

## PRODUCT NAME

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

## MANUFACTURER

- Beaver Plastics Ltd.  
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Acheson, Alberta, T7X 5A3  
888-453-5961
- AMC Foam Technologies Inc.  
35 Headingley St.  
Headingley Manitoba, R4H 0A8  
877-789-7622
- Form Solutions  
P.O. Box 358  
Port Hope, ON, L1A 3W3  
888-706-7709
- Progressive Foam Technologies  
1 Southern Gateway Dr.  
Gnadenhutten, OH, 44629  
800-860-3626
- Perma R Products Inc.  
2604 Sunset Dr.  
Grenada, MS, 38901  
800-647-6130
- Perma R Products Inc.  
106 Perma R Rd.  
Johnson City, TN, 37604  
800-647-6130

## PRODUCT DESCRIPTION

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

Halo Subterra Plus is made with denser rigid Neopor Plus to provide a minimum compressive strength of 16, 20, 25, 30 and 40 psi (Subterra Plus 16, Subterra Plus 20, Subterra Plus 25, Subterra Plus 30 and Subterra Plus 40, respectively). Subterra Plus is coated with a polypropylene woven fabric on one, or both sides.

The denser Neopor Plus and tough woven fabric laminate makes Subterra Plus strong and durable against heaving loading and wet environments, such as backfill and

**Table 1: Halo Subterra Plus Applications**

Application	Subterra Plus 16, 20, 25, 30 & 40
Exterior foundation wall	x
Below slab	x

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

construction traffic. In addition, Halo Subterra Plus acts as a vapor barrier, while providing continuous insulation.

## BASIC USE

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

## 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 Plus conforms to the physical properties shown in Tables 2, 3, 4 and 5.

## ENVIRONMENTAL DATA

Halo Subterra Plus is produced without the use of chlorofluorocarbon (CFCs), hydrochlorofluorocarbon (HCFCs) or formaldehyde. As a result, Halo Subterra Plus 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 Plus 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 Plus 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 Plus 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 <sup>3</sup>	R-value @ 75°F (RSI @ 24°C) <sup>2</sup>	R-value @ 40°F (RSI @ 4.4°C) <sup>2</sup>
Subterra Plus 16	5 (0.88)	5.2 (0.92)
Subterra Plus 20	5 (0.88)	5.3 (0.93)
Subterra Plus 25	5 (0.88)	5.3 (0.93)
Subterra Plus 30	5 (0.88)	5.3 (0.93)
Subterra Plus 40	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 greater compressive strengths. Contact your local Halo representative for available compressive strengths.

**Table 3: Material Properties**

ASTM C578 <sup>1</sup>	Subterra Plus 16 Type II	Subterra Plus 20 Type XIII	Subterra Plus 25 Type IX	Subterra Plus 30 Type IX	Subterra Plus 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 Plus 16 Type 2	Subterra Plus 20 Type 3	Subterra Plus 25 Type 3	Subterra Plus 30 Type 3	Subterra Plus 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.