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Oskarshamn site investigation

Hydraulic injection tests in borehole KLX16A, 2007

Subarea Laxemar

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October 2007

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

This report concerns a study which was conducted for SKB. The conclusions and viewpoints presented in the report are those of the authors and do not necessarily coincide with those of the client.

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Abstract

Hydraulic injection tests have been performed in Borehole KLX16A at the Laxemar area, Oskarshamn. The tests are part of the general program for site investigations and specifically for the Laxemar subarea. The hydraulic testing programme has the aim to characterise the rock with respect to its hydraulic properties of the fractured zones and rock mass between them. Data is subsequently delivered for the site descriptive model.

This report describes the results and primary data evaluation of the hydraulic injection tests in borehole KLX16A performed between 12th and 19th of March 2007.

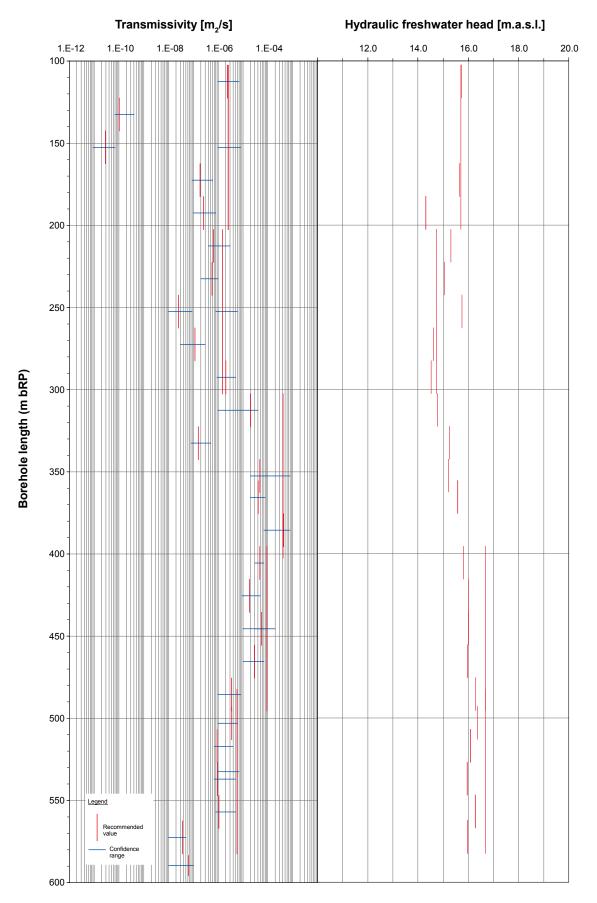
The objective of the hydrotests was to describe the rock around the borehole with respect of hydraulic parameters, mainly transmissivity (T) and hydraulic conductivity (K) at different measurement scales of 100 m and 20 m sections. Transient evaluation during flow and recovery period provided additional information such as flow regimes, hydraulic boundaries and crossover flows. Constant pressure injection tests were conducted between 12.50–433.55 m below ToC. The results of the test interpretation are presented as transmissivity, hydraulic conductivity and hydraulic freshwater head.

Sammanfattning

Injektionstester har utförts i borrhål KLX16A i delområde Laxemar, Oskarshamn. Testerna är en del av SKB:s platsundersökningar. Hydraultestprogrammet där injektionstesterna ingår har som mål att karakterisera berget med avseende på dess hydrauliska egenskaper av sprickzoner och mellanliggande bergmassa. Data från testerna används vid den platsbeskrivande modelleringen av området.

Denna rapport redovisar resultaten och utvärderingar av primärdata de hydrauliska injektionstesterna i borrhål KLX16A. Testerna utfördes mellan den 12 till den 23 Mars 2007.

Syftet med hydraultesterna var framförallt att beskriva bergets hydrauliska egenskaper runt borrhålet med avseende på hydrauliska parametrar, i huvudsak transmissvitet (T) och hydraulisk konduktivitet (K) vid olika mätskalor av 100 m och 20 m sektioner. Transient utvärdering under injektions- och återhämtningsfasen gav ytterligare information avseende flödesgeometri, hydrauliska gränser och sprickläckage. Injektionstester utfördes mellan 12,50–433,50 m borrhålslängd. Resultaten av testutvärderingen presenteras som transmissivitet, hydraulisk konduktivitet och grundvattennivå uttryckt i ekvivalent sötvattenpelare (fresh-water head).



Borehole KLX16 A – Summary of results.

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Appendices attached on CD

Appendix 1 File description table

Appendix 2 Test analyses diagrams

Appendix 3 Test summary sheets

Appendix 4 Nomenclature

Appendix 5 SICADA data tables

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 2006/. The hydraulic injection tests form part of the site characterization program under item 1.1.5.8 in the work breakdown structure of the execution programme, /SKB 2002/.

Measurements were carried out in borehole KLX16A between 12th and 19th of March 2007 following the methodology described in SKB MD 323.001 and in the Activity Plan AP PS 400-07-008 (SKB controlling documents). Data and results were delivered to the SKB site characterization database SICADA and 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 results and primary data evaluation of the hydraulic injection tests in borehole KLX16A. The commission was conducted by Golder Associates AB and Golder Associates GmbH.

Borehole KLX16A is situated in the Laxemar area approximately 3 km southhwest of the nuclear power plant of Simpevarp, Figure 1-1. The borehole was drilled from November 2006 to January 2007 at 433.55 m length with an inner diameter of 96 mm to a depth of 11.25 m and further on of 76 mm to the bottom of the borehole. The inclination of the borehole is -64.98°. The upper 11.25 m is cased with an outer diameter of 90 mm.

The work was carried out in accordance with Activity Plan AP PS 400-07-008. In Table 1-1 controlling documents for performing this activity are listed. Activity Plan and Method Descriptions are SKB's internal controlling documents. Measurements were conducted utilising SKB's custom made testing equipment PSS2.

| Number | Version |
|------------------|---|
| AP PS 400-07-008 | 1.0 |
| Number | Version |
| SKB MD 320.004e | 1.0 |
| SKB MD 323.001e | 1.0 |
| SKB MD 600.004 | 1.0 |
| SKB MD 620.010 | 1.0 |
| SKB SDPO-003 | 1.0 |
| SKB SDP-301 | 1.0 |
| SKB SDP-508 | 1.0 |
| | Number SKB MD 320.004e SKB MD 323.001e SKB MD 600.004 SKB MD 620.010 SKB SDPO-003 SKB SDP-301 |

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

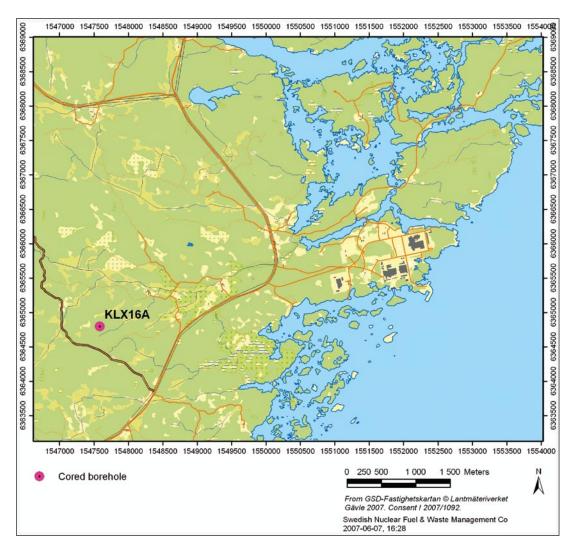


Figure 1-1. The investigation area Laxemar, Oskarshamn with location of borehole KLX16A.

2 Objective and scope

The objective of the hydrotests in borehole KLX16A is to describe the rock around the borehole with respect to hydraulic parameters, mainly transmissivity (T) and hydraulic conductivity (K). This is done at different measurement scales of 100 m and 20 m sections. Among these parameters transient evaluation during the flow and recovery period provides additional information such as flow regimes, hydraulic boundaries and cross-over flows.

The scope of work consisted of preparation of the PSS2 tool which included cleaning of the down-hole tools, calibration and functional checks, injection tests of 100 m and 20 m test sections, analyses and reporting. Furthermore, a single packer test was conducted at a depth of 421.10 m. The used single packer tool consists of a 5 m section but the lower packer was not connected to the pressure lines and therefore not inflated.

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

The following hydraulic injection tests were performed between 12th and 19th March 2007.

2.1 Borehole

The borehole is telescope drilled with specifications on its construction according to Table 2-2. The reference point of the borehole 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. The borehole diameter in Table 2-2 refers to the final diameter of the drill bit after drilling to full depth.

| Table 2-1. Performed inject | ion tests at borehole KLX16A. |
|-----------------------------|-------------------------------|
|-----------------------------|-------------------------------|

| No. of injection tests* | Interval | Positions | Time/test | Total test time |
|-------------------------|----------|----------------|-----------|-----------------|
| 4 | 100 m | 12.50–426.00 m | 125 min | 8.3 hrs |
| 21 | 20 m | 13.00–412.00 m | 90 min | 31.5 hrs |
| Single Packer** | 12.45 m | 421.1-433.55 | 90 min | 1.5 hrs |
| | | | Total: | 41.3 hrs |

* excluding repeated tests;

** conducted with a 5 m tool (bottom packer not inflated).

| Title | Value | | | | |
|----------------------------|-------------------|------------------|------------------------|----------------------|---------------|
| Comment: | No comment exists | | | | |
| Borehole length (m): | 433.55 | | | | |
| Reference level: | TOC | | | | |
| Drilling period (s): | From date | To date | Secup (m) | Seclow (m) | Drilling type |
| | 2006-11-28 | 2007-01-09 | 0.30 | 433.55 | Core drilling |
| Starting point coordinate: | Length (m) | Northing (m) | Easting (m) | Elevation (m.a.s.l.) | Coord system |
| (centerpoint of TOC) | 0.00 | 6,364,797.69 | 1,547,584.06 | 18.85 | RT90-RHB70 |
| | 3.00 | 6,364,798.22 | 1,547,582.90 | 16.14 | RT90-RHB70 |
| Angles: | Length (m) | Bearing | Inclination (- = down) | | |
| | 0.00 | 294.37 | -64.98 | RT90-RHB70 | |
| Borehole diameter: | Secup (m) | Seclow (m) | Hole diam (m) | | |
| | 0.30 | 11.25 | 0.096 | | |
| | 11.25 | 433.55 | 0.076 | | |
| Core diameter: | Secup (m) | Seclow (m) | Core diam (m) | | |
| | 0.30 | 433.55 | 0.050 | | |
| Casing diameter: | Secup (m) | Seclow (m) | Case in (m) | Case out (m) | |
| | 0.00 | 11.25 | 0.077 | 0.090 | |
| Cone dimensions: | Secup (m) | Seclow (m) | Cone In (m) | Cone out (m) | |
| Grove milling: | Length (m) | Trace detectable | | | |
| | 20.00 | YES | | | |
| | 50.00 | YES | | | |
| | 100.00 | YES | | | |
| | 150.00 | YES | | | |
| | 200.00 | YES | | | |
| | 250.00 | YES | | | |
| | 300.00 | YES | | | |
| | 350.00 | YES | | | |
| | 400.00 | YES | | | |

Table 2-2. Information about KLX16A (from SICADA 2007-01-29).

2.2 Injection tests

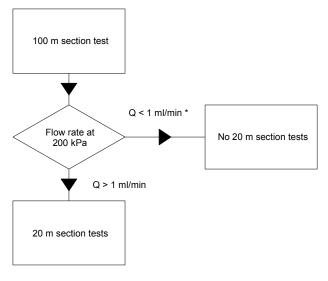
Injection tests were conducted according to the Activity Plan AP PS 400-07-008 and the Method Description for hydraulic injection tests, SKB MD 323.001 (SKB internal documents). Tests were done in 100 m, 20 m test sections between 12.50–426.00 m below ToC (see Table 2-3) and one additional single packer test between 421.10–433.55 m below ToC was performed to describe the lower part of the borehole. The initial criteria for performing injection tests in 20 m sections was a measurable flow of Q > 0.001 L/min in the previous measured 100 m covering the smaller test sections (see Figure 2-1). The measurements were performed with SKB's custom made equipment for hydraulic testing called PSS2.

No other additional measurements except the actual hydraulic tests and related measurements of packer position and water level in annulus of borehole KLX13A were conducted.

| Bh ID | Test section (m bToC) | Test type¹ | Test no | Test start date, time | Test stop date, time |
|--------|--------------------------|------------|---------|--------------------------|-------------------------|
| KLX16A | 13.00–133.00 | 3 | 1 | 2007-03-12 20:28 | 2007-03-13 01:56 |
| KLX16A | 13.00–133.00 | 3 | 2 | 2007-03-13 09:41 | 2007-03-13 12:22 |
| KLX16A | 112.00-212.00 | 3 | 1 | 2007-03-13 14:12 | 2007-03-13 16:02 |
| KLX16A | 212.00-312.00 | 3 | 1 | 2007-03-13 17:54 | 2007-03-13 19:46 |
| KLX16A | 312.00-412.00 | 3 | 1 | 2007-03-13 21:41 | 2007-03-13 23:41 |
| KLX16A | 12.50-32.50 | 3 | 1 | 2007-03-14 13:12 | 2007-03-14 14:38 |
| KLX16A | 32.50-52.50 | 3 | 1 | 2007-03-14 15:41 | 2007-03-14 16:16 |
| KLX16A | 32.50-52.50 | 3 | 2 | 2007-03-14 22:12 | 2007-03-14 23:57 |
| KLX16A | 52.50-72.50 | 3 | 1 | 2007-03-15 00:34 | 2007-03-15 02:39 |
| KLX16A | 72.50-92.50 | 3 | 1 | 2007-03-15 06:50 | 2007-03-15 08:18 |
| KLX16A | 91.00-111.00 | 3 | 1 | 2007-03-15 08:52 | 2007-03-15 10:25 |
| KLX16A | 111.00–131.00 | 3 | 1 | 2007-03-15 10:59 | 2007-03-15 12:22 |
| KLX16A | 131.00–151.00 | 3 | 1 | 2007-03-15 13:31 | 2007-03-15 14:55 |
| KLX16A | 150.00–170.00 | 3 | 1 | 2007-03-15 15:35 | 2007-03-15 17:14 |
| KLX16A | 170.00–190.00 | 3 | 1 | 2007-03-15 17:51 | 2007-03-15 19:24 |
| KLX16A | 188.00–208.00 | 3 | 1 | 2007-03-15 20:00 | 2007-03-15 21:52 |
| KLX16A | 207.00-227.00 | 3 | 1 | 2007-03-15 22:44 | 2007-03-16 00:00 |
| KLX16A | 227.00-247.00 | 3 | 1 | 2007-03-16 00:47 | 2007-03-16 02:13 |
| KLX16A | 247.00-267.00 | 3 | 1 | 2007-03-16 07:36 | 2007-03-16 08:58 |
| KLX16A | 267.00-287.00 | 3 | 1 | 2007-03-16 09:32 | 2007-03-16 10:12 |
| KLX16A | 267.00-287.00 | 3 | 2 | 2007-03-16 10:58 | 2007-03-16 12:19 |
| KLX16A | 287.00-307.00 | 3 | 1 | 2007-03-16 13:27 | 2007-03-16 14:51 |
| KLX16A | 307.00-327.00 | 3 | 1 | 2007-03-16 15:27 | 2007-03-16 17:00 |
| KLX16A | 327.00-347.00 | 4B | 1 | 2007-03-16 17:41 | 2007-03-16 22:23 |
| KLX16A | 347.00-367.00 | 3 | 1 | 2007-03-17 08:35 | 2007-03-17 10:06 |
| KLX16A | 367.00-387.00 | 3 | 1 | 2007-03-17 10:38 | 2007-03-17 12:14 |
| KLX16A | 387.00-407.00 | 3 | 1 | 2007-03-17 12:48 | 2007-03-17 14:40 |
| KLX16A | 406.00-426.00 | 4B | 1 | 2007-03-17 15:37 | 2007-03-17 22:20 |
| KLX16A | 421.10-433.55 | 4B | 1 | 2007-03-18 19:10 | 2007-03-18 22:51 |

Table 2-3. Tests performed.

¹⁾ 3: Injection test; 4B Pulse injection test.



* eventually tests performed after specific discussion with SKB

Figure 2-1. Flow chart for test sections.

2.3 Control of equipment

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

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

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

3 Equipment

3.1 Description of equipment

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

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

PSS2 is documented in photographs 1-6.

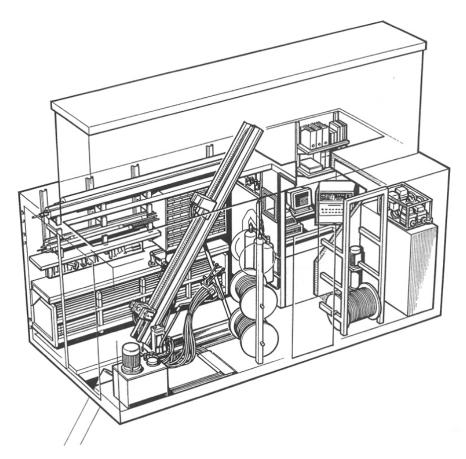


Figure 3-1. A view of the layout and equipment of PSS2.



Photo 1. Hydraulic rig.



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

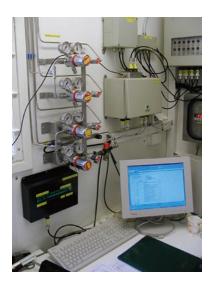


Photo 3. Computer room, displays and gas regulators.



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



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



Photo 6. Packer and gauge carrier.

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

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

The tool scheme is presented in Figure 3-2.

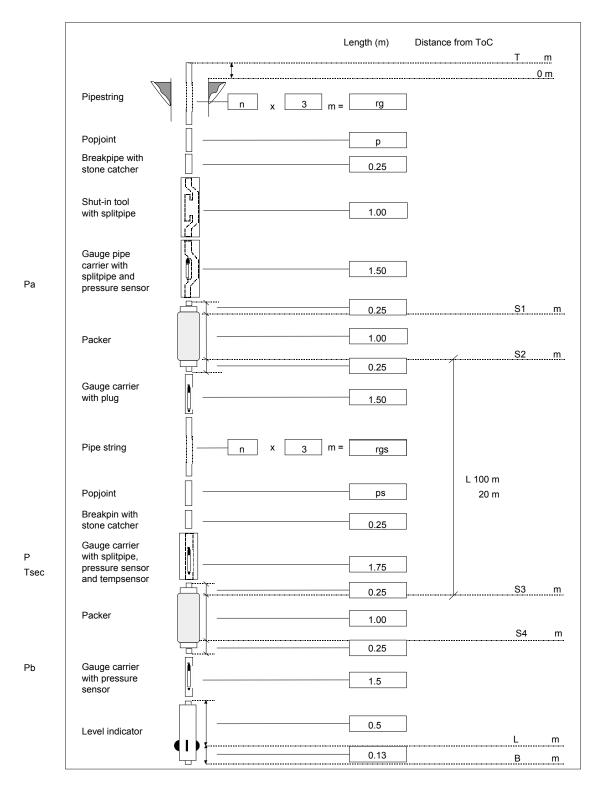


Figure 3-2. Schematic drawing of the down-hole equipment in the PSS2 system.

3.2 Sensors

| Keyword | Sensor | Name | Value/Range | Unit | Comments |
|---------------------------|-----------------|-----------------------|-------------------------|-----------------------------|-------------------|
| P _{sec,a,b} | Pressure | Druck PTX 162-1464abs | 9–30 | VDC | |
| | | | 4–20 0–13.5 ± 0.1 | mA MPa % of FS | |
| T _{sec,surf,air} | Temperature | BGI | 18–24 | VDC | |
| | | | 4–20 | mA | |
| | | | 0–32 | °C | |
| | | | ± 0.1 | °C | |
| Q_{big} | Flow | Micro motion | 0–100 | kg/min | Massflow |
| | | Elite sensor | ± 0.1 | % | |
| Q _{small} | Flow | Micro motion | 0–1.8 | kg/min | Massflow |
| | | Elite sensor | ± 0.1 | % | |
| p _{air} | Pressure | Druck PTX 630 | 9–30 | VDC mA KPa | |
| | | | 4–20 | | |
| | | | 0–120 | % of FS | |
| | | | ± 0.1 | | |
| O _{pack} | Pressure | Druck PTX 630 | 9–30 | VDC | |
| | | | 4–20 | mA MPa | |
| | | | 0–4 | MPa % of FS | |
| | | | ± 0.1 | | |
| O _{in,out} | Pressure | Druck PTX 1400 | 9–28 | VDC mA MPa % of FS | |
| | | | 4–20 | | |
| | | | 0–2.5 | | |
| | | | ± 0.15 | | |
| L | Level Indicator | | | | Length correction |

Table 3-1. Technical specifications of sensors.

Table 3-2. Sensor positions and wellbore storage (WBS) controlling factors.

| Borehole information | | | | Sensors | | Equipment affecting WBS coefficient | | |
|----------------------|------------------|--|-------------|------------------------|----------|-------------------------------------|------------------------|--|
| ID | Test section (m) | Volume in test section (m ³) | Туре | Position (m fr ToC) | Position | Function | Outer diameter (mm) | |
| KLX16A | | 0.454 | pa | | Test | Signal cable | 9.1 | |
| | | section | Pump string | 33 | | | | |
| | | | p₀ L | 113.70 116.25 | | Packer line | 6 | |
| KLX16A | P | A 12.50–32.50 | Test | Signal cable | 9.1 | | | |
| | | | р Т | 31.60 31.35 | section | Pump string | 33 | |
| | | | p₀ L | 33.20 35.75 | | Packer line | 6 | |

3.3 Data acquisition system

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

The data acquisition system starts and stops the test automatically or can be disengaged for manual operation of magnetic and regulation valves within the injection/pumping system. The flow regulation board is used for differential pressure and valve settings prior testing and for monitoring valves during actual test. An outline of the data acquisition system is outlined in Figure 3-3.

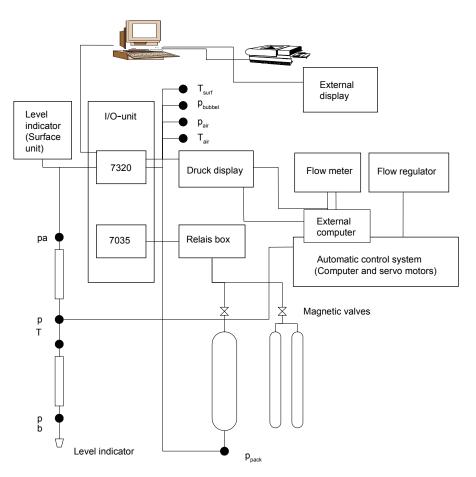


Figure 3-3. Schematic drawing of the data acquisition system and the flow regulation control system in PSS2.

4 Execution

4.1 Preparations

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

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

4.2 Length correction

By running in with the test tool, a level indicator is incorporated at the bottom of the tool. The level indicator is able to record groves milled into the borehole wall. The depths of these groves are given by SKB in the Activity Plan (see Table 2-2) and the measured depth is counter checked against the number/length of the tubes build in. The achieved correction value, based on linear interpolation between the reference marks, is used to adjust the location of the packers for the test sections to avoid wrong placements and minimize elongation effects of the test string.

4.3 Execution of field work

4.3.1 Test principle

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. Based on this result a sequence consisting of a constant pressure injection phase (CHi) and a shut-in pressure recovery (CHir) was conducted. Only the CHi and CHir phases were analysed quantitatively.

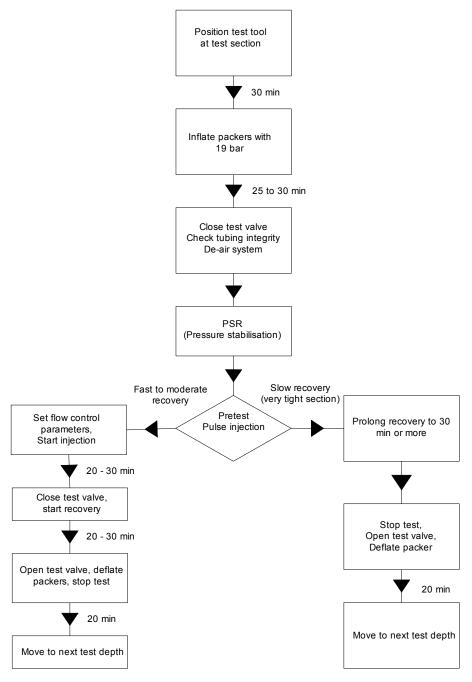


Figure 4-1. Flow chart for test performance.

4.3.2 Test procedure

A typical test cycle includes the following phases: 1) Transfer of down-hole equipment to the next section. 2) Packer inflation. 3) Pressure stabilisation. 4) Preliminary Pulse injection. 5) Constant head injection. 6) Pressure recovery. 7) Packer deflation.

The preliminary pulse injection (Step 4) derives the first estimations of the formation transmissivity. It is conducted by applying a pressure difference of approx. 200 kPa to the static formation pressure. If the pulse recovery indicates a very low transmissivity (flow probably below 1 mL/min) the pulse recovery is prolonged and no constant head injection test is performed. The decision to continue the pulse or to conduct an injection tests is based on the pressure response of the pulse recovery. A pressure recovery less than 50% during the first ten minutes of the pulse indicates a low transmissivity. In such a case no injection test will be conducted. The pressure static recovery (PSR) after packer inflation and before the pulse gives a direct measure of the magnitude of the packer compliance. A steep PSR indicates extremely low test section transmissivity. In such a case the packer compliance would influence the subsequent pulse test too much and introduce very large uncertainties. Therefore tests with this behaviour would be stopped after PSR phase.

If the preliminary pulse injection test indicates a formation transmissivity with a flow above 1 mL/min a constant head injection test (Step 5 and 6) is carried out. It is applied with a constant injection pressure of approx. 200 kPa (20 m water column) above the static formation pressure in the test section. Before start of the injection tests, approximately stable pressure conditions prevailed in the test section. After the injection period, the pressure recovery in the section is measured. In cases, where small flow rates were expected, the automatic regulation unit was switched off and the test was performed manually (determined by the preliminary pulse injection). In those cases, the constant difference pressure was usually unequal to 200 kPa.

In cases when the derived transmissivity of a test section influences the subsequent test program the constant head injection was conducted even if the preliminary pulse indicates a very tight section (e.g. flow below 1 mL/min). The injection phase is then performed to verify the results of the pulse and a flow below 1 mL/min.

The duration for each phase is presented in Table 4-1.

4.4 Data handling/post processing

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

| Step | Phase | Time |
|------|---|-----------------|
| 1 | Position test tool to new test section (correct position using the borehole markers). | Approx. 30 min. |
| 2 | Inflate packers with appr. 1,900 kPa. | 25 min. |
| 3 | Close test valve. | 10 min. |
| | Check tubing integrity with appr. 800 kPa. | 5 min. |
| | De-air system. | 2 min. |
| 4 | Pretest, pulse injection (duration depends on the formation transmissivity). | |
| 5* | Set automatic flow control parameters or setting for manual test. | 5 min. |
| | Start injection. | 20 to 45 min. |
| 6* | Close test valve, start recovery. | 20 min. or more |
| | Open test valve. | 10 min. |
| 7 | Deflate packers. | 25 min. |
| | Move to next test depth. | |

 Table 4-1. Durations for packer inflation, pressure stabilisation, injection and recovery phase and packer deflation.

* Step 5 and 6 conducted if the preliminary pulse indicates a formation transmissivity with a sufficient flow.

4.5 Analyses and interpretations

4.5.1 Analysis software

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

4.5.2 Analysis approach

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

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

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

4.5.3 Analysis methodology

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

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

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

• Pre-test for the Injection Tests

The test cycle always starts with a pulse injection phase with the aim of deriving a first estimation of the formation transmissivity. In cases when the pulse recovery is slow (indicating low transmissivity) the pulse phase is extended and analysed as the main phase of the test.

The transmissivity derived from a pulse test is strongly influenced by the wellbore storage coefficient used as an input in the analysis. The wellbore storage coefficient is calculated as C = dV/dP where dV is the volume difference injected during the brief flow period of the pulse and dP is the initial pressure difference of the pulse. dV is directly measured either by using the flowmeter readings or water level measurements in the injection vessel.

It should be noted though that there is large uncertainty connected with the determination of the wellbore storage coefficient (probably one order of magnitude), which will implicitly translate into uncertainty in the derived transmissivity. Figure 4-2 below show an example of a typical pressure versus time evolution for such a tight section.

 Flow model identification and type curve analysis in the deconvolution Peres Plot /Peres et al. 1989, Chakrabarty and Enachescu 1997/. A non-linear regression algorithm is used to provide optimized model parameters in the later stages. An example of type curves is presented in Figure 4-3.

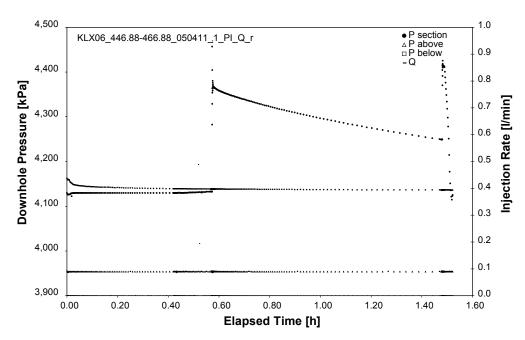


Figure 4-2. Typical pressure versus time plot of a Pulse injection test.

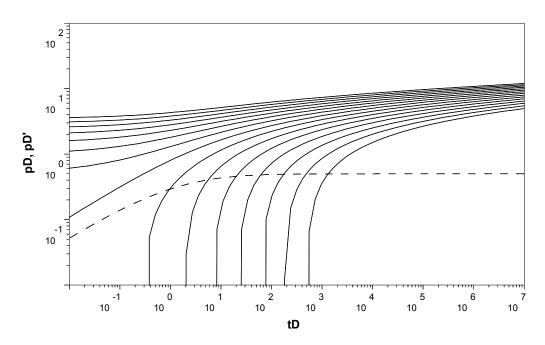


Figure 4-3. Deconvolution type curve set for pulse test analysis.

4.5.4 Correlation between storativity and skin factor

For the analysis of the conducted hydraulic tests below 100 m depth a storativity of $1 \cdot 10^{-6}$ and for hydraulic tests above 100 m a storativity of $1 \cdot 10^{-3}$ is assumed (SKB MD 320.004e). Based on this assumption 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.

• Injection phase (CHi)/Pulse tests (Pi)

Due to the fact that the early time data of the CHi and Pi phases, respectively, is not available or too noisy (attributed to the automatic regulation system) the storativity and the skin factor become correlated. Consequently they cannot be solved independently any more. In this case as a result of the analysis one determines the correlation group e^{2s}/S . This means that in such cases the skin factor can only be calculated when assuming the storativity as known.

• Recovery phase (CHir)

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:

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

The equation above has two unknowns, the storativity (S) and the skin factor (s) 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.

4.5.5 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.

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 .
- 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 t_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 t₂.

Figure 4-4 presents the relationship between the shape of derivative and the ri-index.

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} .

The assignment of the ri-index is based on /Rhén 2005/.

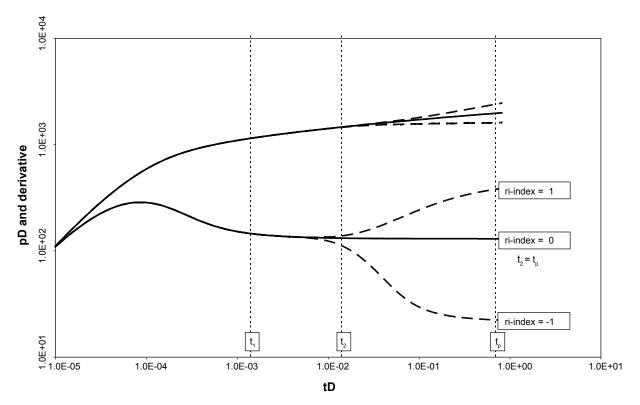


Figure 4-4. Schematic plot of the assignments for the ri-indices.

Calculation of the radius of influence

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

$$ri = 1.89 \times \sqrt{\frac{T_T}{S_T} \times t_2}$$
 [m]

- T_T recommended inner zone transmissivity [m²/s].
- t₂ time when hydraulic formation properties changes (see previous chapter) [s].
- S_T for the calculation of the ri the storage coefficient (S) is estimated from the transmissivity /Rhén et al. 1997/:

 $S_{\rm T} = 0.0007 \times T_{\rm T}^{-0.5} \ [-]$

4.5.6 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/.

4.5.7 Flow models used for analysis

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

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

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

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

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

4.5.8 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 (CHir) 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 metres above sea level) was calculated from the extrapolated static formation pressure (p*), corrected for athmospheric pressure measured by the surface gauge and corrected for the vertical depth considering the inclination of the drill hole, by assuming a water density of 1,000 kg/m³ (freshwater). The equivalent freshwater head is the static water level an individual test interval would show if isolated and connected to the surface by tubing full of freshwater. Figure 4-4 shows the methodology schematically.

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

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

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

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

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

4.5.9 Derivation of the recommended transmissivity and the confidence range

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

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

The confidence range of the transmissivity was derived using expert judgement. Factors considered were the range of transmissivities derived from the individual analyses of the test as

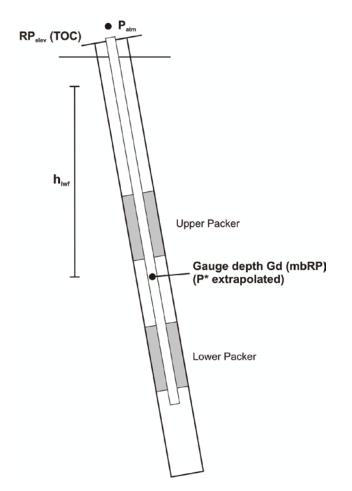


Figure 4-5. Schematic methodologies for calculation of the freshwater head.

well as additional sources of uncertainty such as noise in the flow rate measurement, numeric effects in the calculation of the derivative or possible errors in the measurement of the wellbore storage coefficient. No statistical calculations were performed to derive the confidence range of transmissivity.

In cases when changing transmissivity with distance from the borehole (composite model) was diagnosted, the transmissivity of the zone, which was showing the better derivative quality, was recommended.

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

4.6 Nonconformities

No nonconformities occurred during the performance of the hydraulics tests in KLX16A.

5 Results

In the following, results of all tests are presented and analysed. Chapters 5.1, 5.2 and 5.3 present the 100 m, 20 m and the single packer tests, respectively. The results 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 summarised in Table 6-1 and 6-2 of the Summary chapter. In addition, the results are presented in appendices 3 and 5.

The results are stored in the primary data base (SICADA). The SICADA data base contains data that will be used for further interpretation (modelling). The data are traceable in SICADA by the Activity Plan number (AP PS 400-07-008; SKB controlling document).

5.1 100 m single-hole injection tests

In the following, the 100 m section tests conducted in borehole KLX16A are presented and analysed.

5.1.1 Section 13.00–113.00 m, test no. 1 and 2, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The pressure response and the recovery of the pulse test in test no.1 indicated a high formation transmissivity. Based on this result a sequence consisting of a constant pressure injection phase (CHi) and a recovery phase (CHir) without a preliminary pulse test was conducted. The SIT did not work during this injection test. Therefore the valve was replaced and the injection test was repeated in test 2. Only the CHi and CHir phases were analysed quantitatively.

The CHi phase was conducted with a pressure difference of 162 kPa. No hydraulic connection to the adjacent sections was observed during the CHi phase. The injection rate decreased from 39.9 L/min at start of the CHi phase to 22.1 L/min at the end, indicating a high interval transmissivity (consistent with the pulse recovery). Both phases show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

For the interpretation a flow dimension of 2 (radial flow) was assumed. In case of the present test the CHi phase shows a derivative with a continuous upward slope throughout the test time, indicating a decrease of transmissivity at some distance from the borehole. A two shell composite model with radial flow was chosen for the analysis of the CHi phase. The derivative of the CHi phase shows, after a short period of horizontal stabilization at early times, also a continuous upward slope at middle and late times. A two shell composite model with radial flow, wellbore storage and skin was chosen for the analysis. The analysis is presented in Appendix 2-1.

Selected representative parameters

The recommended transmissivity of $7.2 \cdot 10^{-5}$ m²/s was derived from the analysis of the CHir phase (inner zone), which shows a short time of horizontal stabilization and good data and derivative quality. The confidence range for the interval transmissivity is estimated to be

 $1.0 \cdot 10^{-5}$ m²/s to $3.0 \cdot 10^{-4}$ m²/s. The flow dimension during the test was assumed to be 2 (radial flow). The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 1,038.2 kPa.

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

5.1.2 Section 112.00-212.00 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The pressure response and the recovery of the pulse test indicated a high formation transmissivity. Based on this result a sequence consisting of a constant pressure injection phase (CHi) and a recovery phase (CHir) was conducted. Only the CHi and CHir phases were analysed quantitatively.

The CHi phase was conducted with a pressure difference of 54 kPa. No hydraulic connection to the adjacent sections was observed during the CHi phase. The injection rate decreased from 39.1 L/min at start of the CHi phase to 33.8 L/min at the end, indicating a high interval transmissivity (consistent with the pulse recovery). Both phases show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a derivative with a horizontal stabilization at middle and late times, indicating radial flow. The CHi phase was analysed using an infinite acting homogeneous radial flow model. The response of the CHir phase is a bit noisy but indicates a transition from wellbore storage and skin dominated flow to pure formation flow. A homogeneous radial flow model with wellbore storage and skin was chosen for the analysis of the CHir phase. The analysis is presented in Appendix 2-2.

Selected representative parameters

The recommended transmissivity of $1.6 \cdot 10^{-4}$ m²/s was derived from the analysis of the CHir phase, which shows a better horizontal stabilization than the CHi phase. The confidence range for the interval transmissivity is estimated to be $9.0 \cdot 10^{-5}$ m²/s to $4.0 \cdot 10^{-4}$ m²/s. The flow dimension displayed during the test was 2. The static pressure measured at transducer depth, was derived from the CHir phase using type curve extrapolation in the Horner plot to a value of 1,900.3 kPa.

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

5.1.3 Section 212.00-312.00 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The pressure response and the recovery of the pulse test indicated a relatively high formation transmissivity. Based on this result a sequence consisting of a constant pressure injection phase (CHi) and a recovery phase (CHir) was conducted. Only the CHi and CHir phases were analysed quantitatively.

The CHi phase was conducted with a pressure difference of 195 kPa. No hydraulic connection to the adjacent sections was observed during the CHi phase. The injection rate decreased from

32.4 L/min at start of the CHi phase to 17.0 L/min at the end, indicating a relatively high interval transmissivity (consistent with the pulse recovery). Both phases show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test, both phases (CHi and CHir) show a derivative with a short horizontal part at early time followed by a downward slope at middle time, which finally tends to horizontal stabilization at late times, indicating radial flow. The CHi phase was analysed using a two shell composite radial flow model with an increasing transmissivity at some distance to the borehole. Similar to the CHi phase, a composite radial flow model with wellbore storage and skin was chosen for the analysis of the CHir phase. The analysis is presented in Appendix 2-3.

Selected representative parameters

The recommended transmissivity of $5.0 \cdot 10^{-5}$ m²/s was derived from the analysis of the CHir phase (outer zone), which shows a good horizontal stabilization. The confidence range for the interval transmissivity is estimated to be $2.0 \cdot 10^{-5}$ m²/s to $8.0 \cdot 10^{-5}$ m²/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 2,784.4 kPa.

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

5.1.4 Section 312.00–412.00 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The pressure response and the recovery of the pulse test indicated a medium formation transmissivity. Based on this result a sequence consisting of a constant pressure injection phase (CHi) and a recovery phase (CHir) was conducted. Only the CHi and CHir phases were analysed quantitatively.

The CHi phase was conducted with a pressure difference of 198 kPa. A slight hydraulic connection to the adjacent sections was observed during the CHi phase. With the start of the injection, the pressure in the section below increased by 8 kPa and kept following its general downward trend since inflating the packers. The pressure graph of the section above the interval shows three small peaks (up to 20 kPa) 10–15 min after start of the injection. The injection rate decreased from 0.40 L/min at start of the CHi phase to 0.17 L/min at the end, indicating a medium interval transmissivity (consistent with the pulse recovery). Both phases show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a derivative with an upward slope at early and middle times, which finally tends to horizontal stabilization at late times, indicating radial flow. The CHi phase was analysed using a two shell composite radial flow model with a decreasing transmissivity at some distance to the borehole. Similar to the CHi phase, the CHir phase shows an upward trend but does not reach horizontal stabilization finally. A composite radial flow model with wellbore storage and skin was chosen for the analysis of the CHir phase. The analysis is presented in Appendix 2-4.

Selected representative parameters

The recommended transmissivity of $6.4 \cdot 10^{-8}$ m²/s was derived from the analysis of the CHir phase (outer zone), which shows a better derivative quality than the CHi phase. The confidence range for the interval transmissivity is estimated to be $1.0 \cdot 10^{-8}$ m²/s to $2.0 \cdot 10^{-07}$ m²/s. The flow dimension displayed during the test was 2. The static pressure measured at transducer depth, was derived from the CHir phase using type curve extrapolation in the Horner plot to a value of 3,645.8 kPa.

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

5.2 20 m single-hole injection tests

In the following, the 20 m section tests conducted in borehole KLX16A are presented and analysed.

5.2.1 Section 12.50-32.50 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The pressure response and the recovery of the pulse test indicated a high formation transmissivity. Based on this result a sequence consisting of a constant pressure injection phase (CHi) and a recovery phase (CHir) was conducted. Only the CHi and CHir phases were analysed quantitatively.

The CHi phase was conducted with a pressure difference of 187 kPa. No hydraulic connection to the adjacent sections was observed. The injection rate decreased from 38.9 L/min at start of the CHi phase to 26.0 L/min at the end, indicating a high interval transmissivity (consistent with the pulse recovery). Both phases show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

For the interpretation a flow dimension of 2 (radial flow) was assumed. In case of the present test the CHi phase shows a derivative with a continuous upward slope throughout the test phase and does not reach a horizontal stabilization. The CHi phase was analysed using a two shell composite radial flow model with a decreasing transmissivity at some distance to the borehole. Similar to the CHi phase, the CHir phase shows an upward trend without reaching horizontal stabilization. A composite radial flow model with wellbore storage and skin was chosen for the analysis of the CHir phase. The analysis is presented in Appendix 2-5.

Selected representative parameters

The recommended transmissivity of $6.2 \cdot 10^{-5}$ m²/s was derived from the analysis of the CHi phase (inner zone), which gives the best hint of the interval transmissivity because neither derivative shows horizontal stabilization. The confidence range for the interval transmissivity is estimated to be $1.0 \cdot 10^{-5}$ m²/s to $2.0 \cdot 10^{-6}$ m²/s. The flow dimension during the test was assumed to be 2. The static pressure measured at transducer depth, was derived from the CHir phase using type curve extrapolation in the Horner plot to a value of 335.2 kPa.

The analyses of the CHi and CHir phases show some inconsistency.

5.2.2 Section 32.50–52.50 m, test no. 1 and 2, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. Test one was repeated due to a leakage in a packer line. Test 2 was conducted without problems. The pressure response and the recovery of the pulse test indicated a medium formation transmissivity. Based on this result a sequence consisting of a constant pressure injection phase (CHi) and a recovery phase (CHir) was conducted. The first injection phase of the second test was very noisy. Therefore this injection phase was stopped and a second injection was conducted. Only the CHi and CHir phases of the second injection were analysed quantitatively.

The CHi phase was conducted with a pressure difference of 203 kPa. No hydraulic connection to the adjacent sections was observed. The injection rate decreased from 0.73 L/min at start of the CHi phase to 0.25 L/min at the end, indicating a medium interval transmissivity (consistent with the pulse recovery). Both phases show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase data and derivative are noisy throughout the test phase. An average of the derivative can be considered as horizontal stabilization, indicating radial flow. The CHi phase was analysed using an infinite acting homogeneous radial flow model. The CHir phase shows a transition from wellbore storage and skin dominated flow to pure formation flow and reaches horizontal stabilization at late times. A homogeneous radial flow model with wellbore storage and skin was chosen for the analysis of the CHir phase. The analysis is presented in Appendix 2-6.

Selected representative parameters

The recommended transmissivity of $5.4 \cdot 10^{-7}$ m²/s was derived from the analysis of the CHir phase, which shows the better derivative quality. The confidence range for the interval transmissivity is estimated to be $3.0 \cdot 10^{-7}$ m²/s to $7.0 \cdot 10^{-7}$ m²/s. The flow dimension displayed during the test was 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 496.3 kPa.

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

5.2.3 Section 52.50–72.50 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The pressure response and the recovery of the pulse test indicated a medium formation transmissivity. Based on this result a sequence consisting of a constant pressure injection phase (CHi) and a recovery phase (CHir) was conducted. Only the CHi and CHir phases were analysed quantitatively.

The CHi phase was conducted with a pressure difference of 198 kPa. No hydraulic connection to the adjacent sections was observed. The system needed some time to get stable pressure conditions. The early time data of the Chi phase are not analysable. The injection rate decreased from 96 mL/min at start of the CHi phase to 88 mL/min at the end, indicating a medium interval transmissivity (consistent with the pulse recovery). Both phases show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

For the interpretation a flow dimension of 2 (radial flow) was assumed. In case of the present test the CHi phase derivative is quite noisy throughout the test phase. An average of the derivative can be considered as horizontal stabilization, indicating radial flow. The CHi phase was analysed using an infinite acting homogeneous radial flow model. The pressure response of the CHir phase shows wellbore storage and skin dominated flow but does not reach horizontal stabilization. A homogeneous radial flow model with wellbore storage and skin was chosen for the analysis of the CHir phase. The analysis is presented in Appendix 2-7.

Selected representative parameters

The recommended transmissivity of $2.3 \cdot 10^{-7}$ m²/s was derived from the analysis of the CHir phase, which shows the better derivative quality. The confidence range for the interval transmissivity is estimated to be $6.0 \cdot 10^{-8}$ m²/s to $5.0 \cdot 10^{-7}$ m²/s. A flow dimension of 2 was assumed for the test. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 663.8 kPa.

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

5.2.4 Section 72.50–92.50 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The pressure response and the recovery of the pulse test indicated a medium formation transmissivity. Based on this result a sequence consisting of a constant pressure injection phase (CHi) and a recovery phase (CHir) was conducted. Only the CHi and CHir phases were analysed quantitatively.

The CHi phase was conducted with a pressure difference of 200 kPa. No hydraulic connection to the adjacent sections was observed. The injection rate decreased from 0.34 L/min at start of the CHi phase to 0.24 L/min at the end, indicating a medium interval transmissivity (consistent with the pulse recovery). Both phases show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase derivative is noisy but shows a trend to horizontal stabilization throughout the test phase, indicating radial flow. The CHi phase was analysed using an infinite acting homogeneous radial flow model. The CHir phase shows a transition from wellbore storage and skin dominated flow to pure formation flow with horizontal stabilization at late time. A homogeneous radial flow model with wellbore storage and skin was chosen for the analysis of the CHir phase. The analysis is presented in Appendix 2-8.

Selected representative parameters

The recommended transmissivity of $5.1 \cdot 10^{-7}$ m²/s was derived from the analysis of the CHi phase, which shows a more continuous horizontal stabilization than the CHir phase. The confidence range for the interval transmissivity is estimated to be $2.0 \cdot 10^{-7}$ m²/s to $8.0 \cdot 10^{-7}$ m²/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 840.8 kPa.

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

5.2.5 Section 91.00–111.00 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The pressure response and the recovery of the pulse test indicated a medium formation transmissivity. Based on this result a sequence consisting of a constant pressure injection phase (CHi) and a recovery phase (CHir) was conducted. A first injection was aborted due to a malfunction of the regulation unit. After a restart the system worked properly. Only the CHi and CHir phases were analysed quantitatively.

The CHi phase was conducted with a pressure difference of 228 kPa. No hydraulic connection to the adjacent sections was observed. The injection rate decreased from 0.99 L/min at start of the CHi phase to 0.51 L/min at the end, indicating a medium interval transmissivity (consistent with the pulse recovery). Both phases show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase is noisy but shows a horizontal stabilization at middle and late times, indicating radial flow. The CHi phase was analysed using an infinite acting homogeneous radial flow model. The derivative of the CHir phase shows a downward trend at late times. This indicates a transition from wellbore storage and skin dominated flow to pure formation flow. A homogeneous radial flow model with wellbore storage and skin was chosen for the analysis of the CHir phase. The analysis is presented in Appendix 2-9.

Selected representative parameters

The recommended transmissivity of $5.5 \cdot 10^{-7}$ m²/s was derived from the analysis of the CHi phase, which shows a horizontal stabilization. The confidence range for the interval transmissivity is estimated to be $2.0 \cdot 10^{-07}$ m²/s to $8.0 \cdot 10^{-7}$ m²/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 1,001.7 kPa.

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

5.2.6 Section 111.00–131.00 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The pressure response and the recovery of the pulse test indicated a medium formation transmissivity. Based on this result a sequence consisting of a constant pressure injection phase (CHi) and a recovery phase (CHir) was conducted. Only the CHi and CHir phases were analysed quantitatively.

The CHi phase was conducted with a pressure difference of 199 kPa. No hydraulic connection to the adjacent sections was observed. The injection rate decreased from 0.14 L/min at start of the CHi phase to 0.10 L/min at the end, indicating a medium interval transmissivity (consistent with the pulse recovery). Both phases show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase is noisy but shows a horizontal stabilization at middle and late times, indicating radial flow. The CHi phase was analysed using an infinite acting homogeneous radial flow model. The derivative of the CHir phase shows a flattening downward trend which tends to horizontal stabilization at late times. This indicates a transition from wellbore storage and skin dominated flow to pure formation flow. A homogeneous radial flow model with wellbore storage and skin was chosen for the analysis of the CHir phase. The analysis is presented in Appendix 2-10.

Selected representative parameters

The recommended transmissivity of $1.6 \cdot 10^{-7}$ m²/s was derived from the analysis of the CHi phase, which shows a better horizontal stabilization although the derivative is a bit noisy. The confidence range for the interval transmissivity is estimated to be $8.0 \cdot 10^{-6}$ m²/s to $4.0 \cdot 10^{-7}$ m²/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 1,180.6 kPa.

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

5.2.7 Section 131.00–151.00 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The pressure response and the recovery of the pulse test indicated a high formation transmissivity. Based on this result a sequence consisting of a constant pressure injection phase (CHi) and a recovery phase (CHir) was conducted. Only the CHi and CHir phases were analysed quantitatively.

The CHi phase was conducted with a pressure difference of 68 kPa. A slight hydraulic connection to the section below the interval was observed. The pressure increased 4 kPa during the injection. The pressure in the section above the interval kept rising slowly since packers had been set. No influence of the injection was observed. The injection rate decreased from 37.8 L/min at start of the CHi phase to 33.5 L/min at the end, indicating a high interval transmissivity (consistent with the pulse recovery). Both phases show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase is noisy but shows a horizontal stabilization at middle and late times, indicating radial flow. The CHi phase was analysed using an infinite acting homogeneous radial flow model. Despite being noisy, the derivative of the CHir phase shows a horizontal stabilization at late times. This indicates pure formation, radial flow. A homogeneous radial flow model with wellbore storage and skin was chosen for the analysis of the CHir phase. The analysis is presented in Appendix 2-11.

Selected representative parameters

The recommended transmissivity of $2.0 \cdot 10^{-4}$ m²/s was derived from the analysis of the CHi phase, which shows a better horizontal stabilization. The confidence range for the interval transmissivity is estimated to be $4.0 \cdot 10^{-4}$ m²/s to $9.0 \cdot 10^{-4}$ m²/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 1,358.9 kPa.

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

5.2.8 Section 150.00–170.00 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The pressure response and the recovery of the pulse test indicated a medium formation transmissivity. Based on this result a sequence consisting of a constant pressure injection phase (CHi) and a recovery phase (CHir) was conducted. A first injection was aborted due to a malfunction of the regulation unit. After a restart the system worked properly. Only the CHi and CHir phases were analysed quantitatively.

The CHi phase was conducted with a pressure difference of 217 kPa. No hydraulic connection to the adjacent sections was observed. The injection rate decreased from 0.90 L/min at start of the CHi phase to 0.41 L/min at the end, indicating a medium interval transmissivity (consistent with the pulse recovery). Both phases show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

For the interpretation a flow dimension of 2 (radial flow) was assumed. In case of the present test the derivative of the CHi phase is horizontal at early time and steps down to a continuous downward slope at middle and late times. The step occurs due to regulation effects of the injection system. The CHi phase was analysed using a two shell composite radial flow model with an increasing transmissivity at some distance to the borehole. The CHir phase shows a downward trend with a slight change in inclination. This indicates a transition from wellbore storage and skin dominated flow to pure formation flow. A composite radial flow model with wellbore storage and skin was chosen for the analysis of the CHir phase. The analysis is presented in Appendix 2-12.

Selected representative parameters

The recommended transmissivity of $5.9 \cdot 10^{-7}$ m²/s was derived from the analysis of the CHi phase (inner zone), which gives the best hint of the interval transmissivity because neither derivative shows horizontal stabilization. The confidence range for the interval transmissivity is estimated to be $1.0 \cdot 10^{-7}$ m²/s to $2.0 \cdot 10^{-6}$ m²/s. The flow dimension during the test was assumed to be 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 1,525.4 kPa.

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

5.2.9 Section 170.00–190.00 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The pressure response and the recovery of the pulse test indicated a medium formation transmissivity. Based on this result a sequence consisting of a constant pressure injection phase (CHi) and a recovery phase (CHir) was conducted. Only the CHi and CHir phases were analysed quantitatively.

The CHi phase was conducted with a pressure difference of 244 kPa. No hydraulic connection to the adjacent sections was observed. The injection rate decreased from 0.87 L/min at start of the CHi phase to 0.53 L/min at the end, indicating a medium interval transmissivity (consistent with the pulse recovery). Both phases show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

For the interpretation a flow dimension of 2 (radial flow) was assumed. In case of the present test the derivative of the CHi phase shows a downward slope at early and middle times and tends to horizontal stabilization at late time. The CHi phase was analysed using a two shell composite radial flow model with an increasing transmissivity at some distance to the borehole. Similar to the CHi phase, the CHir phase shows a downward slope at middle time and noisy trend of horizontal stabilization at late time. This indicates a change from wellbore storage and skin dominated flow to pure formation flow. A composite radial flow model with wellbore storage and skin was chosen for the analysis of the CHir phase. The analysis is presented in Appendix 2-13.

Selected representative parameters

The recommended transmissivity of $1.7 \cdot 10^{-7}$ m²/s was derived from the analysis of the CHir phase (inner zone), which gives the best hint of the interval transmissivity because both derivatives show only an indistinctive horizontal stabilization at late time. The confidence range for the interval transmissivity is estimated to be $5.0 \cdot 10^{-7}$ m²/s to $5.0 \cdot 10^{-6}$ m²/s. The flow dimension during the test was assumed to be 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 1,704.5 kPa.

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

5.2.10 Section 188.00-208.00 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The pressure response and the recovery of the pulse test indicated a low formation transmissivity. Based on this result a sequence consisting of a constant pressure injection phase (CHi) and a recovery phase (CHir) was conducted. Only the CHi and CHir phases were analysed quantitatively.

The CHi phase was conducted with a pressure difference of 200 kPa. No hydraulic connection to the adjacent zones was observed. The injection rate decreased from 38.0 mL/min at start of the CHi phase to 14.0 mL/min at the end, indicating a low interval transmissivity (consistent with the pulse recovery). Both phases show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase is noisy but shows a faint horizontal stabilization at middle and late times, indicating radial flow. The CHi phase was analysed using an infinite acting homogeneous radial flow model. The derivative of the CHir phase shows steep downward slope at middle and late times, which is consistent with a high positive skin factor. A homogeneous radial flow model with wellbore storage and skin was chosen for the analysis of the CHir phase. The analysis is presented in Appendix 2-13.

Selected representative parameters

The recommended transmissivity of $1.2 \cdot 10^{-8}$ m²/s was derived from the analysis of the CHi phase, which shows the better derivative quality. The confidence range for the interval transmissivity is estimated to be $9.0 \cdot 10^{-7}$ m²/s to $6.0 \cdot 10^{-8}$ m²/s. The flow dimension displayed during the

test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 1,865.2 kPa.

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

5.2.11 Section 207.00-227.00 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The pressure response and the recovery of the pulse test indicated a high formation transmissivity. Based on this result a sequence consisting of a constant pressure injection phase (CHi) and a recovery phase (CHir) was conducted. Only the CHi and CHir phases were analysed quantitatively.

The CHi phase was conducted with a pressure difference of 198 kPa. No hydraulic connection to the adjacent sections was observed. The injection rate decreased from 26.5 L/min at start of the CHi phase to 20.1 L/min at the end, indicating a high interval transmissivity (consistent with the pulse recovery). Both phases show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase is a little noisy but shows a trend of horizontal stabilization at middle and late times, indicating radial flow. The CHi phase was analysed using an infinite acting homogeneous radial flow model. Similar to the CHi phase, the CHir phase shows a noisy trend of horizontal stabilization at late time. A homogenous radial flow model with wellbore storage and skin was chosen for the analysis of the CHir phase. The analysis is presented in Appendix 2-15.

Selected representative parameters

The recommended transmissivity of $5.3 \cdot 10^{-5}$ m²/s was derived from the analysis of the CHi phase, which shows the best horizontal stabilization. The confidence range for the interval transmissivity is estimated to be $2.0 \cdot 10^{-5}$ m²/s to $9.0 \cdot 10^{-5}$ m²/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 2,032.5 kPa.

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

5.2.12 Section 227.00-247.00 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The pressure response and the recovery of the pulse test indicated a medium formation transmissivity. Based on this result a sequence consisting of a constant pressure injection phase (CHi) and a recovery phase (CHir) was conducted. Only the CHi and CHir phases were analysed quantitatively.

The CHi phase was conducted with a pressure difference of 197 kPa. No hydraulic connection to the adjacent sections was observed. The injection rate decreased from 1.63 L/min at start of the CHi phase to 0.79 L/min at the end, indicating a medium interval transmissivity (consistent with the pulse recovery). The Chir phase shows very fast recovery; therefore the early time data of this phase are not analysable. Both phases show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivatives of the CHi and the CHir phase are a little noisy but show a horizontal stabilization at middle and late times, indicating radial flow. Both phases were analysed using homogeneous radial flow models. The analysis is presented in Appendix 2-16.

Selected representative parameters

The recommended transmissivity of $1.8 \cdot 10^{-6}$ m²/s was derived from the analysis of the CHi phase, which shows the better derivative quality. The confidence range for the interval transmissivity is estimated to be $8.0 \cdot 10^{-7}$ m²/s to $5.0 \cdot 10^{-6}$ m²/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 2,209.9 kPa.

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

5.2.13 Section 247.00-267.00 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The pressure response and the recovery of the pulse test indicated a medium formation transmissivity. Based on this result a sequence consisting of a constant pressure injection phase (CHi) and a recovery phase (CHir) was conducted. Only the CHi and CHir phases were analysed quantitatively.

The CHi phase was conducted with a pressure difference of 200 kPa. A slight hydraulic connection to the section below the interval was observed. The pressure increased by 4 kPa after the start of the injection and kept constant for the rest of the CHi phase. Hydraulic connection to the section above was not observed. The injection rate decreased from 1.55 L/min at start of the CHi phase to 1.25 L/min at the end, indicating a medium interval transmissivity (consistent with the pulse recovery). The CHir phase shows fast recovery. However, the middle and late time data are adequate for quantitative analysis. The Chi phase shows no problems.

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 CHi and the CHir phase are a little noisy but show a horizontal stabilization at middle and late times, indicating radial flow. Both phases were analysed using homogeneous radial flow models. The analysis is presented in Appendix 2-17.

Selected representative parameters

The recommended transmissivity of $2.1 \cdot 10^{-6}$ m²/s was derived from the analysis of the CHi phase, which shows the better derivative quality. The confidence range for the interval transmissivity is estimated to be $9.0 \cdot 10^{-7}$ m²/s to $5.0 \cdot 10^{-6}$ m²/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 2,385.5 kPa.

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

5.2.14 Section 267.00-287.00 m, test no. 1 and 2, injection

Comments to test

The first test was aborted due to a leakage in the pipe string. After replacing the damaged pipe the test was repeated. The second test was composed of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The pressure response and the recovery of the pulse test indicated a high formation transmissivity. Based on this result a sequence consisting of a constant pressure injection phase (CHi) and a recovery phase (CHir) was conducted. Only the CHi and CHir phases of the second test were analysed quantitatively.

The CHi phase was conducted with a pressure difference of 200 kPa. A hydraulic connection to the section below the interval was observed. During injection the pressure increased to a total of 57 kPa. Hydraulic connection to the section above was not observed. The injection rate decreased from 27.0 L/min at start of the CHi phase to 15.1 L/min at the end, indicating a high interval transmissivity (consistent with the pulse recovery). Both phases show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivatives of the CHi phase shows horizontal stabilization at middle and late times, indicating radial flow. The CHi phase was analysed using an infinite acting homogeneous radial flow model. The derivative of the CHir phase shows a downward slope at middle time, tending to a horizontal stabilization at late time. This indicates a transition from wellbore storage and skin dominated flow to pure formation flow. A two shell composite model with increasing transmissivity was chosen for the analysis of the CHir phase. The analysis is presented in Appendix 2-18.

Selected representative parameters

The recommended transmissivity of $2.2 \cdot 10^{-5}$ m²/s was derived from the analysis of the CHi phase, which shows a better horizontal stabilization. The confidence range for the interval transmissivity is estimated to be $9.0 \cdot 10^{-6}$ m²/s to $5.0 \cdot 10^{-5}$ m²/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 2,561.4 kPa.

The analyses of the CHi and CHir phases show some inconsistency regarding the chosen flow models. This may attributed to the relative noisy derivative of the CHi phase, which may hide a change of transmissivity in the early time data. The resulting transmissivities of the CHi phase and the CHir phase (outer zone) are consistent. No further analysis is recommended.

5.2.15 Section 287.00-307.00 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The pressure response and the recovery of the pulse test indicated a medium formation transmissivity. Based on this result a sequence consisting of a constant pressure injection phase (CHi) and a recovery phase (CHir) was conducted. Only the CHi and CHir phases were analysed quantitatively.

The CHi phase was conducted with a pressure difference of 187 kPa. No hydraulic connection to the adjacent zones was observed. The system needed some time to get stable pressure conditions. The injection rate decreased from 2.94 L/min at start of the CHi phase to 0.70 L/min at the end, indicating a medium interval transmissivity (consistent with the pulse recovery). The middle and late time data of the Chi phase and all data of the CHir 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 CHi phase shows a relative flat derivative at middle and late times, indicating radial flow. The CHi phase was analysed using an infinite acting homogeneous radial flow model. The derivative of the CHir phase shows a downward trend at middle and late times. This is indicative for a transition from wellbore storage and skin dominated flow to pure formation flow. The CHir phase was analysed using a homogeneous radial flow model with wellbore storage and skin. The analysis is presented in Appendix 2-19.

Selected representative parameters

The recommended transmissivity of $1.9 \cdot 10^{-6}$ m²/s was derived from the analysis of the CHi phase, which shows a horizontal stabilization. The confidence range for the interval transmissivity is estimated to be $9.0 \cdot 10^{-7}$ m²/s to $5.0 \cdot 10^{-6}$ m²/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 2,740.5 kPa.

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

5.2.16 Section 307.00-327.00 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The pressure response and the recovery of the pulse test indicated a low formation transmissivity. Based on this result a sequence consisting of a constant pressure injection phase (CHi) and a recovery phase (CHir) was conducted. Only the CHi and CHir phases were analysed quantitatively.

The CHi phase was conducted with a pressure difference of 204 kPa. No hydraulic connection to the adjacent zones was observed. The injection rate decreased from 85.0 mL/min at start of the CHi phase to 34.0 mL/min at the end, indicating a low interval transmissivity (consistent with the pulse recovery). Both phases show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi and the CHir phase show relatively flat and horizontal derivatives at middle and late times, indicating radial flow. Both phases were analysed using a homogeneous radial flow model. The analysis is presented in Appendix 2-20.

Selected representative parameters

The recommended transmissivity of $1.1 \cdot 10^{-8}$ m²/s was derived from the analysis of the CHir phase, which shows a better derivative quality. The confidence range for the interval transmissivity is estimated to be $9.0 \cdot 10^{-9}$ m²/s to $3.0 \cdot 10^{-8}$ m²/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 2,911.7 kPa.

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

5.2.17 Section 327.00-347.00 m, test no. 1, pulse injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The very slow recovery of the pulse test indicated a very low formation transmissivity. Based on this result no constant pressure injection test was performed. Instead, the recovery of the pulse injection test was prolonged and analysed.

Prior the pulse injection the pressure in the test section rose by 10 kPa within 13 min. During the brief injection phase of the pulse injection a total volume of about 26.3 mL was injected (derived from the flow meter readings). This injected volume produced a pressure increase of 271 kPa. Using a dV/dP approach, the wellbore storage coefficient relevant for the subsequent pressure recovery can be calculated to $9.7 \cdot 10^{-11}$ m³/Pa. It should be noted though that there is uncertainty connected with the determination of the wellbore storage coefficient, which will implicitly translate into uncertainty in the derived transmissivity.

Flow regime and calculated parameters

For the interpretation a flow dimension of 2 (radial flow) was assumed. In case of the present test the deconvolved PI pressure derivative shows an upward trend with a horizontal stabilisation at late times. The PI phase was analysed using a composite model with radial flow, wellbore storage and skin. The analysis is presented in Appendix 2-21.

Selected representative parameters

The recommended transmissivity of $3.9 \cdot 10^{-11}$ m²/s was derived from the analysis of the Pi phase (inner zone). The confidence range for the interval transmissivity is estimated to be $2.0 \cdot 10^{-11}$ to $2.0 \cdot 10^{-10}$ m²/s. The analysis was conducted using a flow dimension of 2. The static pressure could not be extrapolated due to the very low transmissivity.

No further analysis is recommended.

5.2.18 Section 347.00-367.00 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The pressure response and the recovery of the pulse test indicated a medium formation transmissivity. Based on this result a sequence consisting of a constant pressure injection phase (CHi) and a recovery phase (CHir) was conducted. Only the CHi and CHir phases were analysed quantitatively.

The CHi phase was conducted with a pressure difference of 200 kPa. A hydraulic connection to the zone below the section was observed. The pressure increased during the whole CHi phase up to a total of 24 kPa and began to decrease slowly after the start of the recovery phase. No hydraulic connection to the zone above the section was observed. The injection rate decreased from 0.19 L/min at start of the CHi phase to 0.09 L/min at the end, indicating a medium interval transmissivity (consistent with the pulse recovery). Both phases show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a relative flat derivative at middle and late times, indicating radial flow. The CHi phase was analysed using an infinite acting homogeneous radial flow model. The derivative of the CHir phase shows a slight downward trend at middle and late times without reaching horizontal stabilization. This is indicative for

a transition from wellbore storage and skin dominated flow to pure formation flow. The CHi phase was analysed using a homogeneous radial flow model with wellbore storage and skin. The analysis is presented in Appendix 2-22.

Selected representative parameters

The recommended transmissivity of $6.7 \cdot 10^{-8}$ m²/s was derived from the analysis of the CHi phase, which shows a horizontal stabilization. The confidence range for the interval transmissivity is estimated to be $3.0 \cdot 10^{-8}$ m²/s to $8.0 \cdot 10^{-8}$ m²/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3,254.3 kPa.

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

5.2.19 Section 367.00-387.00 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The pressure response and the recovery of the pulse test indicated a medium formation transmissivity. Based on this result a sequence consisting of a constant pressure injection phase (CHi) and a recovery phase (CHir) was conducted. Only the CHi and CHir phases were analysed quantitatively.

The CHi phase was conducted with a pressure difference of 188 kPa. No hydraulic connection to the adjacent sections was observed. The injection rate decreased from 0.46 L/min at start of the CHi phase to 0.08 L/min at the end, indicating a medium interval transmissivity (consistent with the pulse recovery). Both phases show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

For the interpretation a flow dimension of 2 (radial flow) was assumed. In case of the present test the derivative of the CHi phase shows an upward slope at early and middle times, indicating a decreasing transmissivity at some distance from the borehole. A short time of horizontal stabilization is followed by a downward slope at late time. The CHi phase was analysed using a two shell composite radial flow model. The pressure response of the CHir phase is consistent to the CHi phase. Therefore a composite radial flow model with wellbore storage, skin and a decreasing transmissivity at some distance from the borehole was chosen for the analysis of the CHir phase. The analysis is presented in Appendix 2-23.

Selected representative parameters

The recommended transmissivity of $2.9 \cdot 10^{-7}$ m²/s was derived from the analysis of the CHir phase (inner zone), which gives the best hint of the interval transmissivity because both derivatives don't reach horizontal stabilization at late time. The confidence range for the interval transmissivity is estimated to be $9.0 \cdot 10^{-8}$ m²/s to $7.0 \cdot 10^{-7}$ m²/s. The flow dimension during the test was assumed to be 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3,425.7 kPa.

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

5.2.20 Section 387.00-407.00 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The pressure response and the recovery of the pulse test indicated a medium to low formation transmissivity. Based on this result a sequence consisting of a constant pressure injection phase (CHi) and a recovery phase (CHir) was conducted. Only the CHi and CHir phases were analysed quantitatively.

The CHi phase was conducted with a pressure difference of 211 kPa. A very slight hydraulic connection to the section below was observed. The injection rate decreased from 41.6 mL/min at start of the CHi phase to 16.5 L/min at the end, indicating a medium to low interval transmissivity (consistent with the pulse recovery). Both phases show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase shows noisy early time data and a continuous upward slope at middle and late times. The CHi phase was analysed using a two shell composite radial flow model with a decreasing transmissivity at some distance from the borehole. The pressure response of the CHir phase shows a downward hump at middle times followed by a horizontal stabilisation at late times. Therefore a composite radial flow model with wellbore storage, skin and a decreasing transmissivity at some distance from the borehole was chosen for the analysis of the CHir phase. The analysis is presented in Appendix 2-24.

Selected representative parameters

The recommended transmissivity of $1.5 \cdot 10^{-8}$ m²/s was derived from the analysis of the CHir phase (inner zone), which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be $8.0 \cdot 10^{-9}$ m²/s to $4.0 \cdot 10^{-8}$ m²/s. The flow dimension displayed during the test was 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3,629.4 kPa.

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

5.2.21 Section 406.00-426.00 m, test no. 1, pulse injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The very slow recovery of the pulse test indicated a very low formation transmissivity. Based on this result no constant pressure injection test was performed. Instead, the recovery of the pulse injection test was prolonged and analysed.

Prior the pulse injection the pressure in the test section rose by 8 kPa within 15 min. During the brief injection phase of the pulse injection a total volume of about 7.6 mL was injected (derived from the flow meter readings). This injected volume produced a pressure increase of 231 kPa. Using a dV/dP approach, the wellbore storage coefficient relevant for the subsequent pressure recovery can be calculated to $3.3 \cdot 10^{-11}$ m³/Pa. It should be noted though that there is uncertainty connected with the determination of the wellbore storage coefficient, which will implicitly translate into uncertainty in the derived transmissivity. Due to a low transmissivity in the lower part of the borehole (see single packer test) a squeeze occurred in the section below as packers were set. At the start of the pulse test the pressure in the section below increased by 54 kPa. Most likely this was another squeeze and the pressure response was just a mirror of what happened in the test section. Similar effects or hydraulic connection to the section above were not observed.

Flow regime and calculated parameters

For the interpretation a flow dimension of 2 (radial flow) was assumed. In case of the present test the Pi pressure derivative shows a continuous upward trend with a slight change of inclination throughout the test. Horizontal stabilisation was not reached. The Pi phase was analysed using a composite model with radial flow, wellbore storage and skin. The analysis is presented in Appendix 2-25.

Selected representative parameters

The recommended transmissivity of $9.3 \cdot 10^{-12}$ m²/s was derived from the analysis of the Pi phase (inner zone). The confidence range for the interval transmissivity is estimated to be $5.0 \cdot 10^{-12}$ to $5.0 \cdot 10^{-11}$ m²/s. The analysis was conducted using a flow dimension of 2. The static pressure could not be extrapolated due to the very low transmissivity.

No further analysis is recommended.

5.3 Single packer injection test

In the following the single packer test conducted in borehole KLX 16A is presented and analysed.

5.3.1 Section 421.10–433.55 m, single packer, test no. 1, pulse injection

Comments to test

For the single packer test the tool was build like a double packer system with 5 m interval length. The inflation line for the bottom packer has been plugged so only the top packer was inflated. The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The pressure response and the very slow recovery of the pulse test indicated a very low formation transmissivity. Therefore the recovery of the pulse injection test was prolonged and analysed.

Prior the pulse injection the pressure in the test section rose by 4 kPa within 9 min. During the brief injection phase of the pulse injection a total volume of about 7.3 mL was injected (derived from the flow meter readings). This injected volume produced a pressure increase of 247 kPa. Using a dV/dP approach, the wellbore storage coefficient relevant for the subsequent pressure recovery can be calculated to $3.0 \cdot 10^{-11}$ m³/Pa. It should be noted though that there is uncertainty connected with the determination of the wellbore storage coefficient, which will implicitly translate into uncertainty in the derived transmissivity. Subsequently a constant pressure injection phase (CHi) was conducted with a pressure difference of 261 kPa. No hydraulic connection to the section above was observed. During injection the rate decreased from 28.7 mL/min at start of the CHi phase and dropped below 1.0 mL/min at the end, indicating a very low interval transmissivity (consistent with the pulse recovery). The recovery phase (CHir) could not be conducted because the shut-in tool did not work. Most likely it was stuck due to mud in the lowest part of the borehole. Therefore, only the PI phase was analysed quantitatively.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the Pi pressure derivative shows an upward trend at early and middle times and a horizontal stabilisation at late times, indicating radial flow. The Pi phase was analysed using a radial flow composite model with wellbore storage and skin. The analysis is presented in Appendix 2-26.

Selected representative parameters

The recommended transmissivity of $5.4 \cdot 10^{-11}$ m²/s was derived from the analysis of the Pi phase (outer zone) which shows horizontal stabilization. The confidence range for the interval transmissivity is estimated to be $3.0 \cdot 10^{-11}$ to $1.0 \cdot 10^{-10}$ m²/s and encompasses the inner zone transmissivity. The flow dimension displayed during the test was 2. The static pressure could not be extrapolated due to the very low transmissivity.

No further analysis is recommended.

6 Summary of results

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

6.1 General test data and results

| Table 6-1. General test data from hydraulic tests in KLX16A (for nomenclature see appendix 4 and below). | |
|--|--|
|--|--|

| Borehole sec up [m bToC] | Borehole sec low [m bToC] | Date and Time for test start YYMMDD hh:mm | Date and Time for test stop YYMMDD hh:mm | Q _p (m³/s) | Q _m (m³/s) | t _p (s) | t _F (s) | p₀ (kPa) | p _i (kPa) | p _p (kPa) | p _⊧ (kPa) | te _w (°C) | Test phases measured, Analysed test phases marked bold |
|--------------------------------|---------------------------------|---|--|--------------------------|--------------------------|-----------------------|-----------------------|-------------|-------------------------|-------------------------|-------------------------|-------------------------|--|
| 13.00 | 113.00 | 070313 09:41 | 070313 12:22 | 3.69E-04 | 4.51E-04 | 1,800 | 3,600 | 1,023 | 1,031 | 1,193 | 1,062 | 8.3 | CHi / CHir |
| 112.00 | 212.00 | 070313 14:12 | 070313 16:02 | 5.63E-04 | 5.84E-04 | 1,800 | 1,800 | 1,901 | 1,900 | 1,954 | 1,902 | 9.6 | CHi / CHir |
| 212.00 | 312.00 | 070313 17:54 | 070313 19:46 | 2.85E-04 | 2.95E-04 | 1,800 | 1,800 | 2,788 | 2,789 | 2,984 | 2,785 | 11.0 | CHi / CHir |
| 312.00 | 412.00 | 070313 21:41 | 070313 23:41 | 2.95E-06 | 3.67E-06 | 1,800 | 1,800 | 3,671 | 3,668 | 3,866 | 3,693 | 12.3 | CHi / CHir |
| 12.50 | 32.50 | 070314 13:12 | 070314 14:38 | 4.37E-04 | 5.02E-04 | 1,200 | 1,200 | 314 | 315 | 502 | 359 | 7.8 | CHi / CHir |
| 32.50 | 52.50 | 070314 22:12 | 070314 23:57 | 4.10E-06 | 4.50E-06 | 1,200 | 1,200 | 487 | 493 | 696 | 496 | 7.4 | CHi / CHir |
| 52.50 | 72.50 | 070315 00:34 | 070315 02:39 | 1.47E-06 | 1.52E-06 | 1,200 | 3,600 | 668 | 668 | 866 | 668 | 7.5 | CHi / CHir |
| 72.50 | 92.50 | 070315 06:50 | 070315 08:18 | 4.12E-06 | 4.27E-06 | 1,200 | 1,200 | 846 | 841 | 1,041 | 845 | 7.7 | CHi / CHir |
| 91.00 | 111.00 | 070315 08:52 | 070315 10:25 | 8.47E-06 | 9.15E-06 | 1,200 | 1,200 | 1,010 | 1,009 | 1,237 | 1,009 | 7.9 | CHi / CHir |
| 111.00 | 131.00 | 070315 10:59 | 070315 12:22 | 1.72E-06 | 1.78E-06 | 1,200 | 1,200 | 1,187 | 1,186 | 1,385 | 1,186 | 8.2 | CHi / CHir |
| 131.00 | 151.00 | 070315 13:31 | 070315 14:55 | 5.58E-04 | 5.76E-04 | 1,200 | 1,200 | 1,365 | 1,364 | 1,432 | 1,365 | 8.5 | CHi / CHir |
| 150.00 | 170.00 | 070315 15:35 | 070315 17:14 | 6.97E-06 | 7.33E-06 | 1,200 | 1,200 | 1,529 | 1,533 | 1,750 | 1,532 | 8.8 | CHi / CHir |
| 170.00 | 190.00 | 070315 17:51 | 070315 19:24 | 8.88E-06 | 9.17E-06 | 1,200 | 1,200 | 1,710 | 1,705 | 1,949 | 1,709 | 9.1 | CHi / CHir |
| 188.00 | 208.00 | 070315 20:00 | 070315 21:52 | 2.17E-07 | 2.50E-07 | 1,200 | 2,400 | 1,866 | 1,866 | 2,066 | 1,865 | 9.4 | CHi / CHir |
| 207.00 | 227.00 | 070315 22:44 | 070316 00:00 | 3.36E-04 | 3.43E-04 | 1,200 | 1,200 | 2,034 | 2,036 | 2,234 | 2,033 | 9.7 | CHi / CHir |
| 227.00 | 247.00 | 070316 00:47 | 070316 02:13 | 1.32E-05 | 1.35E-05 | 1,200 | 1,200 | 2,215 | 2,214 | 2,411 | 2,214 | 10.0 | CHi / CHir |
| 247.00 | 267.00 | 070316 07:36 | 070316 08:58 | 2.08E-05 | 2.17E-05 | 1,200 | 1,200 | 2,393 | 2,386 | 2,586 | 2,383 | 10.3 | CHi / CHir |
| 267.00 | 287.00 | 070316 10:58 | 070316 12:19 | 2.55E-04 | 2.63E-04 | 1,200 | 1,200 | 2,582 | 2,563 | 2,763 | 2,564 | 10.3 | CHi / CHir |
| 287.00 | 307.00 | 070316 13:27 | 070316 14:51 | 1.18E–05 | 1.27E-05 | 1,200 | 1,200 | 2,741 | 2,746 | 2,933 | 2,746 | 10.9 | CHi / CHir |
| 307.00 | 327.00 | 070316 15:27 | 070316 17:00 | 5.67E-07 | 6.83E-07 | 1,200 | 1,200 | 2,919 | 2,923 | 3,127 | 2,947 | 11.2 | CHi / CHir |
| 327.00 | 347.00 | 070316 17:41 | 070316 22:23 | #NV | #NV | 10 | 14,400 | 3,101 | 3,108 | 3,380 | 3,114 | 11.4 | Pi |
| 347.00 | 367.00 | 070317 08:35 | 070317 10:06 | 1.60E-06 | 1.77E-06 | 1,200 | 1,200 | 3,276 | 3,269 | 3,469 | 3,281 | 11.7 | CHi / CHir |
| 367.00 | 387.00 | 070317 10:38 | 070317 12:14 | 1.42E-06 | 1.75E–06 | 1,200 | 1,200 | 3,444 | 3,446 | 3,634 | 3,463 | 12.0 | CHi / CHir |
| 387.00 | 407.00 | 070317 12:48 | 070317 14:40 | 2.67E-07 | 3.22E-07 | 1,200 | 2,400 | 3,621 | 3,627 | 3,838 | 3,642 | 12.3 | CHi / CHir |
| 406.00 | 426.00 | 070317 15:37 | 070317 22:20 | #NV | #NV | 10 | 21,600 | 3,794 | 3,802 | 4,042 | 3,872 | 12.5 | Pi |
| 421.10 | 433.55 | 070318 19:10 | 070318 22:51 | #NV | #NV | 10 | 9,420 | 3,788 | 3,792 | 4,053 | 3,806 | 12.5 | Pi |

| Nomenclature | |
|-----------------|---|
| Q _p | Flow in test section immediately before stop of flow [m³/s]. |
| Q _m | Arithmetical mean flow during perturbation phase [m ³ /s]. |
| t _p | Duration of perturbation phase [s]. |
| t _f | Duration of recovery phase [s]. |
| p ₀ | Pressure in borehole before packer inflation [kPa]. |
| pi | Pressure in test section before start of flowing [kPa]. |
| p _p | Pressure in test section before stop of flowing [kPa]. |
| p _F | Pressure in test section at the end of the recovery [kPa]. |
| Te _w | Temperature in test section. |
| Test phases | CHi Constant Head injection phase. |
| | CHir: Recovery phase following the constant head injection phase. |
| | Pi: Pulse injection phase. |
| #NV | not analysed/no values. |

| Interval | position | | - | Transient | analysis | | | | | | | | | | | | | |
|--------------|---------------|-------------|------------------------|-------------------|-------------------|-------------------------|-------------------------|-------------------------|-------------------------|------------|---------------------------|---------------------------|-------------------|--------|------------|------------|-----------|------------------------------|
| | parame | | parameters | | Flow regime | | Formation parameters | | | | | | Static conditions | | | | | |
| up m btoc | low m btoc | Q/s m²/s | T _M m²/s | Perturb. Phase | Recovery Phase | T _{f1} m²/s | T _{f2} m²/s | T _{s1} m²/s | T _{s2} m²/s | T⊤ m²/s | T _{TMIN} m²/s | Τ _{τΜΑΧ} m²/s | C m³/Pa | ξ _ | dt₁ min | dt₂ min | p* kPa | h _{wif} m.a.s.l. |
| 13.00 | 113.00 | 2.2E-05 | 2.9E-05 | 22 | WBS22 | 5.5E-05 | 9.1E–06 | 7.2E–05 | 1.2E–05 | 7.2E–05 | 1.0E–05 | 3.0E-04 | 3.4E-09 | 1.6 | 0.14 | 0.50 | 1,038.2 | 12.82 |
| 112.00 | 212.00 | 1.0E–04 | 1.3E–04 | 2 | WBS2 | 2.2E-04 | #NV | 1.6E–04 | #NV | 1.6E–04 | 9.0E-05 | 4.0E-04 | 1.8E–08 | -0.3 | 1.06 | 11.10 | 1,900.3 | 11.31 |
| 212.00 | 312.00 | 1.4E-05 | 1.9E–05 | 22 | WBS22 | 1.7E–05 | 5.1E–05 | 8.5E-06 | 5.0E–05 | 5.0E–05 | 2.0E-05 | 8.0E-05 | 6.7E–09 | -3.9 | 5.12 | 17.88 | 2,784.4 | 11.31 |
| 312.00 | 412.00 | 1.5E–07 | 1.9E-07 | 22 | WBS22 | 1.6E–07 | 6.9E–08 | 2.5E-07 | 6.4E–08 | 6.4E–08 | 1.0E-08 | 2.0E-07 | 4.7E-10 | -2.5 | #NV | #NV | 3,645.8 | 9.36 |
| 12.50 | 32.50 | 2.3E-05 | 2.4E-05 | 22 | WBS22 | 6.2E–05 | 7.0E-06 | 2.1E-04 | 1.9E–05 | 6.2E–05 | 1.0E-05 | 2.0E-06 | 1.0E-07 | 8.6 | #NV | #NV | 335.2 | 14.04 |
| 32.50 | 52.50 | 2.0E-07 | 2.1E–07 | 2 | WBS2 | 1.6E–07 | #NV | 5.4E-07 | #NV | 5.4E-07 | 3.0E-07 | 7.0E–07 | 2.9E-10 | 12.1 | 1.66 | 8.09 | 496.3 | 12.34 |
| 52.50 | 72.50 | 7.3E-08 | 7.6E–08 | 2 | WBS2 | 1.9E–07 | #NV | 2.3E-07 | #NV | 2.3E-07 | 6.0E-08 | 5.0E-07 | 4.2E-10 | 17.6 | #NV | #NV | 663.8 | 11.31 |
| 72.50 | 92.50 | 2.2E-07 | 2.1E–07 | 2 | WBS2 | 5.1E–07 | #NV | 8.6E-07 | #NV | 5.1E–07 | 2.0E-07 | 8.0E-07 | 6.8E-07 | 12.5 | 0.15 | 10.26 | 840.8 | 11.24 |
| 91.00 | 111.00 | 3.8E-07 | 3.6E-07 | 2 | WBS2 | 5.5E-07 | #NV | 1.6E-06 | #NV | 5.5E-07 | 2.0E-07 | 8.0E-07 | 5.0E-09 | 5.9 | 1.67 | 14.58 | 1,001.7 | 10.92 |
| 111.00 | 131.00 | 8.5E-08 | 8.9E-08 | 2 | WBS2 | 1.6E–07 | #NV | 2.0E-07 | #NV | 1.6E–07 | 8.0E-06 | 4.0E-07 | 2.1E–11 | 5.2 | 2.48 | 15.84 | 1,180.6 | 11.07 |
| 131.00 | 151.00 | 8.1E-05 | 8.4E-05 | 2 | WBS2 | 2.0E-04 | #NV | 1.5E-04 | #NV | 2.0E-04 | 4.0E-04 | 9.0E-04 | 1.6E–08 | 5.6 | 0.95 | 15.42 | 1,358.9 | 11.16 |
| 150.00 | 170.00 | 3.2E-07 | 3.3E-07 | 22 | WBS22 | 5.9E-07 | 1.2E-06 | 5.1E–07 | 1.2E–06 | 5.9E-07 | 1.0E–07 | 2.0E-06 | 8.3E-10 | 4.8 | #NV | #NV | 1,525.4 | 10.98 |
| 170.00 | 190.00 | 3.6E-07 | 3.7E-07 | 22 | WBS22 | 4.1E-07 | 1.3E–06 | 1.7E–07 | 1.1E–06 | 1.7E-07 | 5.0E-07 | 5.0E-06 | 1.3E-10 | -1.9 | 0.06 | 0.37 | 1,704.5 | 11.18 |
| 188.00 | 208.00 | 1.1E–08 | 1.1E–08 | 2 | WBS2 | 1.2E–08 | #NV | 4.7E-08 | #NV | 1.2E-08 | 9.0E-07 | 6.0E–08 | 5.2E–11 | 1.6 | 1.5 | 17.8 | 1,865.2 | 11.34 |
| 207.00 | 227.00 | 1.7E–05 | 1.7E–05 | 2 | WBS2 | 5.3E–05 | #NV | 5.8E-05 | #NV | 5.3E-05 | 1.0E–05 | 9.0E-05 | 5.1E–11 | 10.5 | 0.97 | 19.98 | 2,032.5 | 11.27 |
| 227.00 | 247.00 | 6.6E-07 | 6.7E-07 | 2 | WBS2 | 1.8E-06 | #NV | 4.1E-06 | #NV | 1.8E-06 | 8.0E-07 | 5.0E-06 | 7.1E–11 | 9.7 | 0.86 | 14.10 | 2,209.9 | 11.32 |
| 247.00 | 267.00 | 1.0E-06 | 1.1E–06 | 2 | WBS2 | 2.1E-06 | #NV | 6.4E-06 | #NV | 2.1E-06 | 9.0E-07 | 5.0E-06 | 6.2E-11 | 6.1 | 0.46 | 15.18 | 2,385.5 | 11.19 |
| 267.00 | 287.00 | 1.3E–05 | 1.3E-05 | 2 | WBS22 | 2.2E-05 | #NV | 3.8E-06 | 1.9E–05 | 2.2E-05 | 9.0E-06 | 5.0E-05 | 3.2E-10 | 2.4 | 0.56 | 18.48 | 2,561.4 | 11.08 |
| 287.00 | 307.00 | 6.2E-07 | 6.5E-07 | 2 | WBS2 | 1.9E-06 | #NV | 2.7E-06 | #NV | 1.9E–06 | 9.0E-07 | 5.0E-06 | 2.5E-09 | 11.9 | 1.30 | 15.72 | 2,740.5 | 11.34 |
| 307.00 | 327.00 | 2.7E-08 | 2.9E-08 | 2 | WBS2 | 1.4E-08 | #NV | 1.1E–08 | #NV | 1.1E–08 | 9.0E-09 | 3.0E-08 | 3.9E-11 | -1.9 | 2.05 | 18.30 | 2,911.7 | 10.80 |
| 327.00 | 347.00 | #NV | #NV | #NV | 22 | #NV | #NV | 4.3E-10 | 3.9E–11 | 3.9E–11 | 2.0E-11 | 2.0E-10 | 9.7E–11 | -0.2 | #NV | #NV | #NV | #NV |
| 347.00 | 367.00 | 7.9E-08 | 8.2E-08 | 2 | WBS2 | 6.7E–08 | #NV | 4.2E-08 | #NV | 6.7E–08 | 3.0E-08 | 8.0E-08 | 9.7E-10 | -0.5 | 0.57 | 17.04 | 3,254.3 | 9.84 |
| 367.00 | 387.00 | 7.4E-08 | 7.7E–08 | 22 | WBS22 | 2.4E-07 | 4.4E-08 | 2.9E-07 | 3.3E-08 | 2.9E-07 | 9.0E-08 | 7.0E-07 | 7.4E–11 | 1.3 | 0.17 | 0.34 | 3,425.7 | 9.35 |
| 387.00 | 407.00 | 1.2E-08 | 1.3E–08 | 22 | WBS22 | 1.1E–08 | 4.8E-09 | 1.5E–08 | 8.4E-09 | 1.5E–08 | 8.0E-09 | 4.0E-08 | 5.7E–11 | 0.2 | 0.17 | 0.32 | 3,629.4 | 12.17 |
| 406.00 | 426.00 | #NV | #NV | #NV | 22 | #NV | #NV | 9.3E-12 | 3.5E-12 | 9.3E-12 | 5.0E-12 | 5.0E-11 | 3.3E–11 | -1.4 | #NV | #NV | #NV | #NV |
| 421.10 | 433.55 | #NV | #NV | #NV | 22 | #NV | #NV | 9.9E-11 | 5.4E-11 | 5.4E-11 | 3.0E-11 | 1.0E-10 | 3.0E-11 | 0.2 | 12.88 | 48.07 | #NV | #NV |

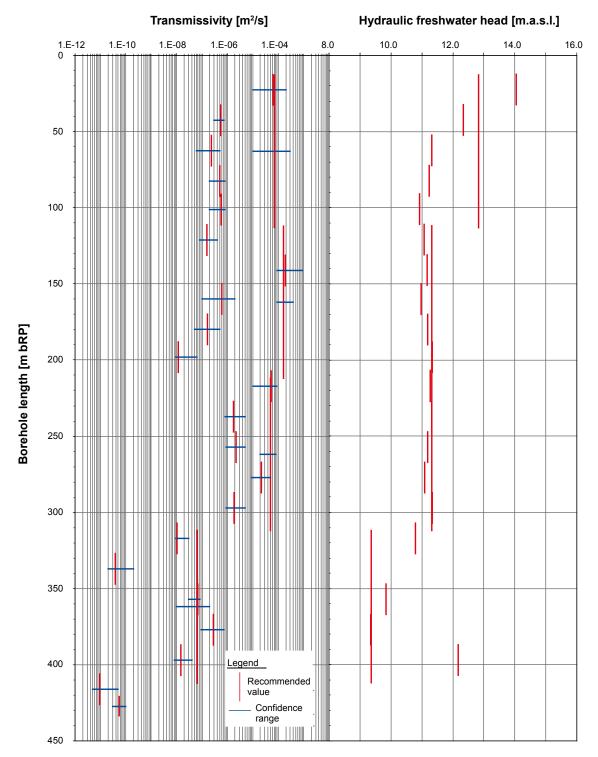
Table 6-2. Results from analysis of hydraulic tests in KLX16A (for nomenclature see appendix 4 and below).

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 (CHi). 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 (CHir or Pi). 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} | Confidence range lower limit. |
| T _{TMAX} | Confidence range upper limit. |
| С | Wellbore storage coefficient. |
| ξ | Skin factor [calculated based on a Storativity of $1\cdot 10^{-6}$ (for tests below 100 m ToC) and on a Storativity of $1\cdot 10^{-3}$ (for tests above 100 m ToC). |
| dt ₁ | Estimated start time of evaluation. |
| dt ₂ | Estimated stop time of evaluation. |
| p* | The parameter p* denoted the static formation pressure (measured at transducer depth) and was derived from the HORNER plot of the CHir phase using straight line or type-curve extrapolation. |
| h _{wif} | Fresh-water head (based on transducer depth and p*). |
| #NV | Not analysed/no values. |
| | |

| Borehole secup | Borehole seclow | Recommended Transmissivity | ri-index | Time t₂ for radius of influence calculation | Radius of Influence |
|-------------------|--------------------|-------------------------------|----------|--|------------------------|
| [m b ToC] | [m b ToC] | Tt [m²/s] | [-] | [s] | ri [m] |
| 13.00 | 113.00 | 7.2E–05 | 1 | 30.00 | 36.04 |
| 112.00 | 212.00 | 1.6E–04 | 0 | 1,800.00 | 341.39 |
| 212.00 | 312.00 | 5.0E-05 | 0 | 1,800.00 | 254.33 |
| 312.00 | 412.00 | 6.4E-08 | -1 | 1,800.00 | 48.16 |
| 12.50 | 32.50 | 6.2E–05 | 1 | #NV | #NV |
| 32.50 | 52.50 | 5.4E–07 | 0 | 1,200.00 | 66.99 |
| 52.50 | 72.50 | 2.3E-07 | 0 | 3,600.00 | 93.86 |
| 72.50 | 92.50 | 5.1E–07 | 0 | 1,200.00 | 66.16 |
| 91.00 | 111.00 | 5.5E–07 | 0 | 1,200.00 | 67.45 |
| 111.00 | 131.00 | 1.6E–07 | 0 | 1,200.00 | 49.34 |
| 131.00 | 151.00 | 2.0E-04 | 0 | 1,200.00 | 293.91 |
| 150.00 | 170.00 | 5.9E–07 | -1 | #NV | #NV |
| 170.00 | 190.00 | 1.7E–07 | -1 | 22.00 | 6.79 |
| 188.00 | 208.00 | 1.2E-08 | 0 | 1,200.00 | 25.90 |
| 207.00 | 227.00 | 5.3E-05 | 0 | 1,200.00 | 211.34 |
| 227.00 | 247.00 | 1.8E-06 | 0 | 1,200.00 | 90.26 |
| 247.00 | 267.00 | 2.1E-06 | 0 | 1,200.00 | 94.65 |
| 267.00 | 287.00 | 2.2E-05 | 0 | 1,200.00 | 169.48 |
| 287.00 | 307.00 | 1.9E-06 | 0 | 1,200.00 | 91.51 |
| 307.00 | 327.00 | 1.1E–08 | 0 | 1,200.00 | 25.05 |
| 327.00 | 347.00 | 3.9E-11 | -1 | 14,400.00 | 21.42 |
| 347.00 | 367.00 | 6.7E–08 | 0 | 1,200.00 | 39.78 |
| 367.00 | 387.00 | 2.9E-07 | 1 | 20.40 | 7.47 |
| 387.00 | 407.00 | 1.5E–08 | 1 | 19.20 | 3.44 |
| 406.00 | 426.00 | 9.3E-12 | 1 | #NV | #NV |
| 421.10 | 433.55 | 5.4E–11 | -1 | 9,420.00 | 18.82 |

Table 6-3. Results from the ri-index calculation of hydraulic tests in KLX16A (see Chapter 4.5.5 for details and nomenclature).



The Figures 6-1 to 6-3 present the transmissivity, conductivity and hydraulic freshwater head pofiles.

Figure 6-1. Results summary – profiles of transmissivity and equivalent freshwater head extrapolated.

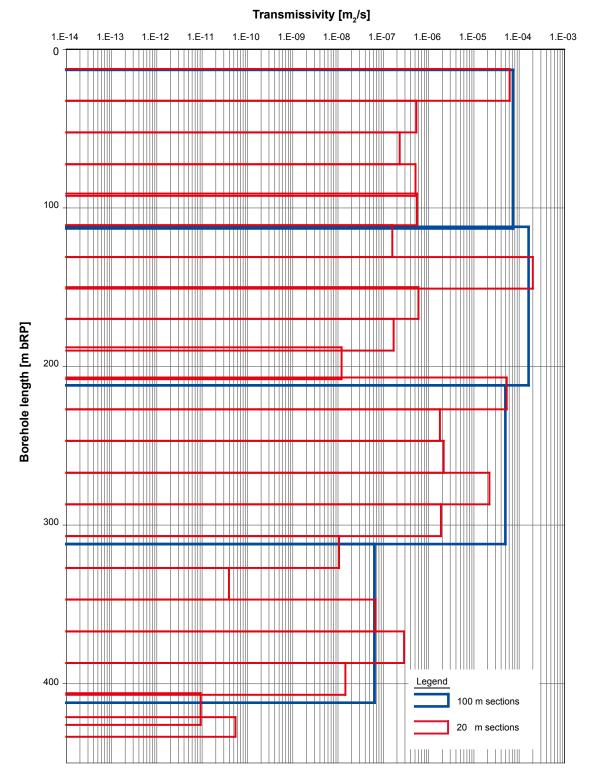


Figure 6-2. Results summary – profile of transmissivity.

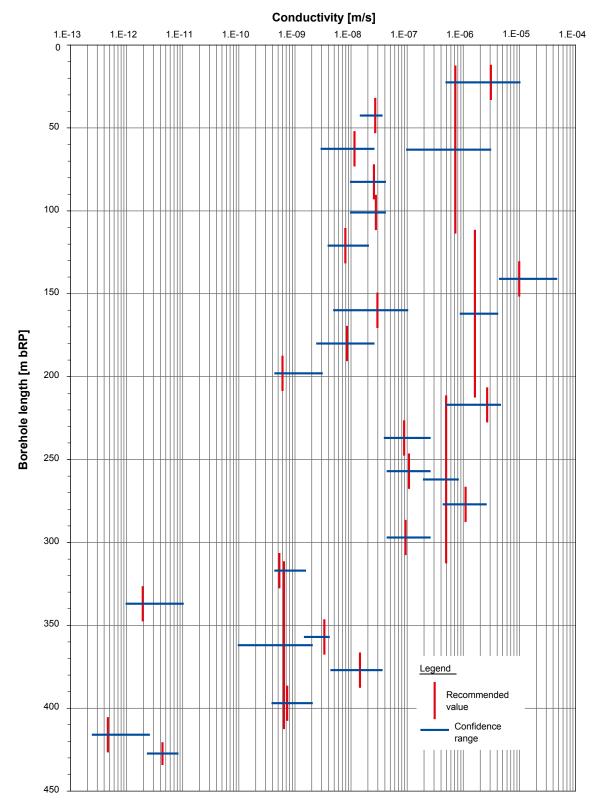


Figure 6-3. Results summary – profile of hydraulic conductivity.

6.2 Correlation analysis

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

6.2.1 Comparison of steady state and transient analysis results

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

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

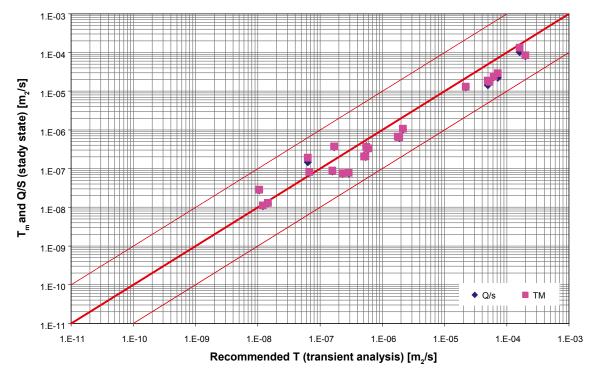


Figure 6-4. Correlation analysis of transmissivities derived by steady state and transient methods.

6.2.2 Comparison between the matched and theoretical wellbore storage coefficient

The wellbore storage coefficient describes the capacity of the test interval to store fluid as result to an unit pressure change in the interval. For a closed system (i.e. closed downhole valve) the theoretical value of the wellbore storage coefficient is given by the product between the interval volume and the test zone compressibility. The interval volume is calculated from the borehole radius and interval length. There are uncertainties concerning the interval volume calculation. Cavities or high transmissivity fractures intersecting the interval may enlarge the effective volume of the interval.

The test zone compressibility is given by the sum of compressibilities of the individual components present in the interval (water, packer elements, other test tool components, and the borehole wall). The water compressibility depends on the temperature and salinity. However, for temperature and salinity values as encountered at the Oskarshamn site the water compressibility varies only slightly between $4.5 \cdot 10^{-10}$ and $5.0 \cdot 10^{-10}$ 1/Pa.

A water compressibility of $5 \cdot 10^{-10}$ 1/Pa and a rock compressibility of $1 \cdot 10^{-10}$ 1/Pa was assumed for the analysis. In addition, the test zone compressibility is influenced by the test tool (packer compliance). The test tool compressibility was calculated as follow:

$$c = \frac{\Delta V}{\Delta p} \times \frac{1}{V} [1/Pa]$$

- ΔV Volume change of 2 Packers (The volume change was estimated at 7.10⁻⁷ m³/100 kPa based on the results of laboratory tests conducted by GEOSIGMA) [m³].
- Δp Pressure change in test section (usually 2.10⁵ Pa) [Pa].
- V Volume in test section [m³].

The following table presents the calculated compressibilities for each relevant section length. The average value for the test tool compressibility based on different section length is $1 \cdot 10^{-10}$ 1/Pa.

| Length of test section [m] | Volume in test section [m³] | Compressibility [1/Pa] |
|-------------------------------|--------------------------------|---------------------------|
| 20 | 0.091 | 8·10 ⁻¹¹ |
| 100 | 0.454 | 2·10 ⁻¹¹ |
| Average compressibility: | | 5·10 ⁻¹¹ |

Table 6-4. Test tool compressibility values based on packer displacement.

The sum of the compressibilities (water, rock, test tool) leads to a test zone compressibility with a value of $7 \cdot 10^{-10}$ 1/Pa. This value is used for the calculation of the theoretical wellbore storage coefficient.

The matched wellbore storage coefficient is derived from the transient type curve analysis by matching the unit slope early times derivative plotted in log-log coordinates.

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

It can be seen that the matched wellbore storage coefficients differ up to three orders of magnitude from the theoretical. This phenomenon was already observed at the previous boreholes. A two or three orders of magnitude increase is difficult to explain by volume uncertainty. Even if large fractures are connected to the interval, a volume increase by two orders of magnitude does not seem probable. This discrepancy is not fully understood, but following hypotheses may be formulated:

- Increased compressibility of the packer system.
- As shown by previous work conducted at site, the phenomenon of increased wellbore storage coefficients can be explained by turbulent flow induced by the test in the vicinity of the borehole. Considering the fact that deviations concerning the wellbore storage rather occur in test sections with a higher transmissivity (which can lead to turbulent flow) seems to rest upon this hypothesis.

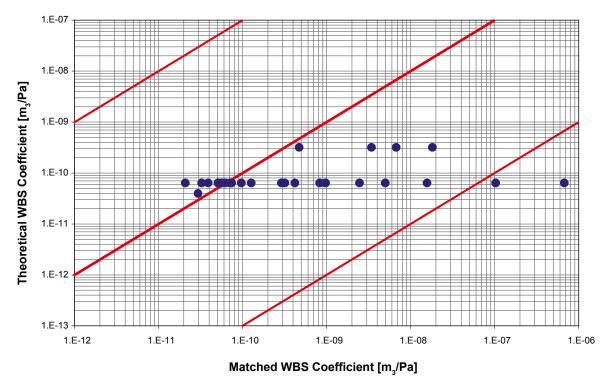


Figure 6-5. Correlation analysis of theoretical and matched wellbore storage coefficients.

7 Conclusions

7.1 Transmissivity

Figure 6-1 presents a profile of transmissivity, including the confidence ranges derived from the transient analysis. The method used for deriving the recommended transmissivity and its confidence range is described in Section 4.5.9.

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

If the conducted preliminary pulse injection (PI) showed a slow recovery the pulse test was prolonged and no further injection test was performed. The pulse test was used for a quantitative analysis. In three cases the preliminary pulse was prolonged and the recommended transmissivities are $3.9 \cdot 10^{-11} \text{ m}^2/\text{s}$ (Section 327.00-347.00 m), $9.3 \cdot 10^{-12} \text{ m}^2/\text{s}$ (Section 406.00-426.00 m) and $5.4 \cdot 10^{-11} \text{ m}^2/\text{s}$ (Section 421.10-433.55 m).

The recommended transmissivities derived from the conducted injection tests (CHi and CHir) range from $6.4 \cdot 10^{-8}$ m²/s to $1.6 \cdot 10^{-4}$ m²/s for 100 m tests and $1.1 \cdot 10^{-8}$ m²/s to $2.0 \cdot 10^{-4}$ m²/s for the 20 m tests.

In two cases the 20 m sections show a higher transmissivity than the appropriate 100 m section. These differences are very small and are covered by the confidence range

7.2 Equivalent freshwater head

Figure 6-1 presents a profile of the derived equivalent freshwater head expressed in metres above sea level. The method used for deriving the equivalent freshwater head is described in Section 4.5.8.

The head profile shows a freshwater head that ranges from 9.35 m to 14.04 m.

In general, the uncertainty related to the derived freshwater heads is dependent on the test section transmissivity. Due to the relatively short pressure recovery phase, the static pressure extrapolation becomes increasingly uncertain at lower transmissivities.

7.3 Flow regimes encountered

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

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

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

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

- If the behaviour is to be completely attributed to changes of transmissivity in the formation, this indicates the presence of larger transmissivity zones in the borehole vicinity, which could be caused by steep fractures that do not intersect the test interval, but are connected to the interval by lower transmissivity fractures. The fact that in many cases the test derivatives of adjacent test sections converge at late times seems to support this hypothesis.
- A further possibility is that the large skins are caused by turbulent flow taking place in the tool or in fractures connected to the test interval. This hypothesis is more difficult to examine. However, considering the fact that some high skins were observed in sections with transmissivities as low as 1.10⁻⁸ m²/s (which imply low flow rates) seems to speak against this hypothesis.

The flow dimension displayed by the test can be diagnosed from the slope of the pressure derivative. A slope of 0.5 indicates linear flow, a slope of 0 (horizontal derivative) indicates radial flow and a slope of -0.5 indicates spherical flow. The flow dimension diagnosis was commented for each of the tests. In all of the cases it was possible to get a good match quality by using radial flow geometry. In no cases an alternative analysis with a flow dimension unequal to two was performed. The analyses are presented in appendix 2.

8 References

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Borehole: KLX16 A

APPENDIX 1

File Description Table

| HYDROTESTING WITH PSS | | | | | DRILLHOLE IDENTIFICATION NO.: KLX16A | | | | | | |
|----------------------------------|-------|--------|--------|---------------------------------|--|-----------|------------|------------|--|--|--|
| TEST- AND FILEPROTOCOL | | | | | Testorder dated : 2007-03-12 | | | | | | |
| Teststart Interval boundaries | | es | Name | e of Datafiles | Testtype | Copied to | Plotted | Sign. | | | |
| Date | Time | Upper | Lower | (*.HT2-file) | (*.CSV-file) | | disk/CD | (date) | | | |
| 2007-03-12 | 20:28 | 13.00 | 113.00 | KLX16A_0013.00_200703122028.ht2 | KLX16A_13.00-113.00_070313_1_CHir_Q_r.csv | Chir | 2007-03-19 | 2007-03-13 | | | |
| 2007-03-13 | 09:41 | 13.00 | 113.00 | KLX16A_0013.00_200703130941.ht2 | KLX16A_13.00-113.00_070313_2_CHir_Q_r.csv | Chir | 2007-03-19 | 2007-03-13 | | | |
| 2007-03-13 | 14:12 | 112.00 | 212.00 | KLX16A_0112.00_200703131412.ht2 | KLX16A_112.00-212.00_070313_1_CHir_Q_r.csv | Chir | 2007-03-19 | 2007-03-13 | | | |
| 2007-03-13 | 17:54 | 212.00 | 312.00 | KLX16A_0212.00_200703131754.ht2 | KLX16A_212.00-312.00_070313_1_CHir_Q_r.csv | Chir | 2007-03-19 | 2007-03-13 | | | |
| 2007-03-13 | 21:41 | 312.00 | 412.00 | KLX16A_0312.00_200703132141.ht2 | KLX16A_312.00-412.00_070313_1_CHir_Q_r.csv | Chir | 2007-03-19 | 2007-03-13 | | | |
| 2007-03-14 | 13:12 | 12.50 | 32.50 | KLX16A_0012.50_200703141312.ht2 | KLX16A_12.50-32.50_070314_1_CHir_Q_r.csv | Chir | 2007-03-19 | 2007-03-14 | | | |
| 2007-03-14 | 15:41 | 32.50 | 52.50 | KLX16A_0032.50_200703141541.ht2 | KLX16A_32.50-52.50_070314_1_CHir_Q_r.csv | Chir | 2007-03-19 | 2007-03-14 | | | |
| 2007-03-14 | 22:12 | 32.50 | 52.50 | KLX16A_0032.50_200703142212.ht2 | KLX16A_32.50-52.50_070314_2_CHir_Q_r.csv | Chir | 2007-03-19 | 2007-03-14 | | | |
| 2007-03-15 | 00:34 | 52.50 | 72.50 | KLX16A_0052.50_200703150034.ht2 | KLX16A_52.50-72.50_070315_1_CHir_Q_r.csv | Chir | 2007-03-19 | 2007-03-15 | | | |
| 2007-03-15 | 06:50 | 72.50 | 92.50 | KLX16A_0072.50_200703150650.ht2 | KLX16A_72.50-92.50_070315_1_CHir_Q_r.csv | Chir | 2007-03-19 | 2007-03-15 | | | |
| 2007-03-15 | 08:52 | 91.00 | 111.00 | KLX16A_0092.50_200703150852.ht2 | KLX16A_91.00-111.00_070315_1_CHir_Q_r.csv | Chir | 2007-03-19 | 2007-03-15 | | | |
| 2007-03-15 | 10:59 | 111.00 | 131.00 | KLX16A_0111.00_200703151059.ht2 | KLX16A_111.00-131.00_070315_1_CHir_Q_r.csv | Chir | 2007-03-19 | 2007-03-15 | | | |
| 2007-03-15 | 13:31 | 131.00 | 151.00 | KLX16A_0131.00_200703151331.ht2 | KLX16A_131.00-151.00_070315_1_CHir_Q_r.csv | Chir | 2007-03-19 | 2007-03-15 | | | |
| 2007-03-15 | 15:35 | 150.00 | 170.00 | KLX16A_0150.00_200703151535.ht2 | KLX16A_150.00-170.00_070315_1_CHir_Q_r.csv | Chir | 2007-03-19 | 2007-03-15 | | | |
| 2007-03-15 | 17:51 | 170.00 | 190.00 | KLX16A_0170.00_200703151751.ht2 | KLX16A_170.00-190.00_070315_1_CHir_Q_r.csv | Chir | 2007-03-19 | 2007-03-15 | | | |
| 2007-03-15 | 20:00 | 188.00 | 208.00 | KLX16A_0188.00_200703152000.ht2 | KLX16A_188.00-208.00_070315_1_CHir_Q_r.csv | Chir | 2007-03-19 | 2007-03-15 | | | |

| HYDROTESTING WITH PSS TEST- AND FILEPROTOCOL | | | | PSS | DRILLHOLE IDENTIFICATION NO.: KLX16A | | | | | | | |
|---|-------|--------|--------|---------------------------------|--|-----------|------------|------------|--|--|--|--|
| | | | | OCOL | Testorder dated : 2007-03-12 | | | | | | | |
| Teststart Interval boundaries | | es | Name | of Datafiles | Testtype | Copied to | Plotted | Sign. | | | | |
| Date | Time | Upper | Lower | (*.HT2-file) | (*.CSV-file) | | disk/CD | (date) | | | | |
| 2007-03-15 | 22:44 | 207.00 | 227.00 | KLX16A_0207.00_200703152244.ht2 | KLX16A_207.00-227.00_070315_1_CHir_Q_r.csv | Chir | 2007-03-19 | 2007-03-16 | | | | |
| 2007-03-16 | 00:49 | 227.00 | 247.00 | KLX16A_0227.00_200703160049.ht2 | KLX16A_227.00-247.00_070316_1_CHir_Q_r.csv | Chir | 2007-03-19 | 2007-03-16 | | | | |
| 2007-03-16 | 07:36 | 247.00 | 267.00 | KLX16A_0247.00_200703160736.ht2 | KLX16A_247.00-267.00_070316_1_CHir_Q_r.csv | Chir | 2007-03-19 | 2007-03-16 | | | | |
| 2007-03-16 | 09:32 | 267.00 | 287.00 | KLX16A_0267.00_200703160932.ht2 | KLX16A_267.00-287.00_070316_1_CHir_Q_r.csv | Chir | 2007-03-19 | 2007-03-16 | | | | |
| 2007-03-16 | 10:58 | 267.00 | 287.00 | KLX16A_0267.00_200703161058.ht2 | KLX16A_267.00-287.00_070316_2_CHir_Q_r.csv | Chir | 2007-03-19 | 2007-03-16 | | | | |
| 2007-03-16 | 13:27 | 287.00 | 307.00 | KLX16A_0287.00_200703161327.ht2 | KLX16A_287.00-307.00_070316_1_CHir_Q_r.csv | Chir | 2007-03-19 | 2007-03-16 | | | | |
| 2007-03-16 | 15:27 | 307.00 | 327.00 | KLX16A_0307.00_200703161527.ht2 | KLX16A_307.00-327.00_070316_1_CHir_Q_r.csv | Chir | 2007-03-19 | 2007-03-16 | | | | |
| 2007-03-16 | 17:41 | 327.00 | 347.00 | KLX16A_0327.00_200703161741.ht2 | KLX16A_327.00-347.00_070316_1_Pi_Q_r.csv | Pi | 2007-03-19 | 2007-03-17 | | | | |
| 2007-03-17 | 08:35 | 347.00 | 367.00 | KLX16A_0347.00_200703170835.ht2 | KLX16A_347.00-367.00_070317_1_Chir_Q_r.csv | Chir | 2007-03-19 | 2007-03-17 | | | | |
| 2007-03-17 | 10:38 | 367.00 | 387.00 | KLX16A_0367.00_200703171038.ht2 | KLX16A_367.00-387.00_070317_1_Chir_Q_r.csv | Chir | 2007-03-19 | 2007-03-17 | | | | |
| 2007-03-17 | 12:48 | 387.00 | 407.00 | KLX16A_0387.00_200703171248.ht2 | KLX16A_387.00-407.00_070317_1_Chir_Q_r.csv | Chir | 2007-03-19 | 2007-03-17 | | | | |
| 2007-03-17 | 15:37 | 406.00 | 426.00 | KLX16A_0406.00_200703171537.ht2 | KLX16A_403.00-423.00_070317_1_Pi_Q_r.csv | Pi | 2007-03-19 | 2007-03-18 | | | | |
| 2007-03-18 | 19:10 | 421.10 | 433.55 | KLX16A_0421.10_200703181910.ht2 | KLX16A_421.10-433.55_070317_1_Pi_Q_r.csv | Pi | 2007-03-19 | 2007-03-19 | | | | |

Borehole: KLX16A

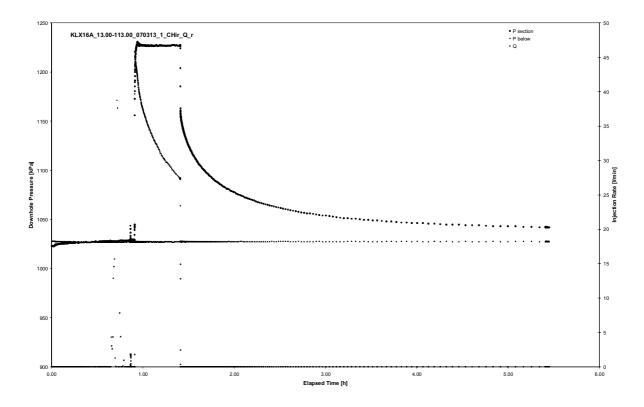
APPENDIX 2

Analysis diagrams

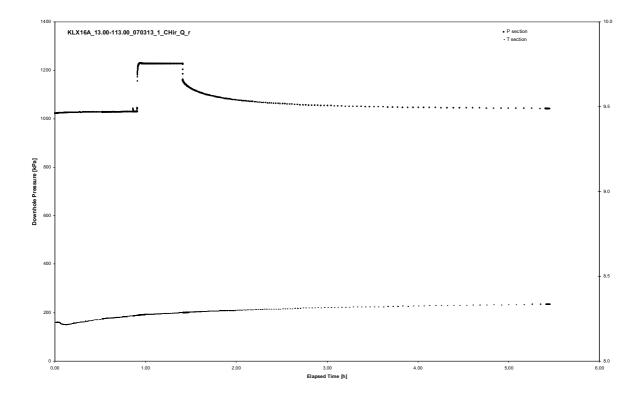
APPENDIX 2-1

Test 13.00 – 113.00 m

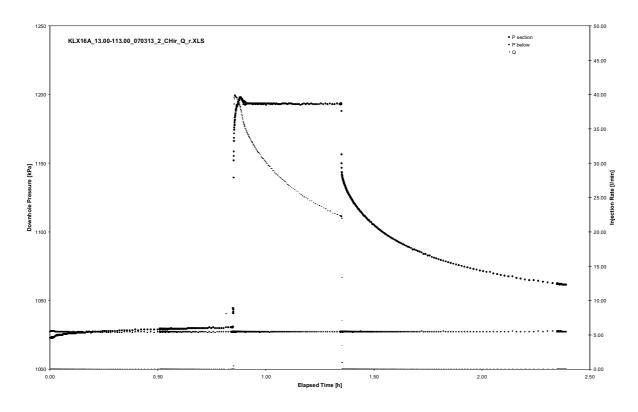
Analysis diagrams



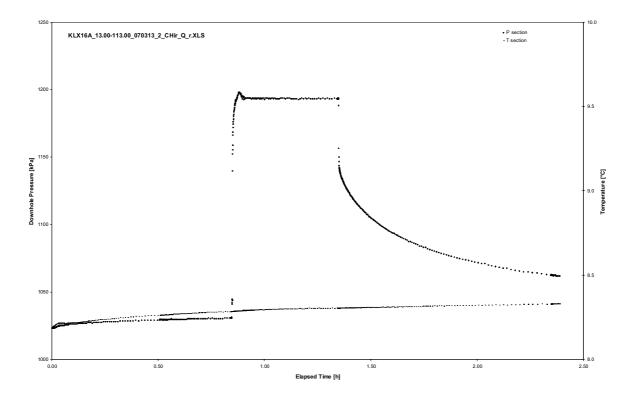
Pressure and flow rate vs. time; cartesian plot (repeated)



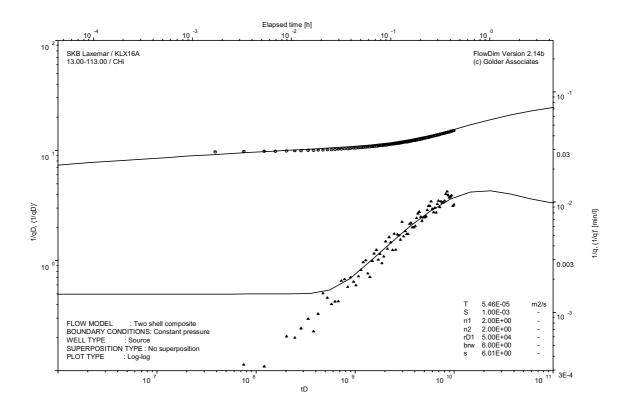
Interval pressure and temperature vs. time; cartesian plot (repeated)



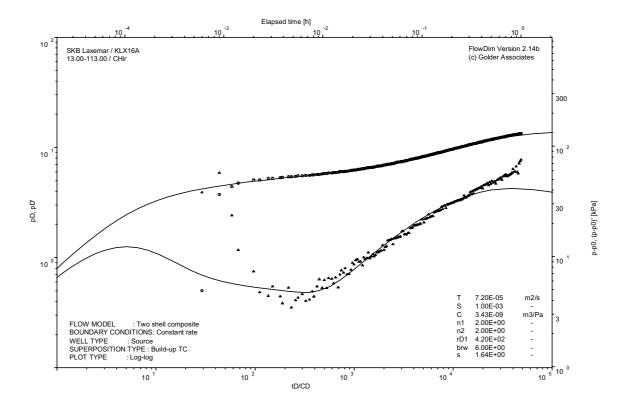
Pressure and flow rate vs. time; cartesian plot



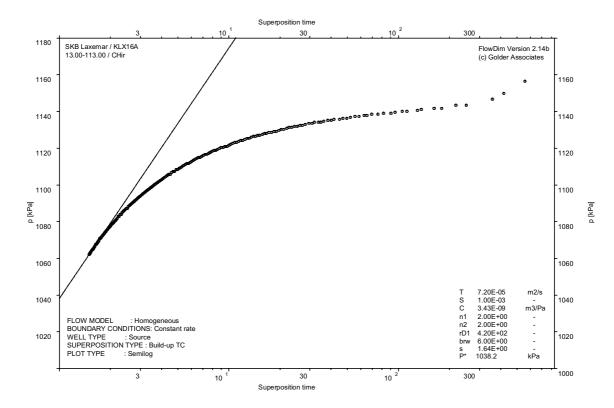
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

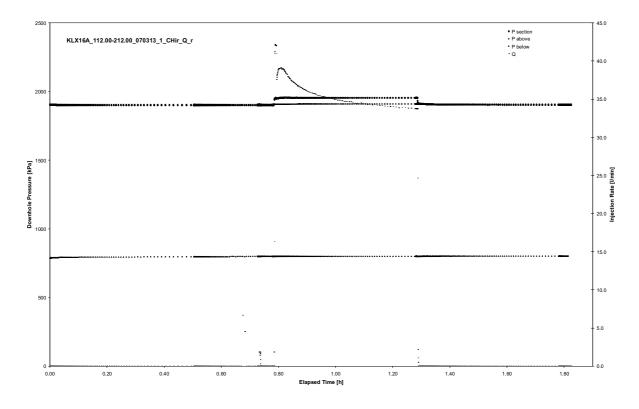


CHIR phase; HORNER match

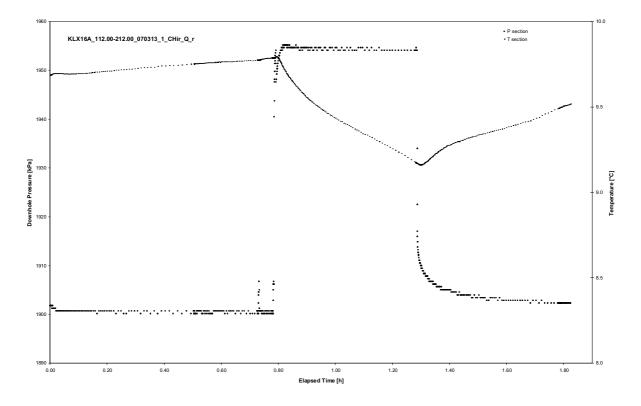
APPENDIX 2-2

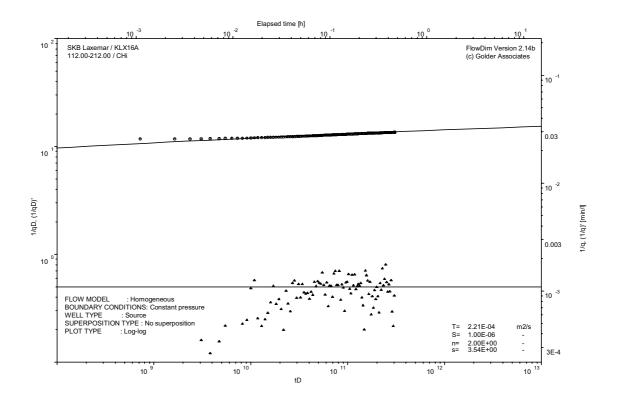
Test 112.00 – 212.00 m

Analysis diagrams

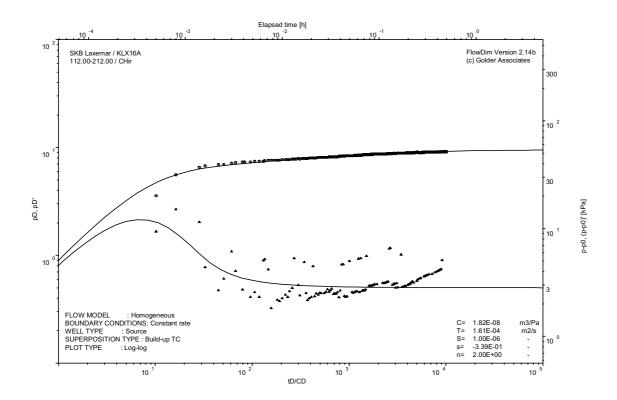


Pressure and flow rate vs. time; cartesian plot

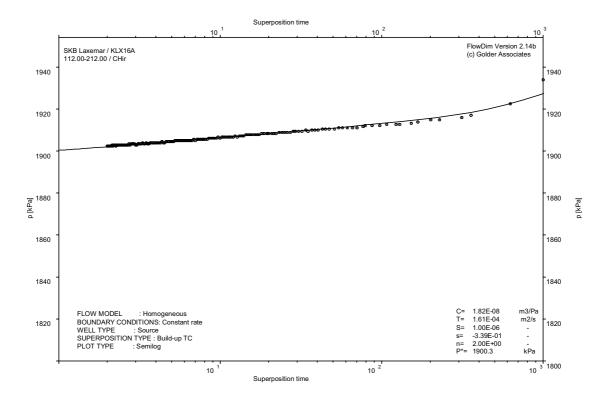




CHI phase; log-log match

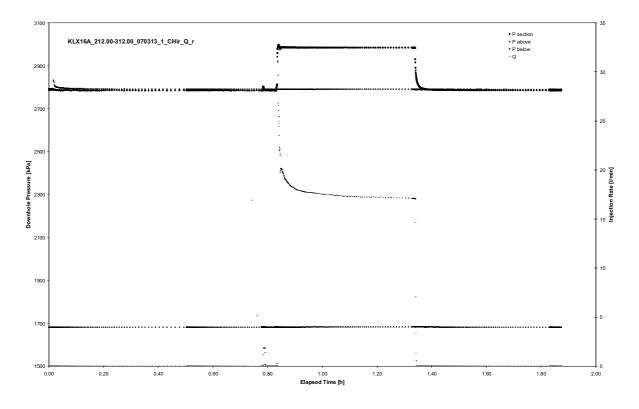


CHIR phase; log-log match

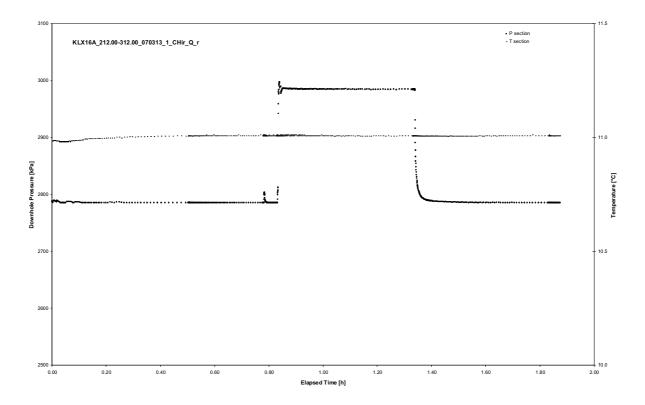


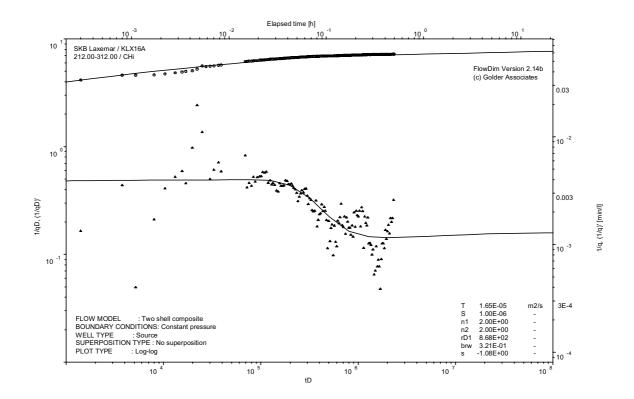
CHIR phase; HORNER match

Test 212.00 – 312.00 m

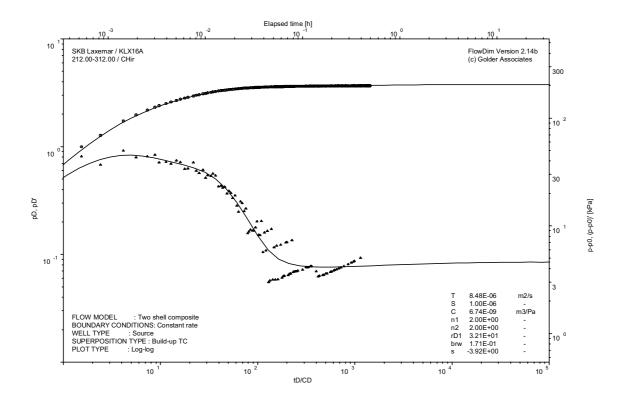


Pressure and flow rate vs. time; cartesian plot

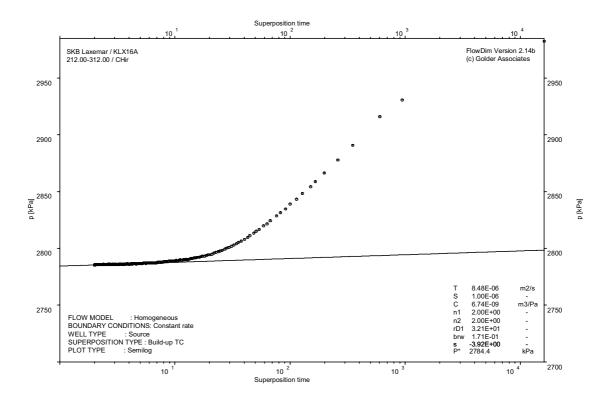




CHI phase; log-log match

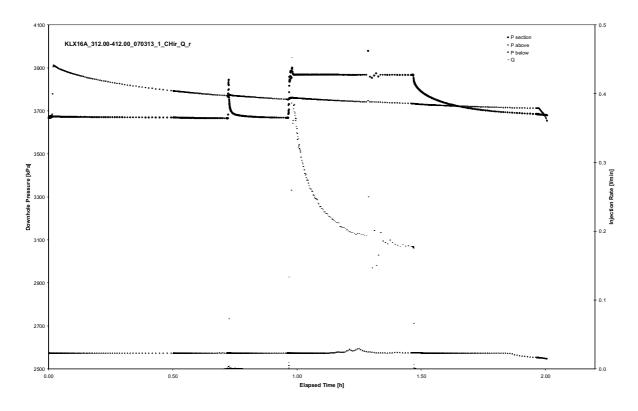


CHIR phase; log-log match

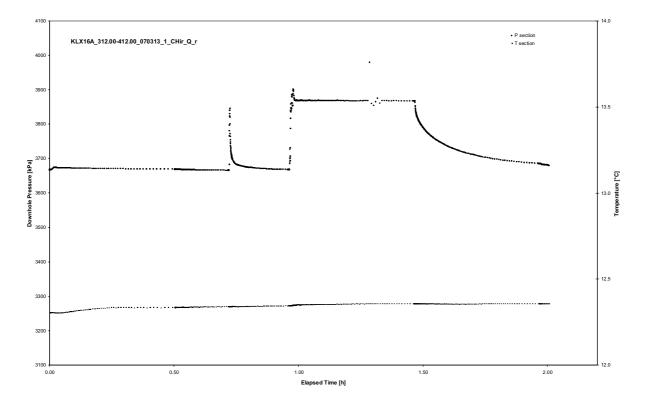


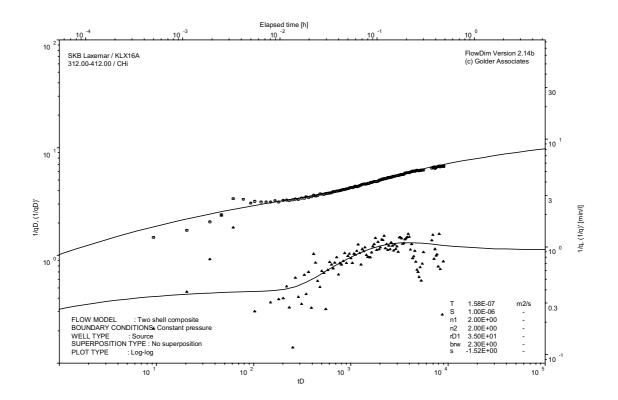
CHIR phase; HORNER match

Test 312.00 – 412.00 m

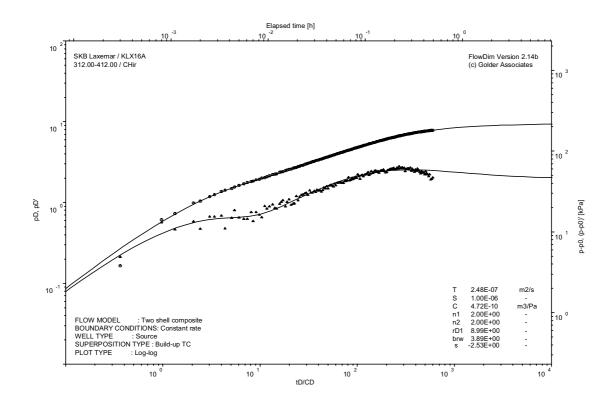


Pressure and flow rate vs. time; cartesian plot

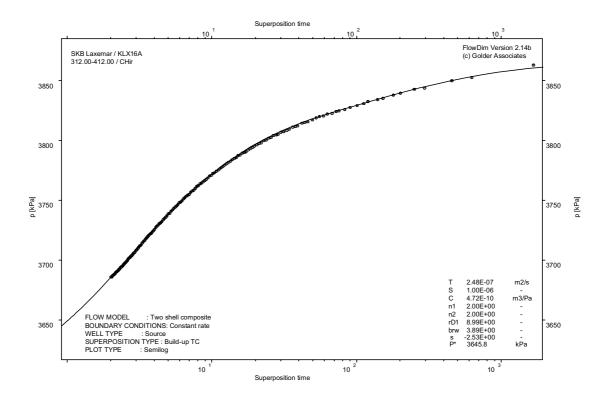




CHI phase; log-log match

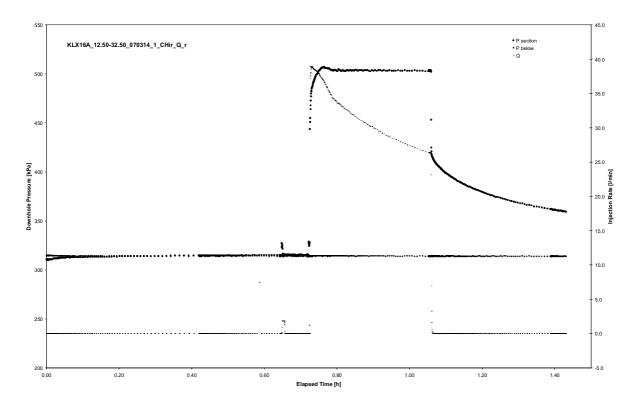


CHIR phase; log-log match

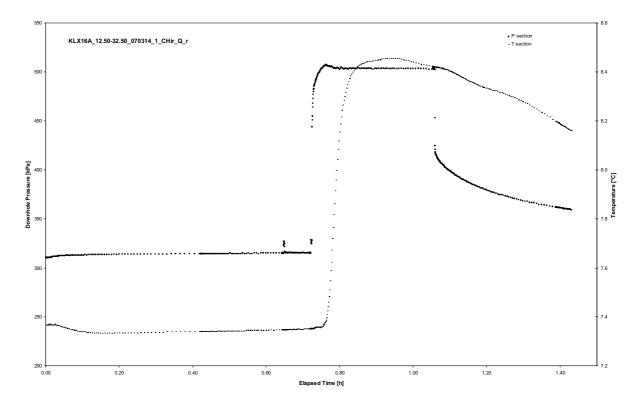


CHIR phase; HORNER match

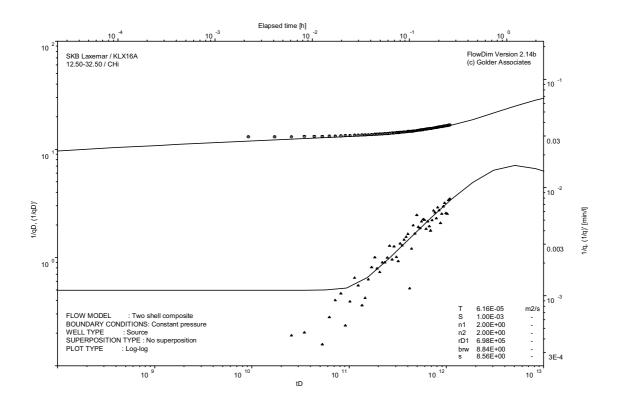
Test 12.50 – 32.50 m



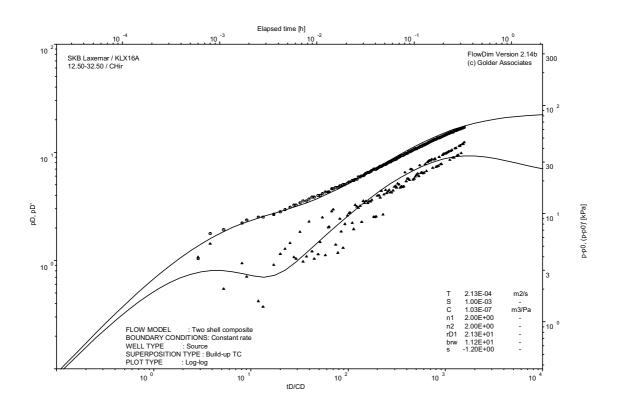
Pressure and flow rate vs. time; cartesian plot



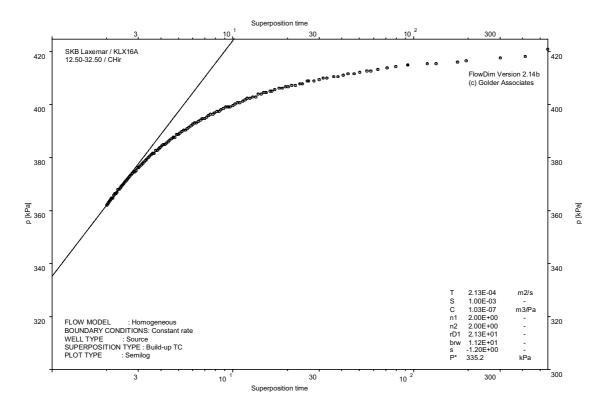
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match

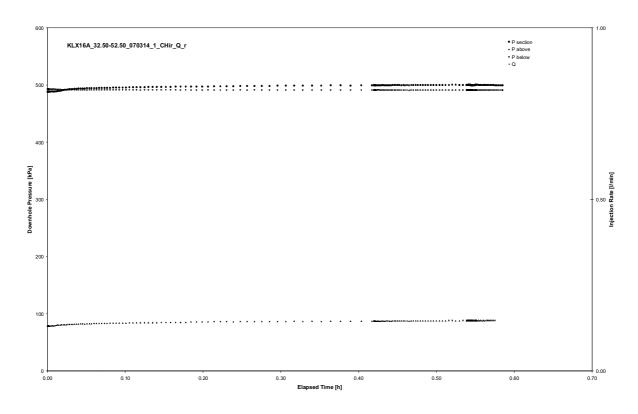


CHIR phase; log-log match

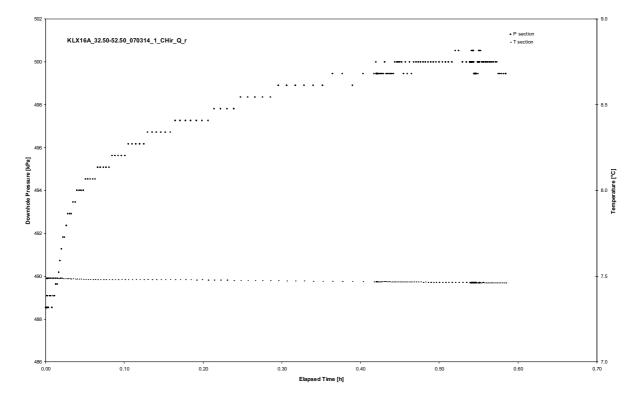


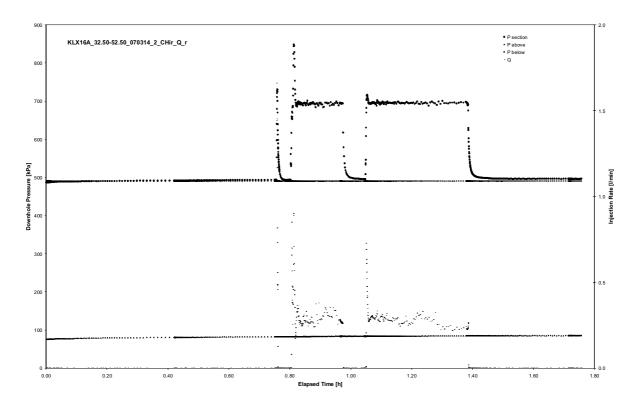
CHIR phase; HORNER match

Test 32.50 – 52.50 m

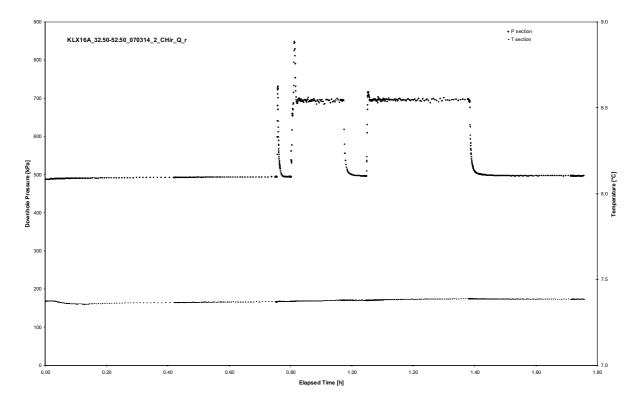


Pressure and flow rate vs. time; cartesian plot (repeated)

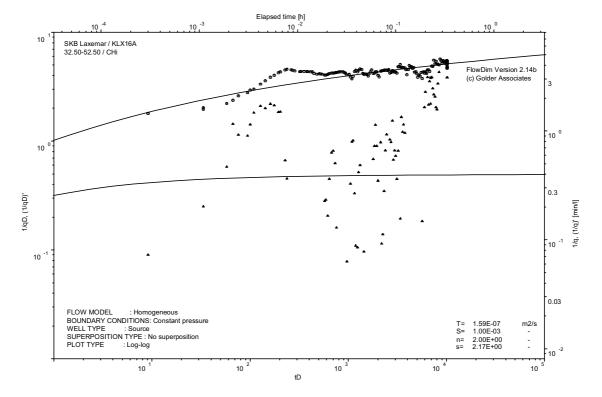




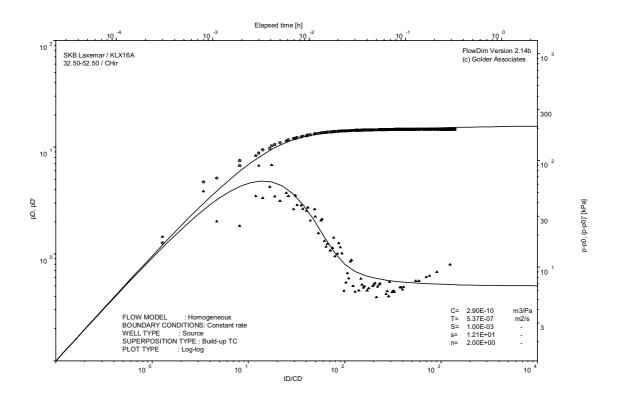
Pressure and flow rate vs. time; cartesian plot



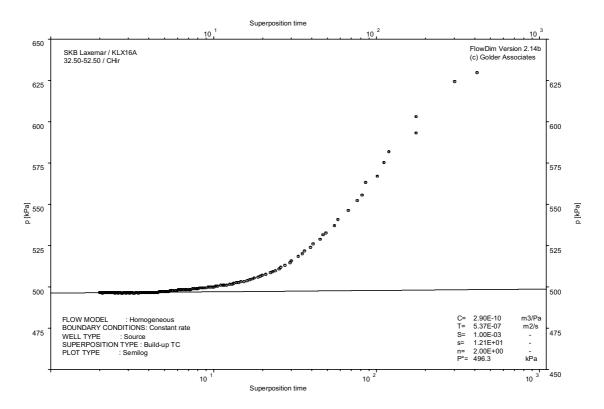




CHI phase; log-log match

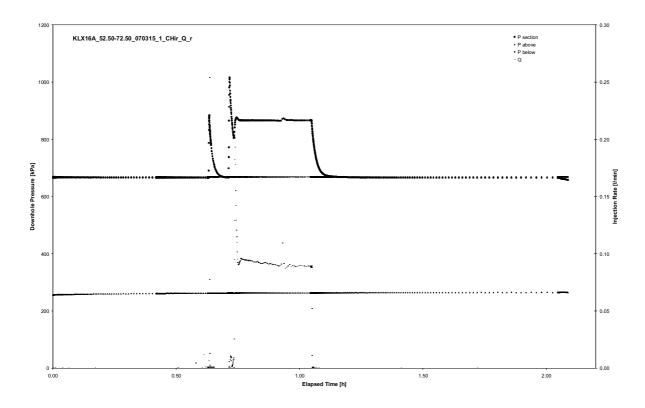


CHIR phase; log-log match

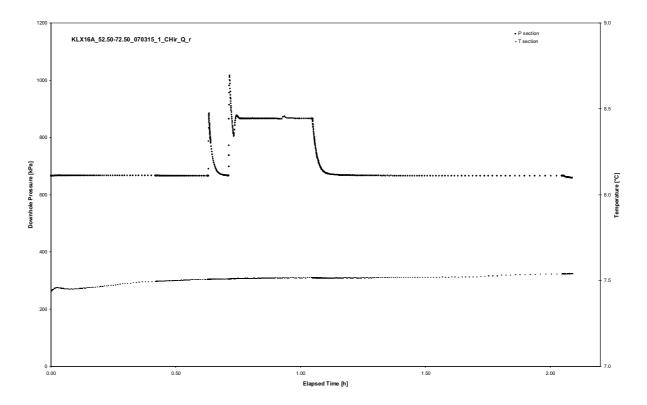


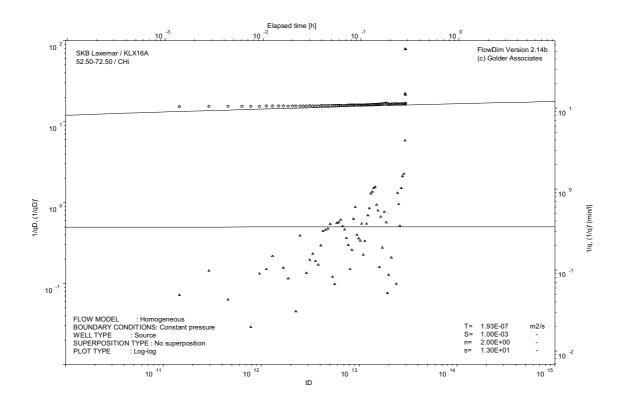
CHIR phase; HORNER match

Test 52.50 – 72.50 m

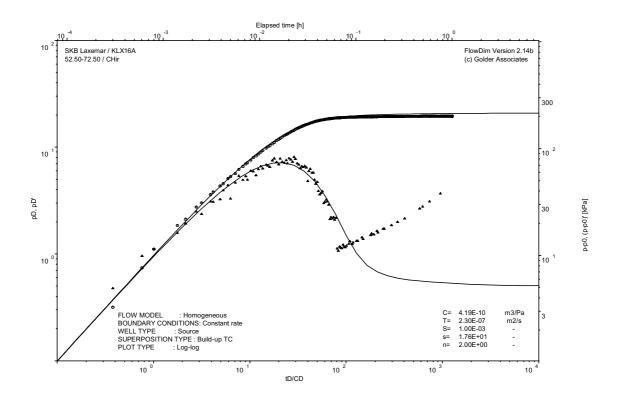


Pressure and flow rate vs. time; cartesian plot

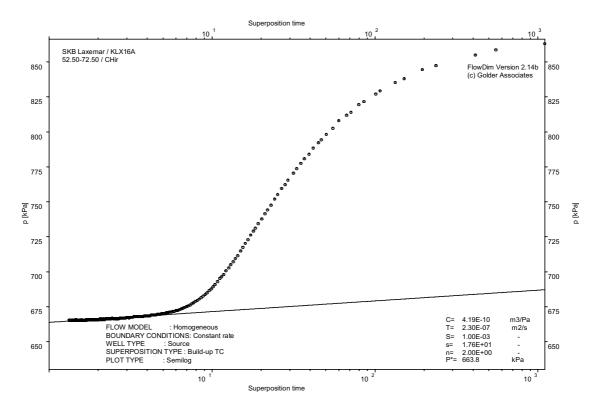




CHI phase; log-log match

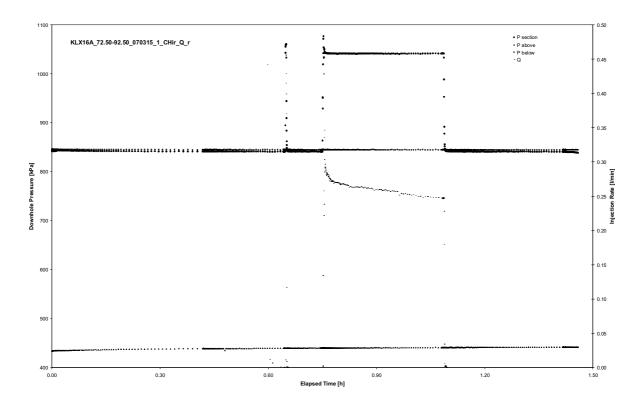


CHIR phase; log-log match

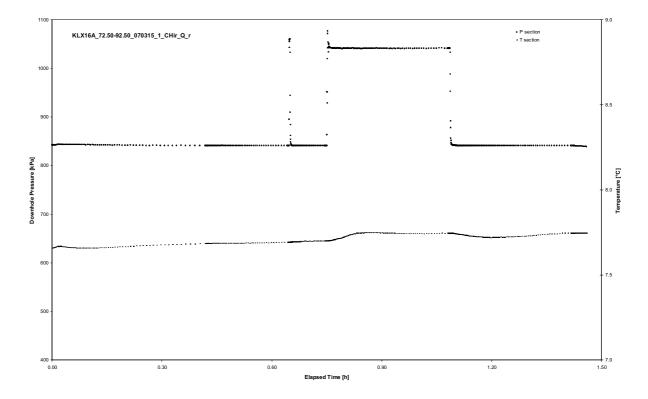


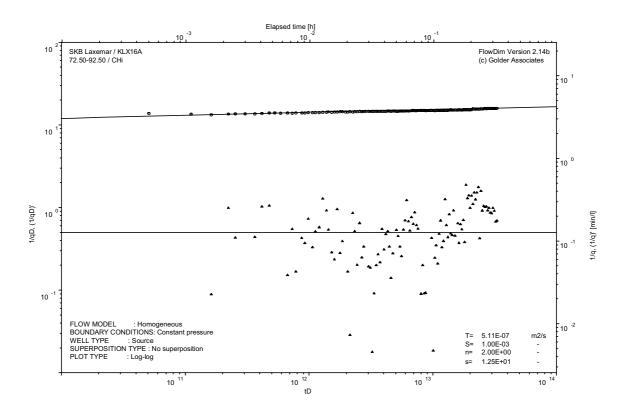
CHIR phase; HORNER match

Test 72.50 – 92.50 m

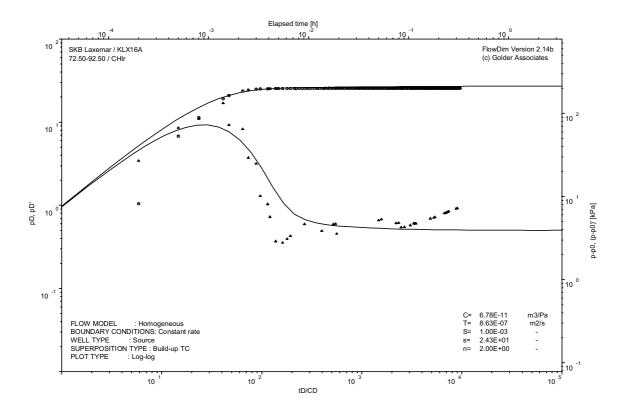


Pressure and flow rate vs. time; cartesian plot

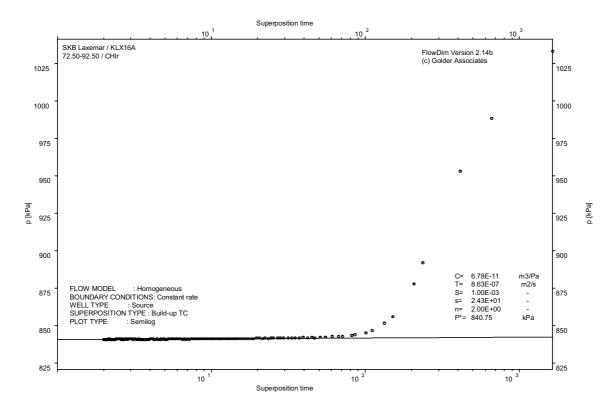




CHI phase; log-log match

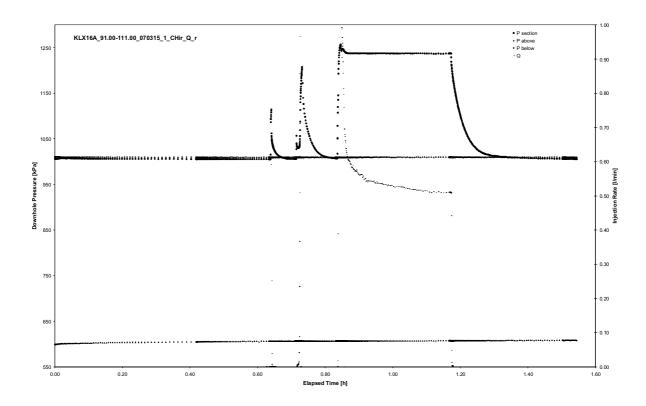


CHIR phase; log-log match

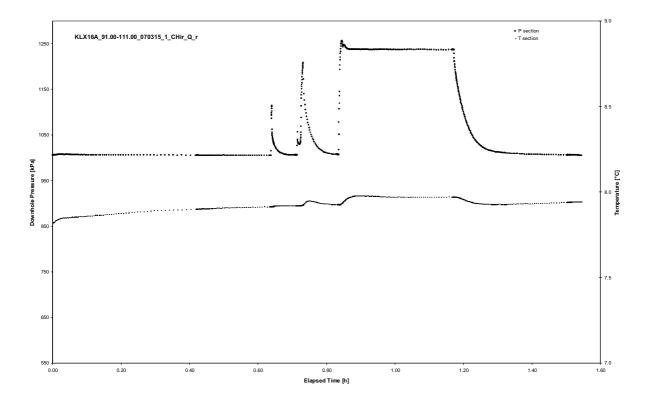


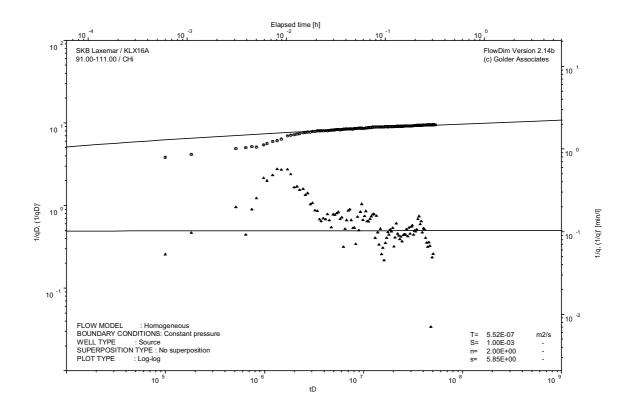
CHIR phase; HORNER match

Test 91.00 – 111.00 m



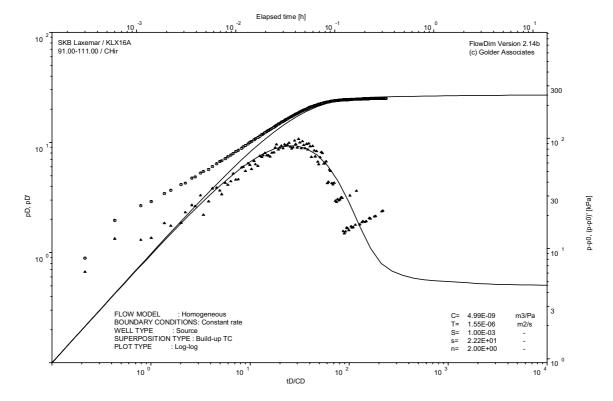
Pressure and flow rate vs. time; cartesian plot



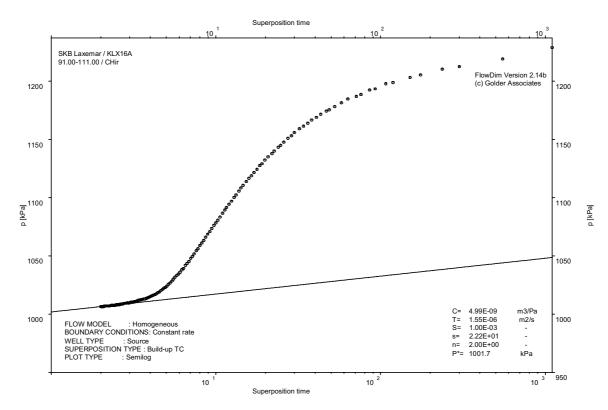


CHI phase; log-log match



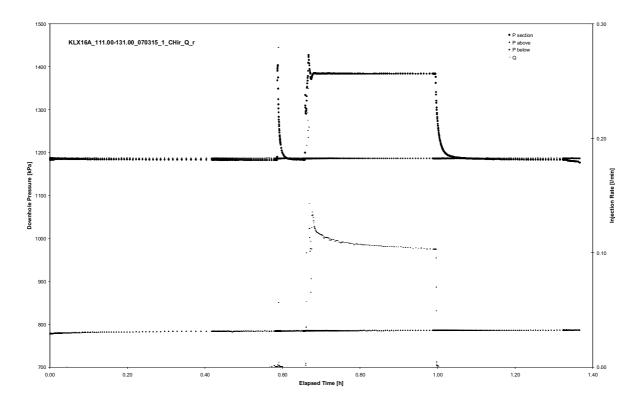


CHIR phase; log-log match

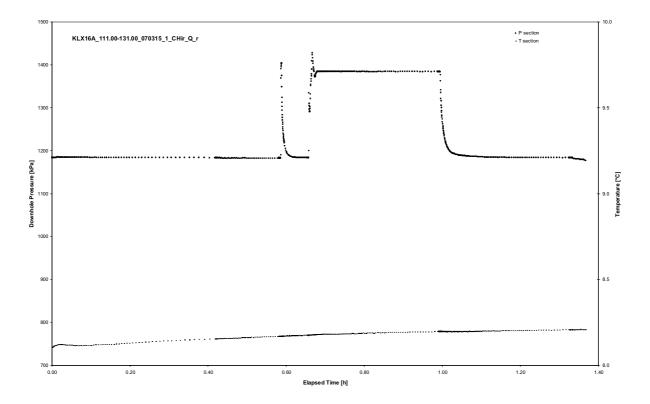


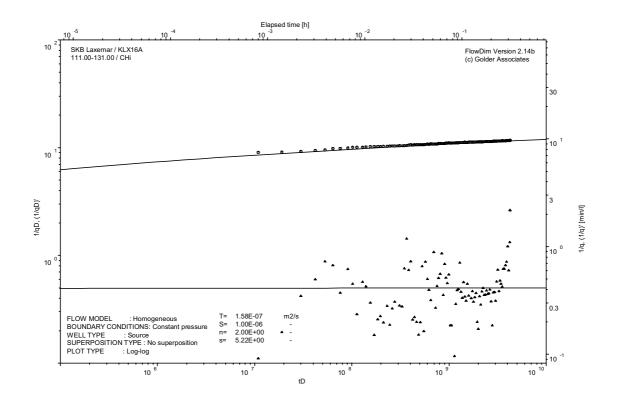
CHIR phase; HORNER match

Test 111.00 – 131.00 m

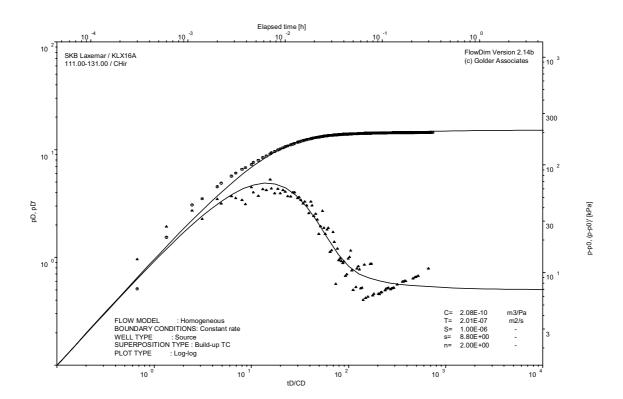


Pressure and flow rate vs. time; cartesian plot

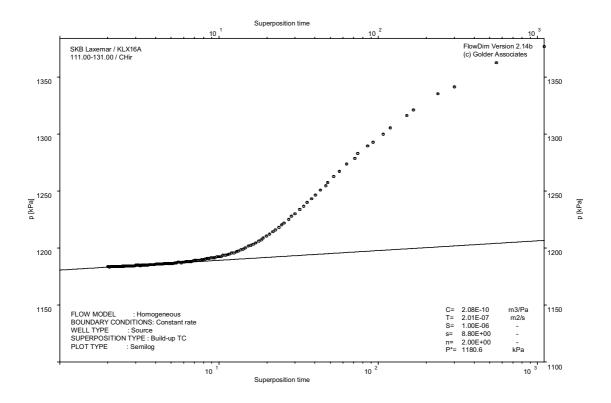




CHI phase; log-log match

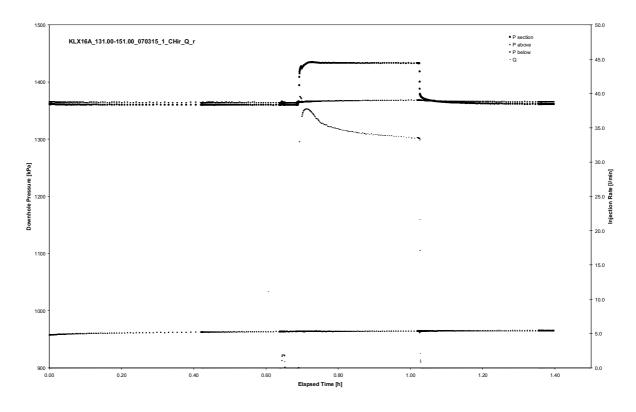


CHIR phase; log-log match

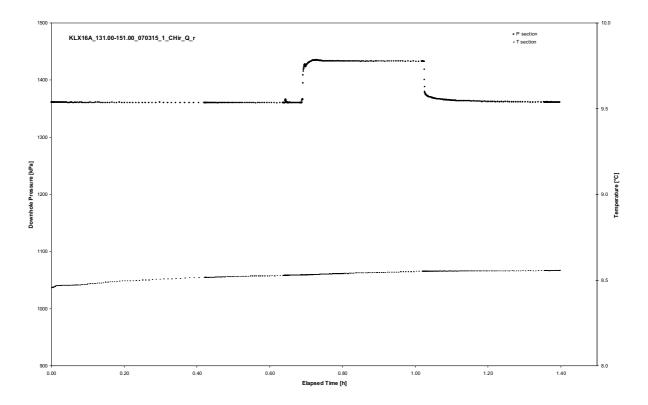


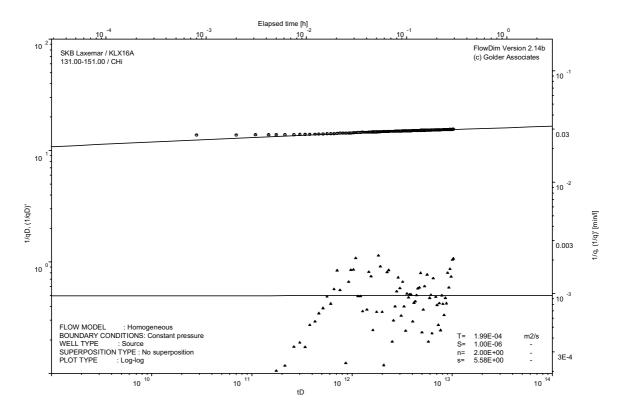
CHIR phase; HORNER match

Test 131.00 – 151.00 m

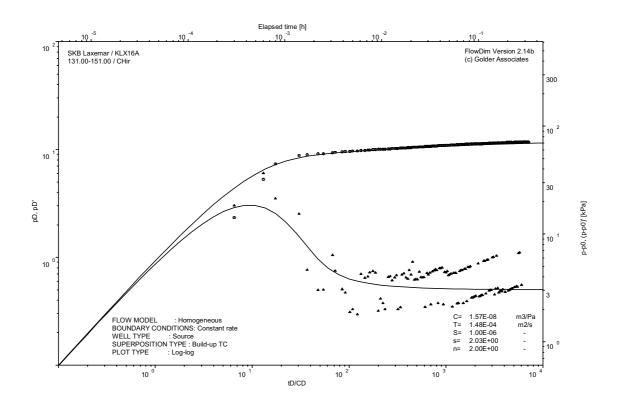


Pressure and flow rate vs. time; cartesian plot

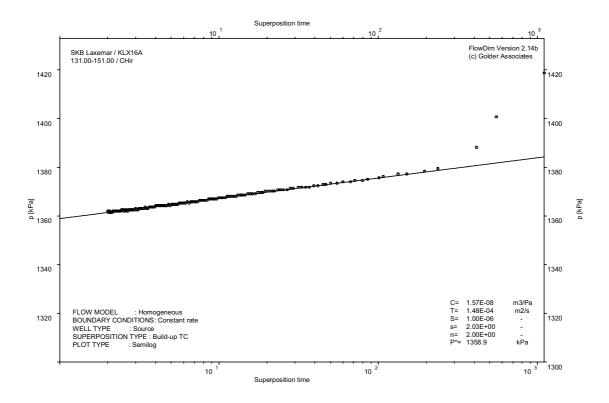




CHI phase; log-log match

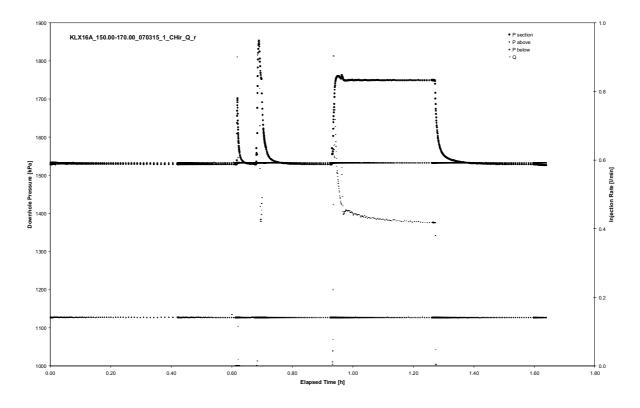


CHIR phase; log-log match

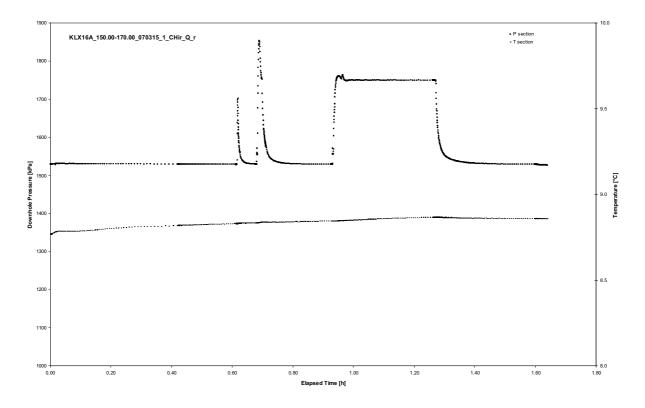


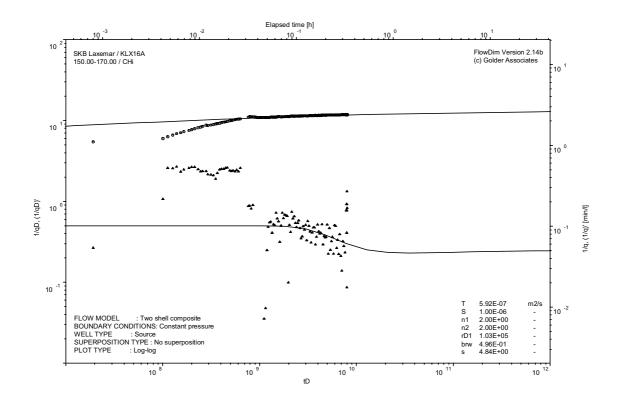
CHIR phase; HORNER match

Test 150.00 – 170.00 m

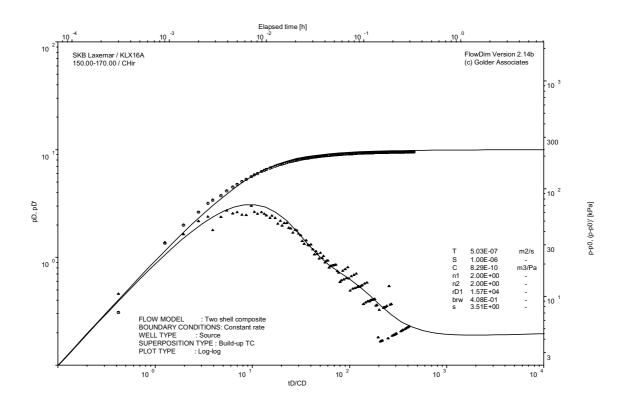


Pressure and flow rate vs. time; cartesian plot

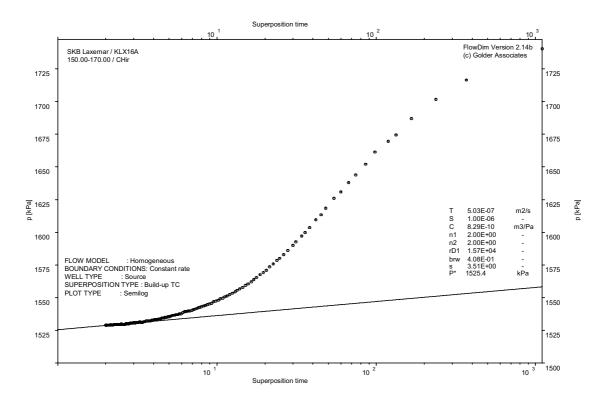




CHI phase; log-log match

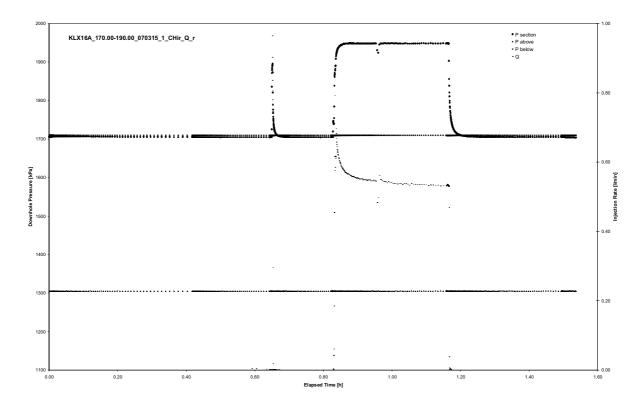


CHIR phase; log-log match

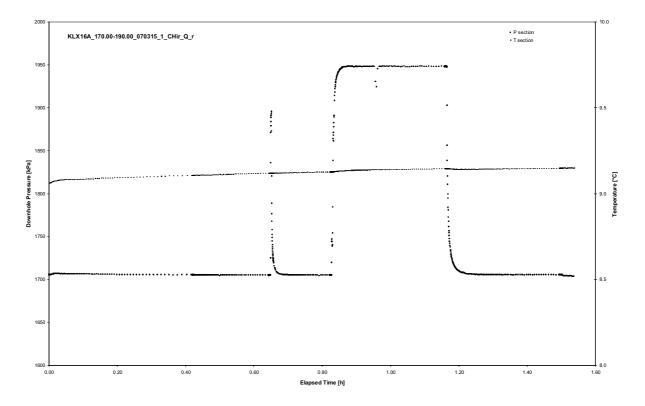


CHIR phase; HORNER match

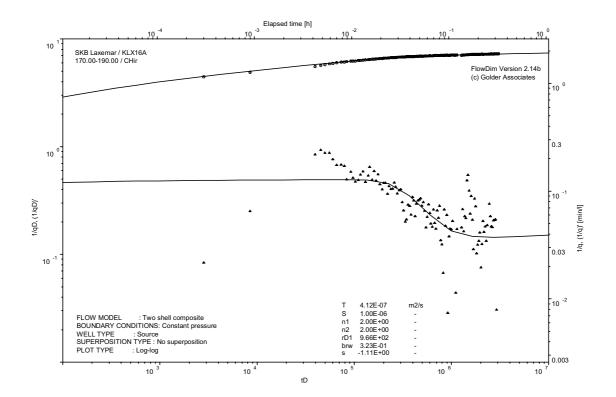
Test 170.00 – 190.00 m



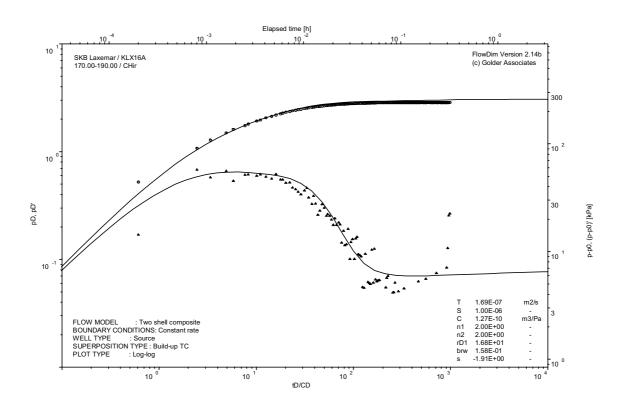
Pressure and flow rate vs. time; cartesian plot



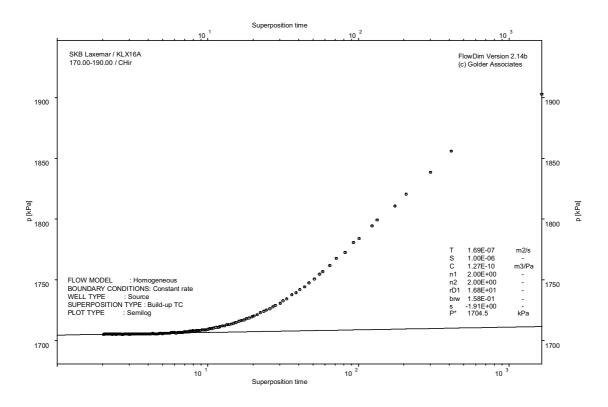
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match

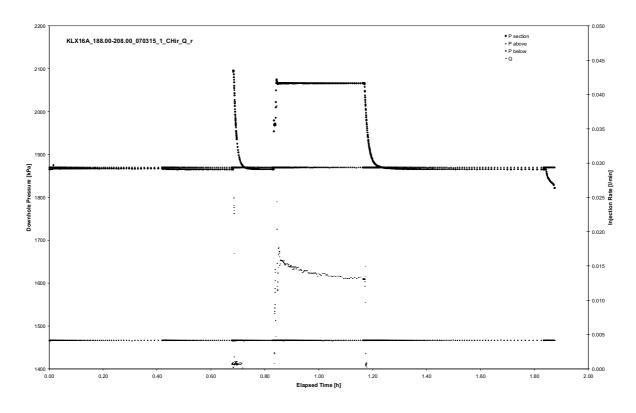


CHIR phase; log-log match

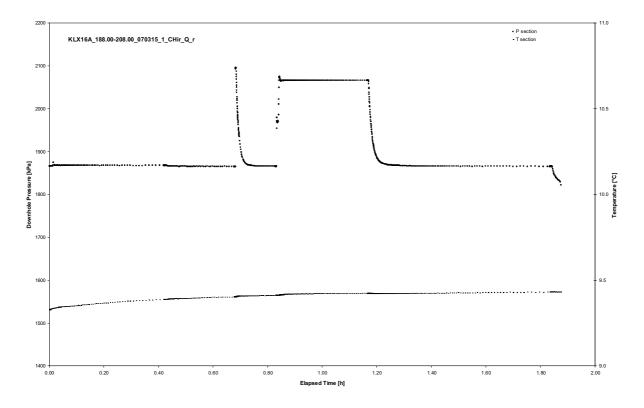


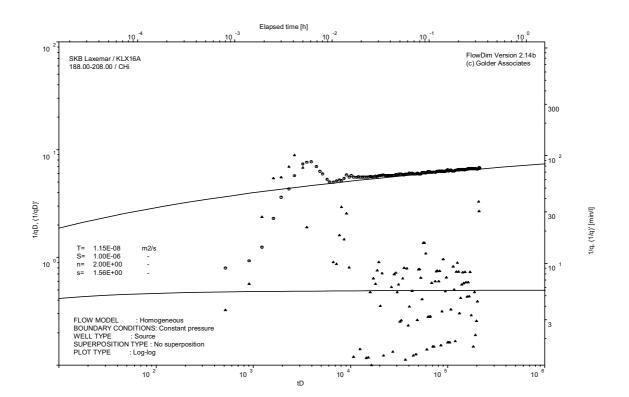
CHIR phase; HORNER match

Test 188.00 – 208.00 m



Pressure and flow rate vs. time; cartesian plot





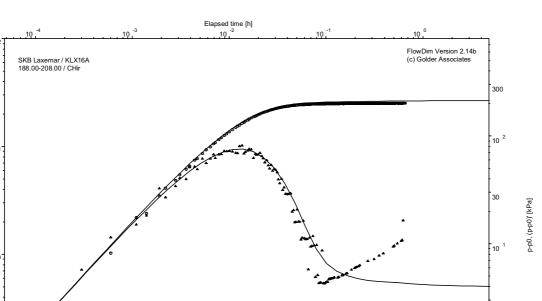
CHI phase; log-log match

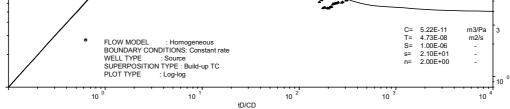
10

10

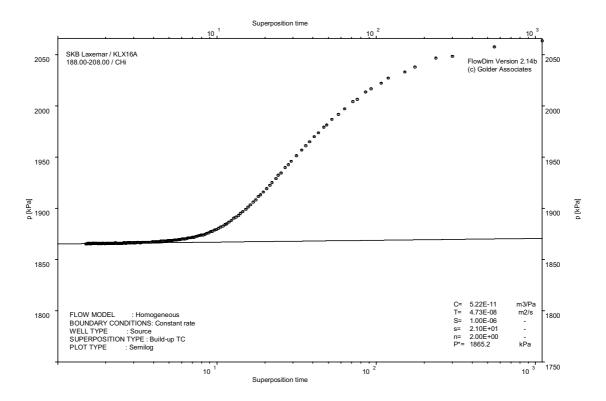
pD, pD'

10



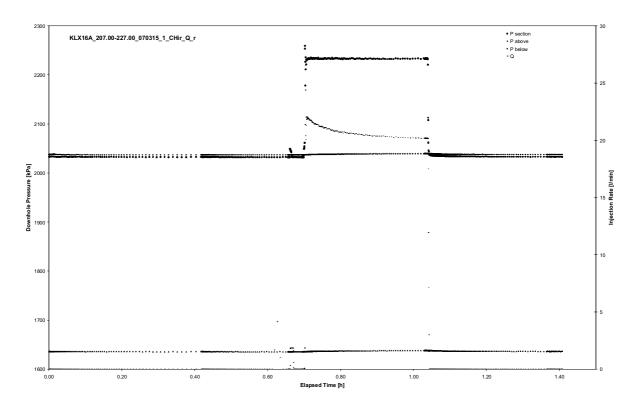


CHIR phase; log-log match

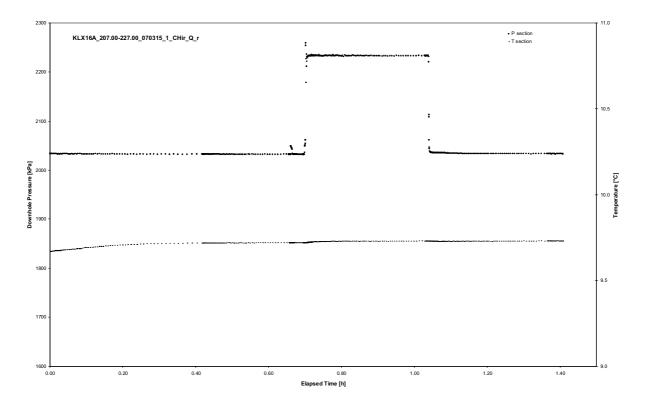


CHIR phase; HORNER match

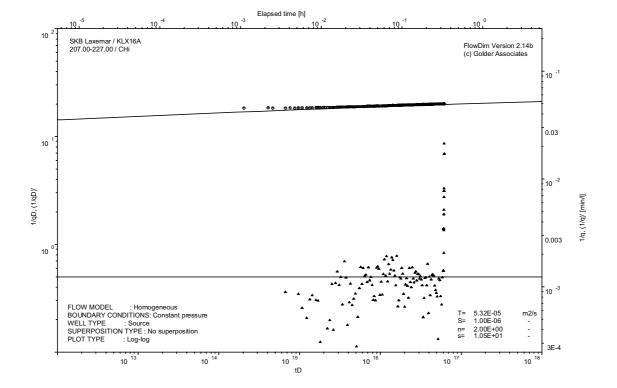
Test 207.00 – 227.00 m



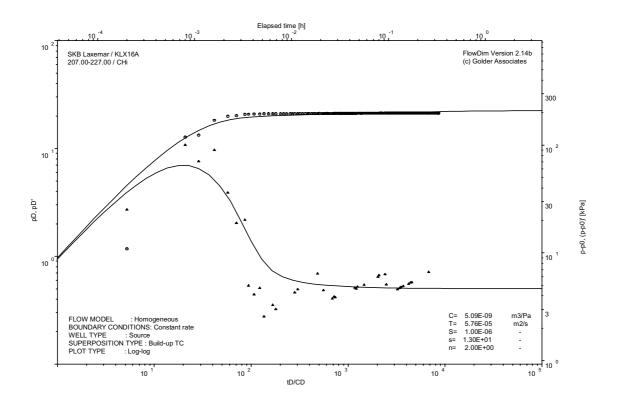
Pressure and flow rate vs. time; cartesian plot



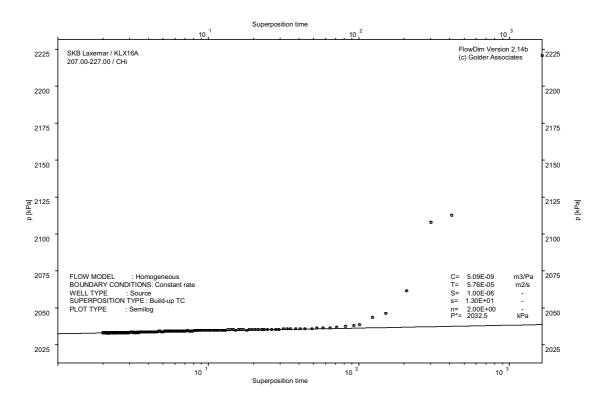




CHI phase; log-log match

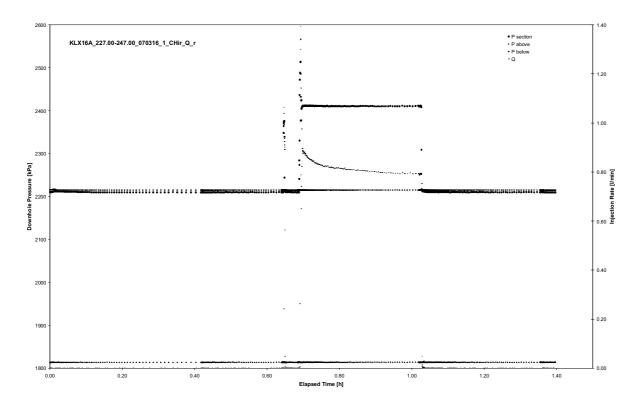


CHIR phase; log-log match

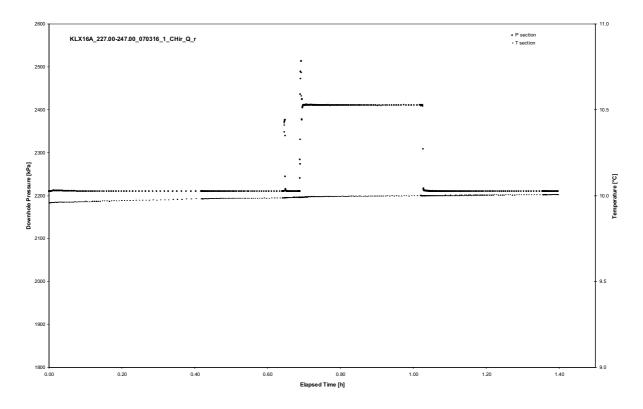


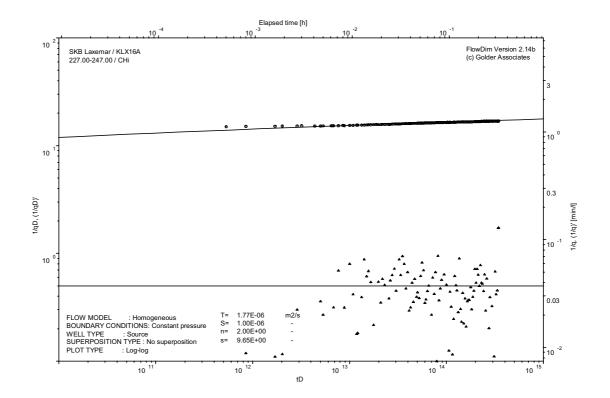
CHIR phase; HORNER match

Test 227.00 – 247.00 m

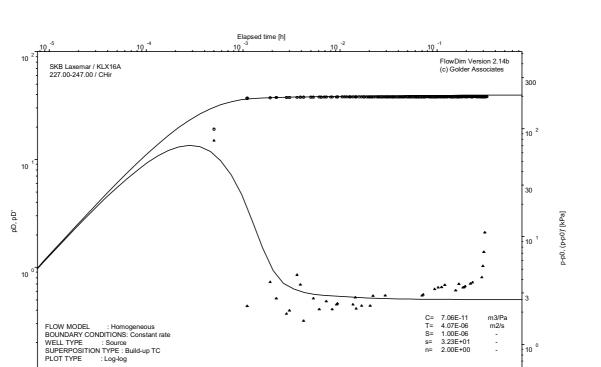


Pressure and flow rate vs. time; cartesian plot





CHI phase; log-log match

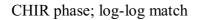


10

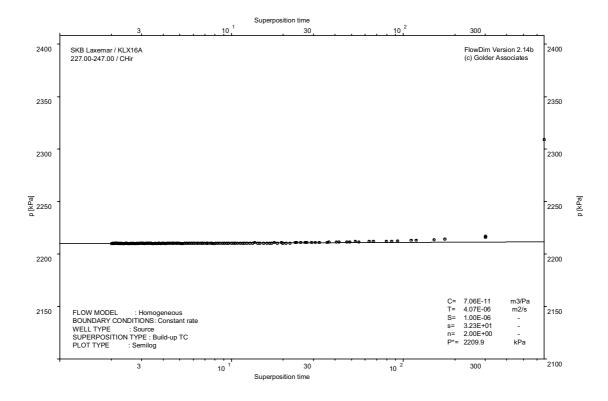
tD/CD

10 4

10



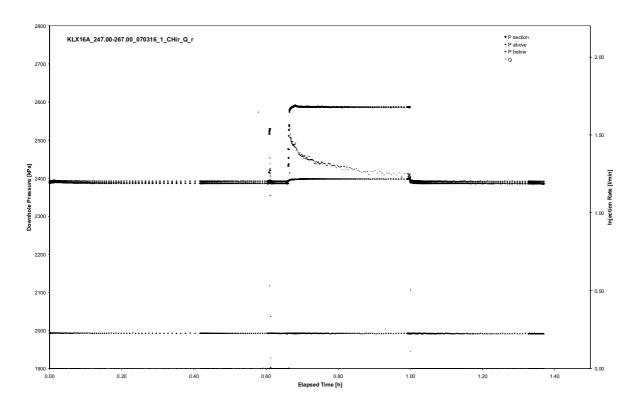
10



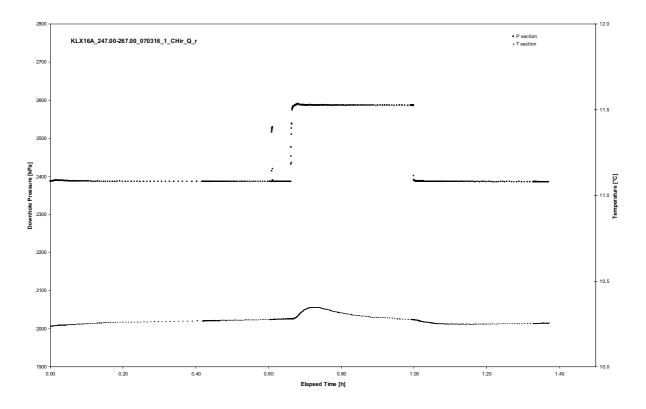
10 2

CHIR phase; HORNER match

Test 247.00 – 267.00 m

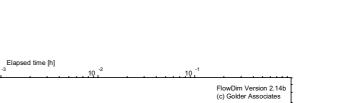


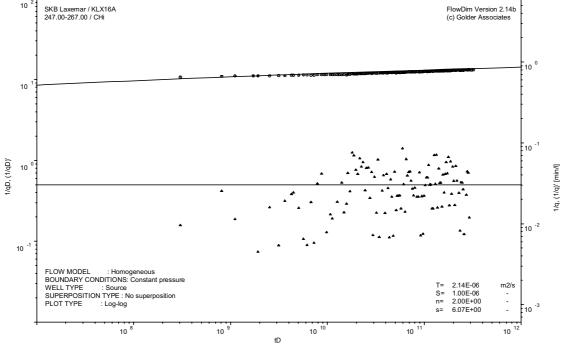
Pressure and flow rate vs. time; cartesian plot



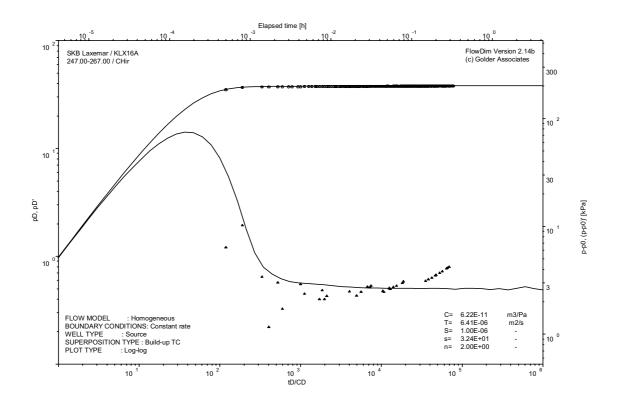
10

-4 10

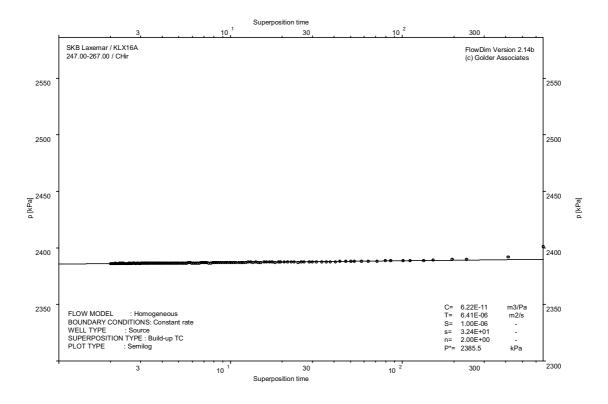




CHI phase; log-log match

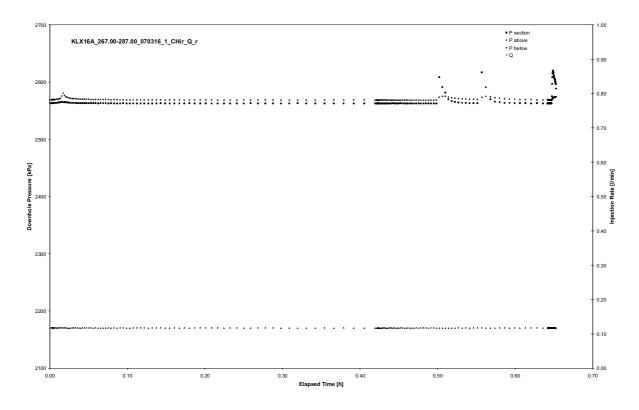


CHIR phase; log-log match

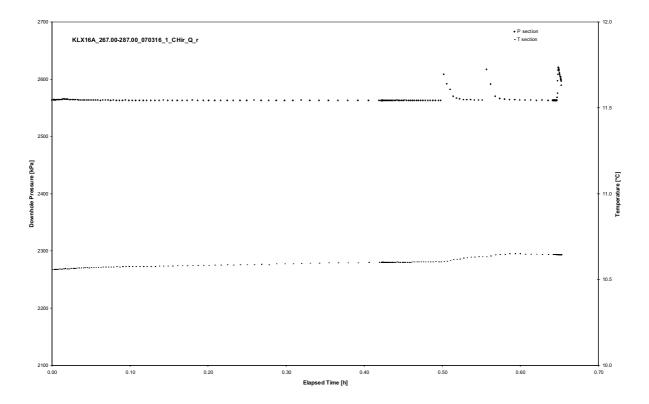


CHIR phase; HORNER match

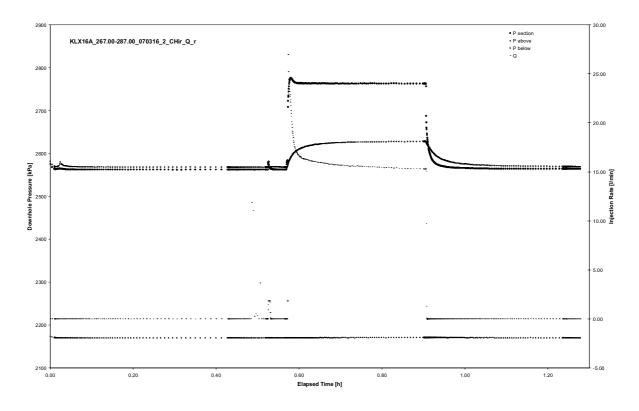
Test 267.00 – 287.00 m



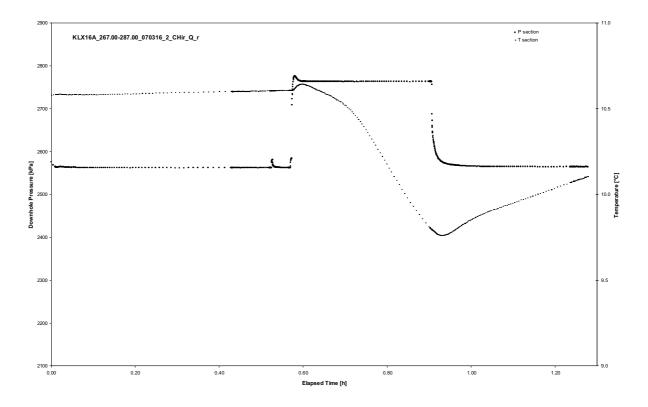
Pressure and flow rate vs. time; cartesian plot (repeated)

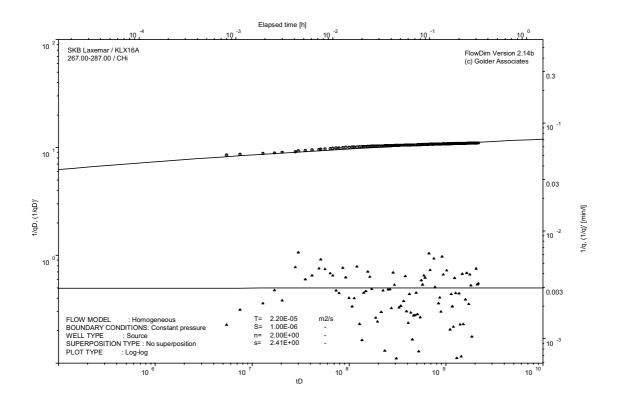


Interval pressure and temperature vs. time; cartesian plot (repeated)

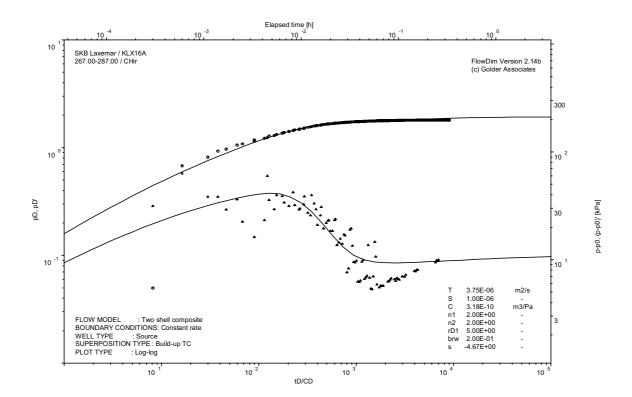


Pressure and flow rate vs. time; cartesian plot

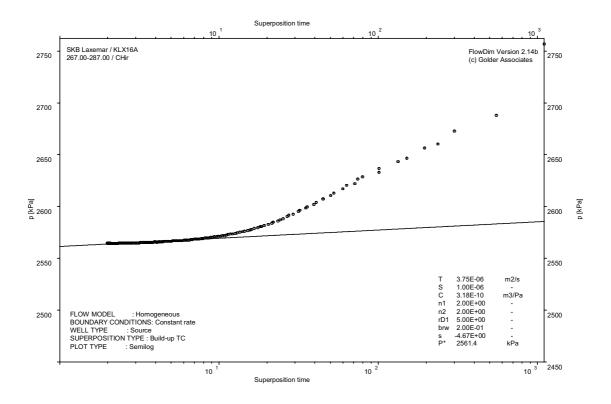




CHI phase; log-log match

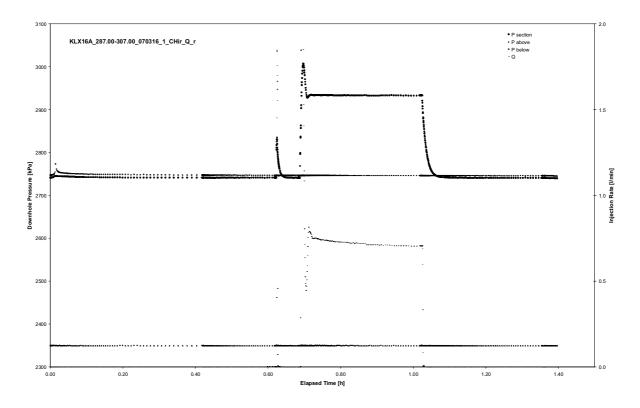


CHIR phase; log-log match

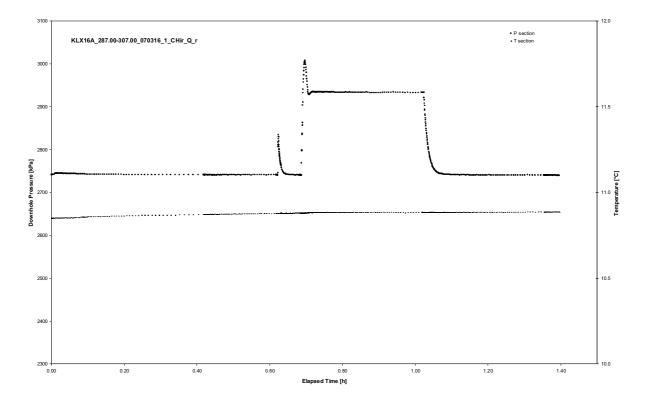


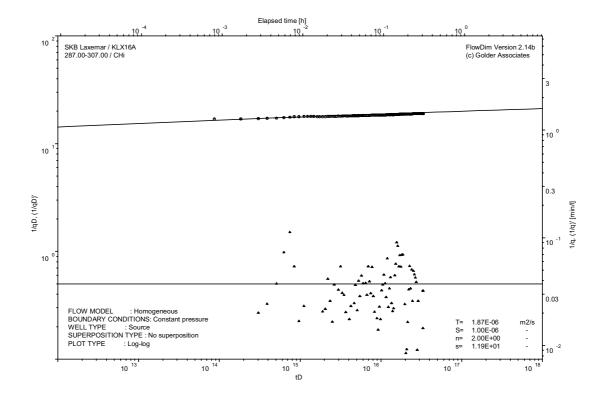
CHIR phase; HORNER match

Test 287.00 – 307.00 m

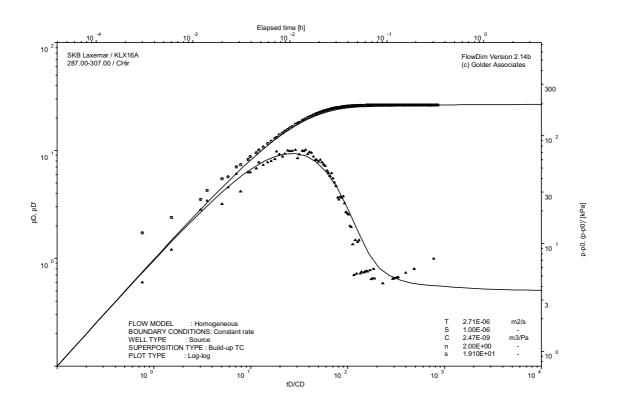


Pressure and flow rate vs. time; cartesian plot

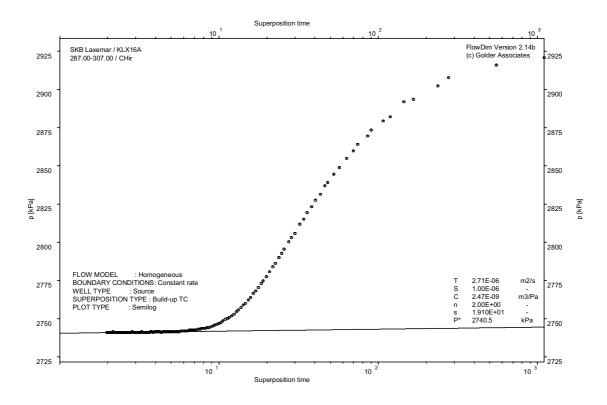




CHI phase; log-log match

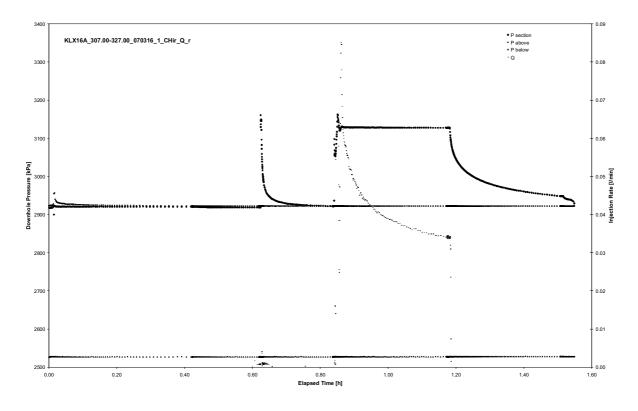


CHIR phase; log-log match

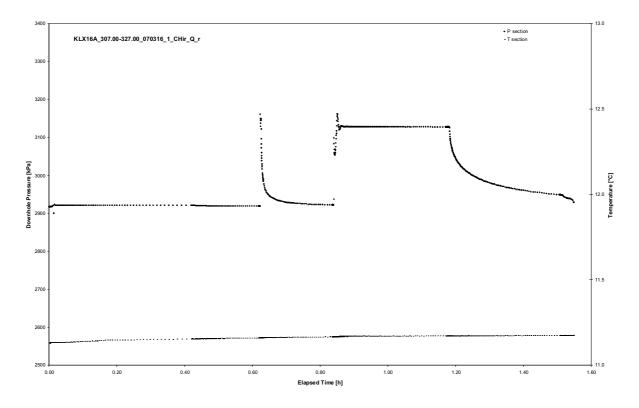


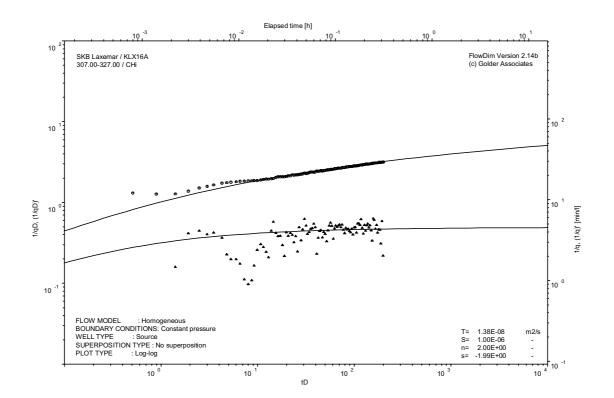
CHIR phase; HORNER match

Test 307.00 – 327.00 m

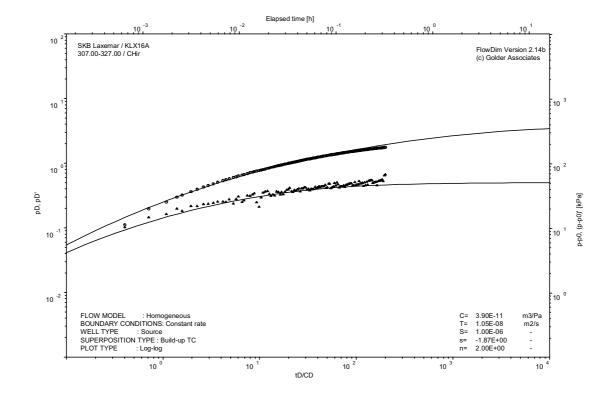


Pressure and flow rate vs. time; cartesian plot

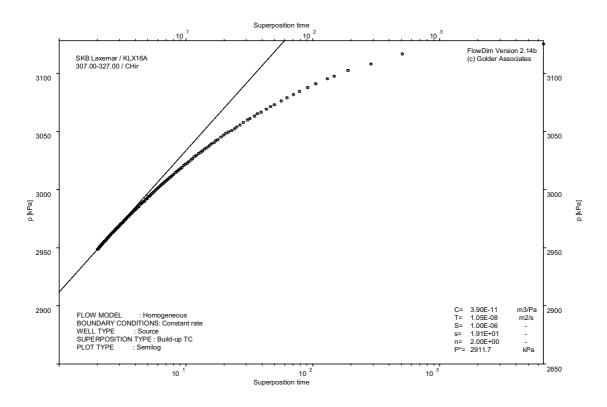




CHI phase; log-log match

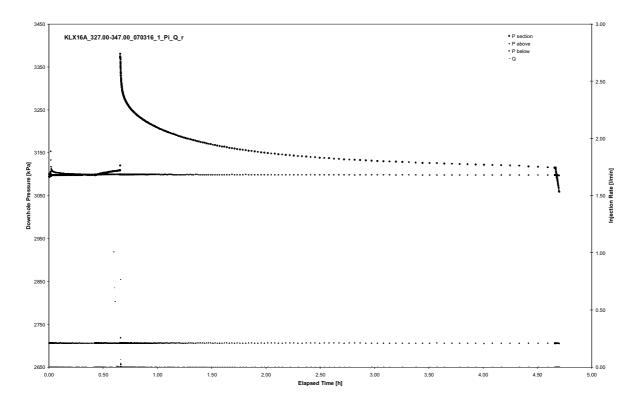


CHIR phase; log-log match

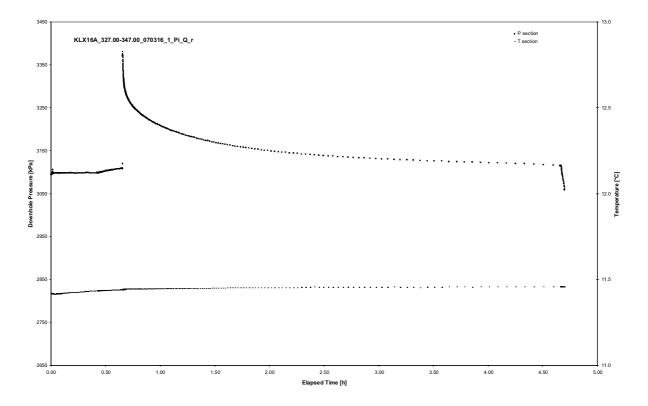


CHIR phase; HORNER match

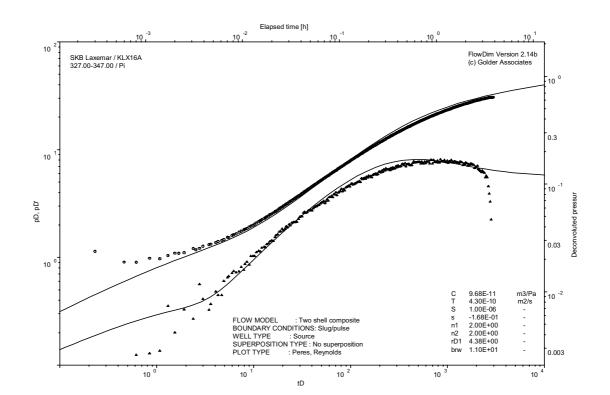
Test 327.00 – 347.00 m



Pressure and flow rate vs. time; cartesian plot

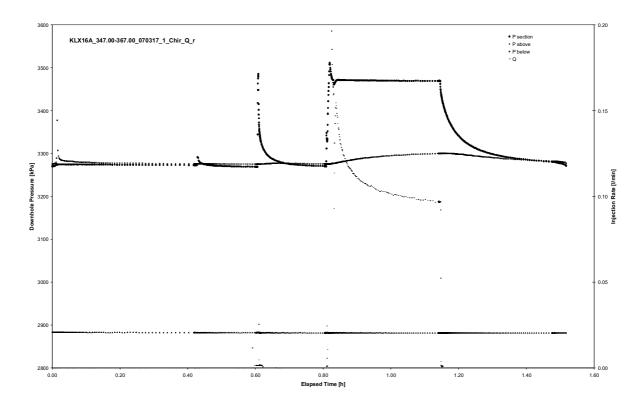


Interval pressure and temperature vs. time; cartesian plot

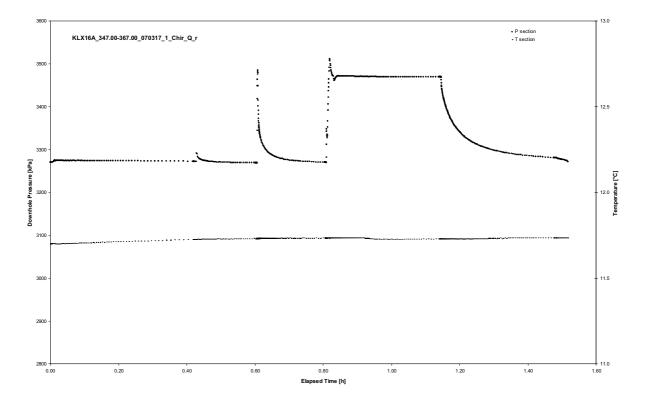


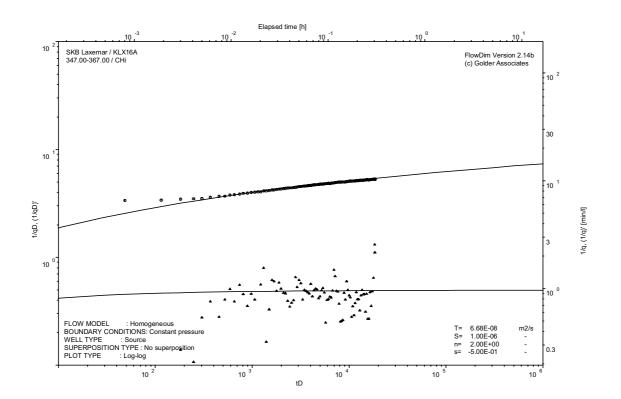
Pulse injection; deconvolution match

Test 347.00 – 367.00 m



Pressure and flow rate vs. time; cartesian plot



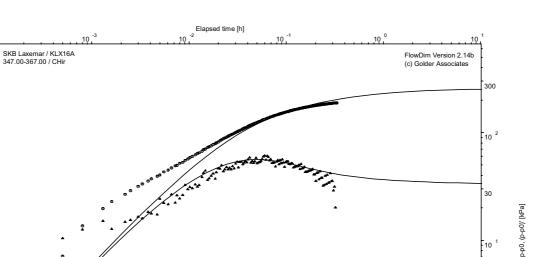


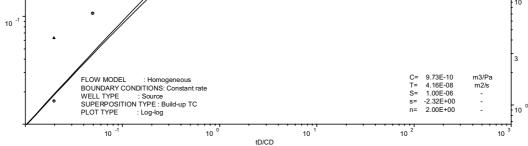
CHI phase; log-log match

10

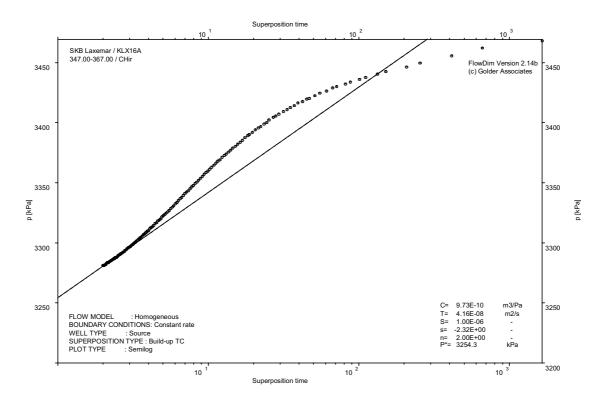
10

pD, pD'



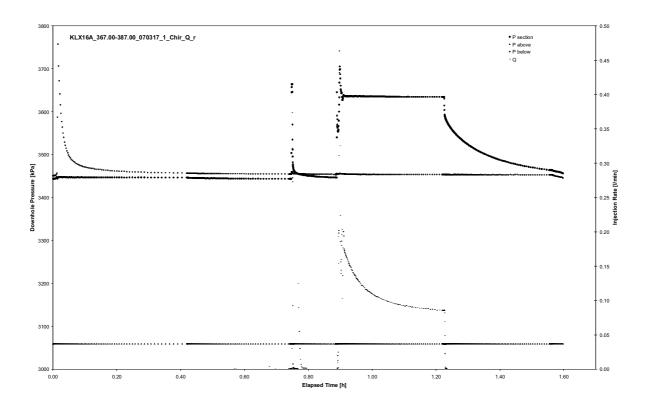


CHIR phase; log-log match

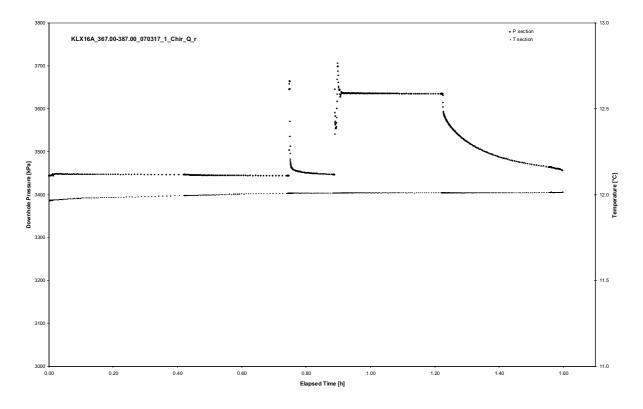


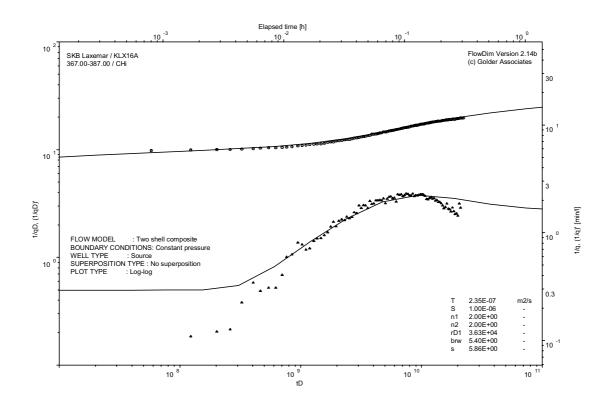
CHIR phase; HORNER match

Test 367.00 – 387.00 m

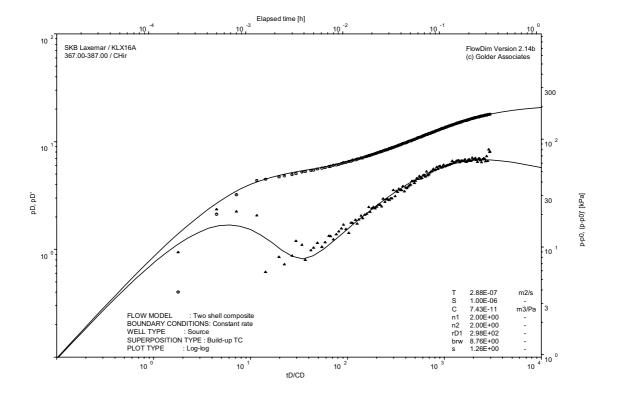


Pressure and flow rate vs. time; cartesian plot

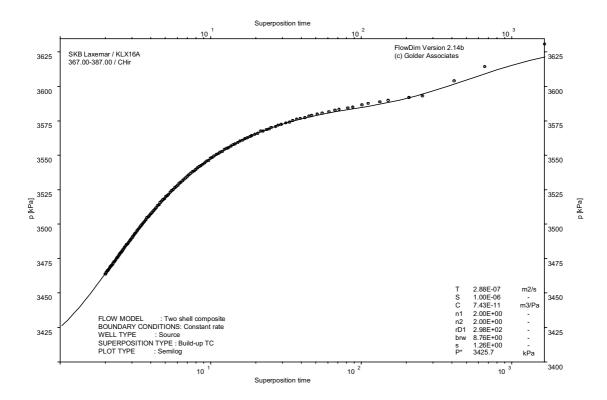




CHI phase; log-log match

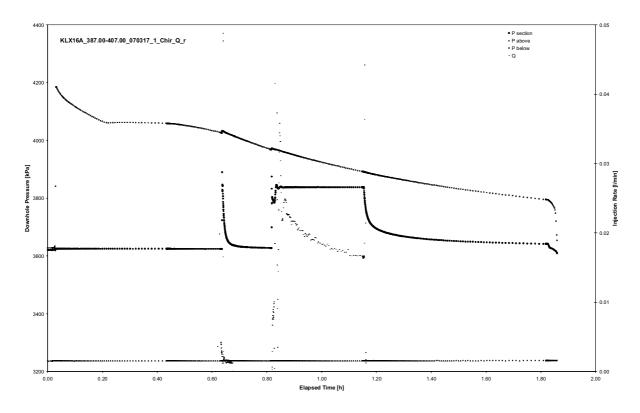


CHIR phase; log-log match

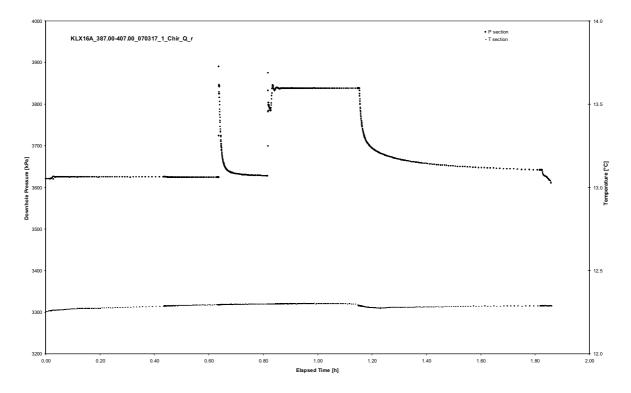


CHIR phase; HORNER match

Test 387.00 – 407.00 m



Pressure and flow rate vs. time; cartesian plot

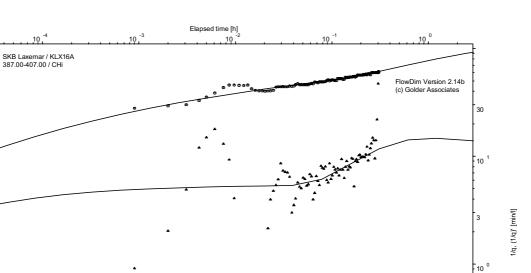


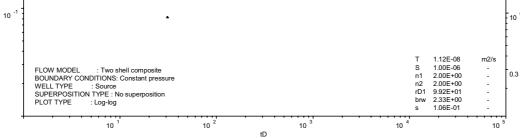
Interval pressure and temperature vs. time; cartesian plot

10

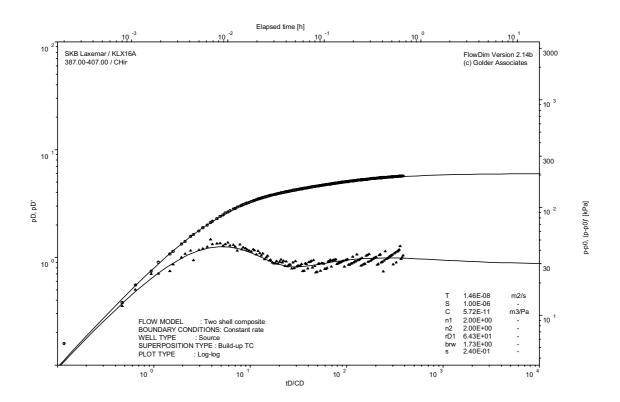
10

1/qD, (1/qD)'

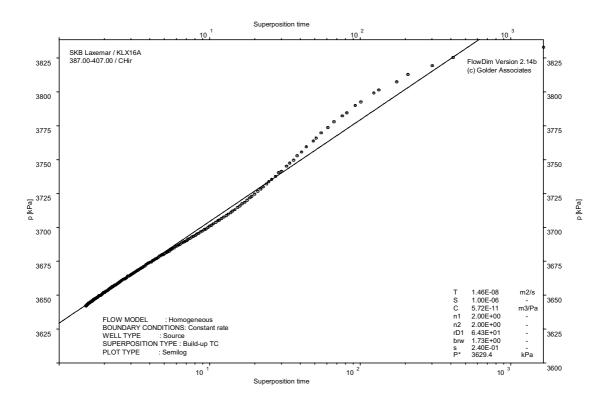




CHI phase; log-log match

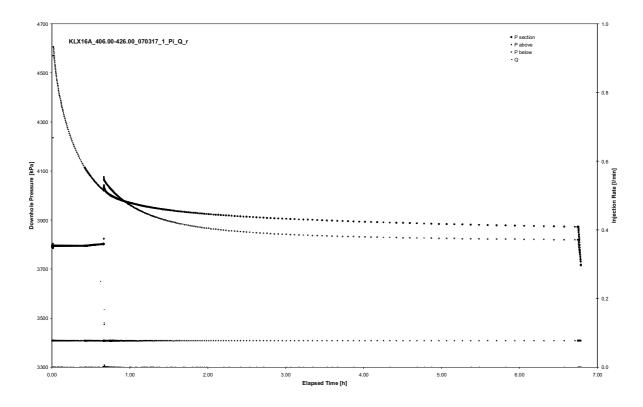


CHIR phase; log-log match

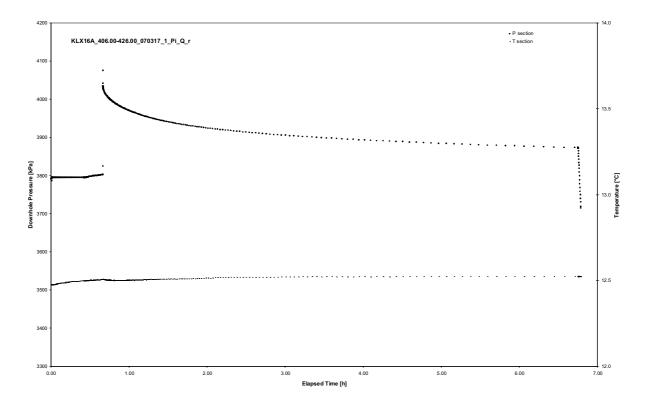


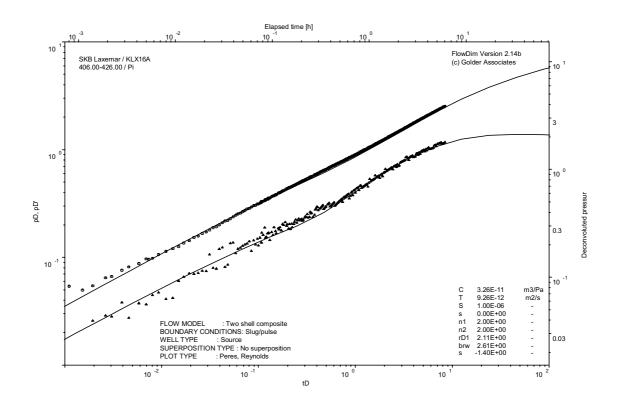
CHIR phase; HORNER match

Test 406.00 – 426.00 m



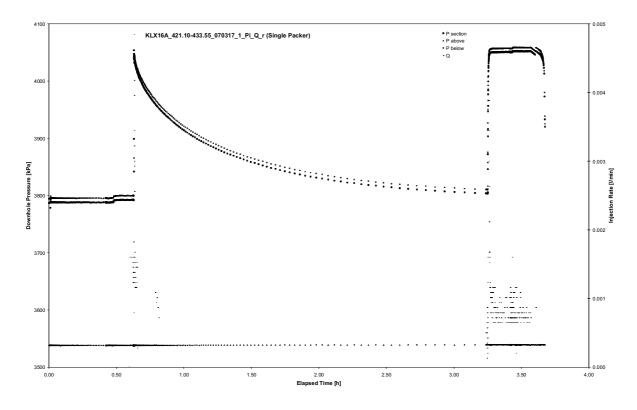
Pressure and flow rate vs. time; cartesian plot



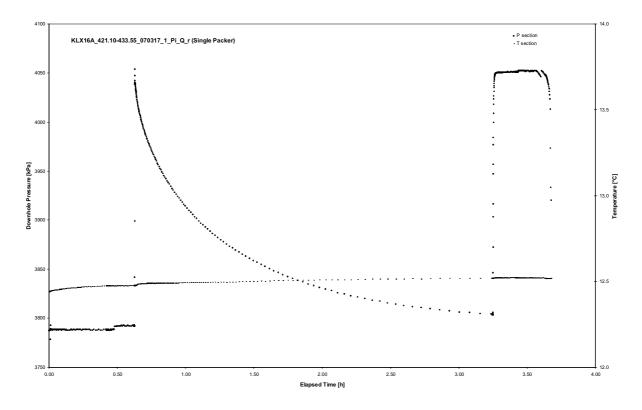


Pulse injection; deconvolution match

Test 421.10 – 433.55 m

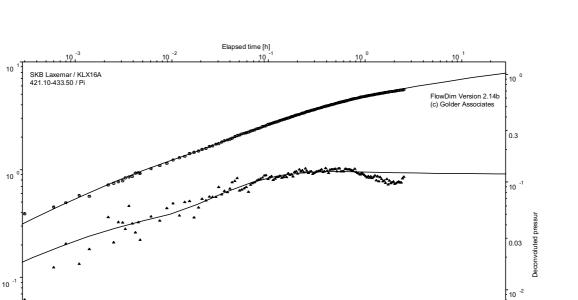


Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot

pD, pD'



10²

tD

Pulse injection; deconvolution match

10 0

10

FLOW MODEL : Two shell composite BOUNDARY CONDITIONS: Slug/pulse WELL TYPE : Source SUPERPOSITION TYPE : No superposition PLOT TYPE : Peres, Reynolds 2.96E-11 9.88E-11 1.00E-06 0.00E+00 2.00E+00 2.00E+00 4.54E+00 1.82E+00 1.78E-01

m3/Pa m2/s --------

10

0.003

C T S n1 n2 rD1 brw s

10³

Borehole: KLX16A

APPENDIX 3

Test Summary Sheets

| | Test Su | ımı | nary Sheet | | | |
|---|--|-----------------------|-------------------------------------|---|---|-------------------------------|
| Project: | Oskarshamn site investig | | | C | | |
| Area: | Laxe | ema | Test no: | | | 2 |
| Borehole ID: | KL> | (16A | Test start: | 070313 09:4 | | |
| Test section from - to (m): | | | Responsible for | Stephan R | | |
| Section diameter, 2·r _w (m): | 0.076 | | test execution: Responsible for | | Crist | Philipp Wolf ian Enachescu |
| | | | test evaluation: | | Onst | |
| Linear plot Q and p | - | | Flow period | | Recovery period | |
| | | | Indata | | Indata | |
| 1220 KLX16A_13.00-113.00_070313_1_CHF_Q_r | ■P section ■ P below ■ Q | [®] | p ₀ (kPa) = | 1023 | | |
| | •0 | - 4 | p _i (kPa) = | 1031 | | |
| | | | p _p (kPa) = | 1193 | p _F (kPa) = | 1062 |
| 1150- | | × | $Q_{p} (m^{3}/s) =$ | 3.69E-04 | | |
| | | - 20 E | tp(s) = | 1800 | t _F (s) = | 360 |
| | | K K Stor Rub/JA | S el S [*] (-)= | | S el S [*] (-)= | 1.00E-03 |
| 150- | *************************************** | - 20 | $EC_w (mS/m) =$ | | | |
| 1000 | | • = | Temp _w (gr C)= | 8.3 | | |
| | | 10 | Derivative fact.= | | Derivative fact.= | 0.08 |
| 660 | | 5 | | 0.02 | | 0.00 |
| 500 1.00 2.00 3. 0.00 1.00 Elapsed | 00 4.00 5.00 Terre [P] | 600 | | | | |
| | | | Results | | Results | 1 |
| and an internal devices of | | | Q/s (m²/s)= | 2.2E-05 | | |
| Log-Log plot incl. derivates- fl | ow period | | T _M (m ² /s)= | 2.9E-05 | | |
| | | | Flow regime: | transient | Flow regime: | transient |
| Elapsed time [h] | · · · · · · · · · · · · · · · · · · · | | dt_1 (min) = | NA | dt_1 (min) = | 0.14 |
| 10 | | | dt_2 (min) = | NA | dt_2 (min) = | 0.50 |
| | 1 | 0 -1 | T (m²/s) = | | T (m²/s) = | 7.2E-0 |
| | | | S (-) = | 1.0E-03 | ., | 1.0E-03 |
| 10 1 | 0.0000000000000000000000000000000000000 | .03 | $K_s (m/s) =$ | | K _s (m/s) = | 7.2E-07 |
| | in the second se | 0 -2 | S _s (1/m) = | 1.0E-05 | S _s (1/m) = | 1.0E-0 |
| | · | Tot form | C (m³/Pa) = | NA | C (m ³ /Pa) = | 3.4E-09 |
| 10 * | • | .003 | C _D (-) = | NA | C _D (-) = | 3.7E-04 |
| | · · · · | o ⁻³ | ξ(-) = | 6.0 | ξ(-) = | 1.6 |
| · | | | 2 | | 2 | |
| 10 ⁷ 10 ⁸ | 10 ⁹ 10 ¹⁰ 10 ¹¹ | 3E-4 | $T_{GRF}(m^2/s) =$ | NA | $T_{GRF}(m^2/s) =$ | NA |
| u . | | | S _{GRF} (-) = | NA | S _{GRF} (-) = | NA |
| | | | D _{GRF} (-) = | NA | $D_{GRF}(-) =$ | NA |
| Log-Log plot incl. derivatives- | recovery period | | Selected represe | • | | |
| Elapsed time (h) | , | | dt_1 (min) = | | C (m ³ /Pa) = | 3.4E-09 |
| 10 2 | 10 | | $dt_2 (min) =$ | | C _D (-) = | 3.7E-04 |
| | Ē | | $T_T (m^2/s) =$ | 7.2E-05 | | 1.6 |
| | 3 | 00 | S (-) = | 1.0E-03 | | |
| 10 1 | | D ² | K _s (m/s) = | 7.2E-07 | | |
| * * | | | S _s (1/m) = | 1.0E-05 | | |
| | 3 | | Comments: | | | |
| | A single production | 1 00-00 | | | f 7.2E-05 m2/s was | |
| 10 ° | المعجد مشبت | o ¹ | | | one), which shows a | |
| | - | | | | ta and derivative qu insmissivity is estim | |
| | 3 | | | | dimension during th | |
| 10 ¹ 10 ² | 10 ⁻³ 10 ⁻⁴ 10 ⁻⁵ 10 | D ° | | | static pressure measure | |
| 10 to to to | | | transducer depth, w | as derived from | the CHir phase usin | g straight line |
| | | | | | value of 1,038.2 kI | |

| | Test Sur | nmary Sheet | | | |
|--|---|--|--|--|--|
| Project: | Oskarshamn site investigati | on <u>Test type:[1]</u> | | | CHir |
| Area: | Laxem | nar Test no: | | | 1 |
| Borehole ID: | KLX1 | 6A Test start: | | | 070313 14:12 |
| Test section from - to (m): | 112.00-212.00 | m Responsible for | | | Stephan Rohs |
| Section diameter, 2·r _w (m): | 0.0 | test execution: 76 Responsible for | | Crist | Philipp Wolf tian Enachescu |
| | | test evaluation: | | | |
| Linear plot Q and p | | Flow period | | Recovery period | l |
| | | Indata | 1001 | Indata | |
| 2000 KLX16A_112.00-212.00_070313_1_CHir_Q_r | • P action • P action • P below • P below • Q | p ₀ (kPa) = p _i (kPa) = | 1901 | | |
| | • P balow • Q • 40 | $p_i(kPa) = p_p(kPa) =$ | 1900 | p _F (kPa) = | 1902 |
| | | | 5.63E-04 | | 1902 |
| | - 33 | $\frac{Q_p (m^3/s)}{tp (s)} =$ | | t _F (s) = | 1800 |
| 2500 · | . 25 | S el S [*] (-)= | | r⊧ (3) = S el S [*] (-)= | 1.00E-06 |
| construction of Provide Anti- | - 20 | <u>د الم الم الم الم الم الم الم الم الم الم</u> | 1.001 00 | 5 8 5 (-)- | 1.001 00 |
| | - 15 | Temp _w (gr C)= | 9.6 | | |
| | - 10 | Derivative fact.= | | Derivative fact.= | 0.04 |
| 500 · | - 51 | | 0.0- | | 0.0 |
| <u>.</u> | 100 120 1.40 1.60 1.00 | | | | |
| 0.00 0.20 0.40 0.60 0.60 Elapand T | 100 520 540 560 580 mme[h] | Results | | Results | |
| | | Q/s (m²/s)= | 1.0E-04 | | |
| Log-Log plot incl. derivates- flo | ow period | $T_{M} (m^{2}/s) =$ | 1.3E-04 | | |
| | | Flow regime: | transient | Flow regime: | transient |
| 10. ⁻³ Elapsed time [h] | 10. ⁻¹ 10. ⁰ 10. ¹ | dt ₁ (min) = | | dt_1 (min) = | 1.06 |
| 10 2 | | dt_2 (min) = | | dt ₂ (min) = | 11.10 |
| | 10 -1 | $T(m^{2}/s) =$ | | T (m²/s) = | 1.6E-04 |
| | 0.03 | S (-) = | 1.0E-06 | | 1.0E-06 |
| 10 1 | | $K_s (m/s) =$ | | K _s (m/s) = | 1.6E-06 |
| : : | 10 -2 | $S_{s}(1/m) =$ | | S _s (1/m) = | 1.0E-08 |
| | 0.003 | ^{ww} C (m ³ /Pa) = | NA | C (m ³ /Pa) = | 1.8E-08 |
| 10 * | · · · · · | [∉] C _D (-) = | | C _D (-) = | 2.0E+00 |
| | 10 ³ | ξ(-) = | 3.5 | ξ(-) = | -0.3 |
| | 3E-4 | T _{GRF} (m ² /s) = | NA | $T_{GRF}(m^2/s) =$ | NA |
| 10 ⁹ 10 ¹⁰ 10 | 10 ⁻¹¹ 10 ⁻¹² 10 ⁻¹³ | $S_{GRF}(-) =$ | NA | $S_{GRF}(-) =$ | NA |
| | | D _{GRF} (-) = | NA | D _{GRF} (-) = | NA |
| Log-Log plot incl. derivatives- | recovery period | Selected repres | entative paran | neters. | |
| | | dt ₁ (min) = | 1.06 | C (m³/Pa) = | 1.8E-08 |
| Elapsed time (h) | · · · · · · · · · · · · · · · · · · · | dt_2 (min) = | | C _D (-) = | 2.0E+00 |
| | 300 | $T_{T} (m^{2}/s) =$ | 1.6E-04 | ξ(-) = | -0.3 |
| | | S (-) = | 1.0E-06 | | |
| | 10 2 | $R_{s}(11/3) =$ | 1.6E-06 | | |
| 10 <u>99 80 80 80 80 80 80 80 80 80 80 80 80 80 </u> | 30 | S _s (1/m) = | 1.0E-08 | | |
| | · · · · · · · · · · · · · · · · · · · | analysis of the CH stabilization than t transmissivity is es flow dimension dis | ir phase, which s he CHi phase. Th stimated to be 9.0 splayed during th | f 1.6E-04 m2/s was hows a better horizone confidence range DE-05 m2/s to 4.0E-0 e test was 2. The state derived from the CH | ontal for the interval 04 m2/s. The atic pressure |
| 10 ⁻¹ 10 ⁻² INCD | 10 ⁻³ 10 ⁻⁴ 10 ⁻⁵ | | | derived from the CH ner plot to a value of | |

| | | nary Sheet | | | |
|--|---|--|---|--|---|
| Project: | Oskarshamn site investigation | Test type:[1] | | | CHi |
| Area: | Laxemar | Test no: | | | 1 |
| Borehole ID: | KLX16A | Test start: | | | 070313 17:54 |
| Fest section from - to (m): | 212.00-312.00 m | | Stephan R Philipp V | | |
| Section diameter, 2·r _w (m): | 0.076 | test execution: Responsible for | | Cristian Enaches | |
| | | test evaluation: | | | |
| ₋inear plot Q and p | - | Flow period | | Recovery period | |
| | | Indata | | Indata | |
| 3 000 | × | p ₀ (kPa) = | 2788 | | |
| KL X16A_212.00-312.00_070313_1_CHIr_Q_r | P action P above P bloov Q | p _i (kPa) = | 2789 | | |
| ····· | Ľ | p _p (kPa) = | 2984 | p _F (kPa) = | 278 |
| 200 | - 2 | Q _p (m ³ /s)= | 2.85E-04 | | |
| 100 | | tp (s) = | 1800 | t _F (s) = | 180 |
| | 2 20 Linux () area () | S el S [*] (-)= | 1.00E-06 | S el S [*] (-)= | 1.00E-0 |
| | | EC _w (mS/m)= | | | |
| 500 * | | Temp _w (gr C)= | 11.0 | | |
| 900 - | | Derivative fact.= | 0.05 | Derivative fact.= | 0.0 |
| 1787 | * 5 | | | | |
| 000 020 0.40 0.00 0.00 11 000 020 0.40 0.00 Elapsed | 80 1.20 1.40 1.60 1.80 2.60 Times[0] | Results | | Results | |
| | | Q/s (m²/s)= | 1.4E-05 | | |
| og-Log plot incl. derivates- fl | ow period | $T_{M} (m^{2}/s) =$ | 1.9E-05 | | |
| | | Flow regime: | transient | Flow regime: | transient |
| Elaosed time (h) | | dt_1 (min) = | 15.36 | dt_1 (min) = | 5.1 |
| 10 ¹ | 10, ⁻¹ | dt_2 (min) = | | dt_2 (min) = | 17.8 |
| · · · · · · · · · · · · · · · · · · · | 0.03 | $T(m^2/s) =$ | | $T(m^2/s) =$ | 5.0E-0 |
| | 0.03 | S (-) = | 1.0E-06 | | 1.0E-0 |
| 10 . | 10 -2 | K _s (m/s) = | | K _s (m/s) = | 5.0E-0 |
| | | $S_{s}(1/m) =$ | | $S_{s}(1/m) =$ | 1.0E-0 |
| | 0.003 | | NA | | 6.7E-0 |
| | | C (m ³ /Pa) = | NA | C (m ³ /Pa) = | 7.4E-0 |
| 10 1 | Ĩ. | C _D (-) = | | C _D (-) = | |
| | ▲ 3E-4 | ξ(-) = | -1.1 | ξ(-) = | -3. |
| 10 4 10 9 | | T _{GRF} (m²/s) = | NA | T _{GRF} (m ² /s) = | NA |
| Ci Ci | 10 10 10 | S _{GRF} (-) = | NA | $S_{GRF}(-) =$ | NA |
| | | D _{GRF} (-) = | NA | D _{GRF} (-) = | NA |
| og-Log plot incl. derivatives- | recovery period | Selected represe | intative paran | neters. | |
| | | | Г г 40 | C (m ³ /Pa) = | 6.7E-0 |
| | | dt ₁ (min) = | 5.12 | $C(\Pi/Pa) =$ | |
| Elapsed Ime [4] | | | | | 7.4E-0 |
| 10 ¹ | | dt_2 (min) = | 17.88 | C _D (-) = | |
| 10 1 Elapset Ime (1 | | $dt_2 (min) = T_T (m^2/s) =$ | 17.88 5.0E-05 | $C_{D}(-) = \xi(-) =$ | |
| 10 ¹ | | $dt_2 (min) = T_T (m^2/s) = S (-) =$ | 17.88 5.0E-05 1.0E-06 | $C_{D}(-) = \xi(-) =$ | |
| 10 10 | | $\begin{array}{llllllllllllllllllllllllllllllllllll$ | 17.88 5.0E-05 1.0E-06 5.0E-07 | $C_{D}(-) = \xi(-) =$ | |
| 10 | | $\begin{array}{llllllllllllllllllllllllllllllllllll$ | 17.88 5.0E-05 1.0E-06 | $C_{D}(-) = \xi(-) =$ | |
| 10 10 10 10 10 10 10 10 10 10 10 10 10 1 | 10 ⁷ 30 | $\begin{array}{llllllllllllllllllllllllllllllllllll$ | 17.88 5.0E-05 1.0E-06 5.0E-07 1.0E-08 | $C_{D}(-) = \xi(-) =$ | 7.4E-0 -3. |
| 10 10 10 10 10 10 10 10 10 10 10 10 10 1 | | $\begin{array}{llllllllllllllllllllllllllllllllllll$ | 17.88 5.0E-05 1.0E-06 5.0E-07 1.0E-08 ransmissivity o | $C_D(-) = \xi(-) $ | -3. |
| 10 ⁻¹ 10 ⁻¹ 10 ⁻¹ 10 ⁻¹ 10 ⁻¹ | 10 ⁷ 30 | $\begin{array}{llllllllllllllllllllllllllllllllllll$ | 17.88 5.0E-05 1.0E-06 5.0E-07 1.0E-08 ransmissivity o | $C_{D}(-) = \xi(-) = \xi(-$ | -3. derived from th good horizonta |
| 10 - 50 ⁻³ Elepted time [n] | 10 ⁷ 30 | $\begin{array}{llllllllllllllllllllllllllllllllllll$ | 17.88 5.0E-05 1.0E-06 5.0E-07 1.0E-08 ransmissivity o phase (outer zo onfidence range | $C_D(-) =$ $\xi(-) =$ f 5.0E-05 m2/s was one), which shows a for the interval trans | -3. derived from th good horizonta smissivity is |
| 10 | 10 ⁷ 30 | $dt_{2} (min) =$ $T_{T} (m^{2}/s) =$ $S (-) =$ $K_{s} (m/s) =$ $S_{s} (1/m) =$ Comments: The recommended t analysis of the CHir stabilization. The co estimated to be 2.0E displayed during the | 17.88 5.0E-05 1.0E-06 5.0E-07 1.0E-08 ransmissivity o phase (outer ze onfidence range E-05 m2/s to 8.0 e test is 2. The s | $C_D(-) =$ $\xi(-) =$ $\xi(-) =$ f 5.0E-05 m2/s was of f 5.0E-05 m2/s was a for the interval trans E-05 m2/s. The flow tatic pressure measu | -3. derived from th good horizonta smissivity is v dimension red at |
| 10 | 10 ² 10 ² 10 ³ 10 ³ 10 ³ | $\begin{array}{llllllllllllllllllllllllllllllllllll$ | 17.88 5.0E-05 1.0E-06 5.0E-07 1.0E-08 ransmissivity o phase (outer ze onfidence range E-05 m2/s to 8.0 e test is 2. The s as derived from | $C_D(-) =$ $\xi(-) =$ $\xi(-) =$ f 5.0E-05 m2/s was one), which shows a for the interval trans E-05 m2/s. The flow | -3. derived from th good horizonta smissivity is v dimension red at g straight line |

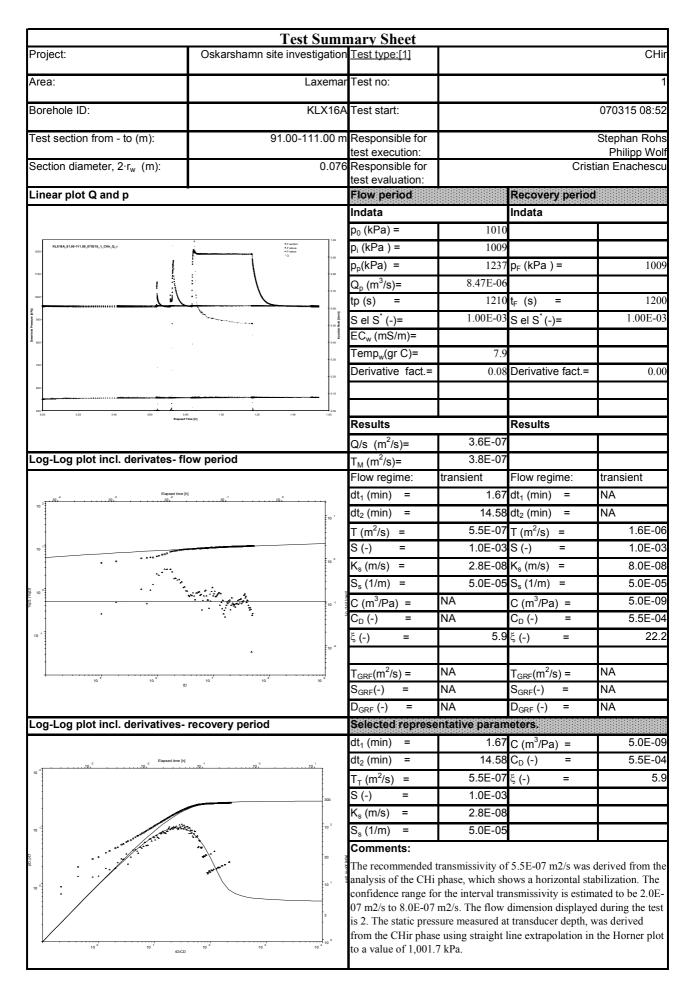
| | Test Sum | nary Sheet | | | |
|--|---|----------------------------------|-----------------|--|------------------|
| Project: | Oskarshamn site investigation | | | | CHir |
| Area: | Laxemar | Test no: | | | 1 |
| Borehole ID: | KLX16A | Test start: | | | 070313 21:41 |
| Test section from - to (m): | 312.00-412.00 m | Responsible for | Steph | | Stephan Rohs |
| | | test execution: | | | Philipp Wolf |
| Section diameter, 2·r _w (m): | 0.076 | Responsible for test evaluation: | | Crist | ian Enachescu |
| Linear plot Q and p | | Flow period | | Recovery period | |
| | | Indata | | Indata | |
| 400 | | p ₀ (kPa) = | 3671 | | 1 |
| KLX16A_312.00-412.00_070313_1_CHr=Q_r | Pacton / Paboe Potow O | p _i (kPa) = | 3668 | | |
| 380 | <u> </u> | $p_p(kPa) =$ | | p _F (kPa) = | 3693 |
| 370 | | $Q_p (m^3/s) =$ | 2.95E-06 | | |
| 3800 | | $\frac{d_p(m/s)}{tp(s)} =$ | | t _F (s) = | 1800 |
| 540 Cardon Cardo | | S el S [*] (-)= | | ⊈ (3) = S el S [*] (-)= | 1.00E-06 |
| | hoden | EC _w (mS/m)= | 1.001 00 | 5 el 5 (-)- | 1.002.00 |
| 380- | | Temp _w (gr C)= | 12.3 | | <u> </u> |
| 2800 | - | Derivative fact.= | | Derivative fact.= | 0.05 |
| | | Derivative Tact | 0.03 | Denvalive laci | 0.05 |
| 2000 100 100 Eligned Ti | 1.50 2.00 | | | | |
| | | Results | | Results | |
| | | Q/s (m ² /s)= | 1.5E-07 | | |
| Log-Log plot incl. derivates- flo | ow period | T _M (m²/s)= | 1.9E-07 | | |
| | | Flow regime: | transient | Flow regime: | transient |
| . 10 . ⁴ Elapsed time [h] | | dt ₁ (min) = | #NV | dt ₁ (min) = | #NV |
| 10 2 | | dt ₂ (min) = | #NV | dt ₂ (min) = | #NV |
| | 30 | T (m²/s) = | 6.9E-08 | $T(m^{2}/s) =$ | 6.4E-08 |
| | | S (-) = | 1.0E-06 | S (-) = | 1.0E-06 |
| 10 1 | 10 1 | $K_s (m/s) =$ | 6.9E-10 | $K_s (m/s) =$ | 6.4E-10 |
| | | $S_{s}(1/m) =$ | | $S_{s}(1/m) =$ | 1.0E-08 |
| • • • • • • • • • • • • • • • • • • • | 3 | C (m ³ /Pa) = | NA | C (m ³ /Pa) = | 4.7E-10 |
| · · · | 10 ° | $C_{D}(-) =$ | NA | $C_{D}(-) =$ | 5.2E-02 |
| 10 | | ξ(-) = | | ξ(-) = | -2.5 |
| | | 5() | | ~ () | |
| • | - 10 ⁻¹ | $T_{GRF}(m^2/s) =$ | NA | $T_{GRF}(m^2/s) =$ | NA |
| 10 ⁻¹ 10 ⁻² 10 | 10 ³ 10 ⁴ 10 ⁵ | $S_{GRF}(-) =$ | NA | $S_{GRF}(-) =$ | NA |
| | | D _{GRF} (-) = | NA | D _{GRF} (-) = | NA |
| Log-Log plot incl. derivatives- | recovery period | Selected represe | ntative paran | neters. | |
| | | dt_1 (min) = | NA | C (m ³ /Pa) = | 4.7E-10 |
| Elapsed time (h | | dt_2 (min) = | NA | $C_{D}(-) =$ | 5.2E-02 |
| | 10 3 | $T_{T} (m^{2}/s) =$ | 6.4E-08 | | -2.5 |
| | | S (-) = | 1.0E-06 | | |
| 10 | | $K_s (m/s) =$ | 6.4E-10 | | |
| | 10 ² | $S_{s}(1/m) =$ | 1.0E-08 | | |
| and the second sec | | Comments: | | | |
| 10 ° | | | ransmissivity o | f 6.4E-08 m2/s was o | derived from the |
| | 10 gi 4 | | | one), which shows a | |
| 10 -1 | | derivative quality th | an the CHi pha | se. The confidence r | ange for the |
| | 10 [°] | interval transmissiv | | | |
| | | | | ng the test was 2. Th derived from the CH | |
| 10 [°] 10 ¹ tD/CD | 10 ² 10 ³ 10 ⁴ | | | ner plot to a value of | |
| | | | | r to a value of | - , u. |

| Oskarshamn site investigation | Test type:[1] | | | CHi |
|--|--------------------------|---|--|--|
| | | | | |
| Laxemar | Test no: | | | 1 |
| KLX16A | Test start: | | | 070314 13:12 |
| 12.50-32.50 m | | | | Stephan Rohs |
| 0.076 | | | Crist | Philipp Wol ian Enachescu |
| | test evaluation: | | | |
| | | | ••••••••••••••••••••••••••••••••••••••• | |
| | | | | |
| • P action | | | | |
| • 2 400 | | | | |
| 350 | - F | | | 35 |
| 300 | | | | 120 |
| | | | | 1200 |
| 200 Ba | | 1.00E-03 | S el S (-)= | 1.00E-0 |
| 150 | | 7.0 | | |
| | | | Device the fact | 0.0 |
| - - - 00 | Derivative fact.= | 0.01 | Derivative fact.= | 0.0 |
| | | | | |
| 191 | Results | | Results | |
| | Q/s (m ² /s)= | 2.3E-05 | | |
| w period | T _M (m²/s)= | 2.4E-05 | | |
| | Flow regime: | transient | Flow regime: | transient |
| 10 ⁻¹ 10 ⁰ | | NA | dt ₁ (min) = | NA |
| | dt_2 (min) = | NA | dt ₂ (min) = | NA |
| 10 -1 | T (m²/s) = | | · · | 1.9E-0 |
| | S (-) = | | | 1.0E-0 |
| 0.03 | | | | 9.5E-0 |
| 10 ⁻² | | | | 5.0E-0 |
| total linear sector and the sector a | | | | 1.0E-0 |
| 0.003 Ē | C _D (-) = | | | 1.1E-02 |
| 10 ⁻³ | ξ(-) = | 8.6 | ξ(-) = | -1.: |
| • | 2 | | 2 | |
| 3E-4 | | | | NA |
| | | | | NA |
| accurate partial | | | | NA |
| ecovery period | | | | |
| | , | | , <i>,</i> | 1.0E-0 |
| ⁻² | | | | 1.1E-0 |
| | | | ς(-) = | 8.0 |
| 10 2 | | | | |
| | | | | <u> </u> |
| and the second s | | 5.0E-05 | | |
| 10 1 60 | | | C 2E 05 2/aa | daniara d Casara da |
| | | | | |
| 3 | | | | |
| | stabilization. The co | onfidence range | for the interval trans | smissivity is |
| 10 | | | | |
| 10 ² 10 ³ 10 ⁴ | | | | |
| | autoucor depui, w | as actived from | e errin priuse usin | |
| | 12.50-32.50 m 0.076 | Flow period Flow regime: Constrained to period Flow regime: Flow regime: Constrained to period Flow regime: Flow re | 12.50-32.50 m Responsible for test execution: 0.076 Responsible for test evaluation: Flow period Indata p_0 (kPa) = 314 p_0 (kPa) = 315 p_0 (kPa) = 316 p_0 (kPa) = 317 p_0 (kPa) = 318 p_0 (kPa) = 319 p_0 (kPa) = 310 p_0 (kPa) = 310 p_0 (kPa) = 310 p_0 (kPa) = 100E-03 Set S' (-)= 1.00E-03 K_s (m/s) = 3.1E-06 Sa (1/m) = 5.0E-05 Sore(-) = NA C_0 (-) = NA | 12.50-32.50 mResponsible for test execution:0.076Responsible for test evaluation:Crist rest evaluation:Flow periodRecovery period10dataIndataIndata $p_{(k}(Pa) =$ 314Indata $p_{(k}(Pa) =$ 502 $p_{c}(kPa) =$ $p_{(k}(Pa) =$ Q_{a} (m ² /s)=4.37E-04Indata $p_{(k}(Pa) =$ 100E-03 S et S' (-)=EC. Q_{a} (m ² /s)=2.3E-05Indata Q_{a} (m ² /s)=2.3E-05Indata Q'_{a} (m ² /s)=2.4E-05Indata Q'_{a} (m ² /s)=0.2E-05Indata Q'_{a} (|

| | Test Sumn | narv Sheet | | | |
|---|---|---|--------------------------------------|---|---------------|
| Project: | Oskarshamn site investigation | | | | CHir |
| Area: | Laxemar | Test no: | | | 1 |
| Borehole ID: | KLX16A | Test start: | | | 070314 22:12 |
| Test section from - to (m): | 32.50-52.50 m | Responsible for | | | Stephan Rohs |
| | | test execution: | | | Philipp Wolf |
| Section diameter, 2·r _w (m): | 0.076 | Responsible for | | Crist | ian Enachescu |
| Linear plot Q and p | | test evaluation: Flow period | | Recovery period | |
| | | Indata | | Indata | |
| | . 20 | p ₀ (kPa) = | 487 | indata | |
| KLX16A_32.56-52.50_070314_2_CHir_Q_r | 9 micro 9 micro 9 micro 9 micro 9 micro 9 micro 9 | p ₀ (kPa) = p _i (kPa) = | 487 | | |
| 603 | | | | | 40 |
| 700. | 15 IS | p _p (kPa) = | | p _F (kPa) = | 490 |
| 600 | | Q _p (m ³ /s)= | 4.10E-06 | | |
| ···· | | tp (s) = | | t _F (s) = | 1200 |
| 400 | to day of | S el S [*] (-)= | 1.00E-03 | S el S [*] (-)= | 1.00E-03 |
| 500 | | EC _w (mS/m)= | | | |
| 200- | - as | Temp _w (gr C)= | 7.4 | | |
| 100 | Weller John Strand Strand | Derivative fact.= | 0.07 | Derivative fact.= | 0.0 |
| 0 000 0.20 0.40 0.60 0.00 Etapand | 100 120 140 160 180 | | | | |
| | | Results | | Results | |
| | | Q/s (m²/s)= | 2.0E-07 | | |
| _og-Log plot incl. derivates- fl | ow period | T _M (m²/s)= | 2.1E-07 | | |
| | | Flow regime: | transient | Flow regime: | transient |
| 10 ⁻⁴ Elapsed time [| 1 10 ⁻¹ 10 ⁰ | dt ₁ (min) = | 0.47 | dt ₁ (min) = | 1.60 |
| 10 1 | | dt_2 (min) = | | dt_2 (min) = | 8.09 |
| | | $T(m^2/s) =$ | | $T(m^2/s) =$ | 5.4E-07 |
| B 00° * 4.44 | | S (-) = | 1.0E-03 | | 1.0E-0 |
| 10 ° | 10 ° | $K_s (m/s) =$ | | K _s (m/s) = | 2.7E-08 |
| | | $S_{s}(1/m) =$ | | $S_{s}(1/m) =$ | 5.0E-0 |
| • | 0.3 | | 0.0L-03 | | 2.9E-10 |
| | 10 ⁻¹ 4 | C (m ³ /Pa) = | NA | C (m ³ /Pa) = | 3.2E-0 |
| 10 -1 | • | | | $C_{D}(-) =$ | |
| | 0.03 | ξ(-) = | 2.2 | ξ(-) = | 12.1 |
| | 10 -2 | T _{GRF} (m²/s) = | NA | T _{GRF} (m ² /s) = | NA |
| 10 ¹ 10 ² 10 | 10 ³ 10 ⁴ 10 ⁵ | S _{GRF} (-) = | NA | S _{GRF} (-) = | NA |
| | | D _{GRF} (-) = | NA | D _{GRF} (-) = | NA |
| Log-Log plot incl. derivatives- | recovery period | Selected represe | intative paran | | |
| | | dt ₁ (min) = | | C (m ³ /Pa) = | 2.9E-10 |
| 10 ⁻⁴ Elapsed time [h] | -2 10 ⁻¹ ⁰ | dt_2 (min) = | | $C_{D}(-) =$ | 3.2E-0 |
| 10 2 | 10 ³ | $T_{T} (m^2/s) =$ | 5.4E-07 | | 12. |
| | | S(-) = | 1.0E-03 | | |
| | 300 | K _s (m/s) = | 2.7E-08 | | |
| 10 1 | | $R_{s}(11/s) = S_{s}(1/m) =$ | 5.0E-05 | | <u> </u> |
| | 10 * | Comments: | 5.0L-05 | | |
| · · · · · · · · · · · · · · · · · · · | | | · · · | 65 4E 07 2' | 1 |
| · · · | | | | f 5.4E-07 m2/s was of hows the better deriv | |
| 10 ° | 10 ¹ | | | hows the better deriv al transmissivity is e | |
| | | | | | |
| | · · · · · · · · · · · · · · · · · · · | 3.0E-07 m2/s to 7.0 | E-07 m2/s. The | flow dimension disr | blayed during |
| | * **** * ** * | 3.0E-07 m2/s to 7.0 the test was 2. The s | | | |
| 10° 0' | 0 ² 10 ² 10 ⁴ | the test was 2. The s | static pressure n Hir phase using | neasured at transduce straight line extrapol | er depth, was |

| Test Sumr | nary Sheet | | | | |
|---|--|--|--|--|--|
| Oskarshamn site investigation | Test type:[1] | | | CHir | |
| Laxemar | Test no: | | | 1 | |
| KLX16A | Test start: | start: | | 070315 00:34 | |
| 52 50-72 50 m | Responsible for | Ster | | Stephan Rohs | |
| 02.00 72.00 11 | test execution: | | | Philipp Wol | |
| 0.076 | | | Cris | tian Enachescu | |
| | | | | | |
| | • | | • | 3 | |
| | | | | 1 | |
| -P sector 0.30 | | | | | |
| ·u | | | | | |
| - 0.25 | | | | 668 | |
| + 0.30 | | | | | |
| | | | | 3600 | |
| 98 21:0 - 10 20 20 20 20 20 20 20 20 20 20 20 20 20 | | 1.00E-03 | S el S [*] (-)= | 1.00E-03 | |
| ÷ | | | | | |
| - 0.10 | | | | | |
| - 0 05 | Derivative fact.= | 0.10 | Derivative fact.= | 0.00 | |
| 1.50 2.00 | | | | | |
| Time [b] | Results | | Results | <u></u> | |
| | Q/s (m ² /s)= | 7.3E-08 | | | |
| ow period | T _M (m ² /s)= | 7.6E-08 | | | |
| | Flow regime: | transient | Flow regime: | transient | |
| [n] (d) | dt ₁ (min) = | 2.65 | dt ₁ (min) = | NA | |
| | dt ₂ (min) = | 13.50 | dt ₂ (min) = | NA | |
| • | T (m²/s) = | 1.9E-07 | T (m²/s) = | 2.3E-07 | |
| 10 ¹ | S (-) = | | | 1.0E-03 | |
| - | $K_s(m/s) =$ | 9.5E-09 | K _s (m/s) = | 1.2E-08 | |
| د ۱۰۰ - ۲۰۰ | $S_{s}(1/m) =$ | 5.0E-05 | $S_{s}(1/m) =$ | 5.0E-05 | |
| | $C (m^{3}/Pa) =$ | NA | $C (m^3/Pa) =$ | 4.2E-10 | |
| | | NA | | 4.6E-05 | |
| 10 -1 | ξ(-) = | | | 17.6 | |
| | | | | | |
| | T _{GRF} (m ² /s) = | NA | $T_{GRF}(m^2/s) =$ | NA | |
| 10 ¹³ 10 ¹⁴ 10 ¹⁵ D | S _{GRF} (-) = | NA | S _{GRF} (-) = | NA | |
| | D _{GRF} (-) = | NA | D _{GRF} (-) = | NA | |
| recovery period | Selected represe | entative paran | neters. | | |
| | dt ₁ (min) = | NA | C (m ³ /Pa) = | 4.2E-10 | |
| <u></u> | dt ₂ (min) = | NA | C _D (-) = | 4.6E-05 | |
| | $T_{T}(m^{2}/s) =$ | 2.3E-07 | ξ(-) = | 17.6 | |
| 300 | S (-) = | 1.0E-03 | | | |
| | $K_s (m/s) =$ | 1.2E-08 | | | |
| * | $S_{s}(1/m) =$ | 5.0E-05 | | | |
| × × | Comments: | | | | |
| | The recommended | transmissivity o | f 2.3E-07 m2/s was | derived from the | |
| service 10 ' | analysis of the CHin | r phase, which s | hows the better deri | vative quality. | |
| | | c .1 | 1 4 | actimated to be | |
| | The confidence ran | | | | |
| 3 | 6.0E-08 m2/s to 5.0 | E-07 m2/s. A fl | ow dimension of 2 | was assumed for | |
| 3 | | DE-07 m2/s. A fl pressure measure | ow dimension of 2 ed at transducer dep | was assumed for th, was derived | |
| | Oskarshamn site investigation Laxemar KLX16A 52.50-72.50 m 0.076 | $0.076 Responsible for test evaluation: Flow period Indata p_0 (kPa) = p_{p}(kPa) = p_{p}(k$ | Oskarshamn site investigation Test type:[1] Laxemar Test no: KLX16A Test start: 52:50-72:50 m Responsible for test execution: 0.076 Responsible for test evaluation: Elew period Indata p_0 (kPa) = 668 p_k (kPa) = 866 Q_p (m ³ /s)= 1.47E-06 p_k (kPa) = 866 Q_p (m ³ /s)= 1.47E-06 p_k (kPa) = 866 Q_p (m ³ /s)= 1.47E-06 p_k (kPa) = 866 Q_p (m ³ /s)= 1.47E-06 p_k (kPa) = 866 Q_p (m ³ /s)= 1.47E-06 p_k (kPa) = 866 Q_p (m ³ /s)= 1.47E-06 p_k (kPa) = 866 Q_p (m ³ /s)= 1.47E-06 p_k (kPa) = 9.66 Q_r (m ³ /s)= 7.3E-08 $Q's$ (m ² /s)= <th< td=""><td>Oskarshamn site investigation Test type:[1] Laxemar Test no: S2.50-72.50 m Responsible for test execution: Cris 0.076 Responsible for test evaluation: Recovery period Flow period Recovery period Recovery period p_0 (kPa) = 668 p p_0 (kPa) = 866 p Q_0 (m³/s)= 1.47E-06 p p_0 (kPa) = 9.000 T Q_0 (m³/s)= 7.3E-08 p Q_0 (m³/s)= 7.3E-08 p Ow period T_M (m²/s)= 7.6E-08 Q_1 (m³/s) = 1.9E-07 T (m²/s) = Q_1 (m³/s) = 1.9E-07 T (m²/s) = Q_2 (m³/s) = 1.9E-07 T (m²/s) = Q_2 (m³/s) = 1.9E-07 <t< td=""></t<></td></th<> | Oskarshamn site investigation Test type:[1] Laxemar Test no: S2.50-72.50 m Responsible for test execution: Cris 0.076 Responsible for test evaluation: Recovery period Flow period Recovery period Recovery period p_0 (kPa) = 668 p p_0 (kPa) = 866 p Q_0 (m ³ /s)= 1.47E-06 p p_0 (kPa) = 9.000 T Q_0 (m ³ /s)= 7.3E-08 p Q_0 (m ³ /s)= 7.3E-08 p Ow period T _M (m ² /s)= 7.6E-08 Q_1 (m ³ /s) = 1.9E-07 T (m ² /s) = Q_1 (m ³ /s) = 1.9E-07 T (m ² /s) = Q_2 (m ³ /s) = 1.9E-07 T (m ² /s) = Q_2 (m ³ /s) = 1.9E-07 <t< td=""></t<> | |

| | Test | Sumn | nary Sheet | | | |
|--------------------------------------|--|-------------------|---|---|--|--|
| Project: | Oskarshamn site invest | | | | | CHir |
| Area: | La | axemar | Test no: | | | 1 |
| Borehole ID: | K | LX16A | Test start: | 070315 0 | | |
| Test section from - to (m): | 72.50-9 | 2.50 m | Responsible for | Stephan Ro | | |
| | | | test execution: | | | Philipp Wolf |
| Section diameter, $2 \cdot r_w$ (m): | | 0.076 | Responsible for test evaluation: | | Crist | ian Enachescu |
| Linear plot Q and p | 4 | | Flow period | | Recovery period | |
| | | | Indata | ************************ | Indata | -1 |
| 1100 | •P sedion | 0.50 | p ₀ (kPa) = | 846 | | |
| KLX16A_72.50-52.50_070315_1_CHir_Q_r | • P adan • P abon • P baba • P baba • Q | 0.45 | p _i (kPa) = | 841 | | |
| 1000 | • | | p _p (kPa) = | 1041 | p _F (kPa) = | 845 |
| 800 | · ; : | 0.35 | $Q_{p} (m^{3}/s) =$ | 4.12E-06 | | |
| ξ | | | $\frac{d_p(m, b)}{d_p(s)} =$ | | t _F (s) = | 1200 |
| | And a second | on Rate Dimit | S el S [*] (-)= | | ♀ (e) S el S [*] (-)= | 1.00E-03 |
| 7700. | · · | • 0.20 Infeatr | EC _w (mS/m)= | 1.0012 02 | 383 (-)- | 1.002 02 |
| 800 | | 0.15 | Temp _w (gr C)= | 7.7 | | |
| | | 0.10 | Derivative fact.= | | Derivative fact.= | 0.02 |
| 500 | | - 0.05 | | 0.04 | Derivative lact | 0.02 |
| 400 0.20 0.60 Etypes | 0.00 1.20 In Time [b] | 0.00 | | | | |
| | | | Results | | Results | - |
| | | | Q/s (m²/s)= | 2.0E-07 | | |
| _og-Log plot incl. derivates- f | low period | | T _M (m²/s)= | 2.1E-07 | | |
| | | | Flow regime: | transient | Flow regime: | transient |
| Elapsed time | իլ 1 | | dt ₁ (min) = | 0.15 | dt_1 (min) = | 1.21 |
| 10 2 | | | dt ₂ (min) = | | dt ₂ (min) = | 6.60 |
| | | 10 | T (m²/s) = | 5.1E-07 | T (m²/s) = | 8.6E-07 |
| 10 1 | /000899 (kaliman 2000) and an angle and a long | | S (-) = | 1.0E-03 | S (-) = | 1.0E-03 |
| | | 10 0 | K _s (m/s) = | 2.6E-08 | K _s (m/s) = | 4.3E-08 |
| | · · · · · | | S _s (1/m) = | 5.0E-05 | S _s (1/m) = | 5.0E-05 |
| 10 0 | | [hrim] (t | C (m³/Pa) = | NA | C (m³/Pa) = | 6.8E-07 |
| | | 10 10 101 | $C_D(-) =$ | NA | $C_{D}(-) =$ | 7.5E-02 |
| 10 -1 | · · | | ξ(-) = | | ξ(-) = | 24.3 |
| | | 10 -2 | | | | |
| | • • | | T _{GRF} (m²/s) = | NA | $T_{GRF}(m^2/s) =$ | NA |
| 10 ¹¹ 10 ¹² 1 | 10 ¹⁰ 1 | 10 14 | $S_{GRF}(-) =$ | NA | $S_{GRF}(-) =$ | NA |
| | | | $D_{GRF}(-) =$ | NA | $D_{GRF}(-) =$ | NA |
| Log-Log plot incl. derivatives- | · recovery period | | Selected represe | ntative paran | | |
| | - | | dt ₁ (min) = | 0.15 | | 6.8E-07 |
| Elapsed time | ² [h] 1 ² | | dt_2 (min) = | 10.26 | $C_{D}(-) =$ | 7.5E-02 |
| 10 2 | | | $T_{T} (m^{2}/s) =$ | 5.1E-07 | | 12.5 |
| | | - | S (-) = | 1.0E-03 | | |
| 10 | | 10 2 | $K_s (m/s) =$ | 2.6E-08 | | |
| | | ł | $S_{s}(1/m) =$ | 5.0E-05 | | |
| | | 10 ' _ | Comments: | | | |
| 10 ⁻⁴ | 10 ³ 10 ⁴ | 10°0') 10°0 | analysis of the CHi stabilization than th transmissivity is est flow dimension disp measured at transdu | phase, which she e CHir phase. T imated to be 2.0 played during th cer depth, was | he confidence range E-07 m2/s to 8.0E-0 e test is 2. The static derived from the CH | ous horizontal for the interval 7 m2/s. The pressure fir phase using |
| בע⊪ טו ∾י בע⊮ | NCD 10 10 | | straight line extrapo | lation in the Ho | rner plot to a value | ot 840.8 kPa. |



| | Test Sum | mary Sheet | | | |
|--|--|---|--|---|---|
| Project: | Oskarshamn site investigatio | | | | CHi |
| A == = = = | Lavama | r Toot no. | | | 4 |
| Area: | Laxema | r Test no: | | | I |
| Borehole ID: | KLX16 | A Test start: | | | 070315 10:59 |
| Test section from - to (m): | 111 00-131 00 r | n Responsible for | | | Stephan Rohs |
| | | test execution: | | | Philipp Wol |
| Section diameter, 2·r _w (m): | 0.07 | 6 Responsible for | | Crist | ian Enachescu |
| | | test evaluation: | | | |
| Linear plot Q and p | | Flow period | | Recovery period | |
| | | Indata | | Indata | |
| 1500 KLX16A_111.80-131.00_070315_1_CHir_Q_r | • P action | p ₀ (kPa) = | 1187 | | |
| 1400 · · · · · · · · · · · · · · · · · · | + P section 19 about 19 bation 10 | p _i (kPa) = | 1186 | | |
| | | p _p (kPa) = | | p _F (kPa) = | 118 |
| 1300 | 0.20 | Q _p (m ³ /s)= | 1.72E-06 | | |
| 1220 | | tp (s) = | | t _F (s) = | 1200 |
| 1900 | and the second se | S el S [*] (-)= | 1.00E-06 | S el S [*] (-)= | 1.00E-0 |
| 1000 | 5 martine 1000 1000 | EC _w (mS/m)= | | | |
| | 0.0 | Temp _w (gr C)= | 8.2 | | |
| | | Derivative fact.= | 0.04 | Derivative fact.= | 0.0 |
| 800 | | | | | |
| 700 0.20 0.40 0.60 Elapsed T | 040 1.00 1.20 1.40 me[h] | Results | | Results | |
| | | Q/s (m ² /s)= | 8.5E-08 | | |
| .og-Log plot incl. derivates- flo | ow period | $T_{M} (m^{2}/s) =$ | 8.9E-08 | | |
| | • | Flow regime: | transient | Flow regime: | transient |
| Elapsed time (h) | | dt_1 (min) = | 2.48 | dt_1 (min) = | NA |
| 10 ² | | dt_2 (min) = | | dt_2 (min) = | NA |
| | | $T(m^2/s) =$ | | $T(m^2/s) =$ | 2.0E-0 |
| | | S (-) = | 1.0E-06 | () | 1.0E-0 |
| 10 1 | 10 ¹ | K_{s} (m/s) = | | $K_s (m/s) =$ | 1.0E-0 |
| | | $S_{s}(1/m) =$ | | $S_{s}(1/m) =$ | 5.0E-0 |
| 1 | • | $C (m^3/Pa) =$ | NA | C (m ³ /Pa) = | 2.1E-1 |
| | • • • • • • | $C (m / Fa) = C_D (-) =$ | NA | $C_{D}(-) =$ | 2.3E-0 |
| 10 ° | | ξ(-) = | | ξ(-) = | 8.8 |
| • | 0.3 | ς (-) – | 5.2 | ·ç(-) – | 0.0 |
| | 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 | T _{GRF} (m ² /s) = | NA | $T_{GRF}(m^2/s) =$ | NA |
| 10 [°] 10 ⁷ tD | 10 ⁸ 10 ⁹ 10 ¹⁰ | $S_{GRF}(-) =$ | NA | $S_{GRF}(-) =$ | NA |
| | | $D_{GRF}(-) =$ | NA | $D_{GRF}(-) =$ | NA |
| .og-Log plot incl. derivatives- | recovery period | Selected represe | | | |
| | | dt_1 (min) = | • | C (m ³ /Pa) = | 2.1E-1 |
| 10 ⁻⁴ Eapsed time [h] | 4n ⁻¹ 4n ⁰ | $dt_1 (min) =$ $dt_2 (min) =$ | | $C (m/Pa) = C_D (-) =$ | 2.1E-1 |
| 10 2 | · · · · · · · · · · · · · · · · · · · | | | | 2.3E-0. |
| | | $T_{T} (m^{2}/s) =$ S (-) = | 1.6E-07 1.0E-06 | | 5./ |
| | 300 | | | | |
| 10 ¹ | 10 ² | $K_s (m/s) =$ | 8.0E-09 | | |
| · · · · · · · · · · · · · · · · · · · | 10 | S _s (1/m) = | 5.0E-08 | | |
| | 30 | Comments: | | A (T) A = | |
| . // | - \. | | | f 1.6E-07 m2/s was o | |
| | | analyzia of the CIT | | iows a neuer norizof | nai siadiiizatiof |
| 10 T | 10 ¹ | analysis of the CHi although the derivat | | | nge for the |
| | and a second sec | although the derivation | tive is a bit nois | y. The confidence ra to be 8.0E-08 m2/s t | |
| | · · · · · · · · · · · · · · · · · · · | although the derivation interval transmissive. The flow dimension | tive is a bit nois ity is estimated a displayed durin | y. The confidence ra to be 8.0E-08 m2/s t ng the test is 2. The s | to 4.0E-07 m2/s static pressure |
| | | although the derivat interval transmissiv The flow dimensior measured at transdu | tive is a bit nois ity is estimated displayed durin icer depth, was | y. The confidence ra to be 8.0E-08 m2/s t | to 4.0E-07 m2/s static pressure fir phase using |

| Test Summ | nary Sheet | | | |
|--|--|---|--|---|
| | | | | CHi |
| Laxemar | Test no: | | | 1 |
| KLX16A | Test start: | | | 070315 13:31 |
| 131.00-151.00 m | Responsible for | | | Stephan Rohs |
| | test execution: | | | Philipp Wol |
| | | | Crist | tian Enachescu |
| | | | Recovery period | |
| | • | | •••••• | |
| T 500 | | 1365 | | |
| ▲ P above | | | | |
| | | | n_ (kPa) = | 136 |
| 350 | | | | 150. |
| 360 | | | | 120 |
| 1210 to 1210 t | 1- (-) | | , | 1.00E-0 |
| | | 1.00E-00 | SeiS (-)= | 1.00E-0 |
| | | 0.4 | | |
| | | | Deviseding frat | 0.0 |
| 50 SD | Derivative Tact.= | 0.01 | Derivative fact.= | 0.0 |
| 0.00 1.00 1.20 1.40 0.0 | | | | |
| | Results | | Results | |
| | Q/s (m²/s)= | 8.0E-05 | | |
| ow period | T _M (m²/s)= | 8.4E-05 | | |
| | Flow regime: | transient | Flow regime: | transient |
| l | dt ₁ (min) = | 0.95 | dt ₁ (min) = | 1.04 |
| | dt ₂ (min) = | 15.42 | dt ₂ (min) = | 15.78 |
| 10 -1 | T (m²/s) = | 2.0E-04 | T (m²/s) = | 1.5E-04 |
| 0.03 | S (-) = | 1.0E-06 | S (-) = | 1.0E-0 |
| | K _s (m/s) = | 1.0E-05 | K _s (m/s) = | 7.5E-0 |
| 10-2 | S _s (1/m) = | 5.0E-08 | S _s (1/m) = | 5.0E-08 |
| d hard | C (m ³ /Pa) = | NA | C (m ³ /Pa) = | 1.6E-08 |
| 0.003 | | NA | | 1.8E+00 |
| 10 3 | ξ(-) = | 5.6 | | 2.0 |
| 3E-4 | $T_{m}^{2}(a) =$ | NΔ | $T_{(m^{2}/a)} =$ | NA |
| 10 12 10 13 10 14 | | | | NA |
| | | | | NA |
| recovery period | | | | <u> </u> |
| | | • | | 1.6E-08 |
| | | | | 1.8E+0 |
| 10, ⁻² 10, ⁻¹ | | | | 1.o⊑+0 5.i |
| 300 | | | | Э. |
| | | | | |
| | | | | |
| | - | 5.0E-08 | 1 | |
| | | transmissivity o | f 2.0E-04 m ^{2/s} was | derived from the |
| · · · · · · · · · | | | | |
| | The confidence range | ge for the interv | al transmissivity is e | estimated to be |
| | | | Cl. 1 | alound during |
| | 9.0E-05 m2/s to 9.0 | | | |
| | 9.0E-05 m2/s to 9.0 the test is 2. The sta derived from the CI | tic pressure mea | asured at transducer | depth, was |
| | Oskarshamn site investigation Laxemar KLX16A 131.00-151.00 m 0.076 | Oskarshamn site investigationTest type:[1]LaxemarTest no:KLX16ATest start:131.00-151.00Responsible for test evaluation:0.076Responsible for test evaluation:Flow periodIndata $p_0 (kPa) =$ $p_1 (kPa) =$ $p_p (kPa) =$ $Q_0 (m^3/s) =$ tp (s) =0.076Sel s' (-)=ECw (mS/m)=Sel s' (-)=ECw (mS/m)=Tempw(gr C)=Derivative fact.=Image: Comparison of the structure fact.=Image: Compari | Oskarshamn site investigation Test no: KLX16A Test no: 131.00-151.00 m Responsible for test execution: 0.076 Responsible for test evaluation: Flow period Indata p_0 (kPa) = 1364 p_0 (kPa) = 13064 <td< td=""><td>Oskarshamn site investigation Test type:[1] Laxemar Test no: 131.00-151.00 Responsible for test execution: 0.076 Responsible for test evaluation: 1000 Recovery period 1000 Recovery period 1000 Recovery period 1000 Recovery period 1000 Po(kPa) = 1000 10434 1000 Po(kPa) = 1100 10434 1000 Po(kPa) = 1000 Sel S' (-)= 1000 Sel S' (-)= 1000 Sel S' (-)= 1000 Derivative fact.= 1000 Derivative fact.= 1000 Derivative fact.= 1000 Derivative fact.= 1000 Taskent 1010 10.424 102(min) = 15.424 1030 Taskent 1041 Taskent 1050 S (-) = 1060 S (-) = 107(%) = 2.0E-04 <tr< td=""></tr<></td></td<> | Oskarshamn site investigation Test type:[1] Laxemar Test no: 131.00-151.00 Responsible for test execution: 0.076 Responsible for test evaluation: 1000 Recovery period 1000 Recovery period 1000 Recovery period 1000 Recovery period 1000 Po(kPa) = 1000 10434 1000 Po(kPa) = 1100 10434 1000 Po(kPa) = 1000 Sel S' (-)= 1000 Sel S' (-)= 1000 Sel S' (-)= 1000 Derivative fact.= 1000 Derivative fact.= 1000 Derivative fact.= 1000 Derivative fact.= 1000 Taskent 1010 10.424 102(min) = 15.424 1030 Taskent 1041 Taskent 1050 S (-) = 1060 S (-) = 107(%) = 2.0E-04 <tr< td=""></tr<> |

| | | <u>nmary Sheet</u> | - | | |
|--|--|--|--|---|--|
| Project: | Oskarshamn site investigati | on <u>Test type:[1]</u> | | | CHi |
| Area: | Laxem | ar Test no: | | | 1 |
| Borehole ID: | KLX16 | 6A Test start: | | | 070315 15:35 |
| Test section from - to (m): | 150.00-170.00 | m Responsible for | | | Stephan Rohs |
| Continu diameter 2 r (m): | 0.0 | test execution: 76 Responsible for | | Cria | Philipp Wol tian Enachescu |
| Section diameter, $2 \cdot r_w$ (m): | 0.0 | test evaluation: | | Clis | |
| Linear plot Q and p | | Flow period | | Recovery period | b |
| | | Indata | | Indata | |
| 1990 | -0t | p ₀ (kPa) = | 1529 | | |
| KLX16A_190.00-170.00_070315_1_CHir_Q_r | • P acton • P atos • P atos • Q atos • Q | p _i (kPa) = | 1533 | | |
| 1700 | · · · · · · · · · · · · · · · · · · · | p _p (kPa) = | 1750 | p _F (kPa) = | 153 |
| | | $Q_{p} (m^{3}/s) =$ | 6.97E-06 | | |
| <u>↓</u> | | tp (s) = | 1200 | t _F (s) = | 120 |
| a store | | S el S [*] (-)= | 1.00E-06 | S el S [*] (-)= | 1.00E-0 |
| 5 MOD | - D4 | EC _w (mS/m)= | | | |
| 1300- | | Temp _w (gr C)= | 8.8 | | |
| | - 62 | Derivative fact.= | 0.09 | Derivative fact.= | 0.0 |
| 1000 1000 000 020 040 080 080 | 100 120 140 160 180 | | | | |
| Elipsed T | ime [N | Results | | Results | |
| | | Q/s $(m^{2}/s)=$ | 3.1E-07 | | |
| .og-Log plot incl. derivates- flo | ow period | T _M (m ² /s)= | 3.3E-07 | | |
| | | Flow regime: | transient | Flow regime: | transient |
| 10 ⁻³ Elapsed time (h) | 40 ⁰ 40 ¹ | dt_1 (min) = | NA | dt_1 (min) = | NA |
| 10 2 | | dt ₂ (min) = | NA | dt ₂ (min) = | NA |
| | | $T(m^{2}/s) =$ | 5.9E-07 | T (m²/s) = | 5.1E-0 |
| 10 1 | | S (-) = | 1.0E-06 | S (-) = | 1.0E-0 |
| • • • • • • • • • • • • • • • • • • • | 10 [°] | $K_{s}(m/s) =$ | 3.0E-08 | K _s (m/s) = | 2.6E-0 |
| | | $S_{s}(1/m) =$ | 5.0E-08 | S _s (1/m) = | 5.0E-0 |
| | 10 1 | ^{will} C (m ³ /Pa) = | NA | C (m³/Pa) = | 8.3E-1 |
| | | [∉] C _D (-) = | NA | C _D (-) = | 9.1E-0 |
| 10 1 | - | ξ(-) = | 4.8 | ξ(-) = | 3. |
| | | - (2) | NA | - (2) | NA |
| 10 th 10 ⁹ tD | 10 ¹⁰ 10 ¹¹ 10 ¹² | $T_{GRF}(m^2/s) =$ | NA | $T_{GRF}(m^2/s) =$ | NA |
| | | $S_{GRF}(-) =$ $D_{GRF}(-) =$ | NA | $S_{GRF}(-) =$ $D_{CRF}(-) =$ | NA |
| Log-Log plot incl. derivatives- | recovery period | Selected repres | | - GRF () | |
| Log-Log plot men derivatives- | recovery period | dt_1 (min) = | NA | <u></u> | 8.3E-1 |
| Elapsed time [h] | | $\frac{dt_1(mn)}{dt_2(min)} =$ | NA | C (m ³ /Pa) = C _D (-) = | 9.1E-0 |
| 10 ² | | $T_{T} (m^2/s) =$ | 5.9E-07 | | 4.6 |
| | 10 3 | $S_{T} (m/s) =$ | 1.0E-06 | | -+.• |
| | | $K_{s}(m/s) =$ | 3.0E-08 | | |
| 10 1 | 300 | $S_{s}(1/m) =$ | 5.0E-08 | | |
| 5.5.5.5.5.5.5.5.5.5.5.5.5.5.5.5.5.5.5. | 10 2 | Comments: | 0.0E-00 | | |
| | 20 10 2 10 2 10 10 10 10 10 10 10 10 10 10 10 10 10 | The recommended analysis of the CHi interval transmissiv stabilization. The c estimated to be 1.0 during the test was | i phase (inner zo vity because neit onfidence range E-07 m2/s to 2.0 assumed to be 2 | f 5.9E-07 m2/s was ne), which gives the her derivative show for the interval tran E-06 m2/s. The flow . The static pressure the CHir phase usin | be best hint of the s horizontal smissivity is w dimension the measured at |

| | Test Sur | mary Sheet | | | |
|--|---|--|---------------------------------------|--|-------------------------------------|
| Project: | Oskarshamn site investigation | on <u>Test type:[1]</u> | | | CHir |
| Area: | Laxem | ar Test no: | | | 1 |
| Borehole ID: | KLX16 | A Test start: | | | 070315 17:51 |
| Test section from - to (m): | 170.00-190.00 | m Responsible for test execution: | | | Stephan Rohs Philipp Wolf |
| Section diameter, 2·r _w (m): | 0.07 | 76 Responsible for test evaluation: | | Crist | tian Enachescu |
| Linear plot Q and p | <u> </u> | Flow period | | Recovery period | |
| | | Indata | <u></u> | Indata | |
| | 100 | p ₀ (kPa) = | 1710 | | |
| KLX16A_170.00-190.00_070315_1_CHir_Q_r | Precion Pation Photo O | p _i (kPa) = | 1705 | | |
| 1800 - | | $p_{p}(kPa) =$ | 1949 | p _F (kPa) = | 1709 |
| 1800 - | | $\frac{Q_{p}}{Q_{p}} (m^{3}/s) =$ | 8.88E-06 | | |
| 1700 | | $\frac{d_p(m/s)}{d_p(s)} =$ | | t _F (s) = | 1200 |
| Ted 1000 | | S el S [*] (-)= | | ⊊ (e) S el S [*] (-)= | 1.00E-06 |
| £ ∑ 5100. 8 | · · · · · | $EC_{w} (mS/m) =$ | 1.001 00 | 3 8 3 (-)- | 1.002 00 |
| 5600 - | t uno | Temp _w (gr C)= | 9.1 | | |
| | | Derivative fact.= | | Derivative fact.= | 0.06 |
| 100 - | : | | | | |
| ов 629 66 60 СВ | 188 128 1.68 1.88 a filme № | Results | | Results | |
| | | Q/s (m²/s)= | 3.6E-07 | | |
| Log-Log plot incl. derivates- f | low period | $T_{M} (m^{2}/s) =$ | 3.7E-07 | | |
| | | Flow regime: | transient | Flow regime: | transient |
| Elapsed time | · [b] 10 ⁻² 10 ⁻¹ 10 ⁰ | dt ₁ (min) = | 9.36 | dt ₁ (min) = | 0.06 |
| 10 1 | 8 78 449 449 449 449 449 449 449 449 449 44 | dt ₂ (min) = | 15.00 | dt ₂ (min) = | 0.37 |
| | 10 ° | T (m²/s) = | 4.1E-07 | T (m²/s) = | 1.7E-07 |
| | | S (-) = | 1.0E-06 | S (-) = | 1.0E-06 |
| 10 ° | 0.3 | K _s (m/s) = | 2.1E-08 | K _s (m/s) = | 8.5E-09 |
| | | S _s (1/m) = | 5.0E-08 | S _s (1/m) = | 5.0E-08 |
| 144 | | ^{www} C (m ³ /Pa) = | NA | C (m³/Pa) = | 1.3E-10 |
| 10 -1 | 0.03 | $\frac{1}{2} C_{\rm D}(-) =$ | NA | C _D (-) = | 1.4E-02 |
| | * • • • • • • • • • • • • • • • • • • • | ξ(-) = | -1.1 | ξ(-) = | -1.9 |
| | 0.003 | $T_{GRF}(m^2/s) =$ | NA | T _{GRF} (m ² /s) = | NA |
| 10 ³ 10 ⁴ | 10 ° 10 ° 10 ° | $S_{GRF}(-) =$ | NA | $S_{GRF}(-) =$ | NA |
| | | $D_{GRF}(-) =$ | NA | $D_{GRF}(-) =$ | NA |
| Log-Log plot incl. derivatives- | recovery period | Selected represe | | | |
| | | dt_1 (min) = | | C (m ³ /Pa) = | 1.3E-10 |
| 10 ⁻⁴ 5 Elapsed time j | [h] | dt_2 (min) = | | $C_{D}(-) =$ | 1.4E-02 |
| 10 10 10 10 10 10 10 10 10 10 10 10 10 1 | | $T_{T} (m^{2}/s) =$ | 1.7E-07 | | -1.9 |
| | 300 | S(-) = | 1.0E-06 | ., | |
| | | K_{s} (m/s) = | 8.5E-09 | | |
| 10 * | 10 2 | $S_{s}(1/m) =$ | 5.0E-08 | | |
| | 30 | Comments: | 0.02.00 | | |
| 10 ° | · · · · · · · · · · · · · · · · · · · | The recommended analysis of the CHi interval transmissiv | r phase (inner zo ity because both | f 1.7E-07 m2/s was one), which gives the derivatives show o | e best hint of the nly an |
| 10 [°] 10 [°] 10 | 20 20 20 20 20 20 20 20 20 20 20 20 20 2 | for the interval tran 07 m2/s. The flow of | smissivity is est dimension durin | at late time. The co imated to be 5.0E-08 g the test was assume the depth was derived | 8 m2/s to 5.0E- and to be 2. The |
| | | | traight line extra | er depth, was derive polation in the Horr | |

| | Test S | umn | nary Sheet | | | |
|--|--|-----------------|---|------------------|-------------------------------------|------------------|
| Project: | Oskarshamn site investig | | | | | CHir |
| Area: | Lax | emar | Test no: | | | 1 |
| Borehole ID: | KL: | X16A | Test start: | | | 070315 20:00 |
| Test section from - to (m): | 188.00-208. | .00 m | Responsible for | | | Stephan Rohs |
| | | | test execution: | | | Philipp Wolf |
| Section diameter, $2 \cdot r_w$ (m): | (| 0.076 | Responsible for test evaluation: | | Cris | tian Enachescu |
| Linear plot Q and p | | | Flow period | | Recovery period | 1 |
| F | | | Indata | | Indata | |
| | | | p ₀ (kPa) = | 1866 | | |
| 2200 KLX16A_188.00.208.00_070315_1_CHir_Q_r | • P ancion • P alcon • P balan | 0.050 | p _i (kPa) = | 1866 | | |
| 2100 | • P talaw • Q | 0.045 | p _p (kPa) = | 2066 | p _F (kPa) = | 1865 |
| 2000 | | 0.040 | $Q_{p} (m^{3}/s) =$ | 2.17E-07 | | |
| | | 0.035 | $\frac{d_p(m/s)^2}{tp(s)} =$ | | t _F (s) = | 2400 |
| | | 0.030 June | S el S [*] (-)= | | ⊈ (3) = S el S [*] (-)= | 1.00E-06 |
| 1000 · · · · · · · · · · · · · · · · · · | · | | S el S (-)= EC _w (mS/m)= | 1.001-00 | 383(-)= | 1.001-00 |
| 5 1750 | | 0.020 | $Temp_w(gr C)=$ | 9.4 | | + |
| 1000 | ⁹⁷⁵ Martin | 0.015 | Derivative fact.= | | Derivative fact.= | 0.02 |
| 150 | | 0.010 | | 0.01 | | 0.02 |
| 1600 0.22 0.40 0.60 0.80 1. Element | | 0.000 | | | | |
| | | | Results | | Results | |
| | | | Q/s (m²/s)= | 1.1E-08 | | |
| _og-Log plot incl. derivates- fl | ow period | | T _M (m²/s)= | 1.1E-08 | | |
| | | | Flow regime: | transient | Flow regime: | transient |
| Elapsed time [h] | | | $dt_1 (min) =$ | | dt_1 (min) = | NA |
| 10 | | | $dt_2 (min) =$ | | dt_2 (min) = | NA |
| | | 200 | T (m²/s) = | | T (m²/s) = | 4.7E-08 |
| | | | S (-) = | 1.0E-06 | | 1.0E-06 |
| 10 ¹ | · | 10 2 | K _s (m/s) = | | K _s (m/s) = | 2.4E-09 |
| | - loop and the second s | | S _s (1/m) = | 5.0E-08 | S _s (1/m) = | 5.0E-08 |
| ·· . | 3 | 5 1/of fming | C (m³/Pa) = | NA | C (m³/Pa) = | 5.2E-11 |
| 10 ⁴ | | 10 ¹ | C _D (-) = | NA | C _D (-) = | 5.7E-03 |
| | | | ξ(-) = | 1.6 | ξ(-) = | 21.0 |
| | | 3 | T _{GRF} (m²/s) = | NA | $T_{GRF}(m^2/s) =$ | NA |
| 10 ² 10 ³ tD | 10 ⁻⁴ 10 ⁻⁵ 10 ⁻⁶ | | $S_{GRF}(-) =$ | NA | $S_{GRF}(-) =$ | NA |
| | | | $D_{GRF}(-) =$ | NA | $D_{GRF}(-) =$ | NA |
| Log-Log plot incl. derivatives- | recovery period | | Selected represe | | | |
| | ••• | | dt_1 (min) = | NA | C (m ³ /Pa) = | 5.2E-11 |
| 21 10, -4 Elapsed time [h] | | | dt_2 (min) = | NA | $C_{D}(-) =$ | 5.7E-03 |
| 10 ² | | | $T_{T} (m^2/s) =$ | 1.2E-08 | | 1.6 |
| | | 300 | S(-) = | 1.0E-06 | | 1.0 |
| | | 10 ² | K _s (m/s) = | 6.0E-10 | | |
| 10 ¹ | *** | 10 | $S_{s}(1/m) =$ | 5.0E-08 | | |
| i. A. | in the second se | 30 g | Comments: | 0.02 00 | | |
| | | (p p0) (kP | | rancmiccivity | $f = 1.2 E_{-0.8} m^{2/a} m^{2/a}$ | derived from the |
| 10 " | and the second second | 10 1 2 | The recommended t analysis of the CHi | | | |
| / | · ***** | | The confidence range | | | |
| | ľ | 3 | 9.0E-09 m2/s to 6.0 | E-08 m2/s. The | flow dimension dis | played during |
| | | 10 0 | the test is 2. The sta | | | |
| 10 ⁰ 10 ¹ tD/CD | 10 ² 10 ³ 10 ⁴ | | derived from the CH Horner plot to a val | | | lation in the |
| | | | riorner plot to a Val | ue of 1,000.2 Ki | a. | |
| | | | | | | |

| | Test Sur | mmary Sheet | | | |
|---|--|---|--|---|---|
| Project: | Oskarshamn site investigat | tion <u>Test type:[1]</u> | | | CHir |
| Area: | l axer | nar Test no: | | | 1 |
| Nou. | Euxer | nui rest no. | | | |
| Borehole ID: | KLX1 | I6A Test start: | | | 070315 22:44 |
| Test section from - to (m): | 207 00-227 00 |) m Responsible for | | | Stephan Rohs |
| | 201.00 221.00 | test execution: | | | Philipp Wolf |
| Section diameter, 2·r _w (m): | 0.0 | 076 Responsible for | | Crist | tian Enachescu |
| Linear plot Q and p | | test evaluation: Flow period | | Recovery period | |
| linear plot & and p | | Indata | | Indata | |
| | | $p_0 (kPa) =$ | 2034 | | |
| 2000 KLX16A_207.00-227.00_070315_1_CHir_Q_r | • P accion • P accen • P below | p ₀ (kPa) = | 2034 | | |
| 2300 | · · · | $p_{i}(kPa) =$ | | p _F (kPa) = | 202 |
| | 1 | | | | 2033 |
| 2100 | | $Q_{p} (m^{3}/s) =$ | 3.36E-04 | | 120 |
| 2000 | | tp (s) = | | t _F (s) = | 1200 |
| 1900 | | $S el S^* (-)=$ | 1.00E-06 | S el S [*] (-)= | 1.00E-00 |
| | | [*] EC _w (mS/m)= | | | |
| 1800 | | Temp _w (gr C)= | 9.7 | | |
| 1700 - | · | Derivative fact.= | 0.06 | Derivative fact.= | 0.0 |
| | Mar se se a constantin a de se | | | | |
| 1600 0.20 0.40 0.60 Elepte | 0.80 1.00 1.20 1.40 d Time (h) | Results | | Results | |
| | | | 1.7E-05 | | 1 |
| .og-Log plot incl. derivates- f | low pariod | $Q/s (m^2/s) =$ | 1.7E-05 | | |
| .og-Log plot lifel. derivates- li | | T _M (m ² /s)= Flow regime: | transient | Flow regime: | transient |
| | | dt_1 (min) = | | $dt_1 (min) =$ | 2.6 |
| Elapsed time [h] | . 10, ⁻² 10, ⁻¹ 10, ⁰ | , | | | 8.88 |
| | - 10 ⁻¹ | dt_2 (min) = | | dt_2 (min) = | |
| | 10 | 1 (1175) = | | $T(m^2/s) =$ | 5.8E-0 |
| | 0.03 | S (-) = | 1.0E-06 | 17 | 1.0E-0 |
| 10 1 | : | $K_s (m/s) =$ | | $K_s (m/s) =$ | 2.9E-0 |
| | 1 0 ⁻² | $S_{s}(1/m) =$ | | $S_{s}(1/m) =$ | 5.0E-0 |
| | • | ^{ww} C (m ³ /Pa) = | NA | $C (m^{3}/Pa) =$ | 5.1E-1 |
| 10 ° | 0.003 | C _D (-) = | NA | C _D (-) = | 5.6E-0 |
| • . | 10 -3 | ξ(-) = | 10.5 | ξ(-) = | 13.0 |
| | | | | | |
| 10 ⁻¹³ 10 ⁻¹⁴ 10 ⁻¹⁵ | 3E-4 10 ¹⁶ 10 ¹⁷ 10 ¹⁸ | TGRF(III /0) | NA | $T_{GRF}(m^2/s) =$ | NA |
| л. | | S _{GRF} (-) = | NA | S _{GRF} (-) = | NA |
| | | $D_{GRF}(-) =$ | NA | D _{GRF} (-) = | NA |
| .og-Log plot incl. derivatives- | recovery period | Selected represe | • . • . • . • . • . • . • . • . • . • . | | |
| | | $dt_1 (min) =$ | 0.97 | 0 (iii /i u) | 5.1E-1 |
| Elapsed time [h | ا | dt_2 (min) = | | C _D (-) = | 5.6E-0 |
| | | $T_{T} (m^{2}/s) =$ | 5.3E-05 | ξ(-) = | 13.0 |
| | 300 | () | 1.0E-06 | | |
| | | $K_s (m/s) =$ | 2.7E-06 | | |
| 0 0 0 000000000000000000000000000000000 | | 5() | | | |
| 10 | 10 ⁻¹ | $S_{s}(1/m) =$ | 5.0E-08 | | |
| 10 | | 2 | 5.0E-08 | | |
| 10 % | w ¹ | S _s (1/m) = Comments: The recommended | ransmissivity o | f 5.3E-05 m2/s was | |
| | 90 30 90 | $S_s (1/m) =$ Comments: The recommended the analysis of the CHi | ransmissivity o | f 5.3E-05 m2/s was hows the best horizon | ntal |
| | | S _s (1/m) = Comments: The recommended analysis of the CHi stabilization. The co | ransmissivity of phase, which should be range | f 5.3E-05 m2/s was hows the best horizon for the interval trans | ntal smissivity is |
| | 20 20 20 3 | S _s (1/m) = Comments: The recommended analysis of the CHi stabilization. The co estimated to be 2.01 | ransmissivity of phase, which sh onfidence range E-05 m2/s to 9.0 | f 5.3E-05 m2/s was ows the best horizon for the interval trans E-05 m2/s. The flow | ntal smissivity is v dimension |
| | | S _s (1/m) = Comments: The recommended analysis of the CHi stabilization. The co estimated to be 2.0I displayed during the | ransmissivity of phase, which sh onfidence range 2-05 m2/s to 9.0 e test is 2. The s | f 5.3E-05 m2/s was hows the best horizon for the interval trans | ntal smissivity is v dimension ıred at |

| | Test Su | ımn | nary Sheet | - | | |
|---|---|---------------|---|------------------|--|---------------|
| Project: | Oskarshamn site investiga | ation | Test type:[1] | | | CHi |
| Area: | Laxe | emar | Test no: | | | 1 |
| Borehole ID: | KLX | (16A | Test start: | | | 070316 00:49 |
| Test section from - to (m): | 227 00-247 (|)0 m | Responsible for | | | Stephan Rohs |
| | 221.00 241.0 | | test execution: | | | Philipp Wol |
| Section diameter, 2·r _w (m): | 0 | .076 | Responsible for | | Crist | ian Enachescu |
| | | | test evaluation: | | | |
| Linear plot Q and p | | | Flow period | | Recovery period | |
| | | | Indata | | Indata | |
| 2000 | •P action | | p ₀ (kPa) = | 2215 | | |
| KLX16A_227.00-347.00_070316_1_CHir_Q_r | ● praction ● bacon ● bacon ● bacon ● Co | | p _i (kPa) = | 2214 | | |
| | | 1.20 | p _p (kPa) = | 2411 | p _F (kPa) = | 221- |
| 2400 | | | Q _p (m ³ /s)= | 1.32E-05 | | |
| 200 | | - 0.80 E | tp (s) = | | t _F (s) = | 120 |
| 2200 | | ion Rate (Tám | S el S [*] (-)= | 1.00E-06 | S el S [*] (-)= | 1.00E-0 |
| 2100 | | ideot | EC _w (mS/m)= | | | |
| | | 0.40 | Temp _w (gr C)= | 10.0 | | |
| | | | Derivative fact.= | 0.03 | Derivative fact.= | 0.0 |
| 1900- - | | • 0.20 | | | | |
| 1900 020 0.40 0.60 Elipsed | 0.80 1.00 1.20 1.40 Time [h] | L | Results | | Results | |
| | | | Q/s (m²/s)= | 6.6E-07 | | 1 |
| .og-Log plot incl. derivates- fl | ow period | | $T_{\rm M} (m^2/s) =$ | 6.9E-07 | | |
| | | | Flow regime: | transient | Flow regime: | transient |
| Elapsed time | | | dt_1 (min) = | | dt_1 (min) = | 0.8 |
| 10 ² | ······································ | • | $dt_2 (min) =$ | | dt_2 (min) = | 4.34 |
| | | 3 | 2 | | 2 | 4.1E-0 |
| | | | , , | 1.0E-06 | | 4.1E-0 |
| | - + @ @ 3 & cos differenting and a second | 10 ° | 5() | | | |
| 10 1 | | | $K_s(m/s) =$ | | | 2.1E-0 |
| 1 | | 0.3 | $S_{s}(1/m) =$ | | $S_{s}(1/m) =$ | 5.0E-0 |
| | • | -10, [m] | C (m ³ /Pa) = | NA | C (m ³ /Pa) = | 7.1E-1 |
| 10 0 | | 10 4 | C _D (-) = | NA | C _D (-) = | 7.8E-0 |
| | | 0.03 | ξ(-) = | 9.7 | ξ(-) = | 32.3 |
| · · · · | | 10 -2 | T _{GRF} (m²/s) = | NA | T _{GRF} (m ² /s) = | NA |
| 10 ¹¹ 10 ¹² | 10 ¹³ 10 ¹⁴ 10 ¹ D | 5 | $S_{GRF}(-) =$ | NA | $S_{GRF}(-) =$ | NA |
| | | | $D_{GRF}(-) =$ | NA | $D_{GRF}(-) =$ | NA |
| .og-Log plot incl. derivatives- | recovery period | | Selected represe | intative paran | | |
| | | | dt ₁ (min) = | | C (m ³ /Pa) = | 7.1E-1 |
| _10_6 Elapsed time [h] | | | dt_2 (min) = | | $C_{D}(-) =$ | 7.8E-0 |
| 10 2 | 300 | | $T_{T} (m^{2}/s) =$ | 1.8E-06 | | 9.1 |
| | = +0.00000000000000000000000000000 | | S(-) = | 1.0E-06 | | J. |
| | 10 | 2 | K _s (m/s) = | 9.0E-08 | | |
| 10 1 | | | $S_{s}(1/m) =$ | 5.0E-08 | | |
| | 30 | | Comments: | 0.0∟-00 | | |
| | - 10 | 8 | | | 1 OF 06 2/ | 1 |
| | | 0, (b | The recommended t analysis of the CHi | | | |
| | · · · · · · · · · · · · · · · · · · · | | The confidence range | | | |
| | • | | 8.0E-07 m2/s to 5.0 | E-06 m2/s. The | flow dimension dis | played during |
| 1 | 10 | | the test is 2. The sta | tic pressure mea | sured at transducer | depth, was |
| | | | | | | |
| 10 ¹ 10 ² tD/CD | 10 ³ 10 ⁴ 10 ⁵ | | derived from the CH Horner plot to a val | | | lation in the |

| | Test Su | ımn | nary Sheet | | | |
|---|---|------------------|---|-------------------|---|-----------------|
| Project: | Oskarshamn site investiga | ation | Test type:[1] | | | CHi |
| Area: | Laxe | emar | Test no: | | | |
| Borehole ID: | KLX | (16A | Test start: | | | 070316 07:30 |
| Test section from - to (m): | 247 00-267 (|)0 m | Responsible for | | | Stephan Roh |
| | 247.00-207.0 | | test execution: | | | Philipp Wol |
| Section diameter, 2·r _w (m): | 0 | .076 | Responsible for | | Crist | tian Enachescu |
| | | | test evaluation: | | | |
| ₋inear plot Q and p | | | Flow period | | Recovery period | |
| | | | Indata | | Indata | 1 |
| 2000 KLX18A_247.05-287.00_070316_1_CH/r_O_r | • P action | | p ₀ (kPa) = | 2393 | | |
| 2700 | P sector P below P below Q | | p _i (kPa) = | 2386 | | |
| 2000 | | | p _p (kPa) = | 2586 | p _F (kPa) = | 238 |
| | | 1.50 | Q _p (m ³ /s)= | 2.08E-05 | | |
| | The second se | - | tp (s) = | 1200 | t _F (s) = | 120 |
| 2000 | | s Ratio (rmin) | S el S [*] (-)= | 1.00E-06 | S el S [*] (-)= | 1.00E-0 |
| 230 | | 1.00 Judgoolu | EC _w (mS/m)= | | \/ | |
| 2200 | | | Temp _w (gr C)= | 10.3 | | |
| 2100 | | 0.50 | Derivative fact.= | | Derivative fact.= | 0.0 |
| 200 | a Salahan Marka ang Kang Kang Kang Kang Kang Kang Kang | | | 0.00 | | 0.0 |
| 100 | 0.00 1.00 1.20 1.40 | 0.00 | Deculto | | Deculto | |
| | | | Results | | Results | 1 |
| | <u> </u> | | Q/s (m ² /s)= | 1.0E-06 | | |
| .og-Log plot incl. derivates- flo | ow period | | T _M (m²/s)= | 1.1E-06 | | |
| | | | Flow regime: | transient | Flow regime: | transient |
| Elapsed time [h] | 10.2 10.1 | | dt ₁ (min) = | 0.46 | dt ₁ (min) = | 0.4 |
| 10 2 | | | dt ₂ (min) = | 15.18 | dt ₂ (min) = | 4.3 |
| | | | T (m²/s) = | 2.1E-06 | T (m²/s) = | 6.4E-0 |
| 10 1 | 1 - C | 10 ⁰ | S (-) = | 1.0E-06 | | 1.0E-0 |
| | | | $K_s (m/s) =$ | | $K_s (m/s) =$ | 3.2E-0 |
| | | | $S_{s}(1/m) =$ | | $S_{s}(1/m) =$ | 5.0E-0 |
| 10 " | | | C (m ³ /Pa) = | NA | C (m ³ /Pa) = | 6.2E-1 |
| | | 5 | | | , , | 6.8E-0 |
| · · | | 10 -2 | | NA | -D() | |
| 10 ⁻¹ | | | ξ(-) = | 0.1 | ξ(-) = | 32. |
| | 1 | 10 ⁻³ | T _{GRF} (m²/s) = | NA | T _{GRF} (m²/s) = | NA |
| 10 ^{°°} 10 ^{°°} tD | 10 ¹⁰ 10 ¹¹ 10 ¹² | | $S_{GRF}(-) =$ | NA | $S_{GRF}(-) =$ | NA |
| | | | $D_{GRF}(-) =$ | NA | $D_{GRF}(-) =$ | NA |
| ag Log plot incl. dorivativos | racovery period | | | | | |
| .og-Log plot incl. derivatives- | recovery period | | Selected represe | | · . · . · . · . · . · . · . · . · . · . | |
| | | | $dt_1 (min) =$ | | C (m ³ /Pa) = | 6.2E-1 |
| 0 2 10,-5 10,-4 | .10, ⁻² 10, ⁻¹ 10, ⁰ | | dt_2 (min) = | | C _D (-) = | 6.8E-0 |
| | 300 | | $T_T (m^2/s) =$ | 2.1E-06 | | 6. |
| | | 2 | S (-) = | 1.0E-06 | | |
| | 10 | 2 | K _s (m/s) = | 1.1E-07 | | |
| • 1 | | | S _s (1/m) = | 5.0E-08 | | |
| | 30 | <u>8</u> | Comments: | | | |
| | 10 | - (p-p0) (kf | The recommended t | ransmissivity of | 2.1E-06 m2/s was | derived from th |
| . \ | | | analysis of the CHi | | | |
| · · · · | 3 | | The confidence rang | ge for the interv | al transmissivity is e | estimated to be |
| | | | 9.0E-07 m2/s to 5.0 | | | |
| | | | the test is 7. The ste | tio measure mass | gurad at transdugar | denth was |
| | 10 | | the test is 2. The sta | | | |
| 10 ¹ 10 ¹ 10 ³ 10 ³ | 10 ⁻⁴ 10 ⁻⁶ | | derived from the CF Horner plot to a val | Iir phase using | straight line extrapo | |

| | Test Sumr | nary Sheet | | | |
|--|--|--|--------------------|--|------------------|
| Project: | Oskarshamn site investigation | Test type:[1] | | | CHi |
| Area: | Laxemar | Test no: | | | 2 |
| Borehole ID: | KLX16A | Test start: | | | 070316 10:58 |
| Test section from - to (m): | 267.00-287.00 m | Responsible for | | | Stephan Rohs |
| | | test execution: | | | Philipp Wol |
| Section diameter, 2·r _w (m): | 0.076 | Responsible for | | Crist | ian Enachesc |
| incomplet Q and p | | test evaluation: Flow period | | mercenter | |
| ₋inear plot Q and p | | | | Recovery period | |
| | | Indata | 2502 | Indata | |
| 2005 KLX16A, 247.00-287.00_070316,2_CHr_Q_r | P nuclon S0 00 P noon P blow | p ₀ (kPa) = | 2582 | | |
| 2000 | - P below - Q = 25.00 | p _i (kPa) = | 2563 | | |
| 2700 | | p _p (kPa) = | | p _F (kPa) = | 256 |
| | 20.00 | Q _p (m ³ /s)= | 2.55E-04 | | |
| ···· | 5.00 <u>F</u> | tp (s) = | | t _F (s) = | 120 |
| 2000 | officer Reads | S el S [*] (-)= | 1.00E-06 | S el S [*] (-)= | 1.00E-0 |
| 5430- | 1000 g | EC _w (mS/m)= | | | |
| 2000 | 5.00 | Temp _w (gr C)= | 10.3 | | |
| | · | Derivative fact.= | 0.00 | Derivative fact.= | 0.0 |
| 2200 | | | | | |
| 2006 020 040 000 000 000 000 000 000 000 000 | Gao 100 120 400 | Results | | Results | |
| | | Q/s (m²/s)= | 1.3E-05 | | |
| og-Log plot incl. derivates- fl | low period | $T_{\rm M} (m^2/s) =$ | 1.3E-05 | | |
| 0 01 | • | Flow regime: | transient | Flow regime: | transient |
| Elapsed time (h) | | dt_1 (min) = | | dt_1 (min) = | 3.1 |
| 10 ² | | dt_2 (min) = | | dt_2 (min) = | 14.4 |
| | 0.3 | $T(m^2/s) =$ | | $T(m^2/s) =$ | 3.8E-0 |
| | | S (-) = | 1.0E-06 | . , | 1.0E-0 |
| 10 | 10 ⁻¹ | $\frac{S(-)}{K_{s}(m/s)} =$ | | K_{s} (m/s) = | 1.9E-0 |
| | 0.03 | | | $S_{s}(11/s) = S_{s}(1/m) =$ | |
| | | $S_{s}(1/m) =$ | 5.0E-06 | <u>,</u> | 5.0E-0 3.2E-1 |
| | 10 ⁻² \$2 | $C (m^{3}/Pa) =$ | | C (m ³ /Pa) = | |
| 10 0 | | C _D (-) = | NA | C _D (-) = | 3.5E-0 |
| | 0.003 | ξ(-) = | 2.4 | ξ(-) = | -4. |
| | 10-3 | T _{GRF} (m ² /s) = | NA | T _{GRF} (m ² /s) = | NA |
| 10 ⁶ 10 ⁷ tD | 10 ⁶ 10 ⁶ 10 ¹⁶ | $S_{GRF}(-) =$ | NA | $S_{GRF}(-) =$ | NA |
| | | $D_{GRF}(-) =$ | NA | $D_{GRF}(-) =$ | NA |
| .og-Log plot incl. derivatives- | recovery period | Selected represe | | | L |
| | | dt ₁ (min) = | | C (m ³ /Pa) = | 3.2E-1 |
| Elapsed time [h] | J 0 | $dt_1(min) =$ $dt_2(min) =$ | | $C_{D}(-) =$ | 3.5E-0 |
| 10 10 10 10 10 10 10 10 10 10 10 10 10 1 | | $T_{T} (m^2/s) =$ | 2.2E-05 | | 3.5⊑-0 |
| | | $I_{T} (m^{-}/s) =$ S (-) = | 2.2E-05 1.0E-06 | | |
| | 300 | | 1.0E-06 4.4E-06 | | |
| 10 ° | 10 ² | · ·s (·····•) | | | |
| | | S _s (1/m) = | 2.0E-07 | | |
| | 30 (194 | Comments: | • • •. ·. | | 1 · 10 · |
| 10 4 | | The recommended analysis of the CHi | | f 2.2E-05 m2/s was | |
| • | 10 ¹ | | | al transmissivity is e | |
| | 3 | 9.0E-06 m2/s to 5.0 | | | |
| | | the test is 2. The sta | tic pressure mea | asured at transducer | depth, was |
| 10 ¹ 10 ² | 10 ⁻³ 10 ⁻⁴ 10 ⁻⁵ | derived from the CI | Hir phase using | straight line extrapol | lation in the |
| 10 10 tD/CE | | Horner plot to a val | | | |

| | Test Sı | ımn | nary Sheet | | | |
|---|--|--|--|--------------------|--|-------------------------------|
| Project: | Oskarshamn site investig | ation | Test type:[1] | | | CHir |
| Area: | Laxe | emar | Test no: | | | 1 |
| Borehole ID: | KI X | (164 | Test start: | | | 070316 13:27 |
| Dorendie ID. | | | | | | 070310 13.27 |
| Test section from - to (m): | 287.00-307.0 | | Responsible for | | | Stephan Rohs |
| Section diameter, 2·r _w (m): | 0 | | test execution: Responsible for | | Crist | Philipp Wolf ian Enachescu |
| | | | test evaluation: | | | |
| Linear plot Q and p | | | Flow period | | Recovery period | |
| | | | Indata | 07.01 | Indata | |
| 2000 KLX16A_287.00-307.00_070316_1_CHir_Q_r | ●P section ● P sectors | 20 | p ₀ (kPa) = p _i (kPa) = | 2741 | | |
| 2000 | ●P section ←P section ←P balance ←Q | | | 2746 | n (kPa) - | 274 |
| 2000 | | - 15 | $p_p(kPa) =$ | 2933 1.18E-05 | p _F (kPa) = | 2746 |
| | | | $Q_p (m^3/s) =$ tp (s) = | | t _r (s) = | 1200 |
| | | Denied | (°) | | + (C) | 1.00E-06 |
| 2 2000 - C 200 | | <u>a</u> | S el S [*] (-)= EC _w (mS/m)= | 1.00E-00 | S el S [*] (-)= | 1.00E-00 |
| 8 2009 | | - | EC_w (mo/m)= Temp _w (gr C)= | 10.9 | | |
| 2000 | | - 05 | Derivative fact.= | | Derivative fact.= | 0.02 |
| 2400- | | | | 0.04 | | 0.02 |
| 2000 0.20 0.40 0.60 | 0.40 1.00 1.20 1.40 | | | | | |
| Elapsed | Time (h) | | Results | | Results | |
| | | | Q/s (m²/s)= | 6.2E-07 | | |
| Log-Log plot incl. derivates- fl | ow period | | T _M (m²/s)= | 6.5E-07 | | |
| | | | Flow regime: | transient | Flow regime: | transient |
| Elapsed time (h | ¹ | | dt ₁ (min) = | 1.30 | dt ₁ (min) = | #NV |
| 10 2 | | | dt ₂ (min) = | 15.72 | dt ₂ (min) = | #NV |
| | | 3 | T (m²/s) = | 1.9E-06 | T (m²/s) = | 2.7E-06 |
| · · · · · · · · · · · · · · · · · · · | | 10 ° | S (-) = | 1.0E-06 | | 1.0E-0 |
| 10 1 | | | K _s (m/s) = | 9.5E-08 | $K_s (m/s) =$ | 1.4E-0 |
| | | 0.3 | S _s (1/m) = | 5.0E-08 | S _s (1/m) = | 5.0E-08 |
| | | (Inim) (pit | C (m³/Pa) = | NA | C (m³/Pa) = | 2.5E-0 |
| 10 * | 1 | 10 ⁻¹ ¹ ¹ | C _D (-) = | NA | C _D (-) = | 2.8E-0 |
| • | | 0.03 | ξ(-) = | 11.9 | ξ(-) = | 19.1 |
| | | | | | | |
| · · · · · · · · · · · · · · · · · · · | * * | 10 -2 | T _{GRF} (m²/s) = | NA | T _{GRF} (m ² /s) = | NA |
| 10 ¹³ 10 ¹⁴ 10 ¹⁵ 10 | 10 ^{.16} 10 ^{.17'} 10 ^{.11} | | S _{GRF} (-) = | NA | S _{GRF} (-) = | NA |
| | | | D _{GRF} (-) = | NA | D _{GRF} (-) = | NA |
| Log-Log plot incl. derivatives- | recovery period | | Selected represe | entative paran | ieters. | |
| | | | dt ₁ (min) = | 1.30 | C (m³/Pa) = | 2.5E-09 |
| Elapsed time [h] | 10 ¹ | | dt ₂ (min) = | 15.72 | C _D (-) = | 2.8E-01 |
| 10 | | | $T_{T} (m^{2}/s) =$ | 1.9E-06 | ξ(-) = | 11.9 |
| | * | 10 | S (-) = | 1.0E-06 | | 1 |
| | 110 | 2 | K _s (m/s) = | 9.5E-08 | | |
| 10 10 | Set and the set of the | | S _s (1/m) = | 5.0E-08 | | |
| ;/.· | at a | [8] | Comments: | | | |
| • • • | | - | The recommended | transmissivity of | 1.9E-06 m2/s was | derived from the |
| 10 * | · · · · | | analysis of the CHi | phase, which sh | ows a horizontal sta | bilization. The |
| | 3 | | confidence range for $0.7 \text{ m}^{2/3}$ to 5.0 E 06 | | | |
| | | | 07 m2/s to 5.0E-06 is 2. The static pres | | | |
| | - | | | | | |
| 10 [°] 10 ¹ | 10 ² 10 ³ 10 ⁴ | | from the CHir phas | e using straight l | ine extrapolation in | the Horner plot |

| Project: Oskarshamn site investig | | nary Sheet | | | |
|--|---------------------------------|--|---|--|------------------|
| | gation | Test type:[1] | | | CHir |
| Area: Lax | kemar | Test no: | | | 1 |
| Borehole ID: KL | X16A | Test start: | | | 070316 15:27 |
| Test section from - to (m): 307.00-327 | 00 m | Responsible for | | | Stephan Rohs |
| | | test execution: | | | Philipp Wolf |
| Section diameter, $2 \cdot r_w$ (m): | 0.076 | Responsible for | | Crist | ian Enachescu |
| | | test evaluation: | | | |
| Linear plot Q and p | | Flow period | | Recovery period | |
| | | Indata | 1 | Indata | |
| 342 | 0.00 | p ₀ (kPa) = | 2919 | | |
| ۲۹ سندی ۲۹ سندی ۱۹ سندی ۱۹ سندی ۱۹ سندی ۱۹ سندی ۱۹ سندی | 0.00 | p _i (kPa) = | 2923 | | |
| - | | p _p (kPa) = | 3127 | p _F (kPa) = | 2947 |
| | 0.07 | $Q_{p} (m^{3}/s) =$ | 5.67E-07 | | |
| 300 | 0.06 | tp (s) = | 1200 | t _F (s) = | 1200 |
| | Rate [inter | S el S [*] (-)= | 1.00E-06 | S el S [*] (-)= | 1.00E-06 |
| | in the second | EC _w (mS/m)= | | () | |
| 300- | 0.00 | Temp _w (gr C)= | 11.2 | | |
| : . | 0.02 | Derivative fact.= | 0.05 | Derivative fact.= | 0.02 |
| 200 | - 0.01 | | | | |
| 200 620 640 600 500 10 10 10 10 10 10 | 1.60 | D # | | D 11 | |
| | | Results | 0.75.00 | Results | |
| | | Q/s (m^{2}/s)= | 2.7E-08 | | |
| Log-Log plot incl. derivates- flow period | | Τ _M (m²/s)= | 2.9E-08 | | |
| | | Flow regime: | transient | Flow regime: | transient |
| Elapsed time [h] | - | dt ₁ (min) = | | dt ₁ (min) = | 2.05 |
| 10 | | dt_2 (min) = | | $dt_2 (min) =$ | 18.30 |
| | - | $T(m^{2}/s) =$ | 1.4E-08 | T (m²/s) = | 1.1E-08 |
| 10 1 | 10 2 | S (-) = | 1.0E-06 | S (-) = | 1.0E-06 |
| | - | $K_s (m/s) =$ | 7.0E-10 | K _s (m/s) = | 5.5E-10 |
| | | $S_{s}(1/m) =$ | 5.0E-08 | S _s (1/m) = | 5.0E-08 |
| | 10 Guiul Ja | C (m ³ /Pa) = | NA | C (m ³ /Pa) = | 3.9E-11 |
| | Mq. (1) | $\frac{C_{\rm D}(-)}{C_{\rm D}(-)} =$ | NA | $C_{D}(-) =$ | 4.3E-03 |
| 10 -1 | 10 ° | ξ(-) = | | ξ(-) = | -1.9 |
| | | · () | | () د | |
| | | T _{GRF} (m ² /s) = | NA | $T_{GRF}(m^2/s) =$ | NA |
| 10 ⁰ 10 ¹ 10 ² 10 ³ 1 | 0 ⁴ 10 ⁻¹ | $S_{GRF}(-) =$ | NA | $S_{GRF}(-) =$ | NA |
| | | $D_{GRF}(-) =$ | NA | $D_{GRF}(-) =$ | NA |
| Log-Log plot incl. derivatives- recovery period | | Selected represe | | | |
| Log-Log plot lifel. derivatives- recovery period | | | • | | |
| Piezza (m. 54 | | dt_1 (min) = | | C (m ³ /Pa) = | 3.9E-11 |
| Lapseo ume (n) | 7 | $dt_2 (min) =$ | | C _D (-) = | 4.3E-03 |
| | ł | $T_T (m^2/s) =$ | 1.1E-08 | | -1.9 |
| 10 1 | 10 3 | S (-) = | 1.0E-06 | | |
| | - | $K_s (m/s) =$ | 5.5E-10 | | |
| 10 4 | 10 2 | S _s (1/m) = | 5.0E-08 | | |
| and a second and a second and a second | , s | Comments: | | | |
| | 10 (00-0) | | | f 1.1E-08 m2/s was | |
| | 10 8 | | | hows a better deriva | |
| | | | | insmissivity is estim | |
| 10 ~ | 10 ° | 09 m2/s to 3.0E-08 | | dimension displayed t transducer depth, v | |
| | ł | | | line extrapolation in | |
| 10 ⁰ 10 ¹ 10 ² 10 ³ | 10 4 | to a value of 2,911. | | e estrupolation III | the riother plot |
| | | 2- | | | |

| | Test S | umn | nary Sheet | | | |
|--|--|---------------------------------|---|---|--|--|
| Project: | Oskarshamn site investig | ation | Test type:[1] | | | Р |
| Area: | Lax | emar | Test no: | | | 1 |
| | | | | | | |
| Borehole ID: | KL | X16A | Test start: | | | 070316 17:41 |
| Test section from - to (m): | 327.00-34 | 47.00 | Responsible for | | | Stephan Rohs |
| | | | test execution: | | | Philipp Wolf |
| Section diameter, 2·r _w (m): | | | Responsible for | | Crist | ian Enachescu |
| Linear plot Q and p | | | test evaluation: Flow period | | Recovery period | |
| | | | Indata | | Indata | |
| | | | p ₀ (kPa) = | 3101 | | |
| 1420 KLX16A_327.00-347.00_070316_1_PI_Q_F | P pacton P pacon P pacon P pacon C | 3.00 | p _i (kPa) = | 3108 | | |
| 3320 | · a | • 2.50 | p _p (kPa) = | 3380 | p _F (kPa) = | 3114 |
| 2201 | | | $\overline{Q_p(m^3/s)}=$ | NA | | - |
| 3100 | | 2.00 | $\frac{dp(m/d)}{tp(s)} =$ | 10.2 | t _F (s) = | 1440 |
| | f:::::: | i B Ban Rado ()/min) | S el S [*] (-)= | | S el S [*] (-)= | 1.00E-00 |
| | | - Fije clion R | EC _w (mS/m)= | | () | |
| 2850 | | 1.00 | Temp _w (gr C)= | 11.4 | | |
| 2850 | | | Derivative fact.= | NA | Derivative fact.= | 0.0 |
| 2750 | | * 0.50 | | | | |
| | 2.29 3.00 3.50 4.00 4.50 | 5.00 | | | | |
| Elap | 2.50 3.00 3.50 4.00 4.50 and Time [h] | | Results | | Results | |
| | | | Q/s (m ² /s)= | NA | | |
| Log-Log plot incl. derivates- | flow period | | T _M (m²/s)= | AN | | |
| | | | Flow regime: | transient | Flow regime: | transient |
| | | | dt ₁ (min) = | NA | dt ₁ (min) = | NA |
| | | | dt ₂ (min) = | NA | dt_2 (min) = | NA |
| | | | T (m²/s) = | NA | T (m²/s) = | 3.9E-1 |
| | | | S (-) = | NA | S (-) = | 1.0E-0 |
| | | | $K_{s} (m/s) =$ | NA | $K_s (m/s) =$ | 2.0E-1 |
| Not : | analysed | | $S_{s}(1/m) =$ | NA | S _s (1/m) = | 5.0E-0 |
| | and joba | | C (m³/Pa) = | NA | C (m³/Pa) = | 9.7E-1 |
| | | | $C_D(-) =$ | NA | $C_D(-) =$ | 1.1E-0 |
| | | | ξ(-) = | NA | ξ(-) = | -0.2 |
| | | | | | | |
| | | | T _{GRF} (m ² /s) = | NA | $T_{GRF}(m^2/s) =$ | NA |
| | | | S _{GRF} (-) = | NA | S _{GRF} (-) = | NA |
| | | | $D_{GRF}(-)$ = | NA | D _{GRF} (-) = | NA |
| -og-Log plot incl. derivatives | - recovery period | | Selected represe | • | • | |
| 40 ⁻³ Elapsed tim | ne (h) | | dt_1 (min) = | NA | C (m ³ /Pa) = | 9.7E-1 |
| 10 2 | | 7 | $dt_2 (min) =$ | | $C_{D}(-) =$ | 1.1E-02 |
| 1 | | 10 ° | $T_T (m^2/s) =$ | 3.9E-11 | | -0.2 |
| - | and the second s | 1 | S (-) = K _s (m/s) = | 1.0E-06 | | |
| | | 1 | | 2.0E-12 | | |
| 10 1 | | 0.3 | | | | |
| 10 | | 0.3 | S _s (1/m) = | 5.0E-08 | | |
| 10 | | 1 | S _s (1/m) = Comments: | 5.0E-08 | | demiserad Cr. d. |
| | | 10 ⁻¹ resad pt normo | S _s (1/m) = Comments: The recommended | 5.0E-08 transmissivity of | f 3.9E-11 m2/s was | |
| 10 10 | | 10 ⁻¹ | S _s (1/m) = Comments: | 5.0E-08 transmissivity of hase (inner zone | f 3.9E-11 m2/s was). The confidence ra | nge for the |
| | | 10 ⁻¹ resad | $S_s (1/m) =$ Comments: The recommended analysis of the Pi pl interval transmissiv analysis was condu | 5.0E-08 transmissivity of hase (inner zone ity is estimated cted using a flow | f 3.9E-11 m2/s was). The confidence ra to be 2.0E-11 to 2.0 v dimension of 2. Th | nge for the E-10 m2/s. The ne static |
| | | 10 ⁻¹ resad | $S_s (1/m) =$ Comments: The recommended analysis of the Pi pl interval transmissiv | 5.0E-08 transmissivity of hase (inner zone ity is estimated cted using a flow | f 3.9E-11 m2/s was). The confidence ra to be 2.0E-11 to 2.0 v dimension of 2. Th | nge for the E-10 m2/s. The ne static |

| | Test Sumr | nary Sheet | | | |
|--|---|--|---|--|--|
| Project: | Oskarshamn site investigation | Test type:[1] | | | CHi |
| Area: | Laxemar | Test no: | | | 1 |
| Borehole ID: | KI X164 | Test start: | | | 070317 08:35 |
| | | | | | |
| Test section from - to (m): | 347.00-367.00 m | Responsible for test execution: | | | Stephan Rohs Philipp Wol |
| Section diameter, 2·r _w (m): | 0.076 | Responsible for | | Crist | tian Enachescu |
| | | test evaluation: | | | |
| Linear plot Q and p | | Flow period | | Recovery period | 1 |
| | | Indata | | Indata | |
| 3005 | 0.20 | p ₀ (kPa) = | 3276 | | |
| KLX16A_347.00-367.00_070317_1_Chir_Q_r | P socian Phone Phone Pointer * Q | p _i (kPa) = | 3269 | | |
| | | p _p (kPa) = | 3469 | p _F (kPa) = | 328 |
| | 0.15 | Q _p (m ³ /s)= | 1.60E-06 | | |
| 2000 | | tp (s) = | 1200 | t _F (s) = | 120 |
| 3390- | | S el S [*] (-)= | 1.00E-06 | S el S [*] (-)= | 1.00E-0 |
| | gpool4 | EC _w (mS/m)= | | | |
| | | Temp _w (gr C)= | 11.7 | | |
| 3000 | - - az | Derivative fact.= | 0.03 | Derivative fact.= | 0.0 |
| 2000 | | | | | |
| 2000 0.00 0.40 0.60 0.80 0.00 0.20 0.40 0.60 0.80 Elapsed Time | 1.00 1.20 1.40 1.60 [0] | Results | | Results | |
| | | | 7.8E-08 | | 1 |
| | | Q/s $(m^{2}/s)=$ | 7.8E-08 8.2E-08 | | |
| og-Log plot incl. derivates- flo | w period | T _M (m ² /s)= | | | |
| | | Flow regime: | transient | Flow regime: | transient |
| 24 | 10 ⁻¹ | dt_1 (min) = | | dt ₁ (min) = | 12.0 |
| 0 | F 10 ² | dt_2 (min) = | | dt_2 (min) = | 17.5 |
| | | T (m²/s) = | | T (m²/s) = | 4.2E-0 |
| | 30 | S (-) = | 1.0E-06 | | 1.0E-0 |
| 10 ¹ | | K_{s} (m/s) = | | K _s (m/s) = | 2.1E-0 |
| • • • • • • • • • • • • • • • • • • • | 10 ' | S _s (1/m) = | 5.0E-08 | S _s (1/m) = | 5.0E-0 |
| | (but and a second se | C (m ³ /Pa) = | NA | C (m³/Pa) = | 9.7E-10 |
| 10 * | · · · · · · · · · · · · · · · · · · · | C _D (-) = | NA | C _D (-) = | 1.1E-0 |
| | 10 ° | ξ(-) = | -0.5 | ξ(-) = | -2.3 |
| | · • • | | | 2 | |
| 10 ² 10 ³ | 10 ⁴ 10 ⁵ 10 ⁶ | $T_{GRF}(m^2/s) =$ | NA | $T_{GRF}(m^2/s) =$ | NA |
| 2 | | S _{GRF} (-) = | NA | S _{GRF} (-) = | NA |
| | | $D_{GRF}(-) =$ | NA | D _{GRF} (-) = | NA |
| .og-Log plot incl. derivatives- r | ecovery period | Selected represe | • | | |
| | | dt_1 (min) = | | C (m³/Pa) = | 9.7E-1 |
| Elapsed time (h) | | dt ₂ (min) = | 17.04 | $C_D(-) =$ | 1.1E-0 |
| | | $T_{T} (m^{2}/s) =$ | 6.7E-08 | ξ(-) = | -0. |
| | 300 | S (-) = | 1.0E-06 | | |
| | 10 ² | K _s (m/s) = | 3.4E-09 | | |
| 10 ° | and the second s | S _s (1/m) = | 5.0E-08 | | |
| 1 | 30 | Comments: | | - | |
| | | T 1 1 1. | transmissivity o | f 6.7E-08 m2/s was | derived from th |
| | | The recommended | | | |
| 10-4 | 10 ' 9 | analysis of the CHi | phase, which sh | ows a horizontal sta | |
| 10 ⁴ | 10 [°] 90 | analysis of the CHi confidence range for | phase, which shor the interval tra | ows a horizontal sta ansmissivity is estim | ated to be 3.0E- |
| 10 -1 | 10 ' 50 10 ' 50 10 ' 50 10 10 10 10 10 10 10 10 10 10 10 10 10 | analysis of the CHi confidence range fo 08 m2/s to 8.0E-08 | phase, which shor the interval tra m2/s. The flow | ows a horizontal sta ansmissivity is estim dimension displayed | ated to be 3.0E- d during the test |
| 10 - | 10 [°] | analysis of the CHi confidence range fo 08 m2/s to 8.0E-08 is 2. The static press | phase, which shor the interval tra m2/s. The flow sure measured a | ows a horizontal sta ansmissivity is estim | ated to be 3.0E- d during the test was derived |

| | Test St | ımn | nary Sheet | | | | |
|---|--|-------------------------------|-------------------------------------|--|---|-------------------------------|--|
| Project: | Oskarshamn site investiga | | | | | CHi | |
| Area: | Laxe | emar | Test no: | | | | |
| Borehole ID: | KLX | Test start: | | | 070317 10:38 | | |
| Test section from - to (m): | 367.00-387.0 | 00 m | Responsible for | | | Stephan Rohs | |
| Section diameter, 2·r _w (m): | 0 | 076 | test execution: Responsible for | | Cris | Philipp Wol tian Enachescu | |
| | , i i i i i i i i i i i i i i i i i i i | | test evaluation: | | | | |
| Linear plot Q and p | | | Flow period | | Recovery period | 1 | |
| | | | Indata | | Indata | | |
| 3800 | | 100 | p ₀ (kPa) = | 3444 | | | |
| KLX16A_367.09-387.00_070317_1_Chir_Q_r • | Pacton Patore Patore Q | 0.45 | p _i (kPa) = | 3446 | | | |
| | | 0.40 | p _p (kPa) = | 3634 | p _F (kPa) = | 346 | |
| 3000 | | - 0.25 | Q _p (m ³ /s)= | 1.42E-06 | | | |
| | | • 0.20 | tp (s) = | 1200 | t _F (s) = | 120 | |
| 3400 | | Rado ()/min) | S el S [*] (-)= | 1.00E-06 | S el S [*] (-)= | 1.00E-0 | |
| | 18 | 0.20 0.20 | EC _w (mS/m)= | | | | |
| 3300 - | $\overline{\mathbf{A}}$ | • 0.15 | Temp _w (gr C)= | 12.0 | | | |
| 3300 · | | 0.10 | Derivative fact.= | 0.10 | Derivative fact.= | 0.0 | |
| 1900 | · · · · · · · · · · · · · · · · · · · | • a.cs | | | | | |
| 2000 0.00 0.40 0.60 0.60 Elepted T | 100 1.20 1.40 1.60 ima [h] | a | Results | | Results | | |
| | | | Q/s (m²/s)= | 7.4E-08 | | | |
| _og-Log plot incl. derivates- flo | ow period | | $T_{\rm M} (m^2/s) =$ | 7.7E-08 | | | |
| 0 01 | · · | | Flow regime: | transient | Flow regime: | transient | |
| a Elapsed time (h) | | | dt ₁ (min) = | #NV | dt_1 (min) = | 0.1 | |
| 10 2 | ······································ | | dt_2 (min) = | #NV | dt_2 (min) = | 0.3 | |
| | 1 | 30 | $T(m^2/s) =$ | | T (m ² /s) = | 2.9E-0 | |
| | | 10 ¹ | S (-) = | 1.0E-06 | | 1.0E-0 | |
| 10 1 | 1970/05/00/09/09/09/09/09/09/09/09/09/09/09/09/ | 10 | K _s (m/s) = | | K _s (m/s) = | 1.5E-0 | |
| | - | 3 | $S_{s}(1/m) =$ | | $S_{s}(1/m) =$ | 5.0E-0 | |
| | imaining and it | [//ii/] | C (m ³ /Pa) = | NA | C (m ³ /Pa) = | 7.4E-1 | |
| | | 0 0 10 ⁰ 101 | | NA | | 8.2E-0 | |
| 10 " | - | 0.3 | $C_{D}(-) = \xi(-) =$ | | $C_{D}(-) = \xi(-) =$ | 1. | |
| | | 0.3 | ξ(-) = | 0.0 | ς (-) | 1. | |
| | | 10 -1 | T _{GRF} (m²/s) = | NA | $T_{GRF}(m^2/s) =$ | NA | |
| 10 ⁸ 10 ⁹ | 10 10 10 10 | | $S_{GRF}(-) =$ | NA | $S_{GRF}(-) =$ | NA | |
| | | | $D_{GRF}(-) =$ | NA | $D_{GRF}(-) =$ | NA | |
| _og-Log plot incl. derivatives- | recovery period | | Selected repres | | | | |
| | | | dt_1 (min) = | | C (m³/Pa) = | 7.4E-1 | |
| Elapsed time (h) | 2 4 0 | | dt_2 (min) = | | $C_{D}(-) =$ | 8.2E-0 | |
| 10 2 | | | $T_T (m^2/s) =$ | 2.9E-07 | | 1. | |
| | | | S(-) = | 1.0E-06 | | 1. | |
| | 3 | 300 | $K_{s}(m/s) =$ | 1.5E-08 | | | |
| 10 1 | | 10 2 | $S_{s}(1/m) =$ | 5.0E-08 | | | |
| | and the second s | | | 5.0E-06 | | | |
| | and the state of t | 01 [kPa] | Comments: | ,, | | 1 . 10 4 | |
| | معج ^ر شرند م | - - - | | | f 2.9E-07 m2/s was one), which gives th | | |
| | × [1 | υ | | | derivatives don't r | | |
| • | 3 | 3 | | | lence range for the | | |
| | د | | transmissivity is es | timated to be 9.0 | E-08 m2/s to 7.0E-0 | 07 m2/s. The | |
| | | | flam, dimension der | at a state state of the state o | accument to be 2 Th | ne static pressur | |
| 10 ° 10 ' | 10 ² 10 ³ 10 ⁴ 1 | 10 0 | flow dimension du | | | | |
| 10 ^{°°} 10 [°] 10CD | 10 ² 10 ³ 10 ⁴ | 10 0 | measured at transd | ucer depth, was | derived from the CF rner plot to a value | Iir phase using | |

| | Test Sum | nary Sheet | | | | |
|--|---|--|---|--|--|--|
| Project: | Oskarshamn site investigation | Test type:[1] | | | CHir | |
| Area: | Laxema | Test no: | | | | |
| Borehole ID: | KLX16A | Test start: | | | 070317 12:48 | |
| Test section from - to (m): | 387.00-407.00 m | Responsible for | | | Stephan Rohs | |
| | 0.070 | test execution: | | | Philipp Wolf | |
| Section diameter, 2·r _w (m): | 0.076 | Responsible for test evaluation: | | Cris | tian Enachescu | |
| Linear plot Q and p | | Flow period | | Recovery period | ł | |
| | | Indata | | Indata | ····· | |
| 400 | 3.05 | p ₀ (kPa) = | 3621 | | | |
| KLX16A_387.00-407.00_070317_1_Chir_Q_r | P as don P bolow P bolow O | p _i (kPa) = | 3627 | | | |
| · · · · | 0.04 | p _p (kPa) = | 3838 | p _F (kPa) = | 3642 | |
| | | $Q_{p} (m^{3}/s) =$ | 2.67E-07 | | | |
| | | tp (s) = | 1200 | t _F (s) = | 2400 | |
| 5 3 2 2 2000 | | S el S [*] (-)= | 1.00E-06 | S el S [*] (-)= | 1.00E-06 | |
| Download Contraction of the second se | 0.02 | EC _w (mS/m)= | | | | |
| 3000 | | Temp _w (gr C)= | 12.3 | | | |
| 3400 - | + 0.01 | Derivative fact.= | 0.10 | Derivative fact.= | 0.05 | |
| 2000 azz 040 azo 110 | 3 1.20 f.40 1.00 1.10 2.00 | | | | | |
| Elegand 1 | ime (h) | Results | | Results | | |
| | | Q/s (m ² /s)= | 1.2E-08 | | | |
| Log-Log plot incl. derivates- flo | ow period | T _M (m ² /s)= | 1.3E-08 | | | |
| | | Flow regime: | transient | Flow regime: | transient | |
| Elapsed time [n] -3 Elapsed time [n] -3 | · · · · · · · 10 , 1 · · · · · · · · 10 , 0 | dt_1 (min) = | #NV | dt_1 (min) = | 0.17 | |
| 10 | | dt_2 (min) = | #NV | dt_2 (min) = | 0.32 | |
| 0000 0000 0000 | 30 | T (m²/s) = | | T (m²/s) = | 1.5E-08 | |
| · · · | | S (-) = | 1.0E-06 | | 1.0E-06 | |
| 10 ° | 10 1 | $K_s (m/s) =$ | | $K_s (m/s) =$ | 7.5E-10 | |
| ÷ . | | S _s (1/m) = | | S _s (1/m) = | 5.0E-08 | |
| • • | | C (m³/Pa) = | NA | C (m³/Pa) = | 5.7E-11 | |
| 10 -1 | 10 ° | C _D (-) = | NA | C _D (-) = | 6.3E-03 | |
| | 0.3 | ξ(-) = | 0.1 | ξ(-) = | 0.2 | |
| 10 ⁻¹ 10 ⁻² | 10 ³ 10 ⁴ 10 ⁵ | $T_{GRF}(m^2/s) =$ | NA | $T_{GRF}(m^2/s) =$ | NA | |
| di Cara | | S _{GRF} (-) = | NA | S _{GRF} (-) = | NA | |
| | | D _{GRF} (-) = | NA | D _{GRF} (-) = | NA | |
| Log-Log plot incl. derivatives- | recovery period | Selected represe | entative paran | neters. | | |
| | | $dt_1 (min) =$ | | C (m³/Pa) = | 5.7E-11 | |
| Elapsed time [h] | 10 ¹¹ ,,10 ¹⁰ ,,10 ¹ | dt_2 (min) = | | $C_D(-) =$ | 6.3E-03 | |
| | | $T_T (m^2/s) =$ | 1.5E-08 | | 0.2 | |
| 1 | 10 3 | S (-) = | 1.0E-06 | | | |
| 10 1 | | $K_s (m/s) =$ | 7.5E-10 | | | |
| | 300 | S _s (1/m) = | 5.0E-08 | | | |
| 10 ² 10 ² 10 ² 10 ² 10 ² 10 ² 10 ² | 10 ² 10 ² 10 ² 10 ² 10 ² 10 ² | Comments: The recommended fanalysis of the CHin derivative quality. T is estimated to be 8. displayed during the transducer depth, w extrapolation in the | r phase (inner zo The confidence n .0E-09 m2/s to 4 e test was 2. The as derived from | one), which shows the ange for the interval 1.0E-08 m2/s. The flue static pressure mean the CHir phase using the | he best data and l transmissivity low dimension asured at ng straight line | |

| | Test Sumr | nary Sheet | | | |
|--|---|---|---|----------------------------------|--------------------|
| Project: | Oskarshamn site investigation | Test type:[1] | | | Pi |
| Area: | Laxemar | Test no: | | | 1 |
| Alea. | Laxemai | Test no. | | | I |
| Borehole ID: | KLX16A | Test start: | | | 070317 15:37 |
| Test section from - to (m): | 406.00-426.00 m | Responsible for | | | Stephan Rohs |
| | | test execution: | | | Philipp Wolf |
| Section diameter, $2 \cdot r_w$ (m): | 0.076 | Responsible for | | Cris | tian Enachescu |
| Linear plot Q and p | | test evaluation: Flow period | | Recovery period | 4 |
| | | Indata | | Indata | 1 |
| | | p ₀ (kPa) = | 3794 | | 1 |
| 4700 KLX16A_406.00-428.00_070317_1_PL_Q_r | • P motion • P atom • P balow • P balow • Q | p ₀ (kPa) = p _i (kPa) = | 3/94 | | |
| 450 | • P balow • Q | | | | 297 |
| | - a.a. | p _p (kPa) = | | p _F (kPa) = | 3872 |
| | | $Q_{p} (m^{3}/s) =$ | NA | | 21(0) |
| F +100 | a.a. | tp (s) = | | t _F (s) = | 21600 |
| | jection Rees | S el S [*] (-)= | 1.00E-06 | S el S [*] (-)= | 1.00E-06 |
| | | EC _w (mS/m)= | | | <u> </u> |
| 3780 · | I I | Temp _w (gr C)= | 12.5 | | |
| | 02 | Derivative fact.= | NA | Derivative fact.= | 0.03 |
| | | | | | |
| 3300 | 440 5.00 6.00 7.00 Time [N] | Results | | Results | |
| | | $Q/s (m^2/s)=$ | NA | | |
| .og-Log plot incl. derivates- fl | ow period | $T_{\rm M} (m^2/s) =$ | NA | | |
| | | Flow regime: | transient | Flow regime: | transient |
| | | dt_1 (min) = | NA | dt_1 (min) = | NA |
| | | $dt_1(min) =$ $dt_2(min) =$ | NA | $dt_1 (min) =$ $dt_2 (min) =$ | NA |
| | | | NA | | 9.3E-12 |
| | | $T(m^{2}/s) =$ | | $T(m^2/s) =$ | 9.3E-12 1.0E-06 |
| | | S (-) = | NA | S (-) = | |
| | | $K_s (m/s) =$ | NA | $K_s (m/s) =$ | 4.7E-13 |
| Not a | nalysed | $S_{s}(1/m) =$ | NA | S _s (1/m) = | 5.0E-08 |
| | - | C (m ³ /Pa) = | NA | C (m ³ /Pa) = | 3.3E-11 |
| | | $C_D(-) =$ | NA | C _D (-) = | 3.6E-03 |
| | | ξ(-) = | NA | ξ(-) = | -1.4 |
| | | - <i>(</i> 2 <i>i</i>) | NIA | - , 2, , | NA |
| | | $T_{GRF}(m^2/s) =$ | NA | $T_{GRF}(m^2/s) =$ | NA |
| | | $S_{GRF}(-) =$ | NA | $S_{GRF}(-) =$ | NA |
| | · · · | $D_{GRF}(-) =$ | NA | $D_{GRF}(-) =$ | NA |
| Log-Log plot incl. derivatives- | recovery period | Selected represe | • | | |
| | | dt_1 (min) = | NA | C (m ³ /Pa) = | 3.3E-1 |
| 10 ¹ | ^{h]} ¹⁰ , [°] | $dt_2 (min) =$ | NA | C _D (-) = | 3.6E-03 |
| | 10 1 | $T_{T} (m^{2}/s) =$ | 9.3E-12 | | -1.4 |
| | | S (-) = | 1.0E-06 | | |
| | | K _s (m/s) = | 4.7E-13 | | |
| 10 | 10° | S _s (1/m) = | 5.0E-08 | | |
| | | Comments: | | | |
| a state and the state of the st | 0.3 | The recommended | | | |
| 10 ⁻¹ | Ě | analysis of the Pi pl | | | |
| · · · · · · · · · · · · · · · · · · · | 10 ⁻¹ | interval transmissiv analysis was conduc | | | |
| · ····· | 0.03 | pressure could not b | | | |
| | | | - | - | - |
| 10 ⁻² 10 ⁻¹ | 10 ⁰ 10 ¹ 10 ² | | | | |

| | Test Sumr | nary Sheet | | | |
|--|--|-------------------------------------|---|---|----------------|
| Project: | Oskarshamn site investigation | | | | Pi |
| Area: | Laxemar | Test no: | | | 1 |
| Borehole ID: | KLX16A | Test start: | 070318 19:1 | | |
| Test section from - to (m): | 421.10-433.55 m | Pooponsible for | | | Stephan Rohs |
| rest section from - to (m). | 421.10-433.55111 | test execution: | | | Philipp Wolf |
| Section diameter, 2·r _w (m): | 0.076 | Responsible for | | Crist | tian Enachescu |
| | | test evaluation: | | | |
| Linear plot Q and p | | Flow period | | Recovery period | |
| | | Indata | - | Indata | |
| 400 | Presion Operation | p ₀ (kPa) = | 3788 | | |
| KLX16A_421.10-433.55_070317_1_Pi_Q_r (Single Packer) | P stolon P alone P blow | p _i (kPa) = | 3792 | | |
| 4000 | 0.004 | p _p (kPa) = | 4053 | p _F (kPa) = | 3806 |
| | | Q _p (m ³ /s)= | NA | | |
| 2 | • • • • • • • • • • • • • • • • • • • | tp (s) = | | t _F (s) = | 9441 |
| 2000 · · · · · · · · · · · · · · · · · · | ************************************** | S el S [*] (-)= | 1.00E-06 | S el S [*] (-)= | 1.00E-06 |
| | 0.002 | EC _w (mS/m)= | | | |
| 1700- | ÷ . | Temp _w (gr C)= | 12.5 | | |
| 300 | | Derivative fact.= | NA | Derivative fact.= | 0.05 |
| | | | | | |
| 3500 100 150 100 150 Elepte | 000 200 300 300 400 d Time [h] | Results | | Results | |
| | | Q/s (m²/s)= | NA | | |
| Log-Log plot incl. derivates- f | low period | T_{M} (m ² /s)= | NA | | |
| | | Flow regime: | transient | Flow regime: | transient |
| | | dt ₁ (min) = | NA | dt ₁ (min) = | 12.88 |
| | | dt_2 (min) = | NA | dt_2 (min) = | 48.07 |
| | | $T(m^2/s) =$ | NA | $T(m^2/s) =$ | 5.4E-11 |
| | | S (-) = | NA | S (-) = | 1.0E-06 |
| | | K _s (m/s) = | NA | $K_s (m/s) =$ | 4.3E-12 |
| | | $S_{s}(1/m) =$ | NA | $S_{s}(1/m) =$ | 8.0E-08 |
| Not a | nalysed | C (m ³ /Pa) = | NA | C (m ³ /Pa) = | 3.0E-11 |
| | | $C_{D}(-) =$ | NA | $C_{D}(-) =$ | 3.3E-03 |
| | | | | | 0.2 |
| | | ξ(-) = | INA | ξ(-) = | 0.2 |
| | | T _{GRF} (m²/s) = | NA | $T_{GRF}(m^2/s) =$ | NA |
| | | $S_{GRF}(-) =$ | NA | $S_{GRF}(-) =$ | NA |
| | | $D_{GRF}(-) =$ | NA | $D_{GRF}(-) =$ | NA |
| Log-Log plot incl. derivatives | - recovery period | Selected represe | | | |
| | | dt ₁ (min) = | • | C (m ³ /Pa) = | 3.0E-11 |
| 10. ⁻³ Elapsed fm | e[h] 10 ⁻¹ 10 ⁻⁰ 40 ⁻¹ | $dt_1(min) =$ $dt_2(min) =$ | | $C (m /Pa) = C_D (-) =$ | 3.3E-03 |
| 10 1 | 10 ° | | 48.07 5.4E-11 | | 5.3⊑-03 0.2 |
| | | $T_{T} (m^{2}/s) =$ | 1.0E-06 | | 0.2 |
| | 0.3 | - () | | | |
| 10 ° | and the second s | · ·s (·····=) | 4.3E-12 | | |
| and the second second | 10 -1 | S _s (1/m) = | 8.0E-08 | | |
| | 2 2 2 2 2 0 0 2 | Comments: | | | |
| | | | | f 5.4E-11 m2/s was | |
| 10 -1 | 10 -2 | | |) which shows horiz for the interval trans | |
| | | | | m2/s and encompas | |
| | 0.003 | | | nsion displayed duri | |
| l | 10 ² 10 ³ 10 ⁴ | 2. The static pressu | | | |
| 10 ⁰ 10 ¹ | 10 ² 10 ³ 10 ⁴ | transmissivity. | | | |

Borehole: KLX16 A

APPENDIX 4

Nomenclature

| Character | SICADA | Explanation | Dimension | Unit |
|-----------------|-------------|---|--|----------------------------|
| Variables, | designation | | | |
| A _w | | Horizontal area of water surface in open borehole, not | $[L^2]$ | m ² |
| ••• | | including area of signal cables, etc. | [-] | |
| b | | Aquifer thickness (Thickness of 2D formation) | [L] | m |
| B | | Width of channel | | m |
| L | | Corrected borehole length | | m |
| L ₀ | | Uncorrected borehole length | [L] | m |
| <u> </u> | | Point of application for a measuring section based on its | [L] | m |
| —p | | centre point or centre of gravity for distribution of | [-] | |
| | | transmissivity in the measuring section. | | |
| L _w | | Test section length. | [L] | m |
| dL | | Step length, Positive Flow Log - overlapping flow logging. | [L] | m |
| | | (step length, PFL) | [=] | |
| r | | Radius | [L] | m |
| | | Borehole, well or soil pipe radius in test section. | [L] | m |
| r _w | | Effective borehole, well or soil pipe radius in test section. | | |
| r _{we} | | (Consideration taken to skin factor) | [L] | m |
| r | | Distance from test section to observation section, the | [L] | m |
| r _s | | shortest distance. | | m |
| r | | | <u>п</u> 1 | m |
| r _t | | Distance from test section to observation section, the | [L] | m |
| r | | interpreted shortest distance via conductive structures. | - | - |
| 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 | [L] | m |
| | | limitation | | |
| Z _{wl} | | Level for test section (section that is being flowed), lower | [L] | m |
| | | limitation | | |
| Z _{ws} | | Level for sensor that measures response in test section | [L] | m |
| | | (section that is flowed) | | |
| 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 | [L] | m |
| | | section | | |
| E | | Eveneration: | $[L^{3}/(T L^{2})]$ | mm/v |
| E | | Evaporation: | | mm/y, |
| | | huden la rice la udente | rı ³ / - -1 | mm/d, m ³ /s |
| <u></u> | | hydrological budget: | [L ³ /T] [L ³ /(T L ²)] | |
| ET | | Evapotranspiration | [L /(I L)] | mm/y, |
| | | hudede einel hudentu | rı 3/ 1 | mm/d, m ³ /s |
| | | hydrological budget: | [L ³ /T] [L ³ /(T L ²)] | |
| Р | | Precipitation | [L ⁻ /(1 L ⁻)] | mm/y, |
| | | | rı ³ / - | mm/d, |
| | | hydrological budget: | [L ³ /T] [L ³ /(T L ²)] | m ³ /s |
| R | | Groundwater recharge | [L°/(T L ⁻)] | mm/y, |
| | | | ru ³ / - -1 | mm/d, |
| | | hydrological budget: | [L ³ /T] [L ³ /(T L ²)] | m ³ /s |
| D | | Groundwater discharge | [LŸ/(T L [*])] | mm/y, |
| | | | | mm/d, |
| | | hydrological budget: | [L ³ /T] [L ³ /T] | m ³ /s |
| Q _R | | Run-off rate | [L ^v /T] | m ³ /s |
| Q _p | | Pumping rate | [L ³ /T] | m³/s |
| Q | | Infiltration rate | [L ³ /T] | m³/s |
| | | | | |
| Q | | Volumetric flow. Corrected flow in flow logging $(Q_1 - Q_0)$ | [L ³ /T] | m³/s |
| | | (Flow rate) | | |
| Q ₀ | 1 | Flow in test section during undisturbed conditions (flow | [L ³ /T] | m³/s |
| | | logging). | ' ' | |
| Q _p | 1 | Flow in test section immediately before stop of flow. | [L ³ /T] | m ³ /s |
| ·u | 1 | Stabilised pump flow in flow logging. | ра — с на — — — — — — — — — — — — — — — — — — | 1 |

| 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] | m³/s |
| Q ₂ | | Flow in test section during pumping with pump flow Q_{p1} , (flow logging). | [L ³ /T] | m³/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] | m³/s |
| ΣQ_1 | SumQ1 | Cumulative volumetric flow along borehole, with pump flow Q_{p1} | [L ³ /T] | m³/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, $\Sigma Q_1 - \Sigma Q_0$ | [L ³ /T] | m³/s |
| ΣQ_{C2} | SumQC2 | Corrected cumulative volumetric flow along borehole, $\Sigma Q_2 - \Sigma Q_0$ | [L ³ /T] | m³/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 |
| Va | | 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,mi n,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,mi n,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 | - | - |
| р | | 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; $p_t=p_a+p_q$ | $[M/(LT)^2]$ | kPa |
| pg | | 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 |
| Pf | | 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 |
| р _F | | Pressure in measuring section at end of recovery. | $[M/(LT)^2]$ | kPa |
| p _D | | $p_{\rm D}=2\pi\cdot T\cdot p/(Q\cdot \rho_{\rm w}g)$, Dimensionless pressure | - | - |
| dp | | Pressure difference, drawdown of pressure surface | $[M/(LT)^2]$ | kPa |
| - 15 | | between two points of time. | r (- .) 1 | |

| 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 $p_p = p_p - p_i$, 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 $p_F = p_F - p_p$, maximal pressure increase/drawdown of pressure surface between two points of time during recovery phase. dp_F expressed positive. | [M/(LT) ²] | kPa |
| Η | | 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 |
| Sp | | Drawdown in measuring section before flow stop. | [L] [L] | m |
| h ₀ | | Initial above reference level before test begins, prior to packer expansion. | [L] | m |
| h _i | | Level above reference level in measuring section before start of flow. | [L] | m |
| h _f | | Level above reference level during perturbation phase. | [L] | m |
| h _s | | Level above reference level during recovery phase. | [L] | m |
| h _p | | Level above reference level in measuring section before flow stop. | [L] | m |
| h _F | | Level above reference level in measuring section at end of recovery. | [L] | m |
| dh | | Level difference, drawdown of water level between two points of time. | [L] | m |
| dh _f | | $dh_f = h_i - h_f$ or $= h_f - h_i$, drawdown/pressure increase of pressure surface between two points of time during perturbation phase. dh_f usually expressed positive. | [L] | m |
| dh _s | | $dh_s = h_s - h_p$ or $= h_p - h_s$, pressure increase/drawdown of pressure surface between two points of time during recovery phase. dh_s usually expressed positive. | [L] | m |
| dh _p | | $dh_p = h_i - h_p$ or $= h_p - h_i$, maximal pressure increase/drawdown of pressure surface between two points of time during perturbation phase. dh_p expressed positive. | [L] | m |
| dh _F | | $dh_F = h_p - h_F$ or $= h_F - h_p$, maximal pressure increase/drawdown of pressure surface between two points of time during perturbation phase. dh_F expressed positive. | [L] | m |
| Te _w | | Temperature in the test section (taken from temperature logging). Temperature | | °C |
| Te _{w0} | | Temperature in the test section during undisturbed conditions (taken from temperature logging). | | °C |

| Character | SICADA designation | Explanation | Dimension | Unit |
|-------------------|--------------------|--|---------------------|-------------------|
| Te _o | | Temperature in the observation section (taken from temperature logging). Temperature | | °C |
| ECw | | Electrical conductivity of water in test section. | | mS/m |
| EC_{w0} | | Electrical conductivity of water in test section during undisturbed conditions. | | mS/m |
| ECo | | 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 |
| TDS₀ | | 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} r_i $ | | |
| 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. $SEMR = \left(\frac{1}{n(n-1)}\sum_{i=1}^{n} (r_i - ME)^2\right)^{0.5}$ | | |
| Parameter | s | | | |
| Q/s | | Specific capacity $s=dp_p$ or $s=s_p=h_0-h_p$ (open borehole) | $[L^2/T]$ | m²/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 |
| dtL | | Response time to obtain 0.1 m (or 1 kPa) drawdown in observation section counted from start of recovery phase. | [T] | S |
| ТВ | | 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 |
| Т | | Transmissivity | $[L^2/T]$ | m²/s |
| Т _М | | Transmissivity according to Moye (1967) | $[L^2/T]$ | m²/s |
| Τ _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] | m²/s |
| Ts | | Transmissivity evaluated from slug test | $[L^2/T]$ | m²/s |

| Character | SICADA designation | Explanation | Dimension | Unit |
|-----------------------------------|--------------------|--|----------------------------|-------------------|
| T _D | | Transmissivity evaluated from PFL-Difference Flow Meter | [L ² /T] | m²/s |
| Γ _I | | Transmissivity evaluated from Impeller flow log | $[L^2/T]$ | m²/s |
| Γ _{Sf} , Τ _{Lf} | | Transient evaluation based on semi-log or log-log | $[L^2/T]$ | m²/s |
| | | diagram for perturbation phase in injection or pumping. | | |
| Γ _{Ss} , Τ _{Ls} | | Transient evaluation based on semi-log or log-log | $[L^2/T]$ | m²/s |
| | | diagram for recovery phase in injection or pumping. | | |
| Γ _T | | Transient evaluation (log-log or lin-log). Judged best evaluation of T_{Sf} , T_{Lf} , T_{Ss} , T_{Ls} | [L ² /T] | m²/s |
| r | | Evaluation based on non-linear regression. | [L ² /T] | m²/s |
| NLR | | | $[L^{7}/T]$ | m ² /s |
| Γ _{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). | | m /s |
| (| | Hydraulic conductivity | [L/T] | m/s |
| κ κ s | | Hydraulic conductivity based on spherical flow model | [L/T] | m/s |
| ∖ _s ∕ _m | | Hydraulic conductivity based on spherical now model | [L/T] | m/s |
| ν _m (| | Intrinsic permeability | [L/1] [L ²] | m^2 |
| k kb | | Permeability-thickness product: kb=k·b | [L] [L ³] | m ³ |
| NU | | Ferneability-thickness product. KD=K·D | | 111 |
| 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 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) | [-] | - |
| Sr | | 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). | [-] | - |
| <u></u> | | | 54/13 | 4/ |
| S _s | | Specific storage coefficient; confined storage. | [1/L] | 1/m |
| S _s * | | Assumed specific storage coefficient; confined storage. | [1/L] | 1/m |
| Эf | | 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. $c_r=b'/K'$ where b' is thickness of the aquitard and K' its hydraulic conductivity across the aquitard. | [T] | S |
| | 1 | | l | + |
| -f | | Leakage factor: $L_f = (K \cdot b \cdot c_f)^{0.5}$ where K represents characteristics of the aquifer. | [L] | m |

| Character | SICADA designation | Explanation | Dimension | Unit |
|-------------------|--------------------|---|-------------------------------------|----------------------|
| ٤* | Skin | Assumed skin factor | [-] | - |
| <u>ځ*</u> C | | Wellbore storage coefficient | $[(LT^2) \cdot M^2]$ | m³/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] | m²/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 |
| Cr | | Pore-volume compressibility, (rock compressibility); Corresponding to α/n in hydrogeological literature. | [(LT ²)/M] | 1/Pa |
| Ct | | $c_t = c_r + c_w$, 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 |
| nct | | Porosity-compressibility factor: $nc_t = n \cdot c_t$ | [(LT ²)/M] | 1/Pa |
| nc _t b | | 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. $e = n_e b$ | [L] | m |
| 0 | | | | 111 |
| ρ | Density | Density | $[M/L^3]$ | $kg/(m^3)$ |
| ρ _w | Density-w | Fluid density in measurement section during pumping/injection | [M/L ³] | $kg/(m^3)$ |
| ρο | 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] | Pas |
| μ _w | my | Dynamic viscosity (Fluid density in measurement section during pumping/injection) | [M/LT] | Pas |
| FC _T | | Fluid coefficient for intrinsic permeability, transference of k to K; K=FC _T ·k; FC _T = $\rho_w \cdot g/\mu_w$ | [1/LT] | 1/(ms) |
| FCs | | 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 ² L 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 | | |
| N/ | | sequence, perturbation and recovery | | |
| M | | Moye | | |
| GRF | | Generalised Radial Flow according to Barker (1988) | | |
| m f | | Matrix | | |
| f T | | Fracture | | |
| Т | | Judged best evaluation based on transient evaluation. | | |

| Character | SICADA designation | Explanation | Dimension | Unit |
|------------|--------------------|--|-----------|------|
| Tot | g | 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 | <u> </u> | • | |
| 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 | | |
| ۴ | | perturbation period | | |
| F | | Pressure in measuring section at end of recovery period. | | |
| m | | Arithmetical mean value | | |
| С | | 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 mise | ellaneous inde | exes 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") | | |
| 0 | | 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") | | |

Borehole: KLX16A

APPENDIX 5

SICADA data tables

Borehole: KLX16A

APPENDIX 5-1

SICADA data tables (Injection tests)

| SKB | | SIC | CADA | /Data | Impo | rt Temp | late | | | Dified version v1.4 Ergodata AB 2004 |
|------------------|------------------|--------------------|--------|--------|------------|---------------------|---------------------------|--------------------------|------------|---|
| | | | | | | | | | | |
| File Identity | | | | | | | Compiled By | | | |
| Created By | | | | | | Quality Check | <pre>K For Delivery</pre> | | | |
| Created | | | | | | Deliv | /ery Approval | | | |
| | | | | | | | | | | |
| Activity Type | | KLX 16A | | | | Project | | AP PS 40 | 00-07-008 | |
| , ,, | | KLX 16A - Injectio | n test | | | | | | | |
| | | | | | | | | | | |
| Activity Informa | ntion | | | | | Additional Activity | Data | | | |
| - | | | | | | C10 | P20 | P200 | P220 | R25 |
| | | | | | | | Field crew | | evaluating | |
| | | Stop Date | | . , | Section No | Company | manager | Field crew | | Report |
| KLX 16A | 2007-03-12 20:28 | 2007-03-18 22:51 | 12.50 | 433.55 | | Golder Associates | Stephan Rohs, Philipp | Philipp Wolf, | | Stephan Rohs |
| | | | | | | | Wolf | Rohs, | Wolf | Rons |
| | | | | | | | | Daniel | | |
| | | | | | | | | Nordbörg, | | |
| | | | | | | | | Linda | | |
| | | | | | | | | Höckert, Erik Lövgren | | |
| | | | | | | | | Lovgren | | |
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| | Table plu_s_hole_test_d | Table |
|--|--|-------|
| PLU Injection and pumping, General information | PLU Injection and pumping, General information | |

| Column | Datatype | Unit | Column Description |
|----------------------|----------|----------|---|
| site | CHAR | | Investigation site name |
| activity_type | CHAR | | Activity type code |
| start_date | DATE | | Date (yymmdd hh:mm:ss) |
| stop_date | DATE | | Date (yymmdd hh:mm:ss) |
| project | CHAR | | project code |
| idcode | CHAR | | Object or borehole identification code |
| secup | FLOAT | m | Upper section limit (m) |
| seclow | FLOAT | m | Lower section limit (m) |
| section_no | INTEGER | number | Section number |
| test_type | CHAR | | Test type code (1-7), see table description |
| formation_type | CHAR | | 1: Rock, 2: Soil (superficial deposits) |
| start_flow_period | DATE | yyyymmdd | Date & time of pumping/injection start (YYYY-MM-DD hh:mm:ss) |
| stop_flow_period | DATE | yyyymmdd | Date & time of pumping/injection stop (YYYY-MM-DD hh:mm:ss) |
| 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</lower> |
| mean_flow_rate_qm | FLOAT | m**3/s | Arithmetic mean flow rate during flow period |
| q_measll | FLOAT | m**3/s | Estimated lower measurement limit of flow rate |
| q_measlu | 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 |
| press_at_flow_end_pp | FLOAT | kPa | Groundwater pressure in test section at stop of flow period. |
| final_press_pf | FLOAT | kPa | Ground water pressure at the end of the recovery period. |
| 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 | | Short comment to data |
| error_flag | CHAR | | If error_flag = "*" then an error occured and an error |
| in_use | CHAR | | If in_use = "*" then the activity has been selected as |
| sign | CHAR | | Signature for QA data accknowledge (QA - OK) |
| lp | FLOAT | m | Hydraulic point of application |
| | | | |

| KL | Х | 1 | 6A |
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|----|---|---|----|

| | | | | | section_ | | formation | | | | | mean_flow_rate | | | |
|---------|--------------|--------------|--------|--------|----------|-----------|-----------|---------------------|---------------------|------------------|---------------|----------------|----------|----------|---------------|
| idcode | start_date | stop_date | secup | seclow | no | test_type | _type | start_flow_period | stop_flow_period | flow_rate_end_qp | value_type_qp | _qm | q_measll | q_measlu | tot_volume_vp |
| KLX 16A | 070313 09:41 | 070313 12:22 | 13.00 | 113.00 |) | 3 | 3 1 | 2007-03-13 10:32:48 | 2007-03-13 11:02:58 | 3.69E-04 | 0 | 4.51E-04 | 1.67E-08 | 8.33E-04 | 8.11E-01 |
| KLX 16A | 070313 14:12 | 070313 16:02 | 112.00 | 212.00 |) | 3 | 3 1 | 2007-03-13 15:00:08 | 2007-03-13 15:30:18 | 5.63E-04 | 0 | 5.84E-04 | 1.67E-08 | 8.33E-04 | 1.05E+00 |
| KLX 16A | 070313 17:54 | 070313 19:46 | 212.00 | 312.00 |) | 3 | 3 1 | 2007-03-13 18:44:46 | 2007-03-13 19:14:56 | 2.85E-04 | 0 | 2.95E-04 | 1.67E-08 | 8.33E-04 | 5.30E-01 |
| KLX 16A | 070313 21:41 | 070313 23:41 | 312.00 | 412.00 |) | 3 | 3 1 | 2007-03-13 22:39:16 | 2007-03-13 23:09:26 | 2.95E-06 | 0 | 3.67E-06 | 1.67E-08 | 8.33E-04 | 6.60E-03 |
| KLX 16A | 070314 13:12 | 070314 14:38 | 12.50 | 32.50 |) | 3 | 3 1 | 2007-03-14 13:56:34 | 2007-03-14 14:16:44 | 4.37E-04 | 0 | 5.02E-04 | 1.67E-08 | 8.33E-04 | 6.02E-01 |
| KLX 16A | 070314 22:12 | 070314 23:57 | 32.50 | 52.50 |) | 3 | 3 1 | 2007-03-14 23:15:47 | 2007-03-14 23:35:57 | 4.10E-06 | 0 | 4.50E-06 | 1.67E-08 | 8.33E-04 | 5.40E-03 |
| KLX 16A | 070315 00:34 | 070315 02:39 | 52.50 | 72.50 |) | 3 | 3 1 | 2007-03-15 01:17:40 | 2007-03-15 01:37:50 | 1.47E-06 | 0 | 1.52E-06 | 1.67E-08 | 8.33E-04 | 1.82E-03 |
| KLX 16A | 070315 06:50 | 070315 08:18 | 72.50 | 92.50 |) | 3 | 3 1 | 2007-03-15 07:36:18 | 2007-03-15 07:56:28 | 4.12E-06 | 0 | 4.27E-06 | 1.67E-08 | 8.33E-04 | 5.12E-03 |
| KLX 16A | 070315 08:52 | 070315 10:25 | 91.00 | 111.00 |) | 3 | 3 1 | 2007-03-15 09:42:53 | 2007-03-15 10:03:03 | 8.47E-06 | 0 | 9.15E-06 | 1.67E-08 | 8.33E-04 | 1.10E-02 |
| KLX 16A | 070315 10:59 | 070315 12:22 | 111.00 | 131.00 |) | 3 | 3 1 | 2007-03-15 11:39:56 | 2007-03-15 12:00:06 | 1.72E-06 | 0 | 1.78E-06 | 1.67E-08 | 8.33E-04 | 2.14E-03 |
| KLX 16A | 070315 13:31 | 070315 14:55 | 131.00 | 151.00 |) | 3 | 3 1 | 2007-03-15 14:13:36 | 2007-03-15 14:33:46 | 5.58E-04 | 0 | 5.76E-04 | 1.67E-08 | 8.33E-04 | 6.91E-01 |
| KLX 16A | 070315 15:35 | 070315 17:14 | 150.00 | 170.00 |) | 3 | 3 1 | 2007-03-15 16:32:21 | 2007-03-15 16:52:31 | 6.97E-06 | 0 | 7.33E-06 | 1.67E-08 | 8.33E-04 | 8.80E-03 |
| KLX 16A | 070315 17:51 | 070315 19:24 | 170.00 | 190.00 |) | 3 | 3 1 | 2007-03-15 18:41:50 | 2007-03-15 19:02:00 | 8.88E-06 | 0 | 9.17E-06 | 1.67E-08 | 8.33E-04 | 1.10E-02 |
| KLX 16A | 070315 20:00 | 070315 21:52 | 188.00 | 208.00 |) | 3 | 3 1 | 2007-03-15 20:50:45 | 2007-03-15 21:10:55 | 2.17E-07 | 0 | 2.50E-07 | 1.67E-08 | 8.33E-04 | 3.00E-04 |
| KLX 16A | 070315 22:44 | 070316 00:00 | 207.00 | 227.00 |) | 3 | 3 1 | 2007-03-15 23:26:19 | 2007-03-15 23:46:29 | 3.36E-04 | 0 | 3.43E-04 | 1.67E-08 | 8.33E-04 | 4.12E-01 |
| KLX 16A | 070316 00:47 | 070316 02:13 | 227.00 | 247.00 |) | 3 | 3 1 | 2007-03-16 01:30:59 | 2007-03-16 01:51:09 | 1.32E-05 | 0 | 1.35E-05 | 1.67E-08 | 8.33E-04 | 1.62E-02 |
| KLX 16A | 070316 07:36 | 070316 08:58 | 247.00 | 267.00 |) | 3 | 8 1 | 2007-03-16 08:16:35 | 2007-03-16 08:36:45 | 2.08E-05 | 0 | 2.17E-05 | 1.67E-08 | 8.33E-04 | 2.60E-02 |
| KLX 16A | 070316 10:58 | 070316 12:19 | 267.00 | 287.00 |) | 3 | 3 1 | 2007-03-16 11:36:56 | 2007-03-16 11:57:06 | 2.55E-04 | 0 | 2.63E-04 | 1.67E-08 | 8.33E-04 | 3.15E-01 |
| KLX 16A | 070316 13:27 | 070316 14:51 | 287.00 | 307.00 |) | 3 | 3 1 | 2007-03-16 14:09:25 | 2007-03-16 14:29:35 | 1.18E-05 | 0 | 1.27E-05 | 1.67E-08 | 8.33E-04 | 1.52E-02 |
| KLX 16A | 070316 15:27 | 070316 17:00 | 307.00 | 327.00 |) | 3 | 3 1 | 2007-03-16 16:18:44 | 2007-03-16 16:38:54 | 5.67E-07 | 0 | 6.83E-07 | 1.67E-08 | 8.33E-04 | 8.20E-04 |
| KLX 16A | 070317 08:35 | 070317 10:06 | 347.00 | 367.00 |) | 3 | 3 1 | 2007-03-17 09:24:20 | 2007-03-17 09:44:30 | 1.60E-06 | 0 | 1.77E-06 | 1.67E-08 | 8.33E-04 | 2.12E-03 |
| KLX 16A | 070317 10:38 | 070317 12:14 | 367.00 | 387.00 |) | 3 | 3 1 | 2007-03-17 11:32:40 | 2007-03-17 11:52:50 | 1.42E-06 | 0 | 1.75E-06 | 1.67E-08 | 8.33E-04 | 2.10E-03 |
| KLX 16A | 070317 12:48 | 070317 14:40 | 387.00 | 407.00 |) | 3 | 1 | 2007-03-17 13:38:20 | 2007-03-17 13:58:40 | 2.67E-07 | 0 | 3.22E-07 | 1.67E-08 | 8.33E-04 | 3.86E-04 |

| | | | dur_flow_phas | dur_rec_phase_ | | head_at_flow_end | | | press_at_flow_ | final_press_p | fluid_temp_t | fluid_elcond_e | fluid_salinity_ | fluid_salinity_t | | | |
|---------|--------|--------|---------------|----------------|-----------------|------------------|---------------|------------------|----------------|---------------|--------------|----------------|-----------------|------------------|-----------|----------|--------|
| idcode | secup | seclow | | tf | initial_head_hi | _hp | final_head_hf | initial_press_pi | end_pp | f | ew | cw | tdsw | dswm | reference | comments | lp |
| KLX 16A | 13.00 | 113.00 | 1800 | 3600 | | | 12.82 | 1031 | 1193 | 1062 | 8.3 | | | | | | 63.00 |
| KLX 16A | 112.00 | 212.00 | 1800 | 1800 | | | 11.31 | 1900 | 1954 | 1902 | 9.6 | | | | | | 162.00 |
| KLX 16A | 212.00 | 312.00 | 1800 | 1800 | | | 11.31 | 2789 | 2984 | 2785 | 11.0 | | | | | | 262.00 |
| KLX 16A | 312.00 | 412.00 | 1800 | 1800 | | | 9.36 | | | 3693 | | | | | | | 362.00 |
| KLX 16A | 12.50 | 32.50 | 1200 | 1200 | | | 14.04 | 315 | 502 | 359 | 7.8 | | | | | | 22.50 |
| KLX 16A | 32.50 | 52.50 | 1200 | 1200 | | | 12.34 | 493 | 696 | 496 | 7.4 | | | | | | 42.50 |
| KLX 16A | 52.50 | 72.50 | 1200 | | | | 11.31 | 668 | 866 | 668 | | | | | | | 62.50 |
| KLX 16A | 72.50 | 92.50 | | 1200 | | | 11.24 | 841 | 1041 | 845 | | | | | <u> </u> | | 82.50 |
| KLX 16A | 91.00 | 111.00 | 1200 | 1200 | | | 10.92 | 1009 | 1237 | 1009 | 7.9 | | | | | | 101.00 |
| KLX 16A | 111.00 | 131.00 | | 1200 | | | 11.07 | 1186 | 1385 | 1186 | 8.2 | | | |] | | 121.00 |
| KLX 16A | 131.00 | 151.00 | 1200 | 1200 | | | 11.16 | | | š | | | | | | | 141.00 |
| KLX 16A | 150.00 | 170.00 | 1200 | 1200 | | | 10.98 | 1533 | 1750 | 1532 | 8.8 | | | | | | 160.00 |
| KLX 16A | 170.00 | 190.00 | 1200 | 1200 | | | 11.18 | 1705 | | 1709 | 9.1 | | | | | | 180.00 |
| KLX 16A | 188.00 | 208.00 | | 2400 | | | 11.34 | 3 | | δ | | | | | [| | 198.00 |
| KLX 16A | 207.00 | 227.00 | 1200 | 1200 | | | 11.27 | 2036 | 2234 | 2033 | 9.7 | | | | | | 217.00 |
| KLX 16A | 227.00 | 247.00 | 1200 | 1200 | | | 11.32 | 2214 | 2411 | 2214 | 10.0 | | | | | | 237.00 |
| KLX 16A | 247.00 | 267.00 | 1200 | 1200 | | | 11.19 | 2386 | 2586 | 2383 | | | | | | | 257.00 |
| KLX 16A | 267.00 | 287.00 | 1200 | 1200 | | | 11.08 | 2563 | | 2564 | 10.3 | | | | | | 277.00 |
| KLX 16A | 287.00 | 307.00 | 1200 | 1200 | | | 11.34 | 2746 | 2933 | 2746 | 10.9 | | | | Į | | 297.00 |
| KLX 16A | 307.00 | 327.00 | 1200 | 1200 | | | 10.80 | 2923 | 3127 | 2947 | 11.2 | | | | | | 317.00 |
| KLX 16A | 347.00 | 367.00 | 1200 | 1200 | | | 9.84 | 3269 | 3469 | 3281 | 11.7 | | | | | | 357.00 |
| KLX 16A | 367.00 | 387.00 | 1200 | 1200 | | | 9.35 | 3446 | 3634 | 3463 | 12.0 | | | | | | 377.00 |
| KLX 16A | 387.00 | 407.00 | 1200 | 2400 | | | 12.17 | 3627 | 3838 | 3642 | . 12.3 | | | | | | 397.00 |

| Column Datatype Unit Column Description atking_upe CHAR Attribution Attribution atking_upe CHAR Attribution Attribution atsupe DATE Date (ymmod trummse) atsupe DATE Date (ymmod trummse) atsupe CHAR Test byte code (1*7) ats table description! atsupe CHAR Test byte code (1*7) ats table description! atsupe CHAR Test byte code (1*7) ats table description! atsupe CHAR Test byte code (1*7) ats table description! atsupe CHAR Test byte code (1*7) ats table description! atsupeupe CHAR Test byte code (1*7) ats table description! atsupeupe CHAR Test byte code (1*7) ats table description! atsupeupe CHAR Dats table description! | Tabl | | | ole_test_ed1 nping/injection. Basic evaluation |
|--|-------------------|------------|---------|--|
| ine CHAR Intersection of the same service of the se | | | | |
| akuki yupe DATE - Date (ymmd hromas) aku Jahe DATE - Date Jahe DATE - Date Jahe DATE - Date aku Jahe DATE - Date Jahe DATE - Date Jahe DATE - Date Jahe DATE - DATE | | <i>.</i> . | Unit | • |
| sind_faile DATE Date (ymmed httmmss) stop_date DATE Date (ymmed httmmss) stop CHAR Project code stop FOAT m Upper sectors intel (m) stop FOAT m Upper sectors intel (m) stop CHAR Tert type code (17), see table description) stommaton_type CHAR Tert type code (17), see table description) stommaton_type CHAR Tert type code (17), see table description) stommaton_type CHAR Portation type (10) in test section, see tesc. stop FOAT m Pytifault point of application for test section, see tesc. stop CHAR Ternsmissivity_montestimit.10% response stop CHAR Otter value.1-Close's meanse init.10* response stop CHAR Otter value.1-Close's meanse stop FOAT m*2's Ternsmissivity_monestim.11 stop FOAT m*2's Ternsmissivity_monestim.11 stop FOAT m*2's Ternsmissivity_monestim.11 Ternsmissivity_monestim.11 | | | | - |
| page data DATE Date (ymmod hummas) project CHAR project orde decup FLOAT m Upper section imit (m) sector FLOAT m Lower sector imit (m) sector NITESER number Sector number sector FLOAT m Lower sector imit (m) sector FLOAT m Hummas formation type CHAR Formation type code (1-7), see table description) formation type FLOAT m Planned ordinary test interval during test compasing. sector, tass FLOAT m Planned ordinary test interval during test compasing. sector, tass FLOAT m"2/s Transmissivity. sector, tass FLOAT m"3/s Estransmissivity. sector, tass FLOAT m"3/s Estrasscon word mumber of taswalan | | | | |
| projectCHARproject codedocabCHARObject or borhole identification codesectorFLOATmusclowFLOATmbectorCHARTest type code (-7), see table descriptionsectorCHARTest type code (-7), see table descriptiontermston_lypeCHARTest type code (-7), see table descriptiontermston_lypeCHARTest type code (-7), see table descriptiontermston_lypeCHARTest type code (-7), see table descriptiontermston_lypeCHARParticle (-1), code (| | | | |
| discoleCHAROpject or borchois derification codesectorFLOATmUpper sector limit (m)sectorNTEGERnumberSector numbersector, noNTEGERnumberSector numbersector, noFLOATmPlaned collinary test interval cursing sets cells, see desc.sector, classFLOATmPlaned collinary test interval cursing sets cells, see desc.sector, classFLOATmPlaned collinary test interval cursing sets cells, see desc.sector, classFLOATmPlaned collinary test interval cursing sets cells, see desc.sector, classFLOATmPlaned collinary test interval cursing sets cells, see desc.sector, classFLOATmPlaned collinary test interval cursing sets cells, see desc.setter, classFLOATmPlaned collinary test interval cursing sets cells, descriptionsetter, classFLOATmPlaned collinary test interval cursing sets cells, descriptionsetter, classCHAREst cells, c | | | | |
| succe FLOAT m Upper section limit (m) section _no NTGSER number Section number section _no NTGSER number Section number isst_pper CHAR Formation type code : 1. Rock, 2. Soi (superficial deposits) p FLOAT m Hydraulic point of application for test section, see desc. section _same_opacity _1.3 FLOAT m Hydraulic point of application for test section, see desc. size_type1.2 FLOAT m Planet of otheray set interval solution set interv | | | | |
| sector FLOAT m Lower sector inft (m) sector, no INTEGER number Sector number sector, no CHAR Test type code (1-7), see table description! sector, no PLOAT m Hydraulic point of application for test section, see descr. sector, no PLOAT m PloAt Specific coaped(1-2), sections, see descr. sector, no PLOAT m Specific coaped(1-2), sections, see descr. Specific coaped(1-2), sections, sections, see table description. raine, Systep_1 CHAR Transmissive, nove see table description. Specific coaped(1-2), sections endue of the 0 transmissive_nove FLOAT m*2/s Transmissive, nove is best choice of 1, else 0 transmissive_nove FLOAT m*2/s Transmissive, nove is best choice of 1, else 0 transmissive_nove FLOAT m Backgreater, for Tigenerally beLay, see descr. with_0, cont, nove FLOAT m*3/s Estimated upper meas. limit, 10/works need. transmissive_nove FLOAT m*3/s Estimated upper meas. limit, 10/works need. transmissive_nove FLOAT m*3/s </td <td></td> <td></td> <td>m</td> <td></td> | | | m | |
| sector.po NITE CER number Sector number set_ype CHAR Test type code (1-7), see table description! p FLOAT m Hydraulic pont of application for test section, see table description! gpeapacity_Q_3 FLOAT m Planned ordinary test interval during test campaign. gpedis_Uppe_Q_3 FLOAT m"218 Specific capacity (08) of fest section, see table description sub_up_ype_Q_3 FLOAT m"218 Specific capacity (08) of fest section, see table description sub_up_ype_Q_3 FLOAT m"218 Transmissivity page meas.limit.110-apper meas.limit.110-apper meas.limit.110-apper meas.limit.110-apper meas.limit.10-apper meas.limit.110-apper meas.limit.10-apper meas.limit.110-apper meas.limit.10-apper meas.limit.10-ap | | | | |
| http://www.inter.com/page CHAR Test type code (-17), see table description! schem_class FLOAT m Hydrauic point of application for test section, see descr. schem_class FLOAT m Planned ordinary test interval during test campaign. schem_class FLOAT m"278 Specific capabit (036) for test section, see descr. wilke_type_q_s CHAR Other value-float-code (176, see table description) mammissivity_more FLOAT m"278 Tarmanissivity_mits and an Os, see table description main_amissivity_more FLOAT m"278 Tarmanissivity_mits based on Moye (1667) bc_m CHAR Est theore code 1 means Trays is based construction of T cells of the other means test charts of T cells of the other means test charts of T cells of the other means test charts of T cells of the other means test charts of T cells of the other means (176, channel, b) FLOAT m Binferred width of formation for waluaded TB see descript. massitub_type_th CHAR Estimated lower means. limit to evaluated TB see description u_meal_b FLOAT m SB 's storaitivity Bewelth of formation to T walued TB see description u_meal_b FLOAT m SB 's storaitivity Bewelth of formation to T walued TB see description u_meal_b FLOAT m SB 's storaitivity Bew | | | | |
| formation type CHAR Formation type code: 1: Rock 2: Soil (apperfield deposit) p FLOAT m Hydraulic point of pellocitation for test sector, see descr. secler_class FLOAT m Planned ordinary test interval during test campaign. spec_capacity_L_S FLOAT m*2/s Specific capacity (Os) of test section, see table description sub_Lype_1 CHAR Ottox = value.1:0s/cover meas.imt, 1:10-yepper meas.imt. sub_Lype_1 CHAR Best choice code. 1: means To is best choice of T, else 0 transmissivity_more FLOAT m*2/s Transmissivity_more meas.imt.1:10-yepper meas.imt. bc_m CHAR Best choice code. 1: means Tory is best choice of T, else 0 runsmissivity_more FLOAT m*2/s Transmissivity.TM. based on Mye (1967) bc_more_l_D FLOAT m Butter thichness repr. for T(general) bellu), see descr. sub_d_n_channes FLOAT m*3/s Estimated upper meas.imnt 1: Thusper meas.imnt. byd_cond FLOAT m*3/s Estimated upper meas.imnt of evaluated TB sub_d_n_code FLOAT m Stocearabity.Bewith of formation.gew | | | number | |
| p FLOAT m Hydraulic point of application for test section, see descr. spec_tape_ty_s FLOAT m Penedordmay fast interval during test section, see datale descript. spec_tape_ty_s CHAR Data value./10/s of test section. Specific capacity (QIs) of test section. Specific capacity | | | | |
| selen glass FLOAT m Planed ordnay fielt interval during test campaign. spect.capacity_q_s FLOAT m*2/s Specific capacity (0)/s) of test sector, see table descript. Cutue value_10s-quere meas.limit.10/supper meas.limit. bulle_type_q FLOAT m*2/s Transmissivity based on C/s, see table description wile_type_q FLOAT m*2/s Transmissivity pager meas.limit. bc_t_n CHAR Best choice odds - I means TO is best choice of T, else 0 transmissivity_m CHAR Taramissivity. bc_tm CHAR Best choice odds - I means TO is best choice of T, else 0 transmissivity_more FLOAT m*2/s Transmissivity_more meas.limit. bc_tm CHAR Best choice odds - I means To yes best choice of T, else 0 transmissivity_more FLOAT m*3/s TB-Flow capacity in 10 formation for valuated TB bc_tm CHAR Best choice odds - I means tho transmissivity. bt_measl_b FLOAT m*3/s Estimated uper meas.limit of valuated TB see description bt_measl_b FLOAT m*3/s Estimated uper meas.limit of valuated TB see description bt_measl_b FLOAT m SB*: Assumed SB-setorativity. summasivity_II FLOAT m*2/s TTransmissivity of formation. place for valuated TB see description transmissivity_II FLOAT m*2/s Estimated uper meas.limit of valuated TB see description transmissivity_II FLOAT m*2/s Estimated uper meas.limit of evaluated TB see description transmissivity_II FLOAT m*2/s TTransmissivity of formation. place for evaluated TI see description transmissivity_II FLOAT m*2/s Estimated uper meas.limit of evaluated TB. transmissivity_II FLOAT m*2/s Estimated uper meas.limit for evaluated TT. transmissivity_II FLOAT m*2/s Estimated uper meas.limit for evaluated TI see description transmissivity_II FLOAT m*2/s Estimated uper meas.limit for evaluated TI. transmissivity_II FLOAT m*2/s Est | | | m | |
| spec_gapaly_g_s FLOAT m*2s Specific capacity (O/s) of test section, see table description wale_type_ga CHAR Citure value-1:0fs/dower meas.limit.12/exuper meas. | | | | |
| value_type_t CHAR Cinue value_till Cinue value_tillill Cinue value_till | | | | |
| Immediativity_tig FLOAT m**2/s Transmissivity based on Qis, see table description value_type_tig CHAR Best choice code. I means TQ is best choice of T, else 0 transmissivity_may FLOAT m**2/s Transmissivity_TM, based on Moye (1967) bc_tim CHAR Best choice code. I means Tray is best choice of T, else 0 value_type_tim CHAR Estimated code code. I means Tray is best choice of T, else 0 value_type_tim CHAR Citrue value.1:TM-object means limit, 1:TM-upper means limit, 1:M-upper means limit, 1:TM-upper m | | | 111 2/5 | |
| subs_type_transmissive_TM CHAR Dure value_1TG-choper measumit. bc_tq CHAR Best choice code. 1 means TQ is best choice of T, else 0 marsmissive_TM CHAR Dest choice code. 1 means TQ is best choice of T, else 0 bc_tm CHAR Dest choice code. 1 means TQ is best choice of T, else 0 wale_type_tm CHAR Dest choice code. 1 means TQ is best choice of T, else 0 wale_type_tm CHAR Dest choice code. 1 means TQ is best choice of T, else 0 wale_type_tm CHAR Dest choice code. 1 means TQ is best choice of T, else 0 wale_type_tm CHAR Dest choice code. 1 means TQ is best choice of T, else 0 wale_type_tm CHAR Best choice code. 1 means TQ is best choice of T, else 0 wale_type_tm FLOAT m**3/s Estimated lower meas. limit of evaluated TB,see description ssumed_sb FLOAT m**3/s Estimated lower meas. limit of evaluated TB,see description ssumed_sb FLOAT m**2/s TT transmissivy of formation, 2D radel tow model.see ransmissivy, TK FLOAT m**2/s Estimated lower meas. limit for evaluated TT see description stransmissivy, TK FLOAT <t< td=""><td></td><td></td><td>m**2/s</td><td></td></t<> | | | m**2/s | |
| bc_tq CHAR Best choice ocle. 1 means To is best choice of T, else 0 transmissivity_moy FLOAT m*2/s Transmissivity_TM, based on Moye (1967) bc_tm CHAR Other value.17M-Over meas.limit, 15M-upper meas.limit, | | | | |
| Instantisely work FLOAT m**2/s Transmissivity.TA, based on Moye (1967) bc_tm CHAR Ditue value,1:TM-loyeer meas.limit.1TM-upper meas.limit. hydr_cond_moye FLOAT m bc_tm formation_with,b FLOAT m bc_tm formation_with,b FLOAT m bc_tm formation_with,b FLOAT m Binferred with of formation for evaluated TB. formation_with,b FLOAT m Binferred with of formation for evaluated TB. gt FLOAT m**3/s Estimated upper meas.limit of evaluated TB. gt FLOAT m**3/s Estimated upper meas.limit of evaluated TB. gt FLOAT m**3/s Estimated upper meas.limit of evaluated TB. gt FLOAT m**3/s Estimated upper meas.limit of evaluated TB. gt FLOAT m Strativity.Brewidth of formation.D Dode.see description gt FLOAT m**2/s Timeremeas.limit or evaluated TT. Timeremeas.limit or evaluated TT. gt FLOAT m**2/s Estimated uper meas.limit or evaluated TT. <td></td> <td></td> <td></td> <td></td> | | | | |
| bc_m CHAR Best choice code: 1 means Troncy is best choice of T, else 0 value_type_tm CHAR Citrue value,-1:TM-forwer means.limit,1:TM-supper means.limit, formation_wdth_b FLOAT m b:Aquifer thickness repr. for T (generally b=Lu), size descr. wdth_of_channel_b FLOAT m B:Inferred vidit of formation or valuated TB see description measl_b FLOAT m"3/s Estimated lower meas. limit of evaluated TB see description measl_b FLOAT m"3/s Estimated upper meas. limit of evaluated TB see description _ameasl_b FLOAT m"3/s Estimated upper meas. limit of evaluated TB see description _sexage_factor_if FLOAT m SB: storativity,Bewidth of formation, 2D reddel,see vdule_type_tr CHAR Citrue value,1:TT-surgerweas.limit, 1:TT-upper meas.limit, or valued, 2, see description vdule_type_tr CHAR Best choice code. 1 means T is best choice of 1, else 0 _uneasl_q_s FLOAT m"2/s Estimated vare meas.limit or valued T1, see table descr _uneasl_q_s FLOAT m"2/s Estimated upper meas.limit or valued T1, see table descr. _uneasl_q_s FLOAT | | | m**2/s | |
| value_type_tm CHAR Oftw value_1*TM-dower meas.limit, 1*TM-upper meas.limit, hydr_cond_moye FLOAT m/s K_M: Hydraulic conductivity based on Moye (1967) formation_with FLOAT m D:Aduler flukhess serp. for Tigenerally b=LW), see descr. width_of_phanel_b FLOAT m B:Inferred width of formation for evaluated TB tb FLOAT m**3/s Estimated lower meas. limit of evaluated TB, see description u_measl_b FLOAT m**3/s Estimated upper meas. limit of evaluated TB, see description stassmed_sb FLOAT m**3/s Estimated upper meas.limit of evaluated TB, see description stassmed_sb FLOAT m**3/s Estimated upper meas.limit of evaluated TB, see description stassmed_sb FLOAT m SS:stassmithy Service for evaluated TF, see description transmissivity_11 FLOAT m**2/s Estimated upper meas.limit for evaluated TF, see description transmissivity_11 FLOAT m**2/s Estimated upper meas.limit for evaluated TF, see description transmissivity_11 FLOAT m**2/s Estimated upper meas.limit for evaluated TF, see description transmissivity_11 FLOAT | | | 20 | |
| hyd_cond_moye FLOAT m/s K_M: Hydraulic conductivity based on Moye (1967) formation_wdmb_b FLOAT m b:Aquifer thickness repr. for Tigenerally b=Lw), see descr. ittmatel_prove FLOAT m**3/s TB-flow capacity in 1D formation of 1T & with B see descr. i_measl_b FLOAT m**3/s Estimated lower meas. limit of evaluated TB see description ssumed_sb FLOAT m SB-storativity, B-with of formation, 1D modelse. u.measl_b FLOAT m SB-storativity, B-with of formation, 2D radial flow model.see ssumed_sb FLOAT m SB-storativity, B-with of formation, 2D radial flow model.see value_type_t CHAR Ottow value_titor for valuation of Leskage factor taule_type_t CHAR Best choice code. 1 means TT is best choice of T, else 0 use_type_t FLOAT m**2/s Estimated uper meas. limit for valuated TT.see table descr. u_measl_q_s FLOAT m**2/s Estimated uper meas. limit for valuated TT.see descr. u_measl_q_s FLOAT m**2/s Estimated uper meas. limit for valuated TT.see descr. u_measl_q_s FLOAT m**2/s < | - | | | • |
| formation_width_b FLOAT m b Aquifer thickness rep. for Tigenerally b=Lw) see descr. width_g_hannel_b FLOAT m*3/s TB-flow capacity in 19 formation of 7 & width B, see descr. Lineasl_tb FLOAT m*3/s Estimated lower meas. limit for evaluated TB, see description u_measl_b FLOAT m*3/s Estimated lower meas. limit of evaluated TB, see description sasumed_sb FLOAT m SB:S=storativity.B=width of formation,1D model,see description sasumed_sb FLOAT m SB:S=storativity.B=width of formation,2D model,see leakage_factor_if FLOAT m SB:S=storativity.B=width of formation,2D model,see value_type_tt CHAR Otrue value,-1:TF-lower meas. limit for evaluated TT-see table descr u_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 lower meas. limit for evaluated TT, see table descr. u_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 lower meas. limit for evaluated TT, see table descr. < | | | m/s | |
| width_of_channel_b FLOAT m B:Inferred width of formation for evaluated TB b FLOAT m*3/s TB:Flow capacity in 1D formation of T & width B, see description u_measl_b FLOAT m*3/s Estimated tower meas. limit for evaluated TB:see description sb FLOAT m SB:Sestorativity.B=width of formation, 1D model, see description sb FLOAT m SB:Sestorativity.B=width of formation, 2D model, see description leakage_factor_if FLOAT m Lf:D model for evaluated TB:see description ransmissivity_it FLOAT m*2/s Transmissivity of formation, 2D radial flow model, see value_type_tt CHAR Otrue value,-1:TT-forwer meas. limit for evaluated TT; see table descr u_measl_q_s FLOAT m*2/s Estimated uoper meas. limit for evaluated TT; see table descr. u_measl_q_s FLOAT m*2/s Estimated uoper meas. limit for evaluated Tr, see table descr. sasumed_s FLOAT m*2/s Estimated uoper meas. limit for evaluated Tr, see description storativity_s FLOAT m*2/s Estimated uoper meas. limit for evaluated Tr, see description storativity_s FLOAT m*2/s Estimated uoper meas. limit for evaluated Tr, see description u_measl_q_s FLOAT m*2/s Estimated uoper evaluated Tr, see descr | | | | |
| b 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 of evaluated TB;see description sumed_sb FLOAT m<3/s | | | | |
| Lmessl_tb FLOAT m*3/s Estimated upper meas. limit for evaluated TB, see description u_measl_tb FLOAT m SB:-sector/UN_B=width of formation, 1D model, see description assumed_sb FLOAT m SB:-sector/UN_B=width of formation, 2D model, see description assumed_sb FLOAT m SB:-sector/UN_B=width of formation, 2D model, see description transmissivity_ft FLOAT m*2/s TT:ransmissivity of formation, 2D radial flow model, see value_type_tt CHAR Ottrue value, 1:TT <description< td=""> 2D radial flow model, see value_type_tt CHAR Ottrue value, 1:TT 2D radial flow model, see u_measl_q_s FLOAT m*2/s Estimated upper meas. limit for evaluated TT, see description storativity_st FLOAT m*2/s Estimated upper meas. limit for evaluated TT, see description storativity_st FLOAT m*2/s Estimated upper meas. limit for evaluated TT, see description storativity_st FLOAT m*2/s Estimated upper meas. limit for evaluated TT, see description storativity_tor FLOAT m*2/s Estimated upper meas. limit for evaluated ttrante the evaluation of tev</description<> | | | | |
| L_measl_tb FLOAT m**3/s Estimated upper meas. limit of evaluated TB,see description ab FLOAT m SBS-storativity,B=width of formation, Dmodel,see description assumed_sb FLOAT m SB*: Assumed SB. Storativity,B=width of formation, see transmissivity_tt 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 upmeasl_q_s FLOAT m**2/s Estimated upper meas. limit for evaluated TT, see table descr upmeasl_q_s FLOAT m**2/s Estimated upper meas. limit for evaluated TT, see table descr. source_q_s FLOAT m**2/s Estimated upper meas. limit for evaluated TT, see descr, total divity_see descr. sumed_s FLOAT m**2/s Estimated upper meas. limit for evaluated TT, see descr, total divity_see descr. sumed_s FLOAT m**2/s Estimated upper meas. limit for evaluated to flexage coeff. seakage_coeff FLOAT m/s Ks1:3D model evaluation of leakage coeff. rule_type_ksf FLOAT m/s Estimated upper meas.limit for evaluated Ksf, see table descr. | | | m**3/s | |
| 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_if FLOAT m L1:D model for evaluation of Leakage factor transmissivity_it FLOAT m**2/s TT:Transmissivity of formation, 2D radial flow model,see value_type_tt CHAR Ottrue value,-1:TT-dower meas.limit.TT-upper meas.limit, bc_it CHAR Best choice code. 1 means Till is best choice of 7, else 0 L_measl_q_s FLOAT m**2/s Estimated lower meas. limit for evaluated TT, see description storativity_s FLOAT m**2/s Estimated lower meas. limit for evaluated TT, see description storativity_s FLOAT m**2/s Estimated lower meas. limit for evaluated TT, see descr. sasumed_s FLOAT m**2/s Estimated lower meas.limit for evaluated TT, see descr. ri FLOAT m Radius of influence :1,0 or 1, see descr. ri FLOAT m Radius of influence :1,0 or 1, see descr. ri,dex FLOAT m/s Ksf3O model evaluation of hexage coeff.see desc. value_type_ksf CHAR Otrue value,-1:Ksf-lower meas.limit,1:Ksf-upper meas.limit, u_measl_ksf FLOAT m/s | | | m**3/s | Estimated upper meas. limit of evaluated TB,see description |
| assumed_sb FLOAT m SB*: Assumed_SB,S=storativity,B=width of formation,see leakage_factor_If FLOAT m Lf:1D model for evaluation of Leakage factor transmissivity,tt FLOAT m**2/s T:Transmissivity of formation,2D radial flow model,see value_type_tt CHAR Otrue value,-1:TT-dower meas.limit for evaluated TT,see able descr bc_tt CHAR Estimated upper meas.limit for evaluated TT,see able descr u_measl_q_s FLOAT m**2/s Estimated upper meas.limit for evaluated TT,see description storativity_s FLOAT Mssumed Storativity_S mstoration,see descr. assumed_sc FLOAT mstoration based on 2D and flow.see descr. assumed_sc FLOAT m Radius of influence ri_index CHAR mindex-index of andius of influence :-1,0 or 1, see descr. value_type_ktf CHAR mindex-index of andius of influence :-1,0 or 1, see descr. value_type_ktf FLOAT m/s Ksf.3D model evaluation of hydraulic conductivity, see desc. value_type_ktf FLOAT m/s Estimated lower meas.limit for evaluated Ksf.see table descr. see_torisea | | | m | |
| transmissivity_tt FLOAT m**2/s TT:Transmissivity of formation, 2D radial flow model, see value_jtype_tt CHAR Ottrue value, 1:TT-tower meas.limit, 1TT-supper meas.limit, L_measl_q_s FLOAT m**2/s Estimated lower meas. limit for evaluated TT, see table descr L_measl_q_s FLOAT m**2/s Estimated upper meas. limit for evaluated TT, see descr, is assumed_s savumed_s FLOAT M**2/s Estimated upper meas. limit for evaluated TT, see descr, is assumed_s bc_s FLOAT Maius of influence Tr. index-index of radius of influence :-1.0 or 1, see descr. in index-index of radius of influence FLOAT m Radius of influence in index-index of radius of influence FLOAT m's Kf:3D model evaluation of locativity, see desc. value_type_kf CHAR Citrue value, 1:Ks/1:oupper meas.limit, time, to evalue to feakage coeff, see desc Kf:3D model evaluation of indrauited Ks/, see table desc. u_measl_ksf FLOAT m/s Estimated uper meas.limit for evaluated Ks/, see table descr. assumed_ssf FLOAT m/s Estimated uper meas.limit for evaluated Ks/, see table descr. assumed_ssf FLOAT m/s Estimated uper meas.limit for evaluated Ks/, see table descr. assumed_ssf FLOAT m/s Estimated uper meas.limit for evaluated Ks/, see table descr. <td></td> <td></td> <td></td> <td></td> | | | | |
| value_type_trime CHAR 0:true value_1:1T-slower meas.limit, 1:TT-super meas.limit, bc_tt CHAR Best choice cde: 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 storativity_s FLOAT m**2/s Estimated lower meas.limit for evaluated TT, see table descr. assumed_s FLOAT S:Storativity of formation based on 2D rad flow, see descr. assumed_s FLOAT Assumed Storativity.2D model evaluation, see table descr. bc_s FLOAT m Radius of influence ri_index CHAR ri index-index of radius of influence ::1, 0 r1, see descr. ri_index FLOAT m/s Ksf:3D model evaluation of leakage coeff, see desc hydr_cond_ksf FLOAT m/s Ksf:3D model evaluation of reakage coeff, see desc hydr_cond_ksf FLOAT m/s Estimated lower meas.limit for evaluated Ksf, see table descr. assumed_ssf FLOAT m/s Estimated upper meas.limit for evaluated Ksf, see table descr. assumed_ssf FLOAT m/s Estimated upper meas.limit for evaluated Ksf, see table descr. assumed_sstrap_ssf FLOAT m/s Stimat | leakage_factor_lf | FLOAT | m | Lf:1D model for evaluation of Leakage factor |
| 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 uover meas. limit for evaluated TT, see table descr u_measl_q_s FLOAT Storativity. 25 Storativity. 20 measl_ont for evaluated TT, see table descr. assumed_s FLOAT Storativity. 20 model evaluation, see table descr. bc_s FLOAT Best choice of S (Storativity. 20 model evaluation, see table descr. if FLOAT m Radius of influence ni index=index of radius of influence i-1.0 or 1, see descr. ri_index CHAR ri index=index of radius or influence i-1.0 or 1, see descr. storativity. 20 value_type_ksf CHAR Ottrue value1:Ksf <lower descr.<="" evaluated="" for="" ksf,="" meas.limit="" see="" table="" td=""> u_measl_ksf FLOAT m/s Estimated uover meas.limit for evaluated Ksf, see table descr. u_measl_ksf FLOAT m/s Estimated uover meas.limit for evaluated Ksf, see table descr. u_measl_ksf FLOAT m/s Estimated uover meas.limit for evaluated Ksf, see table descr. u_measl_ksf FLOAT m/s Estimated uover meas.limit for evaluated Ksf, see table descr. u_measl_ksf FLOAT Stort</lower> | 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,</lower> |
| 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. bc_s FLOAT m Radius of influence ri RLOAT 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. u_measl_ksf FLOAT m/s Estimated lower meas.limit for evaluated Ksf, see table desc. u_measl_ksf FLOAT m/s Estimated lower meas.limit for evaluated Ksf, see table descr. u_measl_ksf FLOAT m/s Estimated store reavely and ksf. Storativity.1:Ksf-upper meas.limit.1:Ksf-upper meas.limit.1:Ksf-uppe | bc_tt | CHAR | | Best choice code. 1 means TT is best choice of T, else 0 |
| 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. bc_s FLOAT m Radius of influence 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 hydraulic conductivity,see desc. value_type_ksf CHAR Ottrue 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 descr. u_measl_ksf FLOAT m/s Estimated upper meas.limit for evaluated Ksf,see table descr. sec_storage_ssf FLOAT m/s Estimated storage.3D model evaluation, see table descr. assumed_sisf FLOAT 1/m Ssf:Assumed Spec.storage.3D model evaluation, see table descr. c FLOAT n**3/pa C: Wellbore storage coefficient; flow or recovery period cd FLOAT s Estimated stop time of evaluation, see table description td1 FLOAT s Stort time for evaluated parameter from start | l_measl_q_s | FLOAT | m**2/s | Estimated lower meas. limit for evaluated TT,see table descr |
| assumed_s FLOAT Assumed Storativity, 2D model evaluation, see table descr. bc_s FLOAT Best choice of S (Storativity), see descr. ri Radius of influence 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 1/s K/b':2D rad flow model evaluation of hydraulic conductivity, see desc. value_type_ksf CHAR Ottrue value, -1:Ksf-lower meas.limit, 1:Ksf-upper meas.limit, 1:L_measl_ksf l_measl_ksf FLOAT m/s Estimated lower meas.limit for evaluated Ksf, see table descr. u_measl_ksf FLOAT m/s Stf:Specific storage, 3D model evaluation, see table descr. c FLOAT 1/m Stf:Specific storage, 2D model evaluation, see table descr. c FLOAT 1/m Stf:Specific storage, 2D model evaluation, see table descr. c FLOAT 1/m Stf:Specific storage coefficient; flow or recovery period cd FLOAT Stimated stor time of evaluated parameter from start flow period cd FLOAT s < | u_measl_q_s | FLOAT | m**2/s | Estimated upper meas. limit for evaluated TT,see description |
| bc_s FLOAT m Radius of influence 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^22D 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 Ottrue value,-1:Ksf-clower meas.limit, 1:Ksf-upper meas.limit, measi_ksf FLOAT m/s Estimated lower meas.limit for evaluated Ksf, see table descr spec_storage_ssf FLOAT m/s Estimated lower meas.limit for evaluated Ksf, see table descr assumed_ssf FLOAT m/m Ssf:Specific storage,3D model evaluation, see table descr c FLOAT 1/m Ssf:Assumed Spec.storage.3D model evaluation, see table descr cd FLOAT m*3/pa C: Wellbore storage coefficient skin FLOAT s Estimated start time of evaluation, see table descr tdt1 FLOAT s Start time for evaluated parameter from start of flow period tt2 FLOAT s Start time for evaluated parameter from start of flow p | storativity_s | FLOAT | | S:Storativity of formation based on 2D rad flow, see descr. |
| n 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 Ottrue value, -1:Ksf-lower meas.limit, 1:Ksf-upper meas.limit, l_measl_ksf FLOAT m/s Estimated upper meas.limit for evaluated Ksf, see table descr. spec_storage_ssf FLOAT m/s Estimated upper meas.limit for evaluated Ksf, see table descr. spec_storage_ssf FLOAT m/s Estimated upper meas.limit for evaluated Ksf, see table descr. c FLOAT 1/m Ssf:Specific storage, 3D model evaluation, see table descr. c FLOAT 1/m Ssf:Ascumed Spec.storage.coefficient; flow or recovery period cd FLOAT C: Wellbore storage coefficient; flow or recovery period, see descr. dt1 FLOAT s Estimated stor; time of evaluated prasmeter form start of flow period td2 FLOAT s Stor time for evaluated prasmeter from start of recovery td1 FLOAT | assumed_s | FLOAT | | Assumed Storativity, 2D model evaluation, see table descr. |
| n_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 Ottrue value, 1:Ksf Char meas.limit, 1:Ksf>upper meas.limit, 1:Ksf>upper meas.limit, 1:Ksf>upper meas.limit, 1:Ksf>upper meas.limit, 1:Ksf>upper meas.limit, 1:Ksf>upper meas.limit, 1:Stspecific storage, 3D model evaluation, see table desc. u_measl_ksf FLOAT m/s Estimated upper meas.limit for evaluated Ksf, see table desc. u_measl_ksf 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 descr. c FLOAT m**3/pa C: Wellbore storage coefficient; flow or recovery period. cd FLOAT s Estimated start time of evaluation, see table description tt1 FLOAT s Estimated start time of evaluated parameter from start of recovery dt2 FLOAT s Start time for evaluated parameter from start of recovery td2 FLOAT s Start time for evaluated parameter from start of recove | bc_s | FLOAT | | Best choice of S (Storativity) ,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 Ottrue value,-1:Ksf-lower meas.limit, 1:Ksf-upper meas | ri | FLOAT | m | Radius of influence |
| hydr_cond_ksfFLOATm/sKsf:3D model evaluation of hydraulic conductivity, see desc.value_type_ksfCHAR0:true value, -1:Ksf <lower desc.<="" evaluated="" for="" ksf,="" meas.limit="" see="" table="" td="">u_measl_ksfFLOATm/sEstimated lower meas.limit for evaluated Ksf, see table descrspec_storage_ssfFLOAT1/mSsf:Specific storage, 3D model evaluation, see table descr.assumed_ssfFLOAT1/mSsf:Specific storage, 3D model evaluation, see table descr.cFLOAT1/mSsf:Assumed Spec. storage, 3D model evaluation, see table des.cFLOATm**3/paC: Wellbore storage coefficient; flow or recovery periodcdFLOATSSkin factor,best estimate of flow/recovery period, see descr.skinFLOATsEstimated start time of evaluation, see table descriptiondt1FLOATsStart time for evaluated parameter from start flow periodt2FLOATsStart time for evaluated parameter from start of flow periodte1FLOATsStart time for evaluated parameter from start of recoverydte2FLOATsStop time for evaluated parameter from start of recoveryp_hornerFLOATsStop time for evaluated parameter from start of recoverytarsmissivity_t_nIrFLOATm**2/sT_NLR Transmissivity based on None Linear Regressionstorativity_s_nIrFLOATm**2/sSult see done storage coefficient, see descr.tarsmissivity_t_nIrFLOATm**2/sSult see done coefficient, see done coefficient, see done coefficient, see done</lower> | ri_index | CHAR | | ri index=index of radius of influence :-1,0 or 1, see descr. |
| 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 desc. spec_storage_ssf FLOAT 1/m Ssf:Specific storage,3D model evaluation,see table desc. c FLOAT 1/m Ssf:Assumed Spec.storage,3D model evaluation,see table desc. c FLOAT m**3/pa C: Wellbore storage coefficient; flow or recovery period cd FLOAT s Estimated stop time of evaluation, see table description skin FLOAT s Estimated stop time of evaluation. see table description dt1 FLOAT s Estimated stop time of evaluated parameter from start flow period t2 FLOAT s Start time for evaluated parameter from start of flow period t2 FLOAT s Start time for evaluated parameter from start of flow period t2 FLOAT s Stop time for evaluated parameter from start of flow period t2 FLOAT s Stop time for evaluated parameter from start of flow period t4=1 FLOA</lower> | leakage_coeff | FLOAT | 1/s | K'/b':2D rad flow model evaluation of leakage coeff,see desc |
| measl_ksfFLOATm/sEstimated lower meas.limit for evaluated Ksf,see table desc.u_measl_ksfFLOATm/sEstimated upper meas.limit for evaluated Ksf,see table descrspec_storage_ssfFLOAT1/mSsf:Specific storage,3D model evaluation,see table descr.assumed_ssfFLOAT1/mSsf:Assumed Spec.storage,3D model evaluation,see table descr.cFLOAT1/mSsf:Assumed Spec.storage,3D model evaluation,see table descr.cFLOAT1/mSsf:Assumed Spec.storage,3D model evaluation,see table descr.cFLOATm**3/paC: Wellbore storage coefficientcdFLOATSsin factor.best estimate of flow/recovery periodcdFLOATsEstimated start time of evaluation, see table descriptiondt1FLOATsStart time for evaluated parameter from start flow periodt2FLOATsStart time for evaluated parameter from start of flow periodt2FLOATsStop time for evaluated parameter from start of recoverydte1FLOATsStop time for evaluated parameter from start of recoverytarasmissivity_t_nirFLOATsStop time for evaluated parameter from start of recoveryp_hornerFLOATsStop time for evaluated parameter from start of recoverytarasmissivity_t_nirFLOATsStop time for evaluated parameter from start of recoverytarasmissivity_t_nirFLOATsStop time for evaluated parameter from start of recoverytarasmissivity_s_nirFLOATm**2/sT_NLR Transm | hydr_cond_ksf | FLOAT | m/s | Ksf:3D model evaluation of hydraulic conductivity, see desc. |
| u_meas_ksfFLOATm/sEstimated upper meas.limit for evaluated Ksf, see table descrspec_storage_ssfFLOAT1/mSsf:Specific storage, 3D model evaluation, see table descr.assumed_ssfFLOAT1/mSsf:Assumed Spec. storage, 3D model evaluation, see table desc.cFLOATm**3/paC: Wellbore storage coefficient; flow or recovery periodcdFLOATm**3/paC: Wellbore storage coefficient; flow or recovery period.skinFLOATSkin factor;best estimate of flow/recovery period, see descr.dt1FLOATsEstimated start time of evaluation, see table descriptiondt2FLOATsEstimated start time of evaluation, see table descriptiont1FLOATsStart time for evaluated parameter from start flow periodt2FLOATsStart time for evaluated parameter from start of recoverydte1FLOATsStop time for evaluated parameter from start of recoveryp_homerFLOATsStop time for evaluated parameter from start of recoveryp_homerFLOATsStop time for evaluated parameter from start of recoveryp_homerFLOATkPap*-Homer extrapolated pressure, see table descriptiontransmissivity_e_nirFLOATm**2/sT_NLR Transmissivity based on None Linear Regressionstorativity_s_nirFLOATm**2/sT_NLR Transmissivity based on None Linear Regressionstorativity_s_nirFLOATm**3/paWellbore storage cofficient, based on NLR, see descr.c_nirFLOATm**3/pa | value_type_ksf | CHAR | | 0:true value,-1:Ksf <lower meas.limit,1:ksf="">upper meas.limit,</lower> |
| spc_storage_ssfFLOAT1/mSsf:Specific storage,3D model evaluation,see table descr.assumed_ssfFLOAT1/mSsf:Assumed Spc.storage,3D model evaluation,see table desc.cFLOATm**3/paC: Wellbore storage coefficient; flow or recovery periodcdFLOATSkin factor;best estimate of flow/recovery period, see descr.skinFLOATSEstimated start time of evaluation, see table descriptiondt1FLOATsEstimated start time of evaluation, see table descriptiondt2FLOATsStart time for evaluated parameter from start flow periodtt2FLOATsStart time for evaluated parameter from start of flow perioddte1FLOATsStart time for evaluated parameter from start of recoverydte2FLOATsStop time for evaluated parameter from start of recoverydte2FLOATsStop time for evaluated parameter from start of recoveryp_hornerFLOATsStop time for evaluated parameter from start of recoverytransmissivity_t_nIrFLOATm**2/sT_NLR Transmissivity based on None Linear Regressionstorativity_s_nIrFLOATm**3/paWellbore storage coefficient, based on NLR, see descr.c_nIrCHARO:true value,-1:T_NLRreased on NLR, see descr.c_nIrFLOATm**3/paWellbore storage coefficient, based on NLR, see descr.c_nIrFLOATm**3/paWellbore storage coefficient, based on NLR, see desc.c_nirFLOATm**3/paWellbore storage coefficient, bas | l_measl_ksf | FLOAT | m/s | Estimated lower meas.limit for evaluated Ksf,see table desc. |
| 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 start time of evaluation, see table description t1 FLOAT s Estimated start time of evaluated parameter from start flow period t2 FLOAT s Start time for evaluated parameter from start of flow period dte1 FLOAT s Start time for evaluated parameter from start of recovery p_horner FLOAT s Stop time for evaluated parameter from start of recovery p_horner FLOAT s Stop time for evaluated parameter from start of recovery p_horner FLOAT m**2/s T_NLR Transmissivity based on None Linear Regression storativity_s_nIr FLOAT m**3/pa O:true value,-1:T_NLR value_type_t_nir CHAR O:true value,-1:T_NLR | u_measl_ksf | FLOAT | m/s | Estimated upper meas.limit for evaluated Ksf,see table descr |
| 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 evaluated parameter from start flow period t2 FLOAT s Start time for evaluated parameter from start of flow period t41 FLOAT s Start time for evaluated parameter from start of flow period t2 FLOAT s Start time for evaluated parameter from start of recovery dte1 FLOAT s Start time for evaluated parameter from start of recovery p_horner FLOAT s Stap time for evaluated parameter from start of recovery p_horner FLOAT m**2/s T_NLR Transmissivity based on None Linear Regression storativity_s_nlr FLOAT m**3/pa O:true value,-1:T_NLR value_type_t_nr CHAR O:true value,-1:T_NLR c_nlr FLOAT m**3/pa Wellbore storage coefficient, based on NLR, see descr. | spec_storage_ssf | FLOAT | 1/m | Ssf:Specific storage,3D model evaluation,see table descr. |
| 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 start time of evaluation, see table description t1 FLOAT s Start time for evaluated parameter from start flow period t2 FLOAT s Start time for evaluated parameter from start of flow period tde1 FLOAT s Stop time for evaluated parameter from start of recovery p_homer FLOAT s Stop time for evaluated parameter from start of recovery p_homer FLOAT s Stop time for evaluated parameter from start of recovery p_homer FLOAT s Stop time for evaluated parameter from start of recovery storativity_s_nlr FLOAT m**2/s T_NLR Transmissivity based on None Linear Regression storativity_s_nlr FLOAT m**3/pa Ottrue value,-1:T_NLR value_type_t_nr CHAR Ottrue value,-1:T_MLR-stower meas.Timit, 1:>upper meas.Timit bc_nir FLOAT m**3/pa Wellbore storage coefficient, based on NLR, se | assumed_ssf | FLOAT | 1/m | Ssf*:Assumed Spec.storage,3D model evaluation,see table des. |
| skinFLOATSkin factor;best estimate of flow/recovery period,see descr.dt1FLOATsEstimated start time of evaluation, see table descriptiondt2FLOATsEstimated stop time of evaluation. see table descriptiont1FLOATsStart time for evaluated parameter from start flow periodt2FLOATsStop time for evaluated parameter from start of flow perioddte1FLOATsStart time for evaluated parameter from start of recoverydte2FLOATsStop time for evaluated parameter from start of recoveryp_hornerFLOATsStop time for evaluated parameter from start of recoveryp_hornerFLOATkPap*:Horner extrapolated pressure, see table descriptiontransmissivity_t_nlrFLOATm**2/sT_NLR Transmissivity based on None Linear Regressionstorativity_s_nlrFLOATm**2/sS_NLR=storativity based on None Linear Regression.seevalue_type_t_nrCHARO:true value,-1:T_NLR <lower 1:="" meas.limit,="">upper meas.limitbc_t_nlrCHARDimensionless wellbore storage constant, see table descrip.skin_nlrFLOATm**2/sT_GRF:Transmissivity based on Genelized Radial Flow, seevalue_type_t_grfFLOATm**2/sT_GRF:Transmissivity based on Genelized Radial Flow, seevalue_type_t_grfCHARO:true value,-1:T_GRF<lower 1:="" meas.limit,="">upper meas.limitbc_t_grfCHARO:true value,-1:T_GRF sbest choice of T, else 0</lower></lower> | | | m**3/pa | |
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| dt2FLOATsEstimated stop time of evaluation. see table descriptiont1FLOATsStart time for evaluated parameter from start flow periodt2FLOATsStop time for evaluated parameter from start of flow perioddte1FLOATsStart time for evaluated parameter from start of recoverydte2FLOATsStop time for evaluated parameter from start of recoveryp_hornerFLOATsStop time for evaluated parameter from start of recoveryp_hornerFLOATkPap*:Horner extrapolated pressure, see table descriptiontransmissivity_t_nIrFLOATm**2/sT_NLR Transmissivity based on None Linear Regressionstorativity_s_nIrFLOATm**3/paStop time value,-1:T_NLRbc_t_nIrCHARBest choice code. 1 means T_NLR is best choice of T, else 0c_nIrFLOATm**2/sT_GRF:Transmissivity based on Sone Linear Regression, seeskin_nIrFLOATm**3/paWellbore storage coefficient, based on NLR, see table descrip.skin_nIrFLOATm**2/sT_GRF:Transmissivity based on Genelized Radial Flow, seevalue_type_t_grfFLOATm**2/sT_GRF:Transmissivity based on Genelized Radial Flow, seevalue_type_t_grfCHAR0:true value,-1:T_GRF <lower 1:="" meas.limit,="">upper meas.limitbc_t_grfCHAR0:true value,-1:T_GRF sbest choice of T, else 0</lower> | | | | |
| 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 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_s_nlr FLOAT m**2/s T_LNLR Transmissivity based on None Linear Regression storativity_s_nlr FLOAT m**2/s S_NLR=storativity based on None Linear Regression, see value_type_t_nlr CHAR 0:true value,-1:T_NLR None Linear Regression, see c_nlr FLOAT m**3/pa Wellbore storage coefficient, based on NLR, see descr. c_d_nlr FLOAT m**3/pa Wellbore storage constant, see table descrip. skin_nlr FLOAT m**2/s T_GRF:Transmissivity based on Genelized Radial Flow, see value_type_t_grf FLOAT m**2/s T_GRF:Transmissivity based on Genelized Radial Flow, see <t< td=""><td></td><td></td><td></td><td></td></t<> | | | | |
| 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 Start time for evaluated parameter from start of recovery p_horner 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 m**2/s T_NLR=storativity based on None Linear Regression,see value_type_t_nlr CHAR S_NLR=storativity based on None Linear Regression,see ot_nlr CHAR 0:true value,-1:T_NLR c_nlr FLOAT m**3/pa skin_nlr FLOAT Dimensionless wellbore storage constant, see table descrip. skin_nlr FLOAT Skin factor based on Non Linear Regression,see value_type_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 could chade accin value_type_t_grf </td <td></td> <td></td> <td></td> <td></td> | | | | |
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| 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 m**2/s T_NLR Transmissivity based on None Linear Regression.see value_type_t_nlr CHAR O:true value,-1:T_NLR None Linear Regression,see c_nlr CHAR O:true value,-1:T_NLR NLR is best choice of T, else 0 c_nlr FLOAT m**3/pa Wellbore storage coefficient, based on NLR, see descr. cd_nir FLOAT Dimensionless wellbore storage constant, see table descrip. skin_nlr FLOAT Skin factor based on Non Linear Regression,see value_type_t_grf FLOAT Skin factor based on Non Linear Regression,see desc. transmissivity_t_grf 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 1:="" meas.limit,="">upper meas.limit bc_t_grf CHAR 0:true val</lower> | | | | |
| p_homer FLOAT kPa p*.Homer 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 bc_t_nlr CHAR 0:true value,-1:T_NLR c_nlr FLOAT m**3/pa vellbore storage coefficient, based on NLR, see descr. odescrip. cd_nlr FLOAT Dimensionless wellbore storage constant, see table descrip. skin_nlr FLOAT Skin factor based on Non Linear Regression,see value_type_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 1:="" meas.limit,="">upper meas.limit bc_t_grf CHAR 0:true value,-1:T_GRF is best choice of T, else 0</lower> | | | | |
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| 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 1:="" meas.limit,="">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 1:="" meas.limit,="">upper meas.limit bc_t_grf CHAR Best choice code. 1 means T_GRF is best choice of T, else 0</lower></lower> | - | | | |
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| 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 1:="" meas.limit,="">upper meas.limit bc_t_grf CHAR Best choice code. 1 means T_GRF is best choice of T, else 0</lower> | | | | |
| 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 1:="" meas.limit,="">upper meas.limit bc_t_grf CHAR Best choice code. 1 means T_GRF is best choice of T, else 0</lower> | | | | |
| 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 1:="" meas.limit,="">upper meas.limit bc_t_grf CHAR Best choice code. 1 means T_GRF is best choice of T, else 0</lower> | | | m**3/pa | - |
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| 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</lower> | | | m**0/- | |
| bc_t_grf CHAR Best choice code. 1 means T_GRF is best choice of T, else 0 | | | m**2/s | |
| | | | | |
| SUDATIVITY SUGATION SECTION SUCRETIVITY DASED ON GENERALIZED RADIAL FIOW. SEE DES. | | | | |
| | | | | |
| flow_dim_grf FLOAT Inferred flow dimesion based on Generalized Rad. Flow model | | | | |
| comment VARCHAR no_unit Short comment to the evaluated parameters | | | no_unit | |
| error_flag CHAR If error_flag = "*" then an error occured and an error | | | | |
| in_use CHAR If in_use = "*" then the activity has been selected as sign CHAR Signature for QA data accknowledge (QA - OK) | | | | _ , |

| | | | | | | | formation_ | | | | value_type_q_ | | value_type_t | | transmissivity_m |
|---------|--------------|--------------|--------|--------|------------|-----------|------------|--------|--------------|-------------------|---------------|-------------------|--------------|-------|------------------|
| idcode | start_date | stop_date | secup | seclow | section_no | test_type | _ | lp | seclen_class | spec_capacity_q_s | | transmissivity_tq | | bc_tq | oye |
| KLX 16A | 070313 09:41 | 070313 12:22 | 13.00 | 113.00 | | : | 3 1 | 63.00 | 100 | 2.23E-05 | (|) | | | 2.91E-05 |
| KLX 16A | 070313 14:12 | 070313 16:02 | 112.00 | 212.00 | | | 3 1 | 162.00 | 100 | 1.02E-04 | (| | | | 1.33E-04 |
| KLX 16A | 070313 17:54 | 070313 19:46 | 212.00 | 312.00 | | | 3 1 | 262.00 | 100 | 1.43E-05 | (|) | | | 1.87E-05 |
| KLX 16A | 070313 21:41 | 070313 23:41 | 312.00 | 412.00 | | | 3 1 | 362.00 | 100 | 1.46E-07 | (|) | | | 1.90E-07 |
| KLX 16A | 070314 13:12 | 070314 14:38 | 12.50 | 32.50 | | | 3 1 | 22.50 | 20 | 2.29E-05 | 0 | | | | 2.40E-05 |
| KLX 16A | 070314 22:12 | 070314 23:57 | 32.50 | 52.50 | | | 3 1 | 42.50 | 20 | 1.98E-07 | (|) | | | 2.07E-07 |
| KLX 16A | 070315 00:34 | 070315 02:39 | 52.50 | 72.50 | | | 3 1 | 62.50 | 20 | 7.27E-08 | 0 |) | | | 7.60E-08 |
| KLX 16A | 070315 06:50 | 070315 08:18 | 72.50 | 92.50 | | | 3 1 | 82.50 | 20 | 2.16E-07 | 0 | | | | 2.06E-07 |
| KLX 16A | 070315 08:52 | 070315 10:25 | 91.00 | 111.00 | | | 3 1 | 101.00 | 20 | 3.81E-07 | (|) | | | 3.64E-07 |
| KLX 16A | 070315 10:59 | 070315 12:22 | 111.00 | 131.00 | | | 3 1 | 121.00 | 20 | 8.46E-08 | 0 | | | | 8.85E-08 |
| KLX 16A | 070315 13:31 | 070315 14:55 | 131.00 | 151.00 | | | 3 1 | 141.00 | 20 | 8.05E-05 | (|) | | | 8.42E-05 |
| KLX 16A | 070315 15:35 | 070315 17:14 | 150.00 | 170.00 | | | 3 1 | 160.00 | 20 | 3.15E-07 | 0 |) | | | 3.29E-07 |
| KLX 16A | 070315 17:51 | 070315 19:24 | 170.00 | 190.00 | | | 3 1 | 180.00 | 20 | 3.57E-07 | 0 |) | | | 3.74E-07 |
| KLX 16A | 070315 20:00 | 070315 21:52 | 188.00 | 208.00 | | | 3 1 | 198.00 | 20 | 1.06E-08 | (|) | | | 1.11E-08 |
| KLX 16A | 070315 22:44 | 070316 00:00 | 207.00 | 227.00 | | | 3 1 | 217.00 | 20 | 1.66E-05 | (| | | | 1.74E-05 |
| KLX 16A | 070316 00:47 | 070316 02:13 | 227.00 | 247.00 | | | 3 1 | 237.00 | 20 | 6.56E-07 | (|) | | | 6.68E-07 |
| KLX 16A | 070316 07:36 | 070316 08:58 | 247.00 | 267.00 | | | 3 1 | 257.00 | 20 | 1.02E-06 | (| | | | 1.07E-06 |
| KLX 16A | 070316 10:58 | 070316 12:19 | 267.00 | 287.00 | | 1 | 3 1 | 277.00 | 20 | 1.25E-05 | 0 |) | | | 1.31E-05 |
| KLX 16A | 070316 13:27 | 070316 14:51 | 287.00 | 307.00 | | | 3 1 | 297.00 | 20 | 6.17E-07 | (|) | | | 6.46E-07 |
| KLX 16A | 070316 15:27 | 070316 17:00 | 307.00 | 327.00 | | | 3 1 | 317.00 | 20 | 2.73E-08 | (| | | | 2.85E-08 |
| KLX 16A | 070317 08:35 | 070317 10:06 | 347.00 | 367.00 | | | 3 1 | 357.00 | 20 | 7.85E-08 | (|) | | | 8.21E-08 |
| KLX 16A | 070317 10:38 | 070317 12:14 | 367.00 | 387.00 | | | 3 1 | 377.00 | 20 | 7.39E-08 | 0 |) | | | 7.73E-08 |
| KLX 16A | 070317 12:48 | 070317 14:40 | 387.00 | 407.00 | | | 3 1 | 397.00 | 20 | 1.24E-08 | 0 | | | | 1.30E-08 |

| | | | | | hydr_cond_m | formation_wi | width_of_channel | | | | | assumed_s | leakage_fact | | value_type | | | |
|---------|--------|---------------------------------------|--------|---------------|-------------|--------------|------------------|----|------------|------------|----|-----------|--------------|----------|------------|---|-------------|-------------|
| idcode | secup | seclow | bc_tm | value_type_tm | oye | dth_b | _b | tb | I_measl_tb | u_measl_tb | sb | b | or_lf | | | | l_measl_q_s | u_measl_q_s |
| KLX 16A | 13.00 | 113.00 | (|) (| 2.91E-07 | | | | | | | | | 7.20E-05 | 0 | 1 | 1.00E-05 | 3.00E-04 |
| KLX 16A | 112.00 | 212.00 | C | 0 0 | 1.33E-06 | | | | | | | | | 1.61E-04 | 0 | 1 | 9.00E-05 | 4.00E-04 |
| KLX 16A | 212.00 | 312.00 | (|) C | 1.87E-07 | | | | | | | | | 4.96E-05 | 0 | 1 | 2.00E-05 | 8.00E-05 |
| KLX 16A | 312.00 | 412.00 | C |) C | 1.90E-09 | | | | | | | | | 6.38E-08 | 0 | 1 | 1.00E-08 | 2.00E-07 |
| KLX 16A | 12.50 | 32.50 | C |) (| 1.20E-06 | | | | | | | | | 6.16E-05 | 0 | 1 | 1.00E-05 | 2.00E-04 |
| KLX 16A | 32.50 | 52.50 | C |) C | 1.04E-08 | | | | | | | | | 5.37E-07 | 0 | 1 | 3.00E-07 | 7.00E-07 |
| KLX 16A | 52.50 | | |) (| 3.80E-09 | | | | | | | | | 2.30E-07 | 0 | 1 | 6.00E-08 | 5.00E-07 |
| KLX 16A | 72.50 | 92.50 | C |) C | 1.03E-08 | | | | | | | | | 5.11E-07 | 0 | 1 | 2.00E-07 | 8.00E-07 |
| KLX 16A | 91.00 | 111.00 | 0 |) (| 1.82E-08 | | | | | | | | | 5.52E-07 | 0 | 1 | 2.00E-07 | 8.00E-07 |
| KLX 16A | 111.00 | 131.00 | C |) (| 4.43E-09 | | | | | | | | | 1.58E-07 | 0 | 1 | 8.00E-08 | 4.00E-07 |
| KLX 16A | 131.00 | 151.00 | C |) (| 4.21E-06 | | | | | | | | | 1.99E-04 | 0 | 1 | 9.00E-05 | 9.00E-04 |
| KLX 16A | 150.00 | | 4 |) (C | 1.65E-08 | | | | | | | | | 5.92E-07 | ÷ | 1 | 1.00E-07 | 2.00E-06 |
| KLX 16A | 170.00 | 4 | ······ |) (| 1.87E-08 | | | | | | | | | 1.69E-07 | 0 | 1 | 5.00E-07 | 5.00E-06 |
| KLX 16A | 188.00 | | J | 0 0 | 5.55E-10 | | | | | | | | | 1.20E-08 | | 1 | 9.00E-07 | 6.00E-08 |
| KLX 16A | 207.00 | ÷ | k, |) (| 8.70E-07 | | | | | | | <u> </u> | | 5.32E-05 | | 1 | 1.00E-05 | 9.00E-05 |
| KLX 16A | 227.00 | · · · · · · · · · · · · · · · · · · · | · |) (| 3.34E-08 | | | | | | | | | 1.77E-06 | | 1 | 8.00E-07 | 5.00E-06 |
| KLX 16A | 247.00 | | |) (| 5.35E-08 | | | | | | | | | 2.14E-06 | | 1 | 9.00E-07 | 5.00E-06 |
| KLX 16A | 267.00 | 287.00 | 0 |) (| 6.55E-07 | | | | | | | j | | 2.20E-05 | 0 | 1 | 9.00E-06 | 5.00E-05 |
| KLX 16A | 287.00 | | |) C | 3.23E-08 | | | | | | | | | 1.87E-06 | | 1 | 9.00E-07 | 5.00E-06 |
| KLX 16A | 307.00 | 327.00 | C |) (| 1.43E-09 | | | | | | | | | 1.05E-08 | 0 | 1 | 9.00E-09 | 3.00E-08 |
| KLX 16A | 347.00 | 4 | ······ |) (| 4.11E-09 | ······ | | | | | | | | 6.68E-08 | | 1 | 3.00E-08 | 8.00E-08 |
| KLX 16A | 367.00 | | |) (| 3.87E-09 | | | | | | | | | 2.88E-07 | | 1 | 9.00E-08 | 7.00E-07 |
| KLX 16A | 387.00 | 407.00 | 0 | 0 0 | 6.50E-10 | | | | | | | | | 1.46E-08 | 0 | 1 | 8.00E-09 | 4.00E-08 |

| | | | | | | | | leakage c | hydr_cond_ks | value tvpe k | s I measi k | u measl k | | assumed ss | | | | | |
|---------|--------|--------|---------------|-----------|------|--------|----------|-----------|--------------|--------------|-------------|-----------|------------------|------------|----------|---------|-------|-------|--------|
| idcode | secup | seclow | storativity_s | assumed_s | bc_s | ri | ri_index | oeff | f | f | sf | | spec_storage_ssf | f – | c | cd | skin | dt1 | dt2 |
| KLX 16A | 13.00 | 113.00 | 1.00E-03 | 1.00E-03 | | 36.04 | 1 | | | | | | | | 3.43E-09 | 3.8E-04 | 1.60 | 8.4 | 30.0 |
| KLX 16A | 112.00 | 212.00 | 1.00E-06 | 1.00E-06 | | 341.39 | C |) | | | | | | | 1.82E-08 | 2.0E+00 | -0.34 | 63.6 | 666.0 |
| KLX 16A | 212.00 | 312.00 | 1.00E-06 | 1.00E-06 | | 254.33 | C |) | | | | | | | 6.74E-09 | 7.4E-01 | -3.90 | 307.2 | 1072.8 |
| KLX 16A | 312.00 | 412.00 | 1.00E-06 | 1.00E-06 | | 48.16 | -1 | | | | | | | | 4.72E-10 | 5.2E-02 | -2.50 | #NV | #NV |
| KLX 16A | 12.50 | 32.50 | 1.00E-03 | 1.00E-03 | | #NV | 1 | | | | | | | | 1.03E-07 | 1.1E-02 | 8.60 | #NV | #NV |
| KLX 16A | 32.50 | 52.50 | 1.00E-03 | 1.00E-03 | | 66.99 | C |) | | | | | | | 2.90E-10 | 3.2E-05 | 12.10 | 99.6 | 485.4 |
| KLX 16A | 52.50 | 72.50 | 1.00E-03 | 1.00E-03 | | 93.86 | C | | | | | | | | 4.19E-10 | 4.6E-05 | 17.60 | #NV | #NV |
| KLX 16A | 72.50 | 92.50 | 1.00E-03 | 1.00E-03 | | 66.16 | C |) | | | | | | | 6.78E-07 | 7.5E-02 | 12.50 | 9.0 | 615.6 |
| KLX 16A | 91.00 | 111.00 | 1.00E-03 | 1.00E-03 | | 67.45 | C |) | | | | | | | 4.99E-09 | 5.5E-04 | 5.90 | 100.2 | 874.8 |
| KLX 16A | 111.00 | 131.00 | 1.00E-06 | 1.00E-06 | | 49.34 | C |) | | | | | | | 2.08E-11 | 2.3E-03 | 5.22 | 148.8 | 950.4 |
| KLX 16A | 131.00 | 151.00 | 1.00E-06 | 1.00E-06 | | 293.91 | C | | | | | | | | 1.57E-08 | 1.7E+00 | 5.60 | 57.0 | 925.2 |
| KLX 16A | 150.00 | 170.00 | 1.00E-06 | 1.00E-06 | | #NV | -1 | | | | | | | | 8.29E-10 | 9.1E-02 | 4.84 | #NV | #NV |
| KLX 16A | 170.00 | 190.00 | 1.00E-06 | 1.00E-06 | | 6.79 | -1 | | | | | | | | 1.27E-10 | 1.4E-02 | -1.91 | 3.6 | 22.2 |
| KLX 16A | 188.00 | 208.00 | 1.00E-06 | 1.00E-06 | | 25.90 | C |) | | | | | | | 5.22E-11 | 5.8E-03 | 1.60 | 87.6 | 1069.2 |
| KLX 16A | 207.00 | 227.00 | 1.00E-06 | 1.00E-06 | | 211.34 | C |) | | | | | | | 5.09E-11 | 5.6E-03 | 10.53 | 58.2 | 1198.8 |
| KLX 16A | 227.00 | 247.00 | 1.00E-06 | | | 90.26 | C |) | | | | | | | 7.06E-11 | 7.8E-03 | | 51.6 | 846.0 |
| KLX 16A | 247.00 | 267.00 | 1.00E-06 | 1.00E-06 | | 94.65 | C |) | | | | | | | 6.22E-11 | 6.9E-03 | 6.07 | 27.6 | 910.8 |
| KLX 16A | 267.00 | 287.00 | 1.00E-06 | 1.00E-06 | | 169.48 | C |) | | | | | | | 3.18E-10 | 3.5E-02 | 2.41 | 33.6 | 1108.8 |
| KLX 16A | 287.00 | 307.00 | 1.00E-06 | 1.00E-06 | | 91.51 | C |) | | | | | | | 2.47E-09 | 2.7E-01 | 11.94 | 78.0 | 943.2 |
| KLX 16A | 307.00 | 327.00 | 1.00E-06 | 1.00E-06 | | 25.05 | C |) | l | | | | | | 3.90E-11 | 4.3E-03 | -1.87 | 123.0 | 1098.0 |
| KLX 16A | 347.00 | 367.00 | 1.00E-06 | 1.00E-06 | | 39.78 | C |) | | | | | | | 9.73E-10 | 1.1E-01 | -0.50 | 34.2 | 1022.4 |
| KLX 16A | 367.00 | 387.00 | 1.00E-06 | 1.00E-06 | | 7.47 | 1 | | | | | | | | 7.43E-11 | 8.2E-03 | 1.26 | 10.2 | 20.4 |
| KLX 16A | 387.00 | 407.00 | 1.00E-06 | 1.00E-06 | | 3.44 | 1 | | | | | | | | 5.72E-11 | 6.3E-03 | 0.24 | 10.2 | 19.2 |

| | | | | | | | | | storativity_s_ | value_type_t_n | | | | | | value_type_t_g | | storativity_s_ | flow_dim_g | |
|---------|--------|--------|----|----|------|------|----------|--|----------------|----------------|---|-------|--------|----------|----------------------|----------------|----------|----------------|------------|---------|
| idcode | secup | seclow | t1 | t2 | dte1 | dte2 | p_horner | transmissivity_t_nlr | nir | | | c_nir | cd_nir | skin_nlr | transmissivity_t_grf | rf | bc_t_grf | grf | rf | comment |
| KLX 16A | 13.00 | 113.00 |) | | | | 1038.2 | | | | | | | | | | | | | |
| KLX 16A | 112.00 | 212.00 |) | 1 | | | 1900.3 | | | | | | 1 | | | | | | | |
| KLX 16A | 212.00 | | | | | | 2784.4 | | | | | | | | | | | | | |
| KLX 16A | 312.00 | 412.00 | | | | | 3645.8 | | | | | | | | | | | | | |
| KLX 16A | 12.50 | 32.50 | | | | | 335.2 | | | | | | | | | | | | | |
| KLX 16A | 32.50 | 52.50 | | | | | 496.3 | | | | | | | | | | | | | |
| KLX 16A | 52.50 | 72.50 | | 1 | | 1 | 663.8 | | | | | | 1 | | | | | | | 1 |
| KLX 16A | 72.50 | 92.50 | | | | | 840.8 | | | | | | | | | | | | | |
| KLX 16A | 91.00 | 111.00 | | | | | 1001.7 | | | | | | | | | | | | | |
| KLX 16A | 111.00 | | | | | | 1180.6 | | | | | | 1 | | | | | | | 1 |
| KLX 16A | 131.00 | | | | | | 1358.9 | | | | | | | | | | | | | |
| KLX 16A | 150.00 | | | | | | 1525.4 | | | | | | ļ | | | | | | | ļ |
| KLX 16A | 170.00 | 190.00 | | | | | 1704.5 | | | | | | | | | | | | | |
| KLX 16A | 188.00 | 208.00 | | | | | 1865.2 | | | | | | | | | | | | | |
| KLX 16A | 207.00 | 227.00 | | ļ | | | 2032.5 | | | | | | | | | | | | | ļ |
| KLX 16A | 227.00 | | | | | | 2209.9 | | | | | | | | | | | | | L |
| KLX 16A | 247.00 | | | | | | 2385.5 | and a second descent descent descent descent descent | | | | | | | | | | | | L |
| KLX 16A | 267.00 | | | | | | 2561.4 | | | | | | ļ | | | | | | | ļ |
| KLX 16A | 287.00 | 307.00 | | | | | 2740.5 | | | | | | I | | | | | L | | ļ |
| KLX 16A | 307.00 | 327.00 | | | | | 2911.7 | | | | | | | | | | | | | |
| KLX 16A | 347.00 | 367.00 | | | | ļ | 3254.3 | | ļ | | ļ | | ļ | | | | | ļ | | ļ |
| KLX 16A | 367.00 | | | ļ | | ļ | 3425.7 | | | | | | ļ | | | | | ļ | | ļ |
| KLX 16A | 387.00 | 407.00 |) | | | | 3629.4 | | | | | | | | | | | | | 1 |

| Tabl | le | • = = | ole_test_obs sections of single hole test |
|---------------|----------|-------|---|
| Column | Datatype | Unit | Column Description |
| site | CHAR | | Investigation site name |
| activity_type | CHAR | | Activity type code |
| idcode | CHAR | | Object or borehole identification code |
| start_date | DATE | | Date (yymmdd hh:mm:ss) |
| secup | FLOAT | m | Upper section limit (m) |
| seclow | FLOAT | m | Lower section limit (m) |
| obs_secup | FLOAT | m | Upper limit of observation section |
| obs_seclow | FLOAT | m | Lower limit of observation section |
| pi_above | FLOAT | kPa | Groundwater pressure above test section, start of flow period |
| pp_above | FLOAT | kPa | Groundwater pressure above test section, at stop flow period |
| pf_above | FLOAT | kPa | Groundwater pressure above test section at stop recovery per |
| pi_below | FLOAT | kPa | Groundwater pressure below test section at start flow period |
| pp_below | FLOAT | kPa | Groundwater pressure below test section at stop flow period |
| pf_below | FLOAT | kPa | Groundwater pressure below test section at stop recovery per |
| comments | VARCHAR | | Comment text row (unformatted text) |

| idcode | start_date | stop_date | secup | seclow | section_no | obs_secup | obs_seclow | pi_above | pp_above | pf_above | pi_below | pp_below | pf_below | comments |
|---------|--------------|--------------|--------|--------|------------|-----------|------------|----------|----------|----------|----------|----------|----------|----------|
| KLX 16A | 070313 09:41 | 070313 12:22 | 13.00 | 113.00 | | 114.00 | 433.55 | #NV | #NV | #NV | 1027 | 1027 | 1028 | |
| KLX 16A | 070313 14:12 | 070313 16:02 | 112.00 | 212.00 | | 213.00 | 433.55 | 800 | 801 | 802 | 1906 | 1909 | 1906 | |
| KLX 16A | 070313 17:54 | 070313 19:46 | 212.00 | 312.00 | | 313.00 | 433.55 | 1683 | 1684 | 1683 | 2790 | 2790 | 2789 | |
| KLX 16A | 070313 21:41 | 070313 23:41 | 312.00 | 412.00 | | 413.00 | 433.55 | 2574 | 2574 | 2549 | 3754 | 3726 | 3705 | |
| KLX 16A | 070314 13:12 | 070314 14:38 | 12.50 | 32.50 | | 33.50 | 433.55 | #NV | #NV | #NV | 314 | 314 | 314 | |
| KLX 16A | 070314 22:12 | 070314 23:57 | 32.50 | 52.50 | | 53.50 | 433.55 | 84 | 85 | 86 | 490 | 491 | 491 | |
| KLX 16A | 070315 00:34 | 070315 02:39 | 52.50 | 72.50 | | 73.50 | 433.55 | 263 | 264 | 265 | 668 | 668 | 668 | |
| KLX 16A | 070315 06:50 | 070315 08:18 | 72.50 | 92.50 | | 93.50 | 433.55 | 440 | 441 | 442 | 845 | 845 | 846 | |
| KLX 16A | 070315 08:52 | 070315 10:25 | 91.00 | 111.00 | | 112.00 | 433.55 | 607 | 608 | 608 | 1009 | 1010 | 1009 | |
| KLX 16A | 070315 10:59 | 070315 12:22 | 111.00 | 131.00 | | 132.00 | 433.55 | 785 | 786 | 787 | 1187 | 1187 | 1187 | |
| KLX 16A | 070315 13:31 | 070315 14:55 | 131.00 | 151.00 | | 152.00 | 433.55 | 963 | 965 | 966 | 1364 | 1368 | 1365 | |
| KLX 16A | 070315 15:35 | 070315 17:14 | 150.00 | 170.00 | | 171.00 | 433.55 | 1128 | 1127 | 1127 | 1533 | 1533 | 1533 | |
| KLX 16A | 070315 17:51 | 070315 19:24 | 170.00 | 190.00 | | 191.00 | 433.55 | 1305 | 1305 | 1305 | 1710 | 1710 | 1710 | |
| KLX 16A | 070315 20:00 | 070315 21:52 | 188.00 | 208.00 | | 209.00 | 433.55 | 1467 | 1467 | 1467 | 1870 | 1870 | 1870 | |
| KLX 16A | 070315 22:44 | 070316 00:00 | 207.00 | 227.00 | | 228.00 | 433.55 | 1636 | 1638 | 1637 | 2037 | 2039 | 2038 | |
| KLX 16A | 070316 00:47 | 070316 02:13 | 227.00 | 247.00 | | 248.00 | 433.55 | 1814 | 1814 | 1815 | 2215 | 2215 | 2215 | |
| KLX 16A | 070316 07:36 | 070316 08:58 | 247.00 | 267.00 | | 268.00 | 433.55 | 1993 | 1992 | 1992 | 2394 | 2393 | 2392 | |
| KLX 16A | 070316 10:58 | 070316 12:19 | 267.00 | 287.00 | | 288.00 | 433.55 | 2170 | 2171 | 2171 | 2570 | 2625 | | |
| KLX 16A | 070316 13:27 | 070316 14:51 | 287.00 | 307.00 | | 308.00 | 433.55 | 2350 | | 2350 | | | | |
| KLX 16A | 070316 15:27 | 070316 17:00 | 307.00 | 327.00 | | 328.00 | 433.55 | 2528 | 2527 | 2528 | 2922 | 2922 | 2922 | |
| KLX 16A | 070317 08:35 | 070317 10:06 | 347.00 | 367.00 | | 368.00 | 433.55 | 2882 | 2882 | 2882 | 3276 | 3298 | 3279 | |
| KLX 16A | 070317 10:38 | 070317 12:14 | 367.00 | 387.00 | | 388.00 | 433.55 | 3059 | 3059 | 3059 | 3455 | 3453 | 3453 | |
| KLX 16A | 070317 12:48 | 070317 14:40 | 387.00 | 407.00 | | 408.00 | 433.55 | 3238 | 3238 | 3239 | 3968 | 3865 | 3793 | |

Borehole: KLX16A

APPENDIX 5-2

SICADA data tables (Pulse injection tests)

File Identity Created By Created

Activity Type

Activity Information

| SI | CAD | A/Dat | a Imp | ort Tem | plate | | | (Simplified versio | | |
|-------------------------|-----|-------------------|-------|---------------------|--|------|---------|--------------------|------|------|
| | | File Time Zone | | Qualit | Compiled By y Check For Deliver Delivery Approva | V | | | | |
| HY665 PLU Pulse Test | | | | Projec | t | PLU | KLX 16A | | | |
| | | | 1 | Additional Activity | Data C40 Company | 1160 | P20 | P200 | P220 | R240 |

| | | | | | C30 | C40 Company | 1160 | P20 | P200 | | R240 Length |
|---------|------------------|-----------|-----------|------------|----------------------------|--------------------------|------|-----------------------|---|---------------------------|----------------|
| Idcode | Start Date | Stop Date | Secup (m) | Seclow (m) | Company evaluating data | performing field work | | Field crew manager | | Person evaluating data | calibration |
| KLX 16A | 2007-03-16 17:41 | | | | - | Golder Associates | | Ū | Philipp Wolf, | Stephan Rohs, | type |
| | | | | | | | | Philipp Wolf | Stephan Rohs, Daniel Nordbörg, Linda Höckert, Erik Lövgren | Philipp Wolf | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

| Tabl | е | plu_slu | g_test_ed |
|-----------------------|----------------|----------------------------|---|
| | | Slug- & pulse test, calcul | ated and evaluated results |
| | | | |
| Column | Datatype | Unit | Column Description |
| site | CHAR | | Investigation site name |
| dcode | CHAR | | Object or borehole identification code |
| secup | FLOAT | m | |
| seclow | FLOAT | m | Lower section limit (m) |
| start_date | DATE | | Date (yymmdd hh:mm:ss) |
| stop_date | DATE | | Date (yymmdd hh:mm:ss) |
| activity type | CHAR | | Activity type code |
| sign | CHAR | | Activity QA signature |
| error_flag | CHAR | | *: Data for the activity is erroneous and should not be used |
| est_type | CHAR | | Type of test, one of 7, see table description |
| ormation_type | CHAR | | 1: Rock, 2: Soil (superficial deposits) |
| start_flow_period | DATE | | Date and time of flow phase start (YYYYMMDD hhmmss) |
| dur_flow_penod | FLOAT | s | Time for the flowing phase of the test (tp) |
| dur_rec_phase_tf | FLOAT | s | |
| | | | Time for the recovery phase of the test (tF) |
| nitial_head_h0 | FLOAT FLOAT | m | Initial formation hydraulic head, see table description |
| nitial_displacem_dh0 | | m | Initial displacement of hydraulic head, see table description |
| displacem_dh0_p | FLOAT | m | Initial displacement of slugtest, see table description |
| displacem_dh0_f | FLOAT | m | Initial displacement of bailtest, see table description |
| nead_at_flow_end_hp | FLOAT | m | Hydraulic head at end of flow phase, see table description |
| inal_head_hf | FLOAT | m | Hydraulic head at the end of the recovery, see table descr. |
| nitial_press_pi | FLOAT | kPa | Initial formation pressure |
| nitial_press_diff_dp0 | FLOAT | kPa | Initial pressure change from pi at time dt=0,pulse test |
| press_change_dp0_p | FLOAT | kPa | Initial pressure change;pulse test-measured |
| press_at_flow_end_pp | FLOAT | kPa | Final pressure at the end of the flowing period |
| final_press_pf | FLOAT | kPa | Final pressure at the end of the recovery period |
| formation_width_b | FLOAT | m | b:Interpreted formation thickness repr. for evaluated T,see |
| ransmissivity_ts | FLOAT | m**2/s | Ts: Transmissivity based on slugtest, see table description |
| value_type_ts | CHAR | | 0:true value,-1:Ts <lower meas.limit,1:ts="">upper meas.limit</lower> |
| oc_ts | CHAR | | Best choice code.1 means Ts is best choice of transm.,else 0 |
| ransmissivity_tp | FLOAT | m**2/s | TP: Transmissivity based on pulse test, see table descript. |
| value_type_tp | CHAR | | 0:true value,-1:Tp <lower meas.limit,1:tp="">upper meas.limit</lower> |
| oc_tp | CHAR | | Best choice code.1 means Tp is best choice of transm.,else 0 |
| _meas_limit_t | FLOAT | m**2 | Estimated lower measurement limit for Ts orTp,see descript. |
| u_meas_limit_t | FLOAT | m**2 | Estimated upper measurement limit for Ts & Tp, see descript. |
| storativity_s | FLOAT | | S= Storativity, see table description |
| assumed_s | FLOAT | | S*=assumed storativity, see table description |
| skin | FLOAT | | Skin factor |
| assumed skin | FLOAT | | Asumed skin factor |
| · · · <u>-</u> · · · | FLOAT | m**3/pa | Well bore storage coefficient |
| , luid temp tew | FLOAT | oC | Fluid temperature in the test section, see table description |
| luid_elcond_ecw | FLOAT | mS/m | Fluid electric conductivity in test section, see table descri |
| luid_salinity_tdsw | FLOAT | mg/l | Total salinity of the test section fluid (EC), see descr. |
| luid_salinity_tdswm | FLOAT | - | Total salinity of the test section fluid (co), see descr. |
| | | mg/l | |
| #1 | FLOAT | s | Estimated start time of evaluation, see table description |
| lt2 | FLOAT | S | Estimated stop time of evaluation, see table description |
| eference | CHAR | | SKB report No for reports describing data and evaluation |
| comments | CHAR | | Short comment to evaluated parameters |

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| | | | (m |) (m) | | | | | (s) | (s |) (m |) (m |) (m) |) (m | (m |) (m) | (kPa) | (kPa) |
|---------|--------------|--------------|--------|--------|------------|-----------|------------|---------------------|-------------------|----------|------------|--------------|----------|----------|----|-----------|------------|----------------|
| | | | | | | | formation_ | | | dur_rec_ | initial_he | initial_disp | displace | displace | | final_hea | initial_pr | initial_press_ |
| idcode | start_date | stop_date | secup | seclow | section_no | test_type | type | start_flow_period | dur_flow_phase_tp | phase_tf | ad_h0 | lacem_dh0 | m_dh0_p | m_dh0_f | р | d_hf | ess_pi | diff_dp0 |
| KLX 16A | 070316 17:41 | 070316 22:23 | 327.00 | 347.00 | | 4B | 1 | 2007-03-16 18:21:27 | 10 | 942 |) | | | | | | 3108 | 272 |
| KLX 16A | 070317 15:37 | 070317 22:20 | 406.00 | 426.00 | | 4B | 1 | 2007-03-17 16:18:19 | 10 | 2160 |) | | | | | | 3802 | 240 |
| KLX 16A | 070318 19:10 | 070318 22:51 | 421.10 | 433.55 | | 4B | 1 | 2007-03-18 19:48:48 | 10 | 942 |) | | | | | Τ | 3792 | 261 |

| | (m) | (m) | (kPa |) (kPa |) (kPa |) (m | (m**2/s) | | | (m**2/s) | | | (m**2) | (m**2 |) | | | | (m**3/pa) | (oC) |) (mS/m) |) (mg/l) | (mg/l) | (s) | (S) | | |
|---------|--------|--------|--------|----------|-----------|----------|-----------|-----------|-------|----------------|------|--------|------------|------------|------------|----------|------|---------|-----------|----------|----------|-----------|-----------|--------|---------|-----------|----------|
| | | | hange_ | ow_end_p | final_pre | n_width_ | transmiss | value_typ | | transmis valu | e_ty | 1 | _meas_limi | u_meas_lim | storativit | assumed | | assumed | | fluid_te | cond_ec | linity_td | inity_tds | | | | |
| idcode | secup | seclow | dp0_p | р | ss_pf | b | ivity_ts | e_ts | bc_ts | sivity_tp pe_t | p b | c_tp t | _t | it_t | y_s | _s | skin | _skin | с | mp_tew | w | sw | wm | dt1 | dt2 | reference | comments |
| KLX 16A | 327.00 | 347.00 | | 3380 | 3114 | | | | | 3.90E-11 | 0 | 1 | 2.00E-11 | 2.00E-10 | 1.00E-06 | 1.00E-06 | -0.2 | | 9.70E-11 | 11.4 | | | | #NV | #NV | | |
| KLX 16A | 406.00 | 426.00 | | 4042 | 3872 | | | | | 9.30E-12 | 0 | 1 | 5.00E-12 | 5.00E-11 | 1.00E-06 | 1.00E-06 | -1.4 | | 3.30E-11 | 12.5 | i | | | #NV | #NV | | |
| KLX 16A | 421.10 | 433.55 | | 4053 | 3806 | i | | | | 5.40E-11 | 0 | 1 | 3.00E-11 | 1.00E-10 | 1.00E-06 | 1.00E-06 | 0.2 | | 3.00E-11 | 12.5 | i | | | 772.92 | 2883.96 | | |

| Tal | ble | le_test_obs ections of single hole test | |
|---------------|----------|---|---|
| Column | Datatype | Unit | Column Description |
| site | CHAR | | Investigation site name |
| activity_type | CHAR | | Activity type code |
| idcode | CHAR | | Object or borehole identification code |
| start_date | DATE | | Date (yymmdd hh:mm:ss) |
| secup | FLOAT | m | Upper section limit (m) |
| seclow | FLOAT | m | Lower section limit (m) |
| sign | CHAR | | Activity QA signature |
| error_flag | CHAR | | *: Data for the activity is erroneous and should not be used |
| obs_secup | FLOAT | m | Upper limit of observation section |
| obs_seclow | FLOAT | m | Lower limit of observation section |
| pi_above | FLOAT | kPa | Groundwater pressure above test section, start of flow period |
| pp_above | FLOAT | kPa | Groundwater pressure above test section, at stop flow period |
| pf_above | FLOAT | kPa | Groundwater pressure above test section at stop recovery per |
| pi_below | FLOAT | kPa | Groundwater pressure below test section at start flow period |
| pp_below | FLOAT | kPa | Groundwater pressure below test section at stop flow period |
| pf_below | FLOAT | kPa | Groundwater pressure below test section at stop recovery per |
| comments | VARCHAR | | Comment text row (unformatted text) |

| | | | (m) | (m) | | (m) | (m) | (kPa) | (kPa) | (kPa) | (kPa) | (kPa) | (kPa) | |
|---------|--------------|--------------|--------|--------|------------|-----------|------------|----------|----------|----------|----------|----------|----------|----------|
| | | | | | | | | | | | | | | |
| idcode | start_date | stop_date | secup | seclow | section_no | obs_secup | obs_seclow | pi_above | pp_above | pf_above | pi_below | pp_below | pf_below | comments |
| KLX 16A | 070316 17:41 | 070316 22:23 | 327.00 | 347.00 | | 348.00 | 433.50 | 2706 | 2706 | 2706 | 3099 | 3098 | 3098 | |
| KLX 16A | 070317 15:37 | 070317 22:20 | 406.00 | 426.00 | | 427.00 | 433.50 | 3408 | 3408 | 3408 | 4021 | 3820 | 3820 | |
| KLX 16A | 070318 19:10 | 070318 22:51 | 421.10 | 433.55 | | #NV | #NV | 3538 | 3539 | 3539 | 4043 | 3811 | 3925 | |