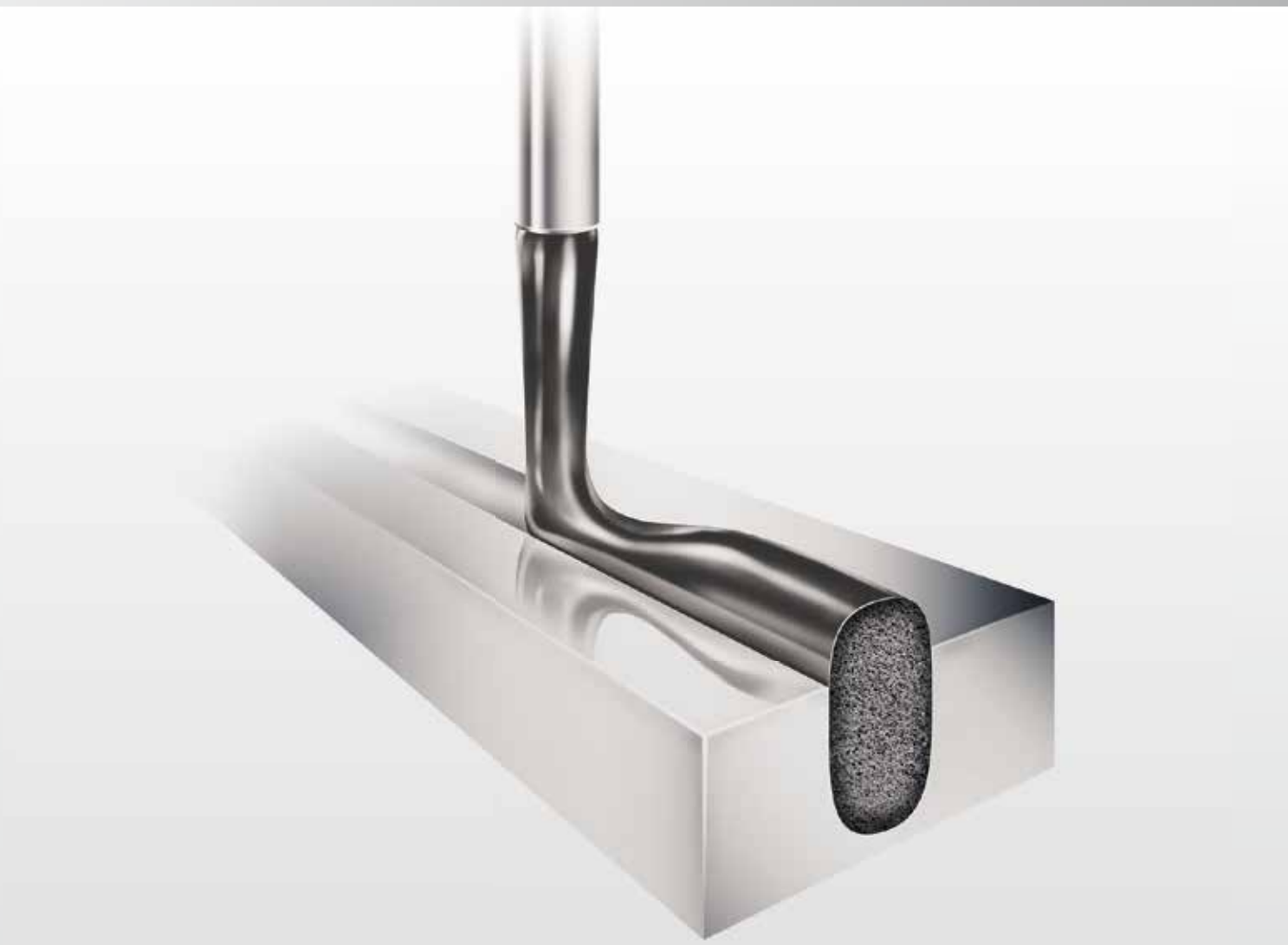
sonderhoff
SYSTEM SOLUTIONS

MORE THAN
50
YEARS OF
EXPERIENCE IN
SYSTEM SOLUTIONS

# SONDERHOFF FERMAPOR K31

Two-component, room temperature cross-linking polyurethane foam for sealing in the FIPFG process



Henkel

# The tailor-made chemistry for growing requirements.

SONDERHOFF FERMAPOR K31 is the two-component polyurethane system to produce soft elastic foam gaskets, which are foamed directly onto the part using FIPFG technology (Formed-In-Place-Foam-Gasket). The system consists of a basic resin (A-component) and a hardener (B-component), which are mixed with each other in a predetermined mixing ratio. When foaming up on the part, a soft foam gasket is formed after a few minutes.

After reaction of the material components, the foam gasket is tack-free and can be installed into mating components. According to experience the seal function is achieved with a compression of approx. 30 – 60 % of the cured foam gasket. The flow behavior, reactivity, degree of hardness and color of the material formulations can be adjusted as required.

Henkel can draw on the variety of more than 1,000 application-specific formulations of the SONDERHOFF FERMAPOR K31 family.

**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 FERMAPOR K31

## Polyurethane foam for sealing in the FIPFG process

### 10 good reasons for SONDERHOFF FERMAPOR K31:

**1.** ... is ideally suited for sealing industrial components in practically all shapes and geometries.

**2.** ... often achieves particularly good adhesion onto the component through the chemical reaction of the two material components on the substrate.

**3.** ... has excellent long-term behavior and shows almost 100 % resetting ability even after years of continuous use.

**4.** ... is tack-free at room temperature in 2 – 20 minutes. A furnace can significantly shorten the reaction time, but it is not always necessary.

**5.** ... offers special quick-reacting fast-cure recipes that are tack-free within 120 seconds for higher production cycle times.

**6.** ... easily compensates for large component tolerances.

**7.** ... forms a cross-linked structure after the reaction, which is extremely resistant to influences such as moisture, dust and temperature.

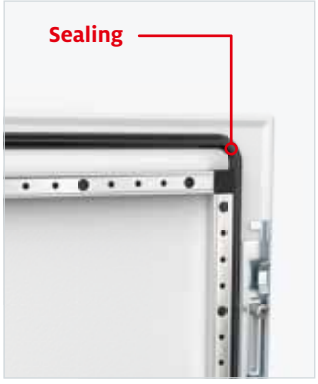
**8.** ... produces foam gaskets with extreme softness.

**9.** ... is processed with mixing and dosing systems for two components and can be easily and quickly changed over to other components, that need to be sealed at any time.

**10.** ... can be processed profitably even in small production runs.

**Automotive**
Door module


**Electrical engineering**
Switch cabinet door




**Lighting**
Moisture-proof luminaire


**Filter technology**
Radial-seal-filter

# SONDERHOFF FERMAPOR K31

## The technology

### SONDERHOFF FERMAPOR K31 – The components

SONDERHOFF FERMAPOR K31 sealing foams consist of a liquid to pasty A-component (polyol) and a hardener, the B-component (MDI isocyanate)

### SONDERHOFF FERMAPOR K31 – The reaction process

The chemical reaction of SONDERHOFF FERMAPOR K31 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 FERMAPOR K31 – 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 – 90 sec.). It is also referred to a processability time or service life.
- **Foaming-up time:** The time span in which the SONDERHOFF FERMAPOR K31 foam system expands to form a seal body (after approx. 30 – 180 sec.).
- **Tack-free time:** The time from which the sealant surface of SONDERHOFF FERMAPOR K31 foam systems can be touched without causing damage (after approx. 2 – 20 min.).
- **Assembly time:** The chemical reaction has progressed so far that the SONDERHOFF FERMAPOR K31 foam systems can bear loads or the foamed components can be assembled (after ≥ 20 min.).

# SONDERHOFF FERMAPOR K31

## Polyurethane foam for sealing in the FIPFG process

## PROCESSING INFORMATION

› SONDERHOFF FERMAPOR K31 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 FERMAPOR K31 |
|---|---|
| **Appearance** | Black or grey, other colors on request |
| **Viscosity** | 900 to 200,000 mPas |
| **Hardness** | From 15 Shore 00 to 40 Shore A achievable |
| **Compression load deflection** | From 5 to 200 kPa (at 25 % compression) |
| **Density** | From 0.1 to 0.6 g/cm³ |
| **Temperature resistance** | From -40 to +80 °C (temporary up to +160 °C) |
| **Tensile strength** | Up to 2 MPa |
| **Elongation at break** | Up to 400 % |
| **Resetting ability** | ≥ 95 % / ≤ 5 % (DVR), (depending on test conditions) |
| **Water absorption** | From ≥ 3.5 %, hydrophobic versions available, (depending on test conditions) |
| **Flame retardancy** | Up to UL 94 V-2 possible |
| **Optional features** | E.g. sliding properties, low fogging, suitable for food packaging, protection class up to IP 68 or NEMA 12 (achievable with suitable component design), UL 50E |

## THE SONDERHOFF FERMAPOR K31 RANGE (SELECTION)

| SONDERHOFF FERMAPOR K31 A-component | Application | Viscosity mPas | Hardness Shore 00 | Density g/cm³ | Special features |
|---|---|---|---|---|---|
| **A-9675-5-VP** | Lighting | 1,300 – 1,900 | 20 – 50 | 0.13 – 0.24 | UL 50 listed, suitable for moisture-proof luminaires, soft |
| **A-9675-2-VP** | Lighting | 1,000 – 2,500 | 35 – 75 | 0.25 – 0.50 | UL 50 listed, suitable for moisture-proof luminaires |
| **A-3505-1** | Lighting | 2,000 – 3,800 | 30 – 40 | 0.22 – 0.28 | Product for moisture-proof luminaires, especially self-levelling |
| **A-4525-1-B-UL** | Enclosures | 25,000 – 33,000 | 40 – 50 | 0.18 – 0.24 | UL 50 listed and good adhesion on lacquer |
| **A-9021-2-VP1** | Enclosures | 37,000 – 52,000 | 37 – 52 | 0.25 – 0.35 | UL 50 listed |
| **A-45C2-1-UL-FR** | Enclosures | 120,000 – 150,000 | 43 – 53 | 0.23 – 0.29 | UL 94 V-2 and UL 50 listed |
| **A-6045-3-B-UL** | Enclosures | 60,000 – 70,000 | 50 – 65 | 0.29 – 0.35 | UL 50 listed, hydrophobic, very good resetting ability (DVR), good adhesion on lacquer |
| **A-4545-1** | Enclosures | 45,000 – 55,000 | 40 – 50 | 0.27 – 0.36 | High mechanic strength, low friction, optimized against shear stress |
| **A-4530-3-B** | Enclosures | 33,000 – 40,000 | 32 – 42 | 0.19 – 0.23 | UL 50 listed, very good resetting ability (DVR), good adhesion on powder coating, fast assembly |
| **A-6060-1-B** | Enclosures | 55,000 – 65,000 | 50 – 60 | 0.23 – 0.29 | UL 50 listed, hydrophobic, very good resetting ability (DVR), good adhesion on powder coating, fast assembly |
| **A-9025-2-VP2** | Enclosures | 35,000 – 50,000 | 28 – 42 | 0.15 – 0.30 | Extremely soft, UL 50 listed, good adhesion on lacquer |
| **A-6045-2-B-MX** | Filters | 50,000 – 65,000 | 50 – 60 | 0.24 – 0.30 | Microbial inert adjustable, suitable for ventilation systems |
| **A-5065-1-G-MX** | Filters | 60,000 – 70,000 | 45 – 55 | 0.21 – 0.29 | Microbial inert adjustable |
| **A-9308-5-VP5-F** | Filters | 130,000 – 200,000 | 38 – 62 | 0.18 – 0.27 | For 3D applications, microbial inert adjustable, suitable for ventilation systems |
| **A-3030-1-MX** | Filters | 28,000 – 38,000 | 20 – 30 | 0.17 – 0.23 | Extremely soft, microbial inert adjustable, suitable for ventilation systems |
| **A-9808** | Filters | 1,000 – 2,000 | 35 – 65 | 0.17 – 0.35 | For very small groove applications (2 mm) |
| **A-6501-3** | Automotive | 900 – 1,500 | 56 – 66 | 0.34 – 0.40 | High tightness, hydrophobic, very good resetting ability (DVR) |
| **A-3565-2** | Automotive | 60,000 – 75,000 | 30 – 45 | 0.13 – 0.16 | Extremely soft, low assembly forces |
| **A-9308-5-VP5** | Automotive | 120,000 – 160,000 | 35 – 55 | 0.18 – 0.40 | Very high mechanic strength, hydrophobic, for 3D applications |
| **A-7060-5-B** | Automotive | 55,000 – 70,000 | 55 – 65 | 0.30 – 0.36 | Sealing of E-Mobility batteries, fast assembly |
| **A-5555-1** | Automotive | 50,000 – 65,000 | 50 – 60 | 0.24 – 0.30 | High tightness, hydrophobic, very good resetting ability (DVR) |
| **A-9199-29-VP3** | Automotive | 45,000 – 60,000 | 20 – 45 | 0.17 – 0.30 | High tightness, low assembly forces and high mechanic strength |
| **A-9308-5-VP4** | Automotive | 90,000 – 150,000 | 25 – 50 | 0.15 – 0.27 | Very high mechanic strength, for 3D applications |
| **A-9675-11** | Automotive | 1,000 – 1,500 | 28 – 48 | 0.16 – 0.22 | Hydrophobic, suitable for 2D groove applications, low density |
| **A-45C0-1-G-LE** | Automotive | 90,000 – 130,000 | 40 – 50 | 0.18 – 0.24 | Low emissions, meets Daimler DBL5452 and BMW TL 8 350 151_6 design 11 |
| **A-6501-4-N** | Packaging | 1,000 – 1,700 | 62 – 72 | 0.40 – 0.48 | Very elastic, for high tightness requirements, good resetting ability (DVR) |
| **A-9843-8-VP3H** | Packaging | 9,000 – 16,000 | 60 – 75 | 0.31 – 0.37 | Good price-performance ratio, good resetting ability (DVR) |
| **A-9762-1** | Packaging | 6,000 – 9,000 | 65 – 75 | 0.33 – 0.40 | Approval for food packaging (EU) |
| **A-6505-1-N-FD** | Packaging | 5,000 – 7,500 | 73 – 83 | 0.24 – 0.30 | Approval for food packaging (EU und FDA) |
| **A-9370-VP5** | Appliances | 58,000 – 80,000 | 10 – 30 | 0.18 – 0.26 | Hyper soft for ceramic stovetops |

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