SILRES® BS 6042 – SILICONE FOR DRY AND BRIGHT FACADES

Modern facade paints and coatings are formulated to be durable and save energy. The water repellency and breathability of silicone-based coatings contribute to keeping facades dry, providing a better long-term appearance, and reducing the impact of wet facades on the thermal insulation properties.

Drier and Brighter Facades

More and more every day, the building sector is under pressure to implement construction materials that are long-lasting and environmentally friendly at the same time. As per the European Commission, buildings are the single largest energy consumer, accounting for approximately 40% of energy consumption, which corresponds to 36% of CO_2 emissions in the EU. Heating and cooling are the main sources of energy consumption of buildings. The future of facade coatings, as a big portion of the building, is focused on two main aspects: durability and saving energy.

Efflorescence, mold and cracks are some of the defects in facades caused by water that make walls appear old, scruffy and damaged. Water also has an immense impact on thermal conductivity – meaning a reduction in the insulation capacity of a facade with increasing moisture content. In conclusion, wet walls are of big concern for long-lasting and energy-saving facades.

SILRES® BS 6042 is a solvent-free, waterborne emulsion of a modified silicone resin used as a stand-alone silicone in silicone resin emulsion paints and plasters (SREP®). SILRES® BS 6042 has exceptional spreading properties and coats mineral substrates with amazing speed, remaining irreversibly anchored there. SILRES® BS 6042 uniquely combines water repellency and breathability for drier facades and low dirt pick-up.

Properties	Value
Appearance	Milky
Solids content (wt%, approx.)	54
pH at 23 °C	5
Viscosity, dynamic at 23 °C (mPa.s)	3,500

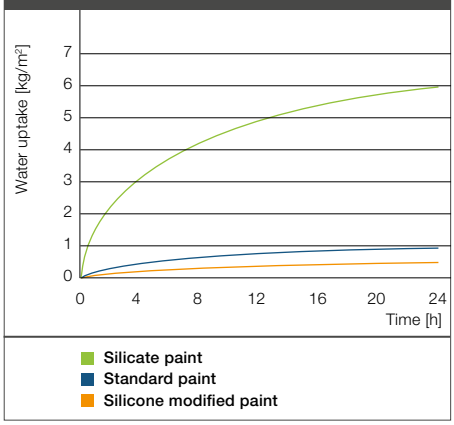
Fast-Drying Facades

What doesn't get wet, doesn't need to dry. Hence, liquid water penetration has to be reduced as much as possible. One way of preventing liquid water from penetrating the facade is to formulate the coating with a medium to low pigment volume concentration (PVC), creating a closed film on top of the facade.
The problem with this approach is that the moisture contained in the substrate, and that coming from indoors, gets trapped inside the wall, preventing the wall from drying quickly and creating some visual defects like efflorescence, mold, algae, blistering, peeling, cracking and damages due to frost/thaw. Another way to a fast-drying facade is formulating the coating with a high PVC. These kind of coatings are porous and allow moisture to easily diffuse through the wall and evaporate. The addition of silicones to this last solution provides protection against liquid water, e.g. from rain, by covering fillers and pigments without closing the gaps between them. In this manner, the coating is effectively hydrophobized to prevent liquid water penetration through the pores and, at the same time, water-vapor diffusion is guaranteed.

Figure 1 shows how a paint that has been modified with a silicone resin provides the lowest water uptake in comparison to a standard and a silicate paint.

SILRES® BS 6042 was developed for high effectiveness. The best class of water uptake as per the EN 1062-3 standard can easily be achieved by adding SILRES® BS 6042 as a stand-alone silicone raw material.

Figure 1: Comparison of Water Uptake of Different Paints after DIN EN 1062-3

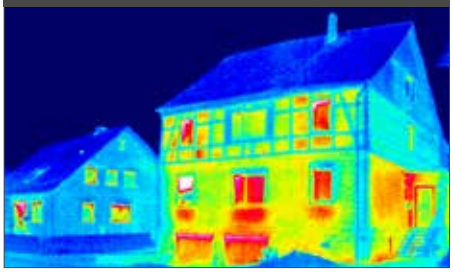


Climate Protection with Energy-Saving Facades

According to the German Energy Agency (Dena), 25% of the total energy loss of a house can be attributed to its facade. It has been proven that suitable facade insulation can achieve energy savings of up to 30% by, for example, minimizing the retention of moisture. The outstanding water repellency of coatings based on SILRES® BS 6042 makes this new development an excellent solution for external thermal insulation composite systems (ETICS).

This performance can be visualized using infrared cameras as shown in Figure 2. Side benefits of a properly insulated facade are more comfortable temperatures of interior wall surfaces (coziness) and a reduction of CO_2 emissions related to the consumption of conventional energy.

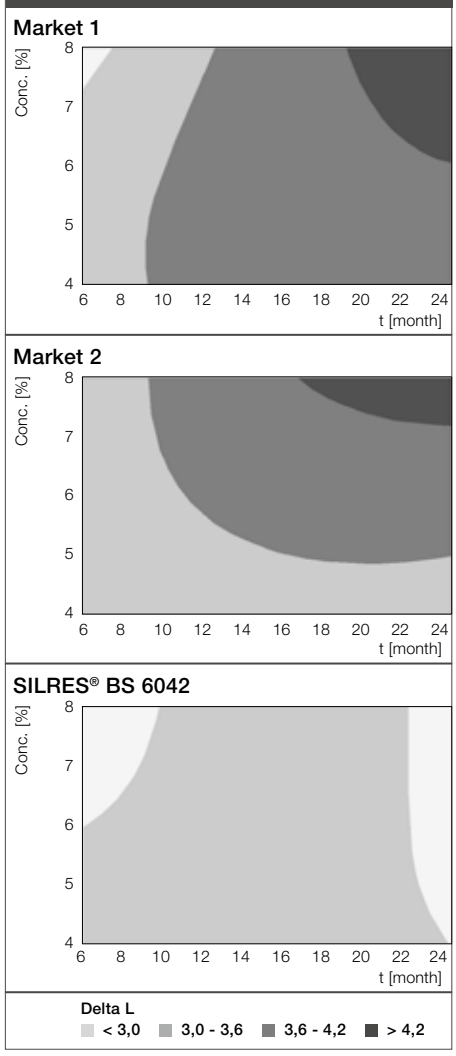
Figure 2: Thermal images of facades: House on the left is well insulated, while the one on the right is not.



Facades Bearing Up Day and Night

The modified silicone resin in SILRES® BS 6042 was specially developed to provide dirt pick-up resistance, making coatings look clean and crisp for a longer period of time. The tackiness of coatings is a key parameter for a long-lasting clean appearance and can be controlled by using this new grade in formulations in the right way. Less tackiness is required, so that dirt and dust will stick less to the surface of the paint. The brightness can be measured with the "L" parameter of the CIE Lab Model and correlates with the dirt pick-up observed on the surface of a coating. Changes in "L" during outdoor exposure of paints based on SILRES® BS 6042 and two other silicone market products were measured and reported in Figure 3. Paints formulated with SILRES® BS 6042 provided the brightest surfaces in time.

Figure 3: Delta L measurements. SILRES® BS 6042 clearly outperforms market products in outdoor exposure at 60 °. The lighter the colour, the cleaner the facade.



SILRES® BS 6042 was optimized in order to provide paints with high resistance to early rain and snail trails, which is relevant when there is gentle rain or dew. Paints and plasters formulated with SILRES® BS 6042 have the appearance of a mineral-based coating, show high hiding power and are highly UV-resistant.

Improved Workability

SILRES® BS 6042 decreases the surface tension of a coating, enhancing its wettability, which makes paints and plasters easier to apply.

Typical Applications	
Silicone resin emulsion paints and plasters – SREP®	●●●
High-PVC paints and plasters for ETICS	●●●
Medium-PVC paints and plasters for ETICS	●●

Suitable ● Recommended ●● Highly recommended ●●●

Benefits

- Facilitate fast-drying facades, avoiding defects caused by water
- Enable facades with a long-lasting bright appearance
- Suitable for eco-label-compliant coatings
- Support energy-saving facades (CO_2 reduction)
- Excellent workability
- Easy to formulate with

SILRES®

Wacker Chemie AG, 81737 Munich, Germany, Phone +49 89 6279-1741
info@wacker.com, www.wacker.com/silres, www.wacker.com/socialmedia

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