

## Features & Benefits

- 💧 Adhesion to a wide variety of substrates
- 💧 Full cure at room temperature
- 💧 Steady cure at low temperatures
- 💧 Easy to apply
- 💧 Fully toughened
- 💧 Good impact strength

## Description

**PERMABOND® ET5393** is a 1:1 mixable epoxy adhesive. It is fully toughened and ideal for structural applications exposed impact and vibration stresses. It is ideal for bonding different materials where differential thermal expansion is anticipated. ET5393 can be used to bond a wide variety of materials including plastics, composites and metals – in particular, stainless steel. Unlike many other epoxies, ET5393 is less affected by low temperatures during cure and exhibits a reliable cure in colder conditions.

## Physical Properties of Uncured Adhesive

	ET5393A	ET5393B
Chemical composition	Epoxy Resin	Phenalkamine
Appearance	Blue paste	Yellow paste
Viscosity @ 23°C	20rpm: 120,000-180,000 mPa.s (cP)	20rpm: 70,000-130,000 mPa.s (cP)
Specific gravity	1.15	1.05

## Typical Curing Properties

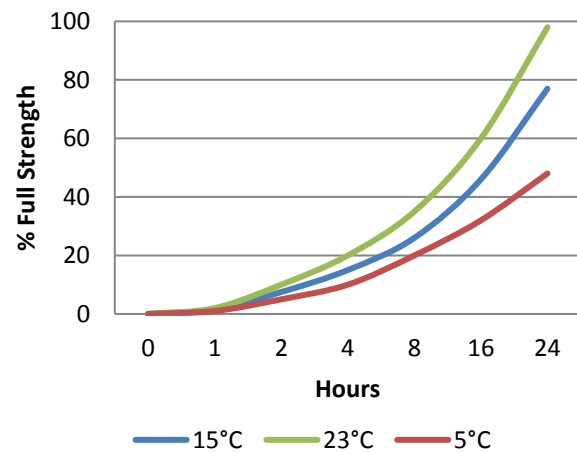
Mix ratio	1:1 by volume 100:90 by weight
Maximum gap fill	2 mm <b>0.08 in</b>
Usable / pot life @23°C 10g mixed	15-25 mins
Handling time @23°C	2-3 hours
Working strength @23°C	8 hours
Full cure @23°C	24 hours

## Typical Performance of Cured Adhesive

Shear strength (mild steel)* (ISO4587)	Cured 24 hrs @23°C: 18-20 N/mm <sup>2</sup> (2600-2900 psi) Cured 1 hr @ 60°C: 20-23 N/mm <sup>2</sup> (2900-3300 psi)
Shear strength (stainless steel)* (ISO4587)	Cured 24 hrs @ 23°C As received: 16-20 N/mm <sup>2</sup> (2300-2900 psi) Gritblast/degrease: 19-22 N/mm <sup>2</sup> (2800-3200 psi) Cured 1 hr @ 60°C As received: 21-25 N/mm <sup>2</sup> (3000-3600 psi) Gritblast/degrease: 23-26 N/mm <sup>2</sup> (3300-3800 psi)
Peel strength (aluminium) (ISO4578)	Cured 1hr @ 60°C: 210-230 N/25mm (46-50 PIW) Cured 5 days @ 23°C: 180-200 N/25mm (33-44 PIW)
Hardness (ISO868)	68-72 Shore D

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

## Strength Development

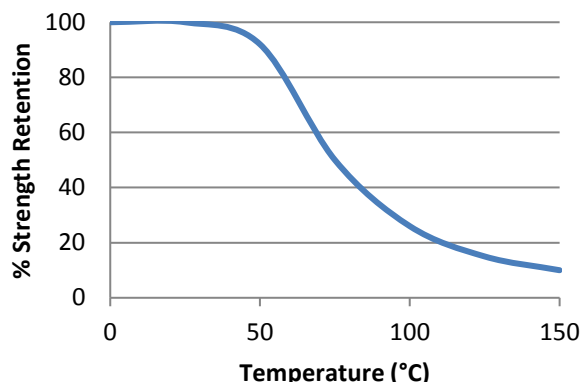


Graph shows typical strength development of bonded components. Increasing the curing temperature will result in a faster cure, colder conditions may slow cure slightly, but this is less marked than with most other epoxies.

The information given and the recommendations made herein are based on our research and are believed to be accurate but no guarantee of their accuracy is made. In every case we urge and recommend that purchasers before using any product in full-scale production make their own tests to determine to their own satisfaction whether the product is of acceptable quality and is suitable for their particular purpose under their own operating conditions. THE PRODUCTS DISCLOSED HEREIN ARE SOLD WITHOUT ANY WARRANTY AS TO MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR ANY OTHER WARRANTY, EXPRESS OR IMPLIED.

No representative of ours has any authority to waive or change the foregoing provisions but, subject to such provisions, our engineers are available to assist purchasers in adapting our products to their needs and to the circumstances prevailing in their business. Nothing contained herein shall be construed to imply the non-existence of any relevant patents or to constitute a permission, inducement or recommendation to practice any invention covered by any patent, without authority from the owner of this patent. We also expect purchasers to use our products in accordance with the guiding principles of the Chemical Manufacturers Association's Responsible Care® program.

## 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.

ET5393 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 -55°C (-65°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)
---------------------	------------------------

## 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 15-25 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 3 hours or until handling strength is obtained.
6. Full cure will be obtained after 24 hours at 23°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/GRX1RyknYqc>



[www.permabond.com](http://www.permabond.com)

• UK: 0800 975 9800

• General Enquiries: +44 (0)1962 711661

• US: 732-868-1372

• Asia: + 86 21 5773 4913

[info.europe@permabond.com](mailto:info.europe@permabond.com)

[info.americas@permabond.com](mailto:info.americas@permabond.com)

[info.asia@permabond.com](mailto:info.asia@permabond.com)

The information given and the recommendations made herein are based on our research and are believed to be accurate but no guarantee of their accuracy is made. In every case we urge and recommend that purchasers before using any product in full-scale production make their own tests to determine to their own satisfaction whether the product is of acceptable quality and is suitable for their particular purpose under their own operating conditions. THE PRODUCTS DISCLOSED HEREIN ARE SOLD WITHOUT ANY WARRANTY AS TO MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR ANY OTHER WARRANTY, EXPRESS OR IMPLIED.

No representative of ours has any authority to waive or change the foregoing provisions but, subject to such provisions, our engineers are available to assist purchasers in adapting our products to their needs and to the circumstances prevailing in their business. Nothing contained herein shall be construed to imply the non-existence of any relevant patents or to constitute a permission, inducement or recommendation to practice any invention covered by any patent, without authority from the owner of this patent. We also expect purchasers to use our products in accordance with the guiding principles of the Chemical Manufacturers Association's Responsible Care® program.