

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

Color	colorless transparent
Joint gap anaerobic [mm]	0,05-0,1
joint gap with heat or activator [mm]	0,3-0,4
joint gap with light curing [mm]	4
Density [g/cm ³] at room temperature (approx. 23 °C)	1.1
Viscosity [mPas] at 23 °C, rheometer, PP20, gap 100µm, shear rate 10 1/s	730
Viscosity [mPas] at 23 °C, Brookfield spm 3/10	700
Curing time until initial strength [min] at room temperature (approx. 23 °C), anaerobic on zinc-phosphated screws	approx. 3-6
Curing time until final strength [h] at room temperature (approx. 23 °C), anaerobic on zinc-phosphated screws	24
Minimal irradiation time [s] DELO Standard 23, UVA intensity: 60 mW/cm ² , DELOLUXcontrol	25
Curable layer thickness [mm] DELO Standard 20 UVA intensity: 55 - 60 mW/cm ² DELOLUXcontrol, DELOLUX 03	1
Curable layer thickness [mm] DELO Standard 20 LED 365 nm, intensity: 200 mW/cm ² DELOLUXcontrol	1
Off-torque without M(on) [Nm]	30
Off-torque with M(on) 46 Nm [Nm]	55

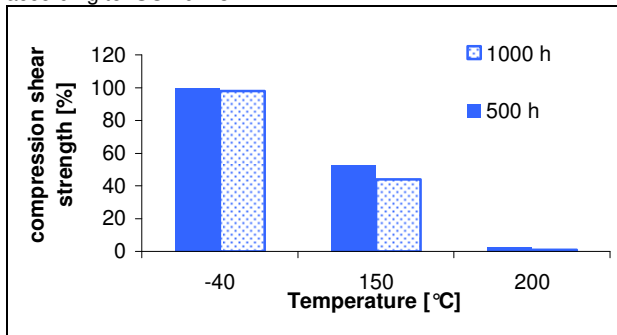
Compression shear strength after 1 h [MPa] according to ISO 10123	15
<i>Compression shear strength</i> [MPa] according to ISO 10123	28
<i>Compression shear strength glass/glass</i> [MPa] DELO Standard 5 LED 365 nm, intensity: 200 mW/cm ² , DELOLUXcontrol, irradiation time: 60 s curing time: 24 h at room temperature (approx. 23 °C)	30
Compression shear strength PMMA/PMMA [MPa] DELO Standard 5 LED 365 nm, intensity: 200 mW/cm ² , DELOLUXcontrol, irradiation time: 60 s curing time: 24 h at room temperature (approx. 23 °C)	10
Compression shear strength PS/PS [MPa] DELO Standard 5 UVA intensity: 55 - 60 mW/cm ² , DELOLUXcontrol, irradiation time: 60 s	13
Compression shear strength PA/PA [MPa] DELO Standard 5 LED 365 nm, intensity: 200 mW/cm ² , DELOLUXcontrol, irradiation time: 60 s curing time: 24 h at room temperature (approx. 23 °C)	18
Compression shear strength steel/PA [MPa] DELO Standard 5 LED 365 nm, intensity: 200 mW/cm ² , DELOLUXcontrol, irradiation time: 60 s curing time: 24 h at room temperature (approx. 23 °C)	10
Compression shear strength stainless steel/PA [MPa] DELO Standard 5 curing: 24h at room temperature with DELO-QUICK 5002	6
compression shear strength stainless steel/PPA [MPa] DELO Standard 5 curing: 24h at room temperature with DELO-QUICK 5002	16
compression shear strength stainless steel/PPS [MPa] DELO Standard 5 curing: 24h at room temperature with DELO-QUICK 5002	3
Tensile shear strength Al/Al [MPa] DIN EN 1465, blank component thickness: 1.6 mm	5
Tensile shear strength Al/Al [MPa] DIN En 1465, sand-blasted component thickness: 1.6 mm	12
Tensile shear strength St/St [MPa] DIN EN 1465, blank	11
Tensile shear strength St/St [MPa] DIN EN 1465, sand-blasted	14
Young's modulus [MPa] according to DIN EN ISO 527	300
Tensile strength [MPa] according to DIN EN ISO 527	20
Elongation at tear [%] according to DIN EN ISO 527	130
Shore hardness D according to DIN EN ISO 868	44

Glass transition temperature [°C] rheometer	104
Coefficient of linear expansion [ppm/K] TMA, in a temperature range of +30 to +95 °C	156
Coefficient of linear expansion [ppm/K] TMA, in a temperature range of +30 to +150 °C	171
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 [Ω cm] VDE 0303, part 30	>1xE16
Surface resistance [Ω] 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	

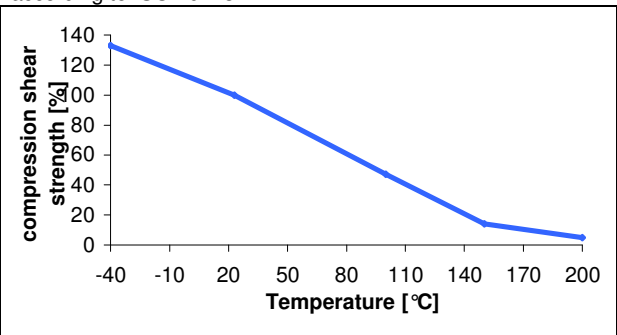
Chemical medium	Compression/shear strength <u>shaft-hub joint</u> [%]
ATF gear oil	95
Diesel fuel	94
engine oil	96
fuel	89

Performance under temperature influence

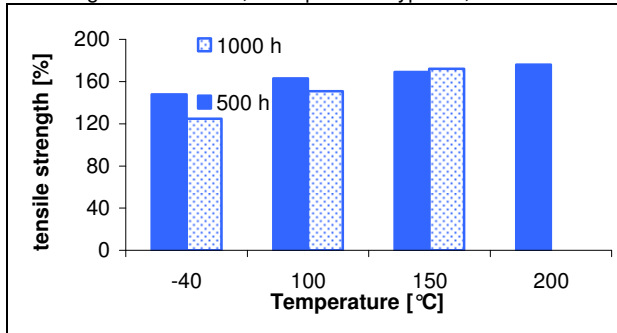
compression/shear strength shaft-hub joint
after temperature storage
based on initial value at room temperature
measured at room temperature (approx. 23 °C)
according to ISO 10123



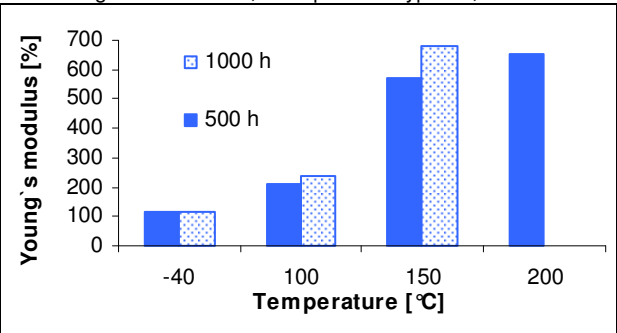
compression/shear strength shaft-hub joint at temperature
based on initial value at room temperature
measured at determined temperature
according to ISO 10123



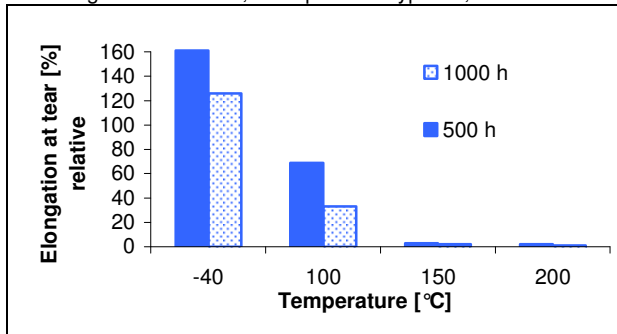
tensile strength after temperature storage
based on initial value at room temperature
measured at room temperature (approx. 23 °C)
according to DIN EN 527, test specimen type 1B, thickness 2 mm



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 at 0 °C to +10 °C
in unopened original container

12 months

Storage life at room temperature (max. 25 °C)
in unopened original container up to 600 ml

9 months

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 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.

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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.