



MOUNTING ADHESIVES

Technical Bulletin A9

Aremco's Crystalbond™ mounting adhesives are ideal for temporarily mounting a range of materials that require dicing, polishing, and other machining processes. These mounting adhesives exhibit good bond strength and adhere readily to ceramics, glass, metals, and quartz. When processing is complete, these adhesives are removed by re-heating and cleaning with a suitable solvent.

PRODUCT HIGHLIGHTS

Crystalbond™ 509

Mid-range melting point of 165 °F (74 °C). Provides excellent adhesion and minimizes clogging of diamond tools when compared to many waxes. Transparent in thin cross-sections. Soluble in acetone or Aremco's proprietary **Crystalbond™ 509-S Stripper**, a low odor, non-flammable, biodegradable, water-rinsible solvent. Available in three standard colors and both round sticks and rectangular bars:

Crystalbond™ 509-1A	Light Amber	Round Stick, 7/8" Dia × 7"
Crystalbond™ 509-1B	Light Amber	Rectangular Bar, 5/8" × 1" × 7"
Crystalbond™ 509-2A	Dark Amber	Round Stick, 7/8" Dia × 7"
Crystalbond™ 509-2B	Dark Amber	Rectangular Bar, 5/8" × 1" × 7"
Crystalbond™ 509-3A	Clear Turquoise	Round Stick, 7/8" Dia × 7"
Crystalbond™ 509-3B	Clear Turquoise	Rectangular Bar, 5/8" × 1" × 7"

Crystalbond™ 555

Low melting point of 120 °F (49 °C).

Crystalbond™ 555-HMP

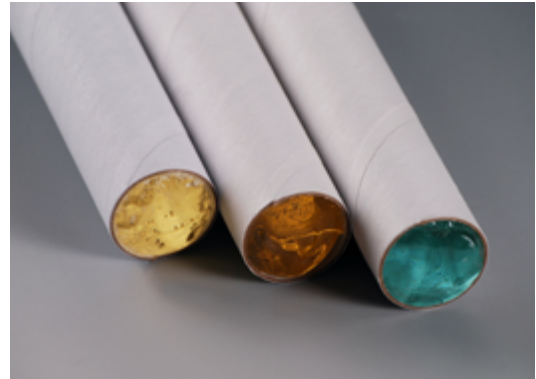
Mid-range melting point of 150 °F (66 °C).

Use 555 and 555-HMP for low stress machining processes, dry plasma etching or silicon wafers, de-paneling copper plated Teflon boards, and dicing ceramic green tape. Transparent in thin cross-sections and soluble in hot water. Available in rectangular bars, 5/8" × 1" × 7".

Crystalbond™ 590

High melting point of 300 °F (150 °C). High strength, flexible adhesive, ideal for dicing high aspect ratios. Soluble in isopropyl alcohol or Aremco's proprietary **Crystalbond™ 590-S Stripper**, a water-dispersible, environmentally safe powder concentrate. Available in two standard forms:

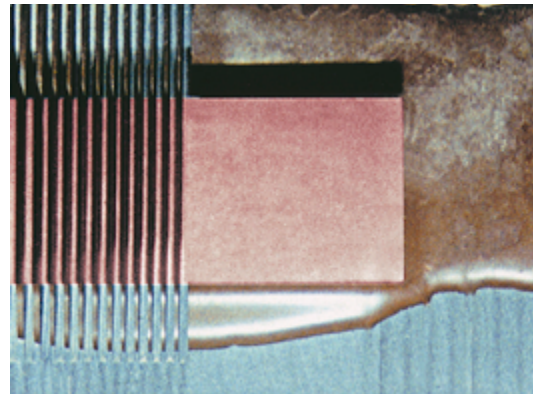
Crystalbond™ 590-STK	Rectangular Stick, 5/8" × 1" × 7"
Crystalbond™ 590-PDR	Granular Powder



Crystalbond™ 509-1A, 509-2A, 509-3A



Crystalbond™ 555-HMP



Crystalbond™ 590 bonds Boron Carbide ceramic diced into 25–50 mil sections.

TYPICAL APPLICATIONS

- Machining advanced ceramics
- Lapping and polishing optical components
- Dicing ceramic substrates
- Dicing semiconductor wafers
- Dicing ferrites, glasses and piezoelectrics
- Dicing metal and optical single crystals
- Mounting cross-sections for SEM
- Backfilling components for support
- Dry plasma etching





CRYSTALBOND™ PRODUCT SPECIFICATIONS

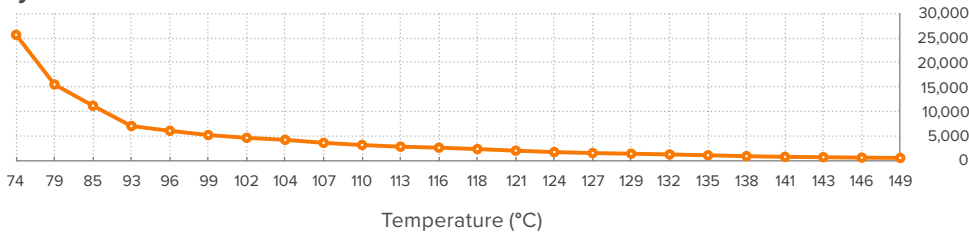
Part Number	509	555	555-HMP	590
Flow Point, °F (°C)	165 (74)	120 (49)	150 (66)	300 (150)
Tensile Strength, psi	1,160 ¹	220	335	950 ²
Solvent	509-S or Acetone	Hot Water	Hot Water	590-S or Isopropanol
Available Colors	509-1 Light Amber 509-2 Dark Amber 509-3 Clear-Turquoise	White	White	Brown
Available Forms	Stick, 7/8" Dia x 7" Stick, 5/8" x 1" x 7"	Stick, 1/2" x 1" x 7"	Stick, 1/2" x 1" x 7"	590-PDR Powder 590-STK 5/8" x 1" x 7"
Weight	0.20 Lbs/Stick	0.15 Lbs/Stick	0.15 Lbs/Stick	0.50 Lbs/Stick

Reference Notes

¹ Crystalbond™ 509 tensile strength measured using a solution of 60 parts 509 and 40 parts Acetone by weight.
² Crystalbond™ 590 tensile strength measured using a solution of 36 parts 590 and 64 parts Isopropanol by weight.

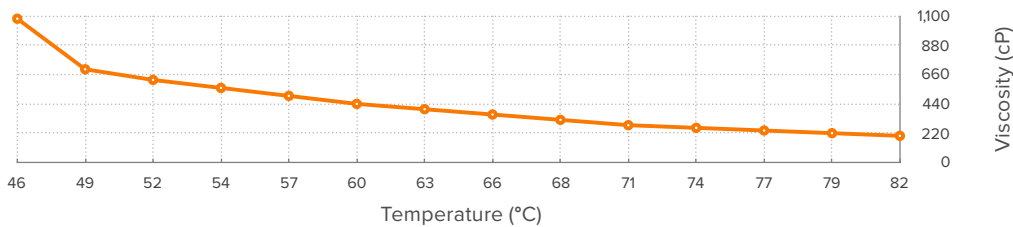
CRYSTALBOND™ — VISCOSITY VS. TEMPERATURE

Crystalbond™ 509



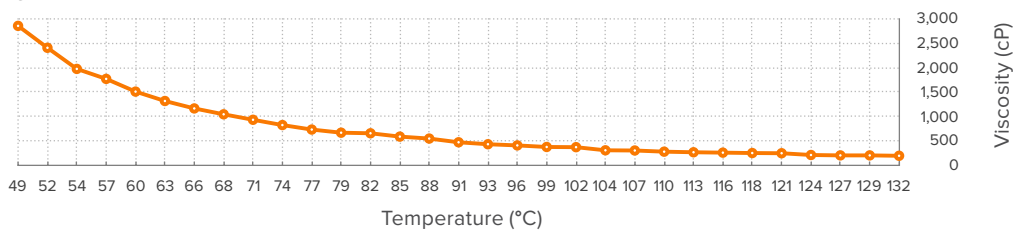
#2 Spindle
 @12 RPM used for viscosity < 2,500 cP,
 @6 RPM for viscosity 2,500–5,000 cP,
 @3 RPM for viscosity 5,000–7,500 cP,
 @1.5 RPM for viscosity 7,500–15,500 cP,
 @1 RPM for viscosity 15,500–26,000 cP.

Crystalbond™ 555



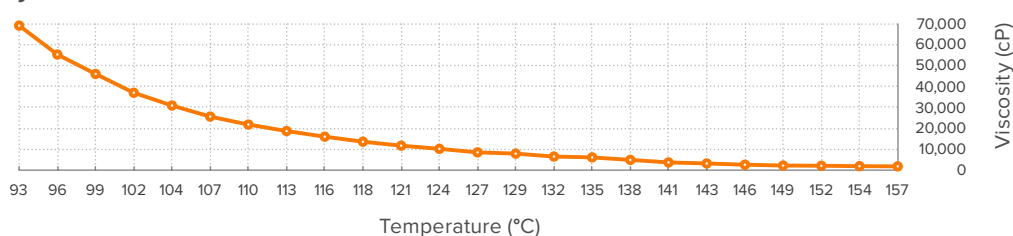
#3 Spindle
 @6 RPM used for viscosity < 1,100 cP.

Crystalbond™ 555-HMP



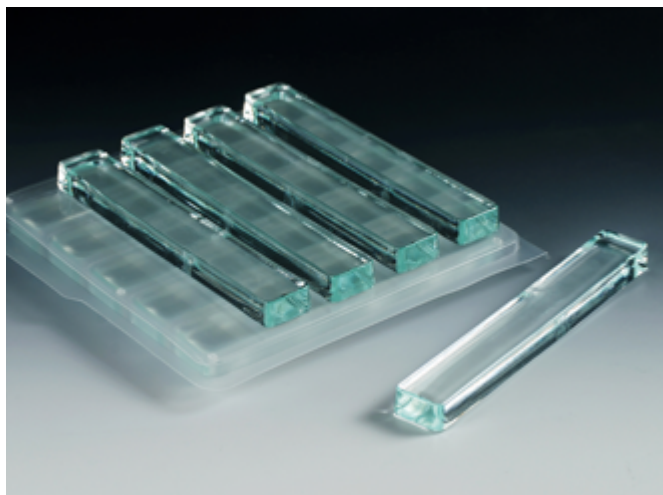
#3 Spindle
 @30 RPM used for viscosity < 3,000 cP.

Crystalbond™ 590



#4 Spindle
 @6 RPM used for viscosity < 55,500 cP,
 @3 RPM for viscosity 55,500–70,000 cP.





Crystalbond™ 509-3B



Crystalbond™ 590

APPLICATION PROCEDURES

Crystalbond™ Adhesives | General Procedure

- 1) Using a hot plate or oven, heat a ceramic or glass mounting block to the flow temperature of the selected adhesive. Make sure to work in a well-ventilated area, and do not overshoot the flow temperature, otherwise, the adhesive will begin to decompose and polymerize, causing a reduction in strength.
- 2) Apply a uniform layer of adhesive to the heated mounting plate and place the substrate over the adhesive. Using a weight, apply even pressure to the substrate to remove air bubbles and to ensure that the substrate is parallel to the plate. Apply a fillet of the adhesive around the perimeter of the substrate to increase the holding strength.
- 3) Remove the mounting plate from the heat source and allow it to cool slowly to room temperature until the adhesive is hardened. Cool for 20–30 minutes before processing.
- 4) Process the substrate as required, then remove the parts by re-heating the mounting block to the flow temperature. Use a tool to remove the substrate from the mounting plate and follow Cleaning section.

Crystalbond™ 509 | Liquid Procedure

- 1) This adhesive can be applied in a thin, uniform film by dissolving and spin-coating, spraying or brushing onto the substrate. Simply crush the adhesive stick into a powder and mix with acetone in a ratio of 80 parts acetone to 20 parts 509 by weight.
- 2) Spin-coat, spray or brush the solution onto the parts and allow solvent to evaporate for a minimum of 5 minutes. A heat gun can be used to accelerate the evaporation rate.
- 3) Press parts together and heat to ~165 °F for 10–15 minutes, then cool to room temperature before processing.

Crystalbond™ 590-PDR | Liquid Procedure

- 1) Blend approximately 65 parts isopropyl alcohol and 35 parts 590-PDR powder by weight. Stir contents regularly to prevent settling of solids.
- 2) Apply a thin film of the mixture to both substrates to be bonded and evaporate solvents naturally or using an oven at ~250 °F for ~10 minutes. Remove from oven and allow to cool.
- 3) Clamp parts together and place in oven at 300 °F for ~30 minutes. Remove parts and allow to cool to room temperature before processing.





OPTIONAL CLEANING AGENTS

Crystalbond™ 509-S Stripper

This is a high performance, environmentally safe, non-ionic cleaning agent developed specifically for removing Crystalbond 509 and other polymer coatings and inorganic particulates.

Features

- Low Evaporation Rate
- Rinses with Water
- Non-Flammable
- Non-Reactive with Metals
- Biodegradable

Usage

509-S works best with an ultrasonic system at 120–140 °F (50–60 °C). The evaporation rate is much slower than acetone so a good lifecycle will be achieved in comparison. Replace 20% of the stripper with new material as adhesive residue begins to concentrate. Refer to process diagram for a suggested cleaning procedure.

Rinsing

A stepwise, warm rinsing process is recommended after removing the adhesive. Rinse in a dilute, non-ionic surfactant or liquid detergent system, followed by a final rinse in deionized water to eliminate water spots due to hard salts and contaminant re-deposition.

Compatibility

This cleaner is non-reactive with metals; however, it will react with many types of polymers and plastics such as elastomers and rubbers. Contact Aremco with any questions about compatibility.

Handling and Storage

This cleaner is readily biodegradable and non-toxic to marine life. The use of gloves and goggles is recommended. Respiratory protection or ventilation is recommended under normal handling. When heated, vapors should be ventilated from the work space. Keep container tightly closed and store in a cool, dry, well ventilated area or cabinet. Isolate from incompatibles such as corrosives, oxidizers, or strong reducing agents.

Crystalbond™ 590-S Stripper

This is an environmentally safe, water dispersible, powder concentrate prepared primarily for use with Crystalbond 590 and other mounting waxes. It can also be used to remove silicones, greases, oils, soils, finishing compounds, and normal contaminants.

Features

- Water Soluble
- Non-Reactive with Metals
- Biodegradable
- Non-Flammable

Usage

Add 6–8 ounces (170–225g) of 590-S powder concentrate to each gallon of water and allow to dissolve completely. Heat solution to 120–160 °F (50–70 °C) and immerse parts for a minimum of 5 minutes until the wax dissolves. Use an ultrasonic system for best results. Replace 20% of the stripper with new material as adhesive residue begins to concentrate in the stripper. Refer to process diagram for a suggested cleaning procedure.

Rinsing

A stepwise, warm rinsing process is recommended after removing the adhesive. Rinse in a dilute, non-ionic surfactant or liquid detergent system, followed by a final rinse in deionized water to eliminate water spots due to hard salts and contaminant re-deposition.

Compatibility

This stripper is non-reactive with ceramics, glass and metals such as brass, copper, iron, and silicon. It is reactive with strong acids.

Handling and Storage

This stripper is biodegradable and inert. It is a caustic material, so gloves and eye goggles should be used for personal protection. Keep container tightly closed and store in a cool, dry, well ventilated area or cabinet. Isolate from incompatibles such as strong acids.

Suggested Process Diagram For Cleaning

