

UL Evaluation Report

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DIVISION: 31 00 00 - EARTHWORKS
Sub-level 3: 31 23 00 - Excavation and Fill
Sub-level 4: 31 23 23 - Fill

DIVISION: 06 00 00 - WOOD, PLASTICS AND COMPOSITES
Sub-level 2: 06 12 00 - Structural Panels
Sub-level 3: 06 12 19 - Shear Wall Panels
Sub-level 4: 06 16 00 - Sheathing

DIVISION: 07 00 00 - THERMAL AND MOISTURE PROTECTION
Sub-level 2: 07 20 00 - Thermal Protection
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

Sub-level 3: 07 25 00 - Weather Barriers

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



1. SUBJECT :

INTEGRITY, THERMALSTAR, GX, ECOSOLUTIONS, AND ELEVATION EXPANDED POLYSTYRENE INSULATION BOARDS

TALONGUARD EPS, XTR T&G BOARD (T&G I, T&G II, T&G IIR, GX T&G), X-GRADE, EWG EIFS, EIFS GX EIFS PRO, THERMALSTAR INTER-GRADE, THERMALSTAR TS, THERMALSTAR LCi UNDERLAYMENT, THERMALSTAR LRi UNDERLAYMENT, THERMALSTAR LCi GX, AND THERMALSTAR ONE

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), dated June 2017, editorially revised October 2017
- ICC-ES Acceptance Criteria for Foam Plastic Sheathing Panels used as Water Resistive Barriers (AC71), dated February 2003, editorially revised January 2018
- ICC-ES Acceptance Criteria for Termite Resistant Foam Plastic (AC239), dated October 2008, editorially revised February 2018
- ICC-ES Acceptance Criteria for Quality Documentation (AC10), dated January 2019

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), dated June 2015, editorially revised October 2017
 - ICC-ES Acceptance Criteria for Quality Documentation (AC10), dated January 2019

- ICC-ES Acceptance Criteria for Foam Plastic Sheathing Panels Used as Water- Resistive Barriers (AC71), dated February 2003, editorially revised January 2018
 - ICC-ES Acceptance Criteria for Cementitious Exterior Wall Coatings (AC11), dated January 2013, editorially revised May 2018
 - ICC-ES Acceptance Criteria for Termite Resistant Foam Plastic (AC239), dated October 2008, editorially revised February 2018
- ANSI/UL:
 - UL723 (ASTM E84-16), Test for Surface Burning Characteristics of Building Materials
 - UL790 (ASTM E108-16), Standard Test Methods for Fire Tests of Roof Coverings
 - UL1256 Fire Test of Roof Deck Constructions
 - UL263 (ASTM E119-16), Fire Tests of Building Construction and Materials
 - UL1715 Fire Test of Interior Finish Material
 - APA:
 - PS 2-10, Performance Standard for Wood-Based Structural-Use Panels, dated June 1, 2011
 - ASTM:
 - ASTM C578-15, 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 E2178-13, 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 711-16, Voluntary Specification for Self-Adhering Flashing Used for Installation of Exterior Wall Fenestration Products

4. USES

4.1 Integrity, ThermalStar, GX, EcoSolutions, and Elevation Expanded Polystyrene Insulation Boards:

Integrity, ThermalStar, GX, EcoSolutions, and Elevation Expanded Polystyrene Insulation 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 Expanded Polystyrene:

TalonGUARD EPS insulation boards or blocks are recognized for the same uses as Integrity, GX, ThermalStar, & Elevation EPS insulation boards. TalonGUARD 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 T&G Board (T&G I, T&G II, T&G IIR, GX T&G):

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 ThermalStar X-GRADE:

ThermalStar X-GRADE EPS insulation board is pale orange EPS formulated for below grade use. The insulation incorporates the same preservative used with TalonGUARD 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 EWG EIFS:

When installed in accordance with this report, EWG 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/ft³ and have an ASTM C578 designation of Type I. Color offerings for these boards are traditional white and pale orange.

4.6 EIFS GX:

When installed in accordance with this report, EIFS GX 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/ft³ or 1.45 lbs/ft³ and have an ASTM C578 designation of Type I or Type II, respectively.

4.7 ThermalStar CVT EIFS PRO:

When installed in accordance with this report, EIFS PRO is a pale orange 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/ft³ and have an ASTM C578 designation of Type II, or at a minimum density of 1.80 lbs/ft³ 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/ft³ and have an ASTM C578 designation of Type I, and are offered at a maximum thickness of 4 inches.

4.9 ThermalStar TS:

ThermalStar TS insulation boards 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 Underlayment:

ThermalStar LCi Underlayment 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 product is available as sheets, fan-folded, or factory bonded to wood.

ThermalStar LCi GX is the same product as ThermalStar LCi, but utilizes a graphite-enhanced dark gray color for higher R-value.

ThermalStar One 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, ThermalStar LCi GX, or ThermalStar One Underlayment insulation boards 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 Underlayment:

ThermalStar LRi Underlayment 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 assembly in accordance with UL790.

4.12 ThermalStar GX:

ThermalStar GX insulation board is graphite enhanced EPS used as an alternate core for T&G, X-GRADE, EWG, and underlayment products. The insulation incorporates the same preservative used with TalonGUARD 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.

4.13 ThermalStar One:

ThermalStar One is gray or orange EPS with a UV resistant polymer facer on one side, and PS2 Exposure I rated OSB 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.

4.14 Elevation Geofoam:

Elevation Geofoam is used as lightweight structural fill in floor cavities. Installation shall be in accordance with Section 6.13 of this report.

5. PRODUCT DESCRIPTION

5.1 General:

All Atlas EPS 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 GX and ThermalStar One 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 ft² h/Btu (°K m²/W)¹
(For SI: 1 lb/ft³ = 16.018 kg/m³, 1°F ft² h/Btu = 0.176°K m²/W, 1inch = 25.4 mm.)

C578 Type	Type I	Type VIII	Type II	Type IX	Type IV	Type XV
Density, min., lb/ft ³ (kg/m ³)	0.90 (14.4)	1.15 (18.4)	1.35 (21.6)	1.80 (28.8)	-	-
Integrity, ThermalStar, Eco Solutions, Elevation, TalonGUARD EPS	3.6 (0.63)	3.8 (0.67)	4.0 (0.70)	4.2 (0.74)	-	-
ThermalStar X- Grade & LRi/LCi Underlayment, TS	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)	-	-	-
EWG EIFS, ThermalStar Inter-Grade	3.6 (0.63)	-	-	-	-	-
EIFS PRO	-	-	4.0 (0.70)	4.2 (0.74)	-	-

¹Thermal 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 –GX Thermal Resistance Values - 1°F ft² h/Btu (°K m²/W)¹
 (For SI: 1 lb/ft³ = 16.018 kg/m³, 1°F ft² h/Btu = 0.176°K m²/W, 1inch = 25.4 mm.)

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

¹Thermal 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 Integrity, ThermalStar, ThermalStar GX, EcoSolutions, and Elevation Expanded Polystyrene Insulation Boards:

Integrity, ThermalStar, ThermalStar GX, EcoSolutions, and Elevation 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/m³). 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 Expanded Polystyrene Boards:

TalonGUARD 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 XTR T&G Board (T&G I, T&G II, T&G IIR, GX T&G):

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/m³) for T&G I, and at 1.35 pcf (21.6 kg/m³) for T&G II and T&G IIR, and GX T&G.

The 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 ThermalStar X-GRADE:

X-GRADE 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 EWG EIFS:

EWG 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/m³). The EWG 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 GX EIFS GX:

EIFS GX 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/m³) or 1.45 pcf (23.2 kg/m³), respectively.

The EIFS GX 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 EIFS PRO:

Designed for better impact resistance in lower elevation areas of buildings subject to wear, 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/m³). The 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 TS:

ThermalStar TS 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/m³). The designations for the four densities are: ThermalStar TS (Type I), ThermalStar TS (Type VIII), ThermalStar TS (Type II), and ThermalStar TS (Type IX).

The ThermalStar TS insulation boards are produced in flat or tapered boards, up to a thickness of 9.0 inches (229 mm) for ThermalStar TS (Type I), 7.2 inches (183 mm) for ThermalStar TS (Type VIII), 6.0 inches (152 mm) for ThermalStar TS (Type II), and 4.5 inches (114 mm) for ThermalStar TS (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 Underlayment:

ThermalStar LCI Underlayment LCI GX and ThermalStar One 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/m³). 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 Underlayment Boards (AC11 exception criteria)¹

Property	ThermalStar LCI Underlayment
Minimum density, lb/ft ³ (kg/m ³)	0.9 (14.4)
Compressive strength @ 10% def., psi (kPa)	10 (69)
Flexural strength, psi (kPa)	38.9 (268)

For SI: 1 lb/ft³ = 16.018 kg/m³, 1°F ft² h/Btu = 0.176°K m²/W, 1 psi = 6.895 kPa.

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

5.12 ThermalStar LRi Underlayment:

ThermalStar LRi Underlayment 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 GX:

Except for higher thermal resistance as shown in Table 1 and distinctive dark gray color, ThermalStar GX 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 One

ThermalStar One 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 One Thermal Resistance Values - 1°F ft² h/Btu (°K m²/W) ¹
(For SI: 1 lb/ft³ = 16.018 kg/m³, 1°F ft² h/Btu = 0.176°K m²/W, 1inch = 25.4 mm.)

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

5.15 Elevation Geofoam:

Elevation 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/ft³, 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 ³	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, ThermalStar LCi GX, and ThermalStar One Underlayment insulation boards. 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 ½” (12mm), ThermalStar LCI, ThermalStar LCI GX, and ThermalStar One Underlayment insulation boards 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 ²	17.0 mJ/m ²
VIII	1875 Btu/ft ²	21.3 mJ/m ²
II	2250 Btu/ft ²	25.5 mJ/m ²
IX	3000 Btu/ft ²	34.0 mJ/m ²

*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 One, 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 One, 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 One 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 SENCO 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

ASTM C578 Type	Density, min. lbs/ft3	MAXIMUM PERMEANCE ¹
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

¹Water 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.

²Water 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 Expanded Polystyrene:

TalonGUARD insulation boards and GX 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 XTR T&G Board (T&G I, T&G II, T&G IIR, GX T&G):

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 ThermalStar X-GRADE:

ThermalStar X-GRADE 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 EWG EIFS:

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

6.6 ThermalStar TS & LRi Underlayment:

ThermalStar TS Roof Insulation Boards and LRi Underlayment 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 Underlayment:

ThermalStar LCi, ThermalStar LCi GX, and ThermalStar One Underlayment 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:

Integrity, ThermalStar, GX, TalonGUARD, & Elevation Type I, VIII, II and IX EPS insulation boards, T&G Boards (T&G I, T&G II, T&G IIR, GX T&G), X-GRADE Type I, VIII, II and IX, EWG EIFS, EIFS PRO, ThermalStar Inter-Grade, and ThermalStar LCi, ThermalStar LCi GX, and ThermalStar One Underlayment 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*[®] (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/m³) and maximum nominal thickness of 4 inches (102 mm); or maximum nominal density of 2 pcf (32 kg/m³) and maximum nominal thickness of 2 inches (51 mm); or maximum nominal density of 1.5 pcf (24 kg/m³) and maximum nominal thickness of 2-²/₃ inches (68 mm); or a maximum nominal density of 1.25 pcf (20 kg/m³) and maximum nominal thickness of 3-¹/₄ inches (82 mm).

6.9 Other Structures:

Integrity, ThermalStar, GX, TalonGUARD, & Elevation Type I, II, VIII and IX EPS insulation boards; XTR T&G Boards (T&G I, T&G II, T&G IIR, GX T&G); X-GRADE Type I, II, VIII and IX; EWG EIFS; ThermalStar Inter-Grade Insulation; and ThermalStar LCi, ThermalStar LCi GX, and ThermalStar One Underlayment 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/m³) and maximum nominal thickness of 4 inches (102 mm); or maximum nominal density of 2 pcf (32 kg/m³) and maximum nominal thickness of 2 inches (51 mm); or maximum nominal density of 1.5 pcf (24 kg/m³) and maximum nominal thickness of 2-²/₃ inches (68 mm); or a maximum nominal density of 1.25 pcf (20 kg/m³) and maximum nominal thickness of 3-¹/₄ inches (82 mm).

6.10 Residential Basements:

Integrity, ThermalStar, GX, EcoSolutions, & TalonGUARD Type I, II, VIII and IX EPS insulation boards; T&G Boards (T&G I, T&G II, T&G IIR, GX T&G); X-GRADE Type I, II, VIII and IX; EWG EIFS; ThermalStar Inter-Grade Insulation; and ThermalStar LCi, ThermalStar LCi GX, and ThermalStar One Underlayment 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/m³) and maximum nominal thickness of 4 inches (102 mm); or maximum nominal density of 2 pcf (32 kg/m³) and maximum nominal thickness of 2 inches (51 mm); or maximum nominal density of 1.5 pcf (24 kg/m³) and maximum nominal thickness of 2-²/₃ inches (68 mm); or a maximum nominal density of 1.25 pcf (20 kg/m³) and maximum nominal thickness of 3-¹/₄ inches (82 mm).

6.11 Fire-Resistance Rated Wall Construction:

ThermalStar (X-Grade, GX, LCi, LCi GX, One, EWG EIFS, and T&G) has 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, ThermalStar LCi GX, and ThermalStar One Underlayment 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, ThermalStar LCi GX, and ThermalStar One Underlayment 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 ³/₈-inch-diameter (9.5 mm) head; 6d ring-shank nails and ¹⁵/₁₆-inch-diameter (24 mm) plastic washers; self-drilling screws with ³/₄-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 $\frac{3}{4}$ 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, ThermalStar LCI GX, and ThermalStar One Underlayment 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- $\frac{1}{2}$ 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 Underlayment 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 $\frac{3}{4}$ -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 One as Structural Sheathing:

ThermalStar One 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 $\frac{7}{16}$ -inch thick OSB for the application
- TRADITIONAL NAILGUNS MAY NOT BE USED WHEN INSTALLING THERMALSTAR ONE WITH OSB FACING STRUCTURAL MEMBERS
- ThermalStar One R3 and R5 shall be installed with a Senco model SCN63LDXP nail gun. Use the $\frac{3}{8}$ " thick R3 spacer when fastening ThermalStar One R3.
- ThermalStar One R7.5 shall be install with a Senco SCN75LDXP nail gun.
- ThermalStar One shall be fastened with 0.113" x 2- $\frac{3}{8}$ " 15° Senco GD24APBF or .131 x 2- $\frac{1}{2}$ " 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 $\frac{1}{2}$ -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 One when not installed in a top plate or bottom plate of a wall.
- When installed in accordance with the installation instructions herein, ThermalStar One 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 One as Nailbase Over Structural Sheathing

ThermalStar One 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

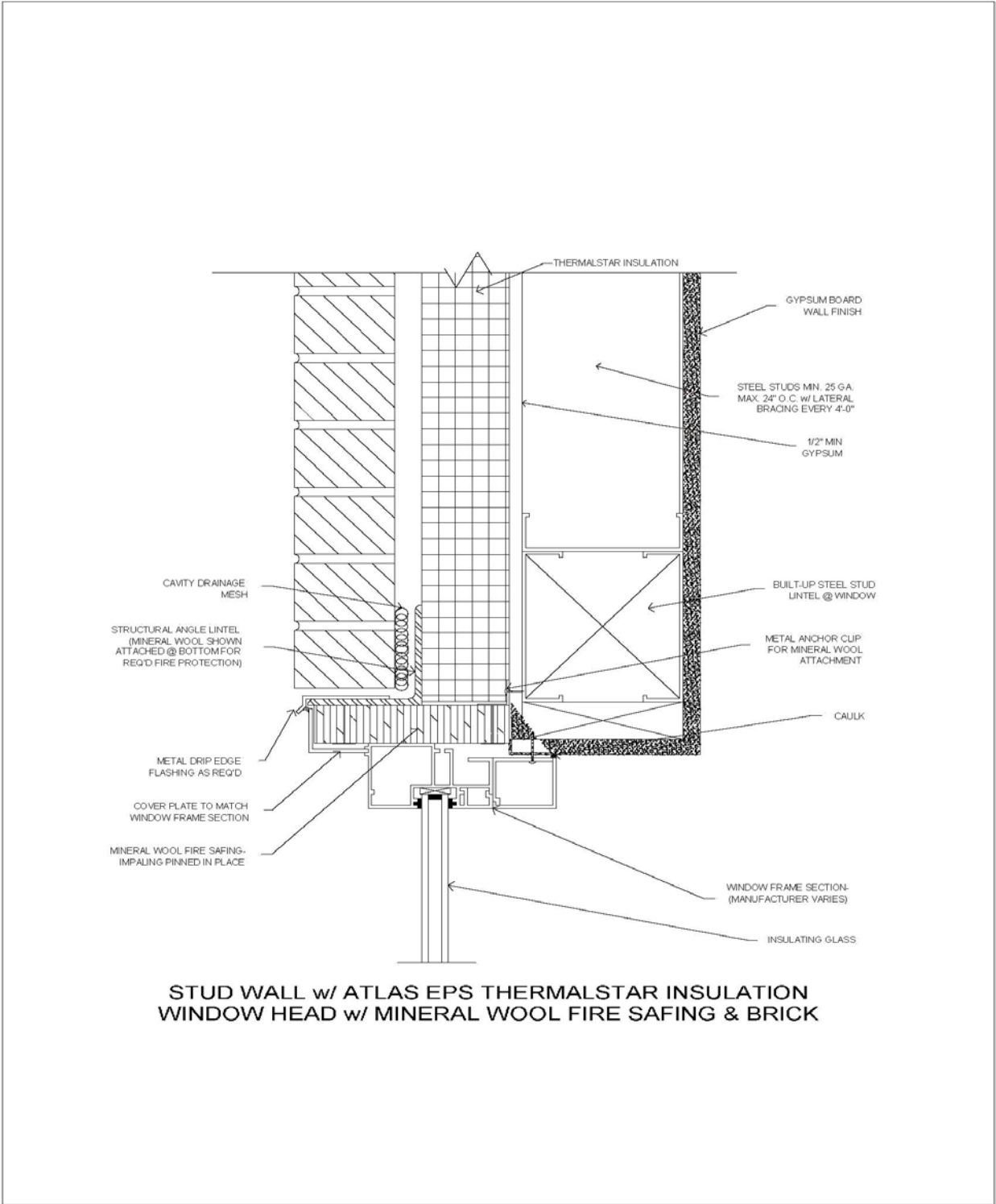
Wall Component	Options
Base Wall Use 1, 2, or 3	<ol style="list-style-type: none"> 1) Cast Concrete Walls 2) CMU Cast Concrete Walls 3) 25 GA (min) 3-5/8 inch thick (min) steel studs spaced 24 inches oc (max) <ol style="list-style-type: none"> a. Any 5/8 inch type X gypsum wallboard interior b. Any 1/2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

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"> 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) 2) Concrete – minimum 2-inch thick with a maximum 2-inch air gap cavity behind the cladding 3) Concrete Masonry Units – minimum 4-inch thick with maximum 2-inch air gap cavity behind the cladding 4) Limestone – minimum 2-inch thick with non-open joints installation technique such as shiplap 5) Natural Stone Veneer – minimum 2-inch thick with non-open joints installation technique such as shiplap 6) Precast Artificial Stone – minimum 1-½ inch thick complying with ICC-ES AC51 with non-open joint installation technique 7) Terra Cotta Cladding – minimum 1-¼ inch thick (solid) with non-open joint installation technique such as shiplap 8) Stucco – minimum ¾ inch thick exterior cement plaster and lath
Window Header Use either 1 or 2 – See Figure 1 for Window Header Detail	<ol style="list-style-type: none"> 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 2) Any header design deemed more robust than item 1 per analysis

* Includes ThermalStar LCI & ThermalStar LCI GX

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



6.16 Elevation Geofoam:

Elevation Geofoam 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 Elevation geofoam 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) Geofoam and ASTM D7557 Standard Practice for Sampling of Expanded Polystyrene Geofoam Specimens.

When Elevation geofoam product is less than 4 inches in thickness, the interior of the building must be separated from the geofoam blocks with a thermal barrier as required by IBC [Section 2603.4](#) or IRC [Section R316.4](#), as applicable.

When Elevation geofoam 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 LCI Underlayment, ThermalStar LCI GX, and ThermalStar One 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 LCI Underlayment, ThermalStar LCI GX, and ThermalStar One 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 Elevation Geofoam: Elevation 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. Elevation 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 Elevation 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 Elevation 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 Elevation 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)

8. SUPPORTING EVIDENCE

8.1 Data in accordance with ICC-ES Acceptance Criteria for Foam Plastic Insulation (AC12), dated June 2015.

8.2 Data in accordance with ICC-ES Acceptance Criteria for Termite Resistant Foam Plastics (AC239), dated October 2008.

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), dated June 2012.

8.5 Data in accordance with ICC-ES Acceptance Criteria for Foam Plastic Sheathing Panels used as Water Resistive Barriers (AC71), dated February 2003.

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 at www.ul.com/erdirectory.

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