



Adhesion Pulley & Brick Testing White Paper

Vincent T. Vu, Product Development Chemist

June 14, 2016

Purpose:

Test adhesion properties of 4195 and three local competitors along with a big box DIY competitor product in pulley adhesion on a grinded concrete surface. Perform brick adhesion testing on various concrete surfaces in hopes of replicating a customer who had a test result that tore up sections of concrete floor. Perform the same test on a specialty garage flooring competitor and a big box competitor

Method:

A total of five different moisture vapor blocking primers were tested on a freshly prepared concrete floor in the Versatile Building Products warehouse. The products were allowed to cure for a sufficient amount of time prior to testing. The brick test consisted of three different primers.

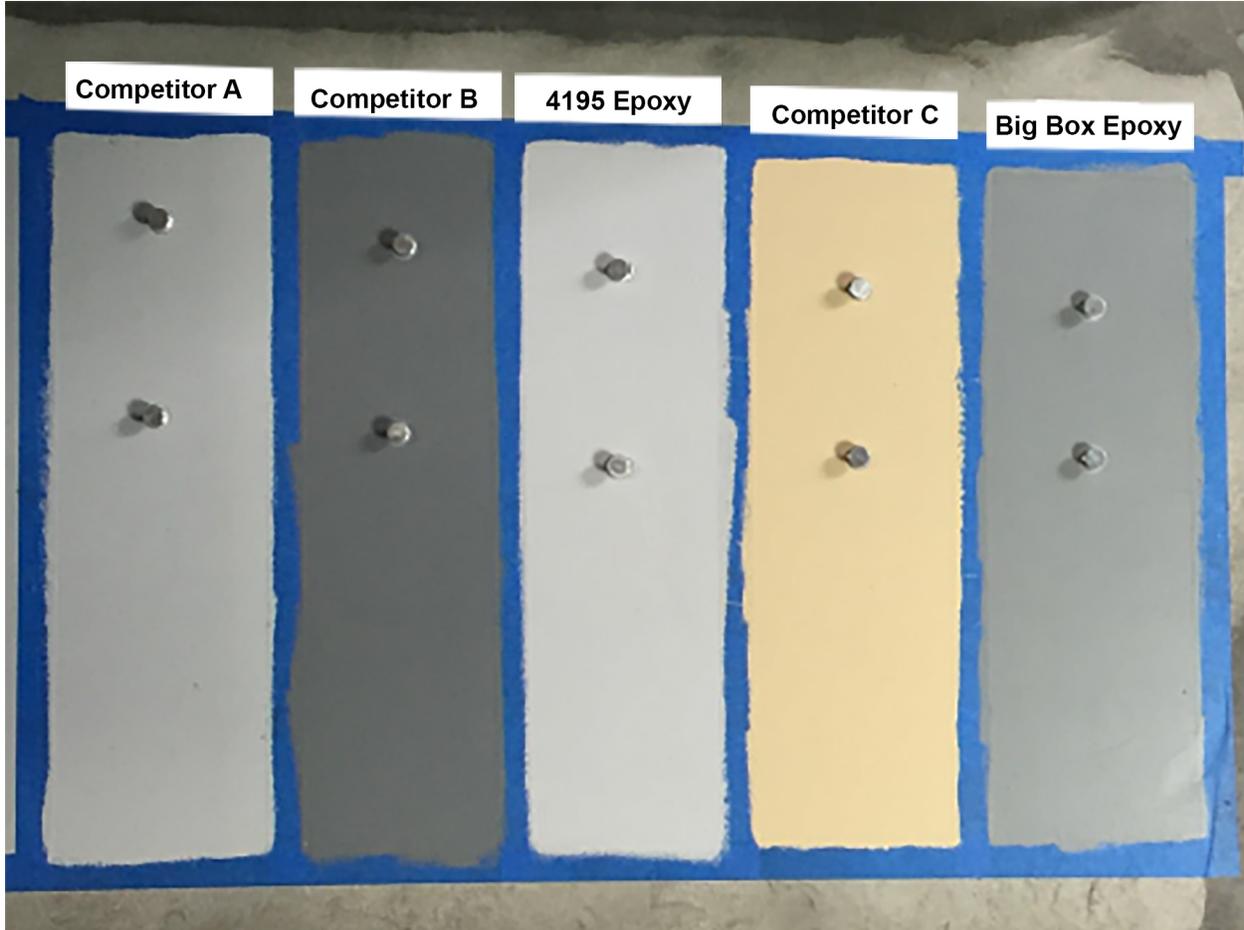
Materials:

Dewalt grinder with concrete grinding blade, Large dust collecting vacuum, Elcometer 106 adhesion testing kit, VBP 4195 Direct To Concrete Epoxy Kit, Competitor A Epoxy Kit, Competitor B Epoxy Kit, Competitor C Epoxy Kit, Competitor Big Box Epoxy Kit, concrete, mixing materials, and application materials.

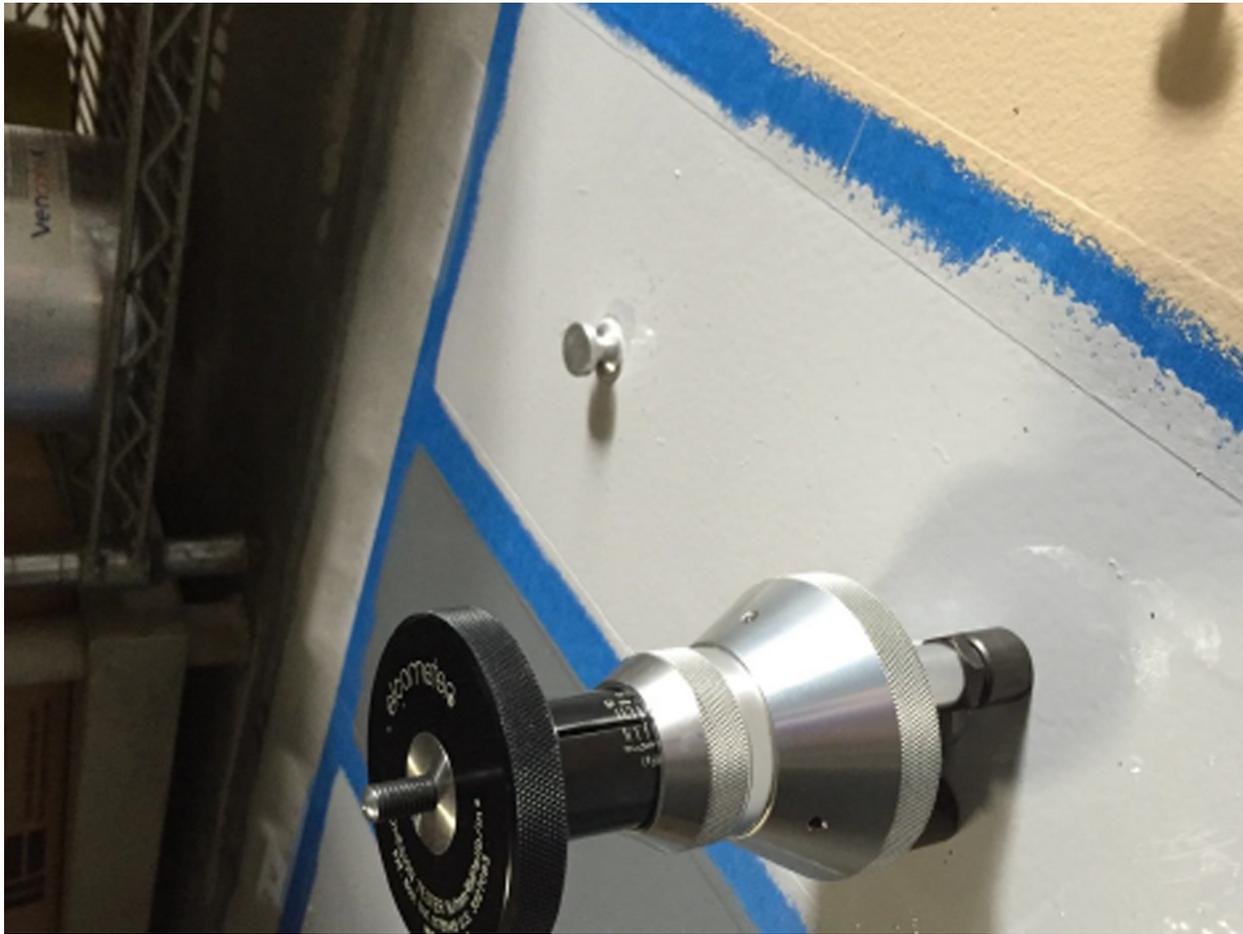
Experiment:

Adhesion Pulley Test

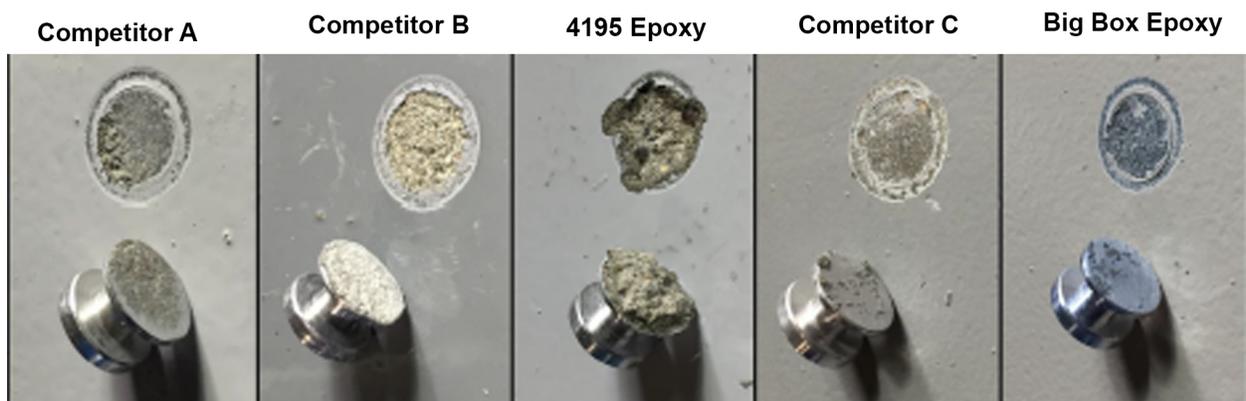
A total of five different epoxy primer/sealers were tested in the adhesion pulley test. Each component was thoroughly mixed for several minutes to ensure that there was no settling of pigments or additives. The resin and hardener components were measured out according to the manufacturer volumetric ratios and mixed for several minutes. A first coat was applied over a taped area on the freshly prepared and cleaned concrete floor with the use of a four inch wide 3/8 inch nap roller. The product was allowed to cure for four hours before a second coat was applied. Once the second coat was applied, two Elcometer adhesion pulleys were placed on the wet product (*img 1*). The coated area was allowed to cure for ten days at ambient temperature during mid-May with no rain or high humidity during the curing process. The surrounding coating was cut with a pulley cutter to ensure that the adhesion results were correct. The Elcometer adhesion puller was attached onto each pulley (*img 2*) and the adhesions results were recorded (*table 1*). Images of the results were photographed (*img 3*).



Img 1. Elcometer adhesion pulleys were attached to the coating and the coating was allowed to dry to a full cure at ambient temperature.



Img 2. Elcometer adhesion puller was attached to adhesion pulleys and adhesion tests were performed.



Img 3. Adhesion results. 4195 was most effective at adhering to the concrete floor. 4195 also removed the most concrete from the floor during the adhesion pulley test. This proves that the 4195 is far superior at wicking/anchoring itself into the concrete surface compared to the other competitor coatings.

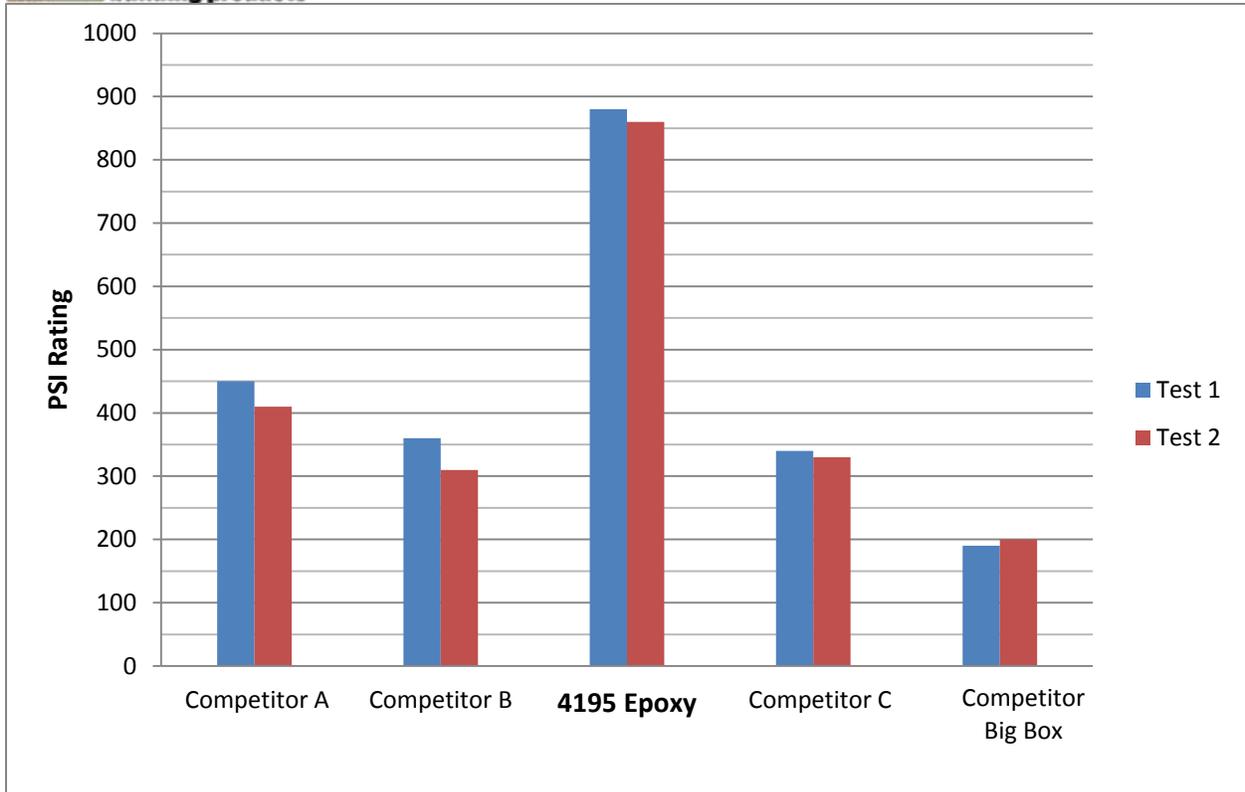


Table 1. Bar graph of adhesion values for various floor coating primers show that 4195 has more than two times the adhesion of most of the competitive products sold into the garage flooring market. This will result in less failures

Brick Testing

The 4195 was mixed according to the manufacturer recommendations and applied over three separate areas (concrete tiles, VBP warehouse floor, and a concrete area behind the VBP building). A second coat was applied after four hours, and a concrete brick was placed on top of the coated surface. The coating was allowed to cure for ten days at ambient temperature during mid-May with no rain or high humidity during the curing process. Once cured, a block of wood was used to distribute force on the brick while a rubber mallet was used for impact. The results were photographed (img 4 and img 5), and the best resulting surface (concrete patio stone) was used for testing with competitor products. The two competitor products chosen were Competitor B (Professional Garage Flooring Epoxy) and a Competitor Big Box (DIY Epoxy). The same test was performed for the Competitor Big Box product and the results were photographed (img 6).

Results:



Img 4. Brick test results for behind VBP building (left) and VBP warehouse floor (right). The bricks broke on both tests due to the fact that the brick was the weakest product. The coating did not fail, and the concrete floor did not fail.



Img 5. VBP 4195 brick test. The coating adhered extremely well to the concrete tile. It took 3 forceful impacts with a mallet to separate the brick from the concrete tile. The coating tore off large sections of concrete due to the wicking technology of 4195.



Img 6. Competitor Big Box Floor Coating brick test. The brick came off extremely easily. The coating failed and the concrete tile was left intact. The brick was also completely intact. The coating failed to adhere the brick and the concrete tile.



Conclusion:

The 4195 was superior in adhesion testing compared to the local and big box competitors. The adhesion values and photographic proof during the adhesion pulley test show definitive proof that 4195 bonds stronger to concrete compared to the other products in this testing. The brick test results are strictly visual. The competitor B was able to tear concrete out of the concrete tile, but it was relatively easy to knock the brick off of the concrete tile. The 4195 took 3 attempts of forceful impact before the brick broke off of the concrete tile, and the photographed result showed that the 4195 was able to tear off a large piece of the concrete tile. The big box competitor (DIY Epoxy) was the weakest coating in both the adhesion pulley and brick testing as it failed to remove any concrete.