Silicones for Urethane Resin Modification

X-12-1056ES and X-12-1172ES Protected Functional Group Type

The functional groups of these silane coupling agents are protected. This means they can be added at the same time to systems that would otherwise be too reactive, and this enables use of a one-component product where a two-component product would have been necessary.

■ Chemical structure

●X-12-1056ES

●X-12-1172ES

■ Features and benefits

Features	Benefits
Protected functional groups	Improved stability of the formulation (Epoxy, acrylic, isocyanate)
Hydrolyzable silyl groups	Adhesion improvement
Protected mercapto groups (X-12-1056ES)	Odor improvement

■Change in viscosity when mixed with isocyanate compounds

● Viscosity measurement result

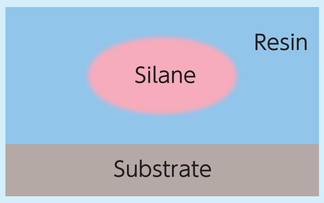
Condition \ Product name	No additive	X-12-1056ES	X-12-1172ES	KBM-803
Initial mPa·s	222	**139**	**174**	119
After 50℃ ×1 week mPa·s	223	**176**	**380**	2,070

(Not specified values)

■Model for improving stability in resin

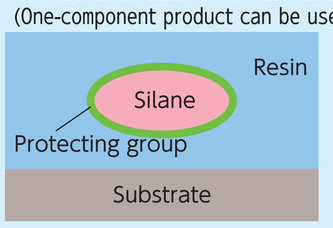
Conventional grade

Reaction starts immediately after product is added to resin.



Protected functional group type

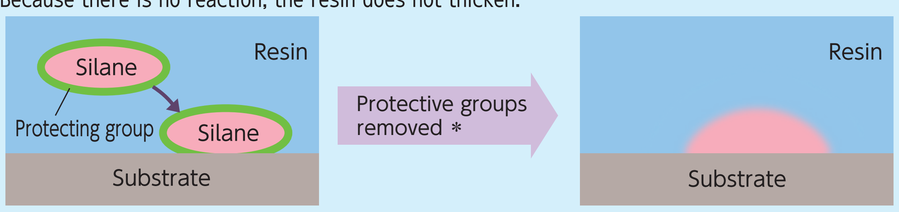
Functional groups are protected. Product does not react after addition to resin and stability is high. (One-component product can be used.)



■Image of further improvement in adhesion

Functional groups are protected and migrate to interface with substrate. Because there is no reaction, the resin does not thicken.

Many reaction sites contribute to adhesion.

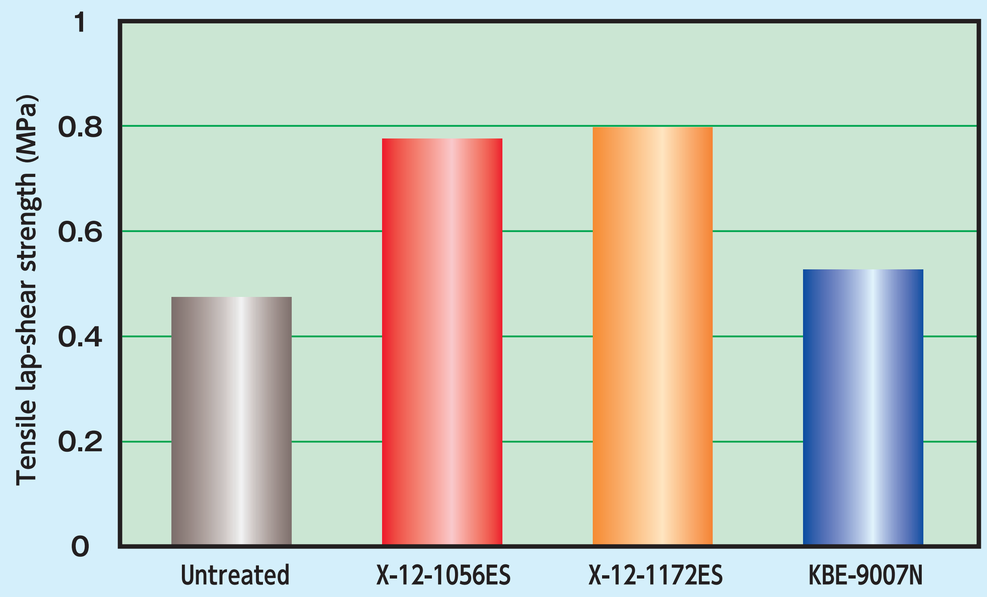


＊The protective groups are removed by water or moisture, then the reaction begins.

■ Application of urethane adhesive

Substrate : Glass

●Tensile lap-shear strength test result of urethane adhesive

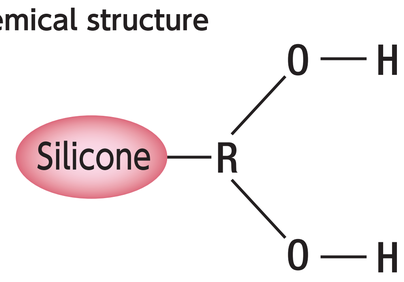


X-22-176DX and KF-6001 Modified Silicone Fluids

Graft copolymerization and block copolymerization give the following properties.

●X-22-176DX

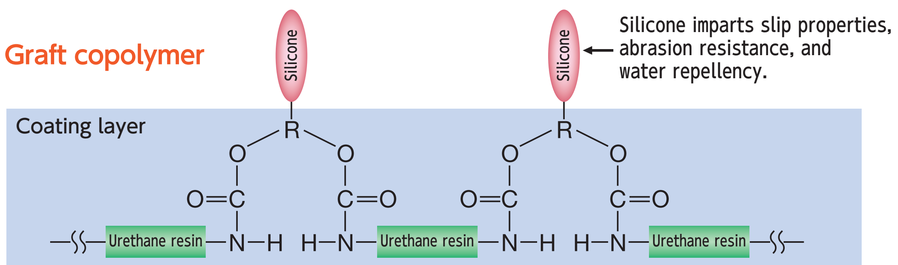
■ Chemical structure



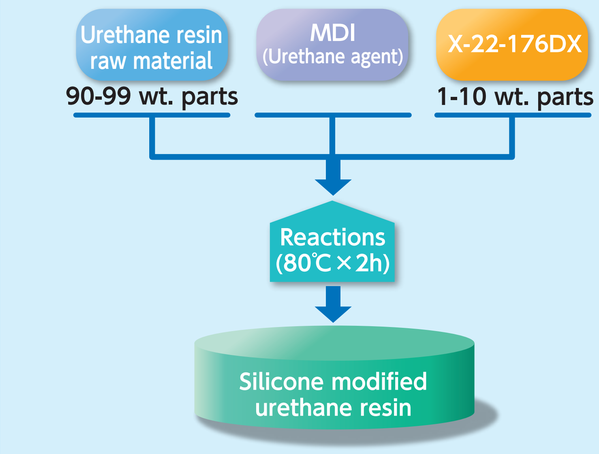
■ Features and benefits

Features	Benefits
Single-end type	Imparting water repellency, slip properties and abrasion resistance

Graft copolymer



■ Modification example with single-end diol fluids



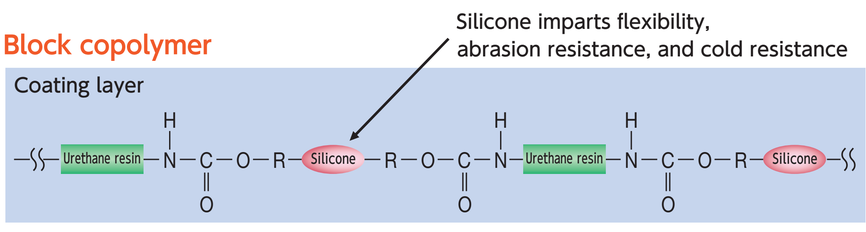
●KF-6001

■ Chemical structure

■ Features and benefits

Features	Benefits
Dual-end type	Imparting flexibility, abrasion resistance, and cold resistance

Block copolymer



■ Modification example with dual-end carbinol fluids