



BUILDING PRODUCTS LISTING PROGRAM

Customer: Modus Structures Inc.
Class: Insulated Metal Panels
Location: Crossfield, Alberta
Website: www.modusinc.ca
Listing No. B1038
Project No. B1038-1 Edition 3
Effective Date: June 16, 2011
Last Revised Date: April 14, 2018
Expires: N/A

Standards: CAN/ULC S701 *Standard for Thermal Insulation, Polystyrene Boards.*
CAN/ULC S102.2 *Standard Method of Test for Surface Burning Characteristics of Flooring, Floor Coverings, and Miscellaneous Materials and Assemblies.*
CAN/ULC-S101 *Standard Methods of Fire Endurance Tests of Building Construction and Materials.*
ASTM E96 *Standard Test Methods for Water Vapor Transmission of Materials.*
ASTM E72 *Standard Test Methods of Conducting Strength Tests of Panels for Building Construction.*
ASTM E564 *Standard Practice for Static Load Test for Shear Resistance of Framed Walls for Buildings.*
ASTM E90 *Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.*
ASTM C578 *Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation.*
ASTM E84 *Standard Test Method for Surface Burning Characteristics of Building Materials.*
ASTM E119 *Standard Test Methods for Fire Tests of Building Construction and Materials.*

Products: Insulated Metal Panels (IMP) in the following configurations:

- Floor Panel: FP95-16OC
- Wall Panel: WP6-WC
- Roof Panel: RP11875-16OC
- Roof Panel: RP14-12OC

Markings: Each structural insulating panel is marked with the following content, using a permanent adhesive label, in an area that is readily visible for inspection at the construction site:

- a) Listee name or recognized trademark (Modus)
- b) City and province of manufacture (Crossfield, Alberta)
- c) QAI logo with 'c' and 'us' indicators
- d) Date of manufacture
- e) Product model
- f) Insulation Type 1 (CAN/ULC S701) Type I (ASTM C578)

- g) Flame Spread / Smoke Developed Rating (FSI \leq 500 / SDI $>$ 500 per CAN/ULC S102.2, FSI \leq 25 / SDI \leq 450 per ASTM E84).
- h) QAI file number (B1038-1)
- i) QAI Logo with 'C' and 'US' indicator shown below:





Models / MODUS IMP products are composed of Type 1 expanded polystyrene, complying with CAN/ULC
 Ratings: S701 as outlined below:

MODUS IMP EPS THERMAL INSULATION TYPES PER CAN/ULC S701	
PROPERTY	TYPE 1
Thermal Resistance Minimum at 25 mm Thickness (m ² *°C/W)- standard panels	0.65
Thermal Resistance Minimum at 25 mm Thickness (m ² *°C/W)- Type 1 NEOPOR™	0.83
Water Vapour Permeance Maximum at 25 mm Thickness (Ng/Pa*s*m ²)	300
Dimensional Stability Maximum Linear Change (%)	1.5
Flexural Strength Minimum (kPa)	170
Water Absorption By Volume Maximum (%)	6.0
Compressive Strength Minimum at 10% Deformation (kPa)	70
Limiting Oxygen Index Minimum (%)	24

Modus IMP products are composed of Type I expanded polystyrene, complying with ASTM C578 as outlined below:

MODUS IMP EPS THERMAL INSULATION TYPES PER ASTM C578	
PROPERTY	TYPE I
Compressive Strength, Minimum @ 10% Deformation (psi)	10.0
Thermal Resistance, Minimum @ 1 inch Thick (F*ft ² *h/Btu) – standard Type 1 EPS	3.6
Thermal Resistance, Minimum @ 1 inch Thick (F*ft ² *h/Btu) – Type 1 NEOPOR™	4.7
Flexural Strength, Minimum (psi)	25.0
Water Vapor Permeance, @ 1-inch Thickness, Maximum (Perms)	5.0
Water Absorption By Volume, Maximum (%)	4.0
Dimensional Stability Linear Change, Maximum (%)	2.0
Oxygen Index, Minimum (%)	24.0
Density, Minimum (lbs/ft ³)	0.90

MODUS IMP product cores have a flame spread and smoke developed rating determined in accordance with CAN/ULC S102.2 as outlined below:

MODUS IMP SURFACE BURNING CHARACTERISTICS PER CAN/ULC S102.2				
Model(s)	Flame Spread Index	Smoke Developed Index	Thickness Max. (mm)	Density Max. (kg/m ³)
WP6-WC FP95-16OC RP11875-16OC RP16-12OC (Evaluated without steel skins)	≤ 500	≥ 500	356 mm (14 inches)	17 kg/m ³ (1.15 lbs/ft ³)

MODUS IMP product cores have a flame spread and smoke developed rating determined in accordance with ASTM E84 as outlined below:

MODUS IMP SURFACE BURNING CHARACTERISTICS PER ASTM E84				
Model(s)	Flame Spread Index	Smoke Developed Index	Thickness Max. (mm)	Density Max. (kg/m ³)



WP6-WC FP95-16OC RP11875-16OC RP16-12OC (Evaluated EPS core only)	≤ 25 ¹	≤ 450	152 mm (6 inches)	17 kg/m ³ (1.15 lbs/ft ³)
WP6-WC FP95-16OC RP11875-16OC RP16-12OC (Evaluated EPS core only)	≤ 25	≤ 450	305 mm (12 inches)	17 kg/m ³ (1.15 lbs/ft ³)

Note 1: Ceiling measurement only. This measurement is conducted through determination of flame spread index and smoke developed index with the removal of any contribution of molten materials ignited on the floor of the tunnel assembly.

MODUS IMP products have a water vapour permeance per ASTM E96 including panel joint, when treated as outlined below:

MODUS IMP WATER VAPOUR PERMEANCE PER ASTM E96			
Model(s)	Joint Treatment	Vapour Permeance ng/	Thickness Max. (mm)
WP6-WC (Evaluated as panel with joint)	With joint sealant	5.02 ng/Pa*s*m ² 0.0088 Perms	152 mm (6 inches)
	Without joint sealant	5.91 ng/Pa*s*m ² 0.103 Perms	

MODUS IMP products have a sound transmission classification determined in accordance with ASTM E90 as outlined below:

MODUS IMP SOUND TRANSMISSION CLASSIFICATION PER ASTM E90			
Model(s)	Joint Treatment	Sound Classification	Thickness Max. (mm)
WP6-WC (Evaluated as single panel without joint)	N/A	Sound Transmission Classification (STC) = 19 Outdoor-indoor transmission class (OITC) = 21	152 mm (6 inches)

MODUS IMP products have transverse load resistances in positive and negative pressure directions, determined in accordance with ASTM E72 as outlined below²:

MODUS IMP PRESSURE RESISTANCE PER ASTM E72					
Model(s)	Maximum Span, m (inches)	Allowable Pressure at Deflection, kPa (psf)			Maximum Design Pressure ³ kPa (psf)
		L/360	L/240	L/180	
WP6-WC	3.2 (126)	2.3 (49)	3.0 ⁴ (63)	3.0 ⁴ (63)	3.0 (63)
FP95-16OC ⁴	6.4 (252)	3.2 (67)	4.1 ⁴ (88)	4.1 ⁴ (85)	4.1 (85)
RP11875-16OC ⁴	7.3 (288)	4.2 (87)	5.6 (118)	6.0 ⁴ (125)	6.0 (125)



RP14-12OC ⁴	7.3 (288)	7.1 (148)	8.1 (170)	8.1 (170)	8.1 (170)
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Note 2: IMP products tested following ASTM E72 panel support conditions. Design consideration for site installation is required.

Note 3: Maximum Design Pressure is determined with Factor of Safety of 2.5 applied to failure pressures determined through testing to ASTM E72.

Note 4: Allowable Pressure at deflection limit exceeds allowable design pressure based on ultimate load with factor of safety. Maximum design pressure based on ultimate is shown.

Where design for allowable transverse load is conducted using engineered wood I-joint strength properties in conformance with CSA 086, values for deflection and maximum allowable design pressure noted can be waived.

MODUS IMP products have racking shear resistance determined in accordance with ASTM E564 as outlined below⁶:

MODUS IMP RACKING SHEAR CAPACITY PER ASTM E564			
Model(s)	Maximum Aspect Ratio	Load @ Drift Limit $\Delta = 13 \text{ mm (1/2 inch)}$ kN/m (lbs/ft)	Maximum Allowable Load ⁷ kN/m (lbs/ft)
WP6-WC Panel joints fastened with #8 x 13 mm (1/2") Tek Screws at 152 mm (6") on centre. Joint sealed with silicone.	1.3	0.4 (307) ⁸	0.4 (307)

Note 6: IMP products tested following ASTM E564, with installation including hold downs used. Design consideration for site installation is required.

Note 7: Maximum allowable racking shear load is determined with Factor of Safety of 2.5 applied to failure loads determined through testing to ASTM E564.

Note 8: Allowable load calculated based on drift limit exceeds maximum allowable racking shear load based on ultimate load with applied factor of safety. Maximum allowable racking shear load based on ultimate load is shown.

MODUS IMP products have axial load resistance determined in accordance with ASTM E72 as outlined below⁹:

MODUS IMP AXIAL CAPACITY PER ASTM E72			
Model(s)	Maximum Height, m (inches)	Load @ Compression Limit $\Delta = 3 \text{ mm (1/8 inch)}$ kN/m (lbs/ft)	Maximum Allowable Load ¹⁰ kN/m (lbs/ft)
WP6-WC	3.2 (126)	3.6 (2,666) ¹¹	3.6 (2,666)

Note 9: IMP products tested following ASTM E72, with installation applying load eccentric to header, without restraint of panel. Design consideration for site installation is required.



Note 10: Maximum allowable axial loading is determined with Factor of Safety of 2.5 applied to failure loads determined through testing to ASTM E72.

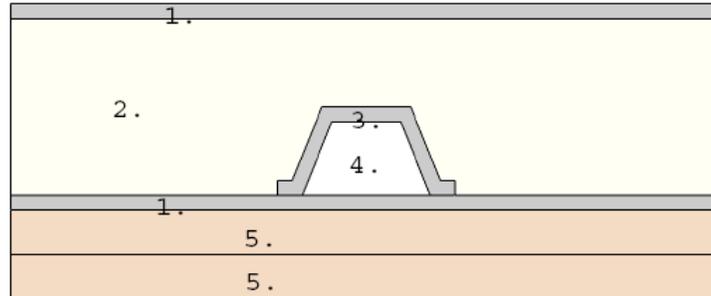
Note 11: Load calculated at compression deformation limit exceeds maximum allowable axial load based on ultimate load with applied factor of safety. Maximum allowable axial load based on ultimate is shown.

MODUS IMP products have fire resistance ratings determined in accordance with CAN/ULC S101, and ASTM E119, as outlined below:

MODUS IMP FIRE RESISTANCE RATINGS PER CAN/ULC S101 / ASTM E119				
QAI Design Listing #	Model(s)	Fire-Resistance Rating	Orientation	Description
B1038-1a	WP6-WP	1-hour Load Bearing, 1.5 kN/m (1,100 lbs/ft)	Interior Facing Fire Only	Base Layer 16 mm (5/8") Type X. Second layer 13 mm (1/2") Type X facing fire. Installed per B1038-1a.
B1038-1b	RP11875-16OC RP14-12OC	1-hour Load Bearing, 5.4 kPa (113 psf)	N/A	2 Layers of 13 mm (1/2") Type X (Type C) facing fire. Exterior of minimum 6mm (1/4") exterior gypsum installed per B1038-1b.
B1038-1c	FC96-16OC	1-hour Load Bearing, 1.4 kPa (30 psf)	N/A	2 Layers of 13 mm (1/2") Type X (Type C) facing fire. Subfloor of minimum 16mm (5/8") tongue and groove plywood installed per B1038-1c.



Design Number: B1038-1a - WP6-WC 1 Hour Load Bearing Fire Resistance Rating from Interior Only, with Applied Load 1.5 kN/m (1100lbs/ft)



Interior Room Side

Load bearing wall assembly using Modus WP6-WC structurally insulated panels manufactured from:

1. 26 gauge steel skin
2. Expanded polystyrene (EPS), Type 1, 6 in. thick
3. 18 gauge steel hat channel
4. Air space

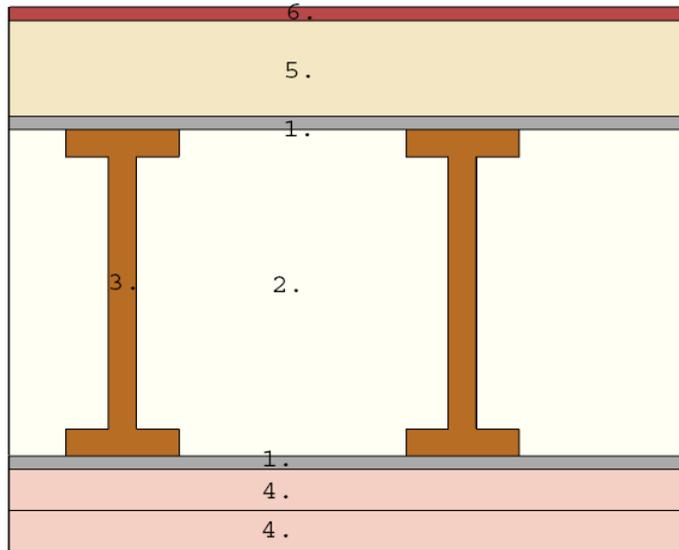
Assembly requirements:

5. Two layers of Type X gypsum wallboard compliant to ASTM C1396 applied to the fire side. First layer is 16 mm (5/8 in.) Type X gypsum wallboard installed vertically with joints staggered 24 in. from panel joints. Second (outer) layer composed of 13 mm (1/2 in.) Type X gypsum wallboard installed vertically with panel joints staggered 12 in. from base layer gypsum joints. Each layer fastened with coarse thread drywall screws located 16 in. on centre vertically and 16 in. on center horizontally. Exposed gypsum wallboard joints are required taped and filled.

Connection of panels (not shown):

Panel joints are connected using sheet metal screws, with eleven screws, located 305 mm (12 in.) on centers in each joint, on each side of the wall. Panel joints are caulked with 3M CP25 WB+ on each side of the wall as an air seal in the joint. The panel is oriented with the steel hat channel side towards the fire.

Design Number: 1038-1b RP11875-16OC 1 Hour Load Bearing Fire Resistance Rating with Applied Load 5.4 kPa (113 psf)



Fire Side

Load bearing ceiling assembly using Modus RP11875-16OC structurally insulated panels manufactured from:

1. 26 gauge steel skin
2. Expandable polystyrene (EPS), Type 1, 304 mm (11-7/8 in.) thickness
3. Wood I-Joists, 304 mm (11-7/8 in.) height, spaced 406 mm (16 in.) on center

Assembly requirements:

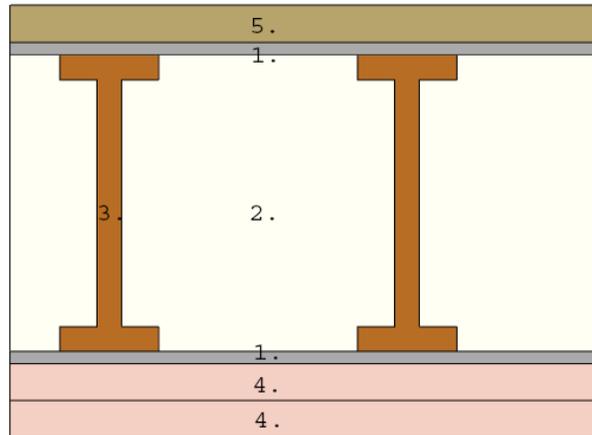
4. Two layers of 13 mm (1/2") Type X / Type C gypsum wallboard on the room side. The wallboard is oriented perpendicular to the wood I-joists, with seams staggered 304 mm (12") between layers. Both layers of gypsum wallboard are mechanically fastened to the internal I-joists using 41 mm (1-5/8") long coarse thread drywall screws spaced 203 mm (8") on center at joints and 305 mm (12") on center in the field. All exposed joints are covered with joint tape and 2 coats of joint compound; all exposed screw heads are covered with two layers of joint compound.
5. 51 mm (2") thick expanded polystyrene foam layer is adhered to the Modus panel surface using a two part adhesive (Weather-Tite® One Step Foamable Adhesive, WTT Systems), with continuous beads 152 mm (6") apart.
6. 6 mm (1/4") sheets of DensDeck black and white exterior gypsum substrate complying to ASTM C1777 adhered to the exposed expanded polystyrene surface using a 2 part adhesive (Weather-Tite® One Step Foamable adhesive, WTT Systems), with continuous beads 152 mm (6") apart.

Connection of panels (not shown):

Panels are joined using tongue and groove connections with a continuous bead of air sealant applied to the female groove. .



1038-1c FC95-16OC 1 Hour Load Bearing Fire Resistance Rating with Applied Load 1.4 kPa (30 psf)



Fire Side

Load bearing floor assembly using Modus FP95-16OC structurally insulated panels manufactured from:

1. 26 gauge steel skin
2. Expanded polystyrene (EPS), Type 1, 241 mm (9-1/2 in.) thickness.
3. Wood I-Joists, 241 mm (9-1/2 in.) height, spaced 406 mm (16 in.) on center

Assembly requirements:

4. Two layers of 13 mm (1/2") Type X (Type C) gypsum wallboard complying with ASTM C1396 on the fire side. The wallboard is oriented perpendicular to the wood I-joists, with staggered seams between layers. The base layer of gypsum wallboard is mechanically fastened to the internal I-joists using 31 mm (1-1/4") length coarse thread drywall screws spaced 405 mm (16" o.c) around the perimeter and in the field.. The face layer is fastened to the internal I-joists using 51 mm (2") length coarse thread drywall screws spaced 405 mm (16" o.c) around the perimeter and in the field, offset from fasteners 204 mm (8") from the base layer fasteners. The face layer of gypsum wallboard requires a level 2 drywall finish.
5. Minimum 16 mm (5/8") thickness tongue and groove plywood, fastened to the internal I-joists using minimum 60 mm (2-3/8") length ring shank nails spaced 152 mm (6") on center. PL400 construction adhesive is used at the joist locations. An EDPM membrane is adhered over the deck using Sarnacol roofing adhesive 2170R (CA).

Connection of panels (not shown):

Panels are joined using tongue and groove connections with a continuous bead of air sealant applied to the female groove.

Notes: Final acceptance of the product in the intended application is to be determined by the authority having jurisdiction (AHJ).

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LABORATORIES

CERTIFICATION TESTING INSPECTION

VANCOUVER, BC: 877.461.8378 ph. | 604.527.8368 fx.
LOS ANGELES, CA: 909.483.0250 ph. | 909.483.0336 fx.
WASHINGTON, DC: 540.636.9445 ph. | 540.636.9414 fx.
TULSA, OK: 918.437.8333 ph. | 918.437.8487 fx.
TORONTO, ON: 416.550.9280
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