Section 7 – Waterproofing Roofing Standards
Purpose
The purpose of this document is to establish the roofing standards for the University of Texas at El Paso. The University of Texas at El Paso has established these standards to decrease life cycle costing, reduce maintenance and ensure the bidding contractors submit competitive bids for apples-to-apples bidding.

Roofing Assemblies
The following is a good, better, best scenario of favored roofing assemblies by the University. Please use the performance requirements as established by ASTM to meet the University’s needs.

Good
- Field - Four (4) Type VI Fiberglass Felts and Fibered Aluminum Coating
- Flashing System - Underlayment and Flashing Membrane
- Warranty 20 NDL Year Warranty

The Standard BUR is not a recommended roofing assembly with a high R-Value. The increase in insulation requires an increase in performance of membrane. The increase in R-Value prevents heat from entering the building. As a result, the heat is isolated at the top of the roofing assembly. The low performing standard BUR membrane will under perform in the hot El Paso sun.

Please see article, “Thermal Shock in Built – Roofing”

Recommendation: Decrease the R-Value. Or specify a Type III modified membrane.

Better
- Field – Two (2) Type IV Fiberglass Felts and Modified Membrane
- Flashing System – Underlayment and Flashing Membrane
- Warranty – 25 Year NDL Warranty

Recommendation: Great the way it is designed.

Best
- Field One (1) Base Sheet, Two (2) Type IV Fiberglass Felts, Modified Membrane, Flood Coat and Gravel
- Flashing System – Underlayment and Flashing Membrane
- Warranty – 30 Year Partnership Warranty

Recommendation: The Base Sheet is not needed.
# ASTM Standards

The following standards are the minimum standard requirements for the roofing assemblies and coverage rates.

<table>
<thead>
<tr>
<th>Description</th>
<th>ASTM Performance Standards</th>
<th>Minimum Coverages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insulation</td>
<td>Minimum R-Value 19.0 (Polyisocyanurate is preferred over Extruded Polystyrene)</td>
<td>FM 1-90, 3.0 Sq. Ft.</td>
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<tr>
<td></td>
<td><strong>Type and Thickness</strong></td>
<td>1 fastener per 3 sq. ft. works out to 11 screws per 4 x 8 insulation board.</td>
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<tr>
<td></td>
<td><strong>R-Value</strong></td>
<td></td>
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<tr>
<td></td>
<td>3” Polyisocyanurate</td>
<td>18.00</td>
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<tr>
<td></td>
<td>½” Wood Fiber</td>
<td>1.39</td>
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<tr>
<td></td>
<td>BUR Membrane</td>
<td>0.24</td>
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<tr>
<td></td>
<td>3.0” polyisocyanurate fastened to deck with 0.5” perlite in hot asphalt.</td>
<td></td>
</tr>
<tr>
<td>Base Sheets</td>
<td>ASTM D4601, Type II asphalt coated fiberglass base sheet.</td>
<td></td>
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<tr>
<td>Glass Felts Type IV</td>
<td>ASTM D2178, Type IV glass fiber roofing felt bonded to the prepared substrate with hot Type IV bitumen.</td>
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<tr>
<td>Glass Felts Type VI</td>
<td>ASTM D2178, Type VI glass fiber roofing felt bonded to prepared substrate with hot bitumen.</td>
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</tr>
<tr>
<td>Fibered Aluminum Coating</td>
<td>Fibered aluminum roof coating having the following characteristics:</td>
<td>2 Gallons / Square</td>
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<td></td>
<td><strong>Flash Point</strong> 100°F (38°C) min.</td>
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<td></td>
<td><strong>Weight/Gallon</strong> 8.2 lbs./gal. (1.0 g/cm³)</td>
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<tr>
<td></td>
<td><strong>Viscosity (75°F)</strong> 100 - 125 K.U.</td>
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</tr>
<tr>
<td>Flashing Under Layment</td>
<td>Thickness 60 mil minimum</td>
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<tr>
<td></td>
<td>SBS modified membrane with woven fiberglass scrim reinforcement with the following minimum performance requirements according to ASTM D5147:</td>
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<tr>
<td></td>
<td>Properties (Finished Membrane):</td>
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<tr>
<td></td>
<td>Tensile Strength (ASTM D5147)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 in/min. @ 73.4 ± 3.6°F MD 215 lbf/in</td>
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<tr>
<td></td>
<td>Tear Strength (ASTM D5147)</td>
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<tr>
<td></td>
<td>2 in/min. @ 73.4 ± 3.6°F MD 275 lbf</td>
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<tr>
<td></td>
<td>Elongation at Maximum Tensile (ASTM D5147)</td>
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<tr>
<td></td>
<td>2 in/min. @ 73.4 ± 3.6°F MD 4.5%</td>
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<tr>
<td>Modified Membrane and Flashing Membrane</td>
<td>ASTM D-6162, Type III, Grade G</td>
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<td></td>
<td>Minimum 135 mil thick</td>
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<tr>
<td></td>
<td>SBS and SIS (Styrene-Butadiene-Styrene and Styrene-Isoprene-Styrene) mineral surfaced rubber modified roofing membrane with fire retardant characteristics and reinforced with a dual fiberglass scrim and polyester mat.</td>
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</tr>
</tbody>
</table>
Tensile Strength (ASTM D5147)
2 in/min. @ 73.4 ± 3.6°F MD 450 lbf/in

Tear Strength (ASTM D5147)
2 in/min. @ 73.4 ± 3.6°F MD 900 lbf

Elongation at Maximum Tensile (ASTM D5147)
2 in/min. @ 73.4 ± 3.6°F MD 6.0%

Low Temperature Flexibility (ASTM D5147):
Passes -30°F (-34°C)

Flood Coat and Gravel
Modified Asphalt: Hot –applied, SEBS (Styrene-Ethylene-Butadiene-Styrene) modified asphalt having the following characteristics:

Penetration Point (ASTM D-36) 203–221°F
Elongation (ASTM D-412) 1100%
Recovery from 300%
Elong. 50% Solubility (ASTM D-2042) 99% min

1. Roofing Aggregate: To conform to ASTM D-1863
a. Slag, Pea Gravel, or White Spar

Interply
ASTM D312, Type IV special steep asphalt having the following characteristics:

a. Softening Point 210°F - 225°F (99°C - 107°C)
b. Flash Point 500°F (260°C)
c. Penetration @ 77°F 15-25 units
d. Ductility @ 77°F 1.5 cm

60 lb per 100 ft² ± 25%

25 lb per 100 ft² ± 25%

All roofing assemblies should meet a UL Class A fire rating.

The reflectivity of the membrane should have a reflectivity of 60% or higher as rated by the Cool Roof Rating Council. To learn more, please visit [http://www.coolroofs.org](http://www.coolroofs.org).

All submittals will include:

a. Product data, description of product(s)
b. Sample(s) included/attached
c. Roofing System Manufacturer’s Certification Form, listing the following
   ✓ Underwriters Laboratories, or approved third party testing facility in accordance with ASTM E108, Class A for external fire and meets local or nationally recognized building codes.
   ✓ Certify that materials are manufactured in the United States and conform to requirements specified herein, are chemically and physically compatible with each other, and are suitable for inclusion within the total roof system specified herein.
   ✓ Written certification from the roofing system manufacturer certifying the applicator is currently authorized for the installation of the specified roof system.
✓ Certify that the manufacturer is the parent company specializing in manufacturing the products specified in this section with minimum 10 years documented experience and has an ISO 9001 certification.

d. FM 1-90 Certification
e. UL Class A Certification
f. ISO Certification Certificate
g. Independent Test Data according to ASTM D5147
h. Unexecuted copy of specified Manufacturer’s Required Warranty
i. Written letter from a Company Executive stating that a manufacturer’s representative will be on site a minimum of three (3) times a week from inception to completion of the project, monitoring the jobs ensuring proper installation and providing weekly status reports to the Owner. Also, provide annual inspections at the owner’s request.
Design considerations
When designing a roofing assembly, use the following design standards. It is the University best interest to obtain a low maintenance roofing assembly.

- Crickets behind every HVAC and Heavy Equipment unit that is greater than two feet.
- Use faced pitch pans around every penetration (i.e., Including gas lines, conduits, equipment stands and condenser unit pipes).
- Use reglet flashing system
- Interior walls should be covered with modified membrane and/or metal wall panels.
- Flashing laps should be sealed with a strip of torch grade membrane that extends 6” beyond center of the lap.
- Slope to have a minimum ½”:12”. Preferably structured slope.
- Flashing height minimum 8” (including perimeter and base flashing).