

Intertek ETL SEMKO

Test: **Water Absorption (24 hour)**
 Date: August 29, 2003
 Client: Rocky Mountain Stone Works
 Project No: 3041212
 Product: Manufactured concrete stone
 Test Method: ASTM C140-02a - Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units
 Sample Type: Whole units (#3 cut from large stone)
 Equipment: Setra Scale 2000g SN 144363 ITS ID P52606
 Fluke 52II meter ITS ID D2679
 Temperature controlled oven

Sample	Saturated weight	Immersed weight	Oven-dry weight ¹	Oven-dry weight ²	Increment of Loss ³	Water Absorption		Weight Change	
	(g)	(g)	(g)	(g)	(%) by mass)	kg/m ³	lb/ft ³	%	
1	274.09	92.63	243.83	243.64	0.08	168	10.5	12.50	
2	425.28	119.83	382.41	382.13	0.07	141	8.8	11.29	
3	1205.32	352.47	1113.14	1112.20	0.08	109	6.8	8.37	
							Mean:	10.7	
							StdDev:	2.1	
							COV:	19.8%	

¹Initial oven-dry weight

²Oven-dry weight 2 hours later

³Not to exceed 0.2 %

Mean Result	139 kg/m ³	8.7 lb/ft ³
Coefficient of Variation	21.1 %	21.1 %

Test: **Water Absorption Coefficient**
 Date: June 26, 2003
 Client: Rocky Mountain Stone Works
 Project: 3041212
 Product: Manufactured Stone
 Test Method: EN 1925:1999 - Natural Stone Test Methods
 Determination of water absorption coefficient by capillarity
 Test Conditions: Temperature of 23 +/-2°C (73 +/-4°F) and 50% relative humidity
 Exposure: Water immersion to a depth of 3 +/- 1mm
 Exposed surface: Back face
 Equipment: Distilled Water Immersion Tray
 Setra Balance 2000g SN 144363 ITS ID P52606
 Mitutoyo Digital Calipers SN 7041919 ITS ID 52626

Nominal Time	Elapsed Time (minutes)	Time In (m/dd hh:mm)	Time Out (m/dd hh:mm)
10 minutes	10	6/26 09:40	6/26 09:50
30 minutes	30	6/26 09:56	6/26 10:16
60 minutes	60	6/26 10:21	6/26 10:51
3 hours	191	6/26 10:56	6/26 13:07
8 hours	1322	6/26 13:12	6/27 08:03
24 hours	5642	6/27 08:10	6/30 08:10
3 days	8872	6/30 08:15	7/02 14:05
5 days	10404	7/02 14:11	7/03 15:43
7 days	17636	7/03 15:43	7/08 16:15
12 days			

Measurement	Specimen				
	1	2	3	4	5
Length (mm)	55.1	55.2	54.9	54.7	55.0
Width (mm)	54.9	54.9	55.1	55.1	55.2
Area (mm ²)	3025	3030	3025	3014	3036
Weight after (g):					
0 minutes	187.24	209.24	185.63	206.33	196.33
10 minutes	188.82	211.15	187.85	208.49	198.78
30 minutes	189.81	212.38	188.99	209.75	199.87
60 minutes	190.67	213.41	189.96	210.82	200.81
3.18 hours	192.55	215.72	192.15	213.26	202.90
0.9 days	197.79	222.39	198.31	220.05	208.64
3.9 days	203.31	229.00	204.67	226.55	214.30
6.2 days	205.02	230.95	206.47	228.32	216.16
7.2 days	205.61	231.56	207.04	228.91	216.74
12.2 days	207.64	233.44	208.74	230.73	218.75

Test: Water Absorption Coefficient
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Time square root (s)	Water Absorption (kg/m ²)				
	1	2	3	4	5
0.0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
24.5	5.22E-01	6.33E-01	7.34E-01	7.17E-01	8.06E-01
42.4	8.51E-01	1.04E+00	1.11E+00	1.13E+00	1.16E+00
60.0	1.13E+00	1.38E+00	1.43E+00	1.49E+00	1.47E+00
107.1	1.76E+00	2.14E+00	2.15E+00	2.30E+00	2.17E+00
281.6	3.49E+00	4.34E+00	4.19E+00	4.55E+00	4.05E+00
581.8	5.31E+00	6.52E+00	6.29E+00	6.71E+00	5.92E+00
729.6	5.88E+00	7.16E+00	6.89E+00	7.30E+00	6.53E+00
790.1	6.07E+00	7.37E+00	7.08E+00	7.49E+00	6.72E+00
1028.7	6.74E+00	7.99E+00	7.64E+00	8.09E+00	7.38E+00

Absorption Coefficient (kg/m ² s ^{1/2})	1.18E-02	1.48E-02	1.40E-02	1.54E-02	1.34E-02
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Mean Result	0.0139 kg/m ² s ^{1/2}
Coefficient of Variation	9.9 %

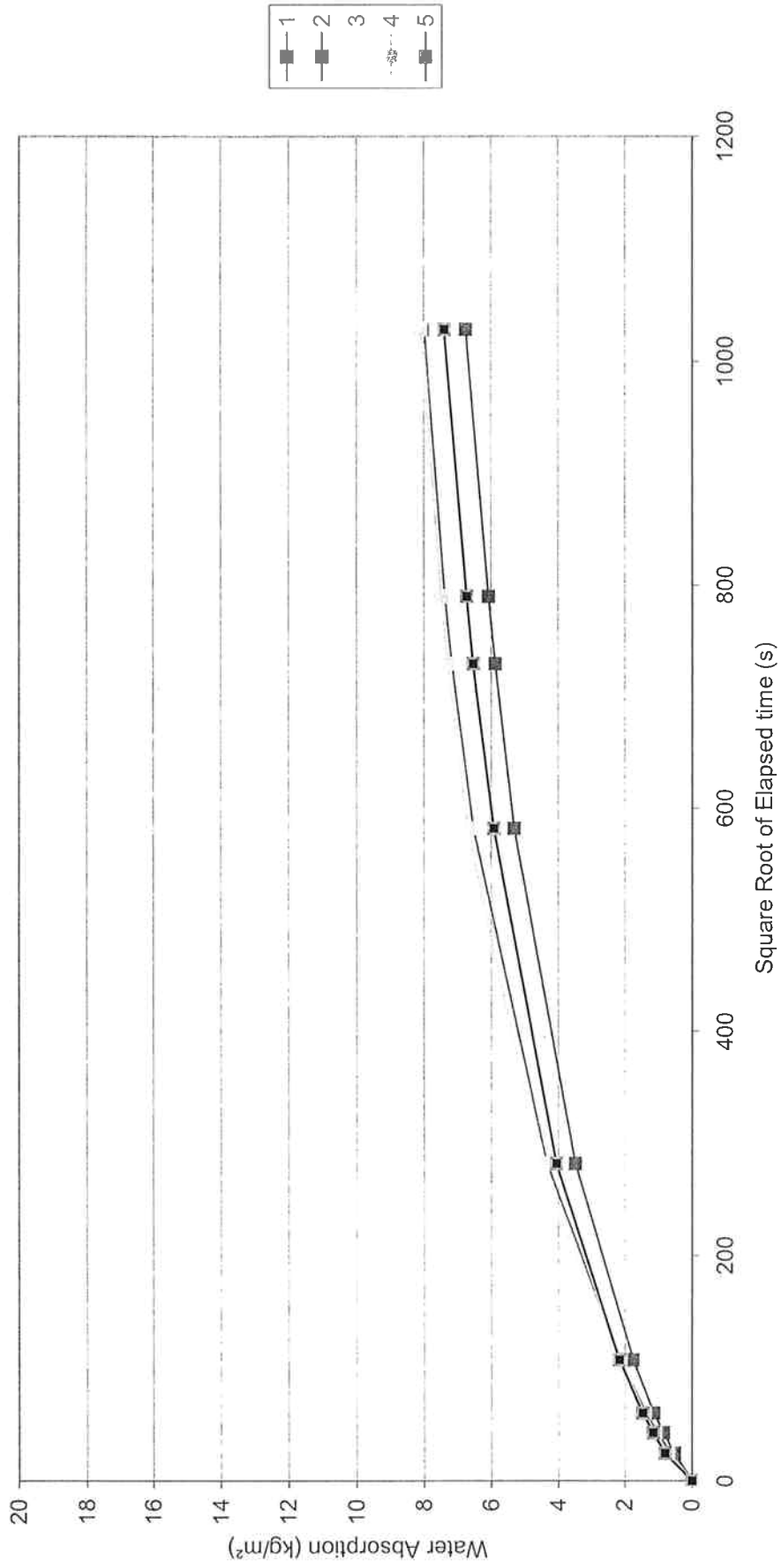
Water Absorption Coefficient

Rocky Mountain Stone Works

Project No. 3041212

Moisture Absorption versus Time

Sample tested: Manufactured Stone





ETL SEMKO

Test: Water Absorption Coefficient
Date: June 26, 2003
Client: Rocky Mountain Stone Works
Project: 3041212
Product: Manufactured Stone
Test Method: EN 1925:1999 - Natural Stone Test Methods
 Determination of water absorption coefficient by capillarity
Test Conditions: Temperature of 23 +/-2°C (73 +/-4°F) and 50% relative humidity
Exposure: Water immersion to a depth of 3 +/- 1mm
Exposed surface: Front face
Equipment: Distilled Water Immersion Tray
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Nominal Time	Elapsed Time (minutes)	Time In (m/dd hh:mm)	Time Out (m/dd hh:mm)
10 minutes	10	6/26 09:40	6/26 09:50
30 minutes	30	6/26 09:56	6/26 10:16
60 minutes	60	6/26 10:21	6/26 10:51
3 hours	191	6/26 10:56	6/26 13:07
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24 hours	5642	6/27 08:10	6/30 08:10
3 days	8872	6/30 08:15	7/02 14:05
5 days	10404	7/02 14:11	7/03 15:43
7 days	17631	7/03 15:48	7/08 16:15
12 days			

Measurement	Specimen				
	1	2	3	4	5
Length (mm)	54.0	55.3	55.0	55.2	55.1
Width (mm)	55.2	54.8	55.1	55.1	54.7
Area (mm ²)	2981	3030	3031	3042	3014
Weight after (g):					
0 minutes	206.72	213.87	174.67	171.34	202.28
10 minutes	208.68	215.78	176.62	172.87	204.49
30 minutes	209.65	216.70	177.62	173.58	205.54
60 minutes	210.51	217.46	178.50	174.16	206.39
3.18 hours	212.27	219.04	180.29	175.35	208.17
0.9 days	216.68	223.16	184.80	178.57	212.59
3.9 days	221.38	227.67	189.57	182.78	217.75
6.2 days	223.37	229.67	191.13	184.29	219.55
7.2 days	223.87	230.20	191.55	184.80	220.06
12.2 days	226.01	232.44	193.35	186.85	222.24



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Equipment: Distilled Water Immersion Tray
 Setra Balance 2000g SN 144363 ITS ID P52606
 Mitutoyo Digital Calipers SN 7041919 ITS ID 52626

Time square root (s)	Water Absorption (kg/m ²)				
	1	2	3	4	5
0.0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
24.5	6.60E-01	6.29E-01	6.46E-01	5.03E-01	7.34E-01
42.4	9.85E-01	9.35E-01	9.76E-01	7.37E-01	1.08E+00
60.0	1.27E+00	1.18E+00	1.26E+00	9.28E-01	1.37E+00
107.1	1.86E+00	1.71E+00	1.86E+00	1.32E+00	1.96E+00
281.6	3.34E+00	3.07E+00	3.34E+00	2.38E+00	3.42E+00
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729.6	5.59E+00	5.21E+00	5.43E+00	4.26E+00	5.73E+00
790.1	5.76E+00	5.39E+00	5.57E+00	4.42E+00	5.90E+00
1028.5	6.47E+00	6.13E+00	6.16E+00	5.10E+00	6.62E+00

Absorption Coefficient (kg/m ² s ^{1/2})	1.10E-02	1.00E-02	1.10E-02	7.74E-03	1.11E-02
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Mean Result	0.0102 kg/m ² s ^{1/2}
Coefficient of Variation	14.1 %

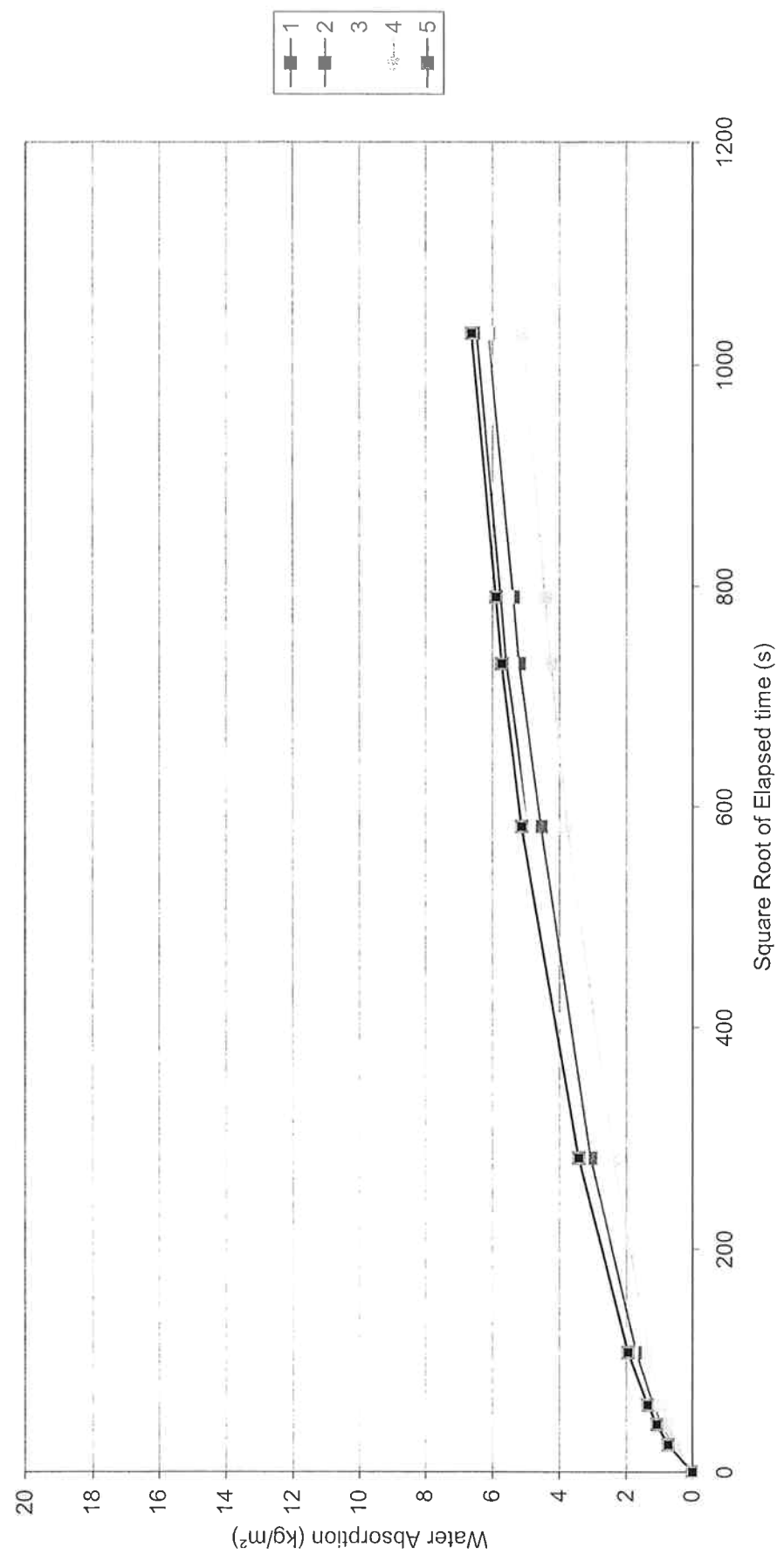
Water Absorption Coefficient

Rocky Mountain Stone Works

Project No. 3041212

Moisture Absorption versus Time

Sample tested: Manufactured Stone



Test: Absorption
Date: 22-Sep-06 **Project No:** 3091486
Client: Rocky Mountain Stoneworks **Eng/Tech:** Trevor Kwasnycia
Product: Stone Cladding
Specimen Thickness: 1.50 in 38.1 mm
Test Method: ASTM C 140 - 05a Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units
Conditioning: Saturation - Immersed in water at 60 to 80°F (15.6 to 26.7°C) for 24 h
 Drying - Dried in ventilated oven at 212 to 239°F (100-115°C) for min 24 h
Equipment: Setra Scale 125000g (Intertek ID 9-0418) Calibration due Date: March-07
 Fluke 52II meter (Intertek ID D2679) Calibration due Date: 02-June-07
 Temperature controlled oven (Intertek ID 9-0477)

Sample	Oven-dry weight after 24 hours (g)	Oven-dry weight after 26 hours (g)	Increment of Loss ³ (% by mass)	Saturated weight in air (g)	Absorption (%)
1	629	629	0.00	737	17.09
2	720	720	0.00	867	20.40
3	590	590	0.00	708	19.98
4	720	720	0.00	850	18.16
5	685	685	0.00	836	21.99
				Mean:	19.52
				StdDev:	1.93
				COV:	9.9%

³Not to exceed 0.2 %

Test: Water Vapor Transmission
Date: 12-Oct-06 **Project:** 3091486 **Eng/Tech:** Trevor Kwasnycia
Client: Rocky Mountain Stone Works
Product: Stone Cladding
Test Methods: Exterior surface face up
Conditioning: ASTM E96-05 Test Methods for Water Vapour Transmission of Materials
Exposure: Method B-Water
Equipment: 24 hours at a temperature of $23 \pm 2^{\circ}\text{C}$ and relative humidity of $50 \pm 5\%$
 Test Chamber (Intertek ID 9-0473) Setra Balance 2000g (Intertek ID P52606)
 Gemini Tinytag Ultra (Intertek ID D2693) Digital Anemometer
 Mitutoyo Digital Calipers (Intertek ID 52639) Calibration due date: 13-June-06

Measurement	Specimen		
	1	2	3
Mean Air Temperature ($^{\circ}\text{C}$)	22.5	22.5	22.5
Saturation Vapour Pressure ¹ (Pa)	2768	2768	2768
Mean Relative Humidity in chamber (%)	51.4	51.4	51.4
Relative Humidity in test dish (%)	0	0	0
Initial Air Velocity (m/s)	0.18	0.18	0.18
Final Air Velocity (m/s)	0.25	0.25	0.25
Air Velocity Minimum Control Limit (m/s)	0.02	0.02	0.02
Air Velocity Maximum Control Limit (m/s)	0.3	0.3	0.3
Mass of Dessicant (g)	0	0	0
Specimen Weight Loss (g)	14.900	11.700	13.700
Moisture Gain of Dessicant (%)	n/a	n/a	n/a
Moisture Gain Control Limit (%)	10	10	10
Test Dish Diameter (mm)	228	228	228
Test Area (m^2)	0.041	0.041	0.041
Gradient of weight/time graph (g/hour)	1.21E-01	9.07E-02	1.08E-01
Mean Thickness (mm)	21.60	21.81	20.94
Water Vapour Transmission ($\text{g}/\text{hour}.\text{m}^2$)	2.96E+00	2.22E+00	2.65E+00
Water Vapour Permeance ($\text{ng}/\text{Pa}.\text{s}.\text{m}^2$)	5.79E+02	4.34E+02	5.18E+02

¹Estimated by the Clausius-Clapeyron equation

Test Result Summary	Metric units	Imperial Units
Water Vapor Transmission	2.61E+00 $\text{g}/\text{hr}.\text{m}^2$	3.74E+00 grains/hr.ft ²
	6.27E+01 $\text{g}/\text{day}.\text{m}^2$	8.97E+01 grains/day.ft ²
Water Vapor Permeance	5.10E+02 $\text{ng}/\text{Pa}.\text{s}.\text{m}^2$	8.92E+00 perms
Coefficient of Variation	14 %	14 %



ETL SEMKO

Test: Water Vapour Transmission
Date: 12-Oct-06 **Project:** 3091486 **Eng/Tech:** Trevor Kwasnycia
Client: Rocky Mountain Stone Works
Product: Stone Cladding
Test Methods: ASTM E96-05 Test Methods for Water Vapour Transmission of Materials
Conditioning: 24 hours at a temperature of 23 ± 2°C and relative humidity of 50 ± 5%
Exposure: As Received
Equipment: Setra Balance 2000g (Intertek ID P52606)
 Gemini Tinytag Ultra H/RH (Intertek ID D2693)
 Digital Anemometer
 Mitutoyo Digital Calipers (Intertek ID 52639) Calibration due date: 13-June-06

Test Procedure:	Water Method
Dessicant:	n/a
Sealant:	Parafin/Bees Wax
Air Temperature Setpoint (°C)	23
Relative Humidity Setpoint (%)	50
Initial Air Velocity (m/s)	0.2
Final Air Velocity (m/s)	0.25
Air Velocity Minimum Control Limit (m/s)	0.02
Air Velocity Maximum Control Limit (m/s)	0.3
Mass of Dessicant (g)	n/A
Test Dish Dimensions (mm)	228
Special conditioning (if applicable):	n/A
Specimen Orientation:	Exterior surface face up

Quadrant	Thickness (mm)			
	Control	Specimen 1	Specimen 2	Specimen 3
1	22.30	22.21	21.92	20.89
2	23.48	21.26	21.11	21.21
3	22.83	21.72	22.54	20.74
4	22.90	21.21	21.66	20.91

Measurement	Date	Time	Mass (g)			
			Control	Specimen 1	Specimen 2	Specimen 3
1	16-Oct-06	12:45 PM	2077.600	2498.20	2546.90	2556.90
2	17-Oct-06	12:45 PM	2076.800	2495.00	2544.00	2554.10
3	18-Oct-06	3:25 PM	2075.600	2491.10	2540.40	2550.30
4	19-Oct-06	3:55 PM	2075.000	2487.60	2537.60	2547.30
5	20-Oct-06	9:00 AM	2074.300	2483.30	2535.20	2543.20
6						
7						
8						
9						
10						

Test: **Water Vapor Transmission**
 Date: 12-Oct-06 Project: 3091486 Eng/Tech: Trevor Kwasnycia
 Client: Rocky Mountain Stone Works
 Product: Stone Cladding

