

DELO-ML® DB133

anaerobic and UV-curing adhesive

Base

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

Use

- for impact-resistant metal bondings
- for mixed bondings with certain plastics, e. g., polyamide
- also suitable for the bonding of components with dissimilar coefficients
- 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 permeable to UV light, it is also possible to bond non-metals by photo-polymerization
- the cured product is normally used in a temperature range of -40 °C to +150 °C; depending on the application, other limits may be more reasonable
- suitable for small casting applications
- 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 – 380 nm. DELOLUX LED curing lamps are especially suitable as per the chart below. All standard DELOLUX HID discharge lamps are also suitable
- both curing mechanisms can be used in combination or separately

| Lamp type | DELOLUX 20 / 50 / 80 | | |
|-----------------|----------------------|-----|-----|
| Wavelength [nm] | 365 | 400 | 460 |
| Suitability | ++ | - | - |

- not suitable + suitable ++ especially suitable

Properties

- flexible, tension-equalizing, impact-resistant
- UV-curing and anaerobic-curing
- visible adhesive in boundary areas can be cured with UV light

Technical data

| | |
|---|---------------|
| <i>Color</i> | colorless |
| preferred 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/cm ³] at room temperature (approx. 23 °C) | 1.1 |
| <i>Viscosity</i> [mPas] at 23 °C, Brookfield spm 3/10 | 700 |
| <i>Curing time until initial strength</i> [min] at room temperature (approx. 23 °C), anaerobic on zinc-phosphated screws | approx. 3- 6 |
| <i>Curing time until final strength</i> [h] at room temperature (approx. 23 °C), anaerobic on zinc-phosphated screws | 24 |
| <i>Minimal irradiation time</i> [s] DELO Standard 23, UVA intensity: 60 mW/cm ² , DELOLUXcontrol | 25 |
| <i>Curable layer thickness</i> [mm] DELO Standard 20 UVA intensity: 55 - 60 mW/cm ² DELOLUXcontrol, DELOLUX 03 | 1 |
| <i>Off-torque without Mon</i> [Nm] | 30 |
| <i>Off-torque with Mon 46 Nm</i> [Nm] | 55 |
| <i>Compression shear strength after 1 h</i> [MPa] according to ISO 10123 | 15 |
| <i>Compression shear strength</i> [MPa] according to ISO 10123 | 28 |

| | |
|---|------------|
| Compression shear strength glass/glass [MPa] | 30 |
| DELO Standard 5 UVA intensity: 55 - 60 mW/cm ² , DELOLUXcontrol, irradiation time: 60 s | |
| Compression shear strength PMMA/PMMA [MPa] | 15 |
| DELO Standard 5 UVA intensity: 55 - 60 mW/cm ² , DELOLUXcontrol, irradiation time: 60 s | |
| Compression shear strength PS/PS [MPa] | 13 |
| DELO Standard 5 UVA intensity: 55 - 60 mW/cm ² , DELOLUXcontrol, irradiation time: 60 s | |
| Compression shear strength PA/PA [MPa] | 13 |
| DELO Standard 5 UVA intensity: 55 - 60 mW/cm ² , DELOLUXcontrol, irradiation time: 60 s | |
| Compression shear strength steel/PA [MPa] | 10 |
| DELO Standard 5 UVA intensity: 55 - 60 mW/cm ² , DELOLUXcontrol, irradiation time: 60 s | |
| Compression shear strength VA/PA [MPa] | 6 |
| DELO Standard 5 curing: 24h at room temperature with DELO-QUICK 5002 | |
| compression shear strength VA/PPA [MPa] | 16 |
| DELO Standard 5 curing: 24h at room temperature with DELO-QUICK 5002 | |
| compression shear strength VA/PPS [MPa] | 3 |
| DELO Standard 5 curing: 24h at room temperature with DELO-QUICK 5002 | |
| Tensile shear strength Al/Al [MPa] | 5 |
| DIN EN 1465, blank component thickness: 1.6 mm | |
| Tensile shear strength Al/Al [MPa] | 12 |
| DIN En 1465, sand-blasted component thickness: 1.6 mm | |
| Tensile shear strength St/St [MPa] | 11 |
| DIN EN 1465, blank | |
| Tensile shear strength St/St [MPa] | 14 |
| DIN EN 1465, sand-blasted | |
| Young's modulus [MPa] | 300 |
| DIN EN ISO 527 | |
| Tensile strength [MPa] | 20 |
| DIN EN ISO 527 | |
| Elongation at tear [%] | 130 |
| DIN EN ISO 527 | |
| Shore hardness D | 44 |
| Glass transition temperature [°C] | 104 |
| rheometer | |
| Coefficient of linear expansion [ppm/K] | 156 |
| TMA, in a temperature range of +30 to +95 °C | |
| Coefficient of linear expansion [ppm/K] | 171 |
| TMA, in a temperature range of +30 to +150 °C | |

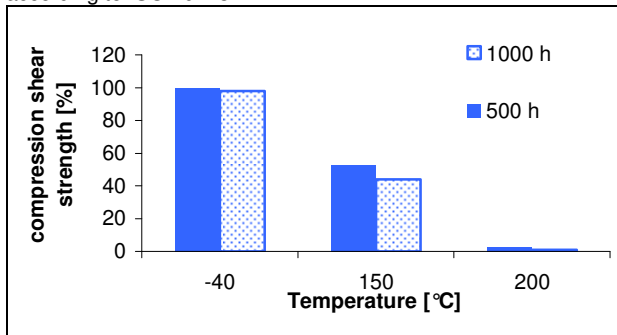
| | |
|---|--------|
| Coefficient of linear expansion [ppm/K] TMA, in a temperature range of +95 to +150 °C | 184 |
| Shrinkage [vol. %] DELO Standard 13 | 8.6 |
| Specific volume resistance [Ωcm] VDE 0303, part 30 | >1xE16 |
| Surface resistance VDE 0303, part 30 | >1xE14 |
| Creep resistance CTI VDE 0303, part 11, DIN EN 60112 | >600 M |

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

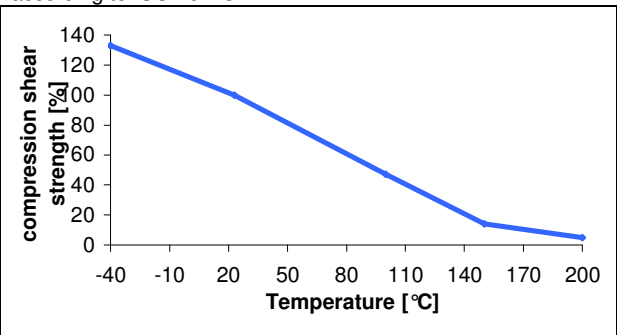
| Chemical medium | Compression/shear strength <u>shaft-hub joint</u> [%] |
|-----------------|--|
| ATF gear oil | 95 |
| Diesel fuel | 94 |
| engine oil | 96 |
| fuel | 89 |

Performance under temperature influence

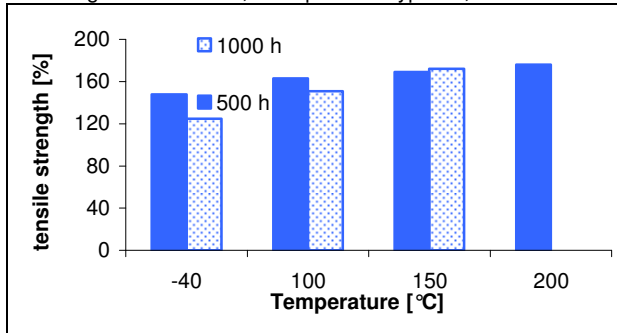
compression/shear strength shaft -hub joint
after temperature storage
based on initial value at room temperature
measured at room temperature (approx. 23 °C)
according to ISO 10123



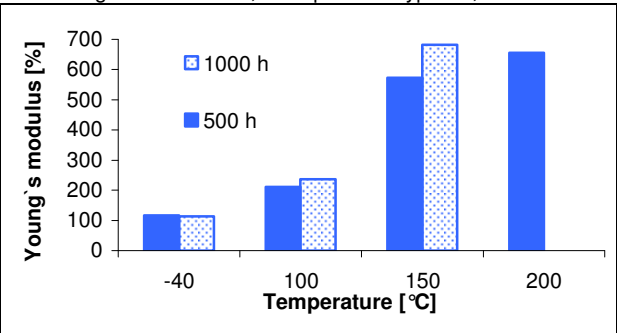
compression/shear strength shaft-hub joint at temperature
based on initial value at room temperature
measured at determined temperature
according to ISO 10123



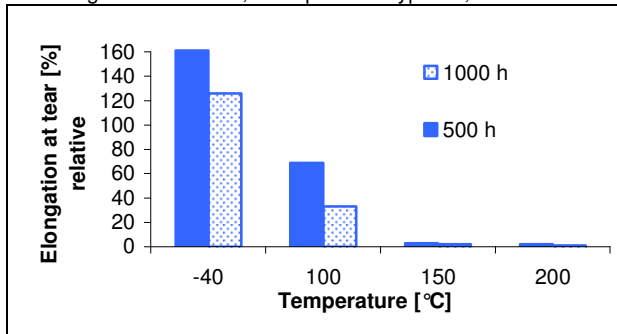
tensile strength after temperature storage
based on initial value at room temperature
measured at room temperature (approx. 23 °C)
according to DIN EN 527, test specimen type 1B, thickness 2 mm



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 1B, 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 1B, thickness 2 mm



Storage life 12 months
at 0 °C to +10 °C in unopened original container

Storage life 9 months
In unopened original container up to 600 ml at room temperature (0-25 °C)

Instructions and advice

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.

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 the product for the intended purpose by considering all specific requirements. Type and 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. The data and information provided are therefore no guarantee for specific product properties or the suitability of the product for the intended purpose.

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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.