SILRES® BS 333 – THE VERSATILE SILICONE ADDITIVE

The future is challenging formulators more and more every day, demanding modern environmentally-friendly coatings that offer high performance combined with low raw material costs.

Performance Booster for Interior Paints

Paint performance can be boosted by incorporating a very small amount of an additive. Additives are thus a good way to achieve an efficient balance between performance and formulation costs. Silicone additives have long enjoyed a good reputation on the market for being high-performance additives for lowering the surface tension of paint formulations in a controlled manner. The additives here are emulsions of reactive and functional polydimethylsiloxanes, and are transparent fluids with strong spreading behavior and hydrophobicity. Their general chemical structure is shown in Figure 1.

SILRES® BS 333 is a nonionic, solvent-free, water-borne emulsion of a reactive polysiloxane. It has been designed to comply with the strictest eco-labels for environmentally-friendly paints and coatings. Long-lasting hydrophobicity and improvements in stain, scratch and dry-burnishing resistance in addition to a soft-touch effect are just some of the properties that can be obtained with SILRES® BS 333. The product acts not only as a surface additive but also improves the workability of the paint, i.e. properties such as open time and leveling.

Long-Lasting Hydrophobicity

This property is crucial for walls located next to windows and doors, where paint is directly exposed to sunlight and moisture. The hydrophobicity of a coating correlates with the contact angle measured between water and coating.
As shown in Figure 2, a clear improvement can be obtained by incorporating just 2% of the silicone additive into a standard commercial paint.

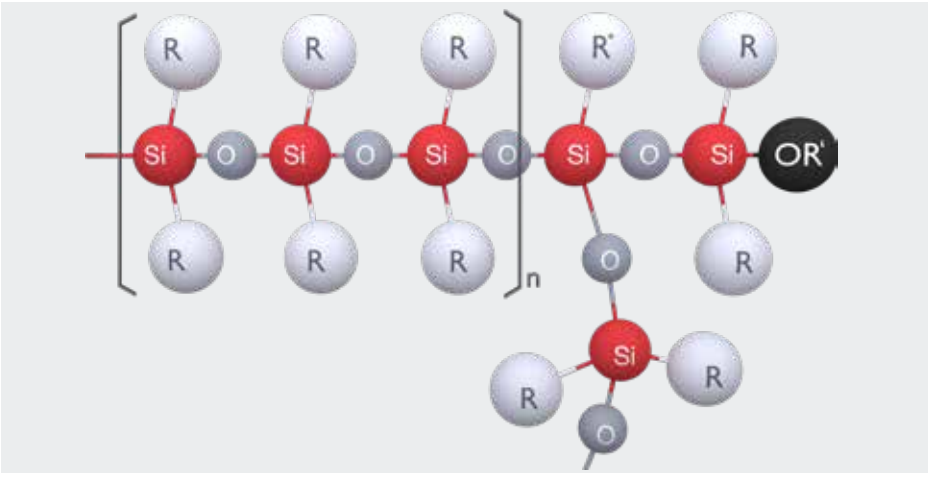
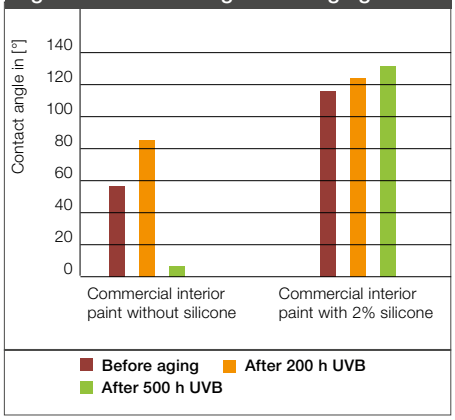


Figure 1: Chemical structure of a silicone additive
Polydimethylsiloxane (left), organic modification (center) and reactive modification (right).

Figure 2: Contact Angle After Aging



Contact angle of paints before and after simulated weathering.

Improved Scratch Resistance

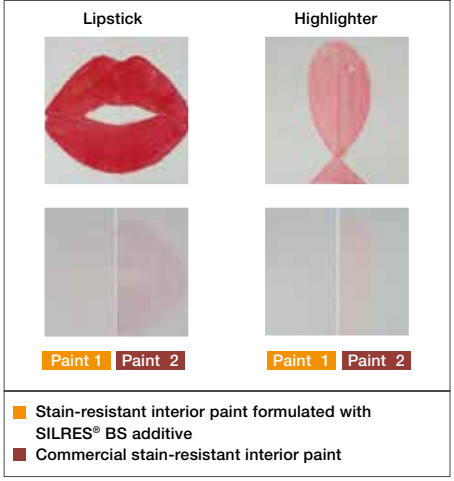
The "writing effect", also known as visible light traces, is often observed on intensely colored coatings. It is caused by minor mechanical impact, e.g. scratching with a fingernail. Scratching displaces pigment particles from the surface and exposes lighter pigment and filler parts, leading to a visibly brighter scratch mark. This is typical of most matt interior paints – especially dark colors. Scratches on paints modified with SILRES® BS 333 are easier to remove. The modified paint needs only 2–3 wipes, while the conventional paint requires 12–15.

Properties	Value
Appearance	Milky
Solids content (wt%, approx.)	50
pH at 25 °C	8 – 9

Enhanced Stain Resistance

SILRES® BS 333 can enhance stain resistance. Laboratories regularly evaluate many different household stains. Figure 3 shows paint panels treated with lipstick and highlighter. These are stains which are often found in children's rooms. The best results were achieved with SILRES® silicone additive.

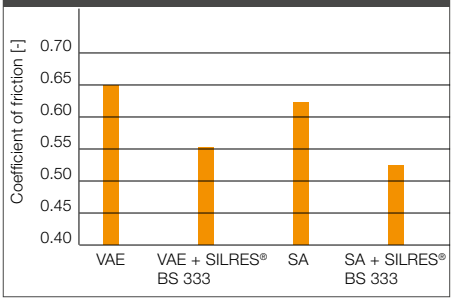
Figure 3: Enhanced Stain Resistance Due to SILRES® BS 333



Soft-Touch Effect

SILRES® BS 333 enhances paint leveling and yields a very smooth coating. Smooth surfaces feel soft to the touch. Surface smoothness is evaluated in the laboratory by determining the coefficient of friction. As shown in Figure 4, SILRES® BS 333 lowers the coefficient of friction of vinyl acetate ethylene (VAE) and styrene acrylic (SA) paints.

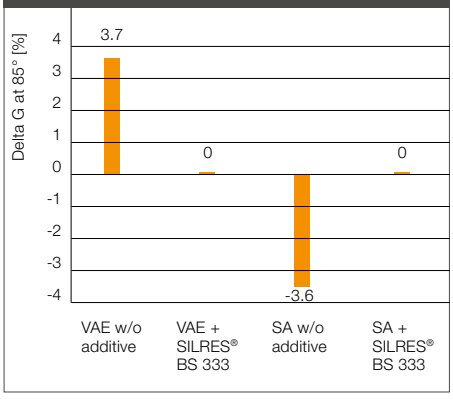
Figure 4: Reduced Coefficient of Friction Due to SILRES® BS 333



Enhanced Dry Burnishing

Dry burnishing is the visual modification of a paint surface that has come into contact with hard materials, e.g. wood or textile furnishings. SILRES® BS 333 reduces the effect by making the paint smoother. Dry burnishing is evaluated in the laboratory by determining delta gloss (before and after treatment of the paint surface). The target value here is "0". As may be seen in Figure 5, SILRES® BS 333 improves the dry burnishing of paints formulated with different binders.

Figure 5: Reduction in Dry Burnishing Due to SILRES® BS 333



Improved Workability

SILRES® BS 333 enhances the wetting and leveling of interior paints and yields a very smooth, even coating. Consequently, applications without visible overlap are possible on surfaces exposed to side light. Due to hydrophobization of the first coat, the open time of the second coat is extended.

Typical Applications	
Matt interior wall paints	●●●
Satin interior wall paints	●●●
Stain-resistant interior paints	●●●
Low-VOC interior paints and plasters	●●●
Lime and silicate interior systems	●●●
Interior plasters	●●

Suitable ● Recommended ●● Highly recommended ●●●

Benefits

- Long-lasting increase in hydrophobicity
- Enhanced stain resistance
- Improved scratch resistance
- Reduced coefficient of friction (soft touch)
- Enhanced dry burnishing
- Improved leveling
- Longer open time
- High alkaline stability

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