Hydrophobic fumed silica AEROSIL® R 972 offers a perfect combination of thickening efficiency, reinforcement and storage stability in moisture sensitive silicone sealant formulations.

AEROSIL® fumed silica such as hydrophilic AEROSIL® 150 is used as a thickening and reinforcing thixotropic filler in silicone sealants. These hydrophilic fumed silica products have freely accessible silanol groups (Si-OH) on their surface causing moisture absorption from environment. However, moisture absorption reduces the shelf-life of the silicone sealants, especially of moisture sensitive neutral alkoxy formulations. Hydrophobization with DDS eliminates the silanol groups and turns the hydrophilic surface of the fumed silica to hydrophobic, for example in AEROSIL® R 972.

Since the moisture adsorption is significantly reduced, AEROSIL® R 972 is the optimum silica product for long shelf-life of moisture sensitive silicone sealant formulations (see Figure 1).

Figure 1  Shelf-life in alkoxy silicone sealants
At first glance, hydrophilic and hydrophobic fumed silica are identical—both are fine white powders. The fundamental difference becomes clear, when they are dispersed in water: while hydrophilic products are completely wetted by water, hydrophobic products do not mix with water at all and remain floating on its surface. This water-repellent behavior is caused by the organic groups anchored at the surface of the fumed silica.

AEROSIL® R 972 is a fumed silica aftertreated with DDS (dimethyldichlorosilane). An impressive example of the altered surface properties is the absorption of moisture (see Figure 2).

Thanks to the nonpolar surface of AEROSIL® R 972 compared with hydrophilic AEROSIL® 150 (a product with no surface treatment), the moisture absorption is significantly reduced.

Figure 2 Moisture uptake at room temperature