MI-15® Ablative Material

MI-15® is a low density, room temperature curing, ablator/insulator which has been used extensively for thermal protection on aircraft and launch vehicles. In aircraft engine applications, continuous use temperatures range between 300-600°F. The MI-15® material has been certified for fire proof protection of fan thrust reversers per FAR Part 25.1181a and FAA Advisory Circular AC 20-135.

The material is a filled elastomeric silicone which is available in either a sprayable or trowelable form. The sprayable material (Type I) can be applied using standard spray equipment for large area primary applications. The trowelable/moldable material (Type II) can be used for small area applications or as a repair material for damage to the sprayable insulation.

MI-15® Material Availability:

Type I (sprayable):	1 gallon or 5 gallon kits
Type II (trowelable):	1 gallon kits

Typical Uncured Properties:

Color	White
Specific Gravity	0.57±0.08
Shelf Life	6 months @70°±10°F
Pot Life Type I	2 hours in closed container
Pot Life Type II	10-15 minutes
Solids Content (%) Type I	42
Solids Content (%) Type II	100

Typical Cured Physical Properties:

Density (lb/ft3) Type I	15 ± 2
Density (lb/ft3) Type II	30 ± 3
Tensile Strength (psi)	> 40
Hardness (Shore A)	> 40
Shear Strength (psi)	40 minimum@ 75°F
Emissivity	0.893 @ 75°F

Typical Cured Thermal Properties:

Ther Conductivity (Btu/h-ft-°F) @ 100°F	0.05
Specific Heat (Btu/lb-°F) @ 100°F	0.26
Enthalpy (Btu/lb) @175°F	45
Ablation Temperature (°F)	950
Heat of Ablation (Btu/lb) @45Btu/ft2-sec	5500
@80 Btu/ft2-sec	3650
@140 Btu/ft2-sec	2700
Ther. Expansion (in/in) 0° to 600°F	0.0084
Continuous Use Temperature (°F)	600

Processing Equipment (Type I):

Pressure Pot	Binks No. 80-254 or equivalent
Spray Gun	Binks Model 2001 or equivalent
Fluid Needle/Nozzle	No. 567SS/No. 67SS
Air Nozzle	Binks No. 67PB
Hoses	3/8 in. ID Nylon or Teflon lined
Gloves	Polyethylene or Polypropylene

Note: Do not use rubber or vinyl plastic materials (i.e. gaskets, hoses, seals, gloves etc.) because these materials may inhibit the cure of MI-15®.

Mixing for MI-15® Type I (sprayable):

MI-15® is supplied in pre-measured kit form.
Thoroughly mix Part A by itself on paint shaker or with a clean spatula or mixing blade. Add the Parts B & C to the Part A and thoroughly blend. Place immediately into spray pot and agitate.
If less than a whole kit is desired, the kits can be broken down by mixing at a ratio of 100: 0.21: 0.21 parts by weight for the pre-mixed Part A to the Parts B & C. Note: Use of an eyedropper may be desired for measuring the small quantities of the Parts B & C.

Mixing for MI-15® Type II (trowelable):

MI-15® is supplied in pre-measured kit form.

Thoroughly mix the Parts B & C together. Thoroughly mix Part A using polyethylene gloves (knead like dough). Place Part A on polyethylene sheet or in a container and incrementally blend in the Part B & C mixture. Knead the mixture like bread dough using polyethylene gloves.

If less than a whole kit is desired, the kits can be broken down by mixing at a ratio of 100: 0.64: 10 parts by weight for the Parts A : B: C.

Application of MI-15® Type I (sprayable):

Clean substrate with solvent (i.e. MEK) to remove any contamination such as oils or hydrocarbons. Apply PR-1200 silicone primer and allow to cure according to vendor recommendations. Set pot pressure to 25±5 psi and atomization pressure to 30±10 psi, and establish spray pattern. Part/Gun distance should be approximately 6-8 inches.
Apply MI-15® in subsequent layers of approx. 15 mils each. Allow solvent to flash-off between coats.
Allow coating to cure 24 hours @ 75±5°F with a relative humidity of 30 % minimum for application thicknesses up to 0.250 inches. Thicker applications may require a longer cure time but may be accelerated with an oven cure of 120-150°F after a 24 hour ambient cure.

Application of MI-15® Type II (trowelable):

Remove all damaged (i.e. not bonded) MI-15® down to substrate. Configure the damaged area as to leave the walls of the removed section perpendicular to substrate. Clean exposed substrate using abrasive pads wetted with solvent (i.e. MEK). Perform a final cleaning with solvent wetted clean cloth. Apply PR-1200 silicone primer to all surfaces and allow to cure according to vendor recommendations. Apply using a spatula or polyethylene gloves a sufficient amount of MI-15® Type II to fill the cavity. Allow the MI-15® to cure at ambient temperature with 30% minimum relative humidity for a minimum of 24 hours. The fully cured material may be sanded using 80 grit or finer sandpaper to a smooth finish.

Finishing:

Fully cured MI-15® may be hand or power sanded to produce specified thicknesses. A silicone top coat (MI-15® Topcoat, also available) is usually applied to MI-15® as a seal coat to improve wear resistance and to minimize handling damage or surface contamination. Do not apply topcoat until MI-15® is fully cured.

Applicable Substrates:

MI-15® has proven to be effective when applied to a variety of substrate materials:

- Aluminum, bare or epoxy primed
- Inconel
- Titanium
- Stainless Steel
- Composites (Graphite/Epoxy)

Prior Uses:

- MI-15® has been flight qualified through extensive testing for the following systems
- CF6 fan reversers of PR-10, 767, 757, 747, 737, MD-11, L-1011, A-300, A-310 and A-330 aircraft. The material is used as flame resistant insulation and firewall protection for engine nacelles and engine components.
- High performance missiles - Thermal protection