Dow Silicone Ablatives

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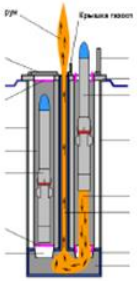
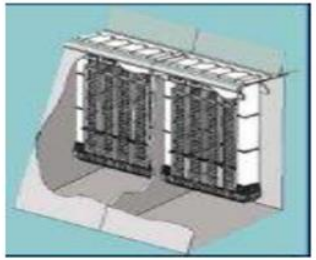
May 2023

Ablatives - Making the case for Silicones for thermal Protection

Ablatives offer sacrificial protection. Launch pads and chutes are typically re-grouted after each launch



Ablatives use a combination of unique extending fillers to enhance char properties



Often used as sacrificial coatings for structural protection

- Flame diversion trench
- Launch gantry and strongback
- Concrete pad

Can be used for critical components on space vehicles/rockets

- Rocket nose cones, fins
- Exhaust nozzles

DOWSIL™ Silicone Ablative Product Portfolio

Product line	Cure type	Working time	Cure time (room temp.)	Application	Surface orientation	Char durability
DOWSIL™ 93-104 Ablative*	2 part, addition cure	5 hr	≤ 24 hr	Trowel, moldable	Horizontal	Best
DOWSIL™ 93-104 Ablative Fast Cure*	2 part, addition cure	2.5 hr	≤ 12 hr	Trowel, moldable	Horizontal	Best
DOWSIL™ 3-6077 Ablative	2 part, condensation cure	2 – 3 hr	≤ 24 hr	Trowel	Horizontal & vertical	Better
DOWSIL™ LPA 4000 Ablative+	1 part, moisture cure	20 – 45 min	≤ 24 hr	Trowel or spray	Horizontal & vertical	Good

*International Traffic In Arms Regulated Products +Developmental product

Benefits of Protective Silicones

- Superior performance in high-shear, high-heat flux environments
- Tough, tenacious char characteristics
- Thermally stable from -65°C to +200°C and for short periods of time at temps greater than 3000°C
- Excellent resistance to weathering, moisture, ozone
- Flexible application options
- Room temperature cure

Examples of Silicone Ablative Performance

3500°C for 3 seconds

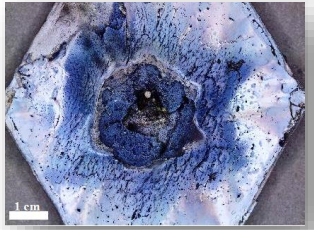
Unprotected
3/16” Porcelain Tile

5mm
Ablative Coating Added

3500°C for 10 seconds

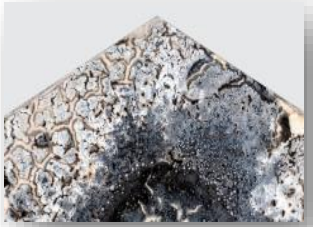
2-part, 10:1 addition cure ablative

- Excellent surface char retention
- Extensive heritage in Aerospace & Defense
- Self-leveling
- Best for direct flame impingement (flame deflector shields, heat tiles)



2-part, 10:1 tin cure ablative

- Durable surface char retention
- Extensive heritage in Aerospace & Defense
- Thixotropic - can be applied to vertical surfaces
- Can be used for direct or indirect flame impingement

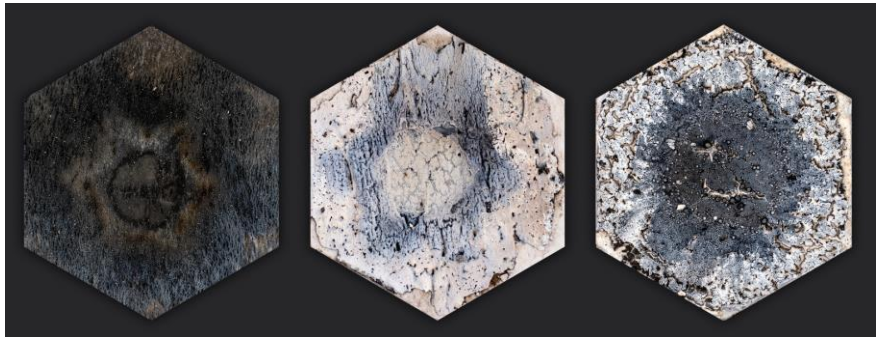


1-part, moisture cure sprayable RTV Ablative

- Sacrificial char
- Surface degrades uniformly and instantaneously
- Best for indirect flame impingement (gantry, strongback, flame diversion trenches)

DOWSIL™ Silicone Ablative Technical Data

Penetration Rate & Bulk Loss



DOWSIL™ 93-104 Ablative | DOWSIL™ 3-6077 Ablative | DOWSIL™ LPA-4000 Ablative

Product	Penetration rate (mm/sec)	Bulk loss rate (g/sec)	Bottom temperature rise (seconds)*
DOWSIL™ 93-104 Ablative	<0.1	0.11	>30
DOWSIL™ 3-6077 Ablative	0.15	0.11	20
DOWSIL™ LPA-4000 Sprayable RTV Ablative	0.16	0.53	20

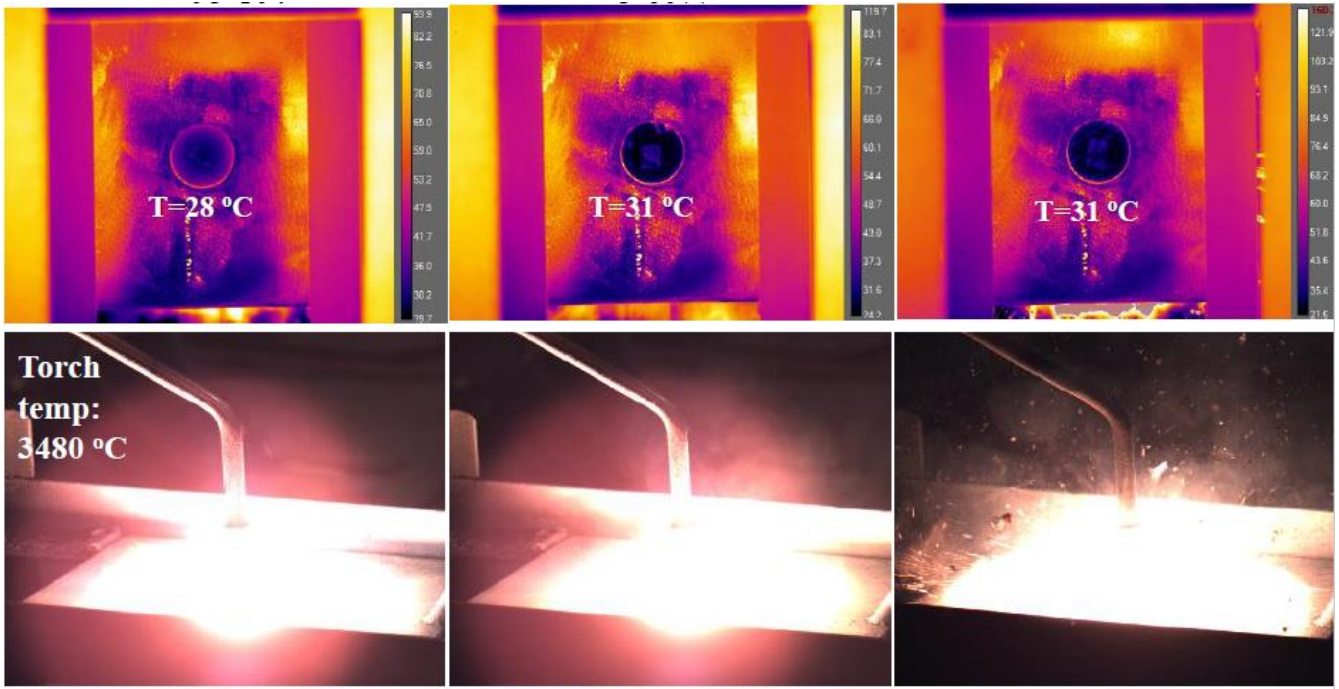
*Exposure time before tile fracture

Adhesion Strength

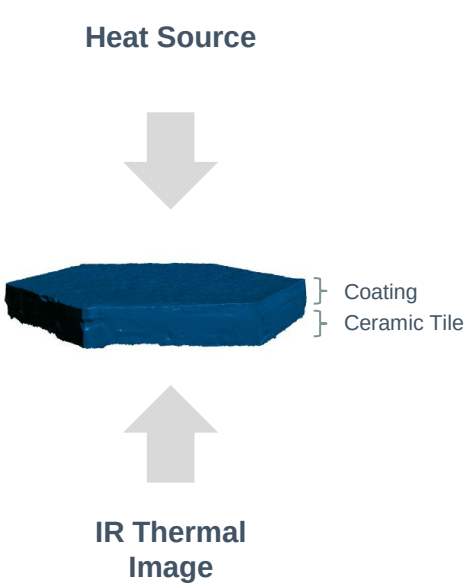
Products	Adhesive strength (pli)			
	Bare steel	Primed steel*	Bare concrete	Primed concrete*
DOWSIL™ 93-104 Ablative	5.1	7.8	5.1	7.6
DOWSIL™ 3-6077 Ablative	<1	15.1	<1	12.6
DOWSIL™ LPA 4000 Ablative	14.7	14.4	15.2	10.8

*DOWSIL™ 1200 Primer

Silicone Ablatives: Thermal Imaging Profiles



10:1 Addition Cure **10:1 Tin Cure** **Sprayable RTV**



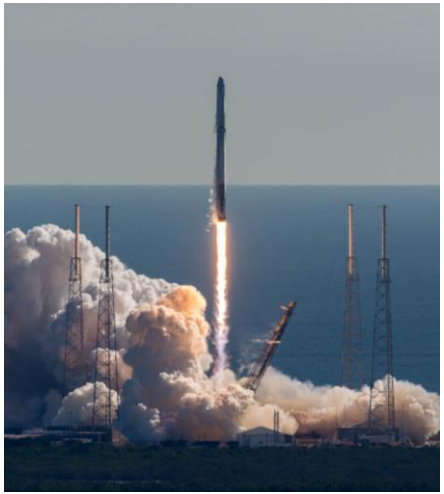
- Backside temperature of coated tiles when exposed to 3500°C for 10 seconds

New Sprayable RTV Silicone Ablative: Application & Performance

- 1-part, neutral cure, flowable silicone RTV
- Solvent-free (no hydrocarbons), PFAS-free
- Sacrificial coating, can be applied by spraying or by troweling
- Spray coat thickness to ~150mils in a single application

ABLATIVE TAKEAWAYS…

- DowSil™ silicone ablatives offer a ***highly effective*** solution for thermal protection and heat shielding systems
- DowSil™ silicone ablatives have been enabling thermal protection and shielding for Aerospace and Defense since the mid 1960's – they have a ***long and proven heritage in use***
- DowSil™ ablative portfolio includes addition cure options as well as moisture cure options. Application methods ***enable design flexibility*** include molding, troweling/rolling, and spraying
- DowSil™ ablatives ***offer sustainability*** vs. alternatives that are often formulated with hydrocarbon solvents



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