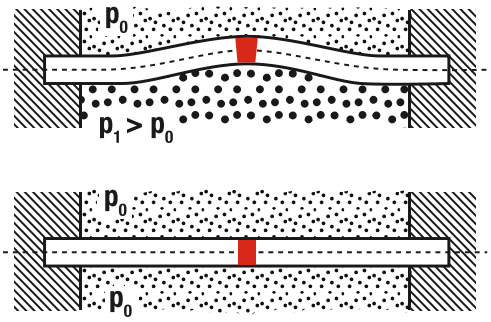
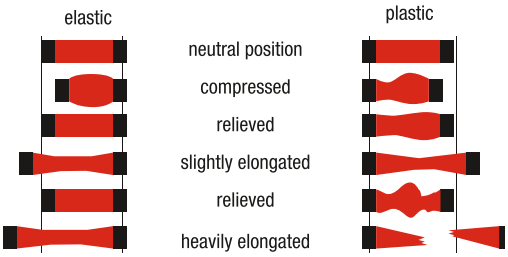
Why use Henkel products for elastic / plastic bonding and sealing?

The Henkel portfolio of industrial elastic / plastic bonding and sealing products offers a wide range of solutions to meet the different requirements and conditions that apply to industrial design and construction.



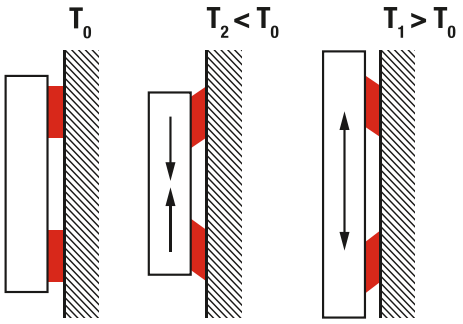
Elastic Sealing

Elastic sealing involves applying an appropriate product in the joint in order to prevent the penetration of moisture/or the passage of air between elements, components and assemblies made of the same or dissimilar materials. The elastic sealing material seals by adhesion to the substrates. The elastic behaviour of the sealant acts as a media barrier while relative part movements are tolerated.



Plastic Sealing

Plastic sealing involves applying an a appropriate product in the joint in order to act as a media barrier. The primary criterion for selection of a plastic sealant (besides the sealing/ media barrier performance) is its mechanical behaviour under deformation. When exposed to forces, each sealant shows both a plastic (deformable) and an elastic (e.g. rubber like) reaction. If the plastic response is dominant, the sealant is referred to as plastic.



Elastic Bonding

Elastic bonding is a process in which two similar or dissimilar materials are joined with an elastic adhesive. Elastic bonding adhesives are selected mainly for their capability to tolerate relative movements of the parts while the parts are bonded by adhesion to the substrates. Besides their elastic properties, many elastic adhesives from Henkel exhibit high inherent strength (cohesion) and a relatively high modulus, producing friction-locked joints which, at the same time, have elastic properties.

Advantages of Elastic / Plastic Bonding and Sealing

- Improved aesthetic aspects
- New designs
- Use of new materials incl. advanced composites
- Fewer parts
- Increased reliability & durability
- Higher quality
- Weight reduction, light weight design
- Efficient production process, fewer production steps
- Cost reduction

Choosing the right Henkel Industrial Elastic / Plastic Adhesive or Sealant

Technical aspects/considerations of elastic/plastic bonding and sealing

- Elastic bonding and sealing assembly needs a gap for elasticity to achieve more even stress distribution and higher elasticity (figure 1 and 2)
- Adhesion to the substrates enables elongation of the product during relative movements without loosening surface contact (figure 3)
- Joint design needs to take into account service conditions, environmental factors and specific durability, compatibility and aesthetic requirements

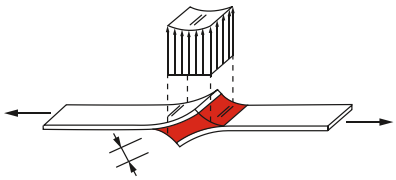


Figure 1: Larger gap

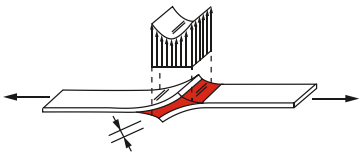


Figure 2: Smaller gap

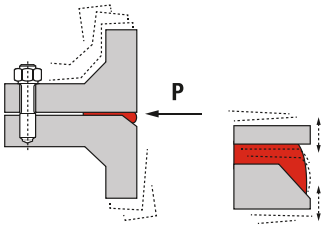


Figure 3: Adhesive & sealant

Silicones

The LOCTITE Silicones are based on silicon – oxygen backbones with organic side groups. Products incorporating this technology undergo moisture curing (1K, RTV*), after mixing (2K) or by temperature (1K, heat cure) to a high performance rubber-like elastomer.

- Elastic bonding and sealing with high flexibility
- 1K or 2K solution
- Outstanding temperature resistance
- Excellent UV and chemical resistance - e.g. in the presence of oil, water and glycol
- Primerless adhesion to many substrates

*Room Temperature Vulcanization

Silane Modified Polymers

The TEROSON MS line is based on silane-modified polymers (SMP). Products incorporating this technology undergo moisture curing and react to form high-performance elastomers. SMP products contain an adhesion promoter (primer) as part of the formulation.

- 1K or 2K solution
- Excellent adhesion on almost all substrates
- Excellent weathering and ageing resistance
- Elastic bonding, sealing and coating

Butyls

The TEROSON RB line is based on butyl rubber and/or polyisobutylene. Due to their inherent tackiness, butyl and PIB sealants adhere to metals, glass, ceramics, mineral substrates, wood, PS, EPDM and other plastics.

- Plastic sealing
- 1K solution
- Final properties directly upon application
- High flexibility even at low temperatures
- Excellent adhesion to almost all substrates
- Good resistance to water and ageing
- Low permeability to water vapour and gases
- Self-welding

Henkel classification of plastic sealants

Flat, Round, Pre-Cut Profiles

- Wound on reels or cut to length
- No application equipment required

Putties

- Easily shapeable kneading mass
- Shaped by hand and pressed into gaps, joints or openings
- Excellent seal against water, moisture, gases and dust

Hotmelt Butyls

- Highly viscous and very tacky at room temperature
- Must be heated to 80°C to 120°C (or even higher) for application
- Applied from hobbocks (pails) or drums

Gun Grade Butyl Sealants

- Cold processable sealants applied at room temperature
- Applied from cartridges or foil cartridges

Industrial Sealants / Adhesives – Silicones

Product Table

	2K		
	General purpose	Fast cure	Medium cure
Solution	**LOCTITE SI 5615**	**LOCTITE SI 5616**	**LOCTITE SI 5607**
			
Description	2K alkoxy silicone	2K alkoxy silicone	2K alkoxy silicone
Mix ratio by volume (A:B)	2:1	2:1	2:1
Colour	Black	White	Grey
Mix tip working life (static mixer)	3 – 5 min.	3 – 5 min.	5 – 7 min.
Skin formation time	–	–	–
Fixture time	10 – 15 min.	10 – 15 min.	50 min.
Elongation at break	230%	200%	140%
Shore A hardness	34	30	43
Shear strength (GBALU*)	1.7 N/mm²	1.7 N/mm²	1.6 N/mm²
Service temperature range	-50°C to +180°C	-50°C to +180°C	-50°C to +180°C
Pack sizes	400ml, 17 ltr	Not available in the U.K.	400ml
	LOCTITE SI 5615 • Fast cure 2K silicone • Good adhesion to a wide range of substrates	**LOCTITE SI 5616** • Fast cure 2K silicone • Sealing/bonding applications	**LOCTITE SI 5607** • Medium cure 2K silicone

Handy Hints

- To improve adhesion on difficult-to-bond materials, we recommend cleaner/adhesion promoter TEROSON SB 450 or Corona/Plasma treatment
- Using 2K silicones with mixing nozzle:

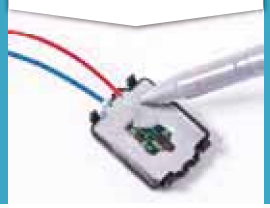
1. After opening the cartridge, press gun until both components come out of the cartridge. Do this without mixer nozzle attached.

2. Mount the mixer and discard the first 5cm of mixed product.

3. Pay attention to the “mix tip pot life”. Make sure that the applied bead is smooth. If you see crumbs on the bead surface, the product is already partly cured and the final properties will not be reached.

4. Change the mixer if you have not used the product for some time.

*GBALU = Grit Blasted Aluminium

	Self-levelling		1K		
	Fast cure	Ultra clear	General purpose	Electrical components	High temperature resistance
	LOCTITE SI 5611	**LOCTITE SI 5700**	**LOCTITE SI 5366**	**LOCTITE SI 5145**	**LOCTITE SI 5399**
					
	2K alkoxy silicone	2K polyaddition silicone	1K acetoxy silicone	1K alkoxy silicone	1K acetoxy silicone
	10:1	1:1	–	–	–
	Grey	Clear	Clear	Clear	Red
	2 – 3 min.	15 min.	–	–	–
	–	–	5 min.	70 min.	5 min.
	6 – 10 min.	220 min.	–	–	–
	60%	190%	530%	500%	500%
	50	39	25	25	33
	0.9 N/mm²	–	2 N/mm²	3.5 N/mm²	2.5 N/mm²
	-50°C to +180°C	-50°C to +150°C	-50°C to +200°C	-50°C to +200°C	-50°C to +300°C
	400ml	400ml	310ml	40ml	310ml
	LOCTITE SI 5611 • Very fast cure 2K silicone • Self-levelling • Potting/sealing applications • Lighting elements, switches, electronic connectors	**LOCTITE SI 5700** • Transparent 2K polyaddition silicone (no by-product) • Self-levelling • Potting/sealing applications • Lighting applications • Electrical & optical, e.g. connectors, switches	**LOCTITE SI 5366** • General purpose 1K silicone • Suitable for glass, metal, ceramics etc.	**LOCTITE SI 5145** • Neutral curing 1K silicone • Non-corrosive • Especially for sealing and protecting electrical components	**LOCTITE SI 5399** • High temperature resistant 1K silicone • For bonding and sealing glass, metal and ceramics, e.g. industrial ovens, stove flues, etc.

Industrial Sealants / Adhesives – Silicones

Product List

Product	Description	Mix ratio by volume A:B	Colour	Mix tip working life (static mixer)	Skin formation time	Fixture time
TEROSON SI 33	1K amine silicone	–	Transparent, grey, black, white	–	10 min.	–
TEROSON SI 111	1K alkoxy silicone	–	Grey, black, white	–	25 min.	–
LOCTITE SI 5145	1K alkoxy silicone	–	Clear	–	5 min.	–
LOCTITE SI 5366	1K acetoxy silicone	–	Clear	–	5 min.	–
LOCTITE SI 5367	1K acetoxy silicone	–	White	–	5 min.	–
LOCTITE SI 5368	1K acetoxy silicone	–	Black	–	5 min.	–
LOCTITE SI 5398	1K acetoxy silicone	–	Red	–	8 min.	–
LOCTITE SI 5399	1K acetoxy silicone	–	Red	–	5 min.	–
LOCTITE SI 5404	1K heat curing silicone	–	White to grey	–	–	–
LOCTITE SI 5607	2K alkoxy silicone	2:1	Grey	5 – 7 min.	–	10 – 20 min.
LOCTITE SI 5610	2K alkoxy silicone	2:1	Black	2 – 3 min.	–	4 – 6 min.
LOCTITE SI 5611	2K alkoxy silicone	10:1	Grey	2 – 3 min.	–	6 – 10 min.
LOCTITE SI 5612	2K alkoxy silicone	4:1	Red	4 – 6 min.	–	25 – 30 min.
LOCTITE SI 5615	2K alkoxy silicone	2:1	Black	3 – 5 min.	–	10 – 15 min.
LOCTITE SI 5616	2K alkoxy silicone	2:1	White	3 – 5 min.	–	10 – 15 min.
LOCTITE SI 5660	1K oxime silicone	–	Grey	–	< 60 min.	–
LOCTITE SI 5700	2K polyaddition silicone	1:1	Clear	15 min.	–*	220 min.
LOCTITE SI 5970	1K alkoxy silicone	–	Black	–	25 min.	–
LOCTITE SI 5980	1K alkoxy silicone	–	Black	–	30 min.	–
LOCTITE SI 5990	1K oxime silicone	–	Copper	–	25 min.	–

*Tack-free time = approx. 220 min

	Elongation at break	Shore A hardness	Shear strength GB ALU	Service temperature range	Pack sizes	Comments
	250%	22	1.2 N/mm²	-50°C to +150°C	Not available in the U.K.	General purpose sealing
	590%	23	1.4 N/mm²	-50°C to +150°C	Not available in the U.K.	High elongation
	500%	25	3.5 N/mm²	-50°C to +200°C	40ml	For electrical components
	530%	25	2 N/mm²	-50°C to +200°C	310ml	General purpose
	500%	20	2 N/mm²	-50°C to +200°C	310ml	General purpose
	435%	26	2 N/mm²	-50°C to +200°C	310ml	General purpose
	200%	35	0.7 N/mm²	-50°C to +300°C	310ml	Flowable
	500%	33	2.5 N/mm²	-50°C to +300°C	310ml	High temperature resistance
	65%	60	1.6 N/mm²	–	Not available in the U.K.	Thermally conductive
	180 %	40	1.5 N/mm²	-50°C to +180°C	400ml	Medium curing speed
	210%	40	1.8 N/mm²	-50°C to +180°C	400ml	Very fast curing
	60%	50	0.9 N/mm²	-50°C to +180°C	400ml	Very fast curing
	180%	45	2.5 N/mm²	-50°C to +220°C	400ml	High temperature resistance
	230%	34	1.7 N/mm²	-50°C to +180°C	400ml, 17 ltr	Fast curing
	200%	30	1.7 N/mm²	-50°C to +180°C	Not available in the U.K.	White version of LOCTITE SI 5615
	100%	45 to 75	1.8 N/mm²	-50°C to +200°C	40ml, 100ml, 200ml, 300ml	Excellent water/glycol resistance
	190%	39	–	-50°C to +200°C	400ml	Ultra-transparent polyaddition curing silicone for potting
	200%	44	1.5 N/mm²	-50°C to +200°C	300ml, 20 ltr	Excellent oil resistance
	290%	27	1.4 N/mm²	-50°C to +200°C	40ml, 100ml, 200ml, 300ml	Excellent oil resistance, pressurised can for direct application
	270%	27	1 N/mm²	-50°C to +300°C	40ml, 100ml, 200ml, 300ml	High temperature resistance

Cleaner
TERSON SB 450 – alcoholic solution designed for cleaning and to improve adhesion (thin fluid, colourless)