



MALLOL & MALLOL ARQUITECTOS, SA	
<input type="checkbox"/>	STATUS A: NO COMMENTS.
<input checked="" type="checkbox"/>	STATUS B: COMMENTS AS NOTED.
<input type="checkbox"/>	STATUS C: REVISE AND RESUBMIT.
Tomás Lee MEP Rep	
BY	03/Mayo/2016
SIGN	

## Protecting Companies and Their People Worldwide™

# INDUSTRIAL PIPE & EQUIPMENT INSULATION

FOAMGLAS® ONE™ insulation is a lightweight, rigid material composed of millions of completely sealed glass cells. FOAMGLAS® ONE™ insulation is manufactured by Pittsburgh Corning in a block form and then fabricated into a wide range of shapes and sizes to satisfy industrial and commercial insulation requirements.

## BENEFITS

### CONSTANT INSULATING EFFICIENCY

FOAMGLAS® ONE™ insulation has a homogeneous, closed cell glass structure that resists moisture in both liquid and vapor forms and results in long term, constant insulating efficiency.

### NONCOMBUSTIBLE

FOAMGLAS® ONE™ insulation is 100% glass and contains no binders or fillers – it cannot burn. It will not absorb flammable liquids or vapors. If a facility fire occurs, FOAMGLAS® ONE™ insulation can help protect people and equipment by aiding in the containment or suppression of the flames.

### CORROSION RESISTENT

FOAMGLAS® ONE™ insulation is unaffected by common chemicals and by most corrosive atmospheres. It does not promote metal corrosion and its moisture resistance will help keep water from reaching equipment and piping.

### LONG TERM DIMENSIONAL STABILITY

FOAMGLAS® ONE™ insulation is not affected by temperature differentials and humidity. It will not swell, warp, shrink or otherwise distort. The integrity of the insulation remains intact even at the extremes of cryogenic service.

### VERMIN RESISTANCE

FOAMGLAS® ONE™ insulation is resistant to vermin, as well as microbes and mold.

### HIGH COMPRESSIVE STRENGTH

FOAMGLAS® ONE™ insulation can withstand loads which crush most other insulating materials. In a properly designed piping system, it eliminates the need for special treatment at pipe cradles. It provides a fire base for roof membranes, jacketing or vapor retarders, and can prolong their life.

### ECOLOGICALLY FRIENDLY, SUSTAINABLE

FOAMGLAS® ONE™ insulation is free of CFC's and HCFC's and has been formally recognized as an ecologically friendly, sustainable construction material.

### WORLDWIDE TECHNICAL SERVICE

Pittsburgh Corning's Technical Service Staff provides product, application and materials testing; standardized and customized application specifications; and onsite customer assistance and installation guidance.

## FOAMGLAS® ONE™ INSULATION SYSTEMS FOR INDUSTRIAL AND COMMERCIAL APPLICATIONS

Pittsburgh Corning insulation systems provide solutions for a wide range of piping and equipment applications at operating temperatures from -268 to 482 °C (-450 to 900 °F).

- Cryogenic systems
- Low temperature pipe, equipment, tanks and vessels
- Medium and high temperature pipes and equipment
- Hot oil and hot asphalt storage tanks
- Heat transfer fluid systems
- Hydrocarbon processing systems
- Chemical processing systems
- Above ground and underground steam and chilled water piping
- Commercial piping and ductwork

### STANDARD BLOCK DIMENSIONS

STANDARD FORMATS	STANDARD BLOCK DIMENSIONS	
	450 x 600 mm (18 x 24 inches)	(18 x 36 inches)
STANDARD THICKNESSES	50 x 180 mm 10 mm increments	
	(2 – 7 inches) (½ inch increments)	(3 - 8 inches) (½ inch increments)

Other thicknesses and formats may be provided to fill specialty orders.

## STANDARDS, CERTIFICATIONS\* AND APPROVALS

FOAMGLAS® ONE™ Insulation is the only cellular glass that can be certified to confirm to the requirements of:

- ASTM C552 "Specification for Cellular Glass Thermal Insulation"
- ASTM C1639 "Standard Specification for Fabrication of Cellular Glass Piping and Tubing Insulation"
- Military Specification MIL-DLT-24244D (SH), with Special Corrosion and Chloride Requirement"
- Nuclear Regulatory Guide 1.36, ASTM C795, C692, C871
- Flame Spread Index 0, Smoke Developed Index 0 (UL 723, ASTM E 84), UL R2844; also classified by UL of Canada
- ISO 9001: 2008
- UL 1709, Rapid Rise Fire Tests of Protection Materials for Structural Steel
- UL Through Penetration Fire Stop Approved Systems UL1479/ASTM E814, please search the UL Database at <http://www.ul.com>. Once on this page click on CERTIFICATIONS on the left hand side. Under General Search click on UL FILE NUMBER and type in R15207 and then click SEARCH.
- Board of Steamship Inspection (Canada) Certificate of Approval No. 100 / FI-98
- General Services Administration, PBS (PCD; 15250, Public Building Services Guide Specification, "Thermal Insulation (Mechanical)"
- New York City Department of Buildings, MEA #138-81-M FOAMGLAS® insulation for piping, equipment, walls and ceilings
- New York State Uniform Fire Prevention and Building Code Department of state (DOS) 07200-890201-2013
- City of Los Angeles General Approval RR22534
- USGS Approval for Non-combustible Inspections
- GreenSpec® Listed. [www.greenspec.com](http://www.greenspec.com)
- EC-114.456 USCG 164.109/EC0736/114.456 Approval for marine use

FOAMGLAS® ONE™ insulation is identified by Federal Supply code for



## PHYSICAL AND THERMAL PROPERTIES

PROPERTY	ASTM METHOD	SI	ENGLISH
DENSITY, NOMINAL	C303	117 kg / m <sup>3</sup>	7.3 lbs. / ft <sup>3</sup>
ABSORPTION OF MOISTURE	C240	< 0.2% by Vol	< 0.2% by Vol
WATER VAPOR PERMEABILITY	E96 Wet Cup	0.00 ng / Pa·s·m	0.00 perm·inch
CHEMICAL RESISTANCE	Impervious to common acids and their fumes.		
CAPILLARITY	None		
COMBUSTIBILITY & REACTION TO FIRE	E136 E84	Non Combustible Flame Spread Index 0 Smoke Development Index 0	
COMPOSITION	Soda lime glass. Inorganic. No fibers or binders.		
CORROSION, WATER SOLUABLE IONS AND PH	C871 C692 C1617	Acceptable for use with Stainless Steel Pass (0 Coupon Cracked) < DI Water	
COMPRESSIVE STRENGTH, BLOCK AVG	C165 C240 C552	620 KPa	90 lbs / in <sup>2</sup>
DIMENSIONAL STABILITY	Excellent – does not shrink or swell		
FLEXURAL STRENGTH, BLOCK AVG	C203 C240	480 KPa	70 lbs / in <sup>2</sup>
HYGROSCOPICITY	No increase in weight at 90% relative humidity.		
COEFFICIENT OF LINEAR THERMAL EXPANSION, AVG	E228	25 to 300 °C 9.0 x 10 <sup>-6</sup> / K -170 to 25 °C 6.6 x 10 <sup>-6</sup> / K	75 to 575 °F 5.0 x 10 <sup>-6</sup> / °F -274 to 75 °F 3.7 x 10 <sup>-6</sup> / °F
SERVICE TEMPERATURE		-268 to 482 °C	-450 to 900 °F
MODULUS OF ELASTICITY, APPROXIMATE	C623	900 MPa	1.3 x 10 <sup>5</sup> lbs·in <sup>-2</sup>
SPECIFIC HEAT	E1461	0.77 kJ / kg·K @ 25 °C	0.18 BTU / lb · °F @ 77 °F
THERMAL DIFFUSIVITY	E1461	4.2 x 10 <sup>-7</sup> m <sup>2</sup> / s	0.016 ft <sup>2</sup> / hr

## THERMAL CONDUCTIVITY (LAMBDA) VALUES AT SELECT TEMPERATURES (ASTM C518, C177)<sup>1</sup>

TEMPERATURE	°C (°F)	204 (400)	149 (300)	93 (200)	38 (100)	24 (75)	10 (50)	-18 (0)	-46 (-50)	-73 (-100)	-101 (-150)	-160 (-275)
ASTM C552 (Maximum)	W / m K (BTU in / hr °F ft <sup>2</sup> )	0.084 (0.58)	0.069 (0.48)	0.058 (0.40)	0.048 (0.33)	0.045 (0.31)	0.043 (0.30)	0.039 (0.27)	0.035 (0.24)	0.032 (0.22)	0.029 (0.20)	-
FOAMGLAS® ONE™ Insulation <sup>2</sup>	W / m K (BTU in / hr °F ft <sup>2</sup> )	0.078 (0.54)	0.065 (0.45)	0.054 (0.38)	0.044 (0.31)	0.042 (0.29)	0.040 (0.28)	0.036 (0.25)	0.032 (0.22)	0.028 (0.20)	0.025 (0.18)	0.020 (0.13)

<sup>1</sup>Contact Pittsburgh Corning for assistance applying our design polynomial to your application.

<sup>2</sup>The average values shown represent expected "as manufactured" properties and should be considered design values for thickness calculation purposes.

For additional information on FOAMGLAS® ONE™ insulation or systems, please visit our website at [www.foamglas.com](http://www.foamglas.com) or contact Pittsburgh Corning at any of our worldwide offices.

### Pittsburgh Corning Corporation (Corporate Headquarters)

800 Presque Isle Drive  
Pittsburgh, PA, USA 15239-2724  
Tel: 1.800.545.5001

### Pittsburgh Corning Asia

Park Luxe Hongo 1001  
29-4, Hongo 2-Chome, Bunkyo-Ku  
Tokyo 113-0033 Japan  
Tel: 81.50.7554.0248

### Pittsburgh Corning Latin America

Av. Constituyentes #800  
Col. Lomas Altas, Del. Miguel Hidalgo  
Mexico DF, CP 11950  
Tel: 52.55.12096780

### Pittsburgh Corning Europe (EMEA)

Albertkade, 1  
B-3980 Tessenderlo,  
Belgium  
Tel: 32.13.66.17.21

The information contained herein is accurate and reliable to the best of our knowledge. But, because Pittsburgh Corning Corporation has no control over installation workmanship, accessory materials or conditions of application, NO EXPRESSED OR IMPLIED WARRANTY OF ANY KIND, INCLUDING THOSE OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, IS MADE as to the performance of an installation containing Pittsburgh Corning products. In the event shall Pittsburgh Corning be liable for any damages arising because of product failure, whether incidental, special, consequential or punitive, regardless of the theory of liability upon which any such damages are claimed. Pittsburgh Corning Corporation provides written warranties for many of its products, and such warranties take precedence over the statements contained herein.

©2014 Pittsburgh Corning  
FOAMGLAS® is a registered trademark in the United States and other countries.  
Printed in the U.S.A.  
FG-3 Rev. 11/14 (Replaces Rev. 01/14)