

**CE-215**  
**11/13 Supersedes 08/02**

### **PENNGUARD<sup>®</sup> 28 BLOCK**

#### **DESCRIPTION**

PENNGUARD 28 Block is a foamed borosilicate glass block. As an inorganic glass, it is highly resistant to acids, solvents, and weak bases. The material is made as a closed cell foamed glass block and is virtually impermeable to liquids and gases. PENNGUARD 28 Block is lightweight, and retains low thermal conductivity even when immersed in acid. Its low coefficient of thermal expansion provides excellent resistance to thermal shock. Refer to CER-299 - Chemical Resistance of PENNGUARD Block for specific chemical resistance information. **Consult Corrosion Engineering specification [CES-350](#) "Specifications for Installation for PENNGUARD Block Lining System" for complete installation details.**

#### **AREAS OF USE**

PENNGUARD 28 Block offers a unique approach to protecting flue gas handling equipment such as ductwork, chimneys, and scrubber inlets/outlets found in coal fired power plants and other industrial facilities. It is suitable for metal, concrete, brick, and FRP substrates. It protects from acid condensate corrosion, while providing excellent thermal insulation and energy conservation, even in saturated flue gas environments. Due to its low expansion, PENNGUARD 28 Block can be used in bypass gas service conditions.

The block is installed in a manner similar to chemically-resistant masonry, utilizing PENNGUARD Adhesive/Membrane (Product Data sheet CE-220) to bond the block to the substrate, to seal and form side joints between the faces of adjacent block.

This technology does not support combustion, and may be used alone or in combination with refractories, acid brick, or acid resistant gunites & castables to provide a combination of corrosion protection and heat conservation.

#### **OUTSTANDING FEATURES**

- Resistant to corrosive flue gas environments.
- Low thermal expansion provides excellent resistance to upset temperatures.
- Excellent thermal insulation, energy savings, eliminates external insulation.
- Virtually zero permeability, capillarity, and absorption, closed celled structure.
- Lightweight, suitable for shop or field application.

**TYPICAL PHYSICAL PROPERTIES**

PROPERTY	PENNGUARD 28 BLOCK
Composition	Borosilicate glass, inorganic, no binders
Maximum service temperature	960°F (517°C) (unloaded) / 800°F (425°C) (with applied load). Maximum service temperature values for foamed glass compositions are a function of thermal shock resistance, resistance to deformation (creep) under load, and consideration for a suitable engineering safety factor. Consult your Corrosion Engineering representative for maximum service temperature limits for specific applications.
Thermal conductivity (ASTM C-117, C-518)	
100°F (38°C) mean	0.58 BTU·in / h·ft <sup>2</sup> ·°F (0.084 W / m ·K)
200°F (93°C) mean	0.66 BTU·in / h·ft <sup>2</sup> ·°F (0.095 W / m ·K)
300°F (149°C) mean	0.73 BTU·in / h·ft <sup>2</sup> ·°F (0.105 W / m ·K)
400°F (204°C) mean	0.81 BTU·in / h·ft <sup>2</sup> ·°F (0.117 W / m ·K)
Specific heat	0.2 BTU / lb /°F (0.2 kcal / kg / C)
Density (ASTM C-303)	12 lb / ft <sup>3</sup> (0.19 gr / cm <sup>3</sup> )
Compressive strength (ASTM C-165 hot asphalt capping)	200 psi (1.38 MPa)
Flexural strength (ASTM C-203, C-240)	90 psi (0.62 MPa)
Modulus of elasticity	180,000 psi (12,600 kg/cm <sup>2</sup> )
Coefficient of linear thermal expansion	1.6 x 10 <sup>-6</sup> /°F (2.8 x 10 <sup>-6</sup> /°C)
Combustibility	None
Capillarity	None
Absorption of moisture, (ASTM C-240)	0.2 % by volume (surface wetting only)
Water vapor permeability	0.0
Shelf life	Indefinite

**ESTIMATING/PACKAGING THEORETICAL QUANTITIES – NO OVERAGE ALLOWANCE**

PRODUCT	CODE	PACKAGING
PG 28 Block 1½" (38mm) x 6" (152mm) x 9" (229mm)	19581	60 Blocks/Carton
PG 28 Block 2" (50mm) x 6" (152mm) x 9" (229mm)	19582	48 Blocks/Carton

PENNGUARD Block is available in additional thicknesses and can also be fabricated into a variety of specialty shapes, such as T-sections, elbow sections, pipe lining segments, or other custom shapes. Contact Corrosion Engineering for details.

**SAFETY PRECAUTIONS / DISCLAIMER**

Mixes and applications of this product present a number of hazards. Read and follow the hazard information, precautions and first aid directions on the individual product labels and [material safety data sheets](#) before using. While all statements, technical information, and recommendations contained herein are based on information our company believes to be reliable, nothing contained herein shall constitute any warranty, express or implied, with respect to the products and/or services described herein and any such warranties are expressly disclaimed. We recommend that the prospective purchaser or user independently determine the suitability of our product(s) for their intended use. No statement, information or recommendation with respect to our products, whether contained herein or otherwise communicated, shall be legally binding upon us unless expressly set forth in a written agreement between us and the purchaser/user.



Corrosion Engineering | 300 Stevens Drive, Suite 310, Lester, PA 19113  
 +1-610-833-4001 Phone | +1-610-833-3040 Fax | [corrosion-engineering.com](http://corrosion-engineering.com)