Kisling

Custom joint solutions for electric motors, electrical and electronic components

ergo.® Adhesives and adhesive systems by Kisling

Adhesive solutions for electric motors and electrical and electronic components

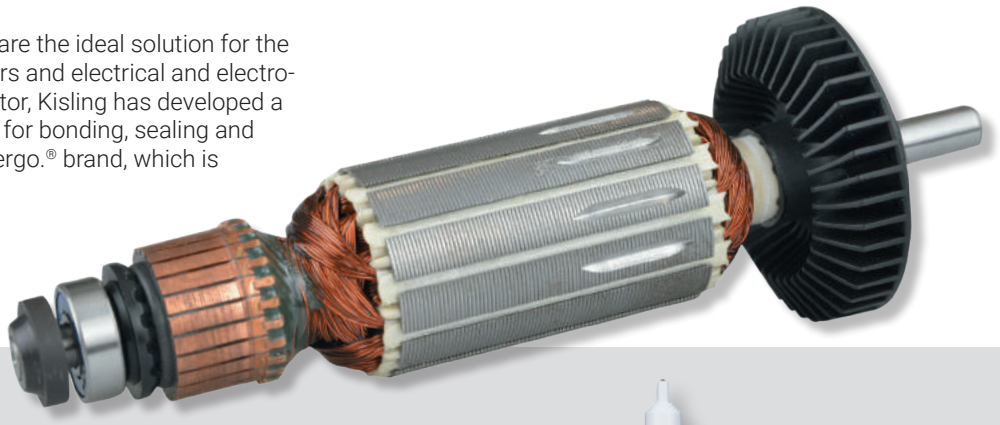
ADHESIVE BONDING AS AN ALTERNATIVE TO MECHANICAL COUPLING

The use of modern, high-performance materials in electric motors has resulted in significant improvements in weight, size and output. It is the advancement in modern adhesive technology that has made these improvements possible

Modern adhesives allow a wide range of material combinations to bond together, that in the past would have been almost impossible; examples are metal-to-metal joins or plastics with ferrites. Adhesives equalise the tensions between different materials this occurs when temperatures change owing to the different coefficients of expansion. In addition, they offer extra functions such as vibration damping, electrical insulation and corrosion protection. On top of this, bonding techniques simplify assembly and result in significant cost savings.

Tough elasticised adhesives are the ideal solution for the construction of electric motors and electrical and electronic components. For this sector, Kisling has developed a custom portfolio of products for bonding, sealing and casting/moulding under the ergo.® brand, which is divided into four categories:

- (Meth)acrylate adhesives for high-performance, tension-equalising and temperature-resistant bonding of various materials
- No-mix structural adhesives for rapid bonding of ceramic and ferrite parts
- Silicones for sealing enclosures and cable entry points and for the casting of sensors and electrical components
- Epoxy resins for moulding windings, plugs and securing screws



The growing proportion of (meth) acrylate and epoxide-based adhesives in the construction of electric motors and electrical components is down to the advantageous properties:

- Low-cost, reliable bonding of various materials
- Superb adhesion and joining with very low weight
- Rapid curing
- Good elasticity (methacrylate)
- High strength even at high temperatures
- High process reliability thanks to automatic dosing

In this brochure, you can discover advice on what adhesives to use with what application. Kisling offers adhesive solutions for all aspects of assembly and recommendations can guide you to the correct product selection.

About Kisling

ADHESIVES FOR THE MOST DEMANDING APPLICATIONS

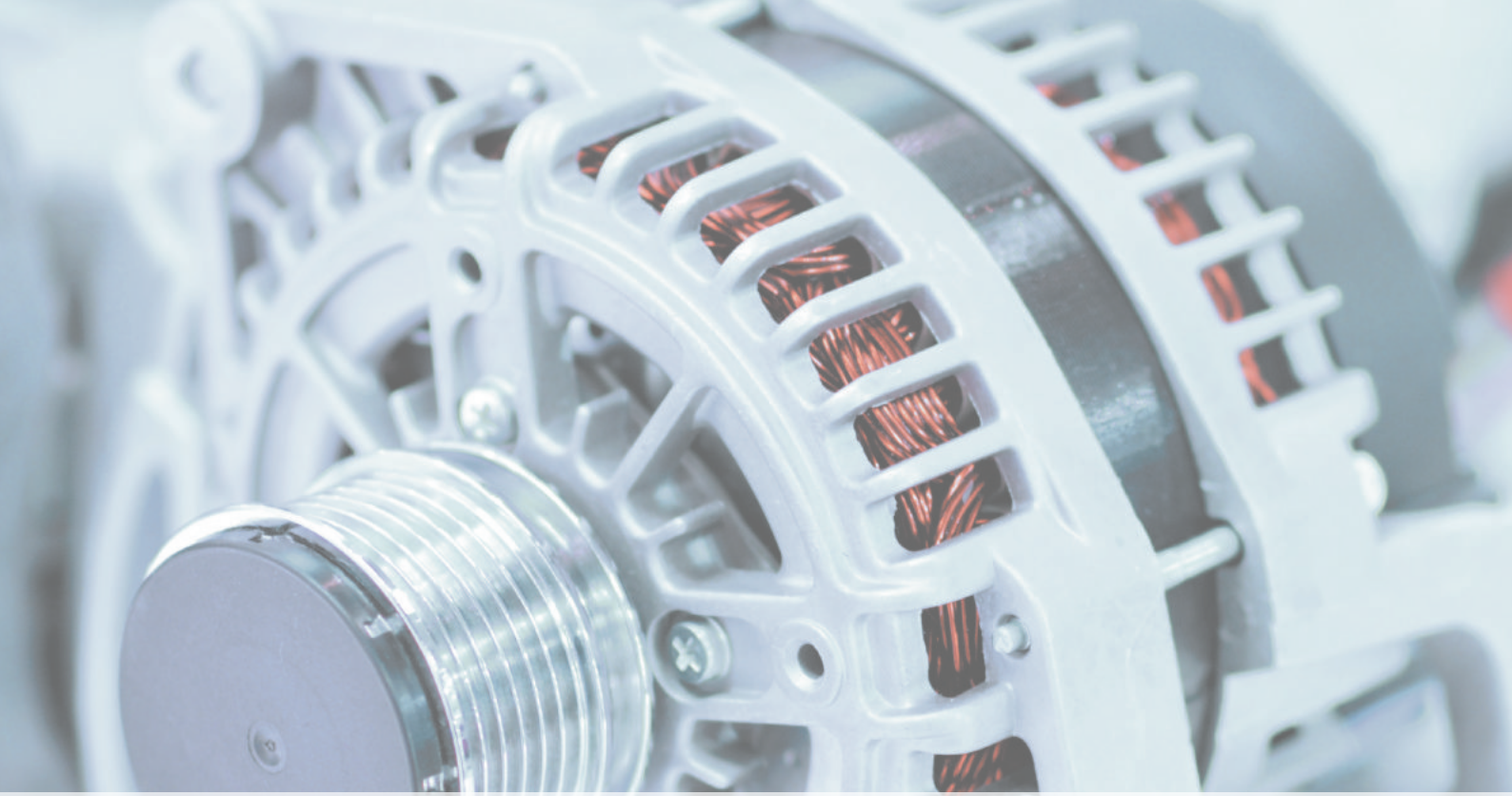
Kisling is one of the leading manufacturers of adhesives and sealants. Our international sales and distributor network supplies some 3500 customers in industry (OEM and supplier industries) and specialist retail with innovative, high-quality products.

With many years of experience in developing and manufacturing custom adhesives, Kisling is the right partner for every application. You too can benefit from our professional application consulting and service. Find out more at www.kisling.com.

CUSTOM PRODUCT DEVELOPMENT

Kisling works in a technical partnership with its customers for product development. Our chemists and process engineers support you in selecting the appropriate adhesives to meet your requirements and to adapt these to your processes. Where necessary we can develop adhesive and sealant solutions on a custom basis and support you in the introduction of new products. At the centre is the security and long-term reliability of the adhesive bonds.

The ergo.® brand from Kisling represents outstanding solutions and unrivalled service.

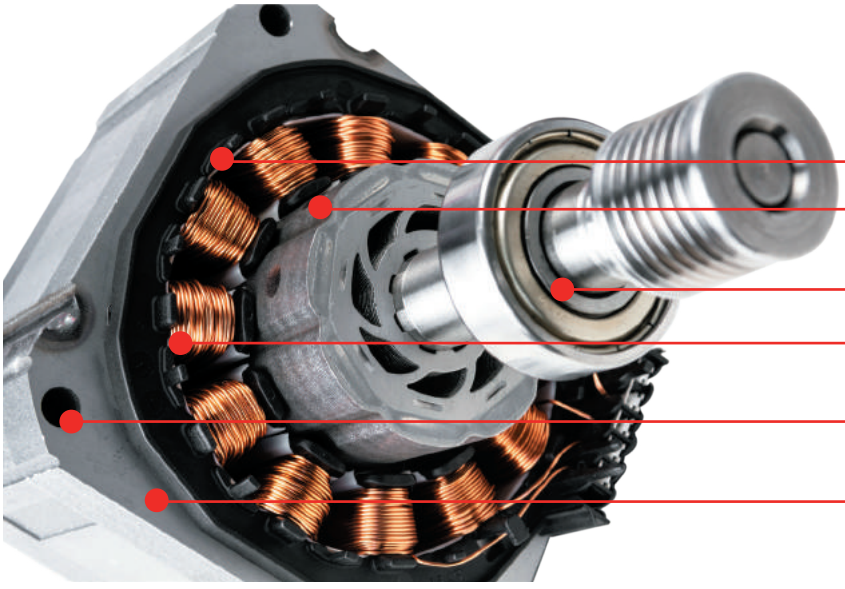


Examples of adhesives used in one electric motor

PRECISE SOLUTIONS FOR THE BONDING OF COMPONENTS

The high-quality adhesives, sealants and casting compounds from ergo.® offer the following advantages;

- Single source
- Ease of finishing and rapid fixing
- Low noise levels
- Excellent adhesion
- Gap-filling to match to manufacturing tolerances
- High-temperature applications (up to 180°C)

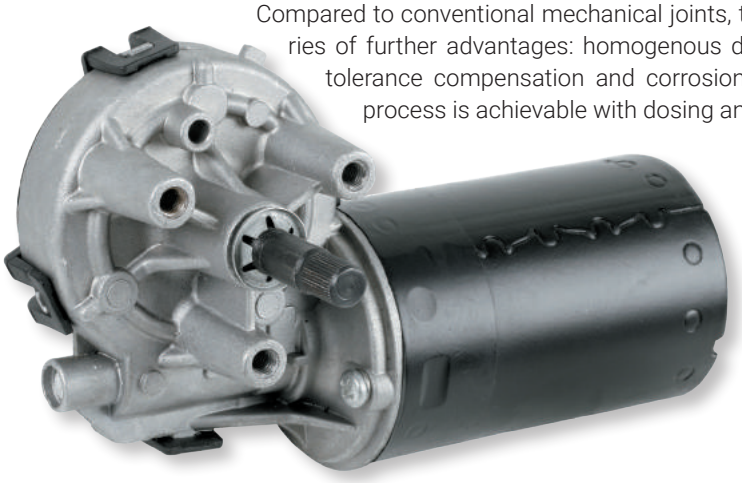


Magnet bonding to high tolerance fit

ADHESIVE BONDING AS AN ALTERNATIVE TO MECHANICAL SECURING

Once built into an electric motor, magnet adhesives must withstand extreme demands. They must counter electromagnetic force fields for extended periods and withstand stretch and cyclic mechanical loads. The bonding of the magnets to the motor must be as tolerant as possible towards temperature fluctuations, moisture and operating materials.

For the effective bonding of magnets into electric motors, not only not only is the correct surface treatment important but also the correct choice of adhesive. A decisive factor for the suitability of an adhesive is its ability to handle mechanical shock, stretching and temperature change.



Compared to conventional mechanical joints, the ergo.® range of adhesives from Kisling offers a series of further advantages: homogenous distribution of tension, suppression of vibration noise, tolerance compensation and corrosion protection. Full automation into the manufacturing process is achievable with dosing and metered applicators.

THE ADVANTAGES:

- Automatic dosing can in some cases be achieved using Rotorspray
- Rapid initial strength and through-curing
- Tension compensation
- Good gap bridging
- High temperature resistance
- Minimises running noise
- Corrosion protection

FIND THE RIGHT ADHESIVE

sorted by **Fixing times [min]**	sorted by **Final strength [h]**	sorted by **Gap-filling capability [mm]**	sorted by **Temperature stability [from/to °C]**	**Low-odour**
ergo.® 1039 [0.5]	ergo.® 1925 [~4]	ergo.® 1675 [10]	ergo.® 1910 [-50/+180]	ergo.® 1039
ergo.® 1675 [2-3]	ergo.® 4451 [~4]	ergo.® 1925 [2]	ergo.® 1039 [-55/+150]	ergo.® 1307
ergo.® 4451 [2-5]	ergo.® 1675 [~12]	ergo.® 1810 [0,5]	ergo.® 4451 [-55/+150]	ergo.® 1315
ergo.® 1315 [5-6]	ergo.® 1307 [~12]	ergo.® 1039 [0,5]	ergo.® 1315 [-40/+150]	ergo.® 1675
ergo.® 1810 [10]	ergo.® 1315 [~12]	ergo.® 1910 [0,15]	ergo.® 1810 [-40/+150]	ergo.® 1810
				ergo.® 1925

ergo.® 1039: Gel-based, extremely rapid curing 2K NoMix product, tough elasticised and therefore highly resistant to knocks and impact, superb bonding to metals, glass, ceramics and ferrite.

ergo.® 1307: Modified, high-strength, rapid-curing 2K methyl acrylate for the bonding of aluminium, steel, brass and plastics.

ergo.® 1315: Modified, low-odour, extremely rapid curing 2K methyl acrylate for the bonding of aluminium, steel, copper, ferritic materials and plastics.

ergo.® 1675: Low-odour, stable 2K methyl acrylate for structural bonding of thermoplastics, metals and composite materials. Bridges gaps up to 10 mm.

ergo.® 1810: Low-odour, high-strength, shock-resistant, gap-filling 2K urethane methyl acrylate for the bonding of aluminium, steel, brass, ferrite and ceramics.

ergo.® 1910: Highly temperature-stable methyl acrylate for the bonding of aluminium, steel, brass and plastics such as ABS, hard PVC, PMMA, PC, GRP.

ergo.® 1925: Odour neutral, slow-curing methyl acrylate with high flash point for the bonding of aluminium, steel, copper, ferrites and plastics such as ABS, PVC, PC, PS.

ergo.® 4451: Dimethacrylate, anaerobically curing, with rapid curing and for the highest shear stresses under static and dynamic loading. For fixing bearings to shafts and gear wheels and pulleys to rotor shafts.

The products listed above are only a small selection of our extensive range. If you are looking for a different product, visit our website www.kisling.com or contact our customer services department: Switzerland +41 58 272 02 72 / Germany +49 8171 99982 30.

The secure replacement for feather keys, wedges and pins

RETAINING GEAR WHEELS AND BEARINGS

The fitting of gear wheels, bearings or pulleys to shafts or in housings demands a secure join. Mechanical fixings such as wedges and pins affect the distribution of mass and can result in an imbalance that must be compensated. Additionally, relative movements in the micro range can encourage the formation of frictional corrosion. Other forms of joining such as force fits, press fits and shrink fits, which allow a secure frictional connection, require a high tolerance of fit, meaning high manufacturing costs.

The ergo.® adhesives from Kisling achieve high shear strengths with a considerably simpler and more economical process. The adhesive surface bears the forces applied uniformly, so avoiding tension peaks and notch effects. The adhesives bridge manufacturing tolerances of up to 0.2 millimetres and thanks to their complete adhesive coverage, provide excellent protection from corrosion.

THE ADVANTAGES:

- Uniform, secure load transfer
- None seizing, even with press fits
- Resistant to water, humidity, high
- temperatures and chemicals
- Medium-strength, resoluble or permanent products available

FIND THE RIGHT ADHESIVE

sorted by **Rapid fixing [min]**	sorted by **Max. thread Ø**	sorted by **Final strength [h]**	sorted by **Gap filling [max. mm]**	sorted by **Temperature stability [from/to °C]**
ergo.® 4453 [2-6]	ergo.® 4401 [M12]	ergo.® 4453 [2-4]	ergo.® 4460 [0.20]	ergo.® 4460 [-55/+200]
ergo.® 4401 [5-10]	ergo.® 4430 [M12]	ergo.® 4401 [3-6]	ergo.® 4401 [0.15]	ergo.® 4453 [-55/+175]
ergo.® 4430 [5-10]	ergo.® 4453 [M20]	ergo.® 4430 [3-6]	ergo.® 4430 [0.15]	ergo.® 4401 [-55/+150]
ergo.® 4460 [30-40]	ergo.® 4460 [M36]	ergo.® 4460 [12-24]	ergo.® 4453 [0.15]	ergo.® 4430 [-55/+150]

ergo.® 4401: Universally applicable, medium-strength adhesive for fixing bearings in bushings and wheels onto shafts.

ergo.® 4430: Methyl acrylate adhesive for high-strength mounting of bearings, gear wheels and drive wheels. Particularly recommended in conjunction with press fits.

ergo.® 4453: Rapid curing, heat-resistant dimethacrylate for attaching cylindrical components with high resistance to acids and alkaline solutions. (Complies with the guidelines of the German Federal Environment Agency for use in contact with drinking water.)

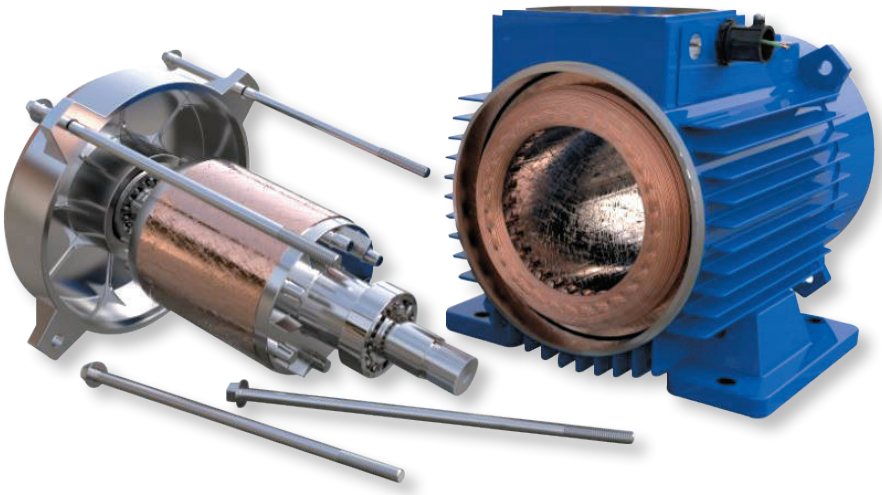
ergo.® 4460: Highly temperature-tolerant adhesive for high-strength bonding of cylindrical joints that are exposed to prolonged high temperatures. (Complies with the guidelines of the German Federal Environment Agency for use in contact with drinking water.)

Secure protection against vibrations and dynamic loading

SECURING SCREW AND BOLT

A screw retainer must hold two or more components securely together, particularly under load. With dynamic loads in the axial or transverse directions, relative movements occur in mechanical joints that over time can lead to loss of pre-load. Even rib washers, serrated washers and spring washers cannot prevent a loss of pre-load over time, and with this comes a failure of the bolted joint.

The liquid, chemically crosslinking ergo.® screw retainer from Kisling provide a secure join even under vibrations and dynamic loads.



THE ADVANTAGES:

- Complete material closure
- Complete tightness of joint
- Corrosion protection
- No damage to component surfaces (unlike with rib washers or spring washers)
- Constant adhesion factors facilitate screwing in and result in secured prestressing
- No stocks of mechanical screw retentions required
- Extremely high vibration resistance

FIND THE RIGHT ADHESIVE

sorted by **Fixing time [min]**	sorted by **Max. thread Ø**	sorted by **Final strength [h]**	sorted by **Gap-filling capability [mm]**	sorted by **Temperature stability [from/to °C]**
ergo.® 4052 [5-15]	ergo.® 4052 [M36]	ergo.® 4052 [1-3]	ergo.® 4052 [0.25]	ergo.® 4052 [-55/+150]
ergo.® 4100 [10-20]	ergo.® 4100 [M36]	ergo.® 4100 [3-6]	ergo.® 4100 [0.25]	ergo.® 4100 [-55/+150]
ergo.® 4115 [ca. 60]	ergo.® 4115 [M36]	ergo.® 4115 [12-24]	ergo.® 4115 [0.20]	ergo.® 4115 [-55/+200]

ergo.® 4052: Medium-strength, universal screw retention, complies with the recommendations of the German Federal Environment Agency for use in direct contact with drinking water. Rapid curing on passivated surfaces and stainless steel.

ergo.® 4100: High-strength screw retention for securing screw and bolt joints, including for use in service water and drinking water. Difficult to remove with ordinary tools.

ergo.® 4115: High-strength screw retention for screw and bolt joints subjected to high stresses and temperatures. For securing and sealing bolts, studs, nuts, thread inserts and screw plugs.

The products listed above are only a small selection of our extensive range. If you are looking for a different product, visit our website www.kisling.com or contact our customer services department: Switzerland +41 58 272 02 72 / Germany +49 8171 99982 30.

Secure protection against leakage

SEALING FOR GEARBOXES AND ENGINE HOUSINGS

Interface sealants are designed to protect gearboxes and engine housings from leakage of oil and lubricants as well as to prevent the entry of moisture, other liquid or gases. Conventional solid gasket seals do not offer 100% protection against leaks. The contact pressure exerted by the pre-loaded bolts can result in settling effects or a drifting of the sealant, and over time to a loss of pre-loading and ultimately a loss of the seal.

Anaerobic ergo.® sealants from Kisling seal metal gearboxes and engine housings reliably and durably. They create a complete material closure between the components and exhibit flaw-free adhesion. Bolts that have been initially tightened do not need to be retightened, since no settling effects occur. This is an another important advantage: No need to keep stocks of solid sealants - an interface or flange sealant from ergo.® is sufficient.

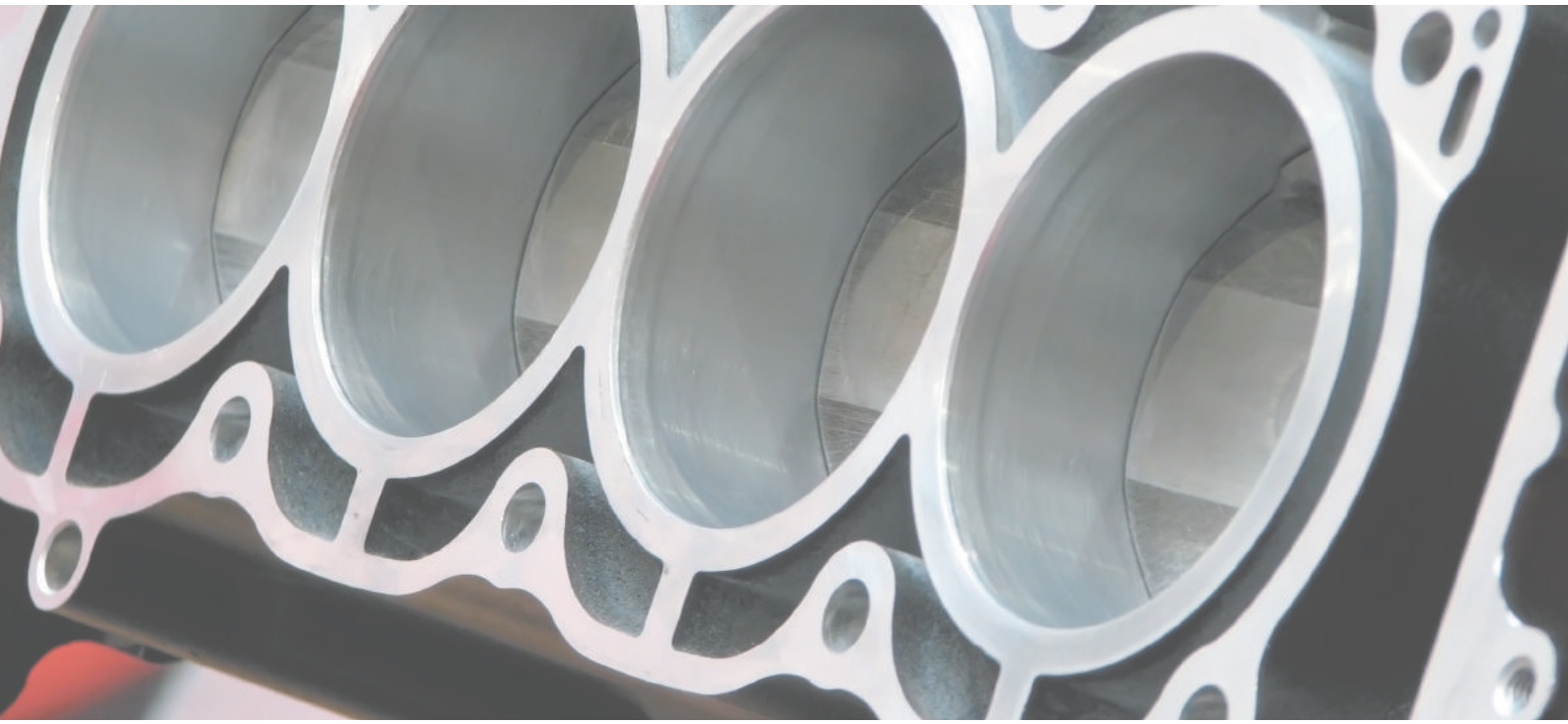
THE ADVANTAGES:

- No settling effects
- Universal application for any component geometry
- Reduced warehousing costs
- High tolerance compared to many media used in industry
- Reinforcement of components thanks to adhesion to surfaces
- Effective corrosion protection
- Simple to apply even to complex geometries - directly from the packaging or by brush, roller, screen printing or robot

FIND THE RIGHT SEALANT

ergo.® 3110: Neutral curing, elastic 1K RTV silicone for sealing housings with gaps of up to 2 mm. Also suitable for cable entries. Low-odour, non-corrosive. Cure through of 2-3mm per 24h at 23°C/50% r.h. Elongation of ~550% and tear strength of ~2 N/mm2.

ergo.® 4252: Anaerobic sealant for flanges and housings with gaps up to 0.5 mm. Adds further strength to the parts. Also suitable for use in service and drinking water systems and in food-handling environments. Shear strength of 4 - 11 N/mm^2. Functional strength after 3 - 6h. Final strength after 24h.



Secure protection for sensitive components

ENCAPSULATION OF CABLE ENTRIES AND ELECTRICAL COMPONENTS

Electronic components require dependable protection against the effects of vibration, impact, moisture, liquids and gases. Encapsulating is an effective solution offering partial or complete protection for cable entries, cavities for contacts, capacitors, relays, sensors, coil bodies and PCBs.

Three product categories from the ergo.® range are relevant for the encapsulation of sensitive components; they require and generate only limited heat for the curing process:

- Modified ergo.® 2K methyl acrylates are especially suited for the encapsulating of cables into plugs and for gas-tight sealing of contacts. Special properties: high strength with plastics and metals, elasticity, rapid curing, tolerant of humid conditions, good dosing.

- ergo.® epoxide resins are used specifically for casting contact cavities in connectors, contact bars and securing screws. Special properties: UL-V0-tested versions with good adhesion spectrum, tac free surface, practically emission-free, easy storage.

- Flexible ergo.® 2K silicones are particularly suited to sealing housings or cable entries, for casting sensors, coil bodies, electronic components and as an impact-absorbing buffer for components on a board. Special properties: high UV and weather resistance, easy application, high elasticity, low shrinkage, high temperature resistance.

OUR FAVOURITES FOR CASTING SOLUTIONS

sorted by **Fixing times [min]**	sorted by **Final strength [h]**	sorted by **Hardness (Shore)**	sorted by **Temperature stability [from/to °C]**	**Low-odour**
ergo.® 1307 [2-5]	ergo.® 1307 [12]	ergo.® 7390 [70-75 D]	ergo.® 3210 [-40/+200]	ergo.® 1307
ergo.® 7390 [~45]	ergo.® 3210 [48]	ergo.® 1307 [~70 D]	ergo.® 7390 [-40/+180]	ergo.® 3210
ergo.® 3210 [~6-8 h]	ergo.® 7390 [168]	ergo.® 3210 [30-35 A]	ergo.® 1307 [-40/+130]	ergo.® 7390

ergo.® 1307: Modified 2K methylacrylate with good adhesion to aluminium, steel, brass and plastics

ergo.® 3210: Modified, permanently elastic silicone for casting gaps and components

ergo.® 7390: Flowable, self-levelling epoxide resin for casting of electronic and electrical components

Curing can be considerably accelerated by the application of heat.

The products listed above are only a small selection of our extensive range. If you are looking for a different product, visit our website www.kisling.com or contact our customer services department: Switzerland +41 58 272 02 72 / Germany +49 8171 99982 30.

Find the correct accessories

DISPENSING GUNS AND MIXERS

	Product	Designation	Mixing ratio	DISPENSING GUNS					MIXERS							
				4472101 Dispensing gun, manual / 1:1 & 1:2 / 50ml	4472105 Dispensing gun, manual / 10:1 / 50ml	4472111 Dispensing gun, pneumatic / 1:1 & 2:1 / 50ml	4472200 Dispensing gun pneumatic / 1:1 & 2:1 / 200ml	4472300 Dispensing gun, manual / 1:1 & 1:2 / 200ml	4472063 T-mixer, B system / 1:1 & 2:1 / 50ml	4472066 T-mixer + dosing tip, B system / 1:1 & 2:1 / 50ml	4472007 Helix mixer, B system / 1:1 & 2:1 / 50ml	4472055 Helix mixer + dosing tip, B system / 1:1 & 2:1 / 50ml	4472046 Quadro mixer, B system / 1:1 & 2:1 / 50ml	4472043 Helix mixer, B system / 4:1 & 10:1 / 50ml	4472047 Quadro mixer, F system / 1:1 & 2:1 / 200ml	4472058 Helix mixer, F system / 1:1 & 2:1 / 200ml
(Methyl) methacrylates	1307.050.DK.E500	Universal structural adhesive, low-odour	1:1	●		●			●	●	●	●	●			
	1315.050.DK.E500	Universal structural adhesive, low-odour, heattolerant	1:1	●		●			●	●	●	●	●			
	1675.050.DK.E500	Rapid structural adhesive, low-odour	10:1		●									●		
	1810.050.DK.E500	Structural adhesive, metal / ferrite, low-odour	1:1	●		●			●	●	●	●	●			
	1910.050.DK.E500	Structural adhesive, metal / ferrite, high-temperature	1:1	●		●			●	●	●	●	●			
	1925.050.DK.E500	Universal structural adhesive, low-odour	1:1	●		●			●	●	●	●	●			
Silicones	3210.050.DK.E503	2K addition silicone (casting compound)	1:1	●		●			●	●	●	●	●			
	3210.200.DK.E500	2K addition silicone (casting compound)	1:1				●	●							●	●

Aids for the best adhesion results

ACCESSORIES AND AUXILIARY PRODUCTS

For best results, surfaces must be free of dust, grease, oils and finger marks. Depending on the material, we recommend the use of a metal or plastics cleaner from Kisling.

To ensure that the adhesive is accurately applied, Kisling has assembled a selection of dosing aids. The selection includes aids such as dosing needles and dosing tips.

SURFACE CLEAN

Type	Description	Packaging	Content	Article-number
ergo.® 9153	Adhesive remover	Plastic bottle	20ml	9153.020.H1.E500
ergo.® 9153	Adhesive remover	Plastic bottle	1l	9153.01L.HK.E500
ergo.® 9153	Adhesive remover	Plastic bottle	20l	9153.20L.HK.E500
ergo.® 9190	Universal metal cleaner	Aerosol	150ml	9190.150.SD.E506
ergo.® 9190	Universal metal cleaner	Aerosol	500ml	9190.500.SD.E506
ergo.® 9190	Universal metal cleaner	Metal canister	5l	9190.05L.BK.E500
ergo.® 9195	Universal plastics cleaner	Aerosol	150ml	9195.150.SD.E506
ergo.® 9195	Universal plastics cleaner	Aerosol	500ml	9195.500.SD.E506
ergo.® 9195	Universal plastics cleaner	Metal canister	5l	9195.05L.BK.E500

LUER LOCK POLYETHYLENE DOSING TIPS

Type	Description	Contains quantity	Article-number
4492561	Internal Ø 0.26 mm, red	25	4492561
4492501	Internal Ø 0.41 mm, blue	25	4492501
4492511	Internal Ø 0.58 mm, pink	25	4492511
4492521	Internal Ø 0.84 mm, green	25	4492521
4492531	Internal Ø 1.20 mm, grey	25	4492531
4492541	Internal Ø 1.55 mm, olive	25	4492541

NYLON DISPOSABLE NEEDLES

Type	Description	Contains quantity	Article-number
4492101	Internal Ø 0.16 mm, 1/2", lavender	25	4492101
4492111	Internal Ø 0.21 mm, 1/2", transparent	25	4492111
4492121	Internal Ø 0.26 mm, 1/2", red	25	4492121
4492131	Internal Ø 0.34 mm, 1/2", orange	25	4492131
4492141	Internal Ø 0.41 mm, 1/2", blue	25	4492141
4492151	Internal Ø 0.50 mm, 1/2", violet	25	4492151
4492161	Internal Ø 0.58 mm, 1/2", pink	25	4492161
4492171	Internal Ø 0.84 mm, 1/2", green	25	4492171
4492181	Internal Ø 1.37 mm, 1/2", yellow	25	4492181
4492191	Internal Ø 1.60 mm, 1/2", olive	25	4492191

For further information please contact our customer services department, Switzerland +41 58 272 02 72 / Germany +49 8171 99982 30

KISLING AG – FOR INNOVATION AND QUALITY.
Kisling AG is one of the leading providers and manufacturers of adhesives and sealants.
We would be pleased to advise you on adhesive related matters.

04-2019, 4491273

Kisling **WWW.KISLING.COM**

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