

**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 #: 02086344.0001

DATE: 4/16/2008

SAMPLE GEOPRO'S THERMAL GROUT LITE 0.57

ID:

DESCR.: BENTONITE ("THERMAL GROUT LITE"): 22.65%  
SAND ( SHORT MOUNTAIN GLASS): 22.65% DEIONIZED WATER: 54.71%

Durham Perm Cell  
BURETTE Area 0.317 cm<sup>2</sup>

INITIAL	
MOISTURE%	DENSITY
W & T, g	WET WT, g 101.8
D & T, g	DIA, in 2.417 6.14 cm
T, g	HT, in 0.999 2.54 cm
	AREA 29.60 cm <sup>2</sup>
MOIST-URE, %	DENSITY: 84.6 PCF WET
	DENSITY: PCF DRY

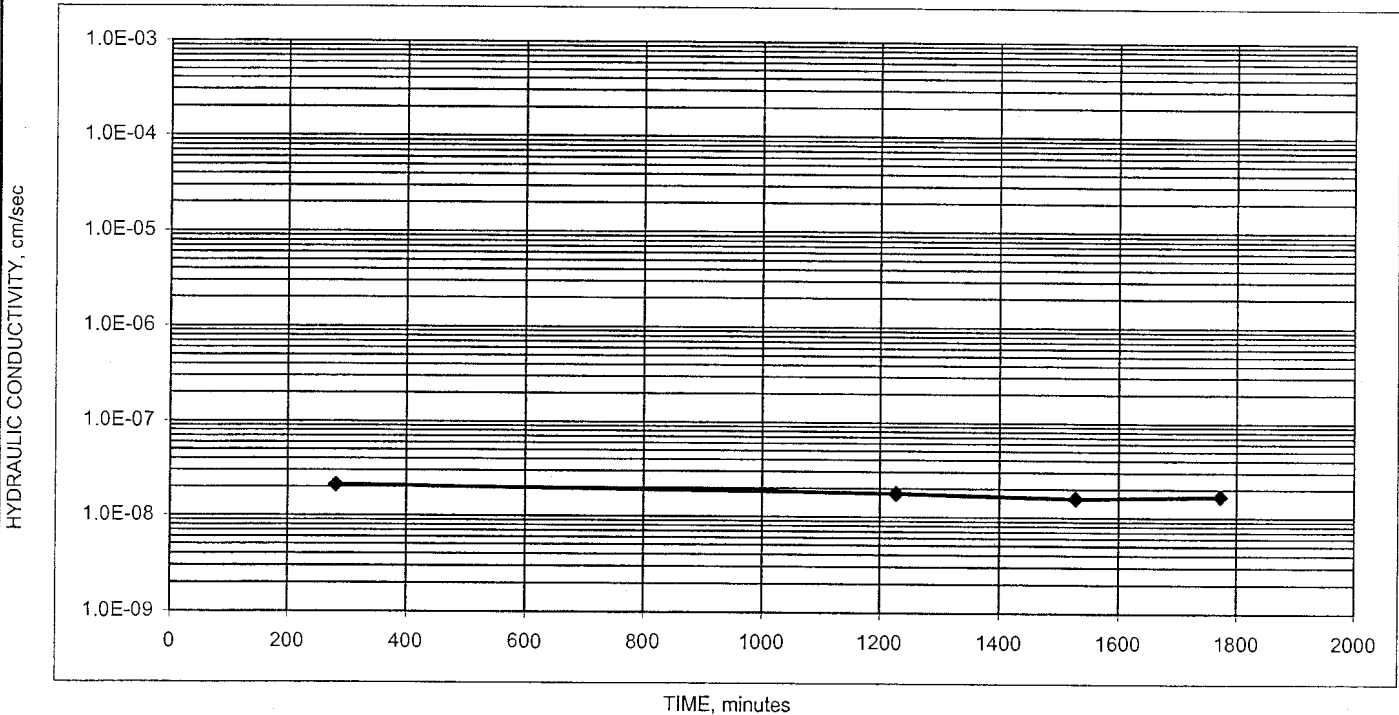
SPECIFIC GRAVITY:	2.70	REMOLDED?:	NO
SPECIFIC GRAVITY:	ASSUMED	PROCTOR, pcf:	NA
POROSITY, %:	NA	OPTIMUM, %:	NA
SATURATION, %:	NA	COMPACTION, %:	NA
VOID RATIO:	NA	OVER OPTIMUM, %:	NA

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 <sup>3</sup>	Lower cm <sup>3</sup>	ELAPSED TIME, min	DELTA H, cm	Ln H1/H2	HYD CON k, cm/sec	OUT FLOW cm <sup>3</sup>	IN FLOW cm <sup>3</sup>	OUT/IN RATIO	HYD GRAD	% FROM MEAN k	TEMP. C	TEMP. CORR.:
5.3	67.2	0.00	61.9									
6.2	66.3	281.00	60.1	0.029510	2.11E-08	0.9	0.9	1.00	23.7	18	24.8	0.887
8.7	64.0	1227.00	55.3	0.083237	1.77E-08	2.5	2.3	1.09	21.8	1	24.8	0.887
9.3	63.3	1528.00	54.0	0.023789	1.59E-08	0.6	0.7	0.86	21.3	11	24.8	0.887
9.9	62.8	1772.00	52.9	0.020581	1.68E-08	0.6	0.5	1.20	20.8	6	25.0	0.882

HYDRAULIC CONDUCTIVITY (k) = **AVERAGE 1.8E-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



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

**FLUID: DEAIRED TAP WATER WITH 0.005 N CaSO4**

PROJECT: GEOPRO

TERRACON JOB #: 02086344.0002

DATE: 4/16/2008

SAMPLE GEOPRO'S THERMAL GROUT LITE 1.00

ID:

DESCR.: BENTONITE ("THERMAL GROUT LITE"): 11.01%

SAND ( SHORT MOUNTAIN GLASS): 55.05% DEIONIZED WATER: 33.94%

Durham Perm Cell  
BURETTE Area 0.317 cm<sup>2</sup>

INITIAL	
MOISTURE%	DENSITY
W & T, g	WET WT, g 129.1
D & T, g	DIA, in 2.421 6.15 cm
T, g	HT, in 0.999 2.54 cm
	AREA 29.70 cm <sup>2</sup>
MOIST-URE, %	DENSITY: 106.9 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

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

Upper cm <sup>3</sup>	Lower cm <sup>3</sup>	ELAPSED TIME, min	DELTA H, cm	Ln H1/H2	HYD CON k, cm/sec	OUT FLOW cm <sup>3</sup>	IN FLOW cm <sup>3</sup>	OUT/IN RATIO	HYD GRAD	% FROM MEAN k	TEMP.: C	TEMP. CORR.:
4.8	67.5	0.00	62.7									
6.0	66.4	280.00	60.4	0.037372	2.69E-08	1.2	1.1	1.09	23.8	14	24.5	0.894
9.4	63.3	1227.00	53.9	0.113859	2.41E-08	3.4	3.1	1.10	21.2	2	24.7	0.889
10.3	62.4	1528.00	52.1	0.033966	2.26E-08	0.9	0.9	1.00	20.5	4	24.8	0.886
11.0	61.8	1772.00	50.8	0.025269	2.08E-08	0.7	0.6	1.17	20.0	12	24.6	0.892

HYDRAULIC CONDUCTIVITY (k) = **AVERAGE 2.4E-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

