

X-Grade™ Insulation



TYPICAL USES

ThermalStar X-Grade insulation has been designed specifically for use below grade. Rigid foam insulation is restricted for use at or below grade in many areas by code because termites can tunnel through foam plastic to the rest of the house, and thus remain hidden from pest control Inspectors.

The combination of wax, EPA listed termitecide, and polystyrene assures long term performance below grade in compliance with all building codes. Lower grades are suitable for vertical use, higher grades for weight bearing applications.

THERMAL RESISTANCE

R-4.2 to 4.4 per inch

R means resistance to heat flow.

The higher the R-value, the greater the insulating power

INSTALLATION AND HANDLING

ThermalStar X-Grade insulation can be handled much the same as wood sheathing, using similar tools or simple utility knives to cut, score, shape, or otherwise customize panels to fit the application. Specific installation instructions for below grade applications can be accessed from www.atlaseps.com.

PRODUCT DESCRIPTION

ThermalStar X-Grade is below grade rigid insulation with a distinctive trademarked orange color. Several grades are available depending on the application. Standard features include:

- Termitecide & wax matrix for long term protection
- Excellent moisture resistance
- High compressive strength
- Scored for snapping to alternate widths
- Lightweight yet industrial strength
- Recyclable
- Closed-cell construction

Table 1 US Physical Properties

Property & ASTM Test Method	X-Grade 15	X-Grade 25	X-Grade 40	X-Grade 60
Compressive Strength (minimum psi) @10% Deformation ¹ D1621	15	25	40	60
R-value per inch (minimum) at 75F mean temperature C518	4.2	4.2	4.2	4.4
ASTM Classification C578	Type II	Type II	Type XIV	Type XV
R-value per inch (minimum) at 40F mean temperature C518	4.4	4.5	4.6	4.7
R-value per inch (minimum) at 25F mean temperature C518	4.6	4.7	4.8	4.9
Compressive Strength (minimum psi) @1% Deformation ¹ D1621	8	11	15	19
Flexural Strength (minimum psi) C203	40	50	75	95
Water Absorption % by volume, maximum after 24 hr immersion C272	2.0	1.5	1.5	1.5
Water Vapor Permeance at 1" thick (perms) - typical E96	3.0	2.5	2.5	2.5
Surface Burning - Flame Spread and Smoke Developed E84	Flame Spread 20, Smoke Developed 400 [meets code]	Flame Spread 5, Smoke Developed 170 [meets code]		
Maximum Use Temperature	Short Term (10-15 minutes) 180F, Long term 165F			

¹ X-Grade is elastic within 1-2% deformation. To prevent long term creep, 3:1 design safety factors for static loads of the 10% deformation values are recommended, or use the tested 1% deformation values for design, whichever is greater

WARRANTY

ThermalStar X-Grade Insulation is backed by a limited 20 year warranty for physical and thermal performance, as well as for termite resistance.

The color Pale Creamy Orange is Registered with the US Patent and Trademark Office
ThermalStar is a registered trademark of Atlas Roofing Corporation

Atlas EPS, a Div of Atlas Roofing
8240 Byron Center Ave SW Byron Center, MI 49315
(800) 917-9138 www.atlaseps.com



CHEMICAL & PHYSICAL PROPERTIES

Tables 1&2 list physical properties of various grades for US and Canada, respectively. Chemical resistance is listed in Table 3.

MOLD RESISTANCE

ThermalStar X-Grade insulation has been tested against 4 week exposure to various mold and fungi via ASTM G21, D3273, and C1338 with no growth of spores on the product. X-Grade insulation provides no nutritive value for mold. However, construction practices greatly impact mold growth, and fungi have been known to even grow on glass.

FREEZE/ THAW EXPOSURE

ThermalStar X-Grade insulation has been tested via ASTM C1512 Moisture & Temperature Cycling for Insulation with no loss of physical or thermal performance. This test places the product between a cold chamber and a high humidity chamber with temperature cycling, measuring the effect on the insulation as natural moisture drive occurs.

Table 2 Canadian Physical Properties

Property & ASTM Test Method	X-Grade 15	X-Grade 25	X-Grade 40	X-Grade 60
Compressive Strength (minimum kpa) @10% Deformation ¹ D1621	110	175	275	415
RSI per 25mm (minimum) at 75F mean temperature C518	0.74	0.74	0.74	0.78
CAN/ULC S701 Type	Type 2	Type 3	Type 3	Type 3
RSI per 25mm (minimum) at 40F mean temperature C518	0.78	0.79	0.81	0.83
RSI per 25mm (minimum) at 25F mean temperature C518	0.81	0.83	0.85	0.86
Compressive Strength (minimum kpa) @1% Deformation ¹ D1621	60	80	110	200
Flexural Strength (minimum kpa) C203	276	345	517	655
Water Absorption % by volume, maximum after 96 hr immersion D2842	4.0	2.0	2.0	2.0
Water Vapor Permeance at 25mm thick (ng/PA's*m ²) - typical E96	200	130	130	130
Surface Burning - Flame Spread and Smoke Developed CAN/ULC S102.2	Flame Spread 290, Smoke Developed Over 500			
Maximum Use Temperature	Short Term (10-15 minutes) 82C, Long term 74C			

¹ X-Grade is elastic within 1-2% deformation. To prevent long term creep, 3:1 design safety factors for static loads or the 10% deformation values are recommended, or use the tested 1% deformation values for design, whichever is greater

CODE COMPLIANCE

ThermalStar X-Grade insulation complies with the model building codes when properly installed:

- Surface Burning – UL BRYX.R16529
- Cal Std Reg #CA472
- International Energy Conservation Code
- ASTM C578 – see product marking for Type

- Physical Properties – UL QORW.R16529
- International Residential Code (IRC) – ICC-ES ESR-1962
- International Building Code (IBC) – ICC-ES ESR-1962
- CAN/ULC S102.2, S701 – ULC BOZCC.R16529

Table 3 Chemical Compatibility of ThermalStar X-Grade insulation

Inorganic Acids (Muriatic, Sulfuric, Boric Acid)	Excellent
Organic Acids (Carboxlic, Citric, Acetic Acid)	Good
Bases (Sodium Hydroxide, Potassium Hydroxide, Ammonia)	Excellent
Alcohols (Methanol, Ethanol, Isopropyl Alcohol)	Good
Beer, Tea, Coffee, Carbonated Soda, Water, Fruit Juice	Excellent
Household Liquid Spray Insecticides (non-aqueous)	Poor
Cement	Excellent
MEK, Methylene Chloride, Acetone	Poor
Antifreeze (Ethylene Glycol - Green, Propylene Glycol - Orange)	Excellent
Hydrocarbons (Hexane, Gasoline, Diesel, Kerosene)	Poor
Mineral Oil	Excellent
Other Oils (Corn, Motor, Palm, Coconut Oil)	Good
Agricultural (Manure, Feed, Urine, Soil, Fertilizer)	Excellent
Formaldehyde, Turpentine, Chloroform, Naphtha	Poor
Salts (Ammonium, Ferrous, Sodium Chloride, Sulfur)	Excellent
MDI-based Adhesive (Gorilla Glue, Fast-Tac, Dow Great Stuff)	Good
Bleach, Detergents, Borax	Excellent
Cured Mastic, Construction Adhesive, Hardened Asphalt	Good
Wherever XPS insulation is used	Excellent

Excellent = No degradation, no effect from exposure

Good = some effect from exposure, but not significant for product performance

Poor = significant degradation affecting performance, up to completely dissolving product

This table is a guide only - consult Atlas Technical Services for specific chemical design questions

SAFETY

MSDS for this product available at www.atlaseps.com. Dust generated from sanding or cutting ThermalStar X-Grade insulation should be avoided using a dust mask as with other building materials. X-Grade insulation is combustible and the product should be protected from ignition sources such as open flames or welder's torch. Applications not specifically listed in ICC-ES ESR-1962 require permanent separation of X-Grade insulation from the interior of the building by a thermal barrier such as drywall or concrete for fire safety.

ENVIRONMENTAL

ThermalStar X-Grade insulation uses air in the insulating cells, emitting no gasses. The ppm levels of termiticide incorporated into the polystyrene wax matrix do not present leaching concerns under typical applications. X-Grade insulation is readily accepted for recycle at many drop off locations.