

**TECH SOLUTIONS 515.0**  
**ACHIEVING CANADIAN CLASS A ROOF**  
**ASSEMBLIES USING STYROFOAM™**  
**BRAND INSULATION WITH**  
**SINGLE-PLY MEMBRANES**



**SUMMARY**

This document describes the requirements of Class A roof assemblies in Canada based on Underwriters' Laboratories of Canada (ULC) standard CAN/ULC S107: Fire Tests of Roof Coverings. Class A testing measures a roof assembly's resistance to fire originating from outside the building. Representative Class A roof assemblies for single-ply membranes from GAF Materials Corp., Carlisle SynTec, Dow Roofing Systems (formerly Stevens Roofing Systems), Sika Sarnafil Inc. and Firestone Building Products are listed in this document.

STYROFOAM™ Brand Extruded Polystyrene (XPS) Insulation can be used in a wide variety of Class A assemblies with single-ply membranes. Other than the ballasted roof where a coverboard is not required for Class A rating, a coverboard/slip sheet is required for all other roof types in order for STYROFOAM™ Brand XPS Insulation to be used in Class A listings. The coverboard commonly used is minimum 1/2" (13 mm) wood fiberboard, 1/4" (6.4 mm) Georgia-Pacific (G-P) DensDeck or 1/2" (13 mm) plywood, 1/2" (13 mm) minimum glass fiber or perlite.

**WHAT IS A CLASS A ROOFING ASSEMBLY?**

Class A, B or C measures external fire performance of a roof assembly. Class A roof assemblies resist flame spread under severe fire exposure from outside. The test method is CAN/ULC S107.

In this test procedure, the roof assembly is exposed to a fire source on the exterior side of the assembly. The roof assembly is placed at the mouth of a furnace. Flames shoot out over the top of the assembly for a period of 10 minutes. The spread of the flame along the surface of the assembly is measured and must not exceed a predetermined length.

Class A assemblies are allowed on any building type. National Building Code of Canada (NBCC) Reference in Division B, Part 3: 3.2.3.18 states "... every building shall have a Class A, B or C roof covering ...." (There are two exceptions in the code.)

Specific Class A approvals vary based on roof slope and membrane type. The listings are generally owned by membrane manufacturers.

**STYROFOAM™ BRAND INSULATION IN CLASS A ROOF ASSEMBLIES WITH SINGLE-PLY MEMBRANES**

The represented single-ply membranes include:

1. TPO membrane from GAF Materials Corp.
2. EPDM and TPO membranes from Carlisle SynTec
3. TPO membrane from Dow Roofing Systems (formerly Stevens Roofing Systems)
4. PVC membrane from Sika Sarnafil
5. EPDM and TPO membranes from Firestone Building Products

For these targeted membrane manufacturers, their roofing approval listings from ULC are shown in Table 1. The table can be used to check the details of the listings by ULC file number at <http://database.ul.com/cgi-bin/XYV/template/LISCANADA/1FRAME/index.html>.

**TABLE 1: MAJOR MEMBRANE MANUFACTURERS AND ULC FILE NUMBERS<sup>(1)</sup>**

Single-Ply Roof Membrane Manufacturer	ULC File Number
GAF Materials Corp.	TGFUC.R1306, TGFU.R1306
Carlisle SynTec	TGFUC.R19678, TGFU.R8103
Dow Roofing Systems (formerly Stevens Roofing Systems)	TGFUC.R10321
Sika Sarnafil Inc.	TGFUC.R16962
Firestone Building Products	TGFUC.R19629, TGFU.R9516

<sup>(1)</sup> File numbers may change over time. Consult membrane manufacturer or ULC online listing for most recent information.

## ACHIEVING CANADIAN CLASS A ROOF ASSEMBLIES USING STYROFOAM™ BRAND INSULATION WITH SINGLE-PLY MEMBRANES

STYROFOAM™ Brand Extruded Polystyrene Insulation Products Designed for Single-Ply Membrane Roof Assemblies:

- STYROFOAM™ Brand HIGHLOAD 40, 60 or 100 Insulation
- STYROFOAM™ Brand ROOFMATE™ Insulation

Carlisle SynTec and Firestone Building Products both have follow-up service with Underwriters Laboratories International for the U.S. and Canada. The UL listing in the U.S. is also applicable for Canada. In Table 1, both U.S. and Canada listing numbers are included. The EPDM membrane listings are taken from the Canada listing and TPO membrane listings are taken from the U.S. listing (not available in the Canada listing) for these two manufacturers.

The current listings are based on ULC website information as of July 14, 2008. Future listing changes from the respective membrane manufacturers may change the stated file number and listings of this document. Consult membrane manufacturer or ULC listing for the most updated assembly listings.

### GAF Typical Class A Roof Listing for Fully Adhered TPO Membrane (TGFU.R1306)

34. Deck: C-15/32

Incline: 2

- Insulation (optional): Any UL Classified, any thickness
- Barrier Board: Minimum 1/4" thick G-P DensDeck Roof Board, DensDeck Prime Roof Board or DensDeck DuraGuard Roof Board
- Membrane: EverGuard Freedom TPO 45-, 60- or 80-mil self-adhered

### Carlisle SynTec Typical Class A Roof Listing for EPDM Membrane (TGFUC.R19678)

Limited to noncombustible decks at inclines not less than 1:24. The deck is covered with ULC labeled expanded or extruded polystyrene rigid roof insulation, unlimited thickness, covered with 13 mm thick wood fiberboard, 4.2 kg/m<sup>2</sup> density, mechanically secured to the deck with metal washers and fasteners. The wood fiberboard is covered with Carlisle Standard Black Reinforced EPDM or UltraGard EPDM membrane, 1.5 mm thick maximum, fully adhered.

### Carlisle SynTec Typical Class A Roof Listing for TPO Membrane (TGFU.R8103)

5. Deck: NC

Incline: 3

- Insulation (optional): Any UL Classified, any combination, any thickness

- Barrier Board: 1/2" thick gypsum wallboard or 1/4" thick G-P DensDeck
- Membrane: Sure-Weld

7. Deck: C-15/32

Incline: Unlimited

- Insulation (optional): Any UL Classified, any combination, any thickness
- Barrier Board: 1/2" min. gypsum board or 1/4" thick G-P DensDeck with staggered joints (6" offset)
- Membrane: Sure-Weld HS or Sure-Weld GSD

The following terms are defined for all the approved Class A assemblies listed in this section.

- Membrane type: The generic type of membrane.
- Deck type: NC means noncombustible; this applies to either concrete or steel decks. C-15/32 is combustible wood deck.
- Incline: The maximum slope of the roof in inches/linear foot.
- Insulation thickness: The maximum allowable insulation thickness.
- Slip sheet, coverboard, barrier board or recovery board: These products are installed on TOP of the insulation. Barrier board can also be used BELOW the insulation.

## ACHIEVING CANADIAN CLASS A ROOF ASSEMBLIES USING STYROFOAM™ BRAND INSULATION WITH SINGLE-PLY MEMBRANES

### 2. Deck: NC

*Incline: 1-1/2*

- Insulation: Carlisle HP Recovery Board, 1/2" to 3"; Carlisle Recovery Board, 1/2" min., over any UL Classified insulation, any combination, any thickness; cellular concrete, precast concrete with grouted joints or structural (poured-in-place) concrete
- Membrane: Sure-Weld or Sure-Weld GSP

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

*Incline: 2-1/2*

- Insulation (optional): Any UL Classified, any combination, any thickness
- Barrier Board: 1/2" min. gypsum board
- Membrane: 72-mil Sure-Weld EXTRA or 80-mil Sure-Weld EXTRA

### 12. Deck: NC

*Incline: 1-1/2*

- Insulation: Carlisle HP Recovery Board, 1/2" to 3"; Carlisle Recovery Board, 1/2" min., over any UL Classified insulation, any combination, any thickness; cellular concrete, precast concrete with grouted joints or structural (poured-in-place) concrete
- Membrane: 72-mil Sure-Weld EXTRA or 80-mil Sure-Weld EXTRA

### 15. Deck: NC

*Incline: 1-1/2*

- Insulation (optional): Any UL Classified, any thickness
- Insulation: 1/2" thick Carlisle HP Recovery Board
- Membrane: Sure-Weld FleeceBACK 100 or 115 (TPO)

### 16. Deck: NC

*Incline: 3*

- Insulation: Any UL Classified, any thickness
- Barrier Board: 1/4" G-P DensDeck or 1/2" gypsum wallboard
- Membrane: Sure-Weld FleeceBACK 100 or 115 (TPO)

### 17. Deck: C-15/32

*Incline: See Note*

- Slip Sheet: Two layers Carlisle FR Base Sheet 2S, Elk VersaShield Underlayment or VersaShield FB-2S
- Insulation: Any UL Classified (except EPS), any combination, any thickness
- Membrane: Any UL Classified Carlisle TPO membrane

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

### 18. Deck: NC

*Incline: 1*

- Insulation: Any UL Classified expanded or extruded polystyrene, any combination, any thickness
- Slip Sheet: One layer Atlas Roofing Corp. FR-10 or FR-50, Carlisle FR Base Sheet 2S or Elk VersaShield Underlayment or VersaShield FB-2S
- Membrane: Any UL Classified Carlisle TPO membrane

### 19. Deck: C-15/32

*Incline: See Note*

- Slip Sheet: Three layers Carlisle FR Base Sheet 1S or Elk VersaShield FB-1S
  - Insulation: Any UL Classified (except EPS), any combination, any thickness
  - Membrane: Any UL Classified Carlisle TPO membrane
- Note: Maximum incline shall be in accordance with Classification established for the insulation/membrane roofing system, but cannot exceed 2:12.*

## ACHIEVING CANADIAN CLASS A ROOF ASSEMBLIES USING STYROFOAM™ BRAND INSULATION WITH SINGLE-PLY MEMBRANES

### 20. Deck: C-15/32

*Incline: See Note*

- Slip Sheet: Three layers Carlisle FR Base Sheet 1S or Elk VersaShield FB-1S
- Insulation (optional): Any UL Classified (except EPS and wood fiberboard), any combination, any thickness
- Membrane: Any UL Classified Carlisle TPO membrane

*Note: Maximum 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.*

### 21. Deck: C-15/32

*Incline: See Note*

- Slip Sheet: Two layers Carlisle FR Base Sheet 1S or Elk VersaShield FB-1S
- Insulation (optional): Any UL Classified (except EPS and wood fiberboard), any combination, any thickness
- Membrane: Any UL Classified Carlisle TPO membrane

*Note: Maximum 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 cannot exceed 3/4:12.*

### 1. Deck: NC

*Incline: 3/4*

- Insulation: Carlisle HP Recovery Board, 1/2" to 3"; Carlisle Recovery Board, 1/2" min., over any UL Classified insulation, any combination, any thickness; cellular concrete, precast concrete with grouted joints or structural (poured-in-place) concrete
- Membrane: Sure-Weld GSD, fully adhered with Sure-Weld Bonding Adhesive at 1-1/3 gal/sq

### 3. Deck: C-15/32

*Incline: Unlimited*

- Insulation (optional): Any UL Classified, any combination, any thickness
- Barrier Board: 1/2" min. gypsum board or 1/4" thick G-P DensDeck
- Membrane: Sure-Weld GSD or Sure-Weld HS, fully adhered with Sure-Weld Bonding Adhesive at 1-1/3 gal/sq

### 4. Deck: NC

*Incline: 3*

- Insulation (optional): Any UL Classified, any combination, any thickness
- Barrier Board: Oriented strand board
- Membrane: Sure-Weld GSD, fully adhered with Sure-Weld Bonding Adhesive at 1-1/3 gal/sq

### 6. Deck: NC

*Incline: 3/4*

- Insulation: Any thickness
  - Polyiso HP-H
  - Tapered Polyiso HP-H
  - Polyiso HP-HP
  - Tapered Polyiso HP-HP
  - Polyiso HP-H Composite
  - Tapered Polyiso HP-H Composite
  - Polyiso HP-HNB
- Membrane: Sure-Weld GSD

**Dow Roofing Systems (formerly Stevens Roofing Systems)  
Typical Class A Roof Listing for TPO Membrane (TGFUC.R10321)**

### 6. Deck: NC

*Incline: Unlimited*

- Insulation: Any following ULC labeled insulation, any thickness, mechanically fastened or hot-mopping asphalt at maximum rate of 1.5 kg/m<sup>2</sup>:
  - Polyisocyanurate
  - Polystyrene
  - Polyisocyanurate composite
  - Wood fiberboard
  - Perlite
  - Glass fiber
- Barrier Board: Layer of ULC labeled G-P DensDeck, 13 mm thick min. overlayment board
- Membrane: Layer of Stevens EP, fully adhered

## ACHIEVING CANADIAN CLASS A ROOF ASSEMBLIES USING STYROFOAM™ BRAND INSULATION WITH SINGLE-PLY MEMBRANES

### 7. Deck: NC

*Incline: 1:12, max.*

- Insulation: Any following ULC labeled insulation, any thickness, mechanically fastened or hot-mopping asphalt at maximum rate of 1.5 kg/m<sup>2</sup>:
  - Polyisocyanurate
  - Polystyrene
  - Polyisocyanurate composite
  - Wood fiberboard
  - Perlite
  - Glass fiber
- Barrier Board: Layer of 13 mm thick min. wood fiberboard
- Membrane: Layer of Stevens EP, fully adhered

### 8. Deck: NC

*Incline: 1:12, max.*

- Insulation: Any following ULC labeled insulation, any thickness, mechanically fastened or hot-mopping asphalt at maximum rate of 1.5 kg/m<sup>2</sup>:
  - Polyisocyanurate
  - Polystyrene
  - Polyisocyanurate composite
  - Wood fiberboard
  - Perlite
  - Glass fiber
- Barrier Board: Layer of 11 mm thick min. oriented strand board, structural particleboard panel, wafer-board panels, or 12 mm thick min. plywood
- Membrane: Layer of Stevens EP, fully adhered

Dow Roofing Systems (formerly Stevens Roofing Systems) has a Class A roofing assembly for extruded polystyrene insulation with TPO membrane using FR-10 or FR-50 as slip sheets instead of G-P DensDeck. However, this listing is currently approved by ULC for U.S. applications only.

### 22. Deck: NC

*Incline: 1/2*

- Insulation: Polystyrene, any thickness
- Slip Sheet: Atlas Roofing FR-10 or FR-50
- Membrane: Stevens EP (TPO) or Stevens EP-XL (TPO)

### Sika Sarnafil Typical Class A Roof Listing for PVC Membrane (TGFUC.R16962)

#### 4. Deck: NC

*Incline: 1:8, max.*

- Insulation (optional): Polystyrene or polyisocyanurate, any thickness
- Barrier Board: Plywood (13 mm min.) or G-P DensDeck (6.4 mm min.), mechanically fastened with metal insulation anchors
- Membrane (PVC):
  - G410
  - G410-14
  - G410-15
  - G410-18
  - G410-20
  - G410-24
  - S327
  - S327-14
  - S327-15
  - S327-18
  - S327-20
  - S327-24

### 5. Deck: NC

*Incline: 1:12, max.*

- Barrier Board: Gypsum board (19 mm min.) or G-P DensDeck (6.4 mm min.)
- Insulation: STYROFOAM™ Brand ROOFMATE™ Insulation or EPS, any thickness
- Barrier Board: Huebert Fiberboard Inc. 25 mm fiberboard
- Membrane (PVC):
  - S327
  - S327-14
  - S327-15
  - S327-18
  - S327-20
  - S327-24

### 14. Deck: NC

*Incline: 1:6, max.*

- Barrier Board: 12 mm gypsum board, mechanically fastened with 152 mm offset of the gypsum joints from the plywood joints
- Insulation: Polystyrene, any thickness
- Barrier Board: 19 mm perlite board
- Membrane (PVC):
  - G410
  - G410/Felt
  - G410-14
  - G410-14/Felt
  - G410-15
  - G410-15/Felt
  - G410-18
  - G410-18/Felt
  - G410-20
  - G410-20/Felt
  - G410-24
  - S327
  - S327/Felt
  - S327-14
  - S327-14/Felt

## ACHIEVING CANADIAN CLASS A ROOF ASSEMBLIES USING STYROFOAM™ BRAND INSULATION WITH SINGLE-PLY MEMBRANES

- S327-15
- S327-15/Felt
- S327-18
- S327-18/Felt
- S327-20
- S327-20/Felt
- S327-24

### 24. Deck: C-12 mm

#### Incline: Unlimited

- Vapor Barrier (optional): Polyethylene, polypropylene, kraft or PVC (not UL Classified)
- Insulation (optional): One or more layers of polyisocyanurate, polystyrene or combinations, any thickness
- Barrier Board: G-P DensDeck, 6 mm min. with 152 mm staggered joints, mechanically fastened
- Membrane (PVC):
  - G410
  - G410/Felt
  - G410-12
  - G410-12/Felt
  - G410-15
  - G410-15/Felt
  - G410-18
  - G410-18/Felt
  - G410-20
  - G410-20/Felt
  - G410-24
  - S327
  - S327/Felt
  - S327-12
  - S327-12/Felt
  - S327-15
  - S327-15/Felt
  - S327-20
  - S327-20/Felt
  - S327-24

### Firestone Building Products Typical Class A Roof Listing for EPDM Membrane (TGFUC.R19629)

6. Limited to minimum 13 mm thick plywood decks and non-combustible decks at inclines not exceeding 1:24. The deck is covered with one or more layers of ULC labeled Firestone ISO 95+GL, Rhoflex Isocyanurate, Owens-Corning roof insulation, STYROFOAM™ Brand ROOFMATE™ Insulation, expanded polystyrene rigid roof insulation, or RxISO Roof Insulation, followed by minimum 13 mm thick moisture-resistant gypsum wallboard mechanically fastened to the deck. Gypsum wallboard to be installed with end joints staggered 600 mm or more in adjacent rows. The gypsum wallboard is covered with one layer of Firestone Standard or Standard Reinforced RubberGard EPDM or Firestone Fire Retardant or Fire Retardant Reinforced RubberGard EPDM roofing membrane, 1.1 mm to 1.5 mm maximum thickness. The roofing membrane is mechanically fastened or fully adhered.
8. Limited to noncombustible decks at inclines not exceeding 1:12. The deck is covered with one or more layers of ULC labeled Firestone ISO 95+GL or GW, Rhoflex Isocyanurate GL or GW, STYROFOAM™ Brand ROOFMATE™ Insulation, or expanded polystyrene rigid roof insulation, covered with minimum

13 mm thick wood fiberboard mechanically fastened to the deck. Wood fiberboard to be installed with end joints staggered 600 mm or more in adjacent rows. The wood fiberboard is covered with one layer of Firestone Standard Reinforced RubberGard EPDM or Firestone Fire Retardant Reinforced RubberGard EPDM roofing membrane, 1.1 mm to 1.5 mm thickness. The roofing membrane is mechanically fastened or fully adhered.

9. Limited to noncombustible decks at inclines not exceeding 1:6. The deck is covered with one or more layers of ULC labeled Firestone ISO 95+GL or GW, Rhoflex Isocyanurate GL or GW, STYROFOAM™ Brand ROOFMATE™ Insulation, or expanded polystyrene rigid roof insulation, covered with minimum 13 mm thick wood fiberboard mechanically fastened to the deck. Wood fiberboard to be installed with end joints staggered 600 mm or more in adjacent rows. The wood fiberboard is covered with one layer of Firestone Fire Retardant Reinforced RubberGard EPDM roofing membrane, 1.1 mm to 1.5 mm thickness. The roofing membrane is mechanically fastened or fully adhered.

## ACHIEVING CANADIAN CLASS A ROOF ASSEMBLIES USING STYROFOAM™ BRAND INSULATION WITH SINGLE-PLY MEMBRANES

11. Limited to minimum 13 mm thick plywood decks and non-combustible decks at inclines not exceeding 1:48. The deck is covered with one or more layers of ULC labeled Firestone ISO 95+GL or GW, Rhoflex Isocyanurate GL or GW, Johns Manville ENRGY 2, STYROFOAM™ Brand ROOFMATE™ Insulation, or expanded polystyrene rigid roof insulation, followed by minimum 13 mm thick regular or moisture-resistant gypsum wallboard mechanically fastened to the deck. Gypsum wallboard to be installed with end joints staggered 600 mm or more in adjacent rows. The gypsum wallboard is covered with one layer of Firestone Standard Reinforced RubberGard EPDM or Firestone Fire Retardant Reinforced RubberGard EPDM roofing membrane, 1.1 mm to 1.5 mm thickness. The roofing membrane is mechanically fastened or fully adhered.

### Firestone Building Products Typical Class A Roof Listing for TPO Membrane (TGFU.R9516)

101. Deck: NC

Incline: 1/2

- Insulation (optional): Any UL Classified, any thickness
- Insulation: Glass fiber, wood fiberboard or perlite, 1/2" min. thickness
- Membrane: Ultraply TPO

102. Deck: C-15/32

Incline: 2-1/2

- Insulation (optional): Any UL Classified, any thickness
- Barrier Board: Gypsum wallboard, 1/2" thick min., G-P DensDeck, 1/4" min., joints in wallboard offset 6" with joints in deck
- Membrane: Ultraply TPO

141. Deck: NC

Incline: 1-1/4

- Insulation: Any UL Classified, any thickness, mechanically fastened
- Insulation: Oriented strand board, 7/16" thick min., mechanically fastened
- Membrane: Ultraply TPO

68. Deck: NC

Incline: 2

- Insulation (optional): Any UL Classified, any thickness
- Insulation: Glass fiber, wood fiberboard or perlite, 1/2" min. thickness
- Membrane: Ultraply TPO

69. Deck: C-15/32

Incline: 4

- Insulation (optional): Any UL Classified, any thickness
- Barrier Board: Gypsum wallboard, 1/2" thick min., G-P DensDeck, 1/4 min., joints in wallboard offset 6" with joints in deck
- Membrane: Ultraply TPO

**ACHIEVING CANADIAN CLASS A ROOF ASSEMBLIES USING  
STYROFOAM™ BRAND INSULATION WITH SINGLE-PLY MEMBRANES**

For Technical Information: 1-866-583-BLUE (2583) (English) 1-800-363-6210 (French)

For Sales Information: 1-800-232-2436 (English) 1-800-565-1255 (French)

DOW CHEMICAL CANADA ULC . Dow Building Solutions . 450 – 1st St. SW . Suite 2100 . Calgary, AB T2P 5H1

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**STYROFOAM™ Brand Extruded Polystyrene Insulation**

CAUTION: This product is combustible. Protect from high heat sources. A protective barrier or thermal barrier may be required as specified in the appropriate building code. For more information, consult MSDS, call Dow at 1-866-583-BLUE (2583) or contact your local building inspector. In an emergency, call 1-519-339-3711.

**WARNING: Rigid foam insulation does not constitute a working walkable surface or qualify as a fall protection product.**

Building and/or construction practices unrelated to building materials could greatly affect moisture and the potential for mould formation. No material supplier including Dow can give assurance that mould will not develop in any specific system.

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