DELO®-ML DB180
Anaerobic- and light curing adhesive, high-viscous

Base
- Modified urethane acrylate
- one-component, solvent-free
- dual-curing adhesive

Use
- for tension-equalizing metal bondings
- fixing: coaxial components, e. g., bearings or sockets
- adhesive leaking from the bonding gap can be cured in seconds with visible light
- therefore, firmness to touch can be reached faster
- if one of the components to be bonded is translucent, specific plastics can also be bonded through polymerization
- DELO curing lamps generating radiation adjusted to the adhesives are available to initiate this reaction
- also suitable for the bonding of components with dissimilar coefficients of expansion due to flexibilized and tension-equalizing nature
- easy application control due to fluorescent color
- the cured product is normally used in a temperature range of -60 °C to +180 °C; depending on the application, other limits may be more reasonable
- compliant with RoHS directive 2015/863/EU

Processing
- the surfaces to be bonded must be dry as well as free of dust, grease and other contaminations
- DELOTHEN cleaners are recommended for the optimal preparation of bonding areas
- thread connections must be tightened well
- the adhesive is good to dispense from original containers or by means of dispensing systems suitable for anaerobic-curing adhesives
Curing
- anaerobic, i.e., by exclusion of air and under metal influence at room temperature with small gap
- the curing may be assisted by application of heat, use of activator and/or light, e.g. if the curing speed is too slow or if it comes to larger gaps
- the build-up of strength depends on the components and the geometry joined. The initial strength is achieved after just a few minutes. Significant acceleration is possible by using an activator and/or applying heat
- curing with UV light in a wavelength range of 320 – 450 nm. DELOLUX LED curing lamps are especially suitable as per the chart below. All standard DELOLUX HID discharge lamps are also suitable
- when using light fixation, an intensity at the adhesive of 700 mW/cm² should not be exceeded. Application related, higher intensities can be useful
- both curing mechanisms can be used in combination or separately

<table>
<thead>
<tr>
<th>Lamp type</th>
<th>DELOLUX 20</th>
<th>50</th>
<th>80</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wavelength [nm]</td>
<td>365</td>
<td>400</td>
<td>460</td>
</tr>
<tr>
<td>Suitability</td>
<td>++</td>
<td>++</td>
<td>-</td>
</tr>
</tbody>
</table>

not suitable  + suitable  ++ especially suitable

Properties
- high-viscous
- flexible setting
- light-curing and anaerobic-curing
- visible adhesive in boundary areas can be cured with visible light
- high strength, difficult to remove
- very good strengths and low roughness depth of the bonding areas

Technical data

Color
- clear- yellowish and fluorescent

Prefered clearance [mm] 0,05-0,1

Clearance with heat or activator [mm] up to 0,3-0,4

Clearance with light curing [mm] 4

Density [g/cm³]
at room temperature (approx. 23 °C) 1.1

Viscosity [mPas]
at 23 °C, Brookfield spindle/rpm 4/5 17000

Curing time until initial strength [min]
at room temperature (approx. 23 °C), anaerobic on zinc-phosphated screws approx. 3- 6

Minimal irradiation time [s] 10
DELO Standard 23, UVA intensity: 60 mW/cm², DELOLUXcontrol

Curable layer thickness [mm] 4
DELO Standard 20
LED 400 nm, intensity: 200 mW/cm² DELOLUXcontrol

Off-torque with M(on) 46 Nm [Nm] 60

Compression shear strength shaft/hub steel [MPa] 40
according to ISO 10123
curing progress

compression shear strength shaft-hub joint based on initial value at room temperature measured at room temperature (approx. 23°C) according to ISO 10123

Compression shear strength glass/glass [MPa]
DELO Standard 5
LED 400 nm, intensity: 200 mW/cm² DELOLUXcontrol, irradiation time: 60 s after 24 h at room temperature (approx. 23 °C)
16

Compression shear strength PA/PA [MPa]
DELO Standard 5
LED 400 nm, intensity: 200 mW/cm² DELOLUXcontrol, irradiation time: 60 s after 24 h at room temperature (approx. 23 °C)
15

Compression shear strength stainless steel/PA [MPa]
DELO Standard 5
LED 400 nm, intensity: 200 mW/cm² DELOLUXcontrol, irradiation time: 60 s after 24 h at room temperature (approx. 23 °C)
10

Tensile shear strength Al/Al [MPa]
DIN EN 1465, blank
6

Tensile shear strength Al/Al [MPa]
DIN EN 1465, sand- blasted
13

Tensile shear strength St/St [MPa]
DIN EN 1465, blank
12
<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tensile shear strength St/St [MPa]</td>
<td>14</td>
</tr>
<tr>
<td>DIN EN 1465, sand-blasted</td>
<td></td>
</tr>
<tr>
<td>Tensile strength [MPa]</td>
<td>30</td>
</tr>
<tr>
<td>according to DIN EN ISO 527</td>
<td></td>
</tr>
<tr>
<td>Elongation at tear [%]</td>
<td>35</td>
</tr>
<tr>
<td>according to DIN EN ISO 527</td>
<td></td>
</tr>
<tr>
<td>Young's modulus [MPa]</td>
<td>1000</td>
</tr>
<tr>
<td>according to DIN EN ISO 527</td>
<td></td>
</tr>
<tr>
<td>Shore hardness D</td>
<td>70</td>
</tr>
<tr>
<td>according to DIN EN ISO 868</td>
<td></td>
</tr>
<tr>
<td>Glass transition temperature [°C]</td>
<td>90</td>
</tr>
<tr>
<td>DELO Standard 24, Rheometer</td>
<td></td>
</tr>
<tr>
<td>Coefficient of linear expansion [ppm/K]</td>
<td>195</td>
</tr>
<tr>
<td>TMA, DELO Standard 26</td>
<td></td>
</tr>
<tr>
<td>in a temperature range of +30 to +150 °C</td>
<td></td>
</tr>
<tr>
<td>Shrinkage [vol. %]</td>
<td>7.8</td>
</tr>
<tr>
<td>DELO Standard 13</td>
<td></td>
</tr>
<tr>
<td>Water absorption [%]</td>
<td>1.1</td>
</tr>
<tr>
<td>DIN EN ISO 62</td>
<td></td>
</tr>
</tbody>
</table>
Performance under temperature influence

Compression/shear strength shaft-hub joint after temperature storage based on initial value at room temperature measured at room temperature (approx. 23 °C) according to ISO 10123

Tensile strength after temperature storage based on initial value at room temperature measured at room temperature (approx. 23 °C) according to DIN EN 527, test specimen type 5A, thickness 2 mm

Elongation at tear after temperature storage based on initial value at room temperature measured at room temperature (approx. 23 °C) according to DIN EN 527, test specimen type 5A, thickness 2 mm

Young’s modulus after temperature storage based on initial value at room temperature measured at room temperature (approx. 23 °C) according to DIN EN 527, test specimen type 5A, thickness 2 mm
Performance under chemical influence
compression shear strength after storage for 1,000 h
based on initial value at room temperature
measured at room temperature (approx. 23 °C)
according to ISO 10123

<table>
<thead>
<tr>
<th>Chemical medium</th>
<th>Compression/shear strength shaft-hub joint [%]</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATF gear oil</td>
<td>105</td>
</tr>
<tr>
<td>Diesel fuel</td>
<td>97</td>
</tr>
<tr>
<td>Engine oil</td>
<td>101</td>
</tr>
<tr>
<td>Fuel</td>
<td>97</td>
</tr>
</tbody>
</table>

Storage life at room temperature (0- 25 °C)
In unopened bottle
6 months

Storage life at 0 °C to +10 °C
In unopened cartridge <= 900ml
6 months

Instructions and advice

General
The data and information provided are based on tests performed under laboratory conditions. Reliable information about the behavior of the product under practical conditions and its suitability for a specific purpose cannot be concluded from this. It is the customer’s responsibility to test the suitability of a product for the intended purpose by considering all specific requirements and by applying standards the customer deems suitable (e. g. DIN 2304-1). Type, physical and chemical properties of the materials to be processed with the product, as well as all actual influences occurring during transport, storage, processing and use, may cause deviations in the behavior of the product compared to its behavior under laboratory conditions. All data provided are typical average values or uniquely determined parameters measured under laboratory conditions. The data and information provided are therefore no guarantee for specific product properties or the suitability of the product for a specific purpose. Nothing contained herein shall be construed to indicate the non-existence of any relevant patents or to constitute a permission, encouragement or recommendation to practice any development covered by any patents, without permission of the owner of this patent. All products provided by DELO are subject to DELO’s General Terms of Business. Verbal ancillary agreements are deemed not to exist.

Instructions for use
The instructions for use of DELO-ML are available on: www.DELO.de. We will be pleased to send them to you on demand.

Occupational health and safety
see material safety data sheet

Specification
The properties in italics are part of the specification. Ranges with clear limits are defined for them and others, where applicable. In the course of the QA test, each batch is tested for these properties and the maintenance of the limits is ensured. The measuring methods used can deviate from those specified in the data sheet. Details can be found in the QA test report.