MACTEC

DRAFT

CONSTANT HEAD PERMEABILITY TEST

(ASTM D5084)

JOB NAME: TVA - KINGSTON
JOB NO.: 3043 - 5 - 1021
BORING NO.: ND - 44 UD-2
DEPTH: 16.5 - 18.5
SAMPLE:
DESCRIPTION: FIRM CLAYEY SILT

TECHNICIAN: [illegible]
DATE: 8-18-5
CHECKED BY: HC
CELL NO.: #1
SYSTEM NO.: 13

SAMPLE INFORMATION

WEIGHT TUBE & SOIL (g):
WEIGHT TUBE (g):
WEIGHT SOIL (g):
VOLUME SOIL (cu ft):
DRY UNIT WEIGHT (pcf):
WET UNIT WEIGHT (pcf):

TUBE LENGTH: (in) (cm)
TUBE DIAMETER: (in) (cm)
SOIL LENGTH(L): 2.006 (in) 5.095 (cm)
SOIL DIAMETER: 2.843 (in) 7.221 (cm)
AREA(A): (in²) 40.96 (cm)

MOISTURE CONTENT

INITIAL WET WEIGHT (g): 405.34
FINAL WET WEIGHT (g): 405.15
FINAL DRY WEIGHT (g): ~~403.37~~ 316.12
INITIAL MOISTURE (%): 28.2
FINAL MOISTURE (%): 28.2
PAN NAME: B-6

PERM INFORMATION

CELL PRESSURE(psi): ~~57~~ 64 (14 psi)
FORE PRESSURE(psi): 52
BACK PRESSURE (psi): 50
HEAD,h (psi) x 70.34: 140.68
TEMPERATURE (°F): 73°F
VISCOSITY CORRECTION(R_T): 0.931
PERMEANT LIQUID USED: H2O
BURET CORRECTION FACTOR(C): 1.0

TABLE OF HYDRAULIC CONDUCTIVITY

DATE		TIME		ELASPED TIME (+)		READING				FLOW (CC)	
START	END	START	END	MINUTES	SECONDS	START		END		cc	k
~~8-19~~		~~8:11~~				12.0	8.0				
~~8-19~~	~~8-19~~	~~9:59AM~~	~~1:25PM~~	CONSOLIDATING		~~13.6~~	~~6.5~~	12.5	7.0	1.0	
8-19	8-19	1:25PM	2:08PM	43	2580	12.5	7.0	12.4	7.2	0.2	6.4×10⁻⁸
8-19	8-20	2:08PM	5:30PM	1642	98520	12.4	7.2	7.0	13.0	5.4	4.5×10⁻⁸
8-20	8-20	5:30PM	9:10PM	220	13200	15.3	4.7	14.5	5.5	0.8	5.0×10⁻⁸
8-20	8-22	9:10PM	9:58AM	2208	132480	14.5	5.5	7.1	13.5	7.4	4.6×10⁻⁸
8-22	8-22	9:58AM	10:58AM	60	3600	7.1	13.5	6.9	13.7	9.2	4.6×10⁻⁸
~~8-22~~		~~11:07AM~~				6.9	13.7				
TOTALS					t= 247800					Q= 13.8	

COEFFICIENT OF PERMEABILITY, $k = \frac{Q \times L \times R_T \times C}{h \times A \times t} = \frac{Q}{t} \cdot \frac{(5.095)(0.931)}{(140.68)(40.96)} = 4.6 \times 10^{-8}$

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CONSTANT HEAD PERMEABILITY TEST

(ASTM D5084)

JOB NAME: TVA KINGSTON
JOB NO.: 3043-5-1021
BORING NO.: MB 47A 10-7
DEPTH: 30'-32'
SAMPLE:
DESCRIPTION: VERY SOFT AND WET

TECHNICIAN: J ALEX
DATE: 8-18-5
CHECKED BY: HC
CELL NO.: #3 JA
SYSTEM NO.: ~~#4 #13~~ SYS: #18

SAMPLE INFORMATION

WEIGHT TUBE & SOIL (g):
WEIGHT TUBE (g):
WEIGHT SOIL (g):
VOLUME SOIL (cu ft):
DRY UNIT WEIGHT (pcf):
WET UNIT WEIGHT (pcf):

TUBE LENGTH: (in) (cm)
TUBE DIAMETER: JA (in) (cm)
SOIL LENGTH(L): ~~5.08~~ 1.997 (in) 5.072 (cm)
SOIL DIAMETER: 2.829 (in) 7.186 (cm)
AREA(A): (in²) 40.55 (cm)

MOISTURE CONTENT

INITIAL WET WEIGHT (g): 386.66
FINAL WET WEIGHT (g): 378.2-8
FINAL DRY WEIGHT (g): ~~378.15~~ 291.15
INITIAL MOISTURE (%): 32.8
FINAL MOISTURE (%): 29.9
PAN NAME: BC-14

PERM INFORMATION

74.0 JA ~~75.0~~ 24 B21
CELL PRESSURE(psi): ~~75.0~~
FORE PRESSURE(psi): 52
BACK PRESSURE (psi): 50
HEAD,h (psi) x 70.34: 140.68
TEMPERATURE (°F): 73°F
VISCOSITY CORRECTION(R_T): 0.931
PERMEANT LIQUID USED: H2O
BURET CORRECTION FACTOR(C): 1.0

TABLE OF HYDRAULIC CONDUCTIVITY

DATE		TIME		ELASPED TIME (+)		READING				FLOW (CC)	
START	END	START	END	MINUTES	SECONDS	START		END		q	k
~~8-19~~		~~8:10 AM~~				12.0	8.1				
~~8-19~~	~~8-19~~	~~9:58 AM~~	~~1:27 PM~~	CONSOLIDATING		~~34.9~~	~~10.2~~	17.8	15.9	2.1	JA
8-19	8-19	1:27 PM	2:09 PM	42	2520	19.8	15.9	14.5	16.2	0.3	9.9×10^{-8}
8-19	8-20	2:09 PM	5:29 PM	1640	98400	19.5	16.2	12.4	23.8	7.1	6.0×10^{-8}
8-20	8-20	5:30 PM	9:13 PM	223	13380	25.2	15.0	24.4	15.8	0.8	4.9×10^{-8}
8-20	8-22	9:13 PM	10:05 AM	2212	132720	34.4	15.8	16.3	24.2	8.4	5.2×10^{-8}
8-22	8-22	10:05 AM	11:10 AM	65	3900	16.3	24.2	16.1	24.4	0.2	4.2×10^{-8}
~~8-22~~	~~8-22~~	~~11:10 AM~~	~~12:57 PM~~	~~107~~	~~6420~~	~~16.1~~	~~24.4~~	~~15.8~~	~~24.7~~	~~0.3~~	~~3.9×10^{-8}~~
TOTALS					t= 248400					Q= 16.5	

COEFFICIENT OF PERMEABILITY, $k = \frac{Q \times L \times R_T \times C}{h \times A \times t}$ $\frac{Q}{t} = \frac{5.072\ (0.931)}{140.68\ (40.55)} = 5.5 \times 10^{-8}$

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CONSTANT HEAD PERMEABILITY TEST

(ASTM D5084)

JOB NAME: TVA-KINGSTON
JOB NO.: 3043-5-1021
BORING NO.: DB-76 UD-2
DEPTH: 19'-20.5'
SAMPLE:
DESCRIPTION: SILTY - FIRM

TECHNICIAN: JALEX
DATE: 8-18-5
CHECKED BY: HC
CELL NO.: #5
SYSTEM NO.: #15

SAMPLE INFORMATION

WEIGHT TUBE & SOIL (g):
WEIGHT TUBE (g):
WEIGHT SOIL (g):
VOLUME SOIL (cu ft):
DRY UNIT WEIGHT (pcf):
WET UNIT WEIGHT (pcf):

TUBE LENGTH: (in) (cm)
TUBE DIAMETER: (in) (cm)
SOIL LENGTH(L): 2.049 (in) 5.306 (cm)
SOIL DIAMETER: 2.833 (in) 7.196 (cm)
AREA(A): (in²) 40.67 (cm)

MOISTURE CONTENT

INITIAL WET WEIGHT (g): 422.17
FINAL WET WEIGHT (g): 423.20
FINAL DRY WEIGHT (g): ~~334.53~~ 340.78
INITIAL MOISTURE (%): 23.9
FINAL MOISTURE (%): 24.2
PAN NAME: CMS

PERM INFORMATION

CELL PRESSURE(psi): 70 PSI (20 PSI)
FORE PRESSURE(psi): 52
BACK PRESSURE (psi): 50
HEAD,h (psi) x 70.34: 140.68
TEMPERATURE (°F): 73°F
VISCOSITY CORRECTION(R_T): 0.931
PERMEANT LIQUID USED: H2O
BURET CORRECTION FACTOR(C): 1.0

TABLE OF HYDRAULIC CONDUCTIVITY

DATE		TIME		ELASPED TIME (+)		READING				FLOW (CC)	
START	END	START	END	MINUTES	SECONDS	START		END		cc	K
~~8-19~~	~~8-19~~	~~8:07 AM~~				~~12.0~~	~~8.1~~				
8-19	8-19	10:00 AM	1:26 PM	206	12360	13.2	6.4	9.5	10.0	3.7	2.6×10^{-7}
8-19	8-19	1:26 PM	2:08 PM	42	2520	9.5	10.0	8.8	10.7	0.7	2.4×10^{-7}
~~8-19~~	~~8-19~~	~~2:08 PM~~				~~8.8~~	~~10.7~~				
8-20	8-20	5:34 PM	8:24 PM	170	10200	11.1	9.1	8.4	11.9	2.7	2.3×10^{-7}
8-22	8-22	9:58	11:08 AM	70	4200	13.2	6.7	12.5	7.4	0.7	1.4×10^{-7}
8-22	8-22	11:08 AM	1:58 PM	170	10200	12.5	7.4	10.4	9.4	2.1	1.8×10^{-7}
TOTALS					t = 27120					Q = 6.2	

COEFFICIENT OF PERMEABILITY, $k = \frac{Q \times L \times R_T \times C}{h \times A \times t} = \frac{Q}{t} \cdot \frac{5.306\,(0.931)\,(1.0)}{140.68\,(40.67)}$ 2.0×10^{-7}

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CONSTANT HEAD PERMEABILITY TEST

(ASTM D5084)

JOB NAME: TVA - KINGSTON - PROP. GYP. STACK
JOB NO.: 3043-05-1021
BORING NO.: NB-76
DEPTH: 5-15
SAMPLE: BULK (REMOLDED)
DESCRIPTION: RED BRN F-M SA CL SI

TECHNICIAN: JA
DATE: 8-9-5
CHECKED BY: HLC
CELL NO.: #13
SYSTEM NO.: #3

SAMPLE INFORMATION

MDD = 99.3 pcf OMC = 21.0%

WEIGHT TUBE & SOIL (g):
WEIGHT TUBE (g):
WEIGHT SOIL (g):
VOLUME SOIL (cu ft):
DRY UNIT WEIGHT (pcf):
WET UNIT WEIGHT (pcf):

TUBE LENGTH: (in) (cm)
TUBE DIAMETER: (in) (cm)
SOIL LENGTH(L): 2.041 (in) 5.184 ✓ (cm)
SOIL DIAMETER: 2.873 (in) 7.297 ✓ (cm)
AREA(A): (in²) 41.82 ✓ (cm²)

MOISTURE CONTENT

INITIAL WET WEIGHT (g): 395.55
FINAL WET WEIGHT (g): 403.09
FINAL DRY WEIGHT (g): ~~405.71~~ 317.89
INITIAL MOISTURE (%): 24.4 ✓
FINAL MOISTURE (%): 26.8 ✓
PAN NAME: B-9

PERM INFORMATION 10 PSI

CELL PRESSURE(psi): 60
FORE PRESSURE(psi): 52
BACK PRESSURE (psi): 50
HEAD,h (psi) x 70.34: 140.68
TEMPERATURE (°F): 73°F
VISCOSITY CORRECTION(R_T): 0.931
PERMEANT LIQUID USED: H2O
BURET CORRECTION FACTOR(C): 1.0

TABLE OF HYDRAULIC CONDUCTIVITY

DATE		TIME		ELASPED TIME (+)		READING				FLOW (CC)	
START	END	START	END	MINUTES	SECONDS	START		END		cc	k
~~8-20~~	~~8-22~~	~~9:13 PM~~	~~9:59 PM~~	~~46~~		~~44.4~~	8.2				
8-22	8-22	10:02 AM	10:06 AM	4	240	11.1	8.9	10.3	9.7	0.8	3.7×10^{-6}
8-22	8-22	10:06 AM	10:09 AM	3	180	10.3	9.7	9.6	10.4	0.7	3.2×10^{-6}
8-22	8-22	10:09 AM	10:12 AM	3	180	9.6	10.4	8.9	11.1	0.7	3.2×10^{-6}
8-22	8-22	11:06 AM	12:48	102	6120	30.1	10.9	11.5	29.9	18.6	2.5×10^{-6}
TOTALS					t = 6720 ✓					Q = 20.8 ✓	

COEFFICIENT OF PERMEABILITY, $k = \frac{Q \times L \times R_T \times C}{h \times A \times t} = \frac{Q}{t} \cdot \frac{5.184\ (0.931)}{140.68\ (41.82)} = 2.5 \times 10^{-6}$ ✓

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REMOLDED SAMPLE DATA SHEET

JOB NO 30435-5-1021 BORING NO NB-76 DEPTH 5-15 DATE 8-20-5

JOB NAME TVA KINGSTON (P.G.S.)

TECHNICIAN _____ CHECKED BY _____

OPTIMUM MOISTURE 21.0 %
MAX DRY DENSITY 99.3 pcf

COMPACTED TO 95 % OF PROCTOR
AT +2 to -5 % MOISTURE
23.0

95 % = 94.3
WET UNIT WEIGHT 116.0 pcf
MOISTURE 23.0 %

ACTUAL = 95.0%

TUBE NO P-1
TUBE DIAMETER 2.88 in
TUBE LENGTH 8.9 in
SOIL LENGTH 2.0 in
TUBE WEIGHT _____ gr
SOIL WEIGHT _____ gr
TOTAL _____ gr
VOLUME _____ cu ft
WEIGHT _____ lb
WEIGHT 396.7 gr
WEIGHT 198.4 gr/in

INITIAL MOISTURE CONTENT
(Hot Plate)

Soil Wet = _____ grs
Soil Dry = _____ grs
% Moisture _____

Soil Wet = 239.9 grs
Soil Dry = 195.7 grs
% Moisture 22.6

ACTUAL MOISTURE CONTENT
(Oven Dried)

Soil Wet = 500.00 grs (min. 500 grs)
Soil Dry = 406.62 grs
% Moisture 23.0
Pan L1

MOISTURE ADJUSTMENT DATA

2000.0 g WET-1 @ 22.6 % = 1631.3 g DRY
1631.3 g DRY @ 23.0 % = 2006.5 g WET-2
- 2000.0 g WET-1

ADD: 6.5

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PROCTOR DATA SHEET

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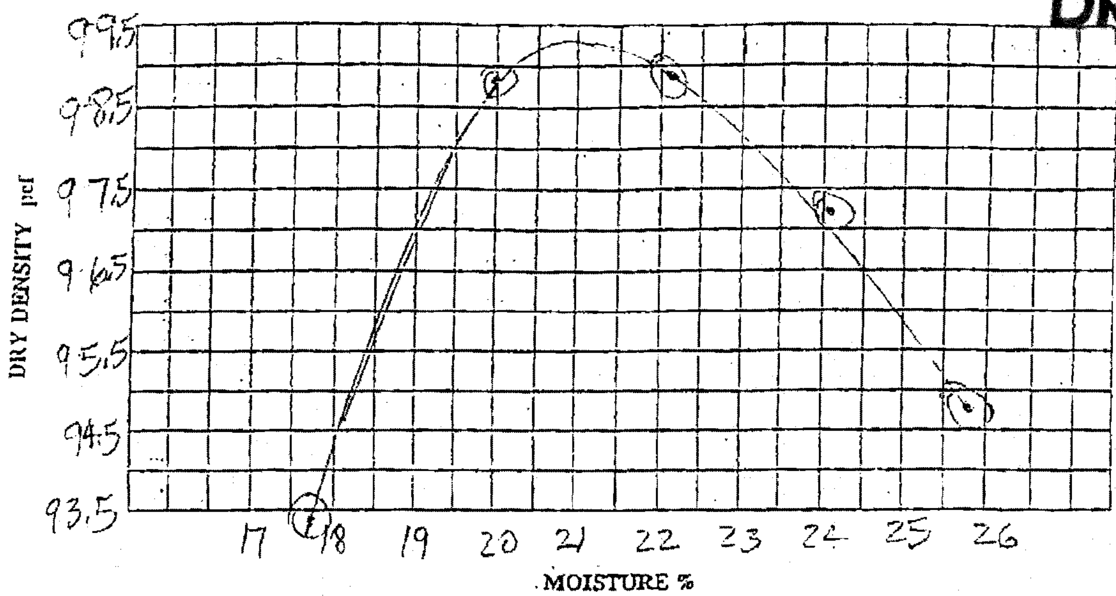

SCALE EP20KA MOLD NO. 4314 MOLD WT(g) 4241 MOLD VOL (cu ft) 1/29.99

WATER CONTENT					COMPACTED SAMPLE					
CAN NO.	WET WT SOIL -	DRY WT SOIL	WEIGHT WATER	% MOISTURE	SOIL + MOLD (g)	SOIL - MOLD (g)	SOIL WT LBS	WET UNIT WEIGHT	DRY UNIT WEIGHT	WATER ADDED
Tee	500	424.6	75.4	17.8	5904	1663	3.67	110.0	93.3	0
Moflai		416.5	83.5	20.0	6035	1794	3.96	118.6	98.8	50
Compton		409.4	90.6	22.1	6098	1857	4.09	122.8	98.9	100
Bevier		403.0	97.0	24.1	6066	1825	4.02	120.7	97.2	150
Moses		397.5	102.5	25.8	6043	1802	3.97	119.1	94.7	200

5 points Proctor Sample

JOB NO 3043-05-1021 CURVE NO NB-76

JOB NAME TVA, Kingston (proposed Gypsum Disposal Area)

JOB LOCATION

CLIENT

TEST METHOD (D 698) OR D 1557 METHOD (A) B C

DESCRIPTION Red brn fmed sa cl silt

PROPOSED USE

SOURCE LOCATION Bulk 5'-15'

OPTIMUM MOISTURE (%) 21.0

MAXIMUM DRY DENSITY (pcf) 99.3

Run 5 points on Proctor

Equipment used:

FIELD MOISTURE
WET WT 296.9
DRY WT 237.0
WT WATER
% MOISTURE 25.3
PAN [illegible]

TRIAXIAL-PERM-CONSOLIDATION
1 OR 2 CYLINDERS

WET WT 239.9	WET WT
DRY WT 195.7	DRY WT
WT WATER	WT WATER
% MOISTURE 22.6	% MOISTURE
PAN [illegible]	PAN

HOT PLATE– Y or N

RUN BY [illegible] DATE 8/1/05
CALCULATED [illegible] DATE 12/12/05
CHECKED DATE

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CONSTANT HEAD PERMEABILITY TEST

(ASTM D5084)

JOB NAME: TVA-KINGSTON - PROP. GYP. STACK
JOB NO.: 3043-05-1021
BORING NO.: NB-84
DEPTH: 2'-10'
SAMPLE: BULK (REMOLDED)
DESCRIPTION:

TECHNICIAN: JA
DATE: 8-9-5
CHECKED BY: HC
CELL NO.: #2
SYSTEM NO.: #14

SAMPLE INFORMATION

MDD = 102.2 PCF OMC: 21.6 %

WEIGHT TUBE & SOIL (g):
WEIGHT TUBE (g):
WEIGHT SOIL (g):
VOLUME SOIL (cu ft):
DRY UNIT WEIGHT (pcf):
WET UNIT WEIGHT (pcf):

TUBE LENGTH: (in) (cm)
TUBE DIAMETER: (in) (cm)
SOIL LENGTH(L): 2.030 (in) 5.156 ✓ (cm)
SOIL DIAMETER: 2.862 (in) 7.269 ✓ (cm)
AREA(A): (in²) 41.50 ✓ (cm²)

10 PSI

MOISTURE CONTENT

INITIAL WET WEIGHT (g): 408.74
FINAL WET WEIGHT (g): 417.20
FINAL DRY WEIGHT (g): ~~420.75~~ 329.71
INITIAL MOISTURE (%): 24.0 ✓
FINAL MOISTURE (%): 26.5 ✓
PAN NAME: BOT

PERM INFORMATION

CELL PRESSURE(psi): 60
FORE PRESSURE(psi): 52
BACK PRESSURE (psi): 50
HEAD,h (psi) x 70.34: 140.68
TEMPERATURE (°F): 73°F
VISCOSITY CORRECTION(R_T): 0.931
PERMEANT LIQUID USED: H20
BURET CORRECTION FACTOR(C): 1.0

TABLE OF HYDRAULIC CONDUCTIVITY

DATE		TIME		ELASPED TIME (+)		READING				FLOW (CC)	
START	END	START	END	MINUTES	SECONDS	START		END		Qc	K
~~8-20~~	8-20	9:11 PM	10:11 PM	60 ✓	3600	15.9	4.6	15.2	5.3	0.7	1.6×10^{-7}
8-22	8-22	9:56 AM	10:07 AM	11 ✓	660	11.0	8.9	~~10.9~~ 10.8	9.0	0.1	1.2×10^{-7}
8-22	8-22	10:07 AM	11:07 AM	60 ✓	3600	10.9	9.0	10.3	9.6	0.6	1.4×10^{-7}
8-22	8-22	11:07 AM	12:27 PM	80 ✓	4800 ✓	10.3	9.6	9.5	10.5	0.8	1.4×10^{-7}
TOTALS					t = 126600					Q = 2.2 ✓	

COEFFICIENT OF PERMEABILITY, $k = \frac{Q \times L \times R_T \times C}{h \times A \times t} = \frac{Q}{t} \frac{5.156\ (0.931)}{140.68\ (41.50)} =$ 1.4×10^{-7} ✓