ALL-TEC®
SEALING SYSTEMS

Seals, guide rings and bushings

Catalogue ST.SGB.18

www.all-tec.net
www.all-tec-business.net

A MOTIVATED AND COMPETENT TEAM

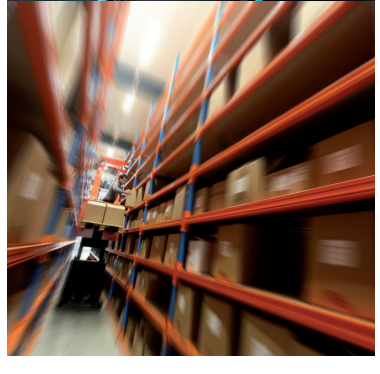
Our technical and commercial competence is one of the fundaments of our company:
Not only our engineers, but also technicians and our warehouse employees are daily doing the utmost to serve you.

A GREEN AND SUSTAINABLE COMPANY

Our photovoltaic system allows us to be fully independent for energy matters. All the plastic and cardboard packaging materials are made from recycled materials
Ecology and sustainability are part of our business strategy.

A STOCK IN PROGRESS

Over 20.000 references are actually stocked at Sealtech. A good service requires a good stock.



A UNIQUE RANGE OF PRODUCTS

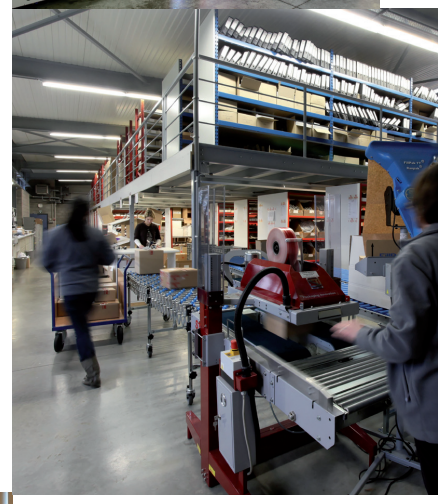
Sealtech's catalogues are well appreciated by our customers for its comprehensive technical documentation.
Most striking is the large range of hydraulic seals, the most complete range on the market at the present time.

A PRODUCTION BASED ON QUALITY

Founded in 1992, Sealtech invested from the beginning in the technique of customized seals.
Today 7 CNC machines produce daily hundreds of special hydraulic seals up to diameter 1500 mm.

A STRIKING SERVICE

Orders can be placed until 16 hr … via overnight shipment, your seals will be delivered the next morning.



A POWERFUL AND USER-FRIENDLY E-BUSINESS WEBSITE

Our customers make intensive use of:
www.sealtech-business.be;
Easy to use, time saving, real-time information, precision, …
Besides the technical information, you can also consult the history over the last 10 years.

SEAMLESS LOGISTICS

You can also contact us for your seal kits (our speciality) and programmed year orders. Our ambition is your complete satisfaction.

All information mentioned in this catalogue is based on the knowledge obtained through a long experience in the manufacturing and application of seals. However, **unknown factors in the field of sealing can considerably change the conditions which may cause this information to be invalid.**

The **pressure, temperature** and **speed** values in this catalogue are maximum values **which can never be used simultaneously**. The maximum pressure allowed by the seal will depend on temperature, speed and **gap dimension e**.

We reserved the right to make design or information modifications **without preliminary announcement**.

The information from **previous editions become invalid** with the publication of this catalogue.

Every care has been taken to ensure the accuracy of the information contained in this catalogue, but **no liability can be accepted for any errors or omissions.**

However all valid recent and updated information **has to be consulted** on our websites. Items may become invalid and **new dimensions** are added daily. Our websites present all **up-to-date** info.

ALL-TEC® SEALING SYSTEMS

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ST.SGB.18

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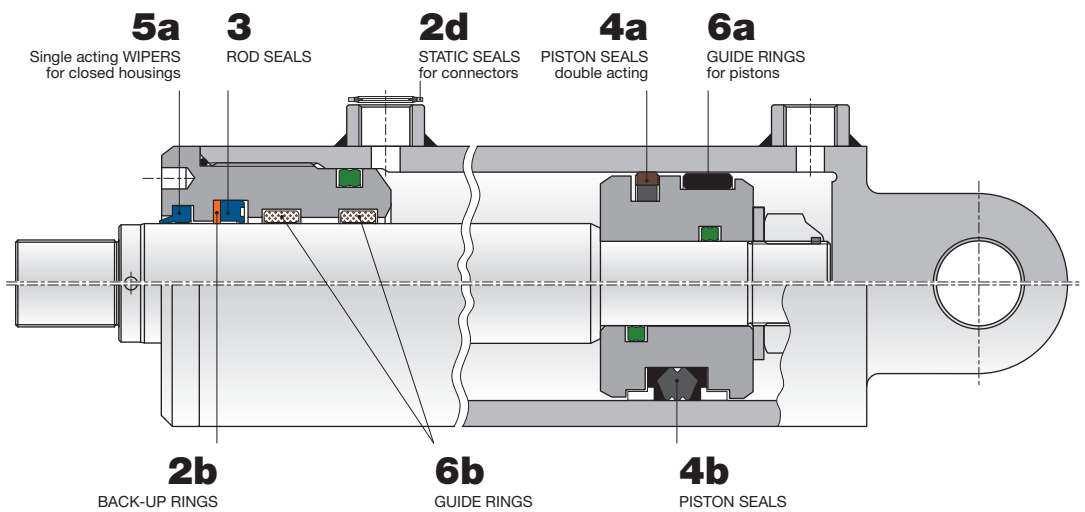
Page

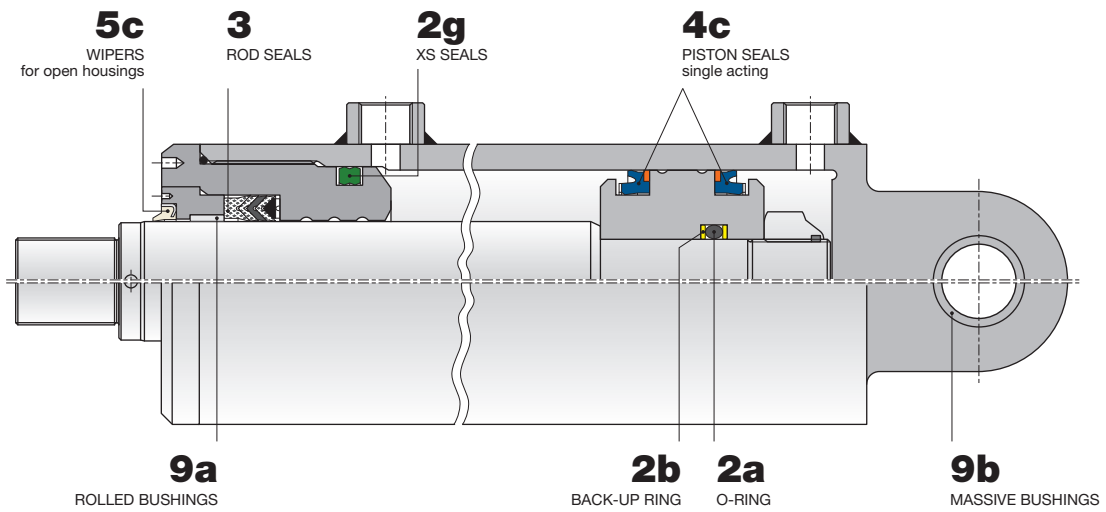
The catalogue ST.SGB.18 provides a complete program of seals, most of them are used for dynamic sealing and guiding of hydraulic cylinders.

The 4 drawings below show some examples where hydraulic seals can be used and which are the different parts of an efficient sealing system.

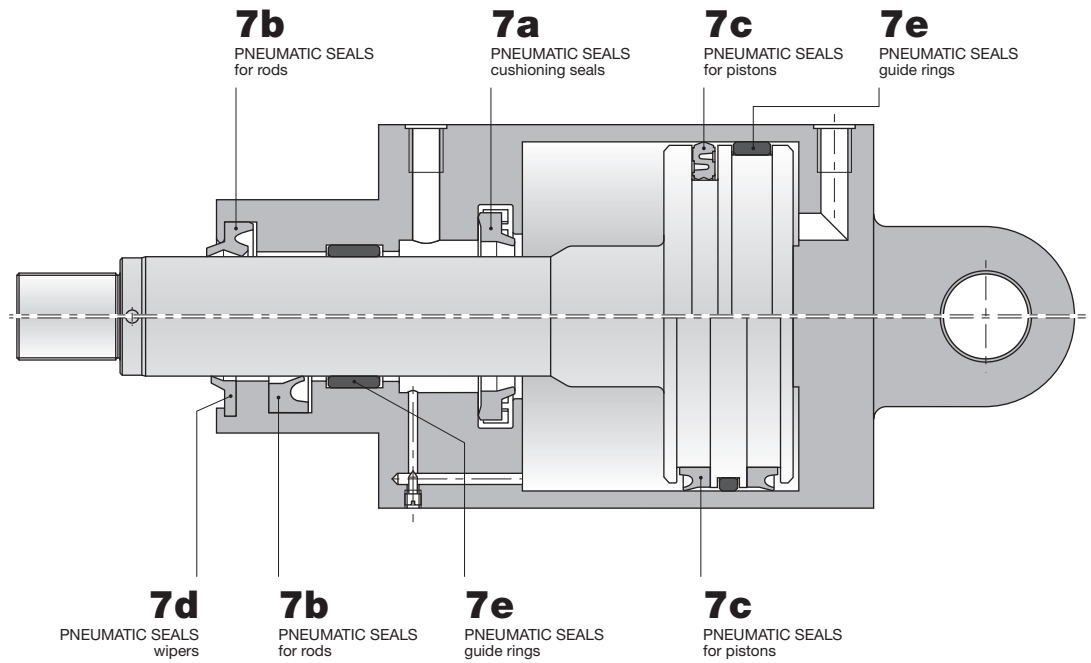
Hydraulic cylinder with guide rings and closed housings.



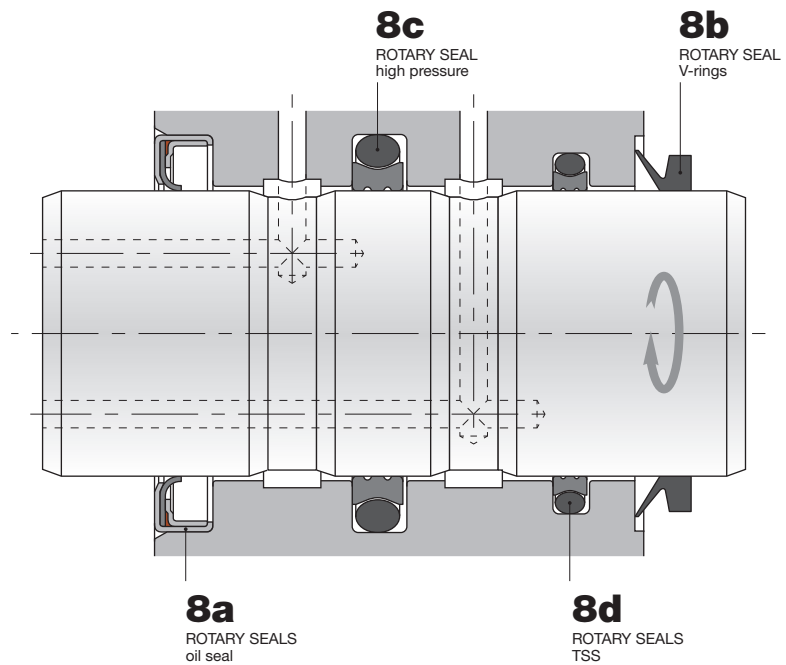
Hydraulic cylinder with metal guiding and open housings



Pneumatic cylinder with cushioning on rod side



Rotary seals application



B. Operating conditions

The **pressure, temperature and speed** values in this catalogue are maximum values which can never be used simultaneously.

If you need to work at the maximum pressure allowed by the seal, you must **limit speed and temperature** to lower values than those given in this catalogue. Similarly, if you need to work at maximum operating temperature, you must limit pressure and speed.

The high pressures and speeds can generate **local temperature increase**, which should be considered.

The maximum working temperature also depends on the **fluid used and on the gap e behind the seal**.

Please **contact us** for applications approaching maximum values.

Here below are some examples to illustrate the importance of these tips:

- **A rod seal** polyurethane **10EU** can work at 40 MPa by up to 50°C, but will be limited to 35 MPa by 70°C and 27,5 MPa by 90°C
- **A piston seal** type **10DBS** has a temperature range between -30°C and 100°C with mineral oils. But used with a HFC-fluid, the temperature range will be limited between +5°C to +50°C
- **A guide ring 10E/GTP1** can be compressed with a dynamic radial load of 100 N/mm² at 25°C but will be limited to 50 N/mm² at 60°C

IMPORTANT NOTE

The pressure, temperature and speed values in this catalogue are maximum values which can never be used simultaneously. The maximum pressure allowed by the seal will depend on temperature, speed and gap dimension e.

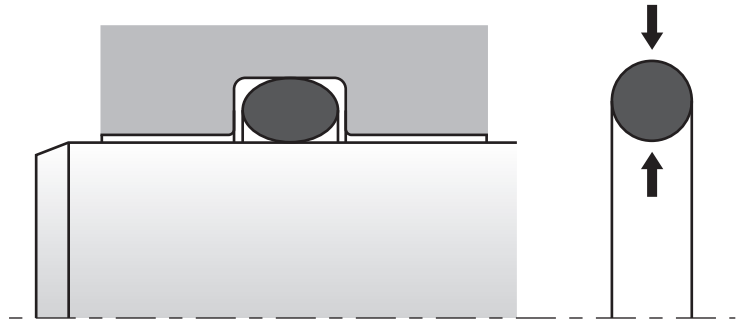
All information mentioned in this catalogue is based on the knowledge obtained through in a long experience in the manufacturing and application of hydraulic seals. However, unknown factors in the field of sealing can considerably change the conditions which may cause the following information to be invalid.

ALL-TEC® SEALING SYSTEMS

C. Assembly types

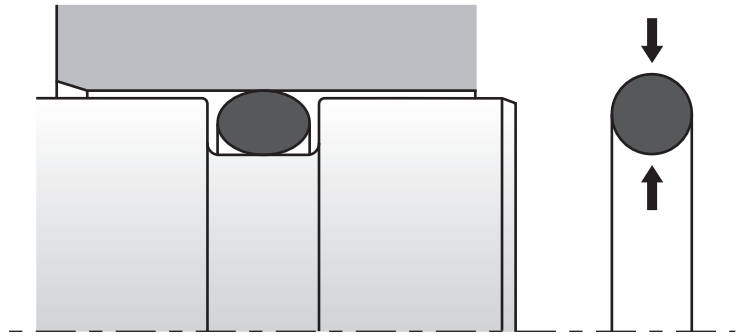
C.1 RADIAL ASSEMBLY IN INTERNAL HOUSING

The static seal is squeezed between external and internal diameter of the housing.



C.2 RADIAL ASSEMBLY IN EXTERNAL HOUSING

The static seal is squeezed between external and internal diameter of the housing.



C.3 AXIAL ASSEMBLY

The static seal is squeezed axially in the groove.

The seal profiles represented in the following classifications are for most of them produced in the material shown in the tables. Therefore these classifications are provided for information only.
Each item is related to a material code: on **www.sealtech-business.be**, click first on the reference and then on the material code to obtain the material data sheet.

D.1 RUBBER COMPOUNDS

The most suitable material choice is very important to give excellent sealing ability and a long service life. The main characteristics of a seal material are:

- **long service life**
- minimal permanent deformation (**Compression Set**)
- good **abrasion resistance**
- good **mechanical** properties
- the ability to maintain these characteristics, even when exposed to the physical and chemical properties of **the fluids** quite often it is necessary to have combination of materials to obtain these benefits.

EPDM COMPOUNDS for standard seals

Material based on ethylene propylene diene monomer. Excellent resistance to steam, ozone, water, non mineral based brake fluids including phosphate esters. Not compatible with mineral oils.

ALL-TEC Code	Seal profile examples	Temperature	Hardness	Colour
EPDM2070	Profile **O-RING** (Group 06)	-50 / +110°C	70 Sh A	black
EPDM2080	Profile **O-RING** (Group 00...EPDM80)	-40 / +110°C	80 Sh A	black

FPM (FKM) COMPOUNDS for standard seals

Fluorelastomer with good resistance to aromatic fuels, HFD fluids, concentrated acids and prolonged exposure to high temperature. Good compression set.

ALL-TEC Code	Seal profile examples	Temperature	Hardness	Colour
FPM0085	Profile **11GA...FPM**	-20 / +210°C	83 Sh A	brown
FPM3675	Profiles **13A...FPM** and **13AS...FPM**	-10 / +200°C	75 Sh A	brown
FPM3682	Profile **13ASP...FPM**	-10 / +200°C	80 Sh A	brown
FPM5280	Profile **20DR SS/FPM/SS**	-10 / +200°C	80 Sh A	brown
FPM6282	Profiles **11DDIM/C...FPM**, **11DDEM/C...FPM**, **11B...FPM-A**, **08CS** and **11CH...FPM-A**	-10 / +200°C	80 Sh A	black / green
FPM6290	Profiles **08KS...FPM** and **20DR...SS/FPM/SS**	-10 / +200°C	90 Sh A	green / black
FPM8580	Rubber part of profiles **11B...FPM-C** and **11DPS...FPM-C**	-10 / +200°C	80 Sh A	brown
FPM8590	Profiles **11DSR...FPM**, **11DSR/U...FPM**, **11UWR...FPM** and **11WRM...FPM**	-10 / +200°C	90 Sh A	brown
FPM9680	Profile **08FC...FPM**	-17 / +250°C	80 Sh A	green
FPM9975	Profile **O-RING** (Group 04)	-35 / +250°C	75 Sh A	black
FPM9990	Profile **O-RING** (Group 05)	-20 / +220°C	90 Sh A	black

FFPM (FFKM) Rubber COMPOUNDS for standard seals

The perfluorelastomer compounds offer almost universal chemical and high temperature resistance.
From -20 / +200°C up to +40 / +300°C.

MVQ COMPOUNDS for standard seals

Excellent resistance to hot air and ozone, but not compatible with mineral oil. Low mechanical properties, mainly used in static sealings.

ALL-TEC Code	Seal profile examples	Temperature	Hardness	Colour
MVQ8870	Profile **O-RING** (Group 07)	-60 / +200°C	70 Sh A	Red

NBR COMPOUNDS for standard seals

Material based on butadiene-acrylonitrile copolymer, suitable for general applications in hydraulic and pneumatic systems. This material has an excellent resistance to mineral oils, HFA, HFB and HFC fluids and produces good compression sets over a wide temperature range.

ALL-TEC Code	Seal profile examples	Temperature	Hardness	Colour
NBR0060	Profiles **13VA** and **13VS**	-30 / +120°C	60 Sh A	black
NBR0083	Profile **10TDO**	-30 / +100°C	83 Sh A	black
NBR1680	Profile **10GPSK**	-25 / +100°C	80 Sh A	black
NBR1970	Profiles **10TRO**, **10TPI**, **08KS7**, **10E/GRK...A** and **10EPK**	-35 / +100°C	70 Sh A	black
NBR1990	Profile **08D-RING**	-40 / +100°C	90 Sh A	black
NBR2475	Profiles **10DBS** and **10DBS-I**	-30 / +110°C	75 Sh A	black
NBR3370	Profile **10GPK**	-30 / +100°C	70 Sh A	black
NBR3380	Profile **10PHD**	-30 / +100°C	80 Sh A	black
NBR3470	Profile **10DBS**	-30 / +120°C	70 Sh A	black
NBR3472	Profile **10NPSL**	-35 / +120°C	70 Sh A	black
NBR3473	Profile **10GPSK**	-30 / +100°C	70 Sh A	black
NBR3670	Profiles **13A** and **13AS**	-30 / +100°C	70 Sh A	black
NBR3680	Profile **13ASP**	-30 / +100°C	80 Sh A	black
NBR3690	Profiles **10GA** and **10GA/R**	-30 / +100°C	90 Sh A	black
NBR4170	Profile **10QR**	-30 / +100°C	70 Sh A	black
NBR4470	Profile **O-RING** (Group 01)	-35 / +120°C	70 Sh A	black
NBR4480	Profile **O-RING** (Group 02)	-25 / +110°C	80 Sh A	black
NBR4490	Profile **O-RING** (Group 03)	-25 / +110°C	90 Sh A	black
NBR4590	Profile **10PWB**	-30 / +100°C	90 Sh A	black
NBR5270	Profiles **08BS** and **08BS9**	-30 / +100°C	70 Sh A	black
NBR5285	Profile **20DR**	-30 / +110°C	85 Sh A	black
NBR5290	For some **10BU**	-30 / +110°C	90 Sh A	black
NBR6270	Profile **08Y-RING**	-30 / +100°C	70 Sh A	black
NBR6278	Profiles **10MPZ** and **10PKK**	-30 / +100°C	78 Sh A	black
NBR6280	Profiles **10DDIM.../C** and **10DDEM.../C**	-30 / +100°C	80 Sh A	black
NBR6288	Profiles **08KS** and some **20DR**	-30 / +100°C	90 Sh A	black
NBR8070	Profile **09OR**	-30 / +110°C	70 Sh A	black
NBR8075	Profiles **10DDEM** and **10DDE**	-20 / +120°C	75 Sh A	black
NBR8085	Profile **10DUM.../N**	-30 / +100°C	85 Sh A	black
NBR8090	Profiles **10DDIM**, **10DUM**, **10DH**, **10DC** and **10DSR**	-15 / +120°C	90 Sh A	black
NBR8275	Profiles **10SM.../M** and **13DB/R**	-30 / +100°C	75 Sh A	black
NBR8470	Profile **10ADOP**	-30 / +105°C	70 Sh A	black
NBR8480	Profiles **15DBSE**, **10TDOP**, **10GPSK**, **10GPK**, **15BE**, **10NPSL-TPE** and **15DPSE**	-30 / +105°C	80 Sh A	black
NBR8490	Rubber part of **10CH1**, **10CH2**, profiles **10DUM/N**, **10DSR**, **10DSR/U**, **10WRM**, **10UWR**, **10TDO**, **10DDIM** and **10DDEM**	-30 / +105°C	90 Sh A	black
NBR9660	For some **13VL**	-25 / +120°C	60 Sh A	black
NBR9681	Profile **13GR**	-30 / +110°C	80 Sh A	black
NBR9682	Profile **13GR**	-20 / +100°C	80 Sh A	black
NBR9687	Profile **08FC**	-35 / +100°C	85 Sh A	black

HNBR COMPOUNDS for standard seals

This highly saturated nitrile has excellent chemical resistance (propane, butane, oil, grease, seawater, diluted acids) and can be applied in a large temperature range.

ALL-TEC Code	Seal profile examples	Temperature	Hardness	Colour
HNBR6670	Profile **O-RING** (Group 00...HNBR70)	-40 / +150°C	70 Sh A	black

TNBR COMPOUNDS for standard seals

TNBR is the right choice for low temperature applications. T-NBR offers less elasticity due to its low temperature properties. It's resistant to mineral oils and fuels but not resistant to concentrated acids, bases and polar solvents.

ALL-TEC Code	Seal profile examples	Temperature	Hardness	Colour
TNBR5570	Low temperature NBR for **O-RING** (Group 00...TNBR70)	-55 / +100°C	70 Sh A	black
TNBR8688	Low temperature NBR for profile **10DSR/U TNBR**	-50 / +125°C	90 Sh A	black
TNBR9670	Low temperature NBR for profile **10BLT**	-54 / +116°C	70 Sh A	black

TSS (Trelleborg Sealing Solutions) RUBBER COMPOUNDS

TSS code	Seal profile examples	Temperature	Hardness	Colour
N7T40	Low temperature NBR, for **O-RING** (Group 17ORAR...N7T40)	-55 / +80°C	70 Sh A	black
N8T60	Nitrile butadiene rubber for **10B**, **10CH**, **10D11W**, **10DBM**, **10DPC**, **10DPS**, **10DSM** and **10SM**	-30 / +100°C	80 Sh A	black
N9T60	Nitrile butadiene rubber for **10WRS** and **10DS.../NEO**	-30 / +100°C	90 Sh A	black

RUBBER COMPOUNDS for machined seals

ALL-TEC Code	Description	Temperature	Hardness	Colour
EPDM2185	Ethylene propylene diene rubber	-45 / +130°C	85 Sh A	black
EPDM2285	Ethylene propylene diene rubber with FDA approvals	-45 / +130°C	85 Sh A	black
FPM9685	Fluorelastomer	-20 / +210°C	85 Sh A	black
FPM9882	Standard fluorelastomer	-20 / +220°C	82 Sh A	brown
FPM9980	Fluorelastomer with FDA approvals	-20 / +220°C	80 Sh A	brown
TFPM7185	Low and high temperature fluorelastomer	-40 / +200°C	85 Sh A	black
HNBR6685	Standard highly saturated nitrile butadiene rubber	-20 / +150°C	85 Sh A	green
HNBR6790	Highly saturated nitrile butadiene rubber with FDA approvals	-20 / +150°C	90 Sh A	black
MVQ8785	Methyl vinyl silicone rubber with FDA approvals	-60 / +200°C	85 Sh A	transparent
MVQ8985	Standard methyl vinyl silicone rubber	-60 / +200°C	85 Sh A	light blue
NBR4575	Nitrile butadiene rubber (soft elastomer)	-30 / +90°C	75 Sh A	black
NBR4585	Standard nitrile butadiene rubber	-30 / +110°C	85 Sh A	black
NBR4685	White nitrile butadiene rubber	-30 / +110°C	85 Sh A	white
TNBR5580	Low temperature nitrile butadiene rubber	-50 / +110°C	80 Sh A	black

D.2 RUBBER-FABRIC COMPOUNDS

Fabric elements can be made of two different types:

- Specific cotton fabric (**-C**). Temperature: max. 150°C
- Aramid fabric (**-A**) with high mechanical properties for high temperatures. Temperature: max. 200°C

Examples:
For a rod seal **10B** made of nitrile and cotton fabric, the material name will be **NBR-C**.
The material for the same seal **10B** made of FPM and aramid fabric will be named **FPM-A**.

NBR-FABRIC COMPOUNDS for standard seals

ALL-TEC Code	Seal profile examples	Temperature	Hardness	Colour
NBR8275-C	Profiles **10CH**, **10DS.../M**, **10SM.../M** and **13DB/R**	-30 / +100°C	75 Sh A	black
NBR8470-C	Profiles **15BE**, **10CH1**, **10CH2**, **10CH3** and **15DPSE**	-30 / +105°C	70 Sh A	black

FPM-FABRIC COMPOUNDS for standard seals

ALL-TEC Code	Seal profile examples	Temperature	Hardness	Colour
FPM8471-C	Profiles **11B...FPM-C**, **11CH1**, **11CH2**, **11CH3** and **11DPS**	-10 / +150°C	70 Sh A	brown
FPM6282-A	Profiles **11B...FPM-A** and **11CH...FPM-A**	-10 / +200°C	80 Sh A	black

TSS (Trelleborg Sealing Solutions) NBR-FABRIC COMPOUNDS

TSS code	Seal profile examples	Temperature	Hardness	Colour
N8T60-C	Nitrile butadiene rubber for **10B**, **10CH**, **10D11W**, **10DPC**, **10DPS** and **10DSM**	-30 / +100°C	80 Sh A	black

D.3 POLYURETHANE COMPOUNDS (PU)

Polyurethane is one of the more recently developped elastomers. This material based on polyester (AU) or polyether (EU) has high qualities:

- high tensile strength and and very good resistance to abrasion
- good compatibility with mineral oils and good resistance to ozone and weathering
- good compression set values and good tear resistance

POLYURETHANE COMPOUNDS for standard seals

ALL-TEC Code	Manufacturing	Seal profile examples	Temperature	Hardness	Colour
PU02	injection moulding	Standard PU compound for pneumatic seals	-40 / +90°C	90 Sh A	light grey
PU03	injection moulding	Special PU for pneumatic seals	-40 / +90°C	85 Sh A	light violet
PU08	cast moulding	For some **10MU** seals	-40 / +100°C	95 Sh A	orange
PU09	injection moulding	For some **10EU**, **10EUS/C**, **10RS.../L**, **10RS.../LA**, **10WNV** and **10XS**	-35 / +110°C	94 Sh A	violet
PU10	injection moulding	Standard PU compound for hydraulic seals: **10DSR/P**, **10EU**, **10MU**, **10RSE**, **10TS.../L**, **10WAH**, **10WUH**, **13TFR**, **10WRM-P** and **10XS**	-40 / +100°C	93 Sh A	dark blue
PU11	injection moulding	PU compound for seals of group 15	-35 / +100°C	92 Sh A	blue
PU12	injection moulding	For a part of the **10MU** seals	-20 / +100°C	93 Sh A	blue
PU13	injection moulding	For some **10RSE.../AE** seals	-40 / +100°C	94 Sh A	green
PU14	injection moulding	Profiles **10GA.../P**, **10SWP**, **10SWP/I** and **10PW.../U**	-30 / +100°C	95 Sh A	off white
PU16	injection moulding	Profile **10SWP/I** wipers	-20 / +100°C	95 Sh A	off white
PU24	injection moulding	For some **10GPS** seals	-40 / +100°C	97 Sh A	red
PU25	injection moulding	For some **10GPS** and **10GPSK** seals	-35 / +110°C	98 Sh A	pink
PU26	cast moulding	Profiles **00RPU** and **10EUS/NEI**	-40 / +90°C	92 Sh A	black / off white
PU27	cast moulding	Profiles **08SFS** (outer part) and **10WRM/PI**	-40 / +90°C	95 Sh A	black
PU28	cast moulding	Profile **08SFS** (inner part)	-40 / +90°C	59 Sh A	yellow
PU29	cast moulding	Profiles **10EPK** and some **10MBK**	-40 / +90°C	65 Sh D	grey
PU32	injection moulding	Profiles **10EU** (S20 range), **10EUS.../LA**, **10IBF**, **10RS.../LA**, **10RSE.../AE** (S18 range) and **10WNV**	-30 / +110°C	95 Sh A	dark grey
PU33	injection moulding	Profiles **10EU.../ET**, **08FS** and **10XS.../AK**	-40 / +130°C	92 Sh A	dark green
PU35	injection moulding	Profile **10GPSK** brown	-30 / +100°C	98 Sh A	brown
PU37	injection moulding	Profiles **10DSR.../UP**, some **10MU** and some **10RS.../L**	-30 / +100°C	92 Sh A	blue
PU38	injection moulding	Profiles **10GPSK** blue and **10PHD.../PU**	-30 / +100°C	98 Sh A	blue
PU39	cast moulding	Back-up ring for profile **10EUS.../NEI**	-40 / +90°C	75 Sh D	off white
PU42	injection moulding	Profile **10EU/I**	-54 / +110°C	90 Sh A	off white
PU45	injection moulding	Profiles **10EUS/I** and **10BLT**	-54 / +104°C	95 Sh A	black
PU46	injection moulding	Profile **10GA.../P**	-40 / +100°C	93 Sh A	white

TSS (Trelleborg Sealing Solutions) POLYURETHANE COMPOUNDS (Zurcon®)

TSS code	Manufacturing	Description	Temperature	Hardness	Colour
Z05	injection moulding	Zurcon® Z05 is harder than Z201 Excellent extrusion resistance	-30 / +80°C	97 Sh A	dark turquoise
Z20	injection moulding	Zurcon® Z20 is the standard PU for hydraulic seals	-35 / +110°C	93 Sh A	turquoise
Z201	injection moulding	Zurcon® Z201 is the standard PU for hydraulic wipers	-35 / +100°C	92 Sh A	turquoise
Z22	injection moulding	Zurcon® Z22 is a PU for low temperatures	-50 / +110°C	93 Sh A	dark turquoise
Z53 old ref.: Z51	machining	Zurcon® Z53 is a 70 Sh D PU for lubricating fluids. Excellent abrasion and extrusion resistance. Limited chemical resistance	-45 / +110°C	70 Sh D	yellow to light brown
Z54 old ref.: Z52	machining	Zurcon® Z54 is a 58 Sh D PU for lubricating fluids. Excellent abrasion and extrusion resistance. Limited chemical resistance	-45 / +110°C	58 Sh D	turquoise

POLYURETHANE COMPOUNDS for machined seals

ALL-TEC Code	Description	Temperature	Hardness	Colour
PU18	Thermoplastic polyurethane	-30 / +110°C	93 Sh A	green
PU19	Thermoplastic polyurethane with resistance to hydrolysis (90°C) and some bio-oils. With FDA approval. For diameters > 400 mm.	-37 / +110°C	96 Sh A	red
PU20	Thermoplastic polyurethane with extremely good abrasive resistance and low compression set	-30 / +110°C	95 Sh A	green
PU21	Thermoplastic polyurethane with resistance to hydrolysis (90°C) and some bio-oils. With FDA approval	-20 / +115°C	95 Sh A	red
PU22	Injected thermoplastic polyurethane with resistance to hydrolysis (90°C) and low temperatures	-55 / +110°C	94 Sh A	dark blue
PU30	Casted thermoplastic polyurethane (hardness 55 Sh D) with resistance to hydrolysis (90°C) and some bio-oils	-20 / +115°C	55 Sh D	dark yellow
PU40	Casted thermoplastic polyurethane (hardness 70 Sh D) with resistance to hydrolysis (90°C) and some bio-oils	-20 / +110°C	70 Sh D	black
PU60	Lubricants filled casted polyurethane with resistance to hydrolysis (90°C)	-20 / +110°C	96 Sh A	grey
PU61	Lubricants filled casted polyurethane with resistance to hydrolysis (90°C)	-30 / +125°C	95 Sh A	burgundy
PU62	Lubricants filled casted polyurethane with resistance to hydrolysis (90°C)	-30 / +125°C	57 Sh D	grey
PU90	Soft PU for pneumatic applications with resistance to hydrolysis	-20 / +110°C	90 Sh A	yellow

D.4 PTFE COMPOUNDS

This thermoplastic polymer is based on Tetrafluoroethylene. This material is not elastic as rubber, but has outstanding properties and characteristics:

- excellent chemical resistance to nearly all commercial fluids and chemicals
- low coefficient of friction, self lubricating
- good electrical insulating properties
- good mechanical resistance if formulated with glass, bronze or carbon
- excellent temperature resistance between -200°C to +260°C

PTFE compounds for standard and machined seals

ALL-TEC Code		Additives	Description	Colour
PT01	01	virgin	Good chemical resistance but limited mechanical resistance.	white
PT02	02	virgin modified	Improved version of PT01 : better permeability and elasticity.	white
PT08	08	CrO	This PTFE is used for food applications.	turquoise
PT12	12	modified	Good mechanical stability. Light and medium duty.	light blue
PT15	15	glass + lubricant	Good dimensional stability. Good wear/extrusion and chemical resistance.	dark grey
PT30	30	carbon graphite	Good mechanical properties. For water hydraulics, soft mating surfaces.	black
PT31	31	carbon	Good mechanical properties. For rotary seals and soft mating surfaces.	dark grey
PT40	40	carbon fibers	Same as carbon graphite with improved stiffness, reduced creep and reduce thermal expansion. Allowed for steam applications.	grey
PT53	53	bronze	Good thermical and electrical conductibility. Low friction.	brown
PT55	55	bronze	Chemical resistance limited. Excellent wear/extrusion resistance and good heat dissipation.	dark brown
PT65	65	bronze	Chemical resistance limited. Excellent wear/extrusion resistance and good heat dissipation.	brown

TSS (Trelleborg Sealing Solutions) PTFE compounds (Turcon®)

TSS Code	Additives	Description	Colour
T05	-	Good chemical resistance. Used for lubricating fluids and suitable for gas sealing. Also for hard mating surfaces.	turquoise
T10	carbon graphite	Good mechanical and chemical properties. For hydraulics and pneumatics. High extrusion resistance. For lubricating and not lubricating fluids.	black
T25	glass + MoS_2	Good dimensional stability. Good wear/extrusion and chemical resistance.	grey
T29	carbon fibre	Good dimensional stability. Good wear/extrusion and chemical resistance. For lubricating and not lubricating fluids. Not suitable for gas sealing.	grey
T40	carbon fibre	Good mechanical properties. For water hydraulics, soft and hard mating surfaces. For lubricating and not lubricating fluids. Not suitable for gas sealing.	grey
T46	bronze	Chemical resistance limited. Excellent wear/extrusion resistance and good heat dissipation. For lubricating fluids and low friction.	brown
T47	bronze	Chemical resistance limited. Good mechanical properties and good heat dissipation. Low friction.	brown
M12	mineral fibres and additives	First material choice for seals in linear motion. Lowest friction and best sliding properties. Lowest wear on seals.	dark grey

D.5 FABRIC REINFORCED COMPOSITE MATERIALS

The fabric reinforced composite materials are used for guide rings. The cotton or synthetic fabrics are spread with different resins. They have a high mechanical strength and rigidity. They also have good resistance to all fluids, very good mechanical resistance and low coefficient of friction.

COMPOSITE MATERIALS for standard seals

ALL-TEC Code	Manufact.	Guide ring profile examples	Temperature	Compressive strength	Colour
PF-C	machined	Phenolic resin with cotton fabric for **10I/GTP** and **10E/GTP**	-40 / +130°C	290 N/mm²	light brown
PF-S	machined	Phenolic resin with synthetic fabric and some PTFE for **10I/GTP1** and **10E/GTP1**	-40 / +130°C	320 N/mm²	light brown
PF-A	machined or rolls	High temperature phenolic resin with aramid fabric and graphite for **10I/GTP-HT**, **10E/GTP-HT** and **10GTP-HT**	-40 / +200°C	380 N/mm²	dark grey
P-P1	machined	Polyester resin with polyester fabric and PTFE for **10I/GTN** and **10E/GTN**	-40 / +130°C	340 N/mm²	light blue
P-P2	rolls	Polyester resin with polyester fabric and PTFE for rolls **10GTN**	-40 / +120°C	270 N/mm²	light blue
P-P3	rolls or spirals	Polyester resin with polyester fabric and graphite for rolls **10GTH** and **10GTH-SPIRAL**	-40 / +120°C	270 N/mm²	grey

TSS (Trelleborg Sealing Solutions) COMPOSITE MATERIALS (Orkot®)

TSS Code	Manufact.	Description	Temperature	Compressive strength	Colour
Orkot® C320	rolls	Orkot® compound from rolls to cut guide rings to length. Very high resistance to wear, good dry running properties and dampens vibrations	-60 / +130°C	300 N/mm²	dark grey
Orkot® C380	rolls	Orkot® compound from rolls to cut guide rings to length. Standard material further development of the C320, more versatile.	-60 / +130°C	300 N/mm²	turquoise

COMPOSITE MATERIALS for machined seals

ALL-TEC Code	Manufact.	Description	Temperature	Compressive strength	Colour
PF-C	machined	Phenolic resin with cotton fabric for guide rings	-40 / +130°C	290 N/mm²	light brown

D.6 THERMOPLASTIC COMPOUNDS

Thermoplastic compounds are a class of materials whose base resin is of thermoplastic nature. They are characterised by good mechanical properties, wide working temperature range and good chemical resistance.

POM (acetal resin) COMPOUNDS for standard seals

This thermoplastic has a high strength, rigidity, hardness and useful characteristics for many technical applications. POM also has an excellent dimensional stability, a high impact resistance, good inherent lubricating properties and excellent resistance to chemical agents.

ALL-TEC Code	Manufacturing	Seal profile examples	Temperature	Hardness	Colour
POM16	injection moulding	POM compound for the back-up rings of some **10RS.../LA** and **10RSE.../AE**	-40 / +110°C	80 HRM	white
POM24	injection moulding	POM compound for the back-up rings of some **10TS.../LA**, **10RS.../LA**, **10RSE.../AE** and **10DBS.../AE**	-40 / +110°C	92 HRM	orange
POM34	injection moulding	POM compound for the pneumatic guide rings (**10IDP** and **10EDP**)	-40 / +115°C	84 Sh D	white
POM84	injection moulding	POM compound for the back-up rings of **10EUS.../LA**, **15BE.../NEI**, **10IBF**, **10CH1**, **10CH2**, **10CH3** and **15DPSE**	-40 / +110°C	80 HRM	black
POM/GF1	injection moulding	POM compound reinforced with glass fibers for the guide rings **10WR**, **10I/DWR**, **10E/DWR**, **10DBS**, **10FIT** and **10FIL**	-40 / +110°C	90 HRM	black

PA (polyamid) COMPOUNDS for standard seals

The most important polyamids are: PA6, PA66, PA11 and PA12. They have a good endurance strength, a high wear resistance, an excellent endurance against chemical products and a very low coefficient of sliding friction.

ALL-TEC Code	Manufacturing	Seal profile examples	Temperature	Additives	Colour
PA66/M	injection moulding	PA compound for the **10NW** wipers	-40 / +100°C	MoS_2	grey
PA66/GF1	injection moulding	PA compound for the **10FET** piston guide rings	-20 / +110°C	Glass	off white
PA66/GF2	injection moulding	PA compound for the **10GPK** piston seals	-40 / +100°C	Glass	black

TPE (polyester) COMPOUNDS for standard seals

This thermoplastic polyester is mainly used in the manufacturing of anti-extrusion rings to support sealing elements. TPE has a very good mechanical resistance, an excellent dimensional stability, good resistance to extrusion and good resistance to the hydraulic fluids.

ALL-TEC Code	Manufacturing	Seal profile examples	Temperature	Hardness	Colour
TPE55	injection moulding	TPE compound for back-up rings **10MBK** and **10PBK**, wipers **10DSR-H** and **10WRMH** and composite seals **10IGH**	-30 / +130°C	55 Sh D	yellow / orange
TPE63	injection moulding	TPE compound for back-up rings of **10DBS** and **10DBS.../AE**	-30 / +130°C	63 Sh D	green
TPE72	injection moulding	TPE compound for back-up rings of **15DBSE**, **10NPSL-TPE** and **15SME**	-30 / +110°C	72 Sh D	grey

TSS (Trelleborg Sealing Solutions) thermoplastic compounds

The thermoplastic compounds of Trelleborg Sealing Solutions are made of acetal resin (POM), polyester resin (TPE) or polyethylene with ultra high molecular weight.

TSS Code	Manufacturing	Seal profile examples	Temperature	Hardness	Colour
HM061	injection moulding	POM compound for the spreader rings of **10CH**	-40 / +130°C	118 HRR	black
PO0WC	injection moulding	POM compound for the guide rings of **10DBM**, **10DPS**, **10DPC**, **10DSM** and **10D11W**	-40 / +130°C	92 HRM	white
PR01N	injection moulding	TPE compound for back-up rings **10DBM**	-50 / +150°C	55 Sh D	black

Zurcon® Z80 is not a polyurethane, but a polyethylene with ultra high molecular weight for non-lubricated applications. Excellent abrasion resistance. Good resistance to chemical agents.

TSS Code	Manufacturing	Seal profile examples	Temperature	Hardness	Colour
Z80	machining	Zurcon® compound for guide rings and some seals	-200 / +80°C	62 Sh D	white

THERMOPLASTIC COMPOUNDS for machined seals

ALL-TEC Code	Manufacturing	Description	Temperature	Hardness	Colour
POM71	machined	POM compound for guide rings and back-up rings. FDA approvals	-45 / +100°C	81 Sh D	white
POM96	machined	POM compound for guide rings and back-up rings	-50 / +100°C	82 Sh D	black
PA85	machined	PA compound for guide rings and back-up rings	-40 / +110°C	85 Sh D	off white
TPE54	machined	TPE compound for some seals and back-up rings	-30 / +120°C	54 Sh D	orange
HDPE	machined	UHMWPE compound for guide rings and some seals	-200 / +80°C	61 Sh D	off white
PEEK	machined	The semi-crystaline thermoplastic is used as special material for high temperature applications.	-60 / +260°C	87 Sh D	cream

D.7 METALS

The following codes are used for metals:

AL	Aluminium	**BZ**	Bronze	**CI**	Cast iron	**CU**	Copper
EY	Elgyloy®	**GG**	Grey cast	**HS**	Hardened steel	**HY**	Hastelloy®
MS	Brass	**SS**	Stainless steel	**ST**	Carbon steel		

We have classified hydraulic fluids in 3 distinct types:

E.1 CONVENTIONAL HYDRAULIC FLUIDS

The most used hydraulic fluids are the mineral oils classified according to ISO:

HH: oils without additives (H according to the DIN)
HL: oils with anti-corrosion and anti-ageing additives (H-L according to the DIN)
HM: HL oils with additives to improve usage and resistance under load pressure (H-LP according to the DIN)
HV: HM oils with improvement of viscosity-temperature characteristics

The other fluids included in this group are water, air and brake oils.

E.2 LOW-FLAMMABILITY FLUIDS

Low-flammability fluids are classified according to the DIN as follows:

HFA: oil emulsions – water content above 80%, generally 95%
HFB: water emulsions – mineral oil with water content above 40%
HFC: polymer solutions in water (water/glycol) with water content above 35%
HFD R: phosphoric ester based fluids

E.3 BIODEGRADABLE FLUIDS

Biodegradable fluids are classified by the DIN as follows:

HETG: vegetable oil based fluids
HEES: synthetic ester based fluids
HEPG: polyglycol based fluids

IMPORTANT NOTICE

Like mineral oils, biodegradable fluids contain additives. In accordance with these, the materials resist more or less well to the fluids used. Be very careful when using the diagram on the following page. A simple, low-cost test would be to place a sample of material in the fluid at the service temperature.

N: not suitable

			FLUIDS										
			Conventional fluids				Fire retardant fluids				Bio-degradable fluids		
Operating temperature range of fluid (°C)			+150 -30	+60 +5	+200 +2	+130 -50	+60 +5	+60 +5	+60 -30	+150 0	+60 -10	+100 -40	+100 -50
MATERIALS	Continuous operating temperature range material (°C)	Operating peak temperature range material (°C)	Mineral oils	Water	Air	Brake fluid	HFA (5/95 oil-water)	HFB (60/40 water-oil)	HFC (water/glycol)	HFDR (phosphoric acid ester based)	HETG (vegetable oils based)	HEES (fully synthetic ester)	HEPG (polyglycol based - soluble in water)
			Continuous temperature range °C										
NBR	+100 -30	+120 -30	+100 -30	+60 +5	+100 +2	N	+60 +5	+60 +5	+60 -30	N	+60 -10	N	+60 -30
TNBR	+80 -45	+90 -50	+80 +30	+60 +5	+80 +2	N	+60 +5	+60 +5	+60 -30	N	+60 -10	N	+60 -45
HNBR	+125 -25	+150 -30	+125 -25	+60 +5	+125 +2	N	+60 +5	+60 +5	+60 -30	N	+60 -10	N	+80 -25
EPDM	+120 -40	+150 -50	N	+60 +5	+120 +2	+120 -40	N	N	+60 -30	+80 0	N	N	N
MVQ Silicone	+200 -55	+250 -55	N	+60 +5	+200 +2	+80 -50	N	N	N	N	N	N	N
FPM (FKM)	+200 -10	+250 -20	+150 -10	+60 +5	+200 +2	N	+60 +5	+60 +5	N	+150 0	+60 -10	+100 -10	+100 -10
FFPM (FFKM)	+200 -20 / +300 +40	<>	+150 -20	+60 +5	+200 +2	+130 -20	+60 +5	+60 +5	+60 -20	+150 0	+60 -10	+100 -20	+100 -20
AU Polyester PU	+100 -30	+110 -30	+100 -30	+40 +5	+40 +2	N	+40 +5	+40 +5	N	N	+60 -10	+60 -30	+40 -30
EU Polyether PU	+100 -40	+100 -45	+100 -30	+60 +5	+80 +2	N	+60 +5	+60 +5	+40 -30	N	+60 -10	+80 -40	+60 -40
PTFE	+200 -200	+200 -200	+100 -30	+60 +5	+200 +2	+130 -50	+60 +5	+60 +5	+60 -30	+150 0	+60 -10	+100 -40	+100 -50
TPE	+100 -40	+120 -40	+100 -30	+60 +5	+80 +2	N	+60 +5	+60 +5	N	N	+60 -10	+80 -30	+50 -30
PA	+100 -30	+120 -40	+100 -30	+60 +5	+80 +2	N	+60 +5	+60 +5	+60 -30	+100 0	+60 -10	+100 -30	+100 -30
POM Acetal resin	+110 -40	+120 -45	+110 -30	+60 +5	+80 +2	N	+60 +5	+60 +5	+60 -30	+110 0	+60 -10	+100 -40	+100 -40
HDPE UHMW Polyethylen	+80 -70	+80 -70	+100 -30	+60 +5	+80 +2	N	+60 +5	+60 +5	+60 -30	+60 0	+60 -10	+80 -40	+80 -50
Thermo-Plastic Polyester resin	+100 -50	+130 -200	+100 -30	+60 +5	+100 +2	N	+60 +5	+60 +5	+40 -30	+100 0	+60 -10	+100 -40	+100 -50
PEEK	+250 -65	+300 -65	+150 -30	+60 +5	+200 +2	+130 -50	+60 +5	+60 +5	+60 -30	+150 0	+60 -10	+100 -40	+100 -50
PF Phenolic resin	+120 -50	+130 -50	+120 -30	+60 +5	+120 +2	N	+55 +5	+60 +5	+60 -30	+80 0	+60 -10	+100 -40	+100 -50

↑ excellent
↗ fair (OK for static seals)
→ questionable
↓ poor

	NBR	EPDM	FPM	TPU	HNBR	MVQ	FFPM	PTFE
Abietic Acid							↑	
Acetaldehyde	↓	↗	↓	↓	↓	↗	↑	
Acetamide	↑	↑	↓	↓	↑	↗	↑	↑
Acetanilide	→	↑	→	↓	→	↗	↑	
Acetic Acid, 30%		↑					↑	
Acetic Acid, 5%	↗	↑	↑	↓	↗	↑	↑	
Acetic Acid, Glacial	↗	↑	↗	↓	↗	↑	↑	
Acetic Acid, Hot, High Pressure	↓	→	↓	↓	↓	→	↑	
Acetic Anhydride	↓	↗	↓	↓	↓	↗	↑	↑
Acetoacetic Acid	→	↑	→	↓	→	↗	↑	
Acetone	↓	↑	↓	↓	↓	↓	↑	↑
Acetone Cyanohydrin	→	↑	→	↓	→	↗	↑	
Acetonitrile	→	↑	↑				↑	
Acetophenetidine	↗	↓	↑	→	↗		↑	
Acetophenone	↓	↑	↓	↓	↓	↓	↑	↑
Acetotoluidide	↗	↓	↑	→	↗		↑	
Acetyl Acetone	↓	↑	↓	↓	↓	↓	↑	
Acetyl Bromide	↓	↑	↑	↓	↓	↓	↑	
Acetyl Chloride	↓	↓	↑	↓	↓	↓	↑	
Acetylene	↑	↑	↑	↓	↑	↗	↑	↑
Acetylene Tetrabromide	↓	↑	↑	↓	↓		↑	
Acetylene Tetrachloride	↓	↑	↑	↓	↓		↑	
Acetylsalicylic Acid	↗	↓	↑	→	↗		↑	
Acids, Non-organic							↑	
Acids, Organic							↑	
Aconitic Acid							↑	
Acridine							↑	
Acrolein	→	↑	↓	↓	→	↗	↑	
Acrylic Acid	↗	↓	↑	→	↗		↑	
Acrylonitrile	↓	↓	↓	↓	↓	↓	↑	↑
Adipic Acid	↑	↑	↑	↓	↑		↑	
Aero Lubriplate	↑	↓	↑	↑	↑	↗	↑	
Aero Shell 17 Grease	↑	↓	↑	↑	↑	↗	↑	
Aero Shell 750	↗	↓	↑	↓	↗	↓	↑	
Aero Shell 7A Grease	↗	↓	↑	↑	↗	↗	↑	
Aero Shell IAC	↑	↓	↑	↑	↑	↗	↑	
Aerosafe 2300	↓	↑	↓	↓	↓	→	↑	
Aerosafe 2300W	↓	↑	↓	↓	↓	→	↑	
Aerozene 50 (50% Hydrazine 50% UDMH)	↓	↑	↓	↓	↓	↓	↗	
Air, 0-90°C	↗	↑	↑	↗	↗	↑	↑	↑
Air, 90-150°C	→	↗	↑	→	→	↑	↑	↑
Air, 150-200°C	↓	↓	↑	↓	↓	↑	↑	↑
Air, 200-260°C	↓	↓	→	↓	↓	↗	↗	↑
Aliphatic Dicarboxylic Acid	↗	↓	↑	→	↗		↑	

	NBR	EPDM	FPM	TPU	HNBR	MVQ	FFPM	PTFE
Alkanes (Paraffin Hydrocarbons)	↑	↓	↑	↑	↑	↗	↑	
Alkanesulfonic Acid	↑	↓	↑	↑	↑	↗	↑	
Alkazene	↓	↓	↗	↓	↓	↓	↑	
Alkenes (Olefin Hydrocarbons)	↗	↓	↑	→	↗		↑	
Alkyl Acetone	→	↑	→	↓	→	↗	↑	
Alkyl Alcohol	↑	↓	↑	↑	↑	↗	↑	
Alkyl Amine	↑	↓	↑	↑	↑	↗	↑	
Alkyl Aryl Sulfonates	↑	↓	↑	↑	↑	↗	↑	
Alkyl Aryl Sulfonics	↑	↓	↑	↑	↑	↗	↑	
Alkyl Benzene	→	↓	↑	→	→		↑	
Alkyl Chloride	↗	↓	↑	→	↗		↑	
Alkyl Sulfide	↗	↓	↑	→	↗		↑	
Alkylnaphthalene Sulfonic Acid	↑	↓	↑	↑	↑	↗	↑	
Allyl Chloride	↗	↓	↑		↗		↑	
Allylidene Diacetate	→	↑	→	↓	→	↗	↑	
Alpha Picoline	→	↑	→	↓	→	↗	↑	
Aluminum Acetate	↗	↑	↓	↓	↗	↓	↑	
Aluminum Bromide	↑	↑	↑	→	↑	↑	↑	
Aluminum Chlorate	→	↑	→	↓	→	↗	↑	
Aluminum Chloride	↑	↑	↑	→	↑	↗	↑	
Aluminum Ethylate							↑	
Aluminum Fluoride	↑	↑	↑	→	↑	↗	↑	
Aluminum Fluorosilicate							↑	
Aluminum Formate	→	↑	→	↓	→	↗	↑	
Aluminum Hydroxide	↗	↑	↗			↗	↑	
Aluminum Linoleate	↑	↓	↑	↑	↑	↗	↑	
Aluminum Nitrate	↑	↑	↑	→	↑	↗	↑	
Aluminum Oxalate	→	↑	→	↓	→	↗	↑	
Aluminum Phosphate	↑	↑	↑	↓	↑	↗	↑	
Aluminum Potassium Sulfate	→	↑	→	↓	→	↗	↑	
Aluminum Salts	↑	↑	↑	→	↑	↑	↑	
Aluminum Sodium Sulfate	→	↑	→	↓	→	↗	↑	
Aluminum Sulfate	↑	↑	↑	↓	↑	↑	↑	
Alums -NH3 -Cr -K	↑	↑	↓		↑	↑	↑	
Ambrex 33 (Mobil)	↑	↓	↑	↗	↑	↓	↑	
Ambrex 830 (Mobil)	↑	↓	↑	↑	↑	↗	↑	
Amines-Mixed	↓	↗	↓	↓	↓	↗	↗	
Aminoanthraquinone							↑	
Aminoazobenzene							↑	
Aminobenzene Sulfonic Acid							↑	
Aminobenzoic Acid							↑	
Aminopyridine							↑	
Aminosalicylic Acid							↑	
Ammonia (Anhydrous)	↗	↑	↓	↓	↗	↗	↗	↑

↑ excellent
↗ fair (OK for static seals)
→ questionable
↓ poor

	NBR	EPDM	FPM	TPU	HNBR	MVQ	FFPM	PTFE
Ammonia and Lithium Metal in Solution	↗	↗	↓	↓	↗	↓	↓	
Ammonia, Gas, Cold	↑	↑	↓	↓	↑	↑	↑	
Ammonia, Gas, Hot	↓	↗	↓	↓	↓		↗	
Ammonia, Liquid (Anhydrous)	↗	↑	↓	↓	↗	↗	↗	↑
Ammonium Acetate	→	↑	→	↓	→	↗	↑	
Ammonium Arsenate	→	↑	→	↓	→	↗	↑	
Ammonium Benzoate	→	↑	→	↓	→	↗	↑	
Ammonium Bicarbonate	→	↑	→	↓	→	↗	↑	
Ammonium Bisulfite	→	↑	→	↓	→	↗	↑	
Ammonium Bromide	↑	↑	↑	↑	↑		↑	
Ammonium Carbamate	→	↑	→	↓	→	↗	↑	
Ammonium Carbonate	→	↑	↑	↓	→		↑	↑
Ammonium Chloride, 2N	↑	↑	↑	↑	↑		↑	
Ammonium Citrate	→	↑	→	↓	→	↗	↑	
Ammonium Dichromate	→	↑	→	↓	→	↗	↑	
Ammonium Diphosphate	→	↑	→	↓	→	↗	↑	
Ammonium Fluoride	↑	↑	↗	→	↑		↑	
Ammonium Fluorosilicate							↑	
Ammonium Formate	→	↑	→	↓	→	↗	↑	
Ammonium Hydroxide, 3 Molar	↑	↑	→	↓	↑	↑	↗	
Ammonium Hydroxide, Concentrated	↓	↑	↓	↓	↓	↑	↗	
Ammonium Iodide	↑	↑	↑	↑	↑		↑	
Ammonium Lactate	→	↑	→	↓	→	↗	↑	
Ammonium Metaphosphate	→	↑	→	↓	→	↗	↑	
Ammonium Molybdenate	→	↑	→	↓	→	↗	↑	
Ammonium Nitrate, 2N	↑	↑			↑			
Ammonium Nitrite	↑	↑			↑	↗	↑	
Ammonium Oxalate	→	↑	→	↓	→	↗	↑	
Ammonium Perchlorate	→	↑	→	↓	→	↗	↑	
Ammonium Perchloride							↑	
Ammonium Persulfate 10%	↓	↑		↓	↓			
Ammonium Persulfate Solution	↓	↑		↓	↓		↑	
Ammonium Phosphate	↑	↑	↓		↑	↑	↑	
Ammonium Phosphate, Dibasic	↑	↑			↑	↑	↑	
Ammonium Phosphate, Mono-Basic	↑	↑			↑	↑	↑	
Ammonium Phosphate, Tribasic	↑	↑			↑	↑	↑	
Ammonium Phosphite	→	↑	→	↓	→	↗	↑	
Ammonium Picrate	→	↑	→	↓	→	↗	↑	
Ammonium Polysulfide	→	↑	→	↓	→	↗	↑	
Ammonium Salicylate	→	↑	→	↓	→	↗	↑	
Ammonium Salts	↑	↑	→		↑	↑	↑	
Ammonium Sulfamate	→	↑	→	↓	→	↗	↑	

	NBR	EPDM	FPM	TPU	HNBR	MVQ	FFPM	PTFE
Ammonium Sulfate	↑	↑	↓		↑		↑	↑
Ammonium Sulfate Nitrate	↑	↑	↓		↑		↑	
Ammonium Sulfide	↗	↑	↓	↓	↗		↑	
Ammonium Sulfite	→	↑	→	↓	→	↗	↑	
Ammonium Thiocyanate	→	↑	→	↓	→	↗	↑	
Ammonium Thioglycolate	→	↑	→	↓	→	↗	↑	
Ammonium Thiosulfate	→	↑	→	↓	→	↗	↑	
Ammonium Tungstate	→	↑	→	↓	→	↗	↑	
Ammonium Valerate	→	↑	→	↓	→	↗	↑	
Amyl Acetate	↓	↗	↓	↓	↓	↓	↑	↑
Amyl Alcohol	↗	↑	↗	↓	↗	↓	↑	↑
Amyl Borate	↑	↓	↑		↑		↑	
Amyl Butyrate	↑	↓	↑	↑	↑	↗	↑	
Amyl Chloride	↓	↓	↑		↓	↓	↑	
Amyl Chloronaphthalene	↓	↓	↑		↓	↓	↑	
Amyl Cinnamic Aldehyde	↗	↓	↑	→	↗		↑	
Amyl Laurate	↗	↓	↑	→	↗		↑	
Amyl Mercaptan	↗	↓	↑	→	↗		↑	
Amyl Naphthalene	↓	↓	↑	↓	↓	↓	↑	
Amyl Nitrate	→	↑	→	↓	→	↗	↑	
Amyl Nitrite	→	↑	→	↓	→	↗	↑	
Amyl Phenol							↑	
Amyl Propionate	↑	↓	↑	↑	↑	↗	↑	
AN-O-3 Grade M	↑	↓	↑	↑	↑	↗	↑	
AN-O-366	↑	↓	↑	↑	↑	↓	↑	
AN-O-6	↑	↓	↑	↑	↑	↓	↑	
AN-VV-O-366b Hydr. Fluid	↑	↓	↑	↗	↑	↓	↑	
Anderol, L- 826 (di-ester)	↗	↓	↑	↓	↗	↓	↑	
Anderol, L- 829 (di-ester)	↗	↓	↑	↓	↗	↓	↑	
Anderol, L-774 (di-ester)	↗	↓	↑	↓	↗	↓	↑	
ANG-25 (Di-ester Base) (TG749)	↗	↓	↑	↓	↗	↗	↑	
ANG-25 (Glyceral Ester)	↗	↑	↑	↓	↗	↗	↑	
Aniline	↓	↗	→	↓	↓	↓	↑	↑
Aniline Dyes	↓	↗	↗	↓	↓	→	↑	
Aniline Hydrochloride	↗	↗	↗	↓	↗	→	↑	
Aniline Oil	↓	↗	→	↓	↓	↓	↗	
Aniline Sulfate	→	↑	→	↓	→	↗	↑	
Aniline Sulfite	→	↑	→	↓	→	↗	↑	
Animal Fats	↑	↗	↑	↑	↑		↑	
Animal Oil (Lard Oil)	↑	↗	↑	↗	↑	↗	↑	
Anisole	↓	↓	↓	↓	↓		↑	↑
Anisoyl Chloride							↑	
Ansul Ether 161 or 181	→	→	↓	↗	→	↓	↑	
Anthracene	↗	↓	↑	→	↗		↑	
Anthranilic Acid							↑	

↑ excellent
↗ fair (OK for static seals)
→ questionable
↓ poor

	NBR	EPDM	FPM	TPU	HNBR	MVQ	FFPM	PTFE
Anthraquinone							↑	
Anti-freeze Solutions	→	↑	→	↓	→	↗	↑	↑
Antimony Chloride	↑	↗	↑	→	↑	↓	↑	
Antimony Pentachloride	↑	↓	↑	↑	↑	↓	↑	
Antimony Pentafluoride							↗	
Antimony Sulfate							↑	
Antimony Tribromide	↑	↓	↑	↑	↑	↓	↑	
Antimony Trichloride	↑	↓	↑	↑	↑	↓	↑	
Antimony Trifluoride	↑	↓	↑	↑	↑	↓	↑	
Antimony Trioxide	↑	↓	↑	↑	↑	↓	↑	
Aqua Regia	↓	→	↗		→		↗	↑
Arachidic Acid							↑	
Argon	↑	↑	↑	↑	↑	↑	↑	
Aroclor, 1248	→	↗	↑	↓	→	↗	↑	
Aroclor, 1254	↓	↗	↑	↓	↓	→	↑	
Aroclor, 1260	↑		↑	↓	↑	↑	↑	
Aromatic Fuel -50%	↗	↓	↑	→	↗	↓	↑	
Arsenic Acid	↑	↑	↑	→	↑	↑	↑	↑
Arsenic Oxide							↑	
Arsenic Trichloride	↑	↓	↓		↑		↑	
Arsenic Trioxide	↑	↓	↓		↑		↑	
Arsenic Trisulfide	↑	↓	↓		↑		↑	
Arsenites							↑	
Arsine							↑	
Aryl Orthosilicate							↑	
Ascorbic Acid	→	↑	→	↓	→	↗	↑	
Askarel Transformer Oil	↗	↓	↑	↓	↗	↓	↑	
Aspartic Acid	→	↑	→	↓	→	↗	↑	
Asphalt	↗	↓	↑	↗	↗	↓	↑	↑
ASTM Oil, No. 1	↑	↓	↑	↗	↑	↑	↑	↑
ASTM Oil, No. 2	↑	↓	↑	↗	↑	↓	↑	↑
ASTM Oil, No. 3	↑	↓	↑	↗	↑	→	↑	↑
ASTM Oil, No. 4	↗	↓	↑	↓	↗	↓	↑	
ASTM Oil, No. 5	↑	↓	↑		↑		↑	
ASTM Reference Fuel A	↑	↓	↑	↑	↑	↓	↑	↑
ASTM Reference Fuel B	↑	↓	↑	→	↑	↓	↑	↑
ASTM Reference Fuel C	↗	↓	↑	↓	↗	↓	↑	↑
ASTM Reference Fuel D	↗	↓	↑		↗		↑	
ATL-857	↗	↓	↑	↓	↗	↓	↑	
Atlantic Dominion F	↑	↓	↑	↗	↑	↓	↑	
Atlantic Utro Gear-e	↑	↓	↑		↑		↑	
Atlantic Utro Gear-EP Lube	↑	↓	↑	↑	↑	↓	↑	
Aure 903R (Mobil)	↑	↓	↑	↑	↑	↓	↑	
AUREX 256							↑	

	NBR	EPDM	FPM	TPU	HNBR	MVQ	FFPM	PTFE
Automatic Transmission Fluid (ATF)	↑	↓	↑	↗	↑	↓	↑	↑
Automotive Brake Fluid	→	↑	↓	↓	→	→	↑	↑
AXAREL 9100							↑	
Azobenzene							↑	
Bardol B	↓	↓	↑	↓	↓	↓	↑	
Barium Carbonate	→	↑	→	↓	→	↗	↑	
Barium Chlorate	→	↑	→	↓	→	↗	↑	
Barium Chloride	↑	↑	↑	↑	↑	↑	↑	
Barium Cyanide	↑	↑	↑	↑	↑	↑	↑	
Barium Hydroxide	↑	↑	↑	↓	↑	↑	↑	↑
Barium Iodide	↑	↑	↑	↑	↑	↑	↑	
Barium Nitrate	→	↑	→	↓	→	↗	↑	
Barium Oxide	↑	↑	↑	↓	↑	↑	↑	
Barium Peroxide	→	↑	→	↓	→	↗	↑	
Barium Polysulfide	→	↑	→	↓	→	↗	↑	
Barium Salts	↑	↑	↑	↑	↑	↑	↑	↑
Barium Sulfate	↑	↑	↑	↑	↑		↑	
Barium Sulfide	↑	↑	↑	↑	↑	↑	↑	
Bayol 35	↑	↓	↑	↗	↑	↓	↑	
Bayol D	↑	↓	↑	↓	↑	↓	↑	
Beer	↑	↑	↑	→	↑	↑	↑	↑
Beet Sugar Liquids	↑	↑	↑		↑		↑	
Beet Sugar Liquors	↑	↑	↑	↓	↑	↑	↑	
Benzaldehyde	↓	↗	↓	↓	↓	↗	↑	↑
Benzaldehyde Disulfonic Acid							↑	
Benzamide	↗	↓	↑	→	↗		↑	
Benzanthrone	↗	↓	↑	→	↗		↑	
Benzene	↓	↓	↑	↓	↓	↓	↑	↑
Benzene Hexachloride							↑	
Benzenesulfonic Acid 10%	↓	↓	↑	↓	↓	↓	↑	
Benzidine	↗	↓	↑	→	↗		↑	
Benzidine 3 Sulfonic Acid	↗	↓	↑	→	↗		↑	
Benzil	↗	↓	↑	→	↗		↑	
Benzilic Acid	↗	↓	↑	→	↗		↑	
Benzine (Ligroin)	↑	↓	↑	↗	↑	↓	↑	
Benzocatechol	↗	↓	↑	→	↗		↑	
Benzochloride	↓	↑	↑		↓		↑	
Benzoic Acid	↓	↓	↑	↓	↓	↓	↑	↑
Benzoin	↗	↓	↑	→	↗		↑	
Benzonitrile	→	↑	→	↓	→	↗	↑	
Benzophenone		↗	↑	↓			↑	
Benzoquinone		↗	↑	↓			↑	
Benzotrichloride	↓	↑	↑		↓		↑	
Benzotrifluoride	↓	↑	↑		↓		↑	

	NBR	EPDM	FPM	TPU	HNBR	MVQ	FFPM	PTFE
Benzoyl Chloride			↑	→			↑	
Benzoyl Peroxide							↑	
Benzoylsulfonilic Acid	↗	↓	↑	→	↗		↑	
Benzyl Acetate	→	↑	→	↓	→	↗	↑	
Benzyl Alcohol	↓	↗	↑	↓	↓	↗	↑	↑
Benzyl Amine							↑	
Benzyl Benzoate	↓	↓	↑	↓	↓	↓	↑	
Benzyl Bromide	↓	↓	↑	↓	↓	↓	↑	
Benzyl Butyl Phthalate	→	↑	→	↓	→	↗	↑	
Benzyl Chloride	↓	↓	↑	↓	↓	↓	↑	
Benzyl Phenol	↗	↓	↑	→	↗		↑	
Benzyl Salicylate	↗	↓	↑	→	↗		↑	
Beryllium Chloride	↑	↑	↑	→	↑	→	↑	
Beryllium Fluoride	↑	↑	↑	→	↑	→	↑	
Beryllium Oxide	↑	↑	↑	→	↑	→	↑	
Beryllium Sulfate	→	↑	→	↓	→	↗	↑	
Bismuth Carbonate	→	↑	→	↓	→	↗	↑	
Bismuth Nitrate	→	↑	→	↓	→	↗	↑	
Bismuth Oxychloride	→	↑	→	↓	→	↗	↑	
Bittern							↑	
Black Liquor	↗	↗	↗	↓	↗		→	↑
Black Point 77	↑	↑	↑	→	↑	→	↑	
Blast Furnace Gas	↓	↓	↑	↓	↓	↑	↑	↑
Bleach Liquor	→	↑	↑	↓	→	↗	↑	
Bleach Solutions	↓	↑	↑	↓	↓		↑	
Borax	↗	↑	↑	↗	↗	↗	↑	
Borax Solutions	↗	↑	↗	↓	↗		↑	
Bordeaux Mixture	↗	↑	↑	↓	↗	↗	↑	
Boric Acid	↑	↑	↑	↗	↑	↑	↑	
Boric Oxide	→	↑	→	↓	→	↗	↑	
Borneol	↗	↓	↑	→	↗		↑	
Bornyl Acetate	↗	↓	↑	→	↗		↑	
Bornyl Chloride	↗	↓	↑	→	↗		↑	
Bornyl Formate	↗	↓	↑	→	↗		↑	
Boron Fluids (HEF)	↗	↓	↑	↓	↗	↓	↑	
Boron Hydride							↑	
Boron Phosphate							↑	
Boron Tribromide							↑	
Boron Trichloride							↑	
Boron Trifluoride							↑	
Boron Trioxide							↑	
Brake Fluid DOT3 (Glycol Type)	→	↑	↓	↓	→	→	↑	↑
Bray GG-130	↗	↓	↑	↓	↗	↓	↑	
Brayco 719-R (VV-H-910)	→	↑	↓	↓	→	↗	↑	
Brayco 885 (MIL-L-6085A)	↗	↓	↑	↑	↗	↓	↑	

	NBR	EPDM	FPM	TPU	HNBR	MVQ	FFPM	PTFE
Brayco 910	↗	↑	↓	→	↗	↓	↑	
Bret 710	↗	↑	↓	→	↗	↓	↑	
Brine	↑	↑	↑		↑		↑	
Brine (Seawater)	↑	→	↑		↑		↑	
Brom - 113	→	↓			→	↓		
Brom - 114	↗	↓	↗		↗	↓	↑	
Bromic Acid	→	↑	→	↓	→	↗	↑	
Bromine	↓	↓	↗	↓	↓	↓	↑	
Bromine Pentafluoride	↓	↓	↓	↓	↓	↓	↗	
Bromine Trifluoride	↓	↓	↓	↓	↓	↓	↗	
Bromine Water	↓	↗	↑	↓	↓	↓	↑	
Bromobenzene	↓	↓	↑	↓	↓	↓	↑	
Bromobenzene Cyanide	→	↑	→	↓	→	↗	↑	
Bromochlorotrifluoroethane (Halothane)	↓	↓	↑	↓	↓	↓	↑	
Bromoform	↗	↓	↑	→	↗		↑	
Bromomethane (Methyl Bromide)	↗	↓	↑		↗		↑	
Bromotrifluoroethylene (BFE)							↑	
Bromotrifluoromethane (F-13B1)							↗	
Brucine Sulfate	→	↑	→	↓	→	↗	↑	
Buffered Oxide Etchants							↑	
Bunker Oil	↗	↓	↑	↗	↗	↗	↑	↑
Bunker's "C" (Fuel Oil)	↑		↑				↑	
Butadiene (Monomer)	↓	↓	↗	↓	↓	↓	↑	↑
Butane	↑	↓	↑	↗	↑	↓	↑	↑
Butane, 2, 2-Dimethyl	↑	↓	↑	↓	↑	↓	↑	
Butane, 2, 3-Dimethyl	↑	↓	↑	↓	↑	↓	↑	
Butanediol	↗	↑	→	↓	↗	↗	↑	↑
Butanol (Butyl Alcohol)	↑	↗	↑	↓	↑	↗	↑	
Butene 2-Ethyl (1-Butene 2-Ethyl)	↑	↓	↑	↓	↑	↓	↑	
Butter-Animal Fat	↑	↗	↑	↗	↑	↗	↑	↑
Butyl Acetate or n-Butyl Acetate	↓	↗	↓	↓	↓	↓	↑	↑
Butyl Acetyl Ricinoleate	↗	↑	↑	↓	↗		↑	
Butyl Acrylate	↓	↓	↓		↓	↗	↑	
Butyl Alcohol	↑	↗	↑	↓	↑	↗	↑	↑
Butyl Alcohol (Secondary)	↗	↗	↑	↓	↗	↗	↑	
Butyl Alcohol (Tertiary)	↗	↗	↑	↓	↗	↗	↑	
Butyl Amine or N-Butyl Amine	↑	→	↓	↓	↑	↓	↑	
Butyl Benzoate	→	↑	→	↓	→	↗	↑	
Butyl Benzoate or n-Butyl Benzoate	↓	↑	↑		↓		↑	
Butyl Benzolate							↑	
Butyl Butyrate or n-Butyl Butyrate	↓	↑	↑		↓		↑	

↑ excellent
↗ fair (OK for static seals)
→ questionable
↓ poor

	NBR	EPDM	FPM	TPU	HNBR	MVQ	FFPM	PTFE
Butyl Carbitol	↓	↑	→		↓	↓	↑	
Butyl Cellosolve	→	↗	↓	↓	→		↑	
Butyl Cellosolve Acetate	→	↑	→	↓	→	↗	↑	
Butyl Cellosolve Adipate	↓	↗	↗	↓	↓	↗	↑	
Butyl Chloride	↑	↓	↑	↑	↑	↗	↑	
Butyl Ether or n-Butyl Ethe	↓	→	→	→	→	↓	↑	
Butyl Glycolate	→	↑	→	↓	→	↗	↑	
Butyl Lactate	→	↑	→	↓	→	↗	↑	
Butyl Laurate	→	↑	→	↓	→	↗	↑	
Butyl Mercaptan (Tertiary)	5	↓	↓	↓	↓	↓	↑	
Butyl Methacrylate	→	↑	→	↓	→	↗	↑	
Butyl Oleate	↓	↗	↑		↓		↑	
Butyl Oxalate	→	↑	→	↓	→	↗	↑	
Butyl Stearate	↗	↓	↑	↑	↗		↑	
Butylbenzoic Acid	↗	↓	↑	→	↗		↑	
Butylene	↗	↓	↑	↓	↗	↓	↑	↑
Butyraldehyde	↓	↗	↓	↓	↓	↓	↑	↑
Butyric Acid	↗	→	↗	↓	↗		↑	↑
Butyric Anhydride	→	↑	→	↓	→	↗	↑	
Butyrolacetone	→	↑	→	↓	→	↗	↑	
Butyryl Chloride	↗	↓	↑	→	↗		↑	
Cadmium Chloride	→	↑	→	↓	→	↗	↑	
Cadmium Cyanide	→	↑	→	↓	→	↗	↑	
Cadmium Nitrate	→	↑	→	↓	→	↗	↑	
Cadmium Oxide	→	↑	→	↓	→	↗	↑	
Cadmium Sulfate	→	↑	→	↓	→	↗	↑	
Cadmium Sulfide	→	↑	→	↓	→	↗	↑	
Calcine Liquors	↑	↑	↑	↓	↑		↑	
Calcium Acetate	↗	↑	↓	↗	↗	↓	↑	
Calcium Arsenate	→	↑	→	↓	→	↗	↑	
Calcium Benzoate	↗	↓	↑	→	↗		↑	
Calcium Bicarbonate	→	↑	→	↓	→	↗	↑	
Calcium Bisulfide	→	↑	→	↓	→	↗	↑	
Calcium Bisulfite	↗	↑	↗	→	↗	→	↑	↑
Calcium Bromide	↑	↑	↑	↑	↑	↑	↑	
Calcium Carbide							↑	
Calcium Carbonate	↑	↑	↑	↑	↑	↑	↑	
Calcium Chlorate	→	↑	→	↓	→	↗	↑	
Calcium Chloride	↑	↑	↑	↗	↑	↑	↑	↑
Calcium Chromate	→	↑	→	↓	→	↗	↑	
Calcium Cyanamide							↑	
Calcium Cyanide	↑	↑			↑	↑	↑	
Calcium Fluoride	↑	↑	↑	↑	↑	↑	↑	
Calcium Gluconate	→	↑	→	↓	→	↗	↑	
Calcium Hydride	↑	↑	↑	↑	↑	↑	↑	

	NBR	EPDM	FPM	TPU	HNBR	MVQ	FFPM	PTFE
Calcium Hydrosulfide	→	↑	→	↓	→	↗	↑	
Calcium Hydroxide	↑	↑	↑	↗	↑	↑	↑	↑
Calcium Hypochlorite	↗	↑	↑	↓	↗	↗	↑	
Calcium Hypophosphite	→	↑	→	↓	→	↗	↑	
Calcium Lactate	→	↑	→	↓	→	↗	↑	
Calcium Naphthenate							↑	
Calcium Nitrate	↑	↑	↑	↗	↑	↗	↑	↑
Calcium Oxalate	→	↑	→	↓	→	↗	↑	
Calcium Oxide	↑	↑	↑	↑	↑	↑	↑	
Calcium Permanganate							↑	
Calcium Peroxide							↑	
Calcium Phenolsulfonate	→	↑	→	↓	→	↗	↑	
Calcium Phosphate	↑	↑	↑	↑	↑	↑	↑	↑
Calcium Phosphate Acid	→	↑	→	↓	→	↗	↑	
Calcium Propionate	→	↑	→	↓	→	↗	↑	
Calcium Pyridine Sulfonate							↑	
Calcium Salts	↑	↑	↑	↑	↑	↗	↑	
Calcium Silicate	↑	↑	↑		↑		↑	
Calcium Stearate	↗	↓	↑	→	↗		↑	
Calcium Sulfamate	↗	↓	↑	→	↗		↑	
Calcium Sulfate	↑	↑	↑	↑	↑	↗	↑	
Calcium Sulfide	↑	↑	↑	↑	↑	↑	↑	
Calcium Sulfite	↑	↑	↑	↑	↑	↑	↑	
Calcium Thiocyanate	→	↑	→	↓	→	↗	↑	
Calcium Thiosulfate	↗	↑	↑	↑	↗	↑	↑	
Calcium Tungstate	→	↑	→	↓	→	↗	↑	
Caliche Liquors	↑	↑	↑	↑	↑	↗	↑	
Camphene	↗	↓	↑	→	↗		↑	
Camphor	↗	↓	↑	→	↗		↑	↑
Camphoric Acid	↗	↓	↑	→	↗		↑	
Cane Sugar Liquors	↑	↑	↑	↓	↑	↑	↑	
Capric Acid	↑	↓	↑	↑	↑	↗	↑	
Caproic Acid	↑	↓	↑	↑	↑	↗	↑	
Caproic Aldehyde		↗	↓	↓		↗	↑	
Caprolactam	↑	↓	↑	↑	↑	↗	↑	
Capronaldehyde	↑	↓	↑	↑	↑	↗	↑	
Carbamate	→	↗	↑	↓	→		↑	
Carbazole							↑	
Carbitol	↗	↗	↗	↓	↗	↗	↑	
Carbolic Acid (Phenol)	↓	↗	↑	→	↓	↓	↑	
Carbon Bisulfide	↓	↓	↑		↓	↓	↑	
Carbon Dioxide	↑	↑	↑	↑	↑	↑	↑	↑
Carbon Dioxide (Explosive Decompression Use)	↑	↑	↑	↑	↑	↑	↑	
Carbon Disulfide	↓	↓	↑		↓	↓	↑	↑
Carbon Fluorides	↗	↓	↑	↓	↗	↓	↑	

↑ excellent
↗ fair (OK for static seals)
→ questionable
↓ poor

	NBR	EPDM	FPM	TPU	HNBR	MVQ	FFPM	PTFE
Chloro 1-Nitro Ethane (1-Chloro 1-Nitro Ethane)	↓	↓	↓	↓	↓	↓	↑	
Chloro Acetaldehyde	↓	↑	↓	↓	↓	↗	↗	
Chloro Oxyfluorides							↗	
Chloro Xylenols	↗	↓	↑	→	↗		↑	
Chloroacetic Acid	↓	↗	↓	↓	↓		↑	↑
Chloroacetone	↓	↑	↓	↓	↓	↓	↑	
Chloroacetyl Chloride							↑	
Chloroamino Benzoic Acid	→	↑	→	↓	→	↗	↑	
Chloroaniline	→	↑	→	↓	→	↗	↑	
Chlorobenzaldehyde	→	↑	→	↓	→	↗	↑	
Chlorobenzene	↓	↓	↗	↓	↓	↓	↑	↑
Chlorobenzene (Mono)	↓	↓	↑	↓	↓	↓	↑	
Chlorobenzene Chloride	↗	↓	↑	→	↗		↑	
Chlorobenzene Trifluoride	↗	↓	↑	→	↗		↑	
Chlorobenzochloride	↗	↓	↑	→	↗		↑	
Chlorobenzotrifluoride	↗	↓	↑	→	↗		↑	
Chlorobromo Methane	↓	↗	↑	↓	↓	↓	↑	
Chlorobromopropane	↗	↓	↑	→	↗		↑	
Chlorobutadiene	↓	↓	↗	↓	↓	↓	↑	
Chlorobutane (Butyl Chloride)	↑	↓	↑	↑	↑	↗	↑	
Chlorododecane	↓	↓	↑	↓	↓	↓	↑	
Chloroethane	↑	↓	↑	↑	↑	↗	↑	
Chloroethane Sulfonic Acid	→	↑	→	↓	→	↗	↑	
Chloroethylbenzene	↗	↓	↑	→	↗		↑	
Chloroform	↓	↓	↗	↓	↓	↓	↑	↑
Chlorohydrin	→	↑	→	↓	→	↗	↑	
Chloronaphthalene or o-Chloronaphthalene	↓	↓	↑	↓	↓	↓	↑	
Chloronitrobenzene	→	↑	→	↓	→	↗	↑	
Chlorophenol or o-Chlorophenol	↓	↓	↑	↓	↓	↓	↑	
Chloropicrin	↗	↓	↑	→	↗		↑	
Chloroprene	↗	↓	↑	→	↗		↑	
Chlorosilanes							↑	
Chlorosulfonic Acid	↓	→	↓	↓	↓	↓	↑	↑
Chlorotoluene	↓	↓	↑	↓	↓	↓	↑	
Chlorotoluene Sulfonic Acid	→	↑	→	↓	→	↗	↑	
Chlorotoluidine	↗	↓	↑	→	↗		↑	
Chlorotrifluoroethylene (CTFE)							↗	
Chlorox	↗	↗	↑	↓	↗		↑	
Chloroxylols							↑	
Cholesterol	↗	↓	↑	→	↗		↑	
Chrome Alum	↑	↑	↑		↑	↑	↑	
Chrome Plating Solutions	↓	↗	↑	↓	↓	↗	↑	
Chromic Acid	↓	↗	↑	↓	↓		↑	↑

	NBR	EPDM	FPM	TPU	HNBR	MVQ	FFPM	PTFE
Carbon Monoxide	↑	↑	↗	↑	↑	↑	↑	↑
Carbon Tetrabromide							↑	
Carbon Tetrachloride	↗	↓	↑	↓	↗	↓	↑	↑
Carbon Tetrafluoride	↗	↓	↑	↓	↗	↓	↑	
Carbonic Acid	↑	↑	↑	↗	↑	↑	↑	
Casein	↑	↗	↑	↓	↑	↗	↑	
Castor Oil	↑	↗	↑	↑	↑	↑	↑	
Caustic Lime	→	↑	→	↓	→	↗	↑	
Caustic Potash	→	↑	→	↓	→	↗	↑	
Caustic Soda (Sodium Hydroxide)	→	↑	→	↓	→	↗	↑	
Cellosolve	↓	↗	↓	↓	↓	↓	↑	↑
Cellosolve, Acetate	↓	↗	↓	↓	↓	↓	↑	
Cellosolve, Butyl	↓	↗	↓	↓	↓	↓	↑	
Celluguard	↑	↑	↑	↓	↑	↑	↑	
Cellulose Acetate	→	↗	→	↑	→	↗	↑	
Cellulose Acetate Butyrate	→	↑	→	↓	→	↗	↑	
Cellulose Ether	→	↑	→	↓	→	↗	↑	
Cellulose Nitrate *	→	↑	→	↓	→	↗	↑	
Cellulose Tripropionate	→	↑	→	↓	→	↗	↑	
Cellulube (Phosphate Esters)							↑	
Cellutherm 2505A	↗	↓	↑	↓	↗	↓	↑	
Cerium Sulfate	→	↑	→	↓	→	↗	↑	
Cerous Chloride	→	↑	→	↓	→	↗	↑	
Cerous Fluoride	→	↑	→	↓	→	↗	↑	
Cerous Nitrate	→	↑	→	↓	→	↗	↑	
Cetane (Hexadecane)	↑	↓	↑	↓	↑	↓	↑	
Cetyl Alcohol	↑	↓	↑	↑	↑	↗	↑	
Chaulmoogric Acid							↑	
China Wood Oil (Tung Oil)	↑	↓	↑	→	↑	↓	↑	
Chloral	→	↑	→	↓	→	↗	↑	
Chloramine							↑	↑
Chloranthraquinone	↗	↓	↑	→	↗		↑	
Chlordane	↗	↓	↑		↗	↓	↑	
Chlorextol	↗	↓	↑	↓	↗	↓	↑	
Chloric Acid	↓	↗	↗	↓	↓	↗	↑	↑
Chlorinated Solvents, Dry	↓	↓	↑	↓	↓	↓	↑	
Chlorinated Solvents, Wet	↓	↓	↑	↓	↓	↓	↑	
Chlorine (Dry)	↗	↓	↑	→	↗		↑	↑
Chlorine (Plasma)							↗	
Chlorine (Wet)							↗	↑
Chlorine Dioxide	↓	→	↑	↓	↓		↑	
Chlorine Dioxide, 8% Cl as NaClO2 in solution	↓	↓	↑	↓	↓		↑	
Chlorine Trifluoride	↓	↓	↓	↓	↓	↓	↗	
Chlorine Water	↓	↗	↑	↓	↓		↑	↑

↑ excellent
↗ fair (OK for static seals)
→ questionable
↓ poor

	NBR	EPDM	FPM	TPU	HNBR	MVQ	FFPM	PTFE
Chromic Chloride							↑	
Chromic Fluorides							↑	
Chromic Hydroxide							↑	
Chromic Nitrates							↑	
Chromic Oxide	↓	↗	↑		↓		↑	
Chromic Phosphate							↑	
Chromic Sulfate							↑	
Chromium Potassium Sulfate (Alum)	↗	↗	↑				↑	
Chromyl Chlorides							↑	
Cinnamic Acid	↗	↓	↑	→	↗		↑	
Cinnamic Alcohol	↗	↓	↑	→	↗		↑	
Cinnamic Aldehyde	↗	↓	↑	→	↗		↑	
Citric Acid	↑	↑	↑	↓	↑	↑	↑	↑
City Service #65 #120 #250	↑	↓	↑	↗	↑	↓	↑	
City Service Koolmoter-AP Gear Oil 140-EP Lube	↑	↓	↑	↑	↑	↓	↑	
City Service Pacemaker #2	↑	↓	↑	↗	↑	↓	↑	
Coal Tar	↗	↓	↗	↓	↗		↑	
Cobalt Chloride	↑	↑	↑	↑	↑	↗	↑	
Cobalt Chloride, 2N	↑	↑	↑	↓	↑	↑	↑	
Cobaltous Acetate	→	↑	→	↓	→	↗	↑	
Cobaltous Bromide	↑	↑	↑	↓	↑	↑	↑	
Cobaltous Linoleate							↑	
Cobaltous Naphthenate							↑	
Cobaltous Sulfate	→	↑	→	↓	→	↗	↑	
Coconut Oil	↑	↓	↑	↑	↑	↑	↑	↑
Cod Liver Oil	↑	↑	↑	↑	↑	↗	↑	↑
Codeine	↗	↓	↑	→	↗		↑	
Coffee	↑	↑	↑	↓	↑	↑	↑	
Coke Oven Gas	↓	↓	↑	↓	↓	↗	↑	
Convelex 10	↓			↗	↓	↓		
Coolanol 20 25R 35R 40& 45A (Monsanto)	↑	→	↑	↑	↑	↓	↑	
Copper Acetate	↗	↑	↓	↓	↗	↓	↑	
Copper Ammonium Acetate	↓	↗	↓	↓	↓	↗	↑	
Copper Carbonate	→	↑	→	↓	→	↗	↑	
Copper Chloride	↑	↑	↑	↑	↑	↑	↑	↑
Copper Cyanide	↑	↑	↑	↗	↑	↑	↑	
Copper Gluconate	→	↑	→	↓	→	↗	↑	
Copper Naphthenate							↑	
Copper Nitrate	↗	↑	↑	↓	↗		↑	↑
Copper Oxide	↑	↑	↑	↑	↑	↑	↑	
Copper Salts	↑	↑	↑	↑	↑	↑	↑	
Copper Sulfate	↑	↑	↑	↑	↑	↑	↑	↑
Copper Sulfate 10%	↑	↑	↑	↗	↑	↑	↑	↑

↑ excellent
↗ fair (OK for static seals)
→ questionable
↓ poor

	NBR	EPDM	FPM	TPU	HNBR	MVQ	FFPM	PTFE
Copper Sulfate 50%	↑	↑	↑	→	↑	↑	↑	↑
Corn Oil	↑	↓	↑	↑	↑	↑	↑	↑
Cottonseed Oil	↑	↓	↑	↑	↑	↑	↑	↑
Creosote, Coal Tar	↑	↓	↑	→	↑	↓	↑	
Creosote, Wood	↑	↓	↑	→	↑	↓	↑	
Cresol (Methyl Phenol)			↑				↑	
Cresols	↓	↓	↗		↓	↓	↑	↑
Cresylic Acid	↓	↓	↑	↓	↓	↓	↑	
Crotonaldehyde	↓	↑	↓	→	↓		↑	↑
Crotonic Acid	↗	↓	↑	→	↗		↑	
Crude Oil	↗	↓	↑	↓	↗	↓	↑	↑
Cumaldehyde	↗	↓	↑	→	↗		↑	
Cumene	↓	↓	↑	↓	↓	↓	↑	
Cumene Hydroperoxide							↑	
Cupric Sulfate	↗	↗	↑				↑	
Cutting Oil	↑	↓	↑	↑	↑	↓	↑	
Cyanamide							↑	
Cyanides							↑	
Cyanogen Chloride							↑	
Cyanogen Gas							↑	
Cyanohydrin							↑	
Cyanuric Chloride							↑	
Cyclohexane	↑	↓	↑	↑	↑	↓	↑	↑
Cyclohexanol	↑	↓	↑		↑	↓	↑	↑
Cyclohexanone	↓	↓	↓	↓	↓	↓	↑	↑
Cyclohexene	↗	↓	↑	→	↗		↑	
Cyclohexylamine	↓	→	↓	↓	↓	↗	↑	↑
Cyclohexylamine Carbonate							↑	
Cyclohexylamine Laurate	↑	↓	↑	↑	↑	↗	↑	
Cyclopentadiene	↗	↓	↑	→	↗		↑	
Cyclopentane	↑	↓	↑	↑	↑	↓	↑	
Cyclopolyolefins	↑	↓	↑	↑	↑	↓	↑	
Cymene or p-Cymene	↓	↓	↑	↓	↓	↓	↑	
DDT (Dichlorodiphenyltrichloroethane)	↗	↓	↑	→	↗		↑	
Decalin	↓	↓	↑		↓	↓	↑	
Decane	↑	↓	↑	↓	↑	↗	↑	
Delco Brake Fluid	→	↑	↓		→	→	↑	
Denatured Alcohol	↑	↑	↑	↓	↑	↑	↑	
Detergent, Water Solution	↑	↑	↑	↓	↑	↑	↑	↑
Developing Fluids	↑	↗	↑		↑	↑	↑	
Dexron	↑	↓	↑	↗	↑	↓	↑	
Dextrin	↑	↑	↑	↓	↑	↗	↑	↑
Dextro Lactic Acid	→	↑	→	↓	→	↗	↑	
Dextron	↑	↓	↑		↑		↑	
Dextrose	↗	↑	↗	→	↗	↗	↑	↑

↑ excellent
↗ fair (OK for static seals)
→ questionable
↓ poor

	NBR	EPDM	FPM	TPU	HNBR	MVQ	FFPM	PTFE
DI Water	↗	↑	↗	↓		↗	↑	
Di-ester Lubricant MIL-L-7808	↗	↓	↑	↓	↗	↓	↑	
Di-ester Synthetic Lubricants	↗	↓	↑	↓	↗	↓	↑	
Di-Tert-Butyl Peroxide							↑	
Diacetone	↓	↑	↓	→	↓	↓	↑	
Diacetone Alcohol	↓	↑	↓	↓	↓	↓	↑	↑
Dialkyl Sulfates	→	↑	→	↓	→	↗	↑	
Diallyl Ether							↑	
Diallyl Phthalate							↑	
Diamylamine	↗	→	↗	↓	↗	↗	↑	
Diazinon	→	↓	↗		→	↓	↑	
Dibenzyl (sym-Diphenylethane)	↗	↓	↑	→	↗		↑	
Dibenzyl Ether	↓	↗	→	↗	↓		↑	↑
Dibenzyl Sebacate	↓	↗	↗	↗	↓	→	↑	
Diborane							↑	
Dibromoethane	↗	↓	↑	→	↗		↑	
Dibromoethyl Benzene	↓	↓	↑	↓	↓	↓	↑	
Dibutyl Cellosolve Adipate	→	↑	→	↓	→	↗	↑	
Dibutyl Ether	↓	→	→	↗	↓	↓	↑	↑
Dibutyl Methylenedithio Glycolate	↗	↓	↑	→	↗		↑	
Dibutyl Phtalate	↓	↗	→	→	↓	↗	↑	↑
Dibutyl Sebacate	↓	↗	↗	↓	↓	↗	↑	↑
Dibutyl Thioglycolate	↗	↓	↑	→	↗		↑	
Dibutyl Thiourea	↗	↓	↑	→	↗		↑	
Dibutylamine	↓	↓	↓	↓	↓	→	↑	
Dichloroacetic Acid	→	↓	→	→	→		↑	↑
Dichloroaniline	→	↑	→	↓	→	↗	↑	
Dichlorobenzene or o-Dichlorobenzen	5	↓	↓	↓	↓	↓	↑	↑
Dichlorobutane	↗	↓	↑	↓	↗	↓	↑	
Dichlorobutene	↗	↓	↑	→	↗		↑	
Dichlorodiphenyl-Dichloroethane (DDD)	↗	↓	↑	→	↗		↑	
Dichloroethane	→	↓	↗	→	→		↑	↑
Dichloroethylene	→	↓	↗	↓	→		↑	↑
Dichlorohydrin	→	↑	→	↓	→	↗	↑	
Dichloroisopropyl Ether	↓	→	→	↗	↓	↓	↑	
Dichloromethane	→	↓	↗	→	→		↑	↑
Dichlorophenol	↗	↓	↑	→	↗		↑	
Dichlorophenoxyacetic Acid	↗	↓	↑	→	↗		↑	
Dichloropropane	↗	↓	↑	→	↗		↑	
Dichloropropene	↗	↓	↑	→	↗		↑	
Dichlorosilane							↑	
Dicyclohexylamine	↓	↓	↓	↓	↓	↗	↑	
Dicyclohexylammonium Nitrate	→	↑	→	↓	→	↗	↑	

↑ excellent
↗ fair (OK for static seals)
→ questionable
↓ poor

	NBR	EPDM	FPM	TPU	HNBR	MVQ	FFPM	PTFE
Dieldrin	↗	↓	↑	→	↗		↑	
Diesel Fuel	↑	↓	↑	↗	↑	↓	↑	↑
Diethanolamine (DEA)	→	↗	→	↓	→	↗	↑	
Diethyl Benzene	↓	↓	↑	↓	↓		↑	
Diethyl Carbonate	→	→	→	↓	→	↗	↑	
Diethyl Ether	↓	↓	↓	↗	↓	↓	↑	↑
Diethyl Phthalate	↗	↓	↑	→	↗		↑	
Diethyl Sebacate	↓	↗	↗	↓	↓	↗	↑	↑
Diethyl Sulfate	↓	↑	↓	↓	↓	↗	↑	
Diethylamine	↓	↗	↓	↓	↓	↗	↑	↑
Diethylaniline	→	↑	→	↓	→	↗	↑	
Diethylene Glycol	↑	↑	↑	↓	↑	↗	↑	↑
Diethylenetriamine	↓	↑	↓	↓	↓		↑	
Difluorodibromomethane	↓	↗		↓	↓	↓	↑	
Difluoroethane	↗	↓	↑	→	↗		↑	
Difluoromonochloroethane	↗	↓	↑	→	↗		↑	
Diglycol Chloroformate	→	↑	→	↓	→	↗	↑	
Diglycolic Acid	→	↑	↗	↓	→	↗	↑	↑
Dihydroxydiphenylsulfone	→	↑	→	↓	→	↗	↑	
Diisobutyl Ketone	↓	↑	↓	↓	↓		↑	↑
Diisobutylcarbinol	↑	↓	↑	↑	↑	↗	↑	
Diisobutylene	↗	↓	↑	↓	↗	↓	↑	
Diisooctyl Sebacate	→	→	↗	↓	→	→	↑	
Diisopropyl Ether (DIPE)							↑	
Diisopropyl Ketone	↓	↑	↓	↓	↓	↓	↑	
Diisopropylbenzene	↓	↓	↑	↓	↓		↑	
Diisopropylidene Acetone	↗	↓	↑	→	↗		↑	
Dimethyl Acetamide	→	↑	→	↓	→	↗	↑	
Dimethyl Ether	↓	↗	↓	↗	↓		↑	
Dimethyl Formaldehyde	→	↑	→	↓	→	↗	↑	
Dimethyl Formamide (DMF)	↗	↗	↓	↓	↗	↗	↑	
Dimethyl Phenyl Carbinol	↗	↓	↑	→	↗		↑	
Dimethyl Phenyl Methanol	↗	↓	↑	→	↗		↑	
Dimethyl Phthalate	↓	↗	↗		↓		↑	
Dimethyl Sulfoxide (DMSO)	→	↑	→	↓	→	↗	↑	
Dimethyl Terephthalate (DMT)	↗	↓	↑	→	↗		↑	
Dimethylamine (DMA)	↓	↗	↓	→	↓	↗	↑	↑
Dimethylaniline (Xylidine)	↓	→	→	↓	↓		↑	
Dimethyldisulfide (DMDS)	↑	↓	↑	↑	↑	↗	↑	
Dimethylhydrazine	↗	↑	→	↓	↗	↗	↑	
Dinitrochlorobenzene	↗	↓	↑	→	↗		↑	
Dinitrogen Tetroxide							↗	
Dinitrotoluene (DNT)	↓	↓	↓	↓	↓	↓	↑	
Dioctyl Phthalate	↓	↗	↗	→	↓	→	↑	↑
Dioctyl Sebacate	↓	↗	↗	↗	↓	→	↑	↑

↑ excellent
↗ fair (OK for static seals)
→ questionable
↓ poor

	NBR	EPDM	FPM	TPU	HNBR	MVQ	FFPM	PTFE
Dioctylamine	↑	↓	↑	↑	↑	↗	↑	
Dioxane	↓	↗	↓	↓	↓	↓	↑	↑
Dioxolane	↓	↗	↓	↓	↓	↓	↑	
Dipentene	↗	↓	↑	↓	↗	↓	↑	↑
Diphenyl	↓	↓	↑	↓	↓	↓	↑	↑
Diphenyl Oxides	↓	↓	↑	↓	↓	→	↑	↑
Diphenylamine (DPA)	↗	↓	↑	→	↗		↑	
Diphenylene Oxide							↑	
Diphenylpropane	↗	↓	↑	→	↗		↑	
Disilane							↑	
Dodecylbenzene	↗	↓	↑	→	↗		↑	
Dow Chemical 50-4		↑	↓				↗	
Dow Chemical ET378	↓			↗	↓	↓		
Dow Chemical ET588	→	↑	↓		→		↗	
Dow Corning -11	↗	↑	↑	↑	↗	↗	↑	
Dow Corning -1265 Fluorosilicone Fluid	↗	↑	↑	↑	↗	↑	↑	
Dow Corning -200	↗	↑	↑	↑	↗	→	↑	
Dow Corning -220	↑	↑	↑		↑		↑	
Dow Corning -3	↗	↑	↑	↑	↗	↗	↑	
Dow Corning -33	↗	↑	↑	↑	↗	→	↑	
Dow Corning -4	↗	↑	↑	↑	↗	↗	↑	
Dow Corning -44	↗	↑	↑	↑	↗	→	↑	
Dow Corning -5	↗	↑	↑	↑	↗	→	↑	
Dow Corning -510	↗	↑	↑	↑	↗	→	↑	
Dow Corning -55	↗	↑	↑	↑	↗	→	↑	
Dow Corning -550	↗	↑	↑	↑	↗	→	↑	
Dow Corning -704	↗	↑	↑	↑	↗	→	↑	
Dow Corning -705	↗	↑	↑	↑	↗	→	↑	
Dow Corning -710	↗	↑	↑	↑	↗	→	↑	
Dow Corning 1208, 4050, 6620, F-60, XF-60	↑	↑	↑		↑		↑	
Dow Corning F-61	↑	↑	↑		↑		↑	
Dow Guard	↑	↑	↑	→	↑	↑	↑	
Dowanol P Mix							↑	
Dowtherm, 209	→	↑	↓		→	→	↑	
Dowtherm, A	↓	↓	↑	↓	↓	↓	↑	
Dowtherm, E	↓	↓	↑	↓	↓	↓	↑	
Drinking Water	↑	↑	↑	↓	↑	↑	↑	
Dry Cleaning Fluids	→	↓	↑	↓	→	↓	↑	
DTE 20 Series, Mobil	↗	↓	↑	↑	↗	↓	↑	
DTE named series, Mobil, light-heavy	↑	↓	↑	↑	↑	→	↑	
Elco 28-EP lubricant	↑	↓	↑	↑	↑	↗	↑	
Epichlorohydrin	↓	↗	↓	↓	↓	↓	↑	↑
Epoxy Resins		↑	↓				↑	

↑ excellent
↗ fair (OK for static seals)
→ questionable
↓ poor

	NBR	EPDM	FPM	TPU	HNBR	MVQ	FFPM	PTFE
Erucic Acid							↑	
Esam-6 Fluid		↑	↓				↑	
Esso Fuel 208	↑	↓	↑	↓	↑	↓	↑	
Esso Golden Gasoline	↗	↓	↑	↓	↗	↓	↑	
Esso Motor Oil	↑	↓	↑	↓	↑	↓	↑	
Esso Transmission Fluid (Type A)	↑	↓	↑	→	↑	↓	↑	
Esso WS2812 (MIL-L-7808A)	↑	↓	↑	↓	↑	↓	↑	
Esso XP90-EP Lubricant	↑	↓	↑	↑	↑	↓	↑	
Esstic 42, 43	↑	↓	↑	↗	↑	↓	↑	
Ethane	↑	↓	↑	↗	↑	↓	↑	↑
Ethanol	→	↑	→	↓	→	↗	↑	↑
Ethanol Amine	→	↑	↓	→	→	↗	↑	
Ethers	↓	→	↓	↗	↓	↓	↑	
Ethoxyethyl Acetate (EGMEEA)	→	↑	→	↓	→	↗	↑	
Ethyl Acetate	↓	↗	↓	↓	↓	↗	↑	↑
Ethyl Acetate-Organic Ester	↓	↗	↓	↓	↓	↗	↑	
Ethyl Acrylate	↓	↗	↓	↓	↓	↗	↑	↑
Ethyl Alcohol	→	↑	→	↓	→	↗	↑	
Ethyl Ammonium Dichloride							↑	
Ethyl Benzene	↓	↓	↑	↓	↓	↓	↑	↑
Ethyl Benzoate	↓	↓	↑	↓	↓	↓	↑	
Ethyl Bromide	↗	↓	↑	↓	↗		↑	
Ethyl Cellosolve	↓	↗	↓	↓	↓	↓	↑	
Ethyl Cellulose	↗	↗	↓	↓	↗	↗	↑	
Ethyl Chloride	↓	↗	↗	↓	↓	↓	↑	↑
Ethyl Chlorocarbonate	↓	↗	↑	↓	↓	↓	↑	
Ethyl Chloroformate	↓	↗	↓	↓	↓	↓	↑	
Ethyl Ether	→	→	↓	↗	→	↓	↑	
Ethyl Formate	↓	↗	↑		↓		↑	
Ethyl Hexanol	↑	↑	↑	↓	↑	↗	↑	
Ethyl Lactate	→	↑	→	↓	→	↗	↑	
Ethyl Mercaptan	↓		↗		↓	→	↑	
Ethyl Nitrite	→	↑	→	↓	→	↗	↑	
Ethyl Oxalate	↓	↗	↑	↑	↓	↓	↑	
Ethyl Pentachlorobenzene	↓	↓	↑	↓	↓	↓	↑	
Ethyl Pyridine	↗	↑	↓	↓	↓		↑	
Ethyl Silicate	↑	↑	↑		↑		↑	
Ethyl Stearate	↗	↓	↑	→	↗		↑	
Ethyl Sulfate	↓	↑	↓	↓	↓		↑	
Ethyl Tertiary Butyl Ether							↑	
Ethyl Valerate	↗	↓	↑	→	↗		↑	
Ethylacrylic Acid	↓	↗		↓	↓	↓		
Ethylamine	→	↑	→	↓	→	↗	↑	
Ethylcyclopentane	↑	↓	↑	↑	↑	↓	↑	
Ethylene	↗	↓	↑	↗	↗	↓	↑	

↑ excellent
↗ fair (OK for static seals)
→ questionable
↓ poor

	NBR	EPDM	FPM	TPU	HNBR	MVQ	FFPM	PTFE
Ethylene Chloride	↓	↗	↗	↓	↓	↓	↑	↑
Ethylene Chlorohydrin	↓	↗	↓	↓	↓	→	↑	↑
Ethylene Cyanohydrin	↗	↓	↑	→	↗		↑	
Ethylene Diamine	↓	↑	↓	↓	↓	↑	↗	↑
Ethylene Dibromide	↓	↓	↑	↓	↓	↓	↑	
Ethylene Dichloride	↓	↓	↑	↓	↓	↓	↑	
Ethylene Glycol	↑	↑	↑	↗	↑	↑	↑	↑
Ethylene Hydrochloride	↓	→	↑	↓	↓	↓	↑	
Ethylene Oxide	↓	↗	↓	↓	↓	↓	↑	
Ethylene Oxide, (12%) and Freon 12 (80%)	→	↗	↓	↓	→	↓	↗	
Ethylene Trichloride	↓	→	↑	↓	↓	↓	↑	↑
Ethyleneimine							↑	
Ethylmorpholene Stannous Octotate (50/50 mixture)	↓	↗	↓		↓		↑	
Ethylmorpholine	↗	↓	↑	→	↗		↑	
Ethylsulfuric Acid	→	↑	→	↓	→	↗	↑	
F-60 Fluid (Dow Corning)	↑	↑	↑	↑	↑	↓	↑	
F-61 Fluid (Dow Corning)	↑	↑	↑	↑	↑	↓	↑	
Fatty Acids	↗	→	↑		↗	→	↑	↑
FC-43 Heptacosofluorotri-butylamine	↑	↑	↑		↑	↑	↑	
FC75 & FC77 (Fluorocarbon)	↑	↑	↗		↑	↑	↑	
Ferric Acetate	→	↑	→	↓	→	↗	↑	
Ferric Ammonium Sulfate	→	↑	→	↓	→	↗	↑	
Ferric Chloride	↑	↑	↑	↑	↑	↗	↑	↑
Ferric Ferrocyanide	→	↑	→	↓	→	↗	↑	
Ferric Hydroxide	→	↑	→	↓	→	↗	↑	
Ferric Nitrate	↑	↑	↑	↗	↑	↗	↑	
Ferric Persulfate	↑	↑	↑		↑		↑	
Ferric Sulfate	↑	↑	↑		↑		↑	
Ferrous Ammonium Citrate	→	↑	→	↓	→	↗	↑	
Ferrous Ammonium Sulfate	→	↑	→	↓	→	↗	↑	
Ferrous Carbonate	→	↑	→	↓	→	↗	↑	
Ferrous Chloride							↑	
Ferrous Iodide	→	↑	→	↓	→	↗	↑	
Ferrous Sulfate	→	↑	→	↓	→	↗	↑	
Ferrous Tartrate	→	↑	→	↓	→	↗	↑	
Fish Oil	↗	↓	↑	→	↗		↑	↑
Fisher Reagent		↗						
Fluorinated Cyclic Ethers		↑					↑	
Fluorine (Gas)							↗	
Fluorine (Liquid)	↓	↓	↗		↓		↗	↑
Fluorobenzene	↓	↓	↗		↓		↑	↑
Fluoroboric Acid	↑	↑					↑	
Fluorocarbon Oils		↑					↗	↑

↑ excellent
↗ fair (OK for static seals)
→ questionable
↓ poor

	NBR	EPDM	FPM	TPU	HNBR	MVQ	FFPM	PTFE
Fluorolube	↑	↑	↗		↑	↑	↑	
Fluorophosphoric Acid							↑	
Fluorosilicic Acid	↗	↑	↑		↗		↑	↑
Fluorosulfonic Acid							↑	
Formaldehyde	→	↑	↓	↓	→	↗	↑	↑
Formamide	↗	↗	↗	↓	↗	↗	↑	↑
Formic Acid	↓	↗	↓	↓	↓		↑	↑
Freon, 11	↑	↓	↗	↓	↑	↓	↗	↑
Freon, 112 (Tetrachlorodifluoroethane)	↗	↓	↗	↗	↗	↓	↑	
Freon, 113	↑	↓	↗	↗	↑	↓	→	↑
Freon, 113 + High and Low Aniline Oil	↑						→	
Freon, 114	↑	↑	↗	↑	↑	↓	↗	↑
Freon, 114B2	↗	↓	↗	↗	↗	↓	↗	
Freon, 115, 116	↑	↑	↗	↗	↑		↗	
Freon, 12	↗	↗	↗	↗	↗	↓	↗	↑
Freon, 12 and ASTM Oil #2 (50/50 Mixture)	↗	↓	↑		↗	↓	↑	
Freon, 12 and Suniso 4G (50/50 Mixture)	↗	↓	↑		↗	↓	↑	
Freon, 123 (Dichlorotrifluoroethane)							↓	
Freon, 124 (Chlorotetrafluoroethane)							↗	
Freon, 125 (Pentafluoroethane)							↗	
Freon, 13	↑	↑	↗	↗	↑	↓	↑	↑
Freon, 134a (Tetrafluoroethane)		↑			↑		→	↑
Freon, 13B1	↑	↑	↗	↗	↑	↓	↗	
Freon, 14	↑	↑	↗	↑	↑	↓	↑	
Freon, 141b (Dichlorofluoroethane)							↑	
Freon, 142b	↑	↑	↓		↑		→	
Freon, 152a (Difluoroethane)	↑	↑	↓		↑		→	
Freon, 21	↓	↓	↓	↗	↓	↓	↑	
Freon, 218	↑	↑	↑		↑		↑	
Freon, 22 (Chlorodifluoroethane)	↓	↑	↓	↓	↓	↓	↑	↑
Freon, 22 and ASTM Oil #2 (50/50 Mixture)	↓	↓	↗		↓	↓	↑	
Freon, 23 (Fluoroform)							↑	
Freon, 31	↓	↑	↓	↗	↓		↗	
Freon, 32	↑	↑	↓	↗	↑		↗	
Freon, 502	↗	↑	↗		↗		↗	
Freon, BF (R112)	↗	↓	↑	↓	↗	↓	↗	
Freon, C316	↑	↑			↑		↗	
Freon, C318	↑	↑	↗		↑		↗	
Freon, K-142b	↑	↑	↓		↑		↓	
Freon, K-152a	↑	↑	↓		↑		↓	

↑ excellent
↗ fair (OK for static seals)
→ questionable
↓ poor

	NBR	EPDM	FPM	TPU	HNBR	MVQ	FFPM	PTFE
Freon, MF (R11)	↗	↓	↗	↗	↗	↓	↗	
Freon, PCA (R113)	↑	↓	↗	↑	↑	↓	↑	
Freon, T-P35	↑	↑	↑	↑	↑		↗	
Freon, T-WD602	↗	↗	↑				↗	
Freon, TA	↑	↑	↓	↑	↑		↗	
Freon, TC	↑	↗	↑	↑	↑		↗	
Freon, TF (R113)	↑	↓	↑	↑	↑	↓	↗	
Freon, TMC	↗	↗	↑	↗			↗	
Fuel Oil, #6	↗	↓	↑	↗	↗	↑	↑	↗
Fuel Oil, 1, and 2	↑	↓	↑	↗	↑	↓	↑	↗
Fuel Oil, Acidic	↑	↓	↑	↗	↑	↑	↑	↗
Fumaric Acid	↑	↗	↑		↑	↗	↑	
Fuming Sulphuric Acid (20/25% Oleum)	↓	↓	↑	↓	↓	↓	↑	
Furaldehyde	↓	↗	↓		↓		↗	
Furan (Furfuran)	↓	↓	↓	↓	↓		↑	↑
Furfural (Furfuraldehyde)	→	↗	↓	→	→	↓	↑	↑
Furfuraldehyde	↓	↗	↓	→	↓	↓	↑	
Furfuryl Alcohol	↓	↗		↓	↓	↓	↑	↑
Furoic Acid							↑	
Furyl Carbinol	↓	↗		↓	↓	↓		
Fyrquel 150 220 300 550	↓	↑	↑	↓	↓	↑	↑	
Fyrquel 90, 100, 500	↓	↑	↑		↓		↑	
Fyrquel A60	↓	↗	↓		↓		↑	
Gallic Acid	↑	↗	↑	↓	↑		↑	
Gasoline	↑	↓	↑	↗	↑	↓	↑	↗
Gelatin	↑	↑	↑	↓	↑	↑	↑	↑
Germane (Germanium Tetrahydride)							↑	
Girling Brake Fluid	→	↑	↓		→		↑	
Glauber's Salt	↓	↗	↑	↓	↓		↑	
Gluconic Acid	→	↑	→	↓	→	↗	↑	
Glucose	↑	↑	↑	↓	↑	↑	↑	↑
Glue	↑	↑	↑	↑	↑		↑	↑
Glutamic Acid	→	↑	→	↓	→	↗	↑	
Glycerine (Glycerol)	↑	↑	↑	↓	↑	↑	↑	↑
Glycerol Dichlorohydrin	→	↑	→	↓	→	↗	↑	
Glycerol Monochlorohydrin	→	↑	→	↓	→	↗	↑	
Glycerol Triacetate	↗	↑	↓	↓	↗	↗	↑	
Glycerophosphoric Acid	→	↑	→	↓	→	↗	↑	
Glyceryl Phosphate	→	↑	→	↓	→	↗	↑	
Glycidol	→	↑	→	↓	→	↗	↑	
Glycol Monoether							↑	
Glycolic Acid	↑	↑	↗	↓	↑	↗	↑	↑
Glycols	↑	↑	↑	↓	↑	↑	↑	
Glycoxylic Acid	→	↑	→	↓	→	↗	↑	

	NBR	EPDM	FPM	TPU	HNBR	MVQ	FFPM	PTFE
Grease Petroleum Base	↑	↓	↑	↑	↑	↓	↑	
Green Sulfate Liquor	↗	↑	↑	↓	↗		↑	
Gulf Endurance Oils	↑	↓	↑	↑	↑	↓	↑	
Gulf FR Fluids (Emulsion)	↑	↓	↑	↑	↑	↓	↑	
Gulf FR G-Fluids	↑	↑	↑	↗	↑	↑	↑	
Gulf FR P-Fluids	↓	↗	↗	↓	↓	↑	↑	
Gulf Harmony Oils	↑	↓	↑	↑	↑	↓	↑	
Gulf High Temperature Grease	↑	↓	↑	↑	↑	↓	↑	
Gulf Legion Oils	↑	↓	↑	↑	↑	↓	↑	
Gulf Paramount Oils	↑	↓	↑	↗	↑	↓	↑	
Gulf Security Oils	↑	↓	↑	↗	↑	↓	↑	
Gulfcrown Grease	↑	↓	↑	↑	↑	↓	↑	
Halothane	↓	↓	↑	↓	↓	↓	↑	
Halowax Oil	↓	↓	↑		↓	↓	↑	
Hannifin Lube A	↑	↓	↑	↑	↑	↗	↑	
Heavy Water	↑	↑		↓	↑	↑	↑	
HEF-2 (High Energy Fuel)	↗	↓	↑	↓	↗	↓	↑	
Helium	↑	↑	↑	↑	↑	↑	↑	
Heptachlor	↗	↓	↑	→	↗		↑	
Heptachlorobutene	↗	↓	↑	→	↗		↑	
Heptaldehyde (Heptanal)	↑	↓	↑	↑	↑	↗	↑	
Heptane or n-Heptane	↑	↓	↑	↗	↑	↓	↑	↑
Heptanoic Acid	↑	↓	↑	↑	↑	↗	↑	
Hexachloroacetone	→	↑	→	↓	→	↗	↑	
Hexachlorobutadiene	↓	↓	↑	↗	↓		↑	↑
Hexachlorobutene	↗	↓	↑	→	↗		↑	
Hexachloroethane	↗	↓	↑	→	↗		↑	
Hexaethyl Tetraphosphate							↑	
Hexafluoroethane (F-116)							↗	
Hexafluoroxylene							↑	
Hexaldehyde or n-Hexaldehyde	↓	↑	↓	→	↓	↗	↑	↑
Hexamethyldisilizane							↑	
Hexamethylene (Cyclohexane)	↑	↓	↑	↑	↑	↗	↑	
Hexamethylene Diammonium Adipate	↗	↓	↑	→	↗		↑	
Hexamethylenediamine	→	↑	→	↓	→	↗	↗	
Hexamethylenetetramine	→	↑	→	↓	→	↗	↗	
Hexane or n-Hexane	↑	↓	↑	↗	↑	↓	↑	↑
Hexene-1 or n-Hexene-1	↗	↓	↑	↗	↗	↓	↑	↑
Hexone (Methyl Isobutyl Ketone)	→	↑	→	↓	→	↗	↑	
Hexyl Acetate	↑	↓	↑	↑	↑	↗	↑	
Hexyl Alcohol	↑	↗	↑	↓	↑	↗	↑	
Hexylene Glycol	→	↑	→	↓	→	↗	↑	
Hexylresorcinol	↗	↓	↑	→	↗		↑	
High Viscosity Lubricant, H2	↑	↑	↑	↓	↑	↑	↑	

↑ excellent
↗ fair (OK for static seals)
→ questionable
↓ poor

	NBR	EPDM	FPM	TPU	HNBR	MVQ	FFPM	PTFE
High Viscosity Lubricant, U4	↑	↑	↑	↓	↑	↑	↑	
HiLo MS #1	↓	↑	↓	↓	↓	→	↑	
Houghto-Safe 1010 phosphate ester	↓	↑	↑		↓	→	↑	
Houghto-Safe 1055 phosphate ester	↓	↑	↑		↓	→	↑	
Houghto-Safe 1120 phosphate ester	↓	↗	↑	↓	↓	→	↑	
Houghto-Safe 271 (Water & Glycol Base)	↑	↑	↗	↓	↑	↗	↑	
Houghto-Safe 416 & 500 Series	↑	↑			↑			
Houghto-Safe 5040 (Water/Oil emulsion)	↑	↓	↑	↓	↑	→	↑	
Houghto-Safe 620 Water/Glycol	↑	↑	↗	↓	↑	↗	↑	
Hydraulic Oil (Petroleum Base, Industrial)	↑	↓	↑	↑	↑	↗	↑	
Hydraulic Oils (Synthetic Base)	↗	↓	↑	→	↗		↑	
Hydrazine	↗	↑	→	↓	↗	↗	↑	
Hydrazine (Anhydrous)	↓	↗	↓	↓	↓		↑	
Hydrazine Dihydrochloride	→	↑	→	↓	→	↗	↑	
Hydrazine Hydrate	→	↑	→	↓	→	↗	↑	↑
Hydriodic Acid	↗	↓	↑	→	↗		↑	
Hydro-Drive MIH-10 (Petroleum Base)	↑	↓	↑	↗	↑	↗	↑	
Hydro-Drive MIH-50 (Petroleum Base)	↑	↓	↑	↗	↑	↗	↑	
Hydroabietyl Alcohol							↑	
Hydrobromic Acid	↓	↑	↑	↓	↓	↓	↑	↑
Hydrobromic Acid 40%	↓	↑	↑	↓	↓	↓	↑	
Hydrocarbons, Saturated	↑	↓	↑	↗	↑	↓	↑	
Hydrochloric Acid (cold) 37%	↓	→	↑				↑	
Hydrochloric Acid (hot) 37%	↓	→	↑	→			↑	
Hydrochloric Acid, 3 Molar to 70°C	↗	↑	↑	↓	↗	↓	↑	
Hydrochloric Acid, Concentrated Room Temp.	↗	↗	↑		↗		↑	↑
Hydrochloric Acid, Concentrated to 70°C	↓	↓	↑	↓	↓	↓	↑	↑
Hydrocyanic Acid	↗	↑	↑		↗	→	↑	↑
Hydrofluoric Acid (Anhydrous)							↑	↑
Hydrofluoric Acid (conc.) Cold	↓	↗	↗	↓	↓		↑	
Hydrofluoric Acid (conc.) Hot	↓	↓	↓	↓	↓		↑	
Hydrofluorosilicic Acid	↗	↑	↑		↗	↓	↑	
Hydrogen Bromide (Anhydrous)							↑	
Hydrogen Chloride (Anhydrous)							↑	
Hydrogen Chloride gas	↓	↑	↑		↓		↑	↑
Hydrogen Cyanide							↑	

	NBR	EPDM	FPM	TPU	HNBR	MVQ	FFPM	PTFE
Hydrogen Fluoride	↓	↗		↓	↓		↑	
Hydrogen Fluoride (Anhydrous)	↓	↑	↓		↓		↑	
Hydrogen Gas, Cold	↑	↑	↑	↑	↑	→	↑	↑
Hydrogen Gas, Hot	↑	↑	↑	↑	↑	→	↑	↑
Hydrogen Iodide (Anhydrous)							↑	
Hydrogen Peroxide	↗	↑	↑		↗	↑	↑	↑
Hydrogen Peroxide 90%	↓	→	↑		↓	↗	↑	↑
Hydrogen Selenide							↑	
Hydrogen Sulfide, Dry, Cold	↑	↑	↓		↑	→	↑	↑
Hydrogen Sulfide, Dry, Hot	↓	↑	↓		↓	→	↑	↑
Hydrogen Sulfide, Wet, Cold	↓	↑	↓		↓	→	↑	↑
Hydrogen Sulfide, Wet, Hot	↓	↑	↓		↓	→	↑	↑
Hydrolube-Water/Ethylene Glycol	↑	↑	↑	↓	↑	↗	↑	
Hydrooxycitronellal			↑	→			↑	
Hydroquinol	↓	↓	↑		↓		↗	
Hydroquinone	↓	↗	↓		↓		↑	↑
Hydroxyacetic Acid	↓	↑	↓	↓	↓	↗	↑	
Hydyne	↗	↑	↓		↗	↓	↑	
Hyjet	↓	↑	↓		↓		↑	
Hyjet IV and IVA	↓	↑	↓	↓	↓	↓	↑	
Hyjet S4	↓	↑	↓				↑	
Hyjet W	↓	↑	↓		↓		↑	
Hypochlorous Acid	↓	↗	↑		↓		↑	
Indole			↑	→			↑	
Industron FF44	↑	↓	↑	↗	↑	↓	↑	
Industron FF48	↑	↓	↑	↗	↑	↓	↑	
Industron FF53	↑	↓	↑	↗	↑	↓	↑	
Industron FF80	↑	↓	↑	↗	↑	↓	↑	
Insulin	→	↑	→	↓	→	↗	↑	
Iodic Acid	→	↑	→	↓	→	↗	↑	
Iodine	↗	↗	↑		↗		↑	↑
Iodine Pentafluoride	↓	↓	↓	↓	↓	↓	↗	
Iodoform		↑	↑				↑	↑
Isoamyl Acetate	→	↑	→	↓	→	↗	↑	
Isoamyl Butyrate	→	↑	→	↓	→	↗	↑	
Isoamyl Valerate	→	↑	→	↓	→	↗	↑	
Isoboreol			↑	→			↑	
Isobutane	↑	↓	↑	↑	↑	↗	↑	
Isobutyl Acetate	→	↑	→	↓	→	↗	↑	
Isobutyl Alcohol	↗	↑	↗	↓	↗	↑	↑	↑
Isobutyl Chloride	↓	↓	↑		↓		↑	
Isobutyl Ether	↗	↓	↓		↗		↑	
Isobutyl Methyl Ketone	↓	↑	↓	↓	↓	↗	↑	
Isobutyl n-Butyrate	↓	↑	↑		↓		↑	
Isobutyl Phosphate	→	↑	→	↓	→	↗	↑	

↑ excellent
↗ fair (OK for static seals)
→ questionable
↓ poor

	NBR	EPDM	FPM	TPU	HNBR	MVQ	FFPM	PTFE
Isobutylene	↑	↓	↑	↓	↑		↑	
Isobutyraldehyde	↓	↑	↓	↓	↓		↗	
Isobutyric Acid	↑	↗	↓		↑	↗	↑	
Isocrotyl Chloride			↑	→			↑	
Isodecanol	↑	↓	↑	↑	↑	↗	↑	
Isododecane	↑	↓	↑	↓	↑	↓	↑	
Isoeugenol	↑	↓	↑	↑	↑	↗	↑	
Isooctane	↑	↓	↑	↗	↑	↓	↑	↑
Isopentane	↑	↓	↑	↗	↑	↗	↑	
Isophorone (Ketone)	↓	↗	↓	↓	↓	↓	↑	↑
Isopropanol	↗	↑	↑	↓	↗	↑	↑	↑
Isopropyl Acetate	↓	↗	↓	↓	↓	↓	↑	↑
Isopropyl Alcohol	↗	↑	↑	↓	↗	↑	↑	
Isopropyl Chloride	↓	↓	↑	↓	↓	↓	↑	↑
Isopropyl Ether	↓		↓	↓	↓	↓	↑	↑
Isopropylacetone	→	↑	→	↓	→	↗	↑	
Isopropylamine	→	↑	→	↓	→	↗	↑	
Jet Fuel A	↗	↓	↑	→	↗		↑	
JP-10	→	↓	↑	→	→	↓	↑	
JP-3 (MIL-J-5624)	↑	↓	↑		↑		↑	↑
JP-4 (MIL-T-5624)	↑	↓	↑	↗	↑	↓	↑	↑
JP-5 (MIL-T-5624)	↑	↓	↑	↗	↑	↓	↑	↑
JP-6 (MIL-J-25656)	↑	↓	↑	↗	↑	↓	↑	↑
JP-8 (MIL-T-83133)	↑	↓	↑	↑	↑	↓	↑	
JP-9 -11	↓	↓	↑	↓	↓	↓	↑	
JP-9 (MIL-F-81912)	→	↓	↑	→	→	↓	↑	
JPX (MIL-F-25604)	↑	↓	↓		↑		↑	
Kel F Liquids	↑	↑	↗		↑	↑	↑	
Kerosene (Similar to RP-1 and JP-1)	↑	↓	↑	↗	↑	↓	↑	↑
Keystone #87HX-Grease	↑	↓	↑	↑	↑	↓	↑	
Lacquer Solvents	↓	↓	↓	↓	↓	↓	↑	
Lacquers	↓	↓	↓	↓	↓	↓	↑	
Lactams-Amino Acids	↓	↗	↓		↓		↑	
Lactic Acid, Cold	↑	↑	↑		↑	↑	↑	↑
Lactic Acid, Hot	↓	↓	↑		↓	↗	↑	↑
Lactones (Cyclic Esters)	↓	↗	↓	↓	↓	↗	↑	
Lard Animal Fat	↑	↗	↑	↑	↑	↗	↑	
Lauric Acid	↑	↓	↑	↑	↑	↗	↑	
Lavender Oil	↗	↓	↑	↓	↗		↑	↑
LB 135	↑	↑	↑		↑		↑	
Lead (Molten)							↑	
Lead Acetate	↗	↑	↓	↓	↗	↓	↑	↑
Lead Arsenate	↑	↑		↗	↑	↗	↑	
Lead Azide							↑	

	NBR	EPDM	FPM	TPU	HNBR	MVQ	FFPM	PTFE
Lead Bromide	→	↑	→	↓	→	↗	↑	
Lead Carbonate	→	↑	→	↓	→	↗	↑	
Lead Chloride	→	↑	→	↓	→	↗	↑	
Lead Chromate	→	↑	→	↓	→	↗	↑	
Lead Dioxide	→	↑	→	↓	→	↗	↑	
Lead Linoleate	→	↑	→	↓	→	↗	↑	
Lead Naphthenate							↑	
Lead Nitrate	↑	↑	↑	↓	↑	↗	↑	↑
Lead Oxide	→	↑	→	↓	→	↗	↑	
Lead Sulfamate	↗	↑	↑		↗	↗	↑	
Lehigh X1169	↑	↓	↑	↑	↑	↓	↑	
Lehigh X1170	↑	↓	↑	↑	↑	↓	↑	
Light Grease	↑	↓	↑		↑		↑	
Ligroin (Petroleum Ether or Benzene)	↑	↓	↑	↗	↑	↓	↑	
Lime Bleach	↑	↑	↑		↑		↑	
Lime Sulfur			↑	→			↑	
Lindol, Hydraulic Fluid (Phosphate ester type)	↓	↑	↗	↓	↓	→	↑	
Linoleic Acid	↗	↓	↗	↗	↗	↗	↑	↑
Linseed Oil	↑	→	↑	↗	↑	↑	↑	↑
Liquid Oxygen (LOX)	↓	↓	↓	↓	↓	↓	↗	
Liquid Petroleum Gas (LPG)	↑	↓	↑	↑	↑	→	↑	
Liquimoly	↑	↓	↑	↗	↑	↓	↑	
Lithium Bromide (Brine)	↑	↑	↑	↓	↑	↗	↑	↑
Lithium Carbonate	→	↑	→	↓	→	↗	↑	
Lithium Chloride	↑	↑	↑	↓	↑	↗	↑	↑
Lithium Citrate	→	↑	→	↓	→	↗	↑	
Lithium Hydroxide	↓	↑	→	↓	↓	↗	↑	
Lithium Hypochlorite	→	↑	→	↓	→	↗	↑	
Lithium Nitrate	→	↑	→	↓	→	↗	↑	
Lithium Nitrite	→	↑	→	↓	→	↗	↑	
Lithium Perchlorate	→	↑	→	↓	→	↗	↑	
Lithium Salicylate	→	↑	→	↓	→	↗	↑	
Lithopone	→	↑	→	↓	→	↗	↑	
Lubricating Oils (Crude & Refined)	↗	↓	↑		↗		↑	
Lubricating Oils (Synthetic base)			↑	→			↑	
Lubricating Oils, Di-ester	↗	↓	↑		↗	↓	↑	
Lubricating Oils, petroleum base	↑	↓	↑	↗	↑	↓	↑	
Lubricating Oils, SAE 10, 20, 30, 40, 50	↑	↓	↑	↗	↑	↓	↑	
Lye Solutions	↗	↑	↗	↓	↗	↗	↑	
Magnesium Chloride	↑	↑	↑	↑	↑	↑	↑	↑
Magnesium Hydroxide	↗	↑	↑	↓	↗		↑	
Magnesium Salts	↑	↑	↑	↑	↑	↑	↑	

	NBR	EPDM	FPM	TPU	HNBR	MVQ	FFPM	PTFE
Magnesium Sulfite and Sulfate	↑	↑	↑		↑	↑	↑	↑
Magnesium Trisilicate							↑	
Malathion	↗	↓	↑		↗	↓	↑	
Maleic Acid	↗	↑	↑	→	↗		↑	↑
Maleic Anhydride	↓	↓	↗		↓		↑	↑
Maleic Hydrazide	→	↑	→	↓	→	↗	↑	
Malic Acid	↑	↗	↑	↓	↑	↗	↑	
Mandelic Acid	→	↑	→	↓	→	↗	↑	
Manganese Acetate	→	↑	→	↓	→	↗	↑	
Manganese Carbonate	→	↑	→	↓	→	↗	↑	
Manganese Chloride	→	↑	→	↓	→	↗	↑	
Manganese Dioxide	→	↑	→	↓	→	↗	↑	
Manganese Gluconate	→	↑	→	↓	→	↗	↑	
Manganese Hypophosphite	→	↑	→	↓	→	↗	↑	
Manganese Linoleate	→	↑	→	↓	→	↗	↑	
Manganese Naphthenate							↑	
Manganese Phosphate	→	↑	→	↓	→	↗	↑	
Manganese Sulfate	→	↑	→	↓	→	↗	↑	
Manganous Chloride	→	↑	→	↓	→	↗	↑	
Manganous Sulfate	→	↑	→	↓	→	↗	↑	
Mannitol	→	↑	→	↓	→	↗	↑	
MCS 312	↓	↓	↑		↓	↑	↑	
MCS 352	↓	↑	↓	↓	↓	→	↑	
MCS 463	↓	↑	↓	↓	↓	→	↑	
MDI (Methylene di-p-phenylene isocyanate)	→	↑	→	↓	→	↗	↑	
Mercaptan	↓	↑	↓	↓	↓	↗	↑	
Mercaptobenzothiazole (MBT)			↑	→			↑	
Mercuric Acetate	→	↑	→	↓	→	↗	↑	
Mercuric Chloride	↑	↑	↑		↑		↑	
Mercuric Cyanide	→	↑	→	↓	→	↗	↑	
Mercuric Iodide	→	↑	→	↓	→	↗	↑	
Mercuric Nitrate	→	↑	→	↓	→	↗	↑	
Mercuric Sulfate	→	↑	→	↓	→	↗	↑	
Mercuric Sulfite	→	↑	→	↓	→	↗	↑	
Mercurous Nitrate	→	↑	→	↓	→	↗	↑	
Mercury	↑	↑	↑	↑	↑		↑	↑
Mercury Chloride	→	↑	→	↓	→	↗	↑	
Mercury Fulminate	→	↑	→	↓	→	↗	↑	
Mercury Salts	→	↑	→	↓	→	↗	↑	↑
Mercury Vapors	↑	↑	↑		↑		↑	
Mesityl Oxide (Ketone)	↓	↑	↓	↓	↓	↓	↑	↑
Meta-Cresol			↑	→			↑	
Meta-Nitroaniline	→	↑	→	↓	→	↗	↑	
Meta-Toluidine			↑	→			↑	
Metaldehyde	→	↑	→	↓	→	↗	↑	

	NBR	EPDM	FPM	TPU	HNBR	MVQ	FFPM	PTFE
Methacrylic Acid	↓	↗	↓	↓	↓	↗	↑	
Methallyl Chloride			↑	→			↑	
Methane	↑	↓	↑	↓	↑	↓	↑	↑
Methanol	↗	↑	↓	↓	↗	↑	↑	↑
Methoxychlor							↑	
Methoxyethanol (DGMMA)	→	↑	→	↓	→	↗	↑	
Methyl Abietate			↑	→			↑	
Methyl Acetate	↓	↗	↓	↓	↓	↓	↑	
Methyl Acetoacetate	↓	↗	↓	↓	↓	↗	↑	
Methyl Acetophenone *			↑	→			↑	
Methyl Acrylate	↓	↗	↓	↓	↓	↓	↑	↑
Methyl Alcohol	↗	↑	↓	↓	↗	↑	↑	
Methyl Amylketone	→	↑	→	↓	→	↗	↑	
Methyl Anthranilate			↑	→			↑	
Methyl Benzoate	↓	↓	↑	↓	↓	↓	↑	
Methyl Bromide	↓	↓	↑	↓	↓		↑	↑
Methyl Butyl Ketone	↓	↑	↓	↓	↓	↓	↑	
Methyl Butyrate Cellosolve	→	↑	→	↓	→	↗	↑	
Methyl Butyrate Chloride	→	↑	→	↓	→	↗	↑	
Methyl Carbonate	↓	↓	↓	↓	↓	↓	↑	
Methyl Cellosolve	↓	↗	↓	↓	↓	↓	↑	
Methyl Cellulose	↗	↗	↗	↗	↗	↗	↑	
Methyl Chloride	↓	↓	↗	↓	↓	↓	↑	↑
Methyl Chloroacetate	→	↑	→	↓	→	↗	↑	
Methyl Chloroform	↓	↓	↑		↓		↑	
Methyl Chloroformate	↓	↓	↑	↓	↓	↓	↑	
Methyl Chlorosilanes							↑	
Methyl Cyanide (Acetonitrile)	→	↑	→	↓	→	↗	↑	
Methyl Cyclohexanone	↑	↓	↑	↑	↑	↗	↑	
Methyl Dichloride			↑	→			↑	
Methyl Ether	↑	↓	↑		↑	↑	↑	
Methyl Ethyl Ketone (MEK)	↓	↗	↓	↓	↓	↓	↑	↑
Methyl Ethyl Ketone Peroxide	↓	↓	↓	↓	↓	↗	↑	
Methyl Ethyl Oleate			↑	→			↑	
Methyl Formate	↓	↗	↓		↓		↑	
Methyl Hexyl Ketone (2-Octanone)	→	↑	→	↓	→	↗	↑	
Methyl Iodide	↑	↓	↑	↑	↑	↗	↑	
Methyl Isobutyl Ketone (MIBK)	↓	→	↓	↓	↓	↓	↑	↑
Methyl Isocyanate	→	↑	→	↓	→	↗	↑	
Methyl Isopropyl Ketone	↓	↗	↓	↓	↓	↓	↑	
Methyl Isovalerate			↑	→			↑	
Methyl Lactate	→	↑	→	↓	→	↗	↑	
Methyl Mercaptan		↑					↑	
Methyl Methacrylate	↓	↓	↓	↓	↓	↓	↑	↑
Methyl Oleate	↓	↗	↑		↓		↑	

↑ excellent
↗ fair (OK for static seals)
→ questionable
↓ poor

	NBR	EPDM	FPM	TPU	HNBR	MVQ	FFPM	PTFE
Methyl Pentadiene			↑	→			↑	
Methyl Phenylacetate			↑	→			↑	
Methyl Salicylate	↓	↗			↓		↑	
Methyl Tertiary Butyl Ether (MTBE)	→	→	→		→		↑	
Methyl Valerate			↑	→			↑	
Methyl-2-Pyrrolidone or n-Methyl-2-Pyrrolidone		↗					↑	
Methylacrylic Acid	↓	↗	→	↓	↓	↓	↑	
Methylal							↑	
Methylamine	→	↑	→	↓	→	↗	↑	
Methylamyl Acetate	→	↑	→	↓	→	↗	↑	
Methylcyclopentane	↓	↓	↑	↓	↓	↓	↑	
Methylene Bromide			↑	→			↑	
Methylene Chloride	↓	↓	↗	↓	↓	↓	↑	
Methylene Iodide			↑	→			↑	
Methylglycerol	→	↑	→	↓	→	↗	↑	
Methylisobutyl Carbinol	↑	↓	↑	↑	↑	↗	↑	
Methylpyrrolidine			↑	→			↑	
Methylpyrrolidone			↑	→			↑	
Methylsulfuric Acid	→	↑	→	↓	→	↗	↑	
MIL-A-6091	↗	↑	↑	↓	↗	↑	↑	
MIL-C-4339	↑	↓	↑	↑	↑	→	↑	
MIL-C-7024	↑	↓	↑	↑	↑	↓	↑	
MIL-C-8188	↗	↓	↗	↓	↗	↓	↑	
MIL-E-9500	↑	↑	↑	↓	↑	↑	↑	
MIL-F-16884	↑	↓	↑	→	↑	↓	↑	
MIL-F-17111	↑	↓	↑	→	↑	↓	↑	
MIL-F-25558 (RJ-1)	↑	↓	↑	↑	↑	↓	↑	
MIL-F-25656	↑	↓	↑	↗	↑	↓	↑	
MIL-F-5566	↗	↑	↑	↗	↗	↑	↑	
MIL-F-81912 (JP-9)	→	↓	↑	→	→	↓	↑	
MIL-F-82522 (RJ-4)	↗	↓	↑	↑	↗	↓	↑	
MIL-G-10924	↑	↓	↑	↑	↑	↓	↑	
MIL-G-15793	↑	↓	↑	↑	↑	↓	↑	
MIL-G-21568	↑	↑	↑	↑	↑	↓	↑	
MIL-G-25013	↑	↑	↑	→	↑	↓	↑	
MIL-G-25537	↑	↓	↑	↑	↑	↓	↑	
MIL-G-25760	↗	↓	↑	↗	↗	↓	↑	
MIL-G-3278	↗	↓	↑	↗	↗	↓	↑	
MIL-G-3545	↑	↓	↑	↑	↑	↓	↑	
MIL-G-4343	↗	→	↑	↑	↗	→	↑	
MIL-G-5572	↑	↓	↑	↗	↑	↓	↑	
MIL-G-7118	↗	↓	↑	→	↗	↓	↑	
MIL-G-7187	↑	↓	↑	↑	↑	↓	↑	
MIL-G-7421	↗	↓	↑	↗	↗	↓	↑	
MIL-G-7711	↑	↓	↑	↑	↑	↗	↑	

	NBR	EPDM	FPM	TPU	HNBR	MVQ	FFPM	PTFE
MIL-H-13910	↑	↑	↑	↓	↑	↓	↑	
MIL-H-19457	↓	↗	↑	↓	↓	→	↑	
MIL-H-22251	↗	↑			↗	↓		
MIL-H-27601	↑	↓	↑	→	↑	↓	↑	
MIL-H-46170 -25 to +200°C	↑	↓	↑	↗	↑	↓	↑	
MIL-H-46170 -30 to +135°C	↑	↓	↑	↗	↑	↓	↑	
MIL-H-46170 -50 to +135°C	↑	↓	↑	↗	↑	↓	↑	
MIL-H-46170 -55 to +135°C	↑	↓	↑	↗	↑	↓	↑	
MIL-H-5606 -54 to +113°C	↑	↓	↑	↗	↑	↓	↑	
MIL-H-5606 -54 to +135°C	↑	↓	↑	↗	↑	↓	↑	
MIL-H-6083	↑	↓	↑	↑	↑	↓	↑	
MIL-H-7083	↑	↑	↗	↓	↑	↑	↑	
MIL-H-8446 (MLO-8515)	↗	↓	↑	↓	↗	↓	↑	
MIL-J-5161	↗	↓	↑	↗	↗	↓	↑	
MIL-L-15016	↑	↓	↑	↑	↑	↓	↑	
MIL-L-15017	↑	↓	↑	↑	↑	↓	↑	
MIL-L-17331	↑	↓	↑		↑	↓	↑	
MIL-L-2104	↑	↓	↑	↑	↑	↓	↑	
MIL-L-21260	↑	↓	↑	↑	↑	↓	↑	
MIL-L-23699	↗	↓	↑	→	↗	↓	↑	
MIL-L-25681	↗	↑	↑	→	↗	↓	↑	
MIL-L-3150	↑	↓	↑	↗	↑	↓	↑	
MIL-L-6081	↑	↓	↑	↑	↑	↓	↑	
MIL-L-6082	↑	↓	↑	↑	↑	→	↑	
MIL-L-6085	↗	↓	↑	→	↗	↓	↑	
MIL-L-6387	↗	↓	↑	↑	↗	↓	↑	
MIL-L-7808	↗	↓	↑	↓	↗	↓	↑	
MIL-L-7870	↑	↓	↑	↗	↑	↓	↑	
MIL-L-9000	↑	↓	↑	→	↑	↓	↑	
MIL-L-9236	↗	↓	↑	↗	↗	↓	↑	
MIL-O-3503	↑	↓	↑	↑	↑	↓	↑	
MIL-P-27402	↗	↑			↗	↓		
MIL-R-25576 (RP-1)	↑	↓	↑	↑	↑	↓	↑	
MIL-S-3136, Type I Fuel	↑	↓	↑	↑	↑	↓	↑	
MIL-S-3136, Type II Fuel	↗	↓	↑	↗	↗	↓	↑	
MIL-S-3136, Type III Fuel	↗	↓	↑	↗	↗	↓	↑	
MIL-S-3136, Type IV Oil High Swell	↑	↓	↑	↑	↑	↗	↑	
MIL-S-3136, Type IV Oil Low Swell	↑	↓	↑	↑	↑	→	↑	
MIL-S-3136, Type V Oil Medium Swell	↑	↓	↑	↑	↑	↗	↑	
MIL-S-81087	↑	↑	↑	↑	↑	→	↑	
MIL-T-5624, JP-4, JP-5	↑	↓	↑	↗	↑	↓	↑	
MIL-T-83133	↑	↓	↑	↑	↑	↓	↑	
Milk	↑	↑	↑	↗	↑	↑	↑	↑

ALL-TEC® SEALING SYSTEMS

↑ excellent
↗ fair (OK for static seals)
→ questionable
↓ poor

	NBR	EPDM	FPM	TPU	HNBR	MVQ	FFPM	PTFE
Mineral Oils	↑	↓	↑	↑	↑	↗	↑	↑
Mixed Acids	→	↑	→	↓	→	↗	↑	↑
MLO-7277 Hydr.	→	↓	↑	→	→	↓	↑	
MLO-7557	→	↓	↑	→	→	↓	↑	
MLO-8200 Hydr.	↗	↓	↑	↑	↗	↓	↑	
MLO-8515	↗	↓	↑	↑	↗	↓	↑	
Mobil 24dte	↑	↓	↑		↑		↑	
Mobil 254 Lubricant							↑	
Mobil Delvac 1100, 1110, 1120, 1130	↑	↓	↑		↑		↑	
Mobil HF	↑	↓	↑		↑		↑	
Mobil Nivac 20, 30	↑	↑	↑		↑		↑	
Mobil SHC 500 Series	→	↓	↑	↗	→	↗	↑	
Mobil SHC 600 Series	→	↓	↑	↑	→	→	↑	
Mobil Therm 600	↑	↓	↑		↑		↑	
Mobil Velocite c	↑	↓	↑		↑		↑	
Mobilgas WA200 ATF	↑	↓	↑		↑		↑	
Mobilgear 600 Series	→	→	↑	↗	→	↑	↑	
Mobilgear SHC ISO Series	→	→	↑	↗	→	↑	↑	
Mobilgrease HP	↗	↓	↑	↑	↗	↗	↑	
Mobilgrease HTS	↗	↓	↑	↑	↗	↗	↑	
Mobilgrease SM	↗	↓	↑	↑	↗	↗	↑	
Mobilith AW Series	↗	↓	↑	↑	↗	↗	↑	
Mobilith SHC Series	↗	↓	↑	↑	↗	↗	↑	
Mobiljet II Lubricant							↑	
Mobilmistlube Series	→	→	↑	↗	→	↑	↑	
Mobiloil SAE 20	↑	↓	↑		↑		↑	
Mobilux	↑	↓	↑		↑		↑	
Molybdenum Disulfide Grease	↑	↓	↑				↑	
Molybdenum Oxide	→	↑	→	↓	→	↗	↑	
Molybdenum Trioxide	→	↑	→	↓	→	↗	↑	
Molybdic Acid	→	↑	→	↓	→	↗	↑	
Monobromobenzene	↓	↓	↗	↓	↓	↓	↑	↑
Monobromotoluene			↑	→			↑	
Monobutyl Paracresol							↑	
Monochloroacetic Acid	↓	↑	↓	↓	↓	↗	↑	↑
Monochlorobenzene	↓	↓	↗	↓	↓	↓	↑	
Monochlorobutene			↑	→			↑	
Monochlorohydrin							↑	
Monoethanolamine (MEA)	↓	↗	↓	↓	↓	↗	↑	
Monoethyl Amine	→	↑	→	↓	→	↗	↑	
Monoisopropylamine	→	↑	→	↓	→	↗	↑	
Monomethyl Aniline	↓	↑	↗	↓		↗	↑	
Monomethyl Ether (Dimethyl Ether)							↑	

	NBR	EPDM	FPM	TPU	HNBR	MVQ	FFPM	PTFE
Monomethyl Ether (Methyl Ether)	↑	↓	↑				↑	
Monomethyl Hydrazine	↗	↑			↗	↓	↑	
Monomethylamine (MMA)	→	↑	→	↓	→	↗	↑	
Monomethylaniline	↓	↗	↗	↓	↓		↑	
Mononitrotoluene	→	↑	→	↓	→	↗	↑	
Mononitrotoluene & Dinitrotoluene (40/60 Mixture)	↓	↑	→	↓	↓	↓	↗	
Monovinyl Acetylene	↑	↑	↑		↑	↗	↑	
Mopar Brake Fluid	→	↑	↓		→	→	↑	
Morpholine			↑	→			↑	↑
Motor Oils	↑	↓	↑	↑	↑	↗	↑	
Mustard Gas							↑	
Myristic Acid			↑	→			↑	
Naphthalene	↓	↓	↑	↓	↓	↓	↑	↑
Naphthalene Chloride			↑	→			↑	
Naphthalene Sulfonic Acid			↑	→			↑	
Naphthalenic Acid			↑	→			↑	
Naphthenic Acid	↗	↓	↑		↗	↓	↑	
Naphthylamine							↑	
Naptha	↗	↓	↑	↗	↗	↓	↑	↗
Natural Gas	↑	↓	↑	↗	↑	↓	↑	↑
Neatsfoot Oil	↑	↗	↑	↑	↑	↗	↑	
Neon	↑	↑	↑	↑	↑	↑	↑	
Neville Acid	↓	↗	↑		↓	↓	↑	
Nickel Acetate	↗	↑	↓	↓	↗	↓	↑	↑
Nickel Ammonium Sulfate	→	↑	→	↓	→	↗	↑	
Nickel Chloride	↑	↑	↑	→	↑	↑	↑	↑
Nickel Cyanide	→	↑	→	↓	→	↗	↑	
Nickel Nitrate	↑	↑	↑		↑	↗	↑	
Nickel Salts	↑	↑	↑	→	↑	↑	↑	
Nickel Sulfate	↑	↑	↑	→	↑	↑	↑	↑
Nicotinamide (Niacinamide)			↑	→			↑	
Nicotinamide Hydrochloride	→	↑	→	↓	→	↗	↑	
Nicotine			↑	→			↑	
Nicotine Sulfate	→	↑	→	↓	→	↗	↑	
Niter Cake	↑	↑	↑	↑	↑	↑	↑	
Nitric Acid (0 - 50%)	↓	↗	↑				↑	
Nitric Acid (50 - 100%)	↓	↓	→				↑	
Nitric Acid 3 Molar to 70°C	↓	↗	→	↓	↓	↓	↗	
Nitric Acid Concentrated Room Temp.		↓	↗				↑	↑
Nitric Acid Concentrated to 70°C	↓	↓	↓	↓	↓	↓	↗	↑
Nitric Acid, Red Fuming	↓	↓	↗		↓		↑	↑
Nitric Acid, White Fuming							↗	↑

↑ excellent ↗ fair (OK for static seals) → questionable ↓ poor	NBR	EPDM	FPM	TPU	HNBR	MVQ	FFPM	PTFE
Nitroaniline	→	↑	→	↓	→	↗	↑	
Nitrobenzene	↓	↓	↓	↓	↓	↓	↑	↑
Nitrobenzoic Acid	→	↑	→	↓	→	↗	↑	
Nitrocellulose	→	↑	→	↓	→	↗	↑	
Nitrochlorobenzene	→	↑	→	↓	→	↗	↑	
Nitrochloroform	→	↑	→	↓	→	↗	↑	
Nitrodiethylaniline	→	↑	→	↓	→	↗	↑	
Nitrodiphenyl Ether							↑	
Nitroethane	↓	↗	↓	↓	↓	↓	↑	
Nitrofluorobenzene	→	↑	→	↓	→	↗	↑	
Nitrogen	↑	↑	↑	↑	↑	↑	↑	↑
Nitrogen Oxides	→	↑	→	↓	→	↗	↑	
Nitrogen Tetroxide (N2O4)	↓	↓	↓	↓	↓	↓	↗	↑
Nitrogen Trifluoride							↗	
Nitroglycerine	→	↑	→	↓	→	↗	↑	↑
Nitrogylcerol	→	↑	→	↓	→	↗	↑	
Nitroisopropylbenzene	→	↑	→	↓	→	↗	↑	
Nitromethane	↓	↗	↓	↓	↓	↓	↑	↑
Nitrophenol	→	↑	→	↓	→	↗	↑	
Nitropropane	↓	↗	↓	↓	↓	↓	↑	↑
Nitrosyl Chloride							↑	
Nitrosylsulfuric Acid							↑	
Nitrothiophene	→	↑	→	↓	→	↗	↑	
Nitrotoluene	→	↑	→	↓	→	↗	↑	
Nitrous Acid	→	↑	→	↓	→	↗	↑	
Nitrous Oxide	↑	↑	↑		↑	↑	↑	↑
Nonane	↑	↓	↑	↑	↑	↗	↑	
Noryl GE Phenolic	↑	↑			↑			
Nyvac FR200 Mobil	↑	↑	↑		↑		↑	
Octachloro Toluene	↓	↓	↑	↓	↓	↓	↑	
Octadecane	↑	↓	↑	↗	↑	↓	↑	
Octanal (n-Octanaldehyde)	↑	↓	↑	↑	↑	↗	↑	
Octane or n-Octane	↗	↓	↑	↓	↗	↓	↑	↑
Octyl Acetate	→	↑	→	↓	→	↗	↑	
Octyl Alcohol	↗	→	↑	↓	↗	↗	↑	↑
Octyl Chloride	↑	↓	↑	↑	↑	↗	↑	
Octyl Phthalate			↑	→			↑	
Olefins			↑	→			↑	
Oleic Acid	↗	↓	↑	↗	↗	↓	↑	↑
Oleum (Fuming Sulfuric Acid)	↓	↓	↑	↓	↓	↓	↑	
Oleum Spirits	↗	↓	↑	→	↗	↓	↑	
Oleyl Alcohol			↑	→			↑	↑
Olive Oil	↑	↓	↑	↑	↑	→	↑	↑
Oronite 8200	↗	↓	↑	↑	↗	↓	↑	
Oronite 8515	↗	↓	↑	↑	↗	↓	↑	

↑ excellent ↗ fair (OK for static seals) → questionable ↓ poor	NBR	EPDM	FPM	TPU	HNBR	MVQ	FFPM	PTFE
Ortho-Chloro Ethyl Benzene	↓	↓	↑	↓	↓	↓	↑	
Ortho-Chloroaniline	→	↑	→	↓	→	↗	↑	
Ortho-Chlorophenol	→	↑	→	↓	→	↗	↑	
Ortho-Cresol	→	↑	→	↓	→	↗	↑	
Ortho-Dichlorobenzene	↓	↓	↑	↓	↓	↓	↑	
Ortho-Nitrotoluene	→	↑	→	↓	→	↗	↑	
Orthophos Acid							↑	
OS 45 Type III (OS45)	↗	↓	↑	↓	↗	↓	↑	
OS 45 Type IV (OS45-1)	↗	↓	↑	↓	↗	↓	↑	
OS 70	↗	↓	↑	↓	↗	↓	↑	
Oxalic Acid	↗	↑	↑		↗	↗	↑	↑
Oxygen, 90-150°C (Evalute for specific applications)	↓	↓	↗		↓		↑	
Oxygen, 150-200°C (Evalute for specific applications)	↓	↓	↗	↓	↓	↑	↑	
Oxygen, Cold (Evalute for specific applications)	↗	↑	↑	↑	↗	↑	↑	
Oxygen, Liquid	↓	↓	↓		↓		↗	
Ozonated Deionized Water	→	↑	→	↓	→	↗	↗	
Ozone	↓	↑	↑	↑	→	↑	↑	↑
Paint Thinner, Duco	↓	↓	↗	↓	↓	↓	↑	
Palmitic Acid	↗	→	↑	↗	↗	↓	↑	↑
Par-al-Ketone	↓	↓	↓	↓	↓	↓		
Para-Aminobenzoic Acid	→	↑	→	↓	→	↗	↑	
Para-Aminosalicylic Acid	→	↑	→	↓	→	↗	↑	
Para-Bromobenzylphenyl Ether							↑	
Para-Chlorophenol	→	↑	→	↓	→	↗	↑	
Para-Dichlorobenzene	↓	↓	↑	↓	↓	↓	↑	
Para-Formaldehyde	→	↑	→	↓	→	↗	↑	
Para-Nitroaniline	→	↑	→	↓	→	↗	↑	
Para-Nitrobenzoic Acid	→	↑	→	↓	→	↗	↑	
Para-Nitrophenol	→	↑	→	↓	→	↗	↑	
Para-Toluene Sulfonic Acid	→	↑	→	↓	→	↗	↑	
Paracymene			↑	→			↑	
Paraffins	↑	↓	↑	↗	↑	↗	↑	↑
Paraldehyde	→	↑	→	↓	→	↗	↑	
Parathion			↑	→			↑	
Parker O Lube	↑	↓	↑	↑	↑	↗	↑	
Peanut Oil	↑	↓	↑	↑	↑	↑	↑	
Pectin (Liquor)			↑	→			↑	↑
Pelagonic Acid							↑	
Penicillin (Liquid)			↑	→			↑	
Pentachloroethane			↑	→			↑	
Pentachlorophenol	→	↗	→	↓	→	↗	↑	
Pentaerythritol	→	↑	→	↓	→	↗	↑	
Pentaerythritol Tetranitrate	→	↑	→	↓	→	↗	↑	

↑ excellent ↗ fair (OK for static seals) → questionable ↓ poor	NBR	EPDM	FPM	TPU	HNBR	MVQ	FFPM	PTFE
Pentafluoroethane (F-125)							↗	
Pentane or n-Pentane	↑	↓	↑	↓	↑	↓	↑	↑
Pentane, 2 Methyl	↑	↓	↑	↓	↑	↓	↑	
Pentane, 2-4 dimethyl	↑	↓	↑	↓	↑	↓	↑	
Pentane, 3-Methyl	↑	↓	↑	↓	↑	↓	↑	
Pentoxone							↑	
Pentyl Pentanoate	↑	↓	↑	↑	↑	↗	↑	
Peracetic Acid	→	↑	→	↓	→	↗	↑	↑
Perchloric Acid - 2N	↓	↗	↑	↓	↓	↗	↑	
Perchloroethylene	↓	↓	↗	↓	↓	↓	↑	↑
Perfluoropropane							↗	
Perfluorotriethylamine							↗	
Permanganic Acid							↑	
Persulfuric Acid (Caro's Acid)							↑	
Petrolatum	↑	↓	↑	↑	↑	↓	↑	
Petrolatum Ether	↑	↓	↑	↑	↑	↗	↑	
Petroleum Oil, Above 120°C	↓	↓	↗	↓	↓	↓	↑	
Petroleum Oil, Below 120°C	↑	↓	↑	↗	↑	↗	↑	
Petroleum Oil, Crude	↑	↓	↑	↑	↑	↓	↑	
Phenol	↓	↓	↗	↓	↓	↓	↑	
Phenol, 70% / 30% H2O	↓	↓	↑	↓	↓	↓	↑	
Phenol, 85% / 15% H2O	↓	↓	↑	↓	↓	↓	↑	
Phenolic Sulfonate	→	↑	→	↓	→	↗	↑	
Phenolsulfonic Acid	→	↑	→	↓	→	↗	↑	
Phenylacetamide			↑	→			↑	
Phenylacetate	→	↑	→	↓	→	↗	↑	
Phenylacetic Acid	→	↑	→	↓	→	↗	↑	
Phenylbenzene	↓	↓	↗	↓	↓	↓	↑	↑
Phenylene Diamine							↑	
Phenylethyl Alcohol			↑	→			↑	
Phenylethyl Ether	↓	↓	↓	↓	↓	↓	↑	↑
Phenylethyl Malonic Ester *			↑	→			↑	
Phenylglycerine	→	↑	→	↓	→	↗	↑	
Phenylhydrazine	↓	↓	↗	↓	↓		↑	
Phenylhydrazine Hydrochloride	→	↑	→	↓	→	↗	↑	
Phenylmercuric Acetate	→	↑	→	↓	→	↗	↑	
Phorone	↓	→	↓	↓	↓	↓	↑	
Phosgene							↑	↑
Phosphine	↓	↑	↗	↓	↓		↑	
Phosphoric Acid 3 Molar to 70°C	↑	↑	↑	↓	↑	↗	↑	
Phosphoric Acid Concentrated Room Temp	↗	↑	↑	↓	↗	→	↑	
Phosphoric Acid Concentrated to 70°C	↓	↑	↑	↓	↓	↓	↑	
Phosphoric Acid, 20%							↑	

↑ excellent ↗ fair (OK for static seals) → questionable ↓ poor	NBR	EPDM	FPM	TPU	HNBR	MVQ	FFPM	PTFE
Phosphoric Acid, 45%	↗	↑	↑	↓	↗		↑	
Phosphorus (Molten)							↑	
Phosphorus Oxychloride							↑	↑
Phosphorus Trichloride	↓	↑	↑		↓		↑	↑
Phosphorus Trichloride Acid	↓	↑	↑		↓		↑	
Phthalic Acid	↗	↑	↗	↓	↗	↗	↑	↑
Phthalic Anhydride	→	↑	→	↓	→	↗	↑	
Pickling Solution	↓	→	↗	↓	↓	↓	↑	↑
Picric Acid (aq)	↑	↑	↑		↑		↑	↑
Picric Acid Molten	↗	↗	↑		↗	↓	↑	
Pine Oil	↗	↓	↑	↑	↗	↓	↑	↑
Pine Tar	↑	↓	↑	↑	↑	↗	↑	
Pinene	↗	↓	↑	↗	↗	↓	↑	↑
Piperazine			↑	→			↑	
Piperidine	↓	↓	↓	↓	↓	↓	↑	↑
Piranha (H2SO4:H2O2)(70:30)							↑	
Plating Solution (Co,Cu,Au,In,Fe,Pb,Ni,Ag,Sn,Zn)	↑	↑	↑		↑		↑	
Plating Solutions Chrome	↓	↗	↑	↓	↓	↗	↑	
Plating Solutions Others	↑	↑	↑		↑	↓	↑	
Polyethylene Glycol	↗	↑	→		↗		↑	
Polyglycerol	→	↑	→	↓	→	↗	↑	
Polyglycol	→	↑	→	↓	→	↗	↑	
Polyvinyl Acetate Emulsion		↑					↑	
Potassium (Molten)							↓	
Potassium Acetate	↗	↑	↗	↗	↗	↓	↑	↑
Potassium Acid Sulfate	→	↑	→	↓	→	↗	↑	
Potassium Alum	→	↑	→	↓	→	↗	↑	
Potassium Aluminum Sulfate	→	↑	→	↓	→	↗	↑	
Potassium Antimonate	→	↑	→	↓	→	↗	↑	
Potassium Bicarbonate	→	↑	→	↓	→	↗	↑	
Potassium Bichromate	→	↑	→	↓	→	↗	↑	
Potassium Bifluoride	→	↑	→	↓	→	↗	↑	
Potassium Bisulfate	↑	↑	↑	↓	↑	↗	↑	↑
Potassium Bisulfite	→	↑	→	↓	→	↗	↑	
Potassium Bitartrate	→	↑	→	↓	→	↗	↑	
Potassium Bromide	↑	↑	↑	↓	↑	↗	↑	↑
Potassium Carbonate	↑	↑	↑	↓	↑	↗	↑	↑
Potassium Chlorate	↓	↑	↑	↓	↓	↗	↑	↑
Potassium Chloride	↑	↑	↑	→	↑	↑	↑	↑
Potassium Chromates	↗	↑	↑	↓	↗	↗	↑	↑
Potassium Citrate	→	↑	→	↓	→	↗	↑	
Potassium Cupro Cyanide	↑	↑	↑	↑	↑	↑	↑	
Potassium Cyanate	→	↑	→	↓	→	↗	↑	
Potassium Cyanide	↑	↑	↑	↓	↑	↑	↑	↑
Potassium Dichromate	↑	↑	↑	→	↑	↑	↑	↑

↑ excellent
↗ fair (OK for static seals)
→ questionable
↓ poor

	NBR	EPDM	FPM	TPU	HNBR	MVQ	FFPM	PTFE
Potassium Diphosphate	→	↑	→	↓	→	↗	↑	
Potassium Ferricyanide	→	↑	→	↓	→	↗	↑	
Potassium Fluoride	→	↑	→	↓	→	↗	↑	
Potassium Glucocyanate	→	↑	→	↓	→	↗	↑	
Potassium Hydroxide 50%	↗	↑	→	↓	↗	→	↑	↑
Potassium Hypochlorite	→	↑	→	↓	→	↗	↑	
Potassium Iodate	→	↑	→	↓	→	↗	↑	
Potassium Iodide	↑	↑	↑	↓	↑	↗	↑	↑
Potassium Metabisulfate	→	↑	→	↓	→	↗	↑	
Potassium Metachromate	→	↑	→	↓	→	↗	↑	
Potassium Metasilicate							↑	
Potassium Monochromate	→	↑	→	↓	→	↗	↑	
Potassium Nitrate	↗	↑	↑	→	↗	↑	↑	↑
Potassium Nitrite	→	↑	→	↓	→	↗	↑	
Potassium Oxalate	→	↑	→	↓	→	↗	↑	
Potassium Perchlorate	↓	↑	↑	↓	↓	↗	↑	↑
Potassium Perfluoro Acetate	↗	↑	↓		↗		↑	
Potassium Permanganate	↓	↑	↑	↗	↓	↗	↑	↑
Potassium Peroxide							↑	
Potassium Persulfate	↓	↑	↑	↓	↓	↗	↑	↑
Potassium Phosphate (Acid)	→	↑	↑	↓	→	↗	↑	
Potassium Phosphate (Alkaline)	→	↑	→	↓	→	↗	↑	
Potassium Phosphate (Di/Tri Basic)	→	↑	→	↓	→	↗	↑	
Potassium Pyrosulfate	→	↑	→	↓	→	↗	↑	↑
Potassium Salts	↑	↑	↑	↑	↑	↑	↑	
Potassium Silicate							↑	
Potassium Sodium Tartrate	→	↑	→	↓	→	↗	↑	
Potassium Stannate	→	↑	→	↓	→	↗	↑	
Potassium Stearate	→	↑	→	↓	→	↗	↑	
Potassium Sulfate	↑	↑	↑	→	↑	↑	↑	
Potassium Sulfide	→	↑	→	↓	→	↗	↑	
Potassium Sulfite	↑	↑	↑	→	↑	↑	↑	
Potassium Tartrate	→	↑	→	↓	→	↗	↑	
Potassium Thiocyanate	→	↑	→	↓	→	↗	↑	
Potassium Thiosulfate	→	↑	→	↓	→	↗	↑	
Potassium Triphosphate	→	↑	→	↓	→	↗	↑	
Prestone Antifreeze	↑	↑	↑	↓	↑	↑	↑	
PRL-High Temp. Hydr. Oil	↗	↓	↑	↗	↗	↗	↑	
Producer Gas	↑	↓	↑	↑	↑	↗	↑	
Propane	↑	↓	↑	↗	↑	↓	↑	↑
Propionaldehyde	→	↑	→	↓	→	↗	↑	
Propionic Acid	→	↑	→	↓	→	↗	↑	
Propionitrile	↑	↓	↑		↑		↑	
Propyl Acetate	↓	↗	↓	↓	↓	↓	↑	

	NBR	EPDM	FPM	TPU	HNBR	MVQ	FFPM	PTFE
Propyl Acetone or n-Propyl Acetone	↓	↑	↓	↓	↓	↓	↑	
Propyl Alcohol	↑	↑	↑	↓	↑	↑	↑	
Propyl Nitrate	↓	↗	↓	↓	↓	↓	↑	
Propyl Propionate	→	↑	→	↓	→	↗	↑	
Propylamine	↓	↓	↓	↓	↓	↗	↑	
Propylbenzene			↑	→			↑	
Propylene	↓	↓	↑	↓	↓	↓	↑	
Propylene Chloride			↑	→			↑	
Propylene Chlorohydrin			↑	→			↑	
Propylene Dichloride	↓	↓			↓		↑	
Propylene Glycol	↑	↑	↑	↓	↑	↗	↑	↑
Propylene Imine			↑	→			↑	
Propylene Oxide	↓	↗	↓	↓	↓	↓	↑	↑
Pydraul 90e	↓	↑	↑		↓		↑	
Pydraul, 10E	↓	↑	↓	↓	↓	↑	↑	
Pydraul, 115E	↓	↑	↑	↓	↓	↓	↑	
Pydraul, 230C, 312C, 540C, A200	↓	↓	↑	↓	↓	↓	↑	
Pydraul, 29ELT 30E, 50E, 65E	↓	↑	↑	↓	↓	↑	↑	
Pyranol Transformer Oil	↑	↓	↑	↗	↑	↓	↑	
Pyridine	↓	↓	↓	↓	↓		↑	↑
Pyridine Oil	↓	↗	↓		↓	↓	↑	
Pyridine Sulfate	→	↑	→	↓	→	↗	↑	
Pyridine Sulfonic Acid	→	↑	→	↓	→	↗	↑	
Pyrogallol (Pyrogallic Acid)	↗	↓	↑	→	↗		↑	
Pyrogard 42, 43, 55	↓	↑	↑		↓		↑	
Pyrogard 53, Mobil Phosphate Ester	↓	↑	↑	↓	↓	↓	↑	
Pyrogard D, Mobil Water-in-Oil Emulsion	↑	↓	↓	↑	↑	→	↑	
Pyroligneous Acid	↓	↗	↓	↓	↓		↑	
Pyrolube	↓	↗	↑	↓	↓	↗	↑	
Pyrosulfuric Acid	→	↑	→	↓	→	↗	↑	
Pyrosulfuryl Chloride	↗	↓	↑	→	↗		↑	
Pyrrole	↓	↓	↓		↓	↗	↑	↑
Pyruvic Acid	→	↑	→	↓	→	↗	↑	
Quinidine	↗	↓	↑	→	↗		↑	
Quinine	↗	↓	↑	→	↗		↑	
Quinine Bisulfate	→	↑	→	↓	→	↗	↑	
Quinine Hydrochloride	→	↑	→	↓	→	↗	↑	
Quinine Sulfate	→	↑	→	↓	→	↗	↑	
Quinine Tartrate	→	↑	→	↓	→	↗	↑	
Quinizarin	↗	↓	↑	→	↗		↑	
Quinoline	↗	↓	↑	→	↗		↑	
Quinone	↗	↓	↑	→	↗		↑	

	NBR	EPDM	FPM	TPU	HNBR	MVQ	FFPM	PTFE
Radiation (Gamma, 1.0 E+07 Rads)	→	↗	↓	↓	→	↗	↗	
Raffinate	↗	↓	↑	→	↗		↑	
Rapeseed Oil	↗	↓	↑	↗	↗	↓	↑	↑
Red Line 100 Oil	↑	↓	↑	↑	↑	↓	↑	
Red Oil (MIL-H-5606)	↑	↓	↑	↑	↑	↓	↑	
Resorcinol	→	↑	→	↓	→	↗	↑	
Rhodium							↑	
Riboflavin	↗	↓	↑	→	↗		↑	
Ricinoleic Acid	↗	↓	↑	→	↗		↑	
RJ-1 (MIL-F-25558)	↑	↓	↑	↑	↑	↓	↑	
RJ-4 (MIL-F-82522)	↗	↓	↑	↗	↗	↓	↑	
Rosin	↗	↓	↑	→	↗		↑	
RP-1 (MIL-R-25576)	↑	↓	↑	↑	↑	↓	↑	
Saccharin Solution	→	↑	→	↓	→	↗	↑	
Sal Ammoniac	↑	↑	↑	↑	↑	↗	↑	
Salicylic Acid	↗	↑	↑	↑	↗		↑	↑
Santo Safe 300	↓	→	↑		↓	↑	↑	
Sea (Salt) Water	↑	↑	↗	→	↑	↑	↑	↑
Sebacic Acid	→	↑	→	↓	→	↗	↑	
Selenic Acid	→	↑	→	↓	→	↗	↑	
Selenous Acid	→	↑	→	↓	→	↗	↑	
Sewage	↑	↑	↑	↓	↑	↑	↑	
SF 1154 GE Silicone Fluid	↗	↑	↑	↗	↗	↓	↑	
SF1147 GE Silicone Fluid	↗	→	↑		↗	↓	↑	
SF96 GE SIlicone Fluid	↗	↑	↑	↗	↗	↓	↑	
Shell 3XF Mine Fluid (Fire resist hydr.)	↑	↓	↑	↓	↑		↑	
Shell Alvania Grease #2	↑	↓	↑	↑	↑	↗	↑	
Shell Carnea 19 and 29	↑	↓	↑	↗	↑		↑	
Shell Diala	↑	↓	↑	↗	↑	↓	↑	
Shell Irus 905	↑	↓	↑	↑	↑	↓	↑	
Shell Lo Hydrax 27 and 29	↑	↓	↑	↗	↑	↓	↑	
Shell Macome 72	↑	↓	↑	↗	↑	↓	↑	
Shell Tellus #32 Pet. Base	↑	↓	↑	↑	↑	↓	↑	
Shell Tellus #68	↑	↓	↑	↑	↑	↓	↑	
Shell Tellus 27 (Petroleum Base)	↑	↓	↑		↑		↑	
Shell Tellus 33	↑	↓	↑		↑		↑	
Shell UMF (5% Aromatic)	↑	↓	↑	↑	↑	↓	↑	
Shellac	→	↑	→	↓	→	↗	↑	
Silane							↑	
Silicate Esters	↗	↓	↑	↑	↗	↓	↑	
Silicon Fluoride							↑	
Silicon Tetrachloride							↑	
Silicon Tetrafluoride							↑	

	NBR	EPDM	FPM	TPU	HNBR	MVQ	FFPM	PTFE
Silicone Greases	↑	↑	↑	↑	↑	→	↑	↑
Silicone Oils	↑	↑	↑	↑	↑	→	↑	↑
Silver Bromide	→	↑	→	↓	→	↗	↑	
Silver Chloride	→	↑	→	↓	→	↗	↑	
Silver Cyanide	→	↑	→	↓	→	↗	↑	
Silver Nitrate	↗	↑	↑	↑	↗	↑	↑	↑
Silver Sulfate	→	↑	→	↓	→	↗	↑	
Sinclair Opaline CX-EP Lube	↑	↓	↑	↑	↑	↓	↑	
Skelly, Solvent B, C, E	↑	↓	↑		↑		↑	
Skydrol 500 B4	↓	↑	↓	↓	↓	→	↑	
Skydrol 7000	↓	↑	↗	↓	↓		↑	
Skydrol LD-4	↓	↑	↓	↓	↓	→	↑	
Soap Solutions	↑	↑	↑	↗	↑	↑	↑	↑
Socony Mobile Type A	↑	↓	↑	↗	↑	↓	↑	
Socony Vacuum AMV AC781 (Grease)	↑	↓	↑	↗	↑	↓	↑	
Socony Vacuum PD959B	↑	↓	↑	↑	↑	↓	↑	
Soda Ash	↑	↑	↑		↑	↑	↑	
Sodium (Molten)							↓	
Sodium Acetate	↗	↑	↓	↓	↗	↓	↑	
Sodium Acid Bisulfate	→	↑	→	↓	→	↗	↑	
Sodium Acid Fluoride	→	↑	→	↓	→	↗	↑	
Sodium Acid Sulfate	→	↑	→	↓	→	↗	↑	
Sodium Aluminate	→	↑	→	↓	→	↗	↑	
Sodium Aluminate Sulfate	→	↑	→	↓	→	↗	↑	
Sodium Anthraquinone Disulfate	→	↑	→	↓	→	↗	↑	
Sodium Antimonate	→	↑	→	↓	→	↗	↑	
Sodium Arsenate	→	↑	→	↓	→	↗	↑	
Sodium Arsenite	→	↑	→	↓	→	↗	↑	
Sodium Benzoate	↑	↑	↑	↓	↑	↗	↑	↑
Sodium Bicarbonate (Baking Soda)	↑	↑	↑		↑	↑	↑	↑
Sodium Bichromate	→	↑	→	↓	→	↗	↑	
Sodium Bifluoride	→	↑	→	↓	→	↗	↑	
Sodium Bisulfate or Bisulfite	↑	↑	↑		↑	↑	↑	↑
Sodium Bisulfide	→	↑	→	↓	→	↗	↑	
Sodium Bitartrate	→	↑	→	↓	→	↗	↑	
Sodium Borate	↗	↑	↑	↓	↗	↑	↑	
Sodium Bromate	→	↑	→	↓	→	↗	↑	
Sodium Bromide	→	↑	→	↓	→	↗	↑	
Sodium Carbonate (Soda Ash)	↑	↑	↑	↓	↑	↑	↑	
Sodium Chlorate	↗	↑	↑	↗	↗	↗	↑	↑
Sodium Chloride	↑	↑	↑	↓	↑	↑	↑	↑
Sodium Chlorite	↓	↑	↑	↓	↓	↗	↑	
Sodium Chloroacetate	→	↑	→	↓	→	↗	↑	
Sodium Chromate	→	↑	→	↓	→	↗	↑	

↑ excellent ↗ fair (OK for static seals) → questionable ↓ poor	NBR	EPDM	FPM	TPU	HNBR	MVQ	FFPM	PTFE
Sodium Citrate	→	↑	→	↓	→	↗	↑	
Sodium Cyanamide	→	↑	→	↓	→	↗	↑	
Sodium Cyanate	→	↑	→	↓	→	↗	↑	
Sodium Cyanide	↑	↑			↑	↑	↑	
Sodium Diacetate	→	↑	→	↓	→	↗	↑	
Sodium Diphenyl Sulfonate	→	↑	→	↓	→	↗	↑	
Sodium Diphosphate	→	↑	→	↓	→	↗	↑	
Sodium Disilicate	→	↑	→	↓	→	↗	↑	
Sodium Ethylate	→	↑	→	↓	→	↗	↑	
Sodium Ferricyanide	→	↑	→	↓	→	↗	↑	
Sodium Ferrocyanide	→	↑	→	↓	→	↗	↑	
Sodium Fluoride	↑	↑	↑	↗	↑	↗	↑	
Sodium Fluorosilicate	→	↑	→	↓	→	↗	↑	
Sodium Glutamate	→	↑	→	↓	→	↗	↑	
Sodium Hydride							↑	
Sodium Hydrogen Sulfate	→	↑	→	↓	→	↗	↑	
Sodium Hydrosulfide	→	↑	→	↓	→	↗	↑	
Sodium Hydrosulfite	→	↑	→	↓	→	↗	↑	
Sodium Hydroxide, 3 Molar	↗	↑	↗	↗	↗	↑	↑	
Sodium Hypochlorite	↗	↑	↑	↓	↗	↗	↑	↑
Sodium Hypophosphate	→	↑	→	↓	→	↗	↑	
Sodium Hypophosphite	→	↑	→	↓	→	↗	↑	
Sodium Hyposulfite	→	↑	→	↓	→	↗	↑	
Sodium Iodide	→	↑	→	↓	→	↗	↑	
Sodium Lactate	→	↑	→	↓	→	↗	↑	
Sodium Metaphosphate	↑	↑	↑		↑		↑	
Sodium Metasilicate	→	↑	→	↓	→	↗	↑	
Sodium Methylate	→	↑	→	↓	→	↗	↑	
Sodium Monophosphate	→	↑	→	↓	→	↗	↑	
Sodium Nitrate	↗	↑	↑	↓	↗	↓	↑	↑
Sodium Oleate	→	↑	→	↓	→	↗	↑	
Sodium Orthosilicate	→	↑	→	↓	→	↗	↑	
Sodium Oxalate	→	↑	→	↓	→	↗	↑	
Sodium Perborate	↗	↑	↑		↗	↗	↑	
Sodium Percarbonate	→	↑	→	↓	→	↗	↑	
Sodium Perchlorate	→	↑	→	↓	→	↗	↑	
Sodium Peroxide	↗	↑	↑	↓	↗	↓	↑	
Sodium Persulfate	→	↑	→	↓	→	↗	↑	
Sodium Phenolate	→	↑	→	↓	→	↗	↑	
Sodium Phenoxide	→	↑	→	↓	→	↗	↑	
Sodium Phosphate (Dibasic)	↑	↑	↑	↑	↑	↓	↑	↑
Sodium Phosphate (Mono)	↑	↑	↑	↑	↑	↓	↑	↑
Sodium Phosphate (Tribasic)	↑	↑	↑	↑	↑	↑	↑	↑
Sodium Plumbite	→	↑	→	↓	→	↗	↑	
Sodium Pyrophosphate	→	↑	→	↓	→	↗	↑	

↑ excellent ↗ fair (OK for static seals) → questionable ↓ poor	NBR	EPDM	FPM	TPU	HNBR	MVQ	FFPM	PTFE
Sodium Resinate	→	↑	→	↓	→	↗	↑	
Sodium Salicylate	→	↑	→	↓	→	↗	↑	
Sodium Salts	↑	↑	↑	↑	↑	↑	↑	
Sodium Sesquisilicate							↑	
Sodium Silicate	↑	↑	↑		↑		↑	↑
Sodium Silicofluoride							↑	
Sodium Stannate	→	↑	→	↓	→	↗	↑	
Sodium Sulfate	↗	↑	↑	↓	↗	↑	↑	↑
Sodium Sulfide and Sulfite	↑	↑	↑	↑	↑	↑	↑	↑
Sodium Sulfocyanide	→	↑	→	↓	→	↗	↑	
Sodium Tartrate	→	↑	→	↓	→	↗	↑	
Sodium Tetraborate	→	↑	→	↓	→	↗	↑	
Sodium Tetraphosphate	→	↑	→	↓	→	↗	↑	
Sodium Tetrasulfide	→	↑	→	↓	→	↗	↑	
Sodium Thioarsenate	→	↑	→	↓	→	↗	↑	
Sodium Thiocyanate	→	↑	→	↓	→	↗	↑	
Sodium Thiosulfate	↗	↑	↑	↑	↗	↑	↑	↑
Sodium Trichloroacetate	→	↑	→	↓	→	↗	↑	
Sodium Triphosphate	→	↑	→	↓	→	↗	↑	
Solvesso 100, 150							↑	
Sorbitol	→	↑	→	↓	→	↗	↑	
Sour Crude Oil	→	↓	↑	↓	→	↓	↑	
Sour Natural Gas	→	↓	↑	↓	→	↓	↑	
Sovasol No. 1, 2, and 3	↑	↓	↑	↗	↑	↓	↑	
Sovasol No. 73 and 74	↗	↓	↑	↗	↗	↓	↑	
Soybean Oil	↑	↓	↑	↗	↑	↑	↑	
Spry	↑	↗	↑	↑	↑	↑	↑	
SR-10 Fuel	↑	↓	↑	↗	↑	↓	↑	
SR-6 Fuel	↗	↓	↑	↗	↗	↓	↑	
Standard Oil Mobilube GX90-EP Lube	↑	↓	↑	↑	↑	↓	↑	
Stannic Ammonium Chloride	→	↑	→	↓	→	↗	↑	
Stannic Chloride	↑	↑	↑		↑	↗	↑	
Stannic Chloride, 50%	↑	↑	↑		↑	↗	↑	
Stannic Tetrachloride	→	↑	→	↓	→	↗	↑	
Stannous Bisulfate	→	↑	→	↓	→	↗	↑	
Stannous Bromide	→	↑	→	↓	→	↗	↑	
Stannous Chloride (15%)	↑	↑	↑		↑	↗	↑	
Stannous Fluoride	→	↑	→	↓	→	↗	↑	
Stannous Sulfate	→	↑	→	↓	→	↗	↑	
Stauffer 7700	↗	↓	↑		↗	↓	↑	
Steam Below 200°C	↓	↑	↓	↓	↓	→	↑	
Steam, 200-260°C	↓	→	↓	↓	↓	↓	↑	
Steam, Above 260°C							↑	
Stearic Acid	↗	↗	↑	↑	↗	↗	↑	↑
Stoddard Solvent	↑	↓	↑	↑	↑	↓	↑	↑

↑ excellent ↗ fair (OK for static seals) → questionable ↓ poor	NBR	EPDM	FPM	TPU	HNBR	MVQ	FFPM	PTFE
Strontium Acetate	→	↑	→	↓	→	↗	↑	
Strontium Carbonate	→	↑	→	↓	→	↗	↑	
Strontium Chloride	→	↑	→	↓	→	↗	↑	
Strontium Hydroxide	→	↑	→	↓	→	↗	↑	
Strontium Nitrate	→	↑	→	↓	→	↗	↑	
Styrene (Monomer)	↓	↓	↑	↓	↓	↓	↑	↑
Succinic Acid	↑	↑	↑	↓	↑	↗	↑	↑
Sucrose Solutions	↑	↑	↑	↓	↑	↑	↑	
Sulfamic Acid	→	↑	→	↓	→	↗	↑	
Sulfanilic Acid	→	↑	→	↓	→	↗	↑	
Sulfanilic Chloride	↗	↓	↑	→	↗		↑	
Sulfanilimide	↗	↓	↑	→	↗		↑	
Sulfite Liquors	→	↑	→	↓	→	↗	↑	
Sulfolane	↗	↑	↗		↗		↑	
Sulfonated Oils	↗	↓	↑	→	↗		↑	
Sulfonic Acid	→	↑	→	↓	→	↗	↑	
Sulfonyl Choride	→	↑	→	↓	→	↗	↗	
Sulfur	↓	↑	↑		↓		↑	↑
Sulfur (Molten)	↓	→	↑	↓	↓	→	↑	
Sulfur Chloride	↓	↓	↑	↓	↓	→	↑	↑
Sulfur Dioxide, Dry	↓	↑	↓		↓	↗	↑	↑
Sulfur Dioxide, Liquidified under pressure	↓	↑	↓		↓	↗	↑	
Sulfur Dioxide, Wet	↓	↑	↓		↓	↗	↑	
Sulfur Hexafluoride	↗	↑	↗		↗		↗	↑
Sulfur Liquors	↗	↗	↑		↗	↓	↑	
Sulfur Monochloride	↑	↓	↑	↑	↑	↗	↑	
Sulfur Tetrafluoride							↗	
Sulfur Trioxide Dry	↓	↗	↑		↓	↗	↑	
Sulfuric Acid (20% Oleum)	→	↑	→	↓	→	↗	↑	
Sulfuric Acid, 3 Molar to 70°C	↗	↑	↑	↓	↗	↑	↑	
Sulfuric Acid, Concentrated Room Temp		→	↑	→			↑	↑
Sulfuric Acid, Concentrated to 70°C	↓	↓	↑	↓		↓	↑	↑
Sulfuric Chlorohydrin (Chlorosulfonic Acid)	→	↑	→	↓	→	↗	↑	
Sulfurous Acid		↗	↑	↓		↓	↑	
Sunoco #3661	↑	↓	↑	↑	↑	↓	↑	
Sunoco All purpose grease	↑	↓	↑	↑	↑	↓	↑	
Sunoco SAE 10	↑	↓	↑	↑	↑	↓	↑	
Sunsafe (Fire resist. hydr. fluid)	↑	↓	↑	↓	↑		↑	
Super Shell Gas	↑	↓	↑	↗	↑	↓	↑	
Surfuryl Chloride	→	↑	→	↓	→	↗	↑	
Swan Finch EP Lube	↑	↓	↑	↑	↑	↓	↑	
Swan Finch Hypoid-90	↑	↓	↑	↑	↑	↓	↑	

↑ excellent ↗ fair (OK for static seals) → questionable ↓ poor	NBR	EPDM	FPM	TPU	HNBR	MVQ	FFPM	PTFE
Tannic Acid (10%)	↑	↑	↑		↑	↗	↑	↑
Tar, bituminous	↓	↓	↗	↓	↓	↗	↑	↑
Tartaric Acid	↑	↗	↑	↓	↑	↑	↑	↑
Tellone II							↑	
Terephthalic Acid	→	↑	→	↓	→	↗	↑	
Terpineol	↗	→	↑	↗	↗		↑	
Terpinyl Acetate	↗	↓	↑	→	↗		↑	
Tertiary Amyl Methyl Ether (TAME)							↑	
Tertiary Butyl Catechol or p-tert-butylcatechol	↓	↗	↑	↓	↓		↑	
Tertiary Butyl Mercaptan	↓	↓	↑		↓		↑	
Tetrabromoethane	↓	↓	↑		↓	↓	↑	
Tetrabromomethane	↗	↓	↑	→	↗		↑	
Tetrabutyl Titanate	↗	↑	↑		↗	↓	↑	
Tetrachloroethane	↓	↓	↗	↓	↓		↑	↑
Tetrachloroethylene	↓	↓	↑	↓	↓	↓	↑	↑
Tetraethyl Lead	↗	↓	↑		↗		↑	↑
Tetraethyl Lead “Blend”	↗	↓	↑		↗		↑	
Tetraethyl Orthosilicate (TEOS)							↑	
Tetrahydrofuran	↓	↓	↓	↓	↓	↓	↑	↑
Tetralin	↓	↓	↑		↓	↓	↑	
Tetramethyl Ammonium Hydroxide	→	↑	→	↓	→	↗	↑	
Tetramethylcyclotetrasiloxane (TMCTS)							↑	
Tetramethyldihydropyridine	↗	↓	↑	→	↗		↑	
Tetraphosphoglucosate	→	↑	→	↓	→	↗	↑	
Tetraphosphoric Acid							↑	
Texaco 3450 Gear Oil	↑	↓	↑	↑	↑	↓	↑	
Texaco Capella A and AA	↑	↓	↑	↗	↑	↓	↑	
Texaco Meropa 220 (No Lead)	↑	↓	↑	↗	↑	↓	↑	
Texaco Regal B	↑	↓	↑	↑	↑	↓	↑	
Texaco Uni-Temp Grease	↑	↓	↑	↑	↑	↗	↑	
Texamatic “A” 1581 Fluid	↑	↓	↑	↗	↑	↓	↑	
Texamatic “A” 3401 Fluid	↑	↓	↑	↗	↑	↓	↑	
Texamatic “A” 3525 Fluid	↑	↓	↑	↗	↑	↓	↑	
Texamatic “A” 3528 Fluid	↑	↓	↑	↗	↑	↓	↑	
Texamatic “A” Transmission Oil	↑	↓	↑	↗	↑	↓	↑	
Texas 1500 Oil	↑	↓	↑	↑	↑	↗	↑	
Therminol 44	↓	↓	↑		↓	↓	↑	
Therminol 55	↗	↓	↑		↗	↓	↑	
Therminol 66							↑	
Therminol FR							↑	
Therminol VP-1, 60, 65	↓	↓	↑		↓	↗	↑	
Thio Acid Chloride							↑	

↑ excellent
↗ fair (OK for static seals)
→ questionable
↓ poor

	NBR	EPDM	FPM	TPU	HNBR	MVQ	FFPM	PTFE
Thioamyl Alcohol	↑	↓	↑	↑	↑	↗	↑	
Thiodiacetic Acid	→	↑	→	↓	→	↗	↑	
Thioethanol	→	↑	→	↓	→	↗	↑	
Thioglycolic Acid	→	↑	→	↓	→	↗	↑	
Thiokol TP-90B	↓	↑	↑		↓		↑	
Thiokol TP-95	↓	↑	↑		↓		↑	
Thionyl Chloride	↓	↗	↑	↓	↓		↑	↑
Thiophene (Thiofuran)	↓	↓	↓	↓	↓		↑	↑
Thiophosphoryl Chloride	→	↑	→	↓	→	↗	↑	
Thiourea	→	↑	→	↓	→	↗	↑	
Thorium Nitrate	→	↑	→	↓	→	↗	↑	
Tidewater Multigear, 140 EP Lube	↑	↓	↑	↑	↑	↓	↑	
Tidewater Oil-Beedol	↑	↓	↑	↑	↑	↗	↑	
Tin Ammonium Chloride	→	↑	→	↓	→	↗	↑	
Tin Chloride	↑	↓	↑	↑	↑	↗	↑	
Tin Tetrachloride	↑	↓	↑	↑	↑	↗	↑	
Titanium Dioxide	→	↑	→	↓	→	↗	↑	
Titanium Sulfate	→	↑	→	↓	→	↗	↑	
Titanium Tetrachloride	↗	↗	↗	↓	↗	↓	↑	↑
Toluene	↓	↓	↗	↓	↓	↓	↑	↑
Toluene Bisodium Sulfite							↑	
Toluene Diisocyanate (TDI)	↓	↗	↓		↓	↓	↑	
Toluene Sulfonyl Chloride	↗	↓	↑	→	↗		↑	
Toluenesulfonic Acid	→	↑	→	↓	→	↗	↑	
Toluidine	↗	↓	↑	→	↗		↑	
Toluol	→	↑	→	↓	→	↗	↑	
Toluquinone	↗	↓	↑	→	↗		↑	
Tolylaldehyde	→	↑	→	↓	→	↗	↑	
Transformer Oil	↗	↓	↑	↑	↗	↗	↑	↑
Transmission Fluid Type A	↑	↓	↑	↑	↑	↗	↑	↑
Triacetin	↗	↑	↓	↓	↗		↑	↑
Triaryl Phosphate	↓	↑	↑	↓	↓	→	↑	
Tribromomethylbenzene	↗	↓	↑	→	↗		↑	
Tributoxyethyl Phosphate	↓	↑	↑	↓	↓		↑	↑
Tributyl Citrate	→	↑	→	↓	→	↗	↑	
Tributyl Mercaptan	↓	↓	↑		↓	↓	↑	
Tributyl Phosphate	↓	↑	↓	↓	↓	↓	↑	↑
Tributylamine							↑	
Trichloroacetic Acid	↗	↗	↓	↓	↗		↑	↑
Trichloroacetyl Chloride	↗	↓	↑	→	↗		↑	
Trichlorobenzene	↗		↑	↓	↓		↑	
Trichloroethane	↓	↓	↑	↓	↓	↓	↑	
Trichloroethanolamine	→	↑	→	↓	→	↗	↑	
Trichloroethylene	↓	↓	↗	↓	↓	↓	↑	↑

	NBR	EPDM	FPM	TPU	HNBR	MVQ	FFPM	PTFE
Trichloromethane	↓	↓	↑	↓	↓	↓	↑	
Trichloronitromethane (Chloropicrin)	→	↑	→	↓	→	↗	↑	
Trichlorophenylsilane							↑	
Trichloropropane	↓	↓	↑	↓	↓	↓	↑	
Trichlorosilane	↓	↓	↑	↓	↓	↓	↑	
Tricresyl Phosphate	↓	↗	↗	↓	↓	→	↑	↑
Triethanol Amine		↑		↓			↑	↑
Triethyl Phosphate	↗	↓	↑	→	↗		↑	
Triethylaluminum		↓	↗				↑	↑
Triethylborane			↑				↑	↑
Triethylene Glycol	→	↑	→	↓	→	↗	↑	
Triethylenetetramine	→	↑	→	↓	→	↗	↑	
Trifluoroacetic Acid	→	↑	→	↓	→	↗	↗	
Trifluoroethane	↓	↓	↑	↓	↓	↓	↑	
Trifluoromethane (Fluoroform)	↓	↓	↑	↓	↓	↓	↑	
Trifluorovinylchloride	↗	↓	↑	→	↗		↑	
Triisopropylbenzylchloride	↗	↓	↑	→	↗		↑	
Trimethylamine	→	↑	→	↓	→	↗	↑	
Trimethylamine (TMA)	→	↑	→	↓	→	↗	↑	
Trimethylbenzene	↗	↓	↑	→	↗		↑	
Trimethylborate (TMB)	↗	↓	↑	→	↗		↑	
Trimethylpentane	↑	↓	↑	↑	↑	↗	↑	
Trinitrotoluene (TNT)	↓	↓	↗	↗	↓		↑	↑
Trioctyl Phosphate	↓	↑	↗	↓	↓	→	↑	↑
Triphenylphosphite	→	↑	→	↓	→	↗	↑	
Tripoly Phosphate	↓	↑	↗	↓	↓	→	↑	
Tripotassium Phosphate	→	↑	→	↓	→	↗	↑	
Trisodium Phosphate	→	↑	→	↓	→	↗	↑	↑
Tung Oil (China Wood Oil)	↑	↓	↑	→	↑	↓	↑	
Tungsten Hexafluoride							↗	
Tungstic Acid							↑	
Turbine Oil	↑	↓	↑	↑	↑	↓	↑	
Turbine Oil #15 (MIL-L-7808A)	↗	↓	↑	↓	↗	↓	↑	
Turbo Oil #35	↑	↓	↑	↑	↑	↓	↑	
Turpentine	↑	↓	↑	→	↑	↓	↑	↑
Type I Fuel (MIL-S-3136)(ASTM Ref. Fuel A)	↑	↓	↑	↑	↑	↓	↑	
Type II Fuel MIL-S-3136	↗	↓	↑	↗	↗	↓	↑	
Type III Fuel MIL-S-3136 (ASTM Ref. Fuel B)	↗	↓	↑	↗	↗	↓	↑	
Ucon Hydrolube J-4	↑	↑	↑	↓	↑	↑	↑	
Ucon Lubricant 50-HB-100	↑	↑	↑		↑	↑	↑	
Ucon Lubricant 50-HB-260	↑	↑	↑		↑	↑	↑	
Ucon Lubricant 50-HB-5100	↑	↑	↑		↑	↑	↑	
Ucon Lubricant 50-HB-660	↑	↑	↑		↑	↑	↑	

ALL-TEC® SEALING SYSTEMS

↑ excellent
↗ fair (OK for static seals)
→ questionable
↓ poor

	NBR	EPDM	FPM	TPU	HNBR	MVQ	FFPM	PTFE
Ucon Lubricant 50-HB55	↑	↑	↑		↑	↑	↑	
Ucon Lubricant LB-1145	↑	↑	↑		↑	↑	↑	
Ucon Lubricant LB-135	↑	↑	↑		↑	↑	↑	
Ucon Lubricant LB-285	↑	↑	↑		↑	↑	↑	
Ucon Lubricant LB-300X	↑	↑	↑		↑	↑	↑	
Ucon Lubricant LB-625	↑	↑	↑		↑	↑	↑	
Ucon Lubricant LB-65	↑	↑	↑		↑	↑	↑	
Ucon Oil 50-HB-280x	↗	↑	→		↗		↑	
Ucon Oil Heat Transfer Fluid 500 (Polyalkalene Glycol)	↑	↑	↑		↑	↑	↑	
Ucon Oil LB-385	↑	↑	↑		↑	↑	↑	
Ucon Oil LB-400X	↑	↑	↑		↑	↑	↑	
Undecylenic Acid	↗	↓	↑	→	↗		↑	
Undecylic Acid	↗	↓	↑	→	↗		↑	
Univis 40 (Hydr. Fluid)	↑	↓	↑	↑	↑	↓	↑	
Univolt #35 (Mineral Oil)	↑	↓	↑	↑	↑	↓	↑	
Unsymmetrical Dimethyl Hydrazine (UDMH)	↗	↑	↓		↗	↓	↑	
UPDI (Ultrapure Deionized Water)	→	↑	→	↓	→	↗	↑	
Uranium Hexachloride			↑				↑	
Uric Acid	→	↑	→	↓	→	↗	↑	
Valeraldehyde	→	↑	→	↓	→	↗	↑	
Valeric Acid	→	↑	→	↓	→	↗	↑	
Vanadium Oxide	↑	↓	↑	↑	↑	↗	↑	
Vanadium Pentoxide	↑	↓	↑	↑	↑	↗	↑	
Varnish	↗	↓	↑	→	↗	↓	↑	
Vegetable Oil	↑	↓	↑		↑	↑	↑	
Versilube F-50	↑	↑	↑	↑	↑	→	↑	
Versilube F44, F55	↑	↑	↑		↑		↑	
Vinegar	↗	↑	↗	↓	↗	→	↑	
Vinyl Acetate	↗	↑	→		↗		↑	↑
Vinyl Benzene	↗	↓	↑	→	↗		↑	
Vinyl Benzoate	↗	↓	↑	→	↗		↑	
Vinyl Chloride	↗	↓	↑	→	↗		↑	↑
Vinyl Fluoride	↗	↓	↑	→	↗		↑	
Vinylidene Chloride	↓	↓	↑	↓	↓		↑	
Vinylpyridine	↗	↓	↑	→	↗		↑	
Vitriol (White)	→	↑	→	↓	→	↗	↑	
VV-H-910	→	↑	↑	↓	→	↗	↑	
Wagner 21B Brake Fluid	→	↑	↓		→	→	↑	
Water	↑	↑	↗	↓	↗	↑	↑	↑
Wemco C	↑	↓	↑	↑	↑	↓	↑	
Whisky and Wines	↑	↑	↑	↓	↑	↑	↑	↑
White Liquor	↑	↑	↑		↑		↑	↑
White Oil	↑	↓	↑	↑	↑	↓	↑	↑

	NBR	EPDM	FPM	TPU	HNBR	MVQ	FFPM	PTFE
White Pine Oil	↗	↓	↑		↗	↓	↑	
Wolmar Salt	↑	↑	↑	↑	↑	↑	↑	
Wood Oil	↑	↓	↑	→	↑	↓	↑	
Xenon	↑	↑	↑	↑	↑	↑	↑	
Xylene	↓	↓	↗	↓	↓	↓	↑	↑
Xylidenes-Mixed-Aromatic Amines	↓	↗	↓	↓	↓	↓	↑	
Xylol	↓	↓	↑	↓	↓	↓	↑	
Zeolites	↑	↑	↑		↑		↑	↑
Zinc Acetate	↗	↑	↓	↓	↗	↓	↑	↑
Zinc Ammonium Chloride	→	↑	→	↓	→	↗	↑	
Zinc Chloride	↑	↑	↑		↑		↑	
Zinc Chromate	→	↑	→	↓	→	↗	↑	
Zinc Cyanide	→	↑	→	↓	→	↗	↑	
Zinc Diethyldithiocarbamate	→	↑	→	↓	→	↗	↑	
Zinc Dihydrogen Phosphate	→	↑	→	↓	→	↗	↑	
Zinc Fluorosilicate							↑	
Zinc Hydrosulfite	→	↑	→	↓	→	↗	↑	
Zinc Naphthenate							↑	
Zinc Nitrate	↑	↑	↑		↑		↑	
Zinc Oxide	↑	↑	↑		↑		↑	
Zinc Phenolsulfonate	→	↑	→	↓	→	↗	↑	
Zinc Phosphate	↑	↑	↑	↑	↑	↑	↑	
Zinc Salts	↑	↑	↑	↑	↑	↑	↑	
Zinc Silicofluoride							↑	
Zinc Stearate	→	↑	→	↓	→	↗	↑	
Zinc Sulfate	↑	↑	↑	↓	↑	↑	↑	
Zinc Sulfide	→	↑	→	↓	→	↗	↑	
Zirconium Nitrate	↑	↑	↑	↓	↑	↑	↑	

G. ISO tolerances

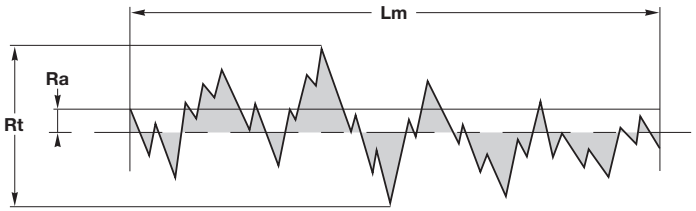
RODS Ø	d10	f7	f8	h6	h7	h8	j6	m6	r6
mm	µm	µm	µm	µm	µm	µm	µm	µm	µm
>1	-20	-6	-6	0	0	0	+4	+8	+16
≤3	-60	-16	-20	-6	-10	-14	-2	+2	+10
3	-30	-10	-10	0	0	0	+6	+12	+23
6	-78	-22	-28	-8	-12	-18	-2	+4	+15
6	-40	-13	-13	0	0	0	+7	+15	+28
10	-98	-28	-35	-9	-15	-22	-2	+6	+19
10	-50	-16	-16	0	0	0	+8	+18	+34
18	-120	-34	-43	-11	-18	-27	-3	+7	+23
18	-65	-20	-20	0	0	0	+9	+21	+41
30	-149	-41	-53	-13	-21	-33	-4	+8	+28
30	-80	-25	-25	0	0	0	+11	+25	+50
50	-180	-50	-64	-16	-25	-39	-5	+9	+34
50	-100	-30	-30	0	0	0	+12	+30	+62
80	-220	-60	-76	-19	-30	-46	-7	+11	+41
80	-120	-36	-36	0	0	0	+13	+35	+76
120	-250	-71	-90	-22	-35	-54	-9	+13	+51
120	-145	-43	-43	0	0	0	+14	+40	+93
180	-305	-83	-106	-25	-40	-63	-11	+15	+63
180	-170	-50	-50	0	0	0	+16	+46	+113
250	-355	-96	-122	-29	-46	-72	-13	+17	+77
250	-190	-56	-56	0	0	0	+16	+52	+130
315	-400	-108	-137	-32	-52	-81	-16	+20	+94
315	-210	-62	-62	0	0	0	+18	+57	+150
400	-440	-119	-151	-36	-57	-89	-18	+21	+108
400	-230	-68	-68	0	0	0	+20	+63	+172
500	-480	-131	-165	-40	-63	-97	-20	+23	+126
500	-263	-76	-76	0	0	0	+22	+70	+194
560	-540	-146	-186	-44	-70	-110	-22	+26	+150
560	-263	-76	-76	0	0	0	+22	+70	+199
630	-540	-146	-186	-44	-70	-110	-22	+26	+155
630	-293	-80	-80	0	0	0	+25	+80	+225
710	-610	-160	-205	-50	-80	-125	-25	+30	+175
710	-293	-80	-80	0	0	0	+25	+80	+235
800	-610	-160	-205	-50	-80	-125	-25	+30	+185

BORE Ø	D10	H7	H8	H9	H10	H11	K7	M7	N7
mm	µm	µm	µm	µm	µm	µm	µm	µm	µm
>1	+60	+10	+14	+25	+40	+60	0	-2	-4
≤3	+20	0	0	0	0	0	-10	-12	-14
3	+78	+12	+18	+30	+48	+75	+3	0	-4
6	+30	0	0	0	0	0	-9	-12	-16
6	+98	+15	+22	+36	+58	+90	+5	0	-4
10	+40	0	0	0	0	0	-10	-15	-19
10	+120	+18	+27	+43	+70	+110	+6	0	-5
18	+50	0	0	0	0	0	-12	-18	-23
18	+149	+21	+33	+52	+84	+130	+6	0	-7
30	+65	0	0	0	0	0	-15	-21	-28
30	+180	+25	+39	+62	+100	+160	+7	0	-8
50	+80	0	0	0	0	0	-18	-25	-33
50	+220	+30	+46	+74	+120	+190	+9	0	-9
80	+100	0	0	0	0	0	-21	-30	-39
80	+260	+35	+54	+87	+140	+220	+10	0	-10
120	+120	0	0	0	0	0	-25	-35	-45
120	+305	+40	+63	+100	+160	+250	+12	0	-12
180	+145	0	0	0	0	0	-28	-40	-52
180	+355	+46	+72	+115	+185	+290	+13	0	-14
250	+170	0	0	0	0	0	-33	-46	-60
250	+400	+52	+81	+130	+210	+320	+16	0	-14
315	+190	0	0	0	0	0	-36	-52	-66
315	+440	+57	+89	+140	+230	+360	+17	0	-16
400	+210	0	0	0	0	0	-40	-57	-73
400	+480	+63	+97	+155	+250	+400	+18	0	-17
500	+230	0	0	0	0	0	-45	-63	-80
500	+540	+70	+110	+175	+280	+440	0	-26	-44
560	+260	0	0	0	0	0	-70	-96	-114
560	+540	+70	+110	+175	+280	+440	0	-26	-44
630	+260	0	0	0	0	0	-70	-96	-114
630	+610	+80	+125	+200	+320	+500	0	-30	-50
710	+290	0	0	0	0	0	-80	-110	-130
710	+610	+80	+125	+200	+320	+500	0	-30	-50
800	+290	0	0	0	0	0	-80	-110	-130

H. Surface finish

The surface finish is essential to ensure optimal sealing and to get a long service life of the hydraulic seals. It is important to remember what are the different measurement systems used: **Ra**, **Rt**, **Rz** and **R max**.

Ra, **Rt**, **Rz** and **R max** are represented on the following drawings (**Fig. H.a** and **Fig. H.b**.). The values for mating surface roughness and groove surface roughness are given in Table H.c.

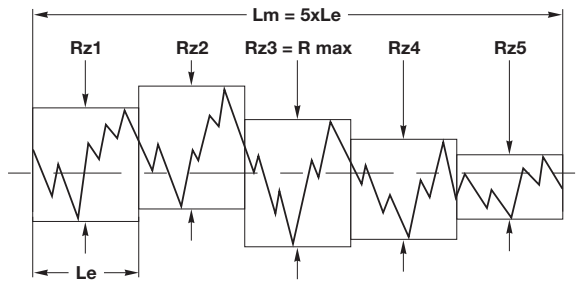


$$Ra = \frac{1}{Lm} \int_0^{Lm} |y| \, dx$$

Ra = arithmetical mean roughness

Rt = maximum gap

Fig. H.a



$$Rz = \frac{1}{5} (Rz1+Rz2+Rz3+Rz4+Rz5)$$

R max = Rz3

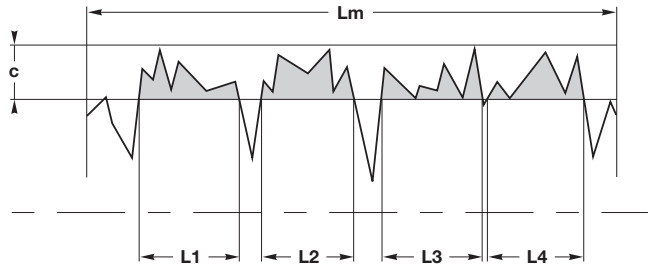
Fig. H.b

Surface roughness (µm)			
Parameter	Mating surface		Groove surface
	PTFE	PUR + rubber	
R max	0,63 - 2,5	1 - 4	< 16
Rz	0,4 - 1,6	0,63 - 2,5	< 10
Ra	0,05 - 0,2	0,1 - 0,4	< 1,6

Table H.c

But the **Ra**, **Rz** and **R max** are not sufficient to determine the roughness. The Rmr value has to be considered (see drawing **Fig. H.d**) and should not be too low.

The Rmr is a percentage of material for a Lm area length at a given depth c. To obtain good results, the Rmr must be situated between 50 and 70% at a depth of 0,25 Rz.



$$Rmr = \frac{1}{Lm} (L1+L2+L3+L4) \times 100\ \%$$

Fig. H.d

I.1 ROD SEALS AND WIPERS

I.1.1 Assembly in open or closed housings

To determine if the assembly is possible in closed housings Ⓐ, consult the table "**Assembly in open or closed housings**".
For a defined section **B**, if the rod diameter is smaller than **d min**, the seal has to be assembled in an open housings Ⓑ.
For **PTFE seals** see K.2.4 page 56.
For **PTFE wipers** see K.4.2 page 59.

I.1.2 Surface roughness

Please respect values **Ra, Rz** and **R max** given in the table "**Surface roughness**".

I.1.3 Radii values

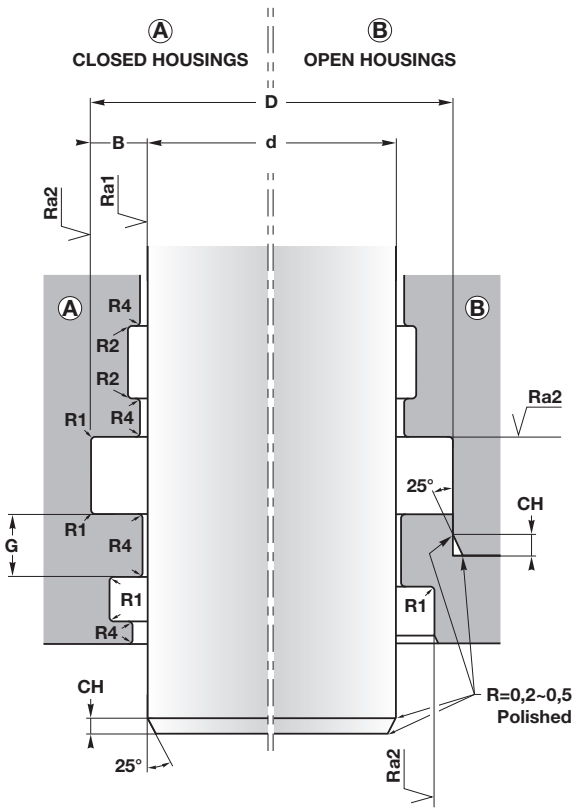
Avoid sharp edges. The values of the radii are specified in the table "**Radii values**".

I.1.4 Chamfers

For the lead-in chamfers lengths, calculate: **CH = 0,7 B**.
Possibility to reduce to **CH = 0,5 B** in case of very compact construction.

I.1.5 Dimension G

Ensure there is enough material behind the seal to withstand the pressure of hydraulic fluid. **G** must always be larger or equal to **B**.



Assembly in open or closed housings							
c/s **B** (mm)	4	5	6	7,5	10	12,5	15
d min (mm)	30	40	50	65	80	150	200

Surface roughness (µm)			
Parameter	Ra1 - Rz1 - R max1		Ra2 Rz2 R max2
	PTFE	PU + rubber	
Ra	**0,05 - 0,2**	**0,1 - 0,4**	**< 1,6**
Rz	0,4 - 1,6	0,63 - 2,5	< 10
R max	0,63 - 2,5	1 - 4	< 16

Radii values (mm)				
section B	R1	R2	R3	R4
≤ 7,5	≤ 0,3	≤ 0,2	≤ 2	0,2
> 7,5	≤ 0,6		≤ 4	0,4

Chamfers
0,5 B ≤ CH ≤ 0,7 B

Dimension G
G ≥ B

I.2 PISTON SEALS AND GUIDE RINGS

I.2.1 One piece or multi pieces pistons

For each seal profile, consult the section "**Assembly**" on the page of the concerned seal.

I.2.2 Surface roughness

Please respect values **Ra, Rz** and **R max** given in the table "**Surface roughness**", page 48.

I.2.3 Radii values

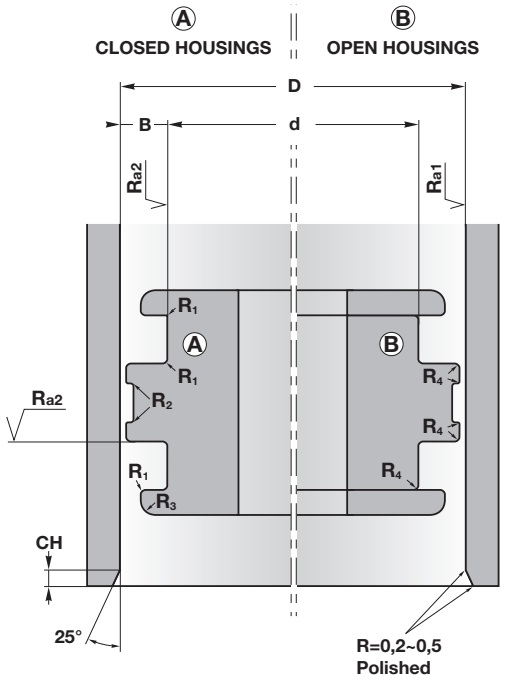
Avoid sharp edges. The values of the radii are specified in the table "**Radii values**", page 48.

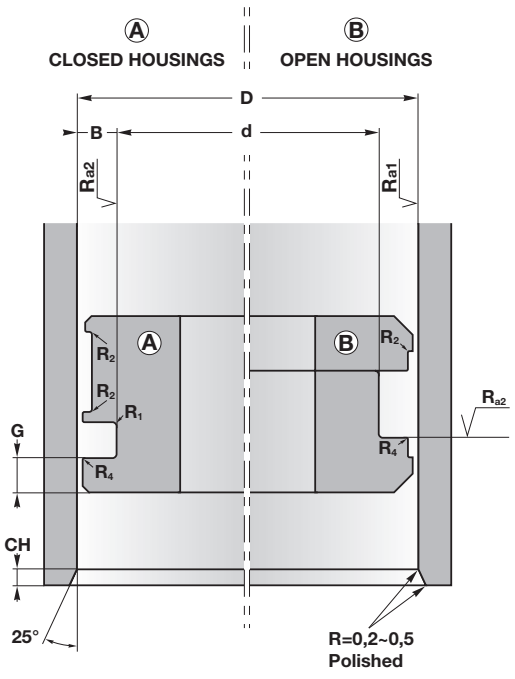
I.2.4 Chamfers

For the lengths of lead-in chamfers **CH**, calculate: **CH = 0,7 B**.
Possibility to reduce to **CH = 0,5 B** in case of very compact construction.

I.2.5 Dimension G

Ensure there is enough material behind the seal to withstand the pressure of hydraulic fluid. For this, **G** must always be larger or equal to **B**.





IMPORTANT NOTICE

The values given on pages 48 and 49 are general. If other values are given further in the catalogue, they have priority.

More and more guide rings are used in hydraulic cylinders because of the advantages they offer compared to metallic guides. However, two types of problems can appear:

- **A too large gap behind the seal** will cause extrusion of the seal (**Fig. J.a**)
- **A too thin gap behind the seal in the head or on the piston** will cause the seizing of the metal parts (**Fig. J.b**)

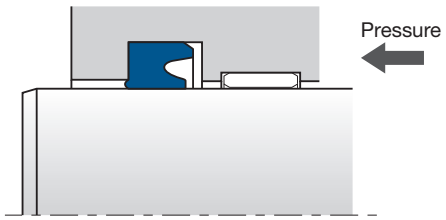


Fig. J.a

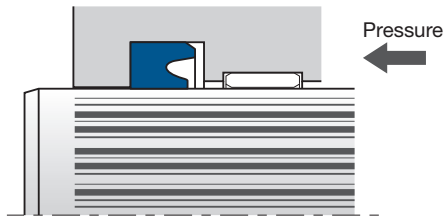


Fig. J.b

J.1 EXTRUSION

To avoid extrusion, the first advice is to use seals with **integrated anti-extrusion ring** (like **10B.../NEI**, **10RS.../LA**, **10TS.../LA**) or with a **separate anti-extrusion ring** which will allow to considerably increase the gap in the seal area. The integrated anti-extrusion ring (**Fig. J.c**) have the advantage of following the radial deplacements of the rod while a separate ring (**Fig. J.d**) can become oval if there are large deflections.

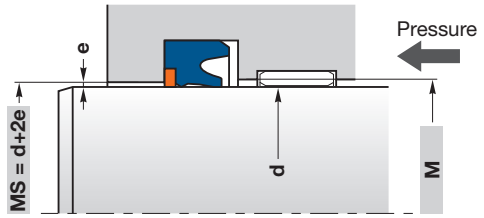


Fig. J.c

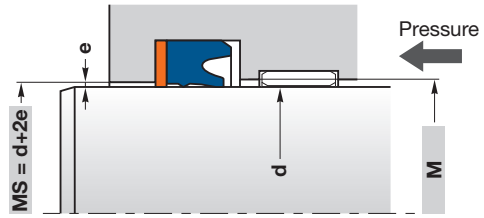


Fig. J.d

The MS diameter is situated in the extrusion area of the seal and is calculated with the gap dimension **e** of the respective type of seal. The gap dimensions **e** is given in **part 3** of this catalog **for the rod seals** and in **part 4 for the piston seals**.

As a precaution, you should always recalculate the maximum gap, we call it **e max**. This value integrates the possible radial forces and all tolerances. **Please contact us if the calculation of e max gives a value of more than 50% above the theoretical e.**

M is the diameter at the guide ring. The value of the **M** diameter, **given in part 6**, depends of the type of seal used. Generally, the gap at **M** is higher than at **MS**. The risk of metallic contact or seizing is thus mainly given at the heigth of the **MS** diameter.

J.2 SEIZING

To prevent seizing between the metallic cylinder parts, it is necessary to calculate the real gap **K min** between the rod or tube and the **MS** dimension as explained in the following pictures **Fig. J.e** (rod) and **Fig. J.f**. (piston).

In general, in the case of normal radial forces, the effective gap between the rod and cylinder head should be greater than 0,1 mm, K min > 0,1 mm. And the same for the effective gap between the piston and the tube.

Contact us if there are significant radial forces.

J.3 CORRECT DIMENSIONING OF METAL PARTS

The following explanations will help you to **properly size cylinder heads and pistons**, using various technical data of the catalogue.

J.3.1 GUIDING ROD: calculation of the maximum real gap and seizing risk (Fig. J.e)

$$e\ max\ (mm) = \frac{MS\ max}{2} + \frac{D1\ max}{2} - d\ min - E\ min + \Delta E$$

To avoid extrusion we recommend **e max ≤ 1,5 x e**

ΔE = variation of the radial thickness under radial load R

Contact us for the calculation of ΔE.

$$K\ min\ (mm) = E\ min - \Delta E - \left(\frac{D1\ max}{2} - \frac{MS\ min}{2}\right)$$

To avoid seizing we recommend **K min > 0,1 mm**

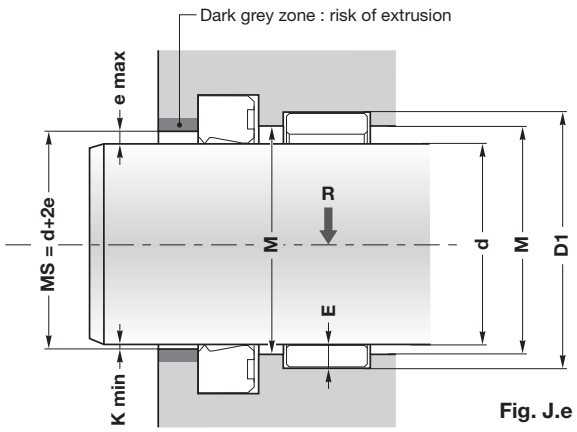


Fig. J.e

J.3.1.1 Calculation with a seal **10TS 5060/L1** and a guide ring **10WR 50/2**

cylinder head working at 30 MPa, designed with:

- a seal **10TS 5060/L1** see page 348, it gives **e = 0,15 mm**
- a guide ring **10WR 50/2** see page 772
- the hardchromed rod has a diameter **50 f7** (49,95/49,975)
- the radial load **R** is insignificant, so **ΔE = 0**

MS diameter is calculated using **e** of **10TS.../L**:

- **MS** = 50,3 H8 ➜ **MS min** = 50,3 and **MS max** = 50,346
- **D1** = 55 H8 ➜ **D1 max** = 55,046
- **E** = 2,5 -0,02/-0,12 ➜ **E min** = 2,38 mm (contact us for the thickness tolerance of **E**)
- **d** f7 ➜ **d min** = 49,95

We can calculate the **maximum real** gap, we find **e max**:

$$e\ max = \frac{50{,}346}{2} + \frac{55{,}046}{2} - 49{,}95 - 2{,}38 = 0{,}366\ mm$$

e max = 0,366 > 1,5 x 0,15 = 0,225 ➜ important risk of extrusion.

If we calculate the **K min**, we find:

$$K\ min = 2{,}38 - \left(\frac{55{,}046}{2} - \frac{50{,}3}{2}\right) = 0{,}007\ mm$$

K min = 0,007 mm < 0,1 mm ➜ important risk of seizing.

This is due to poor precision of acetal resin rings which are injected with poor tolerances, while phenolic and polyester guide rings are machined.

J.3.1.2 Calculation with a seal **10TS 5060/L1** and a guide ring **10I/GTP1-25150-0500-A**

In this case: **E** = 2,5 0/-0,05 ➜ **E min** = 2,45 (contact us for the tickness tolerance of **E**).
The calculation of the **maximum real** gap, we find **e max**:

$$e\ max = \frac{50{,}346}{2} + \frac{55{,}046}{2} - 49{,}95 - 2{,}45 = 0{,}296\ mm$$

e max = 0,296 > 0,225 ➜ risk of extrusion.

If we calculate **K min**:

$$K\ min = 2{,}45 - \left(\frac{55{,}046}{2} - \frac{50{,}30}{2}\right) = 0{,}077\ mm$$

K min = 0,077 mm < 0,1 mm ➜ risk of seizing.

J.3.1.3 Calculation with a seal **10TS 5060/LA1** and a guide ring **10I/GTP1-25150-0500-A**

In this case: **E** = 2,5 0/-0,05 ➜ **E min** = 2,45 (contact us for the tickness tolerance of **E**).
With the seal **10TS 5060/LA1**, the gap **e** can increase to 0,3 mm.
If we calculate the **maximum real** gap, we find **e max**:

$$e\ max = \frac{50{,}646}{2} + \frac{55{,}046}{2} - 49{,}95 - 2{,}45 = 0{,}446\ mm$$

e max = 0,446 < 1,5 x 0,3 = 0,45 ➜ no risk of extrusion.

The calculation of **K min** gives:

$$K\ min = 2{,}45 - \left(\frac{55{,}046}{2} - \frac{50{,}6}{2}\right) = 0{,}227\ mm$$

K min = 0,227 mm > 0,1 mm ➜ no risk of seizing.

J.3.2 GUIDING PISTON: calculation of K and the real maximum gap e max (Fig. J.f).

The same calculations and remarks of **J.3.1** can be made for piston seals.
In case of guiding piston, it's important to take care of the expansion of the tube due to the pressure to calculate the **e max** value.

$$e\ max = D\ max - \left(\frac{MS\ min}{2} - \frac{d1\ min}{2} + E\ min\right) + \Delta D + \Delta E \quad (mm)$$

ΔD = Expansion of the tube under fluid pressure

ΔE = variation of the radial thickness under radial load R

Contact us for the calculation of ΔD and ΔE.

$$K\ min = E\ min - \Delta E - \left(\frac{MS\ max}{2} - \frac{d1\ min}{2}\right) > 0{,}1 \quad (mm)$$

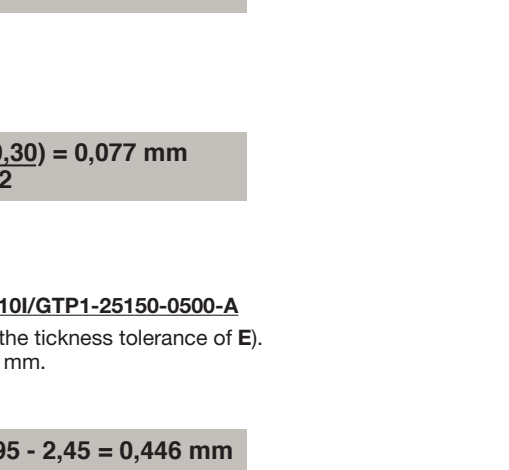


Fig. J.f

IMPORTANT NOTE

To prevent extrusion and seizing, you should consider the following remarks:

- **The higher the pressure, the greater the risk of extrusion and seizing due to a reduced gap behind the seal.**
- **First calculate the MS diameter with formulas and tables e max from the part 3 rod seals and part 4 piston seals of this catalogue. The MS diameter must always be applied in the areas where there is a risk of extrusion (dark grey zones in the 2 previous drawings).**
- **Calculate the M diameter (Fig. J.e and Fig. J.f) with the formulas and tables of the part 6 of this catalogue. Apply this values if possible. This gap is greater than that of diameter MS, so less-risk of metallic contact. But never apply in the dark grey zones because of extrusion.**
- **If the tolerances are more precise, the risks of seizing and extrusion are reduced: for this reason, we recommend the use of machined rings 10I/GTP, 10I/GTP1 and 10I/GTN rather than injected 10WR and 10I/DWR.**
- **To avoid extrusion we also recommend to use seals with anti-extrusion rings.**
  See paragraph J.1 on page 50.
- **In many cases, anti-extrusion rings provide an attractive solution to problems. Our ALL-TEC program offers the best market opportunities in this area.**

Advice to limit the risk of seizing up:
Reduce the metal surfaces concerned with seizing, as shown in **Fig. J.g** for heads and **Fig. J.h** for pistons.

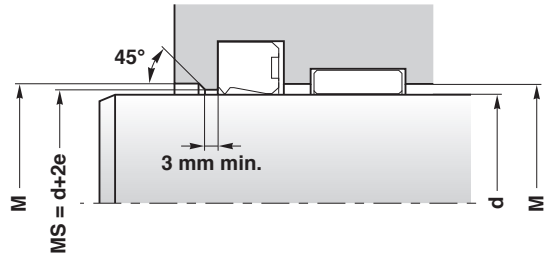


Fig. J.g

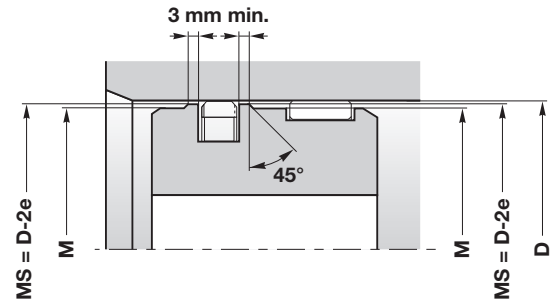


Fig. J.h

ALL-TEC offers many tools for easy assembly, disassembly and measurement of hydraulic seals. You can find them on our E-business website: click on **Assisted search**
then on **Group** select **SEAL KITS, TOOLS and CATALOGUES**
then on **Family** select **TOOLS**

K.1 PRECAUTIONS FOR THE INSTALLATION OF HYDRAULIC SEALS

If hydraulic seals are not properly installed, they can be damaged and this can cause different problems. To avoid these problems, following guidelines are very important:

K.1.1 Determine if the assembly **is possible in closed housings** (page 48 table I.1.1). Check the housing **dimensions, surface finish** and lead-in **chamfers** by referring to the information contained in this catalogue (page 46-49).

K.1.2 All parts must be perfectly clean, without swarf, metal score marks, welding splatter or any kind of defect.

K.1.3 The seal may not come in contact with **sharp edges**, drilled holes or threads during assembly. To avoid this, use the **calibers** of **Fig. K.a** and **Fig. K.b**. Machine **chamfers** at the holes (**Fig. K.c**) or use an **assembly tool** as shown in **Fig. K.d**.

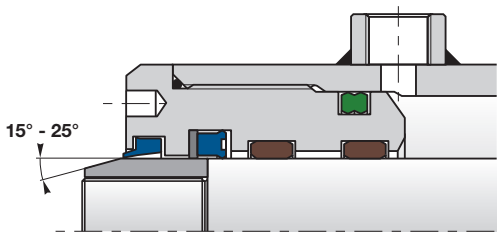


Fig. K.a

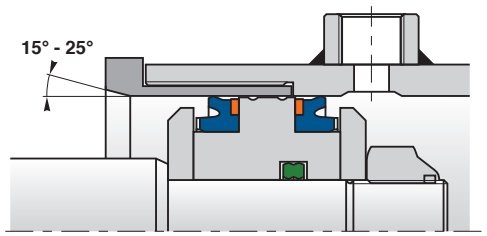


Fig. K.b

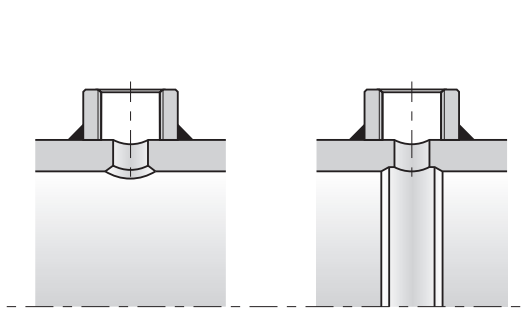


Fig. K.c

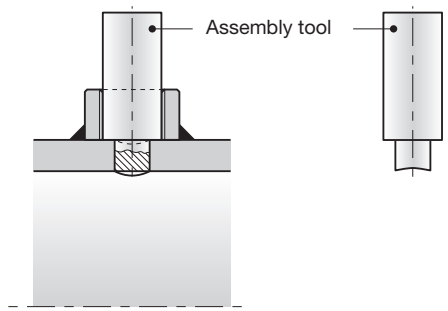


Fig. K.d

K.1.4 All seals and connecting parts must be **lubricated** before assembly using the same or a compatible fluid that will be used in the hydraulic system.

K.1.5 Avoid using pointed or **sharp metal tools**, and don't keep the seal in a deformed position for a long time during assembly.

K.1.6 Ensure the correct **orientation of the seal** in respect to the fluid direction and the exact assembly of all other parts.

K.2 INSTALLATION OF ROD SEALS

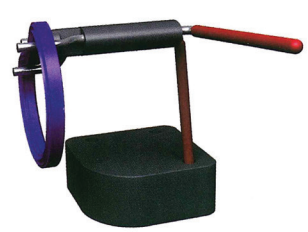
K.2.1 Installation of seals in closed housings

Usually in a closed housing, the seal must be deformed like a bean and then inserted into the groove, where it's returned to its original shape.

Use our tool **19SEAL TWISTORS SET** for easy assembly. See **Fig. K.e**.

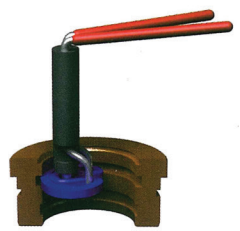
Fig. K.e 19SEAL TWISTORS SET

1. Put on handle into holder, place the seal on the claws

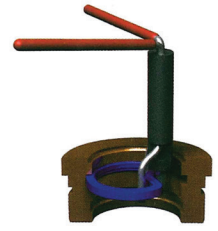


2. Lead the seal with 1 hand when turning the handle with the other

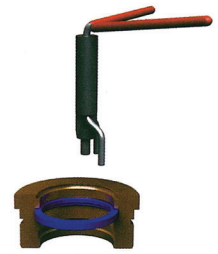
3. Hold both handles then take them away from the holder



4. Put the seal in the groove



5. Release a handle then turn it around gently



6. Remove the tool with care from the piston head

K.2.2 Mounting “Veepack” sets of seals 10CH, 10CH1 and 10CH2 (Fig. K.f)

This type of seal is one of the most difficult to assemble: the components of the seal are often very hard and it is very difficult to pass the chamfers. We advise you to softly **knead the lips** between thumb and forefinger over the entire circumference.

You have to ensure that the spreader ring has **radial grooves** for bringing pressure on all the section of the seal.

You must adjust the height of the housing **L** to height **H** of the set of seals measured before assembly, according to the table “**Calculation of the height of the housing L**” (see part 3a of this catalogue referring to these profiles).

Finally you must check that the different elements are well lubricated before mounting and are fitted without being twisted or turned.

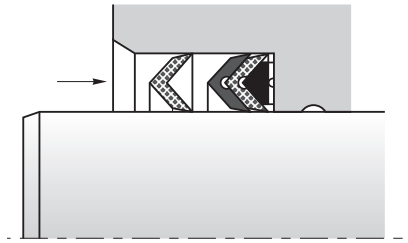


Fig. K.f

K.2.3 Installation of seals DH

As shown in the drawing **Fig. K.g**, it is important that the seal has a controlled and precise preload between the 2 metal parts.

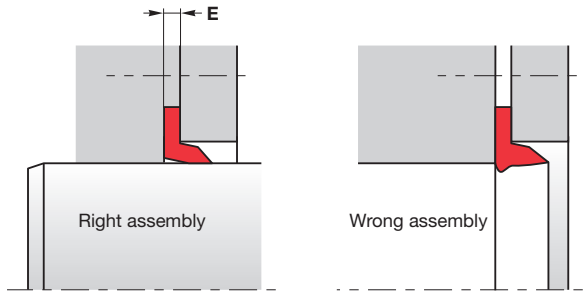


Fig. K.g

K.2.4 Installation of PTFE rod seals

To determine if the assembly is possible in closed housings, consult the table beside “**Assembly in open or closed housings**”.

Assembly in open or closed housings					
O-ring C/S	1,78	2,62	3,53	5,34	7
d min (mm)	12	16	19	38	70

For a defined energising O-ring of the seal, if the rod diameter is smaller than **d min**, the seal has to be assembled in an open housing.

After assembling the O-ring into the groove, compress the PTFE ring **into a bean shape** as illustrated in **Fig. K.h**. Place the compressed PTFE into the housing and push against the O-ring like on **Fig. K.i**.

Finally, use a **sizing mandrel** with a long lead-in chamfer for sizing the seal (**Fig. K.j**).

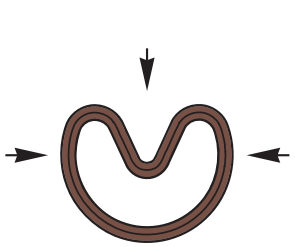


Fig. K.h

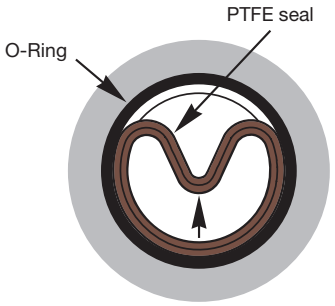


Fig. K.i

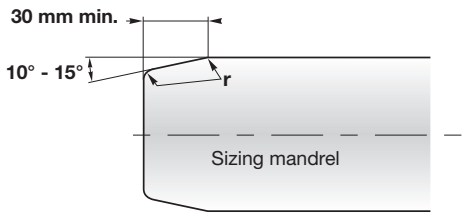


Fig. K.j

K.3 INSTALLATION OF PTFE PISTON SEALS

K.3.1 Installation of PTFE piston seals using cone and expanding sleeve

After assembling the O-ring into the groove, proceed with the PTFE element using an installation cone and an expanding sleeve as illustrated on **Fig. K.k**. This technique prevents excessive deformation of PTFE and reduces the assembly time.

Finally use a sizing sleeve with a long head-in chamfer to calibrate the seal: **Fig. K.l**.

Our tool **19CAL EGR** offers a second possibility of calibration (**Fig. K.m**).

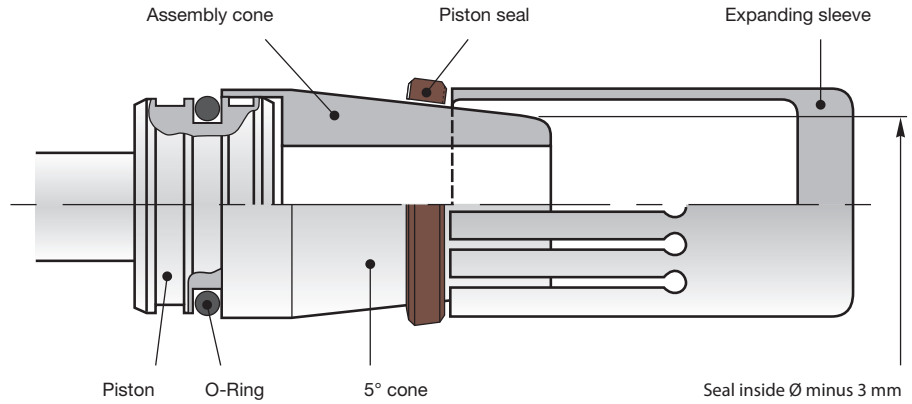
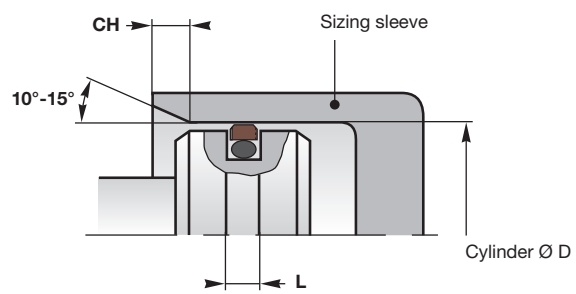


Fig. K.k

øD (mm)	≤ 79,9	80 - 133	≥ 133,1
CH (mm)	8	12	16

Fig. K.l



K.3.2 Calibration of PTFE piston seals using 19CAL EGR (from 50 up to 800 mm)

Circle the seal with the calibrating cloth tape, use the **19CAL EGR** to tighten. It will take 3 to 5 minutes to reach the restoring effect.

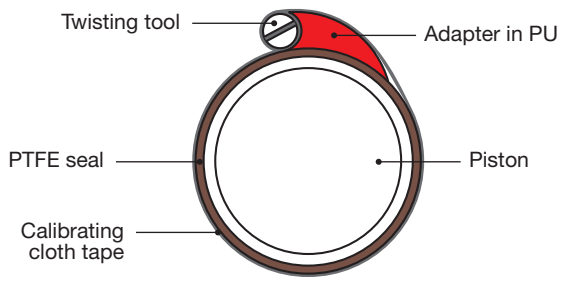


Fig. K.m

K.3.3 Installation of PTFE piston seals using 19SEAL STRETCHER and 19 SEAL CLASPER

After assembling the O-ring into the groove, proceed with the PTFE element following pictures below.

1. First, assemble the O-ring.

2. Heat the PTFE ring to a temperature of 120°C.

3. Extend the PTFE ring using **19SEAL STRECHER**. (diameters from 40 up to 250 mm).

4. Assemble the extended ring on the piston.

5. Calibrate the seal using the tool **19SEAL CLASPER**. (diameters from 50 up to 360 mm).

6. The PTFE seal is now assembled.

K.4 INSTALLATION OF WIPERS

K.4.1 Installation of wipers with steel case 10GA, 10GA.../P, 10PW.../U and 10SWP

First control the chamfer. Push the metal caged wiper carefully in the groove with a press and use a tool (**See Fig. K.n**) which cannot deform the dust seal lip.

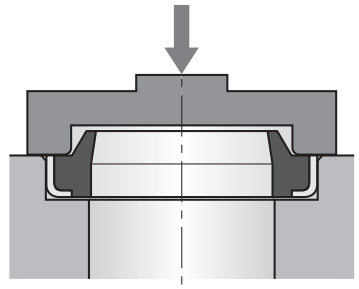


Fig. K.n

K.4.2 Mounting 10WTF and 17WE wipers

Mounting PTFE wipers: please follow the same procedure as the rod seals. See **K.2.4** (page 56).

To determine if the assembly is possible in closed housings, consult the table below "**Assembly in open or closed housings**".

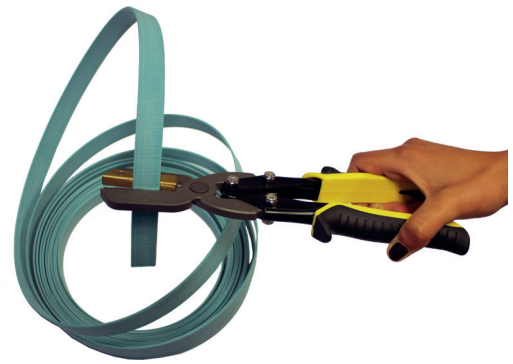
For a defined O-ring (part of the seal), if the rod diameter is smaller than **d min**, the seal has to be assembled in an open housing.

Assembly in open or closed housings						
O-ring C/S	1,78	2,62	3,53	5,34	7	8,4
d min (mm)	30	30	30	40	110	140

K.5 CUT OF GUIDE RINGS

Use the tool **19GUIDE CUTTER** for PTFE strips and **19HARD GUIDE CUTTER** for polyester strips.

19GUIDE CUTTER



19HARDGUIDE CUTTER

The repair of hydraulic cylinders requires the disassembly of seals. To assist you in this work, our ALL-TEC toolkit **19SEAL PICKSET PRO** and **19O-RING PICKSET PRO** for diameters up to 50 mm.

Please find below the description of the various stainless steel tools of this pickset: **Fig. L.a** and **Fig. L.b**.

Tool ①: **piercing tool**, for removing seals and O-rings from normal or hard to reach installation spaces. The seal can not be reused again.

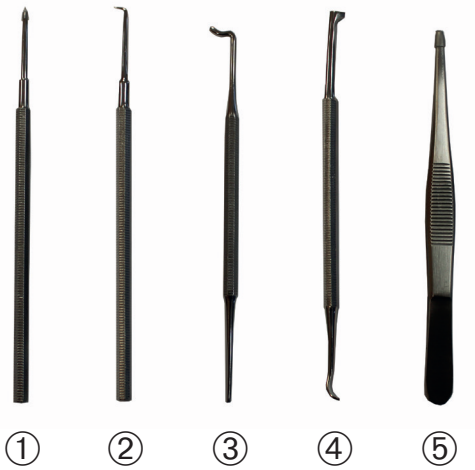
Tool ②: **flate face tool**, for removing or installing seals and O-rings.

Tool ③: push and pull tool or **multi purpose tool**.

Tool ④: **lever tool**, for removing seals and O-rings by leverage.

Tool ⑤: **flat tool**, removed or positioned seals and O-rings that are easily accessible combined with other tools.

Fig. L.a: **19SEAL PICKSET PRO**



Tool ①: **piercing tool**, for removing O-rings from normal or hard to reach installation spaces. The seal can not be reused again.

Tool ②: **flate face tool**, for removing or installing O-rings.

Tool ③: push and pull tool or **multi purpose tool**.

Tool ④: **lever tool**, for removing O-rings by leverage.

Tool ⑤: **tweezers**, ideal to position O-rings, remove or dip it in grease.

Fig. L.b: **19O-RING PICKSET PRO**

Our ALL-TEC toolkit, **19SEAL HOOK SET**, for diameters above 50 mm provides very interesting solutions.

Please find below a description: **Fig. L.c**.

During disassembly, take car **not damage the housings** of seals: claw at the bottom of the housing, damages of the edges must be avoided...

Fig. L.c: **19SEAL HOOK SET**

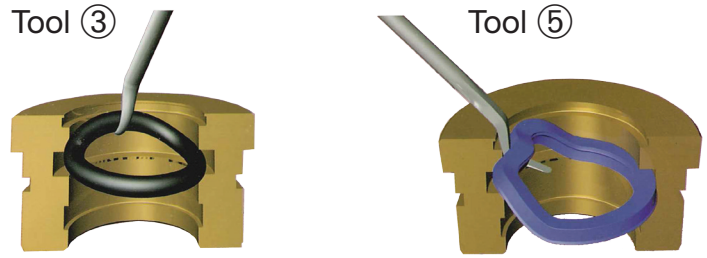


Fig. L.d: examples of applications

M.1 MEASUREMENT OF SEALS

Once the cylinder is completely disassembled, you must reference the different seals to order new ones. Assuming that, due to its flexibility and geometry, a seal is difficult to be measured, this **ALL-TEC** catalogue gives only **housing dimensions**, measured on metal parts.

Unfortunately, the retailers and distributors of spare parts do not always get from the customers the dimensions of the housings where the old seals were installed. Often the sellers have only the old seals to determine the dimensions of the housings.

For measuring the seals, **ALL-TEC** has developed 2 systems:

- Measurement **cones**: see pictures **Fig. M.a** and **Fig. M.b**

  19CONE 5-164 MM (4 pieces)

  19CONE 5-284 MM (7 pieces)

Fig. M.a

Fig. M.b

- The **circometers** are metal strips graduated in mm, giving the diameter when measuring the internal or external circumference as you can see on **Fig. M.c** and **Fig. M.d**.

  Our references:

19CIRCO 50-300 MM	**Fig. M.c**
19CIRCO 200-700 MM	**Fig. M.c**
19CIRCO 700-1100 MM	**Fig. M.d**
19CIRCO 1100-1500 MM	**Fig. M.d**

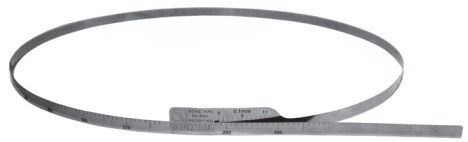


Fig. M.c

Fig. M.d

M.2 MEASUREMENT OF SEAL GROOVES

The dimensions of the grooves can easily be measured with our calipers:

- **19SEAL CALIPER** from 0 to 200 mm T = 50 mm g = 10 or 20 mm (metric)
  g = 1/2" or 1" (inch)

Measure of the depth of the groove with a pin

Measure of the width of the groove

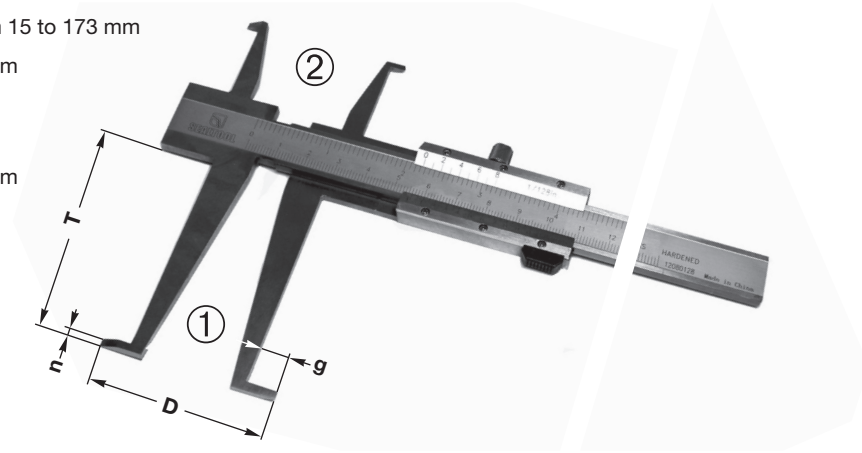
If you loose or break the pins or the width knifes of the caliper, we can offer to you replacement parts:
the 19DEPTH PIN SET and the 19WIDTH KNIFES SET

It is often complicated to measure the diameter of the bottom of the groove. Therefore we have two different groove calipers:

- **19GROOVE CALIPER** from 15 to 173 mm

Side ① D = from 25 to 173 mm
T = 70 mm
g = 10 mm
n = 3 mm

Side ② D = from 15 to 173 mm
T = 30 mm
g = 5 mm
n = 2 mm



- **19GROOVE CALIPER LARGE** from 35 to 343 mm

On this caliper there is only one side

D = from 35 to 343 mm
T = 98,5 mm
g = 23 mm
n = 4 mm

N.1 LIGHT CONSTRUCTION

Advantages:

- Simple construction
- Low cost solution
- Quick and easy assembly
- Good results with cold drawn tubes

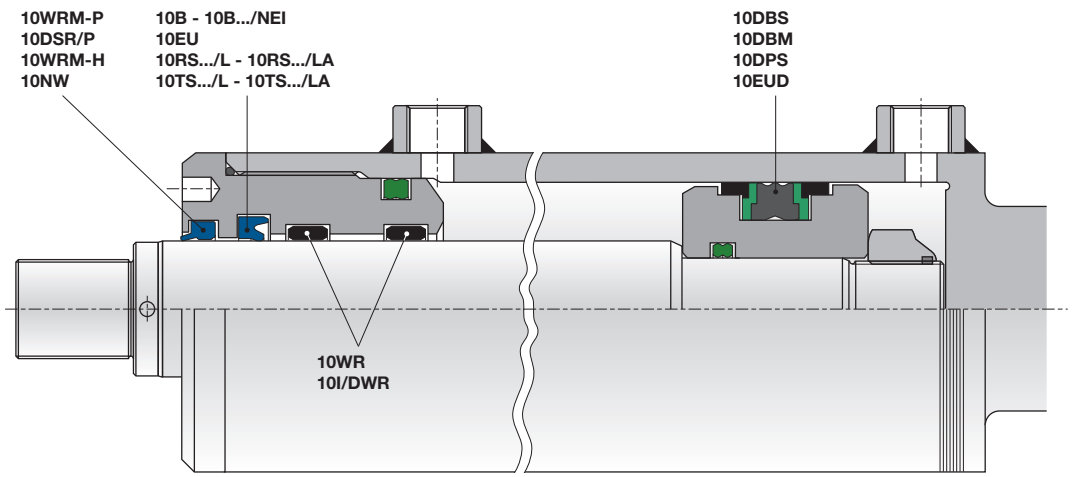


Fig. N.a

N.2 MEDIUM DUTY CONSTRUCTION

Advantages:

- Simple and strong construction
- Good rod sealing (tandem seals)
- Attractive price
- Quick and easy assembly

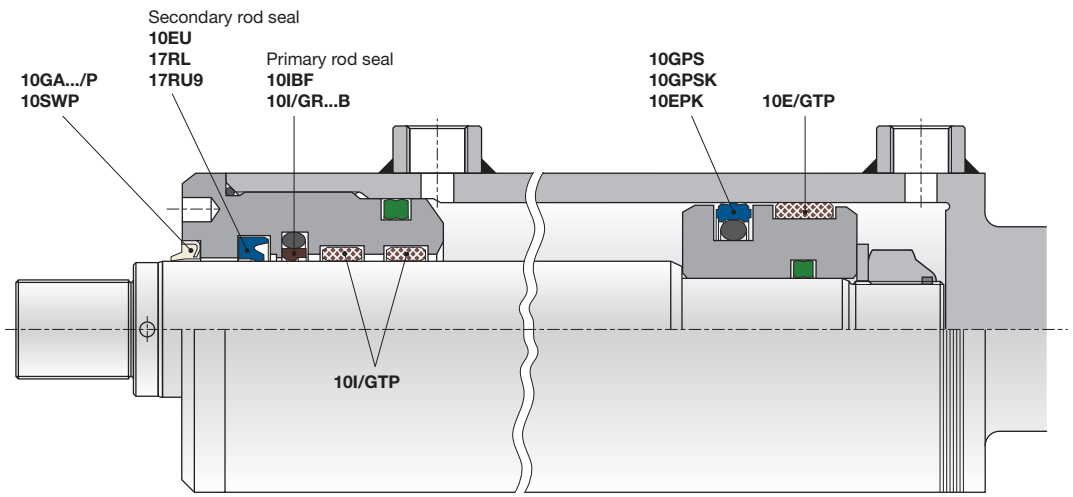


Fig. N.b

N.3 HEAVY DUTY CONSTRUCTION

Advantages:

- Simple and strong construction
- Very good rod sealing (tandem seals + double wiper)
- Rod and piston seals protection (**10I/GT** and **10E/GT** as internal wipers)

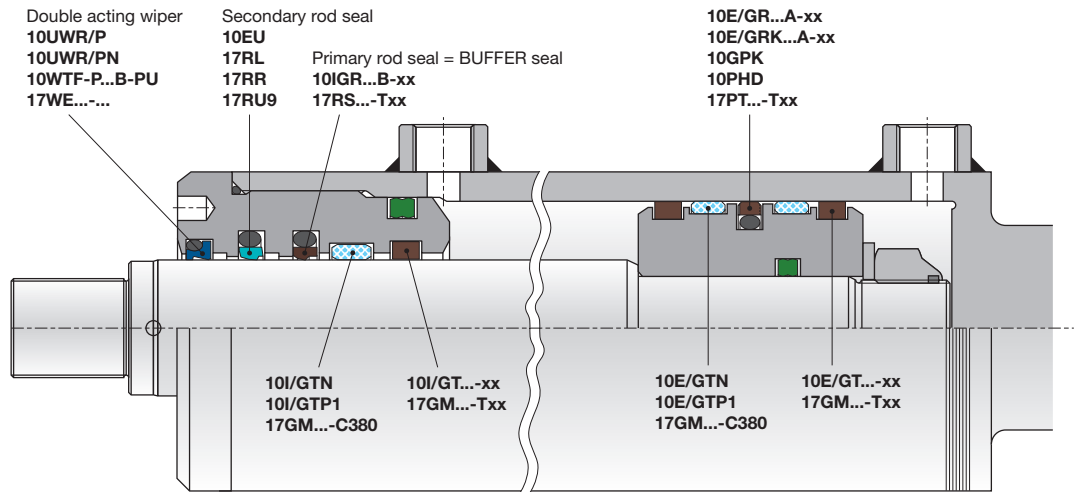


Fig. N.c

N.4 HIGH SPEED, HIGH TEMPERATURE AND DIFFICULT FLUIDS CONSTRUCTION

Advantages:

- Very good rod sealing (tandem seals + double wiper)
- Compatibility with nearly all media due to the high chemical resistance of the sealing element and the wide selection of O-ring compounds

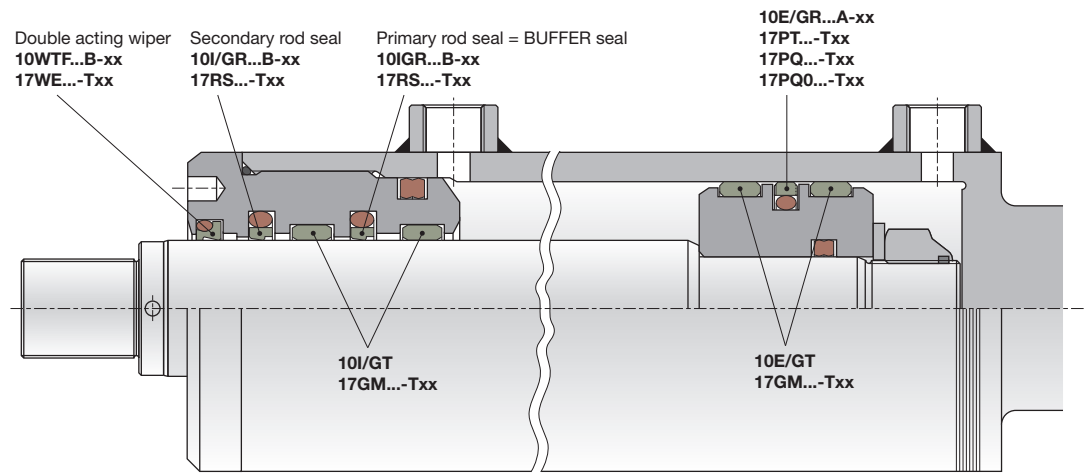


Fig. N.d

O. Machined seals

If the dimensions or the compound you need are not in this catalogue: Not a problem for **ALL-TEC**!

Our company has **8 special CNC-machines** for machining plastics and rubber. We can produce in a very short time seals **up to a diameter of 1500 mm**, specially-created seals or seals-conforming to customer drawings.

It's possible and very easy for you to order on our e-business website:

www.sealtech-business.be >
create a request / create an order >
click on "**machined seal**" >
choose the "**family**" >
determine the "**profile**" >
define the "**material**" >
enter "**dimensions of housing**" >
add this item
you can easily order the seals you need and you'll receive them the day after…

Example: the seal **EU** with dimensions of groove 58,00 x 40,50 x 11,00 mm is not standard, but can be machined with following reference:

25 **EU** **PU20** **058,00x040,50x11,00**

- 25 — Product group of machined seals
- EU — Profile
- PU20 — Material code
- 058,00x040,50x11,00 — Groove dimensions

Find here below the profiles of several seals which can be machined to special sizes. The drawings are only schematic and do not (necessarily) correspond to the final machined profile.
The following profiles "coloured" in polyurethane can also be machined in the **different available rubber compounds** (see page 12).

ROD SEALS

 25DDIM/C	 25EU	 25EU/NEI	 25RS/L	 25RS/LA	 25CSC	 25TS	 25TS/L
 25MU	 25S22	 25DUM	 25EUS	 25S21	 25EUS/NEI	 25EUS/L	 25EUS/LA
 25CH-V	 25CH131	 25S32	 25DH	 25S35	 25S20	 25I/GR B	 25I/GR A
 25I/GRK B	 25I/GRK A	 25RDD	 25VVR	 25VOR			

PISTON SEALS

 25DDEM/C	 25RSE	 25RSE/AE	 25RSE/W	 25MU	 25K22	 25DUM	 25K21
 25EUS/NEO	 25CH111	 25DC	25GPS	25GPSK	25E/GR A	25E/GR B	25E/GRK A
25E/GRK B	25PDD	25K35	25PHD	25K20	25K23	25K17	25K09
25VVP	25VOP						

WIPERS

25WRM	25UWR	25DK	25PPW	25DSR	25DSR/U	25WRS	25PWB
25A17	25A12A	25A12B	25A13	25NW	25GA	25SWP	
25WTF A	25WTF B	25WTF C	25WTF D				

GUIDE RINGS

25F1	25F1/C	25F3	25F3/C	25F4	25F4/C	25F5	25F5/C
25F6	25F6/C	25F7/C	25F8/C	25WP			

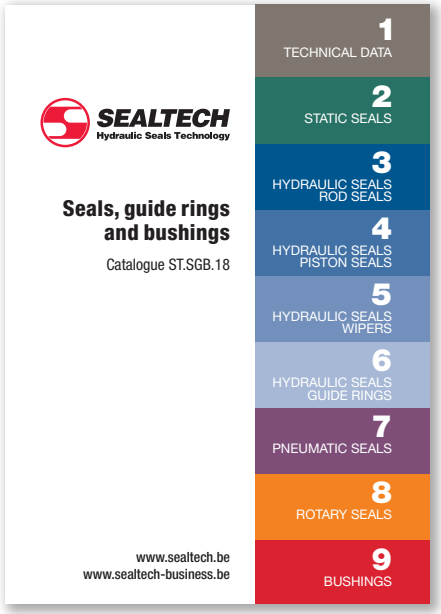
BACK-UP RINGS

28ST8	28ST8/C						

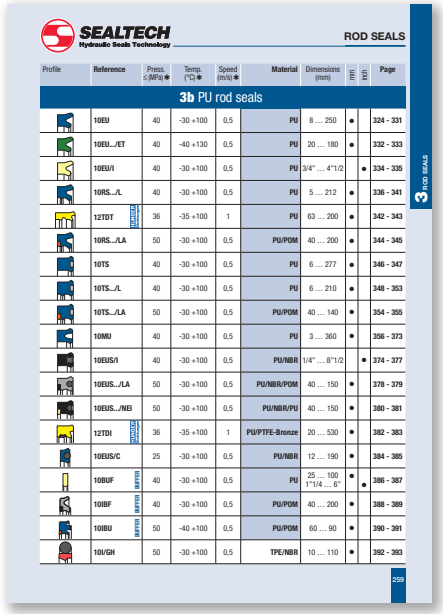
REPRESENTATION OF MATERIALS

- Rubber compound
- Polyurethane 95 Sh A
- Polyurethane 55 Sh D
- PA and POM
- PTFE

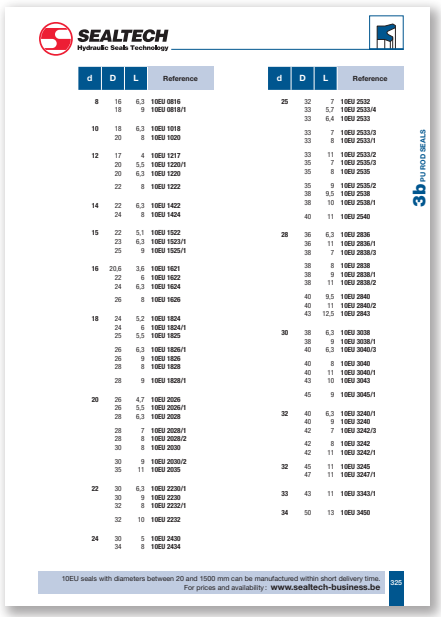
1 Determination of the PRODUCT FAMILY



2 Then you go on with the PROFILE



3 Finally, you use the REFERENCE



4 If you do not find the right dimensions, ALL-TEC machines your seal on sizes :

MACHINED SEALS

For price inquiry or order, please visit www.sealtech-business.be
www.sealtech-business.be >
create a request / create an order >
click on "**machined seal**" >
choose the "**family**" >
determine the "**profile**" >
define the "**material**" >
enter "**dimensions of housing**" >
add this item