

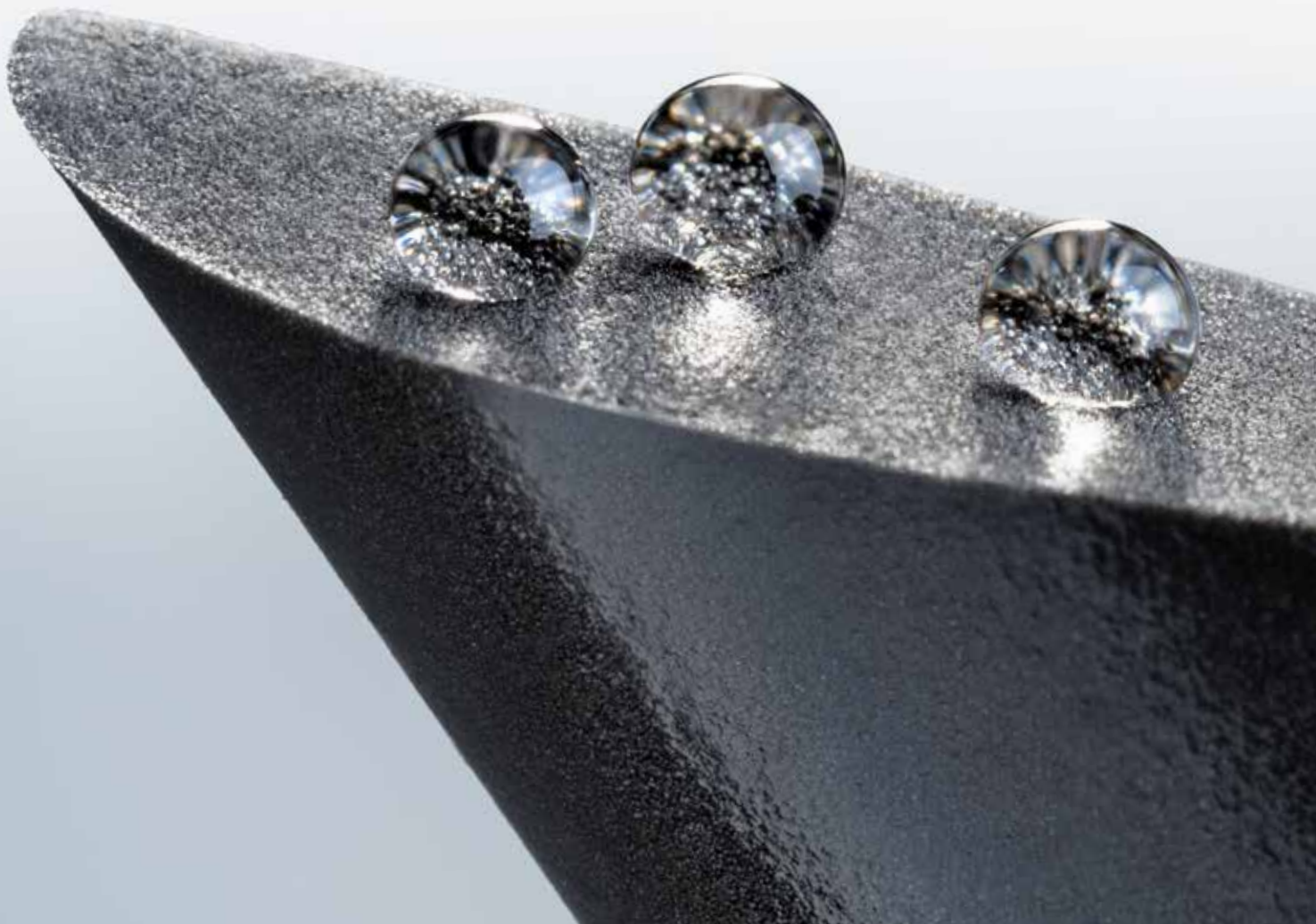
WORLD NOVELTY:

# FIP CC technology

The 2C polyurethane foam sealing with very low water absorption



**FIP CC technology**  
**closed cell foam sealings**  
**on polyurethane basis**

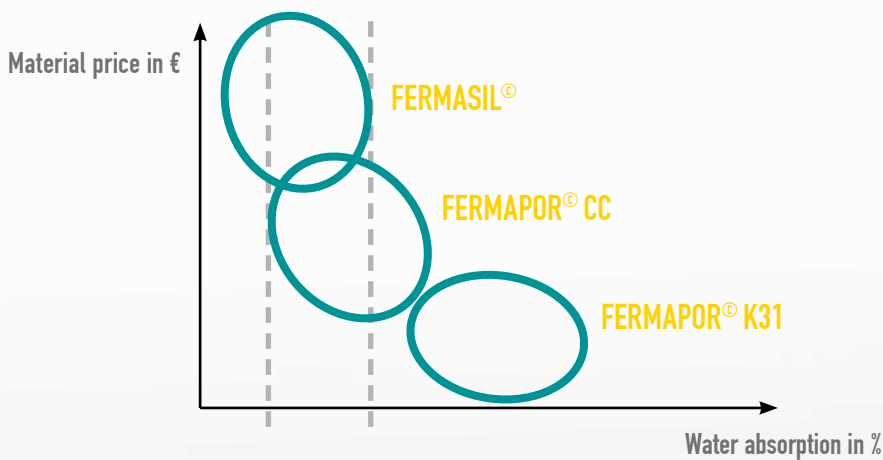


# Formed In-Place Closed-Cell technology

## Very low water absorption at attractive material costs

The new FIP CC technology (Formed In-Place Closed-Cell) combines the high water resistance of the silicone world with the attractive material costs of the polyurethane world.

Is FERMAPOR® CC thus the better silicone? That depends on the application. Silicone remains unsurpassed in its temperature resistance. But if the temperature range of -40° to +80°C is adequate and the decisive factor is the absorption of water, then FERMAPOR® CC is a very attractively priced alternative. We will be happy to provide you with samplings for comparison with other closed-cell liquid sealing systems.



All Sonderhoff material systems can be adapted to the particular requirements of the specific application. Thus the prices and water absorption vary according to the formulation.

FERMAPOR® CC fills the gap between high-priced closed-cell material systems and inexpensive, mainly open-cell systems.

The FERMAPOR® CC material system and the advanced FIPFG process offer a technology which, due to its further increased cost-effectiveness, opens up new fields of application for automated sealing foams.



# FERMAPOR® CC

## The material system on proven polyurethane basis

FERMAPOR® CC material systems are addition cross-linking 2-component systems for the manufacture of soft polyurethane foams. The main elements of the A component are polyfunctional alcohols, the polyols. The B component consists of the aromatic MDI isocyanate and its derivatives. When component A is mixed with component B, a chemical reaction starts that, together with Sonderhoff Engineering's newly developed FIP CC process, leads to the formation of a strongly closed-cell polyurethane soft foam.

### Usual processing conditions – typical polyurethane

As soon as the foam has completely hardened, it can be used for applications with high sealing and quality requirements. The operating temperature range lies between  $-40^{\circ}$  to  $+80^{\circ}\text{C}$ , and in the short term even up to  $+160^{\circ}\text{C}$  dependent on the test conditions, and is tested under real conditions appropriate to the application. The exact hardening time is dependent on external factors such as temperature, humidity, and sealing dimension and it is also evaluated specifically for the sealed part.



# The FIP CC material system

## Low water absorption even for damaged surfaces

FERMAPOR® CC with its smooth, slightly shiny surface gives an optically high-quality appearance. Its foam structure has very fine cells, is impermeable and extremely uniform. Even if the surface should become damaged during application, practical trials and laboratory tests have shown that there is only a marginal change in water absorption.

### Proven and new benefits – typical polyurethane

- **Mostly closed cells, therefore extremely low water absorption**
- **More cost-effective than silicone material and for curing there's no need for an oven or humidity**
- Even with damaged surface the gasket will hardly absorb water
- For accelerated curing an oven can be used
- 90% less air permeability than 2C PU-foam with mixed cells
- Significantly less swelling because of iced water
- Formulation may be customized like mixed cells 2C PU
- Thixotropic and semi-thixotropic formulations available
- Shrinking is no more possible
- Meets the standards REACH/ EG-Regulation 1907/2006, RoHS

### Diversity of formulations – typical polyurethane

Because FERMAPOR® CC is formulated on a polyurethane basis, the know-how based on over 1,000 Sonderhoff polyurethane formulations is available for the variations of FERMAPOR® CC. Sonderhoff Chemicals' extensive experience in developing customer-specific material systems is also completely used for this new material system. Feel free to contact us; we will be pleased to develop the suitable material solution for your requirement.

### PROCESSING INFORMATION

FERMAPOR® CC systems are processed with 2-component medium-pressure mixing and dosing machines. The recommended processing temperature is +23° +/- 5°C. Generally, FERMAPOR® CC components have a shelf-life for at least 6 months at storage temperatures from +10° up to +40°C.

### PHYSICAL AND CHEMICAL PROPERTIES

| Property                                 | FERMAPOR® CC   |
|--|--|
| Appearance                               | black, other colours on request                        |
| Hardness                                 | from 40 to 70 shore 00                                 |
| Compression resistance (25% compression) | > 20 kPa   |
| Bulk density                             | from 0.30 g/cm <sup>3</sup> to 0.50 g/cm <sup>3</sup>  |
| Temperature resistance                   | from -40°C up to +80°C (short term up to +160°C)       |
| Tensile strength                         | from 150 kPa to 500 kPa                                |
| Elongation at fracture                   | 100% to 150%   |
| Resilience (compression set)             | >95% dependent on the test conditions                  |
| Water absorption                         | <10% (material formulation with hydrophobic additives) |

# DM 402 / 403 CC

## World novelty in mixing and dosing technology



The patented dosing technology of the new DM 402 / 403 CC mixing and dosing machine creates a foam sealing directly after the dosage with an almost fully reacted dimension – a huge benefit for process-oriented quality control. The application process itself is based on the known FIPFG (Formed-In-Place-Foam-Gasket) procedure, which is a production standard in many branches.

### Familiar FIPFG benefits and proven peripherals for high process safety

The DM 402 / 403 is anchored in the proven installation layout of Sonderhoff Engineering and works precisely and reliably. A traversing range that can be individually dimensioned depending on the robot type and a standard output rate of 0.5 to 2.0 g/sec enable the technology changeover to be made possible spontaneously and economically for many applications!

- Outstanding material homogenisation by dynamic mixing
- The highly rigid linear robot offers highest positioning and repeating accuracy
- Central control system for additional peripherals/automation is possible with the open peripheral interfaces
- Remote maintenance via a modem or TCP/IP

### A patented leading edge through the CC process

The innovation lies in the mixing head and material processing. The new foam process makes recirculation of material unnecessary. This simplifies changing material and accelerates process adaptations. So-called “shrinkages” can no longer occur. Furthermore, no oven is needed, but it can be incorporated if it is desired to additionally fasten the process until the component is installed. The usual air loading no longer takes place in the storage containers, which enormously shortens the set-up time. As a result, the surface of the CC foam bead is smoother and more resistant than the conventional PU foam beads, and the cells in the foam structure are also significantly finer.

# The FIP CC technology

## For the application of closed-cell 2C polyurethane foam sealings

### CONTROL CONCEPT

- Self-explaining operator guide with interactive menu-based programming using soft keys, touch buttons and function keys; multifunctional Mobile Panel with integrated 6,5" touchscreen
- Modular "IPC" control fitted in the electrical switch cabinet with Power-Link
- EMERGENCY STOP deactivation with the proven "Sonderhoff-SAFETY" concept, real-time bus system
- Recipe management, programmable pot-life monitoring, dosing quantity preselection, automatic rinsing

### MATERIAL PROCESSING

- Mixing ratio: from 1 : 2 to 1 : 4
  - Output quantity: from 0.5 to 2.0 g/s (\*)
  - Material handling: tap line
- (\*) depending on viscosity and mixing ratio / other application rates on request

### PRECISION GEAR PUMPS

- Component A: 1.2 ccm/rpm (typical for output quantity 0.5 - 2 g/s and mixing ratio 1 : 4)
- Component B: 0.3 ccm/rpm (typical for output quantity 0.5 - 2 g/s and mixing ratio 1 : 4)
- Rotation speed: Pumps: 1 - 250 rpm/min
- Speed-controlled servo gear motor with speed display and adjustment through the display

### MIXING HEAD

- MK 125 with high-pressure water or component rinsing
- 2 or 3 components
- Integrated tempering application
- Mixing head: 1 - 6,000 rpm/min

### MATERIAL PREPARATION

- Pressure container with capacitive minimum fill-level sensors and shut-off valve, with compressed air fittings and compressed air reducer valves for controlling the container pressure
- Safety pressure valve, TÜV type-approved
- Novel and patented material preparation for fast process adjustment and optimized foam results
- Direct adjustment of foaming degree possible
- Self-diagnosis of relevant wear components by the control system

### PNEUMATIC

- Pneumatic system with filter-pressure reducer, maintenance unit including pressure monitoring and valve connection plate to control the pneumatic loads

### OPTIONAL HANDLING SYSTEM

- Linear robot HD or HE plus
- Six axis robot
- SMART cell

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



● Production site

■ Foreign subsidiary

▲ Sales office

★ Contract gasketing

**Sonderhoff Chemicals GmbH**

Richard-Byrd-Straße 26  
50829 Cologne  
Germany

Tel +49 221 95685-0  
Fax +49 221 95685-599

**Sonderhoff Engineering GmbH**

Dr. Walter Zumtobel Straße 15  
6850 Dornbirn  
Austria

Tel +43 5572 398810  
Fax +43 5572 398810-55

**Sonderhoff Services GmbH**

Mathias-Brüggen-Straße 124-128  
50829 Cologne  
Germany

Tel +49 221 956526-0  
Fax +49 221 956526-39

**Sonderhoff Polymer-Services Austria GmbH**

Allgäustraße 3  
6912 Hörbranz  
Austria

Tel +43 5572 398810-902  
Fax +43 5572 398819-900

**Sonderhoff Holding GmbH**

Richard-Byrd-Straße 24  
50829 Cologne  
Germany

Tel +49 221 95685-0  
Fax +49 221 95685-599

**Sonderhoff Italia s.r.l.**

Via della Foppa 2/5  
23848 Oggiono  
Italy

Tel +39 0341 26551  
Fax +39 0341 265555

**Sonderhoff USA Corporation**

1895 Big Timber Road · Unit B  
Elgin, IL 60123  
USA

Tel +1 847 888 1110  
Fax +1 847 888 1116

**Sonderhoff (Suzhou) Sealing Systems Co.Ltd.**

1 Lansheng Road, Suzhou Industrial Park  
215126 Suzhou  
P.R. China

Tel +86 512 8227 2800  
Fax +86 512 8227 2799