Section 7 – Waterproofing Roofing Standards

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### 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.

Description	ASTM Performance Standards	Minimum Coverages
Insulation	Minimum R-Value 19.0 (Polyisocyanurate is preferred	FM 1-90, 3.0 Sq. Ft.
	over Extruded Polystrene)	_
		1 fastener per 3 sq. ft.
	Type and Thickness R-Value	works out to 11 screws
	3" Polyiscocyanurate 18.00	per 4 x 8 insulation
	$\frac{1}{2}$ " Wood Fiber 1.39	board.
	BUR Membrane 0.24	
	3.0" polyisocyanurate fastened to deck with 0.5" perlite	
Dana Chasta	In not asphalt.	
Base Sneets	ASTM D4601, Type II aspnan coaled liberglass base	
Glass Felts Type IV	ASTM D2178 Type IV glass fiber roofing	
Class Peris Type TV	felt honded to the prenared substrate with hot	
	Type IV bitumen	
Glass Felts Type VI	ASTM D2178. Type VI glass fiber roofing felt bonded	
	to prepared substrate with hot bitumen.	
Fibered Aluminum	Fibered aluminum roof coating	2 Gallons / Square
Coating	having the following	-
	characteristics:	
	<b>Flash Point</b> $100^{\circ}$ F (38°C) min.	
	Weight/Gallon 8.2 lbs./gal. (1.0 g/cm3)	
<b>Y</b>	<b>Viscosity (75°F)</b> 100 - 125 K.U.	
Flashing Under	Thickness 60 mil minimum	
Layment		
	SBS modified memorane with woven indergiass	
	performance requirements according to ASTM D5147:	
	performance requirements according to ASTW D5147.	
	Properties (Finished Membrane)	
	Tensile Strength (ASTM D5147)	
	$2 \text{ in/min.} @73.4 \pm 3.6^{\circ}\text{F}$ MD 215 lbf/in	
	Tear Strength (ASTM D5147)	
	2 in/min. @ $73.4 \pm 3.6^{\circ}$ F MD 275 lbf	
	Elongation at Maximum Tensile (ASTM D5147)	
	$2 \text{ in/min.} @ 73.4 \pm 3.6^{\circ}\text{F} MD 4.5\%$	
Modified Membrane	ASTM D-6162, Type III, Grade G	
and Flashing	Minimum 125 mil thigh	
wiembrane	Nimimum 135 mil tnick	
	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.	

	Tensile Strength (ASTM D5147)2 in/min. @ $73.4 \pm 3.6^{\circ}$ FMD 450 lbf/inTear Strength (ASTM D5147)2 in/min. @ $73.4 \pm 3.6^{\circ}$ FMD 900 lbfElongation at Maximum Tensile (ASTM D5147)2 in/min. @ $73.4 \pm 3.6^{\circ}$ FMD 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	60 lb per 100 ft <sup>2</sup> ± 25%
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	25 lb per 100 ft <sup>2</sup> ± 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 <u>http://www.coolroofs.org</u>.

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 <sup>1</sup>/2":12". Preferably structured slope.
- Flashing height minimum 8" (including perimeter and base flashing).