

SILRES® HP 2000:

Epoxy Coatings with Unparalleled Weathering Stability

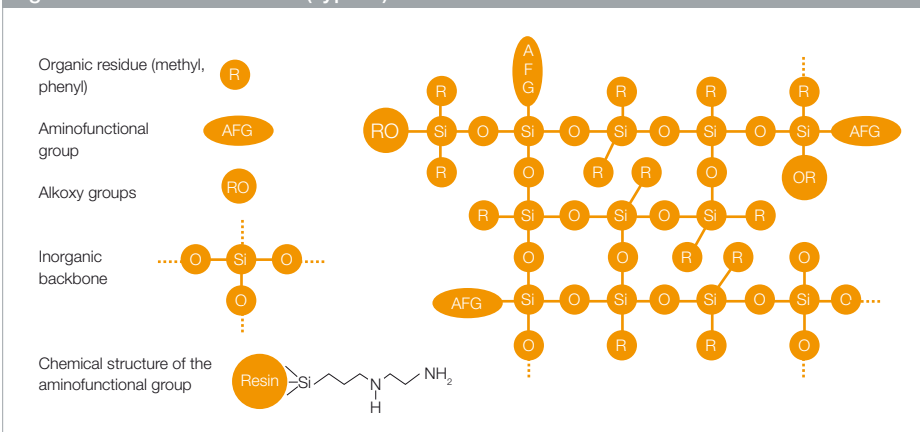
Epoxy coatings combine excellent adhesion-strength and chemical resistance with outstanding corrosion-protection. However, their resistance to sunlight has been inadequate so far. In outdoor applications, the UV component of sunlight damages the film and causes severe chalking. But now a solution is available: SILRES® HP 2000 imparts unique weathering stability to epoxy coatings.

Conventional silicone resins must be cured by baking at high temperatures, such as about 200 °C for 1 hour. This causes the silanol groups to undergo polycondensation. However, for a number of reasons, there are many coatings that cannot be baked.

SILRES® HP 2000 Cures Even at Room Temperature

SILRES® HP 2000 is an amino-functional silicone resin (see figure 1). The amino groups linked to the silicone resin via silicon-carbon bonds both catalyze the condensation of silicon-alkoxy groups and act as reactive curing groups. Even at room temperature, they react with the epoxide groups of epoxy resins to form a high-molecular coating film. The cured coating is completely resistant to strong solvents such as 2-butanone (methyl ethyl ketone, MEK) which proves the high degree of crosslinking that can be achieved by using SILRES® HP 2000.

Figure 1: Chemical Structure (Typical)



SILRES® HP 2000: Typical Formulation

Paint base (component 1)	Weight %
Cycloaliphatic epoxy resin	33.2
Pigment, titanium dioxide	30.0
Mixing and dispersion (high-speed mixer or bead mill)	
Curing agent (component 2)	
SILRES® HP 2000 (AHEW 247 g/eq)	36.8
Mixing with component 1 directly before application; pot life approx. 4h; drying time approx. 4 – 5 h (50% r.h., 23 °C)	

SILRES® HP 2000: The Principle

SILRES® HP 2000 replaces the organic curing agent (e.g. polyamine) in two-component epoxy coatings. Cycloaliphatic epoxy resins are particularly suitable as epoxy components of the pigmented coating base. Pigments (inorganic or organic types), extenders, additives, solvents should be added to the paint base. The products are known as epoxy-polysiloxane coatings (or organo silicone hybrid coating in general).

SILRES® HP 2000: The Advantages

Epoxy-polysiloxane coatings based on SILRES® HP 2000 are characterized by very high hardness, excellent long-term gloss stability, excellent solvent resistance and low VOC values¹. Depending on the desired viscosity, typical coating formulations contain only 100 – 250 g VOC/liter. They combine the advantages of conventional epoxy coatings with the known weathering stability of isocyanate-curing PUR top coats² in a one-coat lacquer.

As a result, to meet the requirements of corrosivity category C4, for example, the previous two coats can now be replaced with a single epoxy-polysiloxane coat. This saves labor costs.

Three-coat systems with topcoats based on SILRES® HP 2000 have proven effective up to the maximum corrosivity categories C5-I and C5-M.

Epoxy-polysiloxane coatings based on SILRES® HP 2000 do not contain harmful isocyanates or urethane groups. Nevertheless, their gloss surpasses that of isocyanate-based PUR topcoats.

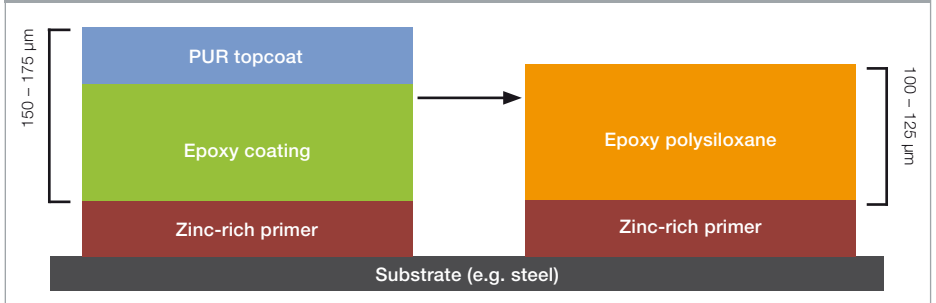
Graphic 1 shows the effect of replacing an organic (cycloaliphatic) amine curing agent with SILRES® HP 2000 in the QUV-B test.

Graphic 2 shows the gloss retention compared to aliphatic PUR coatings in the highly realistic xenon test. After 6,000 h exposure, the epoxy-polysiloxane coating based on SILRES® HP 2000 has a gloss almost 8 times higher than that of a PUR topcoat.

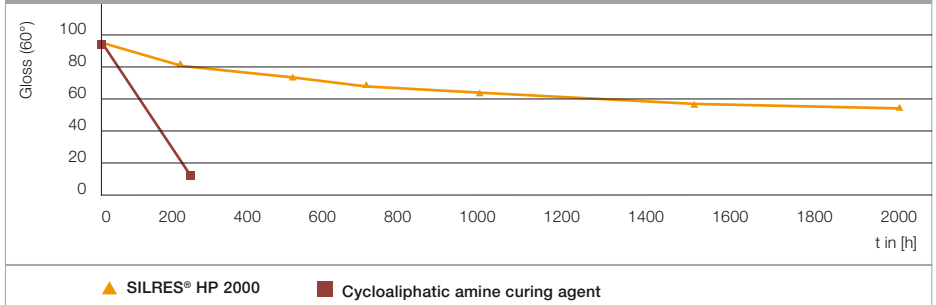
Applications

Silicone-resin-based curing agent for epoxy-polysiloxane coatings applied as corrosion protection to steel structures either as a topcoat or a combined intermediate coat/topcoat.

Figure 2: Two-Coat System

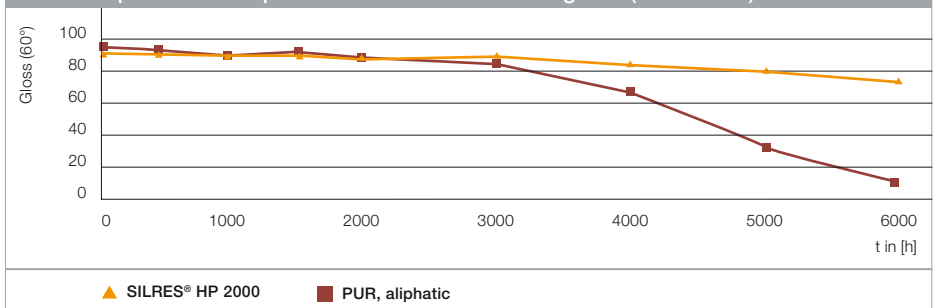


Graphic 1: A Significant Improvement in Gloss Retention in the QUV-B Weathering Test when SILRES® HP 2000 is Used.



QUV-B accelerated weathering test of a white epoxy coating cured with a commercial organic curing agent (reddish-brown curve) or with SILRES® HP 2000 (orange curve)

Graphic 2: Long-Term Gloss-Retention of the Epoxy-Polysiloxane Coating Compared with an Aliphatic PUR Topcoat in the Xenon Weathering Test (Both White)



Almost eight-times better gloss retention after 6,000 h in the xenon test than an aliphatic PUR coating



Wacker Chemie AG, 81737 München, Germany, Tel. +49 89 6279-0, Fax +49 89 6279-1770, info.silicones@wacker.com

The data presented in this information sheet are in accordance with the present state of our knowledge but do not absolve the user from carefully checking all supplies immediately on receipt. We reserve the right to alter product constants within the scope of technical progress or new developments. The recommendations made in this information sheet should be checked by preliminary trials because of conditions during processing over which we have no control, especially where other companies' raw materials are also being used. The information provided by us does not absolve the user from the obligation of investigating the possibility of infringement of third parties' rights and, if necessary, clarifying the position. Recommendations for use do not constitute a warranty, either express or implied, of the fitness or suitability of the product for a particular purpose.