Adhesives and Sealants

Guide for Users

aerospace
climate control
electromechanical
filtration
fluid & gas handling
hydraulics
pneumatics
process control
sealing & shielding

Parker Prädifa

ENGINEERING YOUR SUCCESS.

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Adhesives and Sealants

For assembly, maintenance and repairs

Useful aids for many purposes: The Parker Seal Group's Adhesives and Sealants product line offers you a comprehensive range of solutions for various tasks in the field of maintenance, repair and operations (MRO). This guide provides you with clearly structured information on the products available, the tasks for which they are best suited and the things that need to be observed when using them. For quick reference, the key information has been summarised again in a product overview at the end of this brochure. Enjoy using our products. We trust that they will help you to successfully accomplish the tasks for which we have designed them.

The adhesives and sealants product families

- Anaerobic threadlockers
- Anaerobic retainer adhesives
- Anaerobic gasketing compounds for pipes and flanges
- Instant adhesives
- Epoxy adhesives

Technical sprays and liquids

complement the portfolio and perform the following tasks

- Cleaning and degreasing
- Activating
- Mounting
- Loosening, separating, lubricating, care
- Checking
- Hand care and protection

Easy handling and convenient dosing

The pen system assures extremely easy handling. Convenient dosing allows clean application of the products and sparing use.

Task and Products Solution

Locking of threads

Screws, bolts, nuts, threads, studs, etc.

- Locking, fastening, sealing
- Prevention of seizing, binding and fretting (corrosion) in the thread

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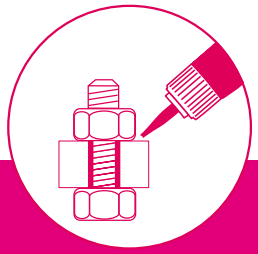

Anaerobic threadlockers

Retaining of joining parts

Bearings, bushings and other cylindrical parts on shafts and in housings

- Repairs of worn joining parts
- Prevention of seizing, binding and fretting (corrosion)
- Allows transmission of larger forces

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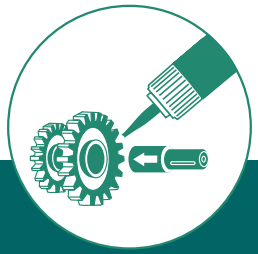

Anaerobic retainer compounds

Sealing of pipes, tubes, threads and flanges

Hydraulics and pneumatics connections, compressed air and coolant lines, flanges, housings, covers etc.

- No leakage of liquid or gaseous substances
- Prevention of seizing, binding and fretting (corrosion)
- No seal setting
- No clogging or contamination of valves (as may be the case when using teflon tapes, hemp or pastes)

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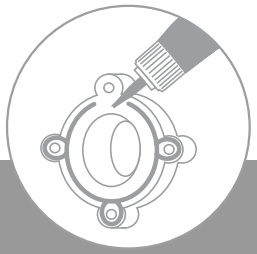

Anaerobic gasketing compounds

Structural gluing and repair jobs

Bonding of various materials

- Connections with high tensile and impact strength
- Can be mechanically finished and painted after curing
- Nearly shrinkage-free curing
- No straining of the materials

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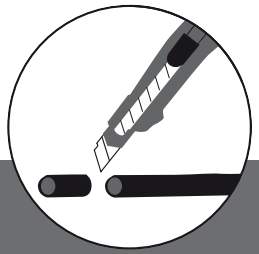

Epoxy adhesives

Bonding within seconds

Bonding of various materials

- Quick curing/assembly
- High strength
- Bonded parts can be immediately handled
- Allows simple assemblies to be made

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Instant adhesives

Technical sprays and liquids

For various uses:

- Cleaning and degreasing
- Activating
- Mounting
- Loosening, separating, lubricating, care
- Checking
- Hand care and protection

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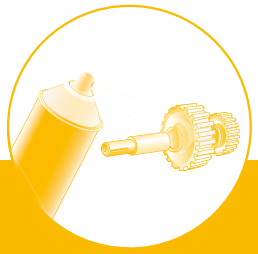


Technical sprays and liquids

Anaerobic Threadlocker Adhesives

TL series

For unmounted parts

What strength is required?

	low	medium	high	
Viscosity [mPa.s]	1,000	2,000 - 7,000	700 - 1,000	500
Thixotropy	medium	medium	low	low
Breakaway force	low	medium	high	high
Breakaway force [Nm]	4 - 8	17 - 22	30 - 35	28 - 35
Finger strength at room temperature [min]	10 - 20	10 - 20	2 - 5	10 - 20
Final strength at room temperature [h]	3 - 6	1 - 3	2 - 4	3 - 6
Temperature resistance [°C]	-60 / +150	-60 / +150	-60 / +180	-60 / +150
Thread size	up to M 36	up to M 36	up to M 20 (R ¾'')	up to M 20 (R ¾'')
Packaging sizes	50 ml	50 ml / 200 ml	50 ml	50 ml / 200 ml

Solution	**TL22**	**TL55**	**TL60**	**TL86**
Properties	• Threadlocker • Ideal for low-strength connections • For adjusting screw and drop bolts • Well suited for use with metals which might break during disassembly such as aluminium or brass	• KTW tested • Universal type in the medium strength range • Connections can be disassembled for maintenance using handheld tools • Prevents vibration-induced loosening such as on pumps, gearboxes or presses • Tolerates minor oily contaminations by industrial oils	• For passive materials such as stainless steel, aluminium etc.; without activator • Ideal for permanent retention of stud bolts on engine blocks and pump housings • For equipment which does not have to be dismantled regularly for maintenance	• Universal type in the high strength range • For equipment which does not have to be dismantled regularly for maintenance • Tolerates minor oily contaminations by industrial oils

Strength parameters determined on M10 screws, grade 8.8, nut height 0.8.d. Long-term usage of anaerobic threadlocker adhesives on copper or copper alloy joints that come into contact with water above +40 °C is not recommended. All the information stated herein is based on laboratory measurements and/or extensive customer experience. Although this information has been prepared with utmost care, it is provided without any assumption of liability and does not qualify as the basis for any legal claims. For additional information, please refer to the material data sheets.

KTW test (Technologiezentrum Wasser TZW Karlsruhe, Prüfstelle Wasser).

General information

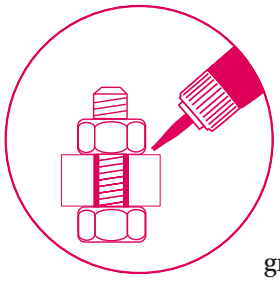
All TL products remain fluid while in contact with air. Curing starts in the absence of air and in the case of contact with metal. Low- and medium-strength bonds can be easily disassembled using standard tools. High-strength bonds can be separated by applying heat starting at +300 °C. Cured adhesive residues can be eliminated mechanically or by anti-seize sprays (e.g. AS40).

Safety precautions

- Avoid prolonged direct contact with skin by using personal protective gear such as gloves and safety glasses.
- Parker TS90 Hand Protection Foam prevents skin irritations.
- In case of eye contact, wash eyes thoroughly with plenty of water and get medical attention.
- In case of skin contact, wash skin with water and soap. If skin irritations persist, get medical attention.
- Immediately remove contaminated clothing to avoid skin irritations.
- Keep out of reach of children.

Storage

- Store at room temperature in the closed original containers.
- Do not return product that has come into contact with metal to original container.
- Avoid exposure to excessive heat or direct sunlight.



Parker TL series products are high-grade anaerobic adhesives and sealants based on methacrylate resins. They are specifically designed for economical locking, retaining and sealing of threaded connections.

The curing of anaerobic adhesives occurs after contact with metal in the absence of air.
This results in a vibration- and impact-resistant bond that is extremely resistant to chemicals and solvents. As liquids, TL products completely fill gaps and provide sealing and protection against leakage as well as fretting corrosion.
The various TL products differ in terms of strengths and viscosities (see chart).

Properties and advantages

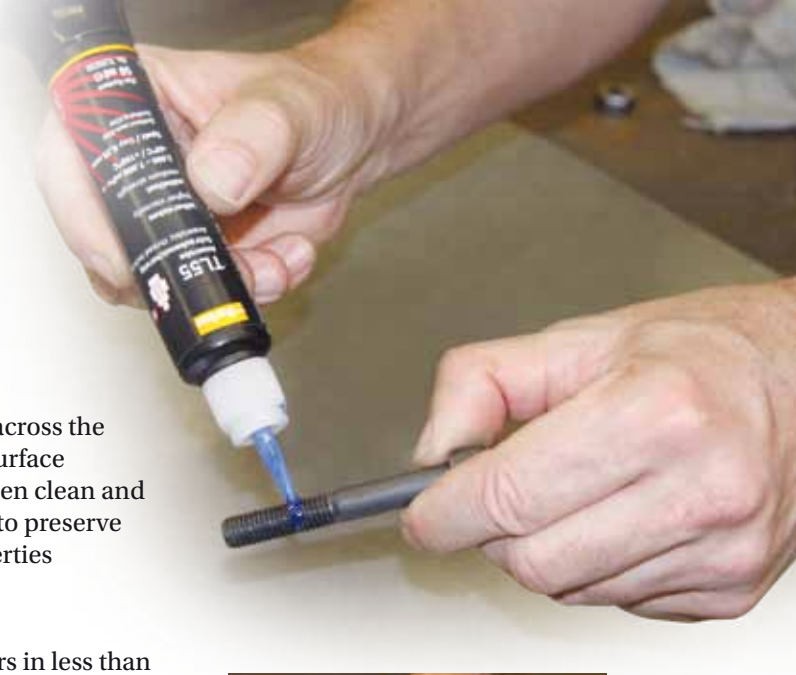
- For locking, retaining and sealing of threaded connections, from M5 to M36
- Quick-curing
- Solvent-free
- Ready to use
- Single-component material
- Easy and clean application
- Wide temperature range (see chart)
- Resistant to numerous chemicals and solvents
- Reduces production costs

Usage guidelines

- The surface should be completely clean and degreased (e.g. using Parker CP01 Cleaner Spray)
- The product can be applied directly from the pen using the dosing tip
- Apply evenly across the entire metal surface
- Always keep pen clean and tightly closed to preserve product properties

Set time

Initial cure occurs in less than 20 minutes, depending – among other things – on the type of surface, gap fill and ambient temperature. Pre-treating the surface using the Activator ST02 may significantly reduce set time. Use of the activator is also recommended for all passive surfaces as well as for all applications involving low ambient temperatures (≤ +10 °C) and large gap fills. For non-metallic surfaces, the activator is necessary to achieve the effectiveness of the TL products.
If no activator is to be used for passive surfaces but quick curing is desired nonetheless, the use of TL60 is recommended. TL60 achieves finger strength (finger tightness) clearly faster than the standard products (without activator).



TL55 – Locking of threaded connections where subsequent dismantling with handheld tools should be possible for maintenance purposes. If necessary, pretreat using the ST02 activator (depicted above).

TL60 – Permanent locking of threaded connections made of passive materials such as stainless steel, aluminium, plastics etc. Requires no pre-treatment with an activator.

TL60 – Permanent retaining of a dowel pin.

Anaerobic Retainer Adhesives

RC series

For hard to dismantle parts

Temperatures above +150 °C ?

	yes		no		
	≤ +180 °C	≤ +175 °C	Gap bridging		
			up to 0.50 mm	up to 0.10 mm	up to 0.20 mm
Viscosity [mPa.s]	3,000 - 6,000	500	150,000 - 900,000	125	2,500
Thixotropy	medium	low	high	low	medium
Breakaway force	high	high	high	high	high
Breakaway force [Nm]	35 - 45	30 - 35	35 - 45	25 - 30	35 - 45
Finger strength at room temperature [min]	2 - 5	approx. 5	15 - 30	10 - 20	approx. 5
Final strength at room temperature [h]	2 - 4	2 - 4	3 - 6	2 - 4	1 - 3
Temperature resistance [°C]	-60 / +180	-60 / +175	-60 / +180	-60 / +150	-60 / +150
Gap bridging [mm]	0.20	0.15	0.50	0.10	0.20
Packaging sizes	50 ml	50 ml	50 ml	50 ml	50 ml / 200 ml
Solution	**RC30**	**RC84**	**RC60**	**RC81**	**RC83**
Properties	• For passive materials such as stainless steel, aluminium etc.; without activator • Higher temperature resistance	• Ideal for clearance or press fit joining such as bushings or bearings • Higher temperature resistance	• Ideal for repairs of worn cylindrical connections without finishing • Allows reuse of worn bearing fits, parallel keys and keyed joints • Suitable for clearance compensation • Gap bridging up to 0.5 mm	• For cylindrical joining parts which cannot be thoroughly degreased • Ideal for cylindrical parts with small gap dimensions • Particularly well suited for retaining bearings • Tolerates minor oil residues	• High resistance to dynamic axial and radial loads • Ideal for parts used in gearboxes, pulley sets or similar applications • Universally usable joining product

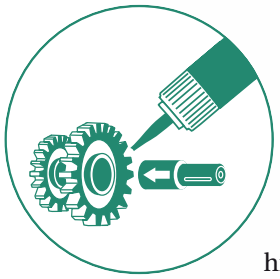
Strength values obtained on M10 bolts, 8.8 grade, nut height 0.8.d. Long-term use of anaerobic retaining compounds on copper compounds and their alloys exposed to water above +40 °C is not recommended. All data provided is based on lab measurements and/or extensive customer experience. Although the data has been compiled with utmost care, no rights to claims can be derived from this data. For additional information, reference is made to the material data sheets.

Safety precautions

- Avoid prolonged direct skin contact by using personal protective gear like gloves and safety goggles.
- Parker Hand Protective Foam TS90 prevents skin irritations.
- In case of eye contact, thoroughly rinse with plenty of water and get medical attention.
- In case of skin contact, wash with water and soap. If skin irritations persist, get medical attention.
- Immediately remove soaked clothing items to prevent skin irritations
- Keep out of the reach of children.

Storage

- Store at room temperature in the closed original containers.
- Do not pour product that has come into contact with metal back into the bottle.
- Avoid storage near heaters and exposure to direct sunlight.



Parker RC series products are high-grade anaerobic retainer adhesives based on special methacrylic resins, specifically designed for economic securing, retaining and sealing of non-threaded connections.

Curing, which occurs in the absence of air after metal contact, is the outstanding feature of anaerobic adhesives. Products of the RC series penetrate the roughness depths of the surfaces and completely fill the gaps between the connecting parts. As a result, there is no need for additional securing elements such as wedges. Due to their liquid state RC products completely fill gaps and provide sealing and protection against leakage and fretting corrosion. The various types of the range differ in terms of strengths and viscosities (see chart)

Properties and benefits

- For securing, retaining and sealing of shafts, bearings, pulleys, flanges, gears, bushes, sleeves, drive pins, sprockets, flywheels, bearings etc. as well as cylindrical parts in slide, press and shrink fits
- Quick-curing
- Solvent-free
- Ready to use
- One-component material
- Easy and clean application
- Wide temperature range (see chart)
- Resistant to chemicals and solvents
- Reduces production costs
- Optimises the transmission of forces
- No costly spare parts
- No time-consuming mechanical finishing
- No additional securing elements

Processing

- Clean and degrease entire surface (e.g. using Parker Cleaner Spray CP01).
- The product can be used directly from the pen by means of the metering nozzle.
- Ensure even coating of entire metal surface.
- Always close the pen tightly and clean to preserve product properties.

Curing

Curing starts during the first 10 minutes. It depends on factors such as surface quality, gap width and ambient temperature. Parts with high-strength bonding can be dissassembled by localised heating to approx. +300 °C. Pre-treating the surface by means of the Parker Activator ST02 can significantly shorten the curing time. The activator is also recommended for all inactive surfaces as well as for any application involving low ambient temperatures (≤ +10 °C) and large gap widths. For non-metallic surfaces, the activator is required to ensure the effectiveness of the RC products.

If the use of an activator on inactive surface is not desirable or unfeasible but quick curing is desired nevertheless, the use of RC30 is recommended. Finger-tightness is achieved clearly faster than with standard types (without activator).

RC81 – Locking, retaining and sealing of non-threaded connections in applications where slight oil residues are present.

RC60 – Bridging of large wear-induced gaps in shaft-mounted components.

Anaerobic Gasketing Compounds for Pipes and Flanges

GG and GT series

For metal threads

Fine-pitch thread or coarse-pitch thread ?

	Coarse-pitch thread			Fine-pitch thread
Viscosity [mPa.s]	17,000 - 50,000	17,000 - 50,000	24,000 - 70,000	500
Thixotropy	medium	high	high	low
Breakaway force	low	medium	medium	medium
Breakaway force [Nm]	6 - 10	7 - 10	18 - 22	12 - 15
Finger strength at room temperature [min]	20 - 40	20 - 40	15 - 30	10 - 20
Final strength at bei room temperature [h]	ca. 12	5 - 10	1 - 3	2 - 4
Temperature resistance [°C]	-60 / +150	-60 / +180	-60 / +150	-60 / +150
Thread size	-	Bis M 80 (R 3'')	Bis M 80 (R 3'')	Bis M 20 (R ¾'')
Packaging sizes	50 ml / 200 ml	50 ml / 200 ml	50 ml / 200 ml	50 ml / 200 ml
Solution	**GG25**	**GG72**	**GG77**	**GT21**
Properties	• Ideal for large, torsionally stiff flange connections • For flanges where assembly may take several hours	• Ideal when slow curing for readjustment of the connection is desirable • Suitable for coarse-pitch metal threads • Immediate sealing action up to 6 bar • DVGW and KTW tested	• Particularly well suited for fast processing at low temperatures such as outdoor maintenance work • Universal type in the medium strength range • BAM approval for gaseous oxygen	• Ideal for fine-pitch thread connections on hydraulics and pneumatics equipment • Well suited for small threaded connections

Strength values obtained on M10 bolts, 8.8 grade, nut height 0.8.d. Long-term use of anaerobic hydraulic and pneumatic sealants on copper compounds and their alloys exposed to water above +40 °C is not recommended. All data provided is based on lab measurements and/or extensive customer experience. Although the data has been compiled with utmost care, no rights to claims can be derived from this data. For additional information, reference is made to the material data sheets.

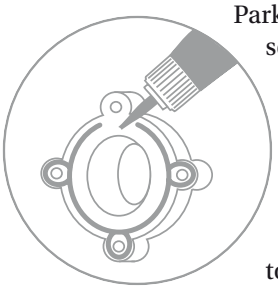
General information
All GG and GT products remain liquid when in contact with air. Curing starts in the absence of air and with metallic contact. Low- to medium-strength bonds can easily be disassembled using normal tools. High-strength bonds can be separated by heating up to approx. +300 °C. Cured adhesive residues can be removed mechanically or by using Parker Anti-Seize Spray AS40.

Safety precautions
- Avoid prolonged direct skin contact by using personal protective gear like gloves and safety goggles.
- Parker Hand Protective Foam TS90 prevents skin irritations.
- In case of eye contact, thoroughly rinse with plenty of water and get medical attention.
- In case of skin contact, wash with water and soap. If skin irritations persist, get medical attention.
- Immediately remove soaked clothing items to prevent skin irritations.
- Keep out of the reach of children.

Storage
- Store at room temperature in the closed original containers.
- Do not pour product that has come into contact with metal back into the pen.
- Avoid storage near heaters and exposure to direct sunlight.

Gasketing Compounds for Pipes and Flanges

GG series



Parker flange sealants prevent leakage of liquid and gaseous substances. They seal up to bursting pressure and are resistant to most media used in industrial applications.

Sealing with Parker's solvent-free, liquid gasketing compounds represents a technologically advanced solution. Curing in the absence of air, which occurs after contact with metal, is the outstanding feature of anaerobic gasketing compounds. The products from the GG series completely fill any irregularity in the surface. The form-in-place gaskets require no settling (unlike seals made from solid materials). Due to their high elasticity the products from the GG series are suitable for use in harsh conditions. The various types of the GG range differ in terms of strength and viscosity (see chart).

Properties and benefits

- Sealing of threaded connections, coolant and compressed air lines, flanges, housings and covers
- Quick-curing
- Solvent-free
- Ready to use
- One-component sealant
- Easy and clean application
- Wide temperature range (see chart)
- Resistant to chemicals and solvents
- Reduces production costs
- Immediate sealing effect at low pressures

Processing instructions

- Clean and degrease entire surface (e.g. using Parker Cleaner Spray CP01).
- Shake before use.
- The product can be used directly from the pen by means of the dosing nozzle.
- Observe even coating across the whole metal surface.
- Immediately assemble parts.

Curing

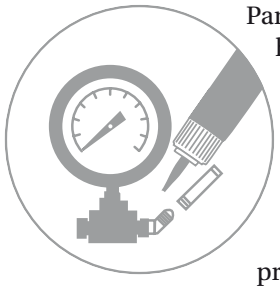
Curing starts during the first 10 to 20 minutes. It depends on factors such as surface quality, gap width and ambient temperature. Pre-treating the surface by means of the Parker Activator ST02 can significantly shorten the curing time. The activator is also recommended for all inactive surfaces as well as for any application involving low ambient temperatures (≤ +10 °C) and large gap widths. For non-metallic surfaces, the activator is required to ensure the effectiveness of the GG products.

GG77 – Pipe seal, also suitable for outdoor maintenance work.

GG25 – Sealing of flange connections, for example on gearboxes.

Hydraulic and Pneumatic Gasketing Compounds

GT series



Parker anaerobic hydraulic and pneumatic sealants prevent leakage of liquid and gaseous substances. They seal up to bursting pressure and are resistant to most media used in industrial applications.

Obstructions of important connectors and couplings and blocking of valves in hydraulic and pneumatic applications (which may occur, for instance, when using teflon tape or hemp) are excluded. Sealed connections can neither seize nor corrode (fretting corrosion). Different grades of strength enable disassembly even years later.

Properties and benefits

- Sealing of hydraulic and pneumatic lines
- Quick-curing
- Solvent-free
- Ready to use
- One-component sealant
- Easy and clean application
- Wide temperature range (see chart)
- Resistant to chemicals and solvents
- Reduces production costs
- Immediate sealing effect at low pressures

Processing instructions

- Clean and degrease entire surface (e.g. using Parker Cleaner Spray CP01).
- Shake before use.
- The product can be used directly from the pen by means of the dosing nozzle.
- Observe even coating across the whole metal surface.
- Immediately assemble parts.

Curing

Curing starts during the first 10 to 20 minutes. It depends on factors such as surface quality, gap width and ambient temperature. Pre-treating the surface by means of the Parker Activator ST02 can significantly shorten the curing time. The activator is also recommended for all inactive surfaces as well as for any application involving low ambient temperatures (≤ +10 °C) and large gap widths.
For non-metallic surfaces, the activator is required to ensure the effectiveness of the GT products.

GT21 – Sealing of fine-pitch thread connections on hydraulic and pneumatic components such as fittings, valves.

Epoxy Adhesives

SA and SA0FE series

For permanent bonding within minutes

Viscosity [mPa.s]	32.000	750.000	-
Mixing ratio	1 : 1	1 : 1	1 : 1
Processing time at RT [min]	3 - 4	3 - 4	3 - 4
Finger strength at room temperature [min]	35	40	10
Final strength at room temperature [h]	24	24	24
Temperature resistance [°C]	-50 / +80	-50 / +145	-50 / +120
Gap bridging [mm]	2	4	15
Packaging sizes	24 g	24 g	57 g / 115 g
Colour	transparent	charcoal-grey	dark grey
Solution	**SA01**	**SA05**	**SA0FE**
Properties	• Ideal for constructions and assemblies • For fast, high-strength and transparent bonding • Despite brief pot life (3 - 4 minutes) sufficient time remains to position and retain the joining parts	• Epoxy adhesive with metallic filler for fast and high-strength bonding • Can be mechanically finished after curing • Despite brief pot life (3 - 4 minutes) sufficient time remains to position and retain the joining parts	• Ideal for fast and high-strength repairs • Can be mechanically finished and painted after curing • For patching and sealing cracks, holes and leaks, for instance on - machine parts - tanks and lines - containers, pumps, housings - balcony lattices and banisters - etc. • Easy handling: cut – knead – use

All data provided is based on lab measurements and/or extensive customer experience.
Although the data has been compiled with utmost care, no rights to claims can be derived from this data.
For additional information, reference is made to the material data sheets.

Safety precautions

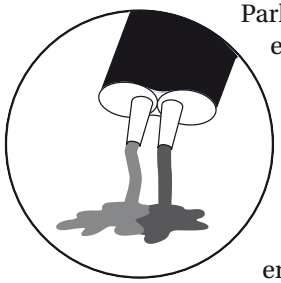
- Substances are by and large toxicologically harmless when properly handled and fully cured.
- Avoid prolonged direct skin contact by using personal protective gear like gloves and safety goggles.
- Parker Hand Protective Foam TS90 prevents skin irritations.
- In case of eye contact, thoroughly rinse with plenty of water and get medical attention
- Keep out of the reach of children.

Storage

- Minimum shelf life at room temperature in unopened state: 18 months.
- Avoid storage near heater and exposure to direct sunlight.

Epoxy Adhesives

SA series



Parker SA series epoxy adhesives are cold-curing, solvent-free 2-component systems providing strong adhesion. They enable material bonds with high tensile strength and impact resistance, which makes them ideally suited for assembly, repair and manufacturing uses.

Epoxy minute adhesive

The transparent, viscous, self-levelling and residual-elastic-curing adhesive is ideally suited for design and assembly jobs.

Fast-metal minute adhesive

Thanks to its high viscosity the steel-filled, paste-like adhesive cannot only be used on vertical surfaces but also fills cracks, voids and gaps as well as irregular surfaces. It is ideally suited for repairs that require bridging of larger tolerances. The material, which is charcoal-grey after curing, can be machined, for instance by drilling, grinding and filing.
The various product types have different strengths and viscosities (see chart).

Properties and benefits

- Cold-curing
- Solvent-free
- Two-component adhesive
- Very short pot life (3 to 4 minutes)
- Quick curing
- Unlike with welding and soldering, surfaces remain unchanged
- For connections with high tensile and impact strength
- For bonding different materials such as metals, hard plastics, fibre composite materials, wood, glass etc.
- The material will be free from distortions, and no additional means for bonding or fastening are required
- The use of thinner and lighter-weight materials often enables simpler and more cost-effective designs, offering the potential of considerable weight and cost reductions.
- Nearly shrinkage-free curing
- Resistant to many chemicals after curing

Processing instructions

- Clean and degrease entire surface (e.g. using Parker Cleaner Spray CP01).
- 3- to 4-minute pot life (related to 10 ml of material applied at room temperature).
- The material is squirted through user-friendly twin nozzles, metering the resin and curing agent in the appropriate mixing ratio.
  As a result, no time-consuming weighing of the two components is required.
- Thorough mixing of the two components is important.
- Parts should be held in place during the curing time.

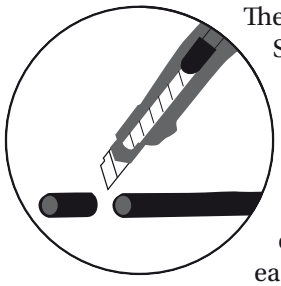
Curing

Due to the typical reaction heat of epoxy resins (exothermal reaction) larger processing quantities have a shorter curing time. Higher temperatures shorten pot life and curing time as well. Rule of thumb: every temperature increase by +10 °C reduces pot life and curing time by 50 per cent. Temperatures below +16 °C significantly prolong pot life and curing time. Reactions cease after approx. +5 °C.

SA05 – Epoxy adhesives from the SA series allow materials to be bonded with high tensile and impact strength. Example: attachment of a plastic retainer to a vertical metal plate.
The practical twin-nozzle enables quick dosing. Easy application after manual mixing of the two components.

Repair Stick Steel

SA0FE series



The Parker Repair Stick Steel SA0FE was specifically developed for quick, high-strength repairs and bonding jobs of metal parts. It is easy to handle: cut – knead – process. As a result, the material is also easy to portion.

The Repair Stick Steel can be used at temperatures of -50 °C to +120 °C (short-term up to +150 °C). It is resistant to oils, salts, alcohols, esters and most alkaline substances and diluted acids. It contains no solvents and cures practically without shrinkage. The cured material can be machined (filing, drilling, milling) and painted/varnished without pre-treatment.

Properties and benefits

- Quick-curing
- Solvent-free
- Two-component material
- Easy handling
- Wide temperature range -50 °C to +120 °C (short-term up to +150 °C)
- Mending and sealing of cracks, holes and leaks on
  - Machine components
  - Tanks/reservoirs and pipes
  - Containers, pumps and housings
  - Balcony grates and staircase banisters
  - Stripped threads
- Resistant to oils, salts, alcohols, esters and most alkaline solutions and diluted acids
- Reduces production costs

SA0FE – After curing, SA0FE can be mechanically handled (drilling, filing, milling) and painted without pre-treatment.

Processing

- Easy handling: cut – knead - process
- Clean and degrease entire surface (e.g. using Parker Cleaner Spray CP01).
- Gap bridging per work step up to max. 15 mm.
- 4-minute pot life (for 25 grams of material at room temperature)

Curing

Due to the typical reaction heat of epoxy resins (exothermal reaction) larger processing quantities have a shorter curing time. Higher temperatures shorten pot life and curing time as well. Rule of thumb: every temperature increase by +10 °C reduces pot life and curing time by 50 per cent. Temperatures below +16 °C significantly prolong pot life and curing time. Reactions cease after approx. +5 °C.

SA0FE – The SA0FE Repair Stick Steel was specifically developed for quick, high-strength repairs and bonding of metal parts.
Example: mending of a motor housing.
Easy handling: cut – knead – use

Instant Adhesives

IA series

For gluing gaps smaller than 0.1 mm

Will the bonding area be exposed to mechanical shocks or peeling?

	yes	no		
Viscosity [mPa.s]	2,000 - 3,000	20 - 40	60 - 120	1,000 - 1,500
Shear resistance	high	high	high	high
Shear resistance [Nmm²]	8 - 24	8 - 20	8 - 20	8 - 21
Finger strength at room temperature [s]	20 - 120	2 - 60	3 - 60	5 - 120
Specially suited for	metal / plastics	plastics	metal / plastics	porous materials
Temperature resistance [°C]	-50 / +135	-50 / +80	-50 / +80	-50 / +80
Gap width	0.20	0.10	0.15	0.20
Packaging sizes	30 g	12 g / 30 g / 60 g	12 g / 30 g / 60 g	30 g / 60 g
Colour	black	transparent	transparent	transparent
Solution	**IA25**	**IA01**	**IA04**	**IA15**
Properties	• For applications requiring impact resistance or which are exposed to mechanical shocks or peeling • Slow curing • Good moisture resistance • Higher temperature resistance	• Particularly well suited for elastomers such as EPDM • Very fast curing	• Universal type for rubber, plastics and metal • Fast curing	• Specially suited for absorbing and porous materials such as wood, cork, leather, ceramics • Slow curing

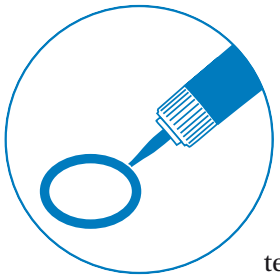
* Information depends on type and quality of the materials to be bonded.
** Determined at standard climate according to DIN 50014 (+23°C and 50 % relative humidity). Sufficient strengths to handle the bonded parts can be achieved within the stated periods.

Safety precautions

- Is largely physiologically harmless.
- Bonds skin and eyes in seconds.
- Contact with skin and eyes should be avoided (use personal protective gear).
- Parker TS90 Hand Protection Foam prevents skin irritations.
- Vapours may cause irritations to mucous membranes and eyes.
- In case of eye contact, thoroughly wash eyes with warm water and get medical attention.
- In case of skin contact, wash with water and soap. If skin irritations persist, get medical attention.
- Immediately remove contaminated clothing to avoid skin irritations.
- Keep out of reach of children.

Storage

- At room temperature (+18 to +25 °C) as well as in a dry and dark place Parker instant adhesives will keep for a minimum of 9 months.
- Storage at +5 °C prolongs shelf life to 12 months.
- At temperatures of approx. -20 °C Parker instant adhesives can be stored for nearly unlimited periods.
- Prior to application, the product has to reach room temperature.



Based on cyano-acrylate technology, Parker's IA (Instant Adhesives) series comprises solvent-free, cold-curing single-component adhesives which quickly polymerise under humidity on the parts to be joined and in the air. They bond various materials such as metals, plastics, glass, ceramics, wood, leather, natural and synthetic rubbers with each other, within seconds.

Unlike welding or soldering, for example, bonding by means of Parker instant adhesives does not change the surfaces, and the materials are not subjected to any strain. In many applications, this enables simpler and quicker assemblies which do not require additional fasteners.
Parker instant adhesives are highly resistant to disassembly, withstand temperatures from -50 to +135 °C and are resistant to many chemical influences.
The strength of the bond after curing often exceeds the strength of the material(s) of the bonded parts.
A wide range of IA series products (see chart) is available for various applications. The individual products differ in terms of their chemical composition and viscosity.

Properties and advantages

- Cures within seconds
- Contains no solvents
- Cross-links at room temperature
- Very economical (1 drop suffices for 3 to 5 cm^2 of bonding area)
- Single-component adhesive
- Clean and easy application
- Wide temperature range (see table)
- Resistant to numerous chemicals and solvents
- Reduces production costs
- Bonded parts can be processed immediately
- Creates clean and visually appealing bonds

Usage guidelines

- The surface should be completely clean, degreased (e.g. using Parker CP01 Cleaner Spray or Parker CP02 Plastic Cleaner) and dry.
- The parts to be joined should be bonded at a relative humidity of 40 to 80 %.
- Apply instant adhesive only to one of the surfaces to be joined.
- Roughen smooth surfaces before applying adhesive.
- 1 drop spreads over 3 to 5 cm^2 of bonding area.
- Always keep pen clean and tightly closed to preserve product properties.

Set time

Curing starts within the first 20 seconds, depending - among other things - on the type of surface, gap width, ambient temperature and humidity.

IA25 is used in applications requiring higher impact strength and/or temperature resistance. Example: gluing of a plastic ring into loader mounts for pressing equipment.

IA15 is specially suited for use with absorbing and porous materials such as wood, cork, leather or ceramics. Example: gluing of a felt seal.

Technical Sprays and Liquids

Cleaner Spray

- Degreases and cleans all metals, glass, ceramics and many plastics
- Fast and non-residual evaporation
- Cleaning and degreasing prior to priming and painting
- Prior to use of adhesives and sealants where a greasy substrate would impair effectiveness
- Cleaning of machine parts
- Thermoplastics like PVC, plexiglass, polystyrene and simple paints can be partially dissolved.

CP01
Page 20

Plastic Cleaner
for sensitive plastics

- Cleans and degreases
  - Sensitive plastics such as thermoplastics (PVC, PMMA = plexiglass, polystyrene etc.)
  - Rubber compounds such as seals
  - Painted areas such as powder-coated metal parts
- Particularly well suited for pretreating surfaces when gluing sensitive plastics, rubber compounds or painted areas
- Fast and non-residual evaporation

CP02
Page 20

Activator
for anaerobically curing adhesives and sealants

- For all anaerobically curing adhesives and sealants
- For all passive surfaces such as stainless steel, aluminium, chrome, nickel, etc.
- Accelerates curing
- Required in low ambient temperatures (below +12 °C) and with large bonding gaps
- In case of non-metallic surfaces no curing is possible without an activator

ST02
Page 21

Anti-Seize Assembly Spray

- Selected, finely ground, metallic solid lubricants in combination with a high-grade synthetic oil mixture
- Suitable for a wide range of applications with materials made of steel, iron or cast iron
- Prevents corrosion, seizing and wear
- Suitable for high temperatures (up to +1.200 °C)
- Suitable for high pressures and aggressive media
- Prevents electrolytic reactions between metals („cold welding“)

AS40
Page 22

PTFE Multifunctional Spray

- Special formulation combines corrosion protection, cleaning, water displacement and preservation in a single product
- Lowest friction coefficient due to high PTFE content
- Silicone-free and resistant to weather influences
- Displaces moisture from electrical lines
- Eliminates squeaking and creaking noises
- Provides protection and care for all types of tools

LT01
Page 23

Silicone Spray

- Ideal lubricating and release agent for efficient production and maintenance jobs
- Prevents deposits of adhesive residues on presses and guides
- Protects electrical contacts against moisture
- Care for rubber, plastics and metal parts
- Protects rubber parts from brittling, freezing and sticking

LS01
Page 24

Leak Detection Spray

- For fast, convenient and reliable detection of leaks (cracks, fissures or porous places) in pressure lines
- For leak detection on valves, fittings and threaded or gland connections
- For work with compressed air, natural or liquid petroleum gas
- Does not form any hazardous chemical compounds with carbon dioxide (CO_2), propane, butane, acetylene, oxygen, city and natural gas

TS01
Page 25

Hand Protective Foam

- Forms a grease-free, invisible protective film which prevents dirt from penetrating the skin
- The „invisible glove“ protects against hazardous substances and irritants in aggressive chemicals
- Can simply be rinsed off with warm water
- Skin care effect due to liposomes
- Dermatologically tested

TS90
Page 25

Cleaner Spray

CP01

The Parker Cleaner Spray CP01 cleans and degreases metals, glass, ceramics and many plastics.
(For sensitive plastics, we recommend Parker Plastic Cleaner CP02.)

Typical uses

- Prior to use of Parker adhesives and sealants as oily/greasy surfaces impair their effectiveness
- Cleaning of machine components
- Cleaning and degreasing of primed and painted surfaces

Properties

- Airs off quickly, without leaving residues
- Unlike thinners, spray cleaner leaves no residual film
- Removes even gummed lubricants
- May start dissolving thermoplastics like PVC, acrylic glass, polystyrene and simple paint coatings

Plastic Cleaner

Cleaner and degreaser for sensitive plastics

CP02

The Parker Plastic Cleaner CP02 is the ideal product for cleaning and degreasing sensitive surfaces.

Aggressive cleaners attack plastics in such a way that their surface structure changes, resulting in brittleness, stress-induced cracks or dull surfaces. In many cases, these materials can no longer be used for aesthetic or technical reasons. Due to its special formulation the Parker Plastic Cleaner prevents such impairments. It is therefore suitable for surface treatment when bonding sensitive plastics, elastomers or painted/varnished surfaces. Unlike conventional cleaners, the Parker Plastic Cleaner evaporates without leaving residues.

Typical uses

- For cleaning and degreasing of
  - Sensitive plastics, thermoplastics (e. g. PVC, acrylic glass, polystyrene), window frames, blinds and plastic profiles
  - Rubber materials, e.g. seals
  - Painted/varnished surfaces, e.g. powder-coated metal parts
- Removal of labels and sticker residues
- Test surface compatibility before using the cleaner

Properties

- Airs off quickly without leaving residues
- Unlike thinners, leaves no residual film
- Special formulation prevents impairment of surfaces

The ST02 activator considerably accelerates the curing of anaerobically curing adhesives and sealants on metal surfaces.

Activator

for anaerobically curing adhesives and sealants ST02

The Parker Activator ST02 significantly accelerates the curing of anaerobically curing adhesives and sealants on all metal surfaces. It is also recommended for all inactive surfaces, at low ambient and material temperatures as well as for large gap widths.

For non-metallic surfaces, the activator is required in order to ensure the effectiveness of anaerobically curing adhesives and sealants.

Directions for use

Spray ST02 Activator on one side of the cleaned surfaces to be bonded. In case of larger and/or rough porous substrates the activator has to be applied on both sides. Let the ST02 Activator air off at room temperature (+20 °C) for approx. 2 minutes. The parts should be bonded no later than within one month after activation. Avoid contamination of the surfaces by dirt prior to bonding the parts. Do not mix activator and adhesive in liquid state.

Typical uses

- For inactive surfaces such as high-alloy steel, aluminium, nickel, zinc, gold, oxide layers, chromate layers and anodic coatings
- For non-metallic surfaces such as plastics and ceramics

Properties

- For large gap dimensions (0.5 mm max.)
- For low ambient and material temperatures (< +15 °C)

Pre-treatment to protect a bolt from seizing (for easier disassembly).

Anti-Seize Assembly Spray

AS40

The Parker Anti-Seize Assembly Spray AS40 provides strong adhesion. It is water-repellent, high-temperature resistant and resistant to fresh, salt and hot water, water vapour, alkaline solutions and weak acids. Threaded connections can be non-destructively separated even in harsh conditions and after long periods of time.

AS40's exceptionally high release properties are based on effective, long-lasting protection against corrosion, seizing and wear. In addition, AS40 exhibits high pressure absorption capabilities (< 230 N/mm²). The Anti-Seize Assembly Spray is free of lead and other toxic heavy metals. It consists of select, finely ground solid lubricants and a high-grade synthetic oil mixture.

Directions for use

Clean and degrease surfaces (e.g. using Parker Cleaner Spray CP01). For optimum spraying functionality, the product should be at room temperature. Shake the spray can until the pea can be heard. Spray surface from a distance of approx. 15 cm. The Anti-Seize Assembly Spray is only suitable for ingredient-specific use and is not a substitute for oil or grease lubrication.

Properties

- Protection against
  - Corrosion, seizing, wear
  - Oxidation and fretting corrosion
  - Electrolytic reactions ("cold welding")
  - Stick-slip effects

- The extremely low friction coefficient enables easy disassembly
- Free of sulphuric additives
- Temperature-resistant from -180 °C to +1,200 °C
- Excellent lubricant for parts subjected to high static loads and for slow-rotating systems (with respective re-lubrication intervals)

PTFE Multifunctional Spray

LT01

The Parker PTFE Multi-functional Spray LT01 is used in all industrial and shop areas. Due to its special formulation, high PTFE content and resultant extremely low friction coefficient the product combines lubrication, corrosion protection, cleaning, water repelling and preservation functions in a single product.

Lubrication of brush tie bars in injection moulding machines

Usage instructions

Shake spray can before use, spray at a distance of approx. 5 cm and allow to act for approx. 30 seconds.

Typical uses

- Loosens corroded (seized) threaded connections, pins, bolts, fittings and valves
- Displaces moisture from electrical lines
- Prevents surface leakage currents and facilitates starting of wet motors
- Eliminates squeaking and creaking noises on hinges, bearings and all types of joints and couplings
- Cleans soiled surfaces and leaves an extremely thin film which neither smears, sticks or attracts dirt
- Protects all tools, machines, electrical and mechanical high-precision devices (measuring equipment, locks and weapons) and keeps them functional and in good condition

Properties

- Silicone-free
- Resistant to weather influences
- Virtually unlimited uses in areas like workshops, automotive, boating, farming, household and hobby

Lubrication and care
for conveyor belts and rollers

Silicone Spray

LS01

The Parker Silicone Spray LS01 is an ideal release agent for efficient production and maintenance activities. It provides a long-lasting release and lubricating film and good surface properties.

Usage instructions

Clean and degrease surfaces prior to application. Shake can and spray from a distance of approx. 25 cm.

Typical uses

- Prevents accumulation of adhesive residues on presses and guiding elements
- Prevents sticking of goods on conveyor belts, channels and slideways
- Protects electrical contacts from moisture
- Keeps rubber, plastic and metal parts in good condition
- Protects rubber parts from embrittling, freezing and sticking

Properties

- Temperature-resistant from -50 °C to +250 °C
- Test surface compatibility before use

Lubrication of plastic castor wheels

Leak Detection Spray

TS01

The Parker Leak Detection Spray TS01 serves to quickly, easily and reliably detect leaks (cracks or porous places) on pressurised lines. TS01 does not form any hazardous compounds with carbon dioxide (CO_2), propane, butane, acetylene and oxygen gases or natural gas.

Usage instructions

Spray on the area to be tested. Leaks will cause bubbles. The spray's high sensitivity will detect even smallest leaks.

Types uses

- For compressed air, natural or liquid gas applications
- For possible leaks on fittings, valves, threaded connections and couplings
- For increased safety of air brakes and gas lines

Properties

- Non-flammable
- Anti-corrosive
- Skin-compatible
- DIN-DVGW tested

Detection of leaks on compressed air lines: spray the line with the leak detector. Bubbles will form where leaks are present.

Hand Protective Foam

TS90

Parker Hand Protective Foam TS90 forms a greaseless, invisible and water-resistant film that prevents various kinds of dirt from penetrating the skin and pores. This "invisible glove" protects against hazardous substances and irritants from aggressive chemical substances. Through the addition of liposomes skin moisture is improved and roughness of skin reduced.

Usage instructions

Massage into cleaned hands, including fingertips and beds of nails, before starting to work. The Hand Protective Foam penetrates the pores of the skin within two minutes and forms an invisible protective film. After the job is finished, dirt can be easily washed off with warm water. Additional cleaning agents are only needed in case of very persistent dirt. Parker Hand Protective Foam has been dermatologically tested.

Properties

- Grease-free
- Water-resistant
- Skin care effect due to liposomes
- Dermatologically tested

Massage hand protective foam into clean palms and back of hands.

Chemical Resistance

The higher the specific strength of an anaerobically curing adhesive or sealant the higher its expected chemical resistance. Therefore, it is recommended to use high-strength products in applications involving aggressive media. The use of anaerobically curing adhesives and sealants in combination with very hot and/or aggressive chemicals is not recommended.
The resistance lists have been prepared based on lab tests and practical experiences. They merely provide an indication of existing resistances. Therefore, it is recommended – particularly in the presence of chemically aggressive media – to confirm resistance by preliminary testing.

Part I
Resistance of anaerobically curing adhesives and sealants to liquid media
Page 26

Part II
Resistance of anaerobically curing adhesives and sealants to gaseous media
Page 32

Part III
Resistance of plastics to anaerobically curing adhesives and sealants
Page 32

Part I – Resistance to liquid media

abradant sludge	+	alcohol, isopropyl alcohol	+	ammonium picrate	+
acetaldehyde	+	alcohol, methyl alcohol	+	ammonium silicofluoride	+
acetamide	+	alcohol, propyl alcohol	+	ammonium sulfate	+
acetate solvent	+	alum	+	ammonium sulfide	+
acetic acid (10 %)	+	alum	+	ammonium thiocyanate	+
acetic acid (80 %)	-	alum / chrome alum	+	ammonium thiocyanate / fluoroammonium	+
acetic acid anhydride	+	alum / potassium alum	+	amyl acetate	+
acetic acid methyl ester	+	alum / sodium alum	+	amyl amine	+
acetic acid vinyl ester	+	aluminum acetate	+	amyl chloride	+
acetic ester	+	aluminum bicarbonate	+	aniline	+
acetone	0	aluminum bifluoride	+	aniline paints	+
acetyl salicylic acid	+	aluminum chloride	+	animal blood	+
acetylchloride	+	aluminum hydroxide, alumina	+	animal fat	+
acetylene (liquid)	+	aluminum sulfate	+	anodizing bath	+
acid fog	+	ammonia anhydride	-	antibiotics	+
acidic alum	+	ammonium bisulfite	+	antichlorine solution	+
acrylic acid	+	ammonium borate	+	antimony salt	+
acrylic acid nitrile	+	ammonium bromide	+	antimony trioxide	+
activated aluminum oxide	+	ammonium carbonate	+	antioxidants	+
activated carbon	+	ammonium chloride	+	apple juice	+
activated silicon	+	ammonium chromate	+	aqua fortis	-
aftershave lotion	+	ammonium copper formate	+	aqua regia	-
aircraft fuel	+	ammonium formate	+	argon	+
albumin	+	ammonium hydroxide	0	arochlor	+
alcohol, allyl alcohol	+	ammonium hyposulfite	+	aromatic gasoline	+
alcohol, amyl alcohol	+	ammonium iodide	+	aromatic solvent	+
alcohol, butyl alcohol	+	ammonium molybdate	+	arsenic acid	+
alcohol, ethyl alcohol	+	ammonium oxalate	+	arsenic lead	+
alcohol, furfuryl alcohol	+	ammonium persulfate	+	asbestos compound	+
alcohol, hexyl alcohol	+	ammonium phosphate	+	ash suspension	+

Symbols:
+ = Resistant
- = Non-resistant
0 = Requires testing
1 = Temperature-dependent
2 = Application-dependent (requires testing)
3 = Only BAM-tested types

aureomycine	+	butyric acid	-	chlorinated alcohol	+
bacitracine	+	butyrilic acid (≤ 10 %)	+	chlorinated hydrocarbon	+
bacterial media	+	cabbage juice	+	chlorinated kerosine	+
barium acetate	+	cadmium cyanide	+	chlorinated paper pulp	+
barium carbonate	+	cadmium plating bath	+	chlorinated solvent	+
barium chloride	+	cadmium sulfate	+	chlorinated water	+
barium hydroxide (≤ 10 %)	+	calcium acetate	+	chlorinated wax	+
barium sulfate	+	calcium bisulfate	+	chlorine (dry)	-
battery acid (≤ 10 %)	+	calcium carbonate	+	chlorine (liquid)	-
battery acid (≤ 10 %)	+	calcium chlorate	+	chlorine bleach	+
bauxite	+	calcium chloride	+	chlorine dioxide	+
beef extract	+	calcium chloride salt solution	+	chloro sulfonic acid	-
beer	+	calcium citrate	+	chloroform (dry)	+
beer wort, malt extract	+	calcium ferrocyanide	+	chlorophyll	+
bentonite (emulgator agent)	+	calcium formate	+	chocolate milk	+
benzaldehyde	+	calcium hydroxide	+	chocolate syrup	+
benzene	-	calcium hypochloride	+	chromic acid (≤ 10 %)	+
benzene hexachloride	+	calcium lactate	+	chromic acid (50 %, cold)	0
benzene hydrochloride	+	calcium nitrate	+	chromic acid (50%, hot)	-
benzene triacid	+	calcium phosphate	+	chromium (liquid) (≤ 10 %)	+
benzoic acid	+	calcium silicate	+	chromium acetate	+
beryllium hydrosulfate	+	calcium sulfamate	+	chromium bath (≤ 10 %)	+
bicarbonate (liquid)	+	calcium sulfate	+	chromium chloride	+
bilge medium	+	calcium sulfite	+	chromium sulfate	+
bitter almond oil	+	camphor	+	citric acid solution (cold)	0
bitumen emulsion	+	cane sugar (liquid)	+	citric acid solution (hot)	0
bleach bath	0	cane sugar (refined)	+	citrus (concentrated)	+
bleached lime	+	carbitol	+	citrus juice	+
blood substitute	+	carbolic acid (≤ 10 %)	+	clay	+
blood, human and animal	+	carbon disulfide	+	coal tar	+
borax (liquid)	+	carbon disulfide	+	cobalt (acidic)	+
bordeaux broth	+	carbon sugar	+	cobalt chloride	+
bordeaux mixture	+	carbon wax	+	coconut oil	+
boric acid	+	carboxylmethylcellulose	+	cod oil	+
brake fluid	+	carnauba wax	+	coffee (concentrated)	+
brandy	+	casein	+	coke quencher	+
brine (alkaline salt water)	+	casein watercolor	+	cola syrup	+
bromine	-	cashew nut oil	+	coloring agent, for vehicles	+
bromine cyanide	+	castor oil	+	coloring agent, linseed-based	+
bromine methylene	+	celane	+	coloring agent, water-based	+
bromine solution	0	cellosolve	+	condensate	+
bronze cyanide	+	cellulose acetate	+	copper ammonium formate	+
butadiene	+	cellulose pulp	+	copper chloride	+
buttermilk	+	cement (high liquid)	+	copper chloride gasoline	+
butyl acetate	+	cement suspension	+	copper cyanide	+
butyl alcohol	+	cereal oil	+	copper naphthanate	+
butyl aldehyde	+	cereals mash	+	copper plating (acidic)	+
butyl amine	+	chalk	+	copper plating (alkaline)	+
butyl cellosolve	+	cheese acid	+	copper plating technologies (acidic)	+
butyl chloride	+	chemical pulp	+	copper plating technologies (lye)	+
butyl ether (dry)	+	chestnut stain	+	copper stain	+
butyl lactate	+	chloramine	+	copper sulfate	+

Symbols:
+ = Resistant
- = Non-resistant
0 = Requires testing
1 = Temperature-dependent
2 = Application-dependent (requires testing)
3 = Only BAM-tested types

corn pulp	+	enzyme solution	+	gelatin (edible gelatin)	+
corn sugar	+	epichlorhydrin	+	gluconic acid	+
cotton seed oil	+	ergosterine solution	+	glucose	+
creosolic acid	+	ethyl acetate	+	glue emulsion	+
creosote	+	ethyl acetate, acetic ester	+	glutamic acid	+
creosote acid	+	ethyl alcohol, spirit of wine	+	gluten	+
creosote oil	+	ethyl amine	+	glycerin brine bath	+
cutting fluid	+	ethyl cellosolve	+	glycine	+
cyanide solution	+	ethyl formate	+	glycine hypochloride	+
cyanur chloride	+	ethyl gasoline	+	glycolamines	+
cyclohexane	+	ethyl silicate	+	glycolic acid	+
cylinder lube oil	+	ethylene diamine	+	glycolic acid	+
DDT agent	+	ethylene dichloride	+	glycoxal	+
detergent	+	ethylene glycol	+	gold chloride	+
developing liquid	+	face cream	+	gold cyanide	+
Dextran	+	fatty acid amine	+	granodine	+
Dextrin	+	fatty acids	+	grape juice	+
diacetone alcohol	+	fatty alcohol	+	grape juice pulp	+
diamyl amine	+	feces	+	grapefruit juice	+
diatom sludge	+	feces	+	grease lubricating	+
diazoacetate	+	ferment	+	green soft soap	+
dibromoethyl	+	ferri-floc	+	grinding lubricants	+
dibutyl phthalate	+	fertilizer solution	+	GRS latex	+
dichlorethylether	+	fish oil	+	hair tonic	+
dichlorethylether	+	flotation concentrates	+	halane solution	+
dichlorphenol	+	fluorine salts	+	halo wax	+
dichlorphenol	+	fluorine-containing gases and liquids	+	halogen tin plating	+
dicyandiamide	+	fluorolube	+	heating oil	+
dielectric fluid	+	fluorosilicic acid	+	heptane	+
diethyl sulfate	+	flux	+	hexachlorbenzene	+
diethylamine	+	foam latex	+	hexadiene	+
diethylether	+	foaming agent	+	hexane	+
diethylglycol	+	foamit	+	hexaphosphate	+
diglycolic acid	+	formaldehyde (cold)	+	hexyl alcohol	+
dimethylbenzene	+	formaldehyde (hot)	0	HtH	+
dimethylformamide	+	formic acid (cold)	0	hydrazine	+
dimethylsulfine	+	formic acid (hot)	-	hydrazine hydrate	+
dioxane (dry)	+	fossil oil	+	hydrochloric acid	0
dioxide	+	fruit juices	+	hydrocyanic acid (≤ 10 %)	+
dipentene-pinene	+	fuming nitric acid	-	hydrocyanic acid (≤ 10 %)	+
diphenyl	+	fuming sulfuric acid	-	hydrofluoric acid	-
dister lube oil	+	furfurol	+	hydrogen	+
distilled water	+	gallert emulsion	+	hydrogen bromide (≤ 10 %)	+
distillery mash	+	gallic acid (≤ 5 %)	+	hydrogen fluoride gas	0
distillery waste water	+	gallium sulfate	+	hydrogen peroxide	+
drinkable water	+	gammaglobuline	+	hydrogen peroxide (concentrated)	0
dye liquid	+	gasoline	+	hydroponic solution	+
edible fat	+	gasoline (acidic)	+	hydroquinone	+
edible oil	+	gasoline (white)	+	hypochlorite	+
emulgated oils	+	gasoline acidic bath	+	ice cream	+
enamel	+	gasoline alkaline bath	+	infusoria clay	+
enamel frit	+	gasoline copper chloride	+	ink	+

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insect poison	+	magnesium mash	+	mustard	+
iodine benzene	+	magnesium sulfate	+	naphtaline	+
iodine in alcohol	+	maize kernel oil	+	naphtha	+
iodine solutions	+	maize kernels	+	neoprene emulsion	+
iodine-potassium iodide	+	maize syrup	+	neoprene latex	+
ion exchange liquid	+	maize water	+	nickel	+
iron chloride	+	maleine anhydride	+	nickel acetate	+
iron nitrate	+	maleinic acid	+	nickel ammonium sulfate	+
iron ore oxide	+	malt mash	+	nickel fluorborate	+
iron ore phytate	+	malt sugar	+	nickel plating	+
iron ore taconite	+	malt syrup	+	nickel sulfate	+
iron sulfate (10 %)	+	maltose	+	nicotine acid (≤ 10 %)	+
iron sulfate (saturated)	+	manganese chloride	+	nitrate solution	+
iron vitriol	+	manganese sulfate	+	nitrator acid	-
iso-octane	+	mannit solution	+	nitric acid (≤ 10 %)	+
isobutyl alcohol	+	mayonnaise	+	nitric acid (20 %)	0
isobutyraldehyde	+	meat broth	+	nitric acid anhydride	+
isocyanate resin	+	melamine resin	+	nitroacrylosulfonic acid	+
isopropyl acetate	+	menthol	+	nitrobenzene (dry)	+
isopropyl acetone	+	mercaptane	+	nitrocellulose	+
isopropyl alcohol	+	mercury	+	nitrofuran	+
isopropyl ether	+	mercury (dry)	+	nitroguanidine	+
itaconic acid	+	mercury chloride	+	nitroparaffin (dry)	+
jet fuel (JP 4)	+	mercury nitrate	+	nitrosyl chloride	+
kaolin	+	methane	+	norite carbon	+
kelp slime	+	methanol	+	Nuchar	+
kernel oil	+	methyl acetate	+	oakite	-
kerosine	+	methyl alcohol	+	oils, animal oils	+
ketones	+	methyl amine	+	oils, castor oil	+
lactic acid	+	methyl carbitol	+	oils, cereal oil	+
lactose	+	methyl cellosolve	+	oils, coconut oil	+
lapping agent	+	methyl chloride	0	oils, cod oil	+
lard	+	methyl ethyl ketone	+	oils, creosote oil	+
latex (natural)	+	methyl isobutyl ketone	+	oils, diesel fuel	+
latex (synthetic)	+	methyl lactate	+	oils, ecologic diesel fuel (RME)	+
laundry water	+	methyl orange	+	oils, emulgated oils	+
lead fluoride	+	methylene dichloride	+	oils, fish oil	+
lead monoxide	+	milk	+	oils, heating oil	+
lead sulfate	+	milk of magnesia	+	oils, linseed oil	+
lecithin	+	mine water	+	oils, lube oil	+
lemon juice	+	mineral oil (white)	+	oils, mineral oil	+
lignin extract	+	mineral spirits	+	oils, olive oil	+
linseed oil	+	molasses (edible)	+	oils, palm oil	+
lithium chloride	+	molasses (raw)	+	oils, peanut oil	+
liver extract	+	molten bitumen	+	oils, soluble oils	+
lox (liquid O_2)	-	molten ceramic	+	oils, soybean oil (raw)	+
ludox	+	molten paraffin	+	oils, tall oil	+
magnesite	+	molten phosphorus	+	oils, tung oil	+
magnesium bisulfate	+	molten sugar	+	oils, vegetable oils	+
magnesium carbonate	+	monochloroacetic acid	+	oils, wood oil	+
magnesium chloride	+	monochlorobenzene	+	oleic acid (cold)	+
magnesium hydroxide	+	morphaline	+	oleic acid (hot)	+

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orange juice	+	phthalic acid	+	proteins	+
ore pulp	+	picric acid solution	+	pulp	+
organic dyes	+	pine oil	+	pyranol	+
oxalic acid	+	pine resin in alcohol	+	pyridine	+
ozone (liquid)	-	pineapple juice	+	pyrogallic acid	+
paint	+	plasma diluent	+	pyromellitic acid	+
paint thinner	+	plating agent, brass cyanide	+	pyrrole	+
paints	+	plating agent, bromine cyanide	+	quebracho tannin	+
palm oil	+	plating agent, bronze cyanide	+	quinone	+
palmitinic acid	+	plating agent, cadmium cyanide	-	rare earth salts	+
paper clips	+	plating agent, cobalt (acidic)	+	rayon viscose	+
paper mil scrap	+	plating agent, copper (acidic)	+	riboflavin	+
paper pulp	+	plating agent, copper (alk.)	+	river water	+
paper pulp, bleached	+	plating agent, gold cyanide	+	roccal	+
paper pulp, chlorinated	+	plating agent, iron (acidic)	+	rubber latex	+
paper pulp, washed and bleached	+	plating agent, lead fluor	+	rubber paste	+
paper pulp, with alum	+	plating agent, nickel	+	safrole	+
paper pulp, with dye	+	plating agent, platinum	+	salad sauce	+
paradichlorbenzene	+	plating agent, silver cyanide	+	salammoniac	+
paraffin oil	+	plating agent, tin (acidic)	+	salicylic acid	+
paraformaldehyde	+	plating agent, zinc (acidic)	+	saline soil (physiol.)	+
peanut oil	+	plating agent, zinc (alk.)	+	salt solution, alkaline	+
pectin gelling agent	+	polio vaccine	+	salt solution, electrolytic	+
penicillin	+	polyacrylnitrile sludge	+	salt solution, for curing	+
pentachlor ethane	+	polyphosphatic acid (≤ 10 %)	+	saltwater (chlorinated)	+
pentaerythrite solution	+	polysulfide liquor	+	saltwater (cold)	+
perchloric acid (≤ 10 %)	+	polyvinylchloride sludge	+	sand blast	+
perchloroethylene (dry)	+	potash	+	sea water	+
perchloromethylmercaptane	+	potassium acetate	+	sebum	+
perfume	+	potassium alum	+	selenium chloride	+
permanganese acid	-	potassium aluminum sulfate	+	shellac	+
peroxidic acid	-	potassium bromide	+	shower water	+
peroxidic bleach	+	potassium carbonate	+	silica (ground)	+
persulfuric acid (≤ 10 %)	+	potassium chloride solution	+	silica gel	+
petrolether	+	potassium chromate	+	silicagel	+
petroleum	+	potassium cyanide solution	+	silicon oils	+
pharmaceutical agents	+	potassium dichromate	+	silicone tetrachloride	+
phenol	+	potassium hydroxide	+	silver cyanide	+
phenol resin glue	+	potassium iodide	+	silver iodide	+
phenol resins	+	potassium nitrate	+	silver nitrate	+
phenol sulfonic acid	+	potassium perchlorate	+	slaked lime	+
phenylbetanaphthylamine	+	potassium permanganate	+	slate (maximum mesh width 4.000)	+
phloroglucine	+	potassium persulfate	+	sloe gin	+
phosphate ester	+	potassium phosphate	+	soap solution (stearate)	+
phosphoric acid (10 %, cold)	+	potassium silicate	+	soda pulp	+
phosphoric acid (10 %, hot)	0	potassium sulfate	+	sodium acetate	+
phosphoric acid (50 %, cold)	0	potassium xanthogenate	+	sodium aluminate	+
phosphoric acid (50 %, hot)	0	press chip scrap	+	sodium arsenate	+
phosphoric acid (85 %, cold)	0	propione hydroxide	+	sodium benzene sulfonate	+
phosphoric acid (85 %, hot)	-	propionic acid	+	sodium bicarbonate	+
phosphorus-containing sand	+	propyl alcohol	+	sodium bisulfite	+
phosphorus-tungsten acid	+	propyl bromide	+	sodium bromide	+

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sodium carbonate	+	sulfite lye	+	tomato juice	+
sodium chlorate	+	sulfoanhydride	+	tomato ketchup	+
sodium chloride	+	sulfone	+	tooth paste	+
sodium chlorite	+	sulfonic acid (≤ 10 %)	+	transil oil	+
sodium cyanide	+	sulfonyl chloride	+	trichlorethane	+
sodium dichromate	+	sulfur-acidic iron oxide (10 %)	+	trichlorethylene	+
sodium dithionite	+	sulfur-acidic potash	+	trichloroacetic acid	+
sodium ferricyanide	+	sulfuric acid	0	trichloromethane	+
sodium fluate	+	sulfuric acid (0-7 %)	0	tricresyl phosphate	+
sodium fluoride	+	sulfuric acid (40-75 %)	0	triethanolamine	+
sodium formate	+	sulfuric acid (7-40 %)	0	triglycol	+
sodium glutamate	+	sulfuric acid (75-95 %)	-	trioxane	+
sodium hydrochloride	+	sulfuric acid (95-100 %)	-	tung oil	+
sodium hydrosulfide	+	sulfuryl chloride	+	tungsten acid anhydride	+
sodium hydrosulfite	+	synthetic latex	+	turnip juice	+
sodium hydroxide (20 %, cold)	+	syrup	+	turpentine	+
sodium hydroxide (20 %, hot)	0	taconite	+	turpentine oil	+
sodium hydroxide (50 %, cold)	0	tall oil	+	Ucon lube oil	+
sodium hydroxide (50 %, hot)	-	tallow	+	Udylithe bath	+
sodium hydroxide (70 %, cold)	0	tallow	+	undecylenic acid	+
sodium hydroxide (70 %, hot)	-	tamine	+	uranium salts	+
sodium hypochloride	+	tannin (cold)	0	uranyl nitrate	+
sodium lignosulfonate	+	tar oil	+	uranyl sulfate	+
sodium metasilicate	+	tartaric acid	+	vacuum	+
sodium monophosphate	+	tergitol	+	vacuum oil	+
sodium nitrate	+	tetraethyl lead	+	vanadium pentoxide	+
sodium nitrite	+	tetrahydrofuran	+	vanilla extract	+
sodium perborate	+	tetranitromethane	+	varsol	+
sodium peroxide	-	textile dye	+	vaseline	+
sodium persulfate	+	textile pressing oil	+	versene	+
sodium potassium chlorides	+	textile processing oils	+	vinegar	+
sodium stannate	+	thiocarbamide	+	vinyl acetate	+
sodium sulfate	+	thiocyanacide	+	vinyl chloride latex emulsion	+
sodium sulfide	+	thiocyanic acid	+	vitamins in oil	+
sodium sulfite	+	thioglycolic acid	+	volatile dust (dry)	+
sodium triphosphate	+	thiol	+	washing bleach	+
sodium xanthate	+	thionyl chloride	+	washing blue	+
soft soap (green)	+	thiophosphoryl trichloride	+	washing soda	+
solvent naphtha	+	thiourea	+	waste water	+
sorbic acid	+	thorium nitrate	+	water, acidic (pH <7)	+
sorbite	+	thyme camphor	+	water, alkaline (pH >7)	+
soybean oil	+	thymol	+	water, boiling	0
spirits of wine	+	tin (acidic)	+	water, carbon-containing	+
starch	+	tin (alkaline)	+	water, chlorinated (>1.000 ppm)	+
starch-based	+	tin solder	+	water, demineralized	+
steam pressure (low)	+	titanium oxide mass	+	water, desalted	+
sterilization steam	+	titanium oxidsulfate	+	water, distilled	+
streptomycin pulp	+	titanium tetrachloride	+	water, filtered	+
styrene	+	tobacco washing solution	+	water, sandy	+
styrene-butadiene-latex	+	toluene	+	water, soft	+
sulfamidic acid	+	toluol	+	water, sterile	+
sulfathiazole	+	toluol sulfone acid	0	wax	+

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Weisberg sulfate plating	+	zinc (alkaline)	+	zinc solder	+
wheat glue	+	zinc bromide	+	zinc sulfate	+
whisky	+	zinc chloride	+	zincolate	+
whisky pulp	+	zinc cyanide (alkaline)	+	zirconium nitrate	+
wine	+	zinc galvanization	+	zirconium sulfate	+
xylene	+	zinc oxide	+		
zeolite water	+	zinc oxide in water	+		

Part II – Resistance to gaseous media

acetylene	+	ethane	+	methan	+
acidic vapors	+	ethene	+	methylene chloride	+
air	+	ether	+	mine gas	+
alkaline vapors	+	ethylene	+	monochloromethane	+
amine	+	ethylene oxide	+	natural gas	+
ammonia vapors	+	freon (11-12-21-22)	2	natural gas (dry)	+
ammonium chloride	+	furnace gas (cold)	+	nitrogen	+
butadiene (liquid)	+	furnace gas (hot)	1	oxygen	3
butane	+	generator gas (3,5 bar; 50 psi)	+	ozone	-
butene gas (liquid)	+	helium	+	propane	+
byproduct gas (liquid)	+	hydrochloric acid gas	+	propene	+
carbon dioxide	+	hydrocyanic acid (≤ 10 %)	+	propylene	+
carbon monoxide	+	hydrocyanic acid (10 %)	+	R 22 chlorodifluoromethane	+
carbonic acid	+	hydrogen chloride	+	R 507 refrigerant	+
chloride (dry)	+	hydrogen gas (cold)	+	R134a tetrafluoroethane	+
chlorine gas (dry)	-	hydrogen sulfide (dry)	+	sulfur dioxide	+
chlorine gas (liquid)	-	hydrogen sulfide (dry)	+	sulfur dioxide (dry)	+
chlorocyane	+	hydrogen sulfide (wet)	+	sulfur trioxide (dry)	+
coke oven gas (cold)	+	hydrogen sulfide (wet)	+	sulfur trioxide gas	-
coke oven gas (hot)	1	hydrogen sulfide gas	+	sulfuric acid vapor	+
cyan chloride	+	industry gases	+	tetrafluoroethane R134a	+
cyanogen	+	isobutane	+	waste gas	+
cyanogen	+	marsh gas	+		

Part III – Resistance of plastics to anaerobically curing adhesives and sealants

acrylic styrene acrylonitrile (ASA)	-	polyamide (nylon)	+	polyimide (PI)	+
acrylonitrile butadiene styrene (ABS)	-	polybutylene terephthalate (PBT)	+	polymethyl methacrylate (PMMA)	-
allyl ester (DAP, DAIP)	+	polycarbonate (PC)	-	polymethylpentene (PMP)	+
cellulose acetate (CAP)	-	polyester (thermoplastic)	+	polyphenylene oxide (PPO)	-
epoxy resin	+	polyether ether ketone (PEEK)	-	polyphenylene sulfide (PPS)	-
fluoro polymers (PTFE, FEP, PFA, ETFE)	+	polyether sulfone (PES)	-	polypropylene (PP)	+
ionomere	-	polyetherimide (PEI)	+	polystyrene (PS)	-
liquid crystal polymer (LCP)	+	polyethylene (PE)	+	polyurethane (PU)	+
phenol resin	+	polyethylene terephthalate (PET)	+	polyvinyl chloride (PVC)	-
polyacetal (POM)	+	polyformaldehyde (POM)	+	styrene acrylnitrile (SAN)	-

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Ordering Information

	Product description	Product name	Content	Order Code
Threadlockers	Anaerobic threadlocker adhesive	TL22	50 ml	TL22E50B12
	Anaerobic threadlocker adhesive	TL55	50 ml	TL55E50B12
			200 ml	TL55E200B8
	Anaerobic threadlocker adhesive (for passive materials)	TL60	50 ml	TL60E50B12
	Anaerobic threadlocker adhesive	TL86	50 ml	TL86E50B12
			200 ml	TL86E200B8
Retaining Compounds	Anaerobic retainer adhesive	RC30	50 ml	RC30E50B12
	Anaerobic retainer adhesive	RC60	50 ml	RC60E50B12
	Anaerobic retainer adhesive	RC81	50 ml	RC81E50B12
	Anaerobic retainer adhesive	RC83	50 ml	RC83E50B12
			200 ml	RC83E200B8
	Anaerobic retainer adhesive	RC84	50 ml	RC84E50B12
Gasketing Compounds	Anaerobic hydraulic and pneumatic gasketing compound	GT21	50 ml	GT21E50B12
			200 ml	GT21E200B8
	Anaerobic gasketing compound for flanges	GG25	50 ml	GG25E50B12
			200 ml	GG25E200B8
	Anaerobic gasketing compound for pipes and flanges (PTFE)	GG72	50 ml	GG72E50B12
			200 ml	GG72E200B8
	Anaerobic gasketing compound for threaded pipes and fittings	GG77	50 ml	GG77E50B12
			200 ml	GG77E200B8
Instant Adhesives	Cyanoacrylate adhesive	IA01	12 g	IA01E12B30
			30 g	IA01E30B20
			60 g	IA01E60B12
	Cyanoacrylate adhesive	IA04	12 g	IA04E12B30
			30 g	IA04E30B20
			60 g	IA04E60B12
	Cyanoacrylate adhesive	IA15	30 g	IA15E30B20
			60 g	IA15E60B12
	Cyanoacrylate adhesive	IA25	30 g	IA25E30B20
Epoxy Adhesives	Epoxy Minute Adhesive	SA01	24 g	SA01E24B12
	Fast-Metal Minute Adhesive	SA05	24 g	SA05E24B12
	Repair Stick Steel	SA0FE	57 g	SA0FEE57B24
			115 g	SA0FEE115B12
Technical Sprays and Liquids	Activator (for anaerobically curing adhesives and sealants)	ST02	200 ml	ST02E200B12
	Cleaner Spray	CP01	500 ml	CP01E500B12
	Plastic Cleaner (for sensitive plastics)	CP02	500 ml	CP02E500B12
	PTFE Multifunctional Spray	LT01	400 ml	LT01E400B12
	Silicone Spray	LS01	400 ml	LS01E400B12
	Leak Detection Spray	TS01	400 ml	TS01E400B12
	Hand Protective Foam	TS90	200 ml	TS90E200B12
	Anti-Seize Assembly Spray	AS40	400 ml	AS40E400B12

Adhesives and Sealants - Product Overview

	Product description	Product name	Colour	Viscosity [mPa·s]	Viscosity	Breakaway torque
Threadlockers	Anaerobic threadlocker adhesive	TL22	purple	1,000	medium	low
	Anaerobic threadlocker adhesive	TL55	blue	2,000 - 7,000	higher	medium
	Anaerobic threadlocker adhesive (for passive materials)	TL60	green	700 - 1,000	medium	high
	Anaerobic threadlocker adhesive	TL86	green	500	medium	high
Retaining Compounds	Anaerobic retainer adhesive	RC30	green	3,000 - 6,000	higher	high
	Anaerobic retainer adhesive	RC60	silver	150,000 - 900,000	high	high
	Anaerobic retainer adhesive	RC81	green	125	low	high
	Anaerobic retainer adhesive	RC83	green	2,500	medium	high
	Anaerobic retainer adhesive	RC84	green	500	medium	high
Gasketing Compounds	Anaerobic hydraulic and pneumatic gasketing compound	GT21	brown	500	medium	medium
	Anaerobic gasketing compound for flanges	GG25	lime	17,000 - 50,000	high	low
	Anaerobic gasketing compound for pipes and flanges (PTFE)	GG72	white	17,000 - 50,000	high	medium
	Anaerobic gasketing compound for threaded pipes and fittings	GG77	yellow	24,000 - 70,000	high	medium
Instant Adhesives	Cyanoacrylate adhesive	IA01	clear	20 - 40	low	high
	Cyanoacrylate adhesive	IA04	clear	60 - 120	medium	high
	Cyanoacrylate adhesive	IA15	clear	1,000 - 1,500	high	high
	Cyanoacrylate adhesive	IA25	black	2,000 - 3,000	high	high
Epoxy Adhesives	Epoxy Minute Adhesive	SA01	crystal-clear	32,000	high	high
	Fast-Metal Minute Adhesive	SA05	anthracite	750,000	very high	high
	Repair Stick Steel	SA0FE	dark grey	-	very high	high
Technical Sprays and Liquids	Activator (for anaerobically curing adhesives and sealants)	ST02	green	-	-	-
	Cleaner Spray	CP01	clear	-	-	-
	Plastic Cleaner (for sensitive plastics)	CP02	clear	-	-	-
	PTFE Multifunctional Spray	LT01	lutescent	-	-	-
	Silicone Spray	LS01	clear	-	-	-
	Leak Detection Spray	TS01	milky	-	-	-
	Hand Protective Foam	TS90	white	-	-	-
	Anti-Seize Assembly Spray	AS40	anthracite	-	-	-

* The strength values were obtained at +25 °C on M 10 x 20 grade 8.8 screws (galvanised) and 0.8d nut height (without initial tension).

** The pressure shear strength of anaerobic adhesives and sealants was determined on cylindrical components at +25 °C with approx. 13 mm Ø, l/d = 0.88, allowance (D-d) = 0.05 mm. [Im Deutschen mmm = ein m zuviel]

The pressure shear strength of cyanoacrylate adhesives was determined according to DIN 53283.

Breakaway torque* [Nm]	Prevail torque [Nm]	Compressive shear strength** [Nm]	Gap fill [mm]	For threaded connections up to	Handling strength at RT [min]	Total cure at RT [h]	Working temp. [°C]	Available sizes
4 – 8	2 – 4	3 – 5	0,20	M 36	10 – 20	3 – 6	-60 / +150	50 ml / 200 ml
17 – 22	8 – 12	9 – 13	0,25	M 36	10 – 20	1 – 3	-60 / +150	
30 – 35	55 – 70	25 – 35	0,15	M 20 R ¾''	2 – 5	2 – 4	-60 / +180	
28 – 35	50 – 65	15 – 20	0,15	M 20 R ¾''	10 – 20	3 – 6	-60 / +150	
35 – 45	50 – 70	20 – 30	0,20	M 36	2 – 5	2 – 4	-60 / +180	50 ml / 200 ml
35 – 45	10 – 20	25 – 30	0,50	R 2''	15 – 30	3 – 6	-60 / +150	
25 – 30	50 – 60	15 – 18	0,10	M 12	10 – 20	2 – 4	-60 / +150	
35 – 45	50 – 70	25 – 30	0,20	M 36	≈ 5	1 – 3	-60 / +150	
30 – 35	55 – 70	25 – 35	0,15	M 20	≈ 5	2 – 4	-60 / +175	
12 – 15	18 – 22	8 – 12	0,15	M 20 R ¾''	10 – 20	2 – 4	-60 / +150	50 ml / 200 ml
6 – 10	2 – 5	4 – 6	0,30	-	20 – 40	≈ 12	-60 / +150	
7 – 10	2 – 4	4 – 6	0,40	M 80 R 3''	20 – 40	5-10	-60 / +150	
8 – 22	10 – 14	6 – 13	0,50	M 80 R 3''	15 – 30	1-3	-60 / +150	
-	-	20	0,10	-	2 – 60s	24	-50 / +80	12 g / 30 g / 60 g
-	-	20	0,15	-	3 – 60s	24	-50 / +80	
-	-	21	0,20	-	5 – 120s	24	-50 / +80	
-	-	24	0,20	-	20 – 120s	24	-50 / +135	
-	-	9	2	-	35	24	-50 / +80	24 g
-	-	10	4	-	40	24	-50 / +145	24 g
-	-	80	-	-	10	24	-50 / +120	57 g / 115 g
-	-	-	-	-	-	-	-	200 ml
-	-	-	-	-	-	-	-	500 ml
-	-	-	-	-	-	-	-	500 ml
-	-	-	-	-	-	-	-50 / +210	400 ml
-	-	-	-	-	-	-	-50 / +250	400 ml
-	-	-	-	-	-	-	-0 / +50	400 ml
-	-	-	-	-	-	-	-	200 ml
-	-	-	-	-	-	-	-180 / +1,200	400 ml

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