

Dow Corning® Brand Primers, Prime Coats, and Adhesion Promoters

Enhancing Adhesion of Silicones

Primers, prime coats, and adhesion promoters offer a variety of benefits to users. Robust adhesion maximizes reliability and offers protection across a wider range of environmental conditions. The range of device design options may be expanded by enabling adhesion or providing lower temperature adhesion to a wider variety of substrate materials. Low-temperature or room-temperature adhesion may also reduce energy or capital costs or increase manufacturing flexibility. Direct material costs may also be reduced when adhesion enhancers enable use of primerless silicones.

Many silicones are designed to adhere well to a wide variety of substrates, but some silicone products and some surfaces require adhesion enhancement to achieve adequate bond strength. Surface treatments to improve adhesion can range from simple cleaning to more complex etching, and may require the application of reactive silane coupling agents to achieve optimal bonding.

Dow Corning® brand primers, prime coats, and adhesion promoters are dilute solutions of silane coupling agents and other active ingredients. The surface reactive components typically must be applied in a very thin layer for best bonding. The solvents used in these products serve to deliver the active ingredients in a thin, uniform coating, enhance surface cleaning, and, in some cases, aid in the penetration of the active ingredients into the bonding surface.

SURFACE PREPARATION

The active ingredients must thoroughly wet-out and coat the bonding surfaces. Mild abrasion, solvent cleaning, plasma, corona discharge, and other pre-treatments have been used to clean and enhance surface reactivity to bonding. In general, light surface abrasion is recommended whenever possible, because it promotes good cleaning and increases the surface area for bonding. Surfaces should be cleaned and/or degreased with Dow Corning® brand OS Fluids, naphtha, mineral spirits, methyl ethyl ketone (MEK), or other suitable solvents that will remove oils and other contaminants that may be present. A final surface wipe with acetone or IPA may also be helpful.

Primers, Prime Coats, and Adhesion Promoters

Type

Dilute solutions of silane coupling agents and other active ingredients

Physical Form

Liquid

Special Properties

Enhance the adhesion and bonding of silicones to a variety of substrates

Different cleaning techniques may give better results than others. Users should determine the best technique for their applications. For especially difficult-to-bond-to surfaces, it may be necessary to increase the surface reactivity by chemical etchants or oxidizers, or by exposing the surface to UV, corona, plasma, or flame sources. Allow solvents to completely evaporate before applying the primer.

APPLICATION

These products should be applied in a very light, even coat by wiping, dipping, or spraying. Excess material should be wiped off to avoid over-application, which generally appears as a white, chalky surface. When dip or spray coating, diluting by a factor of 2 to 4 with additional solvent may avoid excessive build-up.

CURE CONDITIONS

These products require moisture in the air to cure, and are generally cured at room temperature and in a range of 20 to 90 percent relative humidity for 1 to 2 hours. Low humidity and/or low temperature conditions require longer cure times. Mild heat acceleration of the cure rate may be possible but temperatures above 60°C (140°F) are not recommended. During application, the carrier solvent typically evaporates quickly, allowing the active ingredients to begin to react with atmospheric moisture and bonding surfaces. For optimal bonding, different cure times may be required for different temperature and humidity conditions. Users should determine the best cure schedule and conditions for their applications.

The desired silicone elastomer should be applied after the primer, prime coat, or adhesion promoter has fully cured.

PRIMER SELECTION GUIDE

Specification Writers: Please contact your local Dow Corning sales office or your Global Dow Corning Connection before writing specifications on these products.

Dow Corning® brand Primer or Adhesion Promoter	Special Properties	Substrates	Compatible Silicones
<i>Dow Corning®</i> P5200 Adhesion Promoter – Clear	The most versatile of all Dow Corning primers for the widest range of silicones and electronics applications. This clear primer is similar to <i>Dow Corning®</i> 1200 OS Primer but supplied in an organic solvent rather than low-VOC silicone diluent. It enhances the adhesion of many RTV and heat-cure silicones to a wide variety of surfaces. Not registered for use in European Union.	Wide variety of surfaces including FR-4, ceramics, and many metals and plastics	All
<i>Dow Corning®</i> 1200 OS Primer Clear	The most versatile of all Dow Corning primers for the widest range of silicone types and electronics applications. This clear primer is supplied in a low-VOC diluent for lower environmental impact and exhibits low odor for convenient handling. It enhances the adhesion of many RTV and heat-cure silicones to a variety of surfaces. This primer is very similar to <i>Dow Corning</i> P5200 Adhesion Promoter and is registered for use in the European Union.	Wide variety of surfaces including FR-4, ceramics, and many metals and plastics	All
<i>Dow Corning®</i> P5204 Adhesion Promoter	This clear primer is supplied in a low-VOC diluent for lower environmental impact and exhibits low odor for convenient use. It is specially formulated to enhance adhesion of many moisture-cure RTV silicones to a wide variety of surfaces. Recommended for FR-4, ceramics, metals.	Wide variety of surfaces including FR-4, ceramics, and metals. Not recommended for plastics.	All
<i>Dow Corning®</i> 1201 RTV Prime Coat	This transparent primer with yellow tint is supplied in a mixture of acetone and toluene solvents. It is specifically formulated to enhance the adhesion of <i>Dow Corning®</i> 3110 and 3120 RTV Silicone Rubber to a wide variety of surfaces, especially FR-4 and metals.	Wide variety of surfaces, especially FR-4 and metals	<i>Dow Corning®</i> 3110, 3112, 3120 RTV Silicone Rubber
<i>Dow Corning®</i> 1205 Prime Coat	Specially formulated to increase adhesion of a wide range of silicones to plastics including more difficult types such as acrylic and polycarbonate. This clear primer is supplied in a mixture of organic solvents.	Most plastics, ceramics, and composites	Not recommended for use with addition-cure silicones such as <i>Sylgard®</i> 170, 184, 186 Silicone Elastomer Kit, etc.
<i>Dow Corning®</i> 92-023 Primer	Specially formulated for use with addition-cure silicones to mitigate surface cure poisoning. This clear primer is diluted in heptane solvent and enhances the adhesion of many addition-cure silicones to a wide variety of surfaces.	FR-4, most metals, and ceramics	Non-pigmented, two-part addition-cure silicones

APPLYING ADHESIVE

Keeping the primed surface clean may allow application of the silicone elastomer to be delayed, but in some cases lower adhesion can result if too much time elapses; users are encouraged to determine the optimal cure conditions for their specific applications and the effects of any hold times imposed between applications of the primer and elastomer. In some cases it may be recommended to reprime surfaces if 8 to 24 hours elapse before the silicone elastomer can be applied.

STORAGE AND SHELF LIFE

Shelf life is indicated by the “Use By” date found on the product label. For best results, *Dow Corning* primers, prime coats, and adhesion promoters should be stored below 32°C (90°F). Special precautions must be taken to prevent moisture from contacting these materials before use. Containers should be kept tightly closed and head or air space minimized. Partially filled containers should be purged with dry air or other gases such as nitrogen to maximize shelf life. Small amounts for immediate use should be poured into clean, dry containers and discarded when finished.

Material should not be used once it takes on a milky appearance or a large amount of white precipitate is observed, indicating moisture contamination. Repeated opening of the container can cause a small amount of white precipitate to form inside the container cap area, which does not affect the bulk material.

PACKAGING

In general, *Dow Corning* primers, prime coats, and adhesion promoters are supplied in nominal 1-gallon (3.8-L) and 13.5-fl oz (400-mL) or 1-pint (473-mL) containers, net volume. Not all products may be available in all packages and some additional packages may be available for certain products.

LIMITATIONS

These products are neither tested nor represented as suitable for medical or pharmaceutical uses.

TYPICAL PROPERTIES

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Dow Corning® brand Primer or Adhesion Promoter	Color	Solvent	Shelf Life from Date of Manufacture, months	Flash Point,¹ °C (°F)	Volatile Organic Content (VOC)², grams/liter
<i>Dow Corning®</i> P5200 Adhesion Promoter – Clear	Clear	OS-20 ³	18	31 (87)	77/517
<i>Dow Corning®</i> 1200 OS Primer Clear	Clear	OS-20 ³	18	27 (81)	76/508
<i>Dow Corning®</i> P5204 Adhesion Promoter	Clear	OS-20 ³	12	14 (57)	234/668
<i>Dow Corning®</i> 1201 RTV Prime Coat	Light yellow	Acetone/toluene	12	-20 (-4) ⁴	137/461
<i>Dow Corning®</i> 1205 Prime Coat	Clear	Mixture	12	13 (55)	862
<i>Dow Corning®</i> 92-023 Primer	Clear	Heptane	18	-13 (9)	681

¹Closed cup, tested to Dow Corning Corporate Test Method 0917, based on ASTM D 3278.

²The lower VOC value is for states and air quality management districts that have recognized the solvent as VOC exempt.

³*Dow Corning®* OS-20 is a 1-cSt ozone-safe volatile methylsiloxane fluid.

⁴Flash point of *Dow Corning®* 1201 RTV Prime Coat is tested based on a closed cup measurement method.

SAFE HANDLING INFORMATION

PRODUCT SAFETY INFORMATION REQUIRED FOR SAFE USE IS NOT INCLUDED IN THIS DOCUMENT. BEFORE HANDLING, READ PRODUCT AND MATERIAL SAFETY DATA SHEETS AND CONTAINER LABELS FOR SAFE USE, PHYSICAL AND HEALTH HAZARD INFORMATION. THE MATERIAL SAFETY DATA SHEET IS AVAILABLE ON THE DOW CORNING WEBSITE AT WWW.DOWCORNING.COM, OR FROM YOUR DOW CORNING REPRESENTATIVE, OR DISTRIBUTOR, OR BY CALLING YOUR GLOBAL DOW CORNING CONNECTION.

HEALTH AND ENVIRONMENTAL INFORMATION

To support customers in their product safety needs, Dow Corning has an extensive Product Stewardship organization and a team of Product Safety and Regulatory Compliance (PS&RC) specialists available in each area.

For further information, please see our website, www.dowcorning.com, or consult your local Dow Corning representative.

LIMITED WARRANTY INFORMATION – PLEASE READ CAREFULLY

The information contained herein is offered in good faith and is believed to be accurate. However, because conditions and methods of use of our products are beyond our control, this information should not be used in substitution for customer's tests to ensure that Dow Corning's products are safe, effective, and fully satisfactory for the intended end use. Suggestions of use shall not be taken as inducements to infringe any patent.

Dow Corning's sole warranty is that the product will meet the Dow Corning sales specifications in effect at the time of shipment. Your exclusive remedy for breach of such warranty is limited to refund of purchase price or replacement of any product shown to be other than as warranted.

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Solutions

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