



## Moisture Blocker ASTM Results

11MAR19

**Purpose:** The testing of HMI Moisture Blocker was to determine how the treatment of the substrate would affect the bond line of an epoxy bonder, general epoxy coating, vapor transmission reduction and resistance to deicing chemicals. We were directed to assist in guiding HMI in providing official testing that would give Architects, Engineers, Public Works Department managers, maintenance managers and other professionals correct data to support the use of HMI Moisture Blocker with other materials to provide a complete system to solve moisture issues in concrete surfaces.

### American Society for Testing Materials (ASTM)

#### **ASTM-4541 Direct pull off:**

**Why?** To verify Moisture Blocker is not a bond breaker to a standard grade floor epoxy or bonding epoxy to other materials

**Results:** Please review attached document and photos. The results show that Moisture Blocker had no effect on the Bond line on both a standard floor (general use) epoxy or bonder epoxy. The epoxies were able to adhere to the substrate and the samples failed within the structure. Anything above 300 psi on a direct pull off shows the samples are very good samples and this means the bond line was tested under great force in this type of test.

#### **ASTM-C882 Slant Shear:**

**Why?** If you are going to market as a moisture blocker under epoxy floors that will have forklift or vehicle traffic. This test will give data needed to verify adhesion with load points turning and stopping. Also, structural values when bonding repair mortars to existing concrete surfaces.

**Results:** Please review attached document and photos. This test requires the cylinder sample to be made of a 4,000+ psi core. We tested the bond line of wet concrete to cured concrete after treated with Moisture Blocker. The bond line was not affected by the application of Moisture Blocker. For a bonder epoxy to the sample we are looking for anything above 1,500 psi after 14-day cure time. Wet mortar used was HMI Mortar Plus and the tensile strength exceeds the core sample. The samples were maxed to structural failure.

#### **ASTM-E96 Water Vapor Transmission:**

**Why?** To give a value that Moisture Blocker reduces concrete absorption, as well as moisture movement up through the concrete, but will not trap moisture below the surface.

**Results:** Please review attached document. The 4.1% reduction in vapor transmissions indicates that the product allows the concrete to breathe. Results less than 5% reduction are common in the industry.

**ASTM-C672** Scaling Resistance of Concrete Surfaces Exposed to Deicing Chemicals:

**Why?** To show the performance of Moisture Blocker in the market places that use deicing chemicals.

**Results:** Please review the attached document. You will see that the control was completely exposed aggregate versus the treated sample showed minor visual wear.

**ASTM-4541** Direct Pull Off (General Purpose Epoxy and Bonding Epoxy)



Project:	Epoxy/Concrete Bond
Client:	Hargett Materials Inc.
Project No:	1180797C
Date:	10/3/2018

Adhesion (Pull-Off) Strength of epoxy coating to concrete

Test ID/Description	Pull-Off Strength (psi)	Substrate	Site	Failure Mode
Block #1: Moisture Blocker, General Purpose Floor Epoxy Test				
Test 1-1	399	Concrete	Scored	100%[4]
Test 1-2	551			
Average for Block #1	475			
Block #2: Moisture Blocker, Bonding Epoxy				
Test 2-1	430	Concrete	Scored	100%[4]
Test 2-2	538			
Average for Block #2	484			
Average for both tests	480			

Failure Mode

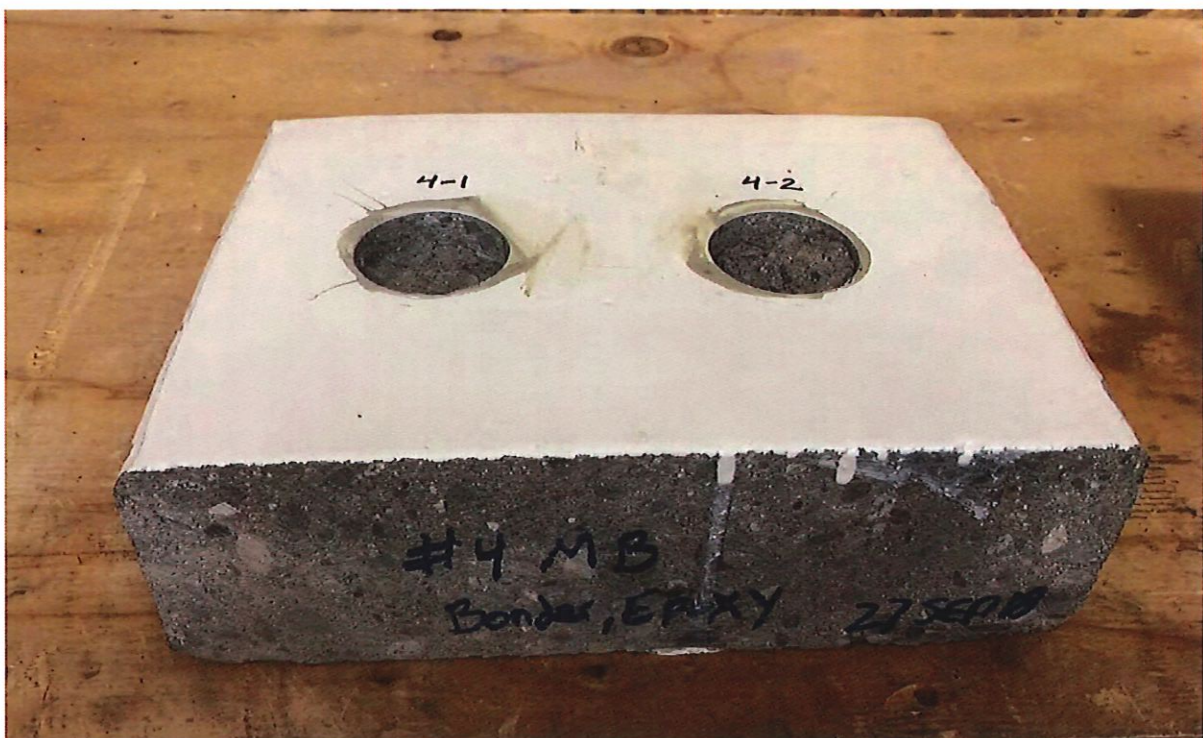
- [1] Adhesive failure of dolly glue (Simpson Set 22) to epoxy
- [2] Adhesive failure of epoxy to concrete
- [3] Cohesive failure of epoxy
- [4] Cohesive failure of concrete



ASTM-4541 (General Purpose Epoxy)



ASTM-4541 (Bonder Epoxy)



## ASTM-C882 (Slant Shear)

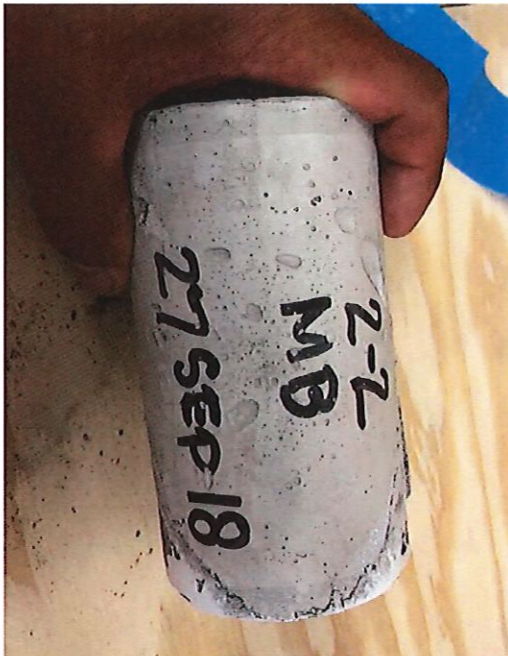


ASTM C 882, "Standard Test Method for Bond Strength of Epoxy-Resin Systems Used with Concrete by Slant Shear"

Area of an Ellipse:  $A = \pi \cdot (a/2) \cdot (b/2)$

ID	Condition	Cast Date	Test Date	Age (days)	Slant Face Condition	Approximate Mortar Contact Area (%)	Length <sub>a</sub> (in.)	Length <sub>b</sub> (in.)	Area (in. <sup>2</sup> )	Load (lb)	Strength (psi)
2-1	With MB	9/27/2018	10/11/2018	14	Sawn	90	5.78	3.02	13.71	31280	2282
2-2	With MB	9/27/2018	10/11/2018	14	Sawn	100	5.70	3.02	13.52	32750	2422
2-3	With MB	9/27/2018	10/11/2018	14	Sawn	93	5.91	3.02	14.02	34950	2493
Average	With MB	9/27/2018	10/11/2018	14	Sawn						2399

10/26/2018 1180797C ASTM C882 Slant Shear (2)



## **HMI Moisture Blocker Direct Pull-Off ASTM Results**

**23AUG19**

**Purpose:** The testing of HMI Moisture Blocker was to determine how the treatment of the substrate would affect the bond line of latex adhesive, acrylic adhesive and a concrete patch. We were directed to assist in guiding HMI in providing official testing that would give Architects, Engineers, Public Works Department managers, maintenance managers and contractors data to support HMI Moisture blocker not being a bond breaker to these types of materials.

**American Society for Testing Materials (ASTM)**

**ASTM-4541** Direct pull off:

**Why?** To verify Moisture Blocker is not a bond breaker to a latex adhesive, vinyl adhesive and concrete patch.

**Results:** Please review below the documents and photos. The results show that Moisture Blocker had no effect on the Bond line on all three products: latex adhesive, vinyl adhesive and concrete patch.





## Adhesion (pull-off) Testing

### Control Block

Specimen No.	Block	Material	Pull-Off Strength (psi)	Failure Mode
1	Control	Taylor 710	60	100%[3]
2	Control	Taylor 710	53	100%[3]
3	Control	Taylor 710	52	100%[3]
Average			55	

### Control Block

4	Control	Ardex CP	251	100%[3]
5	Control	Ardex CP	201	100%[3]
6	Control	Ardex CP	235	100%[3]
Average			229	

### Control Block

7	Control	Stix 2230	308	100%[3]
8	Control	Stix 2230	307	100%[3]
9	Control	Stix 2230	307	100%[3]
Average			307	

### Treated Block 1

10	Treated	Taylor 710	88	80%[1], 20%[3]
11	Treated	Taylor 710	82	90%[1], 10%[3]
12	Treated	Taylor 710	84	90%[1], 10%[3]
Average			85	

### Treated Block 1

13	Treated	Ardex CP	233	100%[2]
14	Treated	Ardex CP	176	90%[3], 10%[2]
15	Treated	Ardex CP	196	20%[3], 80%[2]
Average			202	

### Treated Block 1

16	Treated	Stix 2230	310	100%[3]
17	Treated	Stix 2230	311	100%[3]
18	Treated	Stix 2230	309	100%[3]
Average			310	

### Treated Block 2

19	Treated	Taylor 710	72	100%[3]
20	Treated	Taylor 710	60	100%[3]
21	Treated	Taylor 710	73	100%[3]
Average			68	

### Treated Block 2

22	Treated	Ardex CP	224	50%[3], 50%[2]
23	Treated	Ardex CP	164	100%[3]
24	Treated	Ardex CP	242	20%[3], 80%[2]
Average			210	

### Treated Block 2

25	Treated	Stix 2230	314	100%[3]
26	Treated	Stix 2230	40	100%[1]
27	Treated	Stix 2230	316	95%[3], 5%[2]
Average			315* omitting Test #26	

#### Failure Modes

- [1] Glue failure - dolly epoxy to coating surface
- [2] Cohesive failure of Coating
- [3] Adhesive failure of coating to substrate
- [4] Cohesive failure of substrate