

### **DELO®-ML DB135**

Anaerobic- and light curing adhesive, high-strength

#### **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
- suitable for small casting applications, if cured with DELO curing lamps. The top, open adhesive surface exposed to air remains tacky
- also suitable for the bonding of components with dissimilar coefficients of expansion due to flexibilized and tension-equalizing nature
- 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
- successfully tested according to UL 94 HB
- 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
- 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**

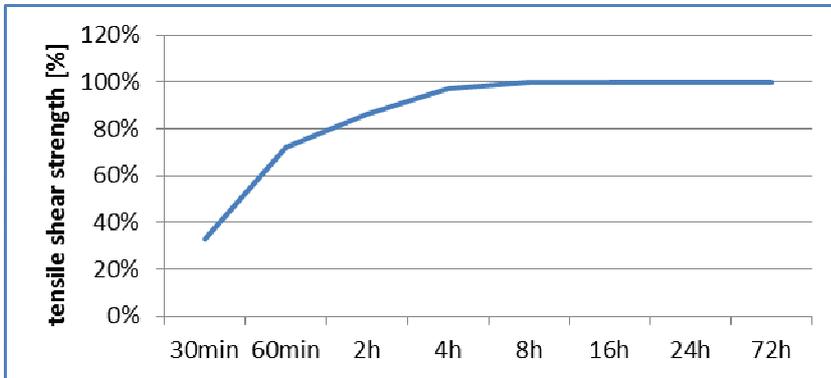
- low-viscous setting
- light-curing and anaerobic-curing
- visible adhesive in boundary areas can be cured with visible light
- high strength, difficult to remove
- very good strengths and low roughness depth of the bonding areas

## **Technical data**

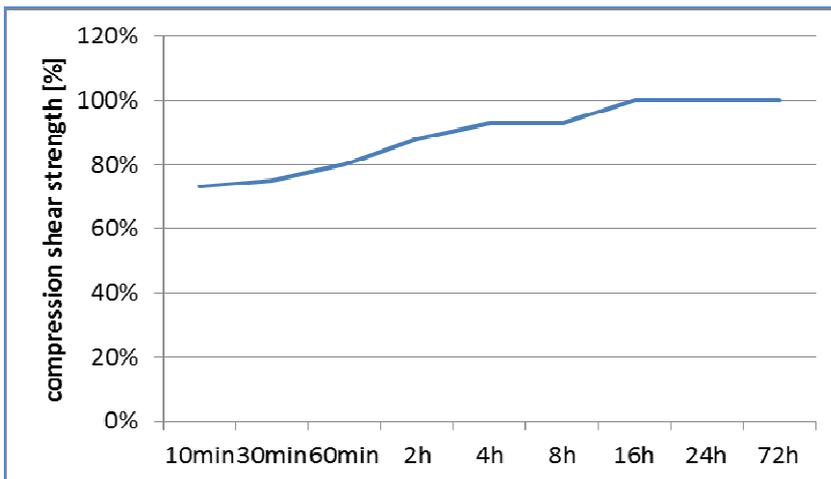
<i>Color</i>	clear- yellowish
preferred clearance [mm]	0,05-0,1
clearance with heat or activator [mm]	up to 0,3-0,4
clearance with light curing [mm]	4
Density [g/cm <sup>3</sup> ] at room temperature (approx. 23 °C)	1.1
Viscosity [mPas] at 23 °C, Brookfield spm 3/10	1200
<i>Curing time until initial strength</i> [min] at room temperature (approx. 23 °C), anaerobic on zinc-phosphated screws	approx. 2- 4

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 shaft-hub joint with activator DELO-QUICK 5006  
 based on initial value at room temperature  
 measured at room temperature (approx. 23 °C)  
 according to ISO 10123



Minimal irradiation time [s] DELO Standard 23, UVA intensity: 60 mW/cm <sup>2</sup> , DELOLUXcontrol	10
Curable layer thickness [mm] DELO Standard 20 UVA intensity: 55 - 60 mW/cm <sup>2</sup> DELOLUXcontrol, DELOLUX 03	4
Off-torque without M(on) [Nm]	30
Off-torque with M(on) 46 Nm [Nm]	60
Compression shear strength after 1 h [MPa] according to ISO 10123	30
<i>Compression shear strength</i> [MPa] according to ISO 10123	40
Compression shear strength glass/glass [MPa] DELO Standard 5 UVA intensity: 55 - 60 mW/cm <sup>2</sup> , DELOLUXcontrol, irradiation time: 60 s	30

Compression shear strength PA/PA [MPa] DELO Standard 5 UVA intensity: 55 - 60 mW/cm <sup>2</sup> , DELOLUXcontrol, irradiation time: 60 s	16
Compression shear strength stainless steel/PA [MPa] DELO Standard 5 UVA intensity: 55 - 60 mW/cm <sup>2</sup> , DELOLUXcontrol, irradiation time: 60 s	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
Tensile shear strength St/St [MPa] DIN EN 1465, sand-blasted	16
Young's modulus [MPa] according to DIN EN ISO 527	1000
Tensile strength [MPa] according to DIN EN ISO 527	30
Elongation at tear [%] according to DIN EN ISO 527	30
Shore hardness D according to DIN EN ISO 868	70
Glass transition temperature [°C] rheometer	110
Coefficient of linear expansion [ppm/K] TMA, in a temperature range of +30 to +95 °C	138
Coefficient of linear expansion [ppm/K] TMA, in a temperature range of +30 to +150 °C	169
Coefficient of linear expansion [ppm/K] TMA, in a temperature range of +95 to +150 °C	203
Shrinkage [%] DELO Standard 13	7.8
Water absorption [%]	1.03
Dielectric constant RF-IV method, 1 MHz	2.8
Dielectric constant RF-IV method, 10 MHz	2.8
Dielectric constant RF-IV method, 100 MHz	2.6
Dielectric constant RF-IV method, 1 GHz	2.2
Specific volume resistance [ $\Omega$ cm] VDE 0303, part 30	3xE16
Surface resistance [ $\Omega$ cm] VDE 0303, part 30	2xE14
Creep resistance CTI VDE 0303, part 11, DIN EN 60112	>600 M

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

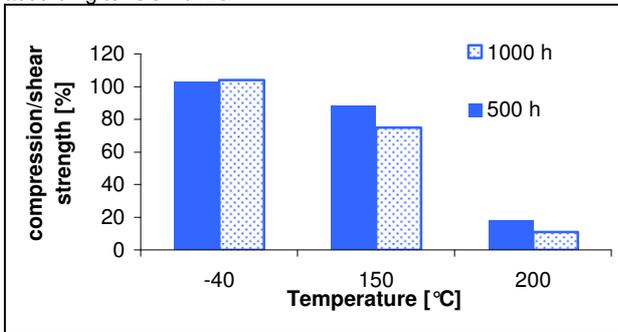
6 months

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

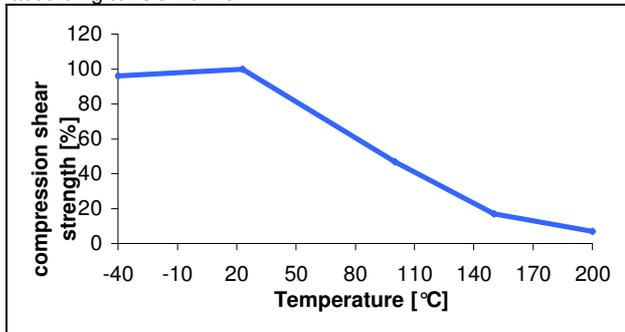
3 months

### Performance under temperature influence

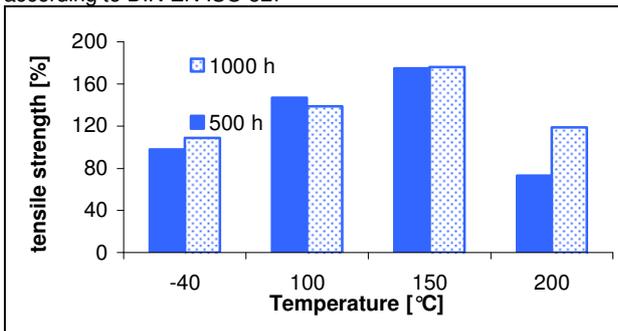
compression/shear strength shaft-hub joint  
after temperature storage  
based on initial value at room temperature  
measured at room temperature (approx. 23 °C)  
according to ISO 10123



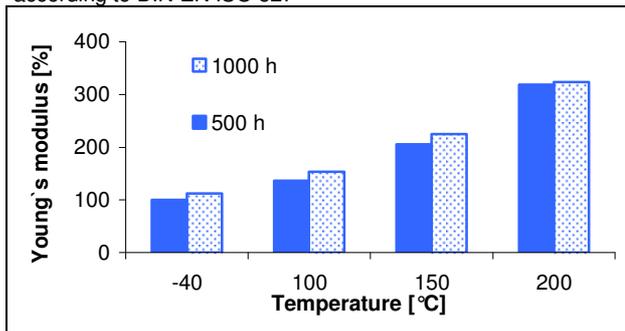
compression/shear strength shaft-hub joint at temperature  
based on initial value at room temperature  
measured at determined temperature  
according to ISO 10123



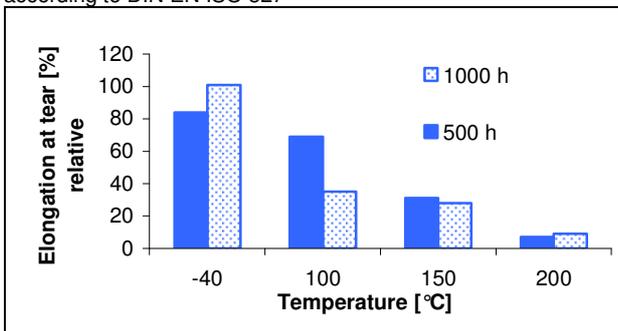
tensile strength after temperature storage  
based on initial value at room temperature  
measured at room temperature (approx. 23 °C)  
according to DIN EN ISO 527



Young's modulus after temperature storage  
based on initial value at room temperature  
measured at room temperature (approx. 23 °C)  
according to DIN EN ISO 527



elongation at tear after temperature storage  
based on initial value at room temperature  
measured at room temperature (approx. 23 °C)  
according to DIN EN ISO 527



## 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 shaft-hub joint [%]
ATF gear oil	110
Diesel fuel	107
engine oil	110
fuel	96

## **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](http://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.