



Feb. 26, 2019

SK Commercial Construction
4015 E Veterans Memorial Blvd
Killeen, TX 76543

Attn: Mr. Suk Kim-Whitty

Re: Pull Test

Dear Mr. Kim-Whitty:

Attached are the results of the pull tests performed on January 28, 2019. The tests consisted of fourteen MEP Pedestal plates, adhered to the base material of epoxy coated concrete, with Hilti HIT-RE 500 V3 and Hilti HIT-RE 100 adhesives. This application is outside the scope of Hilti's published test data. These adhesives are typically injected into holes in concrete for adhering thread rods or rebar to the concrete.

You and your team provided me the following information about the plate preparation, surface preparation, and installation of the adhesive. Hilti not was present during these steps.

- The MEP Pedestals plates are solid composite vibration isolation plates with some texturing on the bottom.
- Provided as an element to pull, a ½" threaded rod was welded to the plates.
- The plates were painted and had a gloss finish.
- Prior to the Hilti adhesive being applied, the bottom of the MEP Pedestal plates was wiped with isopropyl alcohol.
- The surface was concrete with an epoxy coating, specifically the TNE MEC S237-33GRA POWER-TREAD GRAY-ANSI 61.
 - Prior to the epoxy coating being added, a subset of the base material concrete was polished.
 - The epoxy coating varied in thickness.
- After the epoxy coating had cured and prior to the application of the Hilti adhesive, the epoxy coated concrete was prepped with isopropyl alcohol and an abrasive to sand the epoxy coating to provide a rougher surface for better adhesion.
- The Hilti adhesive was applied to the bottom of the plates in an S pattern, horizontal and vertical, resulting in a cross hatched pattern with varying quantity of Hilti adhesive.
- The Hilti adhesive was used to adhere the plates to the surface on January 25th and 27th. The temperature during installation, cure time, and testing ranged from 50 deg. F and 75 deg. F.

The tests were conducted using the Mark V tester. Load was applied until visual fracture between the materials or until the threaded rod/plate system would no longer accept load. The time duration for the load application varied between plates from 30 second to 4 minutes. It was observed that the two materials where the fracture occurred was mostly between the epoxy coating (grey color) and the concrete. Please refer to the photos for reference. The Hilti RE-500 V3 is a bright red color. The Hilti RE-100 is a dark purple color. A steel bridge, provided by your team was used for the 8" wide plates, refer to Figure 4. Should you have any questions please feel free to contact me directly at the number listed below.

We appreciate your business.

Sincerely,

Kathleen Olave, PE (TX)
 Field Engineer I Central & South Texas
 7250 Dallas Parkway, Suite 1000 | Plano, TX 75024
 M 806-252-5498
 E Kathleen.olave@hilti.com

Test #	Hilti Adhesive	MEP Pedestal Plate Size	Load	Polished or Unpolished Concrete prior to epoxy coating
1	RE-500 V3	8" x 8"	5000lbs	Polished
2	RE-100	3" x 16"	1800lbs	Polished
3	RE-100	3" x 20"	2000lbs	Polished
4	RE-100	3" x 5 1/2"	1300lbs	Polished
5	RE-500 V3	3" x 24"	2800lbs	Polished
6	RE-100	8" x 14"	3500lbs	Polished
7	RE-500 V3	3" x 12"	1500lbs	Polished
8	RE-100	3" x 5 1/2"	2850lbs	Unpolished
9	RE-100	3" x 20"	2500lbs	Unpolished
10	RE-100	3" x 12"	2650lbs	Unpolished
11	RE-100	8" x 14"	4700lbs	Unpolished
12	RE-500 V3	8" x 8"	4600lbs	Unpolished
13	RE-500 V3	3" x 16"	2000lbs	Unpolished
14	RE-500 V3	3" x 24"	3100lbs	Unpolished

Important Information
<p>General</p> <p>On-site tests of adhesives do not: evaluate suitability or adequacy of the adhesive or fixture design; verify proper installation or compliance with approval requirements; establish ultimate capacity of tested adhesive or fixture; or address performance of untested fasteners. Testing is performed as a service by Hilti in support of its products; and is intended solely to provide information on the general suitability of the base material and/or assist in identification of gross installation errors of tested adhesives – it does not imply an agreement in or endorsement of the suitability or propriety of the test or the application, and is not intended for use in satisfying any project or regulatory requirements for on-site inspection. Refer to the Hilti Product Technical Guide Vol. 2 Anchor Fastening for more information on fastener design and performance. Proper installation of adhesives is critical – training is available on request – contact Hilti for information.</p>
<p>Execution of on-site tests</p> <p>Test results only indicate the tested adhesives held the stated load for the time applied respectively the applicable failure values. The location and number of tests as well as the loading parameters and the adhesives to be tested have been carried out according to the test conditions determined by the Customer. Hilti does not assess whether these test conditions are suitable for evaluation. Due to the possible variability of the base material and</p>

the various loading situations, the test results may not be representative of other installations. On-site tests may damage the structure – Hilti is not responsible for the damage, or its restoration.

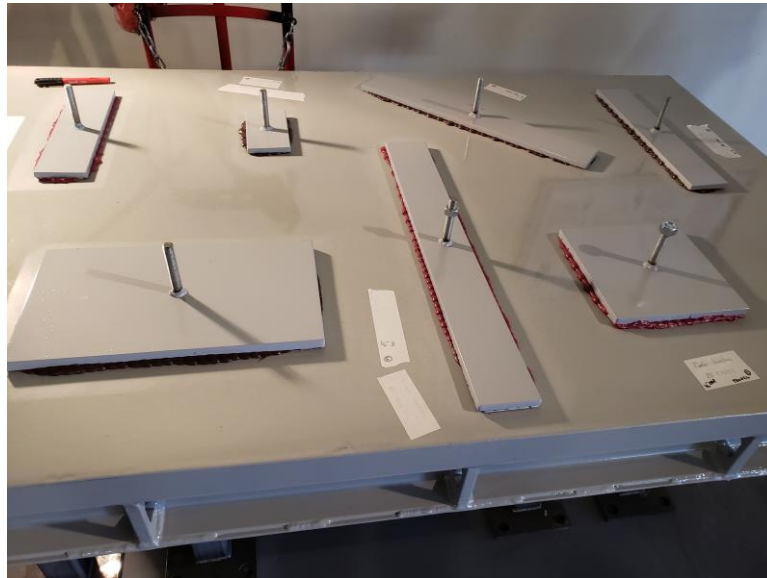


Figure 1: Set-up for Test # 1-7



Figure 2: Before Test #1



Figure 3: After Test #1



Figure 4: Hilti Mark 5 tester and Steel Bridge

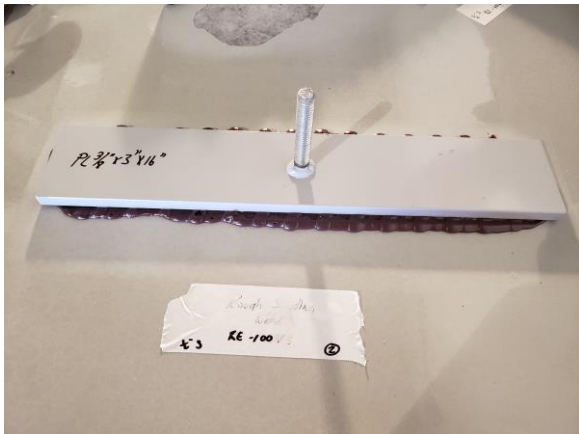


Figure 5: Before Test #2



Figure 6: After Test #2

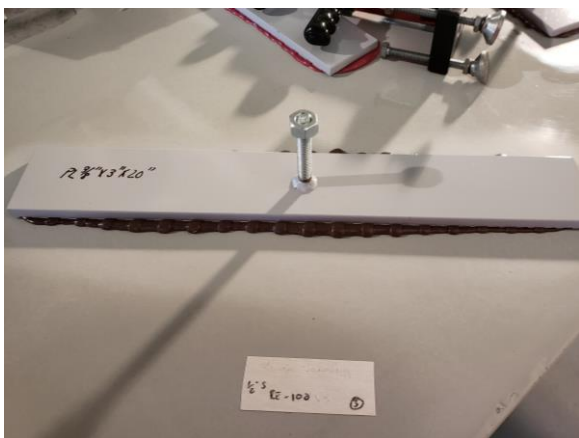


Figure 7: Before Test #3



Figure 8: After Test #3



Figure 9: Before Test #4



Figure 10: After Test #4



Figure 11: Before Test #5



Figure 12: After Test #5

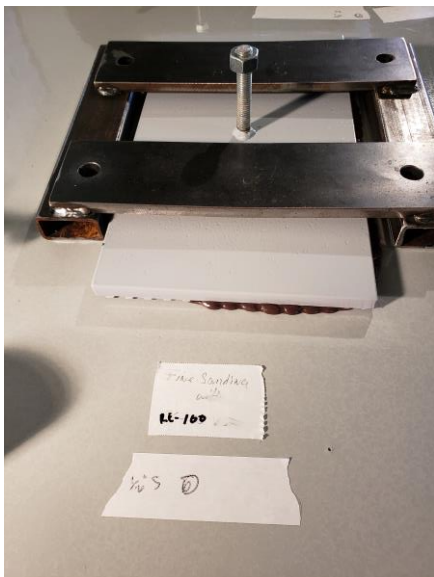


Figure 13: Before Test #6

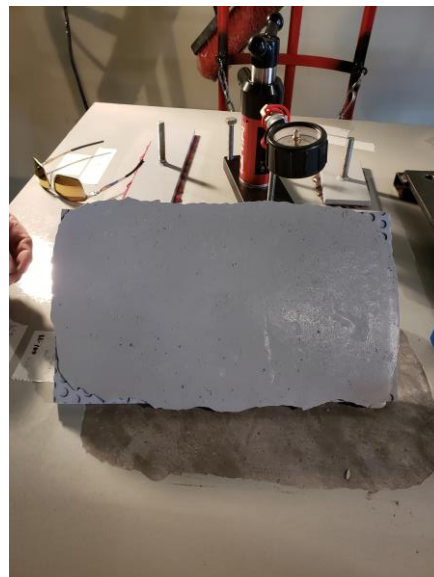


Figure 14: After Test #6

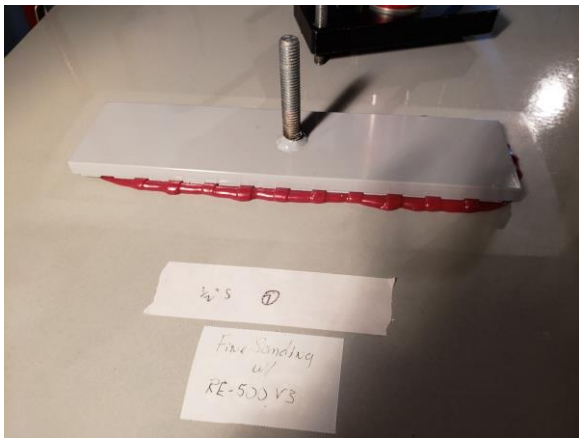


Figure 15: Before Test #7

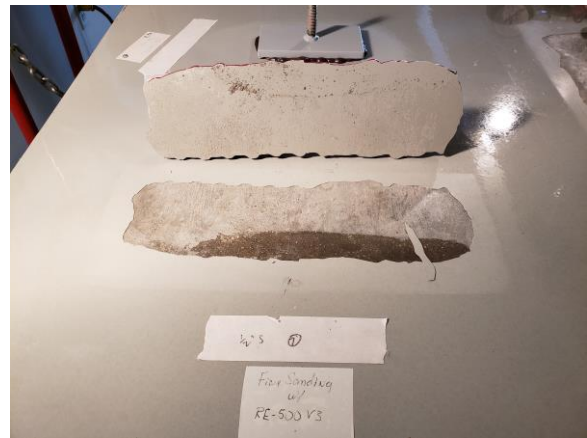


Figure 16: After Test #7

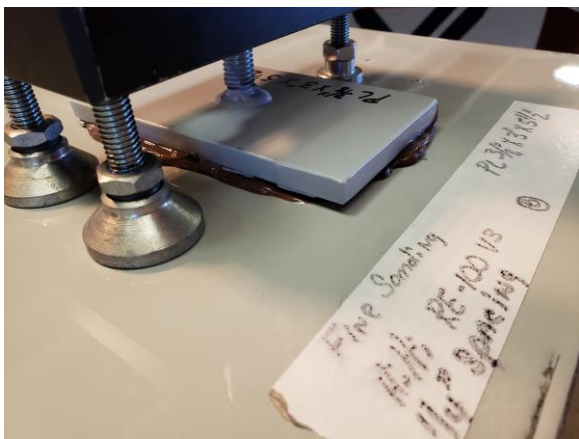


Figure 17: Before Test #8

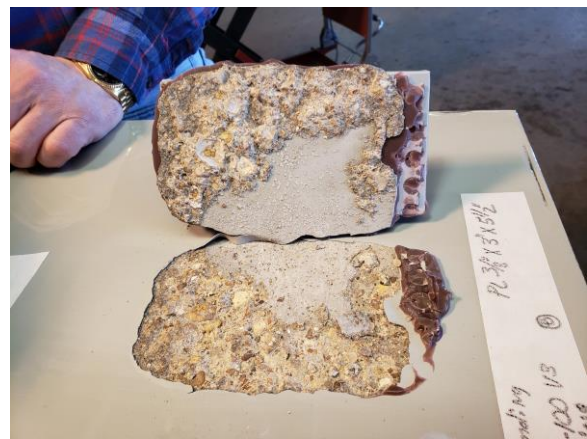


Figure 18: After Test #8



Figure 19: Before Test #9



Figure 20: After Test #9

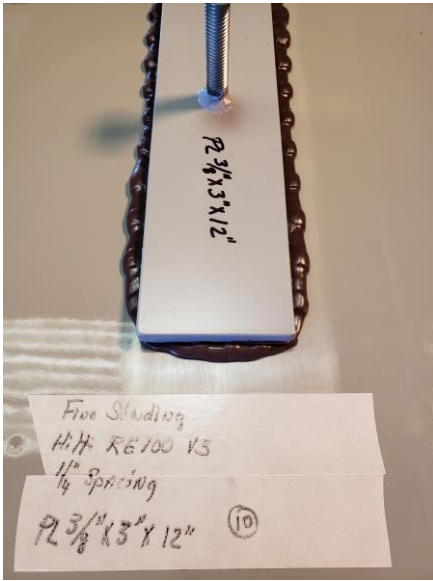


Figure 21: Before Test #10



Figure 22: After Test #10



Figure 23: Before Test #11



Figure 24: After Test #11

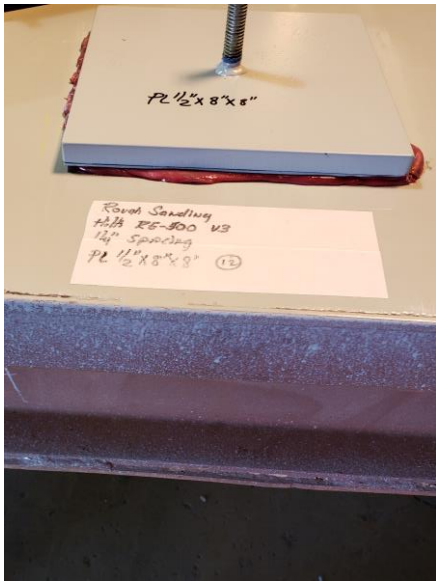


Figure 25: Before Test #12



Figure 26: After Test #12



Figure 27: Before Test #13



Figure 28: After Test #13

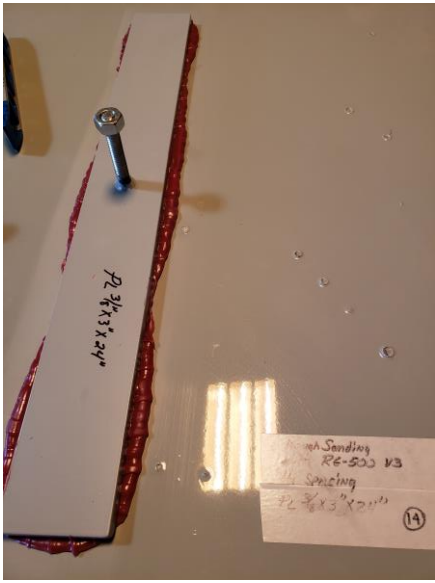


Figure 29: Before Test #14



Figure 30: After Test #14