WACKER

CREATING TOMORROW'S SOLUTIONS

INDUSTRIAL COATINGS I BINDERS I SILRES® REN 50, SILRES® REN 60, SILRES® REN 80

COMBINE HARDNESS WITH FLEXIBILITY: SILRES® REN 50, 60, 80

Phenyl Methyl Silicone Resin Solutions for Heat- and Corrosion-Resistant Coatings

SILRES® REN silicone resins are essential components of heat-resistant coatings. Formulated with pigments and fillers, this class of silicone resins are indispensable binders for paints resistant to temperatures exceeding 600 °C (1,100 °F).

A Proven Track Record for Heat-Resistant Corrosion Protection

WACKER offers three proven binders for heat-resistant anti-corrosive finishes: SILRES® REN 50, SILRES® REN 60 and SILRES® REN 80. Delivered in xylene or xylene/butanol solutions, these medium-hard phenyl methyl silicone resins combine a number of beneficial basic properties:

- Tack-free drying at room temperature with no added pigments or fillers
- Good surface hardness prior to baking
- Improved adhesion on critical smooth substrates such as cold-rolled steel compared to methyl silicone resins
- Constituents for innovative coating developments
- Trusted for decades in the paint and coatings industry
- Baking is required for full curing and the development of optimum mechanical and chemical resistance

SILRES® REN 50, SILRES® REN 60 and SILRES® REN 80 at a Glance

- Solvent-based phenyl methyl silicone resins
- Application: binders for coatings that remain stable at high temperatures
- Good adhesion to all metal substrates
- Medium hard
- Air dries quickly at room temperature

The Right Product for Every Need

These three related SILRES® grades offer ideal solutions for a variety of product requirements.

SILRES® REN 50: Quick drying with excellent initial hardness

SILRES® REN 50 air-dries extremely quickly to produce excellent initial hardness. Addition of 5% n-butanol (to SILRES® REN 50) is recommended for stabilizing viscosity over relatively long storage periods, especially for aluminum-pigmented coatings.

SILRES® REN 60: Little solvent required, outstanding compatibility

A notable feature of SILRES® REN 60 is that it requires much less solvent than SILRES® REN 50, yet exhibits virtually the same properties. The drying process is somewhat longer, and the surface is somewhat softer. SILRES® REN 60 is also highly compatible with organotitanates such as polybutyl titanate.

SILRES® REN 80: Ideal for high-solids coatings

The properties of SILRES® REN 80 are similar to those of SILRES® REN 60 except that its high solids content makes it better suited for formulating high-solids coatings.

Application/Formulation

SILRES® REN 50, SILRES® REN 60 and SILRES® REN 80 are raw materials/binders used in the formulation of high-temperature heat-resistant coatings. They are not ready-to-use high-temperature heat-resistant coatings. Usually a high level of fillers/pigments is added to these binders in the formulation of high-temperature heat-resistant coatings.

Heat Resistance

The heat resistance of the coating largely depends on the type of pigmentation, formulation and substrate. The following are sample guide values for use on sand-blasted steel plate:

- Zinc dust: 420 °C
- Talc and (heat-stable) black pigments: up to 600 °C
- Aluminum pigments: 650 °C

(See table on reverse for typical properties of silicone resin films on steel plate.)

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Substrate Preparation

Coatings adhere well on degreased, bare metal substrates. Sandblasting is recommended for the removal of metal oxides, as well as mechanical surface roughing.

Dry Film Thickness

The dry film thickness that can be attained depends largely on the formulation. Two opposing effects generally need to be taken into account. While corrosion protection improves with increasing film thickness, the risk of cracking increases as well, especially when the temperature fluctuates significantly. A dry film thickness of 25 µm per coat is given as a starting point. Thicker films, however, can also be obtained by adjusting the formulation accordingly.

Typical Properties of Silicone Resin Films on Steel Plate*

	SILRES® REN 50	SILRES® REN 60	SILRES® REN 80**
Applied on steel panels by doctor blade (100 µm wet)			
Tack-free time [23 °C/48% humidity]	14 min.	18 min.	45 min.
After 7 d RT (23 °C/50% humidity)			
Pendulum hardness (EN ISO 1522)	81	45	36
Pencil hardness (ISO 15184)	2B	3B	5B
Cross hatch (EN ISO 2409)	0	0	0
Dry film thickness [µm]	18	21	69
Contact angle on glass (water)	100	96	nd
After baking at 200 °C/1h			
Pendulum hardness (EN ISO 1522)	84	60	42
Pencil hardness (ISO 15184)	2B	3B	3B
Cross hatch (EN ISO 2409)	0	0	0
Dry film thickness [µm]	19 µ	20 µ	47 µ

* Silicone resin films are obtained by applying the unpigmented, undiluted silicone resin solution on steel plate using a doctor blade.

** Results may vary, solvent entrapment in the film cannot be avoided without further dilution of the product.

Number of Coats

Generally speaking, single coats can only be used where the heat is predominantly dry (such as in interior rooms). Two or more coats are recommended for improving corrosion protection. The use of an ethyl-silicate-based zinc-dust primer is recommended for highly corrosive environments.

Baking

Coatings are fully cured after baking, at which point they develop optimum mechanical stability and resistance to chemicals such as fuels and oil. 200 °C/1h can be used as a guide value. Coatings do not attain their final properties until they are used for the first time (T > 400 °C).

Thinners and Compatibility with Other Resins

Acrylic resins in particular have a positive effect on initial hardness. This generally reduces stability at high temperatures, however. We therefore recommend using a silicone resin binder on its own.

Drying

Pigmented coatings based on SILRES® REN 50, SILRES® REN 60 or SILRES® REN 80 dry quickly at room temperature to yield tack-free surfaces. Catalyst addition is unnecessary. Drying is an entirely physical process. Corrosion protection and weather resistance are excellent, even in this state.

Suitable Thinners

	SILRES® REN 50	SILRES® REN 60	SILRES® REN 80
Solvent			
Aromatic hydrocarbons (xylene, solvent naphtha)	+	+	+
Esters (butyl acetate, methoxypropyl acetate)	+	+	+
Ketones (methylisobutyl ketone, cyclohexanone)	+	+	+
Aliphatic hydrocarbons	o/-	o/-	o/-
Alcohols (methoxypropanol, n-butanol)	o/+	o/+	o/+

+: soluble o: hazy/partly soluble -: incompatible

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