

INDUSTRIAL COATINGS | BINDER | SILRES® MPF 52 E

SILRES® MPF 52 E:

A New Generation of Silicone Resin Emulsion

Due to environmental considerations, water-based systems are becoming more essential in the production of coatings. Compared to traditional solvent-based resins, water-based silicone resins significantly reduce VOC emissions in coating formulations.

By utilizing SILRES® MPF 52 E, a complete range of water-based high-temperature coatings can be formulated and produced while retaining all the benefits of a silicone-based coating:

- High heat resistance
- Excellent adhesion
- Chemical and corrosion resistance

SILRES® MPF 52 E has good compatibility with other organic resins, providing formulators with flexibility and ease of compounding during the manufacturing process.

What Distinguishes SILRES® MPF 52 E from Other Silicone Resins?

When SILRES® MPF 52 E is used in combination with other resin emulsions, the formulation will dry at room temperature to form a tack-free film. For moderately heat-resistant coatings (~200 – 300 °C), SILRES® MPF 52 E can be used as a single binder or in combination with a broad range of water-based organic polymers such as acrylates, alkyds and polyesters. Depending upon which systems SILRES® MPF 52 E is combined with, final curing is obtained by baking at 200 – 280 °C for 15 minutes to one hour. When heated,

SILRES® MPF 52 E: Typical General Characteristics

Appearance	White milky emulsion
Solvent content	< 3.0%
Solid content	60 ± 3%
Viscosity, dynamic at 25 °C	~ 100 – 200 mPas
Density at 25 °C	1.06 g/cm ³
Emulsifier	Nonionic
Flash point	60 °C
Ignition temperature (liquids)	450 °C

SILRES® MPF 52 E can chemically react with itself and other organic functional resins. Once reacted, SILRES® MPF 52 E based coating shows an excellent hot-hardness. Due to the required baking process, metals and glass make excellent substrates. For high-temperature exposure, SILRES® MPF 52 E is applied as a single coat with a maximum dry film thickness of 25 µm. High-temperature resistance (~500 °C) can be achieved by using suitable pigments and fillers.

A Wide Variety of Application Possibilities

SILRES® MPF 52 E can be used in all types of coatings for household appliances that are regularly subjected to high temperatures, such as pots, pans and toasters. Some other popular applications in which SILRES® MPF 52 E provides temperature protection and performance are: mufflers and exhaust systems on motorcycles, recreational vehicles and automotive.

More Advantages with SILRES® MPF 52 E

SILRES® MPF 52 E is suitable for use under Recommendation XV and silicones of the BfR.

At a Glance: The Advantages of SILRES® MPF 52 E

- Binder for water-based formulations
- Phenyl-methyl resin emulsion
- Typical formulations can be tack-free after one hour at RT
- Provides water-based paints with high-temperature performance
- Good compatibility with organic resins
- BfR XV confirmed
- Broad end-use applications



Example: Silicone Heat-Resistant Water-Based Coating

SILRES® MPF 52 E	46.3 g
Water	4.8 g
Wetting and dispersing agents	5.9 g
Antifoam agents	1.5 g
Surface agent	1.3 g
Aluminum paste	13.3 g
Thickeners	0.8 g

Curing time 10 min at 280 °C

Coating Properties (After Baking for 10 min. at 280 °C; Dry Film Thickness ~ 25 µm)

König pendulum hardness DIN ISO 1522	~ 95
Pencil hardness DIN ISO 13523-4	1H
Cross-cut test without tape DIN ISO 2409/ASTM 3002	Gt 0/B5
Cross-cut test with tape DIN ISO 2409/ASTM 3002	Gt 0/B5

Coating Properties (After Baking for 60 min. at 500 °C, Dry Film Thickness ~20 µm)

König pendulum hardness DIN ISO 1522	~ 170
Pencil hardness DIN ISO 13523-4	8H
Cross-cut test without tape DIN ISO 2409/ASTM 3002	Gt 1/B4
Cross-cut test with tape DIN ISO 2409/ASTM 3002	Gt 2/B3
MEK	> 200 DR

Silicone Resin Binders: Function and Benefits

Silicone resins crosslink at high temperatures to produce an extended, tightly meshed silicon-oxygen network. Organic components – generally methyl and phenyl groups – bond to this exceptionally chemically stable inorganic backbone. Phenyl-substituted methyl silicone resins are particularly suitable for heat-resistant formulations, since the phenyl-containing resins are highly compatible with pigments, fillers and organic binders and decompose more slowly under the effect of heat.



After curing at 280 °C 10 minutes: the phenylmethyl silicone SILRES® MPF 52 E (panel left) forms a stable film while silicone-acrylic (panel middle) and acrylic (panel right) are destroyed.



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