



Topic: **Water Repellent silicone**

Ref: REF: TT/ APR 2014/ WK 4

Content:

How silicone water repellents work:

Silicone water repellents or waterproofing agents generally come in two forms:

1. **Elastomeric polydimethylsiloxanes** - Elastomeric coatings that adhere to the substrate and cure to form a flexible, protective membrane.
2. **Penetrating water-repellent chemicals** - Reactive silanes and siloxane resins with cross linkable side chains. These materials have smaller molecular structures, which enable them to penetrate deeply into the substrate, where they chemically bond with it.

Either of these materials can be delivered via solvent or aqueous emulsion.

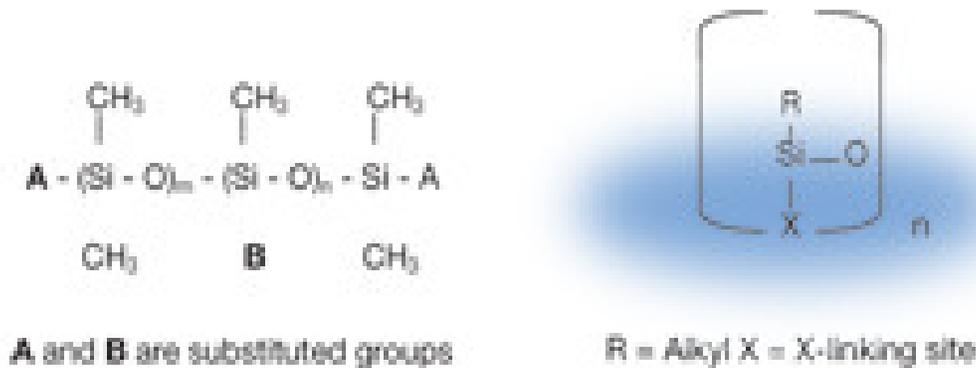


Fig 1: Penetrating Water Repellent



Functional Groups for Penetrating Water Repellents

Group	Position	Reactive	Function
Alkyl	A or B	No	Water repellency
Amino	A or B	No	Catalytic
Alkoxy	A or B	Yes	Crosslinking
Hydroxyl	A	Yes	Crosslinking
Hydrogen	B	Yes	Crosslinking

The mechanics of waterproofing:

Silicones have low surface tension, which enables them to spread and soak easily into a substrate's pores.

Their highly flexible and mobile siloxane backbone enables the water-repelling methyl groups to orient themselves toward the surface, creating a waterproof "umbrella."

What makes this "umbrella" unique is its ability to breathe. Because silicones have a very open molecular structure, water vapor trapped in the substrate can easily slip through. Water molecules, however, are too large to enter



Fig 2



Silicone benefits for water repellency and waterproofing

- High spreading and wetting capabilities - the ability to thoroughly cover a surface or penetrate a porous substrate
- Permeability to gas and water vapor
- Resistance to ultraviolet light (UV), heat, and oxidative degeneration
- Durability, flexibility, and mechanical and chemical adhesion

Typical silicone water repellent and waterproofing applications:

- Water-repellent treatments for leather
- Waterproof elastomeric coatings for industrial and fashion textiles
- Integral additives or surface treatments for building materials
- Waterproof elastomeric coatings for roofs, masonry, and other construction applications
- Additives to improve the wash-off resistance of beauty and personal care products
- Water-repellent additives for paints, inks, and protective coatings

Reference: <http://www.dowcorning.com/content/discover/discoverchem/si-repellents.aspx?e=How+Silicones+Work>

“Happy Week ahead”