

New Vertical Coating Systems

Fast-Drying High-Solid Systems for the Mechanical Engineering Industry

A new two-component high-solid system, which was developed as part of a project for the mechanical engineering industry, not only lowers VOC emissions, but also significantly reduces the time and the energy needed to dry the coatings

Depending on the size of the paint shop, reducing energy consumption, solvent emissions and throughput times can lead to considerable cost savings. This also brings competitive advantages, such as faster production processes and, therefore, shorter delivery times.

The objective of the development project for the mechanical engineering industry was to reduce significantly the time and energy consumption required to cure a two-component high-solid system. In addition, the new coating had to provide excellent corrosion protection in accordance with the DIN EN ISO 12944 standard, both as a single-layer and a multiple-layer coating with the appropriate primer. Another goal was to guarantee good mechan-

ical properties and a high level of resistance to chemicals, such as hydraulic and gear oils, antifreeze, lubricants, cleaning agents and solvents.

Shortening throughput times with high-solid paint systems

As a result of the project, FreiLacke developed the Efdedur two-component PUR high-solid primer UR1407 and the Efdedur two-component PUR high-solid top coat UR1984. As a result of the system's rapid drying properties, with a layer thickness of 50 to 70 µm, coated parts can be packed after just 60 to 90 minutes drying time at room temperature (20°C to 23°C) and can then be dispatched or subjected to further processing. There is also the option of curing parts in an oven at a maximum

object temperature of 100°C, which reduces the drying time even further. Depending on the application, it is possible to completely dispense with the need for oven drying, which reduces the energy consumption of the process.

Because of its good adhesion, mechanical and chemical resistance and corrosion protection properties, the high-solid top coat UR1984 can be applied as a single layer on many components, with no need for a primer.

If greater corrosion protection or resistance is required, the high-solid primer UR1407 can be applied using the same equipment as the high-solid top coat UR1984.

Both paint systems are chemically fully compatible and can be cross-linked with the same curing agent at the same mixing ratio, which makes quicker and more flexible paint changeovers possible. The coatings can be applied with all the commonly used types of painting systems.

Both the UR1984 and the UR1407 paints are listed and approved by the NSF (National Science Foundation) for indirect contact with foodstuffs. As a result, the two products can be used to coat gears, motors, pumps and machinery components for use in the food industry.

Good adhesion, corrosion protection and chemical resistance

The high-solid top coat UR1984 has very good adhesive properties on a variety of substrates. The high-solid primer UR1407 can be used to further improve adhesion on critical surfaces, such as stainless steel and aluminium.



Global rises in energy prices have resulted in the introduction of measures to improve energy efficiency, including in the mechanical engineering industry. Painting is one of the processes with potential for energy savings.

The high-solid top coat UR1984 is resistant to a variety of chemicals and technical operating materials. When combined with the high-solid primer UR1407 to form a multi-layer coating, its resistance is even higher.

The high level of chemical resistance of the top coat and its ability to adhere to a range of substrates allows it to be used as a single layer coating for internal applications. For outdoor use, where the coating is subjected to greater stresses and must comply with corrosion protection classes C4 and C5 in accordance with DIN EN ISO 12944, it must be combined with the high-solid primer UR1407 or the epoxy resin primer ER1926 to create a multi-layer coating.

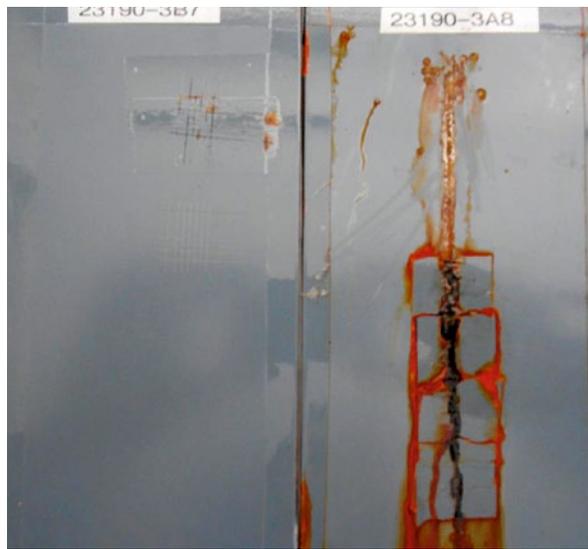
Energy reduction using convective drying

Depending on the process window, it is possible to dry and cure the high-solid UR1984 and UR1407 systems at room temperature, without the use of an oven. If a convection oven is used, the energy requirement correlates with the ambient temperature. The heat losses increase in direct proportion to the curing temperature.

Sample calculations of the required energy consumption using data from the drive system manufacturing sector showed that with an equivalent substrate throughput, but without the use of an oven, drying the parts at room temperature resulted in annual energy savings of around 152,000 euros (compared with drying at 80°C) or around 101,000 euros (compared with

Product range	HS primer UR1407	HS top coat UR1984
Mixing ratio for curing agent HU0936	8:1	8:1
Viscosity on delivery, DIN 4 mm	100 – 110 s	70 – 75 s
Mixed viscosity	40 – 45 s	30 – 35 s
Solids content	78%	76%
Mixed solids content	75%	73.5%
Ready for installation (drying at RT)	approx. 60 min	approx. 90 min
Gloss level	matt	30 – 40 E 60°
Pot life at room temperature (RT)	90 min	90 min

Main technical data for the high-solid systems



Corrosion protection results for the two-layer coating of UR1407 and UR1984 with a total coating thickness of approximately 140 µm after a 720 hour condensation test (left) and 1000 hour salt spray test (right); Substrate: blasted steel (right), Sa 2.5, Rz = 30 µm, creepage: <2 mm, subsurface corrosion: approximately 1 mm, no bubbles on the surface or cut edge

drying at 60°C). Potential applications for the new two-component PUR high-solid coating systems include gears, hydraulic motors, electric motors, pumps, actuators and other components used in drive systems.

In the mechanical engineering industry, the coatings can be used for machine components, sheet metal parts and complete assemblies. Wherever there is a need for VOC-compliant, en-

ergy-efficient, cost-effective and high-quality coatings that can be quickly applied, these paints are the ideal solution. ■

Andreas Morlock

Development and Application of Industrial Coatings,
Tel. +49 7707 151 359, a.morlock@freilacke.de;

Harald Kämpf

Industry Sales, Tel. +49 151 171 17 904, h.kaempf@freilacke.de;
Emil Frei GmbH & Co. KG, Bräunlingen, Germany

Surface Technology – Innovations in plant construction







Surface Technology



Dedusting Technology

Fans

info@rippert.de | www.rippert.de | Phone +49 (0) 52 45 | 9 01-0