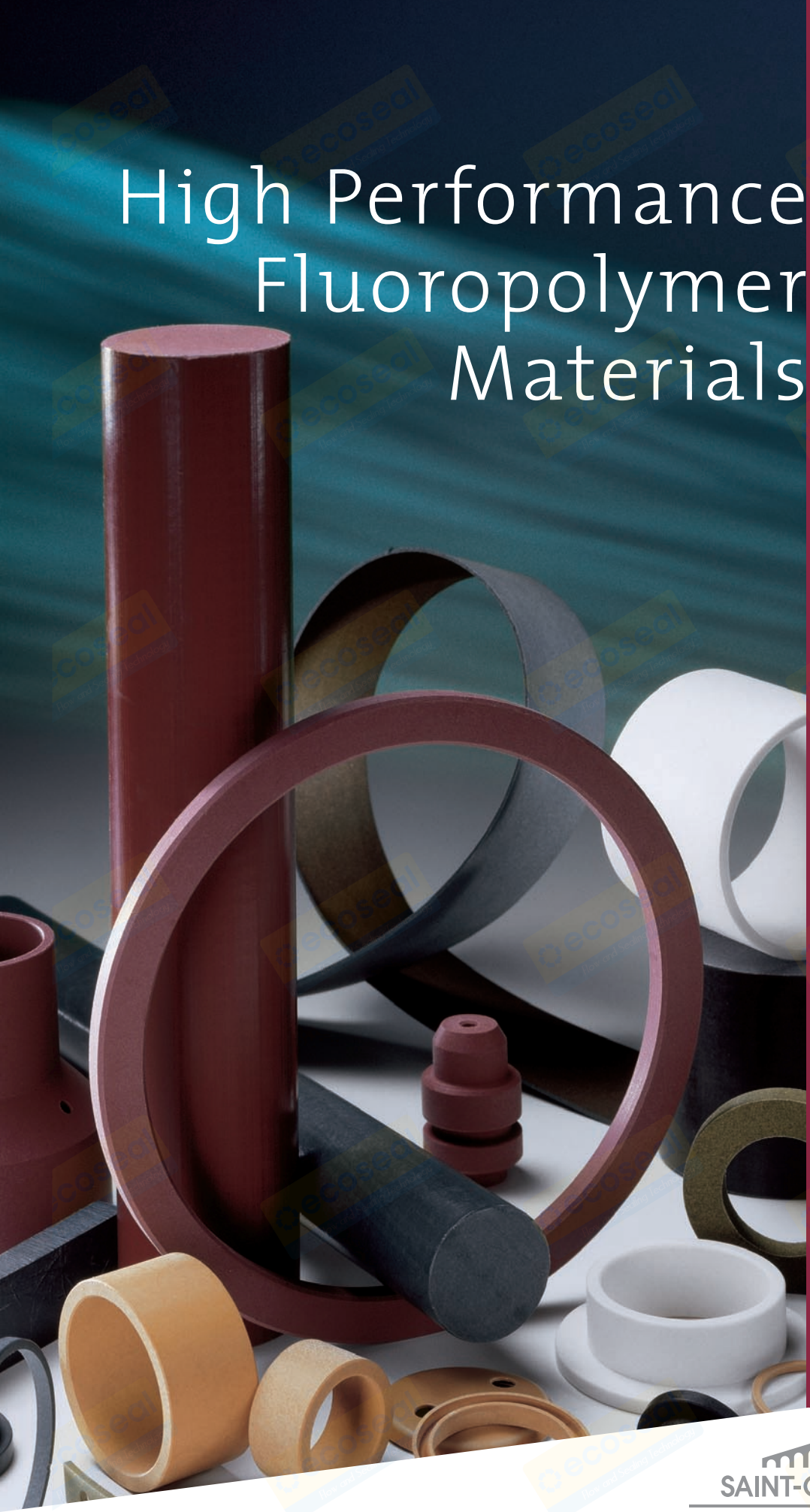
High Performance Fluoropolymer Materials



RULON®

Shaping the Future of Industry Through Performance Plastics

- Low Friction
- High Wear Life
- Chemical Resistance
- Low Maintenance

SAINT-GOBAIN
PERFORMANCE PLASTICS

Saint-Gobain

Saint-Gobain is a worldwide group whose history spans more than three centuries.

Created in 1665 in France, Saint-Gobain launched its first industrial Department with the production of mirrors, which adorn the famous Hall of Mirrors at Versailles.

Expansion beyond French borders began in the middle of the 19th century. An international pioneer, Saint-Gobain established a glass factory in Germany in 1857, another in Italy in 1889 and one in Belgium in 1904. The group moved toward the New World in 1937 with the opening of a plant in Brazil.

Early Diversification

Strongly established in flat glass production, Saint-Gobain began looking toward other activities at the beginning of the 20th century. The company entered the papermaking business in 1925, and the insulation business in 1936.

The 1970 addition of the company Pont-á-Mousson, the world leader in cast iron pipes, reinforced Saint-Gobain's position in the construction market.

Throughout the 1970's and 80's the Saint-Gobain Group continued to pursue both internal and external growth, which culminated with the 1990 acquisition of Norton Company, one of the world's leading abrasives and ceramics manufacturers.

Norton Performance Plastics in turn acquired Furon Company and created the new Saint-Gobain Performance Plastics, combining decades of experience and leadership in metal-backed and polymer bearings and components.

The Rulon® trademark had been acquired by Furon in the purchase of Dixon Industries Corporation, founded in 1876 by Ezra Dixon, specializing in self-lubricating bearings for the then emerging textile industry in the northeastern United States.

Glossary of Materials

- **Rulon LR** Maroon material with low deformation characteristics
- **Rulon J** Dull gold polymer-filled material for lower abrasion and softer mating surfaces
- **Rulon 641** White FDA compliant material for most mating surfaces
- **Rulon W2** Excellent for fresh water applications
- **Rulon 123** FDA compliant, low and consistent friction material for most mating surfaces
- **Rulon 488** Inorganic filled material ideal for dry applications, compatible with most surfaces
- **Rulon 957** Green speckled material, excellent bearing grade with noise dampening capability
- **Rulon XL** Tan, low friction material, suitable for aluminum surfaces, with excellent outgassing capability for use in vacuum
- **Rulon F** Green polymer-filled material with excellent anti-abrasion characteristics
- **Rulon 142** Aqua colored low deformation material suitable for linear bearings and slides
- **Rulon 945** Black very low deformation material suitable for high heat / impact applications
- **Rulon 1045** Dull gold colored high elongation and moderate deformation material suitable for bearings, rings and seals
- **Rulon 1337** Tan FDA compliant material with low frictional characteristics and excellent chemical resistance for most mating surfaces
- **Rulon 1410** Gold colored material for use in high elongation applications requiring good elongation
- **Rulon 1439** White FDA compliant material most suitable for submerged applications with low wear

Processes

Automatic Molding	• Custom bearings • Components, near-net
Extrusion	• Rods & Tubes • Specialty Profiles
Hand Molding	• Rod, Sheet, and Tube
Machining	• Custom Machined Parts
Skiving	• Tapes and Thin Sheet
Stamping / Forming	• Seals • Washers • Bearings & Glides

Products

Bearings:
Sleeve, flanged, and thrust bearings are available in the standard materials, Rulon LR, J, and 641, through our distribution channels. Please contact Saint-Gobain Performance Plastics customer service for the preferred distributor in your area, or for other material options.

Rings:
Solid and split piston rings, featuring a full complement of joint configurations, can be manufactured to your custom specifications, or our applications engineers can work with you to design the optimal ring for your needs. Please contact the main number and you will be connected with the district sales manager for your area.

Tapes:
Most materials can be skived (shaved) into sheets using state of the art equipment. These can be etched for bonding to other materials, or used as is in a wide assortment of applications where friction reduction is desired. FDA - compliant materials can be used as non-stick coating surfaces for food preparation.

Formed Parts:
A wide assortment of cup seals is available, either hot-formed to hold a specific shape, or cold-formed to retain the natural memory of the materials. These produce a consistent hysteresis in dust sealing applications, as well as precision electronic applications. Please contact the main number and you will be connected with the district sales manager for your area.

Basic Shapes:
Molded and extruded rods and tubes and molded sheets are available in most of the materials. Please contact Saint-Gobain Performance Plastics customer service for the preferred distributor in your area.

Wear Components:
Wear components can take a variety of shapes and sizes, other than those described above. These can encompass things such as wear bands, pump bodies, and pistons for chemically and thermally demanding environments. These are usually manufactured to your specifications or SGPPL can assist you in the design. Please contact the main number and you will be connected with the district sales manager for your area.

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Available Shapes

Rod & Tube
Extruded - Up to 10 ft. long
Molded - Up to 12 in. long
Extruded - 3 in. Max. O. D.
Molded - 47" Max. O. D.
Precision grinding or machining available for some sizes

Sheet & Tape
Tape - 38" width maximum
Skived Up to 1/4" thick
Molded Up to 24"x3" thick
Max thickness 3"
Precision grinding or machining available on thickness

Custom
Contact district sales manager
Full machining capabilities available

Materials Selection Guide

		LR	J	641	W2	123	488	957	XL	F	142	945	1045	1337	1410	1439
Rulon Grades	Color	Maroon	Gold	White	Black	Black	Turq.	Green	Tan	Green	Turq.	Black	Gold	Tan	Gold	White
Performance*	Max Load "P" (psi) MPa	1,000 6.9	750 5.2	1,000 6.9	1,000 6.9	1,000 6.9	1,000 6.9	1,000 6.9	1,200 8.3	1,000 6.9	1,000 6.9	1,000 6.9	1,000 6.9	1,000 6.9	750 5.2	1,000 6.9
	Max Speed "V" (fpm) m/s	400 2.0	400 2.0	400 2.0	400 2.0	400 2.0	400 2.0	400 2.0	400 2.0	400 2.0	400 2.0	400 2.0	400 2.0	400 2.0	400 2.0	400 2.0
	Max "PV" (psi-fpm) (Mpa • m/s)	10,000 0.35	7,500 0.26	10,000 0.35	10,000 0.35	10,000 0.35	10,000 0.35	10,000 0.35	10,000 0.35	10,000 0.35	10,000 0.35	10,000 0.35	10,000 0.35	10,000 0.35	7,500 0.26	10,000 0.35
Mating Surface Steel & Stainless Steel	Rb 25 & higher		x	x	x	x	x	x	x	x			x	x	x	x
	Rc 35 & higher	x									x	x				
	Rc 50 & higher															
	Painted metal and porcelain						x	x								
	Aluminum		x						x							
Environment	FDA compliant			x		x								x		x
	Steam	x		x	x	x	x	x	x		x	x		x	x	x
	Wet	x		x	x	x	x	x	x	x	x	x	x	x	x	x
	Dry	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
	Vacuum	x	x	x			x	x	x	x	x		x	x	x	x
Relative Rating 1=Low, 5=High	Coefficient of friction	4	1	1	2	2	3	2	1	2	2	4	1	1	1	3
	Creep resistance	4	3	4	4	4	4	4	4	4	5	5	2	2	2	4
	Insulative prop.	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes
Comments		Our Standard Rulon bearing grade. High Creep and Abrasion resistance	Lowest Coefficient of Friction of Rulon series. Excellent insulator.	Widely used in the food process industry.	Very good operation in wet environments.	Good thermal and electrostatic dissipation.	Temperature (dry) oven bearings. Excellent abrasion resistance.	Low friction/wear against coated metal or porcelain surfaces.	The best Rulon against aluminum surfaces.	Standard tape liner material for Rulon composite bearings.	Extensively used in machine tool guide ways.	Extremely low deformation under load, and high impact resistance.	FDA compliant; Excellent chemical resistance.	A standard material for compressor piston flip seals.	A standard material for compressor piston flip seals.	Ideal for submerged applications.

The list above is only a partial list of available formulations of Rulon.
P,V data may be exceeded based on specific application requirements. Ask to speak to a Saint-Gobain Application Engineer.
RATINGS above are relative within Rulon family ONLY.
For Rulon materials, coefficient of friction decreases with increasing load, and wear decreases with increasing surface hardness.
For PTFE based materials, wear in steam and wet environments is higher than in dry environments.
Saint-Gobain offers enhanced Rulon grades which minimize this effect.
Most Rulon products have excellent chemical compatability. Data available upon request.

RULON® LR

Rulon® LR is a maroon colored bearing material best known for its versatile design properties.

It is compatible with most hardened steel substrates. Mild steel is acceptable; harder running surfaces are better.

Rulon® has a practically universal chemical inertness. Of the chemicals encountered in commercial practice, only molten sodium and fluorine, at elevated temperatures and pressures, show any signs of attack.

For continuous non-lubricated service, RULON® LR sleeve bearings are capable of operating up to 10,000 PV. Higher values are possible for intermittent service.

Design Criteria Rulon LR

Temperature - Typical Range °F (°C)	-400/+550 (-240/288)*
Maximum PV (continuous)(MPa+m/s)	10,000 (0.35)*
Maximum P - psi (static)(MPa)	1,000 (6.9)*
Maximum V -SFM (no load)(m/s)	400 (2)*
Shaft Hardness - Minimum	Rc35
Shaft finish recommended Ra (min/um)	8 - 24 (0.2-0.6)*
Shaft Material	Steel
Engineering Information	
Friction - static & dynamic	.15 - .25
Water Absorption ASTM D570	0%
Flammability ASTM D635	Non-Flammable
Chemical Resistance	Inert
Thermal Conductivity BTU/hr/sq. ft./°F/in.	2.3
Linear Coefficient of Thermal Expansion (78°-200°F) (26° -93°C)	Diameter $3.5x10^{-5}$ (6.3)* Length $6.2x10^{-5}$ (11.2)*
(78°-300°F) (26°-149°C)	Diameter $3.5x10^{-5}$ (6.3)* Length $6.2x10^{-5}$ (11.2)*
Physical Data	
Elongation ASTM D638	135%
Tensile Strength ASTM D638(MPa)	2000 psi (13.8)*
Deformation (1500 psi - 24 hr. RT)	3%
Specific Gravity	2.25

A more complete data sheet is available upon request.
**Metric measurements in parentheses*

Typical Product and Application Description

Products	Applications
• Automatically molded bearings & components • Sleeve, flanged and thrust bearings • Piston Rings • Stamped and formed seals • Extruded shapes • Machined parts • Molded shapes	• Pumps • Mixers • Compressors • Appliances • Automotive • Insulators • Linear slides • Pipe supports • Wear bands

RULON® J

Rulon® J is an all-polymeric reinforced, dull gold colored PTFE compound that operates exceptionally well against soft mating surfaces such as 316 stainless steel, aluminum, mild steel, brass and other plastics. The unique "shaft friendly" material is also low in friction and wear and self-lubricating.

Rulon® J has one of the lowest coefficients of friction of most reinforced PTFE materials. This makes it ideally suited for start/stop applications where stick-slip must be eliminated. The tribological properties of this material also make it suitable for both bearing and wear component applications.

Typical Product and Application Description

Products	Applications
• Automatically molded bearings & components • Sleeve, flanged and thrust bearings • Piston Rings • Stamped and formed seals • Extruded shapes • Machined parts • Molded shapes	• Printers • Copiers • Air Compressors • Appliances • Automotive • Insulators • Linear slides • Anemometers • Wear bands

Design Criteria Rulon J

Temperature - Typical Range °F (℃)	-400/+550 (-240/288)*
Maximum PV (continuous)(MPa•m/s)	7,500 (0.26)*
Maximum P - psi (static)(MPa)	750 (5.2)*
Maximum V -SFM (no load)(m/s)	400 (2)*
Shaft Hardness - Minimum	Rb25
Shaft finish recommended Ra (µ"/µm)	8 - 16 (0.2-0.4)*
Shaft Material	316 Stainless Steel and Non-Ferrous
Engineering Information	
Friction - static & dynamic	.12 - .20
Water Absorption ASTM D570	0%
Flammability ASTM D635	Non-Flammable
Chemical Resistance	Chart Available
Thermal Conductivity BTU/hr/sq. ft./°F/in.	2.0
Linear Coefficient of Thermal Expansion (78°-200°F)	Diameter $4.9x10^{-5}$ (8.8)*
(26° -93°C)	Length $6.5x10^{-5}$ (11.7)*
(78°-300°F)	Diameter $5.2x10^{-5}$ (9.4)*
(26°-149°C)	Length $6.8x10^{-5}$ (12.2)*
Physical Data	
Elongation ASTM D638	180%
Tensile Strength ASTM D638(MPa)	2000 psi (13.8)*
Deformation (1500 psi - 24 hr. RT)	3%
Specific Gravity	1.95

A more complete data sheet is available upon request.
**Metric measurements in parentheses*

RULON® 641

Rulon® 641 is manufactured from FDA compliant materials which possess excellent load and wear characteristics.

It offers excellent, continuous non-lubricated service up to 10,000 PV - higher for intermittent service. While the load capacity of Rulon 641 is generally limited to 1,000 psi at room temperature, deformation is a function of wall thickness, temperature and load.

Its compatibility with a wide array of mating surfaces, including mild steel, 303 and 316 stainless steels, as well as harder materials, make it a good choice for most food and pharmaceutical bearing applications.

Design Criteria Rulon 641

Temperature - Typical Range °F (°C)	-400/+550 (-240/288)*
Maximum PV (continuous)(MPa•m/s)	10,000 (0.35)*
Maximum P - psi (static)(MPa)	1,000 (6.9)*
Maximum V -SFM (no load)(m/s)	400 (2)*
Shaft Hardness - Minimum	Rb25
Shaft finish recommended Ra (µ"/µm)	8 - 16 (0.2-0.4)*
Shaft Material	Mild, 303 & 316 Stainless Steel
Engineering Information	
Friction - static & dynamic	.10 - .30
Water Absorption ASTM D570	0%
Flammability ASTM D635	Non-Flammable
Chemical Resistance	Inert
Thermal Conductivity BTU/hr/sq. ft./°F/in.	2.6
Linear Coefficient of Thermal Expansion (78°-200°F) (26° -93°C)	Diameter 3.9×10^{-5} (7.0)* Length 4.9×10^{-5} (8.8)*
(78°-300°F) (26°-149°C)	Diameter 4.2×10^{-5} (7.6)* Length 5.7×10^{-5} (10.3)*
Physical Data	
Elongation ASTM D638	175%
Tensile Strength ASTM D638(MPa)	2000 psi (19.8)*
Deformation (1500 psi - 24 hr. RT)	4%
Specific Gravity	2.25

A more complete data sheet is available upon request.
**Metric measurements in parentheses*

Typical Product and Application Description

Products	Applications
• Automatically molded bearings & components • Sleeve, flanged and thrust bearings • Piston Rings • Stamped and formed seals • Extruded shapes • Machined parts • Molded shapes	• Pumps • Mixers • Compressors • Appliances • Chute Liners • Insulators • Linear slides • Shaft bearings • Wear bands • Seals

RULON® W2

Rulon® W2 is a black PTFE-based material developed for use in fresh-water applications. It exhibits low friction and excellent wear characteristics (one of the lowest wear rates in fresh water) as well as good thermal dissipation, preventing shaft distress. Its properties are enhanced when wet.

Rulon® W2 is DWGV (European) certified for applications in contact with drinking water.

It is compatible with most metal substrates and soft mating surfaces. Rulon W2 is a good alternative to Rulon J when superior chemical resistance is needed. However, it should not be used on very soft mating surfaces or where electrical insulation is desired.

Typical Product and Application Description

Products	Applications
• Automatically molded bearings & components • Sleeve, flanged and thrust bearings • Piston Rings • Stamped and formed seals • Extruded shapes • Machined parts • Molded shapes	• Pumps • Mixers • Compressors • Appliances • Automotive • Fresh water submerged • Thrust bearings • Plating tanks • Wear bands • Ovens

Design Criteria Rulon W2

Temperature - Typical Range °F	-400/+550
Maximum PV (continuous)(MPa•m/s)	10,000 (0.35)*
Maximum P - psi (static)(MPa)	1,000 (6.9)*
Maximum V -SFM (no load)(m/s)	400 (2)*
Shaft Hardness - Minimum	Rb25
Shaft finish recommended Ra (µ"/µm)	8 - 16 (0.2-0.4)*
Shaft Material	Hard, mild and stainless steels
Engineering Information	
Friction - static & dynamic	.15 - .30
Water Absorption ASTM D570	0%
Flammability ASTM D635	Non-Flammable
Chemical Resistance	Inert
Thermal Conductivity BTU/hr/sq. ft./°F/in.	4.5
Linear Coefficient of Thermal Expansion (78°-200°F) (26° -93°C)	Diameter 4.7×10^{-5} (8.5)* Length 6.0×10^{-5} (10.8)*
Linear Coefficient of Thermal Expansion (78°-300°F) (26°-149°C)	Diameter 4.9×10^{-5} (8.8)* Length 6.3×10^{-5} (11.3)*
Physical Data	
Elongation ASTM D638	70%
Tensile Strength ASTM D638(MPa)	1800 psi (12.4)*
Deformation (1500 psi - 24 hr. RT)	3%
Specific Gravity	2.10

A more complete data sheet is available upon request.
**Metric measurements in parentheses*

RULON® 123

Rulon® 123 is a glossy black non-abrasive compound for softer mating surfaces, such as stainless steel. This material has excellent chemical resistance and is FDA, USDA, and NSF compliant. It is less expensive than Rulon J, but is slightly less flexible and higher in wear.

It has a high resistance to deformation, low coefficient of friction and good thermal and electrostatic dissipation. This material has a maximum operating temperature of 550˚F (300˚C).

Rulon 123 releases black wear debris over time and should not be used in ultra-dry, vacuum applications, or where electrical insulation is desired.

Design Criteria Rulon 123

Temperature - Typical Range ˚F (˚C)	-400/+550 (-240/288)*
Maximum PV (continuous)(MPa•m/s)	10,000 (0.35)*
Maximum P - psi (static)(MPa)	1,000 (6.9)*
Maximum V -SFM (no load)(m/s)	400 (2)*
Shaft Hardness - Minimum	Rb25
Shaft finish recommended Ra (µ"/µm)	8 - 16 (0.2-0.4)
Shaft Material	Steel
Engineering Information	
Friction - static & dynamic	.10 - .30
Water Absorption ASTM D570	0%
Flammability ASTM D635	Non-Flammable
Chemical Resistance	Inert
Thermal Conductivity BTU/hr/sq. ft./˚F/in.	4.6
Linear Coefficient of Thermal Expansion (78˚-200˚F) (26˚ -93˚C)	Diameter 4.4×10^{-5} (7.9)* Length 7.0×10^{-5} (12.6)*
Physical Data	
Elongation ASTM D638	150%
Tensile Strength ASTM D638(MPa)	2500 psi (17.2)*
Deformation (1500 psi - 24 hr. RT)	2.5%
Specific Gravity	2.12

A more complete data sheet is available upon request.
**Metric measurements in parentheses*

Typical Product and Application Description

Products	Applications
• Automatically molded bearings & components • Sleeve, flanged and thrust bearings • Piston Rings • Stamped and formed seals • Extruded shapes • Machined parts • Molded shapes	• Pumps • Mixers • Compressors • Appliances • Automotive lip seals • Liners • Linear slides • Pipe supports • Wear bands • Dust seals

RULON® 488

Rulon® 488 is a dull turquoise material originally developed for use with painted surfaces. It has been used in veneer dryer bearings in the plywood industry.

Its excellent wear resistance, especially in extremely dry environments, make it a material of choice in hydrogen and natural gas compressors. Its almost universal chemical resistance enables it to withstand corrosives and acids sometimes present in trace amounts in these environments.

It has a higher load capacity than Rulon® J and better abrasion resistance than both Rulon® J and Rulon® 123.

Typical Product and Application Description

Products	Applications
• Automatically molded bearings & components • Sleeve, flanged and thrust bearings • Piston Rings • Stamped and formed seals • Extruded shapes • Machined parts • Molded shapes	• Pumps • Mixers • Compressors • Appliances • Automotive • Insulators • Linear slides • Pipe support • Wear bands

Design Criteria Rulon 488

Temperature - Typical Range °F (°C)	-400/+550 (-240/288)
Maximum PV (continuous)(MPa•m/s)	10,000 (0.35)*
Maximum P - psi (static)(MPa)	1,000 (6.9)*
Maximum V -SFM (no load)(m/s)	400 (2)*
Shaft Hardness - Minimum	Rb25
Shaft finish recommended Ra (µ"/µm)	8 - 16 (0.2-0.4)*
Shaft Material	Hard, mild and stainless steels
Engineering Information	
Friction - static & dynamic	.10 - .30
Water Absorption ASTM D570	0%
Flammability ASTM D635	Non-Flammable
Chemical Resistance	Inert
Thermal Conductivity BTU/hr/sq. ft./°F/in.	2.6
Linear Coefficient of Thermal Expansion (78°-200°F) (26° -93°C)	Diameter 5.5×10^{-5} (9.9)* Length 7.0×10^{-5} (12.6)*
Linear Coefficient of Thermal Expansion (78°-300°F) (26°-149°C)	Diameter 5.2×10^{-5} (9.4)* Length 7.0×10^{-5} (12.6)*
Physical Data	
Elongation ASTM D638	175%
Tensile Strength ASTM D638(MPa)	2000 psi (13.8)*
Deformation (1500 psi - 24 hr. RT)	4%
Specific Gravity	2.25

A more complete data sheet is available upon request.
**Metric measurements in parentheses*

RULON® 957

Rulon® 957 is a speckled green material that was developed specifically for noise dampening and abrasion resistance, such as in commercial or residential clothes dryers.

It provides low friction operation on softer mating surfaces at higher loads than Rulon® J.

This material also offers excellent performance on coated metals, particularly porcelain. Among its many benefits are an overall reduction of the weight of the finished product, vibration absorption, and cost reduction due to rapid manufacturing methods.

Design Criteria
Rulon 957

Temperature - Typical Range °F (°C)	-400/+550 (-240/288)*
Maximum PV (continuous)(MPa•m/s)	10,000 (0.35)*
Maximum P - psi (static)(MPa)	1,000 (6.9)*
Maximum V -SFM (no load)(m/s)	400 (2)*
Shaft Hardness - Minimum	Rb25
Shaft finish recommended Ra (µ"/µm)	8 - 16 (0.2-0.4)
Shaft/Mating Material	Hard, Mild and Stainless Steel and porcelain coated
Engineering Information	
Friction - static & dynamic (Dynamic, 20 psi, 360 sfm)	.15 - .25
Water Absorption ASTM D570	0%
Flammability ASTM D635	Non-Flammable
Chemical Resistance	Good
Linear Coefficient of Thermal Expansion (78°-200°F) (26° -93°C)	Diameter $3.5x10^{-5}$ (6.3)* Length $6.2x10^{-5}$ (11.2)*
Physical Data	
Elongation ASTM D638	200%
Tensile Strength ASTM D638(MPa)	2200 psi (15.2)*
Deformation (1500 psi - 24 hr. RT)	4%
Specific Gravity	2.25

A more complete data sheet is available upon request.
**Metric measurements in parentheses*

Typical Product and Application Description

Products	Applications
• Automatically molded bearings & components • Sleeve, flanged and thrust bearings • Piston Rings • Stamped glides • Extruded shapes • Machined parts • Molded shapes	• Clothes Dryers • Mixers • Compressors • Ovens and Dryers • Automotive • Insulators • Linear slides • Sanders • Wear bands

RULON® XL

Rulon® XL is a tan colored material that is best for use against aluminum (including anodized) substrates. Rulon® XL exhibits very low wear as compared with other Rulon® grades.

Other advantages offered by this unique material are that it combines low deformation under load with exceptionally good chemical resistance.

It is compatible with a wide range of mating surfaces, but is not recommended for use with alkalis. Its non-abrasive character enhances the frictional performance to prevent galling of softer mating surfaces.

It is the best material for vacuum service.

Typical Product and Application Description

Products	Applications
• Automatically molded bearings & components • Sleeve, flanged and thrust bearings • Piston Rings • Stamped and formed seals • Extruded shapes • Machined parts • Molded shapes	• Vacuum Pumps • Mixers • Compressors • Appliances • Automotive • Insulators • Linear slides • Shaft support • Wear bands

Design Criteria Rulon XL

Temperature - Typical Range °F	-400/+550 (-240/288)
Maximum PV (continuous)(MPa•m/s)	10,000 (0.35)*
Maximum P - psi (static)(MPa)	1,200 (8.3)*
Maximum V -SFM (no load)(m/s)	400 (2)*
Shaft Hardness - Minimum	Rb25
Shaft finish recommended Ra (µ"/µm)	8 - 16 (0.2-0.4)*
Shaft Material	All Steels and aluminum
Engineering Information	
Friction - static & dynamic	.10 - .25
Water Absorption ASTM D570	0%
Flammability ASTM D635	Non-Flammable
Chemical Resistance	Inert
Thermal Conductivity BTU/hr/sq. ft./°F/in.	1.7
Linear Coefficient of Thermal Expansion (78°-200°F) (26° -93°C)	Diameter 6.4×10^{-5} (11.5)*
Physical Data	
Elongation ASTM D638	160%
Tensile Strength ASTM D638(MPa)	1700 psi (11.7)*
Deformation (1500 psi - 24 hr. RT)	1.4%
Specific Gravity	1.97

A more complete data sheet is available upon request.
**Metric measurements in parentheses*

RULON® F

Rulon® F is a green material with excellent insulating properties and superior abrasion resistance.

It is used in a wide variety of wear component and bearing applications, and is currently used as the liner in one of our composite journal bearings (Rulon® FCJ).

Rulon® F exhibits excellent wear resistance, especially in dry conditions. This material suitably slides against a wide range of mating surfaces but is not recommended for contact with strong bases or steam.

Design Criteria
Rulon F

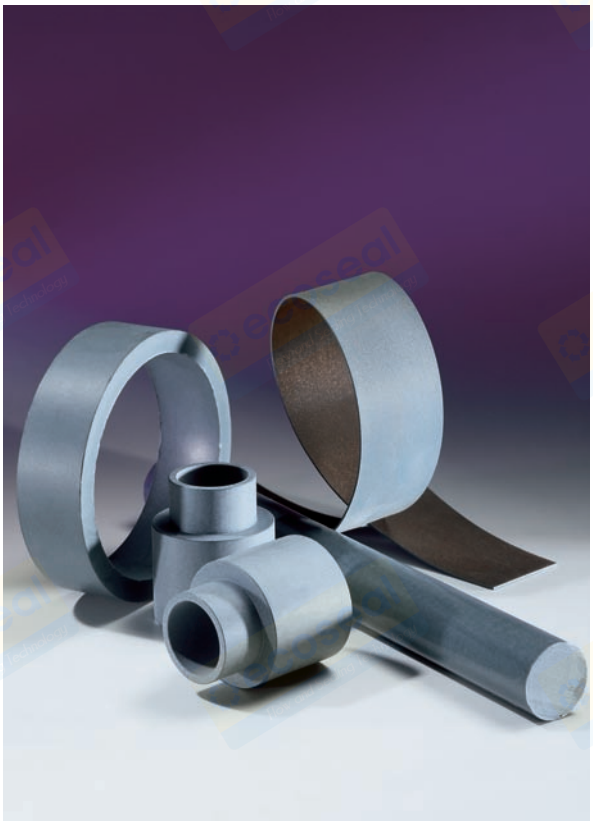
Temperature - Typical Range °F (°C)		-400/+550 (-240/288)
Maximum PV (continuous)(MPa•m/s)		10,000 (0.35)*
Maximum P - psi (static)(MPa)		1,000 (6.9)*
Maximum V -SFM (no load)(m/s)		400 (2)*
Shaft Hardness - Minimum		Rb25
Shaft finish recommended Ra (µ"/µm)		8 - 16 (0.2-0.4)*
Shaft Material		Stainless and Hardened Steel
Engineering Information		
Friction - static & dynamic		.12 - .20
Flammability ASTM D635		Non-Flammable
Chemical Resistance		Data Available
Thermal Conductivity BTU/hr/sq. ft./°F/in.		2.6
Linear Coefficient of Thermal Expansion	(78°-200°F)	Diameter $3.5x10^{-5}$ (6.3)*
	(26° -93°C)	Length $6.2x10^{-5}$ (11.2)*
	(78°-300°F)	Diameter $3.6x10^{-5}$ (6.4)*
	(26°-149°C)	Length $7.0x10^{-5}$ (12.6)*
Physical Data		
Elongation ASTM D638		160%
Tensile Strength ASTM D638(MPa)		1200 psi (8.3)*
Deformation (1500 psi - 24 hr. RT)		3%
Specific Gravity		1.89

A more complete data sheet is available upon request.
**Metric measurements in parentheses*

Typical Product and Application Description

Products	Applications
• Automatically molded bearings & components • Sleeve, flanged and thrust bearings • Piston Rings • Stamped and formed seals • Extruded shapes • Machined parts • Molded shapes	• Clothes Dryers • Chute Liners • Compressors • Appliances • Automotive • Insulators • Linear slides • Pipe supports • Wear bands

RULON® 142



Rulon® 142 is a specially formulated dull blue-green linear bearing material that exhibits low wear, high thermal dissipation, and good dimensional stability characteristics.

Among its many benefits are the virtual elimination of stick-slip, vibration dampening, self-lubrication, uniform friction, long life, ease of application and design diversity.

Rulon® 142 has excellent mechanical properties and is the ideal material for machine tool applications. Its low deformation characteristics limit the amount of misalignment that can occur with other bearing materials.

Strong acids and bases should be avoided, as they may attack the fillers.

Typical Product and Application Description

Products	Applications
• Packings • Sleeve, flanged and thrust bearings • Piston Rings • Stamped parts • Extruded parts • Machined parts • Molded shapes • Wear Bands • Seal rings	• Lathes • Gibs, guideways • Compressors • Appliances • Rotary tables • Motor mounts • Linear slides • Pipe supports • Hydraulic presses

Design Criteria Rulon 142

Temperature - Typical Range °F (°C)	-400/+550 (-240/288)
Maximum PV (continuous)(MPa•m/s)	10,000 (0.35)*
Maximum (continuous bonded)	25,000 (0.88)*
Maximum P - psi (static)(MPa)	1000 (6.9)*
Maximum V -SFM (no load)(m/s)	400 (2)
Shaft Hardness - Minimum	Rc35
Shaft finish recommended Ra (µ"/µm)	8 - 16 (0.2-0.4)*
Shaft Material	Mild/Hardened Steel
Engineering Information	
Friction - static & dynamic	.0.25 with oil
Flammability ASTM D635	Non-Flammable
Chemical Resistance	No acids or bases
Thermal Conductivity BTU/hr/sq. ft./°F/in.	4.8
Linear Coefficient of Thermal Expansion (78°-200°F) (26° -93°C)	Diameter $4.9x10^{-5}$ (8.8)* Length $4.9x10^{-5}$ (8.8)*
Physical Data	
Elongation ASTM D638	200% mold direction
Tensile Strength ASTM D638(MPa)	3100 psi (21.4)*
Deformation (1500 psi - 24 hr. RT)	3%
Specific Gravity	3.16

A more complete data sheet is available upon request.
**Metric measurements in parentheses*

RULON® 945

Rulon® 945 is a black PTFE-based material that has very low wear and deformation under load, making it ideally suited for demanding thermal applications. In fact, its deformation is the lowest of all Rulon® grades. It also possesses excellent chemical resistance and good dimensional stability.

Rulon® 945 is best suited for use against hard mating surfaces, like hardened steel substrates since it does have moderate abrasive qualities. It is not suitable in applications where electrically insulating properties are required.

Design Criteria
Rulon 945

Temperature - Typical Range °F (°C)	-400/+550 (-240/288)
Maximum PV (continuous)(MPa•m/s)	10,000 (0.35)*
Maximum P - psi (static)(MPa)	1,000 (6.9)*
Maximum V -SFM (no load)(m/s)	400 (2)*
Shaft Hardness - Minimum	Rc35
Shaft finish recommended Ra (µ"/µm)	8 - 24 (0.2-0.6)*
Shaft Material	Steel
Engineering Information	
Friction - static & dynamic	.20-.35
Flammability ASTM D635	Non-Flammable
Chemical Resistance	Excellent
Thermal Conductivity BTU/hr/sq. ft./°F/in.	4.8
Linear Coefficient of Thermal Expansion (78°-200°F) (26° -93°C)	Diameter 7.1×10^{-5} (12.8)* Length 2.8×10^{-5} (5.0)*
Physical Data	
Elongation ASTM D638	20%
Tensile Strength ASTM D638(MPa)	2000 psi (13.8)*
Deformation (1500 psi - 24 hr. RT)	0.7%
(1500 psi - 24 hr.RT)	1.4%
Specific Gravity	1.90

A more complete data sheet is available upon request.
**Metric measurements in parentheses*

Typical Product and Application Description

Products	Applications
• Automatically molded bearings & components • Sleeve, flanged and thrust bearings • Piston Rings • Stamped and formed seals • Extruded shapes • Machined parts • Molded shapes	• Pumps • Mixers • Compressors • Appliances • Automotive • Insulators • Linear slides • Pipe supports • Wear bands

RULON® 1045

Rulon® 1045 is a dull gold material that has an excellent ability to elongate in a flip seal application. Coupled with excellent frictional characteristics, it offers the added benefit of energy savings, as well as increased sealing efficiency.

This material is also resistant to many harsh chemicals found in the application environments where it is typically used. It is also compatible with most commercially available lubricants for additional reduction in friction.

Its low deformation properties allow it to be effective as a bearing or sliding surface.

Typical Product and Application Description

Products	Applications
• Automatically molded bearings & components • Sleeve, flanged and thrust bearings • Piston rings & flip seals • Stamped and formed seals • Extruded shapes • Machined parts • Molded shapes	• AC Compressors • Transmissions • Air Compressors • Appliances • Automotive • Linear slides • Fluid transfer systems • Vacuum Pumps • Valves

Design Criteria Rulon 1045

Temperature - Typical Range °F (°C)	-400/+550 (-240/288)
Maximum PV (continuous)(MPa•m/s)	10,000 (0.35)*
Maximum P - psi (static)(MPa)	1,000 (6.9)*
Maximum V -SFM (no load)(m/s)	400 (2)*
Shaft Hardness - Minimum	Rb25
Shaft finish recommended Ra (µ"/µm)	8 - 16 (0.2-0.4)*
Shaft Material	Stainless to Hardened Steel
Engineering Information	
Friction - static & dynamic	.10-.20
Flammability ASTM D635	Non-Flammable
Chemical Resistance	Data available
Linear Coefficient of Thermal Expansion (78°-200°F) (26° -93°C)	Diameter $6.5x10^{-5}$ (11.7)* Length $6.5x10^{-5}$ (11.7)*
Physical Data	
Elongation ASTM D638	450%
Tensile Strength ASTM D638(MPa)	3900 psi (26.9)*
Specific Gravity	2.11

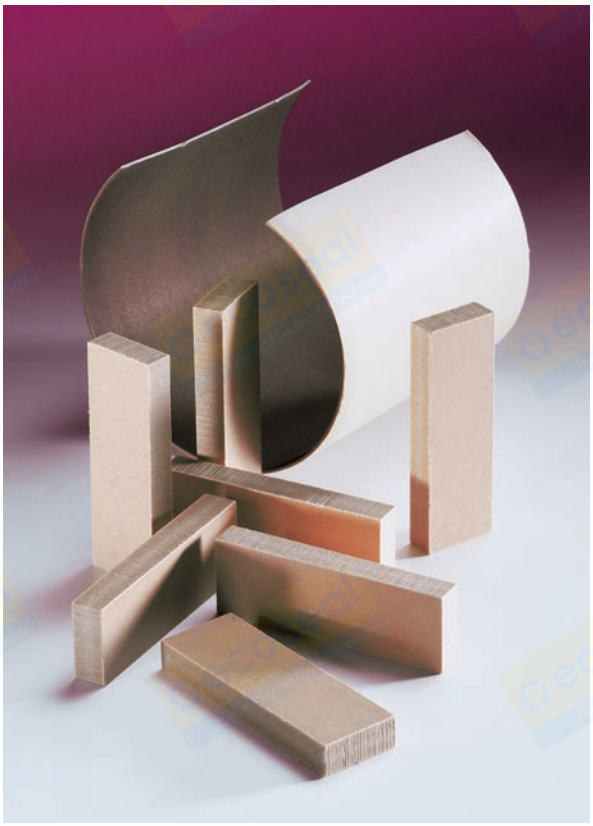
A more complete data sheet is available upon request.
**Metric measurements in parentheses*

RULON® 1337

Rulon® 1337 is a tan material made entirely from FDA compliant components. It has excellent physical properties and is chemically compatible with most chemicals, except concentrated sulfuric acid. This offers much flexibility in wash-down environments of food and pharmaceutical processing environments.

It has a slightly lower coefficient of friction than Rulon J, offering extended life and less abrasion with softer mating surfaces.

It is compatible with most commercially available natural lubricants for additional reduction in friction.



Design Criteria
Rulon 1337

Temperature - Typical Range °F (°C)	-400/+550 (-240/288)
Maximum PV (continuous)(MPa•m/s)	10,000 (0.35)*
Maximum P - psi (static)(MPa)	1,000 (6.9)*
Maximum V -SFM (no load)(m/s)	400 (2)*
Shaft Hardness - Minimum	Rb25
Shaft finish recommended Ra (µ"/µm)	8 - 16 (0.2-0.4)*
Shaft Material	Stainless to Hardened Steel
Engineering Information	
Friction - static & dynamic	.10-.20
Flammability ASTM D635	Non-Flammable
Chemical Resistance	Very Good
Thermal Conductivity BTU/hr/sq. ft./°F/in.	2.3
Linear Coefficient of Thermal Expansion (78°-200°F) (26° -93°C)	Diameter $6.1x10^{-5}$ (11.0)* Length $7.4x10^{-5}$ (13.3)*
Physical Data	
Elongation ASTM D638	175%
Tensile Strength ASTM D638 (MPa)	2500 psi (17.2)*
Deformation (1500 psi - 24 hr. RT)	3.38%
Specific Gravity	2.11

A more complete data sheet is available upon request.
**Metric measurements in parentheses.*

Typical Product and Application Description

Products	Applications
• Automatically molded bearings & components • Sleeve, flanged and thrust bearings • Piston Rings • Stamped and formed seals • Extruded shapes • Machined parts • Molded shapes	• Pumps • Mixers • Compressors • Appliances • Chute liners • Insulators • Linear slides • Shaft bearings • Wear bands • Seals

RULON® 1410

Rulon® 1410 is a gold material with excellent elongation and tensile strength suitable for flip seal and other flexible sealing applications. Coupled with low frictional characteristics, it offers the added benefit of energy savings and/or increased sealing efficiency.

This material is also resistant to most harsh chemicals. It is also compatible with many commercially available lubricants for additional reduction in torque.

It can also be used as a liner material for substrates requiring any of the above characteristics.

Typical Product and Application Description

Products	Applications
• Automatically molded bearings & components • Sleeve, flanged and thrust bearings • Piston rings & flip seals • Stamped and formed seals • Extruded shapes • Machined parts • Molded shapes	• AC Compressors • Transmissions • Air Compressors • Appliances • Automotive • Linear slides • Fluid transfer systems • Vacuum pumps • Valves

Design Criteria Rulon 1410

Temperature - Typical Range °F (°C)		-400/+550 (-240/288)
Maximum PV (continuous)(MPa•m/s)		7.500 (0.26)*
Maximum P - psi (static)(MPa)		750 (5.2)*
Maximum V -SFM (no load)(m/s)		400 (2)*
Shaft Hardness - Minimum		Rb25
Shaft finish recommended Ra (µ"/µm)		8 - 16 (0.2-0.4)*
Shaft Material		Stainless to Hardened Steel & cast iron
Engineering Information		
Friction - static & dynamic		.10 - .20
Flammability ASTM D635		Non-Flammable
Chemical Resistance		Data Available
Thermal Conductivity BTU/hr/sq. ft./°F/in.		1.8
Linear Coefficient of Thermal Expansion	(78°-200°F)	Diameter $7.1x10^{-5}$ (12.8)*
	(26° -93°C)	Length $7.1x10^{-5}$ (12.8)*
	(78°-300°F)	Diameter $7.5x10^{-5}$ (13.5)*
	(26°-149°C)	Length $7.5x10^{-5}$ (13.5)*
	(78°-500°F)	Diameter $8.6x10^{-5}$ (15.5)*
	(26°-260°C)	Length $8.6x10^{-5}$ (15.5)*
Physical Data		
Elongation ASTM D638		210%
Tensile Strength ASTM D638(MPa)		2150 psi (14.8)*
Specific Gravity		2.20

A more complete data sheet is available upon request.
**Metric measurements in parentheses*

RULON® 1439

Rulon® 1439 is a white FDA compliant material that is suitable for immersed service with better wear characteristics than most other PTFE compounds. Its color makes it aesthetically pleasing for food and pharmaceutical applications.

This material is also resistant to many harsh chemicals found in the application environments where it is typically used. It is compatible with most commercially available lubricants for additional reduction in friction.

Its properties allow it to be effectively utilized as a bearing or sliding surface.

Design Criteria Rulon 1439

Temperature - Typical Range °F (°C)	-400/+550 (-240/288)
Maximum PV (continuous)(MPa•m/s)	10,000 (0.35)*
Maximum P - psi (static)(MPa)	1,000 (6.9)*
Maximum V -SFM (no load)(m/s)	400 (2)*
Shaft Hardness - Minimum	Rb25
Shaft finish recommended Ra (µ"/µm)	8 - 16 (0.2-0.4)*
Shaft Material	Stainless to Hardened Steel
Engineering Information	
Friction - static & dynamic	.15 - .25
Flammability ASTM D635	Non-Flammable
Chemical Resistance	Good
Physical Data	
Elongation ASTM D638	190%
Tensile Strength ASTM D638(MPa)	1875 psi (12.9)*
Specific Gravity	2.60

A more complete data sheet is available upon request.
**Metric measurements in parentheses*

Typical Product and Application Description

Products	Applications
• Automatically molded bearings & components • Sleeve, flanged and thrust bearings • Piston Rings • Stamped and formed seals • Extruded shapes • Machined parts • Molded shapes	• Transmissions • Air Compressors • Appliances • Pillow Blocks • Linear slides • Fluid transfer systems • Vacuum Pumps • Valves • Food Processing Equipment

Rulon® Products

Bearings	Applications
• Wide range of Materials • Various mating surfaces • Food and pharmaceutical • Chemical resistance • Standard sizes available	• Mixers • Pumps • Compressors • Ovens, Toasters

Piston Cups & Flip Seals	Applications
• Wide range of Materials • Various mating surfaces • Long life materials • Chemical resistance • Economical alternative	• Fuel Metering Pumps • AC Compressors • Oxygen Compressors • Automotive Transmissions • Pneumatic Tools

Formed Seals	Applications
• Low friction • Various surface compatability • Long life materials • Chemical resistance • Consistent hysteresis	• TPS shaft seals • Emmissions Controls • Dust Seals • Automotive • Medical Pumps

Piston/Seal Rings	Applications
• Molded or machined • Solid or custom joints • Long life materials • Chemical resistance • Low friction	• Pumps • Transmissions • Face seals • Automotive • Medical Pumps

Wear Components	Applications
• Low friction • Painted and plastic surfaces • Long life materials • Chemical resistance • High volume manufacturing	• Mixers • Pumps • Compressors • Ovens, Toasters