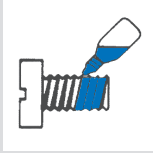
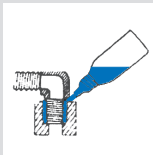


Application examples



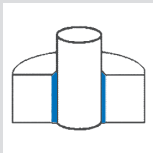
▪ Securing of screws

→ **DELO-ML 5249**
friction value similar to that of an oiled screw, removable, especially optimized for securing screws



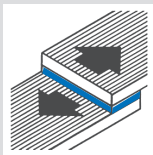
▪ Pipe connections

→ **DELO-ML 5249**, removable



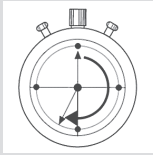
▪ Shaft-to-hub connections

→ **DELO-ML 5327, DELO-ML DB140, DELO-ML DB166, DELO-ML DB180, DELO-ML UB160**
difficult to remove, high-strength bonding, long-term stable even at high dynamic stresses



▪ Grinded and galvanized surfaces

→ **DELO-ML DB133, DELO-ML DB140, DELO-ML DB166, DELO-ML DB180**
difficult to remove, high adhesion on surfaces with low surface roughness ($R_z < 10 \mu\text{m}$), absorption of shear and transverse forces is possible



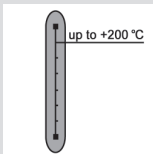
▪ Fast fixing of components

→ **DELO-ML 5327, DELO-ML DB133, DELO-ML DB140, DELO-ML DB166, DELO-ML DB180, DELO-ML UB160**, difficult to remove



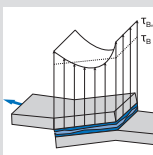
▪ Use in gas-operated installations

→ **DELO-ML 5249**, DIN EN DVGW reg. no. NG-5146BL0234, removable
Curing sealants for threaded connections in fittings and gas-operated devices



▪ Use at high temperatures

→ **DELO-ML 5327**, suitable for permanent use at temperatures of up to +200 °C



▪ Flexibilized setting

→ **DELO-ML DB133**, highly flexible, impact-resistant
→ **DELO-ML DB140, DELO-ML DB166, DELO-ML DB180**, for bonding components with dissimilar coefficients of expansion due to tension-equalizing nature

CONTACT

DELO Industrial Adhesives
Headquarters

► **Germany** · Windach/Munich

- **China** · Shanghai
- **Japan** · Yokohama
- **Malaysia** · Kuala Lumpur
- **Singapore**
- **South Korea** · Seoul
- **Taiwan** · Taipei
- **Thailand** · Bangkok
- **USA** · Sudbury, MA

..... www.DELO-adhesives.com

Our selection charts/material selection guides are a technical selection aid giving an overview of various product variants. We will be pleased to provide you with sales details, such as available container sizes, stock availability and minimum order quantities, on request.

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.

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ADHESIVES

DISPENSING

CURING

CONSULTING

DELO

DELO




SELECTION CHART

DELO-ML

Methacrylates
one-component · anaerobic-curing

DELO-ML anaerobic-curing adhesives

	medium-strength	high-strength						
	anaerobic-curing	anaerobic-curing			anaerobic light-curing			anaerobic UV-curing
Product code	5249	5327	UB160	DB140	DB166	DB180	DB133	
Color cured product	blue	green	green	clear-yellowish/ fluorescent	colorless transparent/ fluorescent	clear-yellowish/ fluorescent	colorless	
Viscosity [mPas] at +23 °C, rheometer	1,900 ¹⁾	300 ¹⁾	7,000 ²⁾	950 ¹⁾	8,000 ²⁾	14,000 ²⁾	700 ¹⁾	
Temperature range of use [°C]	−60 to +150	−60 to +200	−60 to +200	−60 to +180	−60 to +180	−60 to +180	−60 to +150	
For threaded connections up to	all threads	≤ M 10	all threads	all threads	all threads	all threads	all threads	
Off-torque <small>Znph screw M 10/8.8 ISO 10964 M_{OFF} [Nm] at M_{ON} = 46 Nm</small>	50	70	70	n. d.	n. d.	60	55	
Compression shear strength [MPa] with joined connections	by the criteria of ISO 10123	15	33	40	40	30	40	28
	by the criteria of ISO 10123 after 1 h	2	28	30	30	n. d.	24	15
Tensile shear strength [MPa] <small>steel/ steel, sand-blasted</small>	by the criteria of DIN EN 1465	n. d.	16	14	13	14	14	
Curing time at room temperature [min] <small>until initial strength</small>	with Znph screws	5 – 20	2 – 4	2 – 4	1 – 3	1 – 3	3 – 6	
	with stainless steel screws with DELO-QUICK 5004	5	2	2 – 3	n. d.	1	2	
	with stainless steel screws with DELO-QUICK 5910	n. d.	1	n. d.	2	2	2	3
Minimum irradiation time [s] <small>LED lamp 365 nm, intensity: 200 mW/cm² DELOLUXcontrol</small>	DELO Standard 23	← light curing not possible →			10	10	10	25
Elongation at tear [%]	by the criteria of DIN EN ISO 527	n. d.	n. d.	n. d.	30	47	40	130
Final strength [h]	without activator	← 24 →						
Special features of product	multi-purpose sealing of all threads sealing of pipes authorized for gas-operated installations 	fast increased temperature stability secure bonding even on slightly oily surfaces	fast difficult to remove specific high-viscous setting	fast high-strength for flat bonding light curing possible tension-equalizing fluorescent color for adhesive detection	fast high-strength for flat bonding light curing possible flexible tension-equalizing very good humidity resistance fluorescent color for adhesive detection	fast high-strength specific high-viscous setting for flat bonding light curing possible tension-equalizing fluorescent color for adhesive detection	highly flexible impact-resistant equalizes tensions very well for flat bonding UV curing possible	

DB = Dual Bonding **UB** = Universal Bonding

¹⁾ shear rate 10 1/s

²⁾ shear rate 2 1/s

n. d. = not determined

DELO-QUICK activators

Product code	5004	5006	5910	5975
Color	greenish	greenish	bluish	reddish
Fluorescence	–	–	bluish	bluish
Viscosity [mPas] at +23 °C, Brookfield <small>DIN EN 12092</small>	n. d.	n. d.	10	7.000
Solvent	naphtha	acetone	–	–
Evaporation time [min]	5 – 10	5 – 10	–	–
Initial strength [s] with DELO-ML DB140	50	15	60	150

Accelerated curing, pretreatment of passive surfaces

Active surfaces	Passive surfaces
Materials: Non-ferrous metals, such as copper, brass, bronze; low-alloy steel	Materials: High-alloy steels, such as stainless steel; aluminum, zinc, chrome, molybdenum, cadmium; oxide layers; plastics; enameled metals
Curing: Fast Curing can be accelerated by using DELO-QUICK	Curing: Delayed or no curing Curing can be accelerated by using DELO-QUICK
	Instructions for use: Spray or brush DELO-QUICK on passive surface and let it evaporate completely. Then, the components can be bonded.

Product description

DELO-ML are one-component, liquid, solvent-free adhesives based on methacrylates.

Standard temperature range

DELO-ML products are normally used in a temperature range of −60 °C to +200 °C.

Many product properties depend on the temperature and can change permanently, in particular at high temperatures. Therefore, it has to be checked before each use whether a certain adhesive is suitable for the temperatures in the required area of application. Please see the Technical Data Sheet for more information on how our products react to temperatures.

Processing

The products are normally delivered ready for use. They are applied directly from the container or using dispensing units.

Curing

DELO-ML anaerobic curing adhesives cure at room temperature under exclusion of air (anaerobic) with simultaneous metal contact. DELO-ML anaerobic light-curing adhesives can either be cured anaerobic or by irradiation with UV light or visible light (320–450 nm). DELO-ML anaerobic UV-curing adhesives can either be cured anaerobic or by irradiation with UV light (320–400 nm).

Surface pretreatment

To achieve optimum bond strength, the surfaces must be free from dust, oil, grease, separating agents and other contaminations. For cleaning, we recommend using cleaning agents from the DELOTHEN series.

After cleaning, the adhesion of the adhesive can be further enhanced by sand blasting, grinding or pickling the surface.

Preservability

After delivery, in the unopened original container:

see Technical Data Sheet of the product.

The air content in the container prevents premature curing.

Curing of photoinitiated adhesives

Curing with UV light or visible light in the specific wavelength range. DELOLUX LED curing lamps are especially suitable as per the chart below.

Lamp type	DELOLUX 80, DELOLUX 50 and 502, DELOLUX 20 and 202		
	365	400	460
DELO-ML DB133	++	–	–
DELO-ML DB140	++	++	–
DELO-ML DB166	++	++	–
DELO-ML DB180	++	++	–

++ especially suitable

+ suitable

– not suitable

Use

Anaerobic-curing adhesives

- Form-closed connection of axisymmetric components, such as shaft-to-hub connections, fixing of bushes, bearings and pinions
- Securing of screws
- Sealing of pipe, screw and flange connections
- Corrosion protection in bonding gaps

Anaerobic light-curing and anaerobic UV-curing adhesives

have two independent curing mechanisms.

Irradiation with light also makes possible the curing of adhesive in peripheral zones to allow fixing in seconds. Thus, components can be handled faster.

If one of the components is translucent, non-metals can also be bonded.

Thread connections

Thread connections should always be tightened firmly.

ISO 10964 recommends a tightening torque of 40 Nm for comparative testing of screw joints but allows for deviations.

Screw manufacturers require a tightening torque of 46 Nm for the selected screws M 10/8.8.

This tightening torque was also used for the off-torque test mentioned here to enable a practicable comparison between tightening torque and off-torque.

Further information

If bonded connections have contact with aggressive media or high temperatures, high-strength or temperature-stable DELO-ML adhesives are to be used (see also Selection Chart “Media Resistance”).

More type-specific properties are included in the Technical Data Sheets, Material Safety Data Sheets and Instructions for Use.

For application tests and any question you might have regarding the use of DELO products, please do not hesitate to contact our Engineering Department.