Permabond offers a wide range of different adhesive technologies for bonding composites. Whether you require a rapid cure in seconds or several hours to assemble parts, Permabond can help you find a bonding solution.

**Permabond® Adhesive Features & Benefits**
Existing Permabond adhesive users already enjoy many of the following benefits over mechanical fasteners:

- Cost savings
- Component weight reduction
- Improved stress distribution
- Improved appearance
- Faster manufacturing process
- Eliminates pre-drilling & prevents leaks
- Helps prevent corrosion
- Wider choice of substrate materials
- Better noise and vibration absorption
- Low shrinkage - no show-through marks
Here is a small selection of our most popular adhesive grades suitable for use in a range of composite bonding applications. If you can’t see exactly what you require, please contact our technical advisors with information about your application and your particular requirements and we will make a recommendation. The Permabond team provides support through the design phase, sample trials and production line integration. Whether you require technical support, custom formulations or small batch production, please contact us.

**Composite Bonding Product Data**

<table>
<thead>
<tr>
<th>Technical Information</th>
<th>737</th>
<th>ES569</th>
<th>ES5681</th>
<th>ET515</th>
<th>ET5401</th>
<th>ET5428</th>
</tr>
</thead>
<tbody>
<tr>
<td>Features</td>
<td>Toughened, impact resistant single part cyanoacrylate.</td>
<td>Thick epoxy paste, ideal for bonding carbon fibre where vertical application or gap filling is required.</td>
<td>Single part epoxy for the high strength bonding of carbon fibre or FRP/GRP</td>
<td>Flexible epoxy with excellent impact and vibration resistance. Ideal for use on sensitive composites (such as foams).</td>
<td>High temperature resistant epoxy. Ideal for applications where clamping or juggling during heat cure is not possible.</td>
<td>Toughened epoxy with rapid strength development.</td>
</tr>
<tr>
<td>Colour</td>
<td>Black</td>
<td>Black</td>
<td>Black</td>
<td>Clear / colourless</td>
<td>Grey</td>
<td>Charcoal-black or cream version available*</td>
</tr>
<tr>
<td>Viscosity (mPa.s = cP)</td>
<td>2,000-4,000</td>
<td>250,000-500,000</td>
<td>40,000-60,000</td>
<td>Mixed: 12,000-22,000</td>
<td>Thixotropic paste</td>
<td>Thixotropic paste</td>
</tr>
<tr>
<td>Maximum gap fill (mm) in</td>
<td>(0.5)</td>
<td>0.02</td>
<td>0.2</td>
<td>(0.5)</td>
<td>(2.0)</td>
<td>(5.0)</td>
</tr>
<tr>
<td>Handling time (steel)</td>
<td>15-20 sec.</td>
<td>Full strength</td>
<td>Full strength 35 minutes at 135°C</td>
<td>20-30 min.</td>
<td>60-90 min.</td>
<td>30-45 min.</td>
</tr>
<tr>
<td>Full strength (cured at 23°C)</td>
<td>24 hours</td>
<td>60 minutes at 150°C</td>
<td>40 minutes at 135°C</td>
<td>72 hours</td>
<td>4-7 days</td>
<td>24-48 hrs</td>
</tr>
<tr>
<td>Shear strength (MPa)</td>
<td>Steel</td>
<td>FRP-glass polyester</td>
<td>FRP-glass epoxy</td>
<td>Carbon fibre</td>
<td></td>
<td></td>
</tr>
<tr>
<td>psi</td>
<td>(19-23)</td>
<td>(27-41)</td>
<td>(9-11)</td>
<td>(10-12)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2,800-3,300</td>
<td>4,000-6,000</td>
<td>1,300-1,600</td>
<td>1,450-1,700</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peel strength (N/25mm)</td>
<td>PIW</td>
<td>-55 to +120°</td>
<td>-40 to +180°</td>
<td>-40 to +180°</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-65 to +250</td>
<td>-22-26</td>
<td>-20-200</td>
<td>-40-356</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Service temperature (°C)</td>
<td>-40 to +180°</td>
<td>2,800-3,300*</td>
<td>4,800-5,100*</td>
<td>1,700-2,000</td>
<td>1,700-2,600</td>
<td>1,200-1,750</td>
</tr>
<tr>
<td>Available</td>
<td>Worldwide</td>
<td>Worldwide</td>
<td>Worldwide</td>
<td>Worldwide</td>
<td>Worldwide</td>
<td>Worldwide</td>
</tr>
</tbody>
</table>

* Product cured at 80°C for 1 hour.

For full, up-to-date technical information, please refer to the TDS (Technical Data Sheet).

Permabond bonds composites in many industry sectors:

- Aerospace
- Automotive
- Boat Building
- Buildings
- Buses
- Partitioning
- Shopfitting
- Sports Equipment
- Street Furniture
- Trains & Trams
- Wind Turbines
## Service temperature range

<table>
<thead>
<tr>
<th>Peeling strength (N/25mm)</th>
<th>Viscosity (mPa.s = cP)</th>
<th>Handling time (Steel)</th>
<th>Available</th>
<th>Colour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon fibre</td>
<td>FRP-glass</td>
<td>FRP-glass</td>
<td>Steel</td>
<td>FRP-glass</td>
</tr>
<tr>
<td>(-55 to +120)</td>
<td>2,800 - 3,300</td>
<td>80</td>
<td>Full</td>
<td>Black</td>
</tr>
</tbody>
</table>

## Application: Bonding marble honeycomb panels

- Bonding thin marble sections to honeycomb composite for use as worksurfaces in kitchens and bathrooms on yachts, motor homes, caravans and aeroplanes.
- If colour-matched product is required, Permabond’s chemists can produce custom formulations.

**Adhesive used:** Permabond ET5429

## Application: Bonding aircraft seat trays

Bonding ABS, plastic laminate and aluminium seat tray construction together. ET515 was selected due to its excellent impact and vibration resistance, quick cure and most importantly it doesn’t attack any of the sensitive substrate materials.

**Benefits of Permabond ET515**

- Rapid-curing
- Non-flammable
- Flexible, good impact resistance
- Easy application process
- Clear appearance gives an aesthetically good finish.

**Adhesive used:** Permabond ET515
 Permabond’s history of developing and manufacturing engineering adhesives spans four decades and three continents. Today, Permabond Engineering Adhesives Ltd (Europe & Asia) and Permabond LLC (Americas) provide technological solutions to engineers all over the world, with offices and facilities in America, Asia and Europe.

**ISO 9001:2008**

| Technical | Our chemists and technicians are available to provide application assistance, custom formulation, in-house prototype testing, joint product development programs and much more. |
| Training | Permabond’s knowledgeable sales group will provide your staff with the information they need to maximize the efficiencies, cost savings, and safety benefits Permabond products generate. |
| Sales | From preliminary project appraisals and product needs assessments through to process reliability analysis, Permabond’s knowledgeable sales group will support you from product concept through to production. |

This brochure contains information on our most popular products, if you don’t see exactly what you need, or would like assistance in selecting the best product for your application, please contact us:

**www.permabond.com**
- UK - 0800 975 9800
- Asia + 86 21 5773 4913
- **General Enquiries** +44(0)1962 711661
- Deutschland 0800 101 3177
- France 0805 111 388
- US - 732-868-1372

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The information given and the recommendations made herein are based on our experience and are believed to be accurate. No guarantee as to, or responsibility for, their accuracy can be given or accepted, however, and no statement herein is to be treated as a representation or warranty. In every case we urge and recommend that purchasers, before using any product, make their own tests to determine, to their own satisfaction, its suitability for their particular purposes under their own operating conditions. Always refer to current product technical datasheet for most recent and accurate technical information.

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