RPM INDUSTRIAL RUBBER PARTS

TECHNICAL INFORMATION AND REFERENCE

RUBBER TECHNICAL REFERENCE

Classification System for Elastomeric Materials

EXAMPLE: 2BA610 A14 C12 L14
While not a part of the specification itself, the following chart presents the assigned material prefix letters and the polymer such prefix would normally call out. This is the conversion equivalent applicable under:

D-2000 and J-200	D-735 and J-14
AA — Natural, SBR, Butyl, Isoprene	R
AK — Polysulphide	SA
BA — Ethylene-Propylene, Heat Resistant SBR and Butyl	—
BC — Chloroprene-Neoprene	SC
BE — Chloroprene-Neoprene (lower oil swell and comp. set)	—
BF — Nitrile — E14-E34 Requirements	—
BG — Nitrile — E51-E61 Requirements	SB
BK — Organic Dihalide (Thiokol)	SA
CA — Ethylene-Propylene	—
CE — Chlorosulfanated Polyethylene (Hypalon)	—
CH — Nitrile	—
DF — Polyacrilic (Butyl-Acrylate Type)	—
DH — Polyacrilic	TB
FC — Silicone	TA
FE — Silicone	—
FK — Fluorinated Silicone	—

1ST DESIGNATE (2)
Grade number — used to designate supplemental requirements beyond the basic call out. Your supplier can develop this.

2ND DESIGNATE (B)
Indicative of heat resistant requirements at which polymer shall be tested.

BASIC REQUIREMENTS FOR ESTABLISHING TYPE BY TEMPERATURE

Type	Test Temperature °C	°F
A	70	158
B	100	212
C	125	257
D	150	302
E	175	347
F	200	392
G	225	437
H	250	482
J	275	527

3RD DESIGNATE (A)
Indicative of degree of oil resistance as measured by volume swell under test procedures.

BASIC REQUIREMENTS FOR ESTABLISHING CLASS BY VOLUME SWELL

Class	Volume Swell, Max. %
A	No requirement
B	140
C	120
D	100
E	80
F	60
G	40
H	30
J	20
K	10

4th DESIGNATE (6)
Indicative of hardness required, as 60 ± 5 Shore “A”.

Classification System for Elastomeric Materials

5TH AND 6TH DESIGNATE (1 & 0)

5TH AND 6TH DESIGNATE (1 & 0) Indicative of tensile strength required, as 1,000 PSI written in hundreds of PSI.

7TH DESIGNATE

The suffix letters (A, C, L) indicate supplemental requirements for particular applications that set up more rigid test procedures — beyond the basic call out.

MEANING OF SUFFIX LETTERS

SUFFIX	TEST REQUIRED
A	Heat Resistance
B	Compression Set
C	Ozone or Weather Resistance
D	Compression Deflection Resistance
E	Fluid Resistance
F	Low Temperature Resistance
G	Tear Resistance
H	Flex Resistance
J	Abrasion Resistance
K	Adhesion
L	Water Resistance
M	Flammability Resistance
N	Impact Resistance
P	Staining Resistance
R	Resilience
Z	Any special requirement to be specified in detail

8TH DESIGNATE

The suffix numbers (14, 12, 14) indicate the ASTM test method applicable by the first digit.

9TH DESIGNATE

The suffix numbers, (in this case 14, 12, 14) the second digit denotes the temperature at which the test shall be conducted.

FOR SUFFIX LETTERS: A, B, C, E, G, K, L

1 = 73 Deg. F.
2 = 100 Deg. F.
3 = 158 Deg. F.
4 = 212 Deg. F.
5 = 257 Deg. F.
6 = 302 Deg. F.

FOR SUFFIX LETTER: K

4 = Zero Deg. F.
5 = Minus 13 Deg. F.
6 = Minus 31 Deg. F.
7 = Minus 40 Deg. F.
8 = Minus 58 Deg. F.
9 = Minus 67 Deg. F.
10 = Minus 85 Deg. F.
11 = Minus 103 Deg. F.

Tolerance Tables
Cross Sectional Tolerances for Group 1 — Compounds Only

Dimension (Inches) Above - Incl.	Tolerance	Dimension (Inches) (Fractions)	Dimension (Millimeters) Above - Incl.	Tolerance
HIGH PRECISION RMA — CLASS A — DWG DESIGNATION A				
0.00 - 0.10*	±.008	(0 - 3/32)	0.0 - 2.5*	±0.20
0.10 - 0.16	0.010	(3/32 - 5/32)	2.5 - 4.0	0.25
0.16 - 0.25	0.013	(5/32 - 1/4)	4.0 - 6.3	0.32
0.25 - 0.40	0.016	(1/4 - 13/32)	6.3 - 10.0	0.40
0.40 - 0.63	0.020	(13/32 - 5/8)	10.0 - 16.0	0.50
0.63 - 1.00	0.025	(5/8 - 1)	16.0 - 25.0	0.63
Use ± 2-1/4% for dimensions over 1.00 inch				
PRECISION RMA — CLASS 1 — DWG DESIGNATION A1				
0.00 - 0.10*	±.010	(0 - 3/32)	0.0 - 2.5*	±0.25
0.10 - 0.16	0.013	(3/32 - 5/32)	2.5 - 4.0	0.32
0.16 - 0.25	0.016	(5/32 - 1/4)	4.0 - 6.3	0.40
0.25 - 0.40	0.020	(1/4 - 13/32)	6.3 - 10.0	0.50
0.40 - 0.63	0.025	(13/32 - 5/8)	10.0 - 16.0	0.63
0.63 - 1.00	0.032	(5/8 - 1)	16.0 - 25.0	0.80
Use ± 2-3/4% for dimensions over 1.00 inch				
COMMERCIAL RMA — CLASS 2 — DWG DESIGNATION A2				
0.00 - 0.10*	±.013	(0 - 3/32)	0.0 - 2.5*	±0.32
0.10 - 0.16	0.016	(3/32 - 5/32)	2.5 - 4.0	0.40
0.16 - 0.25	0.020	(5/32 - 1/4)	4.0 - 6.3	0.50
0.25 - 0.40	0.025	(1/4 - 13/32)	6.3 - 10.0	0.63
0.40 - 0.63	0.032	(13/32 - 5/8)	10.0 - 16.0	0.80
0.63 - 1.00	0.040	(5/8 - 1)	16.0 - 25.0	1.00
Use ± 3-1/2% for dimensions over 1.00 inch				
NON-CRITICAL RMA — CLASS 3 — DWG DESIGNATION A3				
0.00 - 0.10*	±.016	(0 - 3/32)	0.0 - 2.5*	±0.40
0.10 - 0.16	0.020	(3/32 - 5/32)	2.5 - 4.0	0.50
0.16 - 0.25	0.025	(5/32 - 1/4)	4.0 - 6.3	0.63
0.25 - 0.40	0.032	(1/4 - 13/32)	6.3 - 10.0	0.80
0.40 - 0.63	0.040	(13/32 - 5/8)	10.0 - 16.0	1.00
0.63 - 1.00	0.050	(5/8 - 1)	16.0 - 25.0	1.25
Use ± 4-1/2% for dimensions over 1.00 inch				

*General cross-sectional dimensions below 0.040” (1 mm) are impractical.

Tolerance Tables
Cross Sectional Tolerances for Group 2 — Compounds Only

Dimension (Inches) Above - Incl.	Tolerance	Dimension (Inches) (Fractions)	Dimension (Millimeters) Above - Incl.	Tolerance
HIGH PRECISION RMA — CLASS A — DWG DESIGNATION A				
0.00 - 0.10*	±.010	(0 - 3/32)	0.0 - 2.5*	±0.25
0.10 - 0.16	0.013	(3/32 - 5/32)	2.5 - 4.0	0.32
0.16 - 0.25	0.016	(5/32 - 1/4)	4.0 - 6.3	0.40
0.25 - 0.40	0.020	(1/4 - 13/32)	6.3 - 10.0	0.50
0.40 - 0.63	0.025	(13/32 - 5/8)	10.0 - 16.0	0.63
0.63 - 1.00	0.032	(5/8 - 1)	16.0 - 25.0	0.80
Use ± 2-3/4% for dimensions over 1.00 inch				
PRECISION RMA — CLASS 1 — DWG DESIGNATION A1				
0.00 - 0.10*	±.013	(0 - 3/32)	0.0 - 2.5*	±0.32
0.10 - 0.16	0.016	(3/32 - 5/32)	2.5 - 4.0	0.40
0.16 - 0.25	0.020	(5/32 - 1/4)	4.0 - 6.3	0.50
0.25 - 0.40	0.025	(1/4 - 13/32)	6.3 - 10.0	0.63
0.40 - 0.63	0.030	(13/32 - 5/8)	10.0 - 16.0	0.80
0.63 - 1.00	0.040	(5/8 - 1)	16.0 - 25.0	1.00
Use ± 3-1/2% for dimensions over 1.00 inch				
COMMERCIAL RMA — CLASS 2 — DWG DESIGNATION A2				
0.00 - 0.10*	±.016	(0 - 3/32)	0.0 - 2.5*	±0.40
0.10 - 0.16	0.020	(3/32 - 5/32)	2.5 - 4.0	0.50
0.16 - 0.25	0.025	(5/32 - 1/4)	4.0 - 6.3	0.63
0.25 - 0.40	0.030	(1/4 - 13/32)	6.3 - 10.0	0.80
0.40 - 0.63	0.040	(13/32 - 5/8)	10.0 - 16.0	1.00
0.63 - 1.00	0.050	(5/8 - 1)	16.0 - 25.0	1.25
Use ± 4-1/2% for dimensions over 1.00 inch				
NON-CRITICAL RMA — CLASS 3 — DWG DESIGNATION A3				
0.00 - 0.10*	±.020	(0 - 3/32)	0.0 - 2.5*	±0.50
0.10 - 0.16	0.025	(3/32 - 5/32)	2.5 - 4.0	0.63
0.16 - 0.25	0.030	(5/32 - 1/4)	4.0 - 6.3	0.80
0.25 - 0.40	0.040	(1/4 - 13/32)	6.3 - 10.0	1.00
0.40 - 0.63	0.050	(13/32 - 5/8)	10.0 - 16.0	1.25
0.63 - 1.00	0.063	(5/8 - 1)	16.0 - 25.0	1.60
Use ± 5-1/2% for dimensions over 1.00 inch				

*General cross-sectional dimensions below 0.040” (1 mm) are impractical.

Tolerance Tables
Standard Dimensional Tolerance Table — Molded Rubber Products

Dimension (Inches) Above - Incl.	Fixed	Closure	Dimension (Millimeters) Above - Incl.	Fixed	Closure
HIGH PRECISION DWG DESIGNATION A1					
0 - .40	±.004	±.005	0 - 10	±.10	±.13
.40 - .63	.005	.006	10 - 16	.13	.16
.63 - 1.00	.006	.008	16 - 25	.16	.20
1.00 - 1.60	.008	.010	25 - 40	.20	.25
1.60 - 2.50	.010	.013	40 - 63	.25	.32
2.50 - 4.00	.013	.016	63 - 100	.32	.40
4.00 - 6.30	.016	.020	100 - 160	.40	.50
PRECISION DWG DESIGNATION A2					
0 - .40	±.006	±.008	0 - 10	±.16	±.20
.40 - .63	.008	.010	10 - 16	.20	.25
.63 - 1.00	.010	.013	16 - 25	.25	.32
1.00 - 1.60	.013	.016	25 - 40	.32	.40
1.60 - 2.50	.016	.020	40 - 63	.40	.50
2.50 - 4.00	.020	.025	63 - 100	.50	.63
4.00 - 6.30	.025	.032	100 - 160	.63	.80
6.30 & over — To find fixed dimensional tolerances multiply by 0.4%			160 & over — To find fixed dimensional tolerances multiply by 0.4%		

Drawing Designation “A1” is the tightest tolerance classification and indicates a high precision rubber product. Such products require expensive molds, fewer cavities per mold, costly in-process controls and inspection procedures. The exact method of measurement should be agreed upon between rubber manufacturer and customer, as errors in measurement may be large in relation to the tolerance.

Some materials, particularly those requiring post curing, do not lend themselves to Drawing Designation “A1” tolerances.

Drawing Designation “A2” tolerances indicate a precision product. Molds must be precision machined and kept in good repair. Careful inspection will usually be required.

*General cross-sectional dimensions below 0.040” (1 mm) are impractical.

Tolerance Tables
Standard Dimensional Tolerance Table — Molded Rubber Products

Dimension (Inches) Above - Incl.	Fixed	Closure	Dimension (Millimeters) Above - Incl.	Fixed	Closure
COMMERCIAL DWG DESIGNATION A3					
0 - .40	±.008	±.013	0 - 10	±.20	±.32
.40 - .63	.010	.016	10 - 16	.25	.40
.63 - 1.00	.013	.020	16 - 25	.32	.50
1.00 - 1.60	.016	.025	25 - 40	.40	.63
1.60 - 2.50	.020	.032	40 - 63	.50	.80
2.50 - 4.00	.025	.040	63 - 100	.63	1.00
4.00 - 6.30	.032	.050	100 - 160	.80	1.25
6.30 & over — To find fixed dimensional tolerances multiply by 0.5%			160 & over — To find fixed dimensional tolerances multiply by 0.5%		
NON-CRITICAL DWG DESIGNATION A4					
0 - .40	±.013	±.032	0 - 10	±.32	±.80
.40 - .63	.016	.036	10 - 16	.40	.90
.63 - 1.00	.020	.040	16 - 25	.50	1.00
1.00 - 1.60	.025	.045	25 - 40	.63	1.12
1.60 - 2.50	.032	.050	40 - 63	.80	1.25
2.50 - 4.00	.040	.056	63 - 100	1.00	1.40
4.00 - 6.30	.050	.063	100 - 160	1.25	1.60
6.30 & over — To find fixed dimensional tolerances multiply by 0.8%			160 & over — To find fixed dimensional tolerances multiply by 0.8%		

Drawing Designation “A3” tolerances indicate a ”commercial” product and will normally be used for most products.

Drawing Designation “A4” tolerances apply to products where dimensional control is non-critical and secondary to cost.

Materials and Durometers

Material Designation BN
Durometers 40 through 90*

BUNA-N (NITRILE) (NBR)
The standard for most general applications: petroleum base lubricants, hydraulic oils, gasoline, fuels, alcohol, L.P. gases, water and many other media. Temperature Range: -65 to +275° F (-55 to +135° C)

* To specify compound, precede material with Durometer. Example: 70BN

Material Designation EP
Durometers 40 through 90*

ETHYLENE-PROPYLENE (EPDM)
For hot water, steam, acids, alcohols, alkalis, keytones, phosphate esters, brake fluids, drive belts and exposure to oxygen, ozone and weathering. Temperature Range: -67 to+302° F (-55 to +150° C)

* To specify compound, precede material with Durometer. Example: 70EP

Material Designation S
Durometers 40 through 80*

SILICONE
Compatible with a variety of fluids, air, oxygen, ozone and other media for extremes of low and high temperature applications. Temperature Range: -85 to +450° F (-65 to+232° C)

* To specify compound, precede material with Durometer. Example: 70S

Material Designation C
Durometers 40 through 90*

NEOPRENE (CHLOROPRENE) (CR)
Recommended for refrigeration freon gases, carbon dioxide gases, chlorine, ozone, sunlight exposure and for use as drive belts. Temperature Range: -80 to +275° F (-60 to+135° C)

* To specify compound, precede material with Durometer. Example: 70C

Material Designation V
Durometers 60 through 90*

FLUOROCARBON
High temperature toughness, stability and compatibility with a wide range of fluid and chemical types including acids, oils, fuels, solvents and gases. Temperature Range: -31 to +400° F (-35 to +204° C)

* To specify compound, precede material with Durometer. Example: 75V

Material Designation FS
Durometers 60 through 80*

FLUOROSILICONE
Recommended where extreme temperature properties are required. For petroleum oils, fuels and lubricants; synthetic ester and diester lubricants. Temperature Range: -85 to+350° F (-65 to +177° C)

* To specify compound, precede material with Durometer. Example: 70FS

Material Designation T
Durometer 85*

TEFLON
Recommended for end-cap seals on valves, cylinders, filters, test vessels, flanged connections, tube fittings and couplings. Will not twist, chip, swell or shrink, and can be sterilized. Temperature Range: 75° F to 400°F (60° C to 200° C)

* To specify compound, precede material with Durometer. Example: 85T

Fluid Compatibility

The recommendations shown in this table are based on data supplied by polymer manufacturers, and comparison made with similar materials. These are general guidelines only and users must conduct their own functional tests to determine the suitability of any compound for their particular application.

To aid in your selection, materials are ranked in order of increasing cost with Nitriles costing the least and Fluoroelastomers costing the most.

Increasing Cost

R = Recommended M = Marginal U = Unsatisfactory X = Insufficient Data

Fluid	Nitrile	SBR	EPDM	Neoprene	Silicone	Fluoroelastomer
Acetaldehyde	U	U	R	U	R	U
Acetamide	R	U	R	R	M	U
Acetic Acid	M	M	R	R	R	U
Acetone	U	M	R	M	M	U
Acetophenone	U	U	R	U	U	U
Acetylene	R	R	R	R	R	R
Ammonia	R	R	R	R	R	U
Ammonium Hydroxide	R	R	R	R	R	R
Amyl Acetate	U	U	M	U	U	U
Anderol L-774	M	U	U	U	U	R
Antifreeze	R	R	R	R	R	R
Aniline	U	U	R	U	U	M
Aroclors	M	U	R	U	M	R
Askarel	R	U	U	U	U	R
ASTM #1	R	U	U	R	R	R
ASTM #3	R	U	U	U	U	R
ASTM Fuel A	R	U	U	R	U	R
ASTM Fuel B	R	U	U	U	U	R
ASTM Fuel C	R	U	U	U	U	R
ASTM Fuel D	M	U	U	U	U	R
Auto Transmission Fluid	R	U	U	M	M	R
Beer	R	R	R	R	R	R
Benzaldehyde	U	U	R	U	U	U
Benzene	U	U	U	U	U	R
Benzine	R	U	U	R	U	R
Benzoic Acid	U	U	U	U	U	R
Benzophenone	U	U	R	X	U	R
Benzyl Alcohol	U	U	R	R	X	R
Bleach	R	R	R	R	U	R
Borax	R	R	R	U	R	R
Boric Acid	R	R	R	R	R	R
Brake Fluid (non-petro.)	U	R	R	R	R	U
Bromine	U	U	U	U	U	R

Fluid	Nitrile	SBR	EPDM	Neoprene	Silicone	Fluoroelastomer
Bromobenzene	U	U	U	U	U	R
Bunker Oil	R	U	U	U	U	R
Butane	R	M	U	R	U	R
Butter	R	U	M	R	R	R
Butyl Acetate	U	U	U	U	U	U
Butyl Alcohol	R	R	R	R	R	R
Butyl Amine	M	U	U	U	R	U
Butyl Carbitol	U	U	R	M	U	M
Butyl Cellosolve	M	U	R	M	X	U
Butyraidehyde	U	U	R	U	U	U
Carbitol	R	R	R	R	R	R
Carbitol Acetate	U	U	U	U	U	R
Carbon Disulfide	U	U	U	U	U	R
Carbon Tetrachloride	R	U	U	U	U	R
Carbonic Acid	R	R	R	R	R	R
Castor Oil	R	R	R	R	R	R
Cellosolve	U	R	U	U	U	U
Chassis Grease	R	U	U	M	U	R
Chloracetic Acid	U	U	R	U	X	U
Chloracetone	U	U	R	M	U	R
Chlordane	R	U	U	M	U	R
Chlorine	U	U	R	U	X	R
Chlorobenzol	U	U	U	U	U	R
Chloroform	U	U	U	U	U	R
Chlorosulfonic Acid	U	U	U	U	U	U
Chrome Plating Solution	U	U	R	U	R	R
Chromic Acid	U	U	X	U	M	R
Citric Acid	R	R	R	R	R	R
Cod Liver Oil	R	U	U	R	R	R
Coffee	R	R	R	R	R	R
Corn Oil	R	U	U	U	R	R
Creosote	R	U	U	R	U	R
Creosote Oil	R	U	U	M	M	R

Fluid Compatibility

Increasing Cost

R = Recommended M = Marginal U = Unsatisfactory X = Insufficient Data

Fluid	Nitrile	SBR	EPDM	Neoprene	Silicone	Fluoroelastomer
Creosylic Acid	U	U	U	U	U	R
Crude Oil	R	U	U	U	U	R
Cyclohexane	R	U	U	M	U	R
Cyclohexanol	R	U	U	R	U	R
Decalin	U	U	U	U	U	R
Denatured Alcohol	R	R	R	R	R	R
Diacetone	U	U	R	U	U	U
Dibutyl Amine	U	U	U	M	U	U
Dibutyl Phthalate	U	U	R	U	X	M
Dichloro Aniline	U	U	U	U	U	M
Dichloro Butane	R	U	U	U	U	R
Diesel Oil	R	U	U	M	U	R
Diethylamine	R	R	R	R	R	U
Diethyl Benzene	M	U	U	U	X	R
Diethylene Glycol	R	R	R	R	R	R
Dimethyl Ether	U	U	U	M	U	U
Dimethyl Formamide	U	X	R	X	R	U
Dimethyl Phthalate	U	U	R	U	X	R
Dimethyl Terephthalate	U	U	U	U	U	R
Dioctyl Phthalate	U	U	R	U	M	R
Dioxane	U	U	R	U	U	U
Diphenyl	U	U	U	U	U	R
Dow Corning 550	R	R	R	R	R	R
Dow Gard	R	R	R	R	R	R
Dowtherm A & E	U	U	U	U	U	R
Elco 28	R	U	U	M	R	R
Epoxy Resins	X	X	R	R	X	U
Ethane	R	U	U	R	U	R
Ethanol	R	R	R	R	R	R
Ethanolamine	R	R	R	R	R	U
Ether	M	U	M	U	U	U
Ethyl Acetate	U	U	R	U	R	U
Etnyl Benzene	U	U	U	U	U	R
Ethyl Cellulose	R	R	R	R	R	U
Ethyl Chloride	R	R	R	R	U	R
Ethly Ether	M	U	M	U	U	U
Ethyl Formate	U	U	R	R	X	R
Ethyl Hexanol	M	R	R	R	X	R
Ethyl Merlaptan	U	U	X	M	M	R
Ethylene Chloride	U	U	U	U	U	R
Ethylene Oxide	U	U	R	U	U	U
Formaldehyde	M	M	R	M	R	U
Formic Acid	M	R	R	R	M	U
Freon 12	R	R	R	R	U	R

Fluid	Nitrile	SBR	EPDM	Neoprene	Silicone	Fluoroelastomer
Fuel Oil	R	U	U	R	U	R
Fufuryl Alcohol	U	U	R	U	U	X
Furan	U	U	X	U	X	X
Furfural	U	U	R	U	U	U
Fyrquel	U	U	R	U	R	R
Gallic Acid	R	R	R	R	X	R
Gasoline	R	U	U	U	U	R
Gelatin	R	R	R	R	R	R
Glucose	R	R	R	R	R	R
Glycerine	R	R	R	R	R	R
Heptane	R	U	U	R	U	R
Hexaldehyde	U	U	R	R	R	U
Hexane	R	U	U	R	U	R
Hexanol	R	R	M	R	R	R
Home Heating Oil	R	U	U	M	R	R
Hydrazine	R	R	R	R	R	X
Hydrochloric Acid	R	M	R	R	U	R
Hydrocyanic Acid	R	R	R	R	M	R
Hydrogen Peroxide	R	R	R	R	R	R
Hydrogen Sulfide	U	U	R	R	M	U
Hydroquinone	M	U	U	U	X	R
Hypoid Gear Lube	R	U	U	M	M	R
Iodine	R	R	R	U	X	R
Isocyanate	X	X	X	X	X	R
Iso Octane	R	U	U	R	U	R
Isopar	R	X	U	R	U	R
Iso Phorone	U	U	R	U	U	U
Isopropanol	R	R	R	R	R	R
Isopropyl Acetate	U	U	R	U	U	U
JP-4 (MIL-J-5624)	R	U	U	U	U	R
JP-5 (MIL-J-5624)	R	U	U	U	U	R
Kerosine	R	U	U	R	U	R
Lacquers	U	U	U	U	U	U
Lactic Acid	R	R	R	R	X	R
Lard	R	U	R	R	R	R
Linoleic Acid	R	U	U	R	R	R
Linseed Oil	R	U	M	M	R	R
Lye Solutions	R	R	R	R	R	R
Malathion	R	U	U	X	U	R
Maleic Acid	U	U	U	U	X	R
Mercury	R	R	R	R	X	R
Meter-Cresol	U	U	U	R	U	R
Methacrylic Acid	U	U	R	R	U	M
Methane	R	U	U	R	U	R

Fluid Compatibility

Increasing Cost
R = Recommended M = Marginal U = Unsatisfactory X = Insufficient Data

Fluid	Nitrile	SBR	EPDM	Neoprene	Silicone	Fluoroelastomer
Methanol	R	R	R	R	R	U
Methyl Acetate	U	U	R	R	U	U
Methyl Cellosolve	M	U	R	M	U	U
Methylene Chloride	U	U	U	U	U	R
Methyl Ethyl Ketone	U	U	R	U	U	U
Methyl Mercaptan	X	X	R	X	X	X
Milk	R	R	R	R	R	R
Mineral Oil	R	U	M	R	R	R
Mineral Spirits	R	U	U	U	U	R
Monovinyl Acetylene	R	R	R	R	R	R
Mustard	X	R	R	X	R	R
Naphtha	R	U	U	U	U	R
Naphthalene	U	U	U	U	U	R
Naphthenic Acid	R	U	U	U	U	R
Natural Gas	R	R	U	R	R	R
Neatsfoot Oil	R	U	R	U	R	R
Nitric Acid	U	M	R	U	U	M
Nitrobenzene	U	U	U	U	U	R
Nitropropane	U	U	R	U	U	U
Octane	R	U	U	U	U	R
Octanol	R	R	R	R	R	R
Oleic Acid	M	U	U	M	U	R
Oleum	R	U	U	M	U	R
Oronite 8200	R	U	U	R	U	R
Oxalic Acid	R	R	R	R	R	R
Peanut Oil	R	U	M	M	R	R
Pentane	R	M	U	R	U	R
Perchlorethylene	R	U	U	U	U	R
Petroleum Ether	U	U	U	U	U	R
Phenol	U	U	U	U	U	R
Phenylhydrazine	U	M	U	U	X	R
Phosphoric Acid	R	R	R	R	R	R
Pine Oil	R	U	U	U	U	R
Potassium Hydroxide	R	R	R	R	M	U
Propane	R	U	U	R	U	R
Propanol	R	R	R	R	R	R
Propyl Acetate	U	U	R	U	U	U
Pydraul	U	U	R	U	U	R

Fluid	Nitrile	SBR	EPDM	Neoprene	Silicone	Fluoroelastomer
Pyranol	R	U	U	R	U	R
Pyridine	U	R	U	U	U	U
Rapeseed Oil	R	U	R	R	U	R
Resurcinol	X	R	R	X	X	X
SAE10W30	R	U	U	M	R	R
Seawater	R	R	R	R	R	X
Silicone Grease	R	R	R	R	R	R
Silver Nitrate	R	R	R	R	R	R
Skelly Solvent	R	U	U	U	X	R
Skydrol	U	U	R	U	U	R
Skydrol 500	U	U	R	U	U	U
Sodium Hydroxide	R	R	R	R	U	R
Sovasol	R	U	U	R	R	R
Soy Bean Oil	R	U	M	M	R	X
Stearic Acid	R	R	R	R	X	X
Stoddard Solvent	R	U	U	R	R	R
Sucrose	R	R	R	R	U	U
Sulfuric Acid	R	R	R	R	R	U
Tall Oil	R	U	U	M	R	U
Tannic Acid	R	R	R	R	U	X
Tar	R	U	U	M	U	X
Tartaric Acid	R	R	R	R	X	X
Tetrachloro Ethane	U	U	U	U	U	U
Tetralin	U	U	U	U	U	U
Tidewater Oil	R	U	U	R	R	R
Toluene	U	U	U	U	U	U
Trichloro Ethylene	M	U	U	U	U	U
Triethanol Amine	M	R	R	R	U	U
Turbine Oil	R	U	U	U	R	R
Turpentine	R	U	U	U	R	U
UCDN 50HB280X	R	R	R	R	X	X
Univis J-43	R	U	U	R	R	R
Varnish	R	U	U	U	U	M
Vinegar	R	R	R	R	U	U
Water	R	R	R	R	U	U
Wheat Germ Oil	R	U	U	M	R	R
Whiskey & Wine	R	R	R	R	U	U
Wood Oil	R	U	U	R	X	M

Comparison of Properties

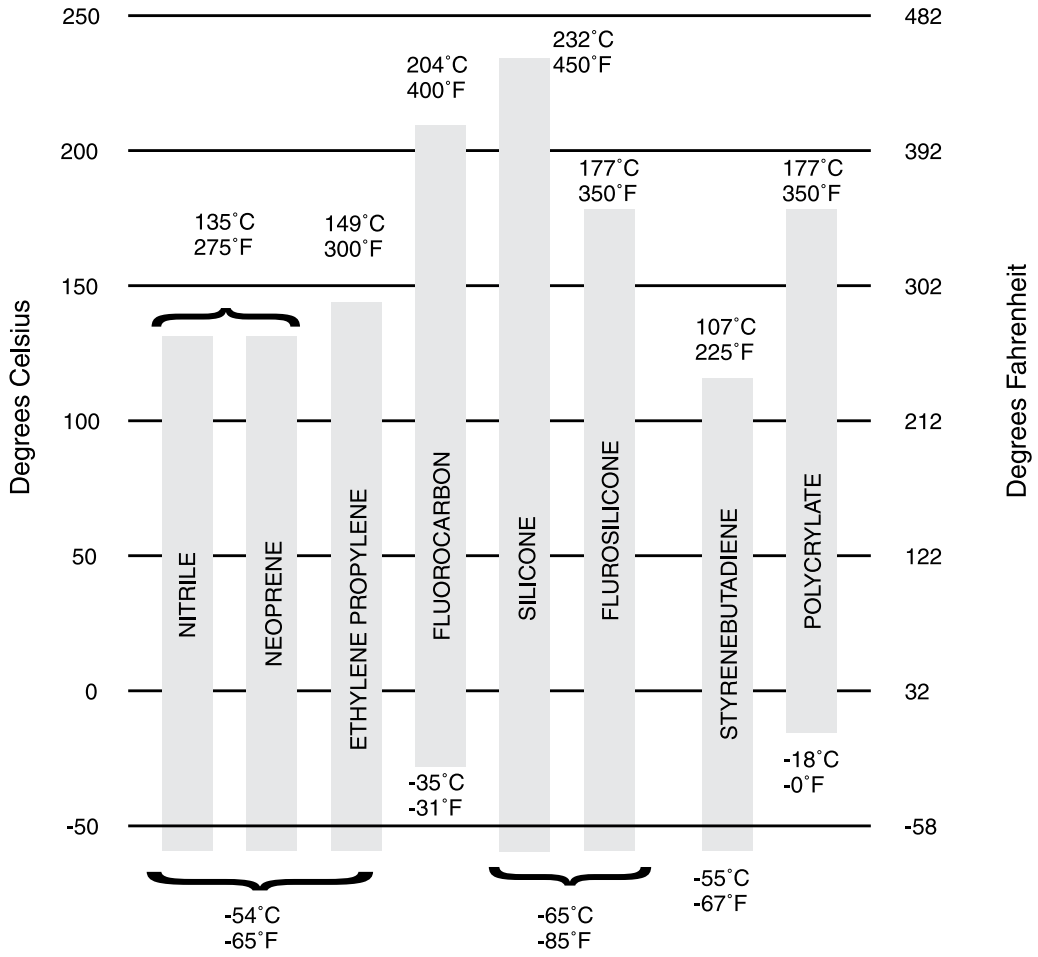
This chart matches the general rubber properties required in most applications with the capabilities of commonly used elastomers. Since no one elastomer is rated “excellent” for all properties, compromises are sometimes necessary when selecting an elastomer for a specific application. Start with the most critical properties to narrow your choices.

Property	Nitrile	SBR	Neoprene	Ethylene Propylene	Fluorocarbon	Fluorosilicone	Silicone
Ozone resistance	P	P	GE	E	E	E	E
Weather resistance	F	F	E	E	E	E	E
Heat resistance	G	FG	G	E	E	E	E
Chemical resistance	FG	FG	FG	E	E	E	GE
Oil resistance	E	P	FG	P	E	G	PG
Impermeability	G	F	G	G	G	P	P
Cold resistance	G	G	FG	G	FP	GE	E
Tear resistance	FG	FG	FG	G	F	P	P

Property	Nitrile	SBR	Neoprene	Ethylene Propylene	Fluorocarbon	Fluorosilicone	Silicone
Abrasion resistance	G	G	G	G	G	P	P
Set resistance	GE	G	F	G	GE	GE	GE
Dynamic properties	GE	G	F	G	GE	P	P
Acid resistance	F	F	FG	G	E	FG	FG
Tensile strength	GE	GE	G	G	GE	F	P
Electrical properties	F	G	F	G	F	E	E
Water/Steam resistance	FG	FG	F	E	FG	F	F
Flame resistance	P	P	G	P	E	G	F

Temperature Range

The temperature range for any compound is determined by the base elastomer used. This chart depicts the maximum temperature range for each elastomer. The temperature range for a specific compound may not reach these maximum limits. Higher temperatures may be considered if exposure is short term or intermittent.



Durometer

The hardness of rubber compounds is measured by the Shore A durometer; the higher the durometer number, the harder the compound, 70-durometer hardness should be used wherever possible as it offers the best combination of properties for most O-Ring applications. Softer compounds stretch easier and seal better on rough surfaces. Harder compounds offer greater abrasion resistance and resistance to extrusion. Extrusion must always be considered where high pressures are used. The proper hardness may be selected from this chart by matching the fluid pressure with the maximum extrusion gap.