



The Pyro-Bloc M and M<sup>2</sup> modules are a ceramic fiber lining system designed for high-temperature furnaces that require corrosion barriers on the shell. The module is manufactured from a high-purity blend of raw materials which is used to produce R Grade (alumina-silica), ZR Grade (alumina-silica-zirconia), and C Grade (alumina-silica-chromia) ceramic fibers.

**Pyro-Bloc M module** have better resistance to mechanical abuse than conventional blanket systems, and does not sacrifice the effectiveness of the shell corrosion barrier. The Pyro-Bloc M modules are manufactured from R grade, ZR grade and C grade ceramic fiber. The modules are held to the steel casing by stainless steel studs that are welded to the shell creating a reliable and secure base of attachment before a protective coating is applied. Special hardware or accessories are used to precompress the modules to dimensions of up to 11" x 11" (279 mm x 279 mm). The modules are then installed over the prewelded studs using a simple guide rod system. Internal hardware is 316SS which offers superior creep resistance and chemical attack resistance versus 304SS. The M module is torqued down firmly holding the fiber intimately against the coated shell. The module includes the fiber module and pre-embedded support tubes, studs and nuts must be purchased separately.

- 12" x 12" (305 mm x 305 mm) modules
- 6" x 12" (152 mm x 305 mm) split long fiber modules
- 12" x 6" (305 mm x 152 mm) split short fiber modules
- Module thickness from 3" to 12" (76 mm to 305 mm) in 1" (25.4 mm) increments

**Pyro-Bloc M<sup>2</sup> module** (16" x 16" square [406 mm x 406 mm]) is a larger format designed for high-temperature furnaces that require corrosion barriers on the shell. The 16" square (406 mm) size offers up to 78%

more installed square feet per module than 12" x 12" (305 mm x 305 mm) modules and is much easier to handle when compared to 24" x 24" (610 mm x 610 mm) modules. The Pyro-Bloc M<sup>2</sup> modules are available in R grade and ZR grade.

The modules are held to the shell by pre-welded stainless steel studs, 316SS which offers superior creep resistance and chemical attack resistance versus 304SS.\* Special installation hardware and accessories allow the M<sup>2</sup> module to be compressed up to 15" x 15" (381 mm x 381 mm). No other system on the market offers such a high degree of on-the-wall densities, which relates directly to high-mechanical abuse resistance and long in-service life.

- 16" x 16" (406 x 406 mm)(1.78 sf per module [0.165 m<sup>2</sup>])
- Module thickness from 3" to 12" (76 mm to 305 mm) in 1" (25.4 mm) increments

#### Features

- Monolithic, edge-grained ceramic fiber module
- Available in uncompressed densities from 10 to 15 pcf (160 to 240 kg/m<sup>3</sup>)
- Installs quickly over coated shells with or without a vaporbarrier
- Installation techniques ensure high on-the-wall densities

#### Applications

- Process heaters
- Heat treating furnaces
- Forge furnaces
- Reformers, ethylene furnaces
- Incinerators
- All furnace linings requiring a pre-weld stud pattern or protective barrier against shell

# Pyro-Bloc M and M<sup>2</sup> Modules

## Product Information

### Physical Properties

	R Grade	ZR Grade	C Grade
Color	white	white	blue/green
Density, pcf ( <i>kg/m<sup>3</sup></i> )	10, 12, 15 (160, 192, 240)	10, 12, 15 (160, 192, 240)	12 (192)
Thickness, in ( <i>mm</i> ) (standard)	3 - 12 (76 - 305)	3 - 12 (76 - 305)	3 - 12 (76 - 305)
Maximum temperature rating, °F (°C)	2400 (1316)	2600 (1427)	2600 (1427)
Melting point, °F (°C)	3200 (1760)	3200 (1760)	3200 (1760)
Continuous use limit, up to °F (°C)	2200 (1204)	2450 (1343)	2500 (1371)

### Chemical Analysis, (Nominal, %)

Alumina, Al <sub>2</sub> O <sub>3</sub>	47	37.5	43
Silica, SiO <sub>2</sub>	53	47	54
Zirconia, ZrO <sub>2</sub>	-	15.5	-
Chromia, Cr <sub>2</sub> O <sub>3</sub>	-	-	3
Loss of ignition, L.O.I.	trace	trace	trace
Other	trace	trace	trace

### Thermal Conductivity, BTU•in/hr•ft<sup>2</sup>•°F (*w/m•k*) (ASTM C 201)

	10 pcf (160kg/m <sup>3</sup> )	12 pcf (192kg/m <sup>3</sup> )	15 pcf (240kg/m <sup>3</sup> )
Mean temperature			
@ 500°F (260°C)	0.52 (0.07)	0.50 (0.07)	0.49 (0.07)
@ 1000°F (538°C)	1.04 (0.15)	0.96 (0.14)	0.84 (0.12)
@ 1500°F (816°C)	1.81 (0.26)	1.66 (0.24)	1.43 (0.21)
@ 2000°F (1093°C)	2.69 (0.38)	2.45 (0.35)	2.19 (0.32)

### Installation

There are a number of factors which must be considered when designing a Thermal Ceramics Pyro-Bloc Module lining. The use limits of Pyro-Bloc Modules should be used only as a guide when considering lining installation and design. For assistance please call your nearest Thermal Ceramics representative.

\*Studs, nuts and installation tools must be purchased separately.

The values given herein are typical average values obtained in accordance with accepted test methods and are subject to normal manufacturing variations. They are supplied as a technical service and are subject to change without notice. Therefore, the data contained herein should not be used for specification purposes. Check with your Thermal Ceramics office to obtain current information.

Thermal Ceramics is a trademark of The Morgan Crucible Company plc. Pyro-Bloc, M and M<sup>2</sup> are trademarks of Thermal Ceramics Inc.

#### Marketing Communications Offices

##### Thermal Ceramics Americas

T: (706) 796 4200  
F: (706) 796 4398

##### Thermal Ceramics Asia Pacific

T: +65 6733 6068  
F: +65 6733 3498

##### Thermal Ceramics Europe

T: +44 (0) 151 334 4030  
F: +44 (0) 151 334 1684

#### North America - Sales Offices

##### Canada

T: +1 (905) 335 3414  
F: +1 (905) 335 5145

##### Mexico

T: +52 (555) 576 6622  
F: +52 (555) 576 3060

##### United States of America

Eastern Region  
T: +1 (800) 338 9284  
F: +1 (866) 785 2764

#### Western Region

T: +1 (866) 785 2738  
F: +1 (866) 785 2760

#### South America - Sales Offices

##### Argentina

T: +54 (11) 4373 4439  
F: +54 (11) 4372 3331

##### Brazil

T: +55 (21) 2418 1366  
F: +55 (21) 2418 1205

#### Chile

T: +56 (2) 854 1064  
F: +56 (2) 854 1952

#### Colombia

T: +57 (2) 2282935/2282803/2282799  
F: +57 (2) 2282935/2282803/23722085

#### Guatemala

T: +50 (2) 4733 295/6  
F: +50 (2) 4730 601

#### Venezuela

T: +58 (241) 878 3164  
F: +58 (241) 878 6712