

MORE THAN
50
YEARS OF
EXPERIENCE
IN SEALING
SOLUTIONS

chemicals



FERMAPOR® K31

Two-component, room-temperature crosslinking polyurethane foam for sealing according to the FIPFG process


sonderhoff

Tailor-made chemistry for growing requirements.

FERMAPOR® K31 is the trade name for Sonderhoff's two-component polyurethane systems for the manufacture of flexible foam seals which are foamed directly onto the part by using FIPFG (formed-in-place foam gasket) technology. The systems consist of a resin (A-component) and a hardener (B-component) which are mixed together at a prescribed ratio. This produces a flexible sealing foam within a few minutes.

After curing has finished the sealing foam is tack-free and the part can be assembled. The sealing function is reached with a compression of approximately 30 – 60 % of the cured seal. The flow behaviour, reactivity and colour of the components are freely adjustable depending on the intended use. Sonderhoff can exploit the experience gained from more than 1000 FERMAPOR® K31 formulations.



**2D application
on a level surface**

Thixotropic (pasty) sealing systems are preferentially used which, depending on the degree of viscosity, form a seal body with a height/width ratio from 1 : 2,5 to 1 : 1,5.



**2D application
in a groove**

Fluid sealing systems, which are self-levelling over joints, are usually used in this case. This allows smooth seamless seals to be created.



**3D application
on a surface**

Thixotropic (pasty) sealing systems are preferentially used which, depending on the degree of viscosity, form a seal body with a height/width ratio from 1 : 2,5 to 1 : 1,5. Use is possible even with extreme slopes up to vertical application.



**3D application
in a groove**

Thixotropic (pasty) sealing systems are used most often in this case. Seal application is also possible even with extreme slopes.



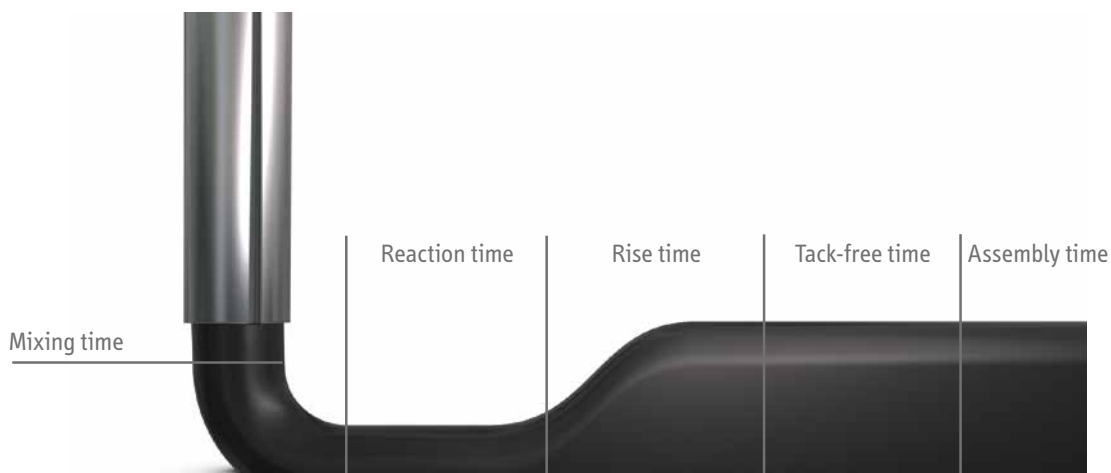
FERMAPOR® K31 – The technology:

FERMAPOR® K31 – The components

FERMAPOR® K31 sealing foams consist of a liquid to paste-like A-component (polyol) and a resin, the B-component (MDI isocyanate).

FERMAPOR® K31 – The reaction process

The reaction of FERMAPOR® K31 sealing foams is initiated by mixing the A and B components. This results in a chemical reaction which proceeds steadily at room temperature. The applied mass foams equally in all dimensions to form the gasket.



FERMAPOR® K31 – The foaming process

- **Mixing time:** is the time period in which the A and B components are mixed.
- **Reaction time:** is the time period in which the FERMAPOR® K31 foam system begins to react (after approx. 15 – 60 seconds*).
- **Rise time:** is the time period in which the FERMAPOR® K31 foam system expands to form the seal body (after approx. 15 – 180 seconds*).
- **Tack-free time:** is the time after which the seal surface of FERMAPOR® K31 foaming systems is tack free at room temperature and can be touched without causing damage (after approx. 2 – 20 minutes*).
- **Assembly time:** is the time point after which FERMAPOR® K31 foaming systems can bear loads or the sealed components can be assembled (after approx. 20 minutes – 12 hours*).

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PROCESSING INFORMATION

FERMAPOR® K31 systems are processed using two component mixing and metering machines. The recommended processing temperature is $+ 23 \pm 5$ °C. Most of the FERMAPOR® K31 components can be stored in the original packaging and for at least 6 months at temperatures between $+ 10$ and $+ 40$ °C.

PHYSICAL AND CHEMICAL PROPERTIES*

| Property | FERMAPOR® K31 |
|-----------------------------|---|
| Appearance | black or grey, other colours upon request |
| Hardness | from 5 Shore 00 to 40 Shore A possible |
| Compression load deflection | 5 kPa to 200 kPa (at 25% compression) |
| Density | from 0,1 g/cm ³ to 0,6 g/cm ³ |
| Temperature resistance | from $- 40$ °C to $+ 100$ °C (short time up to $+ 160$ °C) |
| Tensile strength | up to 2 MPa [N/cm ²] |
| Elongation at break | up to 400 % |
| Compression set (DVR) | > 97 % depending on test conditions |
| Water absorption | from < 3,5 %, hydrophobic versions available |
| Flame retardancy | flame retardancy up to UL-94 HF-1 possible |
| Other properties | E.g. antimicrobial finish, lubricated, suitable for food packaging, up to IP68 protection class, up to NEMA 12 protection class, low fogging, special foam systems with outer elastic protective layer possible |

THE FERMAPOR® K31 RANGE

| FERMAPOR® K31 A-component | Application area* | Viscosity mPas | Hardness Shore 00 | Density g/cm ³ | Other properties* |
|---------------------------|-------------------|-------------------|-------------------|---------------------------|--|
| A-9854-7 | Lighting | 900 - 1.200 | 30 - 45 | 0,30 - 0,40 | self-levelling, high tightness, very good compression set |
| A-9652-11-VP2 | Lighting | 1.000 - 1.600 | 30 - 45 | 0,20 - 0,40 | spec. product for moisture-proof luminaires, good levelling |
| A-9020-5 | Enclosures | 45.000 - 65.000 | 45 - 55 | 0,25 - 0,30 | UL-50 listed and good adhesion to paint |
| A-9021-2-VP1 | Enclosures | 37.000 - 52.000 | 35 - 50 | 0,25 - 0,35 | UL-50 and UL-94 HBF listed |
| A-9230-2-VP | Enclosures | 40.000 - 50.000 | 55 - 65 | 0,30 - 0,40 | UL-50 listed, hydrophobic, good compression set / adhesion to paint |
| A-9160-VP3 | Enclosures | 18.000 - 22.000 | 43 - 53 | 0,20 - 0,30 | high mech. strength, low friction, optimized against shear stress |
| A-9025-2-VP2 | Enclosures | 38.000 - 50.000 | 25 - 40 | 0,20 - 0,30 | ultra soft, UL-50 listed, good adhesion to paint |
| A-9550-VP2 | Enclosures | 2.000 - 4.000 | 40 - 50 | 0,22 - 0,40 | special product for high-pressure dispensing machines |
| A-9020-15-F | Filters | 50.000 - 65.000 | 50 - 60 | 0,20 - 0,30 | antimicrobial, qualified for air conditioning plants |
| A-9020-VP299-1 | Filters | 58.000 - 68.000 | 45 - 57 | 0,25 - 0,40 | for inverse height/width ratio |
| A-9808 | Filters | 800 - 2.000 | 40 - 50 | 0,20 - 0,35 | for smallest groove applications (2 mm) |
| A-9675-2-VP | Automotive | 1.000 - 2.500 | 35 - 75 | 0,25 - 0,50 | high tightness, hydrophobic, extremely good compression set |
| A-9260-2 | Automotive | 40.000 - 60.000 | 20 - 30 | 0,15 - 0,30 | very soft, low assembly force |
| A-9308-5-VP5 | Automotive | 130.000 - 200.000 | 35 - 45 | 0,25 - 0,40 | product for upside-down application, high mech. strength, hydrophobic |
| A-9675-20-VP3 | Automotive | 1.500 - 2.500 | 45 - 55 | 0,35 - 0,60 | special product for high-pressure dispensing machines |
| A-9212-3-VP | Automotive | 53.000 - 65.000 | 50 - 65 | 0,35 - 0,50 | high tightness, hydrophobic, extremely good compression set |
| A-9199-29-VP3 | Automotive | 45.000 - 60.000 | 20 - 35 | 0,20 - 0,30 | high tightness, low assembly force and high mechanical strength |
| A-9199-28-VP4 | Automotive | 35.000 - 45.000 | 40 - 70 | 0,30 - 0,50 | good adhesion to galvanized surfaces, hydrophobic |
| A-9575-3 | Automotive | 1.000 - 1.500 | 40 - 70 | 0,30 - 0,50 | special component for automotive lighting products |
| A-9575-3LE | Automotive | 1.000 - 1.500 | 60 - 70 | 0,35 - 0,50 | low emission, approved according to VW50180, VDA277 / DIN75201-B |
| A-9828-1 | Packaging | 1.800 - 2.700 | 60 - 75 | 0,30 - 0,40 | highly elastic, for highest tightness requirements, good compression set |
| A-9843-8-VP2 | Packaging | 7.000 - 15.000 | 55 - 75 | 0,30 - 0,40 | good cost performance ratio, good compression set |
| A-9762 | Packaging | 5.000 - 8.000 | 60 - 75 | 0,25 - 0,40 | approved for food packaging |
| A-9370-VP5 | Appliances | 60.000 - 80.000 | 7 - 30 | 0,15 - 0,35 | hypersoft, for use at ceramic stove tops |

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10 good reasons for using FERMAPOR® K31 *

1. FERMAPOR® K31 systems are the most suitable for sealing industrial parts
2. The use of FERMAPOR® K31 systems is possible for almost every shape and seal geometry
3. FERMAPOR® K31 systems achieve particularly good adhesion to parts due to the chemical reaction of the two components on the carrier material
4. FERMAPOR® K31 systems possess exceptional long-term behaviour and display almost 100% resetting ability, even after many years of continual use
5. FERMAPOR® K31 systems will become tack-free at room temperature in 2 – 20 minutes and an oven can reduce the reaction time considerably, but it is not a necessity
6. With FERMAPOR® K31 systems even large part tolerances can easily be compensated for
7. The FERMAPOR® K31 systems develop a cross-linked structure which is extremely resistant to environmental effects such as humidity, dust and temperature*
8. With FERMAPOR® K31 systems also sealing foams with ultra softness are possible
9. FERMAPOR® K31 systems are processed using two component metering units and can be adapted flexibly and quickly to other parts at any time
10. By using FERMAPOR® K31 systems even small product series become profitable



FERMAPOR® K31 in automotive parts



FERMAPOR® K31 in electrical enclosures



FERMAPOR® K31 in lighting products



FERMAPOR® K31 in filters

We supply worldwide to more than 50 countries and our customers produce annually more than 300.000.000 seals with our products.



● Production sites ■ Foreign subsidiary ▲ Sales offices ★ Contract gasketing

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*The description of the possible fields of use of our products as well as the technical data and values only have a general character and do not mean that a certain product can be used under all conditions in the respective field of use. In this respect, the stated field of use is not a binding specification or usage provision. Due to the great number of environment variables and their influences (e.g. temperature, test specimens, size, interaction with substrates, influence of machines, or the like) you as our customer must check whether the product is suitable for your specific field of use. We will be pleased to assist and advise you in this respect.