

## Anchor-Loc® 3 Insulating Fiber Modules

### Introduction

The Anchor-Loc® 3 Insulating Fiber Module is designed to meet a wide range of application requirements in many types of heat processing vessels.

Unifrax specifications require inorganic spun fiber blankets for construction of the Anchor-Loc 3 module. The spinning process produces a long, tough fiber that contributes to the strength and stability of the needed blanket. Anchor-Loc 3 modules are manufactured from either ceramic fiber or soluble fiber chemistries to meet customers' specifications or regional product requirements.

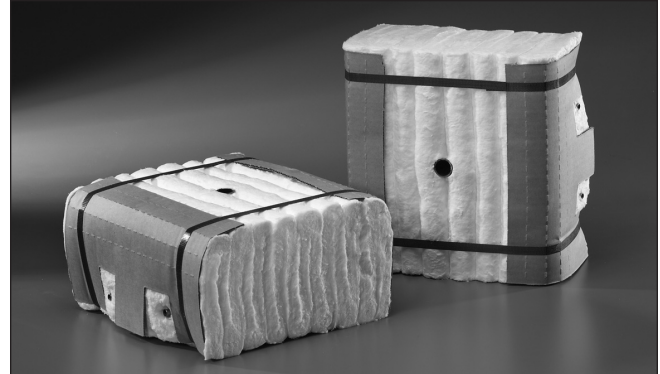
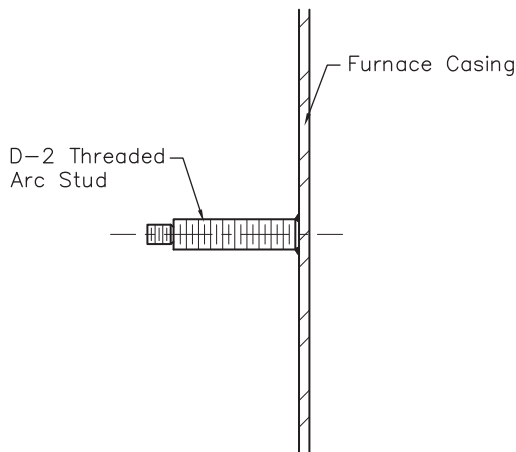
The two ceramic fiber blanket chemistries used for Anchor-Loc 3 construction are Durablanket® HPS and Durablanket 2600 with temperature grades of 1316°C (2400°F) and 1427°C (2600°F) respectively.

Anchor-Loc 3 modules are also constructed from biosoluble insulating blankets. For applications where operating temperatures may reach 1100°C (2012°F), the Anchor-Loc 3 module is fabricated from Insulfrax® S blanket. For continuous operating temperatures up to 1260°C (2300°F), Isofrax® 1260C soluble fiber blanket is selected for module construction.

Anchor-Loc 3 modules are formed by folding a continuous strip of insulating blanket in a serpentine pattern. Next, the folded blanket is compressed and banded to assure close dimensional control of the finished block.

A stainless steel base bar is inserted into the back surface of the block. For ease of attachment in the field, an access tube extends from the center of the module surface to the alloy base bar. This access tube is removed after installation is complete.

**Figure 1. Anchor-Loc 3 Insulating Fiber Module Attachment System**



Two stainless steel tubes are inserted through each fold of blanket to attach the insulating fiber to the module base bar.

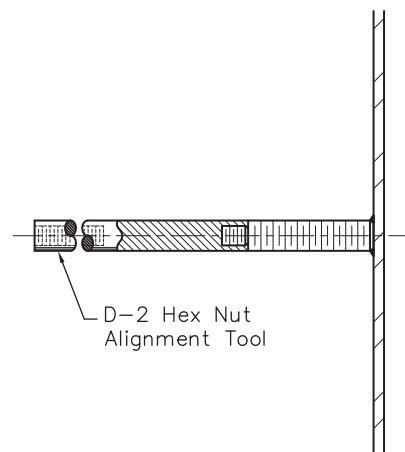
### D-2 Threaded Fastening System

Each Anchor-Loc 3 module is supplied with a D-2 threaded fastener assembly to attach the module to the furnace casing. The D-2 weld stud and hex nut assembly provides all of the features and benefits of a pre-welded fastener.

- Compatibility with mastic coatings, backup insulation and foil vapor barriers.
- Built-in compression due to the pre-engineered weld stud layout.
- Access to the welded fastener for inspection or testing prior to module installation.

In addition, the D-2 weld stud features a pilot thread that attaches to an alignment tool for ease of module placement and fast installation (Figures 1, 2). During installation the alignment tool and D-2 socket prevent cross-threading of the hex nut and stud even if studs are welded at a slight angle to the casing.

**Figure 2. D-2 Alignment Tool Installed on Weld Stud**



## Typical Lining Applications

- Feed heaters
- Reformers
- Convection Boxes
- Ethylene Furnaces
- Boilers
- Reheat Furnaces
- Steel Soaking Pit Covers
- Ladle Preheat Covers
- Forge Furnaces
- Incinerators
- Stacks, Ducts
- Doors, Covers
- Ceramic Kilns
- Personal Protective Shield

## Industries/Markets Served

- Chemical and petrochemical
- Refining
- Iron and Steel
- Ceramic
- Power Generation
- Metals Processing
- Aluminum
- Incineration

## Advantages Over Refractory

- Low heat loss
- Low heat storage
- Thermal shock resistance
- Fast thermal cycling (heat up/cool down)
- Energy savings (less fuel used)
- Easy to install
- Requires less maintenance

Anchor-Loc Modules are protected under U.S. patents #4,803,822 and 4,850,171. Refer to the product Material Safety Data Sheet (MSDS) for recommended work practices and other safety information.

## Typical Product Properties

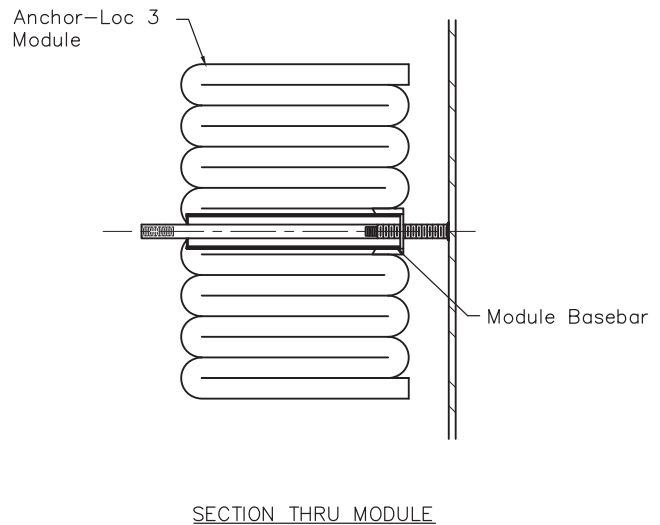
Module Grade	Temperature Grade	Recommended Operating Temperature
Anchor-Loc 3 – 1300	1316°C (2400°F)	1232°C (2250°F)
Anchor-Loc 3 – 1400	1427°C (2600°F)	1343°C (2450°F)
Anchor-Loc 3 INS	1260°C (2300°F)	1100°C (2012°F)
Anchor-Loc 3 ISO	1260°C (2300°F)	1260°C (2300°F)

Note that module number grades are used to identify blocks made from refractory ceramic fiber. Modules constructed from biosoluble fiber are identified by a letter grade.

The recommended operating temperatures for Fiberfrax®, Insulfrax and Isofrax products are determined by irreversible linear change criteria and compression recovery, not melting point.

## Anchor-Loc 3 Insulating Fiber Module Installation

Figure 3. Module Placement with the Alignment Tool



Anchor-Loc 3 Insulating Fiber Modules are installed over the weld stud by aligning the hole in the base bar with the installation tool. Note: Compression Banding and End Caps omitted for clarity.

## Typical Product Parameters

### Available Anchor-Loc 3 Insulating Fiber Modules

#### Standard Block Formats:

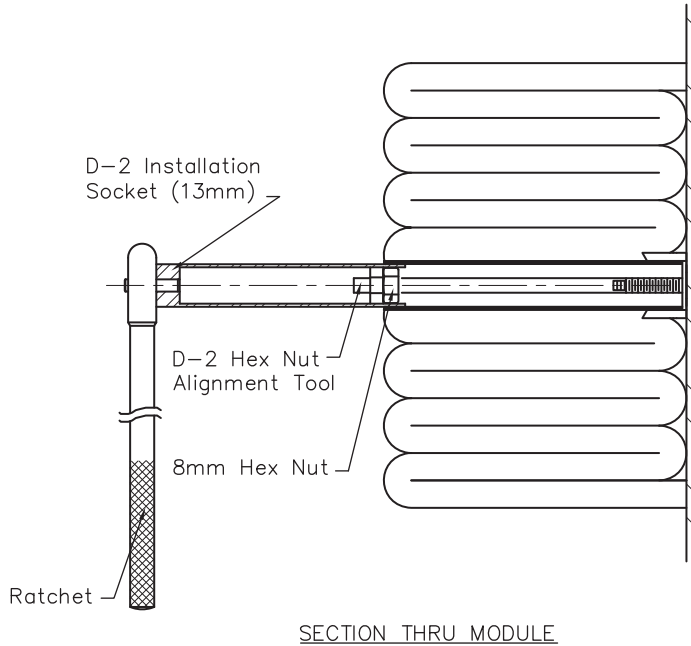
305mm x 305mm (12" x 12")

410mm x 410mm (16" x 16")

Module	Construction	Module Density
Anchor-Loc 3 – 1300	S-folded	160 kg/m <sup>3</sup> (10 pcf)
	Durablanket	192 kg/m <sup>3</sup> (12 pcf)
	High Purity Spun	
Anchor-Loc 3 – 1400	S-Folded	160 kg/m <sup>3</sup> (10 pcf)
	Durablanket	192 kg/m <sup>3</sup> (12 pcf)
	Spun AZS	
Anchor-Loc 3 – INS	S-Folded Insulfrax	160 kg/m <sup>3</sup> (10 pcf)
	Spun Blanket	192 kg/m <sup>3</sup> (12 pcf)
Anchor-Loc 3 – ISO	S-Folded Isofrax	160 kg/m <sup>3</sup> (10 pcf)
	Spun Blanket	192 kg/m <sup>3</sup> (12 pcf)

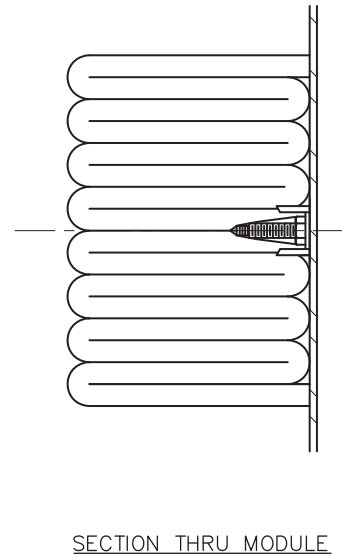
Data are average results of tests conducted under standard procedures and are subject to variation. Results should not be used for specification purposes.

**Figure 4. Installing the Hex Nut**



The alignment tool and D-2 socket are used to guide the hex nut to the threaded stud.

**Figure 5. Anchor-Loc 3 Module After Assembly To Furnace Casing**



After the nut draws the module against the furnace casing, the access tube, banding and endcaps are removed from the module.

**Anchor-Loc Modules**

**Anchor-Loc 3 Ceramic Fiber Module 1300 Grade – 160 kg/m<sup>3</sup> (10 pcf)**

Hot Face °C (°F)	Insulation Thickness – mm (in) Cold Face Temperature –	102 (4) °C (°F)	152 (6) °C (°F)	203 (8) °C (°F)	254 (10) °C (°F)
700 (1292)		82 (179)	67 (152)	58 (136)	53 (127)
900 (1652)		109 (229)	87 (189)	75 (167)	67 (152)
1200 (2192)		162 (323)	128 (262)	108 (227)	96 (205)

**Anchor-Loc 3 Ceramic Fiber Module 1300 Grade – 192 kg/m<sup>3</sup> (12 pcf)**

Hot Face °C (°F)	Insulation Thickness – mm (in) Cold Face Temperature –	102 (4) °C (°F)	152 (6) °C (°F)	203 (8) °C (°F)	254 (10) °C (°F)
700 (1292)		81 (178)	66 (151)	58 (136)	53 (127)
900 (1652)		107 (225)	86 (187)	74 (165)	66 (151)
1200 (2192)		156 (313)	124 (255)	105 (221)	92 (198)

**Anchor-Loc 3 Ceramic Fiber Module 1400 Grade – 160 kg/m<sup>3</sup> (10 pcf)**

Hot Face °C (°F)	Insulation Thickness – mm (in) Cold Face Temperature –	152 (6) °C (°F)	203 (8) °C (°F)	254 (10) °C (°F)	305 (12) °C (°F)
1100 (2012)		113 (235)	96 (205)	85 (185)	77 (170)
1200 (2192)		128 (262)	108 (227)	96 (205)	86 (187)
1300 (2372)		143 (290)	122 (251)	107 (225)	96 (205)



## Anchor-Loc Modules (cont.)

### Anchor-Loc 3 Ceramic Fiber Module 1400 Grade – 192 kg/m<sup>3</sup> (12 pcf)

Hot Face °C (°F)	Insulation Thickness – mm (in) Cold Face Temperature –	152 (6) °C (°F)	203 (8) °C (°F)	254 (10) °C (°F)	305 (12) °C (°F)
1100 (2012)		110 (230)	93 (199)	83 (181)	75 (167)
1200 (2192)		124 (255)	105 (221)	92 (198)	84 (183)
1300 (2372)		138 (281)	117 (243)	103 (217)	93 (199)

### Anchor-Loc 3 Soluble Fiber Module INS Grade – 160 kg/m<sup>3</sup> (10 pcf)

Hot Face °C (°F)	Insulation Thickness – mm (in) Cold Face Temperature –	102 (4) °C (°F)	152 (6) °C (°F)	203 (8) °C (°F)	254 (10) °C (°F)
700 (1292)		84 (183)	68 (154)	59 (139)	54 (129)
900 (1652)		113 (235)	90 (194)	77 (171)	69 (156)
1100 (2012)		148 (299)	117 (243)	99 (211)	88 (190)

### Anchor-Loc 3 Soluble Fiber Module INS Grade – 192 kg/m<sup>3</sup> (12 pcf)

Hot Face °C (°F)	Insulation Thickness – mm (in) Cold Face Temperature –	102 (4) °C (°F)	152 (6) °C (°F)	203 (8) °C (°F)	254 (10) °C (°F)
700 (1292)		83 (181)	68 (154)	59 (139)	54 (129)
900 (1652)		110 (230)	88 (190)	76 (168)	68 (154)
1100 (2012)		142 (288)	114 (237)	97 (207)	86 (186)

### Anchor-Loc 3 Soluble Fiber Module ISO Grade – 160 kg/m<sup>3</sup> (10 pcf)

Hot Face °C (°F)	Insulation Thickness – mm (in) Cold Face Temperature –	152 (6) °C (°F)	203 (8) °C (°F)	254 (10) °C (°F)	305 (12) °C (°F)
1050 (1922)		117 (242)	99 (210)	87 (189)	79 (174)
1150 (2102)		134 (273)	113 (235)	99 (211)	90 (194)
1250 (2282)		152 (306)	129 (264)	113 (235)	102 (215)

### Anchor-Loc 3 Soluble Fiber Module ISO Grade – 192 kg/m<sup>3</sup> (12 pcf)

Hot Face °C (°F)	Insulation Thickness – mm (in) Cold Face Temperature –	152 (6) °C (°F)	203 (8) °C (°F)	254 (10) °C (°F)	305 (12) °C (°F)
1050 (1922)		113 (235)	96 (205)	84 (183)	77 (170)
1150 (2102)		128 (263)	109 (228)	96 (205)	87 (189)
1250 (2282)		146 (294)	123 (253)	108 (226)	97 (207)

All heat flow calculations are based on a surface emissivity factor of .90, an ambient temperature of 27°C (80°F) and zero wind velocity, unless otherwise stated.

All thermal conductivity values for Fiberfrax materials have been measured in accordance with ASTM Test Procedure C-177. When comparing similar data, it is advisable to check the validity of all thermal conductivity values and ensure the resulting heat flow calculations are based on the same condition factors. Variations in any of these factors will result in significant differences in the calculated data.

For additional information about product performance or to identify the recommended product for your application, please contact the Unifrax Application Engineering Group at 716-278-3888.

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

