Smart and stylish protection

Bluestar Silicones. Delivering Your Potential.

BLUESTAR SILICONES

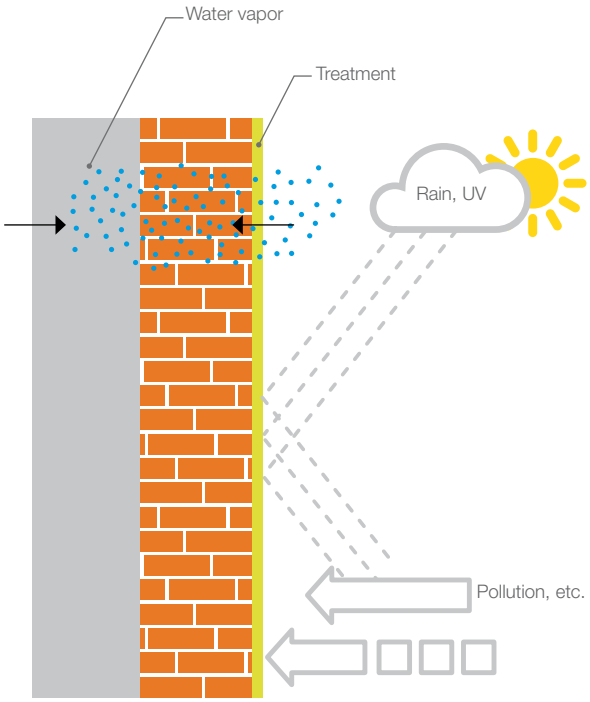
Long lasting protection combined with outstanding beauty thanks to silicones in Bluestar Silicones

Buildings in stone or mineral materials have a porous surface that tends to absorb water while being continuously exposed to weathering and sunlight. To guarantee the durability and beauty of coatings and surfaces over the long term, silicones provide an ideal solution that has been used and improved over the last 40 years.

This long lasting protection is achieved due to two unique properties of silicone resins. First, their outstanding water repellency prevents damage due to moisture, mildew development, loss of thermal insulation, etc. Second, their very high vapor permeability allows the material to breathe and lets water vapor escape to the outside without causing damage. By combining these two unique properties, Bluesil™ products form a barrier that stops liquid water while maintaining the breathability of the surface.

Silicones also have outstanding “UV resistance” as well as resistance to hydrolysis and oxidation: key factors for the long lasting beauty of paints.

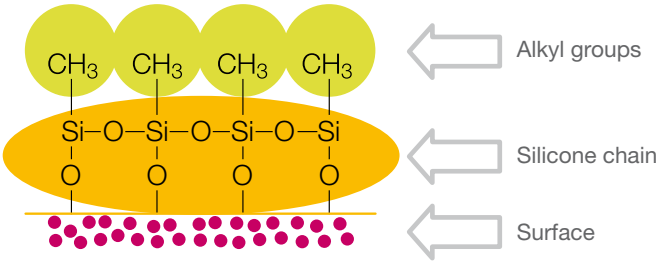
Bluestar Silicones is one of the major integrated players in the silicones sector and has served paint and building products manufacturers for more than 40 years with an extensive, and fully renovated, range of Bluesil™ water repellents, resins and additives. With a dedicated organization for the paints, facade coatings and water repellents sector, Bluestar Silicones is focused on developing innovative solutions that provide customers outstanding performance and optimized use.



Unequalled application properties due to unique chemistry

Silicone resins are molecules with a relatively low molecular weight which form stable, three-dimensional networks whose strong interaction with the surface guarantees outstanding durability.

The diagram opposite shows how we can give a mineral surface organic features by using these properties. The silica part is used as a bonding agent between the surface to be treated and the hydrophobic alkyl groups.



Very high water repellency

Silicones have very high water repellency which is especially stable relative to changes in temperature and climatic conditions. This provides very low water absorption levels over time which offers:

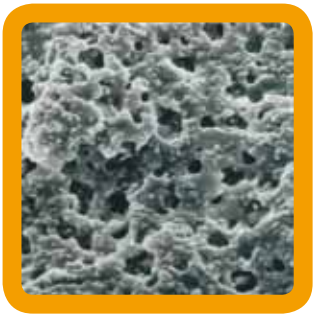
- paints that do not swell and scale
- water repellents that resist the freeze/unfreeze cycle and cracking.

The beading effect is the most visible proof of this property but it may vary in how quickly it appears.

Facades that breathe

Silicones, and particularly resins, have outstanding water vapor permeability. They do not block the surface's micro-porosity when applied to materials and so, whether in paints or water repellents, silicones let facades breathe. Moisture in the material can therefore evaporate from inside to outside resulting in a regular transfer of water and CO_2.

Polymer "dispersion based" film



Polymer "dispersion based" film associated with a silicone resin emulsion 50% - 50%

Long lasting colors

Colored pigments must satisfy extremely high requirements for stability to weathering and light. In siloxane paints, we mainly use mineral pigments that are well integrated in the Si-O-Si backbone structure of the siloxane resin. Due to their outstanding stability to weathering and UV rays, siloxane resins protect pigments from damage and avoid them being washed out by the rain.

Durability and washability

Due to their mineral structure, siloxane resins have very high resistance to humid abrasion and do not become chalky, even after extensive exposure to weathering. This gives them outstanding durability and washability, a highly valued property, especially in indoor paints.

Good value for money and 50% more protection

Only siloxane paints can guarantee long lasting protection against water penetration and keep a facade looking good. Economically, their higher cost compared with conventional paints is easily compensated by their durability which allows the time between renovations to be extended by at least 50%.
Their outstanding protection effectively protects masonry and consequently reduces costs of reconditioning or refurbishing surfaces over the years.
Siloxane paints therefore give better value for the money than conventional products.

Example of a typical paint formula

"Conventional" siloxane paint	
Ingredients	**Weight**
Water	22
Thickeners	0.20
Dispersants	0.40
Antifoam	0.30
TiO_2	12
Filler	44.5
Styrene acrylic binders	10
Coalescence agent	1
Antifoam	0.10
Resin emulsion BP 9800	8
Silicone additive BP 9900	1
Thickener	0.4
Preservative	0.10

Bluesil™ BP silicone resins and additives are used to enhance the water repellency and breathability of many types of facade paints and mineral coatings (rendering, coatings, facade mortars, etc.) either for new constructions or renovations.

Used as co-binders associated with polymer dispersions, resin emulsions represent 5 to 50% of the binder system. Additives provide specific properties, generally added at the end of the compounding at a level of 0.1 to 5% of the ingredients (water repellency, beading effect, etc.).

Bluesil™ Silicone emulsions for decorative paints

	Binders			Additives	
Bluesil™	**BP 9878**	**BP 9800**	**BP 9821**	**BP 9900**	**BP 9705**
Family					
Siloxane emulsions	✓	✓	✓	✓	✓
Properties					
Dry content (%)	43	62	60	55	50
Aqueous/water thinnable	✓	✓	✓	✓	✓
Appearance	Uniform milky white	Uniform milky white	Uniform milky white	Uniform milky white	Uniform milky white
Specific gravity at 25°C	1	1.1	1.1	1.05	1
pH	4	10	10	7	7
Shelf life (months)	12	6	6	12	12
Facade paint applications					
Indoor, outdoor siloxane paints/renderings and coatings					
Co-binder (5-50%)	■■	■■■	■■■		
Additive (0.1-5%)				■■■	■■■
Silicate paints	■■	■■	■■	■■	■■■
Properties					
Water repellency	■■	■■	■■■	■■	■■
Wet scrub resistance	■	■■	■■		
Beading effect				■■■	■■
Dirt pick up resistance	■	■■■	■■	■■	■■■

■ Possible ■■ Suitable ■■■ Ideal

Bluesil™ water repellents for facades

Bluesil™	WR 224	BP 9400	BP 9710	RC 70
Family				
Associated ethyl silicate				✓
Siloxane	✓	✓		
Siloxane emulsions			✓	
Properties				
Active ingredients (%)	69	100	44	70
Thinner	Solvent	Solvent	Water	Solvent
Appearance	Clear slightly yellow	Clear slightly yellow	Uniform milky white	Clear colorless
Specific gravity (at 25°C)	0.98	1	1	0.89
pH	-	-	10	-
Flashpoint °C (closed cup)	30	41	-	40
Shelf life (months) concentrated / diluted	18	12	12/12	12
Applications				
Water repellents for				
Concrete	■■	■■	■■	
Clay bricks	■■■	■■■	■■■	
Limestones	■■■	■■■	■■■	
Sandstone	■■■	■■■	■■■	
Marble	■	■		
Granite	■■	■■	■	
Mineral plasters	■■■	■■■	■■■	
Siliceous bricks	■■■	■■■	■■■	
Rising damp	■■■	■■■		
Consolidation				■■■
Primers	■■■	■■■	■■■	

■ Possible ■■ Suitable ■■■ Ideal

RC 80	RC 90
✓	✓
68	70
Solvent	Solvent
Clear colorless	Clear colorless
0.91	0.92
-	-
27	25
12	12
■■■	
■■■	
■■■	
■■■	
■■■	
■■■	
■■■	
■■■	■■■

- A wide range of water repellents based on different technologies to protect and renovate construction materials and provide an ideal solution for a wide variety of application conditions.
- Used preventively or curatively they help maintain thermal insulation and the visual appearance of materials.
- Our range now includes new environmentally friendly water-based products.

A few examples of projects completed with Bluesil™ H 224 in the past 30 years

Voiron Cathedral	1974
Palace of Monaco	1977
Lyon Auditorium	1977
San Lorenzo Columns (Milan)	1986/1987
Arc de Triomphe (Barcelona)	1990
Facades of the St Trophime Cloister in Arles	1992
Fourvière Basilica (Lyon)	1996
Versailles Castle	1996
Senataurio Palace in Rome	1999
St Thiebaud Thann Collegial	1997/1998
Ars Basilica	2001
Spire of the old Catherinettes convent (Colmar)	2006

Processing, recommendations and tests

Preparing a ready-to-use formula

Products in the Bluesil™ range must be diluted before application. Normally we recommend an active ingredient percentage of between 5 and 8%. The dilution ratio varies between one part of water repellent for 4.5 to 20 parts of diluent, whether water or solvent according to the water repellent used and the surface being treated.

The water repellent performance of the treated materials depends on the quantity applied to the surface. It will only be optimal if a sufficient quantity of Bluesil™ water repellent is applied. The dilution concentration must take account of the absorption capacity of the material and its porosity. Our experts and our distribution network are at your disposal to provide any advice you may need. Once diluted, the solution is stable for at least one year.

Surface preparation

Only vertical surfaces or ones with a steep slope are concerned by this type of treatment. Before application, the surface must be dry. It is therefore necessary to wait 24 hours after the last rainfall before applying. It is also necessary to wait for three days if the surface has previously been cleaned with high pressure water.

The surface to be treated must also be as clean as possible and it is therefore necessary to:

- Brush away any deposit that is not very well attached to the surface (removing surface deposits, dust and scale).
- Fill cracks greater than 3mm wide with sealant or with rendering.
- Wash any stained surfaces.

In all cases, it is essential to avoid cleaning with strongly acidic or basic detergents, as well as those based on cationic surfactants which can seriously damage the surfaces to be treated.

Application methods

- Either by applying to the surface with a flat brush for rough and irregular materials or with a roller, particularly for small surface areas.
- Or by spraying using an air gun with different nozzles adapted to the surface area to be treated.

Recommendations

- Whatever the application method, the product must be applied until the surface of the material is saturated.
- For the majority of materials one single coat is often sufficient. However, for very porous materials, it may be necessary to apply a second coat. This can be applied as soon as the gloss disappears as the first coat dries.
- For information, a solution of one liter Bluesil™ water repellent at a concentration of 8% is generally sufficient to treat a surface area of around 3m². Consumption depends on the type of surface and its porosity. There is a great difference between naturally very dense, low porosity stone (i.e. marble type rocks < 2%) and soft, high porosity limestone > 25% (Tuffeau, St Vaast). In order to obtain realistic values, notably to produce a quote, it is recommended to carry out preliminary application on a test surface of 1 to 2m².

An indication follows of average consumptions most frequently observed on different types of surfaces.

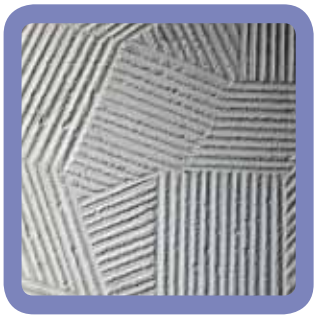
Surfaces	Type	Total Porosity %	Solution l/m²
Mortar	Standardized EN 196	12	0.3-0.6
Tuffeau	Soft limestone	43	2
St Vaast	Soft limestone	41	1.5-2.2
Massangis	Hard limestone	11	0.2
Savonnière	Half-firm limestone	27	0.5
Euville	Firm limestone	14	0.4
Rouffach Sandstone	Firm sandstone	16	0.4
Monks Park	Soft limestone	22	0.5
Leicester Brick	Terracotta	39	0.7
Queinot Brick	Terracotta	25	0.9

Bluesil™ water repellents
for construction materials

Bluesil™	WR 68	EMUL 242	EMUL 872
Family			
Hydrogeno polysiloxane	✓	✓	
Polysiloxane emulsion and/or H siloxane		✓	✓
Siloxane			
Properties			
Water soluble		✓	✓
Solventless	✓	✓	✓
Appearance	Clear	Milky white	Milky white
Active ingredients (%)	100	42	56
Specific gravity at 25°C	1	1	1
Flash point °C (closed cup)	110	-	-
Shelf life (months)	18	9	12
Applications			
Tiles, bricks			
Gypsum board	■■■	■■■	
Mineral fibers			■■■
Fire estinghuiser powders	■■■		
Formulation additives (paints, stains,…)			

■ Possible ■■ Suitable ■■■ Ideal

BP 9400 / WR 224	BP 9705 / BP 9710	BP 9900
	✓	✓
✓		
	✓	✓
	✓	✓
Clear slightly yellow	Milky white	Milky white
100 / 69	50 / 44	55
0.98	1	1.05
30	-	-
18	12	12
■■	■■■	■■
	■■■	■■■
■■■	■■■	■■■



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