

## TEST DATA REPORT

### PROJECT SUMMARY

REPORT DATE	PROJECT NAME	PREPARED BY
8/10/2019	Universal Base Bonded to SBS Modified Bitumen	Lisa Mulder

### PROJECT SUMMARY

Concrete decks and modified bitumen roofs are common in Puerto Rico and much of the south/southwestern US. Mechanically fastening roof top supports requires extra care to seal up penetrations. The purpose of this study is to evaluate the uplift (direct tensile) of bonding the Knuckle Head Universal Base directly to fully adhered modified bitumen on concrete blocks would provide enough holding power to secure the base to the roof membrane without mechanical fasteners/anchors.

#### Prepare the Substrates:

The test is to be conducted using SBS cap sheet and SBS base sheet 1) torched down and 2) bonded with SBS Sheet Bonding Adhesive using a 3/8" notch trowel applied to 8" x 16" x 3" medium weight concrete block. Apply 20 psi pressure to the SBS sheets to ensure an even application of adhesive or asphalt. Allow to cure and condition for 7 days at indoor ambient conditions. Repeat this for 3 test specimens of each, torch down, and SBS Adhesive.

#### Prepare the Test Specimens:

With a stiff brush, remove any loose granules from the adhered cap sheet to prepare it for bonding. Using a 3/8" notched trowel, apply Green Link Adhesive/Sealant over the entire bottom surface of the Universal Base, press the adhesive covered base into the SBS cap sheet, then apply 20 psi to the base to set it into the cap sheet. Allow adhesive to cure 14 days, 70°F, ambient humidity (~45% RH).

### TEST RESULTS

TEST	PEAK STRESS (LBS) AVERAGE	STRAIN @ BREAK % AVERAGE	MODULUS, AVERAGE (PSI)	NOTES
Universal Base 7" diameter; 38.5 sq.in.				

Torched Down SBS	1027.50	44.70	36262.02	Failure within the bond of the base sheet either to the concrete or the cap sheet
SBS Sheet Bonding Adhesive	975.90	33.24	52568.54	Failure within the bond of the base sheet either to the concrete or the cap sheet
Average of both tests	1001.7 Lbs	38.97%	44,415.38 psi	

## CONCLUSIONS/RECOMMENDATIONS

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Bonding the Universal base to modified SBS bitumen, fully adhered to concrete provides sufficient strength to hold most pipes, up to 8-inches of elevation in place on the roof, as well as most supports for low profile equipment up to 48" in height, especially equipment over 200 lbs. The mode of failure in every case was at the bond, or glue line within or between the modified bitumen and/or the concrete. There was no failure between the adhesive bond between the base and the granulated cap sheet.

It is important to note that other, underlying roof components, such as recovery board or insulation will be the weak point of the overall assembly. Failure of any of the underlying components is expected to yield much lower results than what was tested here.