FREUDENBERG XPRESS CUSTOM-MANUFACTURED SEALS

In today’s economic environment Freudenberg Xpress is the clear solution for companies needing precise and speedy results. Short turnaround, high reliability, and quality with custom-manufactured work make Freudenberg–NOK Sealing Technologies your technology specialist.

DEMANDING WORK ENVIRONMENTS REQUIRE HIGH-QUALITY SEALS WITHOUT DELAY OR HASSLE. FREUDENBERG XPRESS OFFERS SUPERIOR CUSTOM SEALS WITH FAST TURNAROUND, SHIPPED WITHIN 24 HOURS IF REQUESTED.

Freudenberg Xpress has the diversified ability to meet the needs of multiple industries, such as hydraulic cylinders impacting equipment from tractors to dump trucks, and even to steel mills. Custom-manufactured sizes are also available ranging to 120 inches in diameter. Aware of our diverse customers’ sealing needs, Freudenberg Xpress service readily provides a solution with superior results and rapid response.

DELIVERING GLOBAL PERFORMANCE

Freudenberg–NOK offers the world’s largest product range from a single source, both materials and manufacturing expertise, along with revolutionary solutions for your next sealing application. We provide global certification for our products that meet the requirements for a wide range of industries. Because we operate globally, our development and sales teams understand our customers’ needs throughout the world whether your application calls for a standard material or a custom compound blend, Freudenberg–NOK delivers.

VALUES FOR THE CUSTOMER

- Customized sealing solutions
- Based on your drawings or ours
- Expert advice available
- Original profiles and materials as used in standard production (FDA compliant)
- Fast delivery for quick maintenance needs—within 24 hours, if requested
- Economical production of small batches
- Prototyping
CUSTOM DESIGNED SEALS AT YOUR FINGERTIPS

FREUDENBERG XPRESS SERVICE

Freudenberg Xpress service is our prototype and production cell, which is redefining the way our customers think about producing their designs.

Conceived as a cost-effective solution for low-quantity production or rapid prototypes, Freudenberg Xpress is a Computer Numeric Control (CNC) machine, integrated with software, to custom-produce seals—up to 120 inches in diameter—usually in less than one day. Seal design variations are easily accommodated and products can be held to extremely high tolerances. Molding issues such as knit lines, ejector pin markings, and flash are eliminated and there are no mold changes.

The Freudenberg Xpress service is comprised of ten product series for heavy industry applications including endless, tailor-cut or precision-jointed versions. The basic seal rings are all provided by our standard production. Guides and roof shaped packing sets are cut to the required sizes and are delivered as open versions. A specially developed bonding technique allows a customizable diameter range for wipers, deflectors and radial shaft seals.

MATERIALS

Freudenberg Xpress uses some of the highest quality materials in the world: virtually any type of sealing material used in a hydraulic or pneumatic application. Below are the the standard Xpress materials and dozens more are available (some are FDA approved).

- Polyurethanes
- Elastomers
- Plastomers
- Fluoro-Plastic (PTFE)

**FX: signifies machined standard product series**
STANDARD DIRT WIPERS

Features
Standard “Snap-in” wipers are proven performers in preventing dirt and contaminants from entering the system. Xpress makes these dirt wipers available in a variety of materials, custom tailored to meet your specific requirements. “Press fit” wipers are also available.

Applications
- Agricultural and construction equipment
- Presses and injection molding machines
- Standard hydraulic cylinders

Surface Requirements

<table>
<thead>
<tr>
<th>Peak-to-Valley Heights</th>
<th>$R_{Max}$</th>
<th>$R_{a}$</th>
</tr>
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<tbody>
<tr>
<td>Running surface</td>
<td>≤2.5μm</td>
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<td>Bottom of groove</td>
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</tr>
<tr>
<td>Sides of groove</td>
<td>≤15μm</td>
<td>≤3μm</td>
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Standard Sizes

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<th>D₂</th>
<th>L</th>
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Profile (standard offering)

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<tr>
<th>TYPE</th>
<th>STANDARD MATERIALS</th>
<th>OPERATING TEMPERATURE</th>
<th>SLIDING SPEED</th>
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<tr>
<td>DA 102</td>
<td>94AU925 (P100)</td>
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<td>DA 116</td>
<td>PTFE Bronze</td>
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*pneumatic seals are indicated with a “PN” suffix*
STANDARD ROD SEALS

Features
Standard rod seals can be used as primary or secondary seals in hydraulic or pneumatic cylinders. Available in a variety of materials and designs, including backup rings, O-ring-energized, and special designs to reduce friction, they can be tailored to meet your specific requirements.

Applications
- Agricultural and construction equipment
- Presses and injection molding machines
- Standard hydraulic cylinders

Surface Requirements

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<tr>
<th>Peak-to-Valley Heights</th>
<th>$R_{\text{Max}}$</th>
<th>$R_{a}$</th>
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<td>Running surface</td>
<td>≤2.5μm</td>
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<td>Bottom of groove</td>
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<td>Sides of groove</td>
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Standard Sizes

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<th>Ød</th>
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Profile (standard offering) | Type | Standard Materials | Operating Temperature | Sliding Speed |
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<td>NBR (N100)</td>
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<tr>
<td></td>
<td>94AU30000 (P300)</td>
<td>−35°C to +120°C (−31°F to +248°F)</td>
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<tr>
<td>DS 107</td>
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<td>Red HPU/NBR</td>
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<td>Red HPU (P500)</td>
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<td>NBR (N100)</td>
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</table>
PTFE ROD SEALS

Features
PTFE rod seals are typically used as primary seals in hydraulic applications. The various PTFE compounds and energizer materials available in combination with these features offer an optimal solution for most applications:

- Very high resistance to pressure
- Good thermal conductivity
- Very good extrusion resistance
- High resistance to abrasion
- Low friction, free of stick-slip

Applications
- Agricultural, construction, and industrial equipment
- Presses and injection molding machines
- Control and regulation equipment
- Standard hydraulic and pneumatic cylinders

Surface Requirements

<table>
<thead>
<tr>
<th>Peak-to-Valley Heights</th>
<th>$R_{\text{Max}}$</th>
<th>$R_a$</th>
<th>$R_{pkx}$</th>
<th>$R_{pk}$</th>
<th>$R_k$</th>
<th>$R_{vk}$</th>
<th>$R_{vkx}$</th>
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</thead>
<tbody>
<tr>
<td>Running surface</td>
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<td>$0.05-0.3\mu m$</td>
<td>$&lt;0.5\mu m$</td>
<td>$0.25-0.7\mu m$</td>
<td>$0.2-0.65\mu m$</td>
<td>$0.2-2.0\mu m$</td>
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<tr>
<td>Bottom of groove</td>
<td>$16.3\mu m$</td>
<td>$1.6\mu m$</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Sides of groove</td>
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<td>$3\mu m$</td>
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Standard Sizes

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<th>ØD</th>
<th>L</th>
<th>C/S</th>
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<tbody>
<tr>
<td>5–7.9</td>
<td>Ød+4.9</td>
<td>2.2</td>
<td>2.45</td>
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<td>8–18.9</td>
<td>Ød+7.3</td>
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<td>≥650</td>
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<td>13.65</td>
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## PTFE Rod Seals

<table>
<thead>
<tr>
<th>PROFILE (standard offering)</th>
<th>TYPE*</th>
<th>STANDARD MATERIALS</th>
<th>OPERATING TEMPERATURE</th>
<th>SLIDING SPEED</th>
</tr>
</thead>
<tbody>
<tr>
<td>DS 124</td>
<td>PTFE Bronze/ NBR</td>
<td>–30°C to +120°C (-22°F to +248°F)</td>
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</tr>
<tr>
<td></td>
<td>PTFE Glass/NBR</td>
<td>–30°C to +120°C (-22°F to +248°F)</td>
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</tr>
<tr>
<td></td>
<td>PTFE Bronze/FPM</td>
<td>–10°C to +200°C (-14°F to +390°F)</td>
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<tr>
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<td>PTFE Glass/FPM</td>
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<tr>
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<tr>
<td>DS 138</td>
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<td>5.0 m/s</td>
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<tr>
<td></td>
<td>PTFE Glass/NBR</td>
<td>–30°C to +120°C (-22°F to +248°F)</td>
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<tr>
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<td>PTFE Glass/FPM</td>
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<tr>
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<td></td>
<td>PTFE Glass/NBR</td>
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<tr>
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STANDARD PISTON SEALS

Features
Standard piston seals can be used for single-acting and double-acting pistons in hydraulic or pneumatic cylinders. Available in a variety of materials and designs, including backup rings, O-ring energizers, special designs to reduce friction, and tailored to meet your specific requirements.

Applications
- Agricultural and construction equipment
- Presses and injection molding machines
- Standard hydraulic cylinders

Surface Requirements

<table>
<thead>
<tr>
<th>Peak-to-Valley Heights</th>
<th>Rmax</th>
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<tr>
<td>Running surface</td>
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<tr>
<td>Bottom of groove</td>
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<td>≤1.6μm</td>
</tr>
<tr>
<td>Sides of groove</td>
<td>≤15μm</td>
<td>≤3μm</td>
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Standard Sizes

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<th>ØD</th>
<th>Ød</th>
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<th>C/S</th>
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<tr>
<td>5–24.9</td>
<td>ØD–8.0</td>
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<td>4.0</td>
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<td>300–499.9</td>
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PROFILE (standard offering) | TYPE* | STANDARD MATERIALS | OPERATING TEMPERATURE | SLIDING SPEED |
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<td>94AU30000 (P300)</td>
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<td>Red HPU/NBR/POM</td>
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# STANDARD PISTON SEALS

<table>
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<th>SLIDING SPEED</th>
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<td>Red HPU (P500)</td>
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</tr>
<tr>
<td>DK 120</td>
<td>94AU925 (P100)</td>
<td>–30°C to +110°C (–22°F to +230°F)</td>
<td>0.5 m/s</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Red HPU (P500)</td>
<td>–20°C to +110°C (–7°F to +230°F)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>NBR (N100)</td>
<td>–30°C to +110°C (–22°F to +230°F)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>94AU30000 (P300)</td>
<td>–35°C to +120°C (–31°F to +248°F)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DK 123</td>
<td>94AU925 (P100)</td>
<td>–30°C to +110°C (–22°F to +230°F)</td>
<td>0.5 m/s</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Red HPU (P500)</td>
<td>–20°C to +110°C (–7°F to +230°F)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>94AU30000 (P300)</td>
<td>–35°C to +120°C (–31°F to +248°F)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DK 126</td>
<td>94AU925 (P100)</td>
<td>–30°C to +110°C (–22°F to +230°F)</td>
<td>0.5 m/s</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Red HPU (P500)</td>
<td>–20°C to +110°C (–7°F to +230°F)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>NBR (N100)</td>
<td>–30°C to +110°C (–22°F to +230°F)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>94AU30000 (P300)</td>
<td>–35°C to +120°C (–31°F to +248°F)</td>
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</tr>
<tr>
<td>DK 143</td>
<td>94AU925 (P100)/NBR</td>
<td>–30°C to +110°C (–22°F to +230°F)</td>
<td>0.5 m/s</td>
<td></td>
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<tr>
<td></td>
<td>Red HPU (P500)/NBR</td>
<td>–20°C to +110°C (–7°F to +230°F)</td>
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<tr>
<td></td>
<td>94AU30000 (P300)</td>
<td>–35°C to +120°C (–31°F to +248°F)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*pneumatic seals are indicated with a “PN” suffix*
PTFE PISTON SEALS

Features

PTFE piston seals are either single- or double-acting seals used in hydraulic or pneumatic applications. The various PTFE compounds and energizer materials available combined with the following features offer an optimal solution for most applications. Features include:

- Very high resistance to pressure
- Good thermal conductivity
- Very good extrusion resistance
- High resistance to abrasion
- Low friction, free of stick-slip

Some designs allow the addition of pressure relief in applications where pressure traps are a concern.

Applications

- Agricultural, construction, and industrial equipment
- Presses and injection molding machines
- Control and regulation equipment
- Standard hydraulic and pneumatic cylinders

Surface Requirements

<table>
<thead>
<tr>
<th>Peak-to-Valley Heights</th>
<th>( R_{\text{Max}} )</th>
<th>( R_a )</th>
<th>( R_{pkx} )</th>
<th>( R_{pk} )</th>
<th>( R_k )</th>
<th>( R_{vk} )</th>
<th>( R_{vkx} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Running surface</td>
<td>( \leq 2.5\mu m )</td>
<td>( 0.05-0.3\mu m )</td>
<td>( &lt;0.3\mu m )</td>
<td>( &lt;0.5\mu m )</td>
<td>( 0.25-0.7\mu m )</td>
<td>( 0.2-0.65\mu m )</td>
<td>( 0.2-2.0\mu m )</td>
</tr>
<tr>
<td>Bottom of groove</td>
<td>( \leq 6.3\mu m )</td>
<td>( 1.6\mu m )</td>
<td>( &lt;0.5\mu m )</td>
<td>( &lt;0.5\mu m )</td>
<td>( 0.25-0.7\mu m )</td>
<td>( 0.2-0.65\mu m )</td>
<td>( 0.2-2.0\mu m )</td>
</tr>
<tr>
<td>Sides of groove</td>
<td>( \leq 15\mu m )</td>
<td>( 3\mu m )</td>
<td>( \leq 2.5\mu m )</td>
<td>( \leq 2.5\mu m )</td>
<td>( 0.25-0.7\mu m )</td>
<td>( 0.2-0.65\mu m )</td>
<td>( 0.2-2.0\mu m )</td>
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</table>

Standard Sizes

<table>
<thead>
<tr>
<th>( \phi_D )</th>
<th>( \phi_d )</th>
<th>( L )</th>
<th>( C/S )</th>
</tr>
</thead>
<tbody>
<tr>
<td>8–14.9</td>
<td>8–4.9</td>
<td>2.2</td>
<td>2.45</td>
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<tr>
<td>15–39.9</td>
<td>15–0.5</td>
<td>3.2</td>
<td>3.75</td>
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<tr>
<td>40–79.9</td>
<td>40–11.0</td>
<td>4.2</td>
<td>5.50</td>
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<tr>
<td>80–132.9</td>
<td>80–5.5</td>
<td>6.3</td>
<td>7.75</td>
</tr>
<tr>
<td>133–329.9</td>
<td>133–21.0</td>
<td>8.1</td>
<td>10.50</td>
</tr>
<tr>
<td>330–649.9</td>
<td>330–24.5</td>
<td>8.1</td>
<td>12.25</td>
</tr>
<tr>
<td>( \geq 650 )</td>
<td>( \phi_d = 28.0 )</td>
<td>9.5</td>
<td>14.00</td>
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Rounded and free of burrs \( R_2 \) <0.2
# PTFE PISTON SEALS

<table>
<thead>
<tr>
<th>PROFILE (standard offering)</th>
<th>TYPE*</th>
<th>STANDARD MATERIALS</th>
<th>OPERATING TEMPERATURE</th>
<th>SLIDING SPEED</th>
</tr>
</thead>
<tbody>
<tr>
<td>DK 108</td>
<td>PTFE Bronze/NBR</td>
<td>–30°C to +120°C (–22°F to +248°F)</td>
<td>5.0 m/s</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PTFE Glass/NBR</td>
<td>–30°C to +120°C (–22°F to +248°F)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>PTFE Bronze/FPM</td>
<td>–10°C to +200°C (–14°F to +390°F)</td>
<td>5.0 m/s</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PTFE Glass/FPM</td>
<td>–10°C to +200°C (–14°F to +390°F)</td>
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<tr>
<td>DK 125</td>
<td>PTFE Bronze/NBR</td>
<td>–30°C to +120°C (–22°F to +248°F)</td>
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<tr>
<td></td>
<td>PTFE Glass/NBR</td>
<td>–30°C to +120°C (–22°F to +248°F)</td>
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<tr>
<td></td>
<td>PTFE Bronze/FPM</td>
<td>–10°C to +200°C (–14°F to +390°F)</td>
<td>5.0 m/s</td>
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<tr>
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<td>PTFE Glass/FPM</td>
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<tr>
<td>DK 138</td>
<td>PTFE Bronze/NBR</td>
<td>–30°C to +120°C (–22°F to +248°F)</td>
<td>5.0 m/s</td>
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<tr>
<td></td>
<td>PTFE Glass/NBR</td>
<td>–30°C to +120°C (–22°F to +248°F)</td>
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<tr>
<td></td>
<td>PTFE Bronze/FPM</td>
<td>–10°C to +200°C (–14°F to +390°F)</td>
<td>5.0 m/s</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PTFE Glass/FPM</td>
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<tr>
<td>DK 238</td>
<td>PTFE Bronze/NBR</td>
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<td>5.0 m/s</td>
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<tr>
<td></td>
<td>PTFE Glass/NBR</td>
<td>–30°C to +120°C (–22°F to +248°F)</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>PTFE Bronze/FPM</td>
<td>–10°C to +200°C (–14°F to +390°F)</td>
<td>5.0 m/s</td>
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<tr>
<td></td>
<td>PTFE Glass/FPM</td>
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<tr>
<td>DK 142</td>
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<tr>
<td></td>
<td>PTFE Glass/NBR</td>
<td>–30°C to +120°C (–22°F to +248°F)</td>
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</tr>
<tr>
<td></td>
<td>PTFE Bronze/FPM</td>
<td>–10°C to +200°C (–14°F to +390°F)</td>
<td>5.0 m/s</td>
<td></td>
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<tr>
<td></td>
<td>PTFE Glass/FPM</td>
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<tr>
<td>DK 222</td>
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<tr>
<td></td>
<td>PTFE Glass/NBR</td>
<td>–30°C to +120°C (–22°F to +248°F)</td>
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<tr>
<td></td>
<td>PTFE Bronze/FPM</td>
<td>–10°C to +200°C (–14°F to +390°F)</td>
<td>5.0 m/s</td>
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<tr>
<td></td>
<td>PTFE Glass/FPM</td>
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<tr>
<td>DK 139</td>
<td>PTFE Bronze/SS</td>
<td>–200°C to +260°C (–328°F to +500°F)</td>
<td>5.0 m/s</td>
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</tr>
<tr>
<td></td>
<td>PTFE Glass/SS</td>
<td>–200°C to +260°C (–328°F to +500°F)</td>
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<tr>
<td>DK 119</td>
<td>PTFE Bronze/SS</td>
<td>–200°C to +260°C (–328°F to +500°F)</td>
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<tr>
<td></td>
<td>PTFE Glass/SS</td>
<td>–200°C to +260°C (–328°F to +500°F)</td>
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</table>
ROTARY SHAFT SEALS

Features
Rotary seals are used for sealing rotating shafts. They can be supplied with a hard outer case, a spring-loaded sealing lip, and secondary dust lip, and tailored to your application by a combination of features and materials.

Applications
- Mills
- Shipbuilding
- Steel hydraulics engineering
- Wind power plants

Surface Requirements

<table>
<thead>
<tr>
<th>Peak-to-Valley Heights</th>
<th>$R_{\text{Max}}$</th>
<th>$R_{\text{a}}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Running surface</td>
<td>≤2.5μm</td>
<td>0.6μm</td>
</tr>
<tr>
<td>Bottom of groove</td>
<td>≤15μm</td>
<td>≤4.0μm</td>
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</tbody>
</table>

Standard Sizes

<table>
<thead>
<tr>
<th>Ød</th>
<th>$S_{\text{Profile}}$</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;100</td>
<td>20</td>
<td>16</td>
</tr>
<tr>
<td>&gt;250</td>
<td>22</td>
<td>20</td>
</tr>
<tr>
<td>&gt;450</td>
<td>25</td>
<td>22</td>
</tr>
<tr>
<td>&gt;750</td>
<td>25</td>
<td>25</td>
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</table>

PROFILE (standard offering) TYPE* STANDARD MATERIALS OPERATING TEMPERATURE SLIDING SPEED

| DR 101    | NBR (N100)/NYL/SS  | −30°C to +100°C (−22°F to +212°F) | 10.0 m/s |
| DR 102    | NBR (N100)/NYL/SS  | −30°C to +100°C (−22°F to +212°F) | 10.0 m/s |
| DR 201    | NBR (N100)/NYL/SS  | −30°C to +100°C (−22°F to +212°F) | 10.0 m/s |
| DR 202    | NBR (N100)/NYL/SS  | −30°C to +100°C (−22°F to +212°F) | 10.0 m/s |
| DR 203    | NBR (N100)/NYL/SS  | −30°C to +100°C (−22°F to +212°F) | 10.0 m/s |
## ROTARY SHAFT SEALS

<table>
<thead>
<tr>
<th>PROFILE (standard offering)</th>
<th>TYPE*</th>
<th>STANDARD MATERIALS</th>
<th>OPERATING TEMPERATURE</th>
<th>SLIDING SPEED</th>
</tr>
</thead>
<tbody>
<tr>
<td>DR 204</td>
<td>NBR (N100)/NYL/SS</td>
<td>−30°C to +100°C (−22°F to +212°F)</td>
<td>10.0 m/s</td>
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</tr>
<tr>
<td>DR 205</td>
<td>NBR (N100)/NYL/SS</td>
<td>−30°C to +100°C (−22°F to +212°F)</td>
<td>10.0 m/s</td>
<td></td>
</tr>
<tr>
<td>DR 206</td>
<td>NBR (N100)/NYL/SS</td>
<td>−30°C to +100°C (−22°F to +212°F)</td>
<td>10.0 m/s</td>
<td></td>
</tr>
<tr>
<td>DR 207</td>
<td>NBR (N100)/NYL/SS</td>
<td>−30°C to +100°C (−22°F to +212°F)</td>
<td>10.0 m/s</td>
<td></td>
</tr>
<tr>
<td>DR 104</td>
<td>94AU925 (P100)</td>
<td>−30°C to +110°C (−22°F to +230°F)</td>
<td>0.2 m/s</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Red HPU (P500)</td>
<td>−20°C to +110°C (−7°F to +230°F)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>NBR (N100)</td>
<td>−30°C to +110°C (−22°F to +230°F)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>94AU300000 (P300)</td>
<td>−35°C to +120°C (−31°F to +248°F)</td>
<td></td>
<td></td>
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<tr>
<td>DR 105</td>
<td>94AU925 (P100)</td>
<td>−30°C to +110°C (−22°F to +230°F)</td>
<td>0.2 m/s</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Red HPU (P500)</td>
<td>−20°C to +110°C (−7°F to +230°F)</td>
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<tr>
<td></td>
<td>NBR (N100)</td>
<td>−30°C to +110°C (−22°F to +230°F)</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>94AU300000 (P300)</td>
<td>−35°C to +120°C (−31°F to +248°F)</td>
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<td></td>
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<tr>
<td>DR 106</td>
<td>NBR (N100)</td>
<td>−30°C to +110°C (−22°F to +230°F)</td>
<td>12.0 m/s</td>
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<tr>
<td>DR 108</td>
<td>94AU925 (P100)</td>
<td>−30°C to +110°C (−22°F to +230°F)</td>
<td>0.5 m/s</td>
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<tr>
<td></td>
<td>Red HPU (P500)</td>
<td>−20°C to +110°C (−7°F to +230°F)</td>
<td>0.5 m/s</td>
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<tr>
<td></td>
<td>NBR (N100)</td>
<td>−30°C to +110°C (−22°F to +230°F)</td>
<td>10.0 m/s</td>
<td></td>
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<tr>
<td></td>
<td>94AU300000 (P300)</td>
<td>−35°C to +120°C (−31°F to +248°F)</td>
<td>0.5 m/s</td>
<td></td>
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<tr>
<td>DK 109</td>
<td>94AU925 (P100)</td>
<td>−30°C to +110°C (−22°F to +230°F)</td>
<td>0.5 m/s</td>
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<tr>
<td></td>
<td>Red HPU (P500)</td>
<td>−20°C to +110°C (−7°F to +230°F)</td>
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<tr>
<td></td>
<td>NBR (N100)</td>
<td>−30°C to +110°C (−22°F to +230°F)</td>
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<tr>
<td></td>
<td>94AU300000 (P300)</td>
<td>−35°C to +120°C (−31°F to +248°F)</td>
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<td></td>
</tr>
</tbody>
</table>
PTFE ROTARY SEALS

Features
PTFE rotary seals are available in a variety of designs and materials. They come in single-action and double-action designs with elastomer energizers or springs. They can be used in small housings and are suitable for stroke, rotary, and pivoting movements.

Applications
- General chemistry
- Petrochemicals

Surface Requirements

<table>
<thead>
<tr>
<th>Peak-to-Valley Heights</th>
<th>$R_{\text{Max}}$</th>
<th>$R_{\text{a}}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Running surface</td>
<td>≤2.5μm</td>
<td>0.05–0.3μm</td>
</tr>
<tr>
<td>Bottom of groove</td>
<td>≤6.3μm</td>
<td>≤1.6μm</td>
</tr>
<tr>
<td>Sides ≤15μm of groove</td>
<td>≤15μm</td>
<td>≤3μm</td>
</tr>
</tbody>
</table>

Standard Sizes

<table>
<thead>
<tr>
<th>Ød</th>
<th>ØD</th>
<th>L</th>
<th>C/S</th>
</tr>
</thead>
<tbody>
<tr>
<td>20–40</td>
<td>Ød+7.5</td>
<td>3.2</td>
<td>3.75</td>
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<td>41–90</td>
<td>Ød+11.0</td>
<td>4.2</td>
<td>5.5</td>
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<td>91–299</td>
<td>Ød+15.5</td>
<td>6.3</td>
<td>7.75</td>
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<td>300–399</td>
<td>Ød+21.0</td>
<td>8.1</td>
<td>10.5</td>
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<tr>
<td>400–549</td>
<td>Ød+24.5</td>
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<td>12.25</td>
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<td>≥550</td>
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<td>14.0</td>
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## PTFE ROTARY SEALS

<table>
<thead>
<tr>
<th>PROFILE (standard offering)</th>
<th>TYPE*</th>
<th>STANDARD MATERIALS</th>
<th>OPERATING TEMPERATURE</th>
<th>SLIDING SPEED</th>
</tr>
</thead>
<tbody>
<tr>
<td>DR 110</td>
<td>PTFE Bronze/NBR</td>
<td>–30°C to +120°C (–22°F to +248°F)</td>
<td>0.5 m/s</td>
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<tr>
<td></td>
<td>PTFE Glass/NBR</td>
<td>–30°C to +120°C (–22°F to +248°F)</td>
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<tr>
<td></td>
<td>PTFE Graphite/NBR</td>
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GUIDE RINGS

Features
Guide rings can be supplied in a variety of designs and materials for use in piston and rod applications. The material and design can be matched to your operating conditions and requirements.

Applications
- Mobile hydraulics and construction equipment
- Injection molding machines and presses
- Steel hydraulics engineering

Surface Requirements

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<th>Peak-to-Valley Heights</th>
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<td>Sides ( \leq 15 \mu m ) of groove</td>
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Standard Sizes

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<th>( \Phi_D )</th>
<th>( S_{\text{Profile}} )</th>
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<td>( \Phi_D+3 )</td>
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## GUIDE RINGS

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<th>PROFILE (standard offering)</th>
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<th>STANDARD MATERIALS</th>
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## FREUDENBERG XPRESS
### MATERIALS GUIDE

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# FREUDENBERG XPRESS MATERIALS GUIDE

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SQ-PU, SQ-SIL/EPDM, FPM also with FDA permission available.
All test results are measured from test specimen and cannot be transferred to seal applications.
Xpress Seal Materials

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<tr>
<th>Polyurethanes</th>
<th>Plastomers</th>
<th>Elastomers</th>
<th>Fluoro-Plastic (PTFE)</th>
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<td>85A Silicone (S100), natural</td>
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</table>
YOUR FREUDENBERG XPRESS
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