

### Features & Benefits

- Excellent adhesive strength
- Rapid cure at low temperature
- Easy to use – no mixing required
- High shear and peel strength
- High temperature resistance

### Biocompatibility

ISO 10993-5 Cytotoxicity

### Description

PERMABOND® 4ES70 is a single-part epoxy adhesive designed for needle bonding. It is ideal for bonding medical plastics thanks to its rapid, low-temperature cure.

### Physical Properties of Uncured Adhesive

Chemical composition	Epoxy Resin
Appearance	Ivory
Viscosity @ 25°C	20rpm: 17,000 mPa.s (cP) 2rpm: 40,000 mPa.s (cP)
Specific gravity	1.15

### Typical Curing Properties

Flow at high temperature	Free flow
Maximum gap fill	0.1 mm 0.004 in
Cure speed (oven) *	115° C (240°F): 20 minutes
Cure speed (induction)	<3 minutes

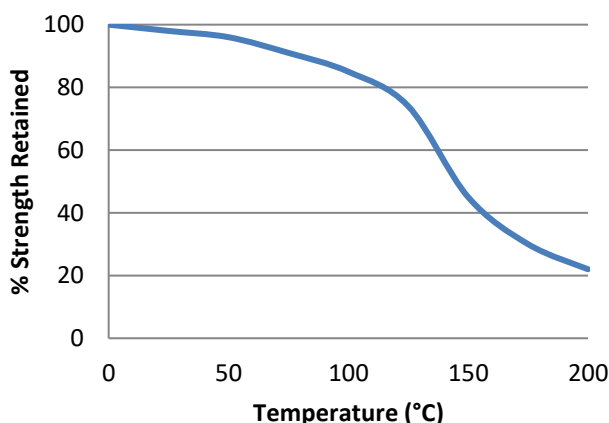
\*Actual cure times will depend on the time it takes for the adhesive to reach this temperature - for example, large assemblies or a crowded oven will require longer to reach full cure. Alternative, quicker methods of curing include induction, hotplates, infrared lamps and hot-air guns.

### Typical Performance of Cured Adhesive

Needle pull out strength* ISO 7864	150-200 N
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\*Strength results will vary depending on the level of surface preparation and gap.

### Hot Strength



“Hot strength” shear strength tests performed on mild steel. Fully cured then conditioned to pull temperature for 30 minutes before testing.

4ES70 can withstand higher temperatures for brief periods (such as for paint baking and wave soldering processes) providing the joint is not unduly stressed. The minimum temperature the cured adhesive can be exposed to is -40°C (-40°F) depending on the materials being bonded.

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## Surface Preparation

Surfaces should be clean, dry and grease-free before applying the adhesive. Use a suitable solvent (such as acetone or isopropanol) for the degreasing of surfaces. Some metals such as aluminium, copper and its alloys will benefit from light abrasion with emery cloth (or similar), to remove the oxide layer.

## Directions for Use

- 1) The adhesive should be dispensed from the bottle via the nozzle supplied (this can be cut to give the appropriate sized bead to cover the bond area).
- 2) Apply the adhesive to one surface and avoid entrapping air.
- 3) Assemble parts applying sufficient pressure to ensure the adhesive spreads to cover the entire bond area.
- 4) Use a jig / clamp to prevent parts moving during cure.
- 5) It is advisable not to disturb the joint until the adhesive is fully cured.
- 6) Cure with heat – see page one for cure schedule.

### Video Links

Surface preparation:

<https://youtu.be/8CMOMP7hXjU>



Single-part epoxy directions for use:

[https://youtu.be/\\_KupaieuuZw](https://youtu.be/_KupaieuuZw)



## Additional Information

This product is not recommended for use in contact with strong oxidizing materials.

Information regarding the safe handling of this material may be obtained from the safety data sheet (SDS).

Users are reminded that all materials, whether innocuous or not, should be handled in accordance with the principles of good industrial hygiene.

**This Technical Datasheet (TDS) offers guideline information and does not constitute a specification.**

## Storage & Handling

Storage Temperature	2 to 7°C (35 to 45°F)
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Permabond 4ES70

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