



LAMINATING
EPOXY

ADHESIVES

ADHESIVES

PROCESS
EQUIPMENT



- Bonds fiber-reinforced composites, wood, steel, aluminum, concrete. Fast, medium and slow cure speeds meet all your assembly needs.
- Unique gap-filling gel flows like a liquid and stands like a solid. Spreads easily and wets the surface, but will not run or sag.
- Dual-cartridge system provides fast “point and shoot” application automatically measures and mixes resin and hardener.
- Yellow resin and blue hardener blend to green, assuring the two components are thoroughly mixed.

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PRO-SET® Adhesives

PRO-SET Adhesives are pre-thickened, two-part epoxy adhesives formulated for secondary bonding of laminated composites as well as steel, aluminum, cast iron, concrete, stone, and most wood species. PRO-SET Adhesives will bond these materials, to themselves, or to one another in any combination. This versatility fits the requirements of the marine and composites industries, as well as the architectural, transportation, and civil engineering fields.

175 Resin with 273 (fast), 275 (medium) or 277 (slow) Hardener is a cost effective, excellent multipurpose adhesive for this wide range of materials. The three hardener cure speeds serve a range of assembly operations.

176 Resin/276 Hardener combination is a highly toughened version of the adhesive for bonding heavily loaded composite structures and where high peel strength is required. These applications include bonding aluminum sail track to carbon masts, bonding prefabricated composite goosenecks or spreader roots to carbon masts, and bonding prefabricated components into pre-preg structures. This combination works well on difficult to bond to materials like pre-preg composites, SMC, metals and most plastics.

Resins and hardeners are thixotropic pastes. The mixture easily fills gaps and will not sag on vertical surfaces. The material aggressively wets out the substrate, making priming or pre-wetting unnecessary on most surfaces, while ensuring a good bond. PRO-SET Adhesives are available in a 15.2 fl. oz. (450 ml) two-cartridge system, and in two bulk container sizes.

SURFACE PREPARATION

Surfaces must be free of contaminants. Solvent wash if necessary before abrading the surface. Sandblast or grind metal or stone surfaces, and bond them as soon as possible. Aluminum surfaces should also be treated with a chemical etch solution and conversion coating to prevent oxidation and promote bonding.

Sand wood and FRP or composite surfaces with 80 grit sandpaper. Remove any dust after sanding. If peel ply is used during fabrication of the part, test the surface for proper surface profile and adhesion. Refer to the PRO-SET Handling Guide for detailed information.

MIXING

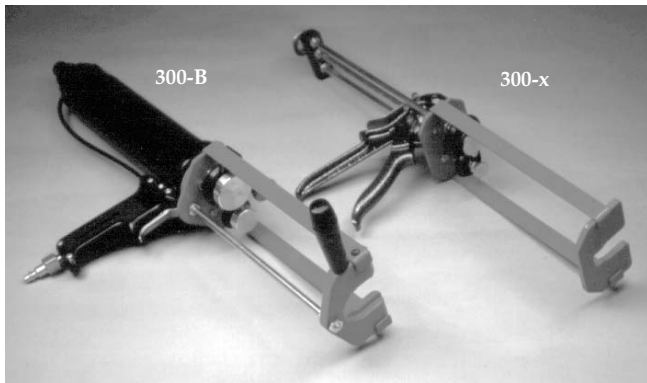
The two-cartridge system provides accurate and convenient dispensing of the adhesive. Manual or air-powered PRO-SET dispensing guns force resin and hardener through the static mixing wand and makes application of a uniform bead of mixed adhesive quick and easy. As the resin and hardener pass through the wand, the yellow-tinted resin and blue-tinted hardener combine to create a green mixture that visually indicates the two components are thoroughly blended. Small batches can also be dispensed without the mixing wand attached. Dispense the amount you need into a cup or onto a palette and use a flat mixing stick to blend the Resin and Hardener to a uniform green mixture.

When mixing bulk batches, measure 2 parts Resin with 1 part Hardener by volume (2.20:1 by weight) into a clean polyethylene pot or cup. A flat palette also works well. Stir the resin and hardener mixture thoroughly. The (yellow and blue makes green) color change helps to assure thorough mixing. Avoid blending air into the mixture. Air powered bulk dispensing systems are available to dispense and mix the adhesive in a production environment. This equipment eliminates air introduction that occurs with hand mixing.

PRO-SET® Adhesive Dispensing Guns

300-X Manual Dispensing Gun

The manually operated, two-component dispenser is used with PRO-SET Adhesive cartridge sets to apply adhesive quickly, cleanly and accurately. The handle and trigger are die cast aluminum and shaped for comfortable operation. A 26:1 trigger ratio dispenses the high-viscosity adhesive with ease and the gun's heavy-duty construction assures precise adhesive application and long operating life.



300-B Pneumatic Dispensing Gun

The air-powered, two-component dispenser is used with PRO-SET Adhesive cartridge sets to apply adhesive in production assembly operations. The trigger controls 484 lb. of thrust for easy and precise adhesive application. Power is supplied by a standard shop air compressor.

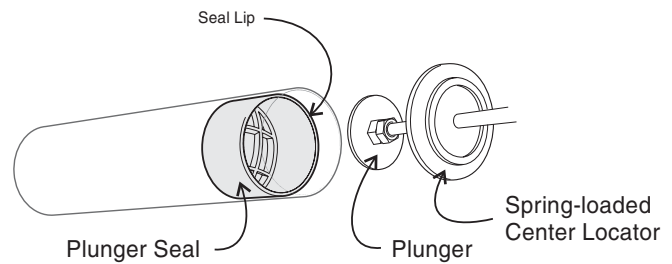
300-MW Mixing Wands

Static mixing wands attach to the adhesive set cartridges to thoroughly blend resin and hardener components as they are dispensed. Tip can be trimmed to apply the appropriate sized bead of adhesive mixture. One wand is supplied with each adhesive cartridge set.



DISPENSING

1. Place the cartridge set in the gun—push the back of the cartridges against the spring-loaded center locator, and drop the front of the cartridge set into the vertical slot at the head of the gun. Push the plungers in to contact the back of the plunger seals inside the cartridge barrels. Be sure the plungers are seated against the centers of the seals and not caught on the seal lip.



2. Remove the locknut and plugs from the cartridge spouts. Equalize the level of resin and hardener in the cartridges by squeezing the trigger until a small amount of both resin and hardener are dispensed. This assures that the first adhesive through the mixing wand will be at the correct ratio. Mix the waste resin and hardener, and dispose of it after it has cured.

3. Place the mixing wand over the spouts and secure it with the locknut. Cut the tip for the appropriate sized bead.

4. Dispense the adhesive as needed. Properly mixed adhesive will be a consistent green color (a mixture of yellow and blue). Dispense adhesive at 60°F or above to assure the proper mix ratio. Refer to the Adhesive cartridge labels or the Technical Data information on page 4 for cure times and additional information.

APPLICATION

Apply the mixed adhesive to one or both mating surfaces of the joint. Use enough adhesive to ensure complete filling of any gaps along the joint. Spread the mixture evenly over surfaces, and join the pieces with moderate clamp pressure. Some squeeze-out of the adhesive is desired. Allow the adhesive to cure thoroughly before stressing the joint.

COVERAGE

One cartridge set dispenses approximately 47 ft of ¼" bead, or 17 ft of ½" bead.

One cartridge set will cover approximately 7 sq ft when spread with a ⅛" × ⅛" notched spreader, or 12 sq ft with a ¼" × ¼" notched spreader.

PRO-SET® Adhesive Technical Data

The gel and cure times are affected by ambient temperature and epoxy mass, or glue line thickness. Curing data is based on 72°F (22°C) ambient temperature. Warmer temperatures and a larger mass will increase cure speed, reducing cure time. Cure time is reduced by approximately one half with every 18°F (10°C) increase in temperature. A smaller mass or cooler temperature will reduce the cure speed. Always dispense adhesive at 60° F or above to assure the proper mix ratio.

HANDLING CHARACTERISTICS	175/273	175/275	175/277	176/276
Mix ratio (Resin:Hardener by weight)	2.12:1	2.2:1	2.29:1	2.42:1
Mix ratio (Resin:Hardener by volume)	2.0:1	2.0:1	2.0:1	2.0:1
Mixed Density (lb/gal)	9.4	9.7	9.5	9.2
Pot life of 100g @ 72°F ASTM D-2471	10 min	30 min	51 min	30 min
Working time (1/2" bead)	20 min	75 min	150 min	90 min
Clamps off cure time (1/16" bond line)	3 hr	8 hr	16 hr	10 hr
Minimum cure temperature	45° F*	60° F	65° F	60° F

*Although 175/273 will cure at temperatures as low as 45° F, keep cartridges at 60°F or above when dispensing.

CURED CHARACTERISTICS

Tensile Strength (psi) ASTM D-638	6,249	7,255	7,069	5,084
Tensile Elongation (%) ASTM D-638	4.2	4.2	4.4	4.3
Tensile Modulus (x10 ⁵ psi) ASTM D-638	3.80	4.20	4.20	2.9
Flexural Strength (psi) ASTM D-790	11,119	11,914	12,108	9,069
Flexural Modulus (x10 ⁵ psi) ASTM D-790	3.70	4.10	4.0	2.7
Hardness (Shore D) 1 day ASTM D-2240	78	74	71	73
2 weeks ASTM D-2240	82	82	84	73
Compression Yield (psi) 2 weeks ASTM D-695	10,720	11,927	11,806	8,495
Onset of Tg by DSC	122°F	126°F	127°F	129°F
Heat Deflection Temperature ASTM D-648	113°F	120°F	123°F	118°F
Izod Impact, notched (ft-lb/in) ASTM D-256	0.952	1.131	1.19	1.46
Lap Shear (psi) A-366 steel ASTM D-1002-72	2,280	2,330	1,982	2,880
Lap Shear (psi) 2024T aluminum ASTM D-1002-72	1,828	1,987	1,975	2,864
Tensile Adhesion (psi) A-366 steel ASTM D-4541	2,545	2,829	2,584	4,296
Tensile Adhesion (psi) aluminum ASTM D-4541	1,422	1,756	1,715	3,415

*Typical values, not to be construed as specification
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For additional information or safety data contact:

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