

## PRODUCT NAME

Halo Exterra rigid EPS foam insulation

## MANUFACTURER

- Beaver Plastics Ltd.  
7-26318-TWP RD 531A  
Acheson, Alberta  
Canada T7X 5A3
- AMC Foam Technologies Inc.  
35 Headingley St.  
Headingley Manitoba Canada  
R4H 0A8
- Form Solutions  
P.O. Box 358  
Port Hope, ON  
L1A 3W3, Canada
- Progressive Foam Technologies  
1 Southern Gateway Dr.  
Gnadenhutten, OH, 44629

## PRODUCT DESCRIPTION

Halo Exterra products are rigid foam sheathing insulation made from BASF Neopor® Plus GPS (expanded polystyrene containing graphite), which offers up to 18% more R-value than conventional EPS.

Halo Exterra is coated with a perforated clear polypropylene laminate on both sides of the rigid insulation.

Halo Exterra provides a breathable, weather resistive barrier for building envelopes, while providing continuous insulation.

Halo Exterra is breathable up to 2" thick, and acts as a weather barrier (does not require building wrap) for thicknesses of 5/8" or greater.

## BASIC USE

Halo Exterra is designed to completely seal and insulate exterior above-grade walls in residential, multi-residential, commercial, and industrial buildings, resulting in energy efficient building envelopes.

## STANDARDS

- ASTM C578 – Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation.
- ASTM C518 – Standard Test Method for Steady-state Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
- ASTM D1621 – Standard Test Method for Compressive Properties of Rigid Cellular Plastics.
- ASTM D1622 – Standard Test Method for Apparent Density of Rigid Cellular Plastics.

- ASTM D2842 – Standard Test Method for Water Absorption of Rigid Cellular Plastics.
- ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials.
- ASTM E96 – Standard Test Methods for Water Vapor Transmission of Materials.
- ASTM C203 – Standard Test Methods for Breaking Load and Flexural Properties of Block-Type Thermal Insulation.
- ASTM C303 – Standard Test Method for Dimensions and Density of Preformed Block and Board-Type Thermal Insulation.
- ASTM D2863 – Standard Test Method for Measuring the Minimum Oxygen Concentration to Support Candle-Like Combustion of Plastics (Oxygen Index).
- ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference
- AC 71 Acceptance Criteria For Foam Plastic Sheathing Panels Used As Water-Resistive Barriers
- CAN/ULC-S701 – Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.
- CAN/ULC S102.2 - Surface Burning Characteristics of Flooring, Floor Covering and Miscellaneous Materials and Assemblies.
- NFPA 286 "Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth".

## CODE EVALUATION APPROVALS

- CCMC 14004-L
- QAI Listing B1031-2

## PHYSICAL PROPERTIES

Halo Exterra conforms to the physical properties shown in Tables 1, 2,3 and 4.

## ENVIRONMENTAL DATA

Halo Exterra is produced without the use of chlorofluorocarbon (CFCs), hydrochlorofluorocarbon (HCFCs) or formaldehyde. As a result, Halo Exterra will not produce harmful emissions to the environment.

BASF Neopor Plus is recognized as a product that produces low chemical emissions by the Greenguard Environment Institute – Neopor Plus is Greenguard Indoor Air Quality Certified® and Greenguard Children & Schools<sup>SM</sup> Certified product.

## FIRE INFORMATION

Halo Exterra products are made of combustible materials and may need to be protected from high heat sources. In addition, a thermal barrier may be required when used in the interior of a building. Refer to your local building codes for appropriate protection and thermal barrier requirements.

## INSTALLATION

Halo Exterra products are light weight, which makes them easy to handle, cut, and install.

A minimal number of fasteners is required to tack Exterra sheets in place – the attachment of cladding, or strapping will fully secure Exterra sheets.

Fasten Exterra at the corner edges. The top of the fasteners should be flush to the surface of Exterra.

### Typical Fastener Types

- Plastic cap nails,
- roofing nails with at least ½" diameter washers,
- cap staples,
- or wood screws with metal roof washers.
- When fastening to metal studs use screws with at least 1" diameter metal washers.

For detailed installation instructions, fastening Exterra, including attachments of cladding or wood strapping refer to the Halo Installation Guide.

## PRODUCT SIZES

Halo Exterra sheathing are available in 4x8 sheets, 5/8", 1", 1.5 and 2" thick. Custom sizes are available. Contact your local Halo representative for more information.

**Table 1: Thermal Insulation<sup>1</sup>**

Product	R-value @ 75°F (RSI @ 24°C) <sup>2</sup>	R-value @ 40°F (RSI @ 4.4°C) <sup>2</sup>
Halo Exterra	5 (0.88)	5.2 (0.92)

- In accordance with ASTM C578, "Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation", and CAN/ULC S701, "Standard For Thermal Insulation, Polystyrene, Boards and Pipe Covering", at 75°F (24°C), and at 40°F (4.4°C) from data provided by BASF.
- At 1" nominal thickness (actual thickness = 1.06").

**Table 2: Material Properties**

ASTM C578 <sup>1</sup>	Halo Exterra <sup>3</sup> Type I
Compressive Resistance at 10% def., Min., psi (ASTM D1621)	10
Flexural Resistance Min., psi (ASTM C203)	25
Water Vapor Permeance Max., perms (ASTM E96)	1.34 <sup>2</sup>
Water Absorption Max., % (ASTM C272)	1.1
Dimensional Stability Max., % (ASTM D2126)	2
Oxygen Index Min., % (ASTM D2863)	24

CAN/ULC S701 <sup>1</sup>	Halo Exterra <sup>3</sup> Type 1
Compressive Resistance at 10% def., Min., kPa (ASTM D1621)	70
Flexural Resistance Min., kPa (ASTM C203)	170
Water Vapor Permeance Max., ng/Pa-s-m <sup>2</sup> (ASTM E96)	77 <sup>2</sup>
Water Absorption Max., % (ASTM C272)	1.1
Dimensional Stability Max., % (ASTM D2126)	1.5
Oxygen Index Min., % (ASTM D2863)	24

- Unless noted otherwise, properties are based on 1" thickness without laminate. Data provided by BASF.
- Based on indepent testing conducted by QAI. Water vapor permeance properties tested with perforated laminate and 1.5" thick Neopor® Plus. The thinner the insulation the higher the permeability.
- Halo Exterra is breathable up to 2" thick, and does not require building wrap for thicknesses of 5/8" or greater.

**Table 3: Surface Burning Characteristics**

	Flame Spread Index Max.	Smoke Developed Index Max.	Thickness Max.	Density
ASTM E84	< 25	< 450	6 in.	2 pcf
CAN/ULC S102.2	230	> 500	102 mm	32 kg/m <sup>3</sup>

**Table 4: Additional Properties**

	Results
Weather Resistive Barrier, per ASTM E331	Complies as a weather resistive barrier at thicknesses of 5/8" or thicker.

## PRODUCT NAME

Halo® Interra® - The Advanced Reflective Interior Rigid Insulation.

## MANUFACTURER

- Beaver Plastics Ltd.  
7-26318-TWP RD 531A  
Acheson, Alberta  
Canada T7X 5A3
- AMC Foam Technologies Inc.  
35 Headingley St.  
Headingley Manitoba Canada  
R4H 0A8
- Form Solutions  
P.O. Box 358  
Port Hope, ON  
L1A 3W3, Canada
- Progressive Foam Technologies  
1 Southern Gateway Dr.  
Gnadenhutten, OH, 44629

## PRODUCT DESCRIPTION

Halo Interra products are rigid foam sheathing insulation made from GPS (graphite infused expanded polystyrene).

Halo Interra is coated with a reflective laminate on both sides of the rigid insulation.

Halo Interra acts as a vapor barrier while providing continuous insulation. In addition, when a sealed air gap between the reflective laminate surface and covering is provided an additional boost in R-value is provided.

## BASIC USE

Halo Interra is suitable for use in residential, multi-residential, commercial, and industrial buildings.

Halo Interra is designed to seal and insulate specific walls, ceilings and floors of a building, as shown in Table 1.

**Table 1: Halo Interra Applications**

Application	Interra
Roof	x
Ceiling	x
Interior above-grade wall	x
Interior foundation wall	x
Above slab	x

## STANDARDS

- ASTM C578 – Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation.
- ASTM C518 – Standard Test Method for Steady-state Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
- ASTM D1621 – Standard Test Method for Compressive Properties of Rigid Cellular Plastics.
- ASTM D1622 – Standard Test Method for Apparent Density of Rigid Cellular Plastics.
- ASTM D2842 – Standard Test Method for Water Absorption of Rigid Cellular Plastics.
- ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials.
- ASTM E96 – Standard Test Methods for Water Vapor Transmission of Materials.
- ASTM C203 – Standard Test Methods for Breaking Load and Flexural Properties of Block-Type Thermal Insulation.
- ASTM C303 – Standard Test Method for Dimensions and Density of Preformed Block and Board-Type Thermal Insulation.
- ASTM D2863 – Standard Test Method for Measuring the Minimum Oxygen Concentration to Support Candle-Like Combustion of Plastics (Oxygen Index).
- ASTM E2178 - Standard Test Method for Air Permeance of Building Materials.
- CAN/ULC-S701 – Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.
- CAN/ULC S102.2 - Surface Burning Characteristics of Flooring, Floor Covering and Miscellaneous Materials and Assemblies.
- NFPA 286 “Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth”.

## CODE EVALUATION APPROVALS

- CCMC 14004-L
- QAI Listing B1031-2

## PHYSICAL PROPERTIES

Halo Interra conforms to the physical properties shown in Tables 2, 3, 4 and 5.

## ENVIRONMENTAL DATA

Halo Interra is produced without the use of chlorofluorocarbon (CFCs), hydrochlorofluorocarbon (HCFCs) or formaldehyde. As a result, Halo Interra

will not produce harmful emissions to the environment.

BASF Neopor Plus is recognized as a product that produces low chemical emissions by the Greenguard Environment Institute – Neopor Plus is Greenguard Indoor Air Quality Certified® and Greenguard Children & Schools<sup>SM</sup> Certified product.

## FIRE INFORMATION

Halo Interra products are made of combustible materials and may need to be protected from high heat sources. In addition, a thermal barrier may be required when used in the interior of a building. Refer to your local building codes for appropriate protection and thermal barrier requirements.

## INSTALLATION

Halo Interra products are light weight, which makes them easy to handle, cut, and install.

A minimal number of fasteners is required to tack Interra sheets in place – the attachment of drywall, or strapping will fully secure Interra sheets.

Fasten Interra at the corner edges. The top of the fasteners should be flush to the surface of Interra.

### Typical Fastener Types

- Plastic cap nails,
- roofing nails with at least ½” diameter washers,
- cap staples,
- or wood screws with metal roof washers.
- When fastening to metal studs use screws with at least 1” diameter metal washers.

For detailed installation instructions, fastening Interra, including attachments of cladding or wood strapping refer to the Halo Installation Guide.

## PRODUCT SIZES

Halo Interra sheathing are available in 4x8 sheets, 5/8”, 1”, 1.5 and 2” thick. Custom sizes are available. Contact your local Halo representative for more information.

**Table 2: Thermal Insulation<sup>1</sup>**

Product	R-value @ 75°F (RSI @ 24°C) <sup>2</sup>	R-value @ 40°F (RSI @ 4.4°C) <sup>2</sup>
Halo Interra	5 (0.88)	5.2 (0.92)

- In accordance with ASTM C578, "Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation", and CAN/ULC S701, "Standard For Thermal Insulation, Polystyrene, Boards and Pipe Covering", at 75°F (24°C), and at 40°F (4.4°C) from data provided by BASF. R-value of GPS increases as temperature decreases.
- At 1" nominal thickness (actual thickness = 1.06").

**Table 3: Material Properties**

ASTM C578 <sup>1</sup>	Halo Interra Type I
Compressive Resistance at 10% def., Min., psi (ASTM D1621)	10
Flexural Resistance Min., psi (ASTM C203)	25
Water Vapor Permeance Max., perms (ASTM E96)	0.03 <sup>2</sup>
Water Absorption Max., % (ASTM C272)	1.1
Dimensional Stability Max., % (ASTM D2126)	2
Oxygen Index Min., % (ASTM D2863)	24

CAN/ULC S701 <sup>1</sup>	Halo Interra Type 1
Compressive Resistance at 10% def., Min., kPa (ASTM D1621)	70
Flexural Resistance Min., kPa (ASTM C203)	170
Water Vapor Permeance Max., ng/Pa-s-m <sup>2</sup> (ASTM E96)	1.7 <sup>2</sup>
Water Absorption Max., % (ASTM C272)	1.1
Dimensional Stability Max., % (ASTM D2126)	1.5
Oxygen Index Min., % (ASTM D2863)	24

- Unless noted otherwise, properties are based on 1" thickness without laminate by data provided by BASF.
- Based on independent testing conducted by QAI. Water vapor permeance properties tested with laminate and 1" thick GPS.

**Table 4: Surface Burning Characteristics**

	Flame Spread Index Max.	Smoke Developed Index Max.	Thickness Max.	Density
ASTM E84	< 25	< 450	5 in.	2 pcf
CAN/ULC S102.2	230	> 500	102 mm	32 kg/m <sup>3</sup>

**Table 5: Additional Properties**

	Results
Air Leakage, per ASTM E2178	0.0010 L/s-m <sup>2</sup> at 1" thickness Complies as an air barrier in accordance with the National Building Code of Canada and the International Residential Code

## PRODUCT NAME

Halo® Subterra® - The Advanced Below-Grade Rigid Insulation.

## MANUFACTURER

- Beaver Plastics Ltd.  
7-26318-TWP RD 531A  
Acheson, Alberta  
Canada T7X 5A3
- AMC Foam Technologies Inc.  
35 Headingley St.  
Headingley Manitoba Canada  
R4H 0A8
- Form Solutions  
P.O. Box 358  
Port Hope, ON  
L1A 3W3, Canada
- Progressive Foam Technologies  
1 Southern Gateway Dr.  
Gnadenhutten, OH, 44629

## PRODUCT DESCRIPTION

Halo Subterra is rigid foam insulation made from GPS (graphite infused expanded polystyrene).

Halo Subterra is made with denser rigid Neopor Plus to provide a minimum compressive strength of 16, 20, 25 and 30 psi (Subterra 16, Subterra 20, Subterra 25 and Subterra 30, respectively). Subterra is coated with a woven fabric on both sides.

The denser Neopor Plus and tough woven fabric laminate makes Subterra strong and durable against heaving loading and wet environments, such as backfill and construction traffic. In addition, Halo Subterra acts as a vapor barrier, while providing continuous insulation.

## BASIC USE

Halo Subterra products are suitable for below-grade applications in residential, multi-residential, commercial, and industrial buildings, as shown in Table 1.

**Table 1: Halo Subterra Applications**

Application	Subterra 16, 20, 25 & 30
Exterior foundation wall	x
Below slab	x

Confirm availability of various Subterra products with your local Halo representative.

## STANDARDS

- ASTM C578 – Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation.
- ASTM C518 – Standard Test Method for Steady-state Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
- ASTM D1621 – Standard Test Method for Compressive Properties of Rigid Cellular Plastics.
- ASTM D1622 – Standard Test Method for Apparent Density of Rigid Cellular Plastics.
- ASTM D2842 – Standard Test Method for Water Absorption of Rigid Cellular Plastics.
- ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials.
- ASTM E96 – Standard Test Methods for Water Vapor Transmission of Materials.
- ASTM C203 – Standard Test Methods for Breaking Load and Flexural Properties of Block-Type Thermal Insulation.
- ASTM C303 – Standard Test Method for Dimensions and Density of Preformed Block and Board-Type Thermal Insulation.
- ASTM D2863 – Standard Test Method for Measuring the Minimum Oxygen Concentration to Support Candle-Like Combustion of Plastics (Oxygen Index).
- CAN/ULC-S701 – Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.
- CAN/ULC S102.2 - Surface Burning Characteristics of Flooring, Floor Covering and Miscellaneous Materials and Assemblies.
- NFPA 286 “Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth”.
- AC 71, Acceptance Criteria for Foam Plastic Sheathing Panels Used as Weather Resistive Barriers.

## CODE EVALUATION APPROVALS

- CCMC 14004-L
- QAI Listing B1031-2

## PHYSICAL PROPERTIES

Halo Subterra conforms to the physical properties shown in Tables 2, 3, 4 and 5.

## ENVIRONMENTAL DATA

Halo Subterra is produced without the use of chlorofluorocarbon (CFCs), hydrochlorofluorocarbon (HCFCs) or

formaldehyde. As a result, Halo Subterra will not produce harmful emissions to the environment.

BASF Neopor Plus is recognized as a product that produces low chemical emissions by the Greenguard Environment Institute – Neopor Plus is Greenguard Indoor Air Quality Certified® and Greenguard Children & Schools<sup>SM</sup> Certified product.

## FIRE INFORMATION

Halo Subterra products are made of combustible materials and may need to be protected from high heat sources. In addition, a thermal barrier may be required when used in the interior of a building. Refer to your local building codes for appropriate protection and thermal barrier requirements.

## INSTALLATION

Halo Subterra products are light weight, which makes them easy to handle, cut, and install.

For detailed installation instructions to the Halo Installation Guide.

## PRODUCT SIZES

Halo Subterra sheathing are available in 4x8 sheets, 5/8”, 1”, 1.5 and 2” thick. Custom sizes are available. Contact your local Halo representative for more information.

**Table 2: Thermal Insulation<sup>1</sup>**

Product	R-value @ 75°F (RSI @ 24°C) <sup>2</sup>	R-value @ 40°F (RSI @ 4.4°C) <sup>2</sup>
<sup>3</sup> Subterra 16	5 (0.88)	5.2 (0.92)
<sup>3</sup> Subterra 20	5 (0.88)	5.3 (0.93)
<sup>3</sup> Subterra 25	5 (0.88)	5.3 (0.93)
<sup>3</sup> Subterra 30	5 (0.88)	5.3 (0.93)

1. In accordance with ASTM C578, "Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation", and CAN/ULC S701, "Standard For Thermal Insulation, Polystyrene, Boards and Pipe Covering", at 75°F (24°C), and at 40°F (4.4°C) from data provided by BASF. GPS R-value increases with decreasing temperatures.
2. At 1" nominal thickness (actual thickness = 1.06").
3. Confirm availability of various Subterra products with your local Halo representative. Subterra is also available in 40 psi, or greater, compressive strength. Contact your local Halo representative for available compressive strengths.

**Table 3: Material Properties**

ASTM C578 <sup>1</sup>	Subterra 16 Type II	Subterra 20 Type XIII	Subterra 25 Type IX	Subterra 30 Type IX	Subterra 40 Type XIV
Compressive Resistance at 10% def., Min., psi (ASTM D1621)	16	20	25	30	40
Flexural Resistance Min., psi (ASTM C203)	70 <sup>2</sup>	70 <sup>2</sup>	70 <sup>2</sup>	70 <sup>2</sup>	70 <sup>2</sup>
Water Vapor Permeance Max., perms (ASTM E96)	0.04 <sup>2</sup>	0.04 <sup>2</sup>	0.04 <sup>2</sup>	0.04 <sup>2</sup>	0.04 <sup>2</sup>
Water Absorption Max., % (ASTM C272)	1.1	1.1	1.1	1.1	1.1
Dimensional Stability Max., % (ASTM D2126)	2.0	2.0	2.0	2.0	2.0
Oxygen Index Min., % (ASTM D2863)	24	24	24	24	24
CAN/ULC S701 <sup>1</sup>	Subterra 16 Type 2	Subterra 20 Type 3	Subterra 25 Type 3	Subterra 30 Type 3	Subterra 40 Type 3
Compressive Resistance at 10% def., Min., kPa (ASTM D1621)	110	140	172	210	276
Flexural Resistance Min., kPa (ASTM C203)	483 <sup>2</sup>	483 <sup>2</sup>	483 <sup>2</sup>	483 <sup>2</sup>	483 <sup>2</sup>
Water Vapor Permeance Max., ng/Pa-s-m <sup>2</sup> (ASTM E96)	2.1 <sup>2</sup>	2.1 <sup>2</sup>	2.1 <sup>2</sup>	2.1 <sup>2</sup>	2.1 <sup>2</sup>
Water Absorption Max., % (ASTM C272)	1.1	1.1	1.1	1.1	1.1
Dimensional Stability Max., % (ASTM D2126)	1.5	1.5	1.5	1.5	1.5
Oxygen Index Min., % (ASTM D2863)	24	24	24	24	24

1. Unless noted otherwise, properties are based on 1" thickness without laminate by data provided by BASF.
2. Based on independent testing conducted by QAI with laminate and 1" thick GPS.
3. Confirm availability of various Subterra products with your local Halo representative.

**Table 4: Surface Burning Characteristics**

	Flame Spread Index Max.	Smoke Developed Index Max.	Thickness Max.	Density
ASTM E84	5	25	5 in.	2 pcf
CAN/ULC S102.2	230	500	102 mm	32 kg/m <sup>3</sup>

**Table 5: Additional Properties**

	Results
Water Resistance: Hydrostatic Pressure Test, per AATCC Test Method 127, and ICC ES AC71	Passed. No water leakage was observed at the underside of the Subterra boards.