

SONDERHOFF FERMASIL

Two-component, room temperature cross-linking silicone systems for sealing and potting



The tailor-made chemistry for growing requirements.

SONDERHOFF FERMASIL is the two-component silicone system for the manufacturing of soft elastic silicone elastomers and silicone foam sealings, which are applied directly onto the part by using FIP(F)G (Formed-In-Place (Foam) Gasket) technology.

The systems consist of an A-component and a cross-linking B-component, which are mixed with each other in a predetermined mixing ratio. After mixing the components, most systems react by their own at room temperature and generate a soft elastic silicone foam sealing or permanently elastic silicone elastomers.



2-dimensional application on flat surface

Thixotropic (pasty) sealing systems are preferably used, which, depending on the degree of viscosity, form a seal body with a height / width ratio of 1 : 3.0 to 1 : 1.5.



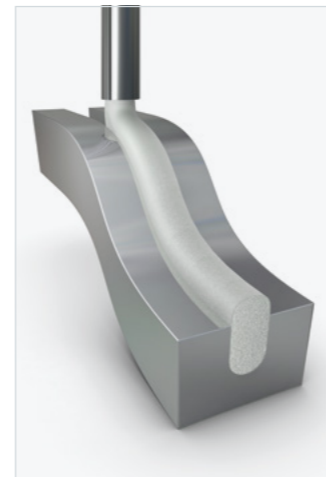
2-dimensional application in a groove

Liquid sealing systems, which are self-levelling over the coupling area, are usually used in this case. This allows seamless foam seals to be created.



3-dimensional application on flat surface

Thixotropic (pasty) sealing systems are preferably used, which, depending on the degree of viscosity, form a seal body with a height / width ratio of 1 : 3.0 to 1 : 1.5. Use is possible even with extreme slopes up to vertical applications.



3-dimensional application in a groove

Thixotropic (pasty) sealing systems are the most often used. It is also possible to apply gaskets on extreme slopes and up to vertical applications.

SONDERHOFF FERMASIL is processed using low pressure mixing and dosing machines for two components. Suited for silicone sealants are dynamic or static mixing systems. Henkel recommends dynamic mixing systems for increased ease of material processing.

SONDERHOFF FERMASIL can be used at a constant temperature from -60 up to +180 °C and for a short time up to +350 °C, while maintaining its softness and flexibility at any time. Due to its closed cell structure, SONDERHOFF FERMASIL does not absorb water and is suitable for use in tropical or damp environments. It is also highly resistant to other chemicals (e.g. commercial cleaning agents, alcohols, diluted acids and lyes, brake fluids, and cooling agents).

Henkel can draw on the variety of more than 200 application-specific formulations of the SONDERHOFF FERMASIL product family.

SONDERHOFF FERMASIL

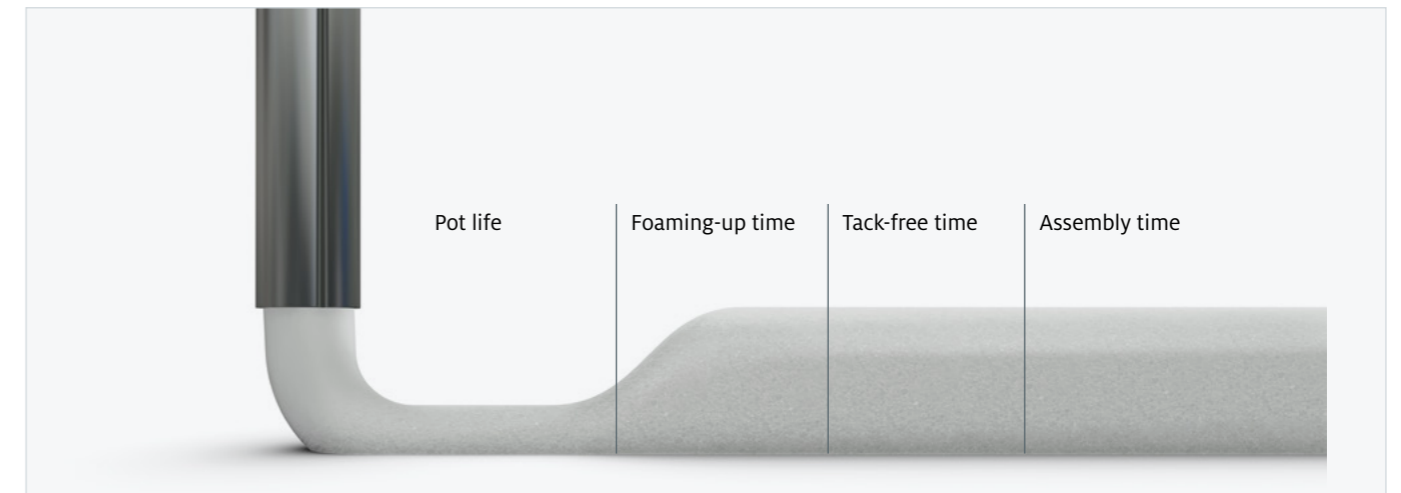
The technology

SONDERHOFF FERMASIL – The components

SONDERHOFF FERMASIL sealing foams consist of a liquid to pasty A-component and a cross-linking B-component.

SONDERHOFF FERMASIL – The reaction process

The chemical reaction of SONDERHOFF FERMASIL sealing foams is initiated by mixing the A- and B-components. The applied compound foams up to a uniform gasket under room temperature conditions.



SONDERHOFF FERMASIL – The foaming process

- **Pot life:** The time span from the mixing of the A- and B-components to the beginning of the foaming time (approx. 5 – 60 sec.). It is also referred to a processability time or service life.
- **Foaming-up time:** The time span in which the SONDERHOFF FERMASIL foam system expands to form a sealing body (after approx. 1 – 20 min.).
- **Tack-free time:** The time from which the sealant surface of SONDERHOFF FERMASIL foam systems can be touched without causing damage (after approx. 2 – 60 min.).
- **Assembly time:** The chemical reaction has progressed so far that the SONDERHOFF FERMASIL foam systems can bear loads or the foamed components can be assembled (after ≥ 20 min.).

SONDERHOFF FERMASIL

Two-component, room temperature cross-linking silicone systems

10 good reasons for SONDERHOFF FERMASIL:

1. ... can be used at a constant temperature up to +180 °C, for special types up to +250 °C and temporary up to +350 °C.
2. ... keeps the greatest possible flexibility even down to -60 °C.
3. ... is closed-cell and therefore nearly do not absorb water.
4. ... is highly resistant to many chemicals.
5. ... is hydrolysis stable and therefore suitable for use in tropical or damp environments.
6. ... is tack-free in 2 – 60 minutes, depending on the thermal conditions. A furnace can significantly shorten the reaction time, but it is not always necessary.
7. ... is processed using a mixing and dosing machine for two components and can be adapted flexibly and quickly to other parts for sealing application at any time.
8. ... develops a cross-linked structure which is extremely resistant to environmental effects such as humidity, dust and temperature.
9. ... has an exceptional long-term behavior and almost 100 % resetting ability, even after many years of continual use.
10. ... is in some cases also suitable for direct contact with food.

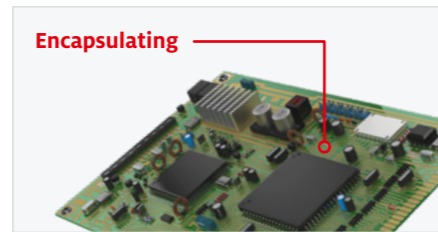
Electrical engineering

Switch cabinet door



Electronics

Circuit board



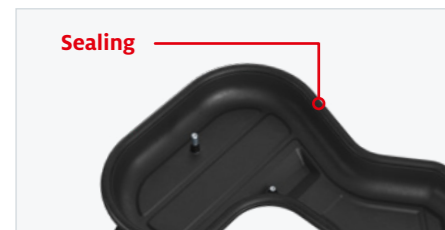
Lighting

Moisture-proof luminaire



Automotive

Drive belt cover



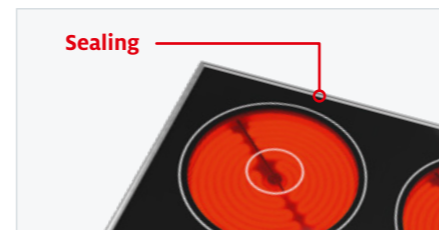
Packaging

Packaging covers suitable for food contact



White goods

Ceramic stovetops



SONDERHOFF FERMASIL

Two-component, addition-curing silicone system for sealing, bonding and potting

PROCESSING INFORMATION

- SONDERHOFF FERMASIL systems are processed with mixing and dosing equipment for two components. The recommended processing temperature is +23 °C ±5 °C.

PHYSICAL AND CHEMICAL PROPERTIES

Property	SONDERHOFF FERMASIL
Appearance	White, grey or black, other colors upon request (also transparent)
Viscosity	5,000 to 250,000 mPas (highly pasty)
Hardness	Foam: 25 Shore 00 up to 40 Shore A, potting: gel-like up to 80 Shore A
Compression load deflection	From 20 to 300 kPa (at 25 % compression)
Density	Foam: from 0.2 to 0.7 g/cm³, potting: from 1.0 to 2.0 g/cm³
Temperature resistance	From -60 to +180 °C (temporary up to +350 °C)
Tensile strength	Foam: up to 1.0 MPa, potting: up to 4.5 MPa
Elongation at break	Foam: up to 200 %, potting: up to 600 %
Resetting ability	≥ 97 % (DVR ≤ 3 %), (depending on test conditions)
Water absorption	≤ 3,5 % (depending on test conditions)
Flame retardancy	Up to UL 94 V-0 possible
Optional features	E.g. UL 50 conformity, UV resistant, ingress protection class up to IP 69K and NEMA 4-6p (achievable with suitable component design), good chemical resistance, ATEX

THE SONDERHOFF FERMASIL RANGE (SELECTION)

SONDERHOFF FERMASIL A-component	Application	Viscosity mPas	Hardness Shore 00	Density g/cm³	Special features
1809-1	Automotive Distance sensors	8,400	77	0.67	Slightly foamed, liquid silicone system, particularly suitable for ultrasonic sensors – good ratio between resonance and absorption behavior
93-VP1	Automotive Drive belt cover	145,000	64	0.35	Highly viscous, stable, medium hardness, curing possible without heat treatment
2525-1	Automotive Underbody cover	28,000	30	0.28	Extremely soft, semi-thixotropic, good processability
3510-1-G	Automotive Maintenance cover Ad-Blue	45,000	45	0.23	Soft, semi-thixotropic, good price-performance ratio
6080-1	Automotive Cover	138,000	57	0.31	Thixotropic, medium hardness, UL50e listed
91-VP2	Lighting Luminaires, E-boxes, packaging, switch cabinets	21,000	57	0.30	Liquid, good flow, curing possible without heat treatment, for lighting with ATEX approval
4570-1-DG	Lighting Lighting with ATEX approval	55,000	40	0.34	Soft, semi-thixotropic, good price-performance ratio
4010-LV	Electronics Potting of electronics, battery packs, sensors, PC boards	5,700	37 Shore A	0.97	Very good dielectric properties, good flow rating, good low-temperature flexibility, good chemical resistance, transparent
5507-LV	Packaging Food boxes, packaging covers in contact with food	14,000	44 Shore A	1.16	Fast curing, good mechanical properties, good chemical resistance
47-14	Enclosures Switch cabinets	92,000	60	0.33	Thixotropic, stable, standard material with medium hardness, UL50e listed
93-1-VP3-GREY	Enclosures Switch cabinets with ATEX approval	110,000	62	0.36	UL50e listed, thixotropic, stable, curing possible without heat treatment
3590-2-DG	Enclosures Switch cabinets	80,000	35	0.30	Soft, thixotropic, fast curing
38C3-1	Enclosures Switch cabinets	165,000	40	0.34	Soft, thixotropic, stable

Customer-specific solutions – worldwide and for many industries

The Henkel specialists for the SONDERHOFF portfolio
are available globally

Every year, more than 300 million seals are manufactured in more than 50 countries using products from Henkel's Sonderhoff portfolio. At our Centers of Expertise and Regional Hubs, our specialists offer application engineering advice, e.g. selecting a suitable material system and sampling of your components, as well as project management for dosing systems and automation. You will receive training from us on how to use the FIPFG technology and we will support you with the selection of spare parts and a regular service offering. Furthermore, we will be pleased to take over parts of your production for you – from small to large series – at our subcontracting locations.

Sales staff at all other Henkel locations worldwide will also be happy to answer any questions and provide you with further information on our sealing, bonding, and potting solutions. We look forward to hearing from you.

KOLO, POLAND
External Subcontracting Location

DÜSSELDORF, GERMANY
Center of Expertise

ELGIN, ILLINOIS, USA
Regional Hub

RICHMOND (KANSAS CITY), USA
Regional Hub

DORNBIRN, AUSTRIA
Center of Expertise

BARCELONA, SPAIN
External Subcontracting Location

OGGIONO, ITALY
Regional Hub

INCHEON, KOREA
External Subcontracting Location

SHANGHAI, CHINA
Regional Hub

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