

TSR1452E

silicone coating and binder resin



MARKETING BULLETIN

SILANES - COATINGS ADDITIVES

TSR1452E silicone resin is a 60% by weight methyl phenyl silicone in solvent that produces a medium-hard film. Delivering exceptional heat, weather and chemical resistance, it is an excellent candidate for use as a vehicle in paint formulations.

Key Features and Typical Benefits

- Excellent thermal resistance with good gloss and color retention
- Low molecular weight polymer, enabling good compatibility with a wide range of organics
- Delivery of thermal resistance as a sole vehicle
- Improved heat resistance when blended with organic vehicles
- Extended shelf life of 18 months when stored below 25 °C

Typical Physical Properties

Property	Value
Appearance	Transparent, light yellow liquid
Specific Gravity at 25 °C	1.06
Viscosity at 25 °C, mPa·s	27
Solid Content, %	60
Diluent	Xylene / ethylbenzene

Typical properties are average data and are not to be used as or to develop specifications.

Mechanical Film Test Properties

TSR1452E silicone resin was coated on a steel sheet (SPC-1 50 mm x 50 mm x 1.0 mm thickness) with a film thickness of 30-40 μm and cured at 150 °C for one hour. The resulting physical properties of the film were evaluated as shown in the table below.

Property	Cured Film at 150 °C, 1 hour
Film Hardness (Sward rocker test)	55
Erichsen Indication, mm	4
Drawing Test	20/20 (no flaking)
Cross Cut Adhesion Test	No coating flakes
Bend Test (bent over a 3 mm in diameter mandrel)	Yes (flexible)

Note: Test results. Actual results may vary.

Gloss and Color Retention Test

A model black enamel containing TSR1452E silicone resin (as a top coat) was evaluated for gloss and color retention after exposures at 250 °C and 400 °C each for 16 hours.

Black enamel test formulation and procedures:

Ingredient	Parts by weight
TSR1452E silicone resin (100% solid resin)	140
Mica Powder (Takaramaika #103 from Takara Kogyo Co.)	70
Ceramic Black #2930 from Ferro Enamels (Japan) Ltd.	70
Stearic Acid Aluminum	0.3
Xylene	50

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A non-treated steel sheet (SPC-1 50 mm x 50 mm x 1.0 mm in thickness) was applied with (first coat) silicone aluminum paint with 20 μm thickness and cured at 150 °C for 1 hour. The model black enamel containing TSR1452E silicone resin was then applied with 25 μm thickness and cured at 150 °C for 1 hour.

Test Condition	Black Enamel with TSR1452E Silicone Resin				Black Enamel with Standard Methyl Phenyl Resin			
	Gloss (60°)			Color Retention	Gloss (60°)			Color Retention
	Initial	After 16 hour Heat Exposure	% Gloss Retention	Delta E	Initial	After 16 hour Heat Exposure	% Gloss Retention	Delta E
250 °C for 16 hours	37.7	23.2	61.5	0.7	31.8	7.0	22.0	5.6
400 °C for 16 hours	37.1	9.1	24.5	2.7	34.5	2.7	7.8	7.0

Note: Test results. Actual results may vary.

The model black enamel formulation with TSR1452E silicone resin had excellent gloss and color retention after exposure to 250 °C for 16 hours as compared to the enamel containing a standard silicone resin.

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