

# UL Evaluation Report

**UL ER16529-01**

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**Sub-level 3: 07 21 00 - Thermal Insulation**  
**Sub-level 4: 07 21 13 - Board Insulation**

**Sub-level 3: 07 22 00 - Roof and Deck Insulation**  
**Sub-level 4: 07 22 16 - Roof Board Insulation**

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**Sub-level 3: 07 27 00 - Air Barriers**

**COMPANY:**

**ATLAS MOLDED PRODUCTS, A DIVISION OF ATLAS ROOFING CORPORATION**  
**8240 BYRON CENTER SW**  
**BYRON CENTER, MICHIGAN 49315**  
**(800) 917-9138**  
[AtlasMoldedProducts.com](http://AtlasMoldedProducts.com)



## 1. SUBJECT :

**ATLAS OEM, DURATHERM, THERMALSTAR, THERMALSTAR GPS, AND ATLAS GEOFOAM EXPANDED POLYSTYRENE INSULATION BOARDS**

**TALONGUARD TREATED EPS, THERMALSTAR T&G BOARD (T&G I, T&G II, T&G IIR, GPS T&G), ORANGE INSULATION BOARD, THERMALSTAR EIFS, THERMALSTAR EIFS GPS, THERMALSTAR EIFS PRO, THERMALSTAR INTER-GRADE INSULATION, THERMALSTAR INSULATION BOARD, THERMALSTAR TAPERED, THERMALSTAR FLUTE FILL**

**THERMALSTAR LCi LAMINATED INSULATION, THERMALSTAR LRi LAMINATED INSULATION, THERMALSTAR LCi GPS LAMINATED INSULATION, THERMALSTAR LWi LAMINATED INSULATION, THERMALSTAR LWi GPS LAMINATED INSULATION, THERMALSTAR SWi LAMINATED STRUCTURAL INSULATION**

## 2. SCOPE OF EVALUATION:

- 2018, 2015, and 2012 *International Building Code*® (IBC)
- 2018, 2015, and 2012 *International Residential Code*® (IRC)
- 2018, 2015, and 2012 *International Energy Code*® (IECC)
- ICC-ES Acceptance Criteria for Foam Plastic Insulation (AC12)
- ICC-ES Acceptance Criteria for Foam Plastic Sheathing Panels used as Water Resistive Barriers (AC71)
- ICC-ES Acceptance Criteria for Termite Resistant Foam Plastic (AC239)
- ICC-ES Acceptance Criteria for Quality Documentation (AC10)

### The products were evaluated for the following properties:

- Surface Burning Characteristics (ANSI/UL723, ASTM E84)
- Physical Properties (ASTM C578)
- Physical Properties (ASTM E2430)
- Physical Properties (ASTM D6817)
- Roof Deck Construction Material With Resistance to Internal Fire Exposure (ANSI/UL1256)
- Roofing Systems for Exterior Fire Exposure (ANSI/UL790, ASTM E108)
- Fire-resistance-rated construction (ANSI/UL263, ASTM E119)
- For Use in Attics and Crawl Spaces (AC12, App. A and B)
- For Use Without a Thermal Barrier – Special Approval (NFPA 286)
- Water-resistive Barrier (AC71)
- Air Barrier (ASTM E2178)
- Termite Resistance (ICC-ES AC239)
- For Use on Exterior Commercial Walls (NFPA285)
- Foam Plastic Special Approval (ANSI/UL1715)

### 3. REFERENCED DOCUMENTS

#### ■ ICC-ES:

- ICC-ES Acceptance Criteria for Foam Plastic Insulation (AC12)
- ICC-ES Acceptance Criteria for Quality Documentation (AC10)
- ICC-ES Acceptance Criteria for Foam Plastic Sheathing Panels Used as Water- Resistive Barriers (AC71)
- ICC-ES Acceptance Criteria for Cementitious Exterior Wall Coatings (AC11)
- ICC-ES Acceptance Criteria for Termite Resistant Foam Plastic (AC239)

#### ■ ANSI/UL:

- UL723 (ASTM E84), Test for Surface Burning Characteristics of Building Materials
- UL790 (ASTM E108), Standard Test Methods for Fire Tests of Roof Coverings
- UL1256 Fire Test of Roof Deck Constructions
- UL263 (ASTM E119), Fire Tests of Building Construction and Materials
- UL1715 Fire Test of Interior Finish Material

#### ■ APA:

- PS 2, Performance Standard for Wood-Based Structural-Use Panels

#### ■ ASTM:

- ASTM C578, Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation
- ASTM E2430, Standard Specification for Expanded Polystyrene (EPS) Thermal Insulation Boards for Use in Exterior Insulation and Finish Systems (EIFS)
- ASTM E2178, Standard Test Method for Air Permeance of Building Materials
- ASTM D6817, Standard Guide for Rigid Cellular Polystyrene Geof foam

#### ■ NFPA:

- NFPA 286, Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth
- NFPA 285, Standard Fire Test for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Assemblies Containing Combustible Components
- NFPA 259, Standard Test Method for Potential Heat of Building Materials

#### ■ AAMA:

- AAMA 711, Voluntary Specification for Self-Adhering Flashing Used for Installation of Exterior Wall Fenestration Products

## **4. USES**

### **4.1 Atlas OEM, DuraTherm, ThermalStar, ThermalStar GPS, and Atlas Geofoam:**

Atlas OEM, DuraTherm, ThermalStar, ThermalStar GPS, and Atlas Geofoam boards are used as insulation on the interior or exterior of above grade walls, on the interior or exterior of below grade walls, below concrete slabs, around concrete slab edges, or as roof insulation. Installation shall be in accordance with Section 6.1 of this report.

The insulation boards may be used on walls in attics and crawl spaces without an ignition barrier, when installation is in accordance with Section 6.8 of this report.

The insulation boards may be used without a thermal barrier on wall, ceiling, and floor surfaces of buildings and structures of an accessory character as regulated under IBC Section 312 (Utility and Miscellaneous, Group U), such as, detached garages, pole barns, telecommunication shelters, concrete modular buildings, and agricultural buildings, with no thermal or ignition barrier applied to the foam plastic, based on testing in accordance with NFPA 286, and 2018 and 2015 IBC Section 2603.9 and 2012 IBC Section 2603.10, or IRC Section R316.6, when all other requirements of the building code for that building are met, and when installed in accordance with section 6.9 of this report.

Products specifically listed in section 6.10 are approved for use on interior walls of residential basements without a prescriptive thermal barrier based on fire testing in accordance with 2018 and 2015 IBC Section 2603.9, 2012 IBC Section 2603.10, and IRC Section R316.6.

### **4.2 TalonGuard Treated Expanded Polystyrene:**

TalonGuard Treated EPS insulation boards or blocks are recognized for the same uses as Atlas OEM, DuraTherm, ThermalStar, GPS & Atlas Geofoam EPS Insulation Boards. TalonGuard Treated EPS products are also designed for use where termites are a concern. In areas where the probability of termite infestation is defined as “very heavy”, the insulation must be installed in accordance with 2018 and 2015 IBC Section 2603.8, 2012 IBC Section 2603.9 or IRC Section R318.1, as applicable. Use is limited to areas exposed to the *Reticulitermes* termite genus.

### **4.3 ThermalStar T&G Board (T&G I, T&G II, T&G IIR, GPS T&G):**

ThermalStar T&G EPS insulation boards are used as nonstructural thermal insulation in buildings of any construction type, as a component of a one-coat cementitious exterior wall coating system. The insulation is for use on the outside faces of exterior walls when an ASTM C 578 Type I or Type II EPS board is recognized for use in a one-coat cementitious exterior wall coating system, or when installed as described in section 6.3 of this report. The insulation may also be directly exposed in attic and crawl spaces without a covering when installed as described in section 6.8 of this report. Additionally, the insulation may be used as exterior perimeter insulation around concrete slab edges, on concrete or masonry foundation walls, or under flat concrete slab on grade construction. In areas where the probability of termite infestation is defined as “very heavy”, the insulation must be installed in accordance with 2018 and 2015 IBC Section 2603.8, 2012 IBC Section 2603.9 or IRC Section R318.1, as applicable. Use below grade is limited to areas exposed to the *Reticulitermes* termite genus.

#### **4.4 Orange Insulation Board:**

Orange Insulation Board is pale orange EPS formulated for below grade use. The insulation incorporates the same preservative used with TalonGuard Treated EPS for applications where termites are a concern. Accordingly, in areas where the probability of termite infestation is defined as “very heavy”, the insulation must be installed in accordance with 2018 and 2015 IBC Section 2603.8, 2012 IBC Section 2603.9 or IRC Section R318.1, as applicable. Use below grade is limited to areas exposed to the *Reticulitermes* termite genus.

#### **4.5 ThermalStar EIFS:**

When installed in accordance with this report, ThermalStar EIFS is an EPS foam plastic insulation board used as nonstructural, thermal insulation on the outside faces of exterior walls as a component in exterior insulation and finish systems (EIFS). The boards have been found to comply with ASTM C578 and ASTM E2430. The boards are manufactured at a minimum density of 0.90 lbs/ft<sup>3</sup> and have an ASTM C578 designation of Type I. Color offerings for these boards are traditional white and pale orange.

#### **4.6 ThermalStar EIFS GPS:**

When installed in accordance with this report, ThermalStar EIFS GPS is a dark gray EPS foam plastic insulation board used as nonstructural, thermal insulation on the outside faces of exterior walls as a component in exterior insulation and finish systems (EIFS). The boards have been found to comply with ASTM C578 and ASTM E2430. The boards are manufactured at a minimum density of 0.90 lbs/ft<sup>3</sup> or 1.45 lbs/ft<sup>3</sup> and have an ASTM C578 designation of Type I or Type II, respectively.

#### **4.7 ThermalStar EIFS PRO:**

When installed in accordance with this report, ThermalStar EIFS PRO is an EPS foam plastic insulation board used as nonstructural, thermal insulation on the outside faces of exterior walls as a component in exterior insulation and finish systems (EIFS). The boards have been found to comply with ASTM C578 and are cured as outlined in Section 4.1.9 of ASTM E2430. The boards are manufactured at a minimum density of 1.35 lbs/ft<sup>3</sup> and have an ASTM C578 designation of Type II, or at a minimum density of 1.80 lbs/ft<sup>3</sup> and have an ASTM C578 designation of Type IX.

#### **4.8 ThermalStar Inter-Grade Insulation:**

When installed in accordance with this report, ThermalStar Inter-Grade Insulation is pale orange or white EPS foam plastic insulation board used as nonstructural thermal insulation on the interior faces of concrete or CMU walls only. The boards are manufactured at a minimum density of 0.90 lbs/ft<sup>3</sup> and have an ASTM C578 designation of Type I and are offered at a maximum thickness of 4 inches.

#### **4.9 ThermalStar Tapered, ThermalStar Flute Fill, and ThermalStar Insulation Board:**

ThermalStar Tapered, Flute Fill, and Insulation Board are EPS foam plastic insulation used as nonstructural thermal insulation as components of a UL Classified Class A, B, or C roof-covering assembly in accordance with UL790. The boards may also be installed directly to steel decks as components of a UL Classified roof deck construction in accordance with UL1256.

#### **4.10 ThermalStar LCI Laminated Insulation, ThermalStar LCI GPS Laminated Insulation, ThermalStar LWI Laminated Insulation, ThermalStar LWI GPS Laminated Insulation and ThermalStar SWi Laminated Structural Insulation:**

ThermalStar LCI Laminated Insulation, ThermalStar LCI GPS Laminated Insulation, ThermalStar LWI Laminated Insulation, and ThermalStar SWi Laminated Structural Insulation EPS insulation boards have a polymeric facer and may be used as an alternative to the water-resistive barriers specified in the codes when installed in accordance with Section 6.11. The products are available as sheets, fan-folded, or factory bonded to wood.

ThermalStar LCI GPS Laminated Insulation is the same product as ThermalStar LCI Laminated Insulation but utilizes a graphite-enhanced dark gray color for higher R-value.

ThermalStar SWi Laminated Structural Insulation is the same product as ThermalStar LCI but utilizes either a graphite-enhanced dark gray color for higher R-value, or orange branded foam core.

ThermalStar LCI Laminated Insulation, ThermalStar LCI GPS Laminated Insulation, or ThermalStar SWi Laminated Structural Insulation may also be used on the outside faces of exterior walls when an ASTM C 578 Type I or Type II EPS board is approved for a one-coat cementitious exterior wall coating system, or when installed as described in Section 6.3 of this report.

#### **4.11 ThermalStar LRI Laminated Insulation:**

ThermalStar LRI Laminated Insulation boards are polymeric faced EPS foam plastic insulation used as nonstructural thermal insulation as components of a UL Classified Class A, B, or C roof-covering assemble in accordance with UL790.

#### **4.12 ThermalStar GPS:**

ThermalStar GPS insulation board is graphite enhanced EPS used as an alternate core for ThermalStar T&G, Orange Insulation Board, ThermalStar EIFS, and laminated products. The insulation incorporates the same preservative used with TalonGuard Treated EPS for applications where termites are a concern. Accordingly, in areas where the probability of termite infestation is defined as "very heavy", the insulation must be installed in accordance with 2018 and 2015 IBC Section 2603.8, 2012 IBC Section 2603.9 or IRC Section R318.1, as applicable. Use below grade is limited to areas exposed to the Reticulitermes termite genus when identified as "TalonGuard Treated EPS".

#### **4.13 ThermalStar SWi Laminated Structural Insulation:**

ThermalStar SWi Laminated Structural Insulation is gray or white EPS with a UV resistant polymer facer on one side, and structurally rated cellulose fiberboard factory-laminated to the other side. The product is used as structural wall sheathing and may be taped and flashed to serve as a weather resistive barrier. Structural performance of the product is not covered in this Evaluation Report.

#### **4.14 Atlas Geof foam:**

Atlas Geof foam is used as lightweight structural fill in floor cavities. Installation for this application shall be in accordance with Section 6.13 of this report.

## 5. PRODUCT DESCRIPTION

### 5.1 General:

All Atlas Molded Products insulation boards described in this report are molded, closed-cell expanded polystyrene foam plastic having a flame spread index not exceeding 25 and a smoke developed index not exceeding 450, when tested in accordance with UL723 (ASTM E84) as required by IBC Section 2603.3 or IRC Section 316.3, as applicable. The boards have been found to comply with ASTM C578 at various densities as described below under product descriptions. Boards are alternately white or light orange color. ThermalStar GPS, ThermalStar LCI GPS Laminated Insulation and ThermalStar SWi Laminated Structural Insulation boards are dark gray in color. See Table 1 and Table 2 for minimum R-values of the products.

**Table 1 – Thermal Resistance Values - 1°F ft<sup>2</sup> h/Btu (°K m<sup>2</sup>/W)<sup>1</sup>**  
(For SI: 1 lb/ft<sup>3</sup> = 16.018 kg/m<sup>3</sup>, 1°F ft<sup>2</sup> h/Btu = 0.176°K m<sup>2</sup>/W, 1inch = 25.4 mm.)

<b>C578 Type</b>	<b>Type I</b>	<b>Type VIII</b>	<b>Type II</b>	<b>Type IX</b>	<b>Type IV</b>	<b>Type XV</b>
Density, min., lb/ft <sup>3</sup> (kg/m <sup>3</sup> )	0.90 (14.4)	1.15 (18.4)	1.35 (21.6)	1.80 (28.8)	-	-
Atlas OEM, DuraTherm, ThermalStar, Atlas Geofoam, Orange Insulation Board & LRi/LCi/LWi Laminated Insulation, ThermalStar Tapered, ThermalStar Flute Fill, ThermalStar Insulation Board, TalonGuard Treated EPS	3.6 (0.63)	3.8 (0.67)	4.0 (0.70)	4.2 (0.74)	4.2 (0.74)	4.3 (0.76)
T&G I	3.6 (0.63)	-	-	-	-	-
T&G II	-	-	4.0 (0.70)	-	-	-
ThermalStar EIFS, ThermalStar Inter-Grade Insulation	3.6 (0.63)	-	-	-	-	-
ThermalStar EIFS PRO	-	-	4.0 (0.70)	4.2 (0.74)	-	-

<sup>1</sup>Thermal resistance (R) values are based on tested values at 1-inch thickness and 75° F mean temperature and must be multiplied by the installed thickness for thicknesses greater than 1 inch.

**Table 2 –GPS Thermal Resistance Values - 1°F ft<sup>2</sup> h/Btu (°K m<sup>2</sup>/W) <sup>1</sup>**  
 (For SI: 1 lb/ft<sup>3</sup> = 16.018 kg/m<sup>3</sup>, 1°F ft<sup>2</sup> h/Btu = 0.176°K m<sup>2</sup>/W, 1inch = 25.4 mm.)

<b><u>C578 Type</u></b>	<b><u>Type I</u></b>	<b><u>Type VIII</u></b>	<b><u>Type II</u></b>	<b><u>Type II-High Density</u></b>	<b><u>Type IX</u></b>
Density, min., lb/ft <sup>3</sup> (kg/m <sup>3</sup> )	0.90 (14.4)	1.15 (18.4)	1.35 (21.6)	1.45 (23.2)	1.80 (28.8)
ThermalStar EIFS GPS	5.0 (0.88)	5.0 (0.88)	5.0 (0.88)	5.0 (0.88)	5.0 (0.88)
ThermalStar GPS	5.0 (0.88)	5.0 (0.88)	5.0 (0.88)	5.0 (0.88)	5.0 (0.88)
ThermalStar LCi GPS Laminated Insulation	5.0 (0.88)	5.0 (0.88)	5.0 (0.88)	5.0 (0.88)	5.0 (0.88)

<sup>1</sup>Thermal resistance (R) values are based on tested values at 1.06-inch thickness and 75° F mean temperature and must be multiplied by the installed thickness for thicknesses greater than 1 inch.

## **5.2 Atlas OEM, DuraTherm, ThermalStar, ThermalStar GPS, and Atlas Geofoam Expanded Polystyrene Insulation Boards:**

Atlas OEM, DuraTherm, ThermalStar, ThermalStar GPS, and Atlas Geofoam Expanded Polystyrene (EPS) insulation boards comply with ASTM C 578 and are manufactured at minimum densities of 0.90, 1.15, 1.35 and 1.80 pcf (14.4, 18.4, 21.6 and 28.8 kg/m<sup>3</sup>). The designations for the four densities are Type I, Type VIII, Type II, and Type IX, respectively.

The EPS insulation boards are produced in various colors having thicknesses up to 6 inches (152 mm), and in various sizes, with square, shiplap or tongue-and-groove edge profiles.

## **5.3 TalonGuard Treated Expanded Polystyrene Boards:**

TalonGuard Treated boards are treated for termite resistance and are similar to EPS insulation boards described in Section 5.2 of this report, and comply with ASTM C 578, Types I, VIII, II and IX. The insulation boards are used as described in Section 4.2 of this report when installed as described in Section 6.2.

## **5.4 ThermalStar T&G Board (T&G I, T&G II, T&G IIR, GPS T&G):**

ThermalStar T&G Board insulation complies with the Type I and Type II requirements of ASTM C 578. The board insulation is molded at minimum densities of 0.90 pcf (14.4 kg/m<sup>3</sup>) for T&G I, and at 1.35 pcf (21.6 kg/m<sup>3</sup>) for T&G II and T&G IIR, and GPS T&G.

The ThermalStar T&G Board insulation consists of nominally 1-inch-thick (25 mm) boards produced in various sizes, with shiplap or tongue-and-groove (T&G) edge profiles.

## **5.5 Orange Insulation Board:**

Orange Insulation Boards are light orange and similar to EPS insulation boards described in Section 5.2 of this report, and comply with ASTM C 578, Types I, VIII, II, IX, XIV, and XV. The insulation boards are used as described in Section 4.4 of this report when installed as described in Section 6.4.

## **5.6 ThermalStar EIFS:**

ThermalStar EIFS is EPS insulation board complying with the Type I requirements of ASTM C 578. The EPS insulation board is manufactured at a minimum density of 0.90 pcf (14.4 kg/m<sup>3</sup>). The ThermalStar EIFS is produced in various thicknesses up to 6 inches (152 mm), and in various sizes, with square, shiplap or tongue-and-groove edge profiles.



### 5.7 ThermalStar EIFS GPS:

ThermalStar EIFS GPS is graphite enhanced EPS insulation board complying with the Type I or Type II requirements of ASTM C 578. The EPS insulation board is manufactured at a minimum density of 0.90 pcf (14.4 kg/m<sup>3</sup>) or 1.45 pcf (23.2 kg/m<sup>3</sup>), respectively.

The ThermalStar EIFS GPS is produced in various thicknesses up to 6 inches (152 mm), and in various sizes, with square, shiplap or tongue-and-groove edge profiles.

### 5.8 ThermalStar EIFS PRO:

Designed for better impact resistance in lower elevation areas of buildings subject to wear, ThermalStar EIFS PRO is a pale orange EPS insulation board complying with the Type II or Type IX requirements of ASTM C 578. The EPS insulation board is manufactured at a minimum density of 1.35 pcf (22 kg/m<sup>3</sup>). The ThermalStar EIFS PRO is produced in various thicknesses up to 6 inches (152mm), and in various sizes with square, shiplap, or tongue-and-groove edge profiles.

### 5.9 ThermalStar Inter-Grade Insulation:

This ASTM C578 Type I ThermalStar Inter-Grade Insulation product is either white or pale orange. The thickness is limited to a maximum of 4 inches, for installation on concrete or CMU walls only.

### 5.10 ThermalStar Tapered:

ThermalStar Tapered insulation boards comply with ASTM C 578 and are used as nonstructural roofing insulation as described in 4.9. The boards are manufactured at minimum densities of 0.90, 1.15, 1.35 and 1.80 pcf (14.4, 18.4, 21.6 and 28.8 kg/m<sup>3</sup>). The designations for the four densities are: ThermalStar Tapered (Type I), ThermalStar TS (Type VIII), ThermalStar TS (Type II), and ThermalStar TS (Type IX).

The ThermalStar Tapered insulation boards are produced in flat or tapered boards, up to a thickness of 9.0 inches (229 mm) for ThermalStar Tapered (Type I), 7.2 inches (183 mm) for ThermalStar Tapered (Type VIII), 6.0 inches (152 mm) for ThermalStar Tapered (Type II), and 4.5 inches (114 mm) for ThermalStar Tapered (Type IX). The boards are produced in various sizes, with square, shiplap or tongue-and-groove edge profiles, and may be tapered or beveled to create roof drainage or fit roof decks.

### 5.11 ThermalStar LCi Laminated Insulation:

ThermalStar LCi Laminated Insulation, ThermalStar LCi GPS Laminated Insulation and ThermalStar SWi Laminated Structural Insulation boards are EPS boards with polymeric film facers adhered to one or both sides. The facing is bonded to the EPS core with adhesive and is cured under factory-controlled conditions. Type I, VIII, II, and IX EPS core products meet the minimum density requirements of their respective C578 Types. The insulation boards are produced in various sizes including sheets & fan-fold, with square, shiplap or tongue-and-groove edge profiles. When used for one coat stucco systems as an alternative to non-faced EPS, the core material is a Type I EPS manufactured at a minimum density of 0.9 pcf (14.4 kg/m<sup>3</sup>). For minimum density, compressive strength, and flexural strength of Type I core product for use in one coat systems see Table 3.

**Table 3 – Physical Properties of ThermalStar LCi Laminated Insulation (AC11 exception criteria)<sup>1</sup>**

Property	ThermalStar LCi Laminated Insulation
Minimum density, lb/ft <sup>3</sup> (kg/m <sup>3</sup> )	0.9 (14.4)
Compressive strength @ 10% def., psi (kPa)	10 (69)
Flexural strength, psi (kPa)	38.9 (268)

For SI: 1 lb/ft<sup>3</sup> = 16.018 kg/m<sup>3</sup>, 1°F ft<sup>2</sup> h/Btu = 0.176°K m<sup>2</sup>/W, 1 psi = 6.895 kPa.

<sup>1</sup>Meets the requirements for less than 1.5 pcf density alternative per AC11 for one coat stucco systems

**5.12 ThermalStar LRi Laminated Insulation:**

ThermalStar LRi Laminated Insulation boards are EPS boards with PVC compatible polymeric film facers adhered to both sides. The facing is bonded to the EPS core with adhesive and is cured under factory-controlled conditions. Type I, VIII, II, and IX EPS core products meet the minimum density requirements of their respective C578 Types. The insulation boards are produced in various sizes including sheets & fanfold, with square, shiplap or tongue-and-groove edge profiles.

**5.13 ThermalStar GPS:**

Except for higher thermal resistance as shown in Table 1 and distinctive dark gray color, ThermalStar GPS insulation boards are similar to EPS insulation boards described in Section 5.2 of this report, and comply with ASTM C 578 for Types VIII, II and IX. The insulation boards are used as described in Section 4.12 of this report.

**5.14 ThermalStar SWi Laminated Structural Insulation**

ThermalStar SWi Laminated Structural Insulation is composed of either a gray graphite enhanced foam core that meets 15 psi compressive resistance, or a more durable orange EPS foam core. The external polymer facer is UV resistant and serves as a water resistive barrier when the joints are sealed, and penetrations are flashed. The foam core is factory laminated to APA PS 2 rated OSB. See Table 4 for minimum R-values of ThermalStar One.

**Table 4 – ThermalStar SWi Laminated Structural Insulation  
Thermal Resistance Values - 1°F ft<sup>2</sup> h/Btu (°K m<sup>2</sup>/W)<sup>1</sup>**  
(For SI: 1 lb/ft<sup>3</sup> = 16.018 kg/m<sup>3</sup>, 1°F ft<sup>2</sup> h/Btu = 0.176°K m<sup>2</sup>/W, 1inch = 25.4 mm.)

Foam Core Thickness (in.)		Thermal Resistance	
Gray foam core	Orange foam core	Gray foam core	Orange foam core
1 <sup>1</sup> / <sub>16</sub>	¾	3.0 (0.53)	3.0 (0.53)
1- <sup>3</sup> / <sub>16</sub>	1- <sup>3</sup> / <sub>16</sub>	5.0 (0.88)	5.0 (0.88)
1- <sup>9</sup> / <sub>16</sub>	1- <sup>25</sup> / <sub>32</sub>	7.5 (1.32)	7.5 (1.32)

**5.15 Atlas Geofoam:**

Atlas Geofoam has been found to comply with ASTM D6817. The product is manufactured at minimum densities of 0.70, 0.90, 1.15, 1.35, 1.80, 2.40, and 2.85 lbs/ft<sup>3</sup>, and has ASTM D6817 designations of EPS12, EPS15, EPS19, EPS22, EPS29, EPS39, and EPS46 respectively. See excerpt from ASTM D6817, Table 5 below.

**Table 5 – ASTM D6817 Physical Property Requirements for RCPS Geofoam**

ASTM Type	Density, min., lb/ft <sup>3</sup>	COMPRESSIVE RESISTANCE (Minimum psi at 1% Strain)
Type EPS12	0.70	2.2
Type EPS15	0.90	3.6
Type EPS19	1.15	5.8
Type EPS22	1.35	7.3
Type EPS29	1.80	10.9
Type EPS39	2.40	15.0
Type EPS46	2.85	18.6

### 5.16 ThermalStar 007 Tape:

When used as an alternate to the water-resistive barrier as described in Section 6.11, board joints must be taped. ThermalStar 007 tape may be used with ThermalStar LCI Laminated Insulation, ThermalStar LCI GPS Laminated Insulation, and ThermalStar SWi Laminated Structural Insulationboards. The tape consists of a polyethylene backing with a rubber-based adhesive and has a nominal thickness of 6 mils [0.006 inch (0.15 mm)] and a minimum width of 2 inches (51 mm). The tape is supplied in rolls 36 yards (32.9 m) long. AAMA 711 approved 3-inch wide flashing tapes and flashing materials 4 inches wide may be used to seal insulation board joints, window, door, roof, and foundation transitions.

### 5.17 Air Permeability

At a minimum thickness of 1/2" (12mm), ThermalStar LCI Laminated Insulation, ThermalStar LCI GPS Laminated Insulation, and ThermalStar SWi Laminated Structural Insulationboards are considered air-impermeable in accordance with IRC Section 806.5 and 2018 and 2015 IECC Section C402.5.1.2.1 and 2012 IECC Section C402.4.1.2.1, based on testing in accordance with ASTM E2178.

### 5.18 Potential Heat:

See Table 6 for potential heat content of insulation boards when tested in accordance with NFPA 259.

**Table 6—Potential Heat of Insulation Boards**

ASTM C578 TYPE ATLAS EPS	HEAT POTENTIAL (ENGLISH) *	HEAT POTENTIAL (METRIC)*
I	1500 Btu/ft <sup>2</sup>	17.0 mJ/m <sup>2</sup>
VIII	1875 Btu/ft <sup>2</sup>	21.3 mJ/m <sup>2</sup>
II	2250 Btu/ft <sup>2</sup>	25.5 mJ/m <sup>2</sup>
IX	3000 Btu/ft <sup>2</sup>	34.0 mJ/m <sup>2</sup>

\*Based on 1-inch thickness

## 6. INSTALLATION

### 6.1 General:

Installation of Atlas EPS foam plastic insulation must comply with this report and the manufacturer's published installation instructions. The manufacturer's published installation instructions must be available at all times on the jobsite during installation. The EPS insulation boards must be attached to supports in a manner that will secure the insulation in place.

The interior of the building must be separated from the insulation boards with a thermal barrier as required in IBC Section 2603.4 or IRC Section R316.4, as applicable, except as described in sections 6.6, 6.8, or 6.9 of this report.

The code official may require an approved vapor retarder to be installed in accordance with 2018 IBC Section 1404.3, 2015 and 2012 IBC Section 1405.3, or IRC Section R702.7, or the IECC, as applicable.

A water-resistive barrier in compliance with 2018 IBC Section 1402.2, 2015 and 2012 IBC Section 1404.2, or IRC Section R703.2 is required and, when applied over wood-based sheathing, must comply with IBC Section 2510.6, 2018 and 2015 IRC Section R703.2, or 2012 IRC Section R703.6.3.

Except for ThermalStar SWi Laminated Structural Insulation, the insulation boards must not be used structurally to resist transverse, vertical, or in-plane loads. The boards must not be used as exterior stud wall bracing. Wall bracing must be provided in accordance with the applicable code. All walls must be braced in accordance with 2018 and 2015 IBC Sections 2308.6 and 2308.6.2, 2012 IBC Sections 2308.9.3 and 2308.12.4 or IRC Section R602.10.3.

Except for ThermalStar SWi Laminated Structural Insulation, the insulation boards must not be used as a nailing base for exterior siding materials. All fastening must be made through the boards and either into the wall framing or into structural sheathing, as required by the siding manufacturer’s published installation instructions, or in accordance with the applicable code.

ThermalStar SWi Laminated Structural Insulation may be used as structural sheathing in accordance with the prescriptive sections of the code regarding the use of wood structural panels. The panels are installed with the OSB facing the studs and are fastened using the same spacing and penetration required for 7/16-inch thick wood structural panels in the code. Fastening must be conducted using patent pending SENCOR nail guns which fire the nail through the foam layer and seat the nail head flush with the OSB. In this manner, the OSB is installed exactly as it would be for all structural provisions covered in the building code. All applicable prescriptive code sections govern the installation.

**6.1.1 For Use as Vapor Retarders:**

These products may serve as vapor retarders based on perm values described in Table 7 for unfaced products and the placement and impact on hygrothermal performance of the assembly should be considered. Vapor retarders are classified in the IBC & IRC as follows:

Class I: 0.1 perm or less      Class II: >0.1 perm to 1.0 perm      Class III: >1.0 perm to 10.0 perms

**Table 7 – Water Vapor Permeance of Atlas EPS non-Faced Products**

<b>ASTM C578 Type</b>	<b>Density, min. lbs/ft3</b>	<b>MAXIMUM PERMEANCE<sup>1</sup></b>
Type I	0.90	5.0
Type VIII	1.15	3.5
Type II	1.35	3.5
Type IX	1.80	2.5
Type XIV	2.40	2.5
Type XV	3.00	2.5

<sup>1</sup>Water vapor permeance values are based on 1-inch thickness when tested in accordance with ASTM C578 & E96 under desiccant conditions. Actual water vapor permeance values may be calculated based on insulation thickness, by dividing the perm value shown by the installed thickness in inches.

<sup>2</sup>Water vapor permeance of faced product varies between 0.1 -1.5 based on polymer film, perforations, and thickness. See manufacturer technical bulletin for exact product and configuration for permeance of faced products.

**6.2 TalonGuard Treated EPS:**

TalonGuard Treated EPS insulation boards and ThermalStar GPS insulation boards must be installed in the same manner as described in section 6.1, with the exception that the insulation is allowed within 6 inches of, or below grade, in “very heavy termite infestation” areas. An approved method to protect the foam plastic from subterranean termite damage has been integrated into the products per exceptions listed in 2018 and 2015 IBC Section 2603.8, 2012 IBC Section 2603.9 or IRC Section R318.4.

### **6.3 ThermalStar T&G Board (T&G I, T&G II, T&G IIR, GPS T&G):**

ThermalStar T&G Board may be installed as part of a one-coat cementitious exterior wall coating system when evaluated for that purpose. The insulation may also be installed in attic and crawl spaces without a covering as described in Section 6.8 of this report. The insulation boards may also be installed as exterior perimeter insulation around concrete slab edges, on concrete or masonry foundation walls, or under flat concrete slab on grade construction. The insulation is allowed within 6 inches of, or below grade, in “very heavy termite infestation” areas provided provisions of 2018 and 2015 IBC Section 2603.8, 2012 IBC Section 2603.9 or IRC Section R318.1 are also followed.

### **6.4 Orange Insulation Board:**

Orange Insulation Boards may be installed as exterior perimeter insulation around concrete slab edges, on concrete or masonry foundation walls, or under flat concrete slab on grade construction. The insulation is allowed within 6 inches of, or below grade, in “very heavy termite infestation” areas provided provisions of 2018 and 2015 IBC Section 2603.8, 2012 IBC Section 2603.9 or IRC Section R318.1 are also followed.

### **6.5 ThermalStar EIFS:**

ThermalStar EIFS, ThermalStar EIFS GPS, or ThermalStar EIFS PRO insulation may be installed as part of an EIFS system when evaluated for that purpose.

### **6.6 ThermalStar Tapered & ThermalStar LRi Laminated Insulation:**

ThermalStar Tapered Roof Insulation Boards and ThermalStar LRi Laminated Insulation are used as a roofing insulation as follows:

- As part of a UL Classified Class A, B or C roof-covering assembly in accordance with UL 790, or
- As part of a UL Classified Roof Deck Construction in accordance with UL 1256

**Reroofing:** New roofing must not be applied over existing roof-covering systems described in this report, since the fire performance of the systems is directly affected by the materials covering the foam plastic insulation. The components of the existing roofing that are to remain on the roof deck must be inspected in accordance with IBC Section 1510 or 2018 and 2015 IRC Section R908 and 2012 IRC Section R907. The existing roof-covering membrane and, if necessary, the cover board must be removed before new roofing materials are installed; the new roofing materials must have characteristics specifically described in this report.

### **6.7 ThermalStar LCi Laminated Insulation:**

ThermalStar LCi Laminated Insulation, ThermalStar LCi GPS Laminated Insulation, and ThermalStar SWi Laminated Structural Insulation wall insulation boards must be installed as specified in Section 6.1 or as described in Section 6.11 of this report.

### **6.8 Attics and Crawl Spaces – Installation Without Code Prescribed Ignition Barrier:**

Atlas OEM, ThermalStar, ThermalStar GPS, TalonGuard Treated EPS, & Atlas Geofoam Type I, VIII, II and IX EPS insulation boards, ThermalStar T&G Boards (T&G I, T&G II, T&G IIR, GPS T&G), Orange Insulation Boards Type I, VIII, II and IX, ThermalStar EIFS, ThermalStar EIFS PRO, ThermalStar Inter-Grade Insulation, and ThermalStar LCi Laminated Insulation, ThermalStar LCi GPS Laminated Insulation, and ThermalStar SWi Laminated Structural Insulation insulation boards may be used in attics and crawl spaces without the coverings listed in IBC Section 2603.4.1.6 or IRC Sections R316.5.3 and R316.5.4, as follows:

1. Attic ventilation is provided when required by 2018 IBC Section 1202.2, 2015 and 2012 IBC Section 1203.2, IRC Section R806, BNBC Section 1210.1, SBC Section 2309.7, or UBC Section 1505.3, as applicable. Under-floor (crawl space) ventilation is provided when required by 2018 IBC Section 1202.4, 2015 IBC Section 1203.4, 2012 IBC Section 1203.3, IRC Section R408.1, BNBC Section 1210.2, SBC Section 1804.6.3, or UBC Section 2306.7, as applicable.
2. Combustion air is provided in accordance with Sections 701 and 703 of the 2006 *International Mechanical Code*<sup>®</sup> (IMC), Sections 701 and 703.1 of the 1997 ICBO *Uniform Mechanical Code* (UMC), or Section M1703.4 of the IRC, as applicable.
3. Insulation boards are limited to a maximum nominal density of 1 pcf (16 kg/m<sup>3</sup>) and maximum nominal thickness of 4 inches (102 mm); or maximum nominal density of 2 pcf (32 kg/m<sup>3</sup>) and maximum nominal thickness of 2 inches (51 mm); or maximum nominal density of 1.5 pcf (24 kg/m<sup>3</sup>) and maximum nominal thickness of 2-<sup>2</sup>/<sub>3</sub> inches (68 mm); or a maximum nominal density of 1.25 pcf (20 kg/m<sup>3</sup>) and maximum nominal thickness of 3-<sup>1</sup>/<sub>4</sub> inches (82 mm).

### **6.9 Other Structures:**

Atlas OEM, ThermalStar, ThermalStar GPS, ThermalStar TalonGuard Treated EPS & Atlas Geofoam Type I, II, VIII and IX EPS insulation boards; ThermalStar T&G Boards (T&G I, T&G II, T&G IIR, GPS T&G); Orange Insulation Boards Type I, II, VIII and IX; ThermalStar EIFS; ThermalStar Inter-Grade Insulation; and ThermalStar LCi Laminated Insulation, ThermalStar LCi GPS Laminated Insulation, and ThermalStar SWi Laminated Structural Insulation boards may be installed on any or all surfaces (wall, ceiling, floor) of buildings and structures of an accessory character as regulated under IBC Section 312 (Utility and Miscellaneous, Group U), such as a detached garages, pole barns, telecommunications shelters, concrete modular buildings, or agricultural buildings, with no thermal or ignition barrier applied to the foam plastics, based on testing in accordance with NFPA 286, 2018 and 2015 IBC Section 2603.9 and 2012 IBC Section 2603.10, or IRC Section R316.6, when all other requirements of the building code for that building are met. Insulation boards are limited to a maximum nominal density of 1 pcf (16 kg/m<sup>3</sup>) and maximum nominal thickness of 4 inches (102 mm); or maximum nominal density of 2 pcf (32 kg/m<sup>3</sup>) and maximum nominal thickness of 2 inches (51 mm); or maximum nominal density of 1.5 pcf (24 kg/m<sup>3</sup>) and maximum nominal thickness of 2-<sup>2</sup>/<sub>3</sub> inches (68 mm); or a maximum nominal density of 1.25 pcf (20 kg/m<sup>3</sup>) and maximum nominal thickness of 3-<sup>1</sup>/<sub>4</sub> inches (82 mm).

## **6.10 Residential Basements:**

Atlas OEM, ThermalStar, ThermalStar GPS, & ThermalStar TalonGuard Treated EPS Type I, II, VIII and IX EPS insulation boards; ThermalStar T&G Boards (T&G I, T&G II, T&G IIR, GPS T&G); Orange Insulation Boards Type I, II, VIII and IX; EWG EIFS; ThermalStar Inter-Grade Insulation; and ThermalStar LCi Laminated Insulation, ThermalStar LCi GPS Laminated Insulation, and ThermalStar SWi Laminated Insulation boards may be installed on wall surfaces of residential basements with no thermal or ignition barrier applied to the foam plastics, based on testing in accordance with NFPA 286, 2018 and 2015 IBC Section 2603.9 and 2012 IBC Section 2603.10, or IRC Section R316.6, when all other requirements of the building code for that building are met. Insulation boards are limited to a maximum nominal density of 1 pcf (16 kg/m<sup>3</sup>) and maximum nominal thickness of 4 inches (102 mm); or maximum nominal density of 2 pcf (32 kg/m<sup>3</sup>) and maximum nominal thickness of 2 inches (51 mm); or maximum nominal density of 1.5 pcf (24 kg/m<sup>3</sup>) and maximum nominal thickness of 2-<sup>2</sup>/<sub>3</sub> inches (68 mm); or a maximum nominal density of 1.25 pcf (20 kg/m<sup>3</sup>) and maximum nominal thickness of 3-<sup>1</sup>/<sub>4</sub> inches (82 mm).

## **6.11 Fire-Resistance Rated Wall Construction:**

ThermalStar (GPS, LCi, LCi GPS, SWi, EIFS, and T&G) and Orange Insulation Board have been evaluated for fire resistance when used as a part of UL Fire Resistance Design Nos. U326, U330, U425, U460, U902, V451, and V499. These products are identified as ThermalStar in the UL Directory. See Section 7.7

## **6.12 Water-resistive Barrier:**

### **6.12.1 General:**

When installed in accordance with this section, the ThermalStar LCi Laminated Insulation, ThermalStar LCi GPS Laminated Insulation, and ThermalStar SWi Laminated Structural Insulation boards combined with ThermalStar 007 or other approved tape may be used as an alternative to the water-resistive barrier in 2018 IBC Section 1402.2, 2015 and 2012 IBC Section 1404.2 or IRC Section R703.2

The 2- or 4-foot-wide (610 or 1219 mm) ThermalStar LCi Underlayment boards with tongue-and-groove joints on the long edges must be oriented horizontally, with tongues facing upward. The 2- or 4-foot-wide (610 or 1219 mm) boards with square edges may be oriented horizontally or vertically.

The ThermalStar LCi Laminated Insulation, ThermalStar LCi GPS Laminated Insulation, and ThermalStar SWi Laminated Structural Insulation boards must be installed directly to framing spaced a maximum of 24 inches on center, except where further limited by the requirements for a wall covering. Fasteners used to attach the boards to framing must be corrosion-resistant roofing nails with a minimum <sup>3</sup>/<sub>8</sub>-inch-diameter (9.5 mm) head; 6d ring-shank nails and <sup>15</sup>/<sub>16</sub>-inch-diameter (24 mm) plastic washers; self-drilling screws with <sup>3</sup>/<sub>4</sub>-inch-diameter (19 mm) cap washers; or 1-inch-wide-crown (25.4 mm), No. 16 gage staples. Fasteners must be spaced at a maximum of 24 inches (610 mm) apart and be long enough to penetrate the framing members a minimum of <sup>3</sup>/<sub>4</sub> inch (19 mm). Joints between boards must be tightly butted together, and corners created with the boards, must be taped with ThermalStar 007 polyethylene tape centered over the joint. ThermalStar LCi Laminated Insulation, ThermalStar LCi GPS Laminated Insulation, and ThermalStar SWi Laminated Structural Insulation boards must be installed with a weep screed when walls are cladded with stucco and require the use of self-adhering flashing around penetrations. The boards must be covered by an approved exterior wall cladding or cementitious wall coating and may be installed over structural sheathing.

### **6.12.2 Installation Around Penetrations and Openings:**

The system is limited to use with flange-type windows. An AC148-compliant flashing material must be installed completely covering the framing sill and extending a minimum of 6 inches (152 mm) up the sides of the opening and approximately 1-1/2 inches (38 mm) beyond the edge of the foam board at the front of the window opening. The sill flashing must be flush with the inside edge of the framing members on the inside of the wall. The flashing extending outside of the ThermalStar LCI Laminated Insulation board must be folded over the front face of the foam board. The flange-type window must then be installed in accordance with the window manufacturer's installation instructions. In lieu of window manufacturer instructions, the flanged window shall be installed resting on a continuous supporting sill preferably with a sloped pan to exterior per best practice. Caulking shall be used continuously on the back of the flange (except weep spaces on the sill flange) if recommended by the window manufacturer. Fasteners shall penetrate the flange holes within 4-6" of each corner and spaced every 6-8" around the remainder of the flange and shall penetrate structural framing a minimum of 3/4-inch (19mm). Fasteners shall not be overdriven or otherwise deform the sealing surface of the flange. The space around the window perimeter from the interior, including the sill, shall be air sealed with backer rod, spray foam, or caulk as needed to create pressure seals that add another layer of wind driven rain penetration resistance. Jamb flashing must be installed prior to the installation of the head flashing. All jamb and head flashing must completely cover the window flanges.

Flashing of pipe penetrations must be accomplished by sealing around the pipe with flashing complying with AC148. Flashing of other penetrating items must be in accordance with the wall covering manufacturer's instructions.

### **6.13 ThermalStar SWi Laminated Structural Insulation as Structural Sheathing:**

ThermalStar SWi Laminated Structural Insulation may be installed with the OSB directly fastened to the structural formwork of a building, with the OSB thus functioning exactly as described in prescriptive requirements of the model codes.

- Fastening must meet the prescriptive spacing and structural penetration required for 7/16-inch thick OSB for the application
- TRADITIONAL NAILGUNS MAY NOT BE USED WHEN INSTALLING THERMALSTAR SWi LAMINATED STRUCTURAL INSULATION WITH OSB FACING STRUCTURAL MEMBERS
- ThermalStar SWi Laminated Structural Insulation R3 and R5 shall be installed with a Senco model SCN63LDXP nail gun. Use the 3/8" thick R3 spacer when fastening ThermalStar SWi Laminated Structural Insulation R3.
- ThermalStar SWi Laminated Structural Insulation R7.5 shall be install with a SENCO SCN75LDXP nail gun.
- ThermalStar One shall be fastened with 0.113" x 2-3/8" 15° SENCO GD24APBF or .131 x 2-1/2" 15° SENCO KD25APBF nails
- Always check the installation to ensure fastener heads are seated against the structural OSB backing material to obtain the expected braced wall capacity.
- Where required, gypsum wallboard shall be a minimum 1/2-inch thickness.
- When installed horizontally, all fasteners are to be spaced 6 inches OC, and double nailed at the top and bottom edge of the horizontally installed ThermalStar SWi Laminated Structural Insulation when not installed in a top plate or bottom plate of a wall.



- When installed in accordance with the installation instructions herein, ThermalStar SWi Laminated Structural Insulation sheathing is an alternative to:
  - Bracing methods for wood structural panels (WSP), including portal frames, in accordance with IRC Section R602.10 and Section R602.12.
  - Conventional wall bracing provisions of 2018 and 2015 IBC Section 2308.6, 2012 IBC Section 2308.9.3 Method 3 for Type V construction, and the alternate bracing methods in accordance with 2012 IBC Sections 2308.9.3.1 and 2308.9.3.2
  - Performance-based provisions for allowable shear and stress for light-framed wood assemblies referenced in IBC Section 2306.1 and Section 2306.3

#### **6.13.1 ThermalStar SWi Laminated Structural Insulation as Nailbase Over Structural Sheathing**

ThermalStar SWi Laminated Structural Insulation may be installed with the OSB facing outward to serve as a nailable surface for cladding or other exterior finishing products.

- The foam plastic side of the product must be installed over a continuous surface such as concrete, structural sheathing, or CMU
- Traditional nail guns and fasteners may be used to fasten the product to the structural formwork of the building.
- All fasteners must penetrate the structural members of the building, a minimum of 1-¼ inches.
- Fasteners must be spaced no more than 16 inches OC for 16-inch stud spacing or other structural base, and no more than 12 inches OC for 24-inch stud spacing.
- Fastener schedules and sizing as in the code for cladding attachments over foam sheathing should be observed
- ThermalStar One does not serve as a water resistive barrier when installed with OSB facing out.

#### **6.14 Uses on Exterior Walls:**

Atlas EPS Insulation Boards may be used on the exterior of above grade walls as follows:

- Exterior Walls of One- and Two-Family Dwellings in accordance with the 2012 IRC,
- Exterior walls of one story buildings of Types I, II, III, or IV construction in accordance with IBC Section 2603.4.1.4,
- Exterior walls of Type V construction in accordance with Section 2603.2, 2603.3, and 2603.4 of the IBC, or
- Exterior walls of buildings of Types I, II, III, or IV construction in accordance with IBC Section 2603.5, when part of a UL Classified Exterior Wall System in accordance with NFPA 285. The products are identified as ThermalStar in the UL NFPA 285 Wall System. See Section 7.7.
- ThermalStar in NFPA 285 assemblies shown in Section 6.12.1 for exterior walls of buildings of Types I, II, III, or IV construction in accordance with IBC Section 2603.5.

### 6.15 ThermalStar Wall Designs as per NFPA 285 Evaluation:

Table 8 below outlines the list of allowable wall construction elements. Note that one element from each "Wall Component" must be selected, unless "None" is an available selection.

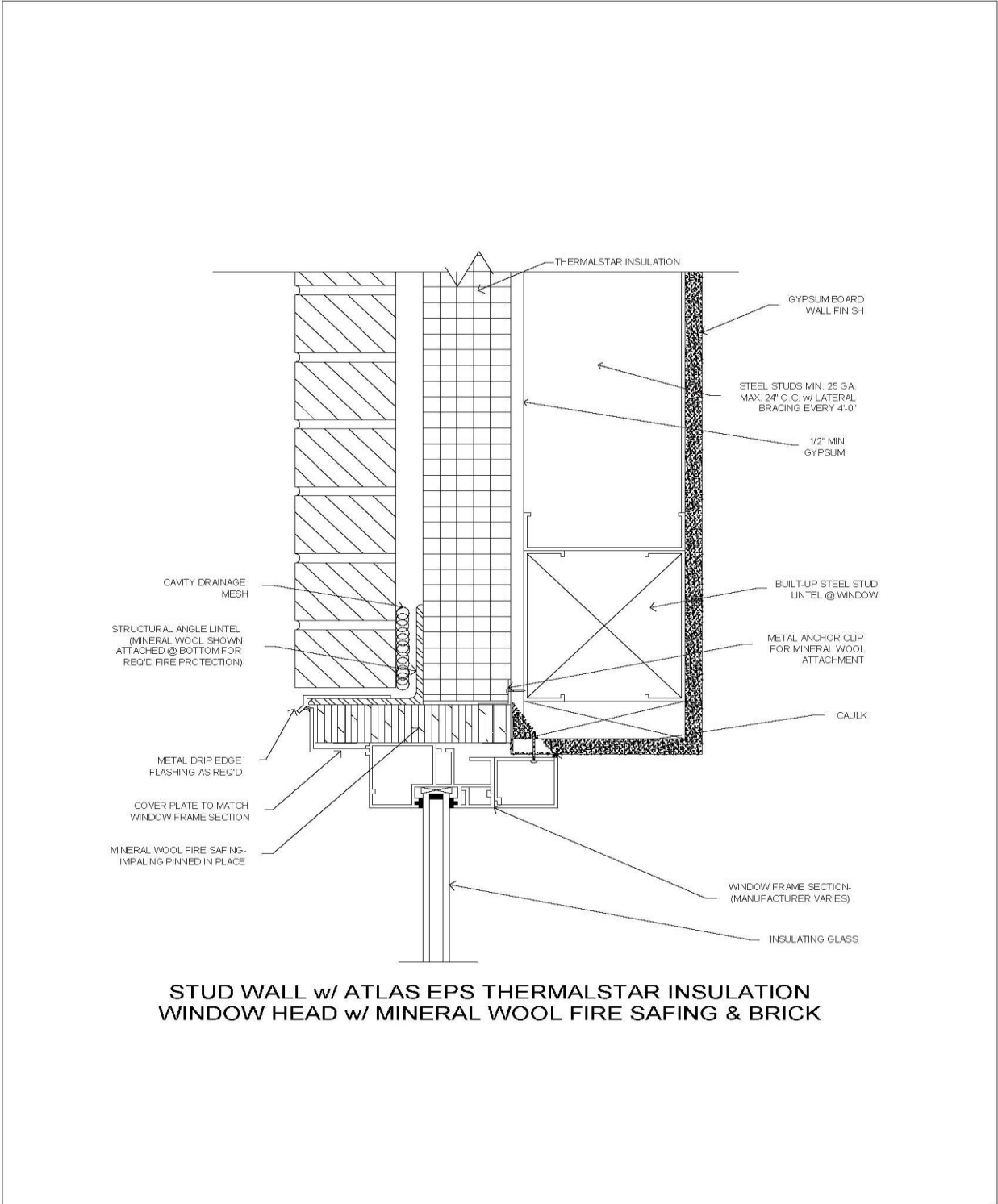
**Table 8 – NFPA 285 Compliant Assembly Options**

Wall Component	Options
Base Wall Use 1, 2, or 3	<ol style="list-style-type: none"> <li>1) Cast Concrete Walls</li> <li>2) CMU Cast Concrete Walls</li> <li>3) 25 GA (min) 3-5/8 inch thick (min) steel studs spaced 24 inches oc (max)               <ol style="list-style-type: none"> <li>a. Any 5/8 inch type X gypsum wallboard interior</li> <li>b. Any 1/2 inch Exterior gypsum sheathing</li> <li>c. Lateral bracing every 4 ft. vertically</li> </ol> </li> </ol>
Fire Stopping at Floor Lines	Any approved 4.0 pcf density mineral fiber based safing insulation in each stud cavity at floor line. Safing thickness must match stud cavity depth. Use mineral fiber insulation manufacturer instructions for installation
Cavity Insulation Use 1, 2, or 3	<ol style="list-style-type: none"> <li>1) None</li> <li>2) Any Class A, B, or C Fiberglass batt insulation (faced or unfaced)</li> <li>3) Any non-combustible insulation</li> </ol>
Exterior Sheathing	1/2" or thicker exterior grade gypsum sheathing
Water Resistive Barrier or Air Barrier over Base Wall Surface Use 1 or 2	<ol style="list-style-type: none"> <li>1) None</li> <li>2) Any of the following applied per individual manufacturer instruction:           <ul style="list-style-type: none"> <li>Tremco EXOAir 130 or EXOAir 230</li> <li>Grace Perm-A-Barrier VPS, AWM, VPL, NPS, NPL, NPL 10, or VPL LT</li> <li>DuPont Fluid Applied WB</li> <li>DuPont Tyvek Commercialwrap (1 or 2 layers)</li> <li>CCW Barritech NP, VP, VP LT, FireResist 705VP or 705FR-A</li> <li>Prosoco R-Guard Cat-5, R-Guard VB, R-Guard MVP, R-Guard Spray Wrap, or R-Guard Spraywrap MVP</li> <li>Henry VP160, Air Bloc 21 FR, Air Bloc 33MR, or Air Bloc 31MR</li> <li>WR Meadows Air-Shield LMP (Gray)</li> <li>WR Meadows Air-Shield LMP (Black)</li> <li>WR Meadows Air-Shield TMP</li> <li>WR Meadows Air-Shield LSR</li> <li>STO Emerald Coat</li> <li>Dow Corning DefendAir 200 Low Temp</li> <li>Hohmann &amp; Barnard Enviro-Barrier VP, or Enviro-Barrier</li> </ul> </li> </ol>
WRB Over Exterior Insulation	<ol style="list-style-type: none"> <li>1. None</li> </ol>
Exterior Insulation Use 1, through 13	<ol style="list-style-type: none"> <li>1) None</li> <li>2) Orange Insulation Board 10 (10 psi product, 0.90 pcf) up to 10.2 inches thick</li> <li>3) Orange Insulation Board 15 (15 psi product, 1.35 pcf) up to 7.2 inches thick</li> <li>4) Orange Insulation Board 25 (25 psi product, 1.80 pcf) up to 5.4 inches thick</li> <li>5) ThermalStar LCI 10 (10 psi product, 0.90 pcf) up to 10.2 inches thick</li> <li>6) ThermalStar LCI 15 (15 psi product, 1.35 pcf) up to 7.2 inches thick</li> <li>7) ThermalStar LCI 25 (25 psi product, 1.80 pcf) up to 5.4 inches thick</li> <li>8) ThermalStar GPS 10 (10 psi product, 0.90 pcf) up to 10.2 inches thick</li> <li>9) ThermalStar GPS 15 (15 psi product, 1.35 pcf) up to 7.2 inches thick</li> <li>10) ThermalStar GPS 25 (25 psi product, 1.80 pcf) up to 5.4 inches thick</li> <li>11) ThermalStar Type I (10 psi product, 0.90 pcf) up to 10.2 inches thick</li> <li>12) ThermalStar Type II (15 psi product, 1.35 pcf) up to 7.2 inches thick</li> <li>13) ThermalStar Type IX (25 psi product, 1.80 pcf) up to 5.4 inches thick</li> </ol>

**Table 8 – NFPA 285 Compliant Assembly Options (continued)**

Wall Component – (continued)	Options
Exterior Cladding Use any of 1 through 8	<ol style="list-style-type: none"> <li>1) Brick – nominal 4-inch clay brick or veneer with maximum 2-inch air gap cavity behind the cladding. Brick with ties / anchors spaced 24 inches oc (max)</li> <li>2) Concrete – minimum 2-inch thick with a maximum 2-inch air gap cavity behind the cladding</li> <li>3) Concrete Masonry Units – minimum 4-inch thick with maximum 2-inch air gap cavity behind the cladding</li> <li>4) Limestone – minimum 2-inch thick with non-open joints installation technique such as shiplap</li> <li>5) Natural Stone Veneer – minimum 2-inch thick with non-open joints installation technique such as shiplap</li> <li>6) Precast Artificial Stone – minimum 1-½ inch thick complying with ICC-ES AC51 with non-open joint installation technique</li> <li>7) Terra Cotta Cladding – minimum 1-¼ inch thick (solid) with non-open joint installation technique such as shiplap</li> <li>8) Stucco – minimum ¾ inch thick exterior cement plaster and lath</li> </ol>
Window Header Use either 1 or 2 – See Figure 1 for Window Header Detail	<ol style="list-style-type: none"> <li>1) Flashing composed of 25 GA (min) sheet metal (steel) with 1 inch thick, 4 pcf mineral wool over the interior of the sheet metal</li> <li>2) Any header design deemed more robust than item 1 per analysis</li> </ol>

**Figure 1 – Window Header Detail for ThermalStar NFPA 285 Wall Design Described in Table 5**



## **6.16 Atlas Geof foam:**

Atlas Geof foam blocks are placed loosely on a level surface or existing structural slab. The blocks may be installed in a single layer or in multiple layers.

Structural loads on Atlas Geof foam shall not exceed the compressive resistance at 1% strain in accordance with ASTM D6817. Additional design considerations are included in ASTM D7180 Standard Guide for Use of Expanded Polystyrene (EPS) Geof foam and ASTM D7557 Standard Practice for Sampling of Expanded Polystyrene Geof foam Specimens.

When Atlas Geof foam product is less than 4 inches in thickness, the interior of the building must be separated from the geof foam blocks with a thermal barrier as required by IBC Section 2603.4 or IRC Section R316.4, as applicable.

When Atlas Geof foam product used in interior applications is greater than 4 inches in thickness, a minimum 1-inch concrete or masonry material must cover the product on all faces.

## **7. CONDITIONS OF USE**

### **7.1 General:**

The EPS insulation boards described in this report comply with or are suitable alternatives to what is specified in those codes listed in Section 2 of this report, subject to the following conditions.

**7.2** The insulation must be produced, identified, and installed in accordance with the manufacturer's published installation instructions. If there is a conflict between this report and the manufacturer's instructions this report governs.

**7.3** The boards must be separated from the building interior with a thermal barrier complying with the applicable code, such as minimum ½-inch thick (12.7 mm) gypsum wallboard installed in accordance with the applicable code, except as described in Sections 4.1, 6.6, 6.8, and 6.9 of this report.

**7.4** Except for ThermalStar L<sub>Ci</sub> Laminated Insulation, ThermalStar L<sub>Ci</sub> GPS Laminated Insulation, and ThermalStar S<sub>Wi</sub> Laminated Structural Insulation boards installed in accordance with Section 6.11, when applied on above grade exterior walls, walls must be further protected by a water-resistive barrier complying with 2018 IBC Section 1402.2, 2015 and 2012 IBC Section 1404.2, or IRC Section R703.2, and by wall coverings that provide the necessary structural resistance to wind and seismic forces in spanning between wall framing members. When used as a water-resistive barrier, all ThermalStar L<sub>Ci</sub> Laminated Insulation, ThermalStar L<sub>Ci</sub> GPS Laminated Insulation, and ThermalStar S<sub>Wi</sub> Laminated Structural Insulation board joints must be backed with a stud or sheathing.

**7.5** Walls must be braced in accordance with the applicable code.

**7.6** In areas where the probability of termite infestation is defined as "very heavy," the foam plastic must be installed in accordance with 2018 and 2015 IBC Section 2603.8, 2012 IBC Section 2603.9, or IRC Section R318.4 of the, as applicable, except as allowed for TalonGuard Treated EPS in Sections 6.2, 6.3, or 6.4 of this report.

**7.7** For a listing of applicable UL Certifications for insulation products, see UL's [Product iQ database](#) for the following categories:

- Foamed Plastic, UL Classified for Surface Burning Characteristics in accordance with UL723 ([BRYX](#)).
- Polystyrene Thermal Insulation, Rigid Cellular, UL Classified in accordance with ASTM C578 ([QORW](#)).
- Class A, B or C roof-covering assemblies UL Classified in accordance with UL 790 ([TGFU](#)).
- Roof Deck Construction [458](#) for UL Classification in accordance with UL 1256 (TGKX).
- For products evaluated as a part of fire-resistance-rated assemblies in accordance with UL 263, Foamed Plastic ([CCVW](#)).
- Exterior Walls for assemblies UL Classified in accordance with NFPA 285 (FWFO):
  - Exterior Wall System [EWS0001](#)
  - Exterior Wall System [EWS0002](#)
  - Exterior Wall System [EWS0003](#)

**7.8** Reroofing must be in accordance with Section 6.6.

**7.9** For ThermalStar insulation used in exterior walls of buildings of Types I, II, III, or IV construction in accordance with IBC Section 2603.5, see Section 6.12.1 for NFPA 285 approved wall designs not covered under the NFPA 285 UL Certifications listed in 7.7.

**7.10** Atlas Geofoam: Atlas Geofoam product less than 4-inch thickness must be separated from the building interior with a thermal barrier such as ½ inch gypsum board, unless meeting conditions of sections 6.9 & 6.10. Atlas Geofoam product greater than 4 inch thickness must be separated from the building interior with a minimum 1 inch thick concrete or masonry on all faces as required by IBC Section 2603.4.1.1.

Design loads to be resisted by Atlas Geofoam must be determined in accordance with the IBC or IRC, as applicable, and must not exceed the allowable loads noted in this report.

All construction documents specifying Atlas Geofoam product must comply with the design limitations of this report. Design calculations and details for specific applications must be furnished to the code official, verifying compliance with this report and the applicable codes. The documents must be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed.

For a listing of applicable UL Certifications for Atlas Geofoam products, see UL's [Product iQ database](#) for the following categories:

- Foamed Plastic, UL Classified for Surface Burning Characteristics in accordance with UL723 ([BRYX](#)).
- Polystyrene Thermal Insulation, Rigid Cellular, UL Classified in accordance with ASTM D6817 ([QORW](#)).
- Foamed Plastic, UL Classified for Interior Building Construction in accordance with UL 1715 ([OERU](#)).

### 7.11 Manufacturing Locations:

The products are manufactured at the following locations under the UL LLC Listing or Classification and Follow-Up Service Program, which includes audits in accordance with ICC-ES Acceptance Criteria for Quality Documentation, AC 10:

Byron Center, MI (BYC)	Gainesville, GA (EGAGA)	Reno, NV (ERNNV)
Denver, CO (EDNCO)	Kansas City, KS (EKCBL)	Ridgeway, VA (MVA)
Fond Du Lac, WI (EFDWI)	Murray, UT (EMUUT)	Tijuana, Mexico (TJM)
Fredericktown, MO (FTM)	Perryville, MO (PMO)	Washington, IA (EWAIA)
Kingman, AZ (EKMAZ)	Anthony, TX (EANTX)	Arlington, TX (EARTX)

## 8. SUPPORTING EVIDENCE

**8.1** Data in accordance with ICC-ES Acceptance Criteria for Foam Plastic Insulation (AC12).

**8.2** Data in accordance with ICC-ES Acceptance Criteria for Termite Resistant Foam Plastics (AC239).

**8.3** UL Classification reports in accordance with UL 723, ASTM C578, UL 790, UL1256, UL263, and NFPA 285. See UL Product Certification Categories (BRYX), (QORW), (TGFU), (TGKX), (CCVW) and (FWFO) respectively.

**8.4** Documentation of quality system elements described in ICC-ES Acceptance Criteria for Quality Documentation (AC10).

**8.5** Data in accordance with ICC-ES Acceptance Criteria for Foam Plastic Sheathing Panels used as Water Resistive Barriers (AC71).

**8.6** Data in accordance with ASTM E2178 Standard Test Method for Air Permeance of Building Materials.

**8.7** Reports of room corner fire tests in accordance with NFPA 286 and AC12 Appendix A and B.

**8.8** Reports and analysis of wall fire tests in accordance with NFPA 285.

## 9. IDENTIFICATION

Atlas Molded Products insulation described in this evaluation report are identified by a marking bearing the report holder's name (Atlas Molded Products or AMP) and address code, the product name, the ASTM type designation, the UL Certification Mark where applicable, and the evaluation report number UL ER16529-01. The validity of the evaluation report is contingent upon this identification appearing on the product or UL Classification Mark certificate.

## 10. USE OF UL EVALUATION REPORT

**10.1** The approval of building products, materials or systems is under the responsibility of the applicable authorities having jurisdiction.

**10.2** UL Evaluation Reports shall not be used in any manner that implies an endorsement of the product, material or system by UL.

**10.3** The status of this report, as well as a complete directory of UL Evaluation Reports may be found at UL.com via the [Product IQ™ database](#).

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