

# Technical data sheet



Product: 5401

Manufacturer: PERMABOND ENGINEERING ADHESIVES

Product group: KLEBSTOFF

Article group: 2-K KLEBSTOFF

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## PERMABOND® ET5401

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### Features & Benefits

- Adhesion to a wide variety of substrates
- Full cure at room temperature
- Easy to apply
- High shear and peel strength
- Good impact strength
- High temperature resistance
- Non-drip rheology

### Description

PERMABOND® ET5401 is a two-part, 2:1 mixable, semi-flexible toughened no slump epoxy adhesive with good adhesion to a variety of substrates such as wood, metal, ceramics and some plastics and composites. Permabond ET5401 forms tough bonds providing high peel resistance and high shear strength coupled with excellent resistance to high temperatures.

ET5401 performance is enhanced by curing at high temperature or being exposed to high temperature (such as during paint-stoving).

### Physical Properties of Uncured Adhesive

	ET5401A	ET5401B
Chemical composition	Epoxy Resin	Polyamine Hardener
Appearance	White	Black
Viscosity @ 25°C	20rpm: 60,000-120,000 mPa.s (cP) 2.5rpm: 250,000-450,000 mPa.s (cP)	20rpm: 50,000-100,000 mPa.s (cP) 2.5rpm: 150,000-250,000 mPa.s (cP)
Specific gravity	1.2	1.1

### Typical Curing Properties

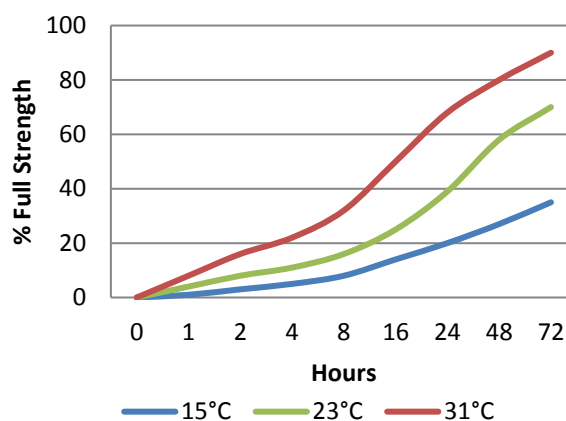
Mix ratio by volume	2:1
Maximum gap fill	5 mm 0.2 in
Usable / pot life @23°C	10-12 mins
Handling time @23°C (to 1 N/mm²)	60-90 mins
Working strength @23°C	24-48 hours
Full cure @23°C	4-7 days

### Typical Performance of Cured Adhesive

Shear strength (grit blasted mild steel)* ISO 4587 Cured 25°C for 7 days	10-15 N/mm² (1450-2200 psi)
Shear strength ISO 4587 Cured 80°C for 1 hour	Mild steel 20-30 N/mm² (2900-4400 psi) Aluminium 20-25 N/mm² (2900-3600 psi) FRP Glass Polyester: 6-8 N/mm² (900-1200psi) FRP Glass Epoxy: 19-23 N/mm² (2800-3300psi) Carbon Fibre: 22-24 N/mm² (3200-3500psi)
Peel Strength (aluminium)* Cured 80°C for 1 hour	140-160 N/25mm (31-35 PIW)
Peel Strength (aluminium)* Cured 200°C for 15 mins	250-300 N/25mm (55-66 PIW)
Hardness (ISO868)	65-75 Shore D (cured at 25°C) 75-85 Shore D (cured for 1hr at 80°C)
Elongation at break (ISO37)	4-8%
Glass transition temperature Tg	Heat cured: 110°C (230°F) Room temp. cure: 50°C (122°F)
Dielectric strength	15-25 kV/ mm

\*Strength results will vary depending on the level of surface preparation and gap.

### Strength Development

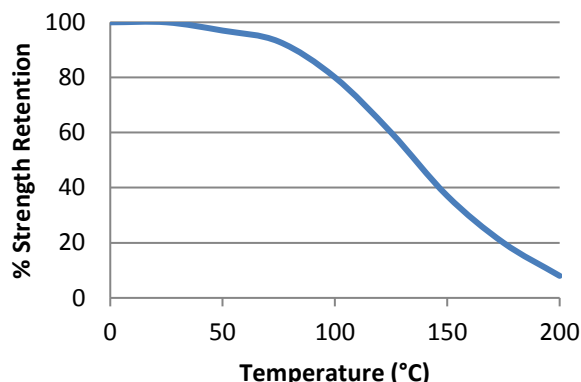


Graph shows typical strength development of bonded components. An increase of 8°C in temperature will halve the cure time. Lower temperatures will result in a slower cure time.

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## Hot Strength



*"Hot strength" shear strength tests performed on mild steel. Fully cured specimens conditioned to pull temperature for 30 minutes before testing at temperature.*

ET5401 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.

## 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.

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	5 to 25°C (41 to 77°F)
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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. Dual cartridges:
  - a) Insert the cartridge into the application gun and guide the plunger into the cartridge.
  - b) Remove the cartridge cap and dispense material until both sides are flowing.
  - c) Attach the static mixer to the end of the cartridge and begin dispensing the material.
2. Apply material to one of the substrates.
3. Join the parts. Parts must be joined within 10-12 minutes of mixing the two epoxy components.
4. Large quantities and/or higher temperature will decrease the usable life or pot life.
5. Apply pressure to the assembly by clamping for 90 minutes or until handling strength is obtained.
6. Full cure will be obtained after 4-7 days at 25°C (77°F). Heat can be used to accelerate the curing process.

## Video Links

Surface preparation:

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



Two-part epoxy directions for use:

<https://youtu.be/-sG85TtNIF4>



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