MA-25S® Ablative Material

MA-25S® is a medium density, room temperature curing, ablator/insulator, which has been used extensively for thermal protection on aircraft and space launch vehicles. On the Space Shuttle, short duration exposure to temperatures exceeding 1200°F may be encountered. In aircraft engine applications, continuous use temperatures range between 300-600°F. The MA-25S® material has been FAA 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. MA-25S® can also be obtained in precured sheet form for secondary bonding applications.

MA-25S® Material Availability:

Type I (sprayable):	1 gallon or 5 gallon kits
Type II (trowelable):	1 gallon kits
Sheet Stock Panels	**All panels are 12"x24"**
Available in three thickness: 0.10, 0.125, and 0.25"	
Type III (no topcoat):	Plain MA-25S®
Type IV (topcoated):	RTV60 & Kevlar Topcoat
Type V (topcoated)	MI-15® Topcoat (white)

Typical Uncured Properties:

Color	reddish brown
Specific Gravity	0.6±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 48
Solids Content (%)	Type II 100

Typical Cured Physical Properties:

Density (lb/ft3) Type I	25 ± 3
Density (lb/ft3) Type II	30 ± 3
Tensile Strength (psi)	> 40
Hardness (Shore A)	> 40
Elongation (%)	20 % @ 75°F
Shear Strength (psi)	40 @ 75°F
Youngs Modulus (psi)	870 @ 75°F
Emissivity	0.80 @ 500°F
Solar Absorptivity	0.29

Typical Cured Thermal Properties:

Ther. Conductivity (Btu/h-ft-°F) @100°F	0.06
Specific Heat (Btu/lb-°F) @ 75°F	0.3
Enthalpy (Btu/lb) @100°F	5
Ablation Temperature (°F)	950
Heat of Ablation (Btu/lb) @29Btu/ft2-sec	23986
Ther. Expansion (in/in) -100° to 200°F	0.008
Continuous Use Temperature (°F)	600

Processing Equipment:

Pressure Pot	Binks No. 80-254 or equivalent
Spray Gun	Binks Model 200W or Devilbiss
Fluid Needle/Nozzle	No. 67SS/No. 567SS
Air Nozzle	Devilbiss #67B or equivalent
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 MA-25S®.

Mixing for MA-25S® Type I (sprayable):

MA-25S® is supplied in pre-measured kit form.
Prepare catalyst by mixing, with a clean spatula Parts B & C.
Thoroughly mix Part A by itself on paint shaker or with a clean spatula or mixing blade.
Add the Part B & C mixture to the Part A and thoroughly blend.
Place immediately into spray pot and agitate.
If less than a kit is desired the kits can be broken down at a ratio of 16.67 to 1.0 parts by weight of pre-mixed Part A to pre-blended Parts B & C.

Mixing for MA-25S® Type II (trowelable):

MA-25S® is supplied in pre-measured kit form.
Prepare catalyst by mixing, with a clean spatula Parts B & C.
Thoroughly mix Part A using polyethylene gloves (knead like dough).
Place Part A on polyethylene sheet or container and incrementally blend in the Part B & C mixture. Knead the mixture like bread dough using polyethylene gloves

If less than a kit is desired the kits can be broken down at a ratio of 7.77 to 1.0 parts by weight of pre-mixed Part A to pre-blended Parts B & C.

Application of MA-25S® Type I (sprayable):

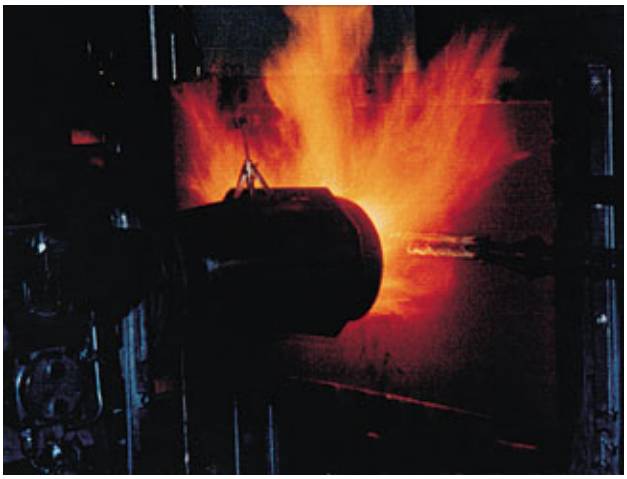
Clean substrate with solvent (i.e. MEK) to remove any contamination such as oils or hydrocarbons. Apply PR-1200 silicone primer and allow to cure according to vendor recommendations. Set pot pressure to 15±5 psi and atomization pressure to 25±5 psi, and establish spray pattern. Part/Gun distance should be approximately 6-8 inches.

Apply MA-25S® in subsequent layers of approx. 15 mils each. Allow solvent to flash-off between coats.

Allow coating to cure 24 hours @ 75±5°F for application thicknesses up to 0.25 inches. Thicker applications may require a longer cure time but may be accelerated with an oven cure of 120-150°F after a 4 hour ambient cure.

Application of MA-25S® Type II (trowelable):

Remove all damaged (i.e. not bonded) MA-25S® 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 MA-25S® Type II to fill the cavity. Allow the MA-25S® to cure at ambient conditions for a minimum of 24 hours. The fully cured material may be sanded using 80 grit or finer sandpaper to a smooth finish.



2000°F flame test for 15 minutes.

Finishing:

Fully cured MA-25S® may be hand or power sanded to produce specified thicknesses. A silicone topcoat (MI-15 Topcoat, also available) is usually applied to MA-25S® as a seal coat to improve wear resistance and to minimize handling damage or surface contamination. Do not apply topcoat until MA-25S® is fully cured.

Applicable Substrates:

MA-25S® 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:

- MA-25S® has been flight qualified through extensive testing for the following systems:
- X-15 flight research vehicle - Thermal insulation for Mach 8 flight
- Titan IIIC universal payload fairing - Ascent heat protection
- 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.
- Space Shuttle External Tank - Ascent heat protection at shock interference locations.
- KC-135 engine retrofit - Firewall protection
- High performance missiles - Thermal protection