

# Technical Bulletin

No. 2001

## **Guidelines for Fastener Pull Tests**

Feb 2020

Mule-Hide requires fastener pull tests on various deck types that routinely fail to meet our minimum warranty requirements. Below is a list of the most common deck types that require pull out testing for warranty consideration. The fastener pull testing must be received before any warranty application can be reviewed.

- Lightweight Insulating Concrete
- Gypsum (plank or poured in place)
- Cementitious Wood Fiber (Tectum)
- Metal Roof Panels (Standing seam, corrugated and other profiles)
- Oriented Strand Board (OSB)
- Other deck type may apply. Contact Mule-Hide Technical Department with any questions.

Typically, these tests are performed by an independent third party such as a fastener manufacturer, however in unusual cases the project timetable requires an alternative solution. When this occurs it is possible to perform and submit pull tests to Mule-Hide to verify the deck is an acceptable substrate for a Mule-Hide roofing system, as long as this procedure is followed and proper documentation is provided. Until the report is submitted, reviewed and results deemed sufficient to install the proposed system, it is not advisable to begin insulation or membrane installation. (This procedure is based on ANSI/SPRI FX-1 2016 Standard Field Test Procedure for Determining the Withdrawal Resistance of Roofing Fasteners)

## **Equipment Requirements**

- 1. Use a pullout tester with either a hydraulic or electronic load cell. The gauge shall display values in lbf (kN) or psi (kPa). Conversion formulas are provided on Form B (Copy attached). During testing, the values obtained shall fall within the working range of the gauge.
- 2. The load gauge shall have a dated calibration certificate showing the calibrated values for the full range of the load gauge. The gauge shall be accurate to +/- 5% of the reading. Calibration shall be performed to a standard that is traceable to a nationally recognized source. The load gauge shall be calibrated every 12 months or sooner if it is suspected that the gauge is out of calibration.

#### Procedure

- 1. Complete all the project information and testing criteria on form A (Copy attached)
- 2. Remove any roofing materials (i.e. roofing membrane, existing insulation) before the test is performed. Use of a core cutter has been found to be an effective method of removing materials above the deck before performing the pull tests.
- 3. It is beneficial to bring a variety of fastener options for the deck type being tested in case a specific fastener does not meet the minimum pull resistance criteria for the system attachment type desired.
- 4. The fastener shall be installed using the same method and tools as will be used during actual construction (i.e. depth of installation, pre-drilled hole diameter, proper installation tools).
- 5. Refer to Mule-Hide's Fastener Guidelines for specifics related to minimum embedment or protrusion (this is defined for each deck type) for the specific fastener being tested.
- 6. The fastener shall be pulled out perpendicular to the deck.
- 7. Record the results of all pullout tests and a photograph of the tester value on Form B.
- 8. Perform a minimum of 10 pullouts for up to 50,000 ft2 (500 squares), and 5 additional pullouts for each additional 50,000 ft2 (500 squares) or portion thereof on each project. Perform the pullouts in various areas of the roof including corners, perimeter and field to provide a representative sampling of the roof area. 50% of the tests shall be performed in the corners and perimeter areas.
- 9. When testing a single building, each roof section with a different elevation or deck type are different test areas and shall be tested and reported separately.
- 10. Prepare a roof plan (on the last page of Form B) to identify the location of each pullout.
- 11. The roof plan shall be marked with the corresponding test number of each pullout test as recorded on Form B. The roof plan need not be to scale.
- 12. Record all pullout values from all tests performed.

## Form A Pull Out Test Report

(Refer to the **Standard Field Test Procedure for Determining the Withdrawal Resistance of Roofing Fasteners** for full documentation)

## Report results on reverse side.

Location:       / / Anbient temperature: ' Select one: Dif _ kN         Max. cap. of tester:       Sq. t       Select one: Dif _ kN         Max. cap. of tester:       Select one: Dif _ kN         Max. cap. of tester:       / / Number of pulls recorded on Form 8:         Fastener tested:       / / Fastener manufacturer:         Fastener tested:       / Restormanufacturer:         Project type (select one):       Det / Thickness:         Steel       Gauge:         Structural concrete       Thickness:         Structural concrete       Thickness:         Orgonaling concret       Thickness:         Select one:       Select one:       Proce         Orgonaling concret       Thickness:       Select one:       Select one:       Proce         Orgonaling concret       Thickness:       Select one:       Select one:       Select one:       Select one:       Se	Job name:						
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Max. cap. of tester:       Select one: □ bf □ kN         Date of last calibration:       /       Number of pulls recorded on Form B:         Fastener tested:       Fastener mufacturer:         Test ture:       Gauge:       Select one: □ Poured in place □ Precast         □ Insulating concret       Thickness:       Select one: □ Poured in place □ Precast         □ Gypsum       Thickness:       Select one: □ Poured in place □ Precast         □ Problement or protrusion:       Thickness:       Select one: □ OSB □ Plywood □ Plank         □ fiberglass       Thickness:       Select one: □ OSB □ Plywood □ Plank         □ Other:       Thickness:       Select one: □ OSB □ Plywood □ Plank	Roof area: Sq. ft			Tester mfg:			
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Drill bit diameter, where aplicable:         Optional Information         Test time:       Building height:       Thickness of existing roof assembly:         New system manufacturer:       Thickness of existing roof assembly:         Roof cover type (select on):       Modified bitumen <ul> <li>Mechanically attached single-ply</li> <li>Modified bitumen</li> <li>Bailasted single-ply</li> <li>Other:</li> <li>Other:</li> </ul> New insulation:       Thickness:         Type:       Thickness:	Embedment or protrusion:						
Optional Information         Test time:       Building height:       Thickness of existing roof assembly:         New system manufacturer:       Meen system manufacturer:       Meen system manufacturer:         Roof cover type (select one):       Meen system manufacturer:       Meen system manufacturer:         Mechanically attached single-ply       Modified bitumen       Built-up roofing         Ballasted single-ply       Other:       Other:         New insulation:       Thickness:       Thickness:	Drill bit diameter, where ap	plicable:					
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Ballasted single-ply       Built-up roofing         Adhered single-ply       Other:	Mechanically attached single-ply			Modified bitumen			
Adhered single-ply Other:	Ballasted single-ply			Built-up roofing			
New insulation: Type: Thickness:	Adhered single-ply			Other:	□ Other:		
	New insulation:		Thickness				

## Form B Pull Out Test Report

#### Report all test results and units of measure.

## **Conversion formulas**

 $lbf \times .00448222 = kN \times 224.8089431 = lbf$   $psi \times 6.895 = kPa \times 0.145 = psi$ 

1.	6.	11.	16.
2.	7.	12.	17.
3.	8.	13.	18.
4.	9.	14.	19.
5.	10.	15.	20.

## Pullout Results of Additional Tests Performed 4.5.

1.	6.	11.	16.
2.	7.	12.	17.
3.	8.	13.	18.
4.	9.	14.	19.
5.	10.	15.	20.

Deviation from standard procedure authorized by:

#### Reason for deviation:

Roof plan not to scale. Identify where the pullouts were performed with corresponding test number.

## Comments

**Disclaimer:** Manufacturer's installation requirements shall be followed when using any of the tested fasteners. Neither the technician performing the pullout tests not his/her company is responsible for the waterproofing integrity of the repairs. This test report does not certify the structural integrity of the roof deck.