Test Report
For

Tremco, Inc.

Tested in Accordance with

ASTM E283
ASTM E2357
ASTM E331

Products Tested:

ExoAir 230, Tremproof 260

Report No.: T0313-014-018
Test Start Time: 3/28/2013 10:21 AM
Test Completion Time: 3/28/2013 4:28 PM

Test Technician: Tim Mattox
Test Engineer: Tim Mattox

Tremco Commercial Sealants & Waterproofing
23150 Commerce Park Drive, Beachwood, OH 44122

I. Test Assembly Description

Basic Dimensions
Test Assembly Height (in.): 96.000
Test Assembly Width (in.): 96.000

Test Area (m^2): 5.946

This is a test report for a Connectivity Project. The wall system that was tested contained one connection that is documented below. The testing that was conducted is an ASTM E2357 test and an ASTM E331 test.

The base wall consisted of a 3-5/8 in. 20 ga. steel stud frame on 16 in. centers. The base of the wall consisted of a single course of CMU block and the frame was built on top of the course of CMU so that the front face of the exterior sheathing was flush with the front of the CMU. 5/8 in. USG SecuRock exterior grade sheathing was secured to the framing with self-tapping screws spaced 8 in. OC vertically. The screw heads and seams were sealed with Dymonic 100. The seam between the CMU and the sheathing was sealed with Dymonic 100. The block was sealed with TP260 applied at 100 mil (wet film thickness).

The frame was sealed to the entire perimeter of the buck frame except for the floor plate gap to the CMU block, which was left unsealed. The gap space was sealed with Dymonic 100 and then the TP 260 was applied. The wall was then coated with ExoAir 230 at 60 mil (wet film thickness). The ExoAir 230 lapped onto the TP260.

The connections that were made are as follows:

1 - EA230 to TP260

The ExoAir 230 covered horizontal and vertical seams in the exterior grade sheathing that were.

Testing was conducted under the following test project numbers:

T0313-014 – Preliminary air leakage testing in accordance with ASTM E283. Air leakage was measured and recorded at pressure differentials required in ASTM E2357.

T0313-015 – Wind Conditioning in accordance with ASTM E2357 for geographical areas where pressure design value is Q_{10} > 0.20 kPa.

T0313-016 – Secondary air leakage testing in accordance with ASTM E283. Air leakage was measured and recorded at pressure differentials required in ASTM E2357.

T0313-017 - Deflection testing in accordance with ASTM E2357 for geographical areas where wind design value is Q_{10} > 0.40 kPa.

T0313-018 - Water leakage testing in accordance with ASTM E331. Water leakage was monitored at 137 Pa pressure differential for 15 minutes to meet the minimum requirement of the test method. Pressure was increased to 750 Pa for 15 minutes and then increased to 1050 Pa. until failure occurred.

II. Test Conditions

T0313-014

Test Temperature at Start(°F): 64.611
Test Temperature at End (°F): 64.955
Average Temperature (°F): 64.719
Avg. Barometric Pressure (in. Hg): 30.228

T0313-015

Test Temperature at Start(°F): 65.058
Test Temperature at End (°F): 65.044
Average Temperature (°F): 64.956
Avg. Barometric Pressure (in. Hg): 30.230

Geographical Area: Q_{10} > 0.20 kPa.

Wind Cycling: Sample was cycled with 2 alternating 1000 cycle series

T0313-016

Test Temperature at Start(°F): 72.905
Test Temperature at End (°F): 72.529
Average Temperature (°F): 72.443
Avg. Barometric Pressure (in. Hg): 30.231

T0313-017

Test Temperature at Start(°F): 72.702
Test Temperature at End (°F): 72.892
Average Temperature (°F): 72.974
Avg. Barometric Pressure (in. Hg): 30.230

Geographical Area: Q_{10} > 0.40 kPa.

T0313-018

Test Temperature at Start(°F): 72.390
Test Temperature at End (°F): 72.594
Average Temperature (°F): 72.502
Avg. Barometric Pressure (in. Hg): 30.231

III. Test Results/Comments

T0313-014 (Preliminary Air Leakage)

Infiltration
Assembly Air Leakage Values @ 75Pa
Air Leakage – 0.023 L/s (0.050 cfm)
Area Leakage Rate – 0.004 L/s·m^2 (0.0008 cfm/ft^2)

Exfiltration
Assembly Air Leakage Values @ 75Pa
Air Leakage – 0.018 L/s (0.038 cfm)
Area Leakage Rate – 0.003 L/s·m^2 (0.0006 cfm/ft^2)

T0313-015 (Wind Conditioning)

No damage was recorded on the test article during the wind conditioning.

T0313-016 (Secondary Air Leakage)

Infiltration
Assembly Air Leakage Values @ 75Pa
Air Leakage – 0.051 L/s (0.108 cfm)
Area Leakage Rate – 0.009 L/s·m^2 (0.0017 cfm/ft^2)

Exfiltration
Assembly Air Leakage Values @ 75Pa
Air Leakage – 0.053 L/s (0.113 cfm)
Area Leakage Rate – 0.009 L/s·m^2 (0.0018 cfm/ft^2)

T0313-017 (Deflection)

Deflection Report				
	Deflection Point 1	Deflection Point 2	Deflection Point 3	Deflection Point 4
	(in)	(in)	(in)	(in)
Nominal	7.44	7.36	7.35	0.00
Infiltration	7.60	7.56	7.55	-0.01
Exfiltration	7.21	7.11	7.09	-0.01
Movement Inf	0.16	0.20	0.20	0.00
Movement Exf	-0.23	-0.25	-0.25	0.00
Max Movement Inf	0.20			
Max Movement Exf	-0.25			

Deflection Point 1 was measured at 16 in. to left of center at mid height on wall.
Deflection Point 2 was measured at the center of the wall.
Deflection Point 3 was measured at 8 in. to right of center at mid height on wall.

T0313-018 (Water Leakage)

Time	Note
0:00:00	137 Pa test started.
0:15:00	End of 137 Pa test. No leaks. Moving to 750 Pa. for 15 minutes.
0:15:49	Start of 750 Pa test.
0:30:49	End of 750 Pa test. No leakage. Moving to 1050 Pa.
0:31:22	1050 Pa test started. 94mph equivalent.
0:32:31	Leakage occurring at the horizontal seam approximately 26 in. from the left side of the assembly.
0:35:26	Water entering at another point on the horizontal seam of the sheathing at the left-most stud. Also, water entering through the block, coming up from the Tap-Con that secures the footer plate to the block. The tap-con that is the source of the leak is approximately 28 in. from the right side of the assembly.
0:38:11	Testing will now be stopped since the system is leaking at the connection.

Comments:

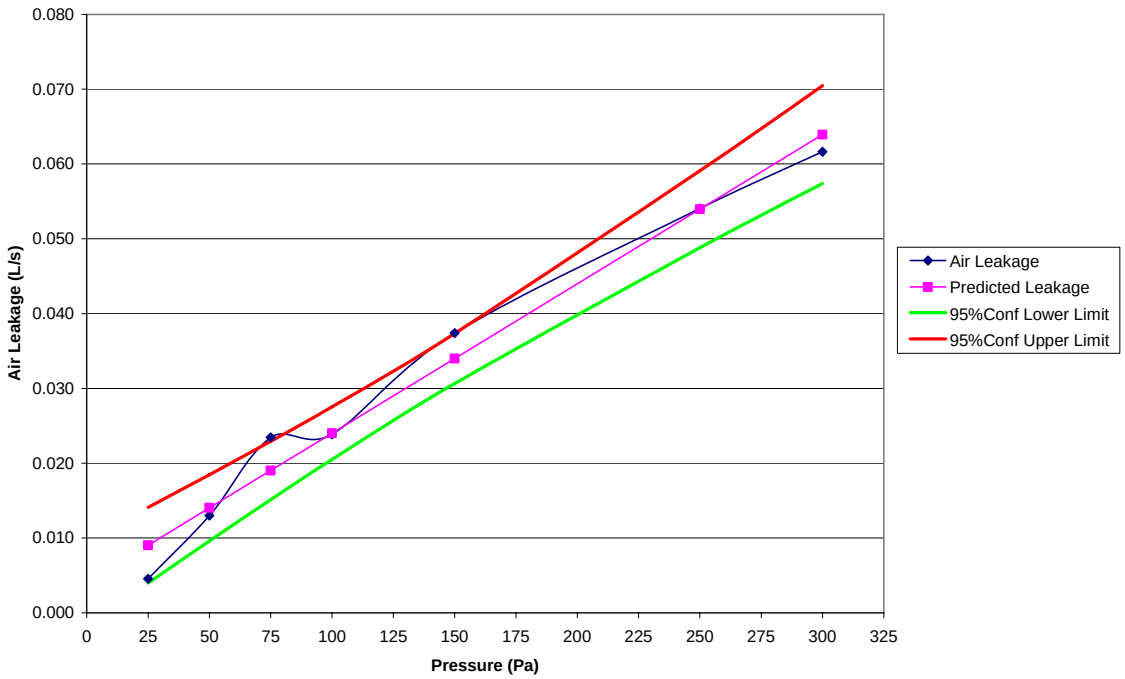
The air leakage of the test assembly, in accordance with the reporting requirements of ASTM E2357, is **0.0018 cfm/ft^2 @75 Pa.** There was no damage witnessed on the test article for the duration of the testing. **The assembly passed ASTM E331 test for 15 minutes at 137 Pa**. **The assembly passed the ASTM E331 test for 15 minutes at 750 Pa.** Leakage occurred at 1 minute 9 seconds into the 1050 Pa test, simulating a 94 mph wind load equivalent. There were no other failures witnessed or recorded.

IV. Conversion Charts

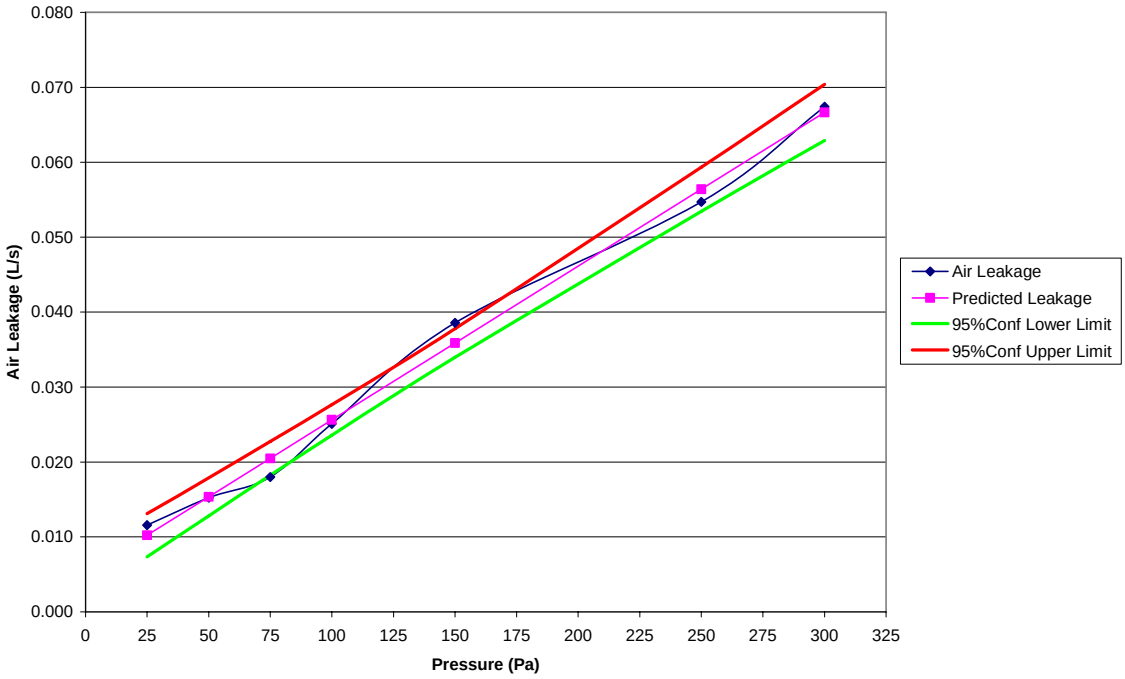
Pressure (Pa)	Pressure (psf)	Wind Speed (mph)
10	0.21	9.1
20	0.42	12.9
30	0.63	15.8
40	0.84	18.3
50	1.05	20.5
60	1.25	22.4
70	1.46	24.2
80	1.67	25.9
90	1.88	27.4
100	2.09	28.9
110	2.30	30.3
120	2.51	31.7
130	2.72	33.0
140	2.93	34.2
150	3.14	35.4
160	3.34	36.6
170	3.55	37.7
180	3.76	38.8
190	3.97	39.9
200	4.18	40.9
210	4.39	41.9
220	4.60	42.9
230	4.81	43.9
240	5.02	44.8
250	5.23	45.7
260	5.43	46.6
270	5.64	47.5
280	5.85	48.4
290	6.06	49.3
300	6.27	50.1
400	8.36	57.9
500	10.45	64.7
600	12.54	70.9
700	14.63	76.5
800	16.72	81.8
900	18.81	86.8
1000	20.90	91.5
1100	22.99	95.9
1200	25.08	100.2
1300	27.17	104.3
1400	29.26	108.2
1500	31.35	112.0
1600	33.44	115.7

V. Charts and Graphs

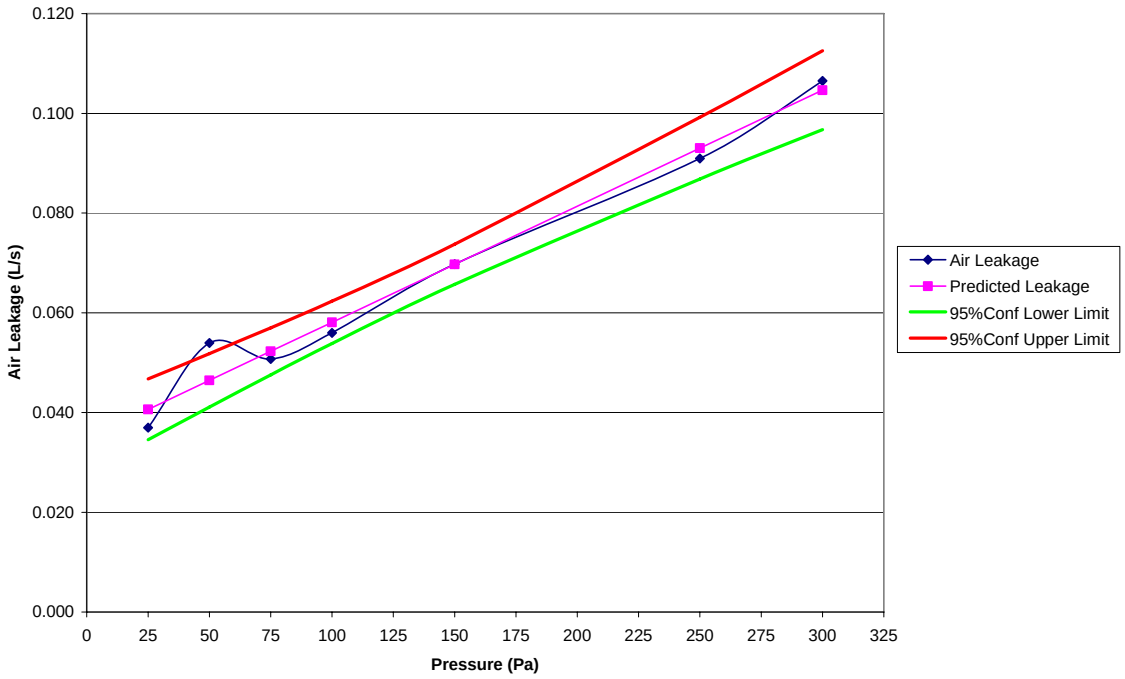
Infiltration T0313-014



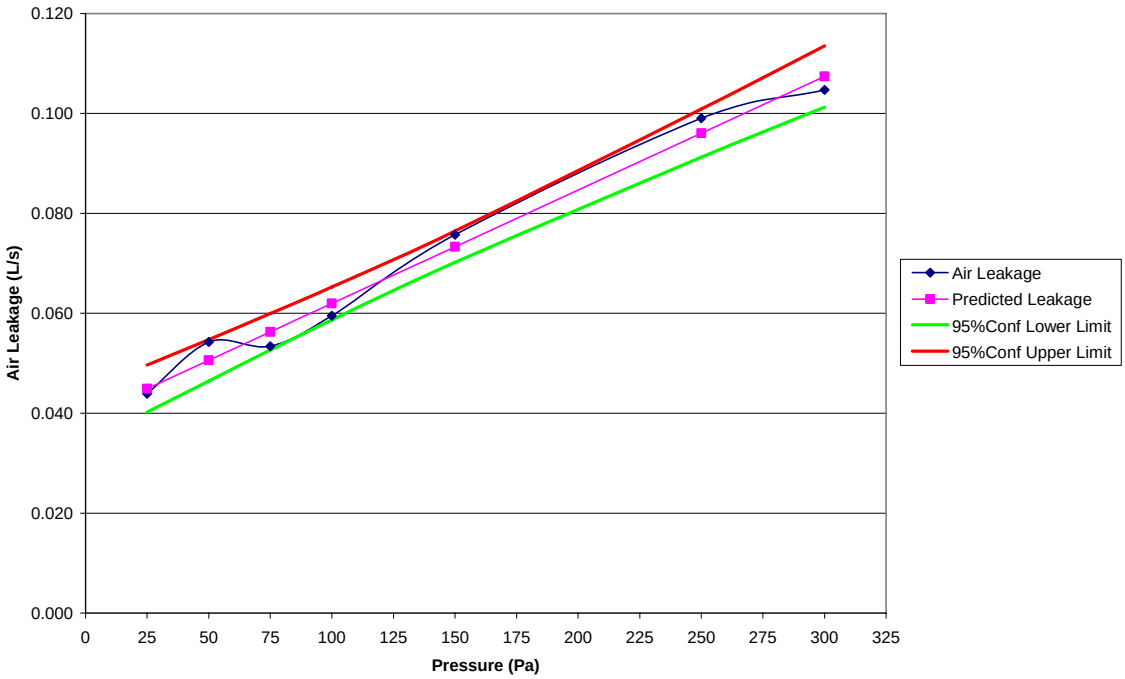
Exfiltration T0313-014



Infiltration T0313-016



Exfiltration T0313-016



Infiltration T0313-014													
Pressure Differential	Total Airflow	Extraneous Leakage	Air Leakage	Leakage Rate	Leakage Rate Test Area	Predicted Leakage	95%Conf Lower Limit	95%Conf Upper Limit	Total Airflow	Extraneous Leakage	Air Leakage	Leakage Rate	Leakage Rate Test Area
P	Qt	Qe	Qs	ql	qa	yf			Qt	Qe	Qs	ql	qa
(Pa)	(L/s)	(L/s)	(L/s)	(L/s*m)	(L/s*m^2)	(L/s)	(L/s)	(L/s)	(cfm)	(cfm)	(cfm)	(cfm/ft)	(cfm/ft^2)
25	0.005	0.000	0.005	No Data	0.001	0.009	0.004	0.014	0.010	0.000	0.010	No Data	0.0002
50	0.013	0.000	0.013	No Data	0.002	0.014	0.010	0.018	0.028	0.000	0.028	No Data	0.0004
75	**0.023**	**0.000**	**0.023**	**No Data**	**0.004**	**0.019**	**0.015**	**0.023**	**0.050**	**0.000**	**0.050**	**No Data**	**0.0008**
100	0.024	0.000	0.024	No Data	0.004	0.024	0.020	0.028	0.051	0.000	0.051	No Data	0.0008
150	0.037	0.000	0.037	No Data	0.006	0.034	0.031	0.037	0.079	0.000	0.079	No Data	0.0012
250	0.054	0.000	0.054	No Data	0.009	0.054	0.049	0.059	0.114	0.000	0.114	No Data	0.0018
300	0.062	0.000	0.062	No Data	0.010	0.064	0.057	0.070	0.131	0.000	0.131	No Data	0.0020

Exfiltration T0313-014													
Pressure Differential	Total Airflow	Extraneous Leakage	Air Leakage	Leakage Rate	Leakage Rate Test Area	Predicted Leakage	95%Conf Lower Limit	95%Conf Upper Limit	Total Airflow	Extraneous Leakage	Air Leakage	Leakage Rate	Leakage Rate Test Area
P	Qt	Qe	Qs	ql	qa	yf			Qt	Qe	Qs	ql	qa
(Pa)	(L/s)	(L/s)	(L/s)	(L/s*m)	(L/s*m^2)	(L/s)	(L/s)	(L/s)	(cfm)	(cfm)	(cfm)	(cfm/ft)	(cfm/ft^2)
25	0.012	0.000	0.012	No Data	0.002	0.010	0.007	0.013	0.025	0.000	0.025	No Data	0.0004
50	0.015	0.000	0.015	No Data	0.003	0.015	0.013	0.018	0.032	0.000	0.032	No Data	0.0005
75	**0.018**	**0.000**	**0.018**	**No Data**	**0.003**	**0.020**	**0.018**	**0.023**	**0.038**	**0.000**	**0.038**	**No Data**	**0.0006**
100	0.025	0.000	0.025	No Data	0.004	0.026	0.024	0.028	0.053	0.000	0.053	No Data	0.0008
150	0.039	0.000	0.039	No Data	0.006	0.036	0.034	0.038	0.082	0.000	0.082	No Data	0.0013
250	0.055	0.000	0.055	No Data	0.009	0.056	0.053	0.059	0.116	0.000	0.116	No Data	0.0018
300	0.067	0.000	0.067	No Data	0.011	0.067	0.063	0.070	0.143	0.000	0.143	No Data	0.0022

Infiltration T0313-016													
Pressure Differential	Total Airflow	Extraneous Leakage	Air Leakage	Leakage Rate	Leakage Rate Test Area	Predicted Leakage	95%Conf Lower Limit	95%Conf Upper Limit	Total Airflow	Extraneous Leakage	Air Leakage	Leakage Rate	Leakage Rate Test Area
P	Qt	Qe	Qs	ql	qa	yf			Qt	Qe	Qs	ql	qa
(Pa)	(L/s)	(L/s)	(L/s)	(L/s*m)	(L/s*m^2)	(L/s)	(L/s)	(L/s)	(cfm)	(cfm)	(cfm)	(cfm/ft)	(cfm/ft^2)
25	0.037	0.000	0.037	No Data	0.006	0.041	0.035	0.047	0.078	0.000	0.078	No Data	0.0012
50	0.054	0.000	0.054	No Data	0.009	0.046	0.041	0.052	0.114	0.000	0.114	No Data	0.0018
75	**0.051**	**0.000**	**0.051**	**No Data**	**0.009**	**0.052**	**0.048**	**0.057**	**0.108**	**0.000**	**0.108**	**No Data**	**0.0017**
100	0.056	0.000	0.056	No Data	0.009	0.058	0.054	0.062	0.119	0.000	0.119	No Data	0.0019
150	0.070	0.000	0.070	No Data	0.012	0.070	0.066	0.074	0.148	0.000	0.148	No Data	0.0023
250	0.091	0.000	0.091	No Data	0.015	0.093	0.087	0.099	0.193	0.000	0.193	No Data	0.0030
300	0.106	0.000	0.106	No Data	0.018	0.105	0.097	0.113	0.226	0.000	0.226	No Data	0.0035

Exfiltration T0313-016													
Pressure Differential	Total Airflow	Extraneous Leakage	Air Leakage	Leakage Rate	Leakage Rate Test Area	Predicted Leakage	95%Conf Lower Limit	95%Conf Upper Limit	Total Airflow	Extraneous Leakage	Air Leakage	Leakage Rate	Leakage Rate Test Area
P	Qt	Qe	Qs	ql	qa	yf			Qt	Qe	Qs	ql	qa
(Pa)	(L/s)	(L/s)	(L/s)	(L/s*m)	(L/s*m^2)	(L/s)	(L/s)	(L/s)	(cfm)	(cfm)	(cfm)	(cfm/ft)	(cfm/ft^2)
25	0.044	0.000	0.044	No Data	0.007	0.045	0.040	0.050	0.093	0.000	0.093	No Data	0.0015
50	0.054	0.000	0.054	No Data	0.009	0.051	0.046	0.055	0.115	0.000	0.115	No Data	0.0018
75	**0.053**	**0.000**	**0.053**	**No Data**	**0.009**	**0.056**	**0.053**	**0.060**	**0.113**	**0.000**	**0.113**	**No Data**	**0.0018**
100	0.059	0.000	0.059	No Data	0.010	0.062	0.059	0.065	0.126	0.000	0.126	No Data	0.0020
150	0.076	0.000	0.076	No Data	0.013	0.073	0.070	0.076	0.161	0.000	0.161	No Data	0.0025
250	0.099	0.000	0.099	No Data	0.017	0.096	0.091	0.101	0.210	0.000	0.210	No Data	0.0033
300	0.105	0.000	0.105	No Data	0.018	0.107	0.101	0.114	0.222	0.000	0.222	No Data	0.0035