





## Features & Benefits

-  High shear strength
-  Long open time
-  Reduced hazards SDS
-  High temperature resistance following low temperature cure

## Description

**PERMABOND® ET5424** is a two-part epoxy adhesive, designed primarily for the aerospace industry. ET5424 has excellent temperature resistance following a low temperature cure, which makes it suitable for powder coat baking. The adhesive has reduced hazards on the SDS allowing for a safer working environment. ET5424 has an extended cure time so it can be used on large bond areas and in batch production processes. ET5424 meets the requirements of ECSS-Q-ST-70-02C (thermal vacuum outgassing test for the screening of space materials).

## Physical Properties of Uncured Adhesive

|                      | ET5424 A-side                     | ET5424 B-side                   |
|----------------------|-----------------------------------|---------------------------------|
| Chemical composition | Epoxy Resin                       | Modified Amine                  |
| Appearance           | Grey Paste                        | Black Gel                       |
| Viscosity @ 25°C     | 245,000 mPa.s (cP)<br>Thixotropic | 1,700 mPa.s (cP)<br>Thixotropic |
| Specific gravity     | 1.41                              | 1.01                            |

## Typical Curing Properties

|                         |                                   |
|-------------------------|-----------------------------------|
| Mix ratio               | 4:1 by volume<br>100:18 by weight |
| Maximum gap fill        | 3 mm <b>0.12 in</b>               |
| Usable / pot life @23°C | 10g: 4 hours                      |
| Working Strength        | 23°C: 24 hours                    |
| Full cure               | 23°C: 3-5 days<br>66°C: 1 hour    |

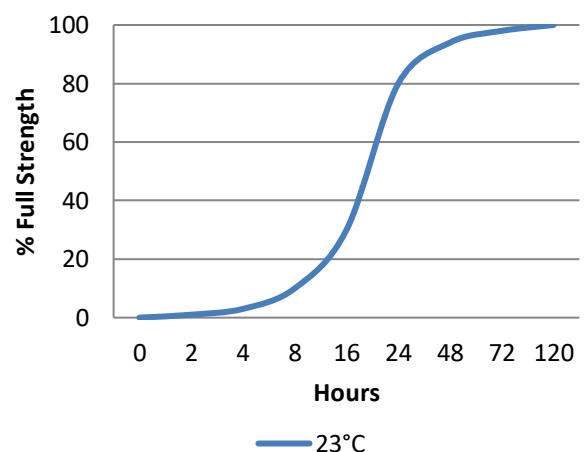
## Typical Performance of Cured Adhesive

|   |   |
|---|---|
| Shear strength*<br>(ISO4587) Cured at<br>23°C for 5 days  | Aluminium: 22-27 N/mm <sup>2</sup><br><b>(3190-3916psi)</b><br>Mild Steel: 20-25 N/mm <sup>2</sup><br><b>(2900-3626psi)</b><br>Stainless Steel: 24-29 N/mm <sup>2</sup><br><b>(3480-4206psi)</b><br>Carbon Fibre: >20 N/mm <sup>2</sup> **SF<br><b>(&gt;2900psi)</b>  |
| Shear strength*<br>(ISO4587) Cured at<br>66°C for 1 hour  | Aluminium: 25-30 N/mm <sup>2</sup><br><b>(3625-4351psi)</b><br>Mild Steel: 21-26 N/mm <sup>2</sup><br><b>(3046-3771psi)</b><br>Stainless Steel: 28-32 N/mm <sup>2</sup><br><b>(4061-4641psi)</b><br>Carbon Fibre: >23 N/mm <sup>2</sup> **SF<br><b>(&gt;3336psi)</b><br>FRP Glass/Epoxy: >21 N/mm <sup>2</sup> **SF<br><b>(&gt;3046psi)</b> |
| Floating Roller Peel<br>Strength (aluminium)<br>(ISO4578) | Cured 5 days @ 23°C: 70-100<br>N/25mm<br><b>(16-23 PIW)</b>   |
| Hardness (ISO868)   | >80 Shore D   |
| Thermal Conductivity<br>(ISO 8302)                        | 0.46 W/(m.K)  |
| Tg (DMA, tan δ peak)                                      | 182°C <b>(360°F)</b>  |

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

\*\*SF Denotes substrate failure

## Strength Development

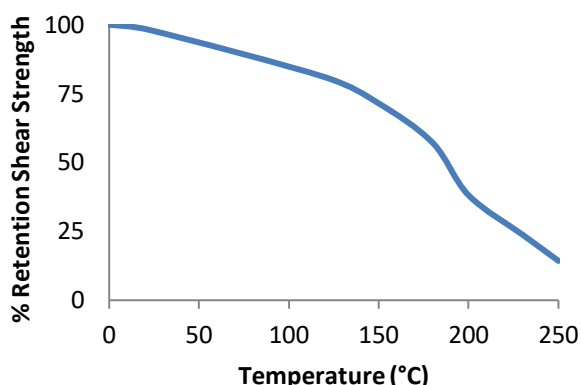


Graph shows typical strength development of bonded components. An increase of 8°C in temperature will halve the cure time. Lower temperatures will result in a slower cure time.

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. Fully cured specimens conditioned to pull temperature for 30 minutes before testing at temperature.

## 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. Measure 100 parts resin to 18 parts hardener by weight. Mix thoroughly taking care not to entrap air. Adhesive can be applied and mixed by automated dispensing equipment.
2. Apply material to one of the substrates.
3. Join the parts. Parts must be joined within the usable pot life 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 until handling strength is obtained.
6. Full cure will be obtained after 3-5 days at 23°C (77°F). Heat can be used to accelerate the curing process.

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

## 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.