Permabond Heat-Cured Epoxies

Permabond single-part epoxy adhesives are suitable for bonding a wide variety of materials. They are available with a range of different viscosities and with and without metal filler. Permabond epoxies have been developed to offer a high standard of performance for demanding applications.

Substrates
Permabond single-part epoxy adhesives will bond most engineering materials. They form excellent structural bonds to a wide variety of materials including metals, composites, wood and even some plastics.

Durability
These adhesives offer excellent performance at high temperatures and harsh environmental conditions, having superb resistance to strong chemicals.

Applications
Single-part epoxies are ideal for use in heavy wear-and-tear applications such as bonding tungsten carbide tools & machinery. They are ideal for replacing welding and brazing and can significantly reduce assembly production costs. For this reason their use is widespread in the heat exchanger bonding market for sealing heat exchanger tubes and end-plates.

Material selection
By replacing welding or brazing, the designer can have greater freedom of choice of manufacturing materials and can bond dissimilar substrates together. This can help reduce component cost and weight and improve performance.

Process
Adhesive is available in cartridge form or in bulk to dispense via automated dispensing equipment. The adhesives cure rapidly when heated so it is necessary to use an oven to cure the adhesive (or other method such as an induction coil, infra-red or a hot air gun).

Joint Design
The high shear and peel strength of the bonds, coupled with the increased stress distribution of adhesives, greatly expands joint design possibilities.

Benefits Include:
- High peel strength increases design versatility
- No requirement for weighing or mixing material
- Durability increases material choices
- Rapid cure increases production rates
- Solvent free improves workplace safety
- Low odour improves workplace environment
Permabond Single-Part Epoxy Adhesives Comparison Chart

This table represents a selection of the complete range of Permabond single-part epoxy adhesives. For more detailed technical information and product Material Safety Data Sheets, visit www.permabond.com. To discuss your specific application requirements, please call the Permabond Helpline and our technical advisors will recommend the best adhesive for you or discuss the development of a new grade or product modification to meet your technical requirements.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
<th>Colour</th>
<th>Viscosity (mPa.s)</th>
<th>Maximum Gap Fill (mm)</th>
<th>Cure time at 150°C (mins)</th>
<th>Shear Strength (steel) (MPa)</th>
<th>Shore D Hardness</th>
<th>Service Temperature (°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ES550</td>
<td>Metal-filled, high viscosity, rapid curing</td>
<td>Silver-grey</td>
<td>Thick paste</td>
<td>3.0</td>
<td>20</td>
<td>27-41</td>
<td>80</td>
<td>-40 to +180</td>
</tr>
<tr>
<td>ES558</td>
<td>Metal-filled, flows like solder when heated</td>
<td>Silver-grey</td>
<td>190,000</td>
<td>0.5</td>
<td>45</td>
<td>27-41</td>
<td>80</td>
<td>-40 to +180</td>
</tr>
<tr>
<td>ES562</td>
<td>Low viscosity, white</td>
<td>White</td>
<td>15,000</td>
<td>0.25</td>
<td>30</td>
<td>20-35</td>
<td>80</td>
<td>-40 to +180</td>
</tr>
<tr>
<td>ES569</td>
<td>Non-slump black paste</td>
<td>Black</td>
<td>250,000 to 500,000</td>
<td>5.0</td>
<td>45</td>
<td>27-41</td>
<td>80</td>
<td>-40 to +180</td>
</tr>
<tr>
<td>ES578</td>
<td>Excellent thermal conductivity</td>
<td>Black</td>
<td>700,000</td>
<td>5.0</td>
<td>20</td>
<td>27-41</td>
<td>84</td>
<td>-40 to +180</td>
</tr>
</tbody>
</table>

Cure-speed varies depending on cure temperature (refer to technical datasheet for recommended cure times). These will depend on the time it takes for the adhesive to reach this temperature - for example, large assemblies or a crowded oven will require longer to reach full cure. Alternative, quicker methods of curing include induction, hotplates, infrared lamps and hot-air guns.

For further information please contact Permabond for individual technical and safety data sheets.

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.