

Fiberfrax® Woven Textiles

Introduction

The woven textile product family is a unique group of high temperature ceramic fiber fabrics useable in a wide variety of industrial applications. It is composed of three basic product lines: Fiberfrax® cloth, tape and sleeving; Fibersil™ cloth and Flexweave™ 1000 cloth and tape. Fiberfrax yarn, the core material from which Fiberfrax cloth, tape and sleeving is woven, is also available as a product form.

Fiberfrax textiles have excellent resistance to thermal shock, corrosive attack and breakdown due to mechanical vibration and stress. They also exhibit excellent chemical stability resisting attack from most corrosive agents. Exceptions are hydrofluoric and phosphoric acids and concentrated alkalis. Fiberfrax textiles also resist oxidation and reduction. If wet by water or steam, thermal and physical properties are completely restored upon drying. No water of hydration is present.

Fiberfrax® Cloth, Tape and Sleeving

Fiberfrax textile product forms are durable, high temperature ceramic fiber fabrics that are well-suited for industrial applications requiring strong, yet flexible, high temperature-resistant materials. They are noted for their superior insulating ability to 1260°C (2300°F).

All textiles contain approximately 20% organic fiber added during the carding process to produce roving. The roving is further processed into yarn for weaving into Fiberfrax cloth, tape and sleeving.

Insert materials are incorporated into the Fiberfrax yarn to increase fabric tensile strength. Alloy wire inserts are available for obtaining maximum strength at elevated temperatures. Glass filament inserts are used in applications where metal

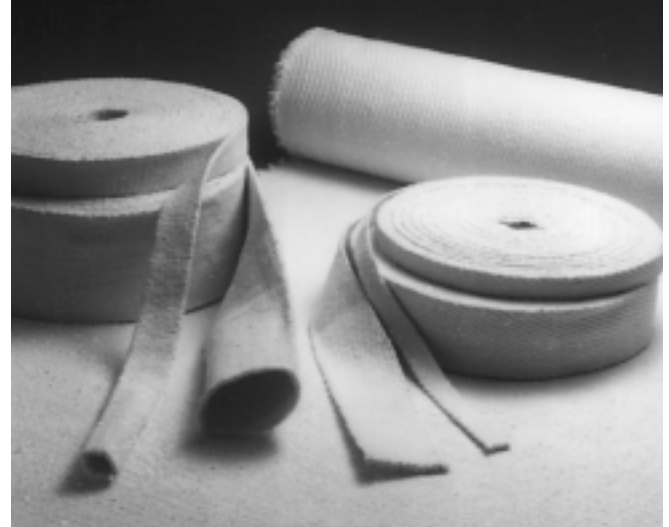
is undesirable as is the case when using Fiberfrax textiles as a dielectric. The following insert materials are available:

- Glass filament: service to 650°C (1200°F)
- Inconel wire: service to 1093°C (2000°F)

In applications where tensile strength is important, temperature limits of insert materials should be considered.

Typical Product Parameters

| | |
|------------------------------------|-----------------|
| Temperature Grade: | 1260°C (2300°F) |
| Recommended Operating Temperature: | 1260°C (2300°F) |
| Melting Point: | 1790°C (3260°F) |



Fiberfrax Cloth, Tape and Sleeving

Typical Applications

- Gasket and wrapping material
- Induction heating furnace coil insulation
- Cable and wire insulation (thermal and/or electrical)
- Infrared radiating diffusers
- Boiler tadpole gaskets
- Fuel line insulation
- Furnace heat zone separators
- High pressure steam portable flange covers
- Welding curtains and blankets
- Exhaust hood curtains
- Pipe hanger insulation

Non-Standard Product Forms:

The following product variations are available as non-standard textile products. Please contact your Unifrax Sales Engineer or Application Engineering at 716-278-3899 for additional information.

Product Variation:

Heat Treatment (T)
 Double Heat Treatment (TT)
 Double Thickness (DL-126, DL-144)
 Ladder Tape (Bolt Hole, Drop Warp)
 Tadpole Gaskets
 Fabricated Curtains
 Custom Sizes

Description:

3% Organics
 0% Organics
 Nominal 3/16"
 Center yarns omitted
 Rope core, tape covering
 Utilizing cloth, grommets
 Special lengths, widths

Refer to the product Material Safety Data Sheet (MSDS) for recommended work practices and other product safety information.

Typical Product Properties

Fiberfrax Cloth

Fiberfrax cloth is available in the following types:

| Type | Standard Width | Nominal Thickness | Insert Material | Temperature Limit of Insert | Weight kg/m | Weight (lb/lin yd) |
|-------|----------------|-------------------|-----------------|-----------------------------|-------------|--------------------|
| L-126 | 914 mm (36") | 3.2 mm (1/8") | Glass | 649°C (1200°F) | 1.3 | (2.7) |
| L-144 | 914 mm (36") | 3.2 mm (1/8") | Inconel | 1093°C (2000°F) | 1.3 | (2.7) |

Fiberfrax Tape

Fiberfrax tape is available in the following types:

| Type | Standard Widths | Nominal Thickness | Insert Material | Temperature Limit of Insert |
|-------|---|-------------------|-----------------|-----------------------------|
| L-126 | 25, 51, 76 mm (1", 2", 3") | 3.2 mm (1/8") | Glass | 649°C (1200°F) |
| L-144 | 13, 25, 51, 76, 152 mm (1/2", 1", 2", 3", 6") | 3.2 mm (1/8") | Inconel | 1093°C (2000°F) |

Fiberfrax Sleeving

Fiberfrax sleeving is available in the following types:

| Type | Standard Sizes | Wall Thickness | Insert Material | Temperature Limit of Insert |
|--------|--|----------------|-----------------|-----------------------------|
| HP-126 | 25, 38, 51 mm I.D. (1", 1 1/2", 2" I.D.) | 3.2 mm (1/8") | Glass | 649°C (1200°F) |
| HP-144 | 13, 19, 25, 38, 51, 63, 76, 102 mm I.D. (1/2", 3/4", 1", 1 1/2", 2", 2 1/2", 3", 4" I.D.) | 3.2 mm (1/8") | Inconel | 1093°C (2000°F) |

Fibersil™ Cloth

Fibersil cloth is a high-performance industrial grade ceramic fiber fabric for use in high temperature applications. Made from Fiberfrax yarns, it exhibits good resistance to abrasion and mechanical abuse, and is wire reinforced for high strength retention at elevated temperatures.

Lightweight Fibersil cloth is easy to fabricate, has low shrinkage, and remains flexible after high temperature exposure.

The superior insulating qualities of Fibersil cloth make it effective for energy-saving zoning curtains in furnaces and flexible entrance and exit barriers in continuous ovens.

Fibersil cloth provides excellent protection from molten metal splash, and can be used in welding and metal cutting applications.

Fibersil cloth contains less than 2% organic carrier and will shrink less than 1% at 982°C (1800°F).

Fibersil Cloth

Typical Product Properties

| | |
|------------------------------------|--|
| Temperature Grade: | 1260°C (2300°F) |
| Recommended Operating Temperature: | 982°C (1800°F) |
| Thickness: | 2.8 mm (.110 in) |
| Weight: | 1187 g/m ² (35 oz/yd ²) |
| Insert Material: | Alloy wire |
| Weave: | Twill |
| Width: | 914 mm (36 in) |
| Roll Size: | 42 m ² (50 yd ²) |
| Flammability (ASTM E-84): | Flame spread: 0 Smoke developed: 0 |
| Shrinkage at 982°C (1800°F): | 1% |



Fibersil Cloth

Typical Fibersil Applications

- Expansion joints
- Furnace curtains (entrance, exit barriers)
- Personnel and equipment protection
- Slow cool blankets
- Welding blankets

Fiberfrax® Yarn

Fiberfrax yarn is a 1260°C (2300°F) ceramic fiber product which can be woven into numerous forms for industrial applications. Products made from Fiberfrax yarn are strong, chemically stable and exhibit superior insulating qualities.

Fiberfrax yarn contains approximately 20% organic carrier and is spun around alloy or monofilament glass strands. These inserts provide maximum tensile strength at elevated temperatures. In applications where tensile strength is important, the temperature limit of the insert material should be considered.

Availability

Shipped on 0.9 kg (2 lb) spools.

Typical Fiberfrax Yarn Applications

- Fiberfrax cloth, tape, sleeving
- Flexible braided wire covers



Fiberfrax Yarn

Typical Product Parameters

| Type | Ply | Insert Material | Temperature Limit of Insert | Diameter | Tex* g/1000m | Yields (Linear Weight): | |
|------|-----|-----------------|-----------------------------|--------------|-----------------|-------------------------|-------------|
| | | | | | | m/kg ± 15% | yd/lb ± 15% |
| 11 | 1 | Glass | 649°C (1200°F) | 2 mm (3/32") | 1078 | 928 | 460 |
| 12 | 2 | Glass | 649°C (1200°F) | 3 mm (1/8") | 1858 | 539 | 267 |
| 14A | 1 | Inconel | 1093°C (2000°F) | 2 mm (3/32") | 1085 | 922 | 457 |
| 14 | 2 | Inconel | 1093°C (2000°F) | 3 mm (1/8") | 1858 | 539 | 267 |

*Unifrax is capable of manufacturing a wide range of yarn weights and diameters (500-2000 Tex). Contact your Unifrax Sales Engineer or Unifrax Application Engineering Group at 716-278-3899 for additional information.

Flexweave™ 1000 Cloth and Tape

Flexweave 1000 cloth and tape form a product line consisting of exceptionally durable woven textiles made from textured fiberglass. Recommended for continuous use to 538°C (1000°F), they are excellent insulators possessing very low thermal conductivity.

Flexweave 1000 textiles exhibit high dielectric strength and a low dielectric constant. They resist abrasion and fraying.

In addition to being highly resistant to chemical attack, Flexweave 1000 cloths and tapes are non-toxic, will not flash or smolder and are reusable. They are also wettable and mildew resistant.

Flexweave cloth is made from specially treated yarns to prevent unravelling during cutting and fabrication.

Flexweave 1000 cloth is easily sewn and is ideal for fabricating products such as curtains and blankets.

All Flexweave 1000 tape is coated with an acrylic binder containing a fire-retardant material to enhance handling properties. The acrylic coating dissipates at 315-370°C (600-700°F) with no adverse effects on the properties of the cloth.

Flexweave 1000 Cloth Typical Product Properties

| | | |
|---|--|---------------------|
| Construction: | Plain weave | |
| Temperature Grade: | 538°C (1000°F) | |
| Breaking Strength | | |
| (Grab method): | Warp direction | Filling direction |
| Type FW-24: | 2364 N (531.3 lb f) | 2047 N (460.1 lb f) |
| Type FW-30: | 1983 N (445.6 lb f) | 1454 N (326.8 lb f) |
| Type FW-35: | 1871 N (420.4 lb f) | 1320 N (296.6 lb f) |
| Type FW-40: | 2879 N (647.0 lb f) | 1998 N (449.0 lb f) |
| Weight:* | | |
| Type FW-24: | 622 g/m ² (24 oz/yd ²) | |
| Type FW-30: | 778 g/m ² (30 oz/yd ²) | |
| Type FW-35: | 907 g/m ² (35 oz/yd ²) | |
| Type FW-40: | 1037 g/m ² (40 oz/yd ²) | |
| Roll Length:* | 45.7 m (50 yds) | |
| Width* (measured between selvage edges): | 1016 mm and 1524 mm (40" and 60") | |

*Normal manufacturing tolerances on roll length, weight and thickness are ±10%. Tolerance on width is ±2%.

For non-standard widths, contact Unifrax Corporation, Customer Service.

Flexweave 1000 Tape

Typical Product Properties

| | |
|------------------------------------|--|
| Construction: | Double pick plain weave |
| Temperature Grade: | 538°C (1000°F) |
| Density: 1.6 mm (1/16"): | Nominal 816.9 kg/m ³ (51 lb/ft ³) |
| 3.2 mm (1/8"): | Nominal 640.7 kg/m ³ (40 lb/ft ³) |
| Abrasion Resistance (ASTM D-1175): | |
| 1.6 mm (1/16"): | Average cycles before wear through: 308 |
| 3.2 mm (1/8"): | Average cycles before wear through: 778 |
| Thicknesses: | 1.6 mm (1/16") 3.2 mm (1/8") |
| Widths: | 25, 38, 51, 64, 76, 89, 102 mm (1", 1 1/2", 2", 2 1/2", 3", 3 1/2", 4") |
| Length: | 30.48 m (100') |

Typical Flexweave 1000 Cloth and Tape Applications

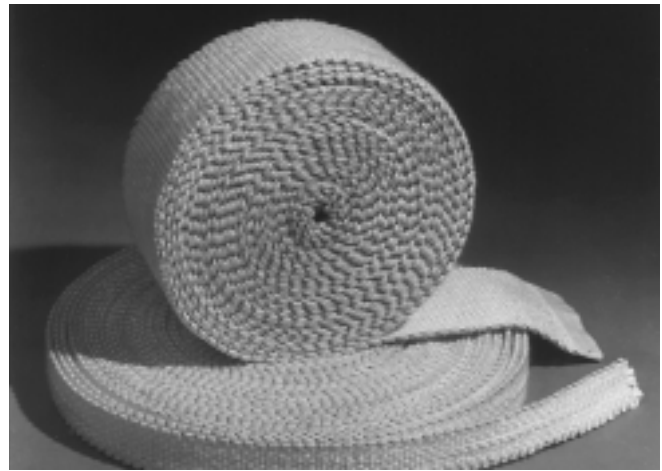
- Personnel protection
- Envelopes for stress-relieving blankets
- Welding curtains
- Pipe wrapping
- Steam tracing lines
- Tadpole gaskets
- Furnace door gaskets
- Pipe and boiler lagging

For additional information about product performance or to identify the recommended product for your application, please contact the Unifrax Application Engineering Group at 716-278-3899.

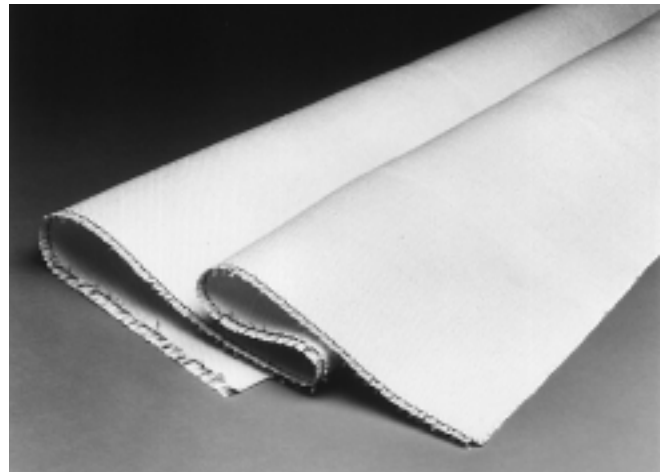
Data are average results of tests conducted under standard procedures and are subject to variation. Results should not be used for specification purposes.

Fiberfrax® Ropes, Braids and Wicking

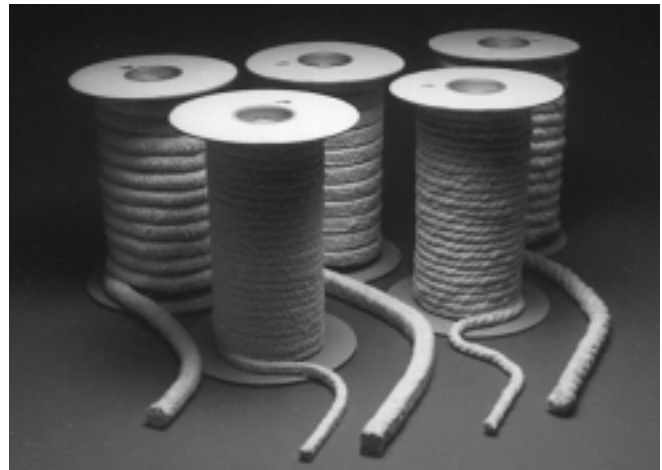
In addition to the Fiberfrax woven products, the Fiberfrax textile product family also contains a variety of ropes, braids and wicking products. These products are dense, resilient, ceramic fiber materials, widely used for a broad variety of high temperature gasketing, packing, and sealing applications. For additional details on the available product forms, typical properties or applications for which they are appropriate, refer to Fiberfrax Ropes, Braids and Wicking, Product Information Sheet, Form C-1426.



Flexweave 1000 Tape



Flexweave 1000 Cloth



Fiberfrax Ropes and Braids