

# Overview of UL Listings for TPO

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## OVERVIEW OF UL LISTINGS

**MULE-HIDE PRODUCTS, CO., INC.  
UNDERWRITERS LABORATORIES (UL)  
TGFU.R13850  
ROOFING SYSTEMS - TPO  
Revised Sept 2016**

### BALLASTED OVERVIEW

**CLASS A – BALLASTED .....Page 2**

### FULLY ADHERED OVERVIEWS

**CLASS A – FULLY ADHERED .....Page 3**

**CLASS A – FULLY ADHERED (SA-TPO & TPO-FB .....Page 4**

**CLASS B – FULLY ADHERED .....Page 5**

**CLASS C – FULLY ADHERED .....Page 5**

### MECHANICALLY ATTACHED OVERVIEWS

**CLASS A – MECHANICALLY ATTACHED .....Page 6**

**CLASS B – MECHANICALLY ATTACHED .....Page 7**

**CLASS C – MECHANICALLY ATTACHED .....Page 8**

### MAINTENANCE AND REPAIR OVERVIEWS

**CLASS A, B AND C .....Page 9**

**CLASS A .....Page 10**

**CLASS B .....Page 11**

**CLASS B AND C .....Page 11**

Note: The following overviews are intended as a guide for referencing our Mule-Hide UL listings. Please refer to our UL Summary Listings or the UL website for more complete information.

**CLASS A – BALLASTED**

<b>Class A - TPO – Ballasted</b>				
Deck Type	Insulation	Membrane	Slope	Listing
<b>Non-Combustible and Combustible*</b>	Mule-Hide Poly ISO 1, Poly ISO 2, Poly ISO 1-WF or Poly ISO 1-NB, Any thickness	Any UL Listed	2"	12,13
<b>Combustible (3)</b>	Any UL Classified (any type or thickness) with gypsum cover board	TPO TPO (FR) TPO Extra TPO-FB	2"	10
(1) Thermal barrier may be 1/4" Dens Deck or 1" Atlas AC-IV				
(2) On Gypsum decking, all joints must be grouted.				
(3) Combustible Deck ratings may be used on Non-Combustible Decks				
(4) Max slope to be same as listing for membrane/insulation but can not exceed stated slope				
*(Combustible decks must have a thermal barrier installed under the listed insulations)(1)				

**CLASS A – FULLY ADHERED**

<b>Class A - TPO – Fully Adhered – Solvent Based Adhesive</b>				
Deck Type	Insulation	Membrane	Slope	Listing
<b>Non-Combustible and Combustible*</b>  (Combustible decks must have a thermal barrier installed under the listed insulations)(1)	JM Energy 3 Plus Composite ISO or HDFB (any thickness)	TPO TPO (FR)	1.5" 1"	6 1
	Atlas AC-II, Hunter H-Panel, Dow Hy-Therm, JM Energy-3, Firestone ISO 95+ GL, GW, HF or R-Max Multi-Max-3 (any thickness)	TPO TPO (FR)	1/8" 1/2"	8 2
	Atlas AC-II Polyiso (any thickness)	TPO	1/4"	7
	Any UL Classified (any type or thickness) with gypsum cover board	TPO TPO Extra	3" 2.5"	9 10
	Any UL Classified (any type or thickness) with FR Deck Panel as cover board	Any UL Listed	Max 2" (4)	108
Lightweight Insulating Concrete or Gypsum (2)	None	TPO TPO (FR)	1.5" 1"	6 1
<b>Class A - TPO – Fully Adhered – WBBA-2000 Adhesive</b>				
<b>Non-Combustible and Combustible*</b>  (Combustible decks must have a thermal barrier installed under the listed insulations)(1)	Atlas AC-II, Hunter H-Panel, Dow Hy-Therm, JM Energy-3, Firestone ISO 95+ GL, GW, HF or R-Max Multi-Max-3 (any thickness)	TPO TPO Extra TPO (FR)	3/8" 3/8" 1/2"	12 12 13
	JM Energy 3 Plus Composite ISO or HDFB (any thickness)	TPO TPO Extra TPO (FR)	1/2" 1/2" 1"	14 14 15
	Any UL Classified (any type or thickness) with gypsum cover board	TPO & Extra TPO (FR)	1"	16
	Any UL Classified (any type or thickness) with FR Deck Panel as cover board	Any UL Listed	Max 2" (4)	108
Lightweight Insulating Concrete or Gypsum (2)	None	TPO Extra TPO (FR)	1"	15
<b>Class A - TPO – Fully Adhered – Solvent Based Adhesive</b>				
<b>Combustible (3)</b>	Any UL Classified (any type or thickness) with gypsum cover board	TPO (FR)	Unlimited	3
	2 layers VersaShield underlayment, Any UL classified except EPS(any type or thickness)	TPO & Extra TPO (FR) TPO-FB	Max 2" (4)	4
	2 layers VersaShield underlayment, Any UL classified except EPS(any type or thickness)	TPO (FR)	Unlimited	11
	Atlas FR-10, FR-50, VersaShield Underlayment or FB-2S under Atlas AC-III min 1.5" thick	TPO TPO (FR) TPO-FB	Max 2" (4)	5
<b>FR Deck Panel A</b>	All joints are blocked and caulked	Any UL listed	1/2:" (4)	61
<b>Class A - TPO – Fully Adhered – WBBA-2000 Adhesive</b>				
<b>Combustible (3)</b>	Any UL Classified (any type or thickness) with gypsum cover board	TPO & Extra TPO (FR)	1"	17
(1) Thermal barrier may be 1/4" Dens Deck or 1" Atlas AC-IV				
(2) On Gypsum decking, all joints must be grouted.				
(3) Combustible Deck ratings may be used on Non-Combustible Decks				
(4) Max slope to be same as listing for membrane/insulation but can not exceed stated slope				

**CLASS A – FULLY ADHERED** (continued)

<b>Class A – TPO – Fully Adhered (self-adhering TPO)</b>				
Deck Type	Insulation	Membrane	Slope	Listing
<b>Non-Combustible and Combustible*</b>  (Combustible decks must have a thermal barrier installed under the listed insulations)(1)	HDFB (1/2" to 3"), HDFB 1/2" over any UL Classified Insulation (any thickness), Cellular Concrete, pre-cast concrete or structural concrete	SA-TPO	1/2"	26
	Any UL Classified (any type or thickness) with FR Deck Panel as cover board	Any UL Listed	Max 2" (4)	108
<b>Combustible</b> (3)	Any UL Classified (any type or thickness) with gypsum cover board	SA-TPO	4	27
	2 layers VersaShield underlayment, Any UL classified except EPS(any type or thickness)	SA-TPO	Max 2" (4)	28
	Atlas FR-10, FR-50, VersaShield Underlayment or FB-2S under Atlas AC-III min 1.5" thick	SA-TPO	Max 2" (4)	29
	3 layers Carlisle FR Base Sheet 2S, VersaShield or VersaShield FB-2S underlayment, Any UL classified except EPS(any type or thickness)	SA-TPO	Max 2" (4)	30
<b>FR Deck Panel A</b>	All joints are blocked and caulked	Any UL listed	1/2" (4)	61
<b>Class A – TPO-FB – Fleece Back TPO Fully Adhered with WBBA-2000 Adhesive</b>				
<b>Non-Combustible</b>  (Combustible decks must have a thermal barrier installed under the listed insulations)(1)	Atlas AC-II, Hunter H-Panel, Dow Hy-Therm, JM Energy-3, Firestone ISO 95+ GL, GW, HF or R-Max Multi-Max-3 (any thickness)	TPO-FB	1/2"	31
	Any classified HDFB or OSB over any UL Classified Insulation (any thickness), Cellular Concrete, pre-cast concrete or structural concrete	TPO-FB	1	32
	Any UL Classified (any type or thickness) with FR Deck Panel as cover board	Any UL Listed	Max 2" (4)	108
<b>FR Deck Panel A</b>	All joints are blocked and caulked	Any UL listed	1/2" (4)	61
<b>Combustible</b> (3)	Any UL Classified (any type or thickness) with gypsum cover board	TPO-FB	2	33
(1) Thermal barrier may be 1/4" Dens Deck or 1" Atlas AC-IV				
(2) On Gypsum decking, all joints must be grouted.				
(3) Combustible Deck ratings may be used on Non-Combustible Decks				
(4) Max slope to be same as listing for membrane/insulation but can not exceed stated slope				

**CLASS B – FULLY ADHERED**

<b>Class B - TPO – Fully Adhered – Solvent Based Adhesive</b>				
Deck Type	Insulation	Membrane	Slope	Listing
<b>Non-Combustible and Combustible*</b>  (Combustible decks must have a thermal barrier installed under the listed insulations)(1)	JM Energy 3 Plus Composite ISO or HDFB (any thickness)	TPO Extra	¾"	1
	Any UL Classified Insulation (any type or thickness) with gypsum cover board	TPO (FR)	3"	2
<b>Combustible</b> (3)	Any UL Classified (any type or thickness) with gypsum cover board	TPO (FR)	3"	3
(5) Thermal barrier may be 1/4" Dens Deck or 1" Atlas AC-IV				
(6) On Gypsum decking, all joints must be grouted.				
(7) Combustible Deck ratings may be used on Non-Combustible Decks				
(8) Max slope to be same as listing for membrane/insulation but can not exceed stated slope				

**CLASS C – FULLY ADHERED**

<b>Class C - TPO – Fully Adhered – Solvent Based Adhesive</b>				
Deck Type	Insulation	Membrane	Slope	Listing
<b>Non-Combustible and Combustible*</b> (Combustible decks must have a thermal barrier installed under the listed insulations)(1)	Atlas AC-II, Hunter H-Panel, Dow Hy-Therm, JM Energy-3, Firestone ISO 95+ GL, GW, HF or R-Max Multi-Max-3 (any thickness)	TPO TPO Extra TPO (FR) TPO-FB	Unlimited	4
	Any UL Classified (any type or thickness) with FR Deck Panel as cover board	Any UL Listed	Max 2" (4)	9
<b>FR Deck Panel C</b>	None	Any UL Listed	Max 2" (4)	2
<b>Combustible (3)</b>	JM Energy 3 Plus Composite ISO or HDFB (min ½")	TPO TPO Extra TPO (FR) TPO-FB	1	3
	Atlas AC-II, Hunter H-Panel, Dow Hy-Therm, JM Energy-3, Firestone ISO 95+ GL, GW, HF or R-Max Multi-Max-3 (any thickness)	TPO TPO Extra TPO (FR)	Unlimited	5
<b>Class C – TPO – Fully Adhered (self-adhering TPO)</b>				
Deck Type	Insulation	Membrane	Slope	Listing
<b>Non-Combustible and Combustible*</b> (Combustible decks must have a thermal barrier installed under the listed insulations)(1)	Poly ISO1, Poly ISO 1 DWD, Poly ISO 2, Atlas AC-II, AC-III, Hunter H-Shield, H-Shield DWD, JM Energy-2, Energy-3 Firestone ISO 95+ GL or R-Max Multi Max	TPO-SA	Unlimited	7
	Any UL Classified (any type or thickness) with FR Deck Panel as cover board	Any UL Listed	Max 2" (4)	9
<b>Combustible (3)</b>	Poly ISO1, Poly ISO 1 DWD, Poly ISO 2, Atlas AC-II, AC-III, Hunter H-Shield, H-Shield DWD, JM Energy-2, Energy-3 Firestone ISO 95+ GL or R-Max Multi Max Minimum 2" thick	TPO-SA	Unlimited	8
	UL labeled HDFB – ½" minimum	TPO-SA	1"	6
<b>Class C – TPO-FB – Fleece Back TPO Fully Adhered with WBBA-2000 Adhesive</b>				
<b>Combustible (3)</b>	UL labeled PolyISO – 2" minimum	TPO-FB	Unlimited	10
(1) Thermal barrier may be 1/4" Dens Deck or 1" Atlas AC-IV				
(2) On Gypsum decking, all joints must be grouted.				
(3) Combustible Deck ratings may be used on Non-Combustible Decks				
(4) Max slope to be same as listing for membrane/insulation but can not exceed stated slope				

**CLASS A – MECHANICALLY ATTACHED**

<b>Class A - TPO – Mechanically Attached</b>					
<b>Deck Type</b>	<b>Insulation</b>	<b>Membrane</b>	<b>Slope</b>	<b>Listing</b>	
<b>Non-Combustible and Combustible*</b>  (Combustible decks must have a thermal barrier installed under the listed insulations)(1)	Atlas AC-II, Hunter H-Panel, Dow Hy-Therm, JM Energy-3, Firestone ISO 95+ GL, GW, HF or R-Max Multi-Max-3 (any thickness)	TPO	½"	1	
		TPO Extra	½"	13	
		TPO (FR)	1.5"	3	
		TPO-FB	½"	14	
	JM Energy 3 Plus Composite ISO or HDFB (any thickness)	TPO	1.5"	2	
		TPO Extra TPO (FR)		12 4	
	Optional – any UL Listed, any thickness with overlay of JM Energy 3 Plus Composite ISO or HDFB (any thickness)	TPO-FB	1.5"	15	
		Any UL Classified (any type or thickness) with gypsum cover board		TPO TPO-FB	3"
Any UL Classified (any type or thickness) with FR Deck Panel as cover board		Any UL Listed		Max 2" (4)	108
Any UL Classified Expanded or Extruded Polystyrene (any type or thickness) With Atlas FR-10 or VersaShield slipsheet		TPO TPO Extra TPO (FR) TPO-FB		1"	18
Any UL Classified (any type or thickness) with FR Deck Panel as cover board	Any UL Listed	Max 2" (4)	108		
<b>Combustible (3)</b>	Two layers of Atlas FR-10 with optional any UL Classified except EPS and HDFB (any type or thickness)	Any UL Classified	Max ¾"(4)	**24	
	2 layers VersaShield Underlayment or FB-S2 under Any UL classified except EPS (any type or thickness)	TPO TPO Extra TPO (FR) TPO-FB	Max 2" (4)	6 or 17	
	3 layers VersaShield FB-1S under Any UL classified except EPS (any type or thickness)	TPO TPO (FR) TPO Extra TPO-FB	Max 2"(4)	19 or 20	
	Atlas FR 10 underlayment, Atlas AC-III min 1.5" thick	TPO TPO (FR) TPO-FB	See Note (4)	8	
	Optional any UL Classified (any type or thickness) with gypsum cover board	TPO Extra TPO-FR	2.5" Unlimited	11 7	
	Two plies of Atlas FR-50 or VersaShield Underlayment or FB-2S	TPO	½"	9	
		TPO Extra TPO (FR) TPO-FB		10	
<b>FR Deck Panel A</b>	All joints are blocked and caulked	Any UL listed	1/2:" (4)	61	
(1) Thermal barrier may be 1/4" Dens Deck or 1" Atlas AC-IV					
(2) On Gypsum decking, all joints must be grouted.					
(3) Combustible Deck ratings may be used on Non-Combustible Decks					
(4) Max slope to be same as listing for membrane/insulation but can not exceed stated slope					

**CLASS B – MECHANICALLY ATTACHED**

<b>Class B - TPO – Mechanically Attached</b>				
<b>Deck Type</b>	<b>Insulation</b>	<b>Membrane</b>	<b>Slope</b>	<b>Listing</b>
<b>Combustible (3)</b>	One layer of Atlas FR-10	Any UL Classified	Max ½”(4)	**6
	One layer of OC Perma Ply No. 28, GAF Gafglas #75, JM Glasbase, Tamko Glass Base, Celotex Type G2 Vaporbar GB, VersaShield Underlayment or FB-2S installed under Atlas AC-II, Dow Hy-Therm, Hunter Panel H-Shield, JM Energy-3, Firestone ISO 95+GL, GW, HF, Rmax Multi-Max-3 (any thickness) or Min ½” HDFB over Min 1” thick any classified insulation	Any UL Classified	Max 1”(4)	1
	JM Energy 3 or HDFB (minimum 1.5” thick)	TPO TPO Extra TPO (FR) TPO-FB	Max 1”(4)	2
	One layer of Atlas FR-10 or VersaShield Underlayment or FB-2S	TPO TPO Extra TPO-FR TPO-FB	Max 1.5” (4)	3
	Optional Min 1” Polysocyanurate Two layers of Atlas FR-50 or VersaShield Underlayment of FB-2S	TPO TPO Extra TPO (FR) TPO-FB	½	4
	One layer of Atlas FR-50	TPO (FR)	½”	5
(1) Thermal barrier may be 1/4” Dens Deck or 1” Atlas AC-IV				
(2) On Gypsum decking, all joints must be grouted.				
(3) Combustible Deck ratings may be used on Non-Combustible Decks				
(4) Max slope to be same as listing for membrane/insulation but can not exceed stated slope				



**CLASS C – MECHANICALLY ATTACHED**

<b>Class C - TPO – Mechanically Attached</b>				
<b>Deck Type</b>	<b>Insulation</b>	<b>Membrane</b>	<b>Slope</b>	<b>Listing</b>
<b>Non-Combustible and Combustible*</b>  (Combustible decks must have a thermal barrier installed under the listed insulations)(1)	Atlas AC-II, Hunter H-Panel, Dow Hy-Therm, JM Energy-3, Firestone ISO 95+ GL, GW, HF or R-Max Multi-Max-3 (any thickness)	TPO TPO Extra TPO (FR)	Unlimited	2
<b>Combustible (3)</b>	JM Energy 3 or HDFB (minimum 1.5" thick)	TPO TPO Extra TPO (FR) TPO-FB	1"	1
	Atlas AC-II, Hunter H-Panel, Dow Hy-Therm, JM Energy-3, Firestone ISO 95+ GL, GW, HF or R-Max Multi-Max-3 (min. 2" thickness)	TPO TPO Extra TPO-FR TPO-FB	Unlimited	3
(1) Thermal barrier may be 1/4" Dens Deck or 1" Atlas AC-IV				
(2) On Gypsum decking, all joints must be grouted.				
(3) Combustible Deck ratings may be used on Non-Combustible Decks				
(4) Max slope to be same as listing for membrane/insulation but can not exceed stated slope				

### MAINTENANCE AND REPAIR - CLASS A, B and C

<b>TPO – Mechanically Attached</b>				
<b>Deck Type</b>	<b>Insulation</b>	<b>Membrane</b>	<b>Slope</b>	<b>Listing</b>
<b>Combustible (3)</b>	Existing Class A, B or C roofing system to retain existing rating, covered with Manniglass 1200, Atlas FR-10, VersaSheild or Type G-2 base sheet	TPO (5)	½"	7
		TPO Extra (5)	½"	7
		TPO (FR) (5)	¾"	8
	Existing Class A, B or C roofing system wit gravel to retain existing rating, covered with OC Durapink, 1"	TPO (5) TPO Extra (5) TPO (FR) (5) TPO-FB (5)	1"	9
	Existing Class A, B or C roofing system to retain existing rating, covered with one or more layers of Atlas FR-50 or VersaShield FB-2S	TPO (5) TPO Extra (5) TPO-FR (5) TPO-FB (5)	Max 1.5" (4)	10
Existing Class A, B or C roofing system to retain existing rating, covered with Poly ISO 1-HD or Poly ISO 1-HD90	Any UL Classified	Max 2" (4)	12	
Existing Class A, B or C roofing system to retain existing rating, covered with Poly ISO 1-HD Composite	Any UL Classified	Max ½" (4)	13	
(1) Thermal barrier may be 1/4" Dens Deck or 1" Atlas AC-IV				
(2) On Gypsum decking, all joints must be grouted.				
(3) Combustible Deck ratings may be used on Non-Combustible Decks				
(4) Max slope to be same as listing for membrane/insulation but can not exceed stated slope				
(5) New roofing system is mechanically fastened				

## MAINTENANCE AND REPAIR SYSTEM – CLASS A

<b>TPO</b>				
Deck Type	Insulation	Membrane	Slope	Listing
<b>Non-Combustible and Combustible*</b>	Existing Class A, gravel may be maintained, covered with Tenneco AMOCOR PB-6, PG38 or PG39	TPO TPO Extra TPO (FR)	¼" (5)	17
	Existing Class A, B or C BUR or Mod Bit roofing system, covered with Atlas AC-II, Dow Hy-Therm, Hunter Panel H-Sheild, JM Energy-3, Firestone ISO 95+ GL, GW, HF, Rmax Multi-Max-3 (any combination, any thickness)	TPO (5) TPO Extra (5) TPO (FR) (5) TPO-FB	½"	19
	Existing Class A, B or C roofing system covered with minimum 3" layer or minimum 2 layers of Poly ISO 1-DWD	Any UL Classified	Max ½" (4)	21
<b>Combustible (3)</b>	Existing Class A, B or C roofing system to maintain existing classification, covered with two or more layers of Atlas FR-50, VersiSheild Underlayment or FB-2S	TPO (5) TPO Extra (5) TPO (FR) (5) TPO-FB (5)	½"	18
	Existing Class A, B or C roofing system covered with minimum 3" layer or minimum 2 layers of Poly ISO 1-DWD	Any UL Classified	Max ½" (4)	22
(1) Thermal barrier may be 1/4" Dens Deck or 1" Atlas AC-IV				
(2) On Gypsum decking, all joints must be grouted.				
(3) Combustible Deck ratings may be used on Non-Combustible Decks				
(4) Max slope to be same as listing for membrane/insulation but can not exceed stated slope				
(5) New roofing system is mechanically fastened				

### MAINTENANCE AND REPAIR SYSTEM – CLASS B

<b>TPO</b>				
Deck Type	Insulation	Membrane	Slope	Listing
<b>Non-Combustible and Combustible*</b>	Existing Class A, B or C roofing system gravel may be maintained, covered with minimum 1.9" Poly ISO 1-DWD	Any UL Classified	Max ½" (4)	6
<b>Combustible (3)</b>	Existing Class B mineral or smooth surfaced BUR or Mod Bit to retain existing classification	TPO (5) TPO Extra (5) TPO (FR) (5) TPO-FB (5)	½"	5
	Existing Class A, B or C roofing system gravel may be maintained, covered with minimum 1.9" Poly ISO 1-DWD	Any UL Classified	Max ½" (4)	7
(1) Thermal barrier may be 1/4" Dens Deck or 1" Atlas AC-IV				
(2) On Gypsum decking, all joints must be grouted.				
(3) Combustible Deck ratings may be used on Non-Combustible Decks				
(4) Max slope to be same as listing for membrane/insulation but can not exceed stated slope				

### MAINTENANCE AND REPAIR SYSTEM – CLASS B and C

<b>TPO</b>				
Deck Type	Insulation	Membrane	Slope	Listing
<b>Combustible (3)</b>	Existing Class B or C roofing system to retain existing classification covered with one or more layers of Atlas FR-50, VersaShield Underlayment or FB-2S	TPO (5) TPO Extra (5) TPO (FR) (5) TPO-FB (5)	½"	1
(1) Thermal barrier may be 1/4" Dens Deck or 1" Atlas AC-IV				
(2) On Gypsum decking, all joints must be grouted.				
(3) Combustible Deck ratings may be used on Non-Combustible Decks				
(4) Max slope to be same as listing for membrane/insulation but can not exceed stated slope				
(5) New roofing system is mechanically fastened				