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# MULE-HIDE PRODUCTS Co., INC.

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“The name trusted in roofing since 1906”

**MULE-HIDE PRODUCTS, CO., INC.  
UNDERWRITERS LABORATORIES (UL)  
TGFU.R13850  
ROOFING SYSTEMS - TPO  
Revised December 2012**

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\* Note: Assembly numbers shown in the following listings correspond to the UL Master Listing number for all Mule-Hide Products, Co., Inc.

\*\*Note: Assembly numbers shown in the following listings correspond to the UL Master Listing number for **Atlas Roofing Corp.**

\*\*\*Note: Assembly numbers shown in the following listings correspond to the UL Master Listing number for **GEORGIA-PACIFIC GYPSUM LLC**

Unless otherwise indicated, insulation is mechanically fastened to the roof deck.

Unless otherwise indicated, when referring to gypsum board in the following classifications, the following will be referenced: G-P Gypsum DensDeck®, 1/4 in., regular gypsum board (not Classified) laid with staggered joints (6 in. offset) measuring 0.463 in. thick min and weighing 184 lbs/sq min or Georgia Pacific "Sound Deadening Board", measuring 0.208 in. thick min and weighing 109 lbs/sq min.

Straight or tapered insulation may be used in the following assemblies provided they do not exceed the indicated incline or thickness and carry a UL label.

Unless otherwise indicated, the term "Referenced Insulation" will include the following: Atlas Roofing "ACFoam I", Johns Manville "ENRGY-1A" or "ENRGY-1G" or "Barrier Board Plus", Rhoflex "Isocyanurate GL, GW or HF", Rmax Inc. "Multi-Max-3", any thickness.

Unless otherwise indicated in the systems described below, any adhesive splice may be overlaid with pressure-sensitive flashing in any TPO system.

Any UL Classified United Solar Systems Corp Photovoltaic (Solar) Module System may be installed over any of the following UL Classified Mule-Hide roofing membrane assemblies that utilizes gypsum board, provided that the roofing membrane is applied directly over the gypsum (either adhered to, mechanically fastened over or loosely-laid over the gypsum):

Standard EPDM, FR EPDM, White-On-Black EPDM, Standard Reinforced EPDM, FR Reinforced EPDM, TPO-c, TPO-c (FR), TPO-c Extra, TPO-c Extra (FR) and TPO-c Fleece Back.

The Module system is either self-adhered directly to the roofing membrane in the field or self-adhered to an intermediate roofing material layer in the factory and then attached to the roofing membrane in the field using liquid adhesive, tape adhesive or fasteners. The Classification applies to combustible and non-combustible decks. Any UL Classified insulation, any combination, any thickness, may be installed below the gypsum. The maximum incline and Classification (Class A, B or C) shall be in accordance with the Classification established for the membrane roofing assembly, however the incline can not exceed 1-1/2:12.

Any UL Classified Mule-Hide TPO roofing system is Classified for Class 4 Impact Resistance when the following conditions are met:

Minimum 80 mil (nominal thickness) Mule-Hide TPO-c, TPO-c Fleece BACK (100 or 115) or TPO-c Fleece Back Plus membrane is applied over any of the following substrates: Barrier Board, Oriented Strand Board, Plywood or Slipsheet over Plywood. These substrates may be placed over insulation or additional substrate layers as specified in the roofing systems. The substrate layer(s) are attached with fasteners and minimum 2 in. metal or plastic plates.

Minimum 45 mil (nominal thickness) Mule-Hide TPO-c, TPO-c Fleece BACK (100 or 115) or TPO-c Fleece Back Plus membrane is applied over any combination of substrate layers, as specified in the roofing systems, and the top substrate layer is attached with adhesives or asphalt. Lower substrate layers may be attached with fasteners and plates, adhesives or asphalt.

## ALL SYSTEMS

### **Class A, B or C (See Note 1)**

**\*\*\*1. Deck: C-15/32**

**Incline:** See Notes 1 and 4

**Insulation:** — Any UL Classified, any thickness.

**Barrier Board: (See Note 2)** — ¼-in., ½-in. or 5/8-in. thick "DensDeck® Roofboard" or "DensDeck Prime® Roofboard" or "DensDeck Prime 2™ Roofboard" or "DensDeck DuraGuard® Roofboard" with all joints staggered a min of 6 in. from the plywood joints.

**Membrane:** — Any UL Classified modified bitumen system, BUR system or CPE, CSM, CSPE, EPDM, NBP, PIB, PVC, TPO or TRE membrane system suitable for use with any roof insulation.

**\*\*\*2. Deck: C-15/32**

**Incline:** See Notes 1 and 4

**Barrier Board: (See Note 3)** — ¼-in., ½-in. or 5/8-in. thick "DensDeck® Roofboard," or "DensDeck Prime® Roofboard" or "DensDeck Prime 2™ Roofboard" or "DensDeck DuraGuard® Roofboard" with all joints staggered a min of 6 in. from the plywood joints.

**Insulation (Optional):** — Fiberglass, polyisocyanurate, perlite or wood fiber, any thickness.

**Membrane:** — Any UL Classified modified bitumen system, BUR system or CPE, CSM, CSPE, EPDM, NBP, PIB, PVC, TPO or TRE membrane system suitable for use with any roof insulation.

Note 1: Classification (A, B or C) and max incline will be the same as that of the Classified Roofing System (TGFU) currently limited to noncombustible deck.

Note 2: The use of the "DensDeck® Roofboard," or "DensDeck Prime® Roofboard" or (min ½ in.) "DensDeck Prime 2™ Roofboard" or "DensDeck DuraGuard® Roofboard" as a barrier board over the insulation permits the use of any Classified Roofing System (TGFU) which otherwise is limited to use over noncombustible deck.

Note 3: The use of the "DensDeck® Roofboard," or "DensDeck Prime® Roofboard" or (min ½ in.) "DensDeck Prime 2™ Roofboard" or "DensDeck DuraGuard® Roofboard" as a barrier board directly over the combustible deck permits the use of any Classified Roofing System (TGFU) which otherwise is limited to use over noncombustible deck. When used, insulation must consist of one of the types specified.

Note 4: The use of ¼ in. thick "DensDeck Prime 2™" limited to a slope of 2-1/2 in. or less.

## **ALL SYSTEMS**

### **Class A**

#### **For Combustible Decks - Class A:      Incline: 1/2**

1. A minimum 3 in. layer or a minimum two layers of 1.5 in. of "Poly ISO 1-DWD" is placed directly over a combustible deck and is covered with any UL Classified roofing membrane used in any UL Class A roofing assembly to achieve a Class A fire Classification. As an alternative, any UL Classified insulation (except expanded or extruded polystyrene), any combination, any thickness, may be used below the 3 in. minimum total thickness of "Poly ISO 1-DWD". The insulation may be loosely laid or attached with fasteners and plates, hot roofing asphalt or cold adhesive. A vapor barrier (non-UL classified) may also be used below the insulation. All insulation joints must be staggered a minimum of 6 in. from the deck joints or from the insulation joints directly below. The maximum incline shall be in accordance with the Classification established for the membrane/insulation roofing assembly, however the incline can not exceed 1/2:12.

2. A minimum 1.9 in. layer of "Poly ISO 1-DWD" is placed over a minimum 1 layer of Carlisle "FR Base Sheet 1S" or Elk "VersaShield FB-1S" over a combustible deck. The insulation is covered with any UL Classified roofing membrane used in any UL Class A roofing assembly to achieve a Class A fire Classification. As an alternative, any UL Classified insulation (except expanded or extruded polystyrene), any combination, any thickness, may be used below the 1.9 in. minimum total thickness of "Poly ISO 1-DWD". The insulation may be loosely laid or attached with fasteners and plates, hot roofing asphalt or cold adhesive. A vapor barrier (non-UL classified) may also be used below the insulation. All insulation joints must be staggered a minimum of 6 in. from the deck joints or from the insulation joints directly below. The maximum incline shall be in accordance with the Classification established for the membrane/insulation roofing assembly, however the incline can not exceed 1/2:12.

**\*\* For Combustible Decks - Class A:** A minimum 1 in. layer of "AC Foam IV" placed directly over a combustible deck and covered with any UL Classified roofing membrane used in any UL Class A roofing assembly to achieve a Class A fire Classification. As an alternate, any UL Classified insulation (except expanded or extruded polystyrene), any combination, any thickness, may be used above or below the 1 in. minimum total thickness of "AC Foam IV." All insulation joints must be staggered a minimum of 6 in. from the deck joints or from the insulation joints directly below. The maximum incline shall be in accordance with the Classification established for the membrane/insulation roofing assembly, however the incline cannot exceed 1:12.

## **ALL SYSTEMS**

### **Class B**

#### **For Combustible Decks - Class B:      Incline: 1/2**

1. A minimum 1.9 in. layer of "Poly ISO 1-DWD", or a minimum 2 in. thick layer of Carlisle "Polyiso HP-WLC" or Atlas "AC Foam III" is placed directly over a combustible deck and is covered with any UL Classified roofing membrane used in any UL Class B roofing assembly to achieve a Class B fire Classification. As an alternative, any UL Classified insulation (except expanded or extruded polystyrene), any combination, any thickness, may be used below the 1.9 in. minimum thickness layer of "Poly ISO 1-DWD". The insulation may be loosely laid or attached with fasteners and plates, hot roofing asphalt or cold adhesive. A vapor barrier (non-UL classified) may also be used below the insulation. All insulation joints must be staggered a minimum of 6 in. from the deck joints or from the insulation joints directly below. The maximum incline shall be in accordance with the Classification established for the membrane/insulation roofing assembly, however the incline can not exceed 1/2:12.

### **CLASS A – BALLASTED**

Unless otherwise indicated in the systems described below, the insulation and the membrane are laid loosely and surfaced with river bottom stone, nom 1-1/2 in. diameter, at 1000 lbs/sq min. Suitable alternates are size Nos. 1, 2, 24, 3 and 4 (as per ASTM D448), also at 1000 lbs/sq min. In addition, concrete pavers or crushed stone may be used. Pavers must weigh 1000 lbs/sq min and spaced no more than 1/8 in. apart and the crushed stone must meet the above size and weight requirements. Thermoplastic membrane may be adhered to the substrate with "Mule-Hide Thermoplastic Membrane Bonding Adhesive" at 1 gal/100 sq ft.

10. **Deck:** C-15/32

**Incline:** 2

**Insulation (Optional):** — Any UL Classified insulation, any thickness.

**Membrane:** — "Mule-Hide TPO-c", "Mule-Hide TPO-c (FR)", "Mule-Hide TPO-c Extra", "Mule-Hide TPO-c Extra (FR)" or "Mule-Hide TPO-c Fleece Back", loose laid, adhered or mechanically fastened.

**Surfacing:** — Stone or paver ballast applied at min 10 lb/sq/ft

### **CLASS A – FULLY ADHERED**

Unless otherwise indicated, membrane is adhered to the insulation with Tacc International "FA661" at 1 gal/sq.

Unless otherwise indicated, 7/16 in. (min) thick nonveneer APA rated oriented strand board may be substituted for wood fiber in the following systems.

Unless otherwise indicated the "Mule-Hide SP-100" or "Mule-Hide SP-100-LT" may be applied in 2-3 in. beads spaced 12 in. OC max as an alternate to full coverage.

**54. Deck: NC**

**Incline: 1/2**

**Insulation:** — Atlas Roofing "ACFoam II", wood fiber, glass fiber or perlite, any thickness.

**Membrane:** — "Mule-Hide TPO", 45-60 mil, fully adhered with Imperial "4459MG" Roofing Adhesive, 60 sq/ft/gal.

**61. Deck: C - 7/16-in. "Mule-Hide FR Deck Panel A"\*      Incline: 1/2**

**Membrane:** — Any UL Classified fully adhered EPDM, PVC, TPO or self-adhered modified bitumen cap sheet. Maximum incline is determined by the existing membrane Classification but cannot exceed 1/2:12.

\* - All FR Deck Panel with non-coated edges require all deck joints blocked with 2 x 4 lumber. Gaps in "Mule-Hide FR Deck Panel" are caulked with Rectorseal "FlameSafe® FS900+" caulk. All FR Deck panel with edges coated with "Blazeguard Fire-Resistant Paint", 80-250 ft<sup>2</sup>/gal., only require blocking below the open joints with 2 x 4 lumber.

**72. Deck: NC**

**Incline: 1**

**Insulation:** — Any UL Classified wood fiberboard; Johns Manville "ENRGY 3 Plus" (composite) insulation; cellular concrete, precast concrete with grouted joints or structural (poured-in-place) concrete.

**Membrane:** — "Mule-Hide TPO-c (FR)", fully adhered with "Mule-Hide TPO-c Bonding Adhesive", at 1-1/3 gal/sq.

**72A. Deck: NC      Incline: 1/2**

**Insulation:** — Atlas Roofing "ACFoam II" or "ACFoam III", Dow "Hy-Therm AP", Hunter Panels "H-Shield", Johns Manville "ENRGY-3", Firestone Building Products "ISO 95+GL", "GW" or "HF", Rmax Inc. "Multi-Max-3", any combination, any thickness.

**Membrane:** — "Mule-Hide TPO-c (FR)", fully adhered with "Mule-Hide TPO-c Bonding Adhesive", at 1-1/3 gal/sq.

**73. Deck: C-15/32**

**Incline: Unlimited**

**Insulation (Optional):** — Any UL Classified, any combination, any thickness.

**Barrier Board:** — 1/2 in. min gypsum board or 1/4 in. thick G-P Gypsum DensDeck®.

**Membrane:** — "Mule-Hide TPO-c (FR)", fully adhered with "Mule-Hide TPO-c Bonding Adhesive" at 1-1/3 gal/sq.

Class A – Fully Adhered (Continued)

74. **Deck:** C-15/32 **Incline:** See Note  
**Slip Sheet:** — Two layers Elk "VersaShield Underlayment" or "VersaShield FB-2S".  
**Insulation:** — Any UL Classified (except EPS), any combination, any thickness.  
**Membrane:** — "Mule-Hide TPO-c", "Mule-Hide TPO-c (FR)", "Mule-Hide TPO-c Extra", "Mule-Hide TPO-c Extra (FR)" or "Mule-Hide TPO-c Fleece Back".

Note: Max incline shall be in accordance with Classification established for the insulation/membrane roofing system, but cannot exceed 2:12.

75. **Deck:** C-15/32 **Incline:** See Note  
**Slip Sheet:** — One layer Atlas Roofing "FR-10" or "FR-50", Elk "VersaShield Underlayment" or "VersaShield FB-2S".  
**Insulation:** — Atlas Roofing "ACFoam III", min 1.5 in. thick with joints staggered min 6 in. from the deck joints.  
**Membrane:** — "Mule-Hide TPO-c", "Mule-Hide TPO-c (FR)", "Mule-Hide TPO-c Extra", "Mule-Hide TPO-c Extra (FR)" or "Mule-Hide TPO-c Fleece Back".

Note: Max incline shall be in accordance with Classification established for the insulation/membrane roofing system.

76. **Deck:** NC **Incline:** 1-1/2  
**Insulation:** — Any UL Classified wood fiberboard; Johns Manville "ENRGY 3 Plus" (composite) insulation; cellular concrete, precast concrete with grouted joints or structural (poured-in-place) concrete.  
**Membrane:** — "Mule-Hide TPO-c", fully adhered with "Mule-Hide TPO-c Bonding Adhesive", at 1-1/3 gal/sq.

77. **Deck:** NC **Incline:** 1/4  
**Insulation:** — Atlas Roofing "ACFoam II", any thickness.  
**Membrane:** — "Mule-Hide TPO-c", fully adhered with "Mule-Hide TPO-c Bonding Adhesive" at 1-1/3 gal/sq.

78. **Deck:** NC **Incline:** 1/8  
**Insulation:** — Atlas Roofing "ACFoam II" or "ACFoam III", Dow "Hy-Therm AP", Hunter Panels "H-Shield", Johns Manville "ENRGY-3", Firestone Building Products "ISO 95+GL", "GW" or "HF", Rmax Inc." Multi-Max-3", any combination, any thickness.  
**Membrane:** — "Mule-Hide TPO-c", fully adhered with "Mule-Hide TPO-c Bonding Adhesive" at 1-1/3 gal/sq.

79. **Deck:** NC **Incline:** 3  
**Insulation (Optional):** — Any UL Classified, any combination, any thickness.  
**Barrier Board:** — 1/2 in. min gypsum board.  
**Membrane:** — "Mule-Hide TPO-c", fully adhered with "Mule-Hide TPO-c Bonding Adhesive" at 1-1/3 gal/sq.



Class A – Fully Adhered (Continued)

87. **Deck:** C-15/32 **Incline:** 1  
**Insulation (Optional):** — Any UL Classified, any combination, any thickness.  
**Barrier Board:** — 1/2 in. min gypsum board or 1/4 in. thick G-P Gypsum DensDeck®.  
**Membrane:** — "Mule-Hide TPO-c", "Mule-Hide TPO-c Extra", "Mule-Hide TPO-c (FR)" or "Mule-Hide TPO-c Extra (FR)", fully adhered with "WBBA 2000 Bonding Adhesive" at 120 ft<sup>2</sup>/gal.
88. **Deck:** NC **Incline:** 1/2  
**Insulation:** — Atlas Roofing "ACFoam II" or "ACFoam III", Dow "Hy-Therm AP", Hunter Panels "H-Shield", Johns Manville "ENRGY-3", Firestone Building Products "ISO 95+GL", "GW" or "HF", Rmax Inc. "Multi-Max-3", any combination, any thickness.  
**Membrane:** — "Mule-Hide TPO-c Fleece Back 100 or 115" (TPO), fully adhered with "Mule-Hide SP-100 Adhesive".
89. **Deck:** NC **Incline:** 1-1/2  
**Insulation (Optional):** — Any UL Classified, any thickness.  
**Insulation:** — Any UL Classified wood fiberboard; Johns Manville "ENRGY 3 Plus" (composite) insulation.  
**Membrane:** — "Mule-Hide TPO-c Fleece Back 110 or 115" (TPO), fully adhered with "Mule-Hide SP-100 Adhesive".
90. **Deck:** NC **Incline:** 3  
**Insulation:** — Any UL Classified, any thickness.  
**Barrier Board:** — 1/4 in. G-P Gypsum DensDeck® or 1/2 in. gypsum wallboard.  
**Membrane:** — "Mule-Hide TPO-c Fleece Back 110 or 115" (TPO), fully adhered with "Mule-Hide SP-100 Adhesive".
91. **Deck:** C-15/32 **Incline:** See Note  
**Slip Sheet:** — Two layers Elk "VersaShield Underlayment" or "VersaShield FB-2S" or three layers Elk "VersaShield FB-1S".  
**Insulation (Optional):** — Any UL Classified (except EPS), any combination, any thickness.  
**Membrane:** — "Mule-Hide TPO-c Fleece Back".
- Note: Max incline shall be in accordance with Classification established for the insulation/membrane roofing system when insulation is used or established for the membrane roofing system applied over fiberboard or gypsum when insulation is not used, but can not exceed 2:12.
92. **Deck:** NC **Incline:** 1/4  
**Insulation:** — Johns Manville "ENRGY3" any combination, any thickness.  
**Membrane:** — "Mule-Hide TPO-c Fleece Back 100 or 115" (TPO), fully adhered with "Mule-Hide SP-100-LT" adhesive.

Class A – Fully Adhered (Continued)

93. **Deck:** NC **Incline:** 1/2  
**Insulation:** — Atlas Roofing "ACFoam II" or "ACFoam III", Dow "Hy-Therm AP", Hunter Panels "H-Shield", Firestone Building Products "ISO 95+GL", "GW" or "HF", Rmax Inc. "Multi-Max-3", any combination, any thickness.  
**Membrane:** — "Mule-Hide TPO-c Fleece Back 100 or 115" (TPO), fully adhered with "Mule-Hide SP-100-LT" adhesive.
94. **Deck:** NC **Incline:** 1  
**Insulation:** — Any UL Classified, any thickness.  
**Insulation:** — Johns Manville "ENRGY 3 Plus" (composite) insulation or 1/2 in. (min) wood fiberboard.  
**Membrane:** — "Mule-Hide TPO-c Fleece Back 100 or 115" (TPO), fully adhered with "Mule-Hide SP-100-LT" adhesive.
102. **Deck:** NC **Incline:** 1/2  
**Insulation:** — "Mule-Hide Poly ISO 2", Atlas Roofing "ACFoam II", wood fiber, glass fiber or perlite, any thickness.  
**Membrane:** — "Mule-Hide TPO", 45-80 mil, fully adhered with "WBBA 2000" Roofing Adhesive, applied at 120-ft<sup>2</sup>/gal.
103. **Deck:** NC **Incline:** 1/4  
**Insulation:** — Firestone Building Products "ISO 95+GL", "EnergyGuard", wood fiber, glass fiber or perlite, any thickness.  
**Membrane:** — "Mule-Hide TPO", 45-80 mil, fully adhered with "WBBA 2000" Roofing Adhesive, applied at 120-ft<sup>2</sup>/gal.
108. **Deck:** NC **Incline:** See Note  
**Insulation (Optional):** — Any UL Classified insulation, any thickness.  
**Barrier Board:** — "Mule-Hide FR Deck Panel A", 7/16 in. min.  
**Membrane:** — Any UL Classified Mule-Hide fully adhered EPDM, PVC, TPO or self-adhered modified bitumen cap sheet,

Note: Maximum incline is determined by the existing membrane/adhesive Classification.

**CLASS B – FULLY ADHERED**

**9. Deck: NC**

**Incline: 3/4**

**Insulation:** — Any UL Classified wood fiberboard; Johns Manville "ENRGY 3 Plus" (composite) insulation; cellular concrete, precast concrete with grouted joints or structural (poured-in-place) concrete.

**Membrane:** — "72 mil Mule-Hide TPO-c Extra" or "80 mil Mule-Hide TPO-c Extra", fully adhered with "Mule-Hide TPO-c Bonding Adhesive", at 1-1/3 gal/sq.

**10. Deck: NC**

**Incline: 3**

**Insulation (Optional):** — Any UL Classified, any combination, any thickness.

**Barrier Board:** — 1/2 in. min gypsum board or 1/4 in. thick G-P Gypsum DensDeck®.

**Membrane:** — "Mule-Hide TPO-c (FR)" or "Mule-Hide TPO-c Extra (FR)", fully adhered with "WBBA 2000 Bonding Adhesive" at 120 ft<sup>2</sup>/gal.

**11. Deck: C-15/32**

**Incline: 3**

**Insulation (Optional):** — Any UL Classified, any combination, any thickness.

**Barrier Board:** — 1/2 in. min gypsum board or 1/4 in. thick G-P Gypsum DensDeck®.

**Membrane:** — "Mule-Hide TPO-c (FR)" or "Mule-Hide TPO-c Extra (FR)", fully adhered with "WBBA 2000 Bonding Adhesive" at 120 ft<sup>2</sup>/gal.

**12. Deck: NC**

**Incline: 3**

**Membrane:** — "Mule-Hide TPO-c Fleece Back 100 or 115" (TPO), fully adhered with "Mule-Hide SP-100-LT" adhesive, 100 sq.ft./gal.

**CLASS C – FULLY ADHERED**

4. **Deck:** NC **Incline:** 1/2  
**Insulation:** — Atlas Roofing "ACFoam II", wood fiber, glass fiber or perlite, any thickness.  
**Membrane:** — "Mule-Hide TPO", 45-60 mil, fully adhered with Ashland "PILOBOND 2825", 60 sq/ft/gal.
5. **Deck:** C - 7/16-in. "Mule-Hide FR Deck Panel C" **Incline:** 2  
**Membrane:** — Any UL Classified fully adhered EPDM, PVC, TPO or self-adhered modified bitumen cap sheet. Maximum incline is determined by the existing membrane Classification but cannot exceed 2:12.
11. **Deck:** C-15/32 **Incline:** 1  
**Insulation:** — Johns Manville "ENRGY 3 Plus" (composite) insulation or any UL Classified wood fiberboard, 1/2 in. thick min.  
**Membrane:** — "Mule-Hide TPO-c", "Mule-Hide TPO-c (FR)", "Mule-Hide TPO-c Extra", "Mule-Hide TPO-c Extra (FR)" or "Mule-Hide TPO-c Fleece Back".
12. **Deck:** NC **Incline:** Unlimited  
**Insulation:** — Atlas Roofing "ACFoam II" or "ACFoam III", Dow "Hy-Therm AP", Hunter Panels "H-Shield", Johns Manville "ENRGY-3", Firestone Building Products "ISO 95+GL", "GW" or "HF", Rmax Inc. "Multi-Max-3", any combination, any thickness.  
**Membrane:** — "Mule-Hide TPO-c", "Mule-Hide TPO-c Extra", "Mule-Hide TPO-c (FR)", or "Mule-Hide TPO-c Extra (FR)", 45 to 80 mil thickness, adhered with "Mule-Hide TPO-c Bonding Adhesive".
13. **Deck:** C-15/32 **Incline:** Unlimited  
**Insulation:** — Atlas Roofing "ACFoam II" or "ACFoam III", Dow "Hy-Therm AP", Hunter Panels "H-Shield", Johns Manville "ENRGY-3", Firestone Building Products "ISO 95+GL", "GW" or "HF", Rmax Inc. "Multi-Max-3", any combination, min 2" thickness.  
**Membrane:** — "Mule-Hide TPO-c", "Mule-Hide TPO-c Extra", "Mule-Hide TPO-c (FR)", or "Mule-Hide TPO-c Extra (FR)", 45 to 80 mil thickness, adhered with "Mule-Hide TPO-c Bonding Adhesive".
17. **Deck:** C-7/16-in. "Mule-Hide FR Deck Panel" **Incline:** See Note  
**Insulation (Optional):** — UL Classified polyisocyanurate, 1 in. thick, minimum.  
**Barrier Board (Optional):** — G-Pgypsum min. ¼-in Dens-Deck or United States Gypsum Co. min. ¼ in. SECUROCK.  
**Membrane:** — Any UL Classified EPDM or TPO membrane, mechanically attached or fully adhered for use as a Class C Roofing System with or without optional use of Insulation and/or Barrier Board.

Note: Maximum incline is determined by the existing membrane Classification, but cannot exceed 1/2:12.

Class C – Fully Adhered (Continued)

**18. Deck: NC**

**Incline:** See Note

**Insulation (Optional):** — Any UL Classified insulation, any thickness.

**Barrier Board:** — "Mule-Hide FR Deck Panel C, 7/16 in. min."

**Membrane:** — Any UL Classified Mule-Hide fully adhered EPDM, PVC, TPO or self-adhered modified bitumen cap sheet,

Note: Maximum incline is determined by the existing membrane/adhesive Classification.

**Class C - FleeceBack Fully Adhered (FAST Adhesive)**

**1. Deck: C-15/32**

**Incline:** 1

**Insulation:** — Johns Manville "ENRGY 3 Plus" (composite) insulation or any UL Classified wood fiberboard, 1/2 in. thick min.

**Membrane:** — "Mule-Hide TPO-c Fleece Back".



Class A – Mechanically Attached (Continued)

98. **Deck:** C-15/32 **Incline:** See Note  
**Slip Sheet:** — Two layers "VersaShield Underlayment" or "VersaShield FB-2S".  
**Insulation:** — Any UL Classified (except EPS), any combination, any thickness.  
**Membrane:** — "Mule-Hide TPO-c", "Mule-Hide TPO-c (FR)", "Mule-Hide TPO-c Extra", "Mule-Hide TPO-c Extra (FR)" or "Mule-Hide TPO-c Fleece Back".

Note: Max incline shall be in accordance with Classification established for the insulation/membrane roofing system, but cannot exceed 2:12.

99. **Deck:** C-15/32 **Incline:** Unlimited  
**Insulation (Optional):** — Any UL Classified, any combination, any thickness.  
**Barrier Board:** — 1/2 in. min gypsum board or 1/4 in. thick G-P Gypsum DensDeck® with staggered joints (6 in. offset).  
**Membrane:** — "Mule-Hide TPO-c (FR)".

100. **Deck:** C-15/32 **Incline:** See Note  
**Slip Sheet:** — One layer Atlas Roofing "FR-10" or "FR-50", Elk "VersaShield Underlayment" or "VersaShield FB-2S".  
**Insulation:** — Atlas Roofing "ACFoam III", 1.5 in. thick with joints staggered min 6 in. from the deck joints.  
**Membrane:** — "Mule-Hide TPO-c", "Mule-Hide TPO-c (FR)", "Mule-Hide TPO-c Extra", "Mule-Hide TPO-c Extra (FR)" or "Mule-Hide TPO-c Fleece Back".

Note: Max incline shall be in accordance with Classification established for the insulation/membrane roofing system.

101. **Deck:** C-15/32 **Incline:** 1/2  
**Slip Sheet:** — Two plies Atlas Roofing "FR-50".  
**Membrane:** — "Mule-Hide TPO-c", "Mule-Hide TPO-c (FR)", "Mule-Hide TPO-c Extra", "Mule-Hide TPO-c Extra (FR)" or "Mule-Hide TPO-c Fleece Back".

- 101A. **Deck:** C-15/32 **Incline:** See Note  
**Slip Sheet:** — Two layers Atlas Roofing "FR 50" or Elk "VersaShield Underlayment" or VersaShield FB-2S".  
**Membrane:** — "Mule-Hide TPO-c", "Mule-Hide TPO-c (FR)", "Mule-Hide TPO-c Extra", "Mule-Hide TPO-c Extra (FR)" or "Mule-Hide TPO-c Fleece Back".

Note: Max incline shall be in accordance with Classification established for the membrane roofing system applied over fiberboard or gypsum, but can not exceed 1-1/2:12.

102. **Deck:** C-15/32 **Incline:** 2-1/2  
**Insulation (Optional):** — Any UL Classified, any combination, any thickness.  
**Barrier Board:** — 1/2 in. min gypsum board.  
**Membrane:** — "72 mil Mule-Hide TPO-c Extra" or "80 mil Mule-Hide TPO-c Extra".

Class A – Mechanically Attached (Continued)

103. **Deck:** NC **Incline:** 1-1/2  
**Insulation:** — Any UL Classified wood fiberboard; Johns Manville "ENRGY 3 Plus" (composite) insulation; cellular concrete, precast concrete with grouted joists or structural (poured-in-place) concrete.  
**Membrane:** — "72 mil Mule-Hide TPO-c Extra" or "80 mil Mule-Hide TPO-c Extra".
104. **Deck:** NC **Incline:** 1/2  
**Insulation:** — Atlas Roofing "ACFoam II" or "ACFoam III", Dow "Hy-Therm AP", Hunter Panels "H-Shield", Johns Manville "ENRGY-3", Firestone Building Products "ISO 95+GL", "GW" or "HF", Rmax Inc. "Multi-Max-3", any combination, any thickness.  
**Membrane:** — "72 mil Mule-Hide TPO-c Extra" or "80 mil Mule-Hide TPO-c Extra".
105. **Deck:** NC **Incline:** 1/2  
**Insulation:** — Atlas Roofing "ACFoam II" or "ACFoam III", Dow "Hy-Therm AP", Hunter Panels "H-Shield", Johns Manville "ENRGY-3", Firestone Building Products "ISO 95+GL", "GW" or "HF", Rmax Inc. "Multi-Max-3", any combination, any thickness.  
**Membrane:** — "Mule-Hide TPO-c Fleece Back 100 or 115" (TPO).
106. **Deck:** NC **Incline:** 1-1/2  
**Insulation (Optional):** — Any UL Classified, any thickness.  
**Insulation:** — Any UL Classified wood fiberboard; Johns Manville "ENRGY 3 Plus" (composite) insulation.  
**Membrane:** — "Mule-Hide TPO-c Fleece Back 100 or 115" (TPO).
107. **Deck:** NC **Incline:** 3  
**Insulation:** — Any UL Classified, any thickness  
**Barrier Board:** — 1/4 in. G-P Gypsum DensDeck® or 1/2 in. gypsum wallboard.  
**Membrane:** — "Mule-Hide TPO-c Fleece Back 100 or 115" (TPO).
108. **Deck:** C-15/32 **Incline:** See Note  
**Slip Sheet:** — Two layers Elk "VersaShield Underlayment" or "VersaShield FB-2S".  
**Insulation :** — Any UL Classified (except EPS ), any combination, any thickness.  
**Membrane:** — "Mule-Hide TPO-c", "Mule-Hide TPO-c (FR)", "Mule-Hide TPO-c Extra", "Mule-Hide TPO-c Extra (FR)" or "Mule-Hide TPO-c Fleece Back".
- Note: Max incline shall be in accordance with Classification established for the insulation/membrane roofing system, but can not exceed 2:12.
109. **Deck:** NC **Incline:** 1  
**Insulation:** — Any UL Classified expanded or extruded polystyrene, any combination, any thickness  
**Slip Sheet:** — One layer Atlas Roofing "FR-10" or "FR-50", Atlas Roofing "FR 50" or Elk "VersaShield Underlayment" or "VersaShield FB-2S"  
**Membrane:** — "Mule-Hide TPO-c", "Mule-Hide TPO-c (FR)", "Mule-Hide TPO-c Extra", "Mule-Hide TPO-c Extra (FR)" or "Mule-Hide TPO-c Fleece Back".

Class A – Mechanically Attached (Continued)

110. **Deck:** C-15/32

**Incline:** See Note

**Slip Sheet:** — Three layers Elk "VersaShield FB-1S".

**Insulation:** — Any UL Classified (except EPS), any combination, any thickness.

**Membrane:** — "Mule-Hide TPO-c", "Mule-Hide TPO-c (FR)", "Mule-Hide TPO-c Extra", "Mule-Hide TPO-c Extra (FR)" or "Mule-Hide TPO-c Fleece Back".

Note: Max incline shall be in accordance with Classification established for the insulation/membrane roofing system, but cannot exceed 2:12.

111. **Deck:** C-15/32

**Incline:** See Note

**Slip Sheet:** — Three layers Elk "VersaShield FB-1S".

**Insulation (Optional):** — Any UL Classified (except EPS and wood fiberboard), any combination, any thickness.

**Membrane:** — "Mule-Hide TPO-c", "Mule-Hide TPO-c (FR)", "Mule-Hide TPO-c Extra", "Mule-Hide TPO-c Extra (FR)" or "Mule-Hide TPO-c Fleece Back".

Note: Max incline shall be in accordance with Classification established for the insulation/membrane roofing system when insulation is used or established for the membrane roofing system applied over fiberboard or gypsum when insulation is not used.

**CLASS B – MECHANICALLY FASTENED**

**\*\*6. Deck:** C-15/32 **Incline:** 1/2, See Note  
**Slipsheet:** — One Ply Atlas "FR-10," mechanically fastened  
**Membrane:** — Any UL Classified PVC, CPE, CSM, CSPE, EPDM, NBP, PIB, TPO, EIP or TRE membrane. (Note: Membrane must be currently Classified for use over the insulation used. Actual incline is determined by the maximum existing membrane/insulation Classification incline, but cannot exceed 1/2:12.)

**20. Deck:** NC **Incline:** Unlimited  
**Membrane:** — "Mule-Hide TPO", 45-60 mil.

**26. Deck:** C-15/32 **Incline:** See Note  
**Base Sheet:** — One layer Owens Corning "Perma Ply No. 28", GAF "Gafglas #75 Base Sheet", Johns Manville "Glasbase", Tamko "Glass Base", Celotex Type G2 "Vaporbar GB", Atlas Roofing "FR 50", Elk "VersaShield Underlayment" or "VersaShield FB-2S", mechanically fastened.  
**Insulation:** — Atlas Roofing "ACFoam II" or "ACFoam III", Dow "Hy-Therm AP", Hunter Panels "H-Shield", Johns Manville "ENRGY-3", Firestone Building Products "ISO 95+GL", "GW" or "HF", Rmax Inc. "Multi-Max-3", any combination, any thickness; Johns Manville "ENRGY 3 Plus" (composite) insulation; UL Classified wood fiber board, min 1/2 in. thick over any Classified insulation (any combination), min 1 in. thick. The bottom insulation layer joints are to be staggered a min 6 in. from the deck joints.  
**Membrane:** — "Mule-Hide TPO-c", "Mule-Hide TPO-c (FR)", "Mule-Hide TPO-c Extra", "Mule-Hide TPO-c Extra (FR)" or "Mule-Hide TPO-c Fleece Back".

Note: Max incline shall be in accordance with Classification established for the insulation/membrane roofing system but not to exceed 1 in.

**27. Deck:** C-15/32 **Incline:** See Note  
**Insulation:** — Johns Manville "ENRGY 3 Plus" (composite) insulation or UL Classified wood fiberboard, min 1-1/2 in. thick. The bottom insulation layer joints are to be staggered a min 6 in. from the deck joints.  
**Membrane:** — "Mule-Hide TPO-c", "Mule-Hide TPO-c (FR)", "Mule-Hide TPO-c Extra", "Mule-Hide TPO-c Extra (FR)" or "Mule-Hide TPO-c Fleece Back".

Note: Max incline shall be in accordance with Classification established for the insulation/membrane roofing system but not to exceed 1 in.

**28. Deck:** C-15/32 **Incline:** See Note  
**Slip Sheet:** — One layer Atlas Roofing "FR 50" or Elk "VersaShield Underlayment" or "VersaShield FB-2S".  
**Membrane:** — "Mule-Hide TPO-c", "Mule-Hide TPO-c (FR)", "Mule-Hide TPO-c Extra", "Mule-Hide TPO-c Extra (FR)" or "Mule-Hide TPO-c Fleece Back".

Note: Max incline shall be in accordance with Classification established for the membrane roofing system applied over fiberboard or gypsum, but can not exceed 1-1/2:12.

Class B – Mechanically Attached (Continued)

29. **Deck:** C-15/32

**Incline:** 1/2

**Insulation (Optional):** — Polyisocyanurate, min 1 in. thickness.

**Slip Sheet:** — Two layers Atlas Roofing "FR 50" or Elk "VersaShield Underlayment" or "VersaShield FB-2S.

**Membrane:** — "Mule-Hide TPO-c", "Mule-Hide TPO-c (FR)", "Mule-Hide TPO-c Extra", "Mule-Hide TPO-c Extra (FR)" or "Mule-Hide TPO-c Fleece Back".

30. **Deck:** C-15/32

**Incline:** 1/2

**Slip Sheet:** — One ply Atlas Roofing "FR-50".

**Membrane:** — "Mule-Hide TPO-c (FR)".





Maintenance and Repair – Class A, B & C (Continued)

12. **Deck:** C-15/32 or NC

**Incline:** See Note

**Existing Roof System:** — Any Class A, B or C roofing system, to retain the existing Classification, is covered with:

**Insulation:** — Hunter Panels "Poly ISO 1-HD" or " Poly ISO 1-HD90".

**Membrane:** — Any UL Classified membrane.

Max incline shall be in accordance with Classification established for insulation/membrane roofing system, but cannot exceed 2:12. TPO membranes are limited to a 1/2:12. max. slope.

13. **Deck:** C-15/32 or NC

**Incline:** See Note

**Existing Roof System:** — Any Class A, B or C roofing system, to retain the existing Classification, is covered with:

**Insulation:** — Hunter Panels " Poly ISO 1-HD-Composite ".

**Membrane:** — Any UL Classified membrane.

Note: Max incline shall be in accordance with Classification established for insulation/membrane roofing system, but cannot exceed 2:12. TPO membranes are limited to a 1/2:12. max. slope.

**MAINTENANCE AND REPAIR SYSTEMS - CLASS A**

16. **Deck:** C-15/32 **Incline:** ¼  
**Existing Roof System:** — Class A, roofing system gravel maintained on gravel built-up system, covered with:  
**Insulation:** — Tenneco "AMOCOR®-PB6, PG38 or PG39".  
**Membrane:** — "Mule-Hide TPO-c", "Mule-Hide TPO-c (FR)", "Mule-Hide TPO-c Extra" or "Sure-Flex PVC", mechanically fastened.
17. **Deck:** NC **Incline:** ¼  
**Existing Roof System:** — Class A, B or C roofing (gravel may be removed from gravel built-up system).  
**Insulation:** — Tenneco "AMOCOR®-PB6, PB6W, PG38 or PG39", mechanically fastened.  
**Slip Sheet:** — One layer Atlas Roofing "FR 10" or FR 50", or Elk "VersaShield Underlayment" or "VersaShield FB-2S".  
**Membrane:** — "Mule-Hide TPO-c (FR)", mechanically fastened.
18. **Deck:** C-15/32 **Incline:** 1/2  
**Existing Roof System:** — Class A, B or C roofing system, to retain the existing Classification, is covered with:  
**Slip Sheet:** — Two or more layers Atlas Roofing "FR-50", Elk "VersaShield Underlayment" or "VersaShield FB-2S".  
**Membrane:** — "Mule-Hide TPO-c", "Mule-Hide TPO-c (FR)", "Mule-Hide TPO-c Extra", "Mule-Hide TPO-c Extra (FR)" or "Mule-Hide TPO-c Fleece Back", mechanically fastened.
19. **Deck:** NC **Incline:** 1/2  
**Existing Roof System:** — Class A, B or C BUR or modified bitumen roofing system gravel may be removed, covered with:  
**Insulation (Optional):** — Atlas Roofing "ACFoam II" or "ACFoam III", Dow "Hy-Therm AP", Hunter Panels "H-Shield", Johns Manville "ENRGY-3", Firestone Building Products "ISO 95+GL", "GW" or "HF", Rmax Inc. "Multi-Max-3", any combination, any thickness.  
**Insulation (Optional):** — Any UL Classified wood fiberboard; Johns Manville "ENRGY 3 Plus" (composite) insulation.  
**Membrane:** — "Mule-Hide TPO-c Fleece Back 100" (TPO) or "Mule-Hide TPO-c Fleece Back 115" (TPO), mechanically attached or fully adhered with "Mule-Hide SP-100 Adhesive".
20. **Deck:** NC **Incline:** 1  
**Existing Roof System:** — Any Class A, B or C roofing system, covered with:  
**Membrane:** — "Mule-Hide TPO-c Fleece Back 100 or 115 Membrane", adhered with "Mule-Hide SP-100 Adhesive".

Maintenance and Repair – Class A (Continued)

21. **Deck:** NC

**Incline:** See Note

**Existing Roof System:** — Class A, B or C roofing system (gravel may be removed from gravel built-up or ballasted single-ply system).

**Insulation:** — A minimum 3 in. layer or minimum two layers of "Poly ISO 1-DWD".

**Membrane:** — Any UL Classified roofing membrane.

Note: The maximum incline shall be in accordance with the Class A Classification established for the membrane/insulation roofing assembly, however the incline can not exceed 1/2:12.

22. **Deck:** C-15/32

**Incline:** See Note

**Existing Roof System:** — Class A, B or C roofing system (gravel may be removed from gravel built-up or ballasted single-ply system).

**Insulation:** — A minimum 3 in. layer or minimum two layers of "Poly ISO 1-DWD".

**Membrane:** — Any UL Classified roofing membrane.

Note: The maximum incline shall be in accordance with the Class A Classification established for the membrane/insulation roofing assembly, however the incline can not exceed 1/2:12.

## **MAINTENANCE AND REPAIR SYSTEMS - CLASS B**

**5. Deck:** C-15/32

**Incline:** 1/2

**Existing Roof System:** — Class B mineral or smooth surfaced built-up or modified roofing system, to retain the existing Classification, is covered with:

**Membrane:** — "Mule-Hide TPO-c", "Mule-Hide TPO-c (FR)", "Mule-Hide TPO-c Extra", "Mule-Hide TPO-c Extra (FR)" or "Mule-Hide TPO-c Fleece Back", mechanically fastened.

**6. Deck:** NC

**Incline:** See Note

**Existing Roof System:** — Class A, B or C roofing system (gravel may be removed from gravel built-up or ballasted single-ply system).

**Insulation:** — A minimum 1.9 in. layer of "Poly ISO 1-DWD".

**Membrane:** — Any UL Classified roofing membrane.

Note: The maximum incline shall be in accordance with the Class A Classification established for the membrane/insulation roofing assembly, however the incline can not exceed 1/2:12.

**7. Deck:** C-15/32

**Incline:** See Note

**Existing Roof System:** — Class A, B or C roofing system (gravel may be removed from gravel built-up or ballasted single-ply system).

**Insulation:** — A minimum 1.9 in. layer of "Poly ISO 1-DWD".

**Membrane:** — Any UL Classified roofing membrane.

Note: The maximum incline shall be in accordance with the Class A Classification established for the membrane/insulation roofing assembly, however the incline can not exceed 1/2:12.

### **MAINTENANCE AND REPAIR SYSTEMS - CLASS B AND C**

1. **Deck:** C-15/32

**Incline:** 1/2

**Existing Roof System:** — Class B or C roofing system, to retain the existing Classification, is covered with:

**Slip Sheet:** — One or more layers Atlas Roofing "FR-50", Elk "VersaShield Underlayment" or "VersaShield FB-2S.

**Membrane:** — "Mule-Hide TPO-c", "Mule-Hide TPO-c (FR)", "Mule-Hide TPO-c Extra", "Mule-Hide TPO-c Extra (FR)" or "Mule-Hide TPO-c Fleece Back", mechanically fastened.