Primers for ELASTOSIL® RTV-2 Silicone Rubber

Characteristics

Primers used for ELASTOSIL® RTV-2 silicone rubbers are low-viscosity liquids containing reactive silanes or silicone resins. After the solvent has evaporated, a rigid filmof resin is formed on exposure to atmospheric moisture at room temperature or elevated temperatures. This resin film has to perform two functions: to adhere both to the substrate and to the coating of RTV-2 silicone rubber.

Application

One of the most remarkable features of RTV-2 silicone rubber is its outstanding release properties. For this reason it is used as a mold-making material for casting plaster, waxes, polyester, epoxy and polyurethane rubbers, metal alloys etc. Special measures are therefore required for bonding RTV-2 silicone resin to other materials; coating the surface of the substrate with selected adhesion promoters, primers, has proved particularly effective.

The resin film can be bonded to the substrate by mechanical anchoring or by chemical reaction with the substrate surface. In principle, the substrate must be a rigid material that is not deformed in use since the primer film may be destroyed by expansion or compression. Therefore a primer generally cannot be used on elastic and flexible substrates.

With absorbent materials (e. g. plaster) or plastics that are swelled by solvents, the primer may penetrate into the surface. In such cases, the mechanical anchoring of the film is critical for the ultimate bonding strength. This mechanical anchoring can usually be promoted by roughening smooth surfaces.
For priming metals or glass, chemical reactions with the oxide layer or the silicate structure play a significant role.

On the other hand, certain thermoplastics such as polyethylene and polypropylene remain completely unaffected by common primers; their surface therefore has to be oxidized by flame treatment. Adhesion to tetrafluoroethylene (e. g. Teflon®) can only be achieved by etching its surface with an alkali metal.

RTV-2 silicone rubbers will only form a permanent bond with the primer coating if the resin film is able to react chemically with the functional groups of the rubber while curing. If drying times become too long, the primer coating may lose its adhesive strength.

Therefore it is imperative to strictly observe the processing instructions for the respective primer.

With condensation-curing RTV-2 rubbers, bonding to the primer coating can be influenced by cure rate and catalyst amount, for which the following rule of thumb applies: the more slowly the rubber is cured, the more likely it is to form a firm bond with the primer coating.

Thin rubber layers have large exposed surface areas, so that evaporation of a substantial part of the catalyst cannot be prevented. In such cases it is advisable to increase the catalyst amount, and preferably to use a grade with lower activity.

With addition-curing RTV-2 rubbers it has been found that curing at elevated temperatures (e. g. at 100 °C) usually results in better adhesion than at room temperature.

Additional heat treatment (at 70 - 150 °C) of the cured rubber may improve adhesion of both condensation and addition-curing grades.

Product data

Property	Unit	G 718	G 790	G 795	FD
Color		Yellow-red	Yellowish	Yellowish	Colorless
Solids content, approx.	[%]	10	17	18	40
Density, approx.	[g/cm^3]	0.82	0.76	0.79	0.92
Solvents		Acetone and toluene	Aliphatic hydrocarbon	Aliphatic and naphtenic hydrocarbon	Acetone and toluene
Flash point	[°C]	-18	+9	+25	-18
Ignition temperature	[°C]	540	420	240	540

These figures are only intended as a guide and should not be used in preparing specifications.

Even if the adhesion is poor at first, a perfect bond may still be achieved after several days' ageing at room temperature.

If the rubber/substrate bond is to be subjected to high stresses (e. g. high temperatures, steam), preliminary tests should be carried out to check whether it will withstand these conditions.

Surface films that have been applied to a substrate during its manufacture and may be difficult to remove (e. g. mold release agents) have a significant effect on the adhesion strength. It is therefore only possible to give general guidelines here. The adhesion strength should be tested in each case.

Grades

There is no "universal primer" suitable for every kind of application. To make a proper choice between the primer grades mentioned below, both the kind of substrate and the grade of RTV-2 silicone rubber should be considered.

- **Primer G718**

  This primer is recommended especially for condensation-curing RTV-2 silicone rubbers.

- **Primer G790**

  This primer is mainly recommended for addition curing RTV-2 rubbers.

  Primer G790, undiluted:

  If the primer is applied undiluted, it is advisable to subsequently heat-treat the substrate. A heating time of 15 minutes at 100 °C is recommended.

  Primer G790, diluted 1 : 1 with white spirit:

  To achieve good adhesion, it is often sufficient to allow the solvent to evaporate and to cure the primer in air at room temperature for 30 minutes. Heating is then no longer necessary.

- **Primer G 795**

  This primer is mainly recommended for addition curing RTV-2 rubbers. Especially for those used in pad-printing applications.

- **Primer FD**

  This primer is recommended for condensation curing RTV-2 silicone rubbers to achieve adhesion to absorbent surfaces such as plaster or wood.

- **Additional primers**

  Our technical department will be pleased to advise you on special adhesion problems.

Processing

Surfaces to be primed should be dry and free from grease, oil or other contaminants. White spirit and / or acetone may be used for cleaning the surface. Loose particles must be removed and very smooth surfaces should preferably be roughened. The primer is best applied with a brush, although dipping and spraying are also possible. In any case, the primer film should be applied as thinly as possible and be free of air bubbles.

With absorbent surfaces, it may be necessary to apply several coats of primer. The instructions concerning the drying time for each primer should be strictly observed.

Drying time is 1 hour at room temperature (minimum 40 % relative humidity) or 10 minutes at 120 - 150 °C.

The catalyzed silicone rubber should be applied to the primer coat, immediately after the drying process, if possible, but at the latest after five hours as otherwise a certain loss of adhesion may occur.

Storage

Primers for ELASTOSIL® RTV-2 silicone rubber should be stored between 5 °C and 25 °C in the tightly closed original container, protected against moisture. The 'Best use before end' date of each batch appears on the product label.

Storage beyond the date specified on the label does not necessarily mean that the product is no longer usable. In this case however, the properties required for the intended use must be checked for quality assurance reasons.

Additional information

The recommended primers for various substrates and ELASTOSIL® RTV-2 silicone rubber grades are shown in the table below.

Substrate surface

Group	Absorbent	Applications	Non-absorbent	Applications
Condensation-curing	Primer FD	1 - 2	Primer G 790 / Primer G 718	1
Addition-curing	Primer G 790 / Primer G 795	2 - 3	Primer G 790 / Primer G 795	1

These recommendations are given without warranty.

Safety information

Since all primers contain flammable solvents, appropriate precautions must be taken.

Detailed safety information is contained in each Material Safety Data Sheet, which can be obtained from our sales offices.

The management system has been certified according to DIN EN ISO 9001 and DIN EN ISO 14001
The Business Unit Elastomers of the Division Silicones is ISO/TS 16949 certified.

Version 3.00 from 10-06-05 replaces Version 2.00 from 11-03-04

For technical, quality, or product safety questions, please contact:

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