

GRINNELL Mechanical Products Gasket Service Recommendations and Material Compatibility

General Description

Gaskets are provided in Grade “E”, Grade “EN”, Grade “T” Nitrile, Grade “O” Fluoroelastomer, and Grade “L” Silicone.

This data sheet includes tables describing Gasket Service Recommendations and Chemical Composition Recommendations that were developed to maximize service life. These tables were compiled from information supplied by the elastomer material manufacturers, referenced technical literature, and testing conducted by GRINNELL Mechanical Products.

In evaluating the gasket grade for intended services, consider the following items:

- System operating temperature
- Fluid or solution type and concentration
- Duration of service

All gasket recommendations are based on a temperature of 70°F (21°C) unless otherwise noted.

Gasket recommendations apply to GRINNELL gaskets and valves only. When considering combinations of service solutions or for those service recommendations not listed in this document, consult Technical Services.

NOTICE

Never remove any piping component nor correct or modify any piping deficiencies without first de-pressurizing and draining the system. Failure to do so may result in serious personal injury, property damage, and/or impaired device performance.

It is the designer’s responsibility to select products suitable for the intended service and to ensure that pressure ratings and performance data are not exceeded. Verify material and gasket selection for compatibility

IMPORTANT

Refer to Technical Data Sheet G1100 for warnings pertaining to regulatory and health information.

with the specific application. Always read and understand the installation instructions.

The properties and applications listed herein are typical. Final selection of gasket material for a specific application should not be undertaken without independent study and evaluation for suitability. Failure to select the proper rubber compound could result in product failure, property damage, or serious personal injury.

Install and maintain the gaskets described herein in compliance with this document, in addition to the standards of any other authorities having jurisdiction. Failure to do so may result in serious personal injury or impair the performance of these devices.

The owner is responsible for maintaining their mechanical system and devices in proper operating condition. Contact the installing contractor or product manufacturer with any questions.

Technical Data

Approvals

Gaskets are laboratory approved as a component of a coupling, mechanical tee or flange adapter. Refer to the individual data sheets for approval information.

Material Specifications and Temperature Ranges

Refer to Table A

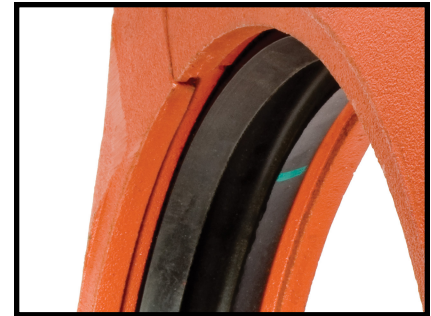
Gasket Recommendations

Proper pipe-end preparation and grooving are mandatory to prevent leakage. Refer to specifications for cut and roll grooving in data sheet G710.

The gasket seal surface must be free from score marks, ridges, indentations, projections, loose paint, flaking galvanizing, scale, dirt chips, grease, and rust that would prevent a positive seal.

Tri-Seal Gaskets

With reference to Figure 1, Tri-Seal Gaskets differ from Standard Gaskets by having a closed-off gap or gasket cavity between pipe sections. This gap is closed by positioning the center “rib”



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of the gasket over the gap between the pipes. The Tri-Seal Gasket has two tapered sealing edges, in addition to the center rib, for additional strength and sealing. They are intended primarily for low temperature and vacuum applications greater than 10 inches of mercury.

Gasket Lubricants

To prevent gasket deterioration, use a petroleum-free lubricant for all EPDM and Grade “L” Silicone gaskets. A petroleum-free silicone lubricant should be used for low-temperature environments to prevent lubricant freezing.

⚠ WARNING

Never use silicone lubricants with Grade “L” silicone gaskets. Failure to select the proper compound could result in product failure, property damage, or serious injury.

Ordering Procedure

GRINNELL Mechanical Products are available globally through a network of distribution centers. For the nearest distributor, as well as technical data describing the complete product line, visit www.grinnell.com.

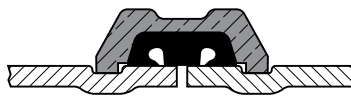
Grade	Temperature Range	Compound	Color Code	General Service Application
"E"	-30°F to 230°F (-34°C to 110°C)	EPDM	Green	Hot water, dilute acids, alkalis, oil free air, and many chemical services not involving petroleum products. Excellent oxidation resistance. Not for use with hydrocarbons. Not recommended for steam service.
"E" Tri-Seal	-30°F to 230°F (-34°C to 110°C)	EPDM	Green	Hot water, dilute acids, alkalis, and many chemical services not involving petroleum products. Excellent oxidation resistance. Not for use with hydrocarbons. Recommended for low-temperature and vacuum services.
"EN" and "EN" Tri-Seal for IPS Pipe	Potable Water up to 180°F (82°C)	EPDM	Green/Yellow	IPS Pipe sizes. Not for use with hydrocarbons.
"T" and "T" Tri-Seal	-20°F to 180°F (-29°C to 82°C)	Nitrile	Orange	Petroleum products, vegetable oils, mineral oils, air with oils. High-end oil vapor temperature decreases to 150°F (66°C). Not recommended for hot water or hot dry air systems.
"O" and "O" Tri-Seal	20°F to 300°F (-7°C to 149°C)	Fluoroelastomer	Blue	Oxidizing acids, petroleum products, hydraulic fluids, lubricants, halogenated hydrocarbons.
"L"	-30°F to 350°F (-34°C to 177°C)	Silicone*	Red Gasket	Air without hydrocarbons, dry heat.

To prevent gasket deterioration, never use silicone-based lubricants with Grade "L" silicone gaskets

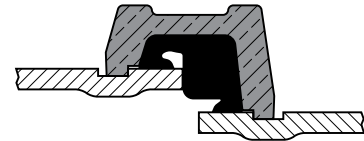
TABLE A
GASKET SPECIFICATIONS AND
GENERAL SERVICE RECOMMENDATIONS



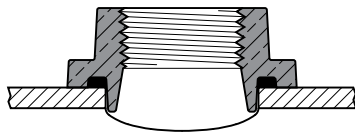
Standard Gasket: The standard style gasket, with a "C" shape configuration, is the most commonly used.



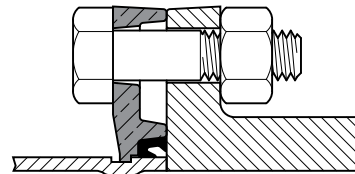
Tri-Seal Gasket: This gasket is designed to close off the gap or gasket cavity. This is accomplished by positioning the center "rib" of the gasket over the gap between the pipes. The tri-seal gasket has two tapered sealing edges in addition to the center rib for additional strength and sealing.



Reducing Coupling Gasket: This gasket is provided with ribs used to position the larger pipe so that the sealing lip is located on the sealing surface of the pipe. This gasket is used only with the GRINNELL Figure 716 Reducing Coupling.



Mechanical Tee Gasket: This gasket provides a compression type seal, which is designed to conform to the exterior curve (OD) of the pipe. Use this type of gasket ONLY with Figure 730 Mechanical Tees and Crosses.



Flange Adapter Gasket: This gasket is specifically designed for use with GRINNELL Flange Adapters. The gasket has an optimal amount of rubber to provide a dependable seal between both the pipe and mating surface.

FIGURE 1
GRINNELL GASKET STYLES

Chemical Composition	Gasket Grade	Chemical Composition	Gasket Grade	Chemical Composition	Gasket Grade	Chemical Composition	Gasket Grade
Acetaldehyde	E	Amyl Chloronaphthalene	T	Calcium Carbonate	E/T	Copper Chloride	E/T
Acetamide	T	Anderol	O	Calcium Chlorate	E/T	Copper Cyanide	E/T
Acetic Acid up to 10% 100°C (38°C)	E/L	Aniline	E	Calcium Chloride	E/T	Copper Fluoride	E
Acetic Acid up to 10-50% 100°C (38°C)	L	Aniline Dyes	E	Calcium Hydroxide (Lime)	E/T	Copper Nitrate	E/T
Acetic Acid, Glacial 100°C (38°C)	L	Aniline Hydrochloride	E	Calcium Hypochlorite	E	Copper Sulfate	E/T
Acetic Anhydride	E	Aniline Oil	E	Calcium Hypochloride	E	Creosol, Cresylic Acid	O
Acetone	E	Antimony Chloride	E	Calcium Nitrate	E/T	Creosote, Coal Tar	T/O
Acetonitrile	T	Antimony Trichloride	E	Calcium Sulfate	E/T	Creosote, Wood	T/O
Acetophenone	E	Argon Gas	E/O	Calcium Sulfide	E/T	Cupric Fluoride	E/T
Acetylene	E/T	Aroclor(S)	O	Caliche Liquors	T	Cupric Sulfate	E/T
Adipic Acid	T	Arsenic Acid, to 75%	E/T/O	Carbitol	E/T	Cyclohexane (Alicyclic Hydrocarbon)	O
Air, oil free	E	ASTM #1, 2 & 3 Oil	T	Carbonic Acid, Phenol	O	Cyclohexanol	O
Air with vaped oil	T	Barium Carbonate	E	Carbon Bisulphide	O	Cyclohexanone	E
Alkalis	E	Barium Chloride	E/T	Carbon Dioxide, Dry	E/T	Deionized Water	E
Allyl Alcohol to 96%	E	Barium Hydroxide	E/T	Carbon Dioxide, Wet	E/T	Dextrin	T
Alum Sulfuric Acid	O	Barium Sulfide	T	Carbon Disulphide	O	Dibutyl Phthalate	E
Aluminum Chloride	E/T	Benzaldehyde	E	Carbon Monoxide	E	Dichloro Difluro Methane	T
Aluminum Fluoride	E/T/O	Benzene	O	Carbon Tetrachloride	O	Dicyclohexylamine	T
Aluminum Hydroxide	E/O	Benzine (see Petroleum Ether)	O	Carbonic Acid, Dry	O	Diesel Oil	T
Aluminum Nitrate	E/T	Benzoic Acid	E	Caster Oil	T	Diethyl Ether	T
Aluminum Oxychloride	T	Benzol	O	Caustic Potash	E/T	Diethyl Sebacate	E
Aluminum Phosphate	E	Benzyl Alcohol	E	Cellosolve	E	Diethylamine	T
Aluminum Salts	E/T	Benzyl Benzoate	E	Cellosolve Acetate	E	Diethylene Glycol	E/T
Aluminum Sulfate	E/T	Benzyl Chloride	E	Cellosolve (Alcohol Ether)	E	Digester Gas	T
Alums	E/T	Black Sulfate Liquor	T	Cellulose Acetate	E	Dimethylamine	T
Ammonia Gas, Cold	E	Blast Furnace Gas	T	Cellulose 220 (Tri-Aryl-Phosphate)	E	Diocetyl Phthalate	E
Ammonia, Aqua, 10-25%	E	Bleach, 12% Active	E	Cellulose Hydraulic Fluids	E	Dioxane	E
Ammonia, Liquid	E	Borax Solutions	E	China Wood Oil, Tung Oil	T	Dipentene (Terpene-Hydrocarbon)	T
Ammonium Bifluoride	T	Bordeaux Mixture	E	Chloric Acid to 20%	E	Dipropylene Glycol	T
Ammonium Carbonate	E	Boric Acid	E/T	Chlorine, Dry	O	Dowtherm A	O
Ammonium Chloride	E/T	Bromine	O	Chlorine, Water 4000 PPM (max.)	E	Dowtherm E	O
Ammonium Fluoride	E	Butane Gas	T	Chlorinated Paraffin (Chlorococane)	T	Dowtherm SR-1	T/E
Ammonium Hydroxide	E	Butanol (see Butyl Alcohol)	E/T	Chloroacetic Acid	E	Ethane	E
Ammonium Metaphosphate	E	Butyl Acetate Ricinoleate	E/T	Chloroacetone	E	Ethanolamine	E
Ammonium Nitrate	E/T	Butyl Alcohol	E/T	Chlorobenzene	O	Ethyl Acetoacetate	E
Ammonium Nitrite	E	Butyl "Cellosolve Adipate"	E/T	Chloroform	O	Ethyl Acrylate	L
Ammonium Persulfate, to 10%	E	Butyl Phenol	E	Chrome Alum	E/T	Ethyl Alcohol (Ethanol)	E
Ammonium Phosphate	T	Butyl Stearate	T/O	Chromic Acid, to 10%	O	Ethyl Cellulose	E
Ammonium Sulfamate	T	Butylene	T/O	Chromic Acid, to 25%	O	Ethyl "Cellusolve"	E
Ammonium Sulfate	E/T	Butylene Glycol	E	Chrome Plating Solutions	O	Ethyl Chloride	E/T
Ammonium Sulfide	E	Calcium Acetate	T	Citric Acid, Saturated	E	Ethyl Ether	T
Ammonium Thiocyanate	E	Calcium Bisulfate	T/O	Citric Acid	E/T	Ethyl Oxalate	E
Amyl Acetate	E	Calcium Bisulfide	T/O	Coke Oven Gas	T/O	Ethyl Silicate	T
Amyl Alcohol	E	Calcium Bisulphite	T/O	Copper Carbonate	E/T	Ethylene Chlorohydrin	E
						Ethylene Diamine	E/T

TABLE B (1 OF 3)
CHEMICAL COMPOSITION RECOMMENDATIONS
FOR GASKET GRADES

Chemical Composition	Gasket Grade	Chemical Composition	Gasket Grade	Chemical Composition	Gasket Grade	Chemical Composition	Gasket Grade
Ethylene Dichloride (Dichloroethane)	O	Hydrochloric Acid, to 36%, 158°F (70°C)	O	Magnesium Chloride	E/T	Oronite 8200 Silicate Ester Fluid	O
Ethylene Glycol	E/T	Hydrocyanic Acid	E	Magnesium Hydroxide	E/T	Orthodichlorobenzene	O
Ferric Chloride, to 35%	E/T/O	Hydrofluoric Acid, to 75%, 75°F (24°C)	O	Magnesium Nitrate	E	OS-45 Silicate Ester Fluid	O
Ferric Chloride, Saturated	E	Hydrofluosilicic Acid	E	Magnesium Sulfate	E/T	OS-45-1	O
Ferric Hydroxide	E	Hydrocyanic Acid, to 10%	E	Maleic Acid, Saturate	T	Oxalic Acid	E
Ferric Sulfate	T	Hydrofluoric Acid, to 30%	O	Malic Acid	T	Oxygen, Cold	E
Fire Fighting Foam Concentrate	E/O	Hydrofluosilicic Acid, to 50%	T	Mercuric Chloride	E/T	Ozone (100 ppm)	E
Fluboric Acid	E/T	Hydrogen Gas, Cold	E/T	Mercuric Cyanide	E/T	Palm Oil	T
Fly Ash	E	Hydrogen Gas, Hot	E	Mercurous Nitrate	E/T	Palmitic Acid	T
FM200 HFC-227ea	E	Hydrogen Peroxide, to 50%	L	Mercury	E/T	Pentane	T
Foam	E	Hydrogen Peroxide, to 90%	O	Methane	T	Perchloroethylene	O
Fog Oil	T	Hydrogen Sulfide	E	Methyl Alcohol, Methanol	E/T	Petroleum Ether (see Benzene)	O
Formaldehyde	E/T	Hydroquinone	T/O	Methyl Chloride	O	Petroleum Oils	T
Formamide	E/T	Hydroxylamine Sulfate	E	Methyl Ethyl Ketone	E	Phenol (Carbolic Acid)	O
Formic Acid, to 25%	E	Hypochlorous Acid, Dilute	E	Methyl Isobutyl Carbinol	E	Phenylhydrazine	E
Freon 11, 130°F (54°C)	T	Iso Octane, 100°F (38°C)	T	Methylene Chloride	O	Phenylhydrazine Hydrochloride	E
Freon 12, 130°F (54°C)	T	Isobutyl Alcohol	E	Methylene Dichloride 100°F (38°C)	O	Phosphate Ester	E
Freon 113 130°F (54°C)	T	Isopropyl Acetate	E	MIL-L7808	O	Phosphoric Acid, to 50%	E
Freon 114, 130°F (54°C)	T	Isopropyl Alcohol	E	MIL-05606	O	Phosphoric Acid, to 75% and 70°F	E/T
Freon F-12	T	Isopropyl Ether	T	MIL-08515	O	Phosphoric Acid, to 85%, 200°F (93°C)	O
Freon 134a, 176°F (80°C)	E/T	JP-3	T	Mineral Oils	T	Phosphate Ester	E
Fructose	E/T	JP-4	T	Naphta	O	Photographic Solutions	T
Fuel Oil	T	JP-5, 6, 7, 8	T	Naptha, 160°F (71°C)	O	Phthalic Anhydride	E
Fumaric Acid	E	Kerosene	T	Napthenic Acid	T	Polybutene	T
Furfuryl Alcohol	E	Ketones	E	Natural Gas	T	Polyvinyl Acetate, Solid (In Liquid State is 50% solution of Methanol or 60% solution of H ₂ O)	E
Gasoline, Refined	T	Latex (1% Styrene & Butadiene)	O	Nevoil	E	Potash	E
Gasoline, Refined, Unleaded	O	Lauric Acid	T	Nickel Chloride	E/T	Potassium Alum	E/T
Glue	E/T	Lavender Oil	T	Nickel Plating Solution 125°F (52°C) - Max.	E/T	Potassium Aluminum Sulfate	E/T
Glycerin	E/T	Lead Acetate	E/T	Nickel Sulfate	E/T	Potassium Bicarbonate	E/T
Glycerol	E/T	Lead Chloride	E	Nitric Acid to 10%, 75°F (24°C) - Max.	E	Potassium Bichromate	E/T
Glycol	E/T	Lead Sulfate	T	Nitric Acid, 10-50%, 75°F (24°C) - Max.	O	Potassium Borate	E
Glycolic Acid	E	Lime and H ₂ O	E/T	Nitric Acid, 50-86%, 75°F (24°C)	O	Potassium Bromate	E
Grease	T/O	Lime Sulfur	O	Nitric Acid, Red Fuming	O	Potassium Bromide	E
Green Sulfate Liquor	T	Linoleic Acid	O	Nitrogen	E	Potassium Bromide	E/T
Halon 1301	E	Lithium Bromide	T	Nitromethane	E	Potassium Carbonate	E/T
Heptane	T	Lithium Chloride	T	Nitrous Oxide	E	Potassium Chlorate	E
Hexaldehyde	E	Lithium Bromide (Brine)	T/O	NOVEC 1230 FK-5-1-12	E	Potassium Chloride	E/T
Hexane	T	Lithium Chloride	T/O	Ogisogiric Acid, to 75%, 150°F (66°C)	O	Potassium Chromate	T
Hexanol	T	Lubricating Oil, Refined	T	Oil, Crude Sour	T	Potassium Cyanide	E/T
Hexanol Tertiary	T	Lubricating Oil, Sour	T	Oil, Motor	T	Potassium Dichromate	E
Hexyl Alcohol	T	Lubricating Oil, to 150°F (66°C)	T	Oleic Acid	T	Potassium Ferricyanide	E
Hydrobromic Acid, to 40%	E	Lubricating Oil, 150°F (66°C) to 180°F (82°C)	T	Olive Oil	T	Potassium Ferrocyanide	E

TABLE B (2 OF 3)
CHEMICAL COMPOSITION RECOMMENDATIONS
FOR GASKET GRADES

Chemical Composition	Gasket Grade	Chemical Composition	Gasket Grade	Chemical Composition	Gasket Grade	Chemical Composition	Gasket Grade
Potassium Fluoride	E	Soda Ash, Sodium Carbonate	E/T	Sohovis 78	T	Titanium Tetrachloride	O
Potassium Hydroxide	T	Sodium Acetate	E	Solvasol #1	T	Toluene, to 30%	T
Potassium Nitrate	E/T	Sodium Alum	T	Solvasol #2	T	Transmission Fluid, Type A	O
Potassium Perborate	E	Sodium Benzoate	E/T	Solvasol #3	T	Triacetin	T
Potassium Perchlorate	T	Sodium Bicarbonate	E/T	Solvasol #73	T	Trichloroethane	O
Potassium Permanganate, Saturated to 10%	E	Sodium Bisulfate	E/T	Spindle Oil	T	Trichloroethylene	O
Potassium Permanganate Saturate 10-25%	E	Sodium Bisulfite (Black Liquor)	E/T	Stannic Chloride	T	Trichloroethylene, to 200°F (93°C)	O
Potassium Persulfate	T	Sodium Bromide	E/T	Stannous Chloride, to 15%	T	Tricresyl Phosphate	E
Potassium Silicate	E/T	Sodium Carbonate	E/T	Starch	E/T	Triethanolamine	E/T
Potassium Sulfate	E/T	Sodium Chlorate	E	Stearic Acid	T	Trisodium Phosphate	E
Prestone	T	Sodium Chloride	E/T	Stoddard Solvent	T	Tung Oil	T
Propane Gas	T	Sodium Cyanide	E/T	Styrene	O	Turbo Oil #15 Diester Lubricant	O
Propanol	E	Sodium Dichromate, to 20%	E/T	Sulfonic Acid	E	Turpentine	T
Propargyl Alcohol	E	Sodium Ferricyanide	E/T	Sulphite Acid Liquor	E	Urea	E/T
Propyl Alcohol	E/T	Sodium Ferrocyanide	E/T	Sulfur	E	Vegetable Oils	T
Propylene Dichloride	L	Sodium Fluoride	E/T	Sulfur Chloride	O	Vinyl Acetate	E
Propylene Glycol	E	Sodium Hydroxide, to 15%	E	Sulfur Dioxide, Dry	E/T	Vinyl Chloride	O
Pyranol 1467	T	Sodium Hydroxide, to 50%	E	Sulfur Dioxide, Liquid	E	Vi-Pex	T
Pyranol 1476	T	Sodium Hypochlorite, to 20%	E	Sulfur Trioxide, Dry	O	Water, to 150°F (66°C)	E/T
Pyroguard "C"	T	Sodium Metaphosphate	T	Sulfuric Acid, to 25%, 150°F (66°C)	E	Water, to 200°F (93°C)	E
Pyroguard "D"	T	Sodium Nitrate	E	Sulfuric Acid, 25-50%, 200°F (93°C)	O	Water, to 230°F (110°C)	E
Pyroguard 55	E	Sodium Nitrite	E/T	Sulfuric Acid, 50-95%, 150°F (66°C)	O	Water, Acid Mine	E/T
Pyrrrole	E	Sodium Peroxide	E	Sulfuric Acid, Fuming	O	Water, Bromine	O
Ref. Fuel (70 ISO Octane, 30 Toluene)	T	Sodium Phosphate	T	Sulfuric Acid, Oleum	O	Water, Chlorinated, to 3500 ppm	E
Rosin Oil	T	Sodium Phosphate, Dibasic	T	Sulfurous Acid	O	Water, Chlorine	E
Salicylic Acid	E	Sodium Phosphate, Monobasic	T	Tall Oil	T	Water, Deionized	E
Secondary Butyl Alcohol	T	Sodium Phosphate, Tribasic	T	Tanning Liquors (50g. alum. solution, 50g. dichromate solution)	T	Water, Potable	EN
Sewage	E/T	Sodium Silicate	T	Tartaric Acid	E	Water, Seawater	E
Silver Nitrate	E	Sodium Sulfate	E/T	Tertiary Butyl Alcohol	E/T	Water, Waste	E/T
Silver Sulfate	E	Sodium Sulfide	E/T	Tetrabutyl Titanate	E	White Liquor	E
Skydrol, 200°F (93°C) - Max.	L	Sodium Sulfite Solution, to 20%	T	Tetrachloroethylene	O	Wood Oil	T
Skydrol 500 Phosphate Ester	E	Sodium Thiosulfate, "Hypo"	T	Tetrachloroethylene	O	Xylene	O
Soap Solutions	E/T	Sohovis 47	T	Thionyl Chloride	T	Zinc Chloride, to 50%	E
				Terpineol	T	Zinc Nitrate	E
				Tertiary Butyl Alcohol	E/T	Zinc Sulfate	E/T
				Tetrachloroethylene	O		

NOTES

- Specify gasket grade when ordering.
- For vacuum or low temperature systems, use Tri-Seal Gaskets. Use a petroleum-free silicone lubricant.
- Check gasket color code to ensure it is recommended for the intended service.
- Unless otherwise specified, note all gasket listings are based upon a temperature of 70°F (21°C).
- For services not listed, contact GRINNELL Products for recommendations.
- Where more than one gasket is shown, the preferred gasket grade is listed first.

TABLE B (3 OF 3)
CHEMICAL COMPOSITION RECOMMENDATIONS
FOR GASKET GRADES

