Moulded Rubber Parts, Membranes, Rubber-Metal and Rubber-Plastic Bonded Parts
Moulded Rubber Parts, Membranes, Rubber-Metal and Rubber-Plastic Bonded Parts

In our internationally active group we manufacture all types of Rubber Moulded Parts, Membranes and Rubber-Metal and Rubber-Plastic Bonded Parts.

We develop and manufacture high-quality moulded rubber parts and diaphragms from all known rubber-elastic materials.

We manufacture rubber-metal and rubber-plastic parts in various material combinations. Metals such as steel, stainless steel, brass, aluminium and plastics such as HGW, PA, PEEK are used as carrier materials.

State-of-the-art CNC-controlled presses, vacuum presses, injection moulding machines and CAD/CAM systems are used.

The processing methods used are either compression, injection, injection compression, transfer moulding or cold runner technology. We manufacture the necessary moulds and tools in our own tool shop.

Materials
Rubber elastomers (NBR, H-NBR, EPDM, FPM, MVQ, NR, SBR, CIIR, MFQ, FFKM): For a wide range of operating conditions, resistances and stresses
Elastomers (TPU, TPE): Polyurethanes for highest mechanical stresses in different hardnesses and material compounds

Surface treatment
Moulded Rubber Parts can be subjected to special surface treatments: Labs-free, halogenated, molycoated, talcumized, PTFE-coated

Approvals
DVGW, KTW D1 D2, FDA, NSF, UL, M1, EU 1935/2004

Applications
Automotive, construction, mining, railways, power generation (power plants, solar energy and wind power), aircraft construction, semiconductors, food and beverages, mechanical engineering, medical technology, mobile hydraulics, oil and gas, paper, pharmaceuticals, steelworks, valve and fitting technology, water preparation

We are a sealing and plastic parts manufacturer
We see ourselves as a partner to our customers
We are independent, holistic and solution-oriented
We are an international network company and we work world-wide
We see our company culture like life: varied, complex and exciting
We value greatly the individuality and the expertise of the staff
We are committed to high professional ethics and integrity in all we do

All this creates a passionate, innovative and dynamic team to support your business.
Rubber moulded parts

We manufacture according to customer drawings and specifications, using either the compression, injection, injection compression or transfer moulding process or cold runner technology. The moulded rubber parts are manufactured from all common elastomers and special materials.

Membranes

Our elastomer diaphragms without fabric inserts are used in a wide variety of industries, e.g. mechanical engineering, gas industry, pneumatics, medical technology, chemicals and pharmaceuticals, automotive engineering, food industry, etc.

Correct selection of the elastomer material

When selecting the material, a number of important selection criteria must be taken into account, such as the operating conditions to be expected, the design requirements, approvals, standards and costs.

Operating conditions

- Which medium (liquid, gaseous, solid) does the component come into contact with?
- What is the minimum and maximum operating temperature?
- Is it a static or dynamic application?
- What type of load is applied to the component?
  - Direction of action: tension, compression, bending, torsion
  - Load distribution: point load, area load

Approvals, regulations, standard specifications, test criteria

- Selection of the material with the necessary prerequisites

Design requirements

- Component geometry with description
- Critical dimensions and tolerances
- Information on the desired service life
- Installation and assembly considerations

Cost in relation to value

- When selecting the materials for your components, the guiding principle should be „value-in-use“. 
- The overall evaluation should also take into account quality, service life and maintenance costs saved.

Membranes

Our elastomer diaphragms without fabric inserts are used in a wide variety of industries, e.g. mechanical engineering, gas industry, pneumatics, medical technology, chemicals and pharmaceuticals, automotive engineering, food industry, etc.

Rubber-metal connecting parts

Production is carried out according to customer drawings and specifications. Metals such as steel, stainless steel, brass, aluminium etc. are used as carrier material. A variety of material combinations are possible.

Rubber-plastic connecting parts

Production is carried out according to customer drawings and specifications. As carrier material we use the appropriate plastics like HGW, PA or PEEK.

Approvals / Conformity

The materials and components manufactured must meet high legal requirements in relation to their application. Special material mixtures have been developed for this purpose, for more information please contact us.

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACS</td>
<td>Drinking water in France</td>
<td>CR, EPDM</td>
</tr>
<tr>
<td>BfR</td>
<td>Compliance for food in Germany</td>
<td>CR, EPDM</td>
</tr>
<tr>
<td>DIN EN 681-1</td>
<td>Water supply and drainage</td>
<td>CR, EPDM</td>
</tr>
<tr>
<td>DIN EN 549-1</td>
<td>Gas inserts in Germany</td>
<td>CR, EPDM</td>
</tr>
<tr>
<td>DIN EN 549-2</td>
<td>Microorganisms in drinking water</td>
<td>CR, EPDM</td>
</tr>
<tr>
<td>EC 2004/72</td>
<td>Food safety in EU</td>
<td>CR, EPDM</td>
</tr>
<tr>
<td>FDA</td>
<td>Food and drug administration in USA</td>
<td>CR, EPDM</td>
</tr>
<tr>
<td>KTW</td>
<td>Drinking water in Germany</td>
<td>CR, EPDM</td>
</tr>
<tr>
<td>NSF 3H</td>
<td>National science Foundation; Food in USA</td>
<td>CR, EPDM</td>
</tr>
<tr>
<td>NSF 61</td>
<td>Drinking water in USA</td>
<td>CR, EPDM</td>
</tr>
<tr>
<td>NSF Class VI</td>
<td>U.S. Pharmacopeia, United States</td>
<td>CR, EPDM</td>
</tr>
<tr>
<td>WRAS</td>
<td>Drinking water in UK</td>
<td>CR, EPDM</td>
</tr>
</tbody>
</table>
## Material overview elastomer compounds

| Material designation | Chemical name | Abbreviation | Default color | Other colors | Minimum Shore A | Maximum Shore A | Minimum temperature °C | Maximum temperature °C | Tear resistance, unreinforced | Tear resistance, reinforced | Ultimate elongation | Rebound resilience | Abrasion resistance | Tear resistance | Electrical contact resistance | Alkali resistance | Ageing stability | Petrol resistance | Hot water | Ozone resistance | Resistance to oil and grease | Acid resistance | Standard | Special | High load stability | Gallery/Composites | Qualities |
|---------------------|---------------|--------------|---------------|--------------|----------------|----------------|-------------------------|-------------------------|-----------------------------|--------------------------|----------------|----------------|----------------|----------------|--------------------------|----------------|-----------------|-----------------|----------|-----------------|--------------------------|--------------|---------|-------|
| CIR                 | Polychloroprene elastomer | CIR | black | black | –35 | +100 | 40–90 | | | | | | | | | | | | | | | | | | | | very good | good | moderate | | insufficient |
| EPDM/EPM             | Ethylene-propylen-dien elastomer | EPDM | black | green, red, beige, blue, grey | –40 | +140 | 30–90 | | | | | | | | | | | | | | | | | | | | very good | | | | | |
| FKM                 | Fluor elastomer | FKM | black | green, red, brown, beige, blue, yellow, white, transparent | –30 | +200 | 50–90 | | | | | | | | | | | | | | | | | | | | very good | | | | | |
| HNBR                | Hydrogenated nitrile rubber elastomer | HNBR | black | green, brown | –40 | +150 | 50–90 | | | | | | | | | | | | | | | | | | | | very good | | | | | |
| HNBR/CIIR           | Butyl elastomer/Chlorinated elastomer | CIIR | black | black | –50 | +100 | 60–80 | | | | | | | | | | | | | | | | | | | | very good | | | | | |
| NGF                 | Nitrile rubber | NGF | red | black, blue, grey, transparent | –60 | +250 | 40–80 | | | | | | | | | | | | | | | | | | | | | | very good | | | | | |
| NBR                 | Nitrile-butylen elastomer | NBR | black | green, red, blue, yellow, white, grey | –60 | +120 | 40–80 | | | | | | | | | | | | | | | | | | | | | | | very good | | | | | |
| SBR                 | Styrene-butadiene elastomer | SBR | black | black, blue, grey, transparent | –60 | +100 | 40–75 | | | | | | | | | | | | | | | | | | | | | | | | very good | | | | | |
| TPU (AU, EU)        | Polyurethane elastomer | TPU | red, brown, blue, yellow, transparent | –30 | +110 | 60–65 | | | | | | | | | | | | | | | | | | | | | | | | very good | | | | | |
Brief descriptions of elastomer compounds

**Silicone elastomer (MVQ)**
- Natural rubber (NR) is a highly polymeric protein with very good physical properties, very high tensile strength, very good elasticity, very good low temperature properties, good abrasion resistance and excellent dynamic properties. This combination is hardly achieved by synthetic elastomers.
- Without the appropriate addition of protective agents, however, the resistance to aging and ozone is only low. There is no resistance to mineral oils and greases.
- Despite more modern synthetic rubbers, natural rubber is still used for engine suspensions, machine bearings, rubber-metal compounds, clutches, damping elements and similar components.

**Polyurethane elastomer (TPU, AU / EU)**
- Polyurethane is characterised by the combination of hardness with elasticity, excellent abrasion resistance and high tear resistance. It can be either either soft or extra hard. The water-based polyurethane is superior in resistance to abrasion and tear, the ether-based polymer has better flexibility at low temperatures. Polyurethanes are available in both liquid and solid form. Polyurethanes are mainly used in applications that require a combination of their excellent properties: Toughness, tensile strength and abrasion resistance.
- Excellent abrasion and tear resistance, very high tensile strength with good elongations, excellent weather, ozone and sun resistance, good oil and grease resistance, excellent adhesion to textiles and metals.
- Poor resistance to alcohols, acids and oxidized solvents; poor resistance to hot water.

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**SBR elastomer (M30)**
- SBR is similar to natural rubber in most respects and is the most cost-effective and highest-volume elastomer on the market. Although its physical properties are slightly worse than those of natural rubber, SBR is tougher and more resistant to heat and cracking and can easily be replaced by natural rubber in many applications. With the exception of silicone, butadiene has the lowest glass transition temperature of any commercially available elastomer and offers unusually good performance at temperatures as low as –95 °C.
- Very good elasticity, tensile strength, abrasion resistance and flexibility at low temperatures.
- Poor resistance to ozone and sunlight; very low resistance to oils, petrol and hydrocarbon solvents.

**Butyl rubber (IIR) / Chlorbutyl rubber (CIIR)**
- Butyl is unlike other synthetic rubber resistant to ozone and corrosive chemicals. Butyl and chlorobutyl behave like plastic by creeping, flowing cold and having a poor compression set. CIIR differs from IIR essentially only in its better compression set.
- Excellent gas and vapour tightness, very good resistance to heat, Oxygen, ozone, and sunlight; high energy absorption (attenuation); excellent resistance to alcohols and oxygenated solvents; good hot tear strength; excellent resistance to water and steam.
- High compression set; poor resistance to oil, petrol and hydrocarbon solvents; low rebound resilience; poor elasticity.

**Epoxy-silicone elastomer (M2Q)**
- The most outstanding property of silicone is its ability to maintain rubber-like properties through extreme temperatures. The operating temperature range from –55 °C to +300 °C. Silicones are normally used in applications that require high resistance.
- Excellent heat resistance; excellent flexibility at low temperatures; low compression set; very good electrical insulation; excellent resistance to weathering, ozone, sunlight and oxidation; excellent color stability.
- Poor abrasion resistance, tear and cut growth resistance, low tensile strength; inferior resistance to oil, gasoline and solvents; poor resistance to alcohols and acids.

**Fluorosilicone elastomer (MVQ)**
- Fluorosilicone shows a considerably better resistance compared to standard silicones.
- Chemical resistance in hydrocarbons, aromatic mineral oils, fuels and low-molecular aromatic hydrocarbons such as benzene or toluene.
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Manufacturing processes

We manufacture moulded rubber parts in different ways and with different types of cross-linking.

Compressing Moulding
In compression moulding, a blank is inserted into a mould which consists of two mould halves and is then closed. This process is suitable for small to medium series.

Injection Moulding
In injection moulding, the material is automatically injected into the mould. This process is suitable for medium to large series.

Injection Compression Moulding
In principle, this procedure is based on the fact that a residual gap is left open when the tool is closed. The required preplasticized mixture is injected into this gap and the press is then closed. This process can be used to produce flat, high-precision molded parts that can be removed from the mold largely without burrs.

Transfer Moulding
In this process, a recess is made in the upper half of the tool, into which the unvulcanised mixture is inserted in the form of simple blanks.

The upper half of the tool is connected to the tool nest by fine channels in the area of the recess. The most important difference to the compression method is that the tool nest is already closed at the start of pressing.

Cold runner technology
In cold runner technology, the injection channels are thermally separated from the actual mould by a cooling plate. A correctly tempered channel system prevents material loss due to vulcanised sprues. This means enormous material savings, especially with high-quality compounds.

Quality and tolerances

Unless explicitly stated otherwise, all rubber-metal elements NR (natural rubber) with a hardness of S5 ±5 Shore A (medium hardness) are used as a metal element for the spring core or ST 37 (galvanized, chromated or bare). The elastomer properties are tested according to the following relevant standards.

<table>
<thead>
<tr>
<th>Material</th>
<th>Maximum Lifetime</th>
</tr>
</thead>
<tbody>
<tr>
<td>AU, CIIR, EU, NR, SBR, TPUs</td>
<td>5 years</td>
</tr>
<tr>
<td>CI, HNBR, HNBR</td>
<td>7 years</td>
</tr>
<tr>
<td>EPDM, FFKM, FPM, MFC, NBR</td>
<td>10 years</td>
</tr>
</tbody>
</table>

Storage

The storage life of the different materials depends on various boundary conditions (reference DIN 7716/DIN 9088).

<table>
<thead>
<tr>
<th>Storage-Conditions</th>
<th>AAU, CIIR, EU, NR, SBR, TPUs</th>
<th>CI, HNBR, HNBR</th>
<th>EPDM, FFKM, FPM, MFC, NBR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heat</td>
<td>the storage temperature should not exceed at 5°–25°C; direct exposure to sunlight should be avoided.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Humidity</td>
<td>the humidity should be below 70%; extreme conditions should be avoided.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Light</td>
<td>the O-rings should be stored in dark rooms, they should be protected from daylight.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oxygen</td>
<td>the O-rings should be packed in air-tight bags and protected from draughts.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deformation</td>
<td>the O-rings should be stored in a relaxed state. O-rings of larger diameter can be stored twisted and folded.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Customer service, packaging

Customer service, comprehensive advice and technical support are our top priorities. From the development to the production process and the desired packaging, we rely on a trustful cooperation with our customers.

- Technical advice for individual problem solving and moulded part design
- Construction and material-specific design of the component
- Prototyping and product optimization
- On request application-related material mixtures, metal types, finishes (e.g. surface treatment) are available

Depending on your requirements and drawings

An extensive range of standard articles is always on call

Customer service, packaging

The following standards are given as examples:

- DIN 53504 Tensile strength (N/mm²) and breaking elongation (%)
- DIN 53505 Hardness measurement (Shore A)
- DIN 53512 Density (g/cm³) and the rebound resilience (%)
- ISO 3302-1 class M3 for rubber-metal buffers
- ISO 3302-1 class M4 for rubber-metal rails

<table>
<thead>
<tr>
<th>Nominal Size Allowed</th>
<th>Tolerance class M2</th>
<th>Tolerance class M4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Measure F</td>
<td>Measure C</td>
</tr>
<tr>
<td>from 0 to 6,3</td>
<td>+0,25 mm ±0,40 mm</td>
<td>+0,30 mm ±0,50 mm</td>
</tr>
<tr>
<td>from 6,3 to 10</td>
<td>+0,80 mm ±0,50 mm</td>
<td>+1,00 mm ±0,70 mm</td>
</tr>
<tr>
<td>from 10 to 18</td>
<td>+1,00 mm ±1,20 mm</td>
<td>+1,20 mm ±1,30 mm</td>
</tr>
<tr>
<td>from 18 to 25</td>
<td>+1,20 mm ±1,40 mm</td>
<td>+1,50 mm ±1,60 mm</td>
</tr>
<tr>
<td>from 25 to 40</td>
<td>+1,50 mm ±1,60 mm</td>
<td>+1,70 mm ±1,80 mm</td>
</tr>
<tr>
<td>from 40 to 63</td>
<td>+1,70 mm ±1,80 mm</td>
<td>+2,00 mm ±2,00 mm</td>
</tr>
<tr>
<td>from 63 to 100</td>
<td>+2,00 mm ±2,00 mm</td>
<td>+2,00 mm ±2,00 mm</td>
</tr>
<tr>
<td>from 100 to 160</td>
<td>+2,00 mm ±2,00 mm</td>
<td>+2,00 mm ±2,00 mm</td>
</tr>
<tr>
<td>from 160</td>
<td>±0,6 % ±1,5 %</td>
<td>±1,5 % ±2,5 %</td>
</tr>
</tbody>
</table>

P refers to each dimension in horizontal direction.
C refers to each dimension in press direction (P).