OWENS CORNING ®
INNOVATIONS FOR LIVING™

07 2113.13.OCC
FOAMULAR® C-200 Extruded Polystyrene Rigid Insulation
FOAMULAR® CodeBord® Extruded Polystyrene Rigid Insulation

Product Data Sheet

PRODUCT DESCRIPTION

FOAMULAR® C-200 extruded polystyrene (XPS) rigid insulation boards are available in 610 mm. (24 in.) x 2438 mm. (96 in.) sizes whereas *FOAMULAR® CodeBord®* extruded polystyrene rigid thermal insulation is available in 1220 mm (48 in.) x 2240 mm. (96 in.) or 2744 mm (108 in.) sizes. Both products are available with ship-lapped edges which help reduce air and water infiltration.

FOAMULAR® C-200 and *FOAMULAR® CodeBord®* extruded polystyrene rigid insulations are manufactured using Owens Corning patented HYDROVAC® technology. Owens Corning uses blowing agents that meet or surpass government environmental requirements (Montreal Protocol).

Their outstanding thermal resistance (rsi 0.87/25 mm; R-5/ in.), compressive strength (140 kPa; 20 psi) and hydrophobic properties (0.7% water absorption) make them an excellent insulation choice for above grade exterior wall and interior of foundation wall applications.

Recommended Uses

FOAMULAR® C-200 and *FOAMULAR® CodeBord®* extruded polystyrene (XPS) rigid thermal insulation boards can be used:

- As exterior insulating sheathing on steel or wood stud wall frames applied directly to studs or overtop of a back-up substrate such as OSB or exterior gypsum board.
- On exterior/interior face of masonry, cast in place concrete walls and pre-cast concrete walls.
- Note: *FOAMULAR® C-200* and *FOAMULAR® CodeBord®* are combustible and have a flame spread rating greater than 25 but less than 500. Consult applicable building Code for required thermal barrier protection.
- On exterior/interior face of concrete masonry unit and cast in place concrete foundation walls.

FOAMULAR® C-200 and *FOAMULAR® CodeBord®* extruded polystyrene rigid insulation boards are GREENGUARD and SCS certified (refer to TECHNICAL DATA) and can contribute to obtain LEED® Certification credits when used in a building submitted to the *LEED* CANADA-NC Green Building Council Rating System (refer to TABLE 2).

Limitations

Owens Corning Canada LP does not recommend using *FOAMULAR® C-200* and *FOAMULAR® CodeBord®* extruded polystyrene (XPS) rigid insulation boards in the following locations:

- In soils that may contain hydrocarbons and other petroleum derivatives, and all other products that may cause corrosion and deterioration of the polystyrene boards.
  - Consult soils investigation reports and an Owens Corning Canada regional technical support representative.

FOAMULAR® C-200 and *FOAMULAR® CodeBord®* are combustible products and their use is prohibited:

- Without an approved thermal barrier to protect it (i.e. gypsum board or other finish meeting the requirements of the applicable building Code).
- When in contact with surfaces whose temperature may exceed 74°C or in locations where ambient temperature will constantly exceed 74°C.
- Where it is impossible to provide clearances required by Codes and Regulations (building, electrical, gas and oil) between the expanded/ extruded polystyrene insulation and heat-emitting appliances, chimneys, pipes, conduits and vents to these appliances and between insulation and recessed light fixtures which are not encased in CSA-approved insulated boxes.

Other precautions to be taken:

- Protect polystyrene boards from prolonged exposure to sunlight, which may cause surface discolouration and/or deterioration; install veneer or backfill as soon as insulation is completed; keep boards in storage and in its packaging until time of installation.
- Before using adhesives, sealants or other similar products with polystyrene boards, verify their compatibility with adhesive manufacturers.

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Components
Polystyrene insulation is manufactured from polystyrene resin and extruded into rigid boards.

Recycled materials incorporated into polystyrene board fabrication are obtained from one source:

- "Post-industrial" (or "pre-consumer") source: materials recycled from industry-wide manufacturing waste that can be recycled to fabricate polystyrene boards.

TECHNICAL DATA

Applicable Codes and Standards
Applicable National Building Code of Canada or provincial building Code

Canadian Standards (Underwriters Laboratories of Canada (ULC))

- CAN/ULC-S701, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering
- CAN/ULC-S102.2, Standard Method of Test for Surface Burning Characteristics of Flooring, Floor Covering and Miscellaneous Materials and Assemblies

Canadian General Standards Board (CGSB)

- CGSB 71-GP-24M, Adhesive, Flexible, for Bonding Cellular Polystyrene Insulation

American Standards:

- ASTM C177, Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus
- ASTM C203, Standard Test Method for Breaking Load and Flexural Properties of Block-Type Thermal Insulation
- ASTM C518, Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus
- ASTM D696, Standard Test Method for Coefficient of Linear Thermal Expansion of Plastics Between -30°C and 30°C With a Vitreous Silica Dilatometer
- ASTM D1621, Standard Test Method for Compressive Properties of Rigid Cellular Plastics
- ASTM D2126, Standard Test Method for Response of Rigid Cellular Plastics to Thermal and Humid Aging
- ASTM D2842, Standard Test Method for Water Absorption of Rigid Cellular Plastics
- ASTM E96, Test Methods for Water Vapor Transmission of Materials

Health Canada/Workplace Hazardous Materials Information System (WHMIS).
Visit www.owenscorning.ca for a current copy of the Material Safety Data Sheet (MSDS) for *"CELFORT® extruded polystyrene insulation".*

Canadian Construction Materials Centre (CCMC) Product Evaluation

FOAMULAR® C-200 and *FOAMULAR® CodeBord®* extruded polystyrene rigid insulation comply to CAN/ULC S701, Type 3 and have a CCMC listing.

Codes & Standards Compliance:

- Meets Montreal Protocol 2010, CFC, HCFC Free
- Zero Ozone Depletion Potential
- 70% Less Global Warming Potential

Product Evaluation Listing Number **CCMC 13431-L**

TABLE 1 Physical Properties

Properties	Test Method	FOAMULAR® C-200 & FOAMULAR® CODEBORD® (CAN/ULC- S701, Type 3)
THERMAL RESISTANCE [1] R value per inch (ft^2 hr °F/BTU) Rsi value per 25 mm (m^2 °C/W)	C518 or C177	 5.0 0.87
COMPRESSIVE STRENGTH, min.[2] (psi) (kPa)	D1621	 20 140
WATER ABSORPTION (maximum % by volume)	D2842	 0.40
WATER VAPOUR PERMEANCE, max. (Perm) (ng/Pa.s.m^2)	E96	 0.80 45
WATER CAPILLARITY	–	None
WATER AFFINITY	–	Hydrophobic
FLEXURAL STRENGTH, typical (psi) (kPa)	C203	 44 300
LINEAR COEFFICIENT OF THERMAL EXPANSION (in./in./°F) (m/m/K)	Modified D696	 2.7×10^{-5} 4.9×10^{-5}
DIMENSIONAL STABILITY, max. (% linear change)	D2126	 1.5
MAXIMUM SERVICE TEMPERATURE (°F) (°C)	–	 165 74

[1] Thermal resistance per inch of thickness (25 mm)

[2] at 10% deformation or yield

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Certification by Independent Third Party Agencies - Recycled Content and Indoor Air Quality Standards

SCS Certification (Scientific Certification Systems) for recycled materials content.

Certification based on the environmental claims certification program:

- 20% minimum certified recycled materials content distributed as follows:
  - 20% "post-industrial" (or "pre-consumer") recycled polystyrene materials content; average for Owens Corning manufacturing facilities: rigid polystyrene insulation: FOAMULAR® brands, (Rockford IL, USA; Tallmadge OH, USA; Gresham OR, USA; Valleyfield PQ, Canada);
- "Certificate of Achievement": "manufactured by Owens Corning (various forms and sizes)".

For up-to-date Certification information, go to www.scscertified.com.

FOAMULAR® C-200 and *FOAMULAR® CodeBord®* extruded polystyrene rigid insulation *boards are GREENGUARD Certified to meet stringent indoor air quality standards.*

Certification is in accordance with the GREENGUARD Product Emission Standard for Children & Schools:

• VOCs	< 1/100 TLV and < ½ CA chronic REL
• Formaldehyde	< 0.0135 ppm/ 13.5 ppb
• Total VOCs	< 0.22 mg/m³
• Total Aldehydes	< 0.043 ppm/ 43 ppb
• Respirable particles	< 0.01 mg/m³
• Total Particles (< 10µm)	< 0.02 mg/m³

"GREENGUARD Indoor Air Quality Certification": Owens Corning FOAMULAR® (Bulletin B-5-41list includes *CELFORT* and *CODEBORD* products) extruded polystyrene rigid insulation. For up-to-date Certification information, go to www.greenguard.org.

IDENTIFICATION AND SIZES

Package Identification

Each board must be adequately labelled or marked to indicate the following information:

A. CAN/ULC-S701-Type 3

B. Board Type

C. Name of the manufacturer or brand name

D. CCMC Product Evaluation Number

E. A cautionary statement as follows: **Caution:** COMBUSTIBLE PRODUCT. KEEP AWAY FROM HEAT, SPARKS AND FLAME. THIS PRODUCT WILL IGNITE IF EXPOSED TO AN IGNITION SOURCE OF SUFFICIENT HEAT AND INTENSITY. PROTECTION OR THERMAL BARRIER IS REQUIRED IN ACCORDANCE WITH APPLICABLE BUILDING CODE.

Sizes and Packaging

FOAMULAR® C-200 extruded polystyrene rigid insulation: 610 mm x 2438 mm (24 in. x 96 in.) x 25 mm, 38 mm, 51 mm, 64 mm,

CONTRIBUTION TO LEED® CANADA CERTIFICATION

TABLE 2: Contribution of Owens Corning Canada's *FOAMULAR® C-200* and *FOAMULAR® CodeBord®* extruded polystyrene rigid insulation boards towards *LEED* credits[1]

Category and performance criteria	Requirements to meet to obtain a voluntary credit	Insulation's contribution to the performance	Additional comments
EA (Energy and Atmosphere) Credit 1 for energy performance optimization of new or existing buildings.	Anticipated energy cost reduction compared to NMECB[2] and ASHRAE / IESNA 90.1-1999 : 1 to 10 points, based on % reduction.	Insulation contributes significantly to the reduction of a building's energy demand. Global contribution depends on the design RSI value.	The Project Manager is responsible for the energy analysis concerning the global energy efficiency of the building (ex. *LEED* standard form letter).
MR (Materials and Resources) Credits 4.1 & 4.2 for recycled materials content.[3]	"Post-consumer" recycled content plus one half "post-industrial" recycled materials: 1 point for at least 7.5% and 2 points for at least 15%.	*FOAMULAR® C-200* and *FOAMULAR® CodeBord®* extruded polystyrene rigid insulation (Rockford IL, Tallmadge OH, Gresham OR, Valleyfield PQ: 20% post-industrial, 0% post-consumer).	Recycled content certifications by Scientific Certification Systems for *FOAMULAR® C-200* and *FOAMULAR® CodeBord®* extruded polystyrene rigid insulation (20% North American average).
MR (Materials and Resources) Credits 5.1 & 5.2 for locally or regionally produced materials.	Materials regionally extracted and manufactured: 1 point for at least 10% and 2 points for at least 20%.	All Canadian extruded polystyrene rigid insulation boards are manufactured at the Rockford IL, Tallmadge OH, Gresham OR, Valleyfield PQ plant and can contribute towards credits for this category.	Verify with local sales representatives to determine the products' origin.

[1] Refer to the ***LEED* - Green Building Rating System** for new construction and important renovations, ***LEED* Canada-NC 1.0**, as promoted by the CaGBC.

[2] Model National Energy Code for Buildings 1997.

[3] The recycled content of a material or furniture must be determined by dividing the weight of the recycled content of the item by the total weight of the whole item, then by multiplying the resulting ratio by the total cost of the item.

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76 mm and 102 mm thicknesses (1 in., 1.5 in., 2 in., 2.5 in., 3 in., and 4 in.).

FOAMULAR® CodeBord® extruded polystyrene rigid insulation: 1220 mm x 2438 mm and 2743 mm (48 in. x 96 in. and 108 in.) x 25 mm, 38 mm, 51 mm, thicknesses (1 in., 1.5 in., 2 in.).

Packaging: *FOAMULAR® C-200* is shipped in units containing four (4) individually shrink-wrapped packages and *FOAMULAR® CodeBord®* is shipped in units containing three (3) individually shrink-wrapped packages.

FOAMULAR® C-200 boards are available with square or ship lapped edges, while *FOAMULAR® CodeBord®* is available with ship lapped edges.

APPLICATION

Safety Measures:
Applicator Protection
This product is combustible and may constitute a fire risk if not used or installed properly. Although it contains a fire-suppressing agent, the product will ignite if exposed to a sufficiently intense flame. Do not expose to open flames or any other ignition source during transport, handling, storage or use.

Preparation
Ensure surfaces to be covered with insulation boards have been inspected, notably:

- substrate solidity and planarity; and
- mechanical, electrical and telecommunication service lines penetrating in or passing through voids in the exterior and foundation walls.

Installation
Carefully adjust insulation boards to obtain tight joints between each board and around electrical service boxes, piping, air ducts and framing passing through; where two layers are required it is preferable to offset all joints.

Fastening to Various Substrates:

- Mechanical fasteners in concrete or concrete masonry unit or metal framing: below and above- grade use pilot hole-self-tapping screws or masonry anchors of sufficient length to penetrate minimum 25 mm into substrate with minimum 25 mm diameter plastic or metal washers.
- Mechanical fasteners with wood framing: above grade use spiral nails or screws with 25 mm diameter plastic washers of sufficient length to penetrate minimum 25 mm into substrate.

Adhesive: Owens Corning recommends the use of the adhesive spot method for temporary installation prior to definitive mechanical fastening or a full coat of adhesive for permanent installation. Select optimum fastening method depending on loads applied to the insulation boards when backfilling according to types of materials and methods involved. Use only water-based adhesives which contain no solvents and that are compatible with extruded polystyrene rigid insulation boards.

Consult an Owens Corning Canada regional technical support representative for the appropriate fastener and adhesive selection.

AVAILABILITY AND COST

Cost Estimates
Cost estimates are readily available from a physical description consisting of drawings and a brief specification based on the information contained in this Product Data Sheet. For more information on product availability or costs, contact your regional technical support representative.

TECHNICAL SERVICES

Owens Corning Canada LP publishes many Technical Bulletins and offers in depth consultation services and dew point analysis to help you select the appropriate products for your designs and prepare details and specifications. For more information, contact your regional technical support representative.

QUALITY CONTROL

Owens Corning Canada LP regularly submits its products to independent agencies that certify their environmental quality in terms of:

- Toxic chemical and volatile particle emissions affecting indoor air quality and the ozone layer.
- Recycled materials content.

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INFORMATION CLASSIFICATION SYSTEM

Architectural Specifications
Classification in accordance with MasterFormat™ 2004 (level 4) published by CSC-DCC and CSI. Selected number and title are **07 21 13.13 - Foam Board Insulation**

Data Sheet
Classification in accordance with MasterFormat 2004 (level 5) published by CSC-DCC and CSI.

Selected number **07 21 13.13. OCC *FOAMULAR® C-200*** and ***FOAMULAR® CodeBord®*** corresponds to Owens Corning Canada (OCC) classification for *FOAMULAR® C-200* and *FOAMULAR® CodeBord®* extruded polystyrene (XPS) rigid insulation boards.

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