Permeability Tests on Silkeborg Sand No. 0000

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Permeability Tests on Silkeborg Sand No. 0000

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1 INTRODUCTION

The flow through porous media plays an important role in various engineering disciplines, as for example in ground water hydrology and soil mechanics. In the present study the permeability is determined for a fine, saturated sand. As the flow through a porous media strongly depends on the characteristics of the soil matrix, the permeability is determined for different void ratios. All tests are performed on reconstituted specimens of Silkeborg Sand No. 0000. The permeability is determined by use of a falling head apparatus. The apparatus, test procedures and the analysis method are described in the succeeding sections. Finally the test results are briefly summarised and a relationship between void ratio and permeability is established.

2 SILKEBORG SAND NO. 0000

The sand, denoted Silkeborg Sand No. 0000, is an artificial sand from a gravel pit near Horsens in Denmark.

The grain size distribution is given in Figure 1. The material contains approximately 1.4% of fines and has a maximum grain size of approximately 0.425 mm. The classification properties are summarised in Table 1.

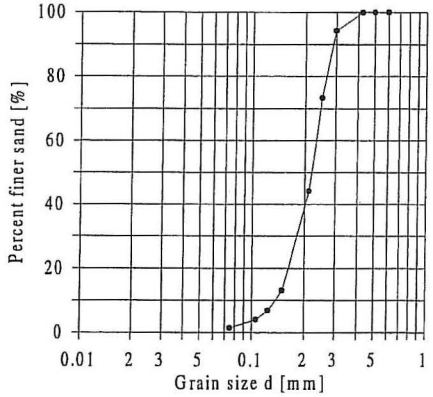

Figure 1. Grain size distribution for Silkeborg Sand No. 0000.

Table 1. Classification properties for Silkeborg Sand No. 0000.

Property	Value
Specific gravity, G_s	2.653
Maximum void ratio, e_{max}	0.932
Minimum void ratio, e_{min}	0.578
Mean grain size, d_{50}	0.220 mm
Uniformity coefficient, $C_U = \frac{d_{60}}{d_{10}}$	1.69
Curvature coefficient, $C = \frac{d_{30}^2}{d_{10} d_{60}}$	1.06

3 FALLING HEAD PERMEAMETER

The test set-up consists of a permeameter containing the fully saturated soil specimen, a standpipe and an overflow basin, see Figure 2.

When the valve in the overflow basin is opened, the water level in the standpipe falls and the water flows through the specimen.

An initial and a final hydraulic head are chosen prior to testing. These hydraulic heads are in the following denoted h_0 and h_2 and the flow times measured during the test are correspondingly denoted t_0 and t_2. The test is repeated until a reproducible value of flow time, t_2, is obtained.

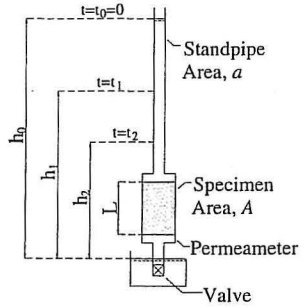

Figure 2. Principle of the falling head permeameter test.

Based on corresponding values of passed time, temperature and loss of head (at a given discharge) the hydraulic conductivity and the permeability may be determined by the simple analytical relationship given in Equation (3).

Besides the measurement of total head loss (h_0-h_2) and total time t_2, measurement of flow time, t_1, at an intermediate head, h_1, are performed to control whether quasi-steady flow conditions exist (see Section 5).

4 SPECIMEN PREPARATION

All specimens are prepared by air pluviation in a cylindrical Plexiglas permeameter with a diameter of 70 mm and a length of approximately 200 mm. The specimens are saturated by the water percolation method, where deionised and de-aired water is introduced through the bottom filter. As the water slowly seeps up through the specimen under a small gradient, entrapped air gets flushed out through the upper filter. As complete saturation of the specimen is necessary to avoid clogging of the pores and to obtain reliable flow parameters the saturation process is furthermore performed under vacuum, causing the volume of air to enlarge and, in part, be sucked out of the specimen.

5 ANALYSIS OF TEST RESULTS

On the assumption that the flow can be considered to be laminar and quasi-steady, the discharge from the standpipe equals the amount of water passing through the specimen per unit time, and the forces of inertia due to velocity changes become negligible. Thus, the hydraulic conductivity can with reasonable accuracy be described by use of the continuity equation and Darcy's law:

$$-\frac{dh}{dt}a = Av \tag{1}$$

$$v = ki \tag{2}$$

Solving the differential equation, using the boundary condition, $h=h_0$ and $t=t_0=0$, yields the relationship between loss of head, flow time and hydraulic conductivity:

$$\ln(h) = -\frac{Ak}{aL}t + \ln(h_0) \quad or \quad k = \ln\left(\frac{h_0}{h}\right)\frac{aL}{At} \tag{3}$$

The hydraulic conductivity depends on the flow properties of the soil matrix and the fluid. This mixture is disadvantageous and it is preferable to introduce the fluid properties and the permeability, K, which solely refers to the properties of the soil matrix:

$$K = k\frac{\nu_{T°C}}{g} \tag{4}$$

where $\nu_{T°C}$ is the kinematic viscosity at T °C.

As stipulated in Section 3 an intermediate head and the corresponding flow time can be used as an indication of whether the assumption of quasi-steady flow is applicable or not.

Assuming that the intermediate flow time, t_1, corresponds to half the total flow time, t_2, an intermediate hydraulic head, h_1, can be determined from Equation (3). Rearrangement of (3) and use of the boundary condition $h=h_2$ for $t=t_2$, yields:

$$t_2 = \frac{aL}{Ak}\ln\left(\frac{h_0}{h_2}\right) \tag{5}$$

Insertion of $t_1=½t_2$ in Equation (3) yields the intermediate head, h_1:

$$h_1 = \sqrt{h_0 h_2} \tag{6}$$

Thus, the intermediate hydraulic head of $h_1 = \sqrt{h_0 h_2}$, corresponds to half the total flow time for quasi-steady flow conditions.

A more thorough evaluation of the quasi-steady flow assumption is found in Jakobsen (1998).

6 PRESENTATION OF TEST RESULTS

The performed permeability tests are presented in Enclosures 1-27, with test conditions, measured values and results. Each enclosure consists of three tables. The first table contains information about test material, void ratio, length and diameter of the specimen and degree of saturation.

The second table contains the scheduled test program and factors correcting for the disparity between nominal and actual volumes of the permeameter and the standpipe.

In the third table the measured quantities, i.e. water temperature at top and bottom of the permeameter and flow times corresponding to intermediate and total loss of head, are tabulated together with the calculated hydraulic conductivity and permeability.

The calculated permeabilities are not corrected for incomplete saturation, as the degree of saturation in all the tests is close to unity and the deviations merely indicate the uncertainty on the measuring method. The test results are summarised in Table 2.

Table 2. Results from performed permeability tests on Silkeborg Sand No. 0000.

Test No	Void ratio e [-]	Permeability K [10^{-12}m^2]
9810.P1	0.638	16.52
9810.P2	0.680	20.23
9810.P3	0.622	14.21
9810.P4	0.627	14.66
9810.P5	0.622	13.90
9810.P6	0.615	13.13
9810.P7	0.613	12.54
9810.P8	0.615	13.85
9810.P9	0.658	16.81
9810.P10	0.645	16.97
9810.P11	0.641	15.69
9810.P12	0.637	15.32
9810.P13	0.607	12.74
9810.P14	0.601	14.23
9810.P15	0.667	16.51
9810.P16	0.791	29.86
9810.P17	0.658	18.18
9810.P18	0.810	32.78
9810.P19	0.629	15.62
9810.P20	0.675	20.28
9810.P21	0.667	20.22
9810.P22	0.718	23.22
9810.P23	0.755	25.30
9810.P24	0.747	25.77
9810.P25	0.706	20.46
9810.P26	0.720	24.64

6.1 Void ratio dependency

The results in Table 2 show that the permeability of the soil skeleton is strongly dependent on the void ratio. This dependency has been described by Taylor (1948) and Lund and Møldrup (1996), both fulfilling physical prerequisite of zero permeability for zero

porosity or void ratio. The proposed relationships are given in Equation (13) and (14), respectively:

$$K = C_1(1+e)e^2 = 2.500 \cdot 10^{-11}(1+e)e^2 \quad (13)$$

$$K = C_2\frac{e^3}{(1+e)} = 1.037 \cdot 10^{-10}\frac{e^3}{(1+e)} \quad (14)$$

The suggested relationships and the measured permeabilities are shown in Figure 3. Both relationships lead to an overestimation of the permeability at low void ratios and vice versa.

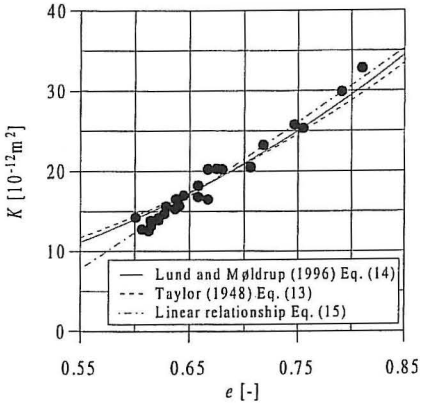

Figure 3. Relation between void ratio and permeability.

However, a simple linear relationship between void ratio and permeability yields a more satisfactory result within the range of e_{min} and e_{max}, whereby it becomes applicable for all practicable purpose. The linear relationship is given by:

$$K = 91.567 \cdot 10^{-12}e - 42.602 \cdot 10^{-11} \quad (15)$$

7 ACKNOWLEDGEMENT

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8 REFERENCES

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9 NOTATION

a	[mm²]	: cross sectional area of standpipe
A	[mm²]	: cross sectional area of permeameter
C	[-]	: curvature coefficient
C_U	[-]	: uniformity coefficient
d	[mm]	: particle diameter
d	[mm]	: standpipe diameter
e	[-]	: void ratio
F_s	[-]	: volume correction factor for standpipe
F_p	[-]	: volume correction factor for permeameter
h	[mm]	: hydraulic head
h_0	[mm]	: initial hydraulic head
h_1	[mm]	: intermediate hydraulic head
h_2	[mm]	: final hydraulic head
k	[m/s]	: hydraulic conductivity
$k_{T°C}$	[m/s]	: hydraulic conductivity at temperature T °C
K	[m²]	: permeability
L	[mm]	: specimen length
t	[s]	: flow time
t_1	[s]	: flow time for intermediate head
t_2	[s]	: total flow time
T	[°C]	: temperature
T_1	[°C]	: temperature at the top of the specimen
T_2	[°C]	: temperature at the bottom of the specimen
v	[m/s]	: velocity
ν	[m²/s]	: kinematic viscosity
$\nu_{T°C}$	[m²/s]	: kinematic viscosity at given temperature T °C

Enclosures

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Enclosure 3	Permeability Test 9810.P3	1 page
Enclosure 4	Permeability Test 9810.P4	1 page
Enclosure 5	Permeability Test 9810.P5	1 page
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Description of soil	Sample preparation method	Specimen dimensions		
Silkeborg No. 0000	Air pluviation	Length	[mm]	201
		Diameter	[mm]	70
Date	Falling head apparatus	Void ratio	[-]	0.638
1998-04-23	Permeameter A	Saturation	[-]	

Test program			
	Standpipe diameter (d)	[mm]	20
	Initial hydraulic head (h_0)	[mm]	2000
	Intermediate hydraulic head ($h_1 = \sqrt{h_0 h_2}$)	[mm]	1265
	Final hydraulic head (h_2)	[mm]	800
	Volume correction factor for standpipe (F_s)	[-]	1.0936
	Volume correction factor for permeameter (F_p)	[-]	1.0129

Test		1	2	3	4	5
Temperature (T_1)	[°C]	23.9	24.4	24.9		
Temperature (T_2)	[°C]	23.8	24.1	24.6		
Elapsed time for flow (t_1)	[s]	46	45	45		
Elapsed time for flow (t_2)	[s]	92	90	90		
Hydraulic conductivity ($k_{T=C} \cdot 10^{-4}$)	[m/s]	1.764	1.804	1.804		
Mean temperature (T)	[°C]	23.9	24.3	24.75		
Kinematic viscosity ($\nu_{T=C} \cdot 10^{-6}$)	[m²/s]	0.9178	0.9095	0.8994		
Permeability ($K \cdot 10^{-11}$)	[m²]	1.649	1.670	1.652		

Remarks: Incorrect measurement of water content after test. Degree of saturation not accessible.

Job: 9810	Aalborg University
Executed: JCI, KPJ	Enclosure No. 1
Evaluated: KPJ	Approved: WL

Description of soil	Sample preparation method	Specimen dimensions		
Silkeborg No. 0000	Air pluviation	Length	[mm]	200
		Diameter	[mm]	70
Date	Falling head apparatus	Void ratio	[-]	0.680
1998-04-21	Permeameter B	Saturation	[-]	1.02

Test program			
	Standpipe diameter (d)	[mm]	20
	Initial hydraulic head (h_0)	[mm]	2000
	Intermediate hydraulic head ($h_1 = \sqrt{h_0 h_2}$)	[mm]	1265
	Final hydraulic head (h_2)	[mm]	800
	Volume correction factor for standpipe (F_s)	[-]	1.0936
	Volume correction factor for permeameter (F_p)	[-]	0.9921

Test		1	2	3	4	5
Temperature (T_1)	[°C]	23.8	24.4	24.6		
Temperature (T_2)	[°C]	24.0	24.3	24.5		
Elapsed time for flow (t_1)	[s]	38	38	37		
Elapsed time for flow (t_2)	[s]	76	76	75		
Hydraulic conductivity ($k_{T^\circ C} \cdot 10^{-4}$)	[m/s]	2.170	2.170	2.199		
Mean temperature (T)	[°C]	23.9	24.4	24.6		
Kinematic viscosity ($\nu_{T^\circ C} \cdot 10^{-6}$)	[m²/s]	0.9158	0.9075	0.9034		
Permeability ($K \cdot 10^{-11}$)	[m²]	1.413	1.424	1.421		

Remarks:

Job: 9810	Aalborg University
Executed: JCI, KPJ	Enclosure No. 2
Evaluated: KPJ	Approved: WL

Description of soil	Sample preparation method	Specimen dimensions		
Silkeborg No. 0000	Air pluviation	Length	[mm]	201
		Diameter	[mm]	70
Date	Falling head apparatus	Void ratio	[-]	0.622
1998-04-23	Permeameter B	Saturation	[-]	1.00

Test program			
	Standpipe diameter (d)	[mm]	20
	Initial hydraulic head (h_0)	[mm]	2000
	Intermediate hydraulic head ($h_1 = \sqrt{h_0 h_2}$)	[mm]	1265
	Final hydraulic head (h_2)	[mm]	800
	Volume correction factor for standpipe (F_s)	[-]	1.0936
	Volume correction factor for permeameter (F_p)	[-]	0.9935

Test		1	2	3	4	5
Temperature (T_1)	[°C]	24.6	25.2	25.5		
Temperature (T_2)	[°C]	24.2	24.6	25.3		
Elapsed time for flow (t_1)	[s]	54	53	52		
Elapsed time for flow (t_2)	[s]	108	106	106		
Hydraulic conductivity ($k_{T^\circ C} \cdot 10^{-4}$)	[m/s]	1.532	1.561	1.576		
Mean temperature (T)	[°C]	24.4	24.9	25.4		
Kinematic viscosity ($\nu_{T^\circ C} \cdot 10^{-6}$)	[m²/s]	0.9054	0.8954	0.8853		
Permeability ($K \cdot 10^{-11}$)	[m²]	2.024	2.005	2.023		

Remarks:

Job: 9810	Aalborg University
Executed: JCI, KPJ	Enclosure No. 3
Evaluated: KPJ	Approved: WL

Description of soil	Sample preparation method	Specimen dimensions		
Silkeborg No. 0000	Air pluviation	Length	[mm]	201
		Diameter	[mm]	70
Date	Falling head apparatus	Void ratio	[-]	0.627
1998-04-23	Permeameter B	Saturation	[-]	1.03

Test program			
	Standpipe diameter (d)	[mm]	20
	Initial hydraulic head (h_0)	[mm]	2000
	Intermediate hydraulic head ($h_1 = \sqrt{h_0 h_2}$)	[mm]	1265
	Final hydraulic head (h_2)	[mm]	800
	Volume correction factor for standpipe (F_s)	[-]	1.0936
	Volume correction factor for permeameter (F_p)	[-]	0.9935

Test		1	2	3	4	5
Temperature (T_1)	[°C]	23.0	23.4	23.7		
Temperature (T_2)	[°C]	23.0	23.1	23.6		
Elapsed time for flow (t_1)	[s]	53	53	53		
Elapsed time for flow (t_2)	[s]	107	106	106		
Hydraulic conductivity ($k_{T^\circ C} \cdot 10^{-4}$)	[m/s]	1.547	1.561	1.561		
Mean temperature (T)	[°C]	23.0	23.3	23.7		
Kinematic viscosity ($\nu_{T^\circ C} \cdot 10^{-6}$)	[m²/s]	0.9352	0.9309	0.9222		
Permeability ($K \cdot 10^{-11}$)	[m²]	1.473	1.480	1.466		

Remarks:

Job: 9810	Aalborg University
Executed: JCI, KPJ	Enclosure No. 4
Evaluated: KPJ	Approved: WL

Description of soil	Sample preparation method	Specimen dimensions		
Silkeborg No. 0000	Air pluviation	Length	[mm]	202
		Diameter	[mm]	70
Date	Falling head apparatus	Void ratio	[-]	0.622
1998-04-21	Permeameter A	Saturation	[-]	1.01

Test program			
	Standpipe diameter (d)	[mm]	20
	Initial hydraulic head (h_0)	[mm]	2000
	Intermediate hydraulic head ($h_1 = \sqrt{h_0 h_2}$)	[mm]	1265
	Final hydraulic head (h_2)	[mm]	800
	Volume correction factor for standpipe (F_s)	[-]	1.0936
	Volume correction factor for permeameter (F_p)	[-]	1.0130

Test		1	2	3	4	5
Temperature (T_1)	[°C]	24.7	25.2	25.5		
Temperature (T_2)	[°C]	24.4	24.7	25.2		
Elapsed time for flow (t_1)	[s]	54	54	53		
Elapsed time for flow (t_2)	[s]	109	108	106		
Hydraulic conductivity ($k_{T^\circ C} \cdot 10^{-4}$)	[m/s]	1.496	1.510	1.539		
Mean temperature (T)	[°C]	24.6	25.0	25.4		
Kinematic viscosity ($\nu_{T^\circ C} \cdot 10^{-6}$)	[m²/s]	0.9034	0.8954	0.8873		
Permeability ($K \cdot 10^{-11}$)	[m²]	1.377	1.377	1.390		

Remarks:

Job: 9810	Aalborg University
Executed: JCI, KPJ	Enclosure No. 5
Evaluated: KPJ	Approved: WL

Description of soil	Sample preparation method	Specimen dimensions		
Silkeborg No. 0000	Air pluviation	Length	[mm]	201
		Diameter	[mm]	70
Date	Falling head apparatus	Void ratio	[-]	0.615
1998-04-16	Permeameter B	Saturation	[-]	1.01

Test program			
	Standpipe diameter (d)	[mm]	20
	Initial hydraulic head (h_0)	[mm]	2000
	Intermediate hydraulic head ($h_1 = \sqrt{h_0 h_2}$)	[mm]	1265
	Final hydraulic head (h_2)	[mm]	800
	Volume correction factor for standpipe (F_s)	[-]	1.0936
	Volume correction factor for permeameter (F_p)	[-]	0.9935

Test		1	2	3	4	5
Temperature (T_1)	[°C]	22.1	22.2	22.4		
Temperature (T_2)	[°C]	21.9	22.1	22.3		
Elapsed time for flow (t_1)	[s]	61	61	61		
Elapsed time for flow (t_2)	[s]	122	122	122		
Hydraulic conductivity ($k_{T^\circ C} \cdot 10^{-4}$)	[m/s]	1.357	1.357	1.357		
Mean temperature (T)	[°C]	22.0	22.2	22.4		
Kinematic viscosity ($\nu_{T^\circ C} \cdot 10^{-6}$)	[m²/s]	0.9569	0.9547	0.9504		
Permeability ($K \cdot 10^{-11}$)	[m²]	1.322	1.319	1.313		

Remarks:

Job: 9810	Aalborg University
Executed: JCI, KPJ	Enclosure No. 6
Evaluated: KPJ	Approved: WL

Description of soil	Sample preparation method	Specimen dimensions		
Silkeborg No. 0000	Air pluviation	Length	[mm]	201
		Diameter	[mm]	70
Date	Falling head apparatus	Void ratio	[-]	0.613
1998-04-16	Permeameter B	Saturation	[-]	1.01

Test program			
	Standpipe diameter (d)	[mm]	20
	Initial hydraulic head (h_0)	[mm]	2000
	Intermediate hydraulic head ($h_1 = \sqrt{h_0 h_2}$)	[mm]	1265
	Final hydraulic head (h_2)	[mm]	800
	Volume correction factor for standpipe (F_s)	[-]	1.0936
	Volume correction factor for permeameter (F_p)	[-]	0.9935

Test		1	2	3	4	5
Temperature (T_1)	[°C]	23.9	24.2	24.4		
Temperature (T_2)	[°C]	23.5	23.8	24.3		
Elapsed time for flow (t_1)	[s]	62	61	61		
Elapsed time for flow (t_2)	[s]	124	122	122		
Hydraulic conductivity ($k_{T^\circ C} \cdot 10^{-4}$)	[m/s]	1.335	1.357	1.357		
Mean temperature (T)	[°C]	23.7	24.0	24.4		
Kinematic viscosity ($\nu_{T^\circ C} \cdot 10^{-6}$)	[m²/s]	0.9200	0.9135	0.9075		
Permeability ($K \cdot 10^{-11}$)	[m²]	1.250	1.262	1.254		

Remarks:

Job: 9810	Aalborg University
Executed: JCI, KPJ	Enclosure No. 7
Evaluated: KPJ	Approved: WL

Description of soil	Sample preparation method	Specimen dimensions		
Silkeborg No. 0000	Air pluviation	Length	[mm]	200
		Diameter	[mm]	70
Date	Falling head apparatus	Void ratio	[-]	0.615
1998-04-16	Permeameter A	Saturation	[-]	1.03

Test program			
	Standpipe diameter (d)	[mm]	20
	Initial hydraulic head (h_0)	[mm]	2000
	Intermediate hydraulic head ($h_1 = \sqrt{h_0 h_2}$)	[mm]	1265
	Final hydraulic head (h_2)	[mm]	800
	Volume correction factor for standpipe (F_s)	[-]	1.0936
	Volume correction factor for permeameter (F_p)	[-]	1.0129

Test		1	2	3	4	5
Temperature (T_1)	[°C]	23.0	23.3	23.5		
Temperature (T_2)	[°C]	22.7	23.0	23.3		
Elapsed time for flow (t_1)	[s]	56	55	55		
Elapsed time for flow (t_2)	[s]	112	110	110		
Hydraulic conductivity ($k_{T°C} \cdot 10^{-4}$)	[m/s]	1.442	1.468	1.468		
Mean temperature (T)	[°C]	22.9	23.2	23.4		
Kinematic viscosity ($\nu_{T°C} \cdot 10^{-6}$)	[m²/s]	0.9395	0.9330	0.9265		
Permeability ($K \cdot 10^{-11}$)	[m²]	1.380	1.395	1.385		

Remarks:

Job: 9810	Aalborg University
Executed: JCI, KPJ	Enclosure No. 8
Evaluated: KPJ	Approved: WL

Description of soil	Sample preparation method	Specimen dimensions		
Silkeborg No. 0000	Air pluviation	Length	[mm]	200
		Diameter	[mm]	70
Date	Falling head apparatus	Void ratio	[-]	0.658
1998-04-16	Permeameter A	Saturation	[-]	1.02

Test program			
	Standpipe diameter (d)	[mm]	20
	Initial hydraulic head (h_0)	[mm]	2000
	Intermediate hydraulic head ($h_1 = \sqrt{h_0 h_2}$)	[mm]	1265
	Final hydraulic head (h_2)	[mm]	800
	Volume correction factor for standpipe (F_s)	[-]	1.0936
	Volume correction factor for permeameter (F_p)	[-]	1.0129

Test		1	2	3	4	5
Temperature (T_1)	[°C]	23.9	24.5	24.8	25.1	
Temperature (T_2)	[°C]	23.7	24.1	24.6	25.1	
Elapsed time for flow (t_1)	[s]	45	44	44	44	
Elapsed time for flow (t_2)	[s]	90	88	88	88	
Hydraulic conductivity ($k_{T°C} \cdot 10^{-4}$)	[m/s]	1.795	1.835	1.835	1.835	
Mean temperature (T)	[°C]	23.8	24.3	24.7	25.1	
Kinematic viscosity ($\nu_{T°C} \cdot 10^{-6}$)	[m²/s]	0.9178	0.9075	0.8994	0.8913	
Permeability ($K \cdot 10^{-11}$)	[m²]	1.677	1.696	1.681	1.666	

Remarks:

Job: 9810	Aalborg University
Executed: JCI, KPJ	Enclosure No. 9
Evaluated: KPJ	Approved: WL

Description of soil	Sample preparation method	Specimen dimensions		
Silkeborg No. 0000	Air pluviation	Length	[mm]	201
		Diameter	[mm]	70
Date	Falling head apparatus	Void ratio	[-]	0.645
1998-04-21	Permeameter A	Saturation	[-]	1.01

Test program			
	Standpipe diameter (d)	[mm]	20
	Initial hydraulic head (h_0)	[mm]	2000
	Intermediate hydraulic head ($h_1 = \sqrt{h_0 h_2}$)	[mm]	1265
	Final hydraulic head (h_2)	[mm]	800
	Volume correction factor for standpipe (F_s)	[-]	1.0936
	Volume correction factor for permeameter (F_p)	[-]	1.0129

Test		1	2	3	4	5
Temperature (T_1)	[°C]	23.2	23.6	24.0		
Temperature (T_2)	[°C]	23.5	23.6	24.0		
Elapsed time for flow (t_1)	[s]	45	45	44		
Elapsed time for flow (t_2)	[s]	90	90	89		
Hydraulic conductivity ($k_{T^\circ C} \cdot 10^{-4}$)	[m/s]	1.804	1.804	1.824		
Mean temperature (T)	[°C]	23.4	23.6	24.0		
Kinematic viscosity ($\nu_{T^\circ C} \cdot 10^{-6}$)	[m²/s]	0.9287	0.9222	0.9135		
Permeability ($K \cdot 10^{-11}$)	[m²]	1.706	1.694	1.697		

Remarks:

Job: 9810	Aalborg University
Executed: JCI, KPJ	Enclosure No. 10
Evaluated: KPJ	Approved: WL

Description of soil	Sample preparation method	Specimen dimensions		
Silkeborg No. 0000	Air pluviation	Length	[mm]	202
		Diameter	[mm]	70
Date	Falling head apparatus	Void ratio	[-]	0.641
1998-04-21	Permeameter B	Saturation	[-]	1.01

Test program			
	Standpipe diameter (d)	[mm]	20
	Initial hydraulic head (h_0)	[mm]	2000
	Intermediate hydraulic head ($h_1 = \sqrt{h_0 h_2}$)	[mm]	1265
	Final hydraulic head (h_2)	[mm]	800
	Volume correction factor for standpipe (F_s)	[-]	1.0936
	Volume correction factor for permeameter (F_p)	[-]	0.9935

Test		1	2	3	4	5
Temperature (T_1)	[°C]	24.7	25.0	25.3		
Temperature (T_2)	[°C]	24.6	24.8	25.2		
Elapsed time for flow (t_1)	[s]	49	48	48		
Elapsed time for flow (t_2)	[s]	98	96	96		
Hydraulic conductivity ($k_{T^\circ C} \cdot 10^{-4}$)	[m/s]	1.697	1.732	1.732		
Mean temperature (T)	[°C]	24.7	24.9	25.3		
Kinematic viscosity ($\nu_{T^\circ C} \cdot 10^{-6}$)	[m²/s]	0.9014	0.8954	0.8893		
Permeability ($K \cdot 10^{-11}$)	[m²]	1.558	1.580	1.569		

Remarks:

Job: 9810	Aalborg University
Executed: JCI, KPJ	Enclosure No. 11
Evaluated: KPJ	Approved: WL

Description of soil	Sample preparation method	Specimen dimensions		
Silkeborg No. 0000	Air pluviation	Length	[mm]	202
		Diameter	[mm]	70
Date	Falling head apparatus	Void ratio	[-]	0.637
1998-04-23	Permeameter A	Saturation	[-]	0.99

Test program			
	Standpipe diameter (d)	[mm]	20
	Initial hydraulic head (h_0)	[mm]	2000
	Intermediate hydraulic head ($h_1 = \sqrt{h_0 h_2}$)	[mm]	1265
	Final hydraulic head (h_2)	[mm]	800
	Volume correction factor for standpipe (F_s)	[-]	1.0936
	Volume correction factor for permeameter (F_p)	[-]	1.0130

Test		1	2	3	4	5
Temperature (T_1)	[°C]	24.8	25.2	25.4		
Temperature (T_2)	[°C]	25.6	25.2	25.4		
Elapsed time for flow (t_1)	[s]	48	48	48		
Elapsed time for flow (t_2)	[s]	97	96	96		
Hydraulic conductivity ($k_{T^\circ C} \cdot 10^{-4}$)	[m/s]	1.682	1.699	1.699		
Mean temperature (T)	[°C]	25.2	25.2	25.4		
Kinematic viscosity ($\nu_{T^\circ C} \cdot 10^{-6}$)	[m²/s]	0.8893	0.8893	0.8853		
Permeability ($K \cdot 10^{-11}$)	[m²]	1.523	1.539	1.532		

Remarks:

Job: 9810	Aalborg University
Executed: JCI, KPJ	Enclosure No. 12
Evaluated: KPJ	Approved: WL

Description of soil	Sample preparation method	Specimen dimensions		
Silkeborg No. 0000	Air pluviation	Length	[mm]	201
		Diameter	[mm]	70
Date	Falling head apparatus	Void ratio	[-]	0.601
1998-04-21	Permeameter B	Saturation	[-]	

Test program			
	Standpipe diameter (d)	[mm]	20
	Initial hydraulic head (h_0)	[mm]	2000
	Intermediate hydraulic head ($h_1 = \sqrt{h_0 h_2}$)	[mm]	1265
	Final hydraulic head (h_2)	[mm]	800
	Volume correction factor for standpipe (F_s)	[-]	1.0936
	Volume correction factor for permeameter (F_p)	[-]	0.9935

Test		1	2	3	4	5
Temperature (T_1)	[°C]	22.5	22.8	23.0		
Temperature (T_2)	[°C]	22.4	22.6	22.9		
Elapsed time for flow (t_1)	[s]	62	62	62		
Elapsed time for flow (t_2)	[s]	125	124	124		
Hydraulic conductivity ($k_{T^\circ C} \cdot 10^{-4}$)	[m/s]	1.324	1.335	1.335		
Mean temperature (T)	[°C]	22.5	22.7	23.0		
Kinematic viscosity ($\nu_{T^\circ C} \cdot 10^{-6}$)	[m²/s]	0.9482	0.9417	0.9374		
Permeability ($K \cdot 10^{-11}$)	[m²]	1.278	1.280	1.274		

Remarks: Incorrect measurement of water content after test. Degree of saturation not accessible.

Job: 9810	Aalborg University
Executed: JCI, KPJ	Enclosure No. 13
Evaluated: KPJ	Approved: WL

Description of soil	Sample preparation method	Specimen dimensions		
Silkeborg No. 0000	Air pluviation	Length	[mm]	201
		Diameter	[mm]	70
Date	Falling head apparatus	Void ratio	[-]	0.601
1998-06-19	Permeameter A	Saturation	[-]	1.02

Test program			
	Standpipe diameter (d)	[mm]	20
	Initial hydraulic head (h_0)	[mm]	2000
	Intermediate hydraulic head ($h_1 = \sqrt{h_0 h_2}$)	[mm]	1265
	Final hydraulic head (h_2)	[mm]	800
	Volume correction factor for standpipe (F_s)	[-]	1.0936
	Volume correction factor for permeameter (F_p)	[-]	1.0129

Test		1	2	3	4	5
Temperature (T_1)	[°C]	24.9	24.8	24.8		
Temperature (T_2)	[°C]	25.1	25.0	25.0		
Elapsed time for flow (t_1)	[s]	52	52	52		
Elapsed time for flow (t_2)	[s]	103	104	104		
Hydraulic conductivity ($k_{T^\circ C} \cdot 10^{-4}$)	[m/s]	1.576	1.561	1.561		
Mean temperature (T)	[°C]	25.0	24.9	24.9		
Kinematic viscosity ($\nu_{T^\circ C} \cdot 10^{-6}$)	[m²/s]	0.8934	0.8954	0.8954		
Permeability ($K \cdot 10^{-11}$)	[m²]	1.434	1.423	1.423		

Remarks:

Job: 9810	Aalborg University
Executed: KPJ	Enclosure No. 14
Evaluated: KPJ	Approved: WL

Description of soil	Sample preparation method	Specimen dimensions		
Silkeborg No. 0000	Air pluviation	Length	[mm]	199
		Diameter	[mm]	70
Date	Falling head apparatus	Void ratio	[-]	0.667
1998-06-19	Permeameter B	Saturation	[-]	1.00

Test program			
	Standpipe diameter (d)	[mm]	20
	Initial hydraulic head (h_0)	[mm]	2000
	Intermediate hydraulic head ($h_1 = \sqrt{h_0 h_2}$)	[mm]	1265
	Final hydraulic head (h_2)	[mm]	800
	Volume correction factor for standpipe (F_s)	[-]	1.0936
	Volume correction factor for permeameter (F_p)	[-]	0.9945

Test		1	2	3	4	5
Temperature (T_1)	[°C]	25.0	25.0	25.1	25.1	25.2
Temperature (T_2)	[°C]	25.0	25.0	25.1	25.1	25.1
Elapsed time for flow (t_1)	[s]	46	45	45	45	45
Elapsed time for flow (t_2)	[s]	92	91	90	90	90
Hydraulic conductivity ($k_{T^\circ C} \cdot 10^{-4}$)	[m/s]	1.779	1.799	1.819	1.819	1.819
Mean temperature (T)	[°C]	25.0	25.0	25.1	25.1	25.2
Kinematic viscosity ($\nu_{T^\circ C} \cdot 10^{-6}$)	[m²/s]	0.8934	0.8934	0.8913	0.8913	0.8913
Permeability ($K \cdot 10^{-11}$)	[m²]	1.619	1.636	1.651	1.651	1.651

Remarks: Leaky neck ring

Job: 9810	Aalborg University
Executed: KPJ	Enclosure No. 15
Evaluated: KPJ	Approved: WL

Description of soil	Sample preparation method	Specimen dimensions		
Silkeborg No. 0000	Air pluviation	Length	[mm]	191
		Diameter	[mm]	70
Date	Falling head apparatus	Void ratio	[-]	0.791
1998-06-19	Permeameter A	Saturation	[-]	1.03

Test program			
	Standpipe diameter (d)	[mm]	20
	Initial hydraulic head (h_0)	[mm]	2000
	Intermediate hydraulic head ($h_1 = \sqrt{h_0 h_2}$)	[mm]	1265
	Final hydraulic head (h_2)	[mm]	800
	Volume correction factor for standpipe (F_s)	[-]	1.0936
	Volume correction factor for permeameter (F_p)	[-]	1.0118

Test		1	2	3	4	5
Temperature (T_1)	[°C]	23.6	23.8	23.9		
Temperature (T_2)	[°C]	23.5	24.1	24.4		
Elapsed time for flow (t_1)	[s]	24	24	24		
Elapsed time for flow (t_2)	[s]	48	48	48		
Hydraulic conductivity ($k_{T^\circ C} \cdot 10^{-4}$)	[m/s]	3.217	3.217	3.217		
Mean temperature (T)	[°C]	23.6	24.0	24.2		
Kinematic viscosity ($\nu_{T^\circ C} \cdot 10^{-6}$)	[m²/s]	0.9244	0.9158	0.9115		
Permeability ($K \cdot 10^{-11}$)	[m²]	3.028	3.000	2.986		

Remarks:

Job: 9810	Aalborg University
Executed: KPJ	Enclosure No. 16
Evaluated: KPJ	Approved: WL

Description of soil	Sample preparation method	Specimen dimensions		
Silkeborg No. 0000	Air pluviation	Length	[mm]	202
		Diameter	[mm]	70
Date	Falling head apparatus	Void ratio	[-]	0.658
1998-06-19	Permeameter B	Saturation	[-]	1.00

Test program			
	Standpipe diameter (d)	[mm]	20.0
	Initial hydraulic head (h_0)	[mm]	2000.0
	Intermediate hydraulic head ($h_1 = \sqrt{h_0 h_2}$)	[mm]	1265.0
	Final hydraulic head (h_2)	[mm]	800.0
	Volume correction factor for standpipe (F_s)	[-]	1.0936
	Volume correction factor for permeameter (F_p)	[-]	0.9935

Test		1	2	3	4	5
Temperature (T_1)	[°C]	23.8	24.1	24.3	24.5	
Temperature (T_2)	[°C]	24.2	24.2	24.6	24.8	
Elapsed time for flow (t_1)	[s]	43	43	42	42	
Elapsed time for flow (t_2)	[s]	86	85	84	84	
Hydraulic conductivity ($k_{T^\circ C} \cdot 10^{-4}$)	[m/s]	1.934	1.957	1.980	1.980	
Mean temperature (T)	[°C]	24.0	24.2	24.5	24.7	
Kinematic viscosity ($\nu_{T^\circ C} \cdot 10^{-6}$)	[m²/s]	0.9135	0.9115	0.9054	0.9014	
Permeability ($K \cdot 10^{-11}$)	[m²]	1.799	1.816	1.826	1.817	

Remarks:

Job: 9810	Aalborg University
Executed: KPJ	Enclosure No. 17
Evaluated: KPJ	Approved: WL

Description of soil	Sample preparation method	Specimen dimensions		
Silkeborg No. 0000	Air pluviation	Length	[mm]	198
		Diameter	[mm]	70
Date	Falling head apparatus	Void ratio	[-]	0.810
1998-06-19	Permeameter A	Saturation	[-]	0.98

Test program			
	Standpipe diameter (d)	[mm]	20
	Initial hydraulic head (h_0)	[mm]	2000
	Intermediate hydraulic head ($h_1 = \sqrt{h_0 h_2}$)	[mm]	1265
	Final hydraulic head (h_2)	[mm]	800
	Volume correction factor for standpipe (F_s)	[-]	1.0936
	Volume correction factor for permeameter (F_p)	[-]	1.0124

Test		1	2	3	4	5
Temperature (T_1)	[°C]	24.1	24.3	24.8	24.9	25.0
Temperature (T_2)	[°C]	25.1	25.1	25.3	25.6	25.8
Elapsed time for flow (t_1)	[s]	22	22	22	22	22
Elapsed time for flow (t_2)	[s]	44	44	44	44	44
Hydraulic conductivity ($k_{T^oC} \cdot 10^{-4}$)	[m/s]	3.636	3.636	3.636	3.636	3.636
Mean temperature (T)	[°C]	24.6	24.7	25.1	25.3	25.4
Kinematic viscosity ($\nu_{T^oC} \cdot 10^{-6}$)	[m²/s]	0.9014	0.8994	0.8934	0.8893	0.8853
Permeability ($K \cdot 10^{-11}$)	[m²]	3.338	3.330	3.308	3.293	3.278

Remarks:

Job: 9810	Aalborg University
Executed: KPJ	Enclosure No. 18
Evaluated: KPJ	Approved: WL

Description of soil	Sample preparation method	Specimen dimensions		
Silkeborg No. 0000	Air pluviation	Length	[mm]	202
		Diameter	[mm]	70
Date	Falling head apparatus	Void ratio	[-]	0.629
1998-06-19	Permeameter B	Saturation	[-]	1.01

Test program			
	Standpipe diameter (d)	[mm]	20
	Initial hydraulic head (h_0)	[mm]	2000
	Intermediate hydraulic head ($h_1 = \sqrt{h_0 h_2}$)	[mm]	1265
	Final hydraulic head (h_2)	[mm]	800
	Volume correction factor for standpipe (F_s)	[-]	1.0936
	Volume correction factor for permeameter (F_p)	[-]	0.9935

Test		1	2	3	4	5
Temperature (T_1)	[°C]	24.6	25.1	25.4		
Temperature (T_2)	[°C]	25.3	25.1	25.4		
Elapsed time for flow (t_1)	[s]	48	48	48		
Elapsed time for flow (t_2)	[s]	97	96	96		
Hydraulic conductivity ($k_{T^oC} \cdot 10^{-4}$)	[m/s]	1.715	1.732	1.732		
Mean temperature (T)	[°C]	25.0	25.1	25.4		
Kinematic viscosity ($\nu_{T^oC} \cdot 10^{-6}$)	[m²/s]	0.8954	0.8913	0.8853		
Permeability ($K \cdot 10^{-11}$)	[m²]	1.563	1.572	1.562		

Remarks:

Job: 9810	Aalborg University
Executed: KPJ	Enclosure No. 19
Evaluated: KPJ	Approved: WL

Description of soil	Sample preparation method	Specimen dimensions		
Silkeborg No. 0000	Air pluviation	Length	[mm]	201
		Diameter	[mm]	70
Date	Falling head apparatus	Void ratio	[-]	0.675
1998-06-19	Permeameter A	Saturation	[-]	1.01

Test program	Standpipe diameter (d)	[mm]	20
	Initial hydraulic head (h_0)	[mm]	2000
	Intermediate hydraulic head ($h_1 = \sqrt{h_0 h_2}$)	[mm]	1265
	Final hydraulic head (h_2)	[mm]	800
	Volume correction factor for standpipe (F_s)	[-]	1.0936
	Volume correction factor for permeameter (F_p)	[-]	1.0129

Test		1	2	3	4	5
Temperature (T_1)	[°C]	24.8	25.1	25.4		
Temperature (T_2)	[°C]	25.4	25.3	25.6		
Elapsed time for flow (t_1)	[s]	36	36	36		
Elapsed time for flow (t_2)	[s]	72	72	72		
Hydraulic conductivity ($k_{T^\circ C} \cdot 10^{-4}$)	[m/s]	2.255	2.255	2.255		
Mean temperature (T)	[°C]	25.1	25.2	25.5		
Kinematic viscosity ($\nu_{T^\circ C} \cdot 10^{-6}$)	[m²/s]	0.8913	0.8893	0.8833		
Permeability ($K \cdot 10^{-11}$)	[m²]	2.046	2.042	2.028		

Remarks:

Job: 9810	Aalborg University
Executed: KPJ	Enclosure No. 20
Evaluated: KPJ	Approved: WL

Description of soil	Sample preparation method	Specimen dimensions		
Silkeborg No. 0000	Air pluviation	Length	[mm]	202
		Diameter	[mm]	70
Date	Falling head apparatus	Void ratio	[-]	0.667
1998-06-19	Permeameter B	Saturation	[-]	0.99

Test program	Standpipe diameter (d)	[mm]	20
	Initial hydraulic head (h_0)	[mm]	2000
	Intermediate hydraulic head ($h_1 = \sqrt{h_0 h_2}$)	[mm]	1265
	Final hydraulic head (h_2)	[mm]	800
	Volume correction factor for standpipe (F_s)	[-]	1.0936
	Volume correction factor for permeameter (F_p)	[-]	0.9935

Test		1	2	3	4	5
Temperature (T_1)	[°C]	24.9	25.2	25.3		
Temperature (T_2)	[°C]	25.9	25.6	25.7		
Elapsed time for flow (t_1)	[s]	37	37	37		
Elapsed time for flow (t_2)	[s]	75	74	74		
Hydraulic conductivity ($k_{T^\circ C} \cdot 10^{-4}$)	[m/s]	2.218	2.248	2.248		
Mean temperature (T)	[°C]	25.4	25.4	25.5		
Kinematic viscosity ($\nu_{T^\circ C} \cdot 10^{-6}$)	[m²/s]	0.8853	0.8853	0.8833		
Permeability ($K \cdot 10^{-11}$)	[m²]	1.999	2.026	2.022		

Remarks:

Job: 9810	Aalborg University
Executed: KPJ	Enclosure No. 21
Evaluated: KPJ	Approved: WL

Description of soil	Sample preparation method	Specimen dimensions		
Silkeborg No. 0000	Air pluviation	Length	[mm]	199
		Diameter	[mm]	70
Date	Falling head apparatus	Void ratio	[-]	0.718
1998-07-13	Permeameter A	Saturation	[-]	1.02

Test program			
	Standpipe diameter (d)	[mm]	20
	Initial hydraulic head (h_0)	[mm]	2000
	Intermediate hydraulic head ($h_1 = \sqrt{h_0 h_2}$)	[mm]	1265
	Final hydraulic head (h_2)	[mm]	800
	Volume correction factor for standpipe (F_s)	[-]	1.0936
	Volume correction factor for permeameter (F_p)	[-]	1.0125

Test		1	2	3	4	5
Temperature (T_1)	[°C]	25.6	25.6	25.6	25.5	
Temperature (T_2)	[°C]	26.7	26.3	26.1	25.9	
Elapsed time for flow (t_1)	[s]	30	31	31	31	
Elapsed time for flow (t_2)	[s]	60	62	62	62	
Hydraulic conductivity ($k_{T°C} \cdot 10^{-4}$)	[m/s]	2.680	2.593	2.593	2.593	
Mean temperature (T)	[°C]	26.2	26.0	25.9	25.7	
Kinematic viscosity ($\nu_{T°C} \cdot 10^{-6}$)	[m²/s]	0.8713	0.8752	0.8772	0.8792	
Permeability ($K \cdot 10^{-11}$)	[m²]	2.377	2.311	2.316	2.322	

Remarks:

Job: 9810	Aalborg University
Executed: KPJ	Enclosure No. 22
Evaluated: KPJ	Approved: WL

Description of soil	Sample preparation method	Specimen dimensions		
Silkeborg No. 0000	Air pluviation	Length	[mm]	198
		Diameter	[mm]	70
Date	Falling head apparatus	Void ratio	[-]	0.755
1998-07-13	Permeameter B	Saturation	[-]	1.00

Test program			
	Standpipe diameter (d)	[mm]	20
	Initial hydraulic head (h_0)	[mm]	2000
	Intermediate hydraulic head ($h_1 = \sqrt{h_0 h_2}$)	[mm]	1265
	Final hydraulic head (h_2)	[mm]	800
	Volume correction factor for standpipe (F_s)	[-]	1.0936
	Volume correction factor for permeameter (F_p)	[-]	0.9943

Test		1	2	3	4	5
Temperature (T_1)	[°C]	25.6	26.0	26.2		
Temperature (T_2)	[°C]	26.2	26.0	26.2		
Elapsed time for flow (t_1)	[s]	28	29	28		
Elapsed time for flow (t_2)	[s]	57	58	57		
Hydraulic conductivity ($k_{T°C} \cdot 10^{-4}$)	[m/s]	2.858	2.809	2.858		
Mean temperature (T)	[°C]	25.9	26.0	26.2		
Kinematic viscosity ($\nu_{T°C} \cdot 10^{-6}$)	[m²/s]	0.8752	0.8732	0.8695		
Permeability ($K \cdot 10^{-11}$)	[m²]	2.547	2.497	2.530		

Remarks:

Job: 9810	Aalborg University
Executed: KPJ	Enclosure No. 23
Evaluated: KPJ	Approved: WL

Description of soil	Sample preparation method	Specimen dimensions		
Silkeborg No. 0000	Air pluviation	Length	[mm]	199
		Diameter	[mm]	70
Date	Falling head apparatus	Void ratio	[-]	0.747
1998-07-13	Permeameter A	Saturation	[-]	1.00

Test program			
	Standpipe diameter (d)	[mm]	20
	Initial hydraulic head (h_0)	[mm]	2000
	Intermediate hydraulic head ($h_1 = \sqrt{h_0 h_2}$)	[mm]	1265
	Final hydraulic head (h_2)	[mm]	800
	Volume correction factor for standpipe (F_s)	[-]	1.0936
	Volume correction factor for permeameter (F_p)	[-]	1.0125

Test		1	2	3	4	5
Temperature (T_1)	[°C]	25.0	25.2	25.5		
Temperature (T_2)	[°C]	25.8	25.6	25.7		
Elapsed time for flow (t_1)	[s]	28	28	28		
Elapsed time for flow (t_2)	[s]	56	56	56		
Hydraulic conductivity ($k_{T=C} \cdot 10^{-4}$)	[m/s]	2.871	2.871	2.871		
Mean temperature (T)	[°C]	25.4	25.4	25.6		
Kinematic viscosity ($\nu_{T=C} \cdot 10^{-6}$)	[m²/s]	0.8853	0.8853	0.8813		
Permeability ($K \cdot 10^{-11}$)	[m²]	2.588	2.588	2.577		

Remarks:

Job: 9810	Aalborg University
Executed: KPJ	Enclosure No. 24
Evaluated: KPJ	Approved: WL

Description of soil	Sample preparation method	Specimen dimensions		
Silkeborg No. 0000	Air pluviation	Length	[mm]	201
		Diameter	[mm]	70
Date	Falling head apparatus	Void ratio	[-]	0.706
1998-07-13	Permeameter A	Saturation	[-]	1.00

Test program			
	Standpipe diameter (d)	[mm]	20
	Initial hydraulic head (h_0)	[mm]	2000
	Intermediate hydraulic head ($h_1 = \sqrt{h_0 h_2}$)	[mm]	1265
	Final hydraulic head (h_2)	[mm]	800
	Volume correction factor for standpipe (F_s)	[-]	1.0936
	Volume correction factor for permeameter (F_p)	[-]	1.0129

Test		1	2	3	4	5
Temperature (T_1)	[°C]	24.7	24.6	24.8	24.9	
Temperature (T_2)	[°C]	25.4	25.1	25.2	25.3	
Elapsed time for flow (t_1)	[s]	36	36	36	36	
Elapsed time for flow (t_2)	[s]	72	72	72	72	
Hydraulic conductivity ($k_{T=C} \cdot 10^{-4}$)	[m/s]	2.255	2.255	2.255	2.255	
Mean temperature (T)	[°C]	25.1	24.9	25.0	25.1	
Kinematic viscosity ($\nu_{T=C} \cdot 10^{-6}$)	[m²/s]	0.8934	0.8974	0.8934	0.8913	
Permeability ($K \cdot 10^{-11}$)	[m²]	2.051	2.060	2.051	2.046	

Remarks:

Job: 9810	Aalborg University
Executed: KPJ	Enclosure No. 25
Evaluated: KPJ	Approved: WL

Description of soil	Sample preparation method	Specimen dimensions		
Silkeborg No. 0000	Air pluviation	Length	[mm]	201
		Diameter	[mm]	70
Date	Falling head apparatus	Void ratio	[-]	0.723
1998-07-13	Permeameter B	Saturation	[-]	1.01

Test program			
	Standpipe diameter (d)	[mm]	20
	Initial hydraulic head (h_0)	[mm]	2000
	Intermediate hydraulic head ($h_1 = \sqrt{h_0 h_2}$)	[mm]	1265
	Final hydraulic head (h_2)	[mm]	800
	Volume correction factor for standpipe (F_s)	[-]	1.0936
	Volume correction factor for permeameter (F_p)	[-]	0.9935

Test		1	2	3	4	5
Temperature (T_1)	[°C]	25.3	25.4	25.5	25.6	
Temperature (T_2)	[°C]	26.7	26.4	26.2	26.1	
Elapsed time for flow (t_1)	[s]	29	30	30	30	
Elapsed time for flow (t_2)	[s]	60	61	61	60	
Hydraulic conductivity ($k_{T^oC} \cdot 10^{-4}$)	[m/s]	2.758	2.713	2.713	2.758	
Mean temperature (T)	[°C]	26.0	25.9	25.9	25.9	
Kinematic viscosity ($\nu_{T^oC} \cdot 10^{-6}$)	[m²/s]	0.8732	0.8752	0.8772	0.8772	
Permeability ($K \cdot 10^{-11}$)	[m²]	2.453	2.418	2.423	2.464	

Remarks:

Job: 9810	Aalborg University
Executed: KPJ	Enclosure No. 26
Evaluated: KPJ	Approved: WL

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