



# FREUDENBERG XPRESS

FREUDENBERG-NOK  
SEALING TECHNOLOGIES

**FREUDENBERG-NOK**  
INNOVATING TOGETHER



# 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.



Merkel EK and ES —Robust chevron sets designed for older cylinder systems



Merkel Enviromatic EA\*—Innovative deflector for challenging applications



Merkel P 6\* and P 9\*—Wipers with supporting elements or additional sealing capability

\*please ask for current lead times

## 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)

Piston guide ring made of resin-bonded fabric



Wiper made of NBR with aluminum case



Compact piston seal made of 95 AU 21420/NBR/POM



FX-NI 150\*\* elastomeric rod seal made of 88 NBR 156



FX-LF 300\*\* low friction rod seal made of 94 AU 925



\*\*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

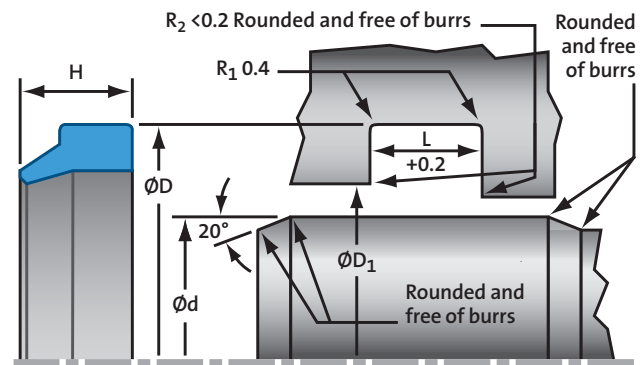
- Agricultural and construction equipment
- Presses and injection molding machines
- Standard hydraulic cylinders






## Surface Requirements

Peak-to-Valley Heights	$R_{Max}$	$R_a$
Running surface	$\leq 2.5\mu m$	0.05-0.3 $\mu m$
Bottom of groove	$\leq 6.3\mu m$	$\leq 1.6\mu m$
Sides of groove	$\leq 15\mu m$	$\leq 3\mu m$



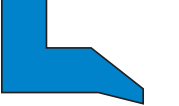







## Standard Sizes

$\phi d$	$\phi D$	$D_1$	L	L
20-80	$\phi d+8.6$	$\phi d+3.0$	5.3	7.0
81-150	$\phi d+12.2$	$\phi d+6.0$	7.2	12.0
151-500	$\phi d+20.0$	$\phi d+10.0$	10.2	18.0
501-1000	$\phi d+25.0$	$\phi d+12.6$	12.7	20.0



PROFILE (standard offering)	TYPE*	STANDARD MATERIALS	OPERATING TEMPERATURE	SLIDING SPEED
	DA 102	94AU925 (P100) Red HPU (P500) NBR (N100) 94AU30000 (P300)	-30°C to +110°C (-22°F to +230°F) -20°C to +110°C (-7°F to +230°F) -30°C to +110°C (-22°F to +230°F) -35°C to +120°C (-31°F to +248°F)	2.0 m/s
	DA 103	94AU925 (P100) Red HPU (P500)/POM NBR (N100)/POM 94AU30000 (P300)	-30°C to +110°C (-22°F to +230°F) -20°C to +110°C (-7°F to +230°F) -30°C to +110°C (-22°F to +230°F) -35°C to +120°C (-31°F to +248°F)	2.0 m/s
	DA 105PN	94AU925 (P100)/POM Red HPU (P500)/POM NBR (N100)/POM 94AU30000 (P300)	-30°C to +110°C (-22°F to +230°F) -20°C to +110°C (-7°F to +230°F) -30°C to +110°C (-22°F to +230°F) -35°C to +120°C (-31°F to +248°F)	2.0 m/s
	DA 106PN	94AU925 (P100)/POM Red HPU (P500)/POM NBR (N100)/POM 94AU30000 (P300)	-30°C to +110°C (-22°F to +230°F) -20°C to +110°C (-7°F to +230°F) -30°C to +110°C (-22°F to +230°F) -35°C to +120°C (-31°F to +248°F)	2.0 m/s
	DA 101	94AU925 (P100) Red HPU (P500) NBR (N100) 94AU30000 (P300)	-30°C to +110°C (-22°F to +230°F) -20°C to +110°C (-7°F to +230°F) -30°C to +110°C (-22°F to +230°F) -35°C to +120°C (-31°F to +248°F)	2.0 m/s

# STANDARD DIRT WIPERS

PROFILE (standard offering)	TYPE*	STANDARD MATERIALS	OPERATING TEMPERATURE	SLIDING SPEED
	DA 104PN	94AU925 (P100) Red HPU (P500) NBR (N100) 94AU30000 (P300)	-30°C to +110°C (-22°F to +230°F) -20°C to +110°C (-7°F to +230°F) -30°C to +110°C (-22°F to +230°F) -35°C to +120°C (-31°F to +248°F)	2.0 m/s
	DA 107	94AU925 (P100) Red HPU (P500) NBR (N100) 94AU30000 (P300)	-30°C to +110°C (-22°F to +230°F) -20°C to +110°C (-7°F to +230°F) -30°C to +110°C (-22°F to +230°F) -35°C to +120°C (-31°F to +248°F)	2.0 m/s
	DA 108	94AU925 (P100) Red HPU (P500) NBR (N100) 94AU30000 (P300)	-30°C to +110°C (-22°F to +230°F) -20°C to +110°C (-7°F to +230°F) -30°C to +110°C (-22°F to +230°F) -35°C to +120°C (-31°F to +248°F)	2.0 m/s
	DA 109	94AU925 (P100) Red HPU (P500) NBR (N100) 94AU30000 (P300)	-30°C to +110°C (-22°F to +230°F) -20°C to +110°C (-7°F to +230°F) -30°C to +110°C (-22°F to +230°F) -35°C to +120°C (-31°F to +248°F)	2.0 m/s
	DA 111	94AU925 (P100) Red HPU (P500) NBR (N100) 94AU30000 (P300)	-30°C to +110°C (-22°F to +230°F) -20°C to +110°C (-7°F to +230°F) -30°C to +110°C (-22°F to +230°F) -35°C to +120°C (-31°F to +248°F)	1.0 m/s
	DA 112	94AU925 (P100) Red HPU (P500) NBR (N100) 94AU30000 (P300)	-30°C to +110°C (-22°F to +230°F) -20°C to +110°C (-7°F to +230°F) -30°C to +110°C (-22°F to +230°F) -35°C to +120°C (-31°F to +248°F)	1.0 m/s
	DA 113	94AU925 (P100) Red HPU (P500) NBR (N100) 94AU30000 (P300)	-30°C to +110°C (-22°F to +230°F) -20°C to +110°C (-7°F to +230°F) -30°C to +110°C (-22°F to +230°F) -35°C to +120°C (-31°F to +248°F)	1.0 m/s
	DA 115	PTFE Bronze PTFE Glass MoS <sub>2</sub> with NBR or FPM energizer	-30°C to +150°C (-22°F to +300°F) (Typical, can be influenced by fluids)	5.0 m/s
	DA 116	PTFE Bronze PTFE Glass MoS <sub>2</sub> with NBR or FPM energizer	-30°C to +150°C (-22°F to +300°F) (Typical, can be influenced by fluids)	5.0 m/s
	DA 117	PTFE Bronze PTFE Glass MoS <sub>2</sub> with NBR or FPM energizer	-30°C to +150°C (-22°F to +300°F) (Typical, can be influenced by fluids)	5.0 m/s

\*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

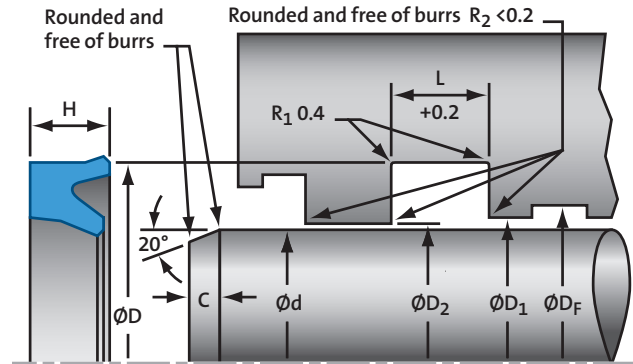
- Agricultural and construction equipment
- Presses and injection molding machines
- Standard hydraulic cylinders



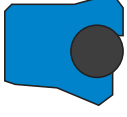

## Surface Requirements

Peak-to-Valley Heights	R <sub>Max</sub>	R <sub>a</sub>
Running surface	≤2.5μm	0.05-0.3μm
Bottom of groove	≤6.3μm	≤1.6μm
Sides of groove	≤15μm	≤3μm

## Standard Sizes

∅d	∅D	L	C/S
5-24.9	∅d+8.0	6.3	4.0
25-49.9	∅d+10.0	8.0	5.0
50-49.9	∅d+15.0	10.0	7.5
150-299.9	∅d+20.0	14.0	10.0
300-499.9	∅d+25.0	17.0	12.5
500-699.9	∅d+30.0	25.0	15.0
≥700	∅d+40.0	32.0	20.0



PROFILE (standard offering)	TYPE*	STANDARD MATERIALS	OPERATING TEMPERATURE	SLIDING SPEED
	DS 101	94AU925 (P100) Red HPU (P500) NBR (N100) 94AU30000 (P300)	-30°C to +110°C (-22°F to +230°F) -20°C to +110°C (-7°F to +230°F) -30°C to +110°C (-22°F to +230°F) -35°C to +120°C (-31°F to +248°F)	0.5 m/s
	DS 102	94AU925 (P100)/POM Red HPU (P500)/POM NBR (N100)/POM 94AU30000 (P300)	-30°C to +110°C (-22°F to +230°F) -20°C to +110°C (-7°F to +230°F) -30°C to +110°C (-22°F to +230°F) -35°C to +120°C (-31°F to +248°F)	0.5 m/s
	DS 103	94AU925 (P100) Red HPU (N100)/NBR 94AU30000 (P300)	-30°C to +110°C (-22°F to +230°F) -20°C to +110°C (-7°F to +230°F) -35°C to +120°C (-31°F to +248°F)	0.5 m/ss
	DS 104	94AU925/NBR/POM Red HPU/NBR/POM 94AU30000 (P300)	-30°C to +110°C (-22°F to +230°F) -20°C to +110°C (-7°F to +230°F) -35°C to +120°C (-31°F to +248°F)	0.5 m/s

# STANDARD ROD SEALS

PROFILE (standard offering)	TYPE*	STANDARD MATERIALS	OPERATING TEMPERATURE	SLIDING SPEED
	DS 105PN	94AU925 (P100) Red HPU (P500) NBR (N100) 94AU30000 (P300)	-30°C to +110°C (-22°F to +230°F) -20°C to +110°C (-7°F to +230°F) -30°C to +110°C (-22°F to +230°F) -35°C to +120°C (-31°F to +248°F)	0.5 m/s
	DS 106	94AU925 (P100) Red HPU (P500) NBR (N100) 94AU30000 (P300)	-30°C to +110°C (-22°F to +230°F) -20°C to +110°C (-7°F to +230°F) -30°C to +110°C (-22°F to +230°F) -35°C to +120°C (-31°F to +248°F)	0.5 m/s
	DS 107	94AU925/NBR Red HPU/NBR 94AU30000 (P300)	-30°C to +110°C (-22°F to +230°F) -20°C to +110°C (-7°F to +230°F) -35°C to +120°C (-31°F to +248°F)	0.5 m/s
	DS 108	94AU925 (P100) Red HPU (P500) NBR (N100) 94AU30000 (P300)	-30°C to +110°C (-22°F to +230°F) -20°C to +110°C (-7°F to +230°F) -30°C to +110°C (-22°F to +230°F) -35°C to +120°C (-31°F to +248°F)	0.5 m/s
	DS 117	94AU925 (P100) Red HPU (P500) NBR (N100) 94AU30000 (P300)	-30°C to +110°C (-22°F to +230°F) -20°C to +110°C (-7°F to +230°F) -30°C to +110°C (-22°F to +230°F) -35°C to +120°C (-31°F to +248°F)	0.5 m/s
	DS 121	94AU925/NBR Red HPU/NBR 94AU30000 (P300)	-30°C to +110°C (-22°F to +230°F) -20°C to +110°C (-7°F to +230°F) -35°C to +120°C (-31°F to +248°F)	0.5 m/s
	DS 125	94AU925/NBR Red HPU/NBR 94AU30000 (P300)	-30°C to +110°C (-22°F to +230°F) -20°C to +110°C (-7°F to +230°F) -35°C to +120°C (-31°F to +248°F)	0.5 m/s
	DS 139	94AU925 (P100) Red HPU (P500) NBR (N100) 94AU30000 (P300)	-30°C to +110°C (-22°F to +230°F) -20°C to +110°C (-7°F to +230°F) -30°C to +110°C (-22°F to +230°F) -35°C to +120°C (-31°F to +248°F)	0.5 m/s
	DS 1141	94AU925 (P100)/POM Red HPU (P500)/POM NBR (N100)/POM 94AU30000 (P300)	-30°C to +110°C (-22°F to +230°F) -20°C to +110°C (-7°F to +230°F) -30°C to +110°C (-22°F to +230°F) -35°C to +120°C (-31°F to +248°F)	0.5 m/s

\*pneumatic seals are indicated with a "PN" suffix

# 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

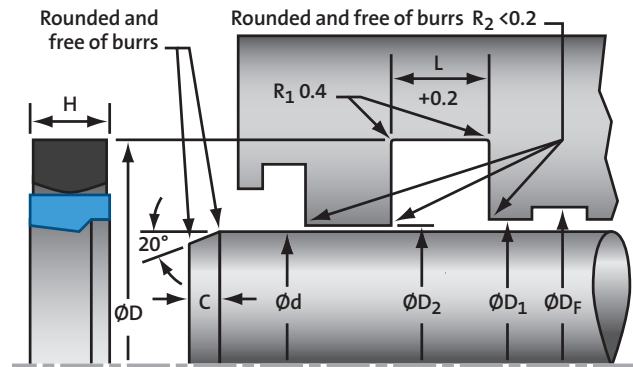
- Agricultural, construction, and industrial equipment
- Presses and injection molding machines
- Control and regulation equipment
- Standard hydraulic and pneumatic cylinders

## Surface Requirements

Peak-to-Valley Heights	$R_{Max}$	$R_a$	$R_{pkx}$	$R_{pk}$	$R_k$	$R_{vk}$	$R_{vKx}$
Running surface	$\leq 2.5\mu m$	0.05-0.3 $\mu m$	$< 0.5\mu m$	$< 0.5\mu m$	0.25-0.7 $\mu m$	0.2-0.65 $\mu m$	0.2-2.0 $\mu m$
Bottom of groove	$\leq 6.3\mu m$	$\leq 1.6\mu m$					
Sides of groove	$\leq 15\mu m$	$\leq 3\mu m$					







## Standard Sizes

$\varnothing d$	$\varnothing D$	L	C/S
5-7.9	$\varnothing d+4.9$	2.2	2.45
8-18.9	$\varnothing d+7.3$	3.2	3.65
19-37.9	$\varnothing d+10.7$	4.2	5.35
38-199.9	$\varnothing d+15.1$	6.3	7.55
200-255.9	$\varnothing d+20.5$	8.1	10.25
256-649.9	$\varnothing d+24.0$	8.1	12.00
$\geq 650$	$\varnothing d+27.3$	9.5	13.65





# PTFE ROD SEALS

PROFILE (standard offering)	TYPE*	STANDARD MATERIALS	OPERATING TEMPERATURE	SLIDING SPEED
	DS 124	PTFE Bronze/NBR PTFE Glass/NBR PTFE Bronze/FPM PTFE Glass/FPM	-30°C to +120°C (-22°F to +248°F) -30°C to +120°C (-22°F to +248°F) -10°C to +200°C (-14°F to +390°F) -10°C to +200°C (-14°F to +390°F)	5.0 m/s
	DS 129	PTFE Bronze/NBR PTFE Glass/NBR PTFE Bronze/FPM PTFE Glass/FPM	-30°C to +120°C (-22°F to +248°F) -30°C to +120°C (-22°F to +248°F) -10°C to +200°C (-14°F to +390°F) -10°C to +200°C (-14°F to +390°F)	5.0 m/s
	DS 138	PTFE Bronze/NBR PTFE Glass/NBR PTFE Bronze/FPM PTFE Glass/FPM	-30°C to +120°C (-22°F to +248°F) -30°C to +120°C (-22°F to +248°F) -10°C to +200°C (-14°F to +390°F) -10°C to +200°C (-14°F to +390°F)	5.0 m/s
	DS 238	PTFE Bronze/NBR PTFE Glass/NBR PTFE Bronze/FPM PTFE Glass/FPM	-30°C to +120°C (-22°F to +248°F) -30°C to +120°C (-22°F to +248°F) -10°C to +200°C (-14°F to +390°F) -10°C to +200°C (-14°F to +390°F)	5.0 m/s
	DS 142	PTFE Bronze/NBR PTFE Glass/NBR PTFE Bronze/FPM PTFE Glass/FPM	-30°C to +120°C (-22°F to +248°F) -30°C to +120°C (-22°F to +248°F) -10°C to +200°C (-14°F to +390°F) -10°C to +200°C (-14°F to +390°F)	5.0 m/s
	DS 119	PTFE Bronze/SS PTFE Glass/SS	-200°C to +260°C (-328°F to +500°F) -200°C to +260°C (-328°F to +500°F)	5.0 m/s

# 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

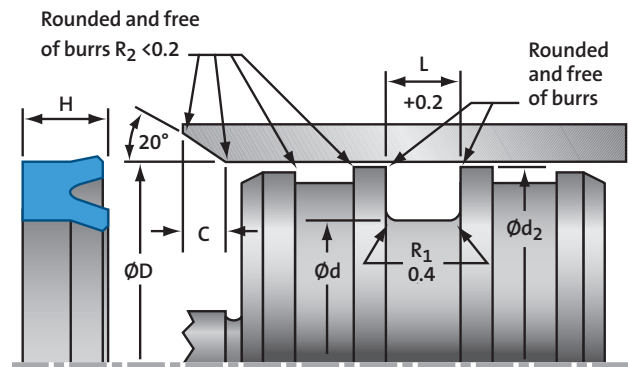
- Agricultural and construction equipment
- Presses and injection molding machines
- Standard hydraulic cylinders

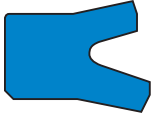
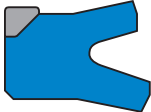
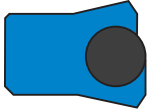
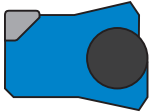
## Surface Requirements

Peak-to-Valley Heights	R <sub>Max</sub>	R <sub>a</sub>
Running surface	≤2.5μm	0.05-0.3μm
Bottom of groove	≤6.3μm	≤1.6μm
Sides of groove	≤15μm	≤3μm

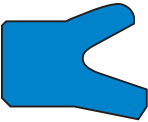
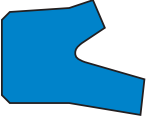






## Standard Sizes

ØD	Ød	L	C/S
5–24.9	ØD–8.0	6.3	4.0
25–49.9	ØD–10.0	7.0	5.0
50–74.9	ØD–12.0	8.0	6.0
75–149.9	ØD–16.0	10.0	8.0
150–299.9	ØD–20.0	12.0	10.0
300–499.9	ØD–24.0	18.0	12.0
500–749.9	ØD–30.0	20.0	15.0
≥750	ØD–40.0	26.0	20.0



PROFILE (standard offering)	TYPE*	STANDARD MATERIALS	OPERATING TEMPERATURE	SLIDING SPEED
	DK 101	94AU925 (P100) Red HPU (P500) NBR (N100) 94AU30000 (P300)	-30°C to +110°C (-22°F to +230°F) -20°C to +110°C (-7°F to +230°F) -30°C to +110°C (-22°F to +230°F) -35°C to +120°C (-31°F to +248°F)	0.5 m/s
	DK 102	94AU925 (P100)/POM Red HPU (P500)/POM NBR (N100)/POM 94AU30000 (P300)	-30°C to +110°C (-22°F to +230°F) -20°C to +110°C (-7°F to +230°F) -30°C to +110°C (-22°F to +230°F) -35°C to +120°C (-31°F to +248°F)	0.5 m/s
	DK 103	94AU925 (P100) Red HPU (N100)/NBR 94AU30000 (P300)	-30°C to +110°C (-22°F to +230°F) -20°C to +110°C (-7°F to +230°F) -35°C to +120°C (-31°F to +248°F)	0.5 m/ss
	DK 104	94AU925/NBR/POM Red HPU/NBR/POM 94AU30000 (P300)	-30°C to +110°C (-22°F to +230°F) -20°C to +110°C (-7°F to +230°F) -35°C to +120°C (-31°F to +248°F)	0.5 m/s

# STANDARD PISTON SEALS

PROFILE (standard offering)	TYPE*	STANDARD MATERIALS	OPERATING TEMPERATURE	SLIDING SPEED
	DK 105PN	94AU925 (P100) Red HPU (P500) NBR (N100) 94AU30000 (P300)	-30°C to +110°C (-22°F to +230°F) -20°C to +110°C (-7°F to +230°F) -30°C to +110°C (-22°F to +230°F) -35°C to +120°C (-31°F to +248°F)	0.5 m/s
	DK 141	94AU925 (P100) Red HPU (P500) NBR (N100) 94AU30000 (P300)	-30°C to +110°C (-22°F to +230°F) -20°C to +110°C (-7°F to +230°F) -30°C to +110°C (-22°F to +230°F) -35°C to +120°C (-31°F to +248°F)	0.5 m/s
	DK 116	94AU925 (P100) Red HPU (P500) NBR (N100) 94AU30000 (P300)	-30°C to +110°C (-22°F to +230°F) -20°C to +110°C (-7°F to +230°F) -30°C to +110°C (-22°F to +230°F) -35°C to +120°C (-31°F to +248°F)	0.5 m/s
	DK 216	94AU925 (P100) Red HPU (P500) NBR (N100) 94AU30000 (P300)	-30°C to +110°C (-22°F to +230°F) -20°C to +110°C (-7°F to +230°F) -30°C to +110°C (-22°F to +230°F) -35°C to +120°C (-31°F to +248°F)	0.5 m/s
	DK 120	94AU925 (P100) Red HPU (P500) NBR (N100) 94AU30000 (P300)	-30°C to +110°C (-22°F to +230°F) -20°C to +110°C (-7°F to +230°F) -30°C to +110°C (-22°F to +230°F) -35°C to +120°C (-31°F to +248°F)	0.5 m/s
	DK 123	94AU925 (P100) Red HPU (P500) 94AU30000 (P300)	-30°C to +110°C (-22°F to +230°F) -20°C to +110°C (-7°F to +230°F) -35°C to +120°C (-31°F to +248°F)	0.5 m/s
	DK 126	94AU925 (P100) Red HPU (P500) NBR (N100) 94AU30000 (P300)	-30°C to +110°C (-22°F to +230°F) -20°C to +110°C (-7°F to +230°F) -30°C to +110°C (-22°F to +230°F) -35°C to +120°C (-31°F to +248°F)	0.5 m/s
	DK 143	94AU925 (P100)/NBR Red HPU (P500)/NBR 94AU30000 (P300)	-30°C to +110°C (-22°F to +230°F) -20°C to +110°C (-7°F to +230°F) -35°C to +120°C (-31°F to +248°F)	0.5 m/s

\*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

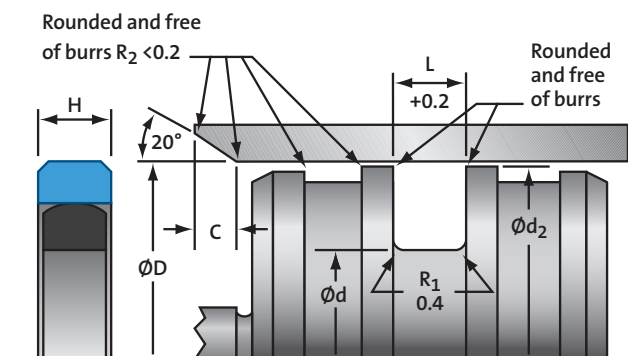
- Agricultural, construction, and industrial equipment
- Presses and injection molding machines
- Control and regulation equipment
- Standard hydraulic and pneumatic cylinders

## Surface Requirements

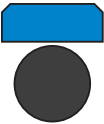





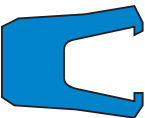
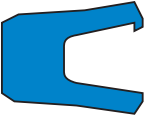
Peak-to-Valley Heights	$R_{Max}$	$R_a$	$R_{pkx}$	$R_{pk}$	$R_k$	$R_{vk}$	$R_{vKx}$
Running surface	$\leq 2.5\mu m$	0.05-0.3 $\mu m$	$< 0.5\mu m$	$< 0.5\mu m$	0.25-0.7 $\mu m$	0.2-0.65 $\mu m$	0.2-2.0 $\mu m$
Bottom of groove	$\leq 6.3\mu m$	$\leq 1.6\mu m$					
Sides of groove	$\leq 15\mu m$	$\leq 3\mu m$					

## Standard Sizes

$\varnothing D$	$\varnothing d$	L	C/S
8-14.9	$\varnothing D-4.9$	2.2	2.45
15-39.9	$\varnothing D-0.5$	3.2	3.75
40-79.9	$\varnothing D-11.0$	4.2	5.50
80-132.9	$\varnothing D-5.5$	6.3	7.75
133-329.9	$\varnothing D-21.0$	8.1	10.50
330-649.9	$\varnothing D-24.5$	8.1	12.25
$\geq 650$	$\varnothing D-28.0$	9.5	14.00



# PTFE PISTON SEALS

PROFILE (standard offering)	TYPE*	STANDARD MATERIALS	OPERATING TEMPERATURE	SLIDING SPEED
	DK 108	PTFE Bronze/NBR PTFE Glass/NBR PTFE Bronze/FPM PTFE Glass/FPM	-30°C to +120°C (-22°F to +248°F) -30°C to +120°C (-22°F to +248°F) -10°C to +200°C (-14°F to +390°F) -10°C to +200°C (-14°F to +390°F)	5.0 m/s
	DK 125	PTFE Bronze/NBR PTFE Glass/NBR PTFE Bronze/FPM PTFE Glass/FPM	-30°C to +120°C (-22°F to +248°F) -30°C to +120°C (-22°F to +248°F) -10°C to +200°C (-14°F to +390°F) -10°C to +200°C (-14°F to +390°F)	5.0 m/s
	DK 138	PTFE Bronze/NBR PTFE Glass/NBR PTFE Bronze/FPM PTFE Glass/FPM	-30°C to +120°C (-22°F to +248°F) -30°C to +120°C (-22°F to +248°F) -10°C to +200°C (-14°F to +390°F) -10°C to +200°C (-14°F to +390°F)	5.0 m/s
	DK 238	PTFE Bronze/NBR PTFE Glass/NBR PTFE Bronze/FPM PTFE Glass/FPM	-30°C to +120°C (-22°F to +248°F) -30°C to +120°C (-22°F to +248°F) -10°C to +200°C (-14°F to +390°F) -10°C to +200°C (-14°F to +390°F)	5.0 m/s
	DK 142	PTFE Bronze/NBR PTFE Glass/NBR PTFE Bronze/FPM PTFE Glass/FPM	-30°C to +120°C (-22°F to +248°F) -30°C to +120°C (-22°F to +248°F) -10°C to +200°C (-14°F to +390°F) -10°C to +200°C (-14°F to +390°F)	5.0 m/s
	DK 222	PTFE Bronze/NBR/POM PTFE Glass/NBR/POM PTFE Bronze/FPM/POM PTFE Glass/FPM/POM	-30°C to +120°C (-22°F to +248°F) -30°C to +120°C (-22°F to +248°F) -10°C to +200°C (-14°F to +390°F) -10°C to +200°C (-14°F to +390°F)	5.0 m/s
	DK 139	PTFE Bronze/SS PTFE Glass/SS	-200°C to +260°C (-328°F to +500°F) -200°C to +260°C (-328°F to +500°F)	5.0 m/s
	DK 119	PTFE Bronze/SS PTFE Glass/SS	-200°C to +260°C (-328°F to +500°F) -200°C to +260°C (-328°F to +500°F)	5.0 m/s

# 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

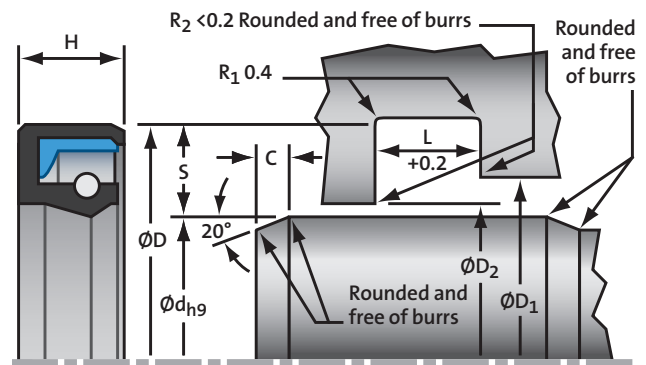
- Mills
- Shipbuilding
- Steel hydraulics engineering
- Wind power plants






## Surface Requirements

Peak-to-Valley Heights	$R_{Max}$	$R_a$
Running surface	$\leq 2.5\mu m$	$0.6\mu m$
Bottom of groove	$\leq 15\mu m$	$\leq 4.0\mu m$










## Standard Sizes

$\varnothing d$	$S_{Profile}$	L
>100	20	16
>250	22	20
>450	25	22
>750	25	25



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

PROFILE (standard offering)	TYPE*	STANDARD MATERIALS	OPERATING TEMPERATURE	SLIDING SPEED
	DR 204	NBR (N100)/NYL/SS	-30°C to +100°C (-22°F to +212°F)	10.0 m/s
	DR 205	NBR (N100)/NYL/SS	-30°C to +100°C (-22°F to +212°F)	10.0 m/s
	DR 206	NBR (N100)/NYL/SS	-30°C to +100°C (-22°F to +212°F)	10.0 m/s
	DR 207	NBR (N100)/NYL/SS	-30°C to +100°C (-22°F to +212°F)	10.0 m/s
	DR 104	94AU925 (P100) Red HPU (P500) NBR (N100) 94AU30000 (P300)	-30°C to +110°C (-22°F to +230°F) -20°C to +110°C (-7°F to +230°F) -30°C to +110°C (-22°F to +230°F) -35°C to +120°C (-31°F to +248°F)	0.2 m/s
	DR 105	94AU925 (P100) Red HPU (P500) NBR (N100) 94AU30000 (P300)	-30°C to +110°C (-22°F to +230°F) -20°C to +110°C (-7°F to +230°F) -30°C to +110°C (-22°F to +230°F) -35°C to +120°C (-31°F to +248°F)	0.2 m/s
	DR 106	NBR (N100)	-30°C to +110°C (-22°F to +230°F)	12.0 m/s
	DR 108	94AU925 (P100) Red HPU (P500) NBR (N100) 94AU30000 (P300)	-30°C to +110°C (-22°F to +230°F) -20°C to +110°C (-7°F to +230°F) -30°C to +110°C (-22°F to +230°F) -35°C to +120°C (-31°F to +248°F)	0.5 m/s 0.5 m/s 10.0 m/s 0.5 m/s
	DK 109	94AU925 (P100) Red HPU (P500) NBR (N100) 94AU30000 (P300)	-30°C to +110°C (-22°F to +230°F) -20°C to +110°C (-7°F to +230°F) -30°C to +110°C (-22°F to +230°F) -35°C to +120°C (-31°F to +248°F)	0.5 m/s

# 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

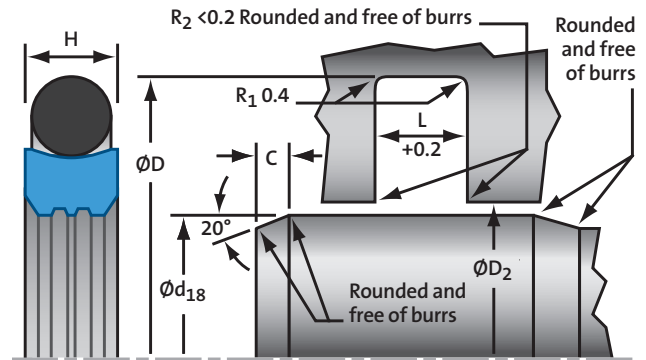
- General chemistry
- Petrochemicals

## Surface Requirements

Peak-to-Valley Heights	$R_{Max}$	$R_a$
Running surface	$\leq 2.5\mu m$	$0.05-0.3\mu m$
Bottom of groove	$\leq 6.3\mu m$	$\leq 1.6\mu m$
Sides $\leq 15\mu m$ of groove	$\leq 15\mu m$	$\leq 3\mu m$




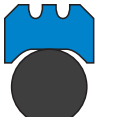

## Standard Sizes

$\phi d$	$\phi D$	L	C/S
20-40	$\phi d+7.5$	3.2	3.75
41-90	$\phi d+11.0$	4.2	5.5
91-299	$\phi d+15.5$	6.3	7.75
300-399	$\phi d+21.0$	8.1	10.5
400-549	$\phi d+24.5$	8.1	12.25
$\geq 550$	$\phi d+28.0$	9.5	14.0





# PTFE ROTARY SEALS

PROFILE (standard offering)	TYPE*	STANDARD MATERIALS	OPERATING TEMPERATURE	SLIDING SPEED
	DR 110	PTFE Bronze/NBR PTFE Glass/NBR PTFE Graphite/NBR	-30°C to +120°C (-22°F to +248°F) -30°C to +120°C (-22°F to +248°F) -30°C to +120°C (-22°F to +248°F)	0.5 m/s
	DR 111	PTFE Bronze/NBR PTFE Glass/NBR PTFE Graphite/NBR	-30°C to +120°C (-22°F to +248°F) -30°C to +120°C (-22°F to +248°F) -30°C to +120°C (-22°F to +248°F)	0.5 m/s
	DR 115	PTFE Bronze/NBR PTFE Glass/NBR PTFE Graphite/NBR	-30°C to +120°C (-22°F to +248°F) -30°C to +120°C (-22°F to +248°F) -30°C to +120°C (-22°F to +248°F)	0.5 m/s
	DR 116	PTFE Bronze/NBR PTFE Glass/NBR PTFE Graphite/NBR	-30°C to +120°C (-22°F to +248°F) -30°C to +120°C (-22°F to +248°F) -30°C to +120°C (-22°F to +248°F)	0.5 m/s
	DR 117	PTFE Bronze/NBR PTFE Glass/NBR PTFE Graphite/NBR	-30°C to +120°C (-22°F to +248°F) -30°C to +120°C (-22°F to +248°F) -30°C to +120°C (-22°F to +248°F)	0.5 m/s

# 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

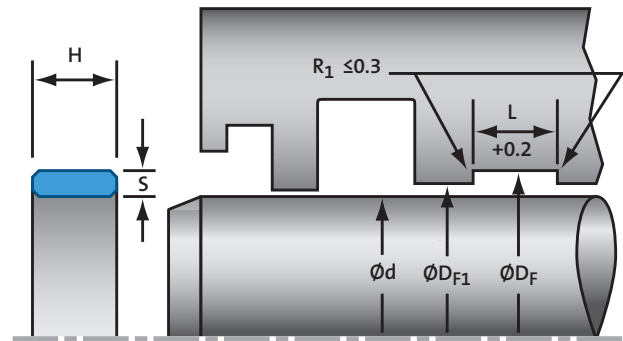
- Mobile hydraulics and construction equipment
- Injection molding machines and presses
- Steel hydraulics engineering

## Surface Requirements









Peak-to-Valley Heights	$R_{Max}$	$R_a$
Running surface	$\leq 2.5\mu m$	$0.05-0.3\mu m$
Bottom of groove	$\leq 6.3\mu m$	$\leq 1.6\mu m$
Sides $\leq 15\mu m$ of groove	$\leq 15\mu m$	$\leq 3\mu m$

## Standard Sizes

$\varnothing D_{piston}/\varnothing d_{rod}$	Piston $\varnothing d$	Piston $\varnothing D$	$S_{profile}$	L
6-29.9	$\varnothing D-3$	$\varnothing D+3$	1.5	4.0
30-49.9	$\varnothing D-3$	$\varnothing D+3$	1.5	5.6
50-99.9	$\varnothing D-5$	$\varnothing D+5$	2.5	9.7
100-799.9	$\varnothing D-5$	$\varnothing D+5$	2.5	15.0
$\geq 800$	$\varnothing D-8$	$\varnothing D+8$	4.0	25.0



# GUIDE RINGS

PROFILE (standard offering)	TYPE*	STANDARD MATERIALS	OPERATING TEMPERATURE	SLIDING SPEED
	DF 101	POM PTFE Polyester Resin/Fabric	-40°C to +100°C (-40°F to +212°F) -200°C to +260°C (-328°F to +500°F) -40°C to +100°C (-40°F to +212°F)	4.0 m/s
	DF 102	POM PTFE Polyester Resin/Fabric	-40°C to +100°C (-40°F to +212°F) -200°C to +260°C (-328°F to +500°F) -40°C to +100°C (-40°F to +212°F)	4.0 m/s
	DF 103	POM PTFE Polyester Resin/Fabric	-40°C to +100°C (-40°F to +212°F) -200°C to +260°C (-328°F to +500°F) -40°C to +100°C (-40°F to +212°F)	4.0 m/s
	DF 104	POM PTFE Polyester Resin/Fabric	-40°C to +100°C (-40°F to +212°F) -200°C to +260°C (-328°F to +500°F) -40°C to +100°C (-40°F to +212°F)	4.0 m/s
	DF 105	POM PTFE Polyester Resin/Fabric	-40°C to +100°C (-40°F to +212°F) -200°C to +260°C (-328°F to +500°F) -40°C to +100°C (-40°F to +212°F)	4.0 m/s
	DF 106	POM PTFE Polyester Resin/Fabric	-40°C to +100°C (-40°F to +212°F) -200°C to +260°C (-328°F to +500°F) -40°C to +100°C (-40°F to +212°F)	4.0 m/s
	DF 107	POM PTFE Polyester Resin/Fabric	-40°C to +100°C (-40°F to +212°F) -200°C to +260°C (-328°F to +500°F) -40°C to +100°C (-40°F to +212°F)	4.0 m/s
	DF 108	POM PTFE Polyester Resin/Fabric	-40°C to +100°C (-40°F to +212°F) -200°C to +260°C (-328°F to +500°F) -40°C to +100°C (-40°F to +212°F)	4.0 m/s

# FREUDENBERG XPRESS MATERIALS GUIDE

Material Data				Material Type			
Property	Measurement Conditions	Unit of Measure	DIN	94AU925 polyurethane	Red HPU polyurethane	NBR	94AU30000
Color				blue	red	black	blue
Specific Gravity		g/cm <sup>3</sup>	53 479	1.18	1.20	1.23	1.17
Hardness		shore A	53 505	94	94	85	94
		shore D	53 505	43	–	–	46
Extension Modulus	100% elongation	N/mm <sup>2</sup>	53 455	–	16	11	–
Tensile Strength		N/mm <sup>2</sup>	53 455	64	60	17	62
Elongation		%	53 455	470	430	150	550
Tear Strength		N/mm	53 515	95	–	–	–
		N/mm	53 507	–	150	9	–
Resilience		%	53 512	–	35	20	–
Abrasion		mm <sup>3</sup>	53 516	–	–	130	–
E-Modulus Strength		N/mm <sup>2</sup>	53 457	–	–	–	–
Compression Set	20°C/24 hours	%	53 517	–	–	–	20
	70°C/22 hours	%	53 517	23	–	–	–
	70°C/70 hours	%	53 517	–	28	–	–
	70°C/100 hours	%	53 517	–	–	–	49
	100°C/22 hours	%	53 517	–	–	9	–
	150°C/22 hours	%	53 517	–	–	–	–
	175°C/22 hours	%	53 517	–	–	–	–
Temperature, minimum		°C		–30	–20	–30	–35
Temperature, maximum		°C		+110	+110	+110	+120
Temperature, max. water/steam		°C		–	+80	–	–
Temperature, max. hot air		°C		–	–	–	–

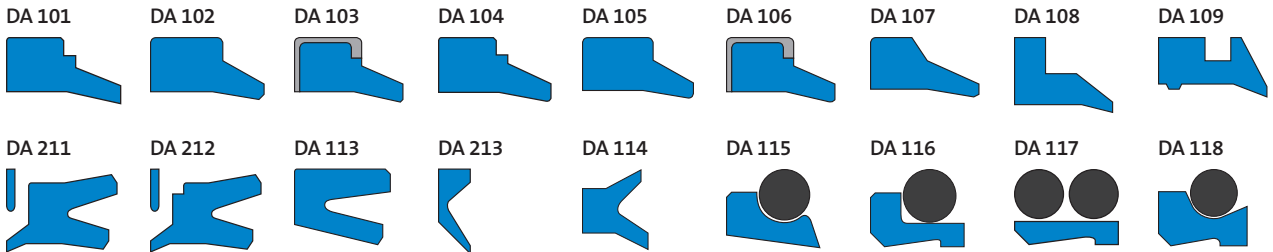
# FREUDENBERG XPRESS MATERIALS GUIDE

Material Type								
H-NBR	FKM	EPDM	Silicone	PTFE virgin/ white	PTFE glass/ MoS <sub>2</sub>	PTFE bronze	FQN polyacetal	PA polyamide
green	brown	black	blue	white	gray	bronze	white/black	natural/black
1.32	2.51	1.23	1.60	2.16	2.30	3.20	1.41	1.13
85	85	85	85	–	–	–	–	–
–	–	–	–	55	63	69	85	85
9.7	10	9.2	–	–	–	–	–	–
19.5	14	14	7.5	27	15	14	70	80
245	200	130	150	350	280	170	40	40
–	–	–	–	–	–	–	–	–
6	6	9	12	–	–	–	–	–
30	7	34	35	–	–	–	–	–
110	200	108	–	–	–	–	–	–
–	–	–	–	540	1350	1375	3000	3000
–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–
–	–	24	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–
21.1	5	18	–	–	–	–	–	–
27.7	6	20	–	–	–	–	–	–
–	7.7	–	34	–	–	–	–	–
–20	–20	–45	–60	–200	–200	–200	–45	–40
+150	+220	+130	+200	+260	+260	+260	+100	+110
+130	+150	+150	+120	–	–	–	–	–
+180 short	+300 short	+180 short	+300 short	–	–	–	–	–

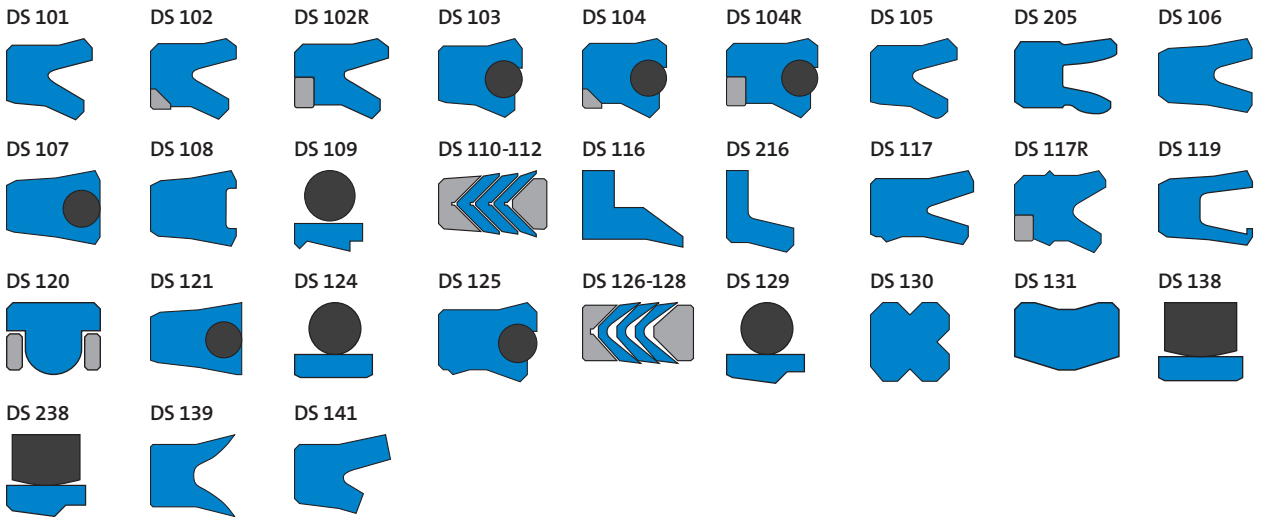
SQ-PU, SQ-SIL/EPDM, FPM also with FDA permission available.  
All test results are measured from test specimen and cannot be transferred to seal applications.

# FREUDENBERG XPRESS PROFILES GUIDE

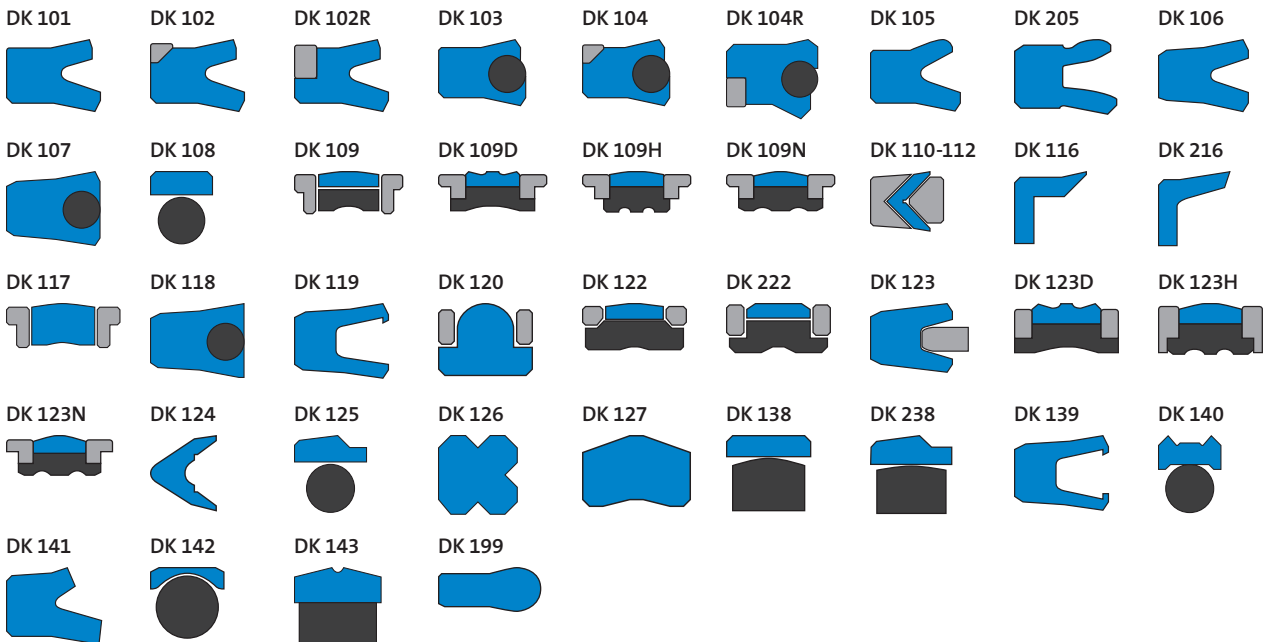
## DIRT WIPERS PROFILES (DA)



## ROD SEALS PROFILES (DS)

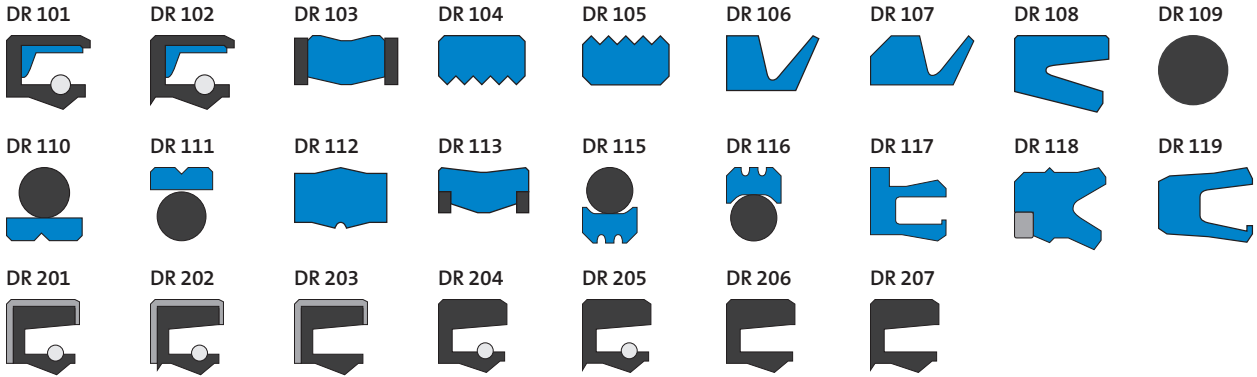


## PISTON SEALS PROFILES (DK)

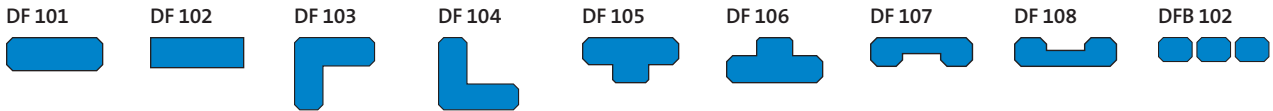


# FREUDENBERG XPRESS PROFILES GUIDE

## ROTARY SEALS PROFILES (DR)



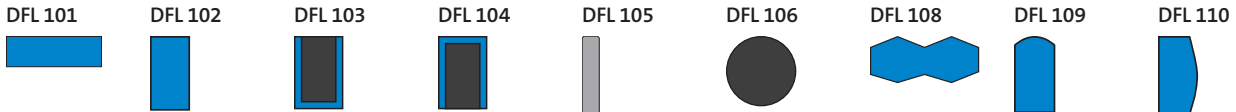
## GUIDE RINGS PROFILES (DF)



## BACKUP RINGS PROFILES (DST)



## GASKETS PROFILES (DFL)



## Xpress Seal Materials

Polyurethanes	Plastomers	Elastomers	Fluoro-Plastic (PTFE)
94AU925 (P100), blue	POM (L100), black	85A NBR (N100), black	PTFE Virgin (T300)
Red HPU (P500), red	Nylon (L200), natural	85A H-NBR (N300), green	PTFE Glass, 15% (T500)
C-HPU (P550), yellow		85A FPM (F100), brown	PTFE Bronze, 40% (T400)
HT-PU (P800), natural		85A EPDM (E100), black	PTFE Carbon (T700)
94AU30000 (P300), blue		85A Silicone (S100), natural	PTFE Glass/MoS2 (T900)



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