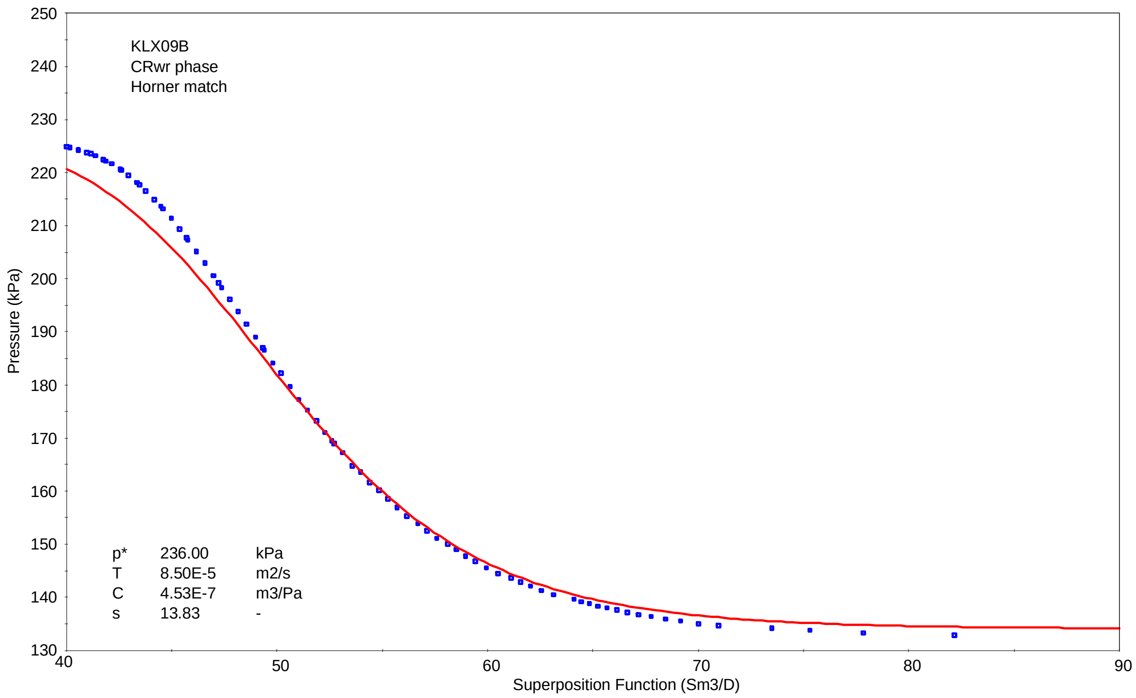
Pressure and flow rate vs. time; cartesian plot



CRw phase; log-log match



CRwr phase; log-log match

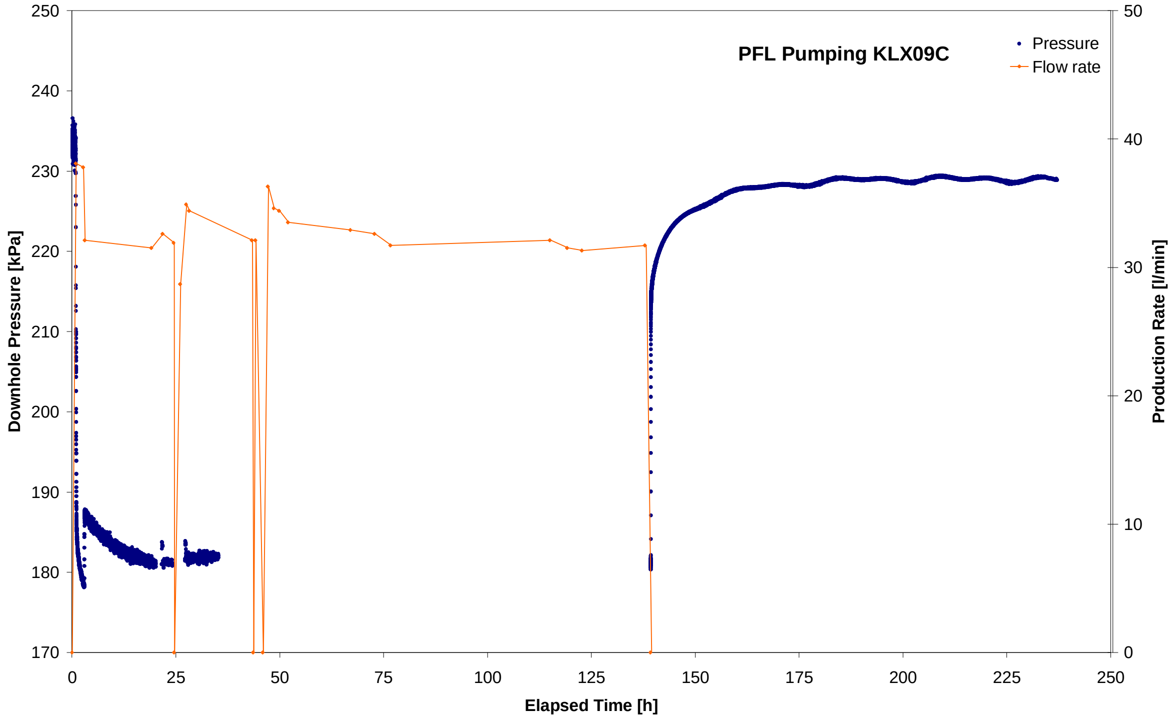


CRwr phase; HORNER match

APPENDIX 1-7

PFL Pumptest KLX09C

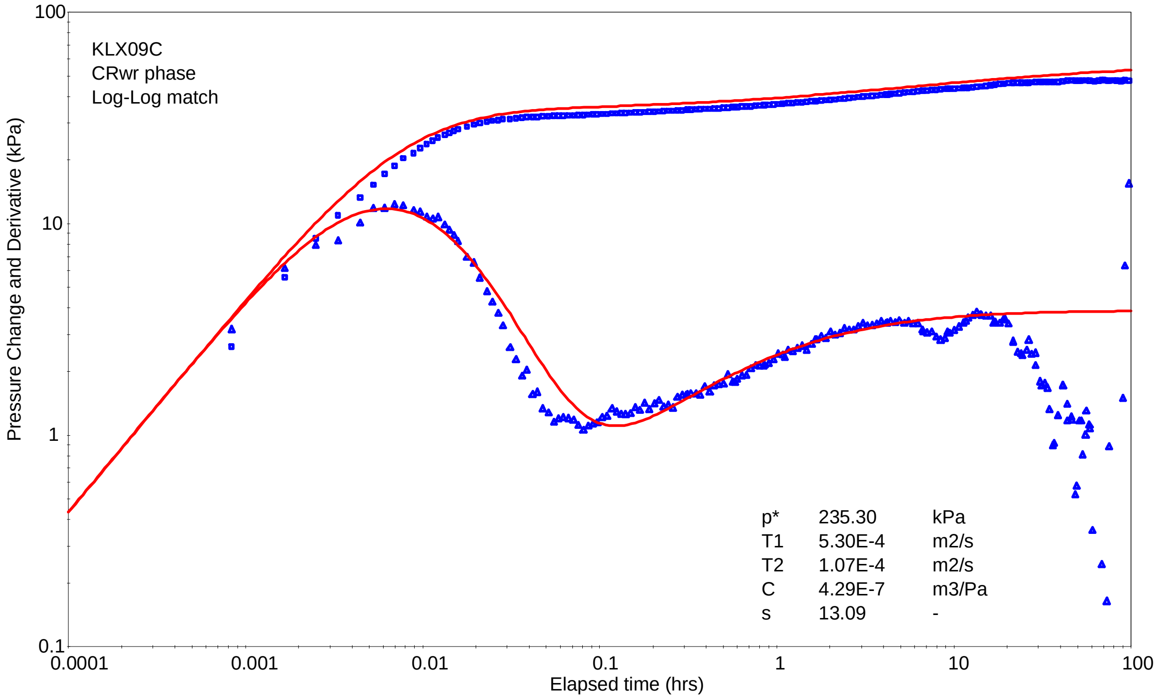
Analysis diagrams



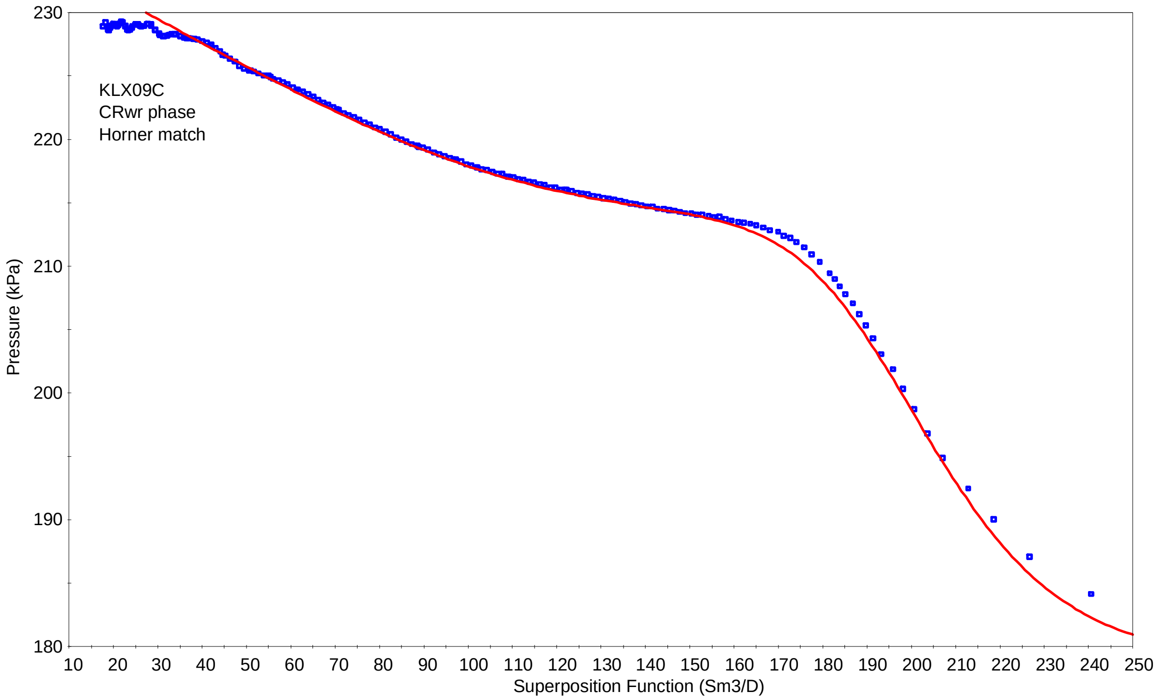
Pressure and flow rate vs. time; cartesian plot

Not analysable

CRw phase; log-log match



CRwr phase; log-log match

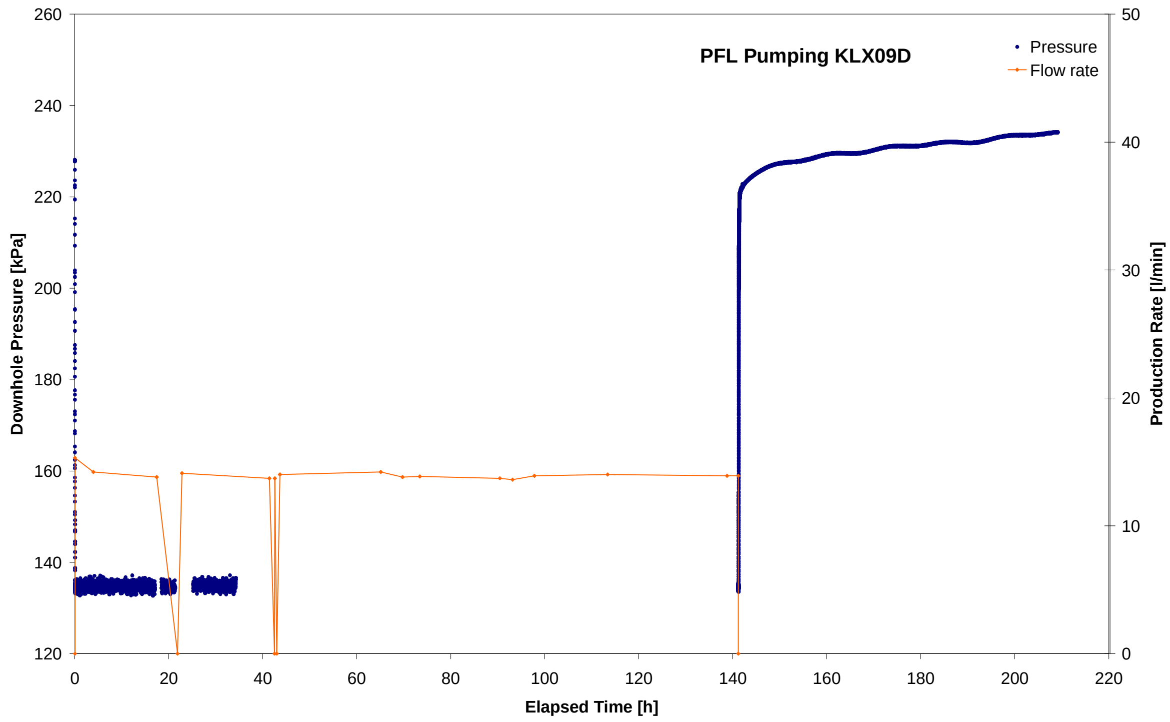


CRwr phase; HORNER match

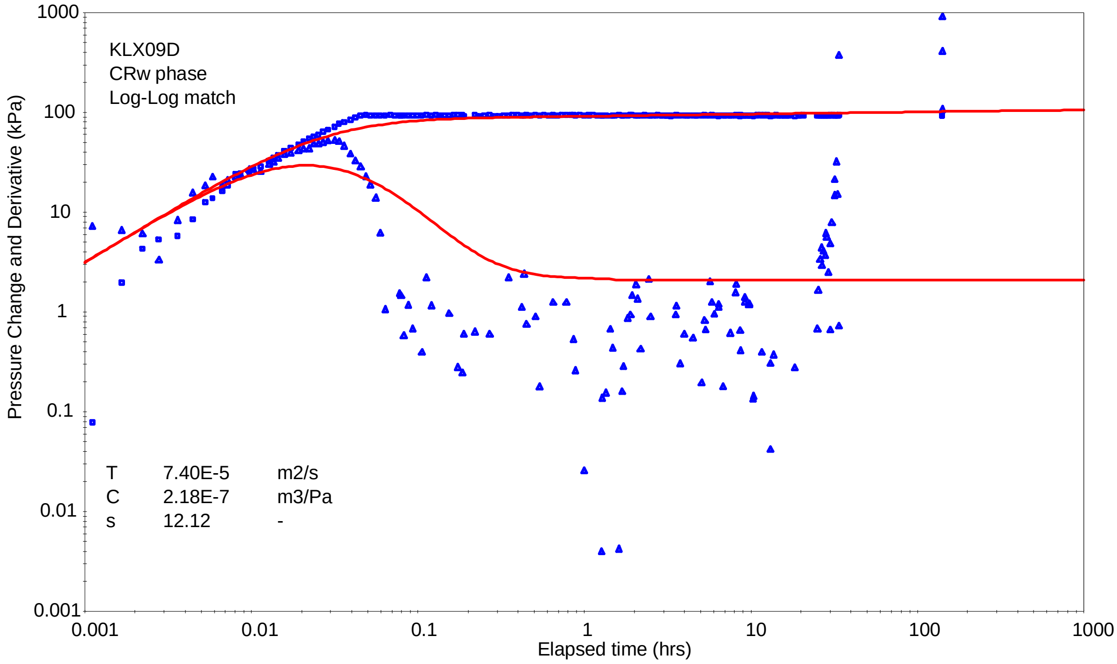
APPENDIX 1-8

PFL Pumptest KLX09D

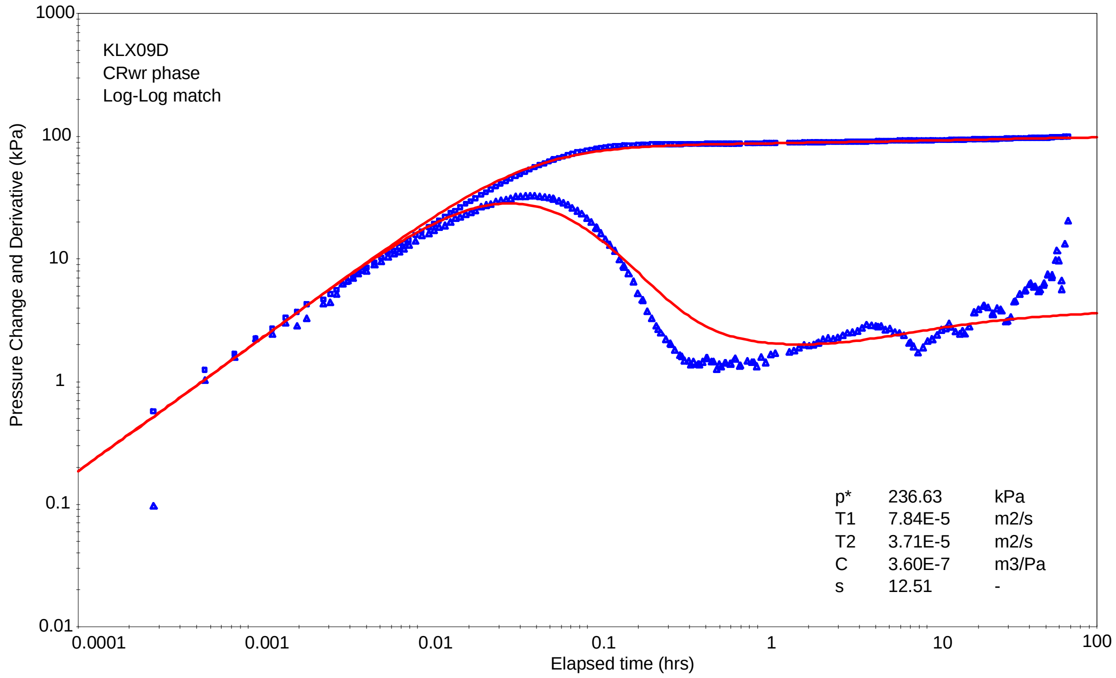
Analysis diagrams



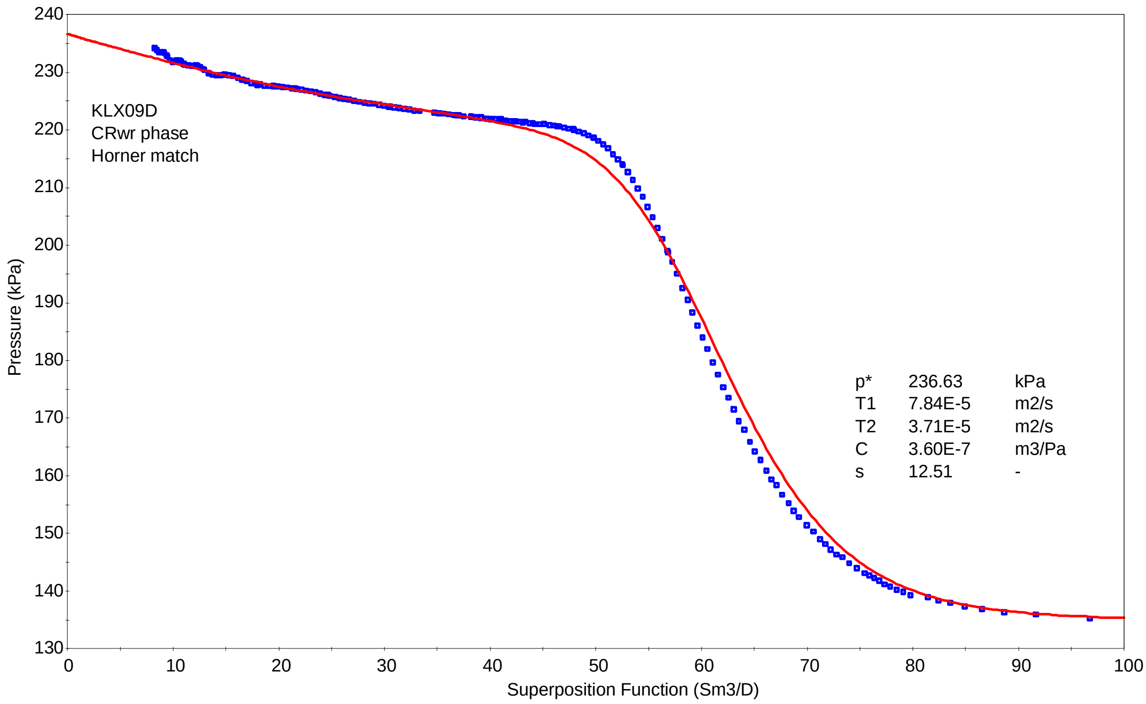
Pressure and flow rate vs. time; cartesian plot



CRw phase; log-log match



CRwr phase; log-log match

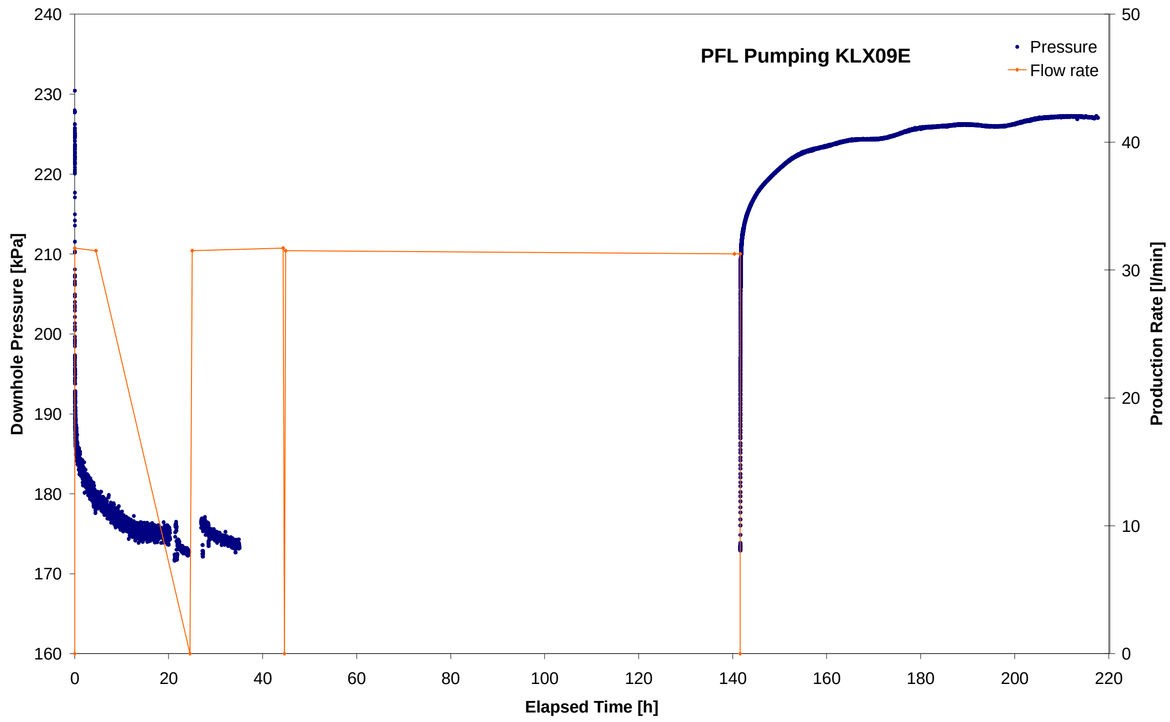


CRwr phase; HORNER match

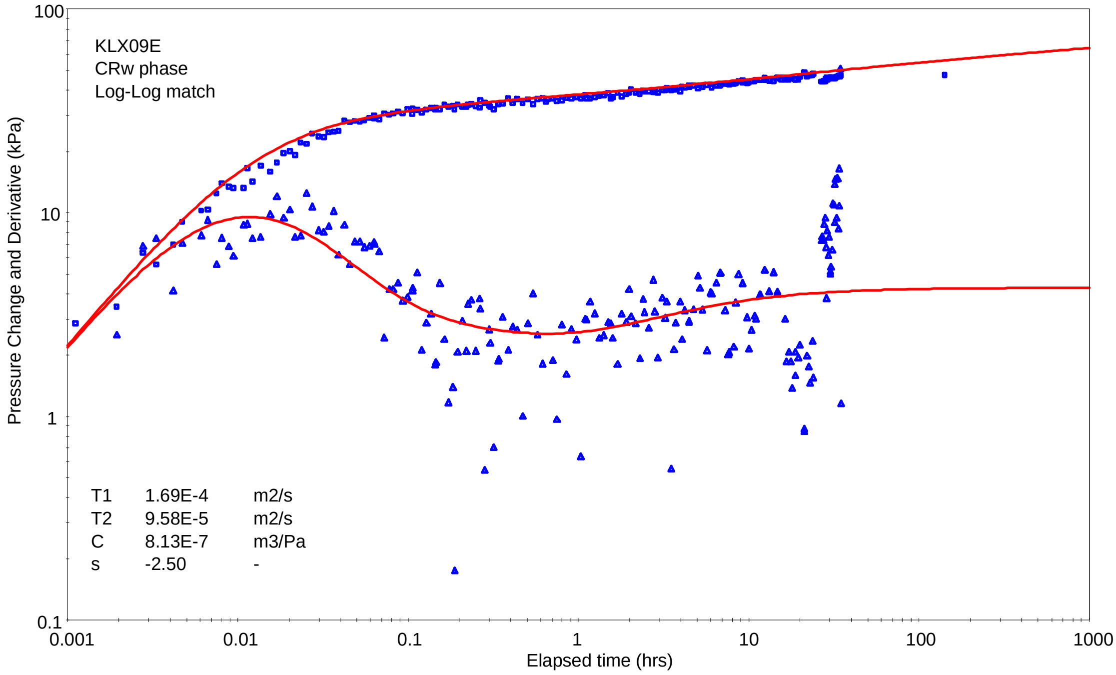
APPENDIX 1-9

PFL Pumptest KLX09E

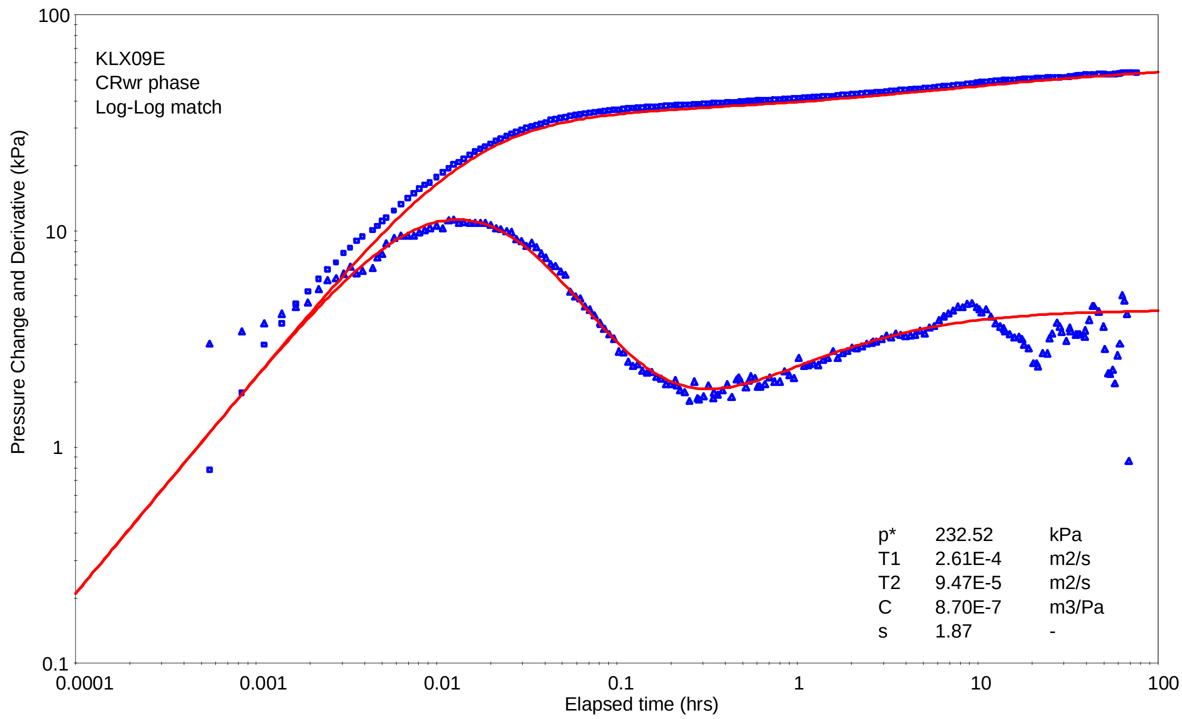
Analysis diagrams



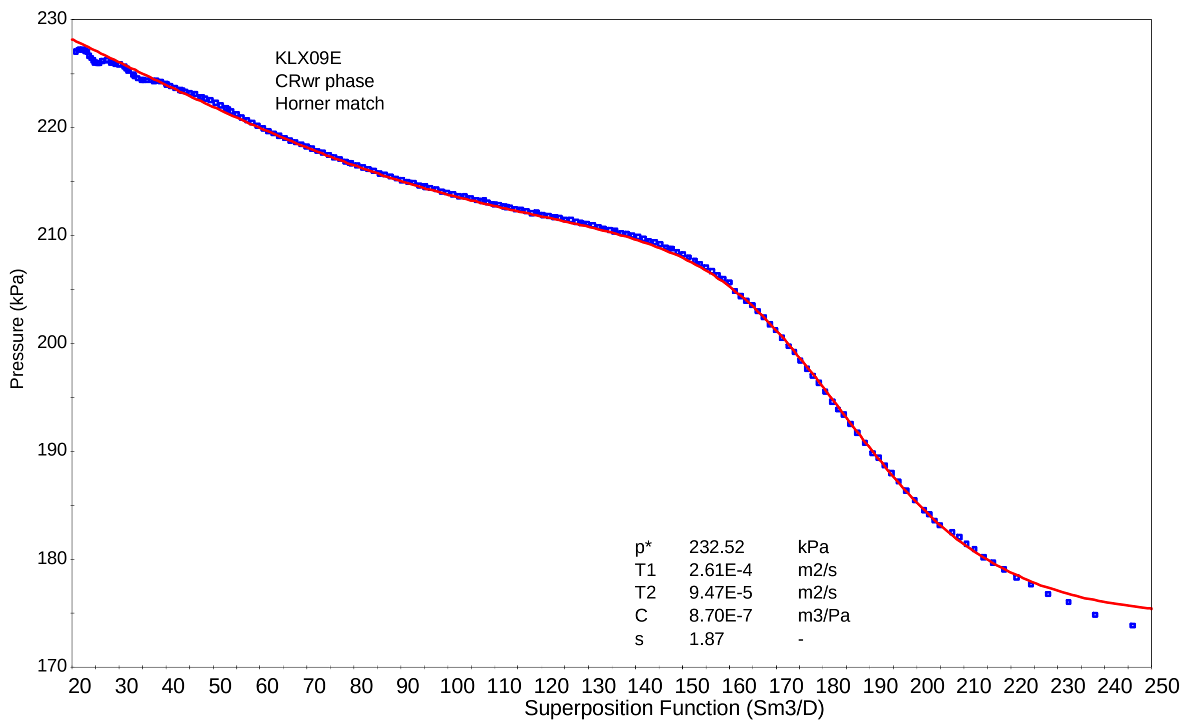
Pressure and flow rate vs. time; cartesian plot



CRw phase; log-log match



CRwr phase; log-log match

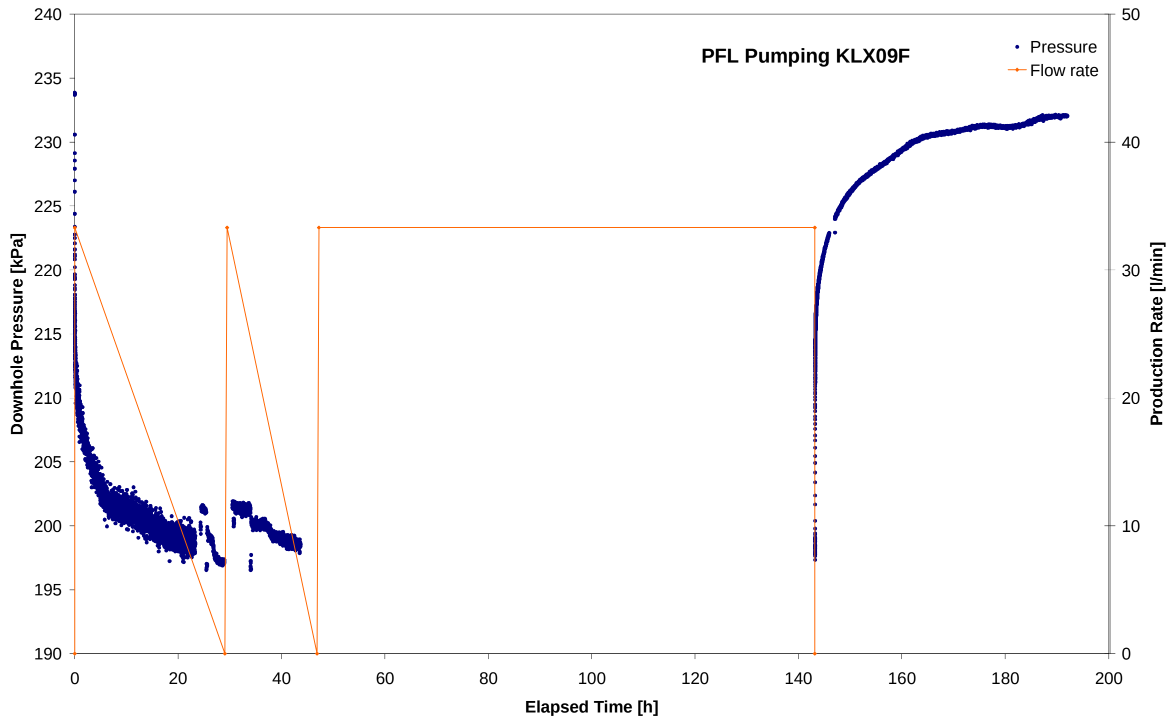


CRwr phase; HORNER match

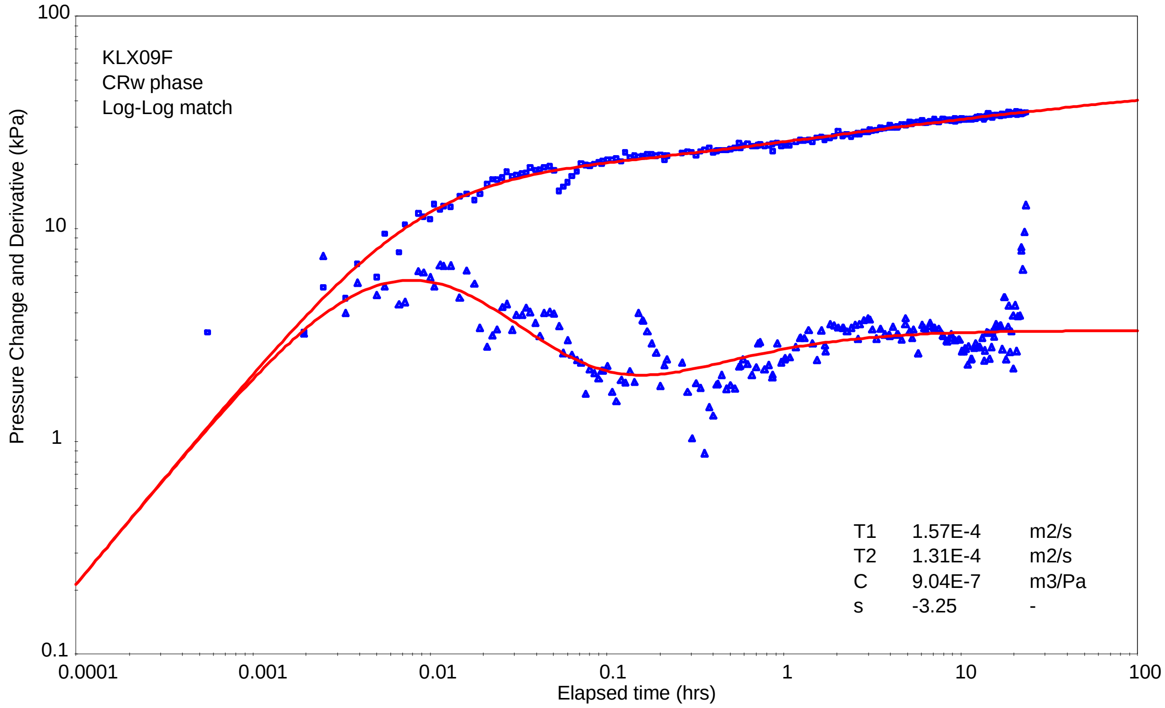
APPENDIX 1-10

PFL Pumptest KLX09F

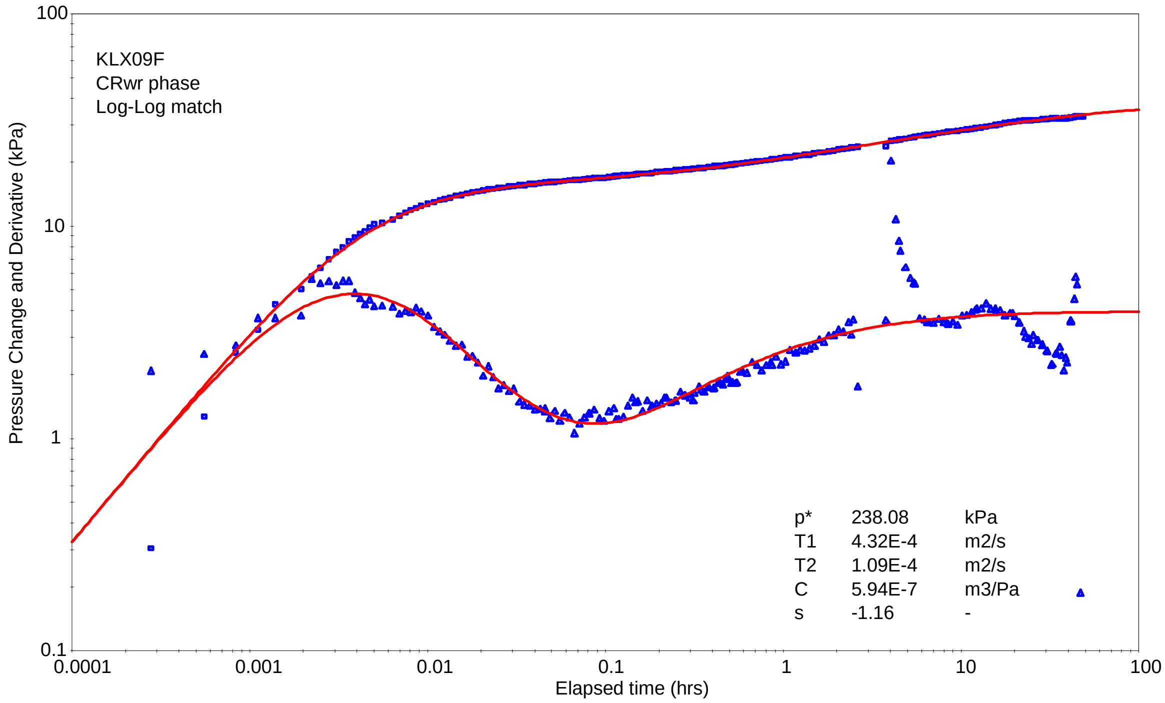
Analysis diagrams



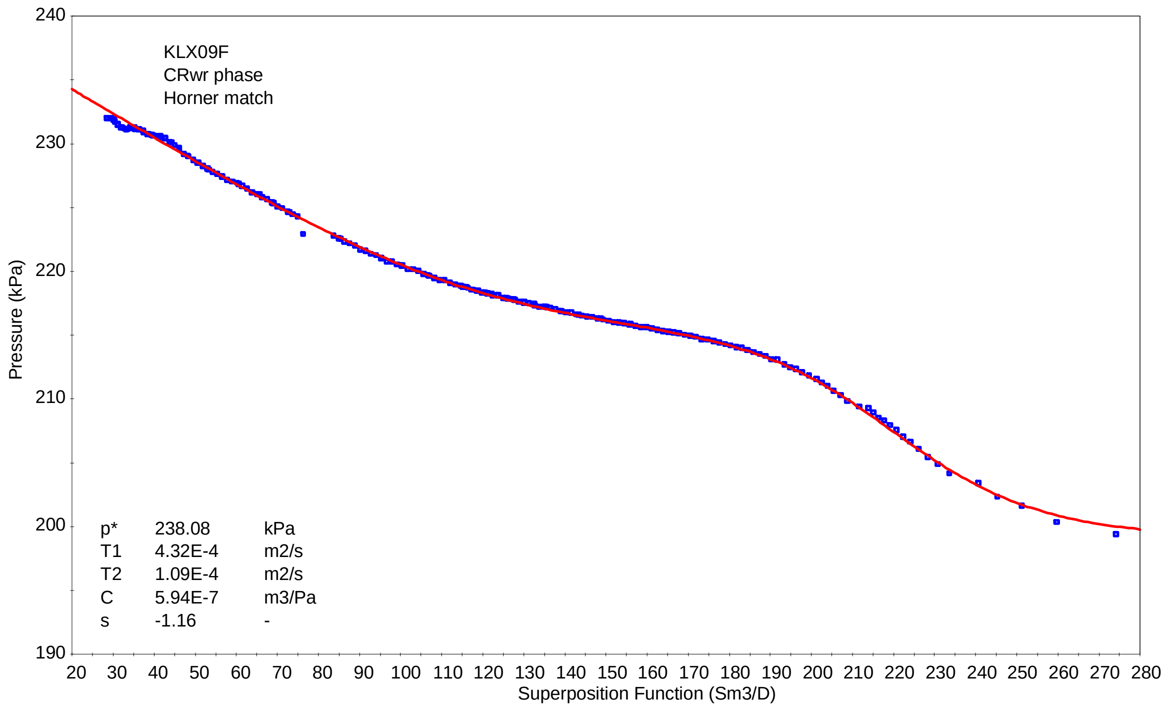
Pressure and flow rate vs. time; cartesian plot



CRw phase; log-log match



CRwr phase; log-log match

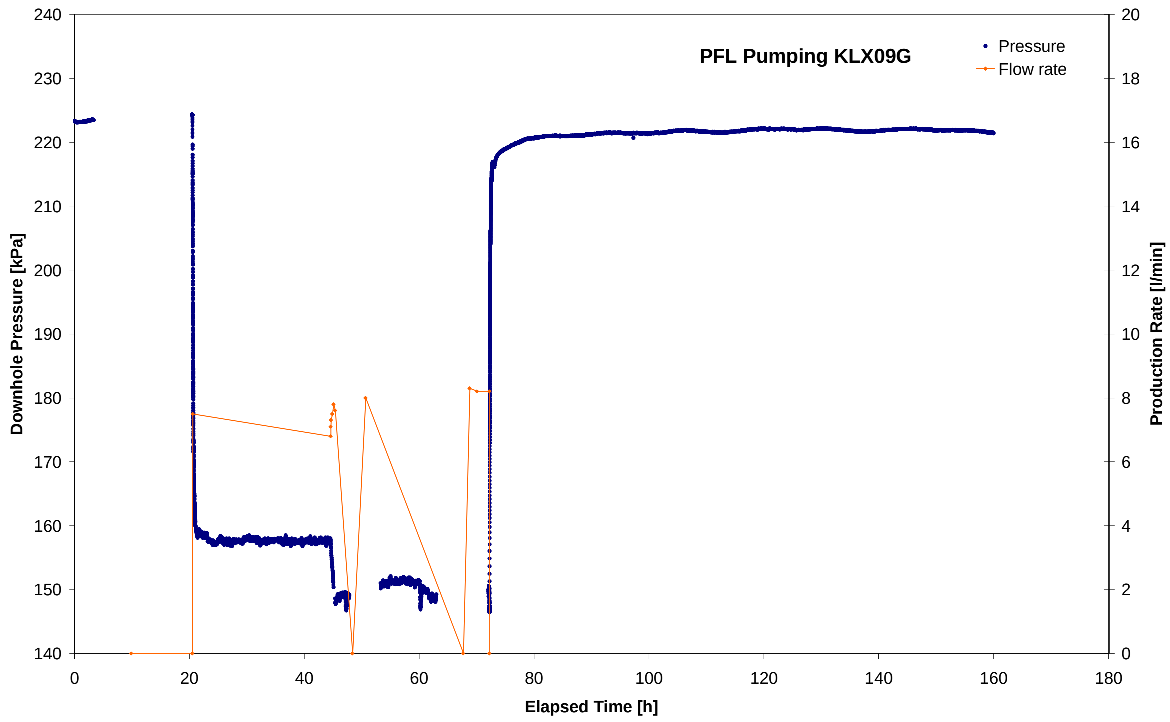


CRwr phase; HORNER match

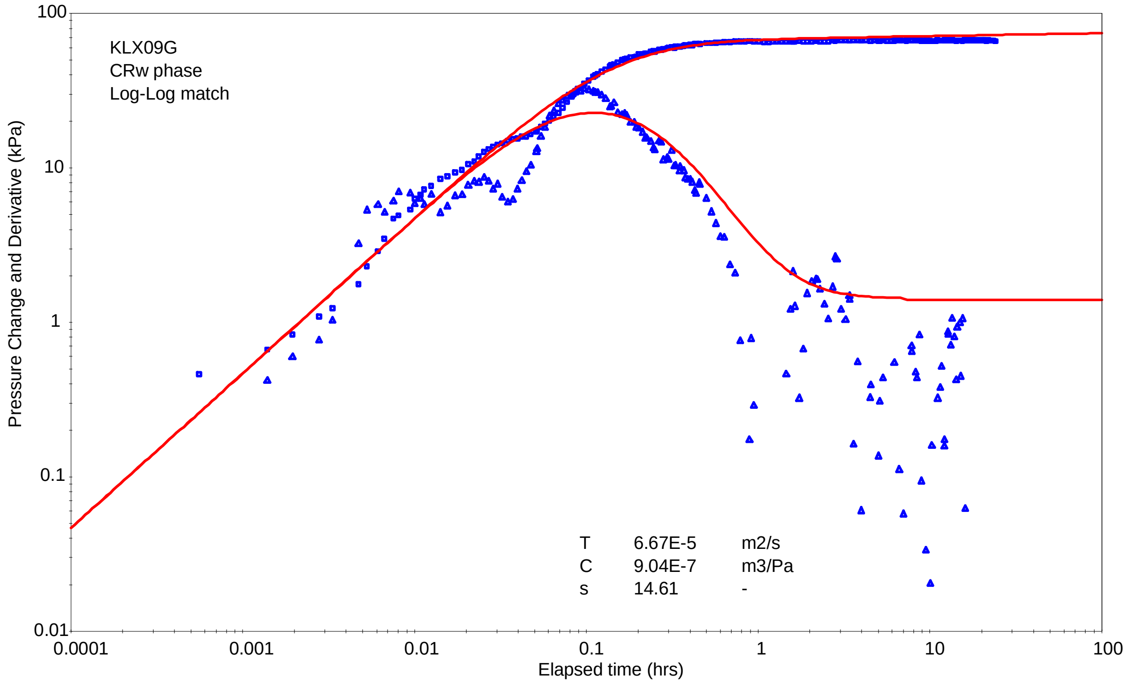
APPENDIX 1-11

PFL Pumptest KLX09G

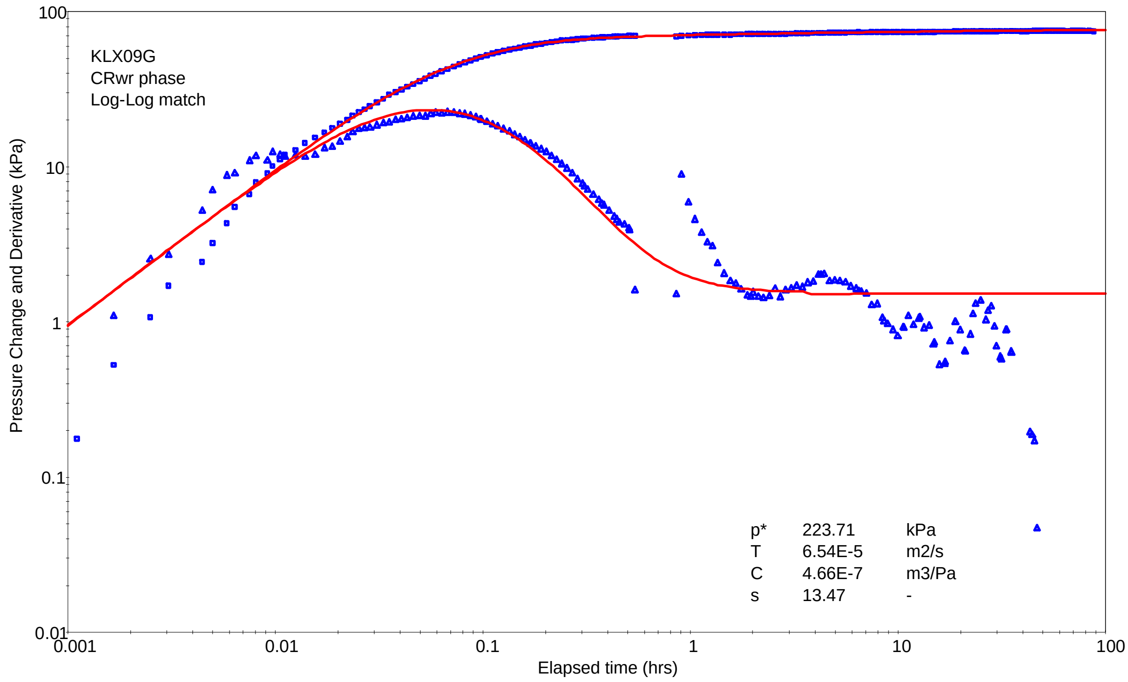
Analysis diagrams



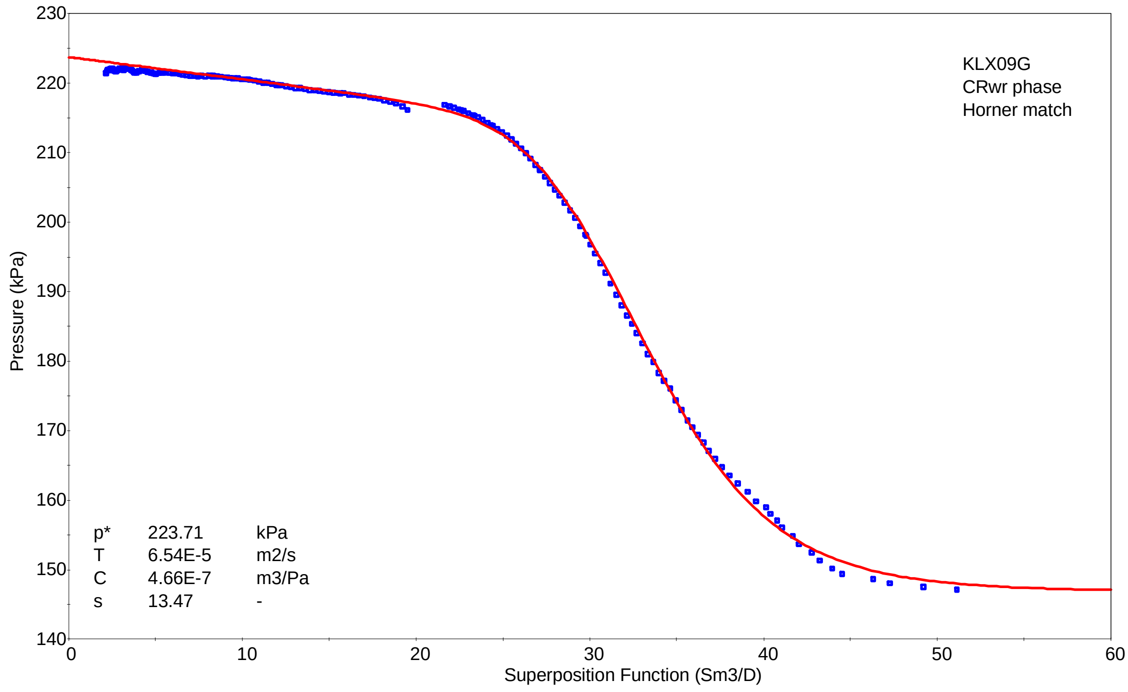
Pressure and flow rate vs. time; cartesian plot



CRw phase; log-log match



CRwr phase; log-log match

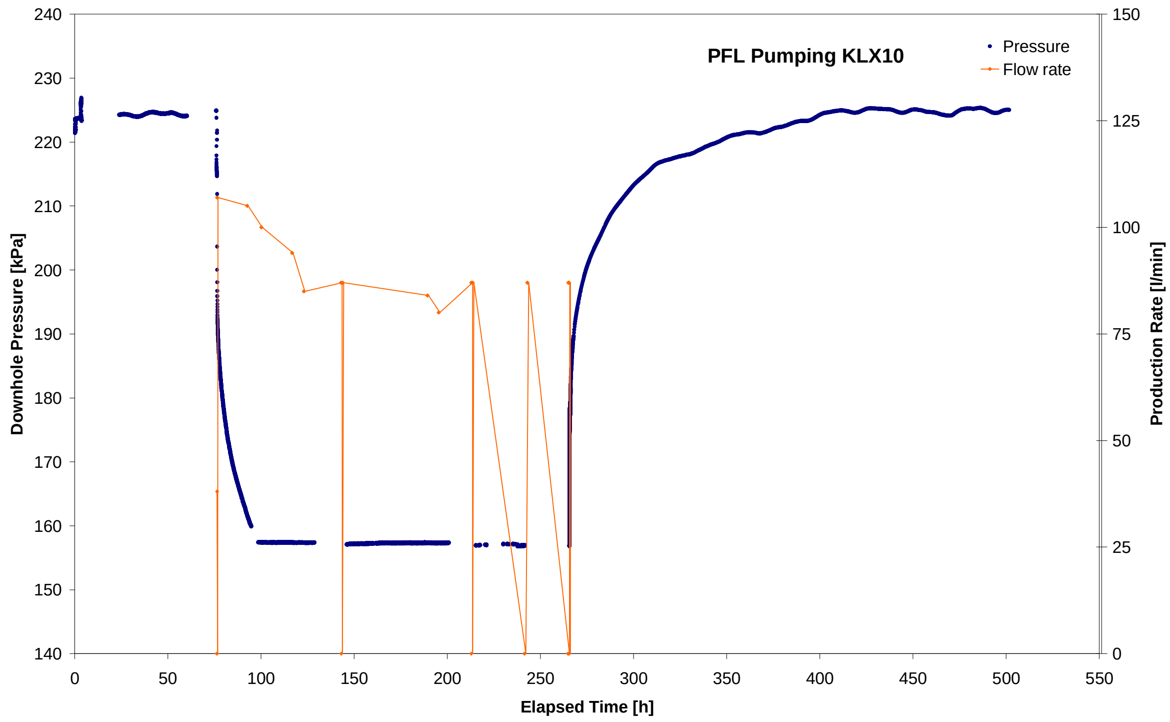


CRwr phase; HORNER match

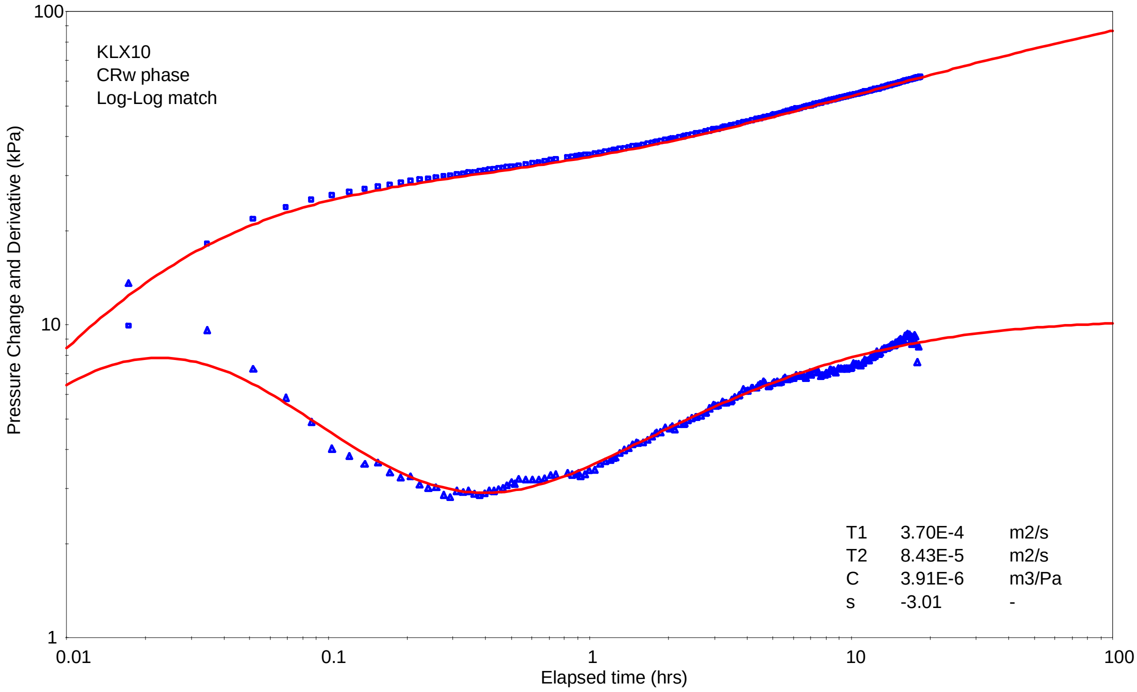
APPENDIX 1-12

PFL Pumptest KLX10

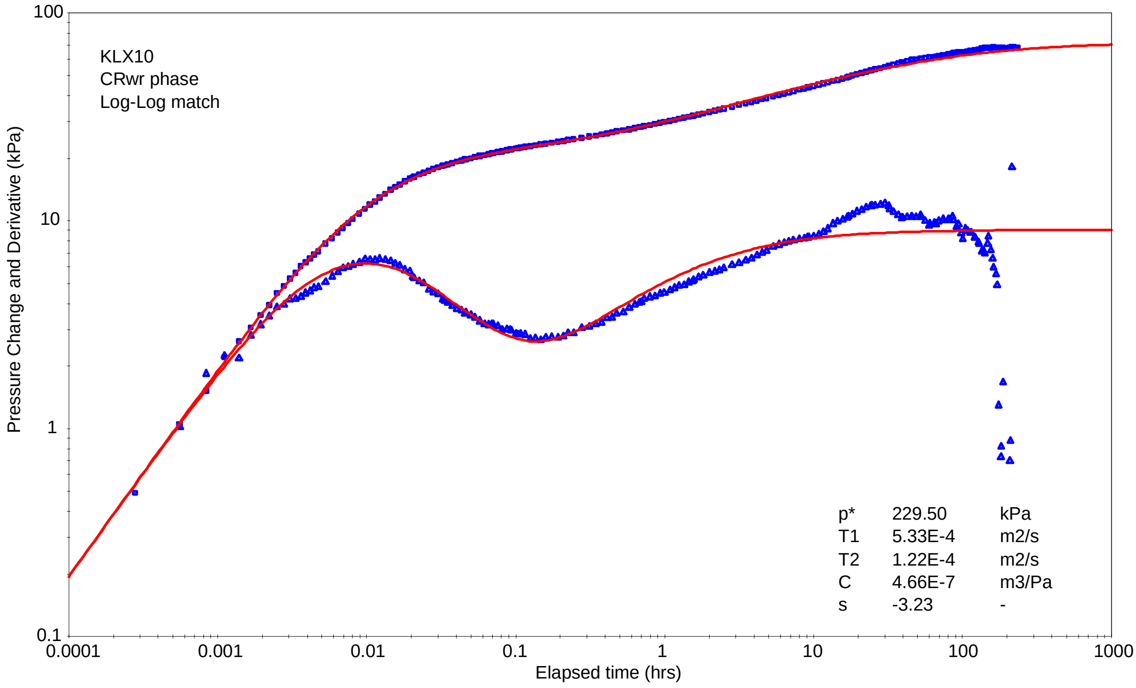
Analysis diagrams



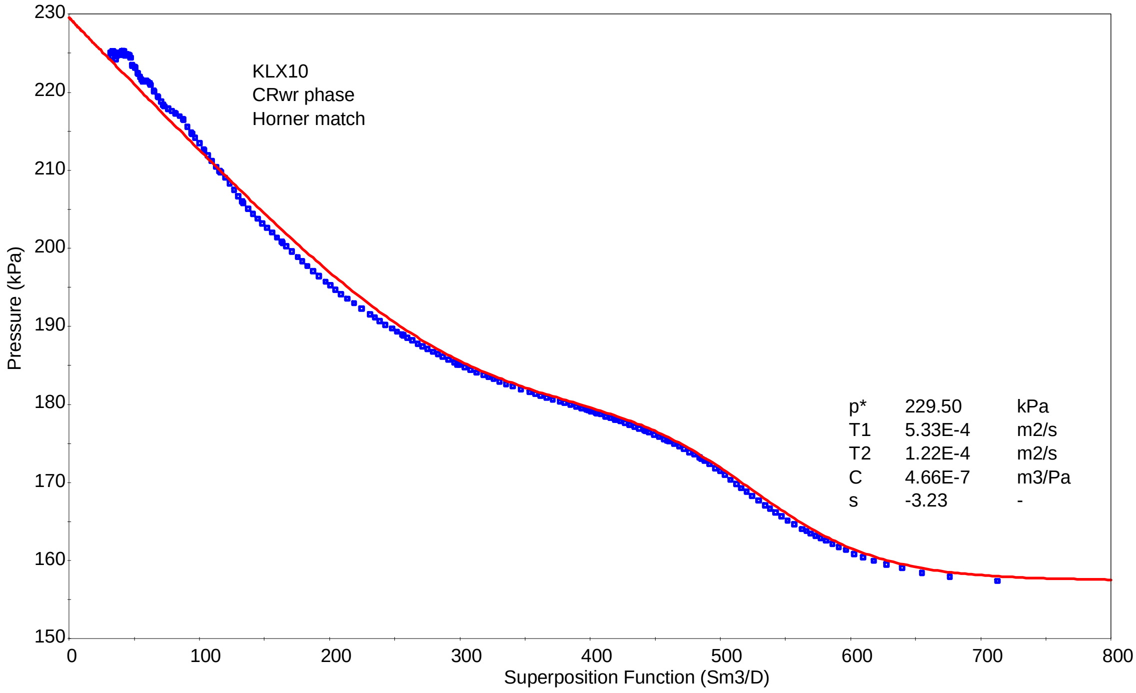
Pressure and flow rate vs. time; cartesian plot



CRw phase; log-log match



CRwr phase; log-log match

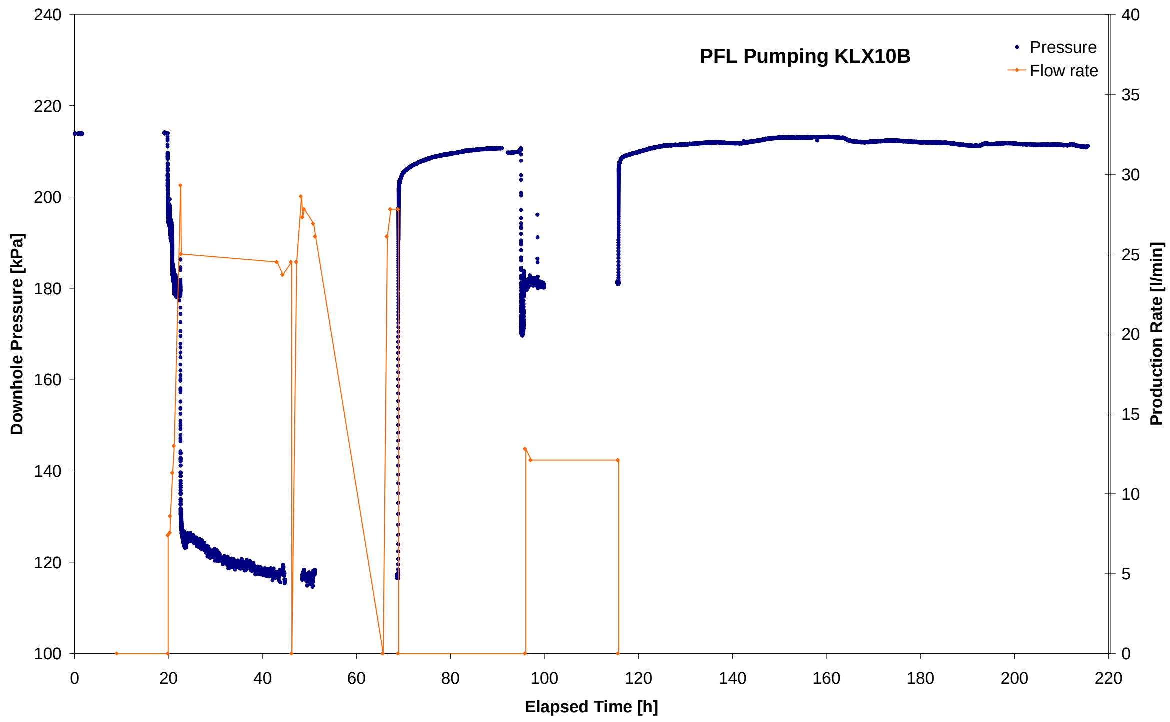


CRwr phase; HORNER match

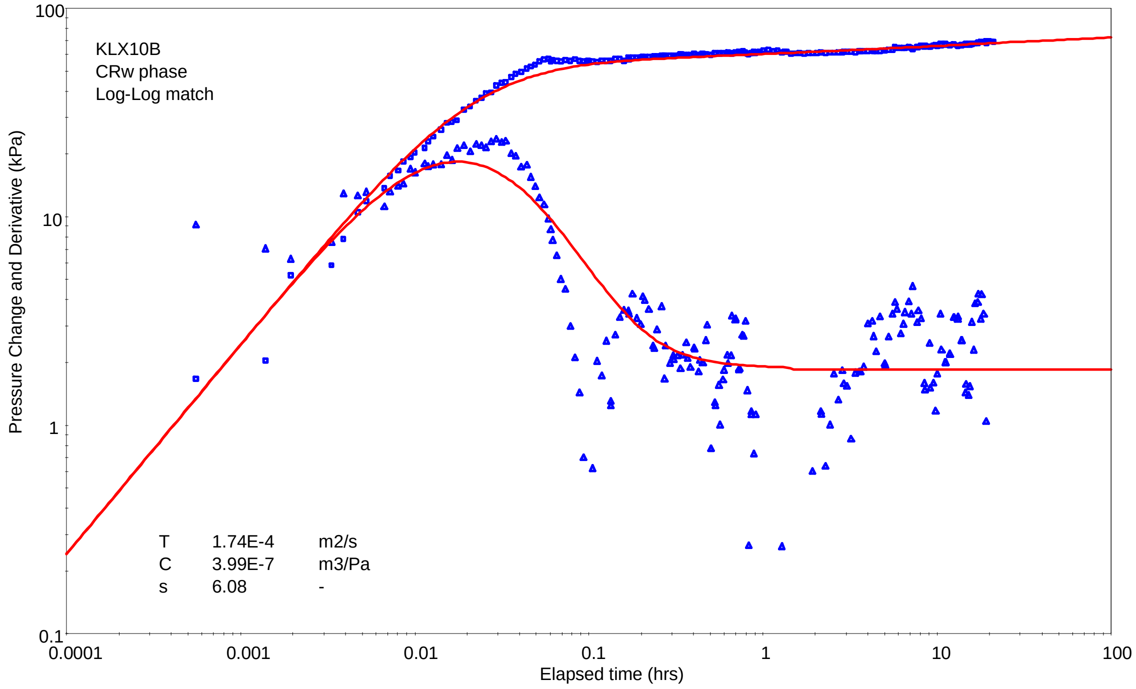
APPENDIX 1-13

PFL Pumptest KLX10B

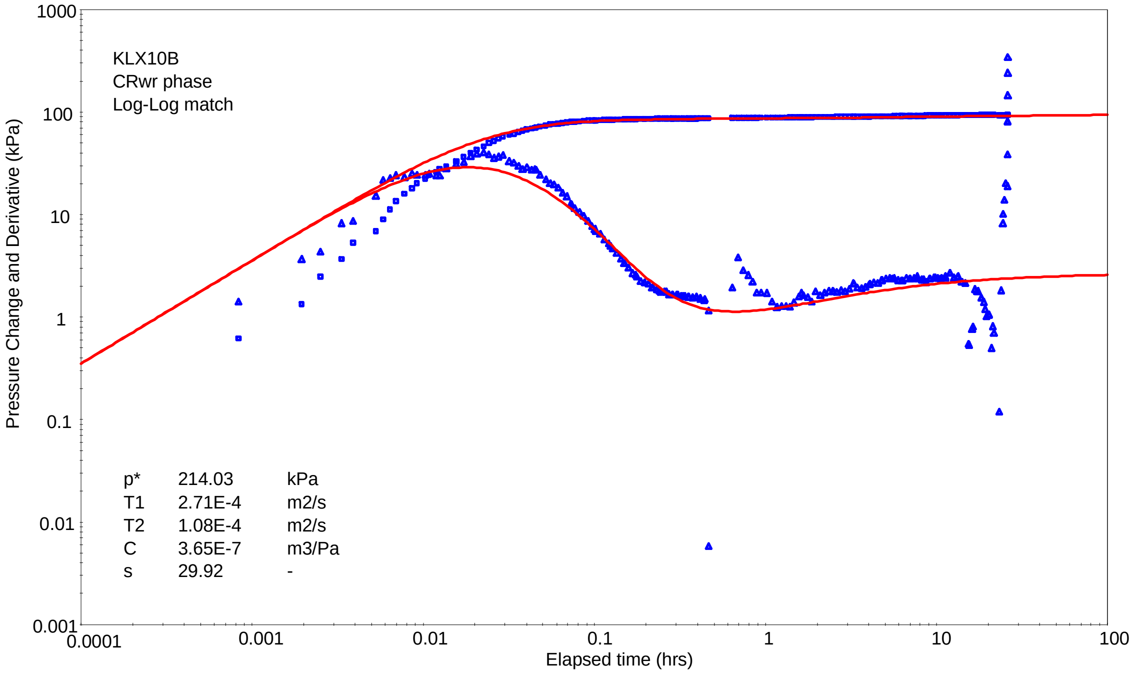
Analysis diagrams



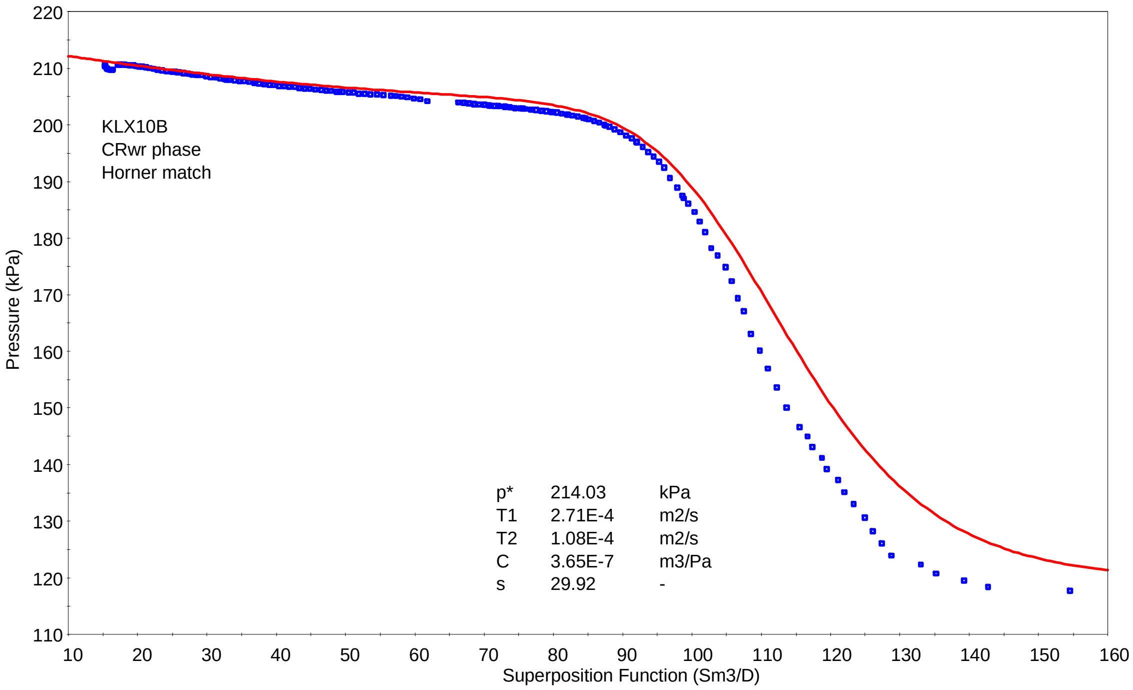
Pressure and flow rate vs. time; cartesian plot



CRw phase; log-log match



CRwr phase; log-log match

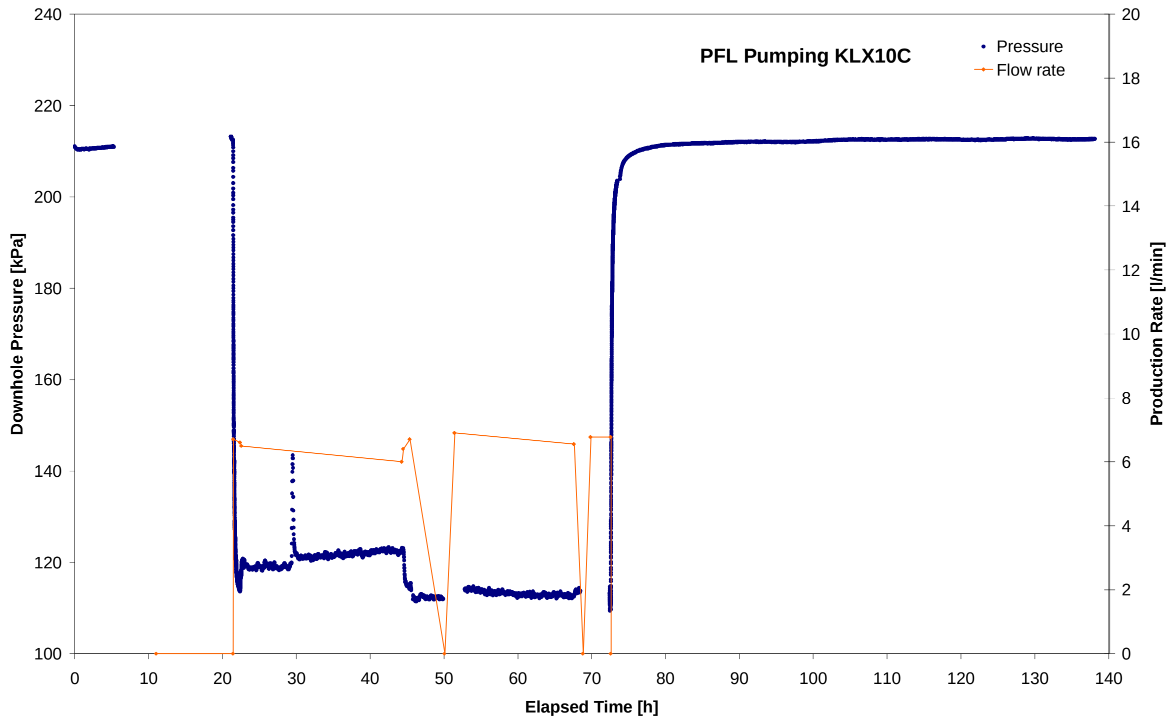


CRwr phase; HORNER match

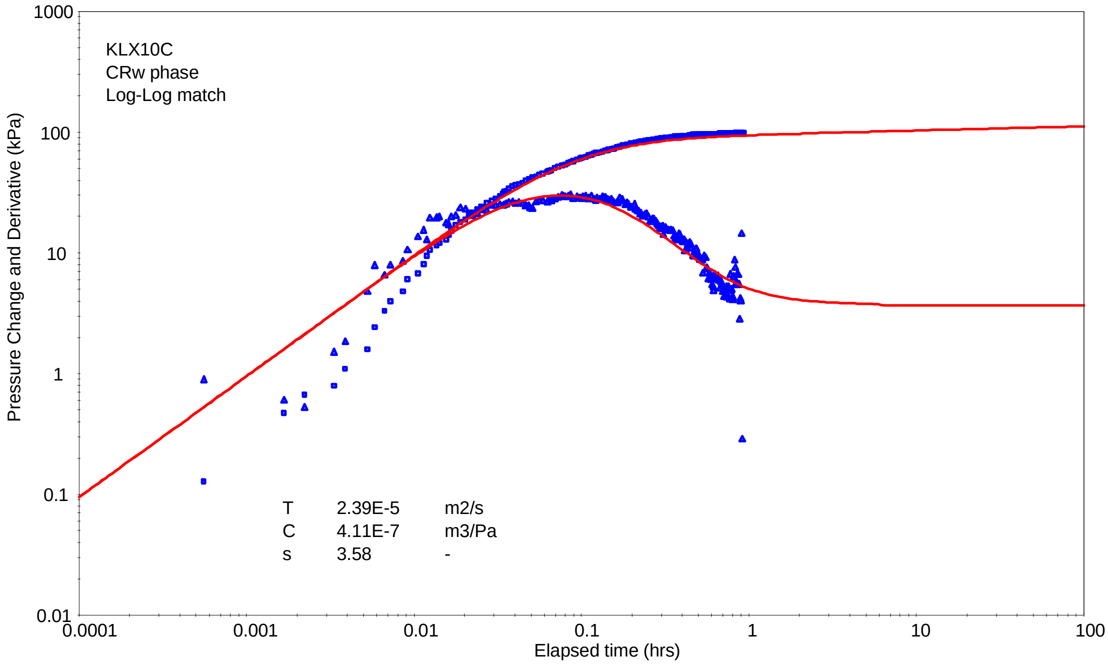
APPENDIX 1-14

PFL Pumptest KLX10C

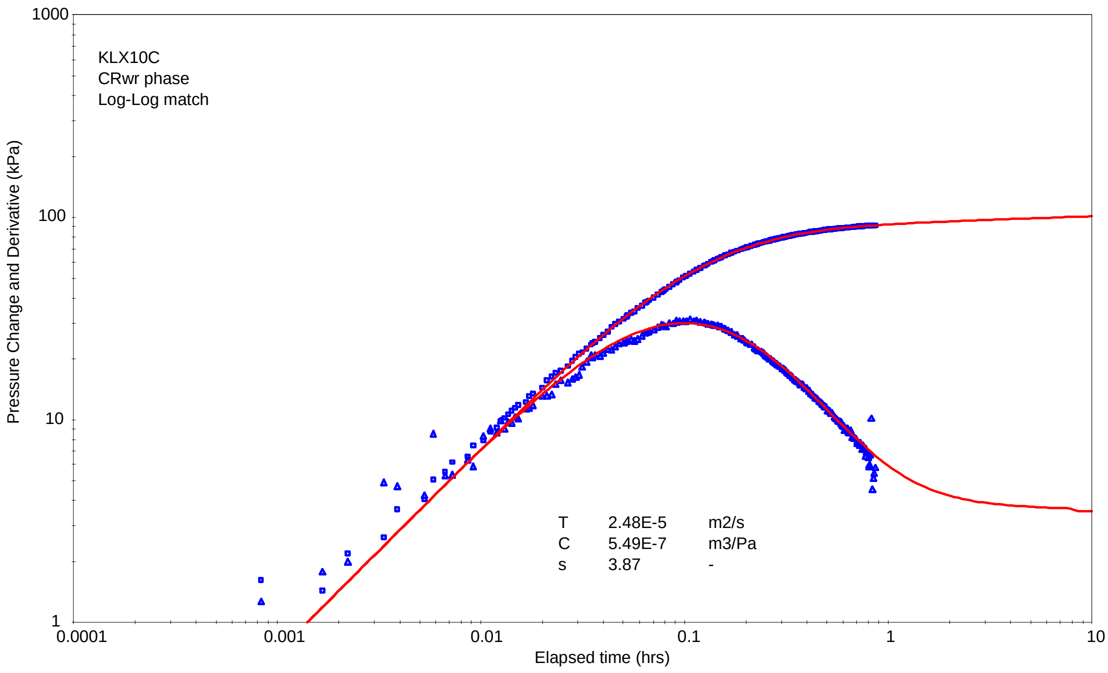
Analysis diagrams



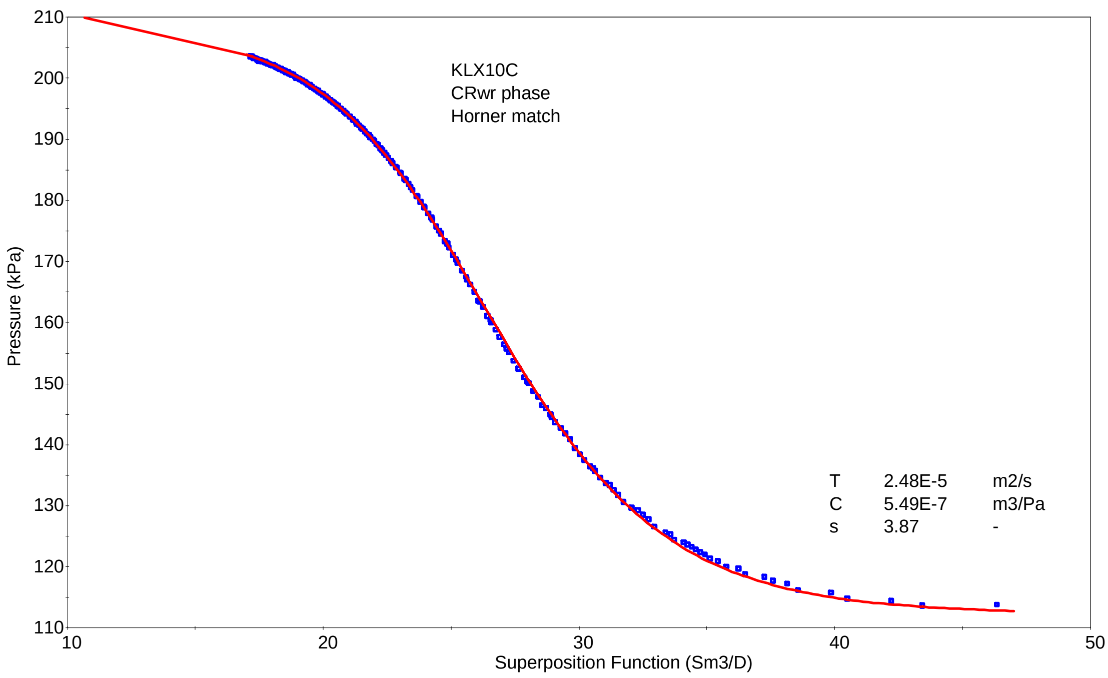
Pressure and flow rate vs. time; cartesian plot



CRw phase; log-log match



CRwr phase; log-log match

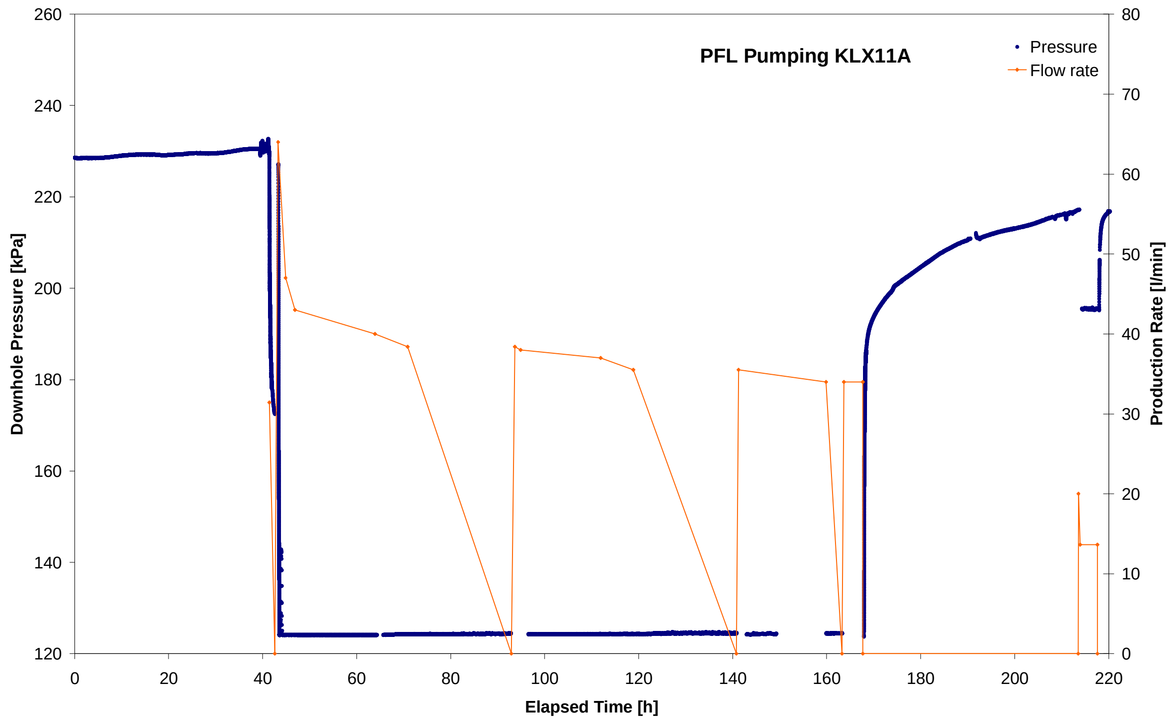


CRwr phase; HORNER match

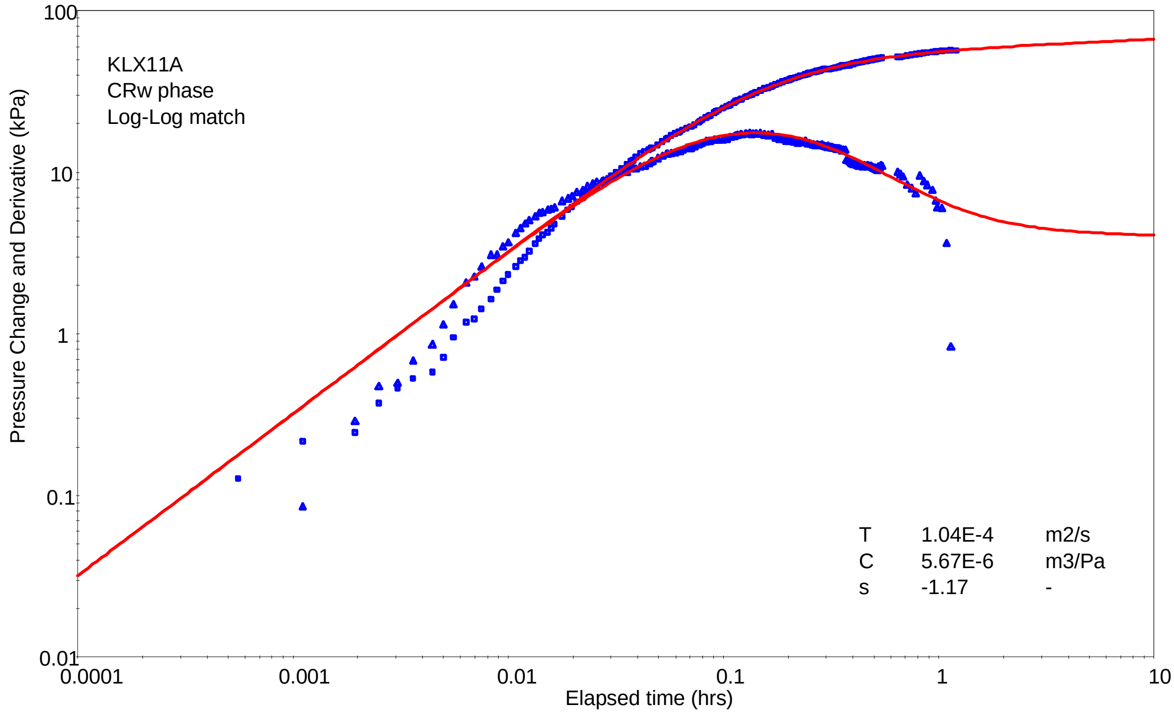
APPENDIX 1-15

PFL Pumptest KLX11A

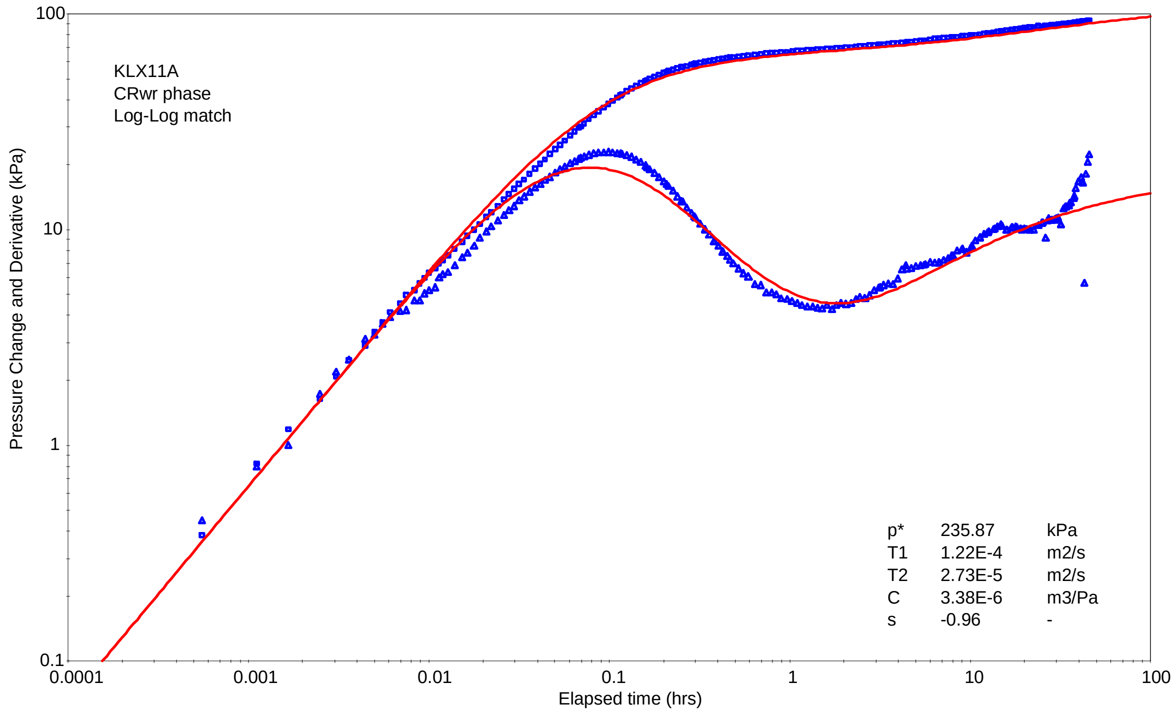
Analysis diagrams



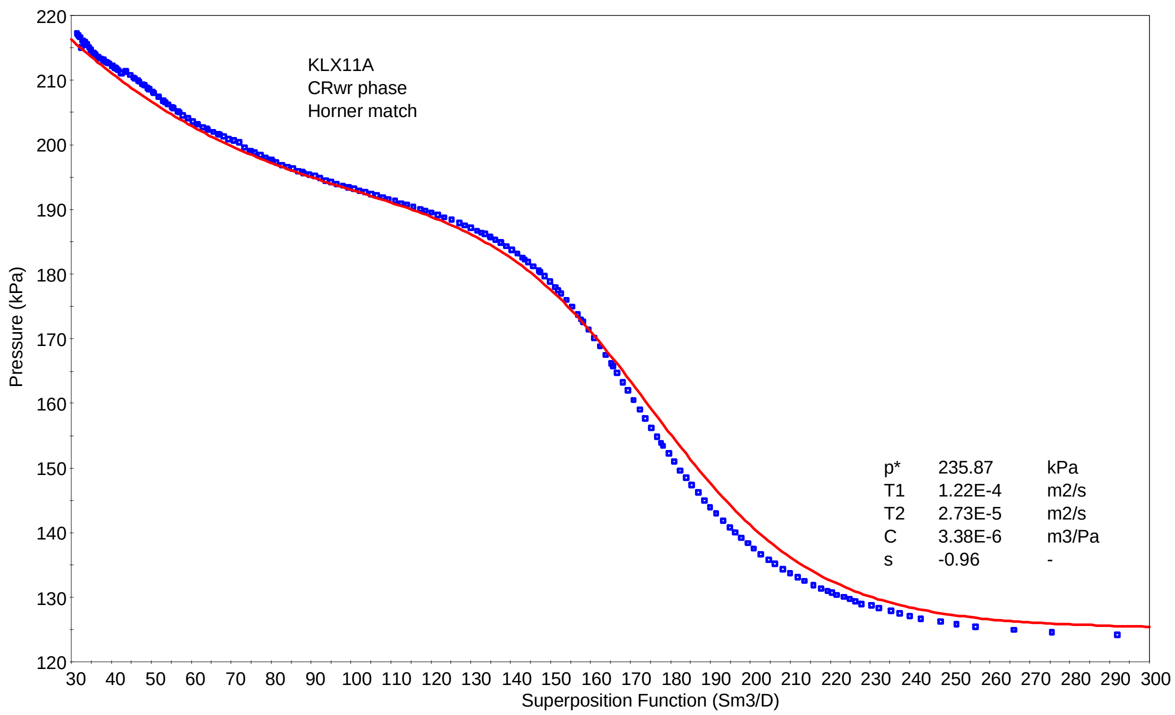
Pressure and flow rate vs. time; cartesian plot



CRw phase; log-log match



CRwr phase; log-log match

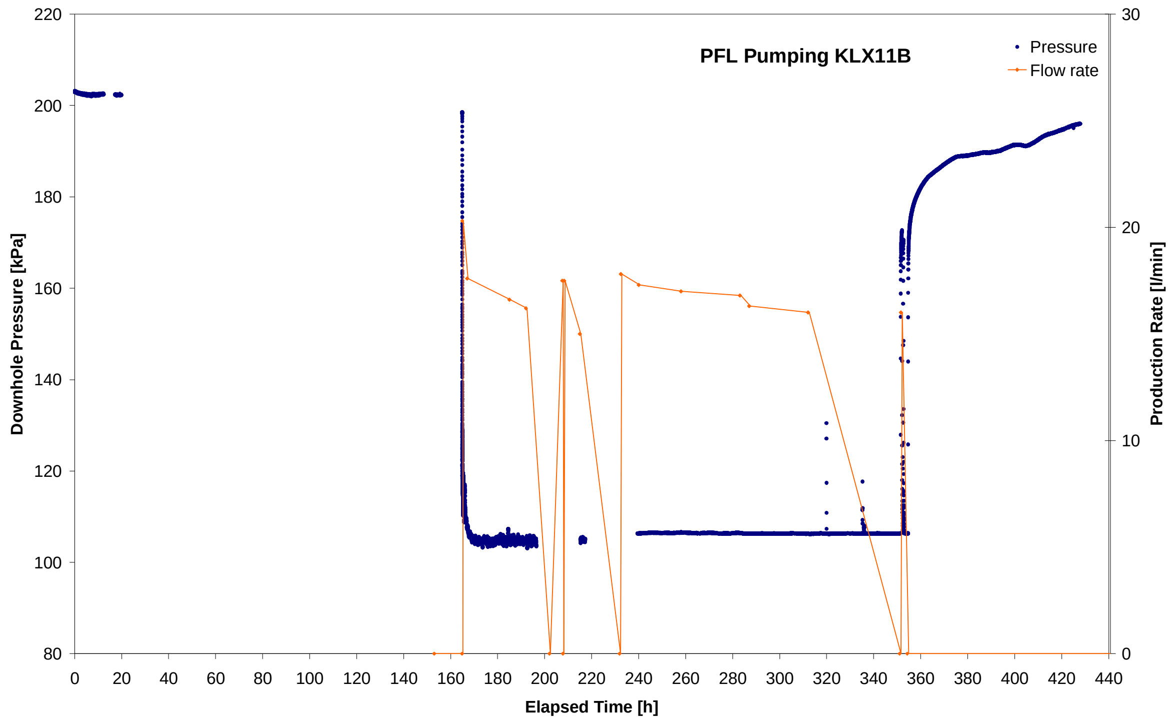


CRwr phase; HORNER match

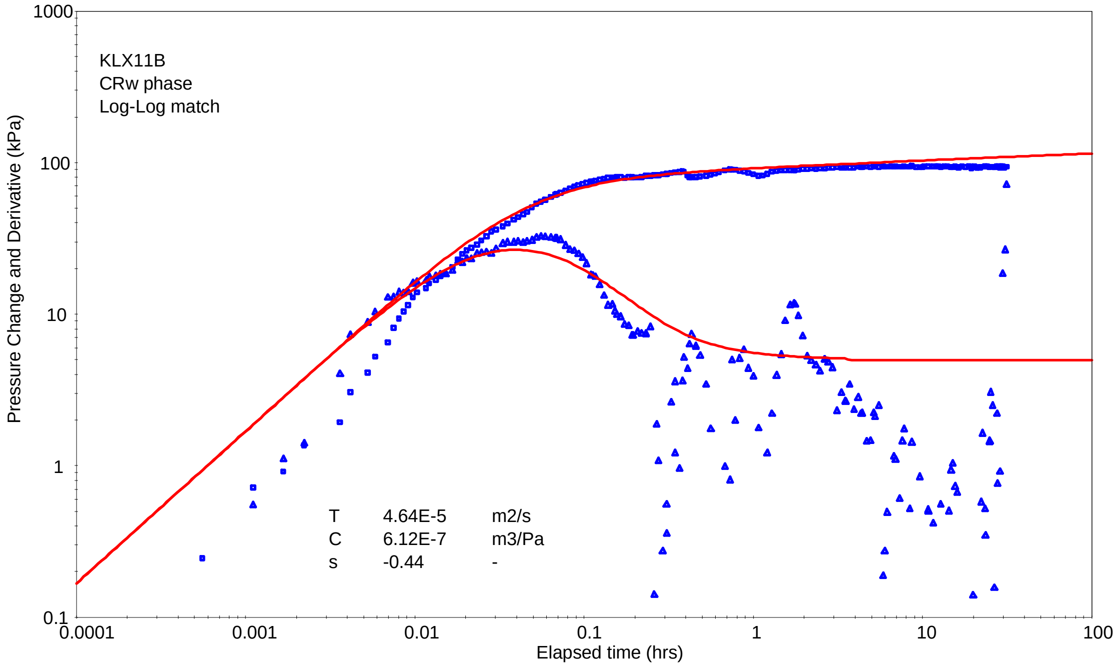
APPENDIX 1-16

PFL Pumptest KLX11B

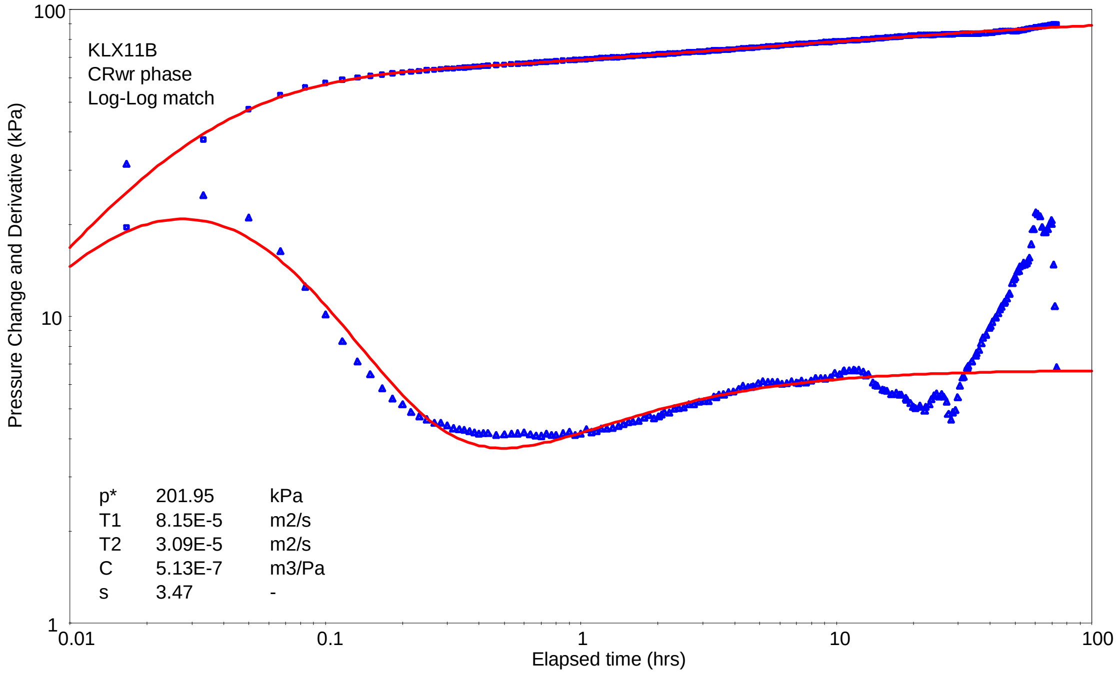
Analysis diagrams



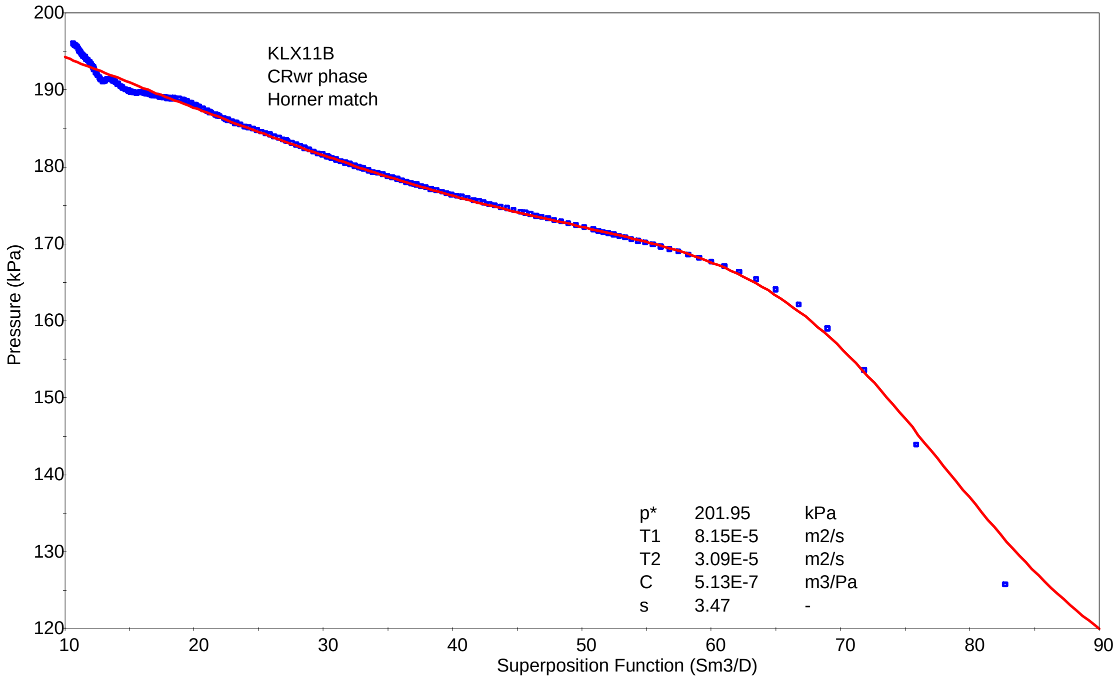
Pressure and flow rate vs. time; cartesian plot



CRw phase; log-log match



CRwr phase; log-log match

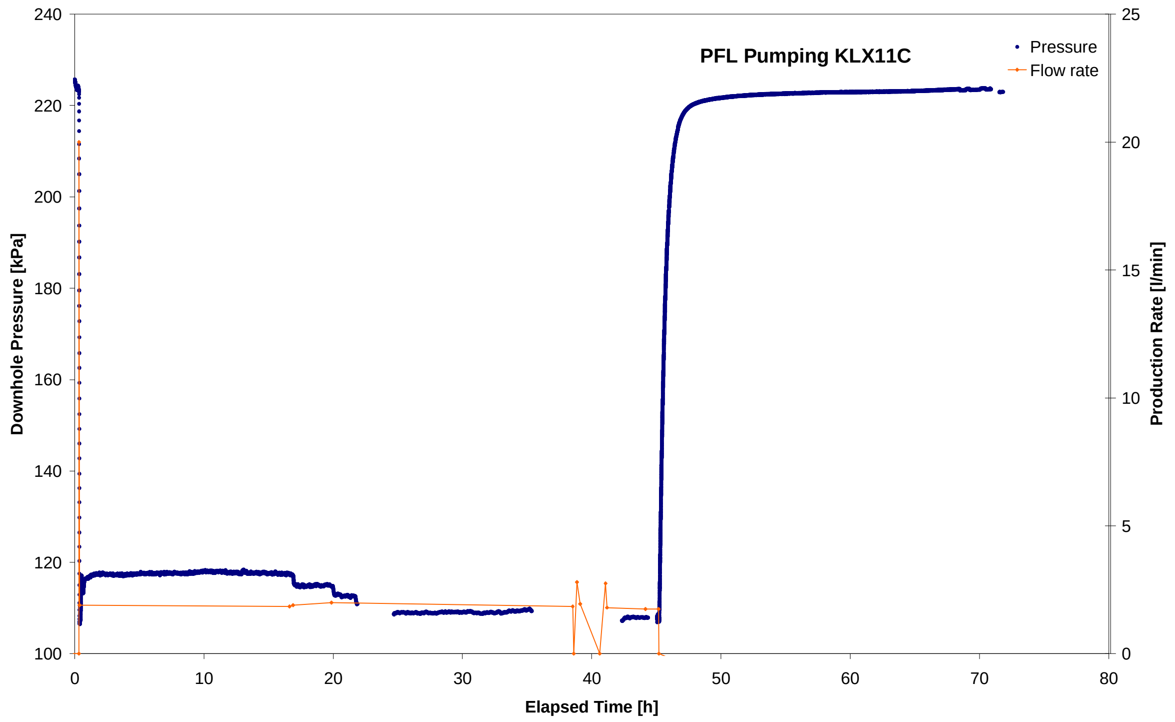


CRwr phase; HORNER match

APPENDIX 1-17

PFL Pumptest KLX11C

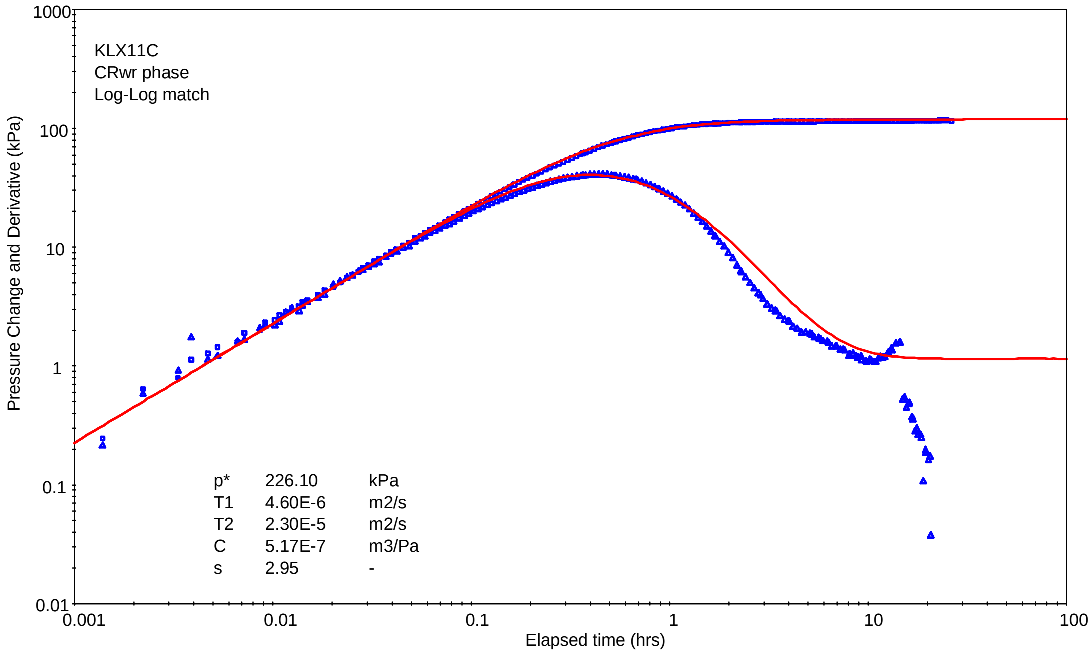
Analysis diagrams



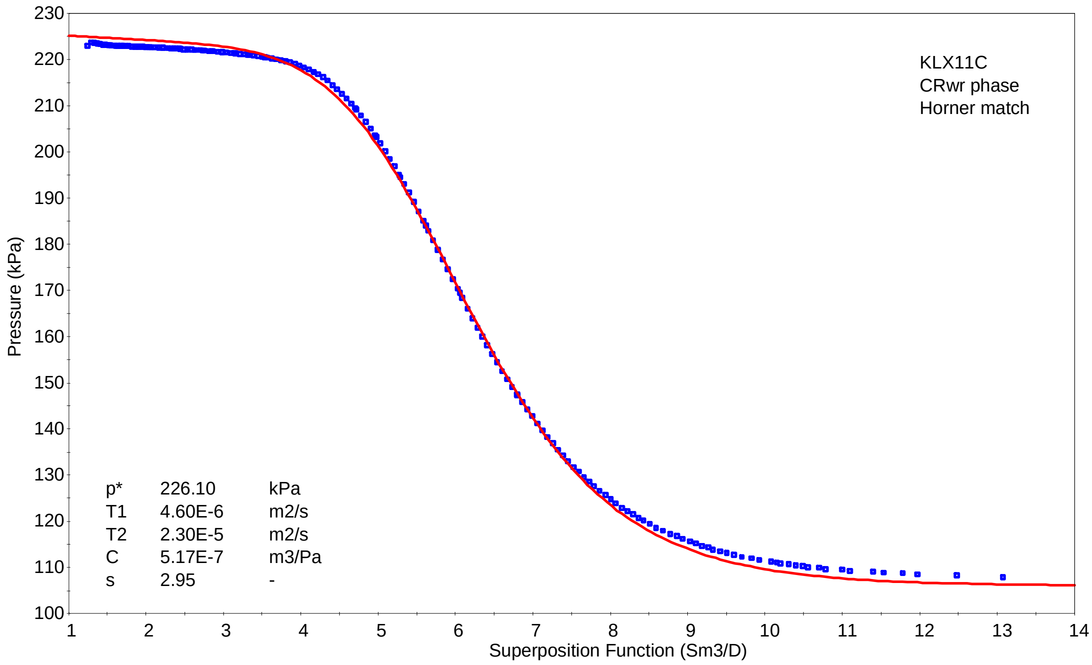
Pressure and flow rate vs. time; cartesian plot

Not analysable

CRw phase; log-log match



CRwr phase; log-log match

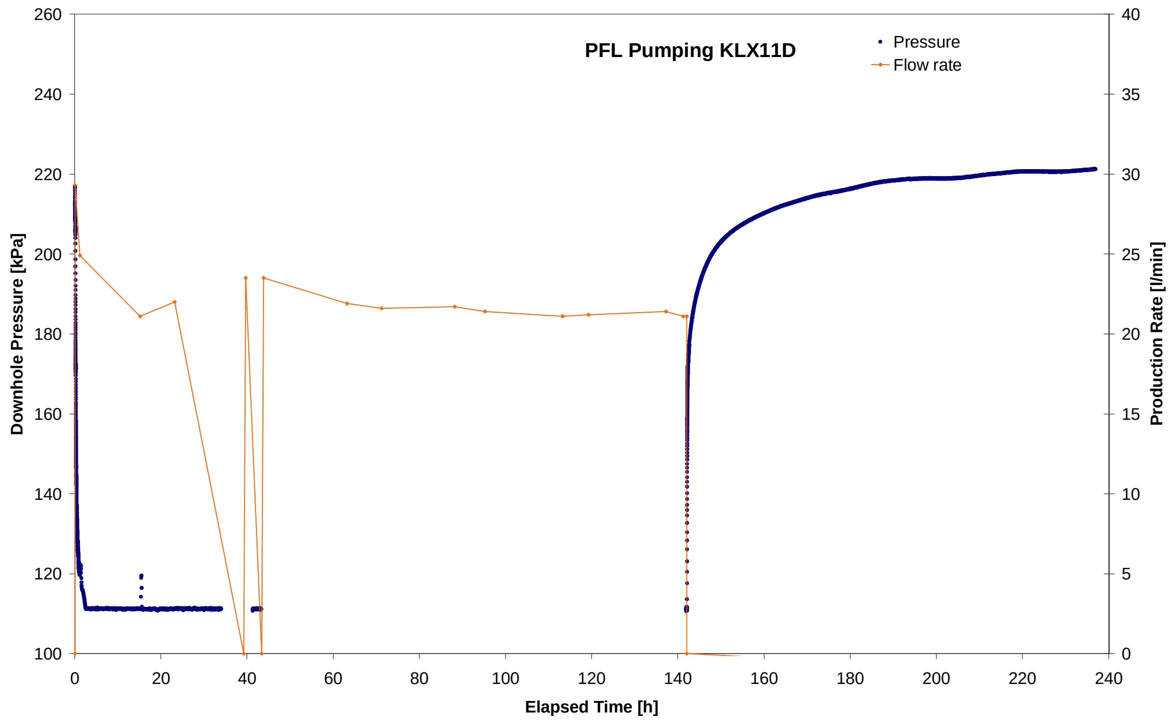


CRwr phase; HORNER match

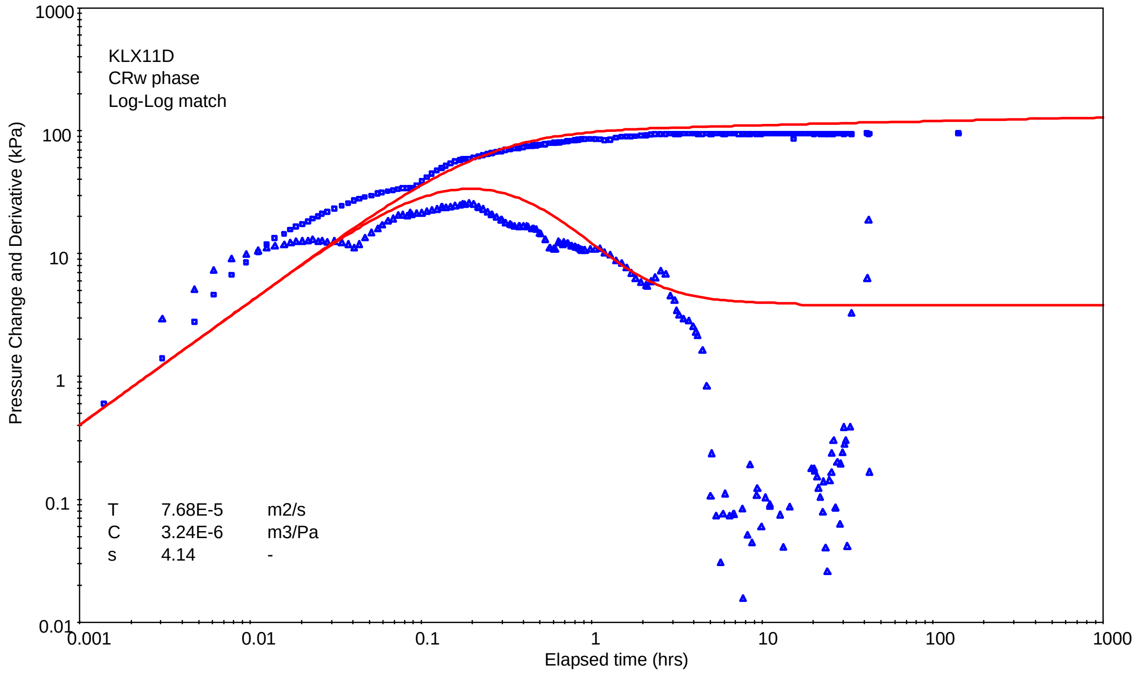
APPENDIX 1-18

PFL Pumptest KLX11D

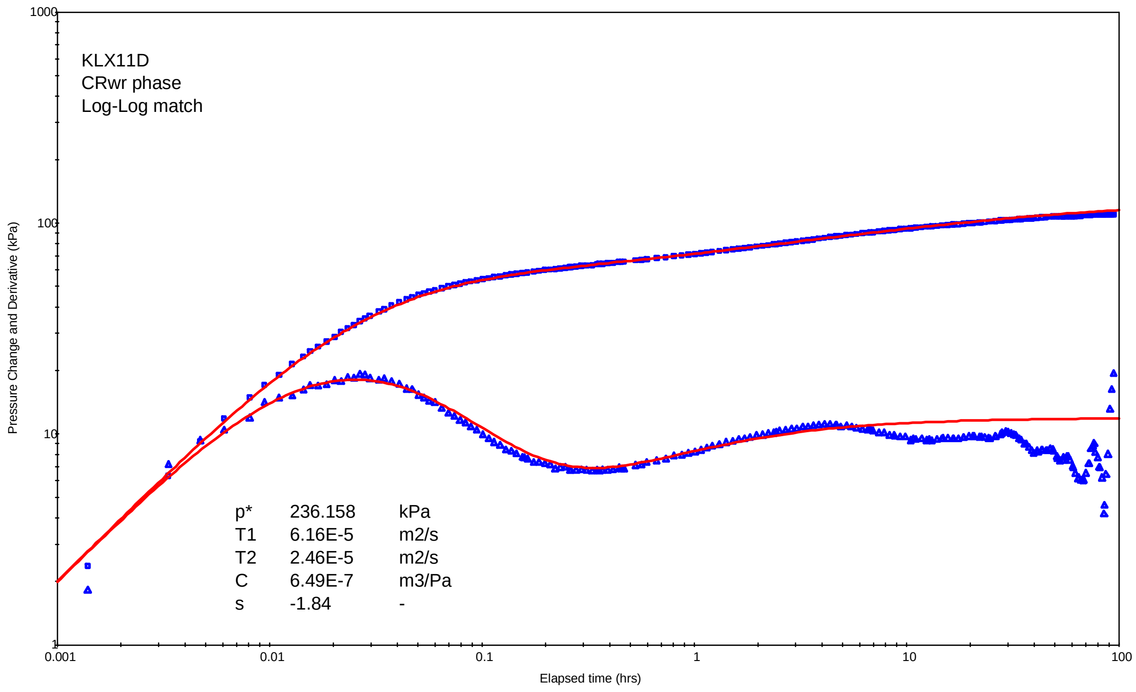
Analysis diagrams



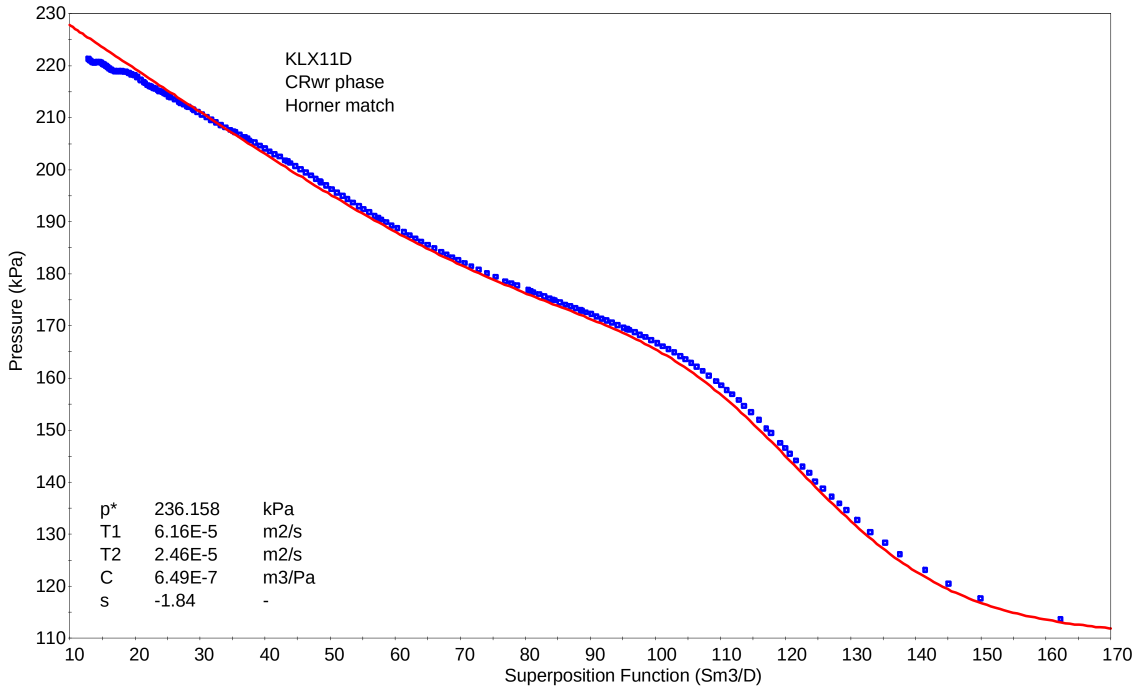
Pressure and flow rate vs. time; cartesian plot



CRw phase; log-log match



CRwr phase; log-log match

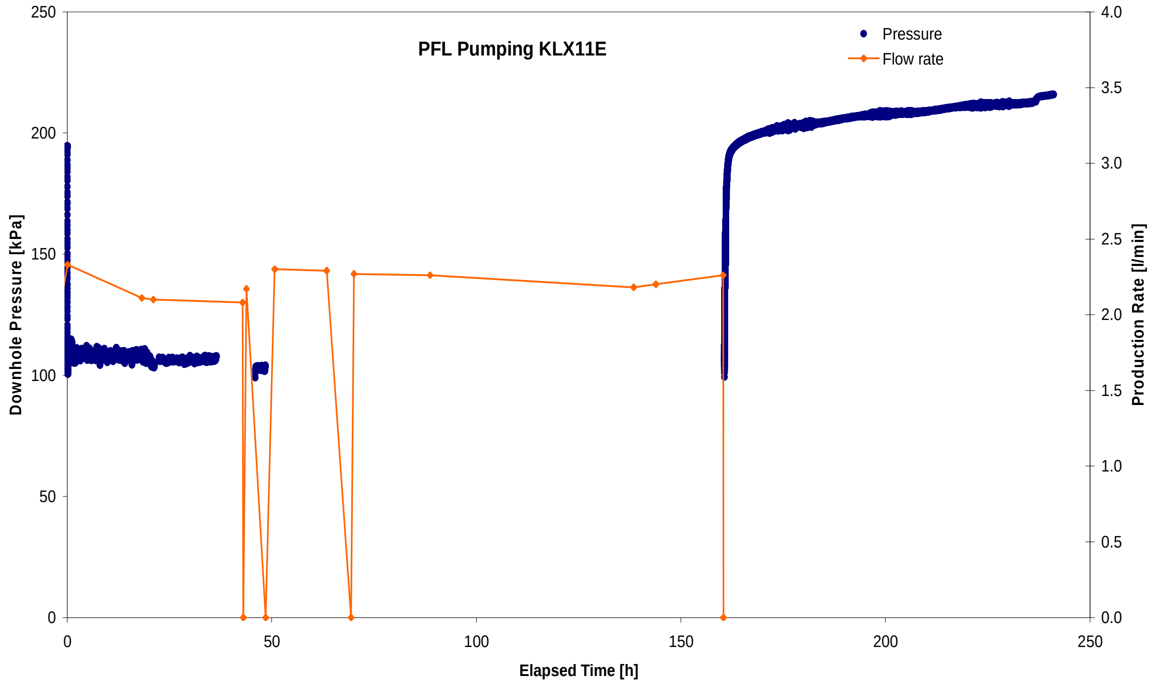


CRwr phase; HORNER match

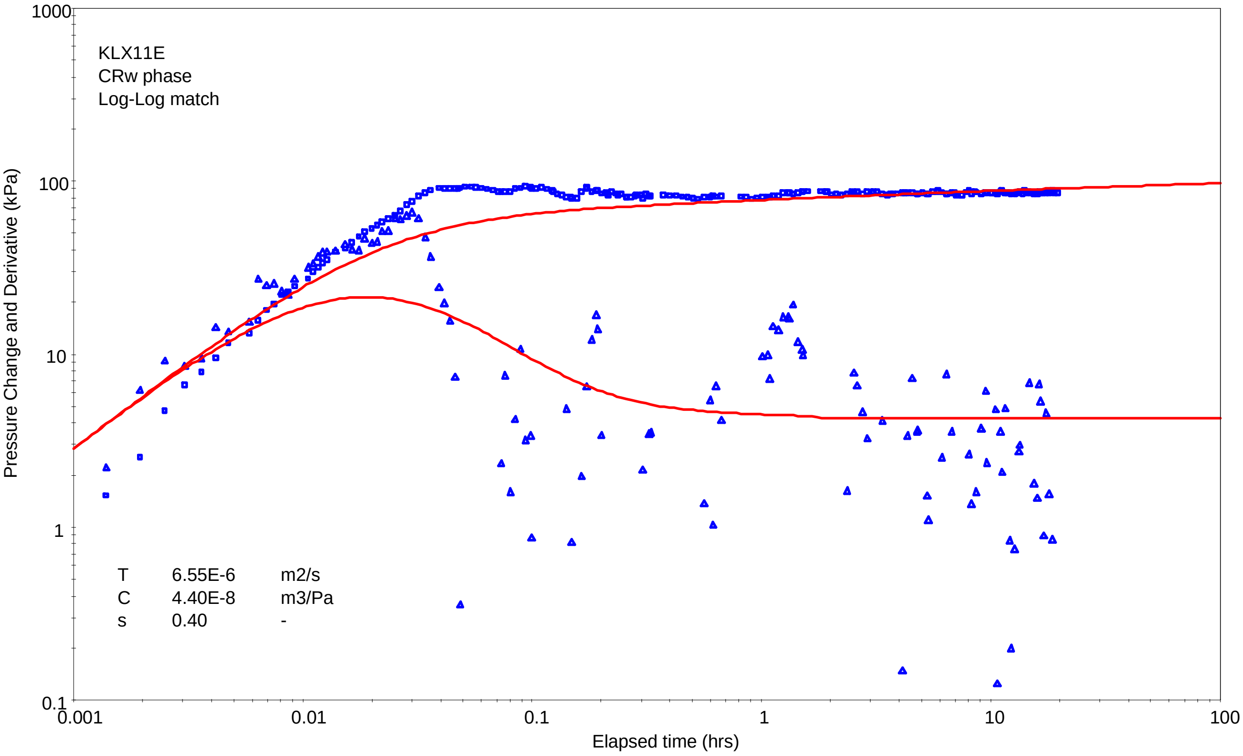
APPENDIX 1-19

PFL Pumptest KLX11E

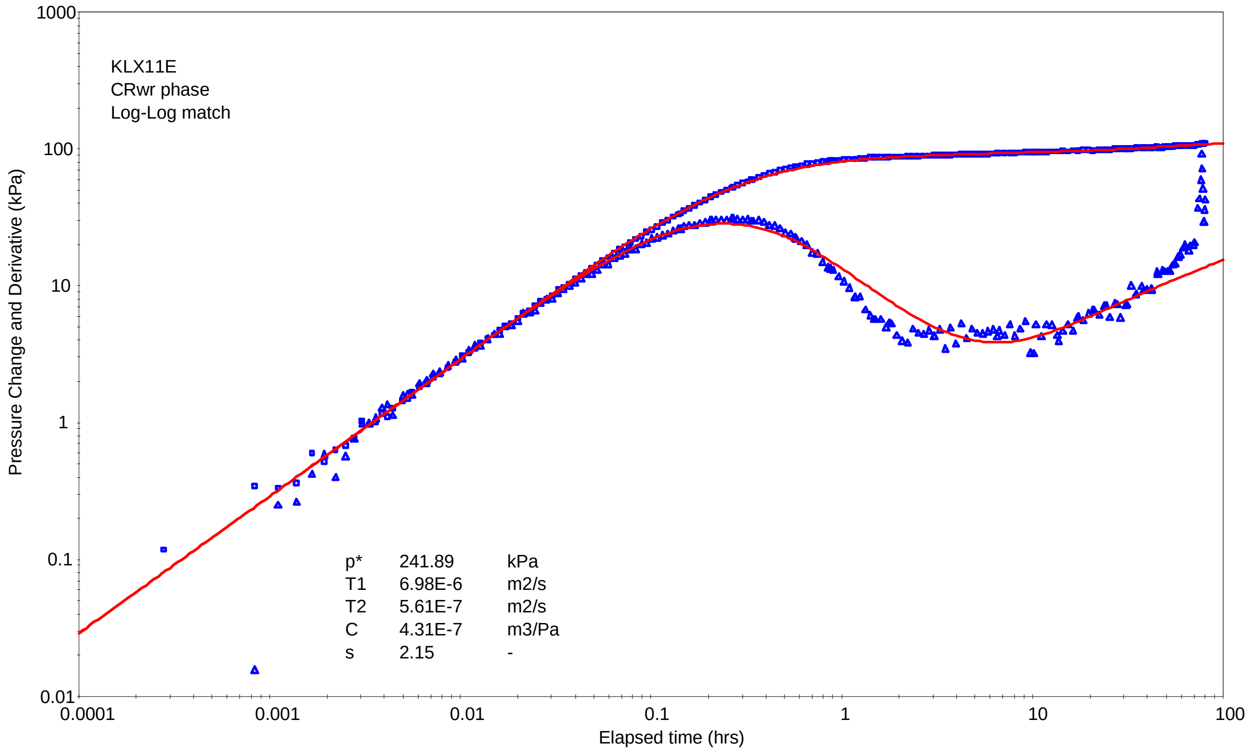
Analysis diagrams



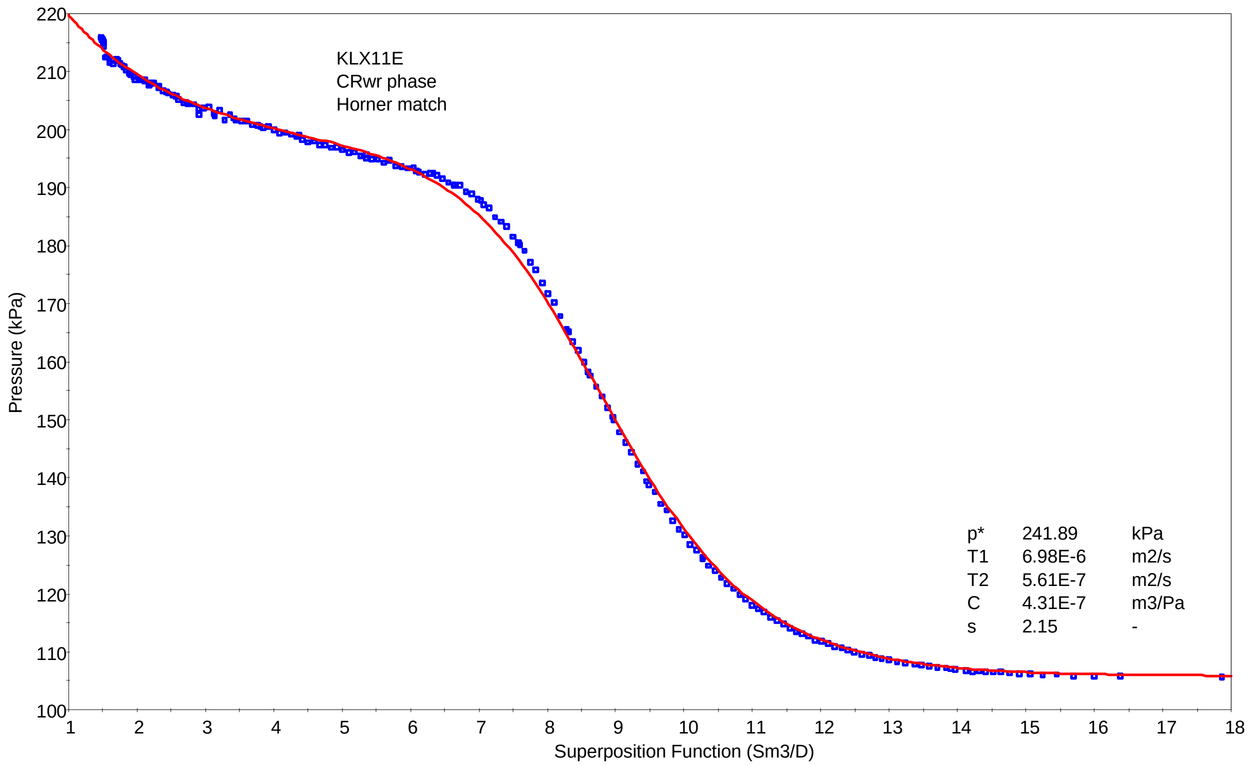
Pressure and flow rate vs. time; cartesian plot



CRw phase; log-log match



CRwr phase; log-log match

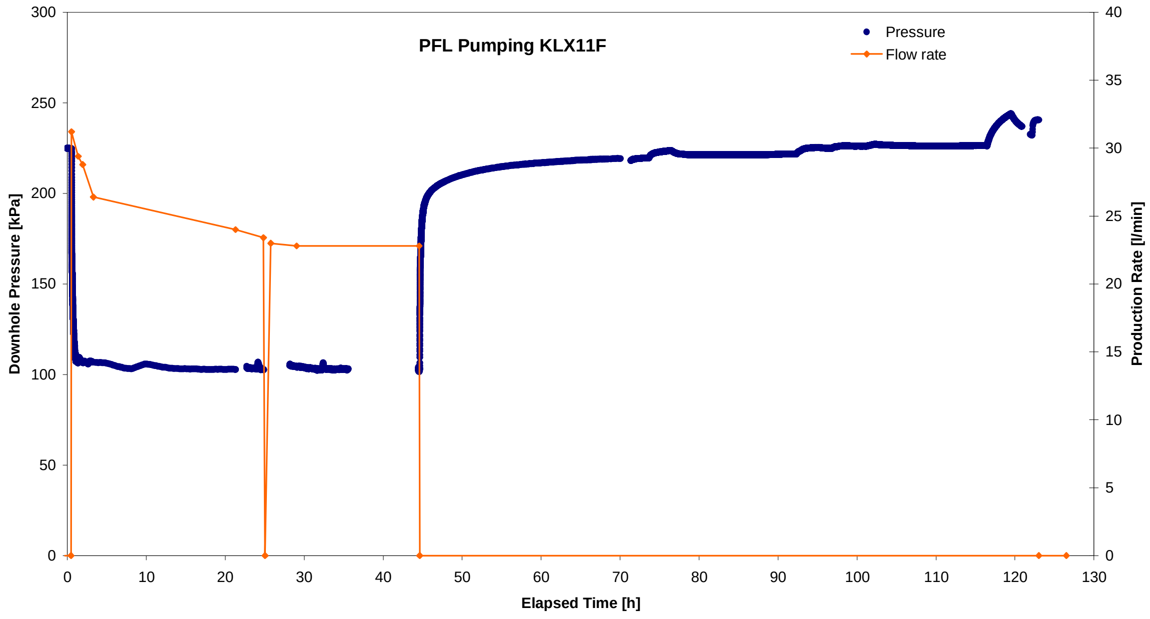


CRwr phase; HORNER match

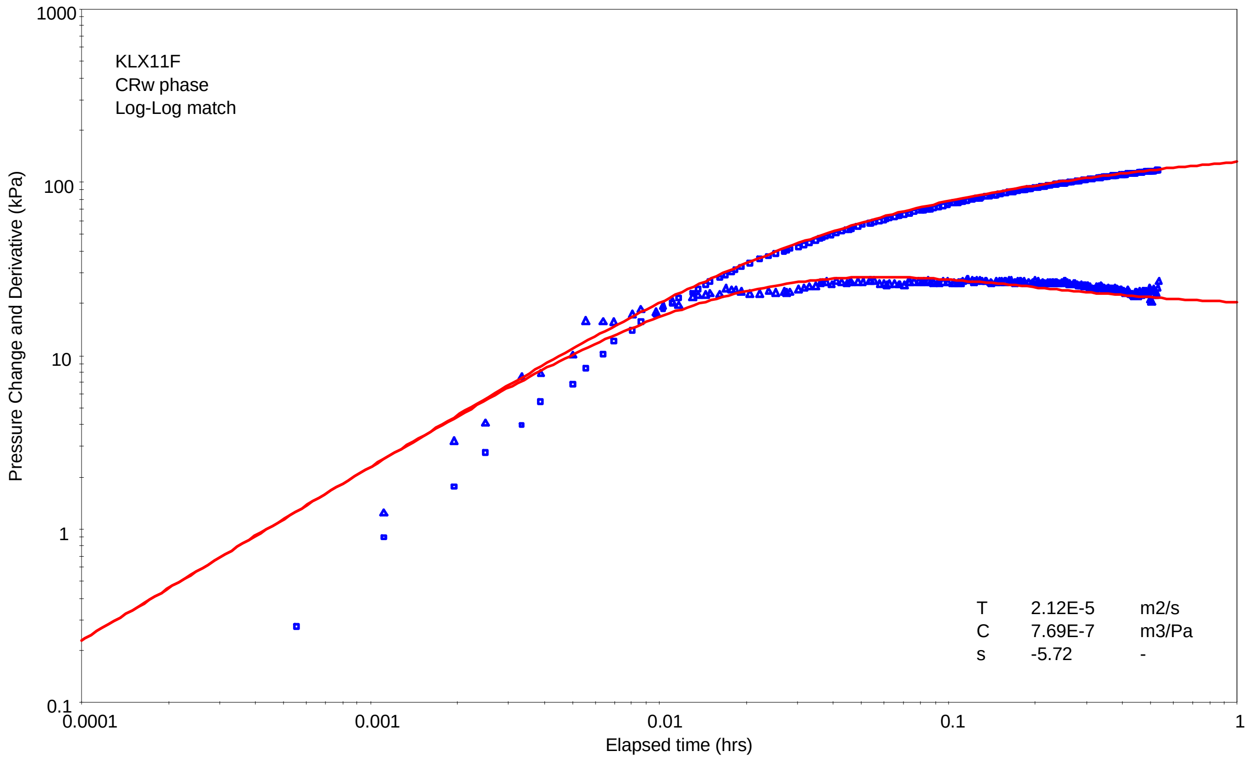
APPENDIX 1-20

PFL Pumptest KLX11F

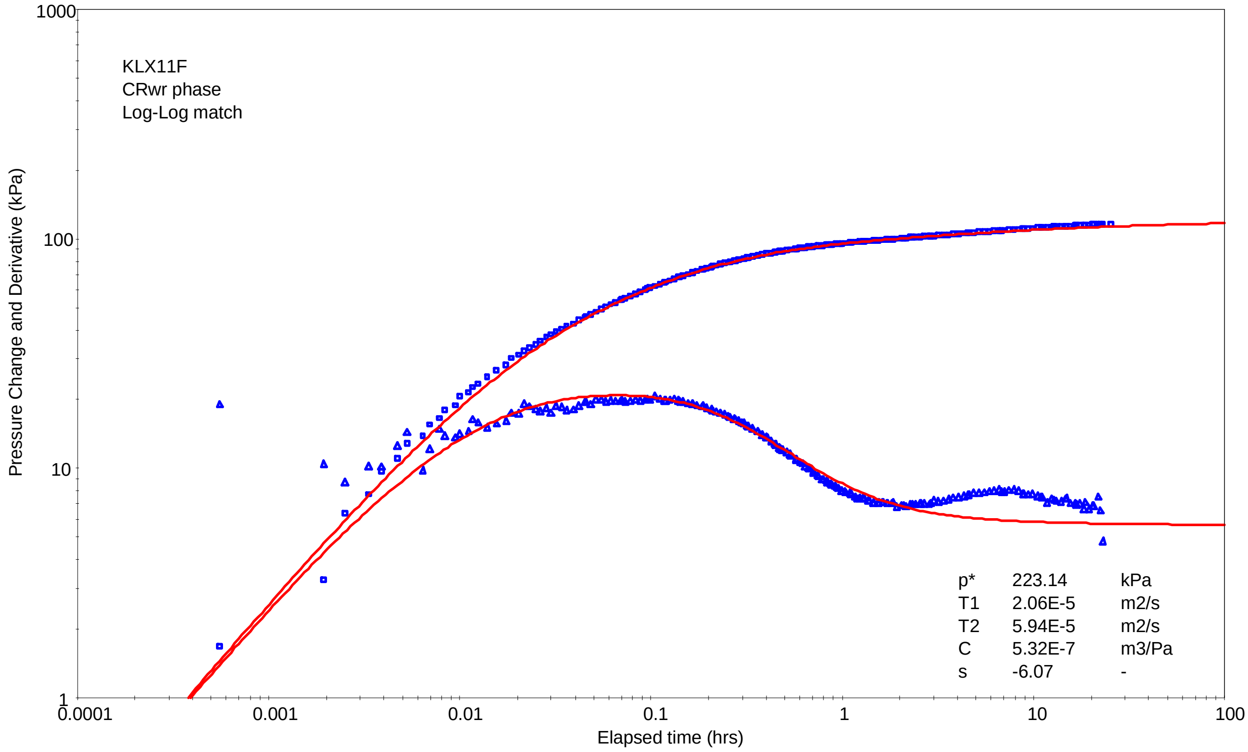
Analysis diagrams



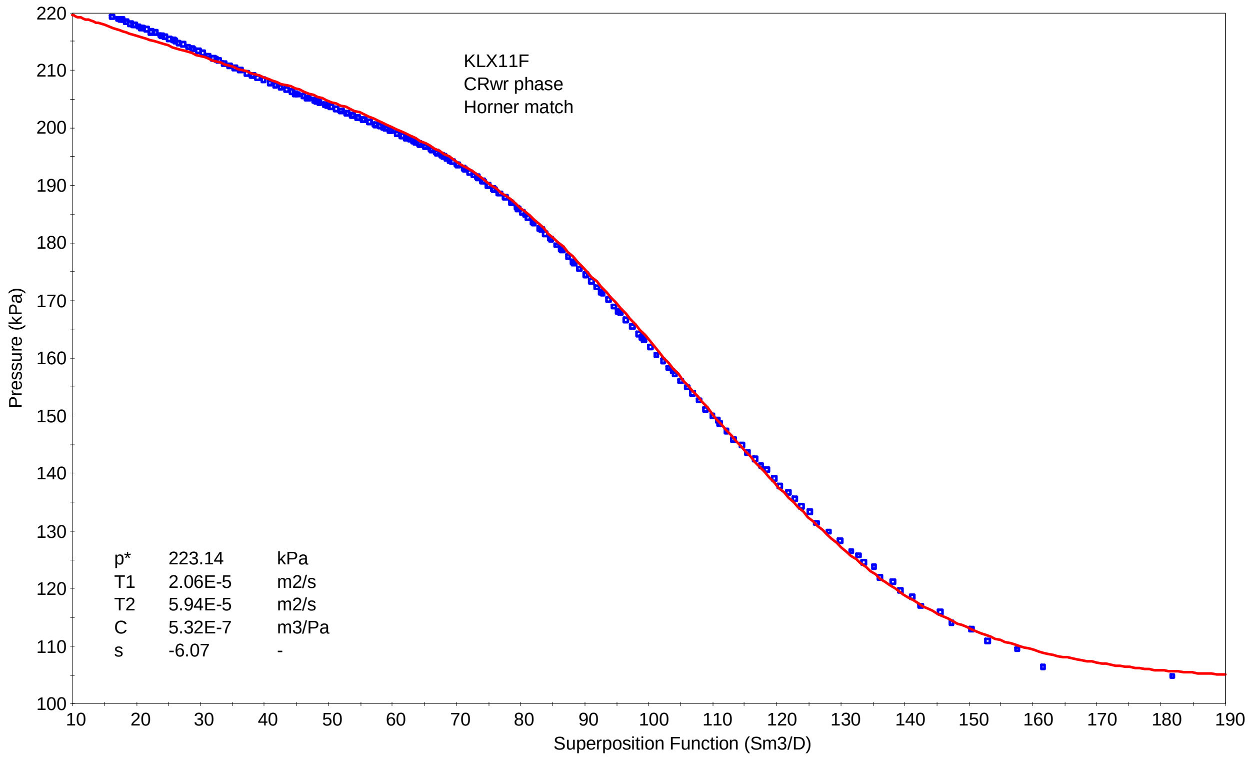
Pressure and flow rate vs. time; cartesian plot



CRw phase; log-log match



CRwr phase; log-log match

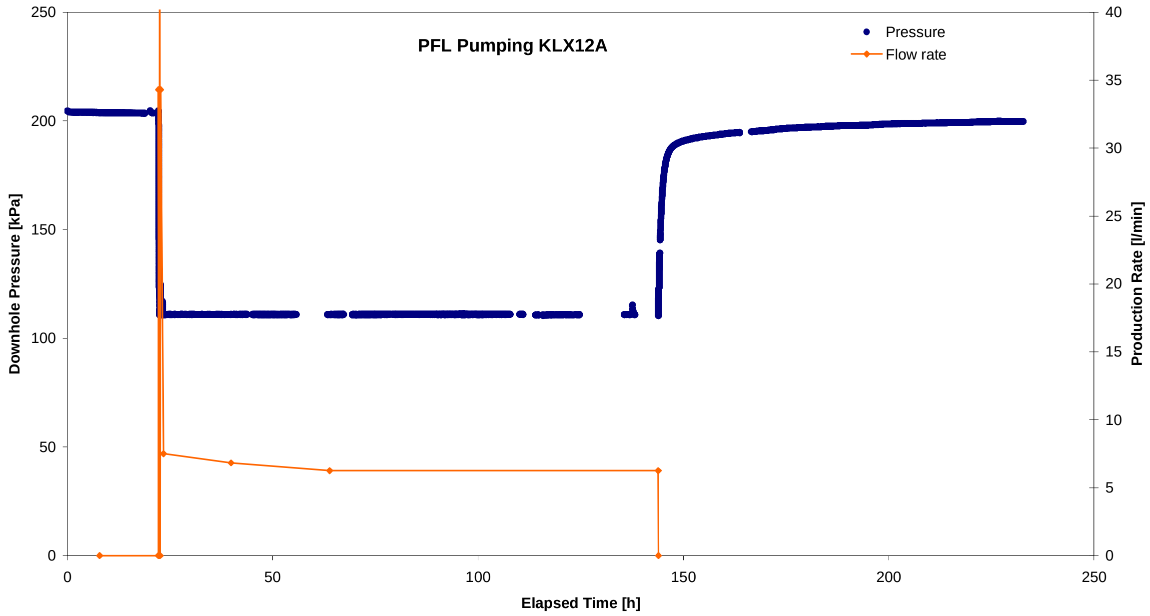


CRwr phase; HORNER match

APPENDIX 1-21

PFL Pumptest KLX12A

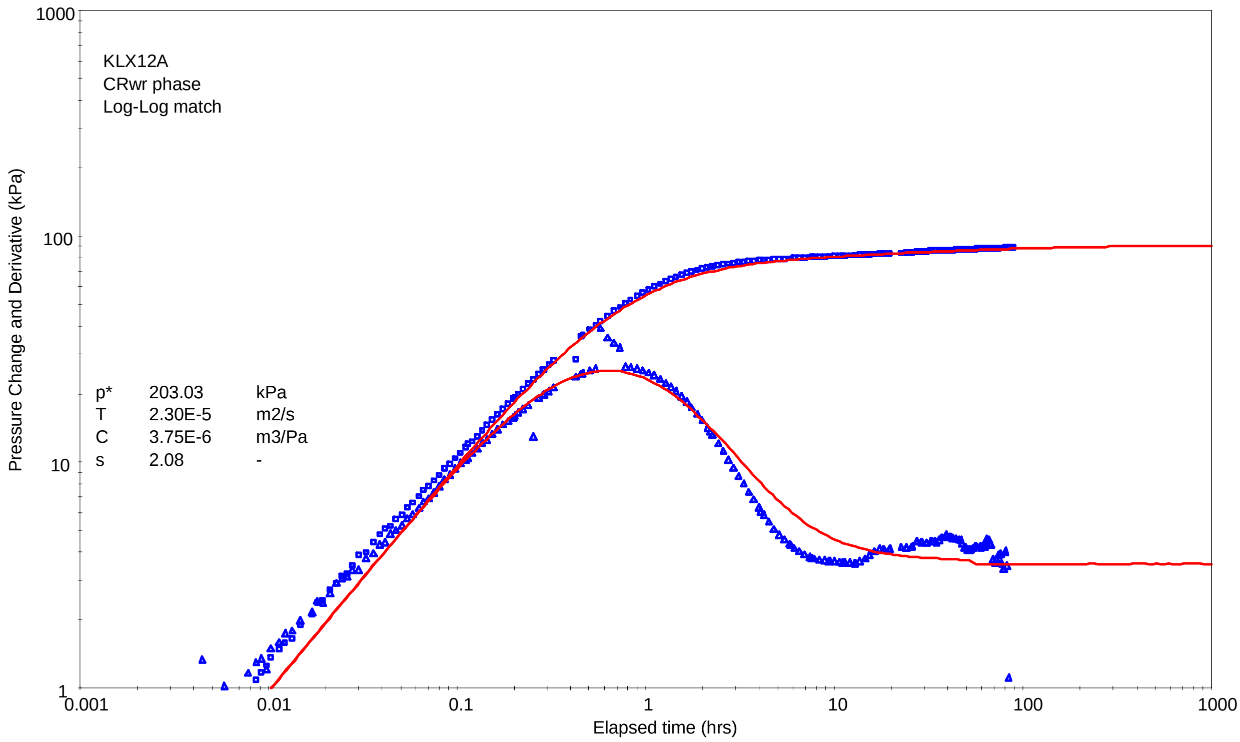
Analysis diagrams



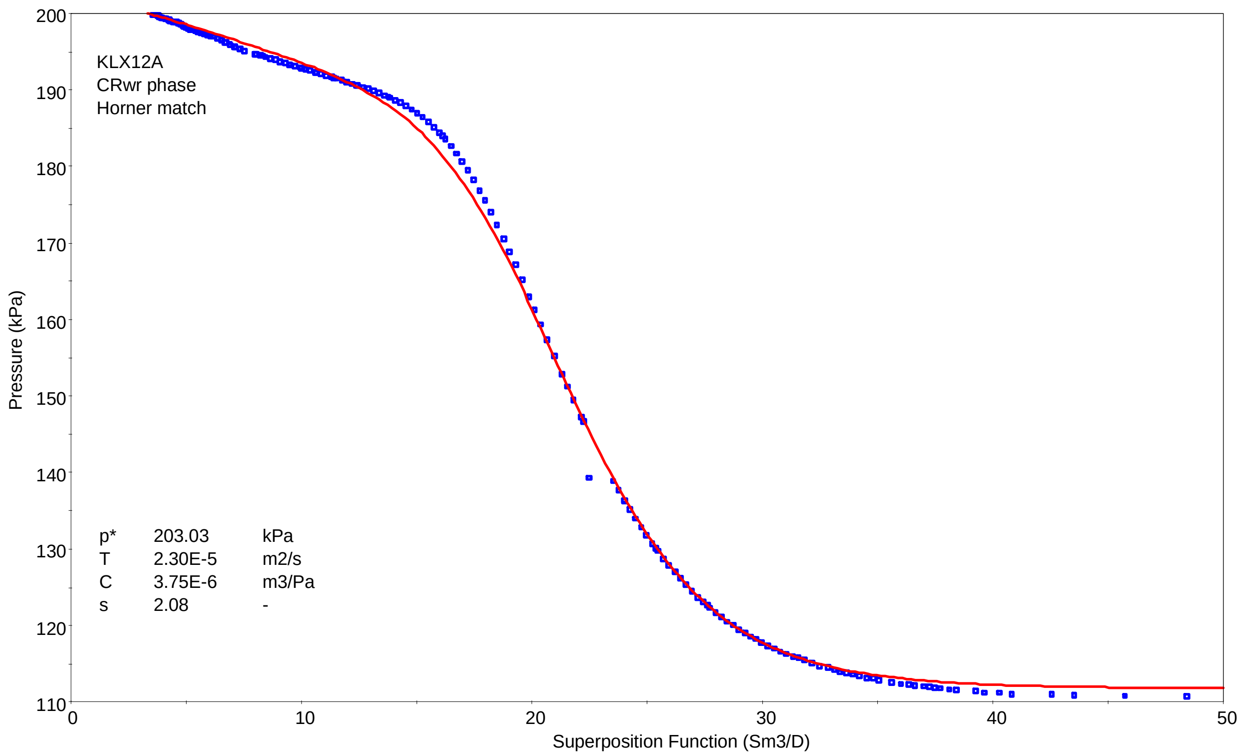
Pressure and flow rate vs. time; cartesian plot

Not analysable

CRw phase; log-log match



CRwr phase; log-log match

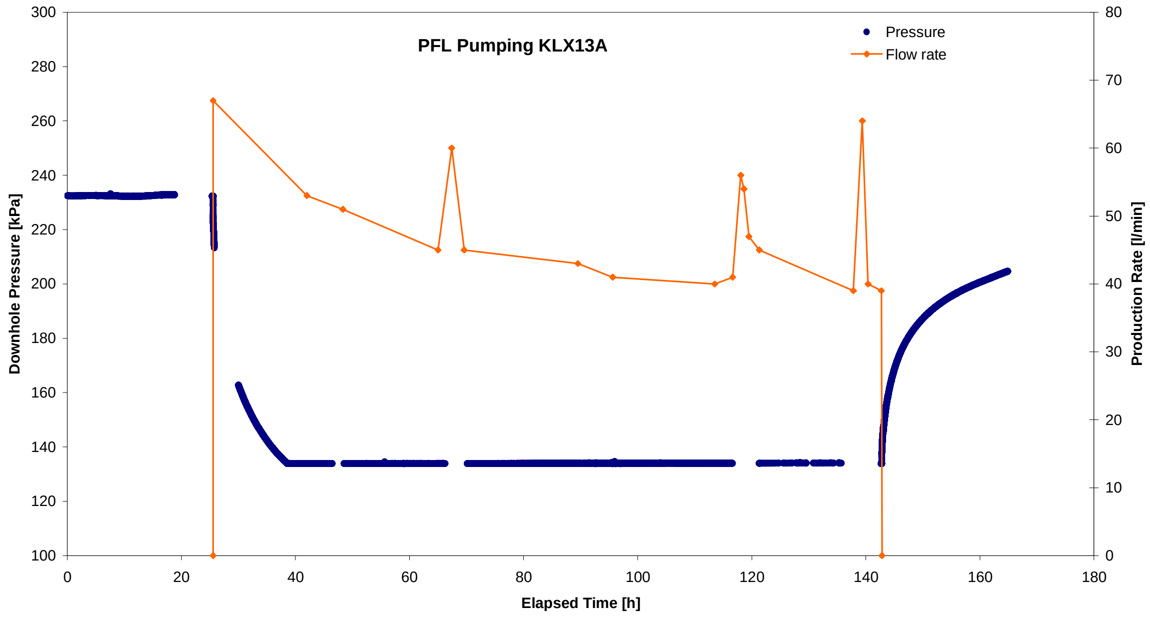


CRwr phase; HORNER match

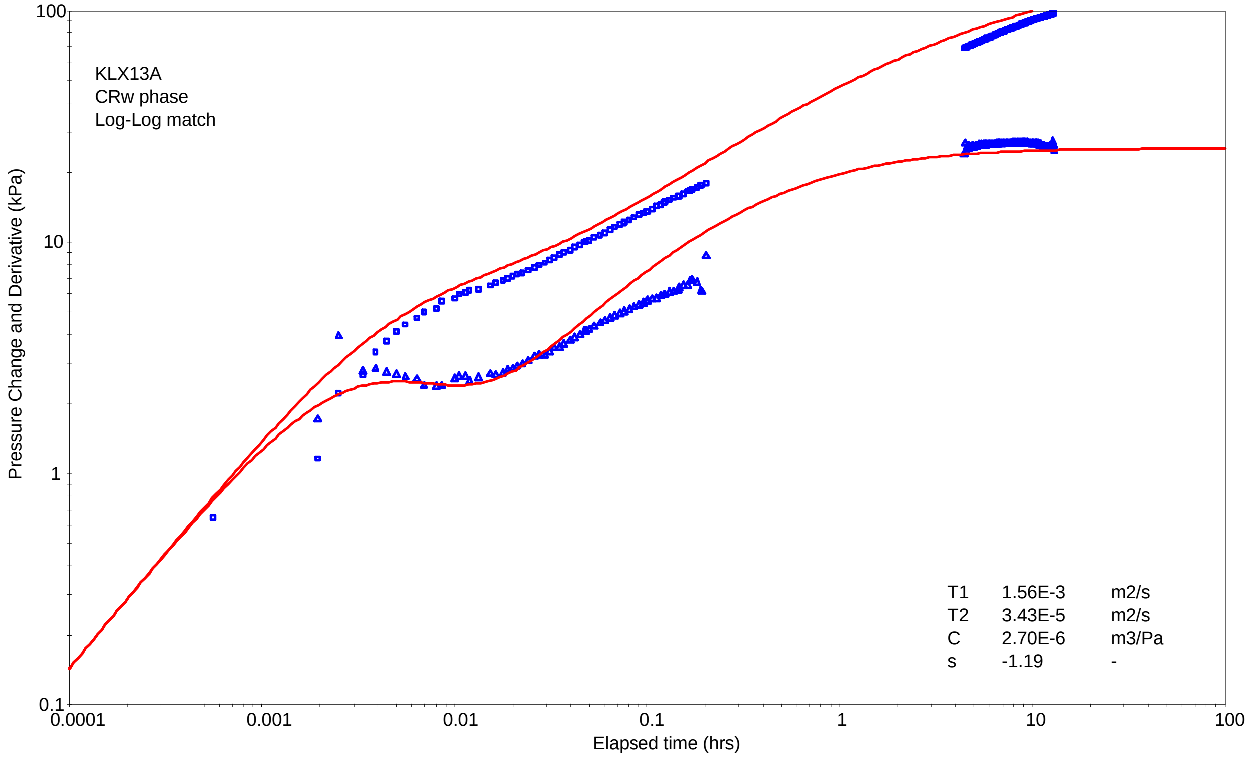
APPENDIX 1-22

PFL Pumptest KLX13A

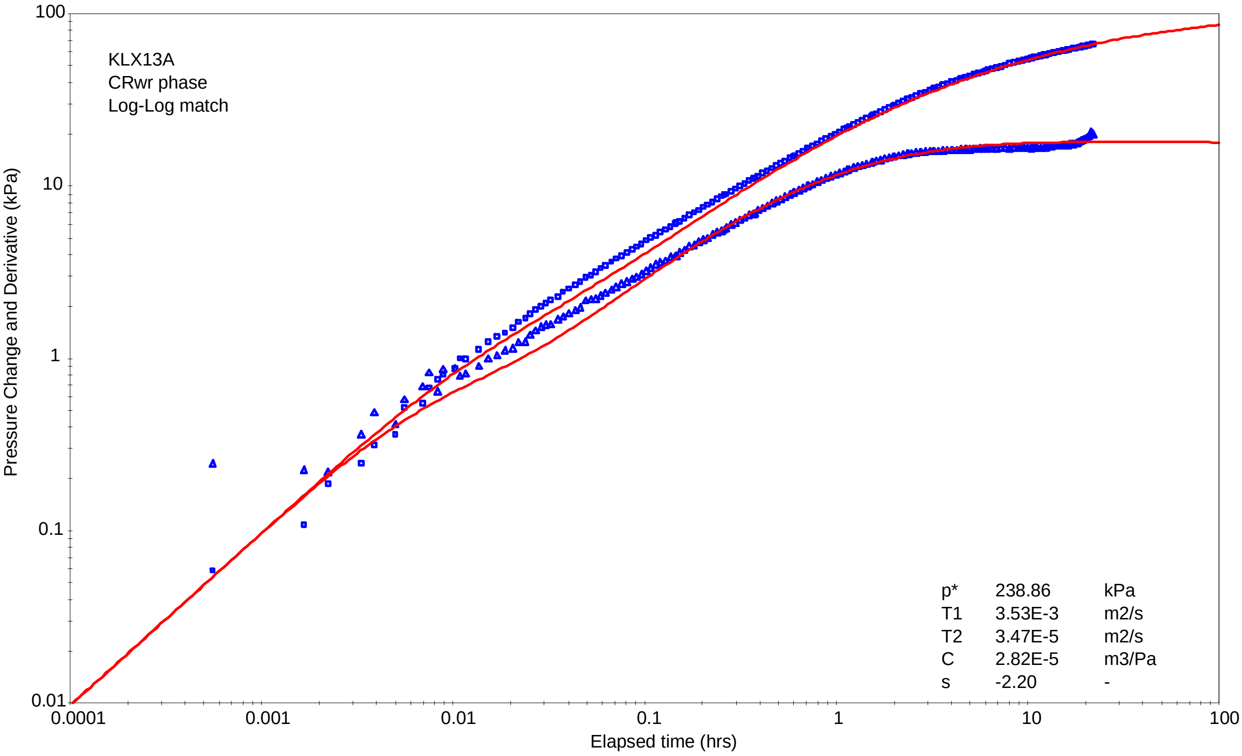
Analysis diagrams



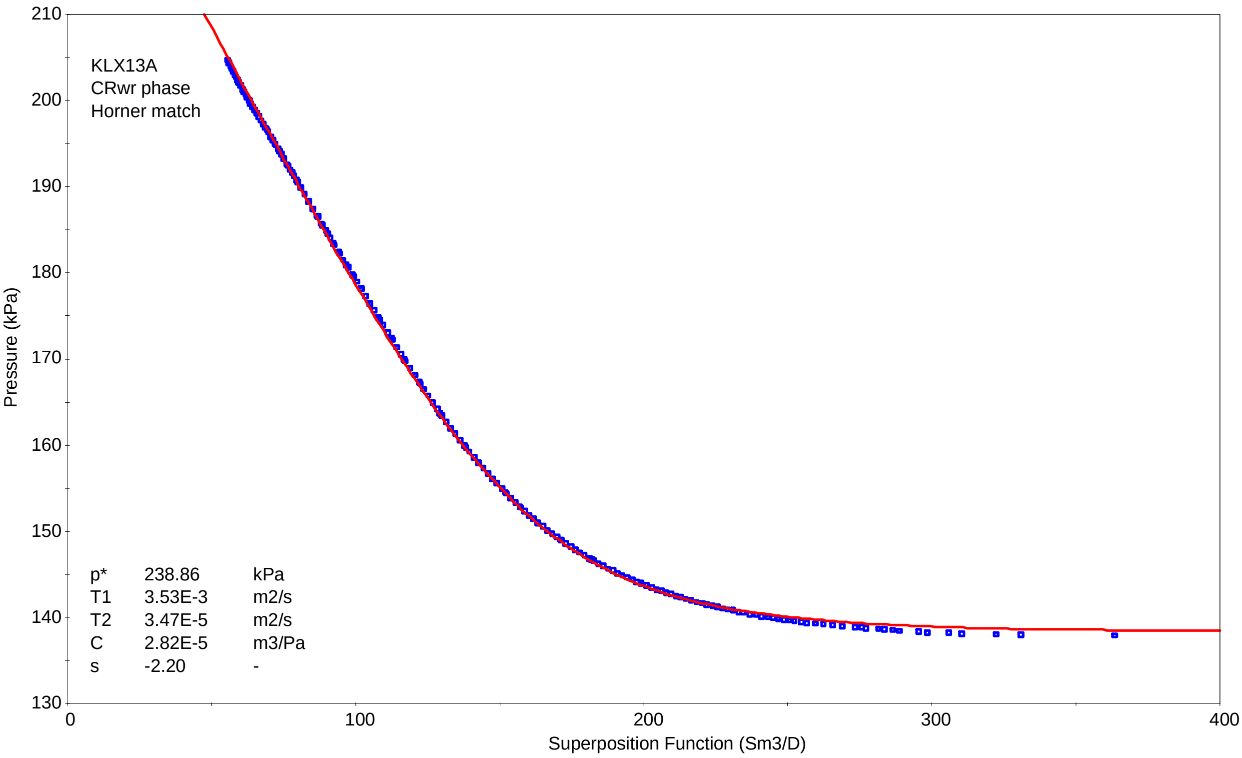
Pressure and flow rate vs. time; cartesian plot



CRw phase; log-log match



CRwr phase; log-log match

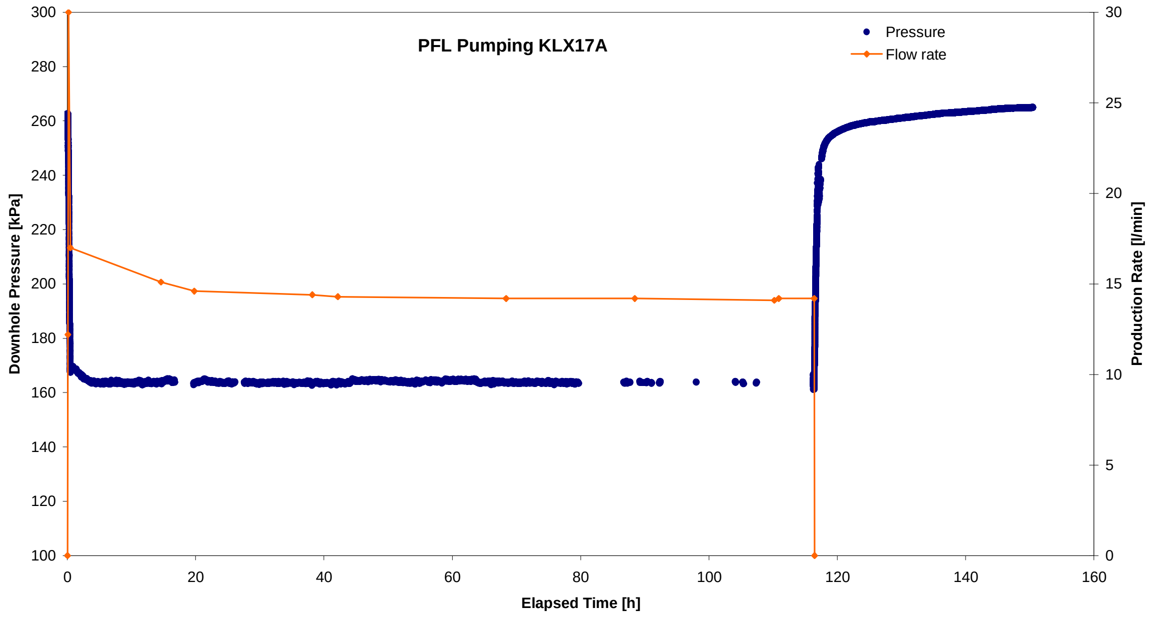


CRwr phase; HORNER match

APPENDIX 1-23

PFL Pumptest KLX17A

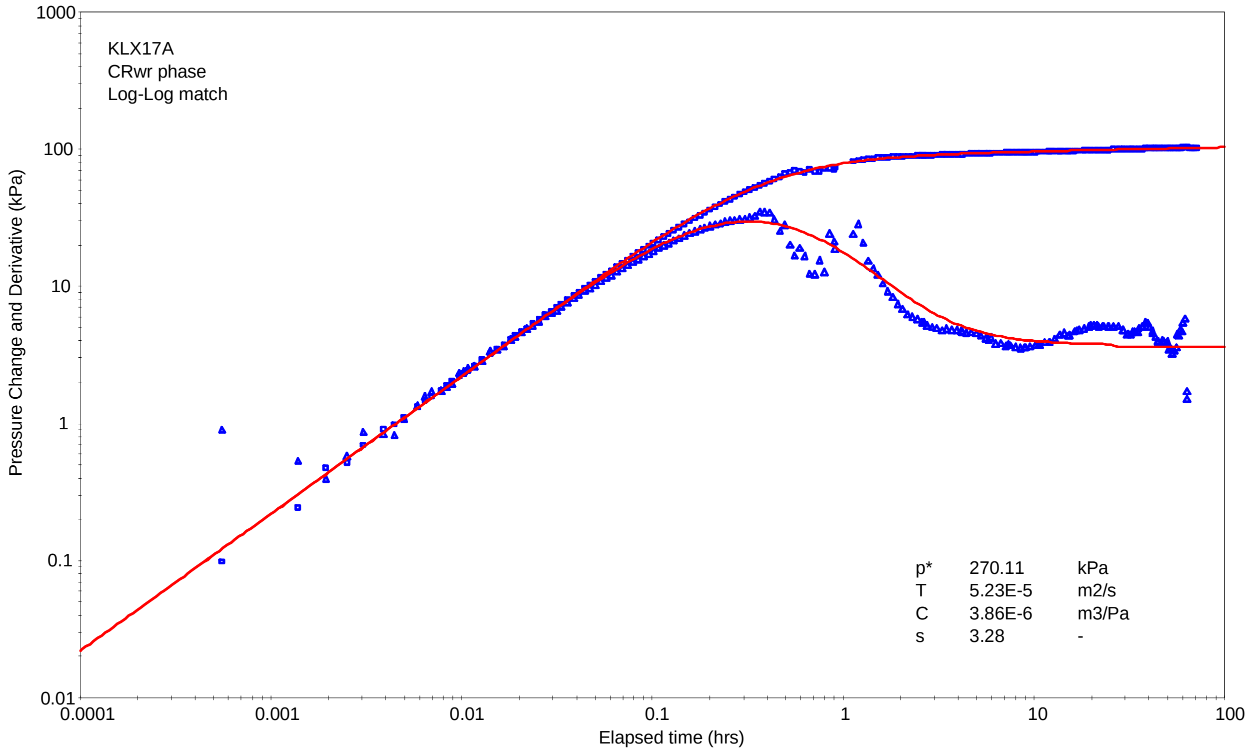
Analysis diagrams



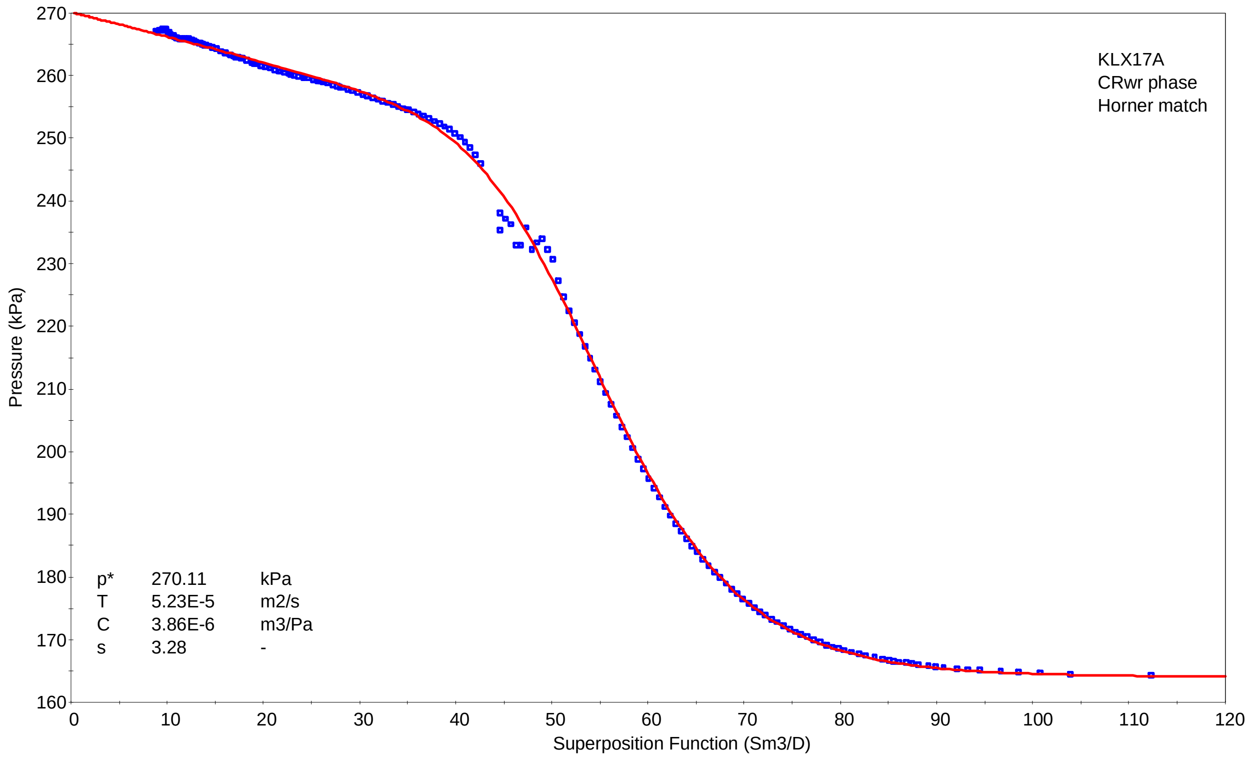
Pressure and flow rate vs. time; cartesian plot

Not analysable

CRw phase; log-log match



CRwr phase; log-log match

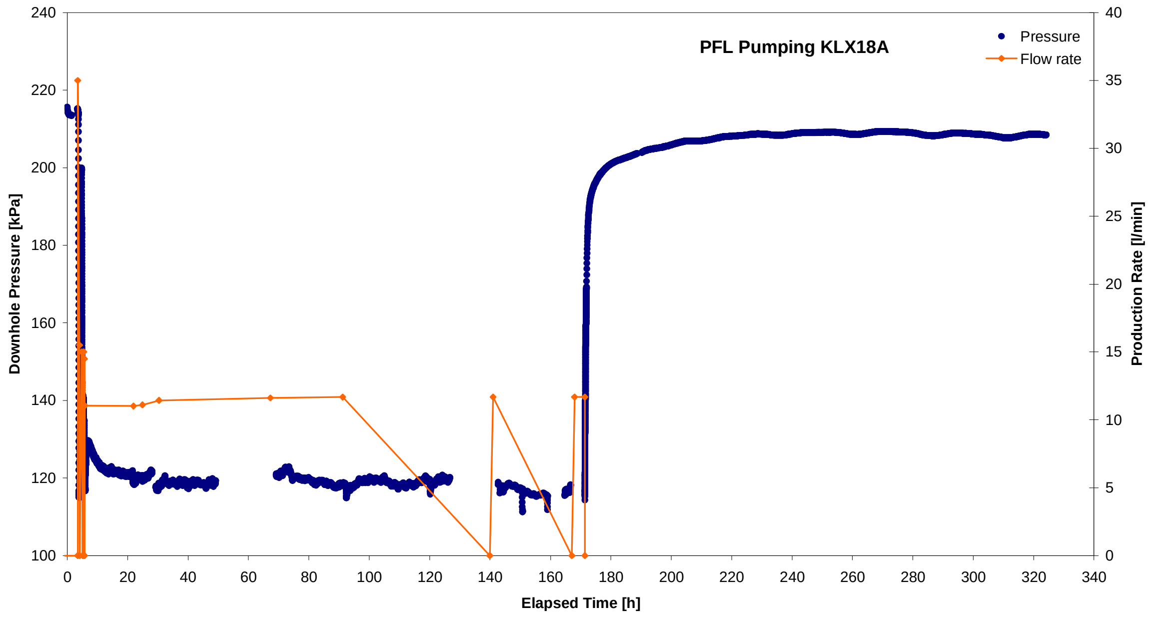


CRwr phase; HORNER match

APPENDIX 1-24

PFL Pumptest KLX18A

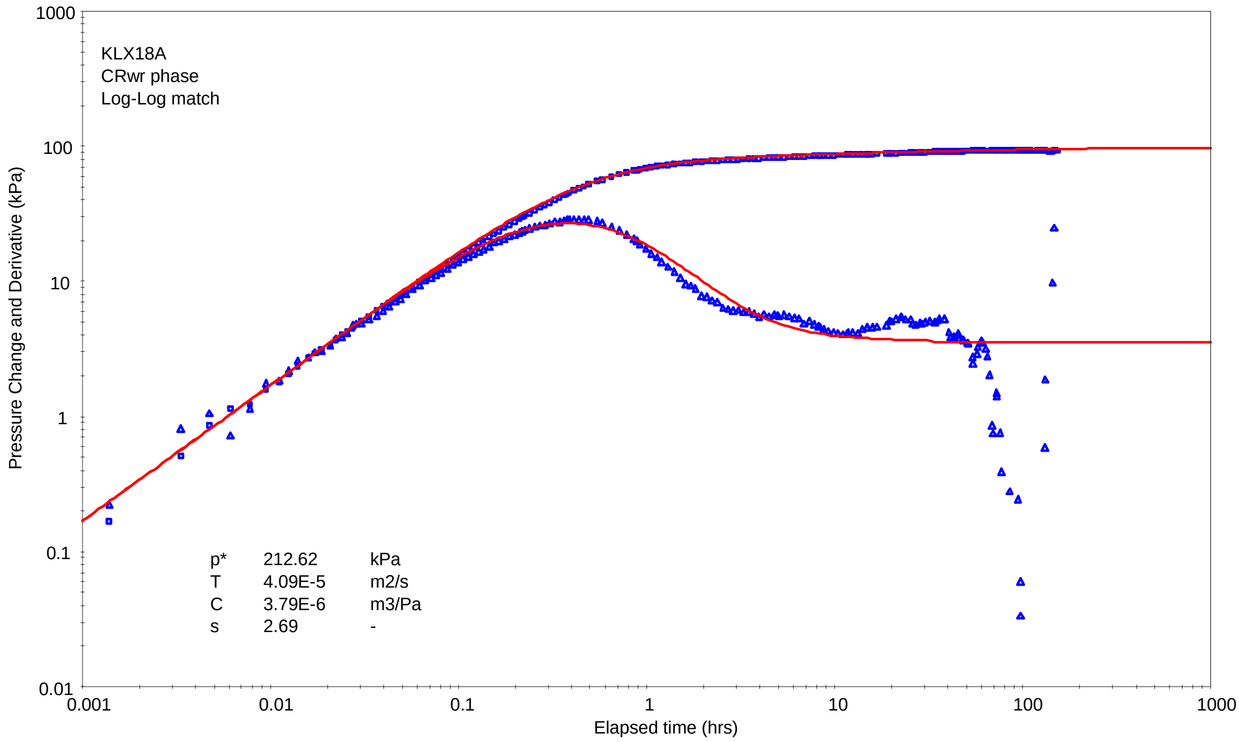
Analysis diagrams



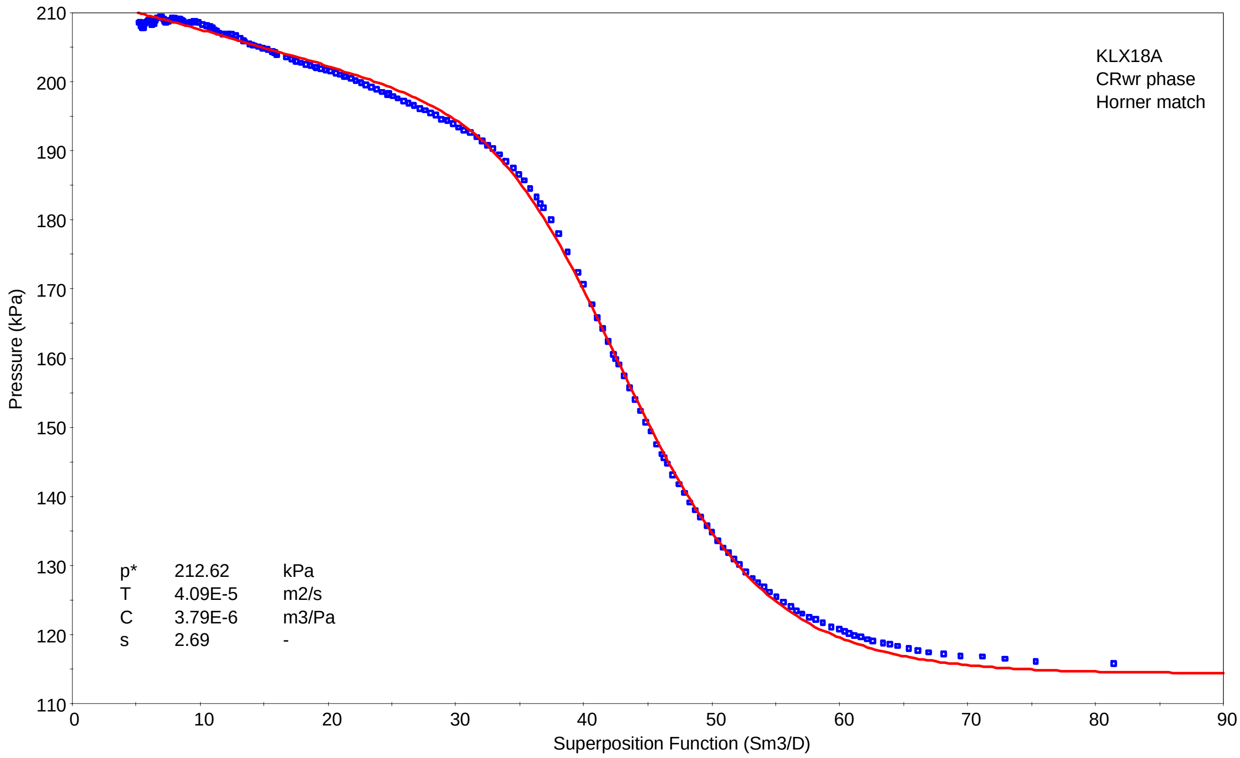
Pressure and flow rate vs. time; cartesian plot

Not analysable

CRw phase; log-log match



CRwr phase; log-log match

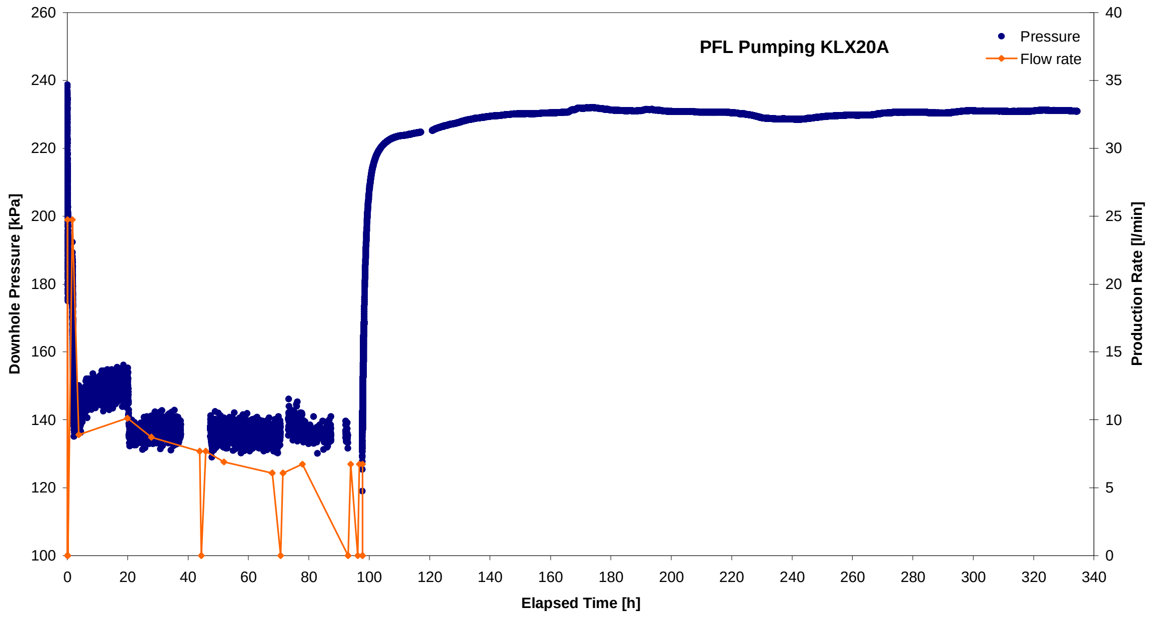


CRwr phase; HORNER match

APPENDIX 1-25

PFL Pumptest KLX20A

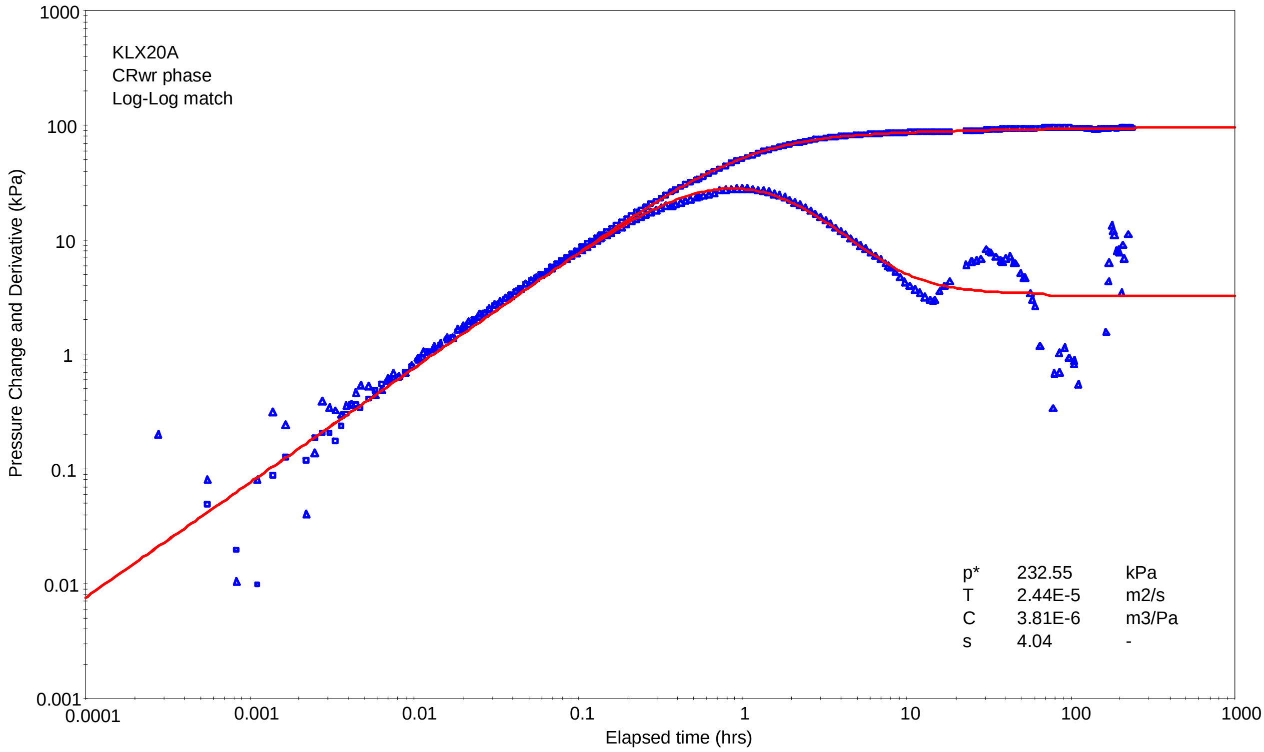
Analysis diagrams



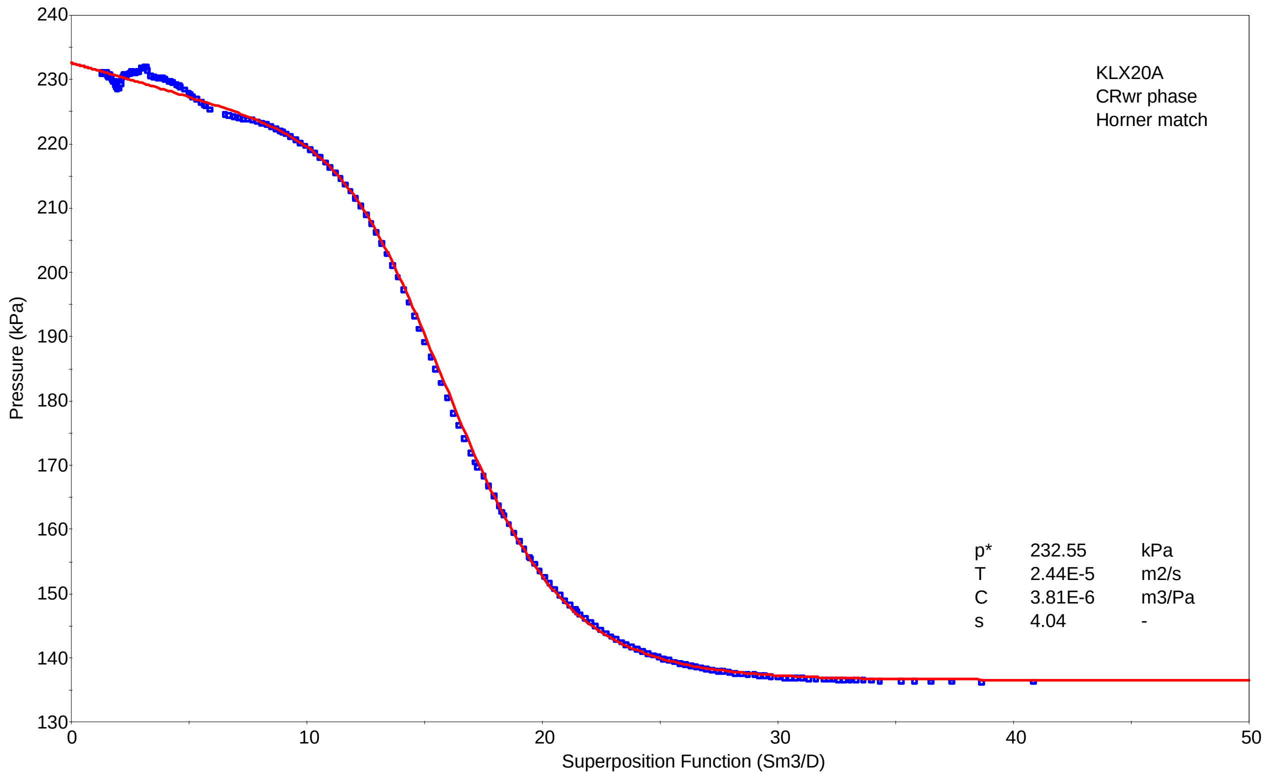
Pressure and flow rate vs. time; cartesian plot

Not analysable

CRw phase; log-log match



CRwr phase; log-log match

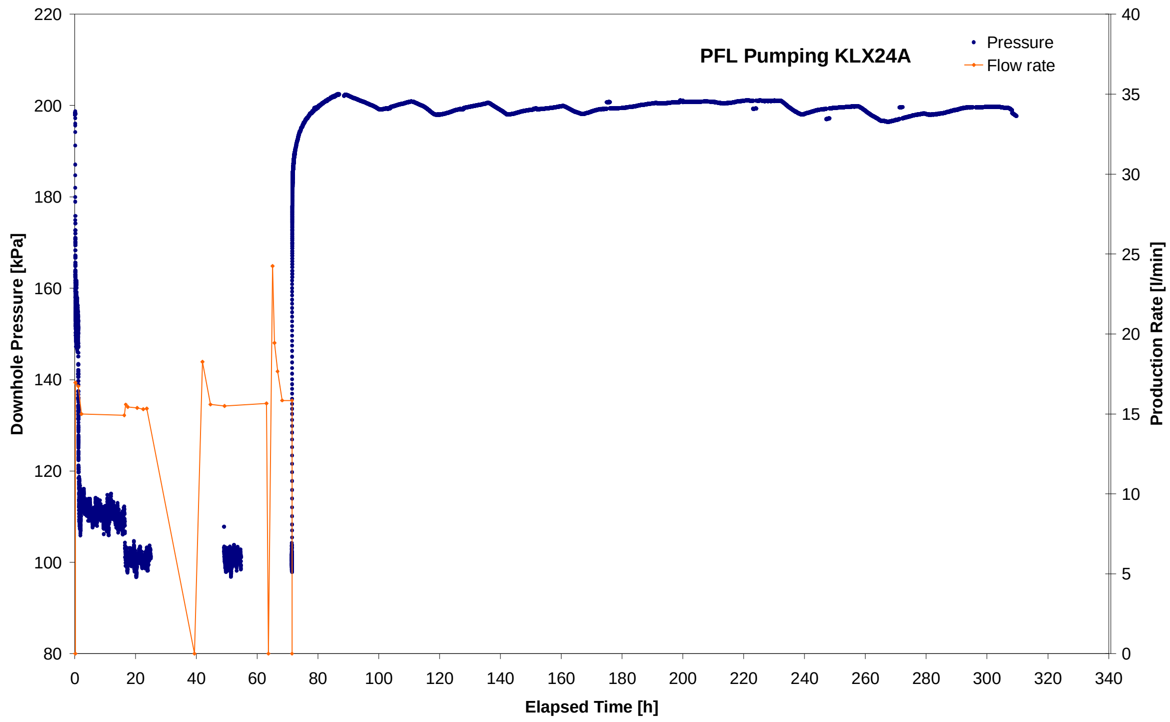


CRwr phase; HORNER match

APPENDIX 1-26

PFL Pumptest KLX24A

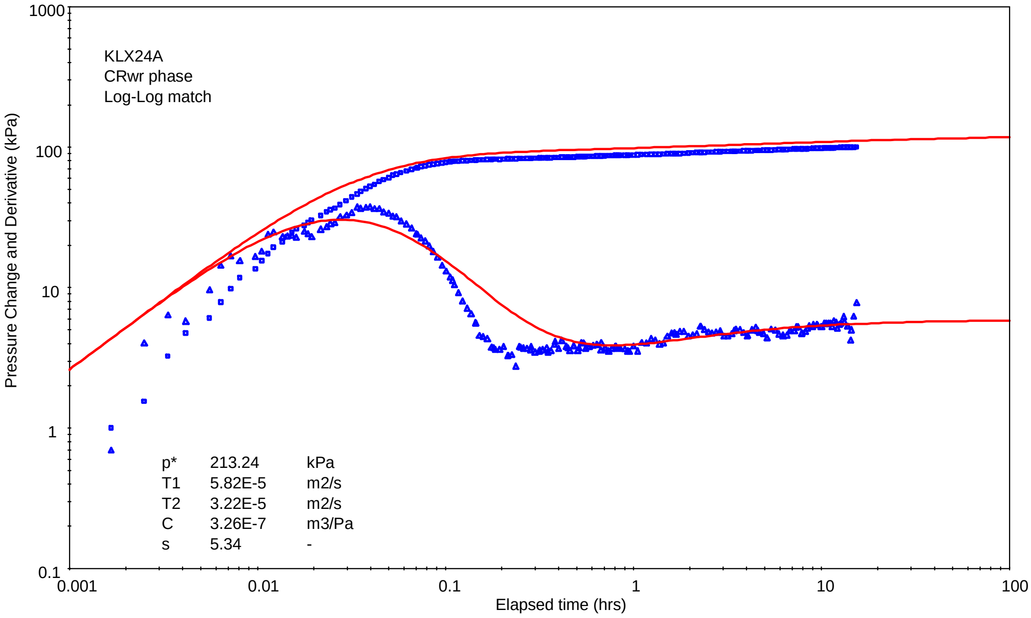
Analysis diagrams



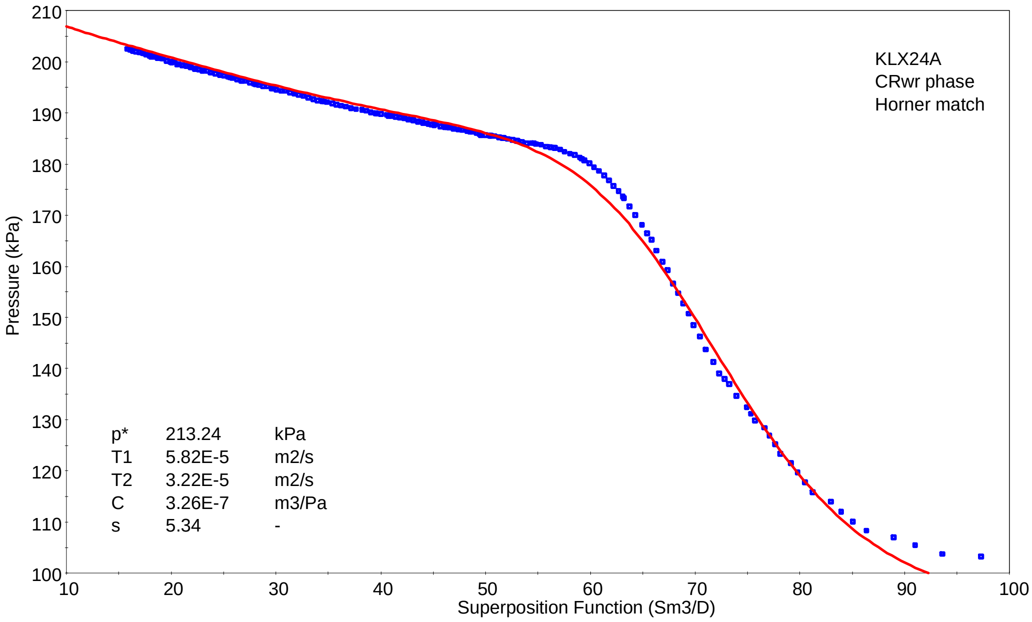
Pressure and flow rate vs. time; cartesian plot

Not analysable

CRw phase; log-log match



CRwr phase; log-log match

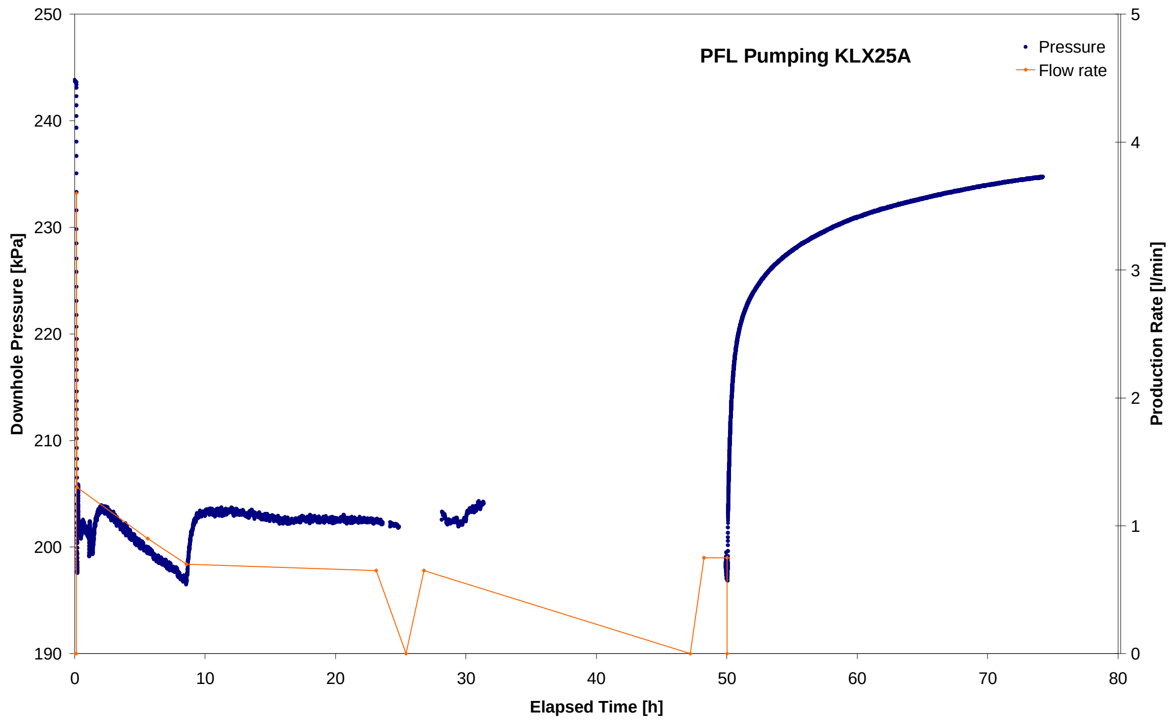


CRwr phase; HORNER match

APPENDIX 1-27

PFL Pumptest KLX25A

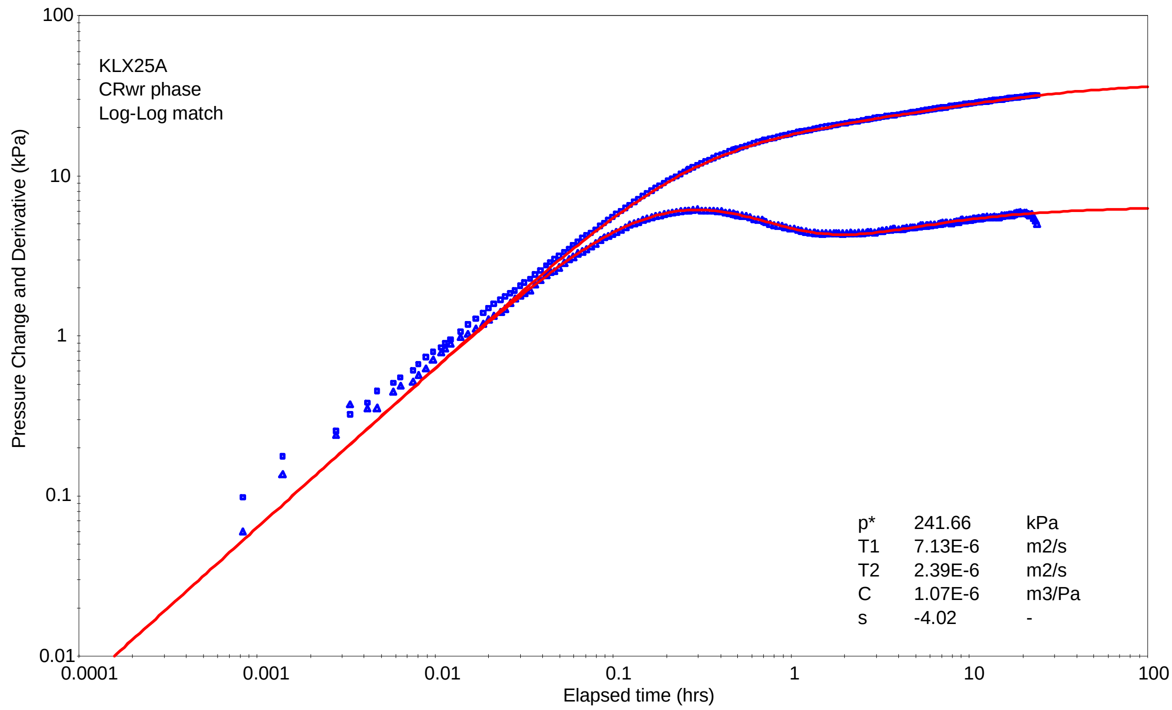
Analysis diagrams



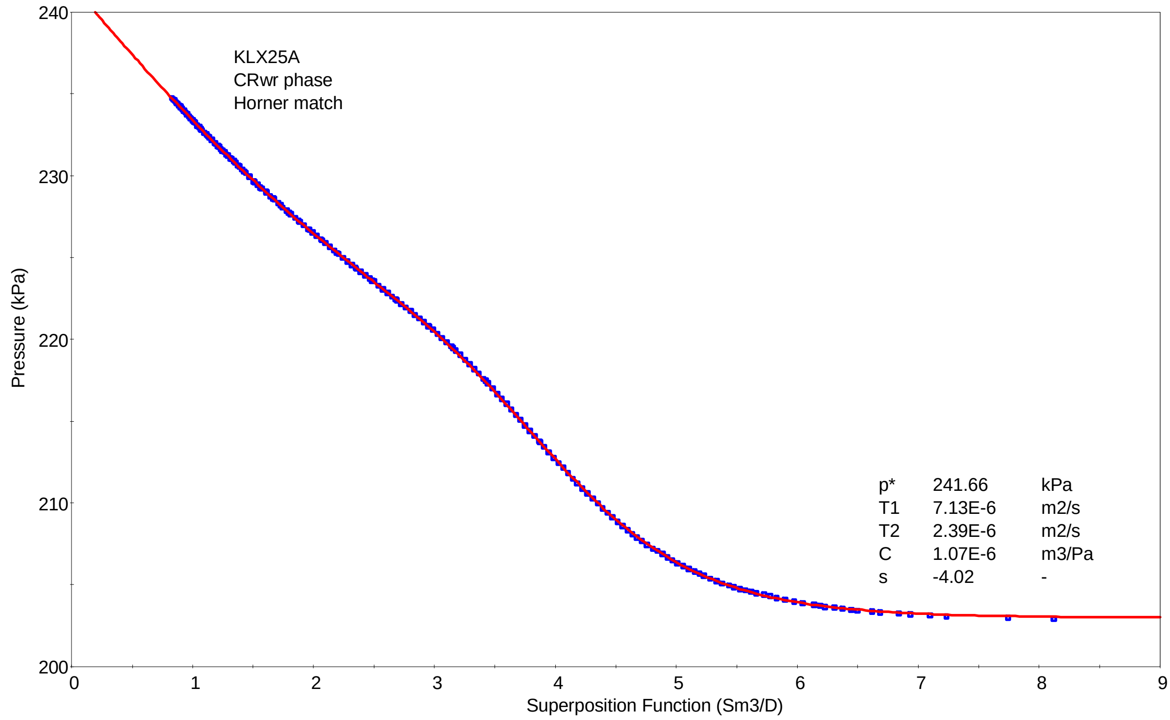
Pressure and flow rate vs. time; cartesian plot

Not analysable

CRw phase; log-log match



CRwr phase; log-log match

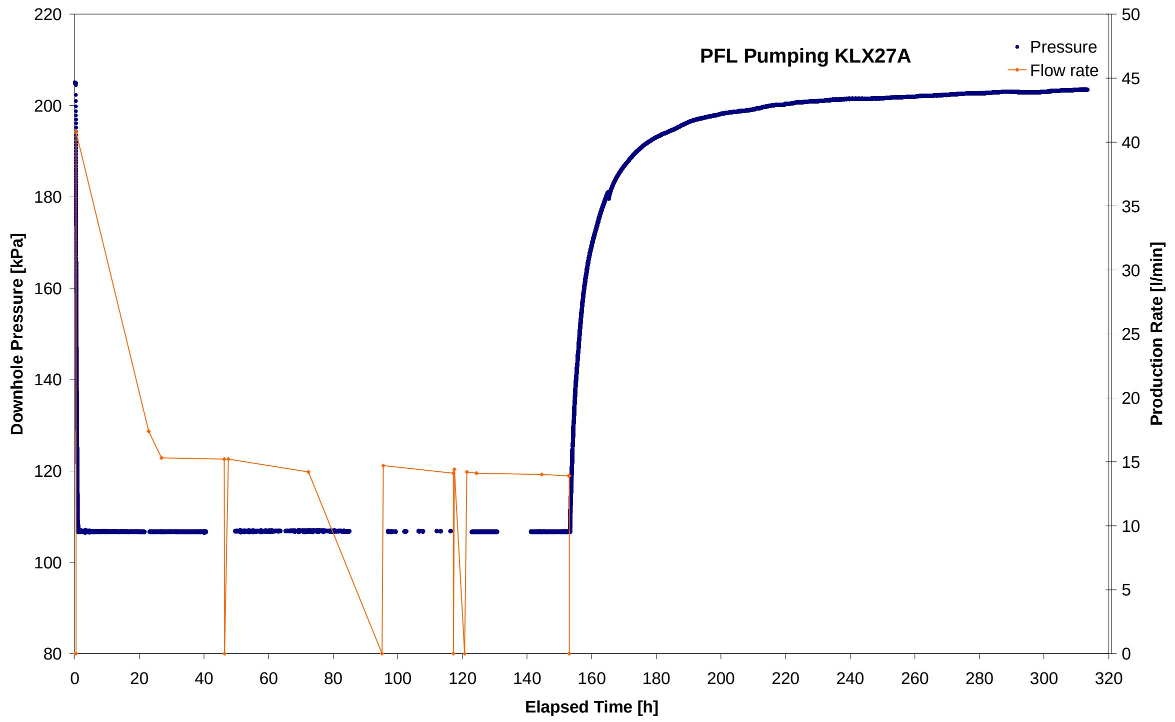


CRwr phase; HORNER match

APPENDIX 1-28

PFL Pumptest KLX27A

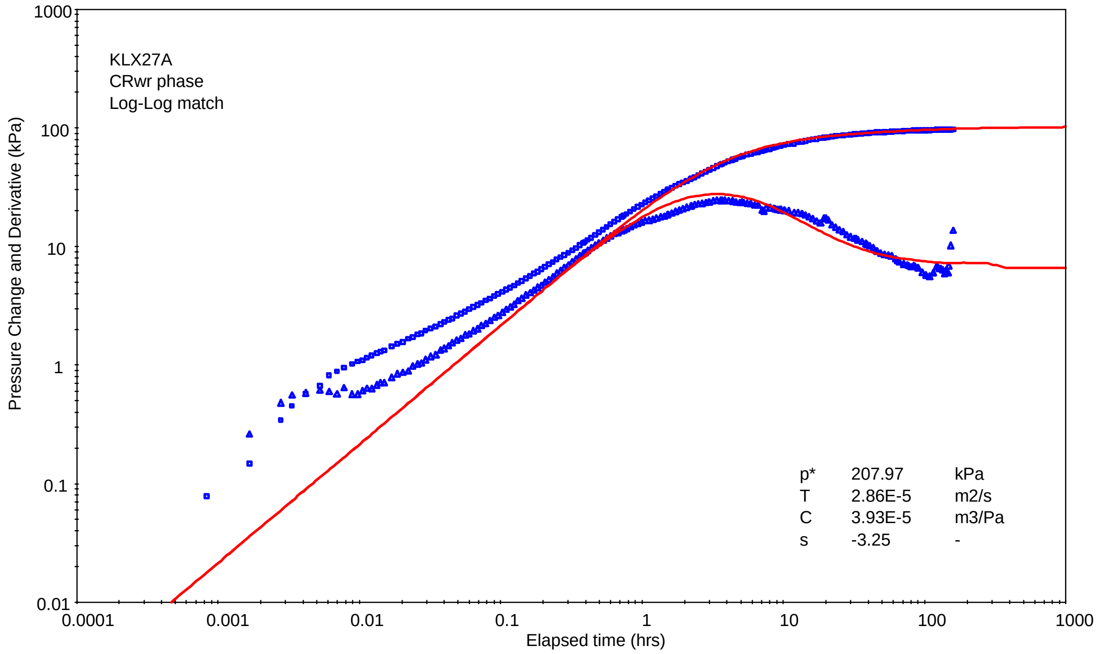
Analysis diagrams



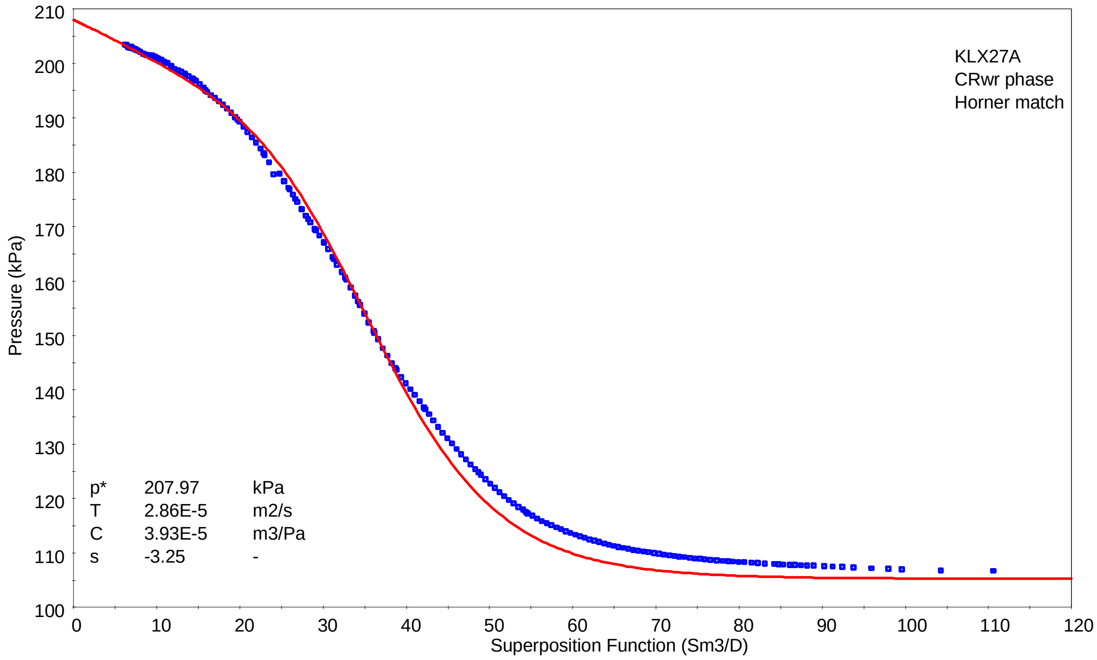
Pressure and flow rate vs. time; cartesian plot

Not analysable

CRw phase; log-log match



CRwr phase; log-log match

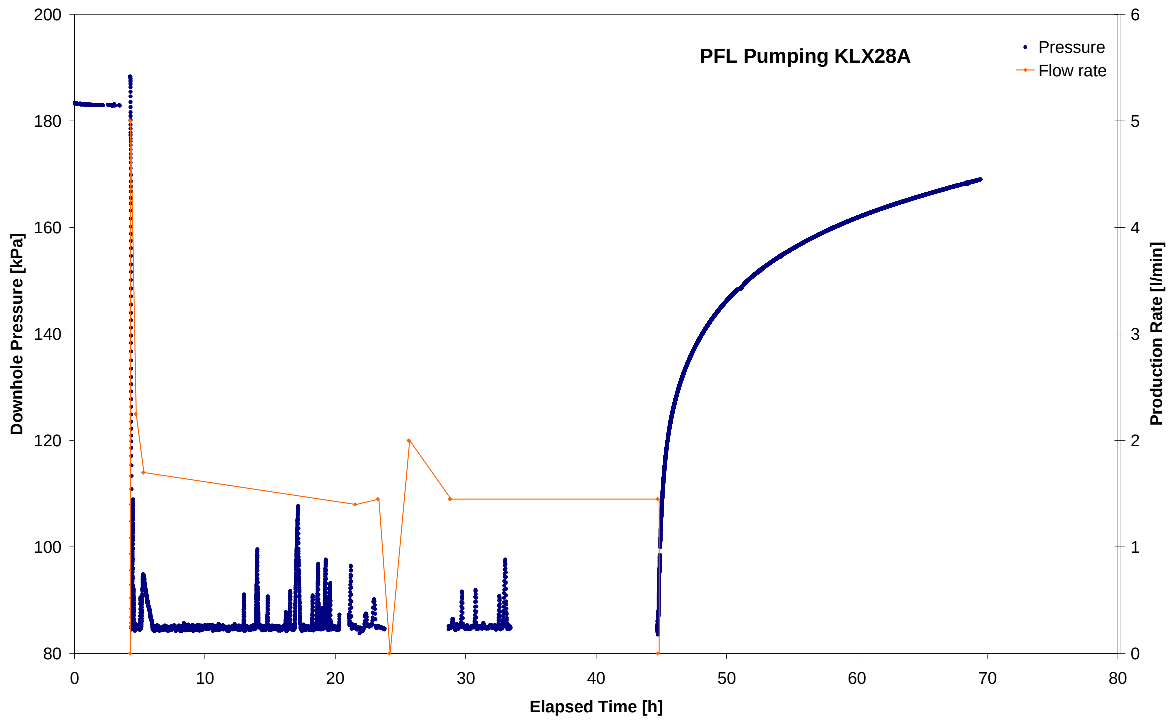


CRwr phase; HORNER match

APPENDIX 1-29

PFL Pumptest KLX28A

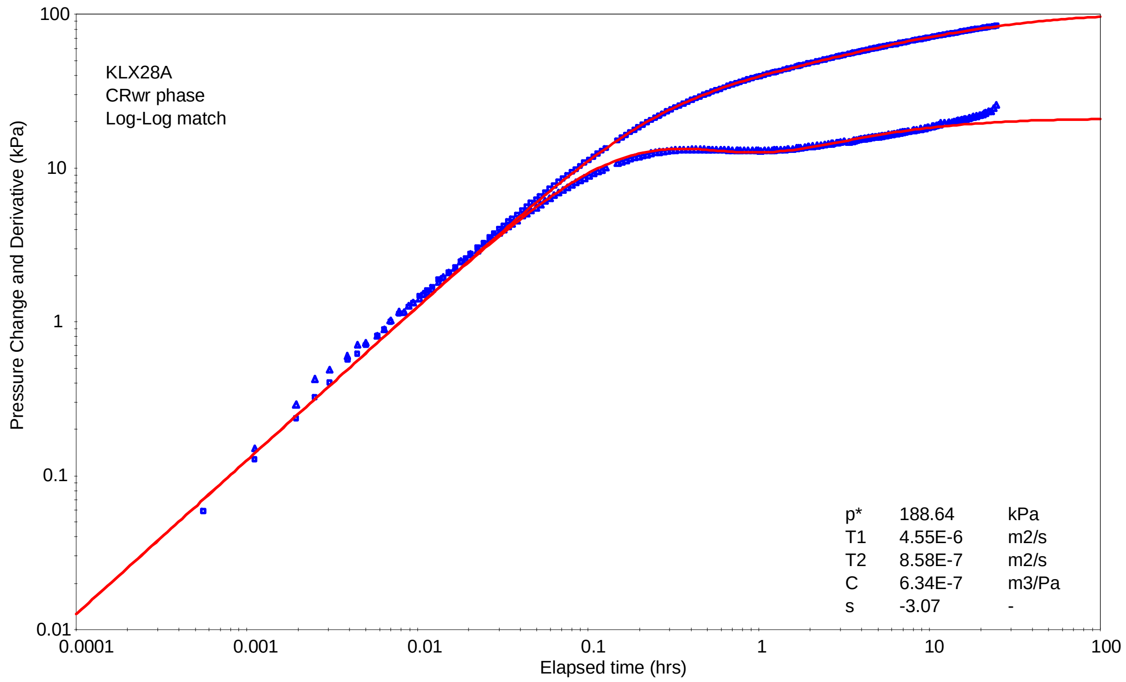
Analysis diagrams



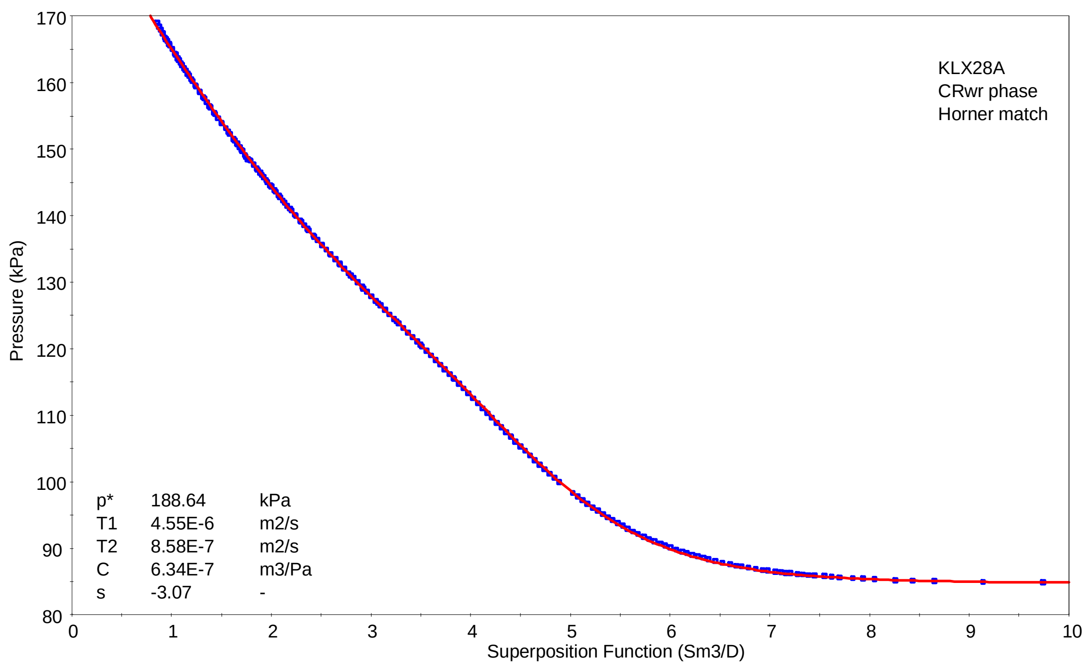
Pressure and flow rate vs. time; cartesian plot

Not analysable

CRw phase; log-log match



CRwr phase; log-log match

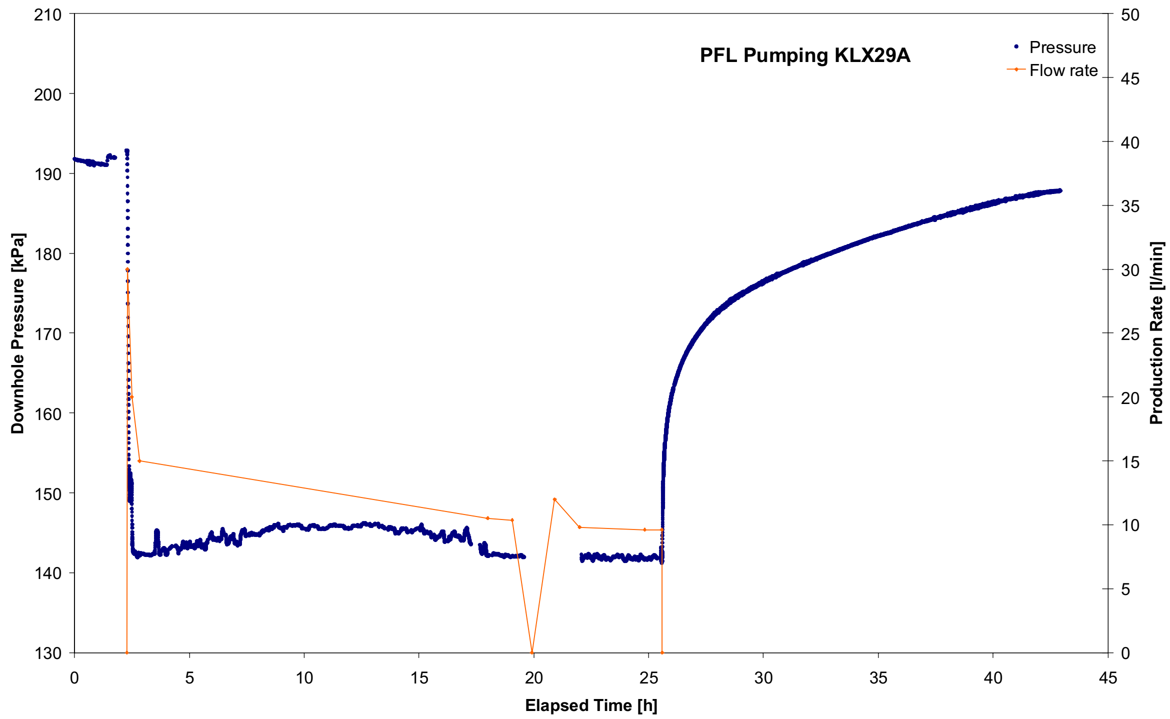


CRwr phase; HORNER match

APPENDIX 1-30

PFL Pumptest KLX29A

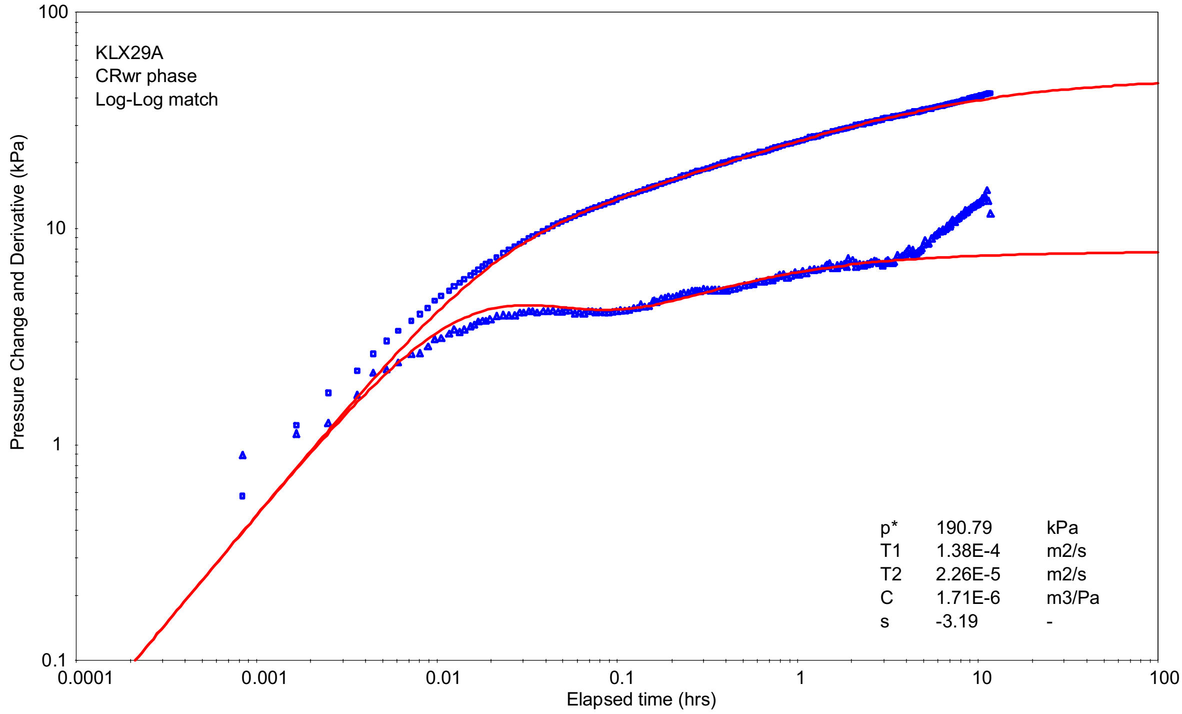
Analysis diagrams



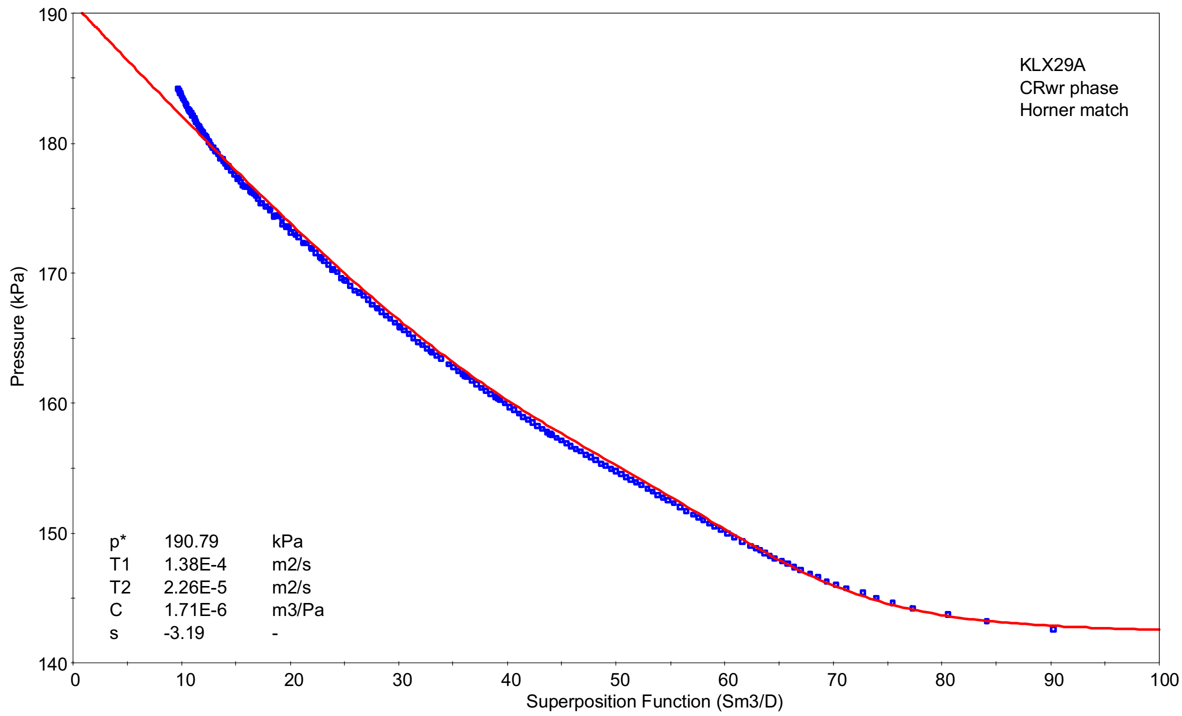
Pressure and flow rate vs. time; cartesian plot

Not analysable

CRw phase; log-log match



CRwr phase; log-log match

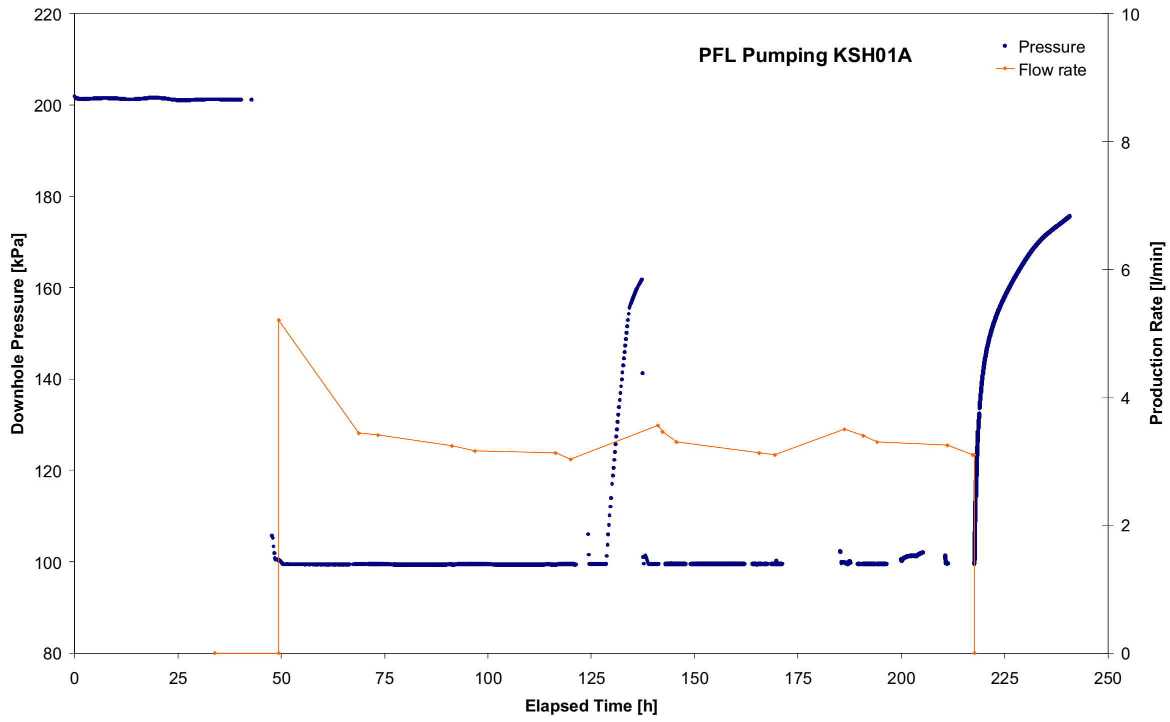


CRwr phase; HORNER match

APPENDIX 1-31

PFL Pumptest KSH01A

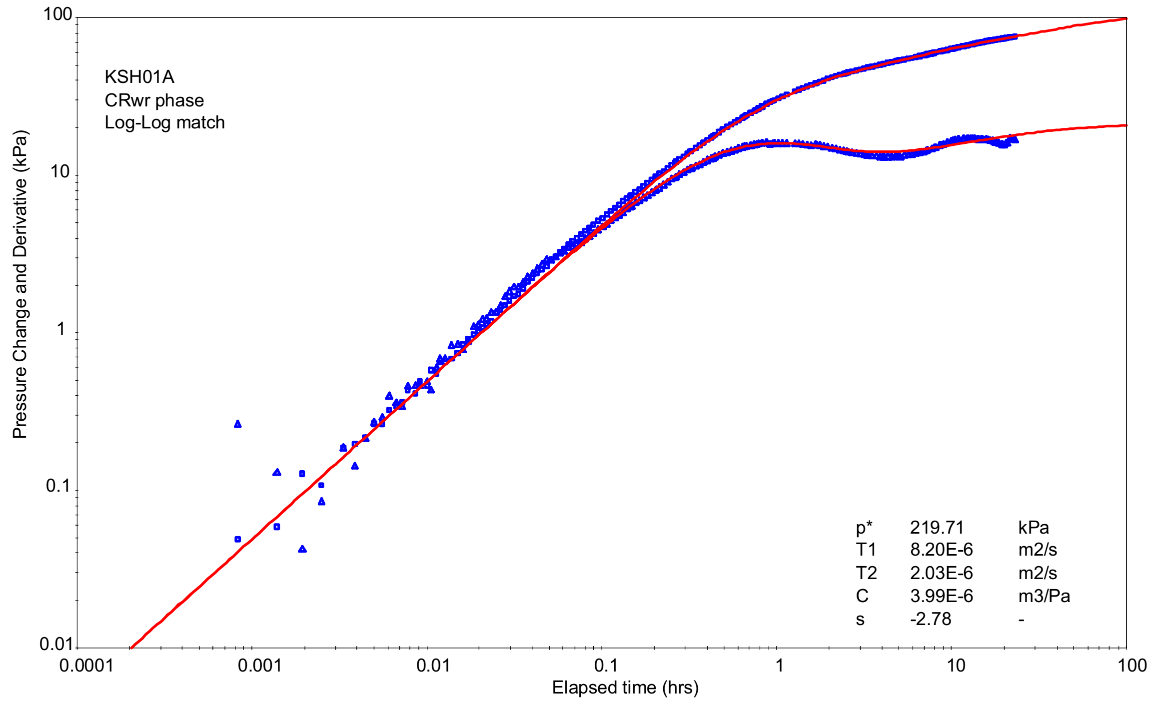
Analysis diagrams



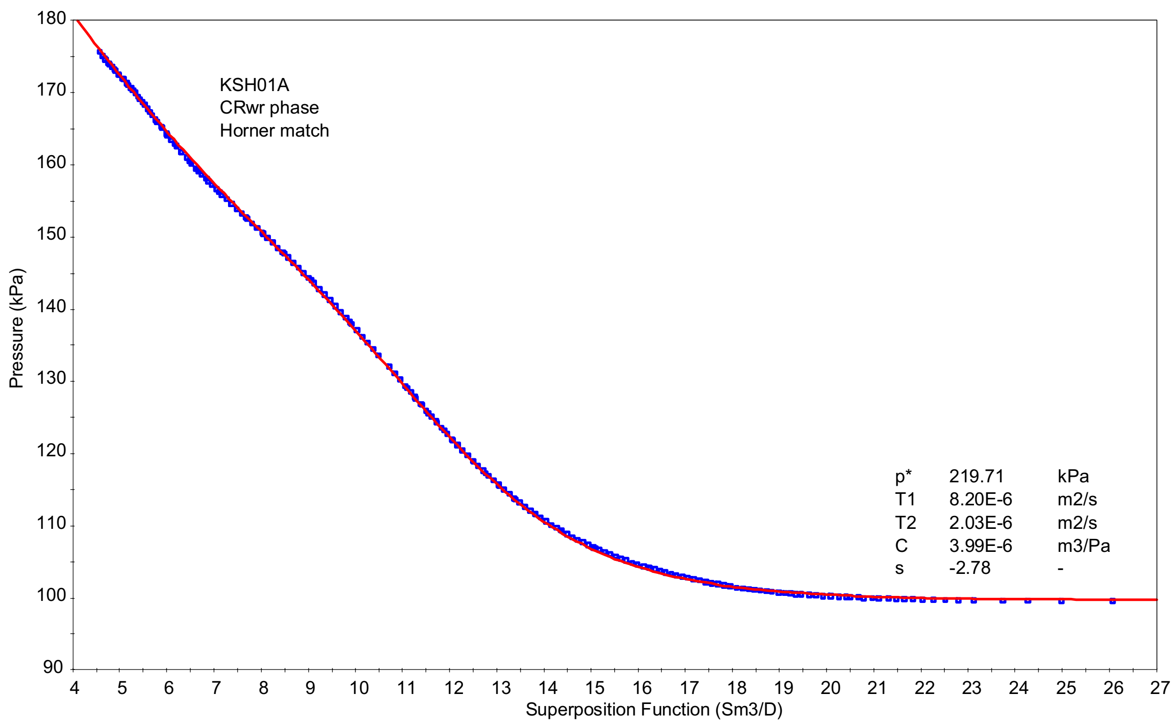
Pressure and flow rate vs. time; cartesian plot

Not analysable

CRw phase; log-log match



CRwr phase; log-log match

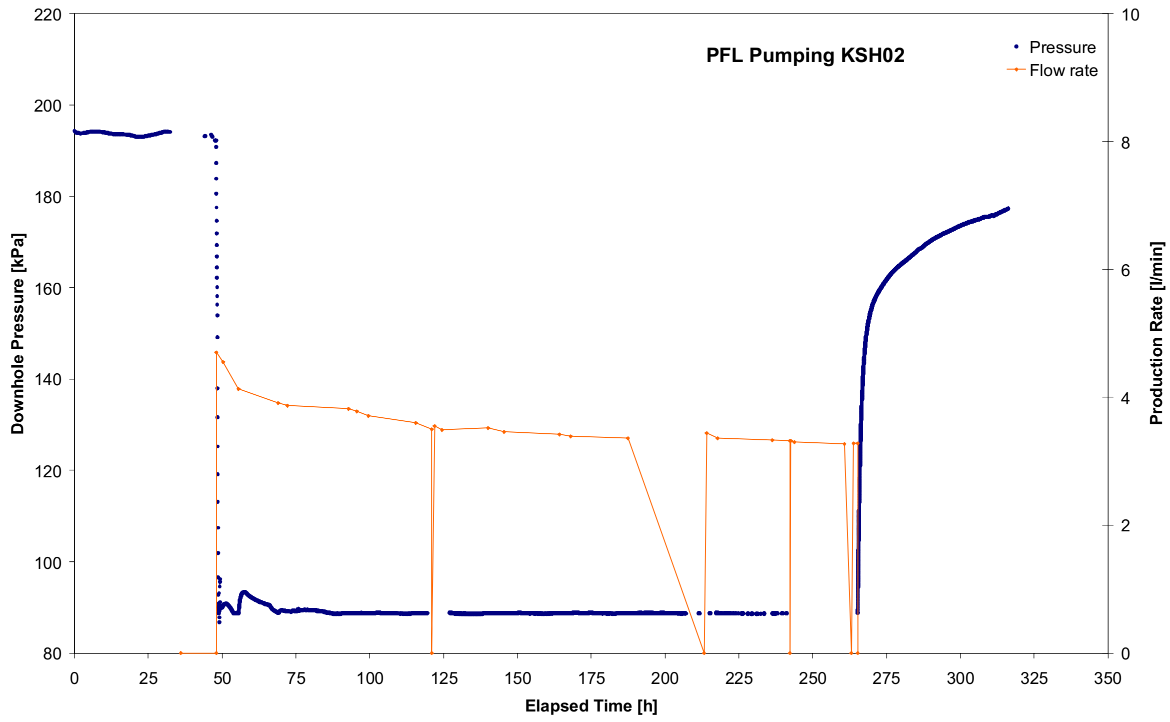


CRwr phase; HORNER match

APPENDIX 1-32

PFL Pumptest KSH02

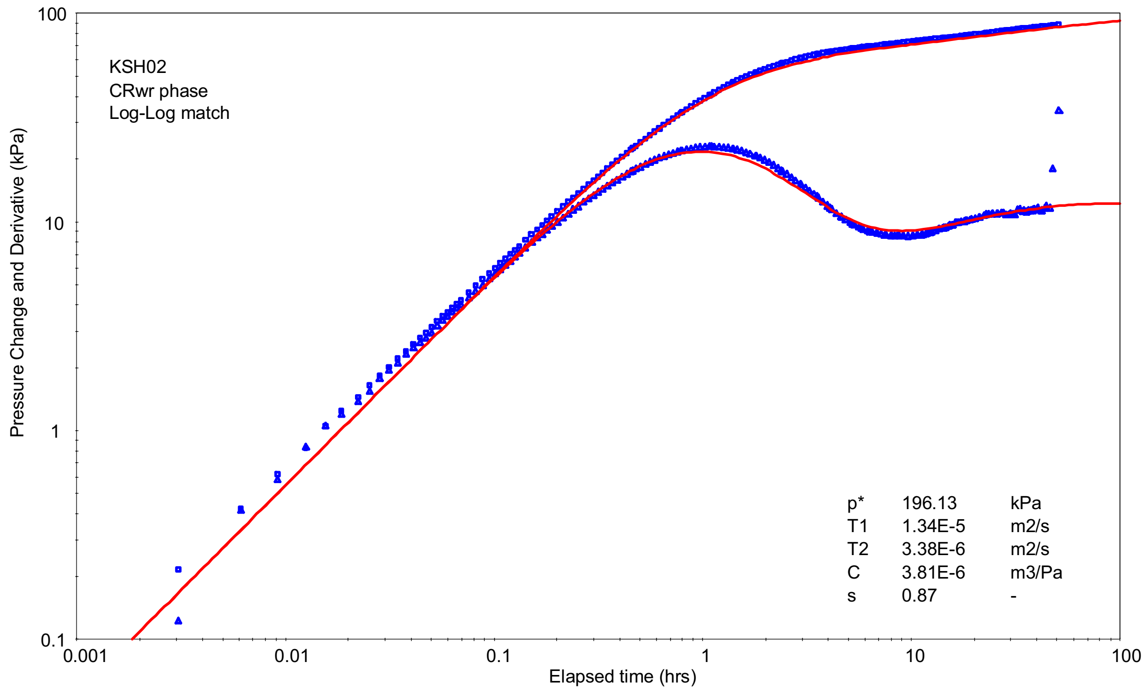
Analysis diagrams



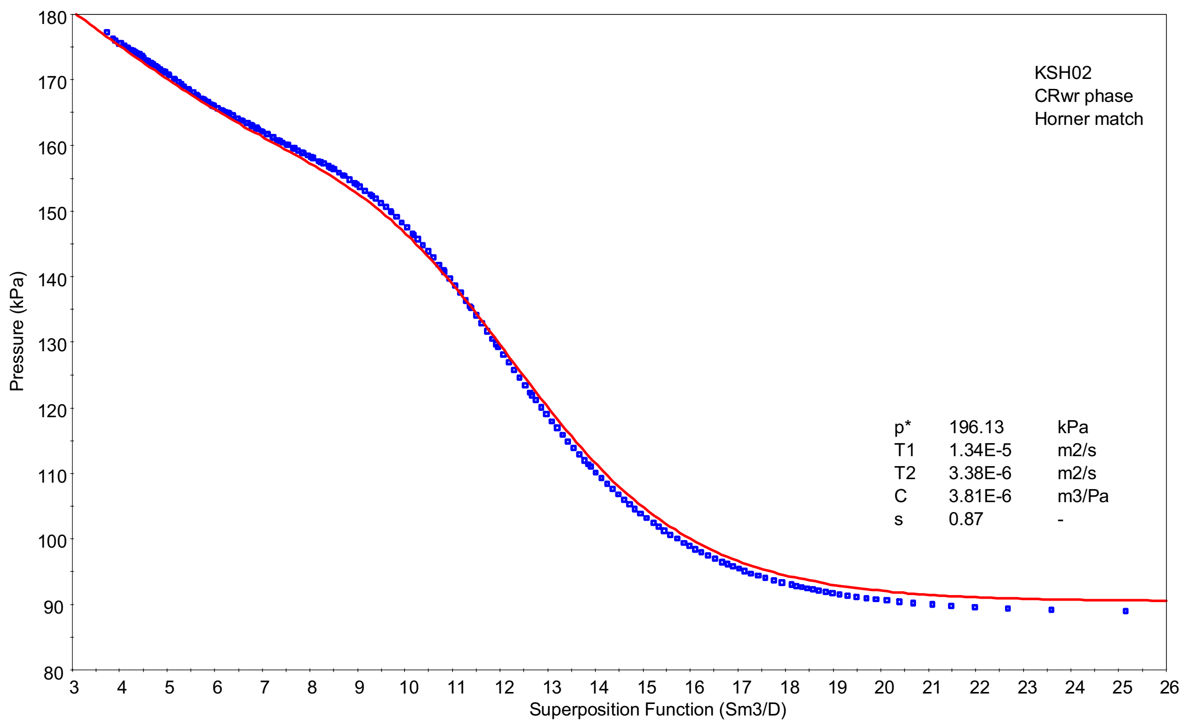
Pressure and flow rate vs. time; cartesian plot

Not analysable

CRw phase; log-log match



CRwr phase; log-log match



CRwr phase; HORNER match

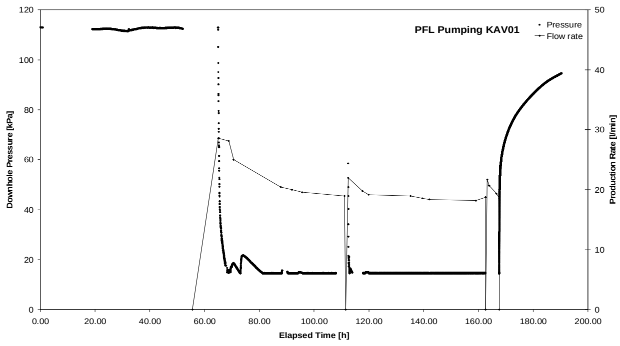
APPENDIX 2

Test Summary Sheets

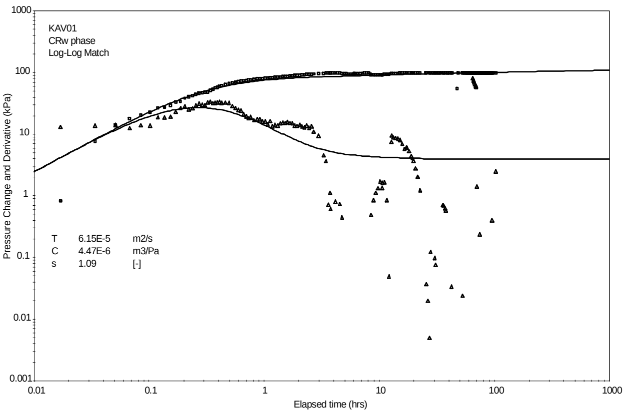
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CRwr
Area:	Laxemar	Test no:	1
Borehole ID:	KAV01	Test start:	18.02.2004 16:25
Test section from - to (m):	70.04 - 757.31	Responsible for test execution:	PFL Pumptest
Section diameter, $2 \cdot r_w$ (m):	0.16	Responsible for test evaluation:	Stephan Rohs

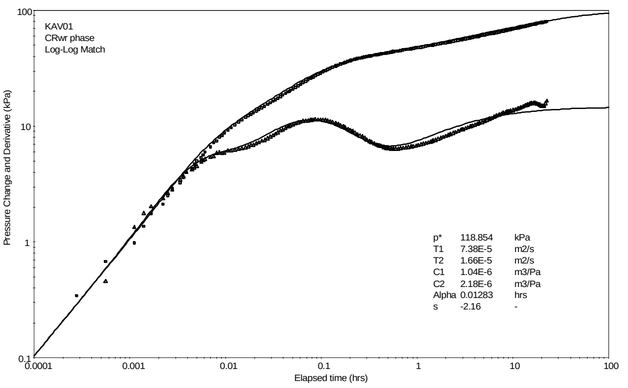
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
h_i (m asl) =	1.31		
h_p(m asl) =	-8.66	h_F (m asl) =	-0.55
Q_p (m^3/s)=	3.11E-04		
tp (s) =	369540	t_F (s) =	81882
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=			
Derivative fact.=	0.09	Derivative fact.=	0.12
Results		**Results**	
Q/s (m^2/s)=	3.1E-05		
T_M (m^2/s)=	4.6E-05		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	NA	dt_1 (min) =	24.60
dt_2 (min) =	NA	dt_2 (min) =	45.00
T (m^2/s) =	6.2E-05	T (m^2/s) =	7.4E-05
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	8.9E-08	K_s (m/s) =	1.1E-07
S_s (1/m) =	1.5E-09	S_s (1/m) =	1.5E-09
C (m^3/Pa) =	4.5E-06	C (m^3/Pa) =	2.2E-06
C_D (-) =	1.1E+02	C_D (-) =	5.5E+01
ξ (-) =	1.1	ξ (-) =	-2.2
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Selected representative parameters.

dt_1 (min) =	24.60	C (m^3/Pa) =	2.2E-06
dt_2 (min) =	45.00	C_D (-) =	2.4E+02
T_T (m^2/s) =	7.4E-05	ξ (-) =	-2.2
S (-) =	1.0E-06		
K_s (m/s) =	1.1E-07		
S_s (1/m) =	1.5E-09		

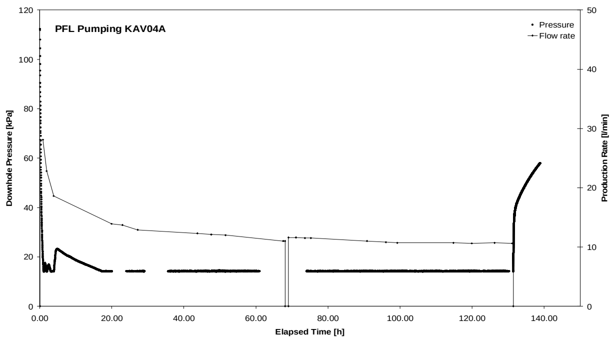
Comments:

The recommended transmissivity of 7.4E-5 m2/s was derived from the analysis of the CRwr phase (inner zone), which shows a better data and derivative quality. The confidence range for the transmissivity is estimated to be 1E-5 to 1E-4 m2/s (this range encompasses the outer zone transmissivity). The flow dimension displayed during the test is 2. The static ground water level was derived from the CRwr phase using straight line extrapolation in the Horner plot to a value of 1.92 m asl.

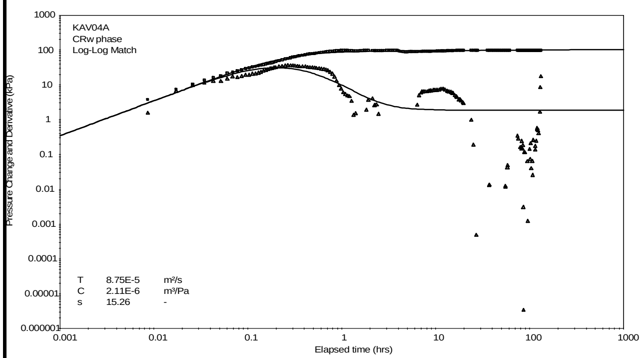
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CRwr
Area:	Laxemar	Test no:	1
Borehole ID:	KAV04A	Test start:	10.06.2004 12:24
Test section from - to (m):	100.95 - 1004.00	Responsible for test execution:	PFL Pumptest
Section diameter, 2·r_w (m):	0.2	Responsible for test evaluation:	Stephan Rohs

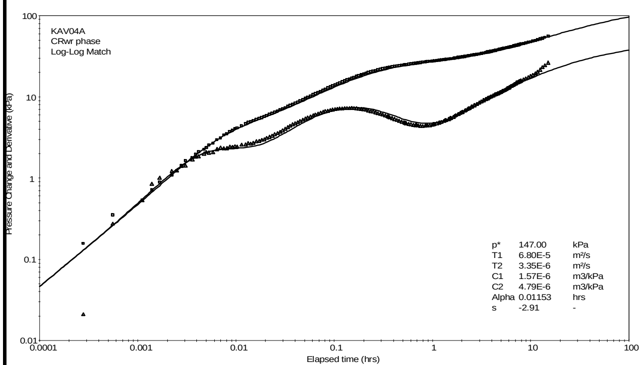
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
h_i (m asl) =	1.25		
h_p(m asl) =	-8.75	h_F (m asl) =	-4.29
Q_p (m^3/s)=	1.77E-04		
tp (s) =	472860	t_F (s) =	54324
S el S* (-)=	1.00E-06	S el S* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=			
Derivative fact.=	0.08	Derivative fact.=	0.13
Results		**Results**	
Q/s (m^2/s)=	1.8E-05		
T_M (m^2/s)=	2.6E-05		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	#NV	dt_1 (min) =	37.20
dt_2 (min) =	#NV	dt_2 (min) =	68.40
T (m^2/s) =	8.8E-05	T (m^2/s) =	6.8E-05
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	9.7E-08	K_s (m/s) =	7.5E-08
S_s (1/m) =	1.1E-09	S_s (1/m) =	1.1E-09
C (m^3/Pa) =	2.1E-06	C (m^3/Pa) =	4.8E-06
C_D (-) =	3.4E+01	C_D (-) =	7.6E+01
ξ (-) =	15.3	ξ (-) =	-2.9
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Selected representative parameters.

dt_1 (min) =	37.20	C (m^3/Pa) =	4.8E-06
dt_2 (min) =	68.40	C_D (-) =	5.3E+02
T_T (m^2/s) =	6.8E-05	ξ (-) =	-2.9
S (-) =	1.0E-06		
K_s (m/s) =	7.5E-08		
S_s (1/m) =	1.1E-09		

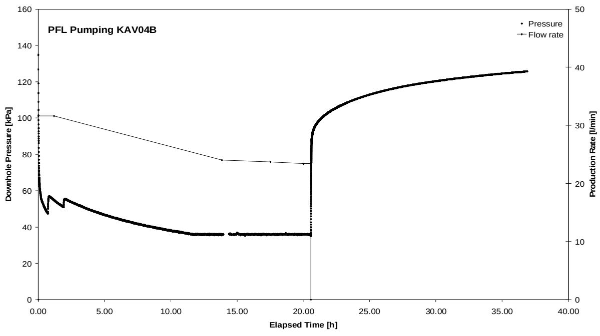
Comments:

The recommended transmissivity of 6.8E-5 m2/s was derived from the analysis of the CRwr phase (inner zone), which shows a better data and derivative quality. The confidence range for the transmissivity is estimated to be 1E-5 to 1E-4 m2/s. The flow dimension displayed during the test is 2. The static ground water level was derived from the CRwr phase using straight line extrapolation in the Horner plot to a value of 4.79 m asl.

Test Summary Sheet

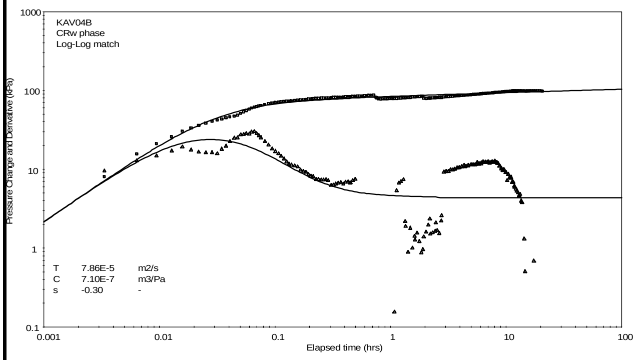
Project:	Oskarshamn site investigation	Test type:[1]	CRwr
Area:	Laxemar	Test no:	1
Borehole ID:	KAV04B	Test start:	16.06.2004 17:18
Test section from - to (m):	11.52 - 101.03	Responsible for test execution:	PFL Pumptest
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Stephan Rohs

Linear plot Q and p

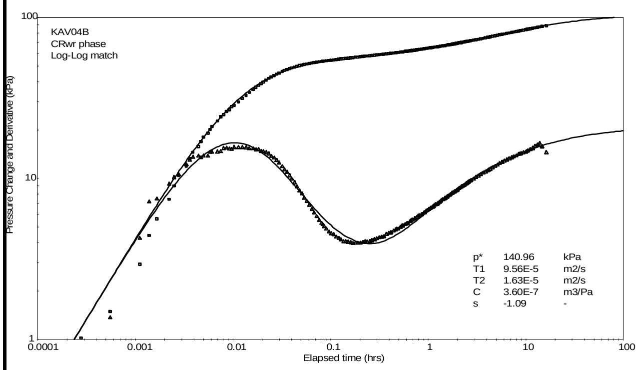


Flow period		Recovery period	
Indata		**Indata**	
h_i (m asl) =	3.55		
h_p(m asl) =	-6.56	h_F (m asl) =	2.61
Q_p (m^3/s)=	3.90E-04		
tp (s) =	74040	t_F (s) =	58726
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=			
Derivative fact.=	0.09	Derivative fact.=	0.13
Results		**Results**	
Q/s (m^2/s)=	3.9E-05		
T_M (m^2/s)=	5.0E-05		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	NA	dt_1 (min) =	7.80
dt_2 (min) =	NA	dt_2 (min) =	16.20
T (m^2/s) =	7.9E-05	T (m^2/s) =	9.6E-05
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	8.8E-07	K_s (m/s) =	1.1E-06
S_s (1/m) =	1.1E-08	S_s (1/m) =	1.1E-08
C (m^3/Pa) =	7.1E-07	C (m^3/Pa) =	3.6E-07
C_D (-) =	7.8E+01	C_D (-) =	4.0E+01
ξ (-) =	-0.3	ξ (-) =	-1.0
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	7.80	C (m^3/Pa) =	3.6E-07
dt_2 (min) =	16.20	C_D (-) =	4.0E+01
T_T (m^2/s) =	9.6E-05	ξ (-) =	-1.0
S (-) =	1.0E-06		
K_s (m/s) =	1.9E-05		
S_s (1/m) =	2.0E-07		

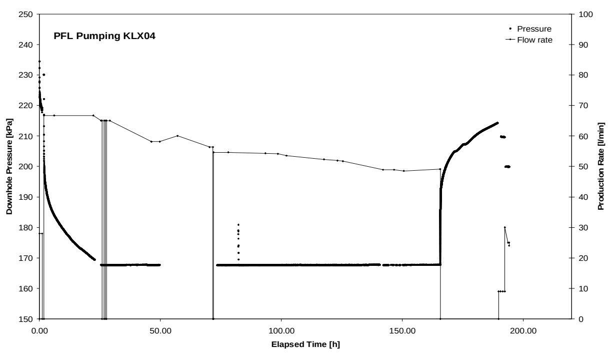
Comments:

The recommended transmissivity of 9.6E-5 m2/s was derived from the analysis of the CRwr phase (inner zone), which shows a horizontal stabilization. The confidence range for the transmissivity is estimated to be 1E-5 to 2E-4 m2/s (this range encompasses the outer zone transmissivity). The flow dimension displayed during the test is 2. The static ground water level was derived from the CRwr phase using straight line extrapolation in the Horner plot to a value of 4.18 m asl.

Test Summary Sheet

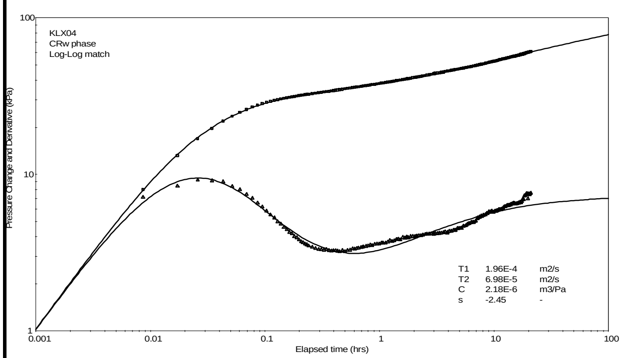
Project:	Oskarshamn site investigation	Test type:[1]	CRwr
Area:	Laxemar	Test no:	1
Borehole ID:	KLX04	Test start:	29.07.2004 09:56
Test section from - to (m):	101.43 - 993.49	Responsible for test execution:	PFL Pumptest
Section diameter, $2 \cdot r_w$ (m):	0.2	Responsible for test evaluation:	Stephan Rohs

Linear plot Q and p

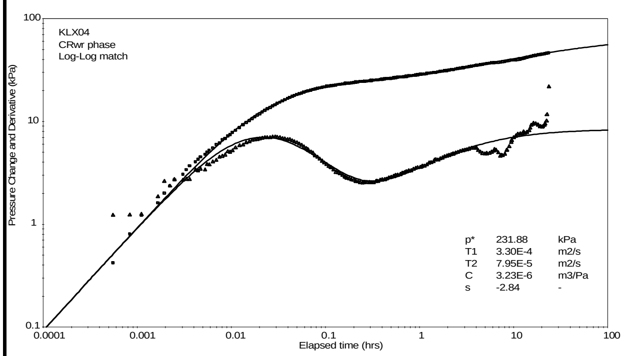


Flow period		Recovery period	
Indata		**Indata**	
h_i (m asl) =	13.66		
h_p(m asl) =	6.99	h_F (m asl) =	11.64
Q_p (m^3/s)=	8.18E-04		
tp (s) =	596340	t_F (s) =	85386
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=			
Derivative fact.=	0.15	Derivative fact.=	0.08
Results		**Results**	
Q/s (m^2/s)=	1.2E-04		
T_M (m^2/s)=	1.8E-04		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	19.20	dt_1 (min) =	12.60
dt_2 (min) =	35.40	dt_2 (min) =	20.40
T (m^2/s) =	2.0E-04	T (m^2/s) =	3.3E-04
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	2.2E-07	K_s (m/s) =	3.7E-07
S_s (1/m) =	1.1E-09	S_s (1/m) =	1.1E-09
C (m^3/Pa) =	2.2E-06	C (m^3/Pa) =	3.2E-06
C_D (-) =	3.5E+01	C_D (-) =	5.1E+01
ξ (-) =	-2.5	ξ (-) =	-2.8
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	12.60	C (m^3/Pa) =	3.2E-06
dt_2 (min) =	20.40	C_D (-) =	3.6E+02
T_T (m^2/s) =	3.3E-04	ξ (-) =	-2.8
S (-) =	1.0E-06		
K_s (m/s) =	3.7E-07		
S_s (1/m) =	1.1E-09		

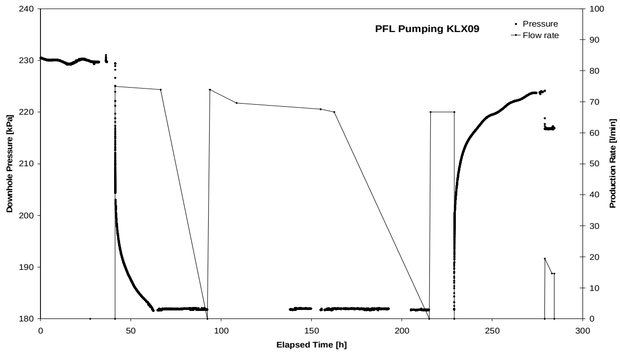
Comments:

The recommended transmissivity of 3.3E-4 m2/s was derived from the analysis of the CRwr phase (inner zone), which shows a slight better derivative quality. The confidence range for the transmissivity is estimated to be 5E-5 to 5E-4 m2/s (this range encompasses the outer zone transmissivities of both phases). The flow dimension displayed during the test is 2. The static ground water level was derived from the CRwr phase using straight line extrapolation in the Horner plot to a value of 13.44 m asl.

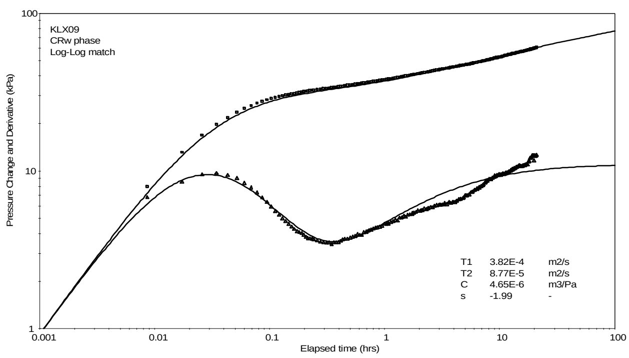
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CRwr
Area:	Laxemar	Test no:	1
Borehole ID:	KLX09	Test start:	11.05.2006 20:27
Test section from - to (m):	11.95 - 880.38	Responsible for test execution:	PFL Pumptest
Section diameter, $2 \cdot r_w$ (m):	0.2	Responsible for test evaluation:	Stephan Rohs

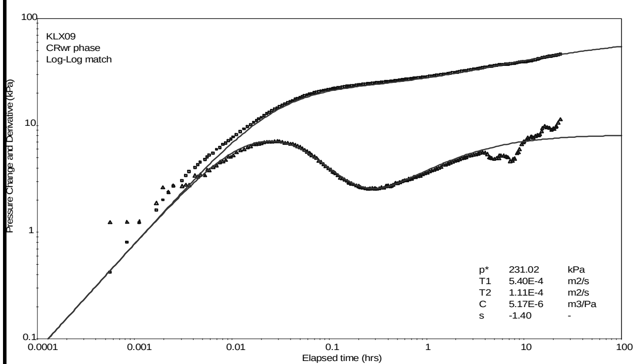
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
h_i (m asl) =	13.19		
h_p(m asl) =	8.34	h_F (m asl) =	13.30
Q_p (m^3/s)=	1.11E-03		
tp (s) =	675720	t_F (s) =	199126
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=			
Derivative fact.=	0.10	Derivative fact.=	0.08
Results		**Results**	
Q/s (m^2/s)=	2.3E-04		
T_M (m^2/s)=	3.4E-04		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	16.20	dt_1 (min) =	12.00
dt_2 (min) =	23.40	dt_2 (min) =	22.20
T (m^2/s) =	3.8E-04	T (m^2/s) =	5.4E-04
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	4.9E-07	K_s (m/s) =	6.9E-07
S_s (1/m) =	1.3E-09	S_s (1/m) =	1.3E-09
C (m^3/Pa) =	4.7E-06	C (m^3/Pa) =	5.2E-06
C_D (-) =	7.4E+01	C_D (-) =	8.2E+01
ξ (-) =	-2.0	ξ (-) =	-1.4
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Selected representative parameters.

dt_1 (min) =	12.00	C (m^3/Pa) =	5.2E-06
dt_2 (min) =	22.20	C_D (-) =	5.7E+02
T_T (m^2/s) =	5.4E-04	ξ (-) =	-1.4
S (-) =	1.0E-06		
K_s (m/s) =	6.9E-07		
S_s (1/m) =	1.3E-09		

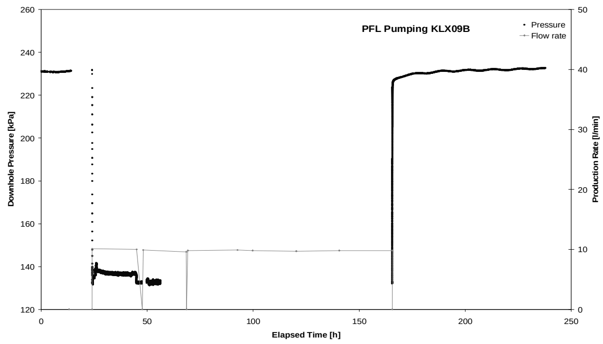
Comments:

The recommended transmissivity of 5.4E-4 m2/s was derived from the analysis of the CRwr phase (inner zone), which shows a slight better derivative quality. The confidence range for the transmissivity is estimated to be 1E-4 to 8E-4 m2. The flow dimension displayed during the test is 2. The static ground water level was derived from the CRwr phase using straight line extrapolation in the Horner plot to a value of 13.36 m asl.

Test Summary Sheet

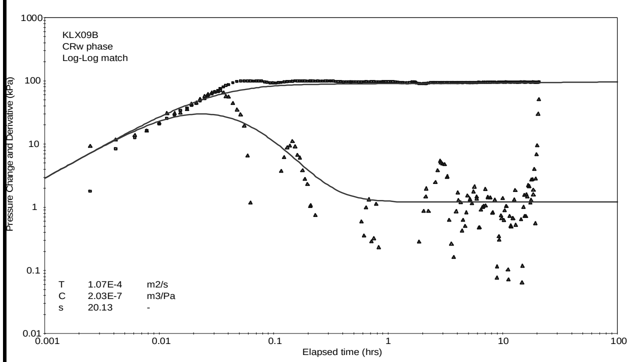
Project:	Oskarshamn site investigation	Test type:[1]	CRwr
Area:	Laxemar	Test no:	1
Borehole ID:	KLX09B	Test start:	21.02.2006 10:45
Test section from - to (m):	10.74 - 100.22	Responsible for test execution:	PFL Pumptest
Section diameter, $2 \cdot r_w$ (m):	0.077	Responsible for test evaluation:	Stephan Rohs

Linear plot Q and p

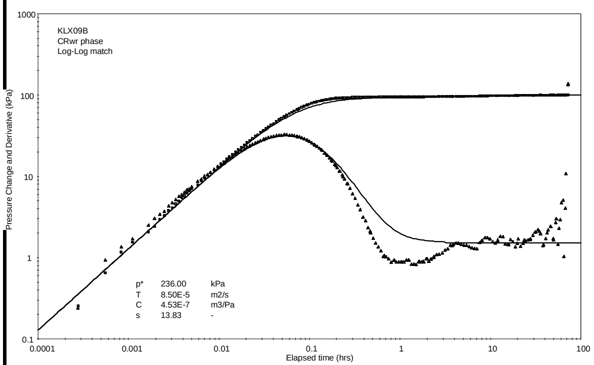


Flow period		**Recovery period**	
Indata		**Indata**	
h_i (m asl) =	13.42		
h_p(m asl) =	3.32	h_F (m asl) =	13.53
Q_p (m^3/s)=	1.63E-04		
tp (s) =	509280	t_F (s) =	259916
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=			
Derivative fact.=	0.08	Derivative fact.=	0.15
Results		**Results**	
Q/s (m^2/s)=	1.6E-05		
T_M (m^2/s)=	2.1E-05		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	44.40	dt_1 (min) =	NA
dt_2 (min) =	996.00	dt_2 (min) =	NA
T (m^2/s) =	1.1E-04	T (m^2/s) =	8.5E-05
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	1.2E-06	K_s (m/s) =	9.5E-07
S_s (1/m) =	1.1E-08	S_s (1/m) =	1.1E-08
C (m^3/Pa) =	2.0E-07	C (m^3/Pa) =	4.5E-07
C_D (-) =	2.2E+01	C_D (-) =	4.9E+01
ξ (-) =	20.1	ξ (-) =	13.8
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	NA	C (m^3/Pa) =	4.5E-07
dt_2 (min) =	NA	C_D (-) =	5.0E+01
T_T (m^2/s) =	8.5E-05	ξ (-) =	13.8
S (-) =	1.0E-06		
K_s (m/s) =	9.5E-07		
S_s (1/m) =	1.1E-08		

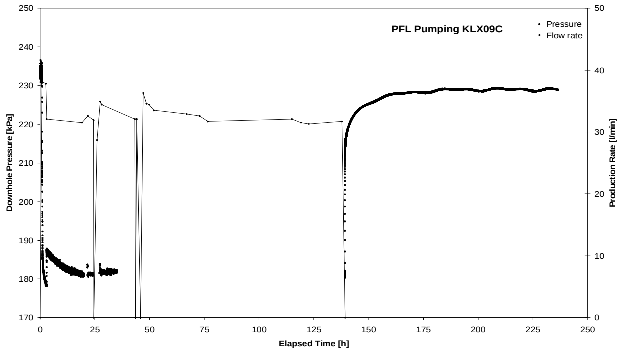
Comments:

The recommended transmissivity of 8.5E-5 m2/s was derived from the analysis of the CRwr phase. The confidence range for the transmissivity is estimated to be 1E-5 to 1E-4 m2/s. A flow dimension of 2 was assumed. The static ground water level was derived from the CRwr phase using straight line extrapolation in the Horner plot to a value of 13.86 m asl.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CRwr
Area:	Laxemar	Test no:	1
Borehole ID:	KLX09C	Test start:	03.03.2006 13:33
Test section from - to (m):	9.00 - 120.05	Responsible for test execution:	PFL Pumptest
Section diameter, $2 \cdot r_w$ (m):	0.077	Responsible for test evaluation:	Stephan Rohs

Linear plot Q and p

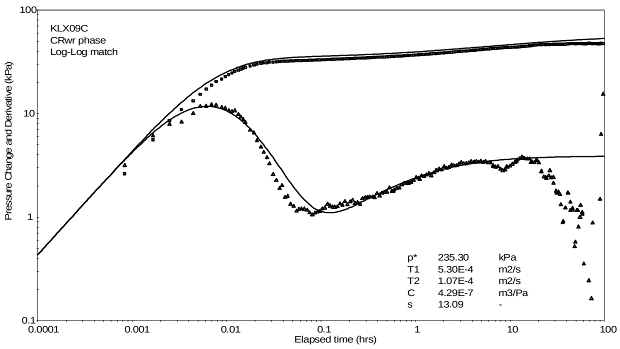


Flow period		**Recovery period**	
Indata		**Indata**	
h_i (m asl) =	13.52		
h_p(m asl) =	8.32	h_F (m asl) =	13.14
Q_p (m^3/s)=	5.28E-04		
tp (s) =	497760	t_F (s) =	350719
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=			
Derivative fact.=	NA	Derivative fact.=	0.07
Results		**Results**	
Q/s (m^2/s)=	1.0E-04		
T_M (m^2/s)=	1.3E-04		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	NA	dt_1 (min) =	3.60
dt_2 (min) =	NA	dt_2 (min) =	7.20
T (m^2/s) =	NA	T (m^2/s) =	5.3E-04
S (-) =	NA	S (-) =	1.0E-06
K_s (m/s) =	NA	K_s (m/s) =	4.8E-06
S_s (1/m) =	NA	S_s (1/m) =	9.0E-09
C (m^3/Pa) =	NA	C (m^3/Pa) =	4.3E-07
C_D (-) =	NA	C_D (-) =	4.6E+01
ξ (-) =	NA	ξ (-) =	13.1
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Log-Log plot incl. derivates- flow period

Not analysable

Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	3.60	C (m^3/Pa) =	4.3E-07
dt_2 (min) =	7.20	C_D (-) =	4.7E+01
T_T (m^2/s) =	5.3E-04	ξ (-) =	13.1
S (-) =	1.0E-06		
K_s (m/s) =	4.8E-06		
S_s (1/m) =	9.0E-09		

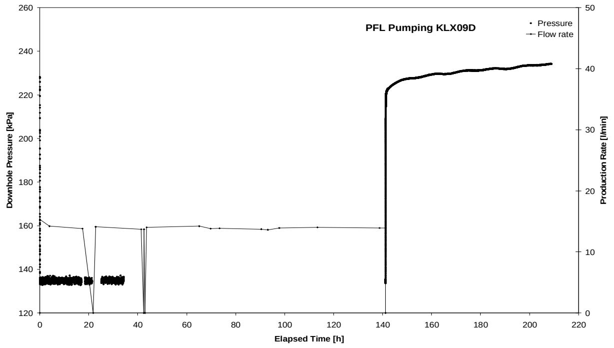
Comments:

The recommended transmissivity of 5.3E-4 m2/s was derived from the analysis of the CRwr phase. The confidence range for the transmissivity is estimated to be 1E-4 to 7E-4 m2/s. The flow dimension displayed during the test is 2. The static ground water level was derived from the CRwr phase using straight line extrapolation in the Horner plot to a value of 13.79 m asl.

Test Summary Sheet

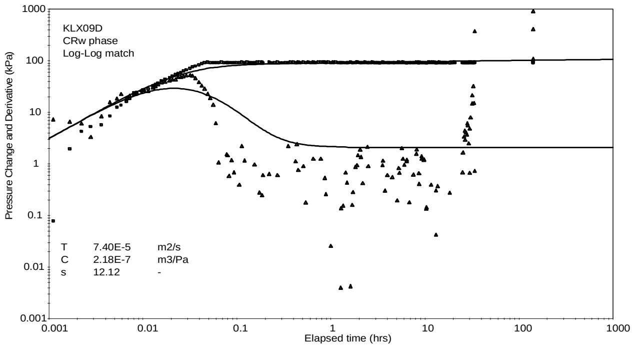
Project:	Oskarshamn site investigation	Test type:[1]	CRwr
Area:	Laxemar	Test no:	1
Borehole ID:	KLX09D	Test start:	22.03.2006 14:33
Test section from - to (m):	9.75 - 121.02	Responsible for test execution:	PFL Pumptest
Section diameter, $2 \cdot r_w$ (m):	0.077	Responsible for test evaluation:	Stephan Rohs

Linear plot Q and p

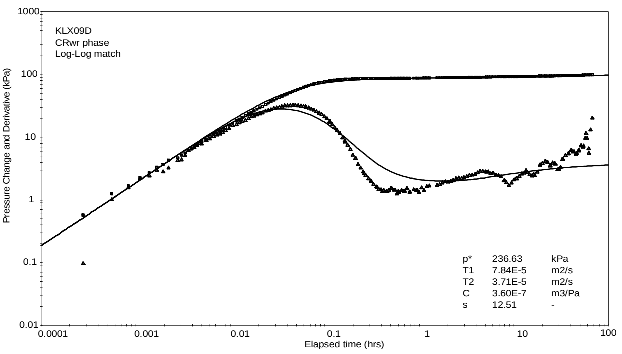


Flow period		Recovery period	
Indata		**Indata**	
h_i (m asl) =	13.03		
h_p(m asl) =	3.53	h_F (m asl) =	13.68
Q_p (m^3/s)=	2.32E-04		
tp (s) =	508020	t_F (s) =	243941
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=			
Derivative fact.=	0.07	Derivative fact.=	0.07
Results		**Results**	
Q/s (m^2/s)=	2.4E-05		
T_M (m^2/s)=	3.2E-05		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	NA	dt_1 (min) =	23.40
dt_2 (min) =	NA	dt_2 (min) =	63.00
T (m^2/s) =	7.4E-05	T (m^2/s) =	7.8E-05
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	6.6E-07	K_s (m/s) =	7.0E-07
S_s (1/m) =	9.0E-09	S_s (1/m) =	9.0E-09
C (m^3/Pa) =	2.2E-07	C (m^3/Pa) =	3.6E-07
C_D (-) =	2.3E+01	C_D (-) =	3.9E+01
ξ (-) =	12.1	ξ (-) =	12.5
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	23.40	C (m^3/Pa) =	3.6E-07
dt_2 (min) =	63.00	C_D (-) =	4.0E+01
T_T (m^2/s) =	7.8E-05	ξ (-) =	12.5
S (-) =	1.0E-06		
K_s (m/s) =	7.0E-07		
S_s (1/m) =	9.0E-09		

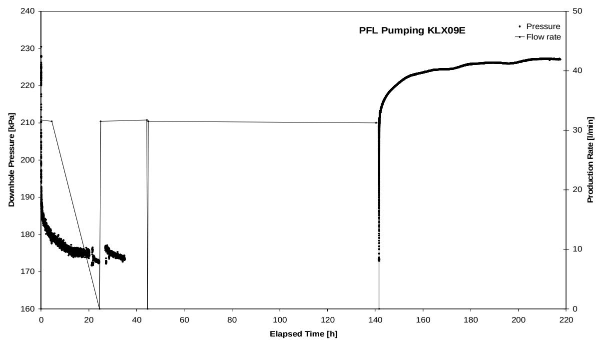
Comments:

The recommended transmissivity of 7.8E-5 m2/s was derived from the analysis of the CRwr phase (inner zone), which shows the best data and derivative quality. The confidence range for the transmissivity is estimated to be 2E-5 to 1E-4 m2/s (this range includes the transmissivity of the outer zone). The flow dimension during the test is 2. The static ground water level was derived from the CRwr phase using straight line extrapolation in the Horner plot to a value of 13.93 m asl.

Test Summary Sheet

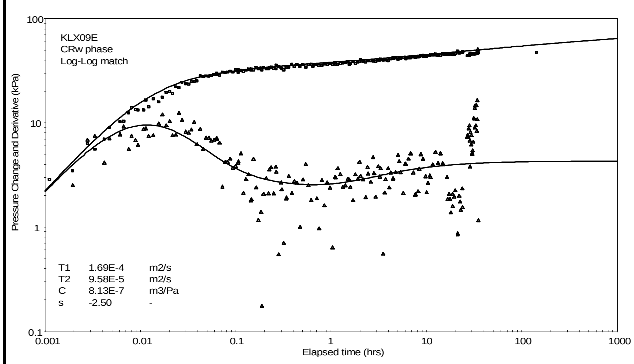
Project:	Oskarshamn site investigation	Test type:[1]	CRwr
Area:	Laxemar	Test no:	1
Borehole ID:	KLX09E	Test start:	13.03.2006 11:10
Test section from - to (m):	9.00 - 120.00	Responsible for test execution:	PFL Pumptest
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Stephan Rohs

Linear plot Q and p

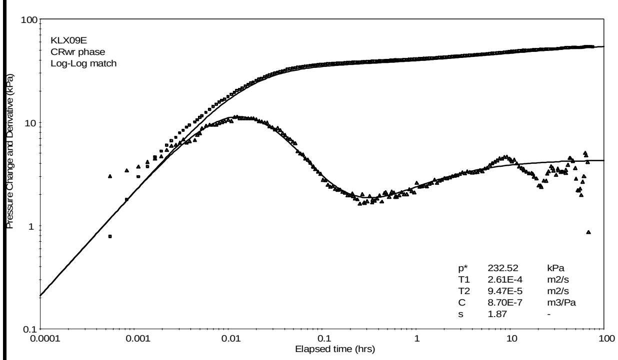


Flow period		Recovery period	
Indata		**Indata**	
h_i (m asl) =	13.03		
h_p(m asl) =	7.53	h_F (m asl) =	12.94
Q_p (m^3/s)=	5.21E-04		
tp (s) =	509700	t_F (s) =	273120
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=			
Derivative fact.=	0.10	Derivative fact.=	0.05
Results		**Results**	
Q/s (m^2/s)=	9.5E-05		
T_M (m^2/s)=	1.2E-04		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	16.20	dt_1 (min) =	12.60
dt_2 (min) =	49.20	dt_2 (min) =	28.80
T (m^2/s) =	1.7E-04	T (m^2/s) =	2.6E-04
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	1.5E-06	K_s (m/s) =	2.4E-06
S_s (1/m) =	9.0E-09	S_s (1/m) =	9.0E-09
C (m^3/Pa) =	8.1E-07	C (m^3/Pa) =	8.7E-07
C_D (-) =	9.0E+01	C_D (-) =	9.6E+01
ξ (-) =	-2.5	ξ (-) =	1.9
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	12.60	C (m^3/Pa) =	8.7E-07
dt_2 (min) =	28.80	C_D (-) =	9.6E+01
T_T (m^2/s) =	2.6E-04	ξ (-) =	1.9
S (-) =	1.0E-06		
K_s (m/s) =	2.4E-06		
S_s (1/m) =	9.0E-09		

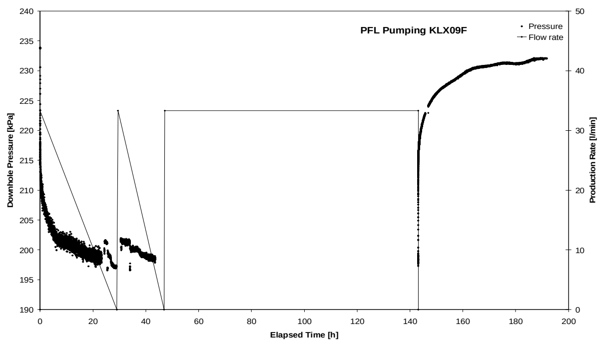
Comments:

The recommended transmissivity of 2.6E-4 m2/s was derived from the analysis of the CRwr phase (inner zone), which shows a better derivative quality. The confidence range for the transmissivity is estimated to be 9E-5 to 4E-4 m2/s (this range encompasses the outer zone transmissivities of both phases). The flow dimension displayed during the test is 2. The static ground water level was derived from the CRwr phase using straight line extrapolation in the Horner plot to a value of 13.51 m asl.

Test Summary Sheet

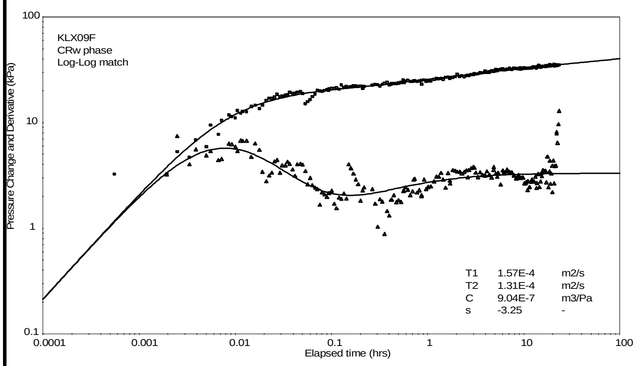
Project:	Oskarshamn site investigation	Test type:[1]	CRwr
Area:	Laxemar	Test no:	1
Borehole ID:	KLX09F	Test start:	31.03.2006 09:11
Test section from - to (m):	9.00 - 152.30	Responsible for test execution:	PFL Pumptest
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Stephan Rohs

Linear plot Q and p

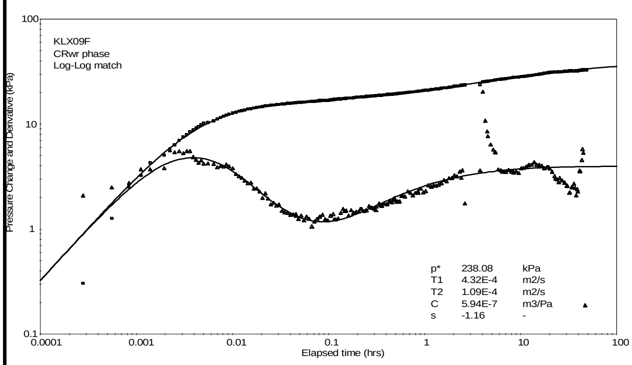


Flow period		Recovery period	
Indata		**Indata**	
h_i (m asl) =	13.64		
h_p (m asl) =	10.02	h_F (m asl) =	13.46
Q_p (m^3/s)=	5.55E-04		
tp (s) =	515220	t_F (s) =	175020
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=			
Derivative fact.=	0.20	Derivative fact.=	0.07
Results		**Results**	
Q/s (m^2/s)=	1.5E-04		
T_M (m^2/s)=	2.1E-04		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	6.60	dt_1 (min) =	3.00
dt_2 (min) =	16.80	dt_2 (min) =	7.80
T (m^2/s) =	2.6E-04	T (m^2/s) =	4.3E-04
S (-) =	1.0E-06	S (-) =	1.1E-04
K_s (m/s) =	1.8E-06	K_s (m/s) =	3.0E-06
S_s (1/m) =	7.0E-09	S_s (1/m) =	7.6E-07
C (m^3/Pa) =	9.0E-07	C (m^3/Pa) =	5.9E-07
C_D (-) =	1.0E+02	C_D (-) =	6.0E-01
ξ (-) =	-3.3	ξ (-) =	-1.2
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	3.00	C (m^3/Pa) =	5.9E-07
dt_2 (min) =	7.80	C_D (-) =	6.0E-01
T_T (m^2/s) =	4.3E-04	ξ (-) =	-1.2
S (-) =	1.1E-04		
K_s (m/s) =	3.0E-06		
S_s (1/m) =	7.6E-07		

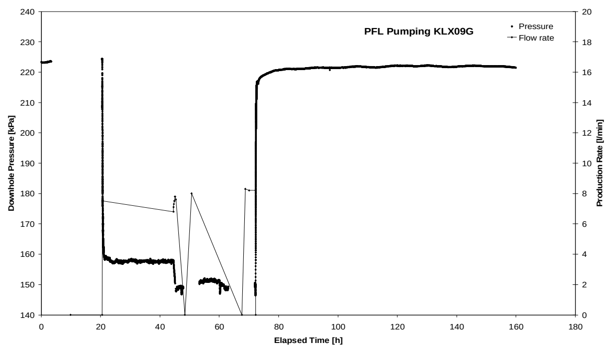
Comments:

The recommended transmissivity of 4.3E-4 m2/s was derived from the analysis of the CRwr phase (inner zone), which shows a better derivative quality. The confidence range for the transmissivity is estimated to be 1E-4 to 6E-4 m2/s (this range encompasses the outer zone transmissivities of both phases). The flow dimension displayed during the test is 2. The static ground water level was derived from the CRwr phase using straight line extrapolation in the Horner plot to a value of 14.14 m asl.

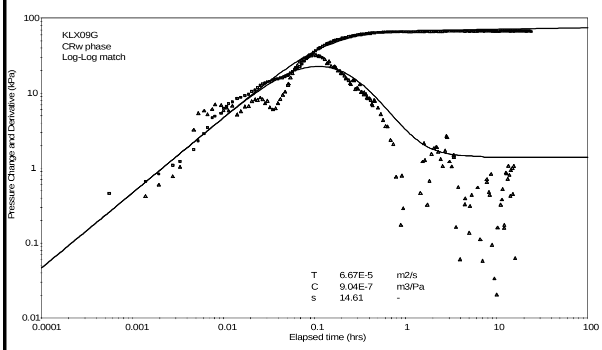
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CRwr
Area:	Laxemar	Test no:	1
Borehole ID:	KLX09G	Test start:	12.07.2006 14:07
Test section from - to (m):	9.30 - 100.10	Responsible for test execution:	PFL Pumptest
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Stephan Rohs

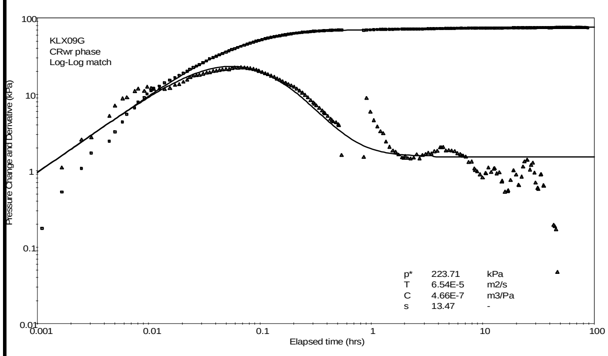
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
h_i (m asl) =	12.67		
h_p(m asl) =	4.76	h_F (m asl) =	12.37
Q_p (m^3/s)=	1.37E-04		
tp (s) =	186060	t_F (s) =	315480
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=			
Derivative fact.=	0.07	Derivative fact.=	0.08
Results		**Results**	
Q/s (m^2/s)=	1.7E-05		
T_M (m^2/s)=	2.2E-05		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	NA	dt_1 (min) =	NA
dt_2 (min) =	NA	dt_2 (min) =	NA
T (m^2/s) =	6.7E-05	T (m^2/s) =	6.5E-05
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	7.3E-07	K_s (m/s) =	7.2E-07
S_s (1/m) =	1.1E-08	S_s (1/m) =	1.1E-08
C (m^3/Pa) =	8.9E-07	C (m^3/Pa) =	4.7E-07
C_D (-) =	9.8E+01	C_D (-) =	5.1E+01
ξ (-) =	14.6	ξ (-) =	13.5
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Selected representative parameters.

dt_1 (min) =	0.00	C (m^3/Pa) =	4.7E-07
dt_2 (min) =	0.00	C_D (-) =	5.1E+01
T_T (m^2/s) =	7.2E-07	ξ (-) =	13.5
S (-) =	1.1E-08		
K_s (m/s) =	1.4E-07		
S_s (1/m) =	2.2E-09		

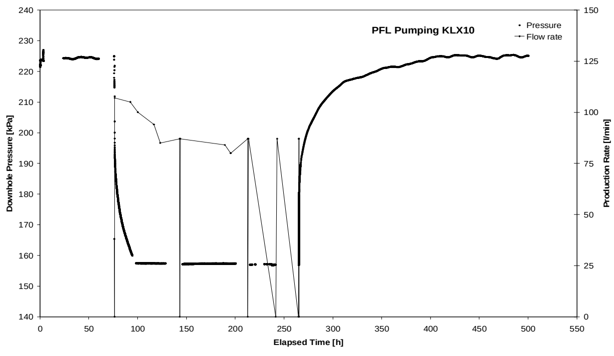
Comments:

The recommended transmissivity of 6.5E-5 m2/s was derived from the analysis of the CRwr phase. The confidence range for the transmissivity is estimated to be 1E-5 to 9E-5 m2/s. A flow dimension of 2 was assumed. The static ground water level was derived from the CRwr phase using straight line extrapolation in the Horner plot to a value of 12.61 m asl.

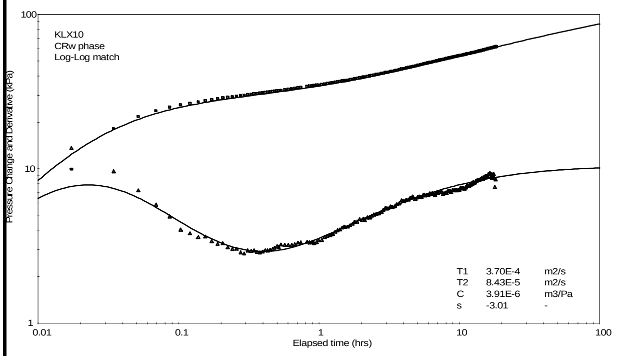
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CRwr
Area:	Laxemar	Test no:	1
Borehole ID:	KLX10	Test start:	10.12.2005 11:10
Test section from - to (m):	12.10 - 1001.20	Responsible for test execution:	PFL Pumptest
Section diameter, $2 \cdot r_w$ (m):	0.2	Responsible for test evaluation:	Stephan Rohs

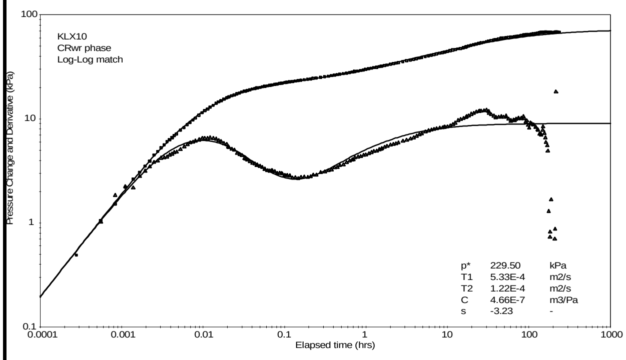
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
h_i (m asl) =	12.73		
h_p(m asl) =	5.80	h_F (m asl) =	12.74
Q_p (m^3/s)=	1.45E-03		
tp (s) =	679800	t_F (s) =	846600
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=			
Derivative fact.=	0.09	Derivative fact.=	0.06
Results		**Results**	
Q/s (m^2/s)=	2.1E-04		
T_M (m^2/s)=	3.2E-04		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	16.20	dt_1 (min) =	7.20
dt_2 (min) =	33.00	dt_2 (min) =	12.00
T (m^2/s) =	3.7E-04	T (m^2/s) =	5.3E-04
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	3.7E-07	K_s (m/s) =	5.4E-07
S_s (1/m) =	1.0E-09	S_s (1/m) =	1.0E-09
C (m^3/Pa) =	3.9E-06	C (m^3/Pa) =	2.5E-06
C_D (-) =	6.2E+01	C_D (-) =	4.0E+01
ξ (-) =	-3.0	ξ (-) =	-3.2
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Selected representative parameters.

dt_1 (min) =	7.20	C (m^3/Pa) =	2.5E-06
dt_2 (min) =	12.00	C_D (-) =	2.8E+02
T_T (m^2/s) =	5.3E-04	ξ (-) =	-3.2
S (-) =	1.0E-06		
K_s (m/s) =	5.4E-07		
S_s (1/m) =	1.0E-09		

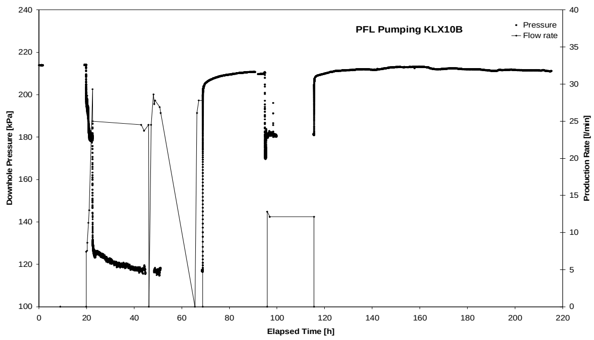
Comments:

The recommended transmissivity of 5.3E-4 m2/s was derived from the analysis of the CRwr phase (inner zone), which shows a slight better derivative quality. The confidence range for the transmissivity is estimated to be 1E-4 to 8E-4 m2/s. The flow dimension displayed during the test is 2. The static ground water level was derived from the CRwr phase using straight line extrapolation in the Horner plot to a value of 13.20 m asl.

Test Summary Sheet

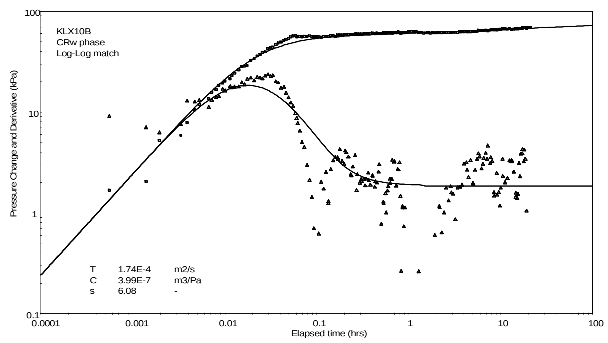
Project:	Oskarshamn site investigation	Test type:[1]	CRwr
Area:	Laxemar	Test no:	1
Borehole ID:	KLX10B	Test start:	18.07.2006 15:01
Test section from - to (m):	9.00 - 50.25	Responsible for test execution:	PFL Pumptest
Section diameter, $2 \cdot r_w$ (m):	0.077	Responsible for test evaluation:	Stephan Rohs

Linear plot Q and p

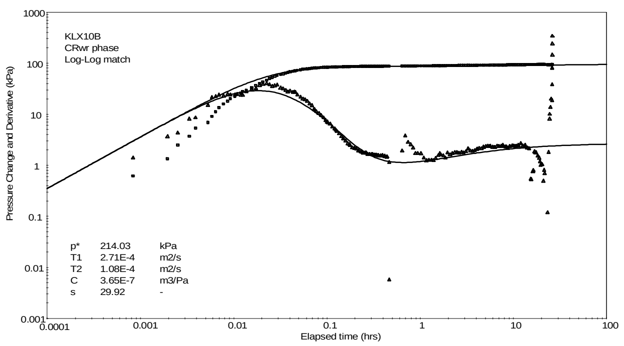


Flow period		**Recovery period**	
Indata		**Indata**	
h_i (m asl) =	11.62		
h_p(m asl) =	1.75	h_F (m asl) =	11.33
Q_p (m^3/s)=	4.63E-04		
tp (s) =	176340	t_F (s) =	527370
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=			
Derivative fact.=	0.09	Derivative fact.=	0.06
Results		**Results**	
Q/s (m^2/s)=	4.7E-05		
T_M (m^2/s)=	5.4E-05		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	NA	dt_1 (min) =	23.40
dt_2 (min) =	NA	dt_2 (min) =	75.60
T (m^2/s) =	1.2E-04	T (m^2/s) =	2.7E-04
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	2.8E-06	K_s (m/s) =	6.6E-06
S_s (1/m) =	2.4E-08	S_s (1/m) =	2.4E-08
C (m^3/Pa) =	4.0E-07	C (m^3/Pa) =	3.7E-07
C_D (-) =	4.3E+01	C_D (-) =	3.9E+01
ξ (-) =	6.1	ξ (-) =	29.9
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	23.40	C (m^3/Pa) =	3.7E-07
dt_2 (min) =	75.60	C_D (-) =	4.0E+01
T_T (m^2/s) =	2.7E-04	ξ (-) =	29.9
S (-) =	1.0E-06		
K_s (m/s) =	6.6E-06		
S_s (1/m) =	2.4E-08		

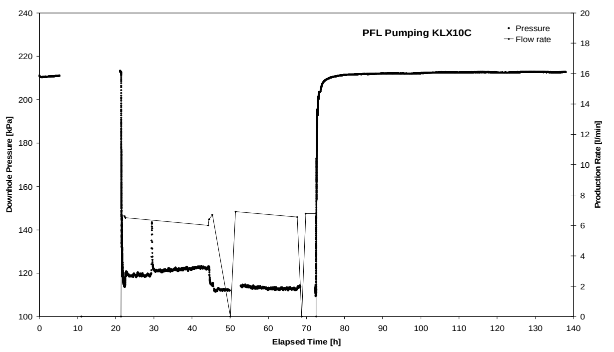
Comments:

The recommended transmissivity of 2.7E-4 m2/s was derived from the analysis of the CRwr phase (inner zone), which shows the better data and derivative quality. The confidence range for the transmissivity is estimated to be 1E-5 to 4E-4 m2/s (this range includes the transmissivity of the outer zone). The flow dimension during the test is 2. The static ground water level was derived from the CRwr phase using straight line extrapolation in the Horner plot to a value of 11.62 m asl.

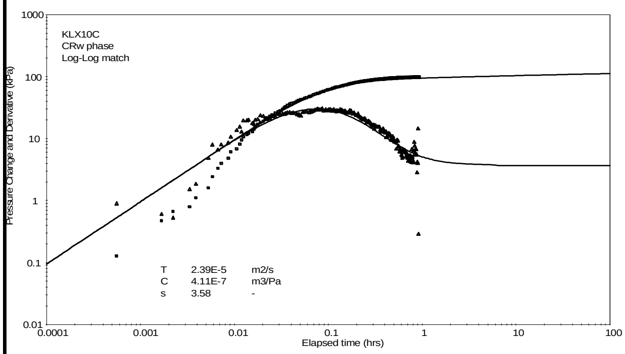
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CRwr
Area:	Laxemar	Test no:	1
Borehole ID:	KLX10C	Test start:	24.07.2006 12:59
Test section from - to (m):	9.00 - 146.25	Responsible for test execution:	PFL Pumptest
Section diameter, $2 \cdot r_w$ (m):	0.077	Responsible for test evaluation:	Stephan Rohs

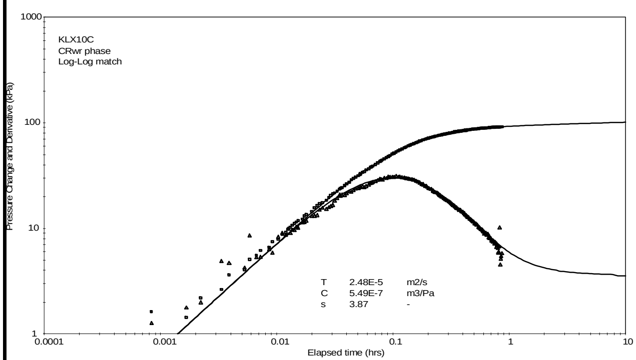
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
h_i (m asl) =	11.46		
h_p(m asl) =	1.08	h_F (m asl) =	11.49
Q_p (m^3/s)=	1.13E-04		
tp (s) =	183960	t_F (s) =	235590
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=			
Derivative fact.=	0.08	Derivative fact.=	0.08
Results		**Results**	
Q/s (m^2/s)=	1.1E-05		
T_M (m^2/s)=	1.5E-05		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	NA	dt_1 (min) =	NA
dt_2 (min) =	NA	dt_2 (min) =	NA
T (m^2/s) =	2.4E-05	T (m^2/s) =	2.5E-05
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	1.7E-07	K_s (m/s) =	1.8E-07
S_s (1/m) =	7.3E-09	S_s (1/m) =	7.3E-09
C (m^3/Pa) =	4.1E-07	C (m^3/Pa) =	5.5E-07
C_D (-) =	4.4E+01	C_D (-) =	5.9E+01
ξ (-) =	3.6	ξ (-) =	3.9
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Selected representative parameters.

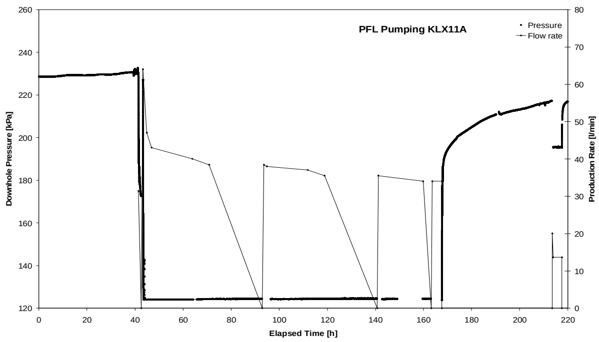
dt_1 (min) =	NA	C (m^3/Pa) =	5.5E-07
dt_2 (min) =	NA	C_D (-) =	6.1E+01
T_T (m^2/s) =	2.5E-05	ξ (-) =	3.9
S (-) =	1.0E-06		
K_s (m/s) =	1.8E-07		
S_s (1/m) =	7.3E-09		

Comments:

Test Summary Sheet

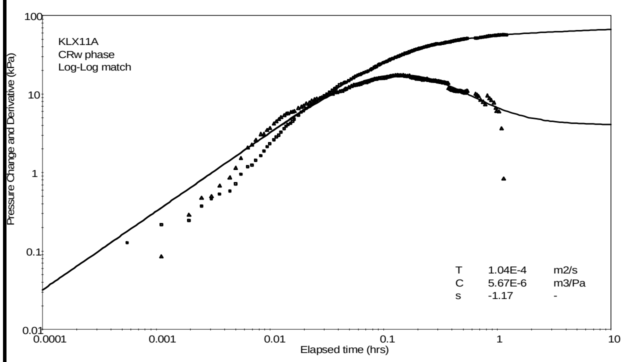
Project:	Oskarshamn site investigation	Test type:[1]	CRwr
Area:	Laxemar	Test no:	1
Borehole ID:	KLX11A	Test start:	01.11.2006 16:08
Test section from - to (m):	12.05 - 992.29	Responsible for test execution:	PFL Pumptest
Section diameter, $2 \cdot r_w$ (m):	0.2	Responsible for test evaluation:	Stephan Rohs

Linear plot Q and p

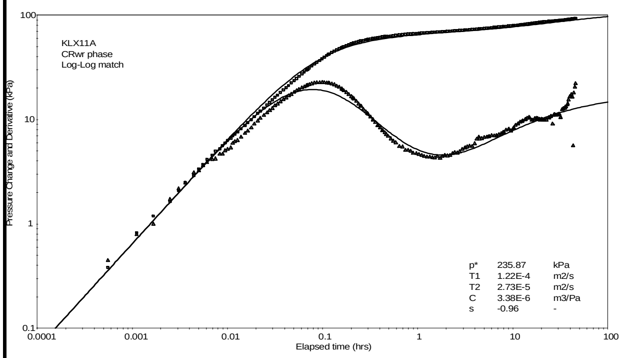


Flow period		Recovery period	
Indata		**Indata**	
h_i (m asl) =	13.20		
h_p(m asl) =	2.46	h_F (m asl) =	11.95
Q_p (m^3/s)=	5.67E-04		
tp (s) =	454500	t_F (s) =	164489
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=			
Derivative fact.=	0.15	Derivative fact.=	0.07
Results		**Results**	
Q/s (m^2/s)=	5.3E-05		
T_M (m^2/s)=	8.0E-05		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	NA	dt_1 (min) =	61.80
dt_2 (min) =	NA	dt_2 (min) =	105.60
T (m^2/s) =	1.0E-04	T (m^2/s) =	1.2E-04
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	1.1E-07	K_s (m/s) =	1.2E-07
S_s (1/m) =	1.0E-09	S_s (1/m) =	1.0E-09
C (m^3/Pa) =	5.7E-06	C (m^3/Pa) =	3.4E-06
C_D (-) =	9.0E+01	C_D (-) =	5.4E+01
ξ (-) =	-1.2	ξ (-) =	1.0
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	61.80	C (m^3/Pa) =	3.4E-06
dt_2 (min) =	105.60	C_D (-) =	3.7E+02
T_T (m^2/s) =	1.2E-04	ξ (-) =	1.0
S (-) =	1.0E-06		
K_s (m/s) =	1.2E-07		
S_s (1/m) =	1.0E-09		

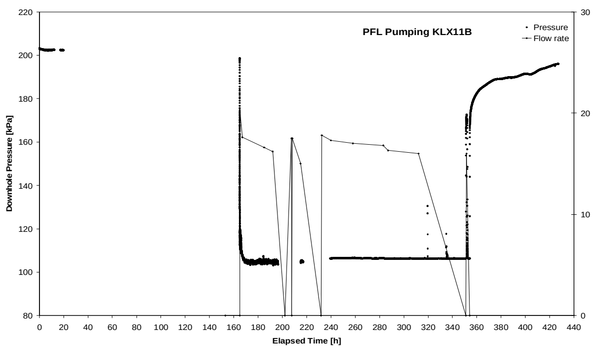
Comments:

The recommended transmissivity of 1.2E-4 m2/s was derived from the analysis of the CRwr phase (inner zone), which shows a short horizontal stabilization. The confidence range for the transmissivity is estimated to be 5E-5 to 4E-4 m2/s. The flow dimension displayed during the test is 2. The static ground water level was derived from the CRwr phase using straight line extrapolation in the Horner plot to a value of 13.85 m asl

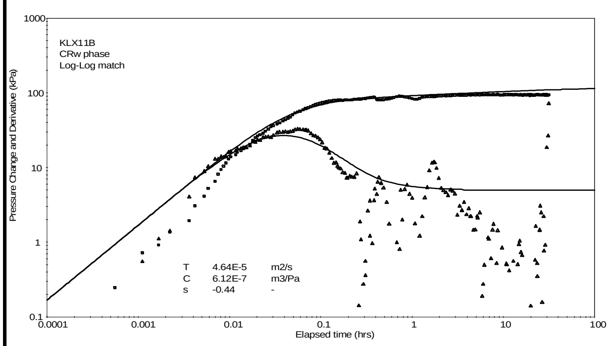
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CRwr
Area:	Laxemar	Test no:	1
Borehole ID:	KLX11B	Test start:	04.09.2006 15:01
Test section from - to (m):	2.54 - 100.20	Responsible for test execution:	PFL Pumptest
Section diameter, $2 \cdot r_w$ (m):	0.077	Responsible for test evaluation:	Stephan Rohs

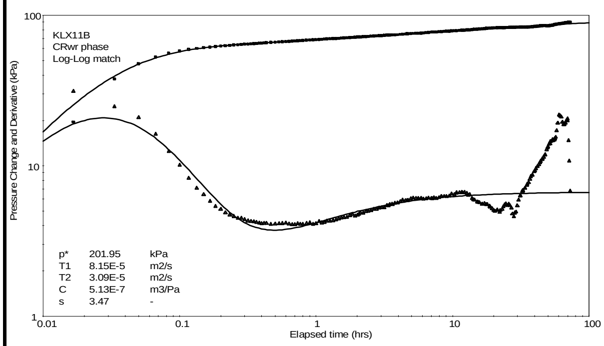
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
h_i (m asl) =	10.04		
h_p(m asl) =	0.64	h_F (m asl) =	9.78
Q_p (m^3/s)=	2.67E-04		
tp (s) =	681600	t_F (s) =	262680
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=			
Derivative fact.=	0.09	Derivative fact.=	0.11
Results		**Results**	
Q/s (m^2/s)=	2.8E-05		
T_M (m^2/s)=	3.7E-05		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	NA	dt_1 (min) =	19.20
dt_2 (min) =	NA	dt_2 (min) =	64.80
T (m^2/s) =	4.6E-05	T (m^2/s) =	8.2E-05
S (-) =	4.8E-07	S (-) =	8.3E-07
K_s (m/s) =	1.5E-06	K_s (m/s) =	2.7E-06
S_s (1/m) =	1.0E-08	S_s (1/m) =	1.0E-08
C (m^3/Pa) =	6.1E-07	C (m^3/Pa) =	5.1E-07
C_D (-) =	6.6E+01	C_D (-) =	5.5E+01
ξ (-) =	-0.4	ξ (-) =	3.5
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Selected representative parameters.

dt_1 (min) =	19.20	C (m^3/Pa) =	5.1E-07
dt_2 (min) =	64.80	C_D (-) =	5.7E+01
T_T (m^2/s) =	2.6E-04	ξ (-) =	3.5
S (-) =	1.0E-06		
K_s (m/s) =	2.7E-06		
S_s (1/m) =	1.0E-08		

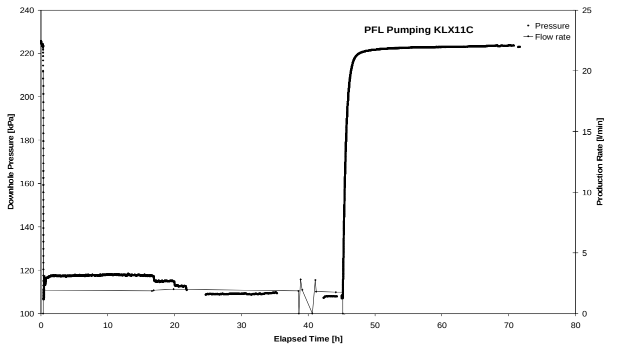
Comments:

TThe recommended transmissivity of 8.2E-5 m2/s was derived from the analysis of the CRwr phase (inner zone), which shows the better data and derivative quality. The confidence range for the transmissivity is estimated to be 1E-5 to 1E-4 m2/s. The flow dimension during the test is 2. The static ground water level was derived from the CRwr phase using straight line extrapolation in the Horner plot to a value of 10.29 m asl.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CRwr
Area:	Laxemar	Test no:	1
Borehole ID:	KLX11C	Test start:	12.10.2006 16:08
Test section from - to (m):	2.00 - 120.15	Responsible for test execution:	PFL Pumptest
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Stephan Rohs

Linear plot Q and p

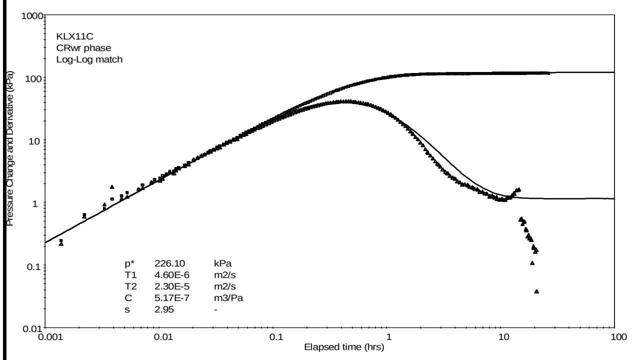


Flow period		Recovery period	
Indata		**Indata**	
h_i (m asl) =	12.55		
h_p(m asl) =	0.80	h_F (m asl) =	12.53
Q_p (m^3/s)=	2.92E-05		
tp (s) =	161460	t_F (s) =	95428
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=			
Derivative fact.=	NA	Derivative fact.=	0.09
Results		**Results**	
Q/s (m^2/s)=	2.5E-06		
T_M (m^2/s)=	3.3E-06		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	NA	dt_1 (min) =	NA
dt_2 (min) =	NA	dt_2 (min) =	NA
T (m^2/s) =	NA	T (m^2/s) =	4.6E-06
S (-) =	NA	S (-) =	1.0E-06
K_s (m/s) =	NA	K_s (m/s) =	3.9E-08
S_s (1/m) =	NA	S_s (1/m) =	8.5E-09
C (m^3/Pa) =	NA	C (m^3/Pa) =	5.2E-07
C_D (-) =	NA	C_D (-) =	5.7E+01
ξ (-) =	NA	ξ (-) =	3.0
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Log-Log plot incl. derivates- flow period

Not analysable

Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	NA	C (m^3/Pa) =	5.2E-07
dt_2 (min) =	NA	C_D (-) =	5.7E+01
T_T (m^2/s) =	4.6E-06	ξ (-) =	3.0
S (-) =	1.0E-06		
K_s (m/s) =	3.9E-08		
S_s (1/m) =	8.5E-09		

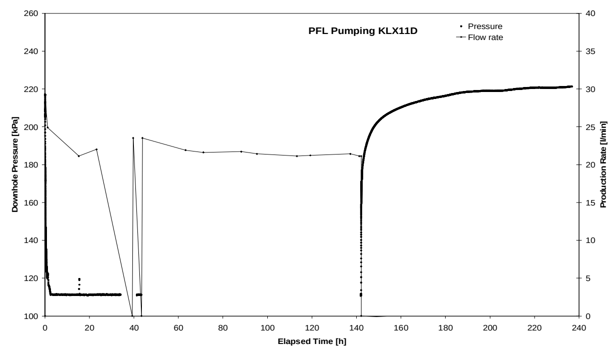
Comments:

The recommended transmissivity of 4.6•10-6 m2/s was derived from the analysis of the CRwr phase (inner zone). The confidence range for the transmissivity is estimated to be 2E-6 to 4E-5 m2/s (this range encompasses the outer zone transmissivity). A flow dimension of 2 was assumed. The static ground water level was derived from the CRwr phase using straight line extrapolation in the Horner plot to a value of 12.85 m asl.

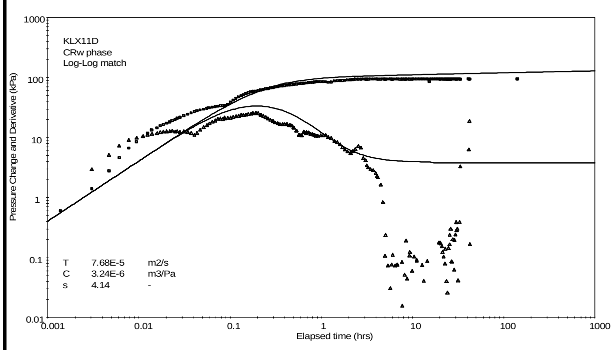
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CRwr
Area:	Laxemar	Test no:	1
Borehole ID:	KLX11D	Test start:	02.10.2006 15:46
Test section from - to (m):	2.00 - 120.35	Responsible for test execution:	PFL Pumptest
Section diameter, $2 \cdot r_w$ (m):	0.077	Responsible for test evaluation:	Stephan Rohs

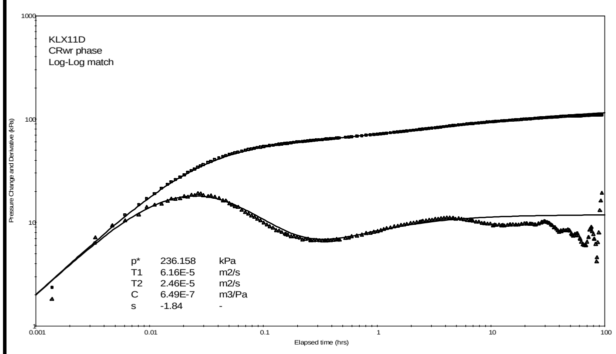
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
h_i (m asl) =	11.91		
h_p(m asl) =	1.08	h_F (m asl) =	12.64
Q_p (m^3/s)=	3.52E-04		
tp (s) =	511260	t_F (s) =	340880
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=			
Derivative fact.=	0.14	Derivative fact.=	0.07
Results		**Results**	
Q/s (m^2/s)=	3.2E-05		
T_M (m^2/s)=	4.3E-05		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	NA	dt_1 (min) =	13.20
dt_2 (min) =	NA	dt_2 (min) =	31.20
T (m^2/s) =	7.7E-05	T (m^2/s) =	6.2E-05
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	6.5E-07	K_s (m/s) =	5.2E-07
S_s (1/m) =	8.4E-09	S_s (1/m) =	8.4E-09
C (m^3/Pa) =	3.2E-06	C (m^3/Pa) =	6.5E-07
C_D (-) =	3.5E+02	C_D (-) =	7.0E+01
ξ (-) =	4.1	ξ (-) =	-1.8
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Selected representative parameters.

dt_1 (min) =	13.20	C (m^3/Pa) =	6.5E-07
dt_2 (min) =	31.20	C_D (-) =	7.2E+01
T_T (m^2/s) =	6.2E-05	ξ (-) =	-1.8
S (-) =	1.0E-06		
K_s (m/s) =	5.2E-07		
S_s (1/m) =	8.4E-09		

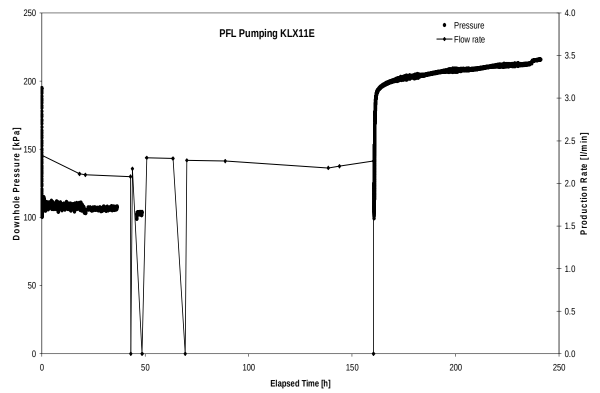
Comments:

The recommended transmissivity of 6.2E-5 m2/s was derived from the analysis of the CRwr phase (inner zone), which shows abetter data and derivative quality. The confidence range for the transmissivity is estimated to be 2E-5 to 9E-5 m2/s. The flow dimension displayed during the test is 2. The static ground water level was derived from the CRwr phase using straight line extrapolation in the Horner plot to a value of 13.95 m asl.

Test Summary Sheet

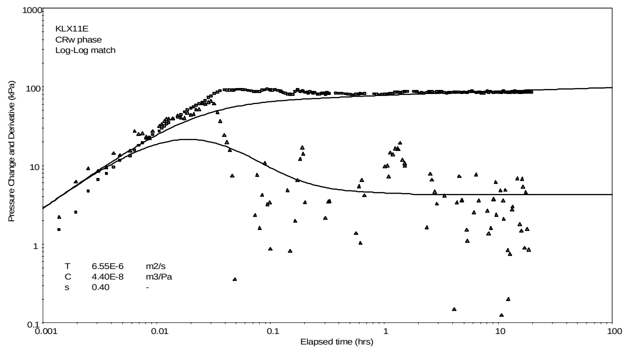
Project:	Oskarshamn site investigation	Test type:[1]	CRwr
Area:	Laxemar	Test no:	1
Borehole ID:	KLX11E	Test start:	22.09.2006 14:47
Test section from - to (m):	2.00 - 121.30	Responsible for test execution:	PFL Pumptest
Section diameter, $2 \cdot r_w$ (m):	0.077	Responsible for test evaluation:	Stephan Rohs

Linear plot Q and p

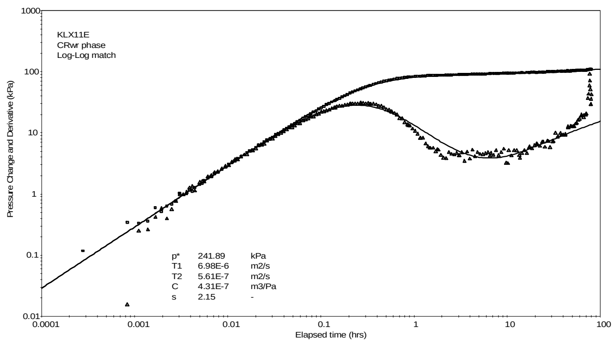


Flow period		Recovery period	
Indata		**Indata**	
h_i (m asl) =	9.62		
h_p(m asl) =	-0.08	h_F (m asl) =	14.38
Q_p (m^3/s)=	3.77E-05		
tp (s) =	576900	t_F (s) =	290882
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=			
Derivative fact.=	0.05	Derivative fact.=	0.07
Results		**Results**	
Q/s (m^2/s)=	3.9E-06		
T_M (m^2/s)=	5.2E-06		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	NA	dt_1 (min) =	187.80
dt_2 (min) =	NA	dt_2 (min) =	690.00
T (m^2/s) =	6.6E-06	T (m^2/s) =	7.0E-06
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	5.5E-08	K_s (m/s) =	5.9E-08
S_s (1/m) =	8.4E-09	S_s (1/m) =	8.4E-09
C (m^3/Pa) =	4.4E-08	C (m^3/Pa) =	4.3E-07
C_D (-) =	4.7E+00	C_D (-) =	4.6E+01
ξ (-) =	0.4	ξ (-) =	2.2
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	10.02	C (m^3/Pa) =	4.3E-07
dt_2 (min) =	14.04	C_D (-) =	4.6E+01
T_T (m^2/s) =	7.0E-06	ξ (-) =	2.2
S (-) =	1.0E-06		
K_s (m/s) =	5.9E-08		
S_s (1/m) =	8.4E-09		

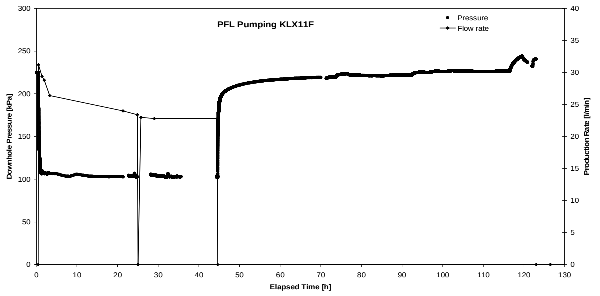
Comments:

The recommended transmissivity of 7.0E-6 m2/s was derived from the analysis of the CRwr phase (inner zone), which shows the best derivative quality. The confidence range for the transmissivity is estimated to be 2E-6 to 1E-5 m2/s. The flow dimension displayed during the test is 2. The static ground water level was derived from the CRwr phase using straight line extrapolation in the Horner plot to a value of 14.46 m asl.

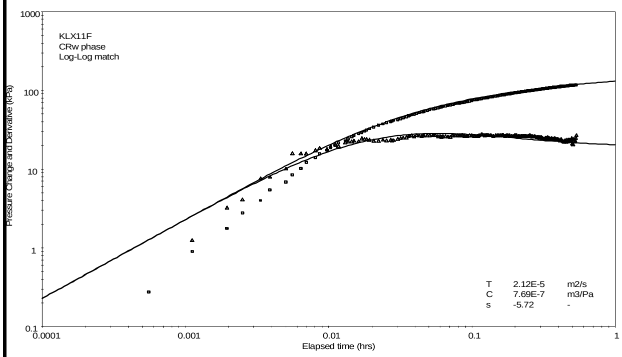
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CRwr
Area:	Laxemar	Test no:	1
Borehole ID:	KLX11F	Test start:	16.10.2006 10:16
Test section from - to (m):	2.00 - 120.05	Responsible for test execution:	PFL Pumptest
Section diameter, $2 \cdot r_w$ (m):	0.077	Responsible for test evaluation:	Stephan Rohs

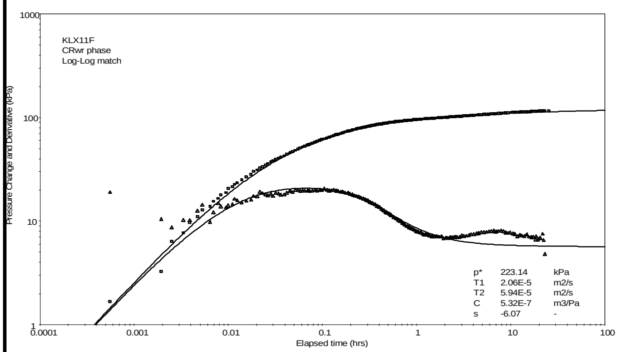
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
h_i (m asl) =	12.73		
h_p(m asl) =	0.35	h_F (m asl) =	12.89
Q_p (m^3/s)=	3.80E-04		
tp (s) =	158700	t_F (s) =	294609
S el S* (-)=	1.00E-06	S el S* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=			
Derivative fact.=	0.1	Derivative fact.=	0.06
Results		**Results**	
Q/s (m^2/s)=	3.1E-05		
T_M (m^2/s)=	4.1E-05		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	2.40	dt_1 (min) =	1.20
dt_2 (min) =	13.20	dt_2 (min) =	13.20
T (m^2/s) =	2.1E-05	T (m^2/s) =	2.1E-05
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	1.8E-07	K_s (m/s) =	1.7E-07
S_s (1/m) =	8.5E-09	S_s (1/m) =	8.5E-09
C (m^3/Pa) =	7.7E-07	C (m^3/Pa) =	5.3E-07
C_D (-) =	8.3E+01	C_D (-) =	5.7E+01
ξ (-) =	-5.7	ξ (-) =	-6.1
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Selected representative parameters.

dt_1 (min) =	1.20	C (m^3/Pa) =	5.3E-07
dt_2 (min) =	13.20	C_D (-) =	5.7E+01
T_T (m^2/s) =	2.1E-05	ξ (-) =	-6.1
S (-) =	1.0E-06		
K_s (m/s) =	1.7E-07		
S_s (1/m) =	8.5E-09		

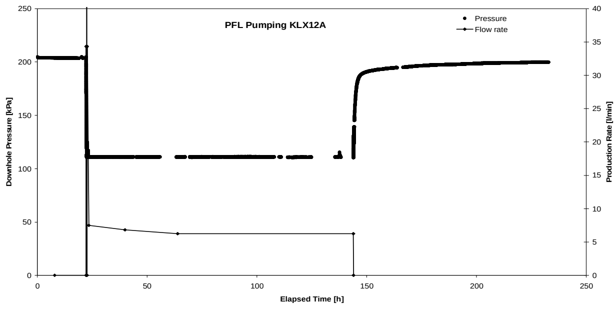
Comments:

The recommended transmissivity of 2.1E-5 m2/s was derived from the analysis of the CRwr phase (inner zone), which shows a better data and derivative quality. The confidence range for the transmissivity is estimated to be 9E-6 to 7E-5 m2/s. The flow dimension displayed during the test is 2. The static ground water level was derived from the CRwr phase using straight line extrapolation in the Horner plot to a value of 12.55 m asl.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CRwr
Area:	Laxemar	Test no:	1
Borehole ID:	KLX12A	Test start:	09.06.2006 16:05
Test section from - to (m):	17.92 - 602.29	Responsible for test execution:	PFL Pumptest
Section diameter, $2 \cdot r_w$ (m):	0.2	Responsible for test evaluation:	Stephan Rohs

Linear plot Q and p

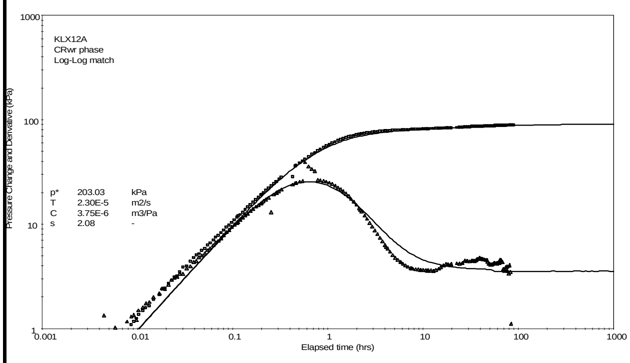


Flow period		Recovery period	
Indata		**Indata**	
h_i (m asl) =	10.66		
h_p(m asl) =	1.10	h_F (m asl) =	10.16
Q_p (m^3/s)=	1.04E-04		
tp (s) =	438180	t_F (s) =	319860
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=			
Derivative fact.=	NA	Derivative fact.=	0.1
Results		**Results**	
Q/s (m^2/s)=	1.1E-05		
T_M (m^2/s)=	1.6E-05		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	NA	dt_1 (min) =	NA
dt_2 (min) =	NA	dt_2 (min) =	NA
T (m^2/s) =	NA	T (m^2/s) =	2.3E-05
S (-) =	NA	S (-) =	1.0E-06
K_s (m/s) =	NA	K_s (m/s) =	3.9E-08
S_s (1/m) =	NA	S_s (1/m) =	1.7E-09
C (m^3/Pa) =	NA	C (m^3/Pa) =	3.8E-06
C_D (-) =	NA	C_D (-) =	6.0E+01
ξ (-) =	NA	ξ (-) =	2.1
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Log-Log plot incl. derivates- flow period

Not analysable

Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	NA	C (m^3/Pa) =	3.8E-06
dt_2 (min) =	NA	C_D (-) =	6.0E+01
T_T (m^2/s) =	2.3E-05	ξ (-) =	2.1
S (-) =	1.0E-06		
K_s (m/s) =	3.9E-08		
S_s (1/m) =	1.7E-09		

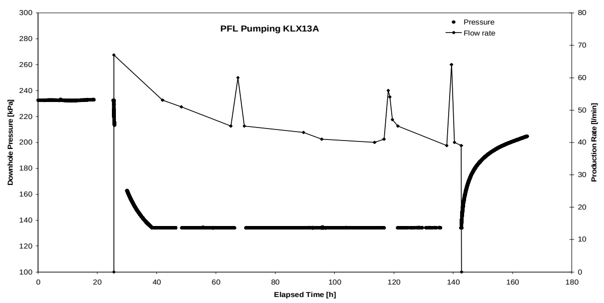
Comments:

The recommended transmissivity of 2.3E-5 m2/s was derived from the analysis of the CRwr phase. The confidence range for the transmissivity is estimated to be 8E-6 to 5E-5 m2/s. The flow dimension displayed during the test is 2. The static ground water level was derived from the CRwr phase using straight line extrapolation in the Horner plot to a value of 10.50 m asl.

Test Summary Sheet

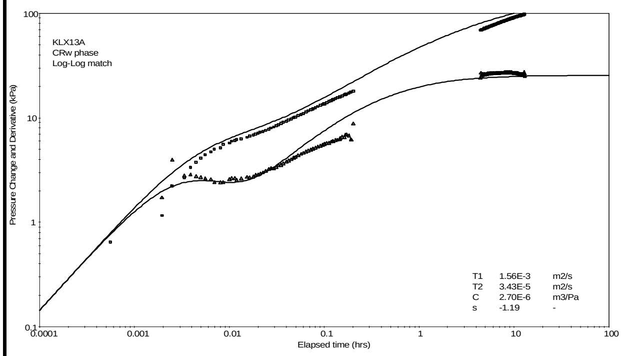
Project:	Oskarshamn site investigation	Test type:[1]	CRwr
Area:	Laxemar	Test no:	1
Borehole ID:	KLX13A	Test start:	24.09.2006 14:30
Test section from - to (m):	11.75 - 595.85	Responsible for test execution:	PFL Pumptest
Section diameter, $2 \cdot r_w$ (m):	0.2	Responsible for test evaluation:	Stephan Rohs

Linear plot Q and p

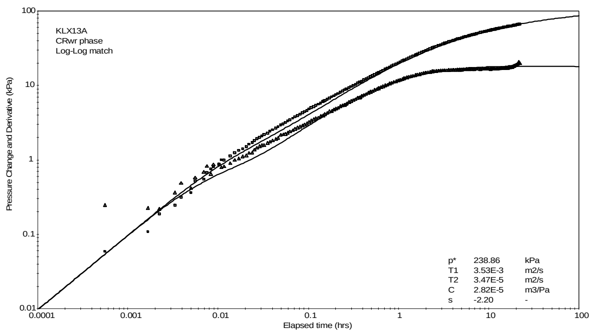


Flow period		**Recovery period**	
Indata		**Indata**	
h_i (m asl) =	13.48		
h_p(m asl) =	3.45	h_F (m asl) =	6.61
Q_p (m^3/s)=	6.50E-04		
tp (s) =	422100	t_F (s) =	79442
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=			
Derivative fact.=	0.25	Derivative fact.=	0.08
Results		**Results**	
Q/s (m^2/s)=	6.5E-05		
T_M (m^2/s)=	9.3E-05		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	256.20	dt_1 (min) =	168.00
dt_2 (min) =	680.40	dt_2 (min) =	930.00
T (m^2/s) =	3.4E-05	T (m^2/s) =	3.5E-05
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	5.9E-08	K_s (m/s) =	5.9E-08
S_s (1/m) =	1.7E-09	S_s (1/m) =	1.7E-09
C (m^3/Pa) =	2.7E-06	C (m^3/Pa) =	2.8E-05
C_D (-) =	4.3E+01	C_D (-) =	4.5E+02
ξ (-) =	-1.2	ξ (-) =	-2.2
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	168.00	C (m^3/Pa) =	2.8E-05
dt_2 (min) =	930.00	C_D (-) =	4.5E+02
T_T (m^2/s) =	3.5E-05	ξ (-) =	-2.2
S (-) =	1.0E-06		
K_s (m/s) =	5.9E-08		
S_s (1/m) =	1.7E-09		

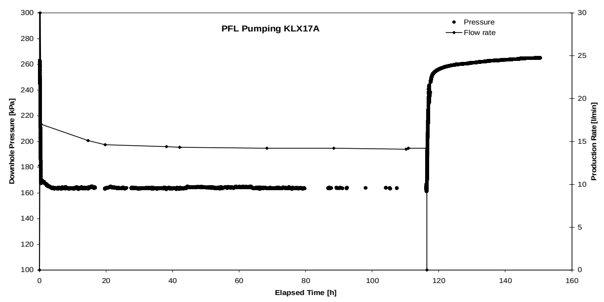
Comments:

The recommended transmissivity of 3.5E-5 m2/s was derived from the analysis of the CRwr phase (outer zone), which is deemed to be representative for the formation. The confidence range for the transmissivity is estimated to be 9E-6 to 6E-5 m2/s. The flow dimension displayed during the test is 2. The static ground water level was derived from the CRwr phase using straight line extrapolation in the Horner plot to a value of 14.15 m asl.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CRwr
Area:	Laxemar	Test no:	1
Borehole ID:	KLX17A	Test start:	03.01.2007 18:38
Test section from - to (m):	11.95 - 701.08	Responsible for test execution:	PFL Pumptest
Section diameter, $2 \cdot r_w$ (m):	0.2	Responsible for test evaluation:	Stephan Rohs

Linear plot Q and p

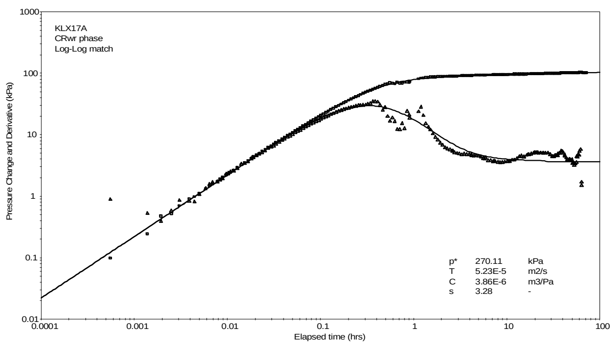


Flow period		**Recovery period**	
Indata		**Indata**	
h_i (m asl) =	16.57		
h_p(m asl) =	6.29	h_F (m asl) =	16.81
Q_p (m^3/s)=	2.37E-04		
tp (s) =	418860	t_F (s) =	256780
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=			
Derivative fact.=	NA	Derivative fact.=	0.06
Results		**Results**	
Q/s (m^2/s)=	2.3E-05		
T_M (m^2/s)=	3.4E-05		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	NA	dt_1 (min) =	322.20
dt_2 (min) =	NA	dt_2 (min) =	3600.00
T (m^2/s) =	NA	T (m^2/s) =	5.2E-05
S (-) =	NA	S (-) =	1.0E-06
K_s (m/s) =	NA	K_s (m/s) =	7.6E-08
S_s (1/m) =	NA	S_s (1/m) =	1.5E-09
C (m^3/Pa) =	NA	C (m^3/Pa) =	3.9E-06
C_D (-) =	NA	C_D (-) =	6.1E+01
ξ (-) =	NA	ξ (-) =	3.3
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Log-Log plot incl. derivates- flow period

Not analysable

Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	322.20	C (m^3/Pa) =	3.9E-06
dt_2 (min) =	3600.00	C_D (-) =	6.1E+01
T_T (m^2/s) =	5.2E-05	ξ (-) =	3.3
S (-) =	1.0E-06		
K_s (m/s) =	7.6E-08		
S_s (1/m) =	1.5E-09		

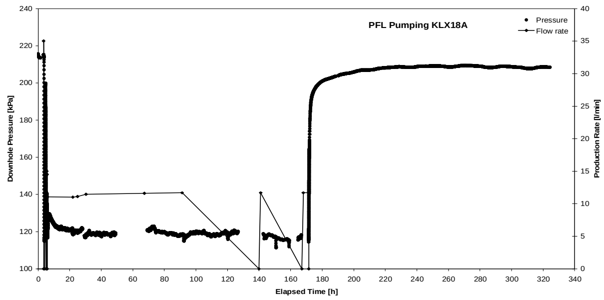
Comments:

The recommended transmissivity of 5.2E-5 m2/s was derived from the analysis of the CRwr phase. The confidence range for the transmissivity is estimated to be 1E-5 to 9E-5 m2/s. The flow dimension displayed during the test is 2. The static ground water level was derived from the CRwr phase using straight line extrapolation in the Horner plot to a value of 17.34 m asl.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CRwr
Area:	Laxemar	Test no:	1
Borehole ID:	KLX18A	Test start:	08.07.2006 11:46
Test section from - to (m):	11.83 - 611.28	Responsible for test execution:	PFL Pumptest
Section diameter, $2 \cdot r_w$ (m):	0.2	Responsible for test evaluation:	Stephan Rohs

Linear plot Q and p

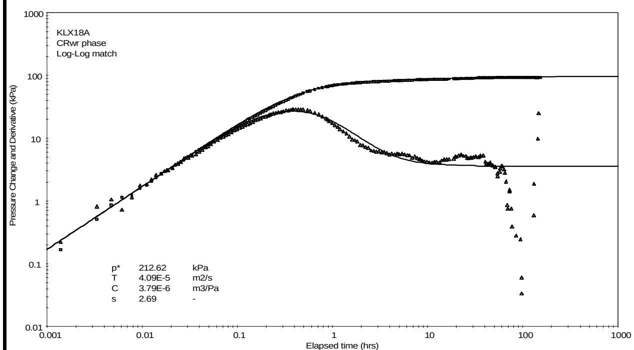


Flow period		Recovery period	
Indata		**Indata**	
h_i (m asl) =	11.74		
h_p(m asl) =	1.60	h_F (m asl) =	11.06
Q_p (m^3/s)=	1.95E-04		
tp (s) =	604740	t_F (s) =	550080
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=			
Derivative fact.=	NA	Derivative fact.=	0.06
Results		**Results**	
Q/s (m^2/s)=	1.9E-05		
T_M (m^2/s)=	2.8E-05		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	NA	dt_1 (min) =	126.00
dt_2 (min) =	NA	dt_2 (min) =	2349.60
T (m^2/s) =	NA	T (m^2/s) =	4.1E-05
S (-) =	NA	S (-) =	1.0E-06
K_s (m/s) =	NA	K_s (m/s) =	6.8E-08
S_s (1/m) =	NA	S_s (1/m) =	1.7E-09
C (m^3/Pa) =	NA	C (m^3/Pa) =	3.8E-06
C_D (-) =	NA	C_D (-) =	6.0E+01
ξ (-) =	NA	ξ (-) =	2.7
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Log-Log plot incl. derivates- flow period

Not analysable

Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	126.00	C (m^3/Pa) =	3.8E-06
dt_2 (min) =	2349.60	C_D (-) =	6.0E+01
T_T (m^2/s) =	4.1E-05	ξ (-) =	2.7
S (-) =	1.0E-06		
K_s (m/s) =	6.8E-08		
S_s (1/m) =	1.7E-09		

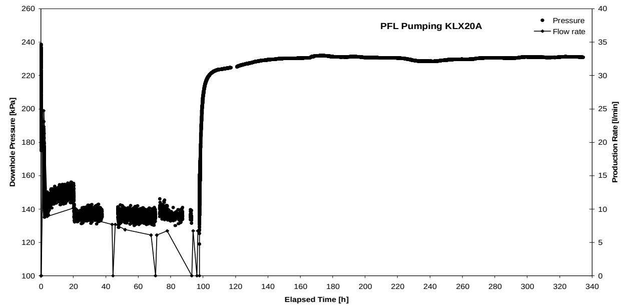
Comments:

The recommended transmissivity of 4.1E-5 m2/s was derived from the analysis of the CRwr phase. The confidence range for the transmissivity is estimated to be 1E-5 to 9E-5 m2/s. The flow dimension displayed during the test is 2. The static ground water level was derived from the CRwr phase using straight line extrapolation in the Horner plot to a value of 11.48 m asl.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CRwr
Area:	Laxemar	Test no:	1
Borehole ID:	KLX20A	Test start:	27.06.2006 11:07
Test section from - to (m):	100.90 - 457.92	Responsible for test execution:	PFL Pumptest
Section diameter, $2 \cdot r_w$ (m):	0.2	Responsible for test evaluation:	Stephan Rohs

Linear plot Q and p

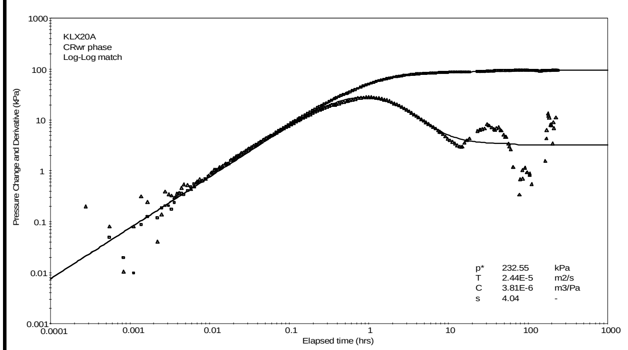


Flow period		**Recovery period**	
Indata		**Indata**	
h_i (m asl) =	13.72		
h_p(m asl) =	3.62	h_F (m asl) =	13.34
Q_p (m^3/s)=	1.12E-04		
tp (s) =	351840	t_F (s) =	852060
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=			
Derivative fact.=	NA	Derivative fact.=	NA
Results		**Results**	
Q/s (m^2/s)=	1.1E-05		
T_M (m^2/s)=	1.5E-05		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	NA	dt_1 (min) =	NA
dt_2 (min) =	NA	dt_2 (min) =	NA
T (m^2/s) =	NA	T (m^2/s) =	2.4E-05
S (-) =	NA	S (-) =	1.0E-06
K_s (m/s) =	NA	K_s (m/s) =	6.8E-08
S_s (1/m) =	NA	S_s (1/m) =	2.8E-09
C (m^3/Pa) =	NA	C (m^3/Pa) =	3.8E-06
C_D (-) =	NA	C_D (-) =	6.1E+01
ξ (-) =	NA	ξ (-) =	4.0
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Log-Log plot incl. derivates- flow period

Not analysable

Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

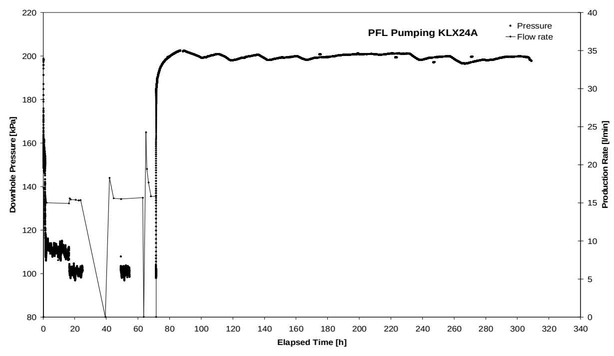
dt_1 (min) =	NA	C (m^3/Pa) =	3.8E-06
dt_2 (min) =	NA	C_D (-) =	6.1E+01
T_T (m^2/s) =	2.4E-05	ξ (-) =	4.0
S (-) =	1.0E-06		
K_s (m/s) =	6.8E-08		
S_s (1/m) =	2.8E-09		

Comments:

The recommended transmissivity of 2.4E-5 m2/s was derived from the analysis of the CRwr phase. The confidence range for the transmissivity is estimated to be 9E-6 to 9E-5 m2/s. A flow dimension of 2 was assumed. The static ground water level was derived from the CRwr phase using straight line extrapolation in the Horner plot to a value of 13.51 m asl.

Area:	Laxemar	Test no:	1
Borehole ID:	KLX24A	Test start:	24.08.2006 17:18
Test section from - to (m):	2.41 - 100.17	Responsible for test execution:	PFL Pumptest
Section diameter, $2 \cdot r_w$ (m):	0.077	Responsible for test evaluation:	Stephan Rohs

Linear plot Q and p

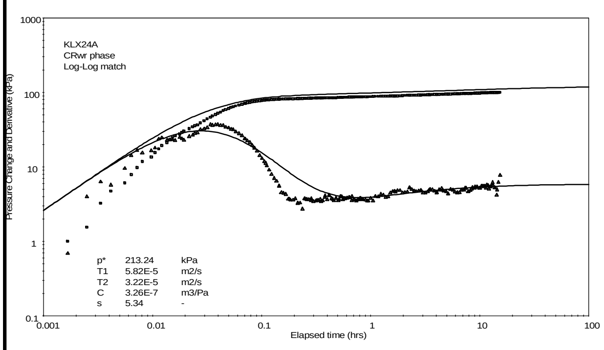


Flow period		Recovery period	
Indata		**Indata**	
h_i (m asl) =	10.01		
h_p(m asl) =	0.22	h_F (m asl) =	9.96
Q_p (m^3/s)=	2.64E-04		
tp (s) =	256440	t_F (s) =	855300
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=			
Derivative fact.=	NA	Derivative fact.=	0.06
Results		**Results**	
Q/s (m^2/s)=	2.7E-05		
T_M (m^2/s)=	3.5E-05		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	NA	dt_1 (min) =	27.00
dt_2 (min) =	NA	dt_2 (min) =	77.40
T (m^2/s) =	NA	T (m^2/s) =	5.8E-05
S (-) =	NA	S (-) =	1.0E-06
K_s (m/s) =	NA	K_s (m/s) =	6.0E-07
S_s (1/m) =	NA	S_s (1/m) =	1.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	3.3E-07
C_D (-) =	NA	C_D (-) =	3.5E+01
ξ (-) =	NA	ξ (-) =	5.3
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Log-Log plot incl. derivates- flow period

Not analysable

Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

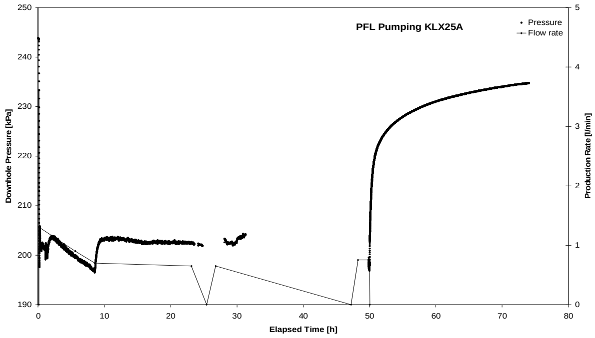
dt_1 (min) =	27.00	C (m^3/Pa) =	3.3E-07
dt_2 (min) =	77.40	C_D (-) =	3.5E+01
T_T (m^2/s) =	5.8E-05	ξ (-) =	5.3
S (-) =	1.0E-06		
K_s (m/s) =	6.0E-07		
S_s (1/m) =	1.0E-08		

Comments:

The recommended transmissivity of 5.8E-5 m2/s was derived from the analysis of the CRwr phase (inner zone). The confidence range for the transmissivity is estimated to be 1E-5 to 9E-5 m2/s. The flow dimension displayed during the test is 2. The static ground water level was derived from the CRwr phase using straight line extrapolation in the Horner plot to a value of 11.54 m asl.

Project:	Oskarshamn site investigation	Test type:[1]	CRwr
Area:	Laxemar	Test no:	1
Borehole ID:	KLX25A	Test start:	17.08.2006 08:53
Test section from - to (m):	2.20 - 50.24	Responsible for test execution:	PFL Pumptest
Section diameter, $2 \cdot r_w$ (m):	0.077	Responsible for test evaluation:	Stephan Rohs

Linear plot Q and p

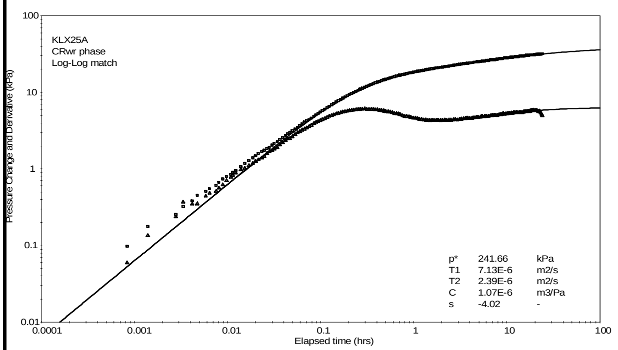


Flow period		Recovery period	
Indata		**Indata**	
h_i (m asl) =	14.64		
h_p(m asl) =	10.02	h_F (m asl) =	13.73
Q_p (m^3/s)=	1.25E-05		
tp (s) =	179580	t_F (s) =	86404
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=			
Derivative fact.=	NA	Derivative fact.=	0.10
Results		**Results**	
Q/s (m^2/s)=	2.7E-06		
T_M (m^2/s)=	3.2E-06		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	NA	dt_1 (min) =	68.40
dt_2 (min) =	NA	dt_2 (min) =	210.00
T (m^2/s) =	NA	T (m^2/s) =	7.1E-06
S (-) =	NA	S (-) =	1.0E-06
K_s (m/s) =	NA	K_s (m/s) =	1.5E-07
S_s (1/m) =	NA	S_s (1/m) =	2.1E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.1E-06
C_D (-) =	NA	C_D (-) =	1.2E+02
ξ (-) =	NA	ξ (-) =	-4.0
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Log-Log plot incl. derivates- flow period

Not analysable

Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	68.40	C (m^3/Pa) =	1.1E-06
dt_2 (min) =	210.00	C_D (-) =	1.2E+02
T_T (m^2/s) =	7.1E-06	ξ (-) =	-4.0
S (-) =	1.0E-06		
K_s (m/s) =	1.5E-07		
S_s (1/m) =	2.1E-08		

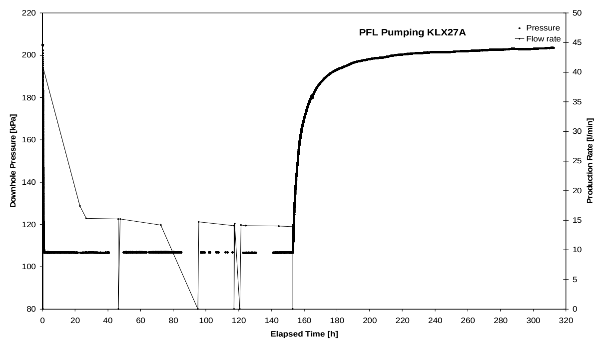
Comments:

The recommended transmissivity of 7.1E-6 m2/s was derived from the analysis of the CRwr phase (inner zone). The confidence range for the transmissivity is estimated to be 1E-6 to 1E-5 m2/s (this range includes the outer zone transmissivity). The flow dimension displayed during the test is 2. The static ground water level was derived from the CRwr phase using straight line extrapolation in the Horner plot to a value of 14.44 m asl.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CRwr
Area:	Laxemar	Test no:	1
Borehole ID:	KLX27A	Test start:	03.01.2008 10:43
Test section from - to (m):	77.02 - 650.56	Responsible for test execution:	PFL Pumptest
Section diameter, $2 \cdot r_w$ (m):	0.2	Responsible for test evaluation:	Stephan Rohs

Linear plot Q and p

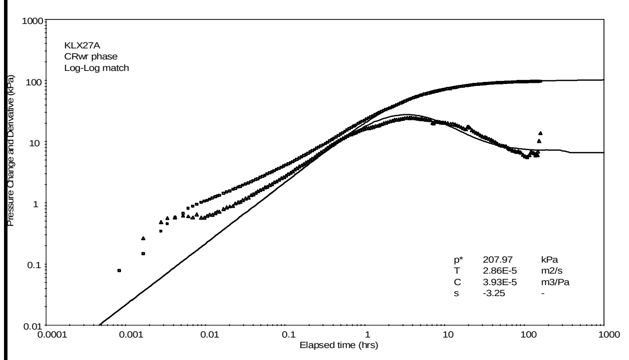


Flow period		Recovery period	
Indata		**Indata**	
h_i (m asl) =	10.69		
h_p(m asl) =	0.68	h_F (m asl) =	10.54
Q_p (m^3/s)=	2.32E-04		
tp (s) =	549600	t_F (s) =	574500
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=			
Derivative fact.=	NA	Derivative fact.=	0.09
Results		**Results**	
Q/s (m^2/s)=	2.3E-05		
T_M (m^2/s)=	3.3E-05		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	8.50	dt_1 (min) =	NA
dt_2 (min) =	26.27	dt_2 (min) =	NA
T (m^2/s) =	NA	T (m^2/s) =	2.9E-05
S (-) =	NA	S (-) =	1.0E-06
K_s (m/s) =	NA	K_s (m/s) =	5.0E-08
S_s (1/m) =	NA	S_s (1/m) =	1.7E-09
C (m^3/Pa) =	NA	C (m^3/Pa) =	3.9E-05
C_D (-) =	NA	C_D (-) =	6.3E+02
ξ (-) =	NA	ξ (-) =	-3.3
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Log-Log plot incl. derivates- flow period

Not analysable

Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	NA	C (m^3/Pa) =	3.9E-05
dt_2 (min) =	NA	C_D (-) =	6.3E+02
T_T (m^2/s) =	2.9E-05	ξ (-) =	-3.3
S (-) =	1.0E-06		
K_s (m/s) =	5.0E-08		
S_s (1/m) =	1.7E-09		

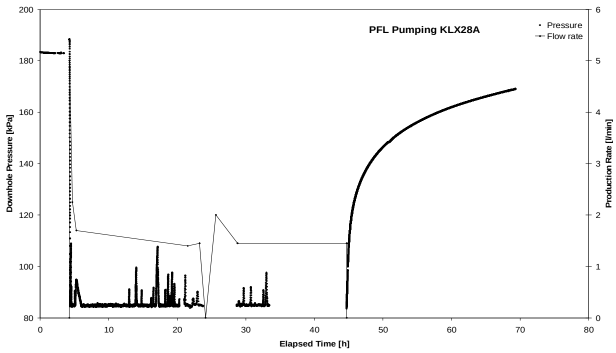
Comments:

The recommended transmissivity of 2.9E-5 m2/s was derived from the analysis of the CRwr phase. The confidence range for the transmissivity is estimated to be 7E-6 to 6E-5 m2/s. A flow dimension of 2 was assumed. The static ground water level was derived from the CRwr phase using straight line extrapolation in the Horner plot to a value of 11.01 m asl.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CRwr
Area:	Laxemar	Test no:	1
Borehole ID:	KLX28A	Test start:	24.11.2006 11:28
Test section from - to (m):	5.10 - 80.23	Responsible for test execution:	PFL Pumptest
Section diameter, $2 \cdot r_w$ (m):	0.077	Responsible for test evaluation:	Stephan Rohs

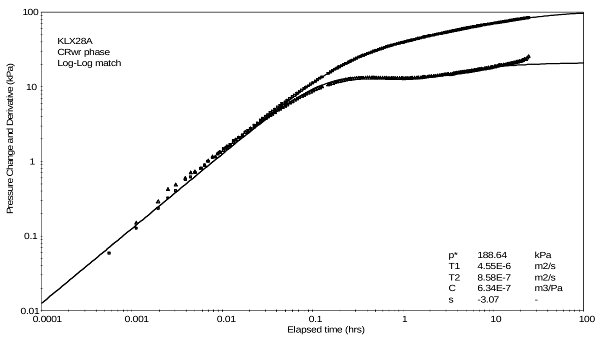
Linear plot Q and p



Log-Log plot incl. derivates- flow period

Not analysable

Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
h_i (m asl) =	8.99		
h_p(m asl) =	-1.63	h_F (m asl) =	7.04
Q_p (m^3/s)=	2.42E-05		
tp (s) =	145560	t_F (s) =	88622
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=			
Derivative fact.=	NA	Derivative fact.=	0.11
Results		**Results**	
Q/s (m^2/s)=	2.3E-06		
T_M (m^2/s)=	2.9E-06		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	NA	dt_1 (min) =	15.00
dt_2 (min) =	NA	dt_2 (min) =	749.40
T (m^2/s) =	NA	T (m^2/s) =	4.6E-06
S (-) =	NA	S (-) =	1.0E-06
K_s (m/s) =	NA	K_s (m/s) =	6.1E-08
S_s (1/m) =	NA	S_s (1/m) =	1.3E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	6.3E-07
C_D (-) =	NA	C_D (-) =	7.0E+01
ξ (-) =	NA	ξ (-) =	-3.1
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Selected representative parameters.

dt_1 (min) =	15.00	C (m^3/Pa) =	6.3E-07
dt_2 (min) =	749.40	C_D (-) =	7.0E+01
T_T (m^2/s) =	4.6E-06	ξ (-) =	-3.1
S (-) =	1.0E-06		
K_s (m/s) =	6.1E-08		
S_s (1/m) =	1.3E-08		

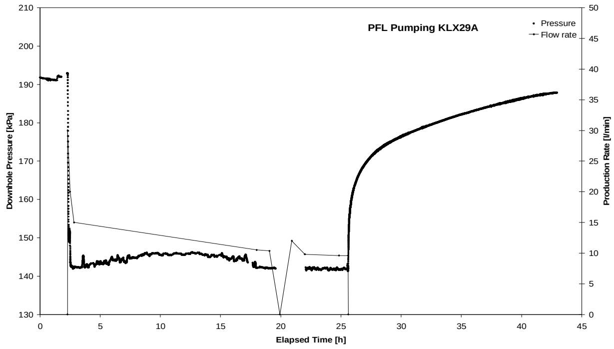
Comments:

The recommended transmissivity of 4.6E-6 m2/s was derived from the analysis of the CRwr phase (inner zone). The confidence range for the transmissivity is estimated to be 8E-7 to 7E-6 m2/s. The flow dimension displayed during the test is 2. The static ground water level was derived from the CRwr phase using straight line extrapolation in the Horner plot to a value of 9.04 m asl.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CRwr
Area:	Laxemar	Test no:	1
Borehole ID:	KLX29A	Test start:	27.11.2006 14:00
Test section from - to (m):	2.35 - 60.25	Responsible for test execution:	PFL Pumptest
Section diameter, $2 \cdot r_w$ (m):	0.077	Responsible for test evaluation:	Stephan Rohs

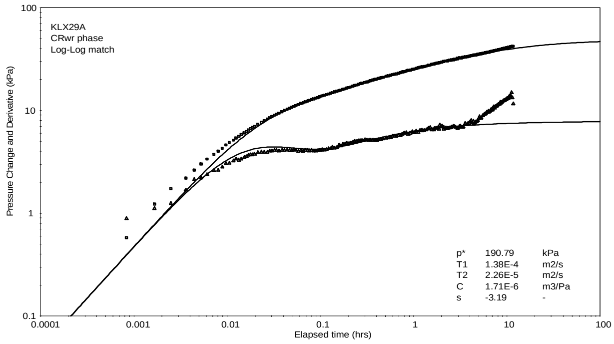
Linear plot Q and p



Log-Log plot incl. derivates- flow period

Not analysable

Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
h_i (m asl) =	9.44		
h_p(m asl) =	4.20	h_F (m asl) =	8.95
Q_p (m^3/s)=	1.60E-04		
tp (s) =	83880	t_F (s) =	62400
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=			
Derivative fact.=	NA	Derivative fact.=	
Results		**Results**	
Q/s (m^2/s)=	3.1E-05		
T_M (m^2/s)=	3.7E-05		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	NA	dt_1 (min) =	NA
dt_2 (min) =	NA	dt_2 (min) =	NA
T (m^2/s) =	NA	T (m^2/s) =	2.3E-05
S (-) =	NA	S (-) =	1.0E-06
K_s (m/s) =	NA	K_s (m/s) =	3.9E-07
S_s (1/m) =	NA	S_s (1/m) =	1.7E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.7E-06
C_D (-) =	NA	C_D (-) =	1.9E+02
ξ (-) =	NA	ξ (-) =	-3.2
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Selected representative parameters.

dt_1 (min) =	NA	C (m^3/Pa) =	1.7E-06
dt_2 (min) =	NA	C_D (-) =	1.9E+02
T_T (m^2/s) =	2.3E-05	ξ (-) =	-3.2
S (-) =	1.0E-06		
K_s (m/s) =	3.9E-07		
S_s (1/m) =	1.7E-08		

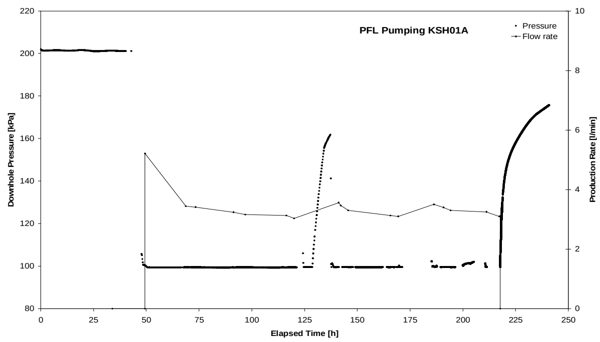
Comments:

The recommended transmissivity of 2.3E-5 m2/s was derived from the analysis of the CRwr phase (outer zone), which is deemed to be representative for the formation. The confidence range for the transmissivity is estimated to be 5E-6 to 4E-5 m2/s. The flow dimension displayed during the test is 2. The static ground water level was derived from the CRwr phase using straight line extrapolation in the Horner plot to a value of 9.26 m asl.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CRwr
Area:	Laxemar	Test no:	1
Borehole ID:	KSH01A	Test start:	20.02.2003 14:05
Test section from - to (m):	12.10 - 1003.00	Responsible for test execution:	PFL Pumptest
Section diameter, $2 \cdot r_w$ (m):	0.2	Responsible for test evaluation:	Stephan Rohs

Linear plot Q and p

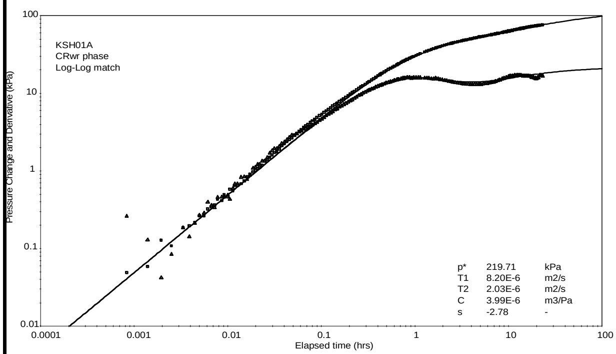


Flow period		Recovery period	
Indata		**Indata**	
h_i (m asl) =	0.12		
h_p(m asl) =	-10.22	h_F (m asl) =	-2.48
Q_p (m^3/s)=	5.17E-05		
tp (s) =	605880	t_F (s) =	83192
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=			
Derivative fact.=	NA	Derivative fact.=	
Results		**Results**	
Q/s (m^2/s)=	5.0E-06		
T_M (m^2/s)=	7.6E-06		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	NA	dt_1 (min) =	192.00
dt_2 (min) =	NA	dt_2 (min) =	342.00
T (m^2/s) =	NA	T (m^2/s) =	8.2E-06
S (-) =	NA	S (-) =	1.0E-06
K_s (m/s) =	NA	K_s (m/s) =	8.3E-09
S_s (1/m) =	NA	S_s (1/m) =	1.0E-09
C (m^3/Pa) =	NA	C (m^3/Pa) =	4.0E-06
C_D (-) =	NA	C_D (-) =	6.4E+01
ξ (-) =	NA	ξ (-) =	-2.8
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Log-Log plot incl. derivates- flow period

Not analysable

Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	192.00	C (m^3/Pa) =	4.0E-06
dt_2 (min) =	342.00	C_D (-) =	6.4E+01
T_T (m^2/s) =	8.2E-06	ξ (-) =	-2.8
S (-) =	1.0E-06		
K_s (m/s) =	8.3E-09		
S_s (1/m) =	1.0E-09		

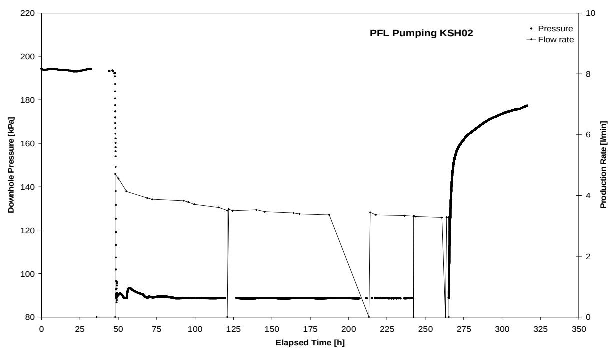
Comments:

The recommended transmissivity of 8.2E-6 m2/s was derived from the analysis of the CRwr phase (inner zone), which shows a horizontal stabilization. The confidence range for the transmissivity is estimated to be 1E-6 to 1E-5 m2/s. The flow dimension displayed during the test is 2. The static ground water level was derived from the CRwr phase using straight line extrapolation in the Horner plot to a value of 1.95 m asl.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CRwr
Area:	Laxemar	Test no:	1
Borehole ID:	KSH02	Test start:	09.07.2003 11:57
Test section from - to (m):	80.00 - 1001.11	Responsible for test execution:	PFL Pumptest
Section diameter, $2 \cdot r_w$ (m):	0.2	Responsible for test evaluation:	Stephan Rohs

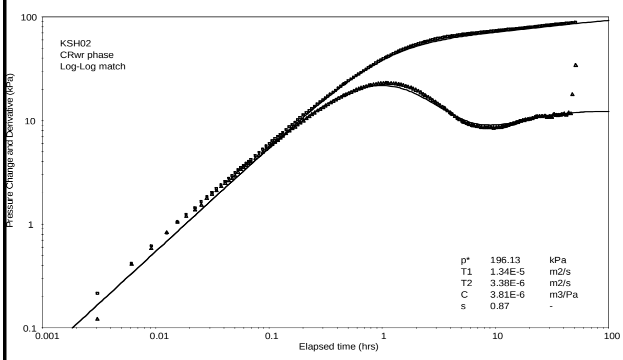
Linear plot Q and p



Flow period		Recovery period	
Indata		**Indata**	
h_i (m asl) =	-0.67		
h_p(m asl) =	-11.21	h_F (m asl) =	-2.32
Q_p (m^3/s)=	5.47E-05		
tp (s) =	781920	t_F (s) =	183808
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=			
Derivative fact.=	NA	Derivative fact.=	0.09
Results		**Results**	
Q/s (m^2/s)=	5.2E-06		
T_M (m^2/s)=	7.8E-06		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	NA	dt_1 (min) =	417.60
dt_2 (min) =	NA	dt_2 (min) =	754.80
T (m^2/s) =	NA	T (m^2/s) =	1.3E-05
S (-) =	NA	S (-) =	1.0E-06
K_s (m/s) =	NA	K_s (m/s) =	1.5E-08
S_s (1/m) =	NA	S_s (1/m) =	1.1E-09
C (m^3/Pa) =	NA	C (m^3/Pa) =	3.8E-06
C_D (-) =	NA	C_D (-) =	6.1E+01
ξ (-) =	NA	ξ (-) =	0.9
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Log-Log plot incl. derivates- flow period

Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	417.60	C (m^3/Pa) =	3.8E-06
dt_2 (min) =	754.80	C_D (-) =	6.1E+01
T_T (m^2/s) =	1.3E-05	ξ (-) =	0.9
S (-) =	1.0E-06		
K_s (m/s) =	1.5E-08		
S_s (1/m) =	1.1E-09		

Comments:

The recommended transmissivity of 1.3E-5 m2/s was derived from the analysis of the CRwr phase (inner zone), which shows a horizontal stabilization. The confidence range for the transmissivity is estimated to be 2E-6 to 3E-5 m2/s (this range encompasses the outer zone transmissivity). The flow dimension displayed during the test is 2. The static ground water level was derived from the CRwr phase using straight line extrapolation in the Horner plot to a value of -0.40 m asl.

APPENDIX 3

SICADA data tables

(Simplified version v1.9)

SICADA/Data Import Template

File Identity	5048	**File Time Zone**	
Created By	Bengt Gentzschein		
Created	2008.05.15 09:43		

Compiled By	
Quality Check For Delivery	
Delivery Approval	

Activity Type	HY610 Pumping test-submersible pump
Project	PLU

Activity Information						**Additional Activity Data**						
						C10	I250	P20	P200	P220	R240	R25
Idcode	**Start Date**	**Stop Date**	**Secup (m)**	**Seclow (m)**	**Section No**	**Company**	**Test equipment**	**Field crew manager**	**Field crew**	**evaluating data**	**calibration type**	**Report**
KAV01	2004-02-18 16:25:51	2004-02-26 14:46:42	70,04	757,31		Golder Associates	Posiva Flowlog			Reinder van der Wall, Stephan Rohs		Reinder van der Wall, Stephan Rohs
KAV04A	2004-06-10 12:24:29	2004-06-16 14:55:24	100,95	1000,40		Golder Associates	Posiva Flowlog			Reinder van der Wall, Stephan Rohs		Reinder van der Wall, Stephan Rohs
KAV04B	2004-06-16 17:18:30	2004-06-16 17:19:00	11,52	101,03		Golder Associates	Posiva Flowlog			Reinder van der Wall, Stephan Rohs		Reinder van der Wall, Stephan Rohs
KLX04	2004-07-29 09:56:34	2004-07-29 09:57:00	101,43	993,49		Golder Associates	Posiva Flowlog			Reinder van der Wall, Stephan Rohs		Reinder van der Wall, Stephan Rohs
KLX09	2006-05-11 20:27:18	2006-05-23 16:47:46	11,95	880,38		Golder Associates	Posiva Flowlog			Reinder van der Wall, Stephan Rohs		Reinder van der Wall, Stephan Rohs
KLX09B	2006-02-21 10:45:25	2006-03-03 08:29:56	10,74	120,22		Golder Associates	Posiva Flowlog			Reinder van der Wall, Stephan Rohs		Reinder van der Wall, Stephan Rohs
KLX09C	2006-03-03 13:33:57	2006-03-13 10:10:19	9,00	120,05		Golder Associates	Posiva Flowlog			Reinder van der Wall, Stephan Rohs		Reinder van der Wall, Stephan Rohs

(Simplified version v1.9)

SICADA/Data Import Template

SKB & Ergodata AB 2007

File Identity	5048
Created By	Bengt Gentzschein
Created	2008.05.15 09:43

File Time Zone

Compiled By	
Quality Check For Delivery	
Delivery Approval	

Activity Type	HY610
	Pumping test-submersible pump

Project	PLU

Activity Information						Additional Activity Data						
						C10	I250	P20	P200	P220	R240	R25
Idcode	Start Date	Stop Date	Secup (m)	Seclow (m)	Section No	Company	Test equipment	Field crew manager	Field crew	evaluating data	calibration type	Report
KLX09D	2006-03-22 14:33:38	2006-03-31 07:29:41	9,75	121,02		Golder Associates	Posiva Flowlog			Reinder van der Wall, Stephan Rohs		Reinder van der Wall, Stephan Rohs
KLX09E	2006-03-13 11:10:18	2006-03-22 12:38:00	9,00	120,00		Golder Associates	Posiva Flowlog			Reinder van der Wall, Stephan Rohs		Reinder van der Wall, Stephan Rohs
KLX09F	2006-03-31 09:11:56	2006-04-08 08:57:00	9,00	152,30		Golder Associates	Posiva Flowlog			Reinder van der Wall, Stephan Rohs		Reinder van der Wall, Stephan Rohs
KLX09G	2006-07-12 14:07:45	2006-07-19 06:00:00	9,30	100,10		Golder Associates	Posiva Flowlog			Reinder van der Wall, Stephan Rohs		Reinder van der Wall, Stephan Rohs
KLX10	2005-12-10 11:10:26	2005-12-31 07:35:00	12,10	1001,20		Golder Associates	Posiva Flowlog			Reinder van der Wall, Stephan Rohs		Reinder van der Wall, Stephan Rohs
KLX10B	2006-07-18 15:01:58	2006-07-27 14:19:30	9,00	50,25		Golder Associates	Posiva Flowlog			Reinder van der Wall, Stephan Rohs		Reinder van der Wall, Stephan Rohs
KLX10C	2006-07-24 12:59:28	2006-07-30 06:58:30	9,00	146,25		Golder Associates	Posiva Flowlog			Reinder van der Wall, Stephan Rohs		Reinder van der Wall, Stephan Rohs

(Simplified version v1.9)

SICADA/Data Import Template

SKB & Ergodata AB 2007

File Identity	5048
Created By	Bengt Gentzschein
Created	2008.05.15 09:43

File Time Zone

Compiled By	
Quality Check For Delivery	
Delivery Approval	

Activity Type	HY610
	Pumping test-submersible pump

Project	PLU

Activity Information						**Additional Activity Data**						
						C10	I250	P20	P200	P220	R240	R25
Idcode	**Start Date**	**Stop Date**	**Secup (m)**	**Seclow (m)**	**Section No**	**Company**	**Test equipment**	**Field crew manager**	**Field crew**	**evaluating data**	**calibration type**	**Report**
KLX11A	2006-11-01 16:08:36	2006-11-10 13:29:29	12,05	992,29		Golder Associates	Posiva Flowlog			Reinder van der Wall, Stephan Rohs		Reinder van der Wall, Stephan Rohs
KLX11B	2006-09-04 15:01:10	2006-09-22 10:12:00	2,54	100,20		Golder Associates	Posiva Flowlog			Reinder van der Wall, Stephan Rohs		Reinder van der Wall, Stephan Rohs
KLX11C	2006-10-12 16:08:29	2006-10-15 15:50:28	2,00	120,15		Golder Associates	Posiva Flowlog			Reinder van der Wall, Stephan Rohs		Reinder van der Wall, Stephan Rohs
KLX11D	2006-10-02 15:46:50	2006-10-12 12:33:20	2,00	120,35		Golder Associates	Posiva Flowlog			Reinder van der Wall, Stephan Rohs		Reinder van der Wall, Stephan Rohs
KLX11E	2006-09-22 14:47:36	2006-10-02 15:53:02	2,00	121,30		Golder Associates	Posiva Flowlog			Reinder van der Wall, Stephan Rohs		Reinder van der Wall, Stephan Rohs
KLX11F	2006-10-16 10:16:54	2006-10-21 16:45:09	2,00	120,05		Golder Associates	Posiva Flowlog			Reinder van der Wall, Stephan Rohs		Reinder van der Wall, Stephan Rohs
KLX12A	2006-06-09 16:05:49	2006-06-19 08:54:00	17,92	602,29		Golder Associates	Posiva Flowlog			Reinder van der Wall, Stephan Rohs		Reinder van der Wall, Stephan Rohs

(Simplified version v1.9)

SICADA/Data Import Template

SKB & Ergodata AB 2007

File Identity	5048
Created By	Bengt Gentzschein
Created	2008.05.15 09:43

File Time Zone

Compiled By	
Quality Check For Delivery	
Delivery Approval	

Activity Type	HY610 Pumping test-submersible pump

Project	PLU

Activity Information						**Additional Activity Data**						
						C10	I250	P20	P200	P220	R240	R25
Idcode	**Start Date**	**Stop Date**	**Secup (m)**	**Seclow (m)**	**Section No**	**Company**	**Test equipment**	**Field crew manager**	**Field crew**	**evaluating data**	**calibration type**	**Report**
KLX13A	2006-09-24 14:30:44	2006-10-01 11:24:02	11,75	595,85		Golder Associates	Posiva Flowlog			Reinder van der Wall, Stephan Rohs		Reinder van der Wall, Stephan Rohs
KLX17A	2007-01-03 18:38:04	2007-01-11 14:23:40	11,95	701,08		Golder Associates	Posiva Flowlog			Reinder van der Wall, Stephan Rohs		Reinder van der Wall, Stephan Rohs
KLX18A	2006-07-08 11:46:08	2006-07-21 23:59:00	11,83	611,28		Golder Associates	Posiva Flowlog			Reinder van der Wall, Stephan Rohs		Reinder van der Wall, Stephan Rohs
KLX20A	2006-06-27 11:07:54	2006-07-11 09:35:00	100,90	457,92		Golder Associates	Posiva Flowlog			Reinder van der Wall, Stephan Rohs		Reinder van der Wall, Stephan Rohs
KLX24A	2006-08-24 17:18:41	2006-09-06 14:20:00	2,41	100,17		Golder Associates	Posiva Flowlog			Reinder van der Wall, Stephan Rohs		Reinder van der Wall, Stephan Rohs
KLX25A	2006-08-17 08:53:34	2006-08-20 10:55:04	2,20	50,24		Golder Associates	Posiva Flowlog			Reinder van der Wall, Stephan Rohs		Reinder van der Wall, Stephan Rohs
KLX27A	2008-01-03 10:43:38	2008-01-16 11:21:00	77,02	650,54		Golder Associates	Posiva Flowlog			Reinder van der Wall, Stephan Rohs		Reinder van der Wall, Stephan Rohs

(Simplified version v1.9)

SICADA/Data Import Template

SKB & Ergodata AB 2007

File Identity	5048	**File Time Zone**		**Compiled By**	
Created By	Bengt Gentzschein			**Quality Check For Delivery**	
Created	2008.05.15 09:43			**Delivery Approval**	

Activity Type	HY610 Pumping test-submersible pump	**Project**	PLU

Activity Information						**Additional Activity Data**						
						C10	I250	P20	P200	P220	R240	R25
Idcode	**Start Date**	**Stop Date**	**Secup (m)**	**Seclow (m)**	**Section No**	**Company**	**Test equipment**	**Field crew manager**	**Field crew**	**evaluating data**	**calibration type**	**Report**
KLX28A	2006-11-24 11:28:37	2006-11-27 08:48:02	5,10	80,23		Golder Associates	Posiva Flowlog			Reinder van der Wall, Stephan Rohs		Reinder van der Wall, Stephan Rohs
KLX29A	2006-11-27 14:00:11	2006-11-29 08:56:00	2,35	60,25		Golder Associates	Posiva Flowlog			Reinder van der Wall, Stephan Rohs		Reinder van der Wall, Stephan Rohs
KSH01A	2003-02-20 14:05:33	2003-03-02 14:54:32	12,10	1003,00		Golder Associates	Posiva Flowlog			Reinder van der Wall, Stephan Rohs		Reinder van der Wall, Stephan Rohs
KSH02	2003-07-09 11:57:09	2003-07-22 16:15:28	80,00	1001,11		Golder Associates	Posiva Flowlog			Reinder van der Wall, Stephan Rohs		Reinder van der Wall, Stephan Rohs

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	INGRESDATE		Date (yymmdd hh:mm:ss)
stop_date	INGRESDATE		Date (yymmdd hh:mm:ss)
project	VARCHAR		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 for test section, see descr.
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)
value_type_tm	CHAR		0:true value,-1:TM<lower meas.limit,1:TM>upper meas.limit.
bc_tm	CHAR		Best choice code. 1 means Tmoye is best choice of T, else 0
hydr_cond_moye	FLOAT	m/s	K_M: Hydraulic conductivity based on Moye (1967)
formation_width_b	FLOAT	m	b:Aquifer thickness repr. for T(generally b=Lw) ,see descr.
width_of_channel_b	FLOAT	m	B:Inferred width of formation for evaluated TB
tb	FLOAT	m**3/s	TB:Flow capacity in 1D formation of T & width B, see descr.
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,1D model,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	TT:Transmissivity of formation, 2D radial flow model,see...
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 TT,see table descr
u_measl_q_s	FLOAT	m**2/s	Estimated upper meas. limit for evaluated TT,see description
storativity_s	FLOAT		S:Storativity of formation based on 2D rad flow,see descr.
assumed_s	FLOAT		Assumed Storativity,2D model evaluation,see table descr.
s_bc	FLOAT		Best choice of S (Storativity) ,see descr.
ri	FLOAT	m	Radius of influence
ri_index	CHAR		ri index=index of radius of influence :-1,0 or 1, see descr.
leakage_coeff	FLOAT	1/s	K'/b':2D rad flow model evaluation of leakage coeff,see desc
hydr_cond_ksf	FLOAT	m/s	Ksf:3D model evaluation of hydraulic conductivity,see desc.
value_type_ksf	CHAR		0:true value,-1:Ksf<lower meas.limit,1:Ksf>upper meas.limit,
l_measl_ksf	FLOAT	m/s	Estimated lower meas.limit for evaluated Ksf,see table desc.
u_measl_ksf	FLOAT	m/s	Estimated upper meas.limit for evaluated Ksf,see table descr
spec_storage_ssf	FLOAT	1/m	Ssf:Specific storage,3D model evaluation,see table descr.
assumed_ssf	FLOAT	1/m	Ssf*:Assumed Spec.storage,3D model evaluation,see table des.
c	FLOAT	m**3/pa	C: Wellbore storage coefficient; flow or recovery period
cd	FLOAT		CD: Dimensionless wellbore storage coefficient
skin	FLOAT		Skin factor;best estimate of flow/recovery period,see descr.
dt1	FLOAT	s	Estimated start time of evaluation, see table description
dt2	FLOAT	s	Estimated stop time of evaluation. see table description

Table	plu_s_hole_test_ed1		
	PLU Single hole tests, pumping/injection. Basic evaluation		

Column	Datatype	Unit	Column Description
t1	FLOAT	s	Start time for evaluated parameter from start flow period
t2	FLOAT	s	Stop time for evaluated parameter from start of flow period
dte1	FLOAT	s	Start time for evaluated parameter from start of recovery
dte2	FLOAT	s	Stop time for evaluated parameter from start of recovery
p_horner	FLOAT	kPa	p*:Horner extrapolated pressure, see table description
transmissivity_t_nlr	FLOAT	m**2/s	T_NLR Transmissivity based on None Linear Regression...
storativity_s_nlr	FLOAT		S_NLR=storativity based on None Linear Regression,see..
value_type_t_nlr	CHAR		0:true value,-1:T_NLR<lower meas.limit,1:>upper meas.limit
bc_t_nlr	CHAR		Best choice code. 1 means T_NLR is best choice of T, else 0
c_nlr	FLOAT	m**3/pa	Wellbore storage coefficient, based on NLR, see descr.
cd_nlr	FLOAT		Dimensionless wellbore storage constant, see table descrip.
skin_nlr	FLOAT		Skin factor based on Non Linear Regression,see desc.
transmissivity_t_grf	FLOAT	m**2/s	T_GRF:Transmissivity based on Genelized Radial 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 based on Generalized Radial Flow, see des.
flow_dim_grf	FLOAT		Inferred flow dimesion based on Generalized Rad. Flow model
comment	VARCHAR		Short comment to the evaluated parameters
error_flag	CHAR		*: Data for the activity is erroneous and should not be used
in_use	CHAR		If in_use = "*" then the activity has been selected as
sign	CHAR		Activity QA signature

idcode	start_date	stop_date	secup (m)	seclow (m)	section_no	test_type	formation_type	lp (m)	seclen_class (m)	spec_capacity_q_s (m**2/s)	value_type_q_s	transmissivity_tq (m**2/s)	value_type_tq	bc_tq	transmissivity_moye (m**2/s)
KAV01	2004-02-18 16:25:51	2004-02-26 14:46:42	70,04	757,31		1B	1	413,68	687,27	3,12E-05	0				4,65E-05
KAV04A	2004-06-10 12:24:29	2004-06-16 14:55:24	100,95	1000,40		1B	1	550,68	899,45	1,77E-05	0				2,65E-05
KAV04B	2004-06-16 17:18:30	2004-06-16 17:19:00	11,52	101,03		1B	1	56,28	89,51	3,86E-05	0				4,95E-05
KLX04	2004-07-29 09:56:34	2004-07-29 09:57:00	101,43	993,49		1B	1	547,46	892,06	1,23E-04	0				1,84E-04
KLX09	2006-05-11 20:27:18	2006-05-23 16:47:46	11,95	880,38		1B	1	446,17	868,43	2,29E-04	0				3,38E-04
KLX09B	2006-02-21 10:45:25	2006-03-03 08:29:56	10,74	120,22		1B	1	65,48	109,48	1,62E-05	0				2,07E-05
KLX09C	2006-03-03 13:33:57	2006-03-13 10:10:19	9,00	120,05		1B	1	64,53	111,05	1,02E-04	0				1,34E-04
KLX09D	2006-03-22 14:33:38	2006-03-31 07:29:41	9,75	121,02		1B	1	65,39	111,27	2,44E-05	0				3,21E-05
KLX09E	2006-03-13 11:10:18	2006-03-22 12:38:00	9,00	120,00		1B	1	64,50	111,00	9,47E-05	0				1,25E-04
KLX09F	2006-03-31 09:11:56	2006-04-08 08:57:00	9,00	152,30		1B	1	80,65	143,30	1,53E-04	0				2,09E-04
KLX09G	2006-07-12 14:07:45	2006-07-19 06:00:00	9,30	100,10		1B	1	54,70	90,80	1,73E-05	0				2,22E-05
KLX10	2005-12-10 11:10:26	2005-12-31 07:35:00	12,10	1001,20		1B	1	506,65	989,10	2,09E-04	0				3,17E-04
KLX10B	2006-07-18 15:01:58	2006-07-27 14:19:30	9,00	50,25		1B	1	29,63	41,25	4,69E-05	0				5,44E-05
KLX10C	2006-07-24 12:59:28	2006-07-30 06:58:30	9,00	146,25		1B	1	77,63	137,25	1,09E-05	0				1,47E-05
KLX11A	2006-11-01 16:08:36	2006-11-10 13:29:29	12,05	992,29		1B	1	502,17	980,24	5,28E-05	0				7,98E-05
KLX11B	2006-09-04 15:01:10	2006-09-22 10:12:00	2,54	100,20		1B	1	51,37	97,66	2,84E-05	0				3,68E-05
KLX11C	2006-10-12 16:08:29	2006-10-15 15:50:28	2,00	120,15		1B	1	61,08	118,15	2,48E-06	0				3,30E-06
KLX11D	2006-10-02 15:46:50	2006-10-12 12:33:20	2,00	120,35		1B	1	61,18	118,35	3,25E-05	0				4,31E-05
KLX11E	2006-09-22 14:47:36	2006-10-02 15:53:02	2,00	121,30		1B	1	61,65	119,30	3,88E-06	0				5,16E-06
KLX11F	2006-10-16 10:16:54	2006-10-21 16:45:09	2,00	120,05		1B	1	61,03	118,05	3,07E-05	0				4,07E-05
KLX12A	2006-06-09 16:05:49	2006-06-19 08:54:00	17,92	602,29		1B	1	310,11	584,37	1,09E-05	0				1,56E-05
KLX13A	2006-09-24 14:30:44	2006-10-01 11:24:02	11,75	595,85		1B	1	303,80	584,10	6,48E-05	0				9,26E-05
KLX17A	2007-01-03 18:38:04	2007-01-11 14:23:40	11,95	701,08		1B	1	356,52	689,13	2,30E-05	0				3,35E-05
KLX18A	2006-07-08 11:46:08	2006-07-21 23:59:00	11,83	611,28		1B	1	311,56	599,45	1,92E-05	0				2,75E-05
KLX20A	2006-06-27 11:07:54	2006-07-11 09:35:00	100,90	457,92		1B	1	279,41	357,02	1,11E-05	0				1,50E-05
KLX24A	2006-08-24 17:18:41	2006-09-06 14:20:00	2,41	100,17		1B	1	51,29	97,76	2,70E-05	0				3,51E-05
KLX25A	2006-08-17 08:53:34	2006-08-20 10:55:04	2,20	50,24		1B	1	26,22	48,04	2,71E-06	0				3,21E-06
KLX27A	2008-01-03 10:43:38	2008-01-16 11:21:00	77,02	650,54		1B	1	363,78	573,52	2,31E-05	0				3,30E-05
KLX28A	2006-11-24 11:28:37	2006-11-27 08:48:02	5,10	80,23		1B	1	42,67	75,13	2,28E-06	0				2,86E-06
KLX29A	2006-11-27 14:00:11	2006-11-29 08:56:00	2,35	60,25		1B	1	31,30	57,90	3,05E-05	0				3,71E-05
KSH01A	2003-02-20 14:05:33	2003-03-02 14:54:32	12,10	1003,00		1B	1	507,55	990,90	5,00E-06	0				8,26E-06
KSH02	2003-07-09 11:57:09	2003-07-22 16:15:28	80,00	1001,11		1B	1	540,56	921,11	5,19E-06	0				8,59E-06

	(m)	(m)			(m/s)	(m)	(m)	(m**3/s)	(m**3/s)	(m**3/s)	(m)	(m)	(m)	(m**2/s)			(m**2/s)	(m**2/s)
idcode	secup	seclow	value_type_tm	bc_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	l_measl_q_s	u_measl_q_s
KAV01	70,04	757,31	0	0	6,77E-08									7,38E-05	0	1	1,00E-05	1,00E-04
KAV04A	100,95	1000,40	0	0	2,94E-08									6,80E-05	0	1	1,00E-05	1,00E-04
KAV04B	11,52	101,03	0	0	5,54E-07									9,56E-05	0	1	1,00E-05	2,00E-04
KLX04	101,43	993,49	0	0	2,06E-07									3,30E-04	0	1	5,00E-05	5,00E-04
KLX09	11,95	880,38	0	0	3,89E-07									5,40E-04	0	1	1,00E-04	8,00E-04
KLX09B	10,74	120,22	0	0	1,89E-07									8,50E-05	0	1	1,00E-05	1,00E-04
KLX09C	9,00	120,05	0	0	1,21E-06									5,30E-04	0	1	1,00E-04	7,00E-04
KLX09D	9,75	121,02	0	0	2,89E-07									7,84E-05	0	1	2,00E-05	1,00E-04
KLX09E	9,00	120,00	0	0	1,13E-06									2,61E-04	0	1	9,00E-05	4,00E-04
KLX09F	9,00	152,30	0	0	1,46E-06									4,32E-04	0	1	1,00E-04	6,00E-04
KLX09G	9,30	100,10	0	0	2,45E-07									6,54E-05	0	1	1,00E-05	9,00E-05
KLX10	12,10	1001,20	0	0	3,20E-07									5,33E-04	0	1	1,00E-04	8,00E-04
KLX10B	9,00	50,25	0	0	1,32E-06									2,71E-04	0	1	1,00E-05	4,00E-04
KLX10C	9,00	146,25	0	0	1,07E-07									2,50E-05	0	1	9,00E-06	6,00E-04
KLX11A	12,05	992,29	0	0	8,14E-08									1,22E-04	0	1	5,00E-05	4,00E-04
KLX11B	2,54	100,20	0	0	3,77E-07									8,15E-05	0	1	1,00E-05	1,00E-04
KLX11C	2,00	120,15	0	0	2,79E-08									4,60E-06	0	1	2,00E-06	4,00E-05
KLX11D	2,00	120,35	0	0	3,64E-07									6,16E-05	0	1	2,00E-05	9,00E-05
KLX11E	2,00	121,30	0	0	4,32E-08									6,98E-06	0	1	2,00E-06	1,00E-05
KLX11F	2,00	120,05	0	0	3,45E-07									2,06E-05	0	1	9,00E-06	7,00E-05
KLX12A	17,92	602,29	0	0	2,66E-08									2,30E-05	0	1	8,00E-06	5,00E-05
KLX13A	11,75	595,85	0	0	1,59E-07									3,47E-05	0	1	9,00E-06	6,00E-05
KLX17A	11,95	701,08	0	0	4,86E-08									5,23E-05	0	1	1,00E-05	9,00E-05
KLX18A	11,83	611,28	0	0	4,59E-08									4,09E-05	0	1	1,00E-05	9,00E-05
KLX20A	100,90	457,92	0	0	4,21E-08									2,44E-05	0	1	9,00E-06	9,00E-05
KLX24A	2,41	100,17	0	0	3,59E-07									5,82E-05	0	1	1,00E-05	9,00E-05
KLX25A	2,20	50,24	0	0	6,68E-08									7,13E-06	0	1	1,00E-06	1,00E-05
KLX27A	77,02	650,54	0	0	5,76E-08									2,86E-05	0	1	7,00E-06	6,00E-05
KLX28A	5,10	80,23	0	0	3,81E-08									4,55E-06	0	1	8,00E-07	7,00E-06
KLX29A	2,35	60,25	0	0	6,41E-07									2,26E-05	0	1	5,00E-06	4,00E-05
KSH01A	12,10	1003,00	0	0	8,33E-09									8,20E-06	0	1	1,00E-06	1,00E-05
KSH02	80,00	1001,11	0	0	9,32E-09									1,34E-05	0	1	2,00E-06	3,00E-05

	(m)	(m)				(m)		(1/s)	(m/s)		(m/s)	(m/s)	(1/m)	(1/m)	(m**3/pa)			(s)	(s)
idcode	secup	seclow	storativity_s	assumed_s	s_bc	ri	ri_index	leakage_coeff	hydr_cond_ksf	value_type_ksf	l_measl_ksf	u_measl_ksf	spec_storage_ssf	assumed_ssf	c	cd	skin	dt1	dt2
KAV01	70,04	757,31	1,00E-06	1,00E-06		1	273,05								2,20E-06	5,47E+01	-2,2	1476	2700
KAV04A	100,95	1000,40	1,00E-06	1,00E-06		1	329,82								4,79E-06	7,62E+01	-2,9	2232	4104
KAV04B	11,52	101,03	1,00E-06	1,00E-06		1	174,78								3,60E-07	3,97E+01	-1,1	468	972
KLX04	101,43	993,49	1,00E-06	1,00E-06		1	267,34								3,23E-06	5,14E+01	-2,8	756	1224
KLX09	11,95	880,38	1,00E-06	1,00E-06		1	315,42								5,16E-06	8,21E+01	-1,4	720	1332
KLX09B	10,74	120,22	1,00E-06	1,00E-06		0	2775,32								4,53E-07	4,86E+01	13,8	#NV	#NV
KLX09C	9,00	120,05	1,00E-06	1,00E-06		1	178,79								4,29E-07	4,61E+01	13,1	216	432
KLX09D	9,75	121,02	1,00E-06	1,00E-06		1	327,99								3,60E-07	3,87E+01	12,5	1404	3780
KLX09E	9,00	120,00	1,00E-06	1,00E-06		1	299,55								8,70E-07	9,59E+01	1,9	756	1728
KLX09F	9,00	152,30	1,00E-06	1,00E-06		1	176,82								5,94E-07	6,55E+01	-1,2	180	468
KLX09G	9,30	100,10	1,00E-06	1,00E-06		0	2863,67								4,66E-07	5,00E+01	13,5	#NV	#NV
KLX10	12,10	1001,20	1,00E-06	1,00E-06		1	231,15								2,51E-06	3,99E+01	-3,2	432	720
KLX10B	9,00	50,25	1,00E-06	1,00E-06		1	489,92								3,65E-07	3,92E+01	29,9	1404	4536
KLX10C	9,00	146,25	1,00E-06	1,00E-06		-1	1945,83								5,49E-07	5,89E+01	3,9	#NV	#NV
KLX11A	12,05	992,29	1,00E-06	1,00E-06		1	474,29								3,38E-06	5,38E+01	-1,0	3708	6336
KLX11B	2,54	100,20	1,00E-06	1,00E-06		1	335,89								5,13E-07	5,51E+01	3,5	1152	3888
KLX11C	2,00	120,15	1,00E-06	1,00E-06		-1	#NV								5,17E-07	5,55E+01	3,0	#NV	#NV
KLX11D	2,00	120,35	1,00E-06	1,00E-06		1	217,32								6,49E-07	6,97E+01	-1,8	792	1872
KLX11E	2,00	121,30	1,00E-06	1,00E-06		1	592,93								4,31E-07	4,63E+01	2,2	11268	41400
KLX11F	2,00	120,05	1,00E-06	1,00E-06		-1	107,49								5,32E-07	5,71E+01	-6,1	72	792
KLX12A	17,92	602,29	1,00E-06	1,00E-06		0	2220,52								3,75E-06	5,97E+01	2,1	#NV	#NV
KLX13A	11,75	595,85	1,00E-06	1,00E-06		1	#NV								2,82E-05	4,49E+02	-2,2	10080	55800
KLX17A	11,95	701,08	1,00E-06	1,00E-06		0	2240,76								3,86E-06	6,14E+01	3,3	19332	216000
KLX18A	11,83	611,28	1,00E-06	1,00E-06		0	1702,34								3,79E-06	6,03E+01	2,7	7560	140976
KLX20A	100,90	457,92	1,00E-06	1,00E-06		0	3678,11								3,81E-06	6,06E+01	4,0	#NV	#NV
KLX24A	2,41	100,17	1,00E-06	1,00E-06		1	337,46								3,26E-07	3,50E+01	5,3	1620	4644
KLX25A	2,20	50,24	1,00E-06	1,00E-06		1	328,85								1,07E-06	1,15E+02	-4,0	4104	12600
KLX27A	77,02	650,54	1,00E-06	1,00E-06		0	3142,53								3,93E-05	6,25E+02	-3,3	#NV	#NV
KLX28A	5,10	80,23	1,00E-06	1,00E-06		1	555,24								6,34E-07	6,81E+01	-3,1	900	44964
KLX29A	2,35	60,25	1,00E-06	1,00E-06		1	#NV								1,71E-06	1,88E+02	-3,2	#NV	#NV
KSH01A	12,10	1003,00	1,00E-06	1,00E-06		1	434,59								3,99E-06	6,35E+01	-2,8	11520	20520
KSH02	80,00	1001,11	1,00E-06	1,00E-06		1	729,98								3,81E-06	6,06E+01	0,9	25056	45288

	(m)	(m)	(s)	(s)	(s)	(s)	(kPa)	(m**2/s)				(m**3/pa)			(m**2/s)					
idcode	secup	seclow	t1	t2	dte1	dte2	p_horner	transmissivity_t_nlr	storativity_s_nlr	value_type_t_nlr	bc_t_nlr	c_nlr	cd_nlr	skin_nlr	transmissivity_t_grf	value_type_t_grf	bc_t_grf	storativity_s_grf	flow_dim_grf	comment
KAV01	70,04	757,31																		
KAV04A	100,95	1000,40																		
KAV04B	11,52	101,03																		
KLX04	101,43	993,49																		
KLX09	11,95	880,38																		
KLX09B	10,74	120,22																		
KLX09C	9,00	120,05																		
KLX09D	9,75	121,02																		
KLX09E	9,00	120,00																		
KLX09F	9,00	152,30																		
KLX09G	9,30	100,10																		
KLX10	12,10	1001,20																		
KLX10B	9,00	50,25																		
KLX10C	9,00	146,25																		
KLX11A	12,05	992,29																		
KLX11B	2,54	100,20																		
KLX11C	2,00	120,15																		
KLX11D	2,00	120,35																		
KLX11E	2,00	121,30																		
KLX11F	2,00	120,05																		
KLX12A	17,92	602,29																		
KLX13A	11,75	595,85																		
KLX17A	11,95	701,08																		
KLX18A	11,83	611,28																		
KLX20A	100,90	457,92																		
KLX24A	2,41	100,17																		
KLX25A	2,20	50,24																		
KLX27A	77,02	650,54																		
KLX28A	5,10	80,23																		
KLX29A	2,35	60,25																		
KSH01A	12,10	1003,00																		
KSH02	80,00	1001,11																		

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	INGRESDATE		Date (yymmdd hh:mm:ss)
stop_date	INGRESDATE		Date (yymmdd hh:mm:ss)
project	VARCHAR		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	INGRESDATE	YYYY-MM-DD hh:mm:ss	Date & time of pumping/injection start (YYYY-MM-DD hh:mm:ss)
stop_flow_period	INGRESDATE	YYYY-MM-DD hh:mm:ss	Date & time of pumping/injection stop (YYYY-MM-DD hh:mm:ss)
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
mean_flow_rate_qm	FLOAT	m**3/s	Arithmetic mean flow rate during flow period
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 or injected water
dur_flow_phase_tp	FLOAT	s	Duration of the flowing period of the test
dur_rec_phase_tf	FLOAT	s	Duration of the recovery period of the test
initial_head_hi	FLOAT	m	Hydraulic head in test section at start of the flow period
head_at_flow_end_hp	FLOAT	m	Hydraulic head in test section at stop of the flow period.
final_head_hf	FLOAT	m	Hydraulic head in test section at stop of recovery period.
initial_press_pi	FLOAT	kPa	Groundwater pressure in test section at start of flow period
initial_press_pi_corr	FLOAT	kPa	Pressure pi in test section corrected for grw pressure trend
press_at_flow_end_pp	FLOAT	kPa	Groundwater pressure in test section at stop of flow period.
press_flowend_pp_corr	FLOAT	kPa	Pressure pp in test section corrected for grw pressure trend
final_press_pf	FLOAT	kPa	Ground water pressure at the end of the recovery period.
final_press_pf_corr	FLOAT	kPa	Pressure pf in test section corrected for grw pressure trend
fluid_temp_tew	FLOAT	oC	Measured section fluid temperature, see table description
fluid_elcond_ecw	FLOAT	mS/m	Measured section fluid el. conductivity,see table descr.
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	no_unit	Short comment to data
error_flag	CHAR		*: Data for the activity is erroneous and should not be used
in_use	CHAR		If in_use = "*" then the activity has been selected as
sign	CHAR		Activity QA signature
lp	FLOAT	m	Hydraulic point of application

			(m)	(m)				(YYYY-MM-DD hh:mm:ss)	(YYYY-MM-DD hh:mm:ss)	(m**3/s)		(m**3/s)	(m**3/s)	(m**3/s)	(m**3)
idcode	**start_date**	**stop_date**	**secup**	**seclow**	**section_no**	**test_type**	**r m**	**start_flow_period**	**stop_flow_period**	**flow_rate _end_qp**	**value_ty pe_qp**	**mean_flow_ rate_qm**	**q_measl __l**	**q_measl __u**	**tot_volu me_vp**
KAV01	2004-02-18 16:25:51	2004-02-26 14:46:42	70,04	757,31		1B	1	2004-02-21 09:23:00	2004-02-25 16:02:00	3,11E-04		3,13E-04			1,16E+02
KAV04A	2004-06-10 12:24:29	2004-06-16 14:55:24	100,95	1000,40		1B	1	2004-06-10 12:29:00	2004-06-15 23:50:00	1,77E-04		2,10E-04			9,92E+01
KAV04B	2004-06-16 17:18:30	2004-06-16 17:19:00	11,52	101,03		1B	1	2004-06-17 13:53:00	2004-06-18 06:11:46	3,90E-04		4,38E-04			3,25E+01
KLX04	2004-07-29 09:56:34	2004-07-29 09:57:00	101,43	993,49		1B	1	2004-08-05 07:36:00	2004-08-06 07:19:06	8,18E-04		9,23E-04			5,51E+02
KLX09	2006-05-11 20:27:18	2006-05-23 16:47:46	11,95	880,38		1B	1	2006-05-13 13:47:00	2006-05-21 09:29:00	1,11E-03		1,17E-03			7,88E+02
KLX09B	2006-02-21 10:45:25	2006-03-03 08:29:56	10,74	120,22		1B	1	2006-02-22 10:50:00	2006-02-28 08:18:00	1,63E-04		1,64E-04			8,35E+01
KLX09C	2006-03-03 13:33:57	2006-03-13 10:10:19	9,00	120,05		1B	1	2006-03-03 14:29:00	2006-03-09 08:45:00	5,28E-04		4,86E-04			2,42E+02
KLX09D	2006-03-22 14:33:38	2006-03-31 07:29:41	9,75	121,02		1B	1	2006-03-22 14:37:00	2006-03-28 11:44:00	2,32E-04		2,33E-04			1,18E+02
KLX09E	2006-03-13 11:10:18	2006-03-22 12:38:00	9,00	120,00		1B	1	2006-03-13 11:11:00	2006-03-19 08:46:00	5,21E-04		5,25E-04			2,67E+02
KLX09F	2006-03-31 09:11:56	2006-04-08 08:57:00	9,00	152,30		1B	1	2006-03-31 09:13:00	2006-04-06 08:20:00	5,55E-04		5,55E-04			2,86E+02
KLX09G	2006-07-12 14:07:45	2006-07-19 06:00:00	9,30	100,10		1B	1	2006-07-13 10:41:00	2006-07-15 14:22:00	1,37E-04		1,28E-04			2,38E+01
KLX10	2005-12-10 11:10:26	2005-12-31 07:35:00	12,10	1001,20		1B	1	2005-12-13 15:35:00	2005-12-21 12:25:00	1,45E-03		1,50E-03			1,02E+03
KLX10B	2006-07-18 15:01:58	2006-07-27 14:19:30	9,00	50,25		1B	1	2006-07-19 10:51:00	2006-07-21 11:50:00	4,63E-04		3,66E-04			6,46E+01
KLX10C	2006-07-24 12:59:28	2006-07-30 06:58:30	9,00	146,25		1B	1	2006-07-25 10:26:00	2006-07-27 13:32:00	1,13E-04		1,10E-04			2,02E+01
KLX11A	2006-11-01 16:08:36	2006-11-10 13:29:29	12,05	992,29		1B	1	2006-11-03 09:33:00	2006-11-08 15:48:00	5,67E-04		6,65E-04			3,02E+02
KLX11B	2006-09-04 15:01:10	2006-09-22 10:12:00	2,54	100,20		1B	1	2006-09-11 11:54:00	2006-09-19 09:14:00	2,67E-04		2,83E-04			1,93E+02
KLX11C	2006-10-12 16:08:29	2006-10-15 15:50:28	2,00	120,15		1B	1	2006-10-12 16:29:00	2006-10-14 13:20:00	2,92E-05		3,38E-05			5,45E+00
KLX11D	2006-10-02 15:46:50	2006-10-12 12:33:20	2,00	120,35		1B	1	2006-10-02 15:51:00	2006-10-08 13:52:00	3,52E-04		3,74E-04			1,91E+02
KLX11E	2006-09-22 14:47:36	2006-10-02 15:53:02	2,00	121,30		1B	1	2006-09-22 14:50:00	2006-09-29 07:05:00	3,77E-05		3,68E-05			2,12E+01
KLX11F	2006-10-16 10:16:54	2006-10-21 16:45:09	2,00	120,05		1B	1	2006-10-16 10:50:00	2006-10-18 06:55:00	3,80E-04		4,29E-04			6,81E+01
KLX12A	2006-06-09 16:05:49	2006-06-19 08:54:00	17,92	602,29		1B	1	2006-06-10 14:20:00	2006-06-15 16:03:00	1,04E-04		1,12E-04			4,90E+01
KLX13A	2006-09-24 14:30:44	2006-10-01 11:24:02	11,75	595,85		1B	1	2006-09-25 16:05:00	2006-09-30 13:20:00	6,50E-04		8,06E-04			3,40E+02
KLX17A	2007-01-03 18:38:04	2007-01-11 14:23:40	11,95	701,08		1B	1	2007-01-03 18:43:00	2007-01-08 15:04:00	2,37E-04		2,62E-04			1,10E+02
KLX18A	2006-07-08 11:46:08	2006-07-21 23:59:00	11,83	611,28		1B	1	2006-07-08 15:12:00	2006-07-15 15:11:00	1,95E-04		2,37E-04			1,43E+02
KLX20A	2006-06-27 11:07:54	2006-07-11 09:35:00	100,90	457,92		1B	1	2006-06-27 11:10:00	2006-07-01 12:54:00	1,12E-04		1,65E-04			5,81E+01
KLX24A	2006-08-24 17:18:41	2006-09-06 14:20:00	2,41	100,17		1B	1	2006-08-24 17:31:00	2006-08-27 16:45:00	2,64E-04		2,76E-04			7,09E+01
KLX25A	2006-08-17 08:53:34	2006-08-20 10:55:04	2,20	50,24		1B	1	2006-08-17 09:02:00	2006-08-19 10:55:00	1,25E-05		1,94E-05			3,48E+00
KLX27A	2008-01-03 10:43:38	2008-01-16 11:21:00	77,02	650,54		1B	1	2008-01-03 11:06:00	2008-01-09 19:46:00	2,32E-04		2,76E-04			1,51E+02
KLX28A	2006-11-24 11:28:37	2006-11-27 08:48:02	5,10	80,23		1B	1	2006-11-24 15:45:00	2006-11-26 08:11:00	2,42E-05		3,47E-05			5,05E+00
KLX29A	2006-11-27 14:00:11	2006-11-29 08:56:00	2,35	60,25		1B	1	2006-11-27 16:18:00	2006-11-28 15:36:00	1,60E-04		2,35E-04			1,97E+01
KSH01A	2003-02-20 14:05:33	2003-03-02 14:54:32	12,10	1003,00		1B	1	2003-02-22 15:30:00	2003-03-01 15:48:00	5,00E-06		5,63E-05			3,41E+01
KSH02	2003-07-09 11:57:09	2003-07-22 16:15:28	80,00	1001,11		1B	1	2003-07-11 12:00:00	2003-07-20 13:12:00	5,19E-06		6,00E-05			4,69E+01

idcode	secup	seclow	dur_flow_phase_tp	dur_rec_phase_tf	initial_head_hi	head_at_flow_end_hp	final_head_hf	initial_press_pi	initial_press_pi_corr	press_at_flow_end_pp	press_flowend_pp_corr	final_press_pf	final_press_pf_corr	fluid_temp_tew	fluid_elcond_ecw	fluid_salinity_tdsw	fluid_salinity_tdswm	reference	comments	lp
	(m)	(m)	(s)	(s)	(m)	(m)	(m)	(kPa)	(kPa)	(kPa)	(kPa)	(kPa)	(kPa)	(oC)	(mS/m)	(mg/l)	(mg/l)		(no_unit)	(m)
KAV01	70,04	757,31	369540	81882	1,31	-8,66	-0,55													
KAV04A	100,95	1000,40	472860	54324	1,25	-8,75	-4,29													
KAV04B	11,52	101,03	74040	58726	3,55	-6,56	2,61													
KLX04	101,43	993,49	596340	85386	13,66	6,99	11,64													
KLX09	11,95	880,38	675720	199126	13,19	8,34	13,30													
KLX09B	10,74	120,22	509280	259916	13,42	3,32	13,53													
KLX09C	9,00	120,05	497761	350719	13,52	8,32	13,14													
KLX09D	9,75	121,02	508020	243941	13,03	3,53	13,68													
KLX09E	9,00	120,00	509700	273120	13,03	7,53	12,94													
KLX09F	9,00	152,30	515220	175020	13,64	10,02	13,46													
KLX09G	9,30	100,10	186060	315480	12,67	4,76	12,37													
KLX10	12,10	1001,20	679800	846600	12,73	5,80	12,74													
KLX10B	9,00	50,25	176340	527370	11,62	1,75	11,33													
KLX10C	9,00	146,25	183960	235590	11,46	1,08	11,49													
KLX11A	12,05	992,29	454500	164489	13,20	2,46	11,95													
KLX11B	2,54	100,20	681600	262680	10,04	0,64	9,78													
KLX11C	2,00	120,15	161460	95428	12,55	0,80	12,53													
KLX11D	2,00	120,35	511260	340880	11,91	1,08	12,64													
KLX11E	2,00	121,30	576900	290882	9,62	0,00	14,38													
KLX11F	2,00	120,05	158700	294609	12,73	0,35	12,89													
KLX12A	17,92	602,29	438180	319860	10,66	1,10	10,16													
KLX13A	11,75	595,85	422100	79442	13,48	3,45	6,61													
KLX17A	11,95	701,08	418860	256780	16,57	6,29	16,81													
KLX18A	11,83	611,28	604740	550080	11,74	1,60	11,06													
KLX20A	100,90	457,92	351840	852060	13,72	3,62	13,34													
KLX24A	2,41	100,17	256440	855300	10,01	0,22	9,96													
KLX25A	2,20	50,24	179580	86404	14,64	10,02	13,73													
KLX27A	77,02	650,54	549600	574500	10,69	0,68	10,54													
KLX28A	5,10	80,23	145560	88622	8,99	-1,63	7,04													
KLX29A	2,35	60,25	83880	62400	9,44	4,20	8,95													
KSH01A	12,10	1003,00	605880	83192	0,12	-10,22	-2,48													
KSH02	80,00	1001,11	781920	183808	-0,67	-11,21	-2,32													

Table	**flow_during_tests** Flow rate measurements during hydraulic tests

Column	Datatype	Unit	Column Description
site	CHAR		Investigation site name
activity_type	CHAR		Activity type code
project	VARCHAR		Project code
idcode	CHAR		Object or borehole identification code
sign	CHAR		Activity QA signature
error_flag	CHAR		*: Data for the activity is erroneous and should not be used
seclow	FLOAT	m	Lower section limit (m)
secup	FLOAT	m	Upper section limit (m)
measurement_date	INGRESDATE	YYYY-MM-DD hh:mm:ss	Date/timre of measurement (YYYY-MM-DD hh:mm:ss)
meas_number	INTEGER	code	Default=1. >1 if more than one value at the same time.
flow	FLOAT	m**3/s	Measured water flow rate(q, m**3/s)
flow_l_min	FLOAT	l/min	Measured water flow rate (q, L/min)
value_type_flow	CHAR		0 or empty:true value,-1:q<low meas.limit,1:q>upper limit,
volume_l	FLOAT	l	Measured volume during flow time interval(L)
time_interval	FLOAT	s	Duration of volume measurement
volume_acc	FLOAT	m**3	Accumulated water volume at measurement time
elapsed_time	FLOAT	min	minutes
drawdown_m	FLOAT	m	Drawdown in m since pumping start
comment	CHAR		Comment on the measurement

			(m)	(m)		(YYYY-MM-DD hh:mm:ss)	(code)	(m**3/s)	(l/min)		(l)	(s)	(m**3)	(min)	(m)	
idcode	**start_date**	**stop_date**	**secup**	**seclow**	**section_no**	**measurement_date**	**meas_number**	**flow**	**flow_l_min**	**value_type_flow**	**volume_l**	**time_interval**	**volume_acc**	**elapsed_time**	**drawdown_m**	**comment**
KAV01	2004-02-18 16:25:51	2004-02-26 14:46:42	70,04	757,31		2004-02-21 09:23:00		3,13E-04	18,8		1,16E+05	369540	1,16E+02	6159	9,96	
KAV04A	2004-06-10 12:24:29	2004-06-16 14:55:24	100,95	1000,40		2004-06-10 12:29:00		2,10E-04	12,6		9,92E+04	472860	9,92E+01	7881	10,00	
KAV04B	2004-06-16 17:18:30	2004-06-16 17:19:00	11,52	101,03		2004-06-17 13:53:00		4,38E-04	26,3		3,25E+04	74040	3,25E+01	1234	10,11	
KLX04	2004-07-29 09:56:34	2004-07-29 09:57:00	101,43	993,49		2004-08-05 07:36:00		9,23E-04	55,4		5,51E+05	596340	5,51E+02	9939	6,67	
KLX09	2006-05-11 20:27:18	2006-05-23 16:47:46	11,95	880,38		2006-05-13 13:47:00		1,17E-03	70,0		7,88E+05	675720	7,88E+02	11262	4,85	
KLX09B	2006-02-21 10:45:25	2006-03-03 08:29:56	10,74	120,22		2006-02-22 10:50:00		1,64E-04	9,8		8,35E+04	509280	8,35E+01	8488	10,10	
KLX09C	2006-03-03 13:33:57	2006-03-13 10:10:19	9,00	120,05		2006-03-03 14:29:00		4,86E-04	29,2		2,42E+05	497761	2,42E+02	8296	5,20	
KLX09D	2006-03-22 14:33:38	2006-03-31 07:29:41	9,75	121,02		2006-03-22 14:37:00		2,33E-04	14,0		1,18E+05	508020	1,18E+02	8467	9,50	
KLX09E	2006-03-13 11:10:18	2006-03-22 12:38:00	9,00	120,00		2006-03-13 11:11:00		5,25E-04	31,5		2,67E+05	509700	2,67E+02	8495	5,50	
KLX09F	2006-03-31 09:11:56	2006-04-08 08:57:00	9,00	152,30		2006-03-31 09:13:00		5,55E-04	33,3		2,86E+05	515220	2,86E+02	8587	3,62	
KLX09G	2006-07-12 14:07:45	2006-07-19 06:00:00	9,30	100,10		2006-07-13 10:41:00		1,28E-04	7,7		2,38E+04	186060	2,38E+01	3101	7,91	
KLX10	2005-12-10 11:10:26	2005-12-31 07:35:00	12,10	1001,20		2005-12-13 15:35:00		1,50E-03	90,3		1,02E+06	679800	1,02E+03	11330	6,93	
KLX10B	2006-07-18 15:01:58	2006-07-27 14:19:30	9,00	50,25		2006-07-19 10:51:00		3,66E-04	22,0		6,46E+04	176340	6,46E+01	2939	9,87	
KLX10C	2006-07-24 12:59:28	2006-07-30 06:58:30	9,00	146,25		2006-07-25 10:26:00		1,10E-04	6,6		2,02E+04	183960	2,02E+01	3066	10,38	
KLX11A	2006-11-01 16:08:36	2006-11-10 13:29:29	12,05	992,29		2006-11-03 09:33:00		6,65E-04	39,9		3,02E+05	454500	3,02E+02	7575	10,74	
KLX11B	2006-09-04 15:01:10	2006-09-22 10:12:00	2,54	100,20		2006-09-11 11:54:00		2,83E-04	17,0		1,29E+05	681600	1,93E+02	7575	9,40	
KLX11C	2006-10-12 16:08:29	2006-10-15 15:50:28	2,00	120,15		2006-10-12 16:29:00		3,38E-05	2,0		5,45E+03	161460	5,45E+00	2691	10,74	
KLX11D	2006-10-02 15:46:50	2006-10-12 12:33:20	2,00	120,35		2006-10-02 15:51:00		3,74E-04	22,5		1,91E+05	511260	1,91E+02	8521	10,83	
KLX11E	2006-09-22 14:47:36	2006-10-02 15:53:02	2,00	121,30		2006-09-22 14:50:00		3,68E-05	2,2		2,12E+04	576900	2,12E+01	9615	9,70	
KLX11F	2006-10-16 10:16:54	2006-10-21 16:45:09	2,00	120,05		2006-10-16 10:50:00		4,29E-04	25,7		6,81E+04	158700	6,81E+01	2645	12,38	
KLX12A	2006-06-09 16:05:49	2006-06-19 08:54:00	17,92	602,29		2006-06-10 14:20:00		1,12E-04	6,7		4,91E+04	438180	4,91E+01	7303	9,56	
KLX13A	2006-09-24 14:30:44	2006-10-01 11:24:02	11,75	595,85		2006-09-25 16:05:00		8,06E-04	48,4		3,40E+05	422100	3,40E+02	7035	10,03	
KLX17A	2007-01-03 18:38:04	2007-01-11 14:23:40	11,95	701,08		2007-01-03 18:43:00		2,62E-04	15,7		1,10E+05	418860	1,10E+02	6981	10,28	
KLX18A	2006-07-08 11:46:08	2006-07-21 23:59:00	11,83	611,28		2006-07-08 15:12:00		2,37E-04	14,2		1,43E+05	604740	1,43E+02	10079	10,14	
KLX20A	2006-06-27 11:07:54	2006-07-11 09:35:00	100,90	457,92		2006-06-27 11:10:00		1,65E-04	9,9		5,81E+04	351840	5,81E+01	5864	10,10	
KLX24A	2006-08-24 17:18:41	2006-09-06 14:20:00	2,41	100,17		2006-08-24 17:31:00		2,76E-04	16,6		7,09E+04	256440	7,09E+01	4274	9,78	
KLX25A	2006-08-17 08:53:34	2006-08-20 10:55:04	2,20	50,24		2006-08-17 09:02:00		1,94E-05	1,2		3,48E+03	179580	3,48E+00	2993	4,62	
KLX27A	2008-01-03 10:43:38	2008-01-16 11:21:00	77,02	650,54		2008-01-03 11:06:00		2,76E-04	16,5		1,51E+05	549600	1,51E+02	9160	13,96	
KLX28A	2006-11-24 11:28:37	2006-11-27 08:48:02	5,10	80,23		2006-11-24 15:45:00		3,47E-05	2,1		5,05E+03	145560	5,05E+00	2426	10,62	
KLX29A	2006-11-27 14:00:11	2006-11-29 08:56:00	2,35	60,25		2006-11-27 16:18:00		2,35E-04	14,1		1,97E+04	83880	1,97E+01	1398	5,24	
KSH01A	2003-02-20 14:05:33	2003-03-02 14:54:32	12,10	1003,00		2003-02-22 15:30:00		5,63E-05	3,4		3,41E+04	605880	5,05E+00	10098	10,34	
KSH02	2003-07-09 11:57:09	2003-07-22 16:15:28	80,00	1001,11		2003-07-11 12:00:00		6,00E-05	3,6		4,69E+04	781920	6,72E+00	13032	10,54	

APPENDIX 4

Information about 32 pumped boreholes (SICADA, 2008-05-02)

SICADA - Information about KAV01

Title	**Value**
	Information about cored borehole KAV01 (2008-05-02).
Comment:	No comment exists.

BOREHOLE LENGTH:

Signed/Approved By	Length(m)	Reference Level
Initial sign by sic_dba	757.31	Top of casing (center)

DRILLING PERIODS:

Signed/Approved By	From Date	To Date	Secup(m)	Seclow(m)	Drilling Type
Anne-Marie Lindekrantz	1977-04-21	1977-05-16	0.00	502.00	Core drilling
Anne-Marie Lindekrantz	1986-10-06	1986-11-16	502.00	746.60	Core drilling
Initial sign by sic_dba	2003-06-11	2004-01-10	0.00	757.31	Core drilling

STARTING POINT COORDINATE:

Signed/Approved By	Length(m)	Northing(m)	Easting(m)	Elevation	Coord System
Johan Svensson	0.00	6367257.52	1553084.92	14.10	RT90-RHB70

STARTING POINT ANGLES:

Signed/Approved By	Length(m)	Bearing	Inclination (- = down)	Coord System
Stefan Sehlstedt	0.00	237.26	-89.20	ÄSPÖ96

BOREHOLE DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Hole Diam(m)
Initial sign by sic_dba	0.04	68.74	0.200
Initial sign by sic_dba	68.74	68.84	0.165
Initial sign by sic_dba	68.84	70.04	0.076
Initial sign by sic_dba	70.04	757.31	0.056

CORE DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Core Diam(m)
Initial sign by sic_dba	502.00	757.31	0.042

CASING DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Case In(m)	Case Out(m)	Comment
Initial sign by sic_dba	0.00	68.00	0.160	0.168	
Initial sign by sic_dba	68.00	68.04	0.147	0.168	

CONE DIMENSIONS:

Signed/Approved By	Secup(m)	Seclow(m)	Cone In(m)	Cone Out(m)
Initial sign by sic_dba	67.49	67.74		0.158
Initial sign by sic_dba	67.74	70.04	0.058	0.066

SICADA - Information about KAV04A

Title	**Value**
	Information about cored borehole KAV04A (2008-05-02).
Comment:	No comment exists.

BOREHOLE LENGTH:

Signed/Approved By	Length(m)	Reference Level
Anne-Marie Lindekrantz	1004.00	Top of casing (center)

DRILLING PERIODS:

Signed/Approved By	From Date	To Date	Secup(m)	Seclow(m)	Drilling Type
Lars-Eric Samuelsson	2003-10-06	2003-11-01	0.00	100.20	Percussion drilling
Anne-Marie Lindekrantz	2003-12-10	2004-05-03	99.55	1004.00	Core drilling

STARTING POINT COORDINATE:

Signed/Approved By	Length(m)	Northing(m)	Easting(m)	Elevation	Coord System
Gerry Johansson	0.00	6366795.76	1552475.00	10.35	RT90-RHB70

STARTING POINT ANGLES:

Signed/Approved By	Length(m)	Bearing	Inclination (- = down)	Coord System
Gerry Johansson	0.00	77.03	-84.91	RT90-RHB70

BOREHOLE DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Hole Diam(m)
Lars-Eric Samuelsson	0.00	12.63	0.349
Lars-Eric Samuelsson	12.63	100.20	0.245
Anne-Marie Lindekrantz	99.55	100.95	0.086
Anne-Marie Lindekrantz	100.95	1004.00	0.076

CORE DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Core Diam(m)
Anne-Marie Lindekrantz	99.55	100.95	0.072
Anne-Marie Lindekrantz	100.95	1004.00	0.050

CASING DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Case In(m)	Case Out(m)	Comment
Lars-Eric Samuelsson	0.00	100.00	0.200	0.208	
Lars-Eric Samuelsson	0.00	12.63	0.265	0.273	

CONE DIMENSIONS:

Signed/Approved By	Secup(m)	Seclow(m)	Cone In(m)	Cone Out(m)
Anne-Marie Lindekrantz	96.25	100.95	0.200	0.200

SICADA - Information about KAV04B

Title	Value
	Information about cored borehole KAV04B (2008-05-02).
Comment:	No comment exists.

BOREHOLE LENGTH:

Signed/Approved By	Length(m)	Reference Level
Lars-Eric Samuelsson	101.03	Top of casing (center)

DRILLING PERIODS:

Signed/Approved By	From Date	To Date	Secup(m)	Seclow(m)	Drilling Type
Lars-Eric Samuelsson	2004-05-12	2004-05-18	0.00	101.03	Core drilling

STARTING POINT COORDINATE:

Signed/Approved By	Length(m)	Northing(m)	Easting(m)	Elevation	Coord System
Gerry Johansson	0.00	6366795.64	1552474.47	10.35	RT90-RHB70

STARTING POINT ANGLES:

Signed/Approved By	Length(m)	Bearing	Inclination (- = down)	Coord System
Gerry Johansson	0.00	134.27	-89.84	RT90-RHB70

BOREHOLE DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Hole Diam(m)
Lars-Eric Samuelsson	0.00	11.52	0.096
Lars-Eric Samuelsson	11.52	101.03	0.076

CORE DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Core Diam(m)
Lars-Eric Samuelsson	0.00	101.03	0.050

CASING DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Case In(m)	Case Out(m)	Comment
Lars-Eric Samuelsson	0.00	11.52	0.077	0.089	

SICADA - Information about KLX04

Title	Value
	Information about cored borehole KLX04 (2008-05-02).
Comment:	No comment exists.

BOREHOLE LENGTH:

Signed/Approved By	Length(m)	Reference Level
Susanne König	993.49	Top of casing (center)

DRILLING PERIODS:

Signed/Approved By	From Date	To Date	Secup(m)	Seclow(m)	Drilling Type
Lars-Eric Samuelsson	2004-02-11	2004-02-18	0.00	100.35	Percussion
	drilling				
Susanne König	2004-03-13	2004-06-28	100.35	993.49	Core drilling

STARTING POINT COORDINATE:

Signed/Approved By	Length(m)	Northing(m)	Easting(m)	Elevation	Coord System
Gerry Johansson	0.00	6367077.19	1548171.94	24.09	RT90-RHB70

STARTING POINT ANGLES:

Signed/Approved By	Length(m)	Bearing	Inclination (- = down)	Coord System
Gerry Johansson	0.00	0.11	-84.68	RT90-RHB70

BOREHOLE DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Hole Diam(m)
Lars-Eric Samuelsson	0.10	12.00	0.347

Lars-Eric Samuelsson	12.00	12.24	0.254
Lars-Eric Samuelsson	12.24	100.35	0.196
Susanne König	100.35	101.47	0.086
Susanne König	101.47	993.49	0.076

CORE DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Core Diam(m)
Susanne König	100.35	101.47	0.050
Susanne König	101.47	993.49	0.072

CASING DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Case In(m)	Case Out(m)	Comment
Lars-Eric Samuelsson	0.00	12.24	0.200	0.208	
Lars-Eric Samuelsson	0.10	11.90	0.310	0.324	

CONE DIMENSIONS:

Signed/Approved By	Secup(m)	Seclow(m)	Cone In(m)	Cone Out(m)
Susanne König	96.85	101.43		

SICADA - Information about KLX09

Title	Value
	Information about cored borehole KLX09 (2008-05-02).
Comment:	No comment exists.

BOREHOLE LENGTH:

Signed/Approved By	Length(m)	Reference Level
Henrik Ask	880.38	Top of casing (center)

DRILLING PERIODS:

Signed/Approved By	From Date	To Date	Secup(m)	Seclow(m)	Drilling Type
Lars-Eric Samuelsson	2005-06-02	2005-06-13	0.00	100.60	Percussion drilling
Henrik Ask	2005-08-26	2005-10-15	100.60	880.38	Core drilling

STARTING POINT COORDINATE:

Signed/Approved By	Length(m)	Northing(m)	Easting(m)	Elevation	Coord System
Gerry Johansson	0.00	6367323.45	1548863.18	23.45	RT90-RHB70

STARTING POINT ANGLES:

Signed/Approved By	Length(m)	Bearing	Inclination (- = down)	Coord System
Lars-Eric Samuelsson	0.00	267.41	-85.29	RT90-RHB70

BOREHOLE DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Hole Diam(m)
Lars-Eric Samuelsson	0.12	9.80	0.341
Lars-Eric Samuelsson	9.80	11.95	0.248
Lars-Eric Samuelsson	11.95	100.50	0.197
Lars-Eric Samuelsson	100.50	100.60	0.163
Henrik Ask	100.60	102.00	0.086
Henrik Ask	101.05	880.38	0.076
Henrik Ask	755.70	757.95	0.084
Henrik Ask	758.70	760.95	0.084

CORE DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Core Diam(m)
Henrik Ask	100.60	101.05	0.072
Henrik Ask	101.05	880.38	0.050

CASING DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Case In(m)	Case Out(m)	Comment
Lars-Eric Samuelsson	0.00	11.95	0.200	0.208	
Lars-Eric Samuelsson	0.65	9.80	0.310	0.323	
Henrik Ask	775.75	757.70	0.082	0.084	

CONE DIMENSIONS:

Signed/Approved By	Secup(m)	Seclow(m)	Cone In(m)	Cone Out(m)
Henrik Ask	97.33	102.00	0.080	0.195

SICADA - Information about KLX09B

Title	Value
	Information about cored borehole KLX09B (2008-05-02).
Comment:	No comment exists.

BOREHOLE LENGTH:

Signed/Approved By	Length(m)	Reference Level
Lars-Eric Samuelsson	100.22	Top of casing (center)

DRILLING PERIODS:

Signed/Approved By	From Date	To Date	Secup(m)	Seclow(m)	Drilling Type
Lars-Eric Samuelsson	2006-01-16	2006-01-26	0.00	100.22	Core drilling

STARTING POINT COORDINATE:

Signed/Approved By	Length(m)	Northing(m)	Easting(m)	Elevation	Coord System
Gerry Johansson	0.00	6367329.07	1548859.01	23.61	RT90-RHB70
Gerry Johansson	3.00	6367329.07	1548859.03	20.61	RT90-RHB70

STARTING POINT ANGLES:

Signed/Approved By	Length(m)	Bearing	Inclination (- = down)	Coord System
Gerry Johansson	0.00	21.25	-89.54	RT90-RHB70

BOREHOLE DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Hole Diam(m)
Lars-Eric Samuelsson	0.30	2.48	0.116
Lars-Eric Samuelsson	2.48	10.74	0.096
Lars-Eric Samuelsson	10.74	100.22	0.076

CORE DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Core Diam(m)
Lars-Eric Samuelsson	2.48	100.22	0.050

CASING DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Case In(m)	Case Out(m)	Comment
Lars-Eric Samuelsson	0.00	10.74	0.077	0.089	

SICADA - Information about KLX09C

Title	**Value**
	Information about cored borehole KLX09C (2008-05-02).
Comment:	No comment exists.

BOREHOLE LENGTH:

Signed/Approved By	Length(m)	Reference Level
Lars-Eric Samuelsson	120.05	Top of casing (center)

DRILLING PERIODS:

Signed/Approved By	From Date	To Date	Secup(m)	Seclow(m)	Drilling Type
Lars-Eric Samuelsson	2006-01-07	2006-01-15	0.30	120.05	Core drilling

STARTING POINT COORDINATE:

Signed/Approved By	Length(m)	Northing(m)	Easting(m)	Elevation	Coord System
Gerry Johansson	0.00	6367353.43	1548838.82	23.75	RT90-RHB70
Gerry Johansson	3.00	6367351.97	1548839.35	21.19	RT90-RHB70

STARTING POINT ANGLES:

Signed/Approved By	Length(m)	Bearing	Inclination (- = down)	Coord System
Gerry Johansson	0.00	160.39	-58.72	RT90-RHB70

BOREHOLE DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Hole Diam(m)
Lars-Eric Samuelsson	0.30	9.00	0.096
Lars-Eric Samuelsson	9.00	120.05	0.076

CORE DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Core Diam(m)
Lars-Eric Samuelsson	0.30	120.05	0.050

CASING DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Case In(m)	Case Out(m)	Comment
Lars-Eric Samuelsson	0.00	9.00	0.077	0.089	

SICADA - Information about KLX09D

Title	**Value**
	Information about cored borehole KLX09D (2008-05-02).
Comment:	No comment exists.

BOREHOLE LENGTH:

Signed/Approved By	Length(m)	Reference Level
Lars-Eric Samuelsson	121.02	Top of casing (center)

DRILLING PERIODS:

Signed/Approved By	From Date	To Date	Secup(m)	Seclow(m)	Drilling Type
Lars-Eric Samuelsson	2005-11-05	2005-11-17	0.30	121.02	Core drilling

STARTING POINT COORDINATE:

Signed/Approved By	Length(m)	Northing(m)	Easting(m)	Elevation	Coord System
Gerry Johansson	0.00	6367336.99	1548878.22	23.10	RT90-RHB70
Gerry Johansson	3.00	6367337.00	1548876.71	20.51	RT90-RHB70

STARTING POINT ANGLES:

Signed/Approved By	Length(m)	Bearing	Inclination (- = down)	Coord System
Gerry Johansson	0.00	270.15	-59.62	RT90-RHB70

BOREHOLE DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Hole Diam(m)
Lars-Eric Samuelsson	0.30	9.75	0.096
Lars-Eric Samuelsson	9.75	121.02	0.076

CORE DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Core Diam(m)
Lars-Eric Samuelsson	0.30	121.02	0.050

CASING DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Case In(m)	Case Out(m)	Comment
Lars-Eric Samuelsson	0.00	9.75	0.077	0.089	

SICADA - Information about KLX09E

Title	**Value**
	Information about cored borehole KLX09E (2008-05-02).
Comment:	No comment exists.

BOREHOLE LENGTH:

Signed/Approved By	Length(m)	Reference Level
Lars-Eric Samuelsson	120.00	Top of casing (center)

DRILLING PERIODS:

Signed/Approved By	From Date	To Date	Secup(m)	Seclow(m)	Drilling Type
Lars-Eric Samuelsson	2005-11-23	2005-12-05	0.30	120.00	Core drilling

STARTING POINT COORDINATE:

Signed/Approved By	Length(m)	Northing(m)	Easting(m)	Elevation	Coord System
Gerry Johansson	0.00	6367304.45	1548880.37	22.16	RT90-RHB70
Gerry Johansson	3.00	6367305.85	1548879.83	19.56	RT90-RHB70

STARTING POINT ANGLES:

Signed/Approved By	Length(m)	Bearing	Inclination (- = down)	Coord System
Gerry Johansson	0.00	338.90	-59.93	RT90-RHB70

BOREHOLE DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Hole Diam(m)
Lars-Eric Samuelsson	0.30	9.00	0.096
Lars-Eric Samuelsson	9.00	120.00	0.076

CORE DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Core Diam(m)
Lars-Eric Samuelsson	0.30	120.00	0.050

CASING DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Case In(m)	Case Out(m)	Comment
Lars-Eric Samuelsson	0.00	9.00	0.077	0.089	

SICADA - Information about KLX09F

Title	**Value**
	Information about cored borehole KLX09F (2008-05-02).
Comment:	No comment exists.

BOREHOLE LENGTH:

Signed/Approved By	Length(m)	Reference Level
Lars-Eric Samuelsson	152.30	Top of casing (center)

DRILLING PERIODS:

Signed/Approved By	From Date	To Date	Secup(m)	Seclow(m)	Drilling Type
Lars-Eric Samuelsson	2005-12-06	2006-01-06	0.30	152.30	Core drilling

STARTING POINT COORDINATE:

Signed/Approved By	Length(m)	Northing(m)	Easting(m)	Elevation	Coord System
Maria Eriksson	0.00	6367318.02	1548817.26	19.57	RT90-RHB70
Maria Eriksson	3.00	6367318.01	1548818.80	17.00	RT90-RHB70

STARTING POINT ANGLES:

Signed/Approved By	Length(m)	Bearing	Inclination (- = down)	Coord System
Gerry Johansson	0.00	90.67	-59.14	RT90-RHB70

BOREHOLE DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Hole Diam(m)
Lars-Eric Samuelsson	0.30	9.00	0.096
Lars-Eric Samuelsson	9.00	152.30	0.076

CORE DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Core Diam(m)
Lars-Eric Samuelsson	0.30	152.30	0.050

CASING DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Case In(m)	Case Out(m)	Comment
Lars-Eric Samuelsson	0.00	9.00	0.077	0.089	

SICADA - Information about KLX09G

Title	**Value**
	Information about cored borehole KLX09G (2008-05-02).
Comment:	No comment exists.

BOREHOLE LENGTH:

Signed/Approved By	Length(m)	Reference Level
Lars-Eric Samuelsson	100.10	Top of casing (center)

DRILLING PERIODS:

Signed/Approved By	From Date	To Date	Secup(m)	Seclow(m)	Drilling Type
Lars-Eric Samuelsson	2006-01-27	2006-02-03	0.00	100.10	Core drilling

STARTING POINT COORDINATE:

Signed/Approved By	Length(m)	Northing(m)	Easting(m)	Elevation	Coord System
Gerry Johansson	0.00	6367330.09	1548905.77	19.63	RT90-RHB70
Gerry Johansson	3.00	6367330.21	1548907.22	17.01	RT90-RHB70

STARTING POINT ANGLES:

Signed/Approved By	Length(m)	Bearing	Inclination (- = down)	Coord System
Gerry Johansson	0.00	85.41	-60.96	RT90-RHB70

BOREHOLE DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Hole Diam(m)
Lars-Eric Samuelsson	0.30	9.30	0.096
Lars-Eric Samuelsson	9.30	100.10	0.076

CORE DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Core Diam(m)
Lars-Eric Samuelsson	0.30	100.10	0.050

CASING DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Case In(m)	Case Out(m)	Comment
Lars-Eric Samuelsson	0.00	9.30	0.077	0.089	

SICADA - Information about KLX10

Title	**Value**
	Information about cored borehole KLX10 (2008-05-02).
Comment:	No comment exists.

BOREHOLE LENGTH:

Signed/Approved By	Length(m)	Reference Level
Henrik Ask	1001.20	Top of casing (center)

DRILLING PERIODS:

Signed/Approved By	From Date	To Date	Secup(m)	Seclow(m)	Drilling Type
Lars-Eric Samuelsson	2005-05-24	2005-06-01	0.00	100.60	Percussion drilling
Henrik Ask	2005-06-18	2005-10-15	100.60	1001.20	Core drilling

STARTING POINT COORDINATE:

Signed/Approved By	Length(m)	Northing(m)	Easting(m)	Elevation	Coord System
Gerry Johansson	0.00	6366319.38	1548515.23	18.28	RT90-RHB70

STARTING POINT ANGLES:

Signed/Approved By	Length(m)	Bearing	Inclination (- = down)	Coord System
Gerry Johansson	0.00	250.81	-85.19	RT90-RHB70

BOREHOLE DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Hole Diam(m)
Lars-Eric Samuelsson	0.12	9.20	0.343
Lars-Eric Samuelsson	9.20	12.10	0.248
Lars-Eric Samuelsson	12.10	100.50	0.197
Lars-Eric Samuelsson	100.50	100.60	0.163
Henrik Ask	100.60	102.13	0.086
Henrik Ask	102.13	1001.20	0.076
Henrik Ask	224.65	226.83	0.084
Henrik Ask	327.40	329.60	0.084
Henrik Ask	336.10	337.83	0.084

CORE DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Core Diam(m)
Henrik Ask	100.60	101.13	0.072
Henrik Ask	101.13	155.10	0.050
Henrik Ask	155.10	156.35	0.045
Henrik Ask	156.35	168.90	0.050
Henrik Ask	168.90	169.50	0.045
Henrik Ask	169.50	188.00	0.050
Henrik Ask	188.00	192.05	0.045
Henrik Ask	192.05	198.24	0.050
Henrik Ask	198.24	204.50	0.045
Henrik Ask	204.50	1001.20	0.050

CASING DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Case In(m)	Case Out(m)	Comment
Lars-Eric Samuelsson	0.00	12.10	0.200	0.208	
Lars-Eric Samuelsson	0.12	9.20	0.280	0.311	
Henrik Ask	224.75	225.75	0.082	0.084	
Henrik Ask	327.50	329.50	0.082	0.084	
Henrik Ask	336.20	337.70	0.082	0.084	

CONE DIMENSIONS:

Signed/Approved By	Secup(m)	Seclow(m)	Cone In(m)	Cone Out(m)
Henrik Ask	97.48	102.13	0.080	0.195

SICADA - Information about KLX10B

Title	**Value**
	Information about cored borehole KLX10B (2008-05-02).
Comment:	No comment exists.

BOREHOLE LENGTH:

Signed/Approved By	Length(m)	Reference Level
Lars-Eric Samuelsson	50.25	Top of casing (center)

DRILLING PERIODS:

Signed/Approved By	From Date	To Date	Secup(m)	Seclow(m)	Drilling Type
Lars-Eric Samuelsson	2006-02-08	2006-02-14	0.00	50.25	Core drilling

STARTING POINT COORDINATE:

Signed/Approved By	Length(m)	Northing(m)	Easting(m)	Elevation	Coord System
Gerry Johansson	0.00	6366316.49	1548525.15	18.15	RT90-RHB70
Gerry Johansson	3.00	6366314.99	1548525.41	16.01	RT90-RHB70

STARTING POINT ANGLES:

Signed/Approved By	Length(m)	Bearing	Inclination (- = down)	Coord System
Gerry Johansson	0.00	170.32	-59.65	RT90-RHB70

BOREHOLE DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Hole Diam(m)
Lars-Eric Samuelsson	0.30	9.00	0.096
Lars-Eric Samuelsson	9.00	50.25	0.076

CORE DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Core Diam(m)
Lars-Eric Samuelsson	0.30	50.25	0.050

CASING DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Case In(m)	Case Out(m)	Comment
Lars-Eric Samuelsson	0.00	9.00	0.077	0.089	

SICADA - Information about KLX10C

Title	Value
	Information about cored borehole KLX10C (2008-05-02).
Comment:	No comment exists.

BOREHOLE LENGTH:

Signed/Approved By	Length(m)	Reference Level
Lars-Eric Samuelsson	146.25	Top of casing (center)

DRILLING PERIODS:

Signed/Approved By	From Date	To Date	Secup(m)	Seclow(m)	Drilling Type
Lars-Eric Samuelsson	2006-02-15	2006-02-28	0.30	146.25	Core drilling

STARTING POINT COORDINATE:

Signed/Approved By	Length(m)	Northing(m)	Easting(m)	Elevation	Coord System
Gerry Johansson	0.00	6366372.07	1548506.94	16.93	RT90-RHB70
Gerry Johansson	3.00	6366373.55	1548506.74	14.33	RT90-RHB70

STARTING POINT ANGLES:

Signed/Approved By	Length(m)	Bearing	Inclination (- = down)	Coord System
Gerry Johansson	0.00	352.43	-60.15	RT90-RHB70

BOREHOLE DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Hole Diam(m)
Lars-Eric Samuelsson	0.30	9.00	0.096
Lars-Eric Samuelsson	9.00	146.25	0.076

CORE DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Core Diam(m)
Lars-Eric Samuelsson	0.03	146.25	0.050

CASING DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Case In(m)	Case Out(m)	Comment
Lars-Eric Samuelsson	0.00	9.00	0.077	0.089	

SICADA - Information about KLX11A

Title	Value
	Information about cored borehole KLX11A (2008-05-02).
Comment:	No comment exists.

BOREHOLE LENGTH:

Signed/Approved By	Length(m)	Reference Level
Lars-Eric Samuelsson	992.29	Top of casing (center)

DRILLING PERIODS:

Signed/Approved By	From Date	To Date	Secup(m)	Seclow(m)	Drilling Type
Lars-Eric Samuelsson	2005-11-01	2005-11-08	0.43	100.06	Percussion drilling
Lars-Eric Samuelsson	2005-11-24	2006-03-02	100.06	992.29	Core drilling

STARTING POINT COORDINATE:

Signed/Approved By	Length(m)	Northing(m)	Easting(m)	Elevation	Coord System
Gerry Johansson	0.00	6366339.72	1546608.49	27.14	RT90-RHB70
Gerry Johansson	3.00	6366339.72	1546609.19	24.23	RT90-RHB70

STARTING POINT ANGLES:

Signed/Approved By	Length(m)	Bearing	Inclination (- = down)	Coord System
Gerry Johansson	0.00	89.84	-76.43	RT90-RHB70

BOREHOLE DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Hole Diam(m)
Lars-Eric Samuelsson	0.43	9.60	0.343
Lars-Eric Samuelsson	9.60	12.05	0.248
Lars-Eric Samuelsson	12.05	99.96	0.195
Lars-Eric Samuelsson	99.96	100.06	0.160
Lars-Eric Samuelsson	100.06	101.53	0.086
Lars-Eric Samuelsson	101.53	992.29	0.076

CORE DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Core Diam(m)
Lars-Eric Samuelsson	100.06	100.53	0.072

Lars-Eric Samuelsson	100.53	992.29	0.050

CASING DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Case In(m)	Case Out(m)	Comment
Lars-Eric Samuelsson	0.00	12.05	0.200	0.208	
Lars-Eric Samuelsson	0.43	9.60	0.310	0.323	

CONE DIMENSIONS:

Signed/Approved By	Secup(m)	Seclow(m)	Cone In(m)	Cone Out(m)
Lars-Eric Samuelsson	96.77	99.77	0.100	0.104
Lars-Eric Samuelsson	99.77	101.53	0.080	0.084

SICADA - Information about KLX11B

Title	**Value**
	Information about cored borehole KLX11B (2008-05-02).
Comment:	No comment exists.

BOREHOLE LENGTH:

Signed/Approved By	Length(m)	Reference Level
Lars-Eric Samuelsson	100.20	Top of casing (center)

DRILLING PERIODS:

Signed/Approved By	From Date	To Date	Secup(m)	Seclow(m)	Drilling Type
Lars-Eric Samuelsson	2006-04-22	2006-04-28	0.30	100.20	Core drilling

STARTING POINT COORDINATE:

Signed/Approved By	Length(m)	Northing(m)	Easting(m)	Elevation	Coord System
Gerry Johansson	0.00	6366339.51	1546604.89	27.27	RT90-RHB70
Gerry Johansson	3.00	6366339.50	1546604.90	24.27	RT90-RHB70

STARTING POINT ANGLES:

Signed/Approved By	Length(m)	Bearing	Inclination (- = down)	Coord System
Gerry Johansson	0.00	136.16	-89.87	RT90-RHB70

BOREHOLE DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Hole Diam(m)
Lars-Eric Samuelsson	0.30	1.21	0.117
Lars-Eric Samuelsson	1.21	2.54	0.096
Lars-Eric Samuelsson	2.54	100.20	0.076

CORE DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Core Diam(m)
Lars-Eric Samuelsson	1.21	100.20	0.050

CASING DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Case In(m)	Case Out(m)	Comment
Lars-Eric Samuelsson	0.00	2.54	0.077	0.089	

SICADA - Information about KLX11C

Title	**Value**
	Information about cored borehole KLX11C (2008-05-05).
Comment:	No comment exists.

BOREHOLE LENGTH:

Signed/Approved By	Length(m)	Reference Level
Lars-Eric Samuelsson	120.15	Top of casing (center)

DRILLING PERIODS:

Signed/Approved By	From Date	To Date	Secup(m)	Seclow(m)	Drilling Type
Lars-Eric Samuelsson	2006-03-30	2006-04-05	0.00	120.15	Core drilling

STARTING POINT COORDINATE:

Signed/Approved By	Length(m)	Northing(m)	Easting(m)	Elevation	Coord System
Gerry Johansson	0.00	6366350.26	1546586.89	27.19	RT90-RHB70
Gerry Johansson	3.00	6366348.88	1546587.41	24.58	RT90-RHB70

STARTING POINT ANGLES:

Signed/Approved By	Length(m)	Bearing	Inclination (- = down)	Coord System
Gerry Johansson	0.00	159.34	-60.52	RT90-RHB70

BOREHOLE DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Hole Diam(m)
Lars-Eric Samuelsson	0.30	2.00	0.096
Lars-Eric Samuelsson	2.00	120.15	0.076

CORE DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Core Diam(m)
Lars-Eric Samuelsson	0.00	120.15	0.050

CASING DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Case In(m)	Case Out(m)	Comment
Lars-Eric Samuelsson	0.00	2.00	0.077	0.089	

SICADA - Information about KLX11D

Title	Value
	Information about cored borehole KLX11D (2008-05-02).
Comment:	No comment exists.

BOREHOLE LENGTH:

Signed/Approved By	Length(m)	Reference Level
Lars-Eric Samuelsson	120.35	Top of casing (center)

DRILLING PERIODS:

Signed/Approved By	From Date	To Date	Secup(m)	Seclow(m)	Drilling Type
Lars-Eric Samuelsson	2006-04-06	2006-04-13	0.00	120.35	Core drilling

STARTING POINT COORDINATE:

Signed/Approved By	Length(m)	Northing(m)	Easting(m)	Elevation	Coord System
Gerry Johansson	0.00	6366357.37	1546631.42	25.57	RT90-RHB70
Gerry Johansson	3.00	6366357.33	1546629.87	23.00	RT90-RHB70

STARTING POINT ANGLES:

Signed/Approved By	Length(m)	Bearing	Inclination (- = down)	Coord System
Gerry Johansson	0.00	268.70	-59.00	RT90-RHB70

BOREHOLE DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Hole Diam(m)
Lars-Eric Samuelsson	0.30	2.00	0.096
Lars-Eric Samuelsson	2.00	120.35	0.076

CORE DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Core Diam(m)
Lars-Eric Samuelsson	0.00	120.35	0.050

CASING DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Case In(m)	Case Out(m)	Comment
Lars-Eric Samuelsson	0.00	2.00	0.077	0.089	

SICADA - Information about KLX11E

Title	Value
	Information about cored borehole KLX11E (2008-05-02).
Comment:	No comment exists.

BOREHOLE LENGTH:

Signed/Approved By	Length(m)	Reference Level
Lars-Eric Samuelsson	121.30	Top of casing (center)

DRILLING PERIODS:

Signed/Approved By	From Date	To Date	Secup(m)	Seclow(m)	Drilling Type
Lars-Eric Samuelsson	2006-04-13	2006-04-21	0.00	121.30	Core drilling

STARTING POINT COORDINATE:

Signed/Approved By	Length(m)	Northing(m)	Easting(m)	Elevation	Coord System
Gerry Johansson	0.00	6366300.39	1546627.23	22.65	RT90-RHB70
Gerry Johansson	3.00	6366301.74	1546626.64	20.03	RT90-RHB70

STARTING POINT ANGLES:

Signed/Approved By	Length(m)	Bearing	Inclination (- = down)	Coord System
Gerry Johansson	0.00	336.17	-60.65	RT90-RHB70

BOREHOLE DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Hole Diam(m)
Lars-Eric Samuelsson	0.30	2.00	0.096
Lars-Eric Samuelsson	2.00	121.30	0.076

CORE DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Core Diam(m)
Lars-Eric Samuelsson	0.30	121.30	0.050

CASING DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Case In(m)	Case Out(m)	Comment
Lars-Eric Samuelsson	0.00	2.00	0.077	0.089	

SICADA - Information about KLX11F

Title	**Value**
	Information about cored borehole KLX11F (2008-05-02).
Comment:	No comment exists.

BOREHOLE LENGTH:

Signed/Approved By	Length(m)	Reference Level
Lars-Eric Samuelsson	120.05	Top of casing (center)

DRILLING PERIODS:

Signed/Approved By	From Date	To Date	Secup(m)	Seclow(m)	Drilling Type
Lars-Eric Samuelsson	2006-03-14	2006-03-17	0.00	120.05	Core drilling

STARTING POINT COORDINATE:

Signed/Approved By	Length(m)	Northing(m)	Easting(m)	Elevation	Coord System
Gerry Johansson	0.00	6366314.09	1546577.96	24.47	RT90-RHB70
Gerry Johansson	3.00	6366314.13	1546579.41	21.84	RT90-RHB70

STARTING POINT ANGLES:

Signed/Approved By	Length(m)	Bearing	Inclination (- = down)	Coord System
Gerry Johansson	0.00	88.61	-60.98	RT90-RHB70

BOREHOLE DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Hole Diam(m)
Lars-Eric Samuelsson	0.30	2.00	0.096
Lars-Eric Samuelsson	2.00	120.05	0.076

CORE DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Core Diam(m)
Lars-Eric Samuelsson	0.00	120.05	0.050

CASING DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Case In(m)	Case Out(m)	Comment
Lars-Eric Samuelsson	0.00	2.00	0.077	0.089	

SICADA - Information about KLX12A

Title	**Value**
	Information about cored borehole KLX12A (2008-05-02).
Comment:	No comment exists.

BOREHOLE LENGTH:

Signed/Approved By	Length(m)	Reference Level
Lars-Eric Samuelsson	602.29	Unknown

DRILLING PERIODS:

Signed/Approved By	From Date	To Date	Secup(m)	Seclow(m)	Drilling Type
Lars-Eric Samuelsson	2005-10-19	2005-10-27	0.15	100.57	Percussion drilling
Lars-Eric Samuelsson	2005-11-10	2006-03-04	100.57	602.29	Core drilling

STARTING POINT COORDINATE:

Signed/Approved By	Length(m)	Northing(m)	Easting(m)	Elevation	Coord System
Gerry Johansson	0.00	6365630.78	1548904.44	17.74	RT90-RHB70
Gerry Johansson	3.00	6365631.34	1548903.90	14.84	RT90-RHB70

STARTING POINT ANGLES:

Signed/Approved By	Length(m)	Bearing	Inclination (- = down)	Coord System
Gerry Johansson	0.00	315.92	-75.07	RT90-RHB70

BOREHOLE DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Hole Diam(m)
Lars-Eric Samuelsson	0.15	15.10	0.343
Lars-Eric Samuelsson	15.10	17.92	0.248
Lars-Eric Samuelsson	17.92	100.40	0.197
Lars-Eric Samuelsson	100.40	100.57	0.161
Lars-Eric Samuelsson	100.57	102.13	0.086
Lars-Eric Samuelsson	102.13	602.29	0.076

CORE DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Core Diam(m)
Lars-Eric Samuelsson	100.57	101.12	0.072
Lars-Eric Samuelsson	101.12	224.03	0.050
Lars-Eric Samuelsson	224.03	224.07	
Lars-Eric Samuelsson	224.07	224.99	0.062
Lars-Eric Samuelsson	224.99	225.48	0.050
Lars-Eric Samuelsson	225.48	225.54	
Lars-Eric Samuelsson	225.54	226.39	0.050
Lars-Eric Samuelsson	226.39	226.43	
Lars-Eric Samuelsson	226.43	226.77	0.050
Lars-Eric Samuelsson	226.77	226.82	
Lars-Eric Samuelsson	226.82	227.72	0.050
Lars-Eric Samuelsson	227.72	228.81	
Lars-Eric Samuelsson	228.81	228.87	0.062
Lars-Eric Samuelsson	228.87	228.91	
Lars-Eric Samuelsson	228.91	229.88	0.050
Lars-Eric Samuelsson	229.88	229.93	
Lars-Eric Samuelsson	229.93	231.04	0.050
Lars-Eric Samuelsson	231.04	231.20	
Lars-Eric Samuelsson	231.20	232.20	0.062
Lars-Eric Samuelsson	232.20	232.24	
Lars-Eric Samuelsson	232.24	233.25	0.062
Lars-Eric Samuelsson	233.25	233.28	
Lars-Eric Samuelsson	233.28	234.31	0.062
Lars-Eric Samuelsson	234.31	235.82	0.050
Lars-Eric Samuelsson	235.82	236.10	
Lars-Eric Samuelsson	236.10	237.13	0.062
Lars-Eric Samuelsson	237.13	237.17	
Lars-Eric Samuelsson	237.17	238.17	0.062
Lars-Eric Samuelsson	238.17	238.90	0.050
Lars-Eric Samuelsson	238.90	238.93	
Lars-Eric Samuelsson	238.93	239.14	0.050
Lars-Eric Samuelsson	239.14	239.21	
Lars-Eric Samuelsson	239.21	240.28	0.062
Lars-Eric Samuelsson	240.28	241.90	0.050
Lars-Eric Samuelsson	241.90	241.95	
Lars-Eric Samuelsson	241.95	302.17	0.050
Lars-Eric Samuelsson	302.17	304.81	0.048
Lars-Eric Samuelsson	304.81	307.92	0.050
Lars-Eric Samuelsson	307.92	310.81	0.048
Lars-Eric Samuelsson	310.81	313.81	0.050
Lars-Eric Samuelsson	313.81	316.57	0.048
Lars-Eric Samuelsson	316.57	319.65	0.050
Lars-Eric Samuelsson	319.65	322.55	0.048
Lars-Eric Samuelsson	322.55	325.67	0.050
Lars-Eric Samuelsson	325.72	328.72	0.048
Lars-Eric Samuelsson	328.72	331.85	0.050
Lars-Eric Samuelsson	331.85	334.81	0.048
Lars-Eric Samuelsson	334.81	349.94	0.050
Lars-Eric Samuelsson	349.94	352.16	0.062
Lars-Eric Samuelsson	352.16	355.07	0.050
Lars-Eric Samuelsson	355.07	356.15	0.062
Lars-Eric Samuelsson	356.15	357.23	0.050
Lars-Eric Samuelsson	357.23	358.26	0.062
Lars-Eric Samuelsson	358.26	359.36	0.050
Lars-Eric Samuelsson	359.36	360.43	0.062
Lars-Eric Samuelsson	360.43	365.22	0.050
Lars-Eric Samuelsson	365.22	368.26	0.062
Lars-Eric Samuelsson	368.26	467.14	0.050
Lars-Eric Samuelsson	467.14	469.41	0.062
Lars-Eric Samuelsson	469.41	470.56	0.050
Lars-Eric Samuelsson	470.18	474.18	0.062
Lars-Eric Samuelsson	474.18	475.10	0.050
Lars-Eric Samuelsson	475.10	476.28	0.062
Lars-Eric Samuelsson	476.28	479.17	0.050
Lars-Eric Samuelsson	479.17	480.19	0.062
Lars-Eric Samuelsson	480.19	481.65	0.050
Lars-Eric Samuelsson	481.65	483.73	0.062
Lars-Eric Samuelsson	483.73	602.29	0.050

CASING DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Case In(m)	Case Out(m)	Comment
Lars-Eric Samuelsson	0.00	17.92	0.200	0.208	
Lars-Eric Samuelsson	0.15	15.10	0.310	0.323	

CONE DIMENSIONS:

Signed/Approved By	Secup(m)	Seclow(m)	Cone In(m)	Cone Out(m)
Lars-Eric Samuelsson	97.36	102.13		

SICADA - Information about KLX13A

Title	**Value**
	Information about cored borehole KLX13A (2008-05-02).
Comment:	No comment exists.

BOREHOLE LENGTH:

Signed/Approved By	Length(m)	Reference Level
Lars-Eric Samuelsson	595.85	Top of casing (center)

DRILLING PERIODS:

Signed/Approved By	From Date	To Date	Secup(m)	Seclow(m)	Drilling Type
Lars-Eric Samuelsson	2006-03-23	2006-03-30	0.15	99.86	Percussion drilling
Lars-Eric Samuelsson	2006-05-19	2006-08-16	99.86	595.85	Core drilling

STARTING POINT COORDINATE:

Signed/Approved By	Length(m)	Northing(m)	Easting(m)	Elevation	Coord System
Gerry Johansson	0.00	6367547.14	1546787.36	24.15	RT90-RHB70
Gerry Johansson	3.00	6367546.86	1546787.08	21.18	RT90-RHB70

STARTING POINT ANGLES:

Signed/Approved By	Length(m)	Bearing	Inclination (- = down)	Coord System
Gerry Johansson	0.00	224.48	-82.25	RT90-RHB70

BOREHOLE DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Hole Diam(m)
Lars-Eric Samuelsson	0.15	6.15	0.341
Lars-Eric Samuelsson	6.15	11.75	0.252
Lars-Eric Samuelsson	11.75	99.76	0.197
Lars-Eric Samuelsson	99.76	99.86	0.160
Lars-Eric Samuelsson	99.86	101.21	0.086
Lars-Eric Samuelsson	101.21	595.85	0.076

CORE DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Core Diam(m)
Lars-Eric Samuelsson	99.86	100.36	0.072
Lars-Eric Samuelsson	100.36	595.85	0.050

CASING DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Case In(m)	Case Out(m)	Comment
Lars-Eric Samuelsson	0.00	11.75	0.200	0.208	
Lars-Eric Samuelsson	0.15	6.15	0.301	0.323	

CONE DIMENSIONS:

Signed/Approved By	Secup(m)	Seclow(m)	Cone In(m)	Cone Out(m)
Lars-Eric Samuelsson	96.11	101.21	0.100	0.104

SICADA - Information about KLX17A

Title	**Value**
	Information about cored borehole KLX17A (2008-05-02).
Comment:	No comment exists.

BOREHOLE LENGTH:

Signed/Approved By	Length(m)	Reference Level
Lars-Eric Samuelsson	701.08	Top of casing (center)

DRILLING PERIODS:

Signed/Approved By	From Date	To Date	Secup(m)	Seclow(m)	Drilling Type
Lars-Eric Samuelsson	2006-08-07	2006-08-15	0.15	65.42	Percussion drilling
Lars-Eric Samuelsson	2006-09-13	2006-10-23	65.42	701.08	Core drilling

STARTING POINT COORDINATE:

Signed/Approved By	Length(m)	Northing(m)	Easting(m)	Elevation	Coord System
Gerry Johansson	0.00	6366848.75	1546862.09	27.63	RT90-RHB70
Gerry Johansson	3.00	6366850.16	1546862.37	25.00	RT90-RHB70

STARTING POINT ANGLES:

Signed/Approved By	Length(m)	Bearing	Inclination (- = down)	Coord System
Gerry Johansson	0.00	11.21	-61.34	RT90-RHB70

BOREHOLE DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Hole Diam(m)

Lars-Eric Samuelsson	0.15	2.60	0.339
Lars-Eric Samuelsson	2.60	11.95	0.248
Lars-Eric Samuelsson	11.95	65.35	0.197
Lars-Eric Samuelsson	65.35	65.42	0.159
Lars-Eric Samuelsson	65.42	66.76	0.086
Lars-Eric Samuelsson	66.76	701.08	0.076

CORE DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Core Diam(m)
Lars-Eric Samuelsson	65.42	65.85	0.072
Lars-Eric Samuelsson	65.85	701.08	0.050

CASING DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Case In(m)	Case Out(m)	Comment
Lars-Eric Samuelsson	0.00	11.95	0.200	0.208	rostfri
Lars-Eric Samuelsson	0.15	2.50	0.310	0.323	
Lars-Eric Samuelsson	2.50	2.60	0.280	0.323	Borrsko 0.1

CONE DIMENSIONS:

Signed/Approved By	Secup(m)	Seclow(m)	Cone In(m)	Cone Out(m)
Lars-Eric Samuelsson	62.02	65.02	0.100	0.104
Lars-Eric Samuelsson	65.02	66.76	0.080	0.084

SICADA - Information about KLX18A

Title	**Value**
	Information about cored borehole KLX18A (2008-05-02).
Comment:	No comment exists.

BOREHOLE LENGTH:

Signed/Approved By	Length(m)	Reference Level
Lars-Eric Samuelsson	611.28	Top of casing (center)

DRILLING PERIODS:

Signed/Approved By	From Date	To Date	Secup(m)	Seclow(m)	Drilling Type
Lars-Eric Samuelsson	2006-02-15	2006-02-21	0.30	99.93	Percussion drilling
Lars-Eric Samuelsson	2006-03-29	2006-05-02	99.93	611.28	Core drilling

STARTING POINT COORDINATE:

Signed/Approved By	Length(m)	Northing(m)	Easting(m)	Elevation	Coord System
Gerry Johansson	0.00	6366413.39	1547966.35	21.01	RT90-RHB70
Gerry Johansson	3.00	6366413.40	1547965.93	18.04	RT90-RHB70

STARTING POINT ANGLES:

Signed/Approved By	Length(m)	Bearing	Inclination (- = down)	Coord System
Gerry Johansson	0.00	271.40	-82.04	RT90-RHB70

BOREHOLE DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Hole Diam(m)
Lars-Eric Samuelsson	0.30	9.30	0.340
Lars-Eric Samuelsson	9.30	11.83	0.254
Lars-Eric Samuelsson	11.83	99.83	0.198
Lars-Eric Samuelsson	99.83	99.93	0.163
Lars-Eric Samuelsson	99.93	101.35	0.086
Lars-Eric Samuelsson	101.35	611.28	0.076

CORE DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Core Diam(m)
Lars-Eric Samuelsson	99.93	100.80	0.072
Lars-Eric Samuelsson	100.80	611.28	0.050

CASING DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Case In(m)	Case Out(m)	Comment
Lars-Eric Samuelsson	0.00	11.83	0.200	0.208	
Lars-Eric Samuelsson	0.30	9.30	0.311	0.323	

CONE DIMENSIONS:

Signed/Approved By	Secup(m)	Seclow(m)	Cone In(m)	Cone Out(m)
Lars-Eric Samuelsson	96.53	101.35		

SICADA - Information about KLX20A

Title	**Value**
	Information about cored borehole KLX20A (2008-05-02).
Comment:	No comment exists.

BOREHOLE LENGTH:

Signed/Approved By	Length(m)	Reference Level
Lars-Eric Samuelsson	457.92	Top of casing (center)

DRILLING PERIODS:

Signed/Approved By	From Date	To Date	Secup(m)	Seclow(m)	Drilling Type
Lars-Eric Samuelsson	2006-02-22	2006-03-08	0.30	99.91	Percussion drilling
Lars-Eric Samuelsson	2006-03-25	2006-04-24	99.91	457.92	Core drilling

STARTING POINT COORDINATE:

Signed/Approved By	Length(m)	Northing(m)	Easting(m)	Elevation	Coord System
Gerry Johansson	0.00	6366334.57	1546604.89	27.24	RT90-RHB70
Gerry Johansson	3.00	6366334.59	1546602.95	24.95	RT90-RHB70

STARTING POINT ANGLES:

Signed/Approved By	Length(m)	Bearing	Inclination (- = down)	Coord System
Gerry Johansson	0.00	270.61	-49.81	RT90-RHB70

BOREHOLE DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Hole Diam(m)
Lars-Eric Samuelsson	0.30	6.00	0.340
Lars-Eric Samuelsson	6.00	99.90	0.253
Lars-Eric Samuelsson	99.90	99.91	0.162
Lars-Eric Samuelsson	99.91	100.90	0.086
Lars-Eric Samuelsson	100.90	457.92	0.076

CORE DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Core Diam(m)
Lars-Eric Samuelsson	99.91	100.40	0.072
Lars-Eric Samuelsson	100.40	457.92	0.050

CASING DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Case In(m)	Case Out(m)	Comment
Lars-Eric Samuelsson	0.00	99.47	0.200	0.208	
Lars-Eric Samuelsson	0.30	6.00	0.310	0.323	
Lars-Eric Samuelsson	99.47	99.50	0.170	0.208	

CONE DIMENSIONS:

Signed/Approved By	Secup(m)	Seclow(m)	Cone In(m)	Cone Out(m)
Lars-Eric Samuelsson	96.08	99.09	0.100	0.104
Lars-Eric Samuelsson	99.09	100.90	0.080	0.084

SICADA - Information about KLX24A

Title	**Value**
	Information about cored borehole KLX24A (2008-05-02).
Comment:	No comment exists.

BOREHOLE LENGTH:

Signed/Approved By	Length(m)	Reference Level
Lars-Eric Samuelsson	100.17	Top of casing (center)

DRILLING PERIODS:

Signed/Approved By	From Date	To Date	Secup(m)	Seclow(m)	Drilling Type
Lars-Eric Samuelsson	2006-06-14	2006-06-29	0.30	100.17	Core drilling

STARTING POINT COORDINATE:

Signed/Approved By	Length(m)	Northing(m)	Easting(m)	Elevation	Coord System
Gerry Johansson	0.00	6366423.35	1546853.80	21.29	RT90-RHB70
Gerry Johansson	3.00	6366423.12	1546855.32	18.71	RT90-RHB70

STARTING POINT ANGLES:

Signed/Approved By	Length(m)	Bearing	Inclination (- = down)	Coord System
Gerry Johansson	0.00	98.41	-59.15	RT90-RHB70

BOREHOLE DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Hole Diam(m)
Lars-Eric Samuelsson	0.30	2.41	0.096
Lars-Eric Samuelsson	2.41	100.17	0.076

CORE DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Core Diam(m)
Lars-Eric Samuelsson	0.30	100.17	0.050

CASING DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Case In(m)	Case Out(m)	Comment
Lars-Eric Samuelsson	0.00	2.41	0.077	0.090	

CONE DIMENSIONS:

Signed/Approved By	Secup(m)	Seclow(m)	Cone In(m)	Cone Out(m)

SICADA - Information about KLX25A

Title	**Value**
	Information about cored borehole KLX25A (2008-05-02).
Comment:	No comment exists.

BOREHOLE LENGTH:

Signed/Approved By	Length(m)	Reference Level
Lars-Eric Samuelsson	50.24	Top of casing (center)

DRILLING PERIODS:

Signed/Approved By	From Date	To Date	Secup(m)	Seclow(m)	Drilling Type
Lars-Eric Samuelsson	2006-07-01	2006-07-04	0.30	50.24	Core drilling

STARTING POINT COORDINATE:

Signed/Approved By	Length(m)	Northing(m)	Easting(m)	Elevation	Coord System
Gerry Johansson	0.00	6366274.74	1546769.66	22.84	RT90-RHB70
Gerry Johansson	3.00	6366273.48	1546770.52	20.25	RT90-RHB70

STARTING POINT ANGLES:

Signed/Approved By	Length(m)	Bearing	Inclination (- = down)	Coord System
Gerry Johansson	0.00	145.73	-59.46	RT90-RHB70

BOREHOLE DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Hole Diam(m)
Lars-Eric Samuelsson	0.30	2.20	0.096
Lars-Eric Samuelsson	2.20	50.24	0.076

CORE DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Core Diam(m)
Lars-Eric Samuelsson	0.30	50.24	0.050

CASING DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Case In(m)	Case Out(m)	Comment
Lars-Eric Samuelsson	0.00	2.20	0.077	0.090	

SICADA - Information about KLX27A

Title	**Value**
	Information about cored borehole KLX27A (2008-05-02).
Comment:	No comment exists.

BOREHOLE LENGTH:

Signed/Approved By	Length(m)	Reference Level
Lars-Eric Samuelsson	650.56	Top of casing (center)

DRILLING PERIODS:

Signed/Approved By	From Date	To Date	Secup(m)	Seclow(m)	Drilling Type
Lars-Eric Samuelsson	2007-08-15 drilling	2007-08-27	0.16	75.60	Percussion
Lars-Eric Samuelsson	2007-10-08	2007-11-21	75.60	650.56	Core drilling

STARTING POINT COORDINATE:

Signed/Approved By	Length(m)	Northing(m)	Easting(m)	Elevation	Coord System
Lars-Eric Samuelsson	0.00	6365608.29	1546742.63	16.98	RT90-RHB70
Lars-Eric Samuelsson	3.00	6365609.54	1546742.65	14.25	RT90-RHB70

STARTING POINT ANGLES:

Signed/Approved By	Length(m)	Bearing	Inclination (- = down)	Coord System
Lars-Eric Samuelsson	0.00	0.73	-65.37	RT90-RHB70

BOREHOLE DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Hole Diam(m)
Lars-Eric Samuelsson	0.16	9.20	0.341
Lars-Eric Samuelsson	9.20	14.76	0.254
Lars-Eric Samuelsson	14.76	73.50	0.197
Lars-Eric Samuelsson	75.50	75.60	0.157
Lars-Eric Samuelsson	75.60	77.02	0.086
Lars-Eric Samuelsson	77.02	650.56	0.076

CORE DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Core Diam(m)
Lars-Eric Samuelsson	75.60	76.12	0.072
Lars-Eric Samuelsson	76.12	650.56	0.050

CASING DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Case In(m)	Case Out(m)	Comment
Lars-Eric Samuelsson	0.00	14.76	0.200	0.208	
Lars-Eric Samuelsson	0.16	9.20	0.310	0.323	

CONE DIMENSIONS:

Signed/Approved By	Secup(m)	Seclow(m)	Cone In(m)	Cone Out(m)
Lars-Eric Samuelsson	72.28	75.28	0.100	0.104
Lars-Eric Samuelsson	75.28	77.02	0.080	0.084

SICADA - Information about KLX28A

Title	**Value**
	Information about cored borehole KLX28A (2008-05-02).
Comment:	No comment exists.

BOREHOLE LENGTH:

Signed/Approved By	Length(m)	Reference Level
Lars-Eric Samuelsson	80.23	Top of casing (center)

DRILLING PERIODS:

Signed/Approved By	From Date	To Date	Secup(m)	Seclow(m)	Drilling Type
Lars-Eric Samuelsson	2006-09-14	2006-09-20	0.30	80.23	Core drilling

STARTING POINT COORDINATE:

Signed/Approved By	Length(m)	Northing(m)	Easting(m)	Elevation	Coord System
Lars-Eric Samuelsson	0.00	6365682.22	1549333.71	10.05	RT90-RHB70
Lars-Eric Samuelsson	3.00	6365680.70	1549333.46	7.47	RT90-RHB70

STARTING POINT ANGLES:

Signed/Approved By	Length(m)	Bearing	Inclination (- = down)	Coord System
Lars-Eric Samuelsson	0.00	189.70	-59.23	RT90-RHB70

BOREHOLE DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Hole Diam(m)
Lars-Eric Samuelsson	0.30	2.85	0.116
Lars-Eric Samuelsson	2.85	5.10	0.096
Lars-Eric Samuelsson	5.10	80.23	0.076

CORE DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Core Diam(m)
Lars-Eric Samuelsson	2.85	80.23	0.052

CASING DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Case In(m)	Case Out(m)	Comment
Lars-Eric Samuelsson	0.00	5.10	0.077	0.090	

SICADA - Information about KLX29A

Title	**Value**
	Information about cored borehole KLX29A (2008-05-02).
Comment:	No comment exists.

BOREHOLE LENGTH:

Signed/Approved By	Length(m)	Reference Level
Lars-Eric Samuelsson	60.25	Top of casing (center)

DRILLING PERIODS:

Signed/Approved By	From Date	To Date	Secup(m)	Seclow(m)	Drilling Type
Lars-Eric Samuelsson	2006-09-09	2006-09-13	0.30	60.25	Core drilling

STARTING POINT COORDINATE:

Signed/Approved By	Length(m)	Northing(m)	Easting(m)	Elevation	Coord System
Lars-Eric Samuelsson	0.00	6366264.54	1549443.99	13.63	RT90-RHB70
Lars-Eric Samuelsson	3.00	6366265.69	1549443.06	11.02	RT90-RHB70

STARTING POINT ANGLES:

Signed/Approved By	Length(m)	Bearing	Inclination (- = down)	Coord System
Lars-Eric Samuelsson	0.00	321.21	-60.35	RT90-RHB70

BOREHOLE DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Hole Diam(m)
Lars-Eric Samuelsson	0.30	2.35	0.096
Lars-Eric Samuelsson	2.35	60.25	0.076

CORE DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Core Diam(m)
Lars-Eric Samuelsson	0.30	60.25	0.050

CASING DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Case In(m)	Case Out(m)	Comment
Lars-Eric Samuelsson	0.00	2.35	0.077	0.090	

SICADA - Information about KSH01A

Title	Value
	Information about cored borehole KSH01A (2008-05-02).
Old Idcode Name(s):	KSH01 used until 2002-09-10 11:44
Comment:	Correct name is KSH01A, not KSH01, according to Stefan Sehltstedt, 2002-09-10.

BOREHOLE LENGTH:

Signed/Approved By	Length(m)	Reference Level
Lars-Eric Samuelsson	1003.00	Top of casing (center)

DRILLING PERIODS:

Signed/Approved By	From Date	To Date	Secup(m)	Seclow(m)	Drilling Type
Lars-Eric Samuelsson	2002-08-22	2002-09-17	0.00	100.24	Percussion drilling
Lars-Eric Samuelsson	2002-10-07	2002-12-18	100.24	1003.00	Core drilling

STARTING POINT COORDINATE:

Signed/Approved By	Length(m)	Northing(m)	Easting(m)	Elevation	Coord System
Gerry Johansson	0.00	6366013.45	1552442.98	5.32	RT90-RHB70

STARTING POINT ANGLES:

Signed/Approved By	Length(m)	Bearing	Inclination (- = down)	Coord System
Gerry Johansson	0.00	173.60	-80.44	RT90-RHB70

BOREHOLE DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Hole Diam(m)
Lars-Eric Samuelsson	0.00	2.20	0.420
Lars-Eric Samuelsson	2.20	12.10	0.350
Lars-Eric Samuelsson	12.10	100.24	0.198
Lars-Eric Samuelsson	100.24	101.67	0.086
Lars-Eric Samuelsson	101.67	1003.00	0.076

CORE DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Core Diam(m)
Lars-Eric Samuelsson	100.24	100.81	0.072
Lars-Eric Samuelsson	100.81	1003.00	0.050

CASING DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Case In(m)	Case Out(m)	Comment
Lars-Eric Samuelsson	0.00	12.05	0.265	0.273	
Lars-Eric Samuelsson	0.00	2.20	0.392	0.465	
Lars-Eric Samuelsson	0.00	12.10	0.200	0.208	

CONE DIMENSIONS:

Signed/Approved By	Secup(m)	Seclow(m)	Cone In(m)	Cone Out(m)
Lars-Eric Samuelsson	97.02	97.02	0.195	0.199
Lars-Eric Samuelsson	101.67	101.67	0.076	0.080

SICADA - Information about KSH02

Title	Value
	Information about cored borehole KSH02 (2008-05-02).
Comment:	No comment exists.

BOREHOLE LENGTH:

Signed/Approved By	Length(m)	Reference Level
Lars-Eric Samuelsson	1001.11	Top of casing (center)

DRILLING PERIODS:

Signed/Approved By	From Date	To Date	Secup(m)	Seclow(m)	Drilling Type
Lars-Eric Samuelsson	2003-01-22	2003-03-03	0.00	65.85	Percussion drilling
Johan Svensson	2003-01-22	2003-03-03	0.00	100.40	Percussion drilling
Lars-Eric Samuelsson	2003-01-28	2003-06-11	65.85	1001.11	Core drilling

STARTING POINT COORDINATE:

Signed/Approved By	Length(m)	Northing(m)	Easting(m)	Elevation	Coord System
Gerry Johansson	0.00	6365658.33	1551528.93	5.48	RT90-RHB70

STARTING POINT ANGLES:

Signed/Approved By	Length(m)	Bearing	Inclination (- = down)	Coord System
Gerry Johansson	0.00	330.68	-85.68	RT90-RHB70

BOREHOLE DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Hole Diam(m)
Lars-Eric Samuelsson	0.10	3.55	0.390
Lars-Eric Samuelsson	3.55	16.78	0.350
Lars-Eric Samuelsson	16.78	65.85	0.248
Lars-Eric Samuelsson	65.85	80.00	0.086
Lars-Eric Samuelsson	80.00	1001.11	0.076

CORE DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Core Diam(m)
Lars-Eric Samuelsson	65.85	67.25	0.072
Lars-Eric Samuelsson	67.25	1001.11	0.050

CASING DIAMETERS:

Signed/Approved By	Secup(m)	Seclow(m)	Case In(m)	Case Out(m)	Comment
Lars-Eric Samuelsson	0.00	65.36	0.200	0.208	
Lars-Eric Samuelsson	0.10	16.78	0.265	0.273	
Lars-Eric Samuelsson	65.36	80.00	0.080	0.084	

APPENDIX 5

Nomenclature

Character	SICADA designation	Explanation	Dimension	Unit
Variables, constants				
A_w		Horizontal area of water surface in open borehole, not including area of signal cables, etc.	$[L^2]$	m^2
b		Aquifer thickness (Thickness of 2D formation)	[L]	m
B		Width of channel	[L]	m
L		Corrected borehole length	[L]	m
L_0		Uncorrected borehole length	[L]	m
L_p		Point of application for a measuring section based on its centre point or centre of gravity for distribution of transmissivity in the measuring section.	[L]	m
L_w		Test section length.	[L]	m
dL		Step length, Positive Flow Log - overlapping flow logging. (step length, PFL)	[L]	m
r		Radius	[L]	m
r_w		Borehole, well or soil pipe radius in test section.	[L]	m
r_{we}		Effective borehole, well or soil pipe radius in test section. (Consideration taken to skin factor)	[L]	m
r_s		Distance from test section to observation section, the shortest distance.	[L]	m
r_t		Distance from test section to observation section, the **interpreted** shortest distance via conductive structures.	[L]	m
r_D		Dimensionless radius, $r_D=r/r_w$	-	-
z		Level above reference point	[L]	m
z_r		Level for reference point on borehole	[L]	m
z_{wu}		Level for test section (section that is being flowed), upper limitation	[L]	m
z_{wl}		Level for test section (section that is being flowed), lower limitation	[L]	m
z_{ws}		Level for sensor that measures response in test section (section that is flowed)	[L]	m
z_{ou}		Level for observation section, upper limitation	[L]	m
z_{ol}		Level for observation section, lower limitation	[L]	m
z_{os}		Level for sensor that measures response in observation section	[L]	m
E		Evaporation: hydrological budget:	$[L^3/(T\ L^2)]$ $[L^3/T]$	mm/y, mm/d, m^3/s
ET		Evapotranspiration hydrological budget:	$[L^3/(T\ L^2)]$ $[L^3/T]$	mm/y, mm/d, m^3/s
P		Precipitation hydrological budget:	$[L^3/(T\ L^2)]$ $[L^3/T]$	mm/y, mm/d, m^3/s
R		Groundwater recharge hydrological budget:	$[L^3/(T\ L^2)]$ $[L^3/T]$	mm/y, mm/d, m^3/s
D		Groundwater discharge hydrological budget:	$[L^3/(T\ L^2)]$ $[L^3/T]$	mm/y, mm/d, m^3/s
Q_R		Run-off rate	$[L^3/T]$	m^3/s
Q_p		Pumping rate	$[L^3/T]$	m^3/s
Q_I		Infiltration rate	$[L^3/T]$	m^3/s
Q		Volumetric flow. Corrected flow in flow logging ($Q_1 – Q_0$) (Flow rate)	$[L^3/T]$	m^3/s
Q_0		Flow in test section during undisturbed conditions (flow logging).	$[L^3/T]$	m^3/s
Q_p		Flow in test section immediately before stop of flow. Stabilised pump flow in flow logging.	$[L^3/T]$	m^3/s

Character	SICADA designation	Explanation	Dimension	Unit
Q_m		Arithmetical mean flow during perturbation phase.	$[L^3/T]$	m^3/s
Q_1		Flow in test section during pumping with pump flow Q_{p1}, (flow logging).	$[L^3/T]$	m^3/s
Q_2		Flow in test section during pumping with pump flow Q_{p1}, (flow logging).	$[L^3/T]$	m^3/s
ΣQ	SumQ	Cumulative volumetric flow along borehole	$[L^3/T]$	m^3/s
ΣQ_0	SumQ0	Cumulative volumetric flow along borehole, undisturbed conditions (ie, not pumped)	$[L^3/T]$	m^3/s
ΣQ_1	SumQ1	Cumulative volumetric flow along borehole, with pump flow Q_{p1}	$[L^3/T]$	m^3/s
ΣQ_2	SumQ2	Cumulative volumetric flow along borehole, with pump flow Q_{p2}	$[L^3/T]$	m^3/s
ΣQ_{C1}	SumQC1	Corrected cumulative volumetric flow along borehole, ΣQ_1-ΣQ_0	$[L^3/T]$	m^3/s
ΣQ_{C2}	SumQC2	Corrected cumulative volumetric flow along borehole, ΣQ_2-ΣQ_0	$[L^3/T]$	m^3/s
q		Volumetric flow per flow passage area (Specific discharge (Darcy velocity, Darcy flux, Filtration velocity)).	$([L^3/T*L^2]$	m/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
v		Velocity	$([L^3/T*L^2]$	m/s
v_a		Mean transport velocity (Average linear velocity (Average linear groundwater velocity, Mean microscopic velocity));. $v_a=q/n_e$	$([L^3/T*L^2]$	m/s
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

Character	SICADA designation	Explanation	Dimension	Unit
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
h_p		Pressure head; Level above reference level for height of measuring point of stationary column of water giving corresponding static pressure at measuring point	[L]	m
h_v		Velocity head; height corresponding to the lifting for which the kinetic energy is capable (usually neglected in hydrogeology)	[L]	m
s		Drawdown; Drawdown from undisturbed level (same as dh_p, positive)	[L]	m
s_p		Drawdown in measuring section before flow stop.	[L]	m
			[L]	
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).		^oC

Character	SICADA designation	Explanation	Dimension	Unit
Te_o		Temperature in the observation section (taken from temperature logging). Temperature		^oC
EC_w		Electrical conductivity of water in test section.		mS/m
EC_{w0}		Electrical conductivity of water in test section during undisturbed conditions.		mS/m
EC_o		Electrical conductivity of water in observation section		mS/m
TDS_w		Total salinity of water in the test section.	$[M/L^3]$	mg/L
TDS_{w0}		Total salinity of water in the test section during undisturbed conditions.	$[M/L^3]$	mg/L
TDS_o		Total salinity of water in the observation section.	$[M/L^3]$	mg/L
g		Constant of gravitation (9.81 $m*s^{-2}$) (Acceleration due to gravity)	$[L/T^2]$	m/s^2
π	pi	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)		
ME		Mean error in residuals. $ME = \frac{1}{n}\sum_{i=1}^{n} r_i$		
NME		Normalized ME. NME=ME/(x_{MAX}-x_{MIN}), x: measured variable considered.		
MAE		Mean absolute error. $MAE = \frac{1}{n}\sum_{i=1}^{n} \lvert r_i \rvert$		
NMAE		Normalized MAE. NMAE=MAE/(x_{MAX}-x_{MIN}), x: measured variable considered.		
RMS		Root mean squared error. $RMS = \left(\frac{1}{n}\sum_{i=1}^{n} r_i^2\right)^{0.5}$		
NRMS		Normalized RMR. NRMR=RMR/(x_{MAX}-x_{MIN}), x: measured variable considered.		
SDR		Standard deviation of residual. $SDR = \left(\frac{1}{n-1}\sum_{i=1}^{n} (r_i - ME)^2\right)^{0.5}$		
SEMR		Standard error of mean residual. $SEMR = \left(\frac{1}{n(n-1)}\sum_{i=1}^{n} (r_i - ME)^2\right)^{0.5}$		
Parameters				
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
dt_L		Response time to obtain 0.1 m (or 1 kPa) drawdown in observation section counted from start of recovery phase.	[T]	s
TB		Flow capacity in a one-dimensional structure of width B and transmissivity T. Transient evaluation of one-dimensional structure	$[L^3/T]$	m^3/s
T		Transmissivity	$[L^2/T]$	m^2/s
T_M		Transmissivity according to Moye (1967)	$[L^2/T]$	m^2/s
T_Q		Evaluation based on Q/s and regression curve between Q/s and T, as example see Rhén et al (1997) p. 190.	$[L^2/T]$	m^2/s
T_S		Transmissivity evaluated from slug test	$[L^2/T]$	m^2/s

Character	SICADA designation	Explanation	Dimension	Unit
T_D		Transmissivity evaluated from PFL-Difference Flow Meter	$[L^2/T]$	m^2/s
T_I		Transmissivity evaluated from Impeller flow log	$[L^2/T]$	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
T_{Tot}		Judged most representative transmissivity for particular test section and (in certain cases) evaluation time with respect to available data (made by SKB at a later stage).	$[L^2/T]$	m^2/s
K		Hydraulic conductivity	[L/T]	m/s
K_s		Hydraulic conductivity based on spherical flow model	[L/T]	m/s
K_m		Hydraulic conductivity matrix, intact rock	[L/T]	m/s
k		Intrinsic permeability	$[L^2]$	m^2
kb		Permeability-thickness product: $kb=k \cdot b$	$[L^3]$	m^3
SB		Storage capacity in a one-dimensional structure of width B and storage coefficient S. Transient evaluation of one-dimensional structure	[L]	m
SB*		Assumed storage capacity in a one-dimensional structure of width B and storage coefficient S. Transient evaluation of one-dimensional structure	[L]	m
S		Storage coefficient, (Storativity)	[-]	-
S*		Assumed storage coefficient	[-]	-
S_y		Theoretical specific yield of water (Specific yield; unconfined storage. Defined as total porosity (n) minus retention capacity (S_r)	[-]	-
S_{ya}		Specific yield of water (Apparent specific yield); unconfined storage, field measuring. Corresponds to volume of water achieved on draining saturated soil or rock in free draining of a volumetric unit. $S_{ya}= S_y$ (often called S_y in literature)	[-]	-
S_r		Specific retention capacity, (specific retention of water, field capacity) (Specific retention); unconfined storage. Corresponds to water volume that the soil or rock has left after free draining of saturated soil or rock.	[-]	-
S_f		Fracture storage coefficient	[-]	-
S_m		Matrix storage coefficient	[-]	-
S_{NLR}		Storage coefficient, evaluation based on non-linear regression	[-]	-
S_{Tot}		Judged most representative storage coefficient for particular test section and (in certain cases) evaluation time with respect to available data (made by SKB at a later stage).	[-]	-
S_s		Specific storage coefficient; confined storage.	[1/L]	1/m
S_s*		Assumed specific storage coefficient; confined storage.	[1/L]	1/m
c_f		Hydraulic resistance: The hydraulic resistance is an aquitard with a flow vertical to a two-dimensional formation. The inverse of c is also called Leakage coefficient. $c_f=b'/K'$ where b´ is thickness of the aquitard and K´ its hydraulic conductivity across the aquitard.	[T]	s
L_f		Leakage factor: $L_f = (K \cdot b \cdot c_f)^{0.5}$ where K represents characteristics of the aquifer.	[L]	m
ξ	Skin	Skin factor	[-]	-

Character	SICADA designation	Explanation	Dimension	Unit
ξ^*	Skin	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	Stor-ratio	$\omega= S_f/(S_f + S_m)$, storage ratio (Storativity ratio); the ratio of storage coefficient between that of the fracture and total storage.	[-]	-
λ	Interflow-coeff	$\lambda= \alpha\cdot (K_m / K_f)\cdot r_w^2$ 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
nc_t		Porosity-compressibility factor: $nc_t= n\cdot c_t$	$[(LT^2)/M]$	1/Pa
nc_tb		Porosity-compressibility-thickness product: $nc_tb= n\cdot c_t.b$	$[(L^2T^2)/M]$	m/Pa
n		Total porosity	-	-
n_e		Kinematic porosity, (Effective porosity)	-	-
e		Transport aperture. $e = n_e\cdot b$	[L]	m
ρ	Density	Density	$[M/L^3]$	$kg/(m^3)$
ρ_w	Density-w	Fluid density in measurement section during pumping/injection	$[M/L^3]$	$kg/(m^3)$
ρ_o	Density-o	Fluid density in observation section	$[M/L^3]$	$kg/(m^3)$
ρ_{sp}	Density-sp	Fluid density in standpipes from measurement section	$[M/L^3]$	$kg/(m^3)$
μ	my	Dynamic viscosity	[M/LT]	Pa s
μ_w	my	Dynamic viscosity (Fluid density in measurement section during pumping/injection)	[M/LT]	Pa s
FC_T		Fluid coefficient for intrinsic permeability, transference of k to K; $K=FC_T\cdot k$; $FC_T=\rho_w\cdot g/\mu_w$	[1/LT]	1/(ms)
FC_S		Fluid coefficient for porosity-compressibility, transference of c_t to S_s ; $S_s=FC_S\cdot n\cdot c_t$; $FC_S=\rho_w\cdot g$	$[M/T^2L^2]$	Pa/m
Index on K, T and S				
S		S: semi-log		
L		L: log-log		
f		Pump phase or injection phase, designation following S or L (withdrawal)		
s		Recovery phase, designation following S or L (recovery)		
NLR		NLR: Non-linear regression. Performed on the entire test sequence, perturbation and recovery		
M		Moye		
GRF		Generalised Radial Flow according to Barker (1988)		
m		Matrix		
f		Fracture		
T		Judged best evaluation based on transient evaluation.		

Character	SICADA designation	Explanation	Dimension	Unit
Tot		Judged most representative parameter for particular test section and (in certain cases) evaluation time with respect to available data (made by SKB at a later stage).		
b		Bloch property in a numerical groundwater flow model		
e		Effective property (constant) within a domain in a numerical groundwater flow model.		
Index on p and Q				
0		Initial condition, undisturbed condition in open holes		
i		Natural, "undisturbed" condition of formation parameter		
f		Pump phase or injection phase (withdrawal, flowing phase)		
s		Recovery, shut-in phase		
p		Pressure or flow in measuring section at end of perturbation period		
F		Pressure in measuring section at end of recovery period.		
m		Arithmetical mean value		
c		Estimated value. The index is placed last if index for “where” and “what” are used. Simulated value		
m		Measured value. The index is placed last if index for “where” and “what” are used. Measured value		
Some miscellaneous indexes on p and h				
w		Test section (final difference pressure during flow phase in test section can be expressed dp_{wp}; First index shows “where” and second index shows “what”)		
o		Observation section (final difference pressure during flow phase in observation section can be expressed dp_{op}; First index shows “where” and second index shows “what”)		
f		Fresh-water head. Water is normally pumped up from section to measuring hoses where pressure and level are observed. Density of the water is therefore approximately the same as that of the measuring section. Measured groundwater level is therefore normally represented by what is defined as point-water head. If pressure at the measuring level is recalculated to a level for a column of water with density of fresh water above the measuring point it is referred to as fresh-water head and h is indicated last by an f. Observation section (final level during flow phase in observation section can be expressed h_{opf}; the first index shows “where” and the second index shows “what” and the last one “recalculation”)		