

### Features & Benefits

- 💧 Ideal for bonding composite materials
- 💧 Easy to apply
- 💧 High shear and peel strength
- 💧 Rapid cure speed
- 💧 High temperature resistance
- 💧 Colour matched for carbon fibre bonding

### Description

PERMABOND® ET5428 BLACK is a thixotropic two-part adhesive with excellent resistance to impact and vibration. The controlled flow properties as well as its ease of mixing and application, enables the adhesive to be used where gap filling is required. Permabond® ET5428 BLACK has been found to provide exceptional performance even at elevated temperatures.

Permabond® ET5428 BLACK has been specifically formulated for use in applications requiring toughness and high strength and shows special benefits in the construction of composite assemblies.

### Physical Properties of Uncured Adhesive

	ET5428 BLACK A side	ET5428 BLACK B side
Chemical composition	Epoxy Resin	Polyamine Hardener
Appearance	White	Black
Mixed appearance	Charcoal black	
Viscosity @ 25°C	20rpm: 115,000 mPa.s (cP) 2rpm: 300,000 mPa.s (cP)	20rpm: 200,000 mPa.s (cP) 2rpm: 1,100,000 mPa.s (cP)
Specific gravity	1.1	1.1

### Typical Curing Properties

Mix ratio	2:1 by volume 2:1 by weight
Maximum gap fill	5 mm <b>0.2 in</b>
Usable / pot life @23°C 10g mixed	10-20 mins
Handling time	23°C: 30-45 mins
Working strength	23°C: 1 hour 60°C: 15 minutes
Full cure	23°C: 24-48 hours 60°C: 1 hour

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.

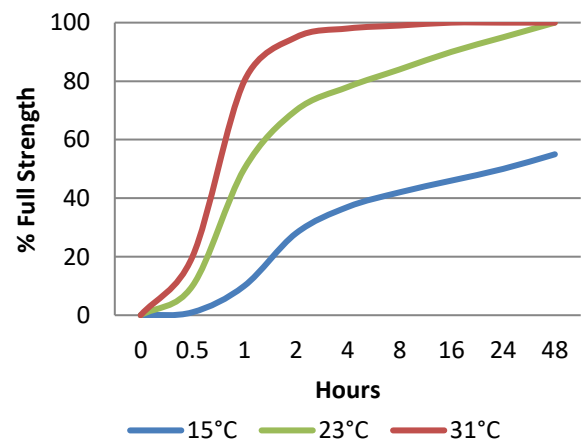
No representative of ours has any authority to waive or change the foregoing provisions but, subject to such provisions, our engineers are available to assist purchasers in adapting our products to their needs and to the circumstances prevailing in their business. Nothing contained herein shall be construed 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.

### Typical Performance of Cured Adhesive

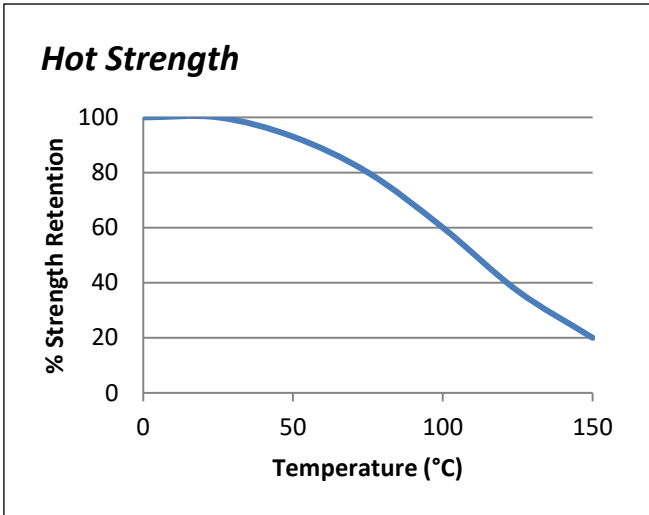
Shear strength* (ISO4587)	Mild steel: 28-34 N/mm <sup>2</sup> (4060-4930psi) Aluminium: 22-28 N/mm <sup>2</sup> (3190-4060psi) Stainless Steel: 29-35 N/mm <sup>2</sup> (4205-5075psi) Carbon Fibre: >25 N/mm <sup>2</sup> ** SF (>3625psi) FRP Glass/Polyester: >9 N/mm <sup>2</sup> ** SF (>1305psi) FRP Glass/Epoxy: 24-28 N/mm <sup>2</sup> (3480-4060psi) PEEK: 4-5 N/mm <sup>2</sup> (580-725psi) PA6 30% filled: 3-4 N/mm <sup>2</sup> (435-580psi)
Peel strength (aluminium) (ISO4578)	150-250 N/25mm (33-55 PIW)
Impact strength (ASTM D-950)	30-40 KJ/m <sup>2</sup>
Hardness (ISO868)	65-75 Shore D
Elongation at break (ISO37)	<5%
Glass transition temperature Tg	50-60°C (122-140°F)
Dielectric strength	15-25 kV/ mm

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

### 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.



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

ET5428 BLACK 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 (-67°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.

### 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

- Dual cartridges:
  - Insert the cartridge into the application gun and guide the plunger into the cartridge.
  - Remove the cartridge cap and dispense material until both sides are flowing.
  - Attach the static mixer to the end of the cartridge and begin dispensing the material.
- Apply material to one of the substrates.
- Join the parts. Parts must be joined within the usable pot life of mixing the two epoxy components.
- Large quantities and/or higher temperature will decrease the usable life or pot life.
- Apply pressure to the assembly by clamping until handling strength is obtained.
- Full cure will be obtained after 24-48 hours at 23°C (73°F). Heat can be used to accelerate the curing process.

**NB. Exercise caution when mixing large quantities due to exothermic reaction.**

### Storage & Handling

Storage Temperature	5 to 25°C (41 to 77°F)
---------------------	------------------------

### 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.