

## Fiberfrax® Specialties Products

### Introduction

The Fiberfrax® Specialties family of products includes Fiberfrax moldables, pumpables, caulks, coating cements, rigidizers, tamping mix, and Moist-Pack™ blanket. Many of these products contain a wet, inorganic binder to provide both strength and hardness at elevated temperatures. The range of product forms provides a choice of materials to address a wide range of application problems, such as resistance to hot gas erosion, flame impingement, the ability to be formed into special shapes and configurations, installation into blind hot spots and hard-to-insulate areas.

Fiberfrax Specialties also possess the advantages inherent with other Fiberfrax ceramic fiber insulating materials: high temperature resistance, excellent insulating properties, thermal shock resistance, chemical stability, and ease of installation.

### Fiberfrax Coating Cements and Rigidizers

Fiberfrax QF-180™, QF-180™ Blue, and QF-150™ coating cements provide a range of consistencies for brush, spray, and trowel-on application. These coatings have 1260°C (2300°F) temperature grade rating. They possess good adhesion, thermal reflectance, dielectric strength, hot gas erosion resistance, and effectively resist wetting by many nonferrous molten metals.

Fiberfrax Topcoat™ 3000 and Topcoat™ M coating cements have a temperature grade rating of 1538°C (2800°F). Topcoat 3000 consists of a blend of regular ceramic fibers and high-temperature Fibermax® polycrystalline fibers combined with an inorganic binder system. This product imparts excellent flame and hot gas erosion resistance to other product forms and effectively minimizes thermal shrinkage of fiber blankets, modules, and boards. Topcoat M is a blend of Fibermax fibers in a dry powder form which is mixed with a prescribed amount of potable water at the job site. It provides protection against slag and alkali attack when applied to Fiberfrax high-temperature boards and modules.

Fiberstick™ refractory cement is a high-temperature, air-setting mortar used as an adhesive to securely bond Fiberfrax Bonded modules and other product forms to refractory surfaces.

Rigidizer™ and Rigidizer™ W, inorganic liquid hardeners, have a temperature grade rating of 1260°C (2300°F). They are generally used to increase the durability and surface erosion resistance of Fiberfrax blanket and board products. Rigidizer W hardener contains an organic wetting agent to



promote saturation into the substrate, whereas Rigidizer hardener tends to remain on the material surface of the product form to which it is applied.

### Fiberfrax Moldables and Pumpables

Fiberfrax LDS and LDS-AL moldables consist of Fiberfrax ceramic fibers dispersed in a sticky water-based refractory binder. These materials have a putty-like consistency which permits application by caulking, troweling, or hand forming.

Both products adhere well to most surfaces. Drying is accomplished at a noncritical, elevated temperature, and the resulting dried material is strong, hard, and erosion resistant. LDS-AL moldable possesses excellent resistance to wetting by many nonferrous molten metals and is used extensively in molten aluminum contact applications.

Fiberfrax Pumpable-LDS, Pumpable-GS, and Topcoat 2600 Insulating Mix were designed for application into difficult-to-reach areas requiring insulation. Fiberfrax Pumpable-LDS and Pumpable-GS have temperature grade ratings of 1260°C (2300°F). Fiberfrax Topcoat 2600 Insulating Mix has a temperature grade rating of 1426°C (2600°F). A conventional air-operated extrusion pump permits application of these products directly from their container into furnace and boiler hot spots, refractory cracks, furnace door jambs, and other areas requiring high-temperature insulation and sealing.

Fibermax caulk is a high-temperature blend of Fiberfrax bulk fibers, Fibermax polycrystalline high-alumina fibers, and inorganic binder. This product is available in convenient-to-use caulking tubes. With a temperature grade rating of 1538°C (2800°F), it can be used to caulk joints and cracks in both high-temperature Fiberfrax lining systems and conventional refractories. Fibermax caulk is also used as a patching material around deteriorating burner blocks.

## Fiberfrax Moist Pak-D® and Casting Mixes

Fiberfrax Moist Pak-D is a moldable and formable blanket insulation containing an inorganic wet binder. It dries upon firing to a hard shape having a dry density of 12-18 pounds/cubic foot. Moist Pak-D insulation possesses excellent thermal insulating properties and effectively resists hot gas velocities well in excess of 100 feet/second.

Moist Pak-D insulation is used primarily as a surface layer over Fiberfrax blanket linings in hot gas erosion applications (e.g., hot gas ducts, breechings, convection boxes, flares, etc.). It is also used to protect alloy hardware exposed to high temperatures, as a durable insulating cover for exhaust lines, around burner assemblies, and wherever a formable blanket is needed to provide strength and hot gas erosion resistance.

Fiberfrax FC-25 tamping mix and Vari-Form™ castable materials provide casting mixes which can be applied in small areas such as furnace access and site doors, tube sheets, and as a refractory backup.

FC-25 tamping mix is a wet mix containing Fiberfrax fibers and inorganic binders. It is poured directly from the container and tamped into place. Dry density is 20-25 pounds/cubic foot. Vari-Form is a dry mix available in two density grades of 30-40 and 50-60 pounds/cubic foot. Water is added to the dry product at the job site and mixed thoroughly. It is then simply poured and troweled into the area to be insulated. The mix sets in about 18 hours and can then be heated to operating temperature.

## Typical Applications

### Fiberfrax Coating Cements and Rigidizers

#### QF-150, QF-180, & QF-180 Blue

- Electrical insulation coatings and potting
- Adhesive for other Fiberfrax product forms
- Surface coating for other Fiberfrax product forms
- Radiant coatings for variety of substrates
- Flame-resistant coatings
- Surface coating for molten aluminum contact
- Oxidation-resistant coating for injection tubes and graphite crucibles

#### Topcoat 3000 & Topcoat M

- Protect high-temperature Fiberfrax lining systems from slag and alkali attack
- Improve hot gas erosion resistance of Fiberfrax high-temperature linings
- Reduce thermal shrinkage of hot face in high-temperature refractory and ceramic fiber linings
- Fill hot face surface cracks

#### Rigidizer & Rigidizer W

- Rigidizer for surface hardening of other Fiberfrax product forms
- Rigidizer W for saturating and rigidizing other Fiberfrax product forms

- Erosion-resistant coating for surfaces subject to high-velocity hot gases

#### Fiberstick Cement

- Adhesive for Fiberfrax bonded modules

## Fiberfrax Moldables and Pumpables

#### LDS Moldable®

- Patch refractory joints and cracks
- Hardware protection of ceramic fiber furnace linings
- Patch around burner blocks
- Refractory backup

#### LDS AL-Moldable®

- Lining for molten aluminum transfer troughs
- Lining for molten aluminum transfer ladles

#### Pumpable-LDS

- Repair and seal boiler penthouse floors
- Boiler hot spot repairs
- Refractory backup
- Backup for molten metal ladles
- Seal joints on kiln car decks

#### Pumpable-GS

- On-line boiler hot spot repairs
- Seal furnace door jambs
- Seal furnace penetrations
- Seal around burner blocks
- Caulk refractory cracks
- On-line refractory hot spot repairs
- Turbine exhaust duct hot spot repairs

#### Topcoat 2600

- Hot face repairs of ceramic fiber linings
- Sacrificial lining for areas of mechanical abuse
- Refractory lining veneer

#### Fibermax Caulk

- Caulk for cracks in refractory and module linings
- Patching around burner blocks

## Fiberfrax Moist Pak-D & Casting Mixes

#### Moist Pak-D

- Hot gas erosion resistant layer over Fiberfrax linings
- Recuperator linings
- External pipe insulation
- Reformer header and pigtail insulation
- Protection for process tube welds
- Process heater tube support protection

#### FC-25 Tamping Mix

- Furnace and boiler access door insulation
- Tube sheet insulation

#### Vari-Form A and B

- Backup insulation
- Ladle backup insulation
- Induction furnace insulation
- Furnace door insulation

## Typical Product Properties

### Fiberfrax Coating Cements & Rigidizers

Physical Properties	QF-150	QF-180	QF-180 Blue	Topcoat 3000	Topcoat M	Rigidizer	Rigidizer W	Fiberstick Cement
Appearance	White paste	White paint	Blue paint	Blue paste	Dry powder	Pink liquid	Blue liquid	Gray/Brown paste
Temperature Grade*	2300°F	2300°F	2300°F	2800°F	2800°F	2300°F	2300°F	3000°F
Recommended Operating Temperature	2150°F	2150°F	2150°F	2700°F	2650°F	2000°F	2000°F	2850°F
Normal Layer Thickness	1/16"	.010"	.010"	1/8"	1/32" – 1/16"	—	—	1/8" – 1/4"
Approx. Coverage 1-Layer (SF/Gal)	20	50-100	50-100	8-10	2½-5 SF/lb (Dry mix)	100-200	50-100	1.45 lbs/SF 3-4 lbs/module
Net Weight/Gal (lbs/gal)	15	14½	12½	5	9½ (Dry mix)	10	10	—
Mean Coefficient of Expansion (in/in °F)	3.0x10 <sup>-6</sup>	3.0x10 <sup>-6</sup>	3.0x10 <sup>-6</sup>	—	—	3.0x10 <sup>-6</sup>	3.0x10 <sup>-6</sup>	—
Linear Shrinkage (%) (24 hrs)	—	3.2 @ 2300°F	—	2.5-3.5 @ 2800°F	0.3 @ 2600°F	—	—	—
Approx. Dielectric Strength (Volts/Mil)	40	39	37	—	—	—	—	—

### Fiberfrax Moldables and Pumpables

Physical Properties	LDS Moldable	LDS AL-Moldable	Pumpable-LDS	Pumpable-GS	Topcoat 2600 Insulating Mix	Fibermax Caulk
Appearance	Sticky putty	Sticky putty	Sticky putty	Smooth putty	Brown putty	Blue gel
Temperature Grade*	2300°F	2300°F	2300°F	2300°F	2600°F	2800°F
Recommended Operating Temp.	2000°F	2000°F	2000°F	2000°F	2450°F	2700°F
Solids (%)	55	50	55	28	45	—
Wet Density (lb/ft <sup>3</sup> )	85	80	85	70	80	—
Dry Density (lb/ft <sup>3</sup> )	50	45	50	25	35	10-15
Dry MOR (psi)	400	375	400	350	140	—
LOI (%)	5	5	8	3-4	—	—
Shrinkage (%) (24 hrs)	4@2000°F	4@2000°F	4@2000°F	6@2000°F	1.2@2450°F	1.5-2.5@2600°F
Molten Aluminum Wetting Resistance	Good	Excellent	Good	Good	Fair	—

### Fiberfrax Moist Pak-D and Casting Mixes

Physical Properties	Moist Pak-D	FC-25 Tamping Mix	Vari-Form A	Vari-Form B
Appearance	Moist blanket	Wet clumpy Bulk fiber	Dry fibers Gray	Dry fibers Gray
Dry Density (lbs/ft <sup>3</sup> )	12-18	20-25	30-40	50-60
Temperature Grade*	2000°F	2300°F	2200°F	2200°F
Recommended Operating Temperature	1800°F	1800°F	1800°F	1800°F
Shrinkage (%) (24 hrs)	1.8@1800°F	1.7@1800°F	1.6@1800°F	1.6@1800°F
Dry MOR (psi)	—	40	20-50	130-210

\*The temperature grade of Fiberfrax insulation is determined by irreversible linear change criteria, not product melting point.

For additional information about product performance or to identify the recommended product for your application, please contact the Unifrax Application Engineering Group at 716-768-6460.

Data are average results of tests conducted under standard procedures and are subject to variation. Results should not be used for specification purposes.

## Typical Product Parameters

### Fiberfrax Coating Cements & Rigidizers

	QF-150	QF-180	QF-180 Blue	Topcoat 3000	Topcoat M	Rigidizer	Rigidizer W	Fiberstick Cement
<b>Typical Dry Chemical Composition (% Wt)</b>								
Al <sub>2</sub> O <sub>3</sub>	38.6	37.2	35.0	51.0	73.0	—	—	41.2
SiO <sub>2</sub>	57.5	59.1	60.8	47.0	21.0	—	—	52.1
Na <sub>2</sub> O	0.7	0.7	1.1	0.3	—	—	—	4.4
MgO	0.3	0.3	0.3	—	—	—	—	0.1
Fe <sub>2</sub> O <sub>3</sub>	0.7	0.7	0.7	—	—	—	—	0.8
TiO <sub>2</sub>	1.5	1.4	1.4	—	—	—	—	1.0
Trace Inorganics	0.6	0.6	0.6	1.0	3.0	—	—	0.4
<b>Packaging</b>								
1-Gallon Can	X	X	X	—	—	X	X	50-lb pail
5-Gallon Pail	X	X	X	X	X	X	X	—
55-Gallon Drum	X	X	X	—	—	X	X	—
Shelf Life-Months (Unopened)	<12	<12	<12	<6	<12	<12	<12	<6
<b>Specifications</b>								
U.S. Coast Guard for "Incombustible Materials" Subpart 164.009	X	X	X	—	—	X	X	—

### Fiberfrax Moldables and Pumpables

	LDS Moldable	LDS AL-Moldable	Pumpable-LDS	Pumpable-GS	Topcoat 2600 Insulating Mix	Fibermax Caulk
<b>Packaging</b>						
11 oz Caulking Tube	X	—	—	—	—	—
32 oz Caulking Tube	—	—	—	—	—	X
1-Gallon Can	X	X	—	—	—	—
5-Gallon Pail	X	X	X	X	X	—
55-Gallon Drum	X	X	—	—	X	—
Shelf Life-Months (Unopened)	<6	<6	<6	<6	<6	<4
<b>Specifications</b>						
U.S. Coast Guard for "Incombustible Materials" Subpart 164.009	X	—	X	—	—	—

### Fiberfrax Moist Pak-D and Casting Mixes

	Moist Pak-D	FC-25 Tamping Mix	Vari-Form A	Vari-Form B
<b>Packaging/Sizes</b>	¼" & ½" thick x 24" wide x 12½' long rolls. Plastic bags in cartons.	5-gallon pail	50-pound box	50-pound box
<b>Specifications</b>				
U.S. Coast Guard for "Incombustible Materials" Subpart 164.009	X	X	X	X

For additional information about product performance or to identify the recommended product for your application, please contact the Unifrax Application Engineering Group at 716-768-6460.



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