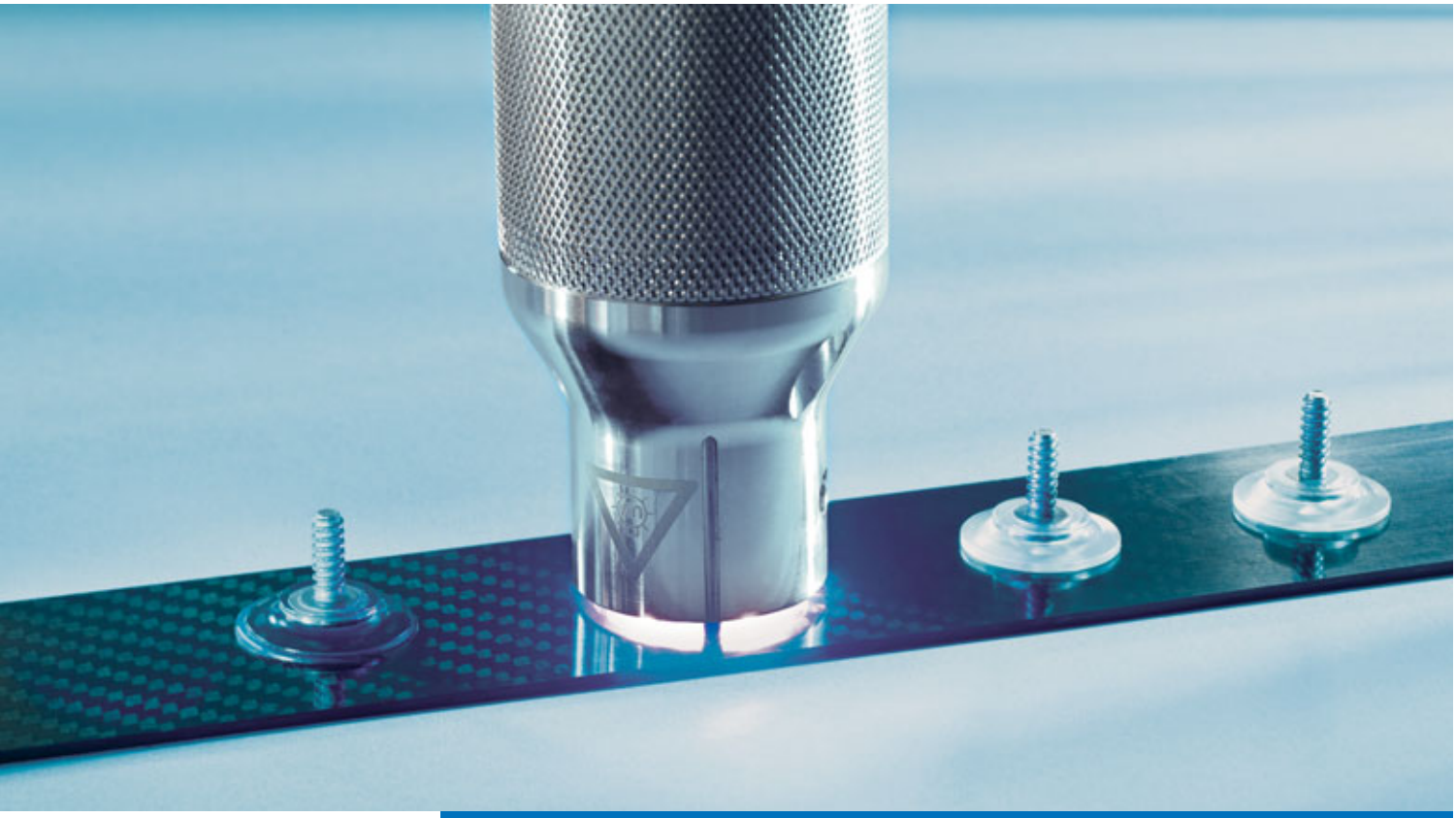


ONSERT®

Quick and process-reliable bonding of fastening elements with light-curing adhesives

A joint project between

BÖLLHOFF
DELO

ONSERT® – Contents

ONSERT® – An efficient joint

An ever increasing diversity of models and variants, new designs and materials as well as reduced development times and product cycles lead to new and versatile tasks when joining most different materials.

The typical tasks include:

- Superior design of design and visible surfaces (customer component)
- Determination of material requirements to be joined (material type and the condition of the joining part surface)
- Flexible fastening technology (platform technology, plastic mouldings, component modifications)
- Diverse process requirements

As a result, Böllhoff, as a specialist in mechanical joining technology, and DELO, as a specialist for intelligent bonding technology, have developed a new fastening system together.

The idea behind:

The advantages of bonding technology are combined with those of detachable screwed connections. Fastening elements made of transparent/translucent plastic with or without metallic thread reinforcements are fixed using light-curing adhesive. The most important aspects are reliable curing of adhesives with short cycle times as well as the geometric fastener design.

The result:

The ONSERT® technology – quick and process-reliable bonding of fasteners. The innovative joining process provides ideal conditions for versatile applications in most diverse industries.

ONSERT® – Advantages

ONSERT® basic

- Optimised design ensures distortion-free surfaces;
  ideal where close tolerance or visual requirements are important
- Fastening elements do not become apparent on the visible side through heat input such as it happens during welding and heat curing
- Processing parameters independent of customer component
- Full mechanical load capacity immediately after irradiation (no post-crosslinking)
- Short curing times (< 5 sec)
- Connection of joint points also after surface treatment (e. g. cathodic dip coating)

ONSERT® – The product range

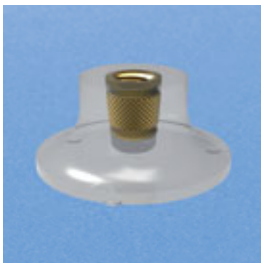
ONSERT® basic – surface connection

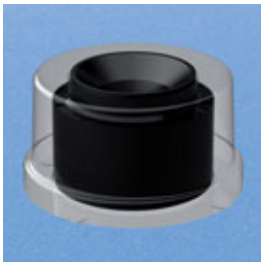
Principle and concept

Optics, haptics and lightweight construction also influence the design of thin-walled components. The use of materials with ever decreasing material thicknesses impedes the use of conventional mechanical or thermal joining processes.
For example, there is a particularly strong load on the joining part (joining forces / joining temperature). This can result in visual and/or mechanical damage to the customer component.
ONSERT® basic is the answer. A transparent plastic sheath is applied to fasteners such as screws, threaded bushes or snap connections. The geometry provides for sufficient bonding surface.

Generally, all geometries which can be produced by injection moulding are possible:

Screwed connections on plastic mouldings, detachable and non-detachable snap connections, adhesive SNAPLOC® fasteners, etc. can be applied to materials such as CFRP, FRP, glass, lacquer, cathodic dip coating, plastic or metal.





DELO – The ideal partner for a secure joint

DELO Industrial Adhesives is a globally successful company specialised in the field of bonding processes for technical applications of growth markets, such as optoelectronics and consumer electronics, RFID, automotive, photovoltaics and mechanical engineering. DELO as a supplier of bonding system solutions provides the development of adhesives to the equipment for dispending and curing as well as individual consulting services during the development process.
Thanks to know-how and individual commitment, DELO customers have been able to rely on fast and reliable solutions for more than 50 years.

Which adhesive is suitable?

There are two product families in the DELO range of adhesive products that are suitable for ONSERT® adhesion. Both cure within seconds with the help of corresponding light. The coordination of DELO and BÖLLHOFF allows optimised processing with ONSERT® elements.

Characteristics of the two product families:

DELO-PHOTOBOND
- Light-curing acrylate
- Curing in less than 10 seconds
- Universal adhesion to various substrates
- Application specific mechanical properties (ultimate elongation, TG, Young's modulus)

DELO-DUALBOND
- 2K-acrylate plus light curing
- Fixing by light in 4 seconds, technical strength after 60 minutes
- Temperature range from -40 °C to +120 °C

The ONSERT® process guarantees optimised adhesive curing since the transmissive elements transmit the light. Adhesives should be chosen individually for your substrate and field of application in consultation with DELO and BÖLLHOFF.
Material examples:
- Fibre-reinforced plastics: CFRP, GRP
- Glass, also coated and printed
- Plastics, such as PBT, ABS, blends, etc.
- Metals

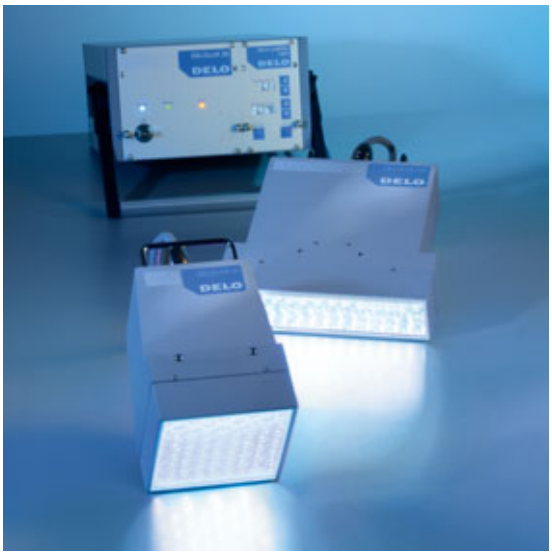
DELO and BÖLLHOFF are pleased to assist you during the entire development process.

DELOLUX Curing lamps

Efficient bonding technology. DELO curing lamps and adhesives are matched to optimise joining processes. The especially developed lamps can be adapted to different surfaces and intensities (cycle times).

- Curing of adhesives within seconds
- Fast and reliable serial processes
- Minimum heat generation at the component (cold light source)
- Achievable service life > 20,000 h (at typical operating conditions)
- Great process reliability due to monitored functions
- No hazardous radiation in UVB or UVC range – high occupational safety

DELOLUX 80
LED curing lamp, light exit area Ø 23 mm



DELOLUX 20 / DELOLUX 202
LED area lamps, light exit area 101 x 101 mm2 (DELOLUX 20) or 48.1 x 198.4 mm2 (DELOLUX 202)

DELOLUXcontrol
Even if the light source is constant, there are influencing variables which considerably affect curing. The decrease in light intensity resulting from dirt or a larger distance between adhesive and lamp (e.g. through misalignment) is often underestimated.
For a reproducible curing process, the light intensity at the component should be regularly checked using the DELOLUXcontrol light intensity meter.

- Monitoring of radiation intensity for completely cured adhesive and reliable production processes
- Measuring heads adapted to lamp type

ONSERT® – Processing systems semi-automatic

- Optimised curing due to special LED lamp geometry
- Reliable due to active cooling and temperature monitoring
- Quick and reliable positioning
- Reduce operator fatigue
- Easy handling
- Flexibility
- Suitable for different element types

ONSERT® – Portable

The new ONSERT® Portable allows manual processing. The joint between the workpiece and the ONSERT® fastener is created with a light-curing adhesive. The adhesive is manually applied to an ONSERT® fastener, then placed in the holder in front of the light source and held in position there by a magnet or mechanical means.

An integrated protective shield guarantees safety at work. A green LED on the base of the device indicates that the device is in the correct home position. Now simply position the device, press down – and the joining process can commence by pressing the start button. The light source switches on for a specified exposure time and the adhesive hardens.

The exposure time and light intensity depend on the adhesive used and the material of the workpiece. The relevant parameters can be set on a PC and transferred to the ONSERT® Portable by USB cable.

Contents :

- ONSERT® Portable setting tool
- Battery
- Recharger
- Adhesive metering gun
- Accessories

ONSERT® – Process description

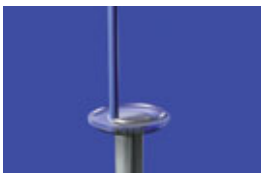
The production process is flexible and consists of only a few steps.

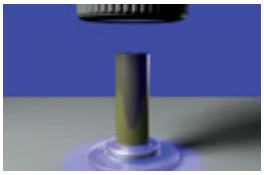
ONSERT® basic – Surface connection

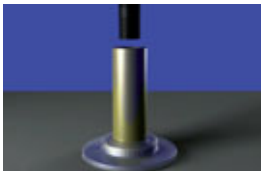
1. Dispensing
The one-component, UV- and light-curing DELO-PHOTOBOND acrylate adhesive is applied to the surface.
The adhesive is dispensed with the DELO-XPRESS 951 pressure tank via up to four pinch valves from the one litre container. The DELOMAT control unit is used for control.

2. Joining
The ONSERT® basic is joined onto the plastic plate.
At least one joining partner – in this case the adhesive boss – must be translucent in the absorbing range of the adhesive.

3. Curing
DELO-PHOTOBOND is irradiated for several seconds (e.g., < 10 s) – until final strength is reached.
All DELOLUX curing lamps, such as the DELOLUX 80 LED lamp, are suitable.

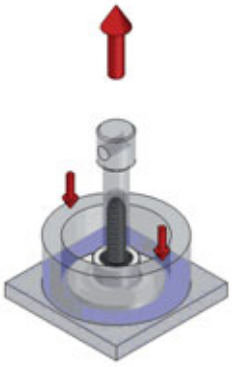






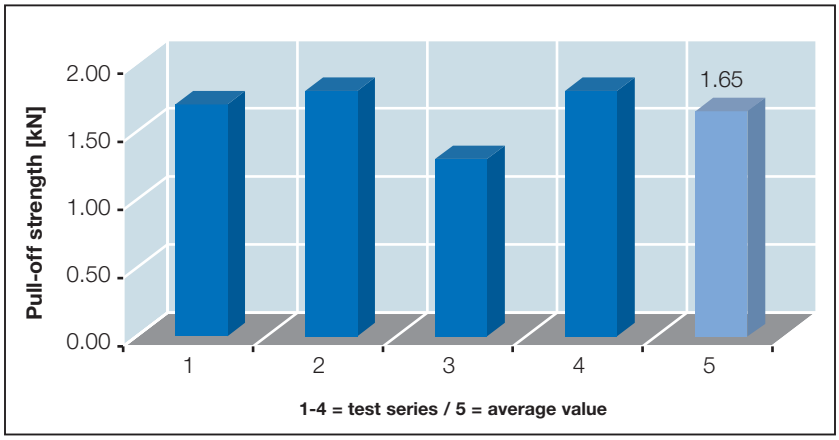
ONSERT® – Technical data

Specimen	F_A [kN]	M_L [Nm]	Deviation F_A [kN]	
1	1.70	8.60	+	–
2	1.80	7.90	0.15	0.35
3	1.30	8.20	**Deviation M_L [kN]**	
4	1.80	9.20	+	–
average velue	1.65	8.48	0.73	0.57



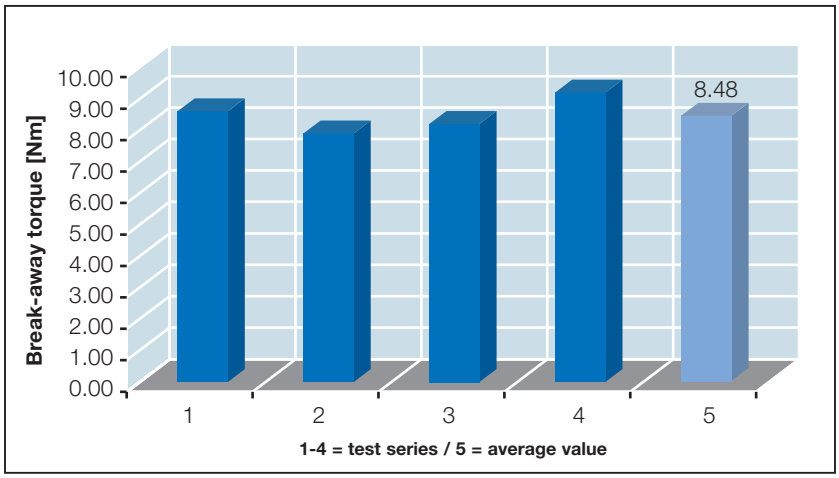
F_A

Mechanical properties with ONSERT® basic FA [kN]



M_L

Break-away torques with ONSERT® basic ML [Nm]



Test set-up

ONSERT® thread bolts T 5; substrate: steel; component surface: cathodic dip coating; adhesive: DELO-PHOTOBOND AD494; thickness of adhesive layer: 0.2 mm; light source: DELOLUX 80; irradiation time: 5 sec; lamp distance: 32 mm

Ageing

VDA climate change test: Joint stability remains constant after a four-week storage period.
After 1,000 hours of storage in Skydrol (hydraulic fluid used in aviation technology), the joint stability is not significantly reduced.

The data given are typical average values or specific values that have been determined once under laboratory conditions. Therefore, the data and information provided are no guarantee or assurance of certain product characteristics. They do not indicate the suitability of the product for a certain purpose.

ONSERT® – Fields of application

White goods

- Glass panels, plastic linings for displays, surface-coated coverings for electrical household appliances such as refrigerators, freezers, electric cookers, washing machines, dishwashers, hoovers and laundry dryers

Aerospace

- Connection of joint points on lightweight structures (sandwich materials, CFRP, aluminium)
- Easy handling due to optimised and flexible processing devices
- Easily controllable/reproducible process

Automotive industry

- Bodyshell, car structures
- Mounting of coverings
- Connection of fixing points after cathodic dip coating
- Alternative to welding elements on materials which are not suitable for thermal joining and very thin-walled components
- Independent from previous processes and flexible in use
- Easy repair solutions

Böllhoff International with companies in:

Argentina
Austria
Brazil
Canada
China
Czech Republic
France
Germany
Hungary
India
Italy
Japan
Mexico
Poland
Romania
Russia
Slovakia
South Korea
Spain
Switzerland
Thailand
Turkey
United Kingdom
USA

Apart from these 24 countries, Böllhoff supports its international customers in other important industrial markets in close partnership with agents and dealers.

Böllhoff Group
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