

**MEASUREMENT OF HYDRAULIC CONDUCTIVITY OF SATURATED POROUS MATERIALS
USING A FLEXIBLE WALL PERMEAMETER**

ASTM D 5084 - 03 METHOD C TEST WITH INCREASING TAILWATER LEVEL

FLUID: DEAIRED TAP WATER WITH 0.005 N CaSO4

PROJECT: GEOPRO

TERRACON JOB #: 02086344.0003B

DATE: 4/28/2008

SAMPLE GEOPRO'S THERMAL GROUT SELECT 1.00

ID: SPECIMENS ALLOWED TO CURE 48 HOURS PRIOR TO TESTING

DESCR.: BENTONITE ("THERMAL GROUT SELECT"): 11.11%

SAND (SHORT MOUNTAIN GLASS): 55.56% DEIONIZED WATER: 33.32%

Durham Perm Cell	
BURETTE Area	0.317 cm ²

INITIAL				
MOISTURE%	DENSITY			
W & T, g	WET WT, g	129.7		
D & T, g	DIA, in	2.421	6.15	cm
T, g	HT, in	0.999	2.54	cm
	AREA		29.70	cm ²
MOIST- URE, %	DENSITY:	107.5	PCF WET	
	DENSITY:		PCF DRY	

SPECIFIC GRAVITY:	2.70	REMOLDED?:	NO
SPECIFIC GRAVITY:	ASSUMED	PROCTOR, pcf:	NA
POROSITY, %:	NA	OPTIMUM, %:	NA
SATURATION, %:	NA	COMPACTION, %:	NA
VOID RATIO:	NA	OVER OPTIMUM, %:	NA

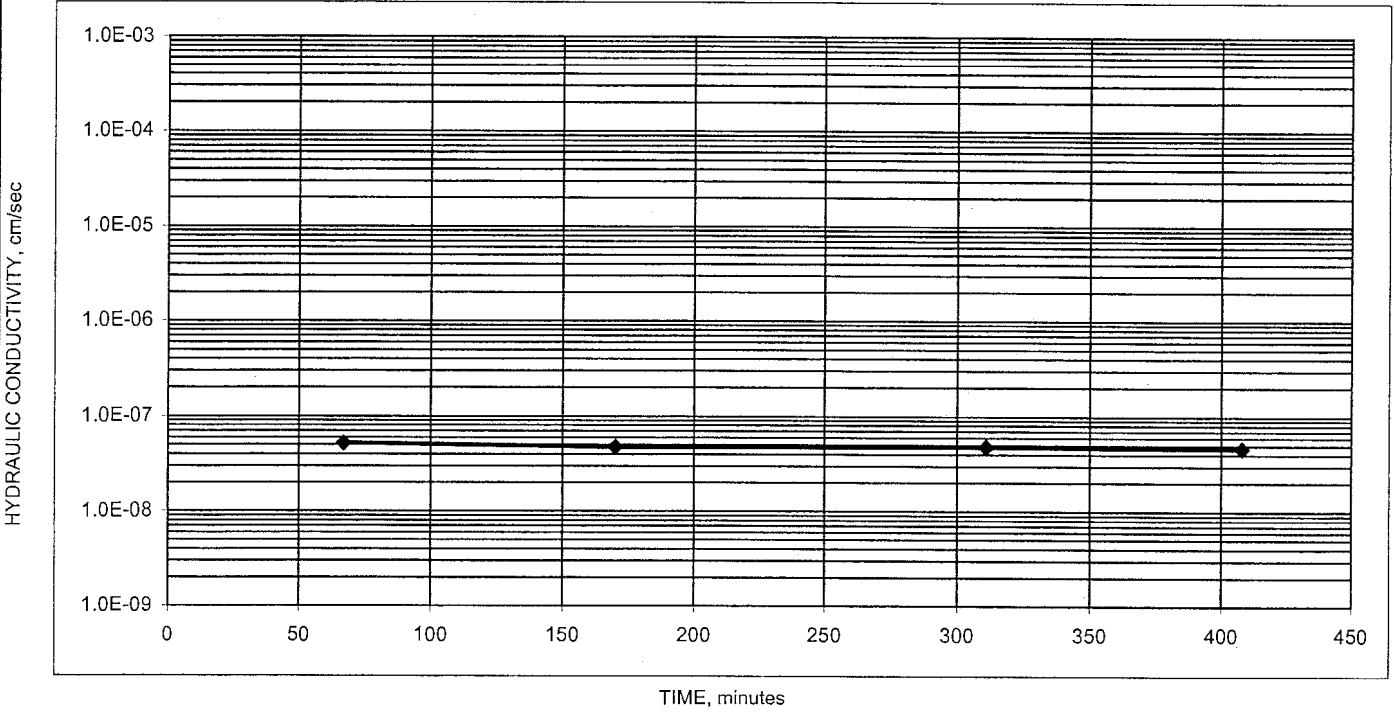
SATURATION:	LATERAL PRESS.:	105.0 psi	BACK PRESSURE (=UPPER=LOWER):	100.0 psi
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TEST:	LATERAL PRESS.:	105.0 psi	UPPER:	100.0 psi	LOWER:	100.0 psi
			BIAS PRESSURE (=LOWER-UPPER)			0.0 psi

Upper cm ³	Lower cm ³	ELAPSED TIME, min	DELTA H cm	Ln H1/H2	HYD CON k, cm/sec	OUT FLOW cm ³	IN FLOW cm ³	OUT/IN RATIO	HYD GRAD	% FROM MEAN k	TEMP.: C	TEMP. CORR.:
5.2	68.3	0.00	63.1									
5.7	67.7	67.00	62.0	0.017586	5.21E-08	0.5	0.6	0.83	24.4	7	25.1	0.880
6.5	67.0	170.00	60.5	0.024491	4.75E-08	0.8	0.7	1.14	23.8	2	24.9	0.884
7.5	66.0	311.00	58.5	0.033617	4.79E-08	1.0	1.0	1.00	23.1	1	24.7	0.889
8.2	65.4	408.00	57.2	0.022473	4.65E-08	0.7	0.6	1.17	22.5	4	24.7	0.889

HYDRAULIC CONDUCTIVITY (k) = **AVERAGE 4.8E-08 cm/sec**

MAXIMUM	1.0E-03 TO 1.0E-04	2	0.75<	30	% < 25 AT
HYDRAULIC	1.0E-04 TO 1.0E-05	5	RATIO	MAX	> 1.0E-8
GRADIENT	1.0E-05 TO 1.0E-06	10	<1.25	HYD	OR
	1.0E-06 TO 1.0E-07	20		GRAD	% < 50 AT
	less than 1.0E-07	30		ALLOWED	< 1.0E-8



MEASUREMENT OF HYDRAULIC CONDUCTIVITY OF SATURATED POROUS MATERIALS

USING A FLEXIBLE WALL PERMEAMETER

ASTM D 5084 - 03 METHOD C TEST WITH INCREASING TAILWATER LEVEL

FLUID: DEAIRED TAP WATER WITH 0.005 N CaSO4

PROJECT: GEOPRO

TERRACON JOB #: 02086344.0004C

DATE: 5/6/2008

SAMPLE GEOPRO'S THERMAL GROUT SELECT 1.20
ID: SPECIMENS ALLOWED TO CURE 48 HOURS PRIOR TO TESTING

Durham Perm Cell
BURETTE Area 0.317 cm²

DESCR.: BENTONITE ("THERMAL GROUT SELECT"): 7.94%
SAND (SHORT MOUNTAIN GLASS): 63.50% DEIONIZED WATER: 28.56%

INITIAL	
MOISTURE%	DENSITY
W & T, g	WET WT, g 133.3
D & T, g	DIA, in 2.427 6.16 cm
T, g	HT, in 0.994 2.53 cm
	AREA 29.85 cm ²
MOIST-URE, %	DENSITY: 110.4 PCF WET
	DENSITY: PCF DRY

SPECIFIC GRAVITY:	2.70	REMOLDED?:	NO
SPECIFIC GRAVITY:	ASSUMED	PROCTOR, pcf:	NA
POROSITY, %:	NA	OPTIMUM, %:	NA
SATURATION, %:	NA	COMPACTION, %:	NA
VOID RATIO:	NA	OVER OPTIMUM, %:	NA

SATURATION:	LATERAL PRESS.: 105.0 psi	BACK PRESSURE (=UPPER=LOWER): 100.0 psi
TEST:	LATERAL PRESS.: 105.0 psi	UPPER: 100.0 psi LOWER: 100.0 psi
		BIAS PRESSURE (=LOWER-UPPER) 0.0 psi

Upper cm ³	Lower cm ³	ELAPSED TIME, min	DELTA H, cm	Ln H1/H2	HYD CON k, cm/sec	OUT FLOW cm ³	IN FLOW cm ³	OUT/IN RATIO	HYD GRAD	% FROM MEAN k	TEMP. C	TEMP. CORR.:
5.6	67.5	0.00	61.9									
6.8	66.4	354.00	59.6	0.037865	2.09E-08	1.2	1.1	1.09	23.6	4	25.4	0.872
9.6	63.8	1283.00	54.2	0.094975	2.01E-08	2.8	2.6	1.08	21.5	0	25.1	0.880
11.0	62.6	1779.00	51.6	0.049159	1.95E-08	1.4	1.2	1.17	20.4	3	25.1	0.880
13.1	60.8	2545.00	47.7	0.078590	1.99E-08	2.1	1.8	1.17	18.9	1	25.5	0.870

HYDRAULIC CONDUCTIVITY (k) = **AVERAGE 2.0E-08 cm/sec**

MAXIMUM HYDRAULIC GRADIENT	1.0E-03 TO 1.0E-04	2	0.75<	30	% < 25 AT
	1.0E-04 TO 1.0E-05	5	RATIO	MAX	> 1.0E-8
	1.0E-05 TO 1.0E-06	10	<1.25	HYD	OR
	1.0E-06 TO 1.0E-07	20		GRAD	% < 50 AT
	less than 1.0E-07	30		ALLOWED	< 1.0E-8

