

MIRATECH External Insulation Specification

1. Description

This specification provides the requirements for external insulation options for carbon or stainless steel equipment. Insulation installed on MIRATECH carbon steel emissions housings where the inlet exhaust temperature is greater than 900°F or on MIRATECH carbon steel or aluminized silencer housings where the inlet exhaust temperature is greater than 1100°F for greater than 500 hours per year or is greater than 1100°F, respectively, will void the warranty of the equipment.

2. MIRATECH Insulation Types

This section defines standard material for MIRATECH provided insulation options. Any deviation from this specification would require a custom part number.

A. Type 1 – Thermal Wraps

Max Temperature Rating: 1250°F

Insulation Material: Fiberglass, 8 lb/ft³

Insulation Thickness: 1" standard

Exterior Cloth: Silicone fabric, 32 oz/sq. yd.

Encapsulation: 304 SS mesh, inner and outer surfaces

Construction Method: Sewn using Kevlar® thread

Attachment: Stainless steel lacing hooks (wire tied or with spring clips)

B. Type 2 – Insulation Blankets

Max Temperature Rating: 1250°F

Insulation Material: Fiberglass, 8 lb/ft³

Insulation Thickness: 2" standard, thicker available as custom

Exterior Cloth: Silicone fabric, 32 oz/sq. yd.

Encapsulation: 304 SS mesh, inner and outer surfaces

Construction Method: Sewn using Kevlar® thread

Attachment: Stainless steel lacing hooks (wire tied or with spring clips)

C. Type 3 – Field Installed

Max Temperature Rating: 1250°F

Insulation Material: Mineral wool, 8 lb/ft³ density

Insulation Thickness: 3" unless otherwise specified

Sheathing: 0.020" thick aluminum sheathing

Additional Requirements:

- All sheathing seams to have silicone-rubber caulking applied before enclosure
- Seams to have a minimum of 1" overlap
- Bevel perimeter surrounding flanges for bolt access
- Removable insulation section or blankets for catalyst access

3. Material Specification

A. Silicone Impregnated Fiberglass Fabric 32oz.

1) This material conforms to the following specifications:

- a. Mil-C-20079 G with G filament fiber.
- b. Mil-I-24244
- c. UL 91 Flame out 1 second.
- d. UL 723 Flame spread 0 Smoke development index 10.
- e. ASTM E84
- f. UBC42-1
- g. NFPA 255

2) Typical Properties:

- a. **Maximum Temperature:** 500°F
- b. **Minimum Temperature:** -80°F
- c. **Color:** Silver-Gray
- d. **Type Weave:** 8 Harness Satin
- e. **Type Fiberglass:** E-Glass
- f. **Weight:** 32 Oz./Sq. Yd.
- g. **Thickness:** .032 Inches

B. Silicone Impregnated Fiberglass Fabric 17oz.

3) This material conforms to the following specifications:

- a. Mil-C-20079 G with G filament fiber.
- b. Mil-I-24244
- c. UL 91 Flame out 1 second.
- d. UL 723 Flame spread 0 Smoke development index 10.
- e. ASTM E84
- f. UBC42-1
- g. NFPA 255

4) Typical Properties:

- a. **Maximum Temperature:** 500°F
- b. **Minimum Temperature:** -80°F
- c. **Color:** Silver-Gray
- d. **Type Weave:** 8 Harness Satin
- e. **Type Fiberglass:** E-Glass
- f. **Weight:** 17 Oz./Sq. Yd.
- g. **Thickness:** .017 Inches

C. Mat Insulation

1) Mat insulation is composed of 100% type “E” glass fibers needled together into mat form. It is non-respirable, incombustible, asbestos free and contains no resinous or inorganic binders.

2) This material conforms to the following specifications:

- a. Mil-I-24244
- b. USCG subpart 164.009
- c. ASTM E84



3) Typical Properties:

- a. **Melting Point:** 1523°F
- b. **Maximum Temperature:** 1200°F
- c. **Continuous Temperature:** 1000°F
- d. **Thickness:** ½” and 1”

4) Thermal Conductivity “K” Factor at Given Temperature:

- a. 300°F = 0.40 BTU/Inch/Hr./Ft²/°F
- b. 500°F = 0.50 BTU/Inch/Hr./Ft²/°F
- c. 700°F = 0.60 BTU/Inch/Hr./Ft²/°F

D. [Stainless Steel Knitted Mesh](#)

1) Typical Properties:

- a. **Construction:** 304 Stainless Steel
- b. **Maximum Temperature:** 1500°F
- c. **Wire Diameter:** .008”
- d. **Density:** 60#
- e. **Style:** Flat

E. [Kevlar® Thread](#)

1) Typical Properties:

- a. **Color:** Black
- b. **Breaking Strength:** 35 Pounds
- c. **Maximum Temperature:** 800°F
- d. **Stretch Percent Factor:** 1%
- e. **Nonflammable**

4. Part Numbers

A. [Type 1 – Thermal Wraps and Type 2 – Insulation Blankets](#)

1) Standard and Configurable Silencer Part Numbers:

- a. Remove the number and associated hyphen defining the material
- b. Remove the X on configurable part numbers
- c. Add the following to the beginning of the part number:
 - i. For 1” thick wire tied wraps add “W-” (standard)
 - ii. For 1” thick spring clip wraps add “WS-”
 - iii. For 2” thick insulation blankets add “IB-”
 - iv. For custom insulation blankets add “WZ-”
- d. **Example Part Numbers:**
 - i. **Silencer Part Number:** JHFA0AX-D08PF14PF-2-XXXXXXXXX
 - ii. **Thermal Wrap w/ Wire:** W-JHFA0A-D08PF14PF-XXXXXXXXX
 - iii. **Thermal Wrap w/ Springs:** WS-JHFA0A-D08PF14PF-XXXXXXXXX
 - iv. **Insulation Blanket:** IB-JHFA0A-D08PF14PF-XXXXXXXXX
 - v. **Custom Insulation Blanket:** WZ-JHFA0A-D08PF14PF-XXXXXXXXX



2) Custom Silencer Part Numbers:

- a. Remove the number and associated hyphen defining the material
- b. Remove the mounting type designation
- c. Add the following to the beginning of the part number:
 - i. For 1" thick wire tied wraps add "W-" (standard)
 - ii. For 1" thick spring clip wraps add "WS-"
 - iii. For 2" thick insulation blankets add "IB-"
 - iv. For custom insulation blankets add "WZ-"
- d. **Example Part Numbers:**
 - i. **Silencer Part Number:** JHFA0AZ-D08PF14PF-2-YYMMZZZZ
 - ii. **Thermal Wrap w/ Wire:** W-JHFA0Z-D08PF14PF-YYMMZZZZ
 - iii. **Thermal Wrap w/ Springs:** WS-JHFA0Z-D08PF14PF-YYMMZZZZ
 - iv. **Insulation Blanket:** IB- JHFA0Z-D08PF14PF-YYMMZZZZ
 - v. **Custom Insulation Blanket:** WZ-Y08X-D08CA-14PF-207-360-00

3) Accessories Group 1 & 2 Part Numbers:

- a. Remove the number and associated hyphen defining the material
- b. Remove the number associated with each flange defining flange mounting type
- c. For Bellows, remove the number defining single or dual ply
- d. Add the following to the beginning of the part number:
 - i. For 1" thick wire tied wraps add "W-" (standard)
 - ii. For 1" thick spring clip wraps add "WS-"
 - iii. For 2" thick insulation blankets add "IB-"
 - iv. For custom insulation blankets add "WZ-"
- e. **Example Part Numbers:**
 - i. **Accessory Part Number:** Y08X-D08CA1-14PF1-207-360-00-2
 - ii. **Thermal Wrap w/ Wire:** W-Y08X-D08CA-14PF-207-360-00
 - iii. **Thermal Wrap w/ Springs:** WS-Y08X-D08CA-14PF-207-360-00
 - iv. **Insulation Blanket:** IB-Y08X-D08CA-14PF-207-360-00
 - v. **Custom Insulation Blanket:** WZ-Y08X-D08CA-14PF-207-360-00

4) Emissions Product Part Numbers:

- a. Use the catalyst housing part number and remove "HSG-0" from the end
- b. Remove stainless material callout "S" if present
- c. Add the following to the beginning of the part number:
 - i. For 1" thick wire tied wraps add "W-" (standard)
 - ii. For 1" thick spring clip wraps add "WS-"
 - iii. For 2" thick insulation blankets add "IB-"
 - iv. For custom insulation blankets add "WZ-"
- d. **Standard Product Example Part Numbers:**
 - i. **Catalyst Housing Part Number:** RCS2-4230-16-HSG-0
 - ii. **Thermal Wrap w/ Wire:** W-RCS2-4230-16
 - iii. **Thermal Wrap w/ Springs:** WS-RCS2-4230-16
 - iv. **Insulation Blanket:** IB-RCS2-4230-16
 - v. **Custom Insulation Blanket:** WZ-RCS2-4230-16
- e. **Custom Product Example Part Numbers:**
 - i. **Catalyst Housing Part Number:** SP-IQ2-30-YYMMZZZZ-HSG-0
 - ii. **Thermal Wrap w/ Wire:** W-SP-IQ2-30-YYMMZZZZ
 - iii. **Thermal Wrap w/ Springs:** WS-SP-IQ2-30-YYMMZZZZ
 - iv. **Insulation Blanket:** IB-SP-IQ2-30-YYMMZZZZ
 - v. **Custom Insulation Blanket:** WZ-SP-IQ2-30-YYMMZZZZ



B. Type 3 – Field Installed

- 1) Part number structure is not aligned with the equipment.
 - a. Always listed in the Catalyzer as “FIELD-INSTALLED.”

5. Inspection

MIRATECH personnel may inspect any or all phases of the work to verify that it is in accordance with the requirements of this specification. The Supplier shall facilitate this inspection as required, including allowing sufficient time for the inspections.

6. Shipping

A. Type 1 – Thermal Wraps

- 1) Thermal wraps will either ship with order or dropship from the supplier.

B. Type 2 – Insulation Blankets

- 1) Insulation blankets will either ship installed on unit or separately as determined by MIRATECH. Insulation blankets shipping separately must be packaged in crate or double wall cardboard box. The use of Instapack “foam in place” system may be used if blankets may shift during shipment. For housing shipping with insulation installed, the insulation shall be protected from the binding chains or bands in such a way that no rubbing will occur during shipment that could damage the coatings

7. Summary of Revisions

- Revision 0 – [7/22/2014]: Original Release
- Revision 1 – [2/13/2019]: Added thermal wraps, material properties, and part number definition for each type of insulation to document.