Omniseal Solutions
SAINT-GOBAIN

RULON®

PTFE-FILLED FLUOROPOLYMER MATERIALS

BEYOND
the boundaries of possible

SAINT-GOBAIN

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.

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 1970s and 80s 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 Saint-Gobain Performance Plastics, with Saint-Gobain Seals being one of their business units. In 2021, Saint-Gobain Seals was rebranded to Omniseal Solutions™, combining decades of experience and leadership in not only polymer seals, bearings and components but also metal seals and composites.

The Rulon® trademark was 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® AR	Maroon material for seals and applications requiring higher physical properties than Rulon LR
· 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/USDA/USP Class VI compliant material for most mating surfaces
· Rulon® W2	Excellent for fresh water applications
· Rulon® 123	FDA/USDA 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® 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/USDA compliant material with low frictional characteristics and excellent chemical resistance for most mating surfaces
· Rulon® 1410	Gold colored material for use in applications requiring high elongation
· Rulon® 1439	White FDA/USDA 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

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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 Seals' 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 Seals' 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 Saint-Gobain Seals can assist you in the design. Please send email to sealsmarketing@saint-gobain.com. 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 (3.05m) 3" (76.2mm) Max O.D.

Molded – Up to 12" long (304.8mm) 47" (1,193.8mm) Max O.D.

Precision grinding or machining available for some sizes

Sheet & Tape

Tape – 38" (965.2mm) width* Skived Up to 0.25" (6.35mm) thick

Molded – Up to 24"x3" (609.6mm x 76.2mm) thick Max thickness 3" (76.2mm)

Precision grinding or machining available on thickness

*Other sizes available upon request

Custom

Contact District Sales Manager

Full machining capabilities available

Materials Selection Guide

Rulon® Grades	Grade	**AR**	**LR**	**J**	**641**	**W2**	**123**	**488**
	Color	Maroon	Maroon	Gold	White	Black	Black	Turquoise
Performance	Max Load "P" (psi) MPa	**1,000 6.9**	**1,000 6.9**	**750 5.2**	**1,000 6.9**	**1,000 6.9**	**1,000 6.9**	**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**
	Max "PV" (psi-fpm) (MPa • m/s)	**10,000 0.35**	**10,000 0.35**	**7,500 0.26**	**10,000 0.35**	**10,000 0.35**	**10,000 0.35**	**10,000 0.35**
Mating Surface Steel & Stainless Steel	Rb 25 & higher			**X**	**X**	**X**	**X**	**X**
	Rc 35 & higher	**X**	**X**					
	Painted metal and porcelain							
	Aluminum							
Environment	FDA/USDA compliant						**X**	
	Steam	**X**	**X**			**X**	**X**	**X**
	Wet	**X**	**X**		**X**	**X**	**X**	**X**
	Dry	**X**	**X**	**X**	**X**	**X**	**X**	**X**
	Vacuum	**X**	**X**	**X**	**X**			**X**
Relative Rating 1 = Low, 5 = High	Coefficient of friction	4	4	1	1	2	2	3
	Creep resistance	3	4	3	4	4	4	4
	Insulative properties (Elec & Temp)	Yes	Yes	Yes	No	No	Yes	Yes
Comments		Standard Rulon® seal material with higher physical properties.	Standard Rulon® bearing grade. High creep & abrasion resistance.	Lowest coefficent 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.

The list above is only a partial list of available formulations of Rulon®.
P or V data may be exceeded based on specific application requirements. Ask to speak to an 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.
Omniseal Solutions™ offers enhanced Rulon® grades, which minimize this effect.
Most Rulon® products have excellent chemical compatability. Data available upon request.

Materials Selection Guide

Rulon® Grades	Grade	**957**	**XL**	**142**	**945**	**1045**	**1337**	**1410**	**1439**
	Color	Green	Tan	Turquoise	Black	Gold	Tan	Gold	White
Performance	Max Load "P" (psi) MPa	**1,000 6.9**	**1,200 8.3**	**1,000 6.9**	**1,000 8.3**	**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**
	Max "PV" (psi-fpm) (MPa · m/s)	**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**
	Rc **35** & higher			**X**	**X**				
	Painted metal and porcelain	**X**							
	Aluminum		**X**						
Environment	FDA/USDA compliant						**X**		**X**
	Steam	**X**	**X**	**X**	**X**		**X**	**X**	**X**
	Wet	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**
	Dry	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**
	Vacuum	**X**	**X**	**X**		**X**	**X**	**X**	**X**
Relative Rating 1 = Low, 5 = High	Coefficient of friction	**2**	**1**	**2**	**4**	**1**	**1**	**1**	**3**
	Creep resistance	**4**	**4**	**5**	**5**	**2**	**2**	**2**	**4**
	Insulative properties (Elec & Temp)	Yes	Yes	No	No	Yes	Yes	Yes	Yes
Comments		Low friction/ wear against coated metal or porcelain surfaces.	The best Rulon® against aluminum surfaces.	Extensively used in machine tool guide ways.	Extremely low deformation under load, and high impact resistance.	A standard material for compressor piston flip seals.	FDA compliant; excellent chemical resistance.	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 or 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® AR

Rulon® AR is a light maroon colored material best known as the current version of the first Rulon® introduced, namely Rulon® A.

It is somewhat more flexible than Rulon® LR, hence suitable for seals and bonded coating of slide surfaces. It has many decades of use in automotive shaft seals and fuel metering pump cups.

Rulon® AR has a practically universal chemical inertness like that of Rulon® LR and provides long life and reliabiltiy in continuous non-lubricated service.

It is capable of operating at PV values up to approximately 10,000. Higher PV values are possible for intermittent use applications.

Design Criteria Rulon® AR

Temperature - Typical Range ˚F (˚C)	-400/+550 (-240/+288)*
Maximum PV (continuous)(MPa•m/s)	10,000 (0.35)*
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 µin(µm)	8 - 16 (0.2-0.4)*
Shaft Material	Steel
Engineering Information	
Friction - static & dynamic	0.15 - 0.25
Water Absorption ASTM D570	0%
Flammability ASTM D635	Non-Flammable
Chemical Resistance	Inert
Thermal Conductivity BTU/hr/sq. ft./˚F/in. (W/m•K)	2.3 (0.33)*
Linear Coefficient of Thermal Expansion 78˚ - 300˚F (26° to 149 °C) x 10 -5 in/in °F (x 10 -5 m/m °C)	Diameter 4.8 (8.6)* Length 6.2 (11.1)*
Physical Data	
Elongation ASTM D4894	175%
Tensile Strength ASTM D4894 (MPa)	2000 psi (13.8)*
Deformation ASTM D621	5% (1500 psi - 24 hr. RT)
Specific Gravity ASTM D792	2.22

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

Typical Product and Application Description

Products	Applications
• Automatically molded bearings & components • Skived sheet • Piston/Piston rings • Stamped/Machined formed seals • Extruded shapes • Machined parts • Molded shapes	• Pumps • Mixers • Compressors • Appliances • Automotive • Insulators • Linear slides • Pipe support • Wear bands

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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® LR 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.

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 · Textile Industry

Design Criteria Rulon® LR

Temperature - Typical Range ˚F (˚C)	-400/+550 (-240/+288)*
Maximum PV (continuous)(MPa·m/s)	
Maximum P - psi (static)(MPa)	1,000 (6.9)*
Maximum V -SFM (no load)(m/s)	
Shaft Hardness - Minimum	Rc35
Shaft finish recommended Ra µin(µm)	
Shaft Material	Steel
Engineering Information	
Friction - static & dynamic	0.15 - 0.25
Water Absorption ASTM D570	0%
Flammability ASTM D635	Non-Flammable
Chemical Resistance	Inert
Thermal Conductivity BTU/hr/sq. ft./˚F/in. (W/m·K)	2.3 (0.33)*
Linear Coefficient of Thermal Expansion (78˚ to 300˚F (26˚ to 149˚C) x 10 -5 in/in °F (x 10 -5 m/m °C)	Diameter 5.1 (9.2)* Length 5.9 (10.6)*
Physical Data	
Elongation ASTM D4894	150%
Tensile Strength ASTM D4894 (MPa)	
Deformation ASTM D621	3% (1500 psi - 24 hr. RT)
Specific Gravity ASTM D792	

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

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.

Design Criteria Rulon® J

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 µin(µm)	8 - 16 (0.2-0.4)*
Shaft Material	316 Stainless Steel and Non-Ferrous
Engineering Information	
Friction - static & dynamic	0.12 - 0.20
Water Absorption ASTM D570	0%
Flammability ASTM D635	Non-Flammable
Chemical Resistance	Data Available
Thermal Conductivity BTU/hr/sq. ft./˚F/in. (W/m·K)	1.7 (0.24)*
Linear Coefficient of Thermal Expansion(26˚ to 149˚C) x 10 -5 in/in °F (x 10 -5 m/m °C)	78˚ to 300˚F Diameter 5.2 (9.3)* Length 6.8 (12.2)*
Physical Data	
Elongation ASTM D4894	180%
Tensile Strength ASTM D4894 (MPa)	2000 psi (13.8)*
Deformation ASTM D621	3% (1500 psi - 24 hr. RT)
Specific Gravity ASTM D792	1.95

A more complete data sheet is available upon request.
**Metric data 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	· Printers · Copiers · Air Compressors · Appliances · Automotive · Insulators · Linear slides · Anemometers · Wear bands · Solenoid valves · Refrigeration valves · Textile Industry

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RULON® 641

Rulon® 641 is manufactured from FDA and USDA compliant materials possessing excellent load and wear characteristics while meeting the requirements for USP Class VI.

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 (6.9 MPa) 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.

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

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 µin(µm)	8 - 16 (0.2-0.4)*
Shaft Material	Mild, 303 & 316 Stainless Steel
Engineering Information	
Friction - static & dynamic	0.10 - 0.30
Water Absorption ASTM D570	0%
Flammability ASTM D635	Non-Flammable
Chemical Resistance	Inert
Thermal Conductivity BTU/hr/sq. ft./˚F/in. (W/m·K)	2.6 (0.37)*
Linear Coefficient of Thermal Expansion (78˚ to 300˚F (26˚ to 149˚C) x 10 -5 in/in °F (x 10 -5 m/m °C)	Diameter 4.2 (7.5)* Length 5.7 (10.2)*
Physical Data	
Elongation ASTM D4894	175%
Tensile Strength ASTM D4894 (MPa)	2000 psi (13.8)*
Deformation ASTM D621	4% (1500 psi - 24 hr. RT)
Specific Gravity ASTM D792	2.25

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

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.

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.

Design Criteria Rulon® W2

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 µin(µm)	8 - 16 (0.2-0.4)*
Shaft Material	Hard, mild and stainless steels
Engineering Information	
Friction - static & dynamic	0.15 - 0.30
Water Absorption ASTM D570	0%
Flammability ASTM D635	Non-Flammable
Chemical Resistance	Inert
Thermal Conductivity BTU/hr/sq. ft./˚F/in. (W/m·K)	4.5 (0.65)*
Linear Coefficient of Thermal Expansion (78˚ to 500˚F (26˚ to 260˚C) x 10 -5 in/in °F (x 10 -5 m/m °C)	Diameter 6.2 (11.1)* Length 8.6 (15.4)*
Physical Data	
Elongation ASTM D4894	70%
Tensile Strength ASTM D4894 (MPa)	1800 psi (12.4)*
Deformation ASTM D621	3% (1500 psi - 24 hr. RT)
Specific Gravity ASTM D792	2.10

A more complete data sheet is available upon request.
**Metric data 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 · Fresh water submerged · Thrust bearings · Plating tanks · Wear bands · Ovens

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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 and USDA 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 (288˚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.

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 · Solenoid valves · TPS shaft seals · EGR valves

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 µin(µm)	8 - 16 (0.2-0.4)
Shaft Material	Steel
Engineering Information	
Friction - static & dynamic	0.10 - 0.30
Water Absorption ASTM D570	0%
Flammability ASTM D635	Non-Flammable
Chemical Resistance	Inert
Thermal Conductivity BTU/hr/sq. ft./˚F/in. (W/m·K)	4.6 (0.66)*
Linear Coefficient of Thermal Expansion 78˚ to 200˚F (26˚ to 93˚C) x 10 -5 in/in °F (x 10 -5 m/m °C)	Diameter 4.4 (7.9)* Length 7.0 (12.6)*
Physical Data	
Elongation ASTM D4894	**150%**
Tensile Strength ASTM D4894 (MPa)	2500 psi (17.2)*
Deformation ASTM D621	2.5% (1500 psi - 24 hr. RT)
Specific Gravity ASTM D792	**2.12**

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

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.

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 µin(µm)	8 - 16 (0.2-0.4)*
Shaft Material	Hard, mild and stainless steels
Engineering Information	
Friction - static & dynamic	0.10 - 0.30
Water Absorption ASTM D570	0%
Flammability ASTM D635	Non-Flammable
Chemical Resistance	Inert
Thermal Conductivity BTU/hr/sq. ft./˚F/in. (W/m·K)	2.6 (0.37)*
Linear Coefficient of Thermal Expansion(26˚ to 149˚C) x 10 -5 in/in °F (x 10 -5 m/m °C)	78˚ to 300˚F Diameter 4.2 (7.5)* Length 5.7 (10.2)*
Physical Data	
Elongation ASTM D4894	**175%**
Tensile Strength ASTM D4894 (MPa)	2000 psi (13.8)*
Deformation ASTM D621	4% (1500 psi - 24 hr. RT)
Specific Gravity ASTM D792	**2.25**

A more complete data sheet is available upon request.
**Metric data 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 support · Wear bands

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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.

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

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 µin(µm)	8 - 16 (0.2-0.4)
Shaft Material	Hard, Mild and Stainless Steel and Porcelain coated
Engineering Information	
Friction - static & dynamic (Dynamic, 20 psi, 360 sfm)	0.13
Water Absorption ASTM D570	0%
Flammability ASTM D635	Non-Flammable
Chemical Resistance	Data Available
Physical Data	
Elongation ASTM D4894	200%
Tensile Strength ASTM D4894 (MPa)	2200 psi (15.2)*
Specific Gravity ASTM D792	1.96

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

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.

Design Criteria Rulon® XL

Temperature - Typical Range ˚F (˚C)	-400/+550 (-240/+288)
Maximum PV (continuous)(MPa·m/s)	10,000 (0.35)*
Maximum P - psi (static)(MPa)	1,200 (8.3)*
Maximum V -SFM (no load)(m/s)	400 (2)*
Shaft Hardness - Minimum	Rb25
Shaft finish recommended Ra µin(µm)	8 - 16 (0.2-0.4)*
Shaft Material	All Steels and aluminum
Engineering Information	
Friction - static & dynamic	0.10 - 0.25
Water Absorption ASTM D570	0%
Flammability ASTM D635	Non-Flammable
Chemical Resistance	Inert
Thermal Conductivity BTU/hr/sq. ft./˚F/in. (W/m·K)	1.7 (0.24)*
Linear Coefficient of Thermal Expansion 78˚ to 400˚F (26˚ to 204˚C) x 10 -5 in/in °F (x 10 -5 m/m °C)	Diameter 6.4 (11.5)* Length 6.8 (12.2)*
Physical Data	
Elongation ASTM D4894	160%
Tensile Strength ASTM D4894 (MPa)	1700 psi (11.7)*
Deformation ASTM D621	1.4% (1500 psi - 24 hr. RT)
Specific Gravity ASTM D792	1.97

A more complete data sheet is available upon request.
**Metric data 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	· Vacuum Pumps · Mixers · Compressors · Appliances · Automotive · Insulators · Linear slides · Shaft support · Wear bands

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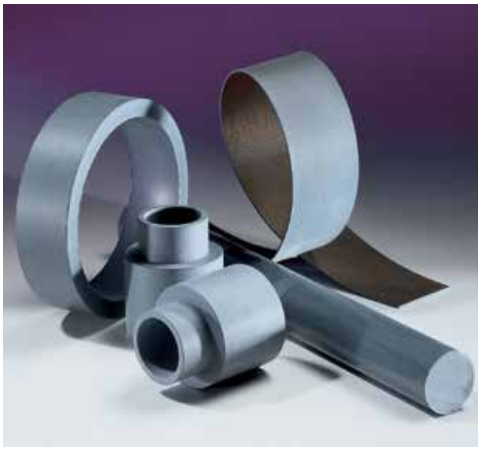
RULON® 142

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.



Design Criteria Rulon® 142

Temperature - Typical Range ˚F (˚C)	-400/+550 (-240/+288)
Maximum PV (continuous)(MPa•m/s)	10,000 (0.35)* 25,000 (0.88)*
Maximum (continuous bonded)	
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 µin(µm)	8 - 16 (0.2-0.4)*
Shaft Material	Mild/Hardened Steel
Engineering Information	
Friction - static & dynamic	0.025 with oil
Flammability ASTM D635	Non-Flammable
Chemical Resistance	Data Available
Thermal Conductivity BTU/hr/sq. ft./˚F/in. (W/m·K)	4.8 (0.69)*
Linear Coefficient of Thermal Expansion (78˚ to 200˚F (26˚ to 93˚C) x 10 -5 in/in °F (x 10 -5 m/m °C)	Length 4.9 (8.8)*
Physical Data	
Elongation ASTM D4894	200% mold direction
Tensile Strength ASTM D4894 (MPa)	3100 psi (21.4)*
Deformation ASTM D621	3% (1500 psi - 24 hr. RT)
Specific Gravity ASTM D792	3.11

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

Typical Product and Application Description

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

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.

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

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)	1,200 (8.3)*
Maximum V -SFM (no load)(m/s)	400 (2)*
Shaft Hardness - Minimum	Rc35
Shaft finish recommended Ra µin(µm)	8 - 16 (0.2-0.4)*
Shaft Material	Steel
Engineering Information	
Friction - static & dynamic	0.20 - 0.35
Flammability ASTM D635	Non-Flammable
Chemical Resistance	Data Available
Linear Coefficient of Thermal Expansion (78˚ to 400˚F (26˚ to 204˚C) x 10 -5 in/in °F (x 10 -5 m/m °C)	Diameter 2.8 (5.0)* Length 7.1 (12.7)*
Physical Data	
Elongation ASTM D4894	20%
Tensile Strength ASTM D4894 (MPa)	3000 psi (20.7)*
Deformation Astm D621	0.7% (1500 psi - 24 hr. RT)
	1.4% (2000 psi - 24 hr .RT)
Specific Gravity ASTM D792	1.90

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

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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.

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 µin(µm)	8 - 16 (0.2-0.4)*
Shaft Material	Stainless to Hardened Steel
Engineering Information	
Friction - static & dynamic	0.10 - 0.20
Flammability ASTM D635	Non-Flammable
Chemical Resistance	Data available
Linear Coefficient of Thermal Expansion (26˚ to 93˚C) x 10 -5 in/in °F (x 10 -5 m/m °C)	78˚ to 200˚F Diameter 5.2 (9.3)* Length 6.8 (12.2)*
Physical Data	
Elongation ASTM D4894	450%
Tensile Strength ASTM D4894 (MPa)	3900 psi (26.9)*
Specific Gravity ASTM D792	2.11

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

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

RULON® 1337

Rulon® 1337 is a tan material made entirely from FDA and USDA 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.

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

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 µin(µm) Shaft Material	8 - 16 (0.2 - 0.4)* Stainless to Hardened Steel
Engineering Information	
Friction - static & dynamic	0.10 - 0.20
Flammability ASTM D635	Non-Flammable
Chemical Resistance	Data Available
Linear Coefficient of Thermal Expansion (x 10 -5 in/in °F (x 10 -5 m/m °C)	78° to 400°F (26° to 204°C) Diameter 6.1 (10.9)* Length 7.4 (13.3)*
Physical Data	
Elongation ASTM D4894	175%
Tensile Strength ASTM D4894 (MPa)	2500 psi (17.2)*
Deformation ASTM D621	3.38% (1500 psi - 24 hr. RT)
Specific Gravity ASTM D792	1.95

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

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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.

Design Criteria Rulon® 1410

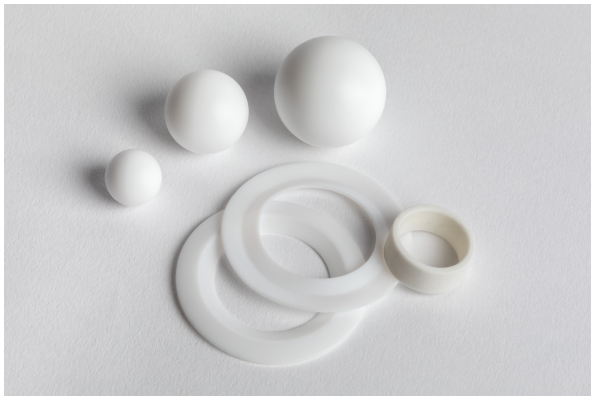
Temperature - Typical Range ˚F (˚C)	-400/+550 (-240/+288)
Maximum PV (continuous)(MPa•m/s)	7,500 (0.26)*
Maximum P - psi (static)(MPa)	750 (5.2)*
Maximum V -SFM (no load)(m/s)	400 (2)*
Shaft Hardness - Minimum	Rb25
Shaft finish recommended Ra µin(µm)	8 - 16 (0.2-0.4)*
Shaft Material	Stainless to Hardened Steel & cast iron
Engineering Information	
Friction - static & dynamic	0.10 - 0.20
Flammability ASTM D635	Non-Flammable
Chemical Resistance	Data Available
Linear Coefficient of Thermal Expansion (78˚ to 500˚F (26˚ to 260˚C) x 10 -5 in/in °F (x 10 -5 m/m °C)	Length 8.6 (15.4)*
Physical Data	
Elongation ASTM D4894	210%
Tensile Strength ASTM D64894 (MPa)	2150 psi (14.8)*
Specific Gravity ASTM D792	2.20

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

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

RULON® 1439



Rulon® 1439 is a white FDA and USDA 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.

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

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 µin(µm)	8 - 16 (0.2-0.4)*
Shaft Material	Stainless to Hardened Steel
Engineering Information	
Friction - static & dynamic	0.15 - 0.25
Flammability ASTM D635	Non-Flammable
Chemical Resistance	Data Available
Linear Coefficient of Thermal Expansion (78° to 400°F (26° to 204°C) x 10 -5 in/in °F (x 10 -5 m/m °C)	Diameter 4.8 (8.6)* Length 5.7 (10.2)*
Physical Data	
Elongation ASTM D4894	190%
Tensile Strength ASTM D4894 (MPa)	1800 psi (12.4)*
Deformation ASTM 621	2% (1500 psi - 24 hr. RT)
Specific Gravity ASTM D792	2.60

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

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RULON® SOLUTIONS

Typical Product and Application Description

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

Typical Product and Application Description

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

RULON® PRODUCTS

Typical Product and Application Description

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 · Refrigeration valves

Typical Product and Application Description

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 · Solenoid valves · Air Compressors

Typical Product and Application Description

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

Notes

Notes

Omniseal Solutions™
Application Inquiry Data Form

Customer Information	
Company:	
Street:	
City, St, Zip:	
Engineering Contact:	Fax Number:
Telephone Number:	
Purchasing Contact:	Fax Number:
Telephone Number:	

Action Required		Date Needed	Quotation Generalities	
Material Recommendation	☐		Quote Production	
Provide Tech Data on Material	☐		Quantities of:	
Part Design Recommendation	☐		Send Quote to:	
Produce prototypes	☐		Quote Due Date:	

Production Information (Attach Drawing or Sketch if Available)					
Design:	☐ New	☐ Existing	Bearing* Size (Units):	☐ In.	☐ mm.
			*For non bearing application, attach drawing		
If Existing:					
Type/Brand:		ID:		OD:	
Material:		Length:		Flange OD:	
Part/Drawing #:		Flange Thickness:			
Describe End Uses:		Other Dimensions:			

Desired Characteristics:

Other Comments:

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Application Inquiry Data Form

Part Installation

Press Fit on OD:	☐
Shrink Fit on ID:	☐
Mechanical Means:	☐
Slip Fit:	☐
Bonding:	☐
Other (list):	☐

Shaft Specifications

Diameter (& Tolerance):	
Material Type:	
Surface Finish:	
Hardness:	

Housing Specifications

Diameter (& Tolerance):	
Material Type:	
Length (& Tolerance):	

Temperature

Typical:	˚F ☐	˚C ☐
Maximum:	˚F ☐	˚C ☐
Duration:	Min. ☐	Hrs. ☐
Minimum:	˚F ☐	˚C ☐
Duration:	Min. ☐	Hrs. ☐

Load

Radial ☐ Thrust ☐

Units: lb ☐ psi ☐ N/mm² ☐ Other: ☐

Cantilevered ☐ Impact ☐

Typical:	
Maximum:	
Duration:	
Minimum:	
Duration:	

Velocity

Units:	rpm ☐	ft/min ☐	m/sec ☐
Linear/Stroke Length:			
Number of Strokes/Min:			
Rotary:			
Degree of Oscillation:			
Number of Cycles/Min:			
Other:			
Running Surface:	ID ☐	OD ☐	Face ☐

Environment

Dry ☐ Water ☐ Lubricated ☐

Clean ☐ Dirt ☐ Vacuum ☐

Chemicals: Specify

Gases: Specify

Oil: (Type)

Service Life

Current:	
Desired:	

Production Validation

Bench:	
Field:	
Both:	

Product Testing

Test Start Date:	
Test Duration:	

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Other Omniseal Solutions™ Lines

Omniseal® critical parts are engineered for sealing control. The spring-energized polymer seals are designed for high static pressures and the metal-cased polymer lip seals are designed for high rotational speeds.

Meldin® critical parts are engineered for tolerance control. The thermoplastic components are injection molded and the polyimide materials have no melting point and can handle extreme temperatures.

A Global Network of Expertise and Service

Manufacturing and sales locations Sales only locations R&D Centers

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