

HYDRAULIC CONDUCTIVITY AND PERMEABILITY REDUCED BY TWO FULL ORDERS OF MAGNITUDE*

EMC SQUARED System Stabilizer Treatment

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*1 Order of Magnitude (10) x 1 Order of Magnitude (10) = 100. A reduction of 2 full magnitudes means the EMC SQUARED System stabilizer application reduced the rate of water flow through the soil by a factor of 100 times.



Client:	Ninyo & Moore		
Project Name:	Musket/Laboratory Testing		
Project Location:	Pheonix, AZ		
GTX #:	314988		
Start Date:	2/16/2022	Tested By:	sjt
End Date:	3/3/2022	Checked By:	jsc
Boring #:	145972		
Sample #:	Treated (EMC2 Stabilizer)		
Depth:	---		
Visual Description:	Moist, brown silty sand (with stabilizer)		



Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter by ASTM D5084 Constant Gradient

Sample Type:	Remolded	Permeant Fluid:	De-aired Distilled water
Orientation:	Vertical	Cell #:	---
Sample Preparation:	Material was mixed with EMC2 Stabilizer in accordance with client recommended mixing procedures. Target Compaction: 95% of the maximum dry density (125.4 pcf) at the optimum moisture content (10.4%). Values specified by client. Trimmings moisture content = 10.9%		
Assumed Specific Gravity:	2.70		

Parameter	Initial	Final
Height, in	2.00	1.88
Diameter, in	2.86	2.93
Area, in ²	6.42	6.74
Volume, in ³	12.8	12.7
Mass, g	434	435
Bulk Density, pcf	128	130
Moisture Content, %	20.2	20.6
Dry Density, pcf	106.7	108.2
Degree of Saturation, %	94	100

B COEFFICIENT DETERMINATION

Cell Pressure, psi:	80.00	Increased Cell Pressure, psi:	85.00	Cell Pressure Increment, ps	5.00
Sample Pressure, psi:	70.00	Corresponding Sample Pressure, psi:	73.38	Sample Pressure Increment	3.38
				B Coefficient:	0.68

FLOW DATA

Date	Time, sec	Pressure, psi			Gradient	Flow Volume, cc				Temp, °C	R _t	Permeability K @ 20 °C, cm/sec
		Cell	Inlet	Outlet		In	Out	Δ In	Δ Out			
28-Feb	---	80.0	70.5	69.5	14.7	7.00	14.00	---	---	---	---	---
28-Feb	5,400	80.0	70.5	69.5	14.7	7.05	13.95	0.05	0.05	19.5	1.013	1.5E-08
28-Feb	----	80.0	70.5	69.5	14.7	7.00	14.00	---	---	---	---	---
28-Feb	5,400	80.0	70.5	69.5	14.7	7.05	13.95	0.05	0.05	19.5	1.013	1.5E-08
28-Feb	----	80.0	70.5	69.5	14.7	7.00	14.00	---	---	---	---	---
28-Feb	5400	80.0	70.5	69.5	14.7	7.05	13.95	0.05	0.05	19.5	1.013	1.5E-08
28-Feb	----	80.0	70.5	69.5	14.7	7.00	14.00	---	---	---	---	---
28-Feb	5400	80.0	70.5	69.5	14.7	7.05	13.95	0.05	0.05	19.5	1.013	1.5E-08

PERMEABILITY AT 20° C: 1.46 x 10⁻⁸ cm/sec (@ 10 psi effective stress)



Client:	Ninyo & Moore		
Project Name:	Musket/Laboratory Testing		
Project Location:	Phoenix, AZ		
GTX #:	314988		
Start Date:	2/4/2022	Tested By:	sjt
End Date:	2/15/2022	Checked By:	jsc
Boring #:	145972		
Sample #:	Untreated		
Depth:	---		
Visual Description:	Moist, brown silty sand		

Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter by ASTM D5084 Constant Volume

Sample Type:	Remolded	Permeant Fluid:	De-aired Distilled water
Orientation:	Vertical	Cell #:	5/23
Sample Preparation:	Target Compaction: 95% of the maximum dry density (125.4 pcf) at the optimum moisture content (10.4%). Values specified by client. Trimmings moisture content = 10.5%		

Assumed Specific Gravity: 2.65

Parameter	Initial	Final
Height, in	3.00	2.90
Diameter, in	2.86	2.86
Area, in ²	6.42	6.42
Volume, in ³	19.3	18.6
Mass, g	666	683
Bulk Density, pcf	131.4	139.3
Moisture Content, %	9.7	12.5
Dry Density, pcf	119.7	123.9
Degree of Saturation, %	67	98

B COEFFICIENT DETERMINATION

Cell Pressure, psi:	69.99	Increased Cell Pressure, psi:	75.00	Cell Pressure Increment, psi:	5.01
Sample Pressure, psi:	60.04	Corresponding Sample Pressure, psi:	63.06	Sample Pressure Increment, psi:	3.02
				B Coefficient:	0.60

FLOW DATA

*B value did not increase with increase in pressure.
Final degree of saturation >95%.

Date	Trial #	Pressure, psi		Manometer Readings			Elapsed Time, sec	Gradient	Permeability K, cm/sec	Temp, °C	R _t	Permeability K @ 20 °C, cm/sec
		Cell	Sample	Z ₁	Z ₂	Z ₁ -Z ₂						
2/15	1	75.0	65.0	8.0	7.2	0.8	33	13.7	1.4E-06	19.5	1.013	1.4E-06
2/15	2	75.0	65.0	8.0	7.2	0.8	34	13.7	1.4E-06	19.5	1.013	1.4E-06
2/15	3	75.0	65.0	8.0	7.2	0.8	30	13.7	1.6E-06	19.5	1.013	1.6E-06
2/15	4	75.0	65.0	8.0	7.2	0.8	32	13.7	1.5E-06	19.5	1.013	1.5E-06

PERMEABILITY AT 20° C: 1.47 x 10⁻⁶ cm/sec (@ 10 psi effective stress)

Stabilization Products LLC

Ph: (209) 383-3296 or (800) 523-9992

E-mail: info@stabilizationproducts.net

Website: <https://www.stabilizationproducts.net>



Canadian Sales
Milieu Road Technologies
(780) 875-9159