Garlock®

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Industrial Products Catalog

THE STANDARD PACKING OF THE WORLD®



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This is Garlock

Since 1887, Garlock has supplied its products to, and served industry throughout the world. Our concentrated research and development program, intense quality assurance program, growing facilities, expansion of Authorized Distributor stocking points, and our trained representatives all have but one aim . . . to serve you better.

The manufacturing facilities of Garlock, Inc. presently include eight domestic plants and four production plants outside of the United States. The Company has over 1,000,000 square feet of floor space devoted to the efficient production and engineering of our many products.

1 Chromex, S.A. produces mechanical packings, gaskets, seals, rubber and plastic products for the European Common Market. The plant is located at Lardy, France.

2 Spring Division of Bristol, Conn. produces extension, compression and torsion springs, wire forms, metal stampings and screw machine products.

3 France Products Div., Philadelphia, Pa. manufactures metal packings, plastic piston rings and rider rings. Principal customers include both the manufacturers and users of engines; compressors; and high pressure, reciprocating power pumps.

4 Garlock Plastic Division in Camden, New Jersey manufacturers plastic packings, components for mechanical packings, gaskets, expansion joints and specialty products.

5 Garlock of Canada Ltd. produces mechanical packings, gaskets, oil seals, expansion joints, molded rubber goods and specialty products. The plant is located at Toronto.

6 Garlock de Mexico, Mexico City, manufactures a complete line of mechanical packings—braided soft packings, gaskets, seals and plastic products.

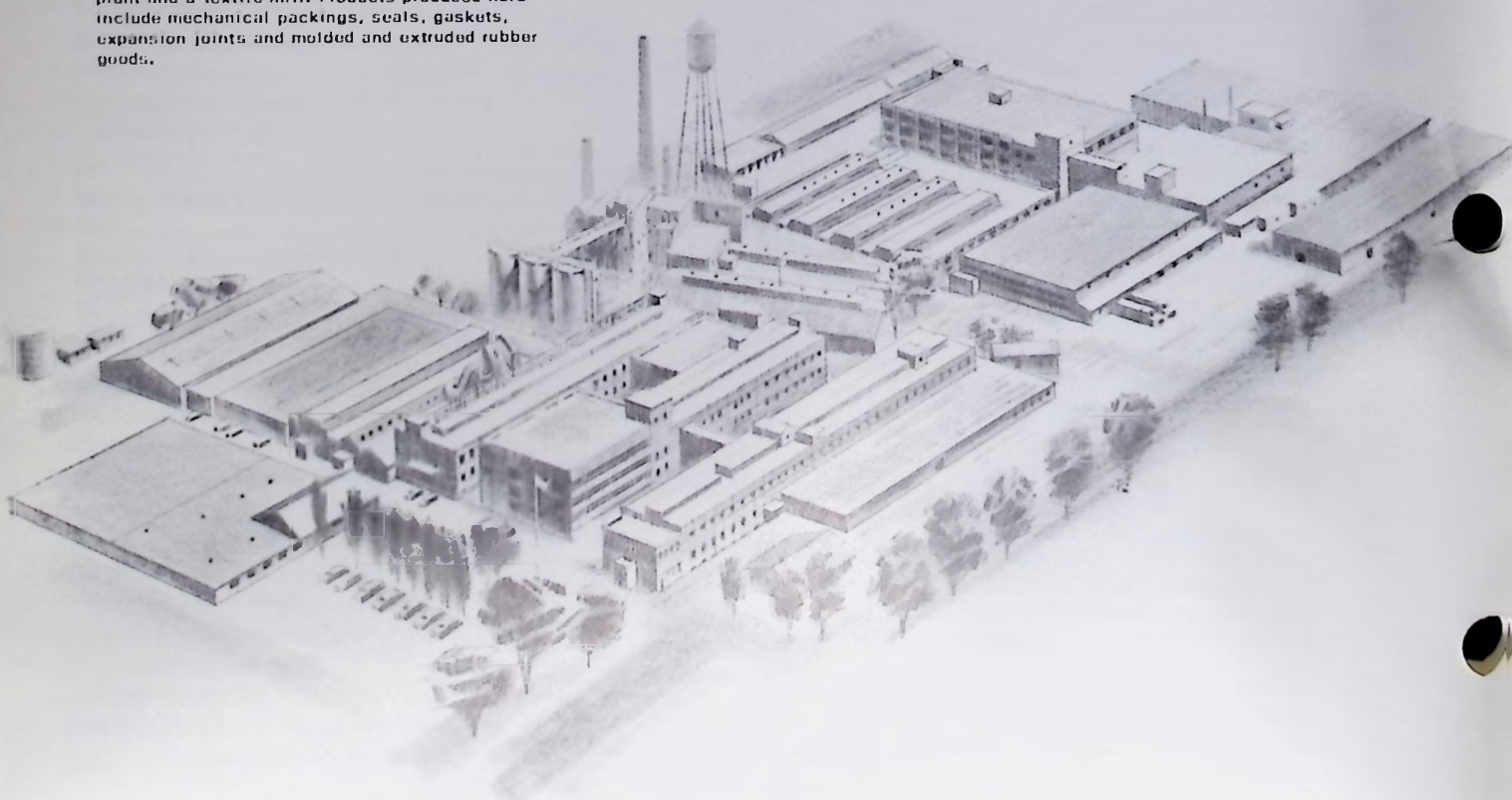
7 The Precision Seal Division of Garlock is located at Gastonia, N.C. This new, 100,000 square-foot plant produces oil seals to serve the transportation industry.

8 Garlock Bearing Division markets plastic-based bearings from this modern facility located at Cherry Hill, N.J.

9 Stemco Manufacturing Co., Inc. of Longview, Texas, produces hub seals and heavy duty mufflers for the truck and trailer industry, as well as leather products.

10 The Woodville Rubber Company Ltd. at Ross-on-Wye, England manufactures precision molded rubber products.

The principal manufacturing plant is located at Palmyra, New York. Within the 27 building complex are a rubber plant, a metal fabrication plant and a textile mill. Products produced here include mechanical packings, seals, gaskets, expansion joints and molded and extruded rubber goods.



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1



6



2



7



3



8



4



9



5



10

Garlock Materials vs. various media under typical conditions

	MEDIUM	METALS	NATURAL RUBBER	SBR	NEOPRENE	NITRILE	SILICONE	POLY-URETHANE
GASES	Air	Satisfactory, except lead melts above 600°F.	Satisfactory but becomes tacky above 200°F.	Satisfactory but hardens above 250°F.	Satisfactory but hardens and decomposes above 250°F.	Satisfactory but hardens above 250°F.	Satisfactory but deterioration accelerated above 500°F.	Satisfactory to 200°F.
	Oxygen	Satisfactory, except lead melts above 600°F.	Limited depending on conditions.	Limited depending on conditions.	Limited depending on conditions.	Limited depending on conditions.	Limited depending on conditions.	Limited depending on conditions.
	Halogens (Chlorine, Bromine, etc.)	Satisfactory if free from water. Otherwise attacked.	Hardens on exposed surfaces.	Hardens on exposed surfaces.	Hardens on exposed surfaces.	Hardens on exposed surfaces.	Hardens on exposed surfaces.	Not recommended.
	Other Hot Gases or Dry Steam	Satisfactory below melting point. Hot compressed H_2 embrittles steel.	Satisfactory but becomes tacky above 200°F.	Satisfactory but hardens above 250°F.	Satisfactory but hardens and decomposes above 250°F.	Satisfactory but hardens above 250°F.	Satisfactory but decomposes in steam above 300°F.	Not recommended.
LIQUIDS	Water (including all neutral water-soluble salts, suger solutions, etc.)	Satisfactory except for iron rusting.	Satisfactory but becomes tacky above 200°F.	Satisfactory but hardens above 250°F.	Satisfactory but hardens above 250°F.	Satisfactory but hardens above 250°F.	Satisfactory but decomposes above 300°F.	Satisfactory to 200°F.
	Alkaline Solutions	Satisfactory except lead, tin, zinc, aluminum and alloys.	Limited, depending on conditions, exposed surfaces become tacky.	Satisfactory but exposed surfaces swell.	Satisfactory but butyl rubber preferred.	Satisfactory but exposed surfaces swell.	Not recommended.	Not recommended.
	Weak Acid Solutions (including Acetic and other organic acids, sulphurous acid and low concentration of sulphuric acid and hydrochloric)	Copper, its alloys and stainless irons satisfactory; aluminum satisfactory in organic acids only and lead in all but acetic acid.	Satisfactory if free from acid-soluble fillers.	Satisfactory if free from acid-soluble fillers.	Satisfactory if free from acid-soluble fillers.	Satisfactory if free from acid-soluble fillers.	Not recommended.	Not recommended.
	Strong Acids Hydrochloric Acid	Not recommended except Hastelloy, gold and platinum.	Limited depending on conditions.	Limited depending on conditions.	Satisfactory up to 150°F. if free from acid-soluble fillers.	Limited depending on conditions.	Not recommended.	Not recommended.
	Sulfuric Acid Dilute up to 50%	Not recommended except Duriron, lead, gold and platinum.	Limited depending on conditions.	Limited depending on conditions.	Limited depending on conditions.	Limited depending on conditions.	Not recommended.	Not recommended.
	Concentrated Sulfuric Acid	Limited depending on conditions.	Not recommended.	Not recommended.	Not recommended.	Not recommended.	Not recommended.	Not recommended.
	Concentrated Acetic Acid (Glacial)	Limited depending on conditions.	Limited depending on conditions.	Limited depending on conditions.	Limited depending on conditions.	Limited depending on conditions.	Limited depending on conditions.	Not recommended.
	Nitric Acid	Not recommended except Duriron, gold and platinum. (Stainless Steel in concentrate but not dilute.)	Not recommended.	Not recommended.	Not recommended.	Not recommended.	Not recommended.	Not recommended.
	Aqua Ammonia	Satisfactory except copper and its alloys.	Satisfactory but becomes tacky above 200°F.	Satisfactory but hardens above 250°F.	Not recommended.	Satisfactory but hardens above 250°F.	Satisfactory but deteriorates above 300°F.	Not recommended.
	Liquid Ammonia (Anhydrous)	Satisfactory except copper and its alloys.	Limited depending on conditions.	Limited depending on conditions.	Satisfactory.	Satisfactory.	Limited depending on conditions.	Not recommended.
	Liquid Chlorine, Bromine, etc.	Satisfactory if completely free from water. Otherwise attacks all metals.	Not recommended.	Not recommended.	Not recommended.	Not recommended.	Not recommended.	Not recommended.
SOLVENTS	Aliphatic (Gasoline, etc.)	Satisfactory.	Not recommended.	Not recommended.	Limited depending on conditions.	Satisfactory.	Limited depending on conditions.	Excellent.
	Aromatic Types (Benzol, etc.) or chlorinated Types (Carbontetra-chloride, etc.)	Satisfactory.	Not recommended.	Not recommended.	Not recommended.	Limited depending on conditions.	Not recommended.	Excellent.
	Acetone	Satisfactory.	Limited depending on conditions. Butyl preferred.	Limited depending on conditions.	Limited depending on conditions.	Not recommended.	Limited depending on conditions.	Not recommended.
	Alcohol	Satisfactory.	Satisfactory.	Satisfactory.	Satisfactory.	Satisfactory.	Limited depending on conditions.	Satisfactory except in oxygenated alcohol.
OILS		Satisfactory except high-sulphur hot oils attack copper, iron and alloys.	Not recommended.	Not recommended.	Limited depending on conditions and nature of oil.	Satisfactory except for some additive type oils.	Limited depending on conditions and nature of oil.	Satisfactory.

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• This chart indicates the general suitability of basic materials commonly used in packings and gaskets against various media and is intended only for the general information of the packing user. Obviously the subject of the interaction of packing materials with the several liquids listed is too complex to be covered adequately in a few words. Although chemical considerations are important in the selection of packings, the mechanical properties of the packing itself usually are of greater importance. Packings rarely are fully exposed to the gas or liquid and, therefore, do not necessarily react in the same degree as indicated for the base material. For these reasons packings or gaskets should not be accepted or rejected for any application solely on the basis of chemical consideration.

GRAPHITE YARN	VITON* and FLUOREL**	PHENOLIC RESINS	TFE FLUORO-CARBON	WHITE ASBESTOS	BLUE ASBESTOS	COTTON, FLAX, VISCOSE RAYON	PAPER	LEATHER
Satisfactory to 650°F.	Satisfactory but hardens above 500°F.	Reinforcing fiber usually establishes limits.	Satisfactory but softens above 500°F.	Satisfactory.	Satisfactory.	Satisfactory but weakens above 200°F.	Satisfactory but weakens and embrittles above 200°F.	Satisfactory from cryogenics to +200°F.
Not recommended.	Limited depending on conditions.	Limited depending on conditions.	Satisfactory but softens above 500°F.	Satisfactory.	Satisfactory.	Not recommended.	Not recommended.	Not recommended.
Not recommended.	Satisfactory up to 225°F.	Satisfactory except for effect on reinforcing fibers.	Satisfactory.	Satisfactory.	Satisfactory.	Not recommended.	Not recommended.	Not recommended.
Satisfactory.	Satisfactory but hardens above 500°F. Not recommended in steam above 300°F.	Satisfactory.	Satisfactory.	Satisfactory.	Satisfactory.	Satisfactory but weakens above 200°F.	Satisfactory but weakens above 200°F.	Satisfactory but weakens above 200°F.
Satisfactory.	Satisfactory but decomposes above 300°F.	Satisfactory.	Satisfactory.	Satisfactory.	Satisfactory.	Satisfactory but weakens above 200°F.	Satisfactory but weakens above 200°F.	Satisfactory but weakens above 200°F.
Satisfactory.	Limited depending on conditions.	Satisfactory unless solutions are strong and above 200°F.	Satisfactory.	Satisfactory.	Satisfactory.	Not recommended.	Not recommended.	Not recommended.
Satisfactory.	Satisfactory if free from acid-soluble fillers.	Satisfactory. If used, reinforcing fibers should be acid resistant.	Satisfactory.	Satisfactory.	Satisfactory.	Not recommended.	Not recommended.	Not recommended.
Satisfactory.	Satisfactory if free from acid-soluble fillers.	Satisfactory. If used, reinforcing fibers should be acid resistant.	Satisfactory.	Not recommended.	Satisfactory.	Not recommended.	Not recommended.	Limited depending on conditions.
Satisfactory.	Satisfactory if free from acid-soluble fillers.	Satisfactory. If used, reinforcing fibers should be acid resistant.	Satisfactory.	Not recommended.	Satisfactory.	Not recommended.	Not recommended.	Limited depending on conditions.
Satisfactory.	Satisfactory if free from acid-soluble fillers.	Not recommended.	Satisfactory.	Not recommended.	Satisfactory.	Not recommended.	Not recommended.	Not recommended.
Satisfactory.	Limited depending on conditions.	Limited depending on conditions.	Satisfactory.	Satisfactory.	Satisfactory.	Satisfactory.	Satisfactory.	Satisfactory.
Not recommended above 100°F for concentrations above 25%.	Limited depending on conditions.	Not recommended.	Satisfactory.	Not recommended.	Satisfactory.	Not recommended.	Not recommended.	Not recommended.
Satisfactory.	Satisfactory but deteriorates above 300°F.	Satisfactory.	Satisfactory.	Satisfactory.	Satisfactory.	Satisfactory but weakens above 200°F.	Satisfactory but weakens above 200°F.	Satisfactory but weakens above 200°F.
Satisfactory.	Not recommended.	Satisfactory.	Satisfactory.	Satisfactory.	Satisfactory.	Satisfactory.	Satisfactory.	Not recommended.
Not recommended.	Not recommended.	Not recommended.	Satisfactory.	Satisfactory.	Satisfactory.	Not recommended.	Not recommended.	Not recommended.
Satisfactory.	Satisfactory.	Satisfactory.	Satisfactory.	Satisfactory.	Satisfactory.	Satisfactory.	Satisfactory.	Satisfactory but loses waxes, shrinks and hardens.
Satisfactory.	Not recommended.	Satisfactory.	Satisfactory.	Satisfactory.	Satisfactory.	Satisfactory.	Satisfactory.	Satisfactory but loses waxes, shrinks and hardens.
Satisfactory.	Not recommended.	Limited depending on conditions.	Satisfactory.	Satisfactory.	Satisfactory.	Satisfactory.	Satisfactory.	Satisfactory but loses waxes, shrinks and hardens.
Satisfactory.	Limited depending on conditions.	Limited depending on conditions.	Satisfactory.	Satisfactory.	Satisfactory.	Satisfactory.	Satisfactory.	Satisfactory but loses waxes, shrinks and hardens.
Satisfactory.	Satisfactory.	Satisfactory.	Satisfactory.	Satisfactory.	Satisfactory.	Satisfactory but weakens above 200°F.	Satisfactory but weakens above 200°F.	Satisfactory but becomes porous and hardens above 200°F.

*DUPONT TRADEMARK

**3M TRADEMARK

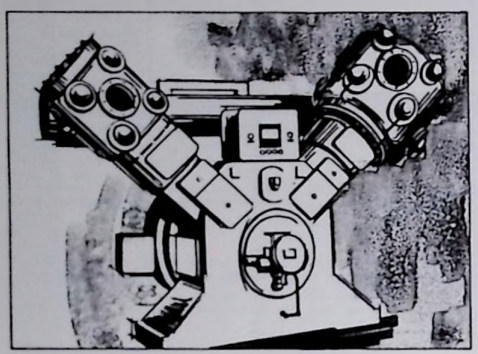
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Packing recommendations by equipment

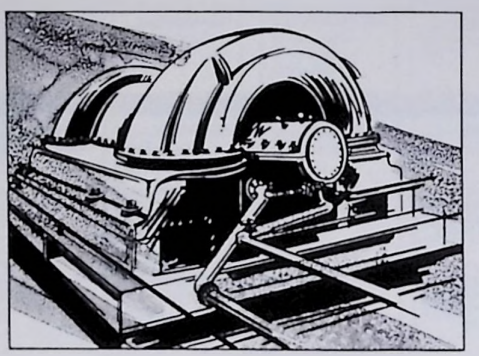
The recommendations shown here should only be considered as tentative until you have checked them out with *all* of the service conditions which exist in your particular application. When you take the basic factors which surround any application (fluid, temperature, pressure, speed, and type of motion) and add to them the age and condition of equipment, you can see that the variables are such as to make a concrete recommendation, based only on type of equipment and fluid involved, very difficult.

For most applications, we have made more than one packing recommendation. The first choice is the one which, in our opinion, will give the ultimate service under the most severe conditions. But other conditions, which only you can know, may make another recommendation preferable. For example, your equipment may be operating at temperatures well below those normally associated with the application.

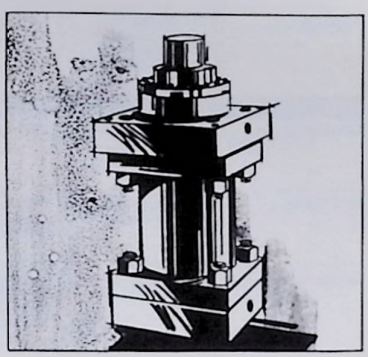
Reciprocating Compressor



Centrifugal Compressor



Hydraulic Cylinder



	ACIDS		ALKALIES		GASES			OILS		SOLVENTS					
EQUIPMENT	MILD	CORROSIVE	MILD	CORROSIVE	AIR & DRY INDUSTRIAL GASES	BROMINE, CHLORINE	OXYGEN	PETROLEUM	SYNTHETICS	AROMATIC (BENZENE, ETC.)	ALIPHATIC (GASOLINE, ETC.)	STEAM	WATER & SALT SOLUTIONS	FLUIDS WHERE NON-CONTAMINATION REQUIRED	COMMENTS:
ACCUMULATORS & INTENSIFIERS								432 5876 740	.7904 433 5862				432 5876 740		
COMPRESSORS, RECIPROCATING					532 432 631	*8764 5888 5889	*8764 5898 5780								*CHEVRON*
CENTRIFUGAL					100 631 5862	5889 5888	5898 5780								
CRYSTALLIZERS	100 5889 5862	*100 5889 5884	100 5889 5862	100 5889 5884									100 5883 5862	5889 5862 5876	*Except in strong oxidizers

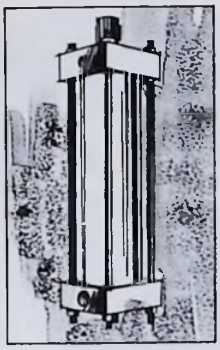
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We suggest you use these pages as a starting point. Choose a style number and cross check it for other variables, plus a description of the product, on the Packing Description Pages. For those numbers printed in black, this information is contained on pages 39-42; for those printed in gray, refer to page 55.

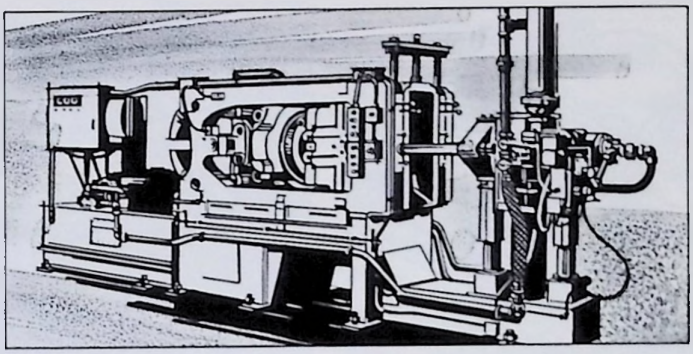
If no recommendation is shown, it only means that those fluids are not normally associated with the particular equipment. Garlock, of course, stands ready to make a recommendation upon receipt of full service condition information.

We recognize that many Garlock packings not shown have worked well in these applications for many years. However, this catalog is designed on the assumption that the user comes to it with a problem and in search of a solution. Packings shown here are those which have solved many similar problems.

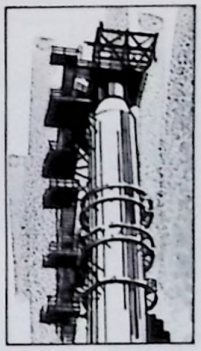
Air Cylinder



Die Casting Machine



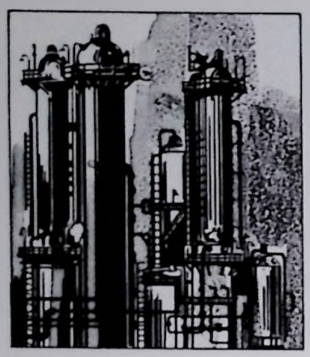
Washing Digester



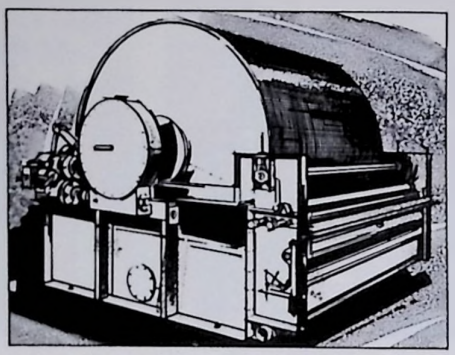
EQUIPMENT	ACIDS: MILD	ACIDS: CORROSIVE	ALKALIES: MILD	ALKALIES: CORROSIVE	GASES: AIR & DRY INDUSTRIAL GASES	GASES: BROMINE, CHLORINE	GASES: OXYGEN	OILS: PETROLEUM	OILS: SYNTHETICS	SOLVENTS: AROMATIC (BENZENE, ETC.)	SOLVENTS: ALIPHATIC (GASOLINE, ETC.)	SOLVENTS: STEAM	SOLVENTS: WATER & SALT SOLUTIONS	SOLVENTS: FLUIDS WHERE NON-CONTAMINATION REQUIRED	COMMENTS:
CYLINDERS HYDRAULIC PISTON CUPS AND ROD CHEVRON								432 8452 7271 BITAN Leather 432	433 7904 8764 9188 7904 433				540 8619 432		
CYLINDERS PNEUMATIC PISTON CUPS AND ROD CHEVRON					8764 8452 7131 8452 432										
DIE CASTING MACHINES								432	7904 433						
DIGESTERS CONTINUOUS AND LIQUOR PUMPS USED WITH BOTH BATCH AND CONTINUOUS SYSTEMS.	100 5889 5862	*100 5889 5884	100 5889 5884	100 5889 5884											*Except in strong oxidizers

Packing recommendations by equipment

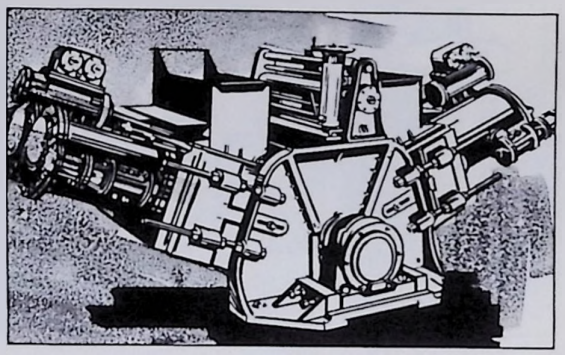
Petrochemical Plants



Paper Processing



Wood Pulp Grinder



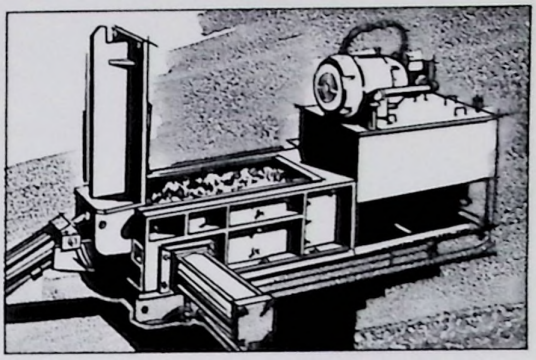
EQUIPMENT	ACIDS		ALKALIES		GASES			OILS		SOLVENTS					COMMENTS:
	MILD	CORROSIVE	MILD	CORROSIVE	AIR & DRY INDUSTRIAL GASES	BROMINE, CHLORINE	OXYGEN	PETROLEUM	SYNTHETICS	AROMATIC (BENZENE, ETC.)	ALIPHATIC (GASOLINE, ETC.)	STEAM	WATER & SALT SOLUTIONS	FLUIDS WHERE NON-CONTAMINATION REQUIRED	
DISTILLATION COLUMNS—	5005	5005	5005	5005				5005	5005	5005	5005				
TRAY OR BELL & SPIGOT JOINTS	5889	5889	5889	5889				5889	5889	5889	5889				
	5555		5555					5555	5555	5555	5555				
EXPANSION JOINTS	5862	5888	5862	5888	5862	5888	5898	127	127	127	127	127	127	5888	
SLIP TYPE	5876	5884	5876	5884	5876	5889	5780	5862	5862	5862	5862	5862	5862	5862	
	731	736	731	736	127			5876	5876	5876	5876	5876	5876	5876	
FILTERS—	100	*100	100	100	100			100	100	100	100		100	5889	*Except in strong oxidizers
ROTARY														5862	
	5862	5889	5862	5889	5862			5862	5862	5862	5862	5862	5862	5876	
	5876	5884	5876	5884	5876			5876	5876	5876	5876	5876	5876		
GRINDERS—PULP															
POCKET ROD													432 745 740		
PISTON													7131 BITAN Cups		
ROBERTS													100 5862 737		

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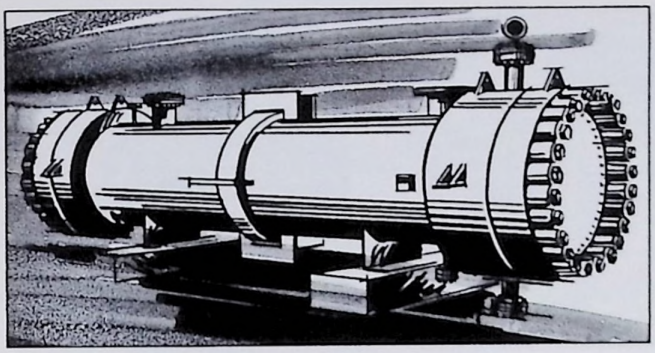
Vacuum Mixer



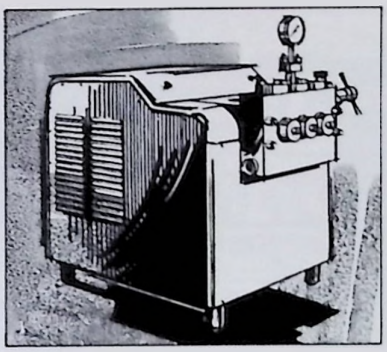
Baling Press



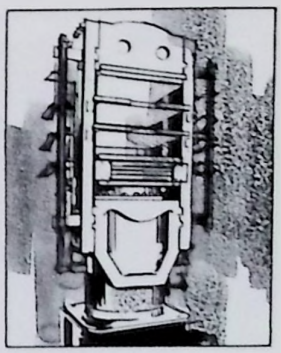
Heat Exchanger



Homogenizer



Side Plate Press

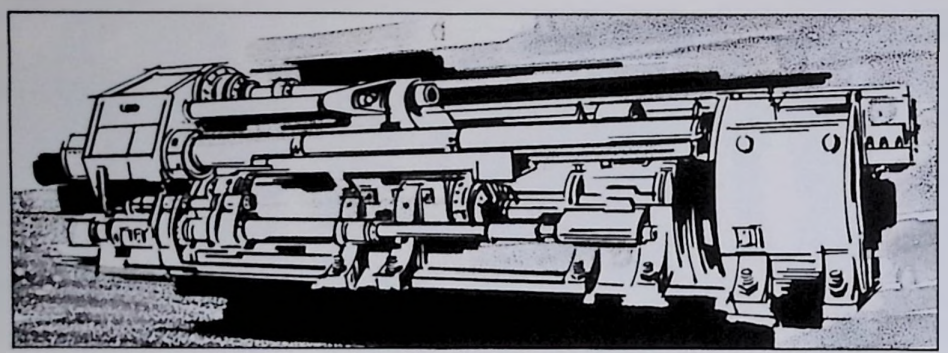


	ACIDS		ALKALIES		GASES			OILS		SOLVENTS					
EQUIPMENT	MILD	CORROSIVE	MILD	CORROSIVE	AIR & DRY INDUSTRIAL GASES	BROMINE, CHLORINE	OXYGEN	PETROLEUM	SYNTHETICS	AROMATIC (BENZENE, ETC.)	ALIPHATIC (GASOLINE, ETC.)	STEAM	WATER & SALT SOLUTIONS	FLUIDS WHERE NON-CONTAMINATION REQUIRED	COMMENTS:
HEAT EXCHANGERS FLOATING HEAD TYPE	5862 5876 731	5888 5884 736	5862 5876 731	5888 5884 736	5862 5876 731			5862 5876 127	5862 5876 127	5862 5876 127	5862 5876 127	5862 5876 127	5862 5876 127	5888 5862 737	
HOMOGENIZERS														8051	
MIXERS, AGITATORS	100 5889 5862	*100 5889 5884	100 5889 5862	100 5889 5884	100 5862 5876	5889 5888	5898 5780	100 5889 5862	100 5889 5862	100 5889 5862	100 5889 5862	100 5889 5862	100 5889 5862	5889 5862 5876	*Except in strong oxidizers
PRESSES BALING								7904 BITAN Leather 432	7904 BITAN Leather 433				7904 BITAN Leather 432		BITAN Leather will give best service if rams are scored.

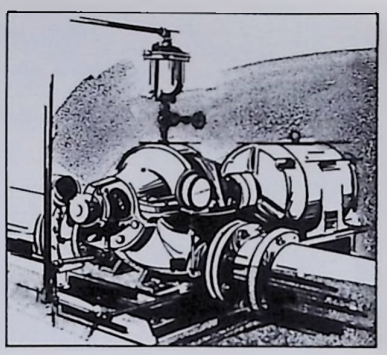
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Packing recommendations by equipment

Extrusion Press



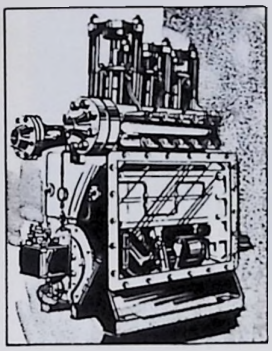
Centrifugal Pump



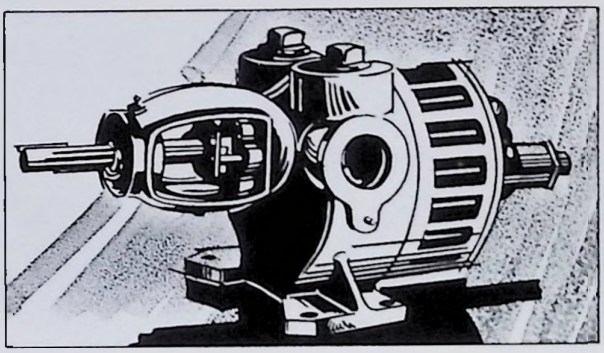
	ACIDS		ALKALIES		GASES			OILS		SOLVENTS					
EQUIPMENT	MILD	CORROSIVE	MILD	CORROSIVE	AIR & DRY INDUSTRIAL GASES	BROMINE, CHLORINE	OXYGEN	PETROLEUM	SYNTHETICS	AROMATIC (BENZENE, ETC.)	ALIPHATIC (GASOLINE, ETC.)	STEAM	WATER & SALT SOLUTIONS	FLUIDS WHERE NON-CONTAMINATION REQUIRED	COMMENTS:
PRESSES EXTRUSION & FORGING								7271 7904 432	 7904 433			 532	 7904 432		A high pressure application. Use R.H. top & bottom adapters and be sure gland followers give top ring good support.
HYDRAULIC								7904 432	7904 433				7904 432		
PUMPS CENTRIFUGAL	100 5862 733	*100 5889 5884	100 5862 737	100 5889 5884	100 5862 733	5889 5888	5898 5780	100 5862 733	100 5889 5862	100 5889 5862	100 5889 5862	100 5862 730	100 5862 733	5889 5862 737	*Except in strong oxidizers
RECIPROCATING RODS & PLUNGER	7904 5862 5876	7904 5888 5884	7904 5862 5876	7904 5888 5884				432 5862 5876	433 5888 5862	7904 5888 5862	7904 5888 5862	532 5888 5862	432 5888 5862	8051 5883 5862	
PISTONS								8136 Cups or *262 R.H.				813 540 Cups or *262 R.H.	540 Cups or *262		*Ring style No. is 261 or 261 R.H.

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Reciprocating Pump



Rotary Pump



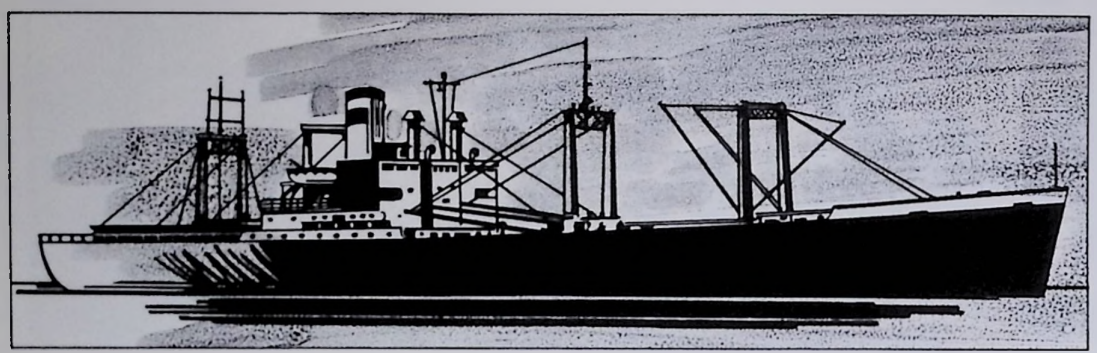
Power House



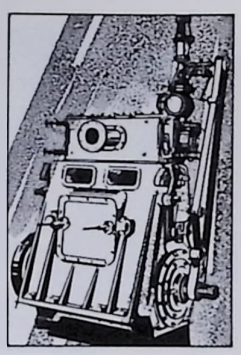
	ACIDS		ALKALIES		GASES			OILS		SOLVENTS					
EQUIPMENT	MILD	CORROSIVE	MILD	CORROSIVE	AIR & DRY INDUSTRIAL GASES	BROMINE, CHLORINE	OXYGEN	PETROLEUM	SYNTHETICS	AROMATIC (BENZENE, ETC.)	ALIPHATIC (GASOLINE, ETC.)	STEAM	WATER & SALT SOLUTIONS	FLUIDS WHERE NON-CONTAMINATION REQUIRED	COMMENTS:
PUMPS															
ROTARY	100	*100	100	100	100	5889 5888	5898 5780	100	100	100	100		100	5889 5862	*Except in strong oxidizers
POSITIVE DISPLACEMENT	5862 733	5889 5884	5862 737	5889 5884	5862 733			5862 733	5889 5862	5889 5862	5889 5862		5862 733	737	
SOOT BLOWERS															
INSULATED FEED					*8534 XV 5501 5862							*8534 XV 5501 5862			*A carbon-graphite filled TFE
UNINSULATED FEED					5501 127 735							5501 127 735			

Packing recommendations by equipment

Marine Products



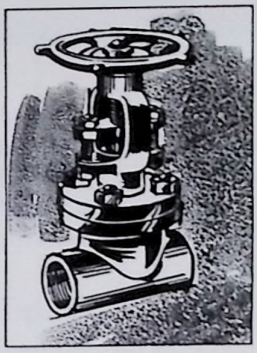
Steam Engine



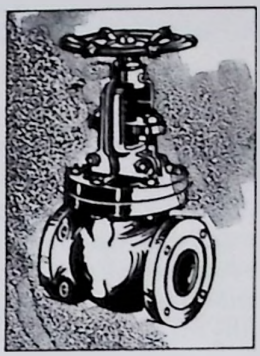
	ACIDS		ALKALIES		GASES			OILS		SOLVENTS					
EQUIPMENT	MILD	CORROSIVE	MILD	CORROSIVE	AIR & DRY INDUSTRIAL GASES	BROMINE, CHLORINE	OXYGEN	PETROLEUM	SYNTHETICS	AROMATIC (BENZENE, ETC.)	ALIPHATIC (GASOLINE, ETC.)	STEAM	WATER & SALT SOLUTIONS	FLUIDS WHERE NON-CONTAMINATION REQUIRED	COMMENTS:
STEAM ENGINES												7904 532 635			
STEAM HAMMERS												7904 532 150			
STERN TUBES													MARINEPAK® 5876 31		
TURBINES HYDRAULIC													5862 730 745		

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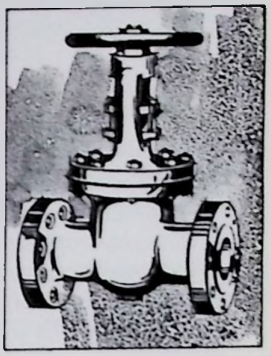
Forged Valve



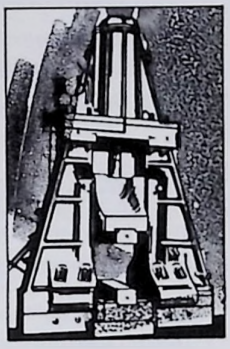
Cast Steel Valve



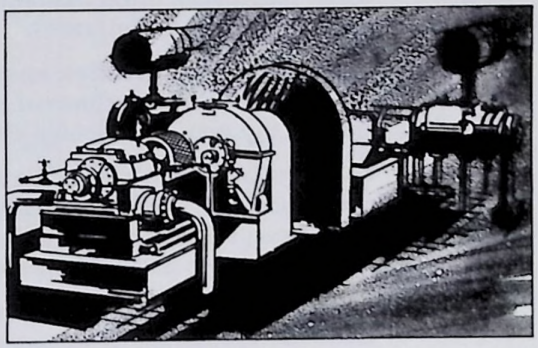
Stainless Valve



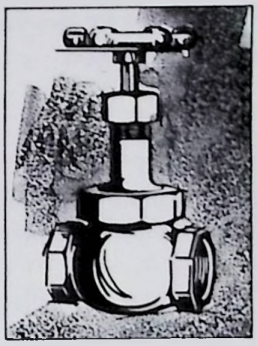
Steam Hammer



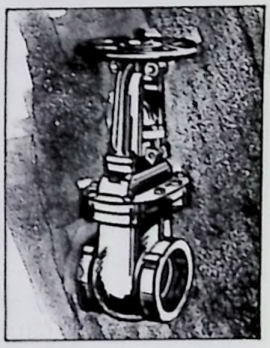
Hydraulic Turbine



Bronze Valve



Cast Iron Valve



	ACIDS		ALKALIES		GASES			OILS		SOLVENTS					
EQUIPMENT	MILD	CORROSIVE	MILD	CORROSIVE	AIR & DRY INDUSTRIAL GASES	BROMINE, CHLORINE	OXYGEN	PETROLEUM	SYNTHETICS	AROMATIC (BENZENE, ETC.)	ALIPHATIC (GASOLINE, ETC.)	STEAM	WATER & SALT SOLUTIONS	FLUIDS WHERE NON-CONTAMINATION REQUIRED	COMMENTS:
VALVES															
BRONZE & CAST IRON	5862 5876 731		5862 5876 127		127 5862 5876	5888 7130 5898	5898 5780	127 633 5862	127 633 5862	127 5862 5876	127 5862 5876	127 635 5862	127 5862 233	5888 5862 5876	
FORGED & CAST STEEL						5888 7130 5898		127 633 908	127 633 908	127 908 5862	127 908 5862	127 635 908	127 635 908		
STAINLESS & SPECIAL ALLOYS	•8764 5888 5862	•8764 5888 5884	•8764 5888 5862	•8764 5888 5884	•8764 5888 5862	•8764 5888 7130	•8764 5888 5780	•8764 5888 5862	•8764 5888 5862	•8764 5888 5862	•8764 5888 5862	5888		•8764 5888 5862	•CHEVRON®

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Choosing the right gasket material

Every gasket material available to industry has certain inherent limitations that tend to restrict each material's range of applications. However, many of these limitations may be partially or wholly eliminated by several methods, including use of reinforcing inserts, combining with other materials, varying construction, or by the type of joint the material must seal.

Although mechanical factors are important to the design of the complete joint, primary selection of a gasket material is greatly influenced by two factors:

Temperature of fluid or gas contained

Nature of fluid or gas contained

Temperature

With very few exceptions, a material should never be used at temperatures higher than those recommended for its group.

Temperature ranges for rubber are: Natural—up to 200° F; SBR, Nitrile and Neoprene—up to 250° F; VITON*—up to 450°F; Silicone—up to 500° F.

Vegetable fiber sheet with glue-glycerine bond has a temperature range up to 250° F with synthetic rubber bond up to 300° F.

Woven asbestos cloth is effective up to 600° F; compressed asbestos up to 700° F.

Rubber used in most cloth-inserted sheets usually determines the material's temperature range.

However, you should never select or reject a gasket material solely on the preceding information as this is merely a general guide. To be sure, consult your nearest Garlock representative for more specific recommendations.

Fluid contained

By using the resistance chart on pages 15, 16 and 17, you can easily ascertain a material's reaction to a specific medium, and thereby determine its suitability in service. Four values appear throughout this chart. They are: G for good; F or fair; D for depends on conditions; and U for unsuitable. With the exception of symbol D, all values are self-explanatory. Where D is indicated, and no other material is suitable for your specific application, contact your Garlock representative. He'll gladly help you determine the material's suitability.

Although the above values are of extreme importance, various other factors should also be given due consideration as they directly influence the fluid contained and its effect on the gasket material.

*Registered Trademark - du Pont Co.

Concentration of the corrosive agent can have a decided effect upon the gasket material selection. Full strength solutions are not necessarily more corrosive than those of dilute proportions. The reverse is often true.

Purity of corrosive agent or the absence of contaminating compounds is another factor involved. Example: dissolved oxygen in otherwise chemically pure water may cause rapid oxidation of high temperature steam generating equipment.

Temperature of corrosive agent, in addition to temperature effect on mechanical properties, will also influence the rate of corrosive attack.

Location of gasket can often influence its chemical resistance. For example, a gasket either in a partially filled line or one at or above the solution level may be more subject to attack than those below the surface.

Construction of gasket material decidedly affects its chemical resistance. It is generally poor economy to use an inferior material that can cause frequent gasket replacements. This ultimately results in extremely high maintenance costs. However, if it is necessary that a joint be opened frequently, a less expensive, less resistant material may be quite satisfactory. Where a joint is seldom opened, the most resistant material, regardless of cost, is usually the most economical in the long run.

Also, if a slight swelling of the gasket occurs due to reaction to fluid, the overall effect may be a more positive seal. Conversely, materials that shrink and dry out usually cause early gasket failure.

Other factors that may influence material selection are internal pressures, operating cycle and vibration. A highly resilient material and proper design is essential where sudden variations in operating conditions occur frequently.

Bolt relaxation, caused by thermal expansion and creep, is sometimes an important consideration. Expansion and contraction of line or gasket and excessive bending movements on the flange may also limit selection of gasket material and construction.

To summarize... if these considerations are all taken into account and properly evaluated and a suitable gasket material is selected from the resistance chart, the choice, in most cases, can be narrowed to a small number. Final choice, then, can usually be made on the basis of relative cost, availability or personal experience.

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RESISTANCE RATINGS	HOMOGENEOUS RUBBER						CLOTH INSERTED RUBBER (GASKETING)				ASBESTOS										VEGETABLE FIBER		
											WOVEN					COMPRESSED						
G=Good F=Fair D=Depends on conditions U=Unsuitable	Natural	Neoprene	Nitrile	SBR	Silicone	Viton	SBR with cotton insert	Silicone with fiberglass insert	Neoprene with cotton insert	SBR with brass wire insert	White with Silicone binder	White with Neoprene binder	White with Natural binder	Blue with TFE impregnation	Blue with Neoprene binder	White with Nitrile binder	White with Neoprene binder	White with SBR binder	Blue with SBR binder	Glue-glycerine binder	Nitrile binder	SBR and Nitrile binder
Acetic Acid: ..... Crude	F	D	D	F	D	U	F	D	U	U	D	F	F	G	G	D	G	G	G	U	U	U
Pure	F	D	U	F	U	U	F	F	U	U	D	F	F	G	F	D	F	F	G	U	U	U
Vapors	F	D	U	F	U	U	D	F	D	U	D	F	F	G	G	F	G	G	G	U	U	U
150 psi, 400° F.	U	U	U	U	U	U	U	U	U	U	D	U	U	G	U	U	D	D	D	U	U	U
Acetic Anhydride	D	D	U	D	D	U	D	D	D	D	D	U	U	G	U	G	G	G	G	U	U	U
Acetone	F	U	U	F	F	U	F	F	U	F	F	U	F	G	U	U	F	G	G	G	U	D
Acetylene	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
Air	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
Ammonia Gas ..... cold	G	G	G	G	G	G	G	G	G	U	G	G	G	G	G	G	G	G	G	F	G	G
hot	D	D	D	D	G	G	D	G	D	U	G	F	F	G	F	G	G	G	G	U	U	U
Ammonium hydroxide	D	D	D	D	G	G	D	G	D	U	G	G	D	G	G	G	G	G	G	U	G	G
Ammonium phosphate: ... Monobasic	G	G	G	G	G	D	G	G	G	U	G	G	G	G	G	G	G	G	G	U	F	F
Dibasic	G	G	G	G	G	D	G	G	G	U	G	G	G	G	G	G	G	G	G	U	F	F
Tribasic	G	G	G	G	G	D	G	G	G	U	G	G	G	G	G	G	G	G	G	U	F	F
Amyl Acetate	F	U	U	U	U	U	U	U	U	U	U	D	F	G	D	D	D	D	D	G	F	F
Amyl Alcohol	G	G	G	G	F	G	G	F	G	G	F	G	G	G	G	G	G	G	G	U	F	F
Aniline, aniline oil	U	U	U	U	U	U	U	U	D	U	U	D	U	G	D	D	F	D	U	G	F	F
Asphalt	U	F	F	U	U	F	U	U	F	U	U	F	U	G	F	G	G	U	U	F	G	G
Beer	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	U	G	G
Beet sugar liquors	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	U	G	G
Benzene, benzol	U	U	U	U	U	G	U	U	U	U	U	U	U	G	U	F	U	U	U	G	F	D
Benzene, petroleum ether naphtha ..	U	U	D	U	U	G	U	U	U	U	U	U	U	G	U	F	U	U	U	G	G	F
Black sulphate liquor	G	G	G	G	F	F	G	F	G	G	F	G	G	G	G	G	G	G	G	U	G	G
Blast Furnace Gas	D	D	D	D	D	G	D	G	D	D	D	D	D	G	D	G	G	G	G	D	F	D
Bromine	U	U	U	U	U	U	U	U	U	U	U	U	U	G	U	F	F	F	F	U	U	U
Butane	D	G	G	D	U	G	U	D	F	U	D	G	F	G	G	G	G	F	F	D	G	D
Butyl acetate	F	U	U	U	U	U	U	U	U	U	U	U	U	G	U	D	D	D	D	U	F	F
Butyl alcohol, butanol	G	G	G	G	F	G	G	F	G	G	F	G	G	G	G	G	G	G	G	U	F	F
Cane sugar liquors	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	U	G	G
Carbon dioxide ..... dry	D	D	D	D	D	D	D	G	D	D	G	D	G	G	D	G	G	G	G	U	F	F
wet	D	D	D	D	D	D	D	G	D	D	G	G	G	G	D	G	D	D	G	U	F	F
Carbon bisulphide	U	U	U	U	U	G	U	U	U	U	U	U	U	G	U	D	U	U	U	F	D	D
Carbon monoxide, hot	D	D	D	D	G	G	D	G	D	D	G	D	D	G	D	G	G	G	G	U	D	D
Carbon tetrachloride	U	U	U	U	U	G	U	U	U	U	U	U	U	G	U	G	U	U	U	F	F	D
Castor oil	U	G	G	U	D	G	U	D	G	U	D	G	G	G	G	G	G	G	G	G	G	G
Chinawood oil, tungoil	U	F	G	U	U	G	U	U	F	U	U	F	U	G	F	G	F	D	U	F	G	G
Chlorine ..... dry	U	U	U	U	U	G	U	U	U	U	U	U	U	G	U	F	F	F	F	U	U	U
wet	U	U	U	U	U	U	U	U	U	U	U	U	U	G	U	F	F	F	F	U	U	U
Chlorinated solvents	U	U	U	U	U	D	U	U	U	U	U	U	U	G	U	F	F	U	U	U	F	D
Chloroacetic acid	F	F	F	F	U	U	F	U	F	F	U	U	U	G	U	D	D	D	F	U	U	U
Chlorosulphonic acid	U	D	U	U	U	U	U	U	U	U	U	U	U	G	U	D	D	D	F	U	U	U
Chromic acid	U	U	U	U	U	D	U	U	U	U	U	U	U	G	U	D	D	D	F	U	U	U
Citric acid	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	U	F	F
Coke oven gas	D	D	D	D	D	G	D	G	D	D	D	D	D	G	D	G	G	G	G	D	F	D
Copper chloride	D	F	F	F	D	F	D	D	D	F	G	G	G	G	G	G	G	G	G	U	D	D
Copper sulfate	G	G	G	G	G	G	G	G	G	F	G	G	G	G	G	G	G	G	G	U	G	G
Corn oil	U	F	G	U	U	G	U	U	F	U	U	F	U	G	U	G	G	D	D	G	G	G
Cotton seed oil	U	F	G	U	U	G	U	U	F	U	U	F	U	G	F	G	G	D	D	F	G	D
Creosote ..... coal tar	U	D	D	U	U	G	U	U	U	U	U	F	U	G	F	G	D	U	U	D	D	D
wood	U	D	D	U	U	G	U	U	U	U	U	F	U	G	F	G	F	D	U	D	D	D
Cresols, cresylic acid	U	U	D	U	U	G	U	U	U	U	U	U	U	G	U	F	D	U	U	D	U	U
*Dowtherm A	U	U	U	U	U	D	U	U	U	U	U	F	U	G	F	F	F	U	U	U	U	U
*Dowtherm E	U	U	U	U	U	D	U	U	U	U	U	F	U	G	F	F	F	U	U	U	U	U

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RESISTANCE RATINGS	HOMOGENEOUS RUBBER						CLOTH INSERTED RUBBER (GASKETING)				ASBESTOS										VEGETABLE FIBER		
											WOVEN					COMPRESSED						
G=Good F=Fair D=Depends on conditions U=Unsuitable	Natural	Neoprene	Nitrile	SBR	Silicone	Viton	SBR with cotton insert	Silicone with fiberglass insert	Neoprene with cotton insert	SBR with brass wire insert	White with Silicone binder	White with Neoprene binder	White with Natural binder	Blue with TFE impregnation	Blue with Neoprene binder	White with Nitrile binder	White with Neoprene binder	White with SBR binder	Blue with SBR binder		Glue-glycerine binder	Nitrile binder	SBR and Nitrile binder
Ethers	D	U	D	U	U	U	U	U	U	U	U	U	U	G	F	F	D	D	U		D	F	D
Ethyl acetate	U	U	U	U	U	U	U	U	U	U	U	U	U	G	U	D	D	D	U		G	F	D
Ethyl chloride	U	U	U	U	U	D	U	U	U	U	U	U	U	G	U	F	F	U	U		G	F	D
Ethylene glycol	G	G	G	G	F	G	G	F	G	G	F	G	G	G	G	G	G	G	G		U	G	G
Formaldehyde	G	D	G	G	U	U	G	U	D	D	U	F	G	G	F	G	G	G	G		U	G	G
Formic acid	G	F	G	G	D	U	F	D	D	D	D	D	G	G	D	G	G	G	G		U	U	U
*Freon 12	U	G	D	D	U	G	D	U	G	U	U	G	U	G	G	G	G	U	U		F	D	U
Fuel Oil	U	F	G	U	U	G	U	U	F	U	U	F	U	G	F	G	G	D	U		G	G	F
Furfural	U	U	U	U	U	U	U	U	U	U	U	U	U	G	U	F	F	U	U		F	F	F
Gasoline ..... sour	U	F	G	U	U	G	U	U	F	U	U	F	U	G	F	G	G	U	U		G	G	G
refined	U	F	G	U	U	G	U	U	F	U	U	F	U	G	F	G	G	U	U		G	G	G
Gelatin	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G		U	G	G
Glucose	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G		U	G	G
Glue	G	G	G	G	F	G	G	F	G	G	F	G	G	G	G	G	G	G	G		U	G	G
Glycerin, glycerol	G	G	G	G	F	G	G	F	G	G	F	G	G	G	G	G	G	G	G		U	G	G
Green sulphate liquor	G	G	G	G	D	G	G	D	G	G	D	G	G	G	G	G	G	G	G		U	F	F
Hydrobromic acid	U	D	D	D	U	U	D	D	D	U	D	U	U	G	U	F	F	F	F		U	U	U
Hydrochloric acid ..... <150° F.	F	G	F	F	D	U	U	D	U	U	D	F	F	G	F	G	G	G	G		U	U	U
>150° F.	U	D	U	U	U	U	U	D	U	U	D	D	D	G	D	F	F	F	F		U	U	U
Hydrocyanic acid	F	F	F	F	F	F	F	F	F	D	G	F	F	G	F	G	G	G	F		U	U	U
Hydrofluoric acid ..... cold <65%	D	G	D	D	D	G	U	D	U	U	D	D	U	G	D	D	F	F	F		U	U	U
>65%	U	U	U	U	U	D	U	U	U	U	U	D	U	G	D	F	F	F	F		U	U	U
hot <65%	U	U	U	U	U	G	U	U	U	U	U	U	U	G	D	D	F	D	F		U	U	U
>65%	U	U	U	U	U	D	U	U	U	U	U	U	U	G	D	U	D	U	F		U	U	U
Hydrofluorsilicic acid	G	F	F	F	U	D	U	U	U	U	U	U	U	G	D	U	D	U	F		U	U	U
Hydrogen gas ..... cold	F	G	G	G	G	G	G	G	G	G	G	G	F	G	G	G	G	G	G		U	F	F
hot	F	G	G	G	G	G	D	D	D	D	D	G	F	G	G	G	G	G	G		U	U	U
Hydrogen sulphide ..... dry, cold	D	G	G	G	F	G	D	D	G	D	D	G	D	G	G	G	G	G	G		U	F	F
hot	D	D	D	D	D	G	D	D	D	D	D	D	D	G	D	G	G	G	G		U	D	D
wet, cold	D	F	F	F	F	G	D	D	D	D	D	D	D	G	D	G	G	G	G		U	F	F
hot	D	D	D	D	D	G	D	D	D	D	D	D	D	G	D	G	G	G	G		U	D	D
Kerosene	U	F	G	U	U	G	U	U	F	U	U	F	U	G	F	G	G	D	U		G	G	G
Lacquers	U	U	U	U	U	U	U	U	U	U	U	U	U	G	U	D	D	D	D		G	F	D
Lacquer solvents	U	U	U	U	U	U	U	U	U	U	U	U	U	G	U	D	D	D	D		G	F	D
Lactic acid ..... cold	D	G	G	G	G	G	G	G	G	G	G	G	D	G	G	G	G	G	G		U	G	G
hot	D	D	D	D	G	G	D	G	D	D	G	D	D	G	F	G	G	G	G		U	D	D
Linseed oil	U	F	G	U	U	G	U	U	F	U	U	F	U	G	F	G	F	D	D		G	F	F
Lubricating oils ..... sour	U	F	G	U	U	G	U	U	F	U	U	F	U	G	F	G	G	D	U		G	G	G
refined	U	F	G	U	U	G	U	U	F	U	U	F	U	G	F	G	G	D	U		G	G	G
Magnesium hydroxide	G	G	G	G	G	G	G	G	G	D	G	G	G	G	G	G	G	G	G		U	G	G
Methyl alcohol, methanol	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G		U	G	G
Methyl chloride	U	U	U	U	U	U	U	U	U	U	U	D	D	G	U	D	D	D	D		D	D	U
Milk	G	G	G	G	G	G	G	G	G	U	G	G	G	G	G	G	G	G	G		U	G	G
Mineral oils	U	F	G	U	D	G	U	D	F	U	D	F	U	G	F	G	F	F	F		G	G	G
Natural gas	D	G	G	D	U	G	F	D	G	F	D	G	F	G	G	G	G	F	F		F	G	G
Nitric acid ..... crude	U	U	U	U	U	U	U	U	U	U	U	U	U	G	U	U	U	U	U		U	U	U
diluted	U	U	U	U	D	U	U	D	U	U	D	U	U	G	U	D	D	D	D		U	U	U
concentrated	U	U	U	U	U	U	U	U	U	U	U	U	U	G	U	U	U	U	U		U	U	U
Nitrobenzene	U	U	D	U	U	U	U	U	U	U	U	U	U	G	U	D	F	U	U		U	D	D
Oleic acid	D	F	G	D	D	G	D	D	F	D	D	G	D	G	F	G	G	F	F		F	F	F
Oleum spirits	U	F	G	U	D	G	U	U	U	U	U	U	U	G	D	D	D	D	D		U	U	U
Oxalic acid	G	F	G	G	D	G	F	D	D	D	F	F	F	F	F	G	G	G	G		U	G	G

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RESISTANCE RATINGS	HOMOGENEOUS RUBBER						CLOTH INSERTED RUBBER (GASKETING)				ASBESTOS										VEGETABLE FIBER		
											WOVEN					COMPRESSED						
G=Good F=Fair D=Depends on conditions U=Unsuitable	Natural	Neoprene	Nitrile	SBR	Silicone	Viton	SBR with cotton insert	Silicone with fiberglass insert	Neoprene with cotton insert	SBR with brass wire insert	White with Silicone binder	White with Neoprene binder	White with Natural binder	Blue with TFE impregnation	Blue with Neoprene binder	White with Nitrile binder	White with Neoprene binder	White with SBR binder	Blue with SBR binder	Glue-glycerine binder	Nitrile binder	SBR and Nitrile binder
Oxygen ..... cold	D	D	D	D	F	F	U	F	U	U	F	U	U	G	U	U	U	U	U	U	U	U	U
<500° F.	U	U	U	U	D	D	U	D	U	U	D	U	U	G	U	U	U	U	U	U	U	U	U
Ozone	D	G	D	D	G	G	D	G	F	D	G	F	D	G	F	D	D	D	D	U	F	F
Palmitic Acid	D	F	G	D	D	G	D	D	F	D	D	G	D	G	F	G	G	F	F	F	F	F
Petroleum oils ..... crude, <500° F.	U	F	G	U	D	G	U	D	D	U	D	G	U	G	G	G	G	D	U	D	D	D
>500° F.	U	U	U	U	U	D	U	U	U	U	U	U	U	D	U	D	D	U	U	U	U	U
Phosphoric acid ..... crude	D	F	F	D	D	D	U	D	U	U	D	F	D	G	F	G	G	G	G	U	F	F
Pure, <45%	D	F	F	D	D	G	U	D	U	U	D	F	D	G	F	G	G	G	G	U	D	D
>45%, cold	D	F	F	D	D	D	U	D	U	U	D	F	D	G	F	G	G	G	G	U	D	D
hot	D	D	D	D	D	D	U	D	U	U	D	D	D	G	D	F	F	F	F	U	D	D
Potassium hydroxide	D	D	G	D	D	U	D	D	D	D	D	D	F	G	F	G	D	F	F	U	U	U
Producer gas	D	D	D	D	D	G	D	G	D	D	D	D	D	G	D	G	G	G	G	U	F	D
Propane	D	G	G	D	U	G	U	D	F	U	D	G	F	G	G	G	D	F	F	D	G	D
Sewage	D	F	G	D	D	G	D	D	F	D	D	F	D	G	F	G	G	D	D	U	D	D
Soap solutions	D	F	G	D	G	G	F	G	F	G	G	F	D	G	F	G	G	G	G	U	F	F
Sodium hydroxide	D	D	G	D	D	U	D	D	D	D	D	D	F	G	F	G	D	F	F	U	U	U
Sodium hypochlorite	F	F	F	F	G	D	D	G	D	D	G	F	F	G	F	G	G	G	G	U	F	F
Sodium silicate	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	U	G	G
Soybean oil	U	G	G	U	D	G	U	D	G	U	D	G	U	G	G	G	G	D	U	G	G	G
Stannic chloride	D	F	F	F	D	D	G	D	G	G	D	G	G	G	G	G	G	G	G	U	G	G
Steam ..... <500° F.	U	U	D	D	U	G	U	U	U	D	U	F	G	G	F	G	F	G	U	U	U	U
500-1000° F.	U	U	U	U	U	D	U	U	U	U	U	U	D	U	U	D	U	D	U	U	U	U
Stearic acid	D	F	G	D	D	G	D	D	F	D	D	G	D	G	F	G	G	F	F	F	F	F
Sulphur	D	F	F	F	G	D	D	G	F	F	G	F	D	G	F	G	G	G	F	U	F	F
Sulphur chloride	U	D	D	U	U	D	U	U	D	U	U	D	U	G	D	F	F	F	F	D	D	D
Sulphur dioxide, dry	F	F	F	F	F	G	D	G	D	D	G	F	D	G	F	G	G	D	D	U	D	D
Sulphur trioxide, dry	D	D	D	D	D	G	D	D	D	D	D	F	D	G	F	G	G	D	D	U	D	D
Sulphuric acid ..... <10% cold	G	G	G	G	G	G	U	G	U	U	G	G	F	G	G	G	G	G	G	U	U	U
hot	F	F	F	F	U	G	U	U	U	U	U	F	F	G	F	G	G	G	G	U	U	U
10-75%, cold	D	D	D	D	D	D	U	U	U	U	D	D	D	G	D	D	D	D	F	U	U	U
hot	U	U	U	U	U	D	U	U	U	U	U	D	D	G	D	D	D	D	D	U	U	U
75-95%, cold	D	D	D	D	U	D	U	U	U	U	U	U	U	G	D	U	U	U	D	U	U	U
hot	U	U	U	U	U	D	U	U	U	U	U	U	U	G	U	U	U	U	D	U	U	U
fuming	U	U	U	U	U	D	U	U	U	U	U	U	U	G	U	U	U	U	U	U	U	U
Sulphurous acid	F	F	F	F	D	D	U	D	U	U	D	G	G	G	G	G	G	G	G	U	U	U
Tannic acid	F	F	F	F	D	F	F	D	F	F	D	G	G	G	G	G	G	G	G	U	F	D
Tar	U	D	G	U	F	G	U	F	D	U	F	G	U	G	G	G	G	D	D	D	F	F
Tartaric acid	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	U	F	F
Toluene	U	U	F	U	U	G	U	U	U	U	U	U	U	G	U	G	F	D	D	G	F	D
Trichloroethylene	U	U	U	U	U	G	U	U	U	U	U	U	U	G	U	F	D	D	D	F	D	D
Turpentine	U	U	G	U	U	G	U	U	U	U	U	U	U	G	U	G	D	D	D	F	F	F
Vinegar	F	G	G	G	G	G	G	G	G	D	G	G	G	G	G	G	G	G	G	U	G	G
Water, acid mine, containing oxidizing salt	G	G	G	G	D	G	D	D	D	D	D	G	G	G	G	G	G	G	G	U	F	F
no oxidizing salt	G	G	G	G	F	G	D	F	D	D	F	G	G	G	G	G	G	G	G	U	F	F
Water ..... fresh (tap, boiler, etc.)	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	U	G	G
Distilled, lab. grade	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	U	G	G
return condensate	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	U	G	G
Water, seawater	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	U	G	G
Whiskey and wines	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	U	D	D
Zinc chloride	D	F	F	F	D	F	D	D	G	D	D	G	G	G	G	G	G	G	G	U	G	G
Zinc Sulphate	G	G	G	G	F	G	G	F	G	D	F	G	G	G	G	G	G	G	G			

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Designing your gasket correctly

Ideally, the designer should adapt flange construction to the existing gasket design. However, this is usually impossible as joint features are, in most cases, already fixed and cannot be changed as easily as the gasket.

But, regardless of whether you are designing flange to gasket or gasket to flange, the design principles are identical . . . only the approach is different. In order to achieve satisfactory gasket design and, consequently, prolonged trouble-free service from your gaskets, the following design information should be followed carefully.

Gasket yield stress—"y" factor

If a tight seal is to be effected, gasket material must be compressed sufficiently and flow into imperfections of the contact faces . . . filling all voids between mating flanges. If this flow doesn't take place a seal can't be effected without using gasket pastes or compounds.

"y" factor is the amount of force, expressed in p.s.i., that must be applied to the gasket contact area causing this essential flow. "y" factor is wholly independent of internal pressure. It is the minimum amount of stress needed if a gasket is to seal at all . . .even at very low pressures.

For example, soft rubber requires so little stress that it is considered self-yielding. Therefore, rubber of less than 75 durometer has a "y" value of 0 p.s.i. Most gasket materials and designs require relatively high initial stress if gasket is to seal properly. Once high initial stress is effected, however, gasket load may be sharply reduced without loss of efficiency. If such loss does occur, it is normally caused by bolt expansion, creep and relaxation.

Gasket factor—"m" factor

There are three forces that largely determine the "m" factor (see fig. 1). They are:

1. Bolt load—the force that squeezes the gasket into the face voids to form seal.

2. Hydrostatic end force—force that tends to separate flanges when internal pressure is applied.

3. Internal pressure—pressure that acts on the portion of the gasket exposed to the pressure side of the joint. Tends to blow gasket out of joint.

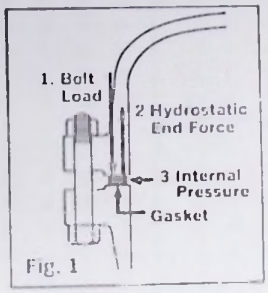


Fig. 1

"m" or gasket factor is the ratio of residual unit stress (bolt load minus hydrostatic end force) on gasket (p.s.i.) to internal pressure of the system. "m" factor usually remains constant throughout a wide range of pressure for a given gasket material and construction.

A gasket factor of 3.0, for example, would indicate that the residual stress of the gasket must be a minimum of three times the system's internal pressure if a proper seal is to be maintained.

Two basic steps

Step 1. First, designer must determine total force available: (a) to yield the gasket, and (b) to maintain a tight seal under service conditions. This force, usually supplied by bolts, will depend on the size and number of bolts in the flange and on the maximum allowable bolt stress. In turn, the maximum bolt stress will depend on the bolt material and operating temperature. Once this is obtained, total available bolt force can easily be determined by multiplying total bolt area by allowable stress.

Step 2. Next, an approximation of gasket dimensions should be ascertained. For some confined-joint facings, recess face dimensions limit gasket dimensions. On a full-face joint, a full-face gasket may be provided, reducing flange distortion. On other facings, considerable leeway is available. It is possible, then, to find "y" and "m" factors at the service pressure by determining the bolt force available and by having worked out a rough approximation of the gasket dimensions. By pairing these findings with a previous selection of materials, based on the recommendation chart and operating conditions, the proper gasket may be selected from a table of gasket factors and yield stresses (Tables 1 and 2).

Bolt load formulas

The initial bolt load required to seat a gasket sufficiently should be:

$Wm_2 = 3.14\ b\ GY.$

The required operating bolt load should be at least sufficient, under maximum operating conditions, to resist the hydrostatic end force and, in addition, to maintain a compression load on the gasket that experience has shown is sufficient, under maximum operating conditions, to resist the hydrostatic end force and, in addition, to maintain a compression load on the gasket that experience has shown is sufficient to assure a tight joint:

$Wm_1 = 0.785\ G^2P + (2b \times 3.14\ GMP)$

When determining number of bolts needed, use the greater of the two values Wm_1 or Wm_2.

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Nomenclature for the two formulas are:

Wm_1 = required bolt load for maximum operating conditions in lbs.

Wm_2 = required initial bolt load without internal pressure in lbs.

G = outside diameter of gasket contact face less 2b.

P = maximum allowable working pressure in p.s.i.

b = effective gasket seating width in inches (see Table 1)

Note: $b = b_0$ when b_0 is equal to or less than 1/4"

$b = \frac{\sqrt{b_0}}{2}$ when b_0 is greater than 1/4"

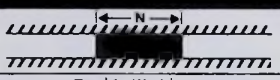
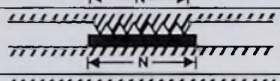
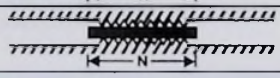
2b = effective gasket pressure width in inches

m = gasket factor (see Table 2)

y = gasket seating load in p.s.i. (see Table 2)

Note: This data applies only when the gasket is contained entirely within the inner edges of the bolt holes.

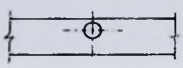
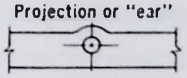
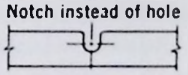
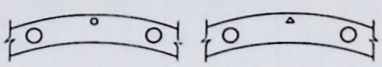
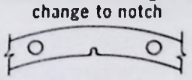
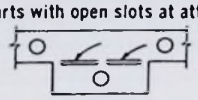
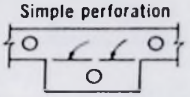
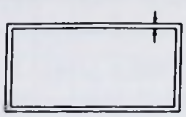
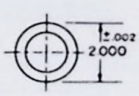
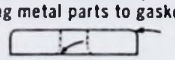
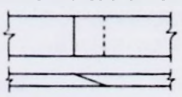
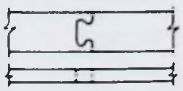
EFFECTIVE GASKET WIDTH—b (Table 1)

FACING LIMITS	GASKET SEATING WIDTH b
	$b = \frac{N}{2}$
	$b = \frac{W+T}{2}$, $(\frac{W+N}{4}$ maximum)
	$b = \frac{7N}{16}$
	$b = \frac{3N}{8}$

GASKET FACTORS (Table 2)

MATERIAL	"m"	"y"
Rubber		
Below 75 durometer	0.50	0
75 or higher durometer	1.00	200
Rubber with cotton fabric insert	1.25	400
Asbestos with a suitable binder for operating conditions:		
1/8" thickness	2.00	1600
1/16" thickness	2.75	3700
1/32" thickness	3.50	6500
Vegetable fiber	1.75	1100

COMMON FAULTS IN GASKET DESIGN AND SUGGESTED REMEDIES

DETAIL	WHY FAULTY	SUGGESTED REMEDY
Bolt holes close to edge 	Causes breakage in stripping and assembling	Projection or "ear"  Notch instead of hole 
Very small bolt holes or noncircular openings 	Require hand picking . . . easy to miss	Avoid hole sizes under 3/32-inch diameter. If small hole is for locating or indexing, change to notch 
Tear-away parts with open slots at attached edges 	Slots require hand picking, costly dies and die maintenance	Simple perforation 
Thin walls, delicate cross section in relation to over-all size 	High scrap loss; stretching or distortion in shipment or use. Restricts choice to high tensile strength materials	Have the gasket in mind during early design stages
Metalworking tolerances applied to gasket thickness, diameters, length, width, etc. 	Results in perfectly usable parts being rejected at incoming inspection. Requires time and correspondence to reach agreement on practical limits. Increases cost of parts and tooling. Delays deliveries	Most gasket materials are compressible. Many are affected by humidity changes. Try standard or commercial tolerances before concluding that special accuracy is required
Transference of fillets, radii, etc., from mating metal parts to gasket 	Unless part is molded, such features mean extra operations and higher cost	Most gasket stocks will conform to mating parts without preshaping. Be sure radii, chamfers, etc., are functional, not merely copied from metal members
Large gaskets made in sections with beveled joints 	Extra operations to skive. Extra operations to glue. Difficult to obtain smooth, even joints without steps or transverse grooves 	Die-cut dovetail joint 

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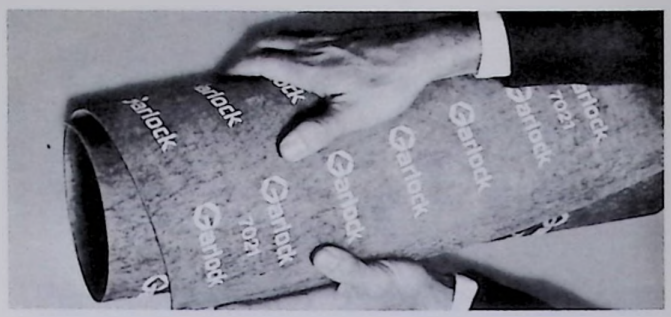
Anti-stick compressed asbestos sheet

Garlock's anti-stick releasing agent is blended into the surface of all compressed asbestos sheet, eliminating the need for graphited sheet.

Garlock Compressed Asbestos styles are made of either white or blue asbestos and several binders, including SBR, Neoprene or Nitrile. The asbestos and elastomeric binder are bonded under pressure and vulcanized into a homogeneous sheet.

All compressed sheet styles are ideal in applications employing rigid flanges with adequate bolting capacity. Garlock Compressed Asbestos sheet materials are excellent on such heavy-duty bolted and threaded joints as water and steam pipe fittings and manifold connections.

All styles are tough and durable with sufficient compressibility to provide a properly gasketed joint, but are resistant to plastic flow ordinarily encountered under heavy bolt loads.



Generally, white asbestos styles are suitable for service against hot oil, hot gases or steam. Blue asbestos sheet seals against hot or cold mineral acids, either alone or in conjunction with oils or organic solvents.

For more specific recommendations on all Garlock Compressed Asbestos styles see the Resistance Ratings Chart beginning on page 15. For technical information on each sheet, see the data on page 21.

Easy method for ordering compressed asbestos sheet packing

Now you can convert ordering data for Garlock compressed asbestos sheet packing into simple nine digit numbers . . . thus allowing further use of data processing equipment both for order entry and disbursements. To determine the correct nine-digit number, take the following steps:

1. First, make sure, by checking the following page, that the style number is available in the thickness you wish.

2. Use five digit number for the sheet *style* you wish to buy.

3. Follow this with the four digit number for the sheet *size* and *thickness* you wish.

4. In front of the resulting nine digit number, indicate the number of pounds or sheets you wish to buy.

Example:

2000# of Style 900 in 1/16" x 60 x 63 sheets would read . . . 2000# 31038-2521

50 sheets of 7705 in 1/8" x 60 x 126 sheets . . . 50 sheets 31064-2607

Style No.	Ordering No.	Style No.	Ordering No.
900	(31038-)	8748	(31114-)
7021	(31042-)	7819	(31595-)
7228	(31052-)	9057	(31571-)
7705	(31064-)	7006	(31417-)

SHEET SIZE AND THICKNESS NUMBER

Sheet Size	Sheet Thickness 1/64"	1/32"	1/16"	3/32"	1/8"	3/16"	1/4"
40 x 42"	2429	2471	2512	2554	2596	2680	2764
40 x 63"	2431	2473	2514	2556	2598	2682	2766
40 x 126"	2433	2475	2516	2558	2600	2684	2768
50 x 50"	1702	1704	1706	1708	1710	1714	1827
50 x 75"	1723	1727	1731	1735	1739	1747	1755
50 x 150"	1724	1728	1732	1736	1740	1748	1756
60 x 63"	2438	2480	2521	2563	2605	2689	2773
60 x 126"	2440	2482	2523	2565	2607	2691	2775
75 x 75"	1761	1765	1769	1773	1777	1785	1793
75 x 150"	1762	1766	1770	1774	1778	1786	1794
120 x 126"	2443	2485	2526	2568	2610	2694	2778
150 x 150"	1797	1799	1801	1803	1805	1809	1813

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Compressed Asbestos	900/ 7735	7021	7228	7705	8748	7006 & 7819	9057
Material	White chrysotile asbestos with SBR binder	White chrysotile asbestos with SBR binder	White chrysotile asbestos with neoprene binder —no sulphur	Blue crocidolite asbestos with acid resisting SBR binder	White chrysotile asbestos with nitrile binder	White chrysotile asbestos with SBR binder	White chrysotile asbestos with neoprene binder —no sulphur
* Tensile strength: Across grain	3000 p.s.i.	3600 p.s.i.	3000 p.s.i.	2000 p.s.i.	4000 p.s.i.	2600 p.s.i.	4600 p.s.i.
Compressibility, under 5000 p.s.i. load Recovery	7-17% 40% min.	7-17% 40% min.	7-17% 40% min.	15—25% 40% min.	7-17% 40% min.	7-17% 40% min.	7-17% 40% min.
Oil resistance after 5 hrs. in: ASTM #3 oil @ 300° F. Thickness increase Tensile loss	30% 50%	30% 50%	20% 35%		5% 7%	30% 45%	15% 25%
Fuel resistance, after 5 hrs. in: ASTM Ref. Fuel B @ R.T. Thickness increase Weight increase	25% 20%	20% 25%	15% 20%		7% 15%	25% 25%	15% 15%
Flexibility	Bends 180° around rod (diameter 8X thicker than sheet) without cracking	Bends 180° around rod (diameter 8X thicker than sheet) without cracking	Bends 180° around rod (diameter 12X thicker than sheet) without cracking	Bends 180° around rod (diameter 8X thicker than sheet) without cracking	Bends 180° around rod (diameter 12X thicker than sheet) without cracking	Bends 180° around rod (diameter 12X thicker than sheet) without cracking	Bends 180° around rod (diameter 12X thicker than sheet) without cracking
Density (per cubic inch)	.93 oz.	.90 oz.	.91 oz.	.83 oz.	.85 oz.	.97 oz.	1.0 oz.
Thicknesses available (inches)	1/64 1/32 1/16 3/32 1/8 3/16 1/4	1/64 1/32 1/16 3/32 1/8 3/16 1/4	1/64 1/32 1/16 3/32 1/8	1/32 1/16 3/32 1/8	1/64 1/32 1/16 3/32 1/8	1/64 1/32 1/16 3/32 1/8	1/64 1/32 1/16 3/32 1/8
Sheet sizes (inches)	The following sizes are available in all style numbers 40x42 40x63 40x126 50x50 50x75 50x150 60x63 60x126 75x150 120x126 150x150						
Tolerances on thicknesses (inches)	1/64 +.005 —.002 1/64 CT ±.0015 1/32 ±.005 1/16 ±.006 3/32 ±.008 1/8 ±.010 3/16 & 1/4 ±.015	1/64 +.005 —.002 1/64 CT ±.0015 1/32 ±.005 1/16 ±.006 3/32 ±.008 1/8 ±.010 3/16 & 1/4 ±.015	1/64 +.005 —.002 1/64 CT ±.0015 1/32 ±.005 1/16 ±.006 3/32 ±.008 1/8 ±.010	1/32 ±.005 3/64 ±.006 3/32 ±.008 1/8 ±.015	1/64 +.005 —.002 1/32 ±.005 1/16 ±.006 3/32 ±.008 1/8 ±.010	1/64 +.005 —.002 1/64 CT ±.0015 1/32 ±.005 1/16 ±.006 3/32 ±.008 1/8 ±.010	1/64 +.005 —.002 1/64 CT ±.0015 1/32 ±.005 1/16 ±.006 3/32 ±.008 1/8 ±.010
Meets specifications	ASTM-D-1170-62T Grade P-1161A. MIL-G-12803A Grade P-1161A MIL-A-7021C Class II	HH-P-46C ASTM-D-1170-62T Grade P-1161A MIL-G-12803A Grade P-1161A MIL-A-17472B UL Approval	MIL-A-7021C Cl. I ASTM-D-1170-62T P-1151-A AMS-3232H		ASTM-D-1170-62T Grade P-1141A MIL-G-12803A Grade 1141A AMS-3232H	ASTM-D-1170-62T Grade P-1161A	ASTM-D-1170-62T Grade P-1151A SAE J90A Grade P-1151A
How branded	Style numbers 900, 7021, 7228 and 7705 are branded with Garlock name and style number thru 60". Over 60" std. is unbranded unless otherwise specified.				Garlock name only thru 60". Over 60" std. is unbranded unless otherwise specified	Unbranded	Unbranded

* Typical Physical Values

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Garlock homogeneous rubber sheet SBR • NATURAL • NEOPRENE • NITRILE

Garlock offers a wide range of natural and synthetic rubbers, all having certain basic characteristics that allow the gasket designer infinite design possibilities.

Rubber is incompressible—It can easily be deformed, depending upon durometer and cross section, but can never be reduced in volume.

Rubber is extensible—This feature is extremely valuable when a gasket must be assembled over a projection or shoulder with the idea of having it "snap tight" within a groove. Rubber is one of the few materials capable of withstanding such treatment.

Rubber is highly impermeable—This feature applies when describing rubber's ability to serve as a tight barrier against the passage of gases or fluids.

Rubber is elastic—As a result, relatively little flange pressure is required to effect intimate contact with the face of the rubber gasket. Also, this elasticity allows a rubber gasket to move with flange surfaces without disrupting the seal.

Generally, rubber's unique properties are best utilized in applications where controlled deformation is desirable.

Other materials—such as viton and silicone are also available on request.

Easy order method for homogeneous rubber sheeting

Now you can convert ordering data for homogenous rubber sheet into nine-digit code numbers . . . thus allowing further use of data processing equipment for order entry and disbursements. It can be used for all standard widths.

1. First, check to make sure the style number is available in the thickness you wish.
2. Use five digit number for the sheet *style* you wish to buy.
3. Follow this with the four digit number for the sheet *thickness* you wish.
4. In front of the resulting nine digit number, indicate the number of standard rolls you wish to buy. (For 1/32", a standard roll is 100#, for 1/16" and up, a standard roll is 200 pounds.)

Example: 2000# of 1/8 Style No. 353 would read: 10 rolls 31016-0118. (2000# of 31016-0118 would also, of course, be acceptable.)

Style No.

22	(31003-)	7797	(31072-)	9122	(31560-)
91	(31006-)	7986	(31082-)	8495	(31100-)
353	(31016-)	8312	(31090-)	8459	(31098-)
6023	(31041-)	8639	(31108-)	8752	(31859-)

Thickness

1/32"	(-0095)	3/32"	(-0110)	3/16"	(-0133)
1/16"	(-0102)	1/8"	(-0118)	1/4"	(-0149)

Homogeneous Rubber Sheet	91	22	353
Material	SBR	SBR	SBR
Hardness (Shore A)	60 ± 5	80 ± 5	80 ± 5
Tensile strength (Min.)	2000 p.s.i.	1000 p.s.i.	1200 p.s.i.
Elongation (Min.)	400%	250%	150%
Compression set ASTM method B 25% deflection	22 hrs./158° F. 25% max.	22 hrs./158° F. 60% max.	22 hrs./158° F. 40% max.
Weight (lbs.-approx.)	1/16—3.3 # sq. yd.	1/16—4.7 # sq. yd.	1/16—4.4 # sq. yd.
Volume change after immersion in: ASTM #1 oil, 70 hrs/212°F. ASTM #3 oil, 70 hrs/212°F.			
Thicknesses available (inches)	1/32 1/16 3/32 1/8 3/16 1/4 and greater	1/32 1/16 3/32 1/8 3/16 1/4 and greater	1/32 1/16 3/32 1/8 3/16 1/4 and greater
Width available (inches)	Standard—36 Special—42	Standard—36 Special—42	Standard—36 Special—42
Size of rolls available (approx.)	1/32"—100 lbs. 1/16" and over, 200 lbs.	1/32"—100 lbs. 1/16" and over, 200 lbs.	1/32"—100 lbs. 1/16" and over, 200 lbs.
Finishes available	Standard—cloth Special—smooth	Thru 1/8", cloth finish Over 1/8", smooth finish	Thru 1/8", cloth finish Over 1/8", smooth finish
Tolerances on thicknesses (inches)	1/32 ±.012 1/16 & 3/32 ±.016 1/8 ±.020 3/16 & 1/4 ±.031	1/32 ±.012 1/16 & 3/32 ±.016 1/8 ±.020 3/16 & 1/4 ±.031	1/32 ±.012 1/16 & 3/32 ±.016 1/8 ±.020 3/16 & 1/4 ±.031
Meets specifications:	ASTM-D-735-SAE J 14 Grade R-615 B, F1, F2 ASTM-D-2000-SAE J 200 5AA620A13B 13B3?F17 L14	HH-G-156-C Class C ASTM-D-1330 Grades 1 & 2 ASTM-D-2000 SAE J 200 2AA810A13 F17 L14	ASTM-D-735-SAE J 14 Grade R-810 ASTM-D-2000-SAE J 200 2AA810A13 F17 L14
How branded	Garlock name and style no.		

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6023	8312	7986	8639	7797	9122	8495	8459	8752
Natural Rubber	Neoprene	Neoprene	Neoprene	Neoprene	Nitrile	Nitrile	Nitrile	CPE-Black
35 ± 5	50 ± 5	60 ± 5	70 ± 5	80 ± 5	60 ± 5	70 ± 5	80 ± 5	70 ± 5
3000 p.s.i.	1500 p.s.i.	2000 p.s.i.	1900 p.s.i.	1500 p.s.i.	2000 p.s.i.	2600 p.s.i.	2100 p.s.i.	1000 p.s.i.
600%	375%	350%	275%	125%	500%	450%	300%	225%
22 hrs./150° F. 25% max.	70 hrs./212° F. 35% max.	70 hrs./212° F. 35% max.	70 hrs./212° F. 65% max.	70 hrs./212° F. 75% max.	22 hrs./212°F 20% max.	22 hrs./212°F 40% max.	22 hrs./212°F 25% max.	22 hrs./302°F 45% max.
1/16—2.8# sq. yd.	1/16—3.8# sq. yd.	1/16—4.0# sq. yd.	1/16—4.2# sq. yd.	1/16—4.3# sq. yd.	1/16—3.45# sq. yd.	1/16—3.5# sq. yd.	1/16—3.8# sq. yd.	1/16—3.9# sq. yd.
	−7 to 0% +60 to +90%	−4 to +3% +50 to +80%	0 to +10% +40 to +70%	−7 to 0% +45 to +60%	−10 to +5% 0 to +25%	−10 to +5% 0 to +35%	−5 to +5% +16 to +35%	−4 to +3% −60 to −40%
1/16 3/32 1/8 3/16 1/4 and greater	1/16 3/32 1/8 3/16 1/4 and greater	1/16 3/32 1/8 3/16 1/4 and greater	1/32 1/16 3/32 1/8 3/16 1/4 and greater	1/32 1/16 3/32 1/8 3/16 1/4 and greater	1/16 1/8 3/16 1/4 and greater	1/16 1/8 3/16 1/4 and greater	1/16 1/8 3/16 1/4 and greater	1/16 3/32 1/8
Standard—36	Standard—36	Standard—36 Special—42	Standard—36 Special—42	Standard—36 Special—42	Standard—36 Special—44	Standard—36 Special—44	Standard—36 Special—44	Standard—36 Special—42
200 lbs.	200 lbs.	200 lbs.	1/32"—100 lbs. 1/16" & over, 200 lbs.	1/32"—100 lbs. 1/16" & over, 200 lbs.	200 lbs. over 1/4-15 ft. lengths	200 lbs. over 1/4-15 ft. lengths	200 lbs. over 1/4-15 ft. lengths	200 lbs.
Smooth	Smooth	Smooth	1/32" & 1/16" cloth over 1/16" smooth	1/32" & 1/16" cloth over 1/16" smooth	Smooth	Smooth	Smooth	cloth
1/16 & 3/32 ±.016 1/8 ±.020 3/16 & 1/4 ±.031	1/16 & 3/32 ±.016 1/8 ±.020 3/16 & 1/4 ±.031	1/16 & 3/32 ±.012 1/8 ±.020 3/16 & 1/4 ±.031	1/32 ±.012 1/16 & 3/32 ±.016 1/8 ±.020 3/16 & 1/4 ±.031	1/32 ±.012 1/16 & 3/32 ±.016 1/8 ±.020 3/16 & 1/4 ±.031	1/16 & 3/32 ±.016 1/8 ±.020 3/16 & 1/4 ±.031	1/16 & 3/32 ±.016 1/8 ±.020 3/16 & 1/4 ±.031	1/16 & 3/32 ±.016 1/8 ±.020 3/16 & 1/4 ±.031	1/16 & 3/32 ±.016 1/8 ±.020 3/16 & 1/4 ±.031
HH-G-156C Class A ASTM-D-2000-SAE J 200 4AA425A13 B33F17L14	ASTM-D-735-SAE J 14 Grade SC515 B, E1, E3, F1 ASTM-D-2000-SAE J 200 6BC515A14B14 C12E14E34G21	ASTM-D-735-SAE J 14 Grade SC612 B, E1, E3, F1 ASTM-D-2000-SAE J 200 6BC620A14 B14 E14	ASTM-D-735-SAE J 14 Grade SC720 E1, E3 ASTM-D-2000-SAE J 200 6BC715A14 B14E14E34G21	ASTM-D-735-SAE J 14 Grade SC815 E1, E3 ASTM-D-2000-SAE J 200 2BE815A14 E14E34	ASTM-D-2000 SAE J 200 5BG620A14 B14B34E14 E34	ASTM-D-735-SAE J 14 Grade SB 720A MIL-D-3377 Type I ASTM-D-2000-SAE J 200 3BG725B14 E14	ASTM-D-735-SAE J 14 Grade SB820 E1 MIL-D-3377 ASTM-D-2000-SAE J 200 6BG820A14 B14E14E34	ASTM-D-2000-SAE J 200 2CE710A16B15
Garlock name and style no.					1/16 x 1/8—Garlock name and style no. Others—Garlock name only	Garlock name only		Unbranded

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Cloth inserted rubber sheet for gasketing or diaphragm service

In the manufacture of rubber diaphragm sheet, Garlock utilizes the elasticity and extensibility features of rubber and the tough construction of a fabric insert. The result: a sturdy diaphragm sheet that has an extremely high burst strength and, yet, has the flexibility so vital in diaphragm service.

Each Garlock diaphragm style is specially compounded, using various combinations of rubbers and fabric inserts, to meet specific sets of service conditions.

For example, Garlock offers for normal service, where temperatures are low, SBR or neoprene rubbers with either cotton sheeting, hose duck or tire duck inserts. Nylon insert is combined with neoprene where higher pressure and temperature diaphragm service is encountered.

When selecting diaphragm sheet material, extreme care should be exercised. Such factors as pressures, fluids, required stroke, and life expectancy deserve careful consideration.



Detailed information provided in the chart below can give you valuable assistance in this selection process.

However, we suggest that before you make your final choice of diaphragm sheet, you contact your nearest Garlock sales representative. He will gladly help you in determining a diaphragm material's suitability for your particular needs.

Cloth-Inserted Rubber	19	619	7992	8798	9205
Material	SBR rubber with 5 oz. cotton sheeting in 1/32" thickness as fabric insert, 12 oz. cotton chafer in all others	SBR rubber with 22 oz. tire duck fabric insert	Neoprene with 22 oz. tire duck fabric insert	Neoprene with 13 oz. nylon fabric insert	Nitrile with 4.5 oz. nylon fabric insert
Hardness (Shore A)	80	50	50	50	50
Burst Test across 2" diameter opening		270 p.s.i.g. (1/8"—1 ply)	270 p.s.i.g. (1/8"—1 ply)	1000 p.s.i.g. (1/8"—1 ply)	350 p.s.i. (1/32" or 1/16"—1 ply)
Number of plies	1/32 1/16 3/32—1 ply 1/8—2 ply 3/16—3 ply 1/4—4 ply	1/16 3/32 & 1/8—1 ply 3/16—2 ply 1/4—3 ply	1/16 3/32 & 1/8—1 ply 3/16—2 ply 1/4—3 ply	1/16 3/32 & 1/8—1 ply 3/16—2 ply 1/4—3 ply	1/32 & 1/16—1 ply
Weight (lbs. per square yard)	1/32"— 2.1 1/16"— 4.1 3/32"— 5.8 1/8"— 7.6 3/16"—11.4 1/4"—15.2	1/16"— 3.4 3/32"— 5.1 1/8"— 6.8 3/16"—10.1 1/4"—13.5	1/16"— 3.6 3/32"— 5.6 1/8"— 7.5 3/16"—11.1 1/4"—14.8	1/16"— 3.7 3/32"— 5.8 1/8"— 7.6 3/16"—11.4 1/4"—14.9	1/32"—2.06 1/16"—4.13
Thicknesses available (inches)	1/32, 1/16, 3/32, 1/8, 3/16, 1/4	1/16, 3/32, 1/8, 3/16, 1/4	1/16, 3/32, 1/8, 3/16, 1/4	1/16, 3/32, 1/8, 3/16, 1/4	1/32, 1/16
Width available (inches)	44	44	44	56	44
Finish available	Smooth	Smooth	Smooth	Smooth	Smooth
Tolerances on thicknesses	1/32, 1/16, 3/32 ±.012 1/8 ±.016 3/16, 1/4 ±.031	1/16, 3/32 ±.012 1/8 ±.016 3/16, 1/4 ±.031	1/16, 3/32 ±.012 1/8 ±.016 3/16, 1/4 ±.031	1/16, 3/32 ±.012 1/8 ±.016 3/16, 1/4 ±.031	1/8 ±.016 1/32 ±.012
How branded	Garlock name and style no.				

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Easy ordering method for cloth-inserted rubber sheet

Now you can convert ordering data for cloth-inserted rubber sheet into nine-digit code numbers . . . thus allowing further use of data processing equipment for order entry and disbursements.

1. First, check the chart on page 24 to make sure the style number is available in the thickness you wish.

2. Use five digit number for the sheet *style* you wish to buy.

3. Follow this with the four digit number for the sheet *thickness* you wish.

4. In front of the resulting nine digit number, indicate the number or standard rolls you wish to buy. (For 1/32" a standard roll is 100#, for 1/16" and up, a standard roll is 200 pounds.)

Style No.	Ordering No.
19	(31002-)
619	(31026-)
7992	(31180-)
8798	(31119-)
9205	(31136-)

Thickness*	Ordering No.
1/32"	(-0247)
1/16"	(-0254)
3/32"	(-0261)
1/8"	(-0270)
3/16"	(-0285)
1/4"	(-0301)

*Different for Style 8798 - Please Inquire.

Woven asbestos gasketing cloth style 605

Garlock 605 is woven from white asbestos yarn which has been reinforced with brass wire. It is impregnated with a high temperature-resistant natural rubber cement. Garlock 605 was specially designed for use against steam, gases and aqueous solutions other than strong mineral acids.

Easy ordering method for woven asbestos gasketing cloth style 605.

Now you can order style 605 Gasketing Cloth by nine-digit code number . . . thus allowing further use of data processing equipment for order entry and disbursements.

1. The five digit code number for all 605 cloth is 31018.

2. Follow this number with the four digit number for the thickness desired.

3/64" (-0327)
1/16" (-0330)
1/8" (-0346)
3/16" (-0361)
1/4" (-0377)

3. In front of the resulting nine digit number, indicate the number of rolls or pounds desired. 3/64" thickness comes in 100# rolls and 1/16" and up comes in 200# rolls.

How to order style 604 gaskets.

See current price pages for sizes of manhole and handhole gaskets.

How to order style 612 folded tape.

This tape is available in a large variety of widths and thicknesses. See current price pages for ordering information.



Woven Asbestos Cloth, Tape and Gaskets	605
	Asbestos Cloth with brass wire insertion, impregnated with a high temperature resistant rubber cement
Thicknesses available (inches)	3/64 1/16 1/8 3/16 1/4
Width available (inches)	48
Size of rolls	3/64" 100 lbs. 1/16" and up 200 lbs.
Also available in folded gasket form under style 604 and folded tape under style 612	

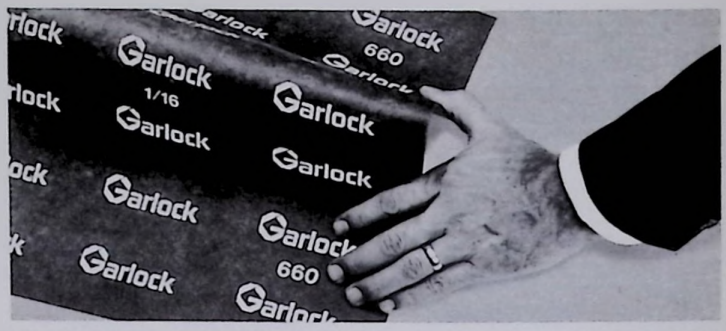
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Vegetable fiber sheet

Garlock furnishes high-quality Vegetable Fiber sheets compounded with a glue-glycerine binder.

Garlock 660 is made of a combination of vegetable fiber, cork and glue-glycerine. It is suitable against oils, solvents, aromatic and non-aromatic fuels up to 250° F. Garlock 660 is a highly compressible sheet . . . especially useful where lightweight sheet metal flanges are involved.

Garlock 681 is a vegetable fiber sheet with a glue-glycerine binder. It is suitable against the same media as 660.



Easy ordering method for vegetable fiber sheet

Now you can convert ordering data for vegetable fiber sheet into nine digit code numbers . . . thus allowing further use of data processing equipment for order entry and disbursements.

The code numbers can be used for both standard rolls and standard sheets.

Thicknesses

Standard rolls:	.006" thru .021"	100 lineal yards
	1/32" & 3/64"	50 lineal yards
	1/16" thru 1/8"	25 lineal yards
Standard sheets:	3/16" & 1/4"	36" x 36"

1. First check to make sure the style number you wish is available in the thickness you wish.

2. Use five digit number for the sheet *style* you wish to buy.

3. Follow this with the four digit number for the sheet *thickness* you wish.

4. In front of the resulting nine digit number indicate the number of standard rolls or sheets you wish to buy.

Example:

5 rolls of 1/16" Style 660 would read 5 rolls 31029-0102.

Style No.	Ordering No.
660	(31029-)
681	(31035-)

Style No.	Ordering No.
.006"	(-0077)
.010"	(-0084)
1/64"	(-0087)
.021"	(-0091)
1/32"	(-0095)
3/64"	(-0099)
1/16"	(-0102)
3/32"	(-0110)
1/8"	(-0118)
3/16"	(-0133)
1/4"	(-0149)

Vegetable Fiber Sheet	660	681
Material	Vegetable fiber and cork granules with glue-glycerine binder	Vegetabler fiber with glue-glycerine binder
Tensile strength (minimum)	1000 p.s.i.	2000 p.s.i.
Compressibility under 1000 p.s.i. load Recovery	40%—55% 40% (minimum)	25%—40% 40% (minimum)
Oil Resistance after 22 hours in: ASTM #3 oil at 70°-85° F. Thickness Increase Weight increase	5% (maximum) 30% (maximum)	5% (maximum) 15% (maximum)
Fuel Resistance after 22 hours in: Fuel B at 70°-85° F. Thickness increase Weight increase	5% (maximum) 30% (maximum)	5% (maximum) 15% (maximum)
Water Absorption after 22 hours in: Distilled water at 70°-85° F. Thickness Increase Weight increase	30% (maximum) 100% (maximum)	30% (maximum) 90% (maximum)
Thicknesses available (inches)	.010 1/64 .021 1/32 3/64 1/16 3/32 1/8 3/16 1/4	.006 .010 1/64 .021 1/32 3/64 1/16 3/32 1/8 3/16 1/4
Widths available (inches)	Standard 36" Special 48" in following thicknesses 1/32 1/16 3/32 1/8 3/16 1/4	Standard 36"
Tolerances on Thicknesses	.010 1/64 ±.0035" .021 1/32 3/64 ±.005" 1/16 ±.008" 3/32 & greater ±.016"	.010 1/64 ±.0035" .021 1/32 3/64 ±.005" 1/16 ±.008" 3/32 & greater ±.016"
Meets Specifications	ASTM-D-1170-62T Grade P-3415-A SAE J90 Grade P-3415-A	ASTM-D-1170-62T Grade P-3313-B SAE J90 Grade P-3313-B
How Branded	Garlock name and style number	

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Garlock CHEMISEAL® solid TFE pipe flange gaskets

Corrosion-resistant non-contaminating wide temperature range (—450° F. to +500° F.)

Garlock gaskets of solid 8764 TFE fluorocarbon resin are used throughout industry wherever resistance to chemical attack or product non-contamination are important considerations. Generally, solid TFE fluorocarbon gaskets: (1) are serviceable against any material except molten alkali metals and fluorine under pressure—eliminating change of gaskets to suit medium; (2) have outstanding non-adhesive properties eliminating gasket sticking where joints are opened frequently.

Solid TFE Chemiseal gaskets are available in either ring, full face, or special-shaped forms.

Style 8764 TFE gaskets for standard pipe flanges are now "skin-packed" for added cleanliness, protection from damage and for convenience in storage. 1/16" thick gaskets are put up ten per pack and 1/8" thick are offered five per pack.



Standard Sizes Garlock 8764 Pipe Flange Ring Gaskets—Class 150 Pound Flange

PIPE SIZE (inches)	OLD STANDARD I.D.	OLD STANDARD O.D.	USA STANDARD* I.D.	USA STANDARD* O.D.
1	1	2 5/8	1 5/16	2 5/8
1 1/4	1 1/4	3	1 21/32	3
1 1/2	1 1/2	3 3/8	1 29/32	3 3/8
2	2	4 1/8	2 3/8	4 1/8
2 1/2	2 1/2	4 7/8	2 7/8	4 7/8
3	3	5 3/8	3 1/2	5 3/8
3 1/2	3 1/2	6 3/4	4	6 3/4
4	4	6 7/8	4 1/2	6 7/8
5	5	7 3/4	5 9/16	7 3/4
6	6	8 3/4	6 5/8	8 3/4
8	8	11	8 5/8	11
10	10	13 3/8	10 3/4	13 3/8
12	12	16 1/8	12 3/4	16 1/8

*Non-Metallic Gaskets for Pipe Flanges USA B16.21—1951.

NOTE: USA standard size will be shipped unless "old standard" is specified on order.

Garlock 8764 TFE sheet

Garlock 8764 TFE Sheet, per United States Department of Commerce Standard CS-239-63 Grade B, is available for cutting gaskets in your plant to fill emergency needs for either standard or non-standard flanged joints. TFE Sheet is available in three standard sheet sizes: 24 in. x 24 in., 36 in. x 36 in. and 48 in. x 48 in. and twelve standard thicknesses shown in chart below. Standard sheet size tolerances are +.250 in. —.000 in.

THICKNESS (inches)	THICKNESS TOLERANCES (inches)	APPROX. WEIGHT (lb./sq. ft.)
1/32	+.015 —.005	0.40
*1/16	+.015 —.005	0.75
3/32	+.020 —.005	1.12
*1/8	+.016 —.008	1.45
3/16	+.022 —.011	2.17
1/4	+.030 —.015	2.89
3/8	+.038 —.019	4.32
1/2	+.046 —.022	5.73
5/8	+.054 —.027	7.16
3/4	+.070 —.035	8.60
7/8	+.078 —.039	10.00
†1	+.087 —.043	11.45

*48 in. x 48 in. sheets available in these thicknesses per United States Department of Commerce Standard CS-239-63 Grade C.
†Thicknesses greater than 1 in., per United States Department of Commerce Standard CS-239-63 Grade B, available in standard sheet sizes on special order.

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Garlock CHEMISEAL® jacketed gaskets

For chemical-resistant piping and equipment.

CHEMISEAL Jacketed Gaskets are now "skin-packed" to keep them clean, sanitary and perfectly flat for perfect sealing ability whenever you are ready to use them.

Garlock gaskets with 8764 TFE jackets (often called envelopes) are ideal for applications where corrosion, contamination or other undesirable effects must be combated . . . also where gasketing must be resilient and highly deformable. Good examples are glass-lined piping and such processing equipment as reactors, kettles, condensers, heat exchangers and columns.

In glass-lined steel piping, bolting pressures must not be too heavy. Thus, the gasket filler material must be carefully selected. From the several Garlock filler materials you can choose the one with exactly the right deformability to assure a tight lasting seal on any specific application.

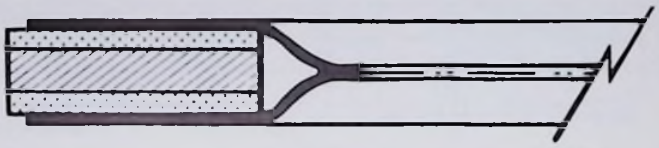
On processing equipment, where corrosion and contamination cannot be tolerated, the TFE jacket gives complete resistance to both conditions . . . reduces chemical permeability to the base minimum—virtually eliminating mechanical failure.



Basic jacket designs

Slit envelope jackets

Slit envelope jackets are basically ring gaskets .040 in. thick, split from outside diameter to about 1/16 in. from inside diameter. Bearing surface is determined by filler dimensions as jacket requires clearance between filler I.D. and jacket I.D. Gasket outside diameter nests within bolt circle. Inside diameter is approximate nominal I.D. of pipe. Available for standard USA flanges in pipe sizes from 1 in. through 12 in. Maximum O.D. 24 in.



Milled envelope jackets

Milled envelope jackets are made from TFE cylinder stock. Jacket is machined from its O.D. to within 1/32 in. of I.D., leaving shields of approximately .020 in. top and bottom. Flat I.D. of jacket fits flush with pipe I.D. Gasket O.D. nests within bolt circle. Standard sizes from 1 in. through 12 in. Maximum O.D. 24 in.

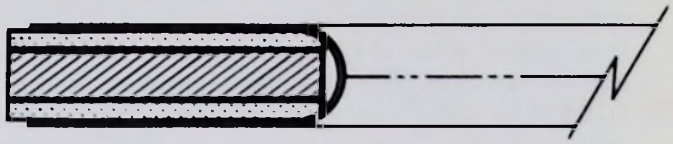


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Formed shield jackets

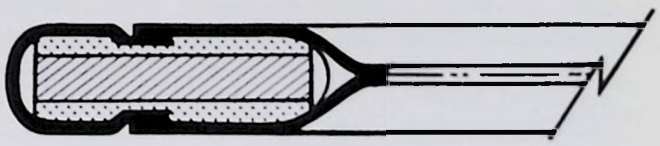
with exclusive butt welded construction

Formed shield jackets are necessary for diameters over 12 in. and such irregular openings as tank heads and man-holes. Over-all thicknesses range from 3/16 in. to 3/8 in. Patented Garlock Butt Welded Construction eliminates any "lump" at the seam and allows: (1) uniform bolting around entire flange surface for tight, leakproof seal; (2) much less bolt loading for a good seal, as compared with lap joint construction.



Double jacket design

Double jacket design. Two jackets are overlapped to protect O.D. as well as I.D. They can be either slit envelope, milled envelope or formed shield types. Especially recommended for vacuum service where outside atmosphere is corrosive enough to attack filler material. Minimum standard I.D. is 12 in. Under special conditions smaller sizes can be made.

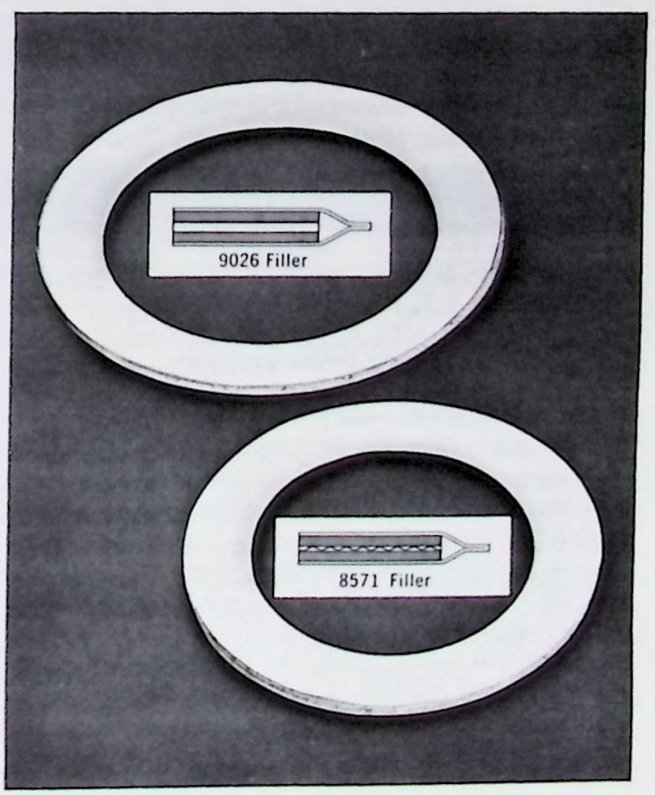


For glass lined steel flanged piping and equipment

Garlock 9026 filler. Made of compressed asbestos between two layers of felted blue asbestos. *Service:* For pressures under 300 psi on larger diameter openings.

Garlock 8571 filler. Made of corrugated steel between two layers of felted blue asbestos. *Service:* For high pressures (300 psi and over). Its use in nominal sizes up to 12 in. for low or high pressure service is recommended due to its ability to seal at lower bolt loads than 9026 Filler.

Interchangeable for any glass-lined flanged openings, these fillers are recommended because their resiliency and deformability make possible minimum bolt loading. This, in turn, accommodates the fragile characteristics of the glass lining. Other than glass-lined steel, these fillers should be used *only* where excessive flange surface irregularity is present. For vacuum service, double jacketed gaskets are recommended, with either of the above fillers completely shielded.



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Garlock GYLON® gaskets

Designed specifically for chemical service.

GYLON gasket materials are made by an unique Garlock process that permits the restructuring of fluorocarbon particles to meet specific requirements of gasket applications. The recoverability, compressibility, stress relaxation and cold flow characteristics of GYLON gaskets exceed those of all known gasket materials with similar chemical resistance. GYLON gaskets are recommended for all liquids except molten alkali metals and certain active fluorine compounds. Additionally, a special style GYLON gasket material has been developed specifically for hydrofluoric acid service.

Benefits of GYLON Gaskets.

Garlock's improved fluorocarbon materials offer all the chemical resistance features of TFE with almost none of the problems. For example, GYLON gaskets have excellent pressure resistance with virtually no creep or cold flow. The compression set characteristics are unusually low and the recovery characteristics are excellent. Since GYLON gasket material is stable over a wide temperature range, there are no leakage problems during extremely hot or cold process cycles. All the benefits of GYLON gaskets combine to offer an improved fluorocarbon material that will provide better service and seal longer than any other known gasket material of comparable chemical resistance.

GYLON Gasket Specifications.

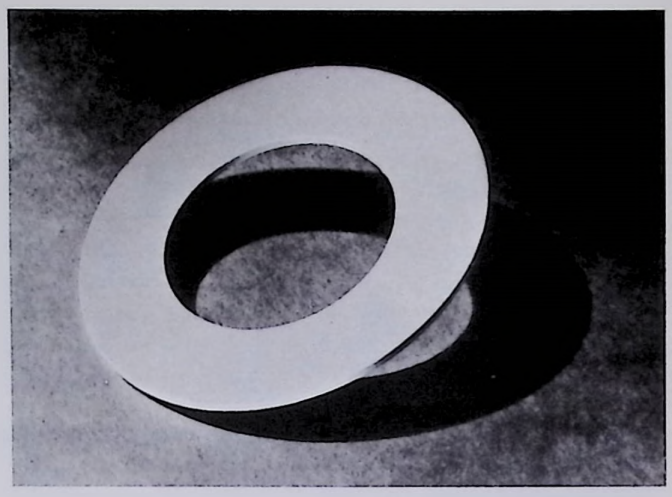
- Chemical resistance of TFE
- Special material for hydrofluoric acid service
- Pressure to 500 psi
- Temperature from cryogenic to 500° F
- General Chemical Gasketing (color-coded Fawn) meets FDA specifications.

Thickness	Min. Design Seating Stress (y) PSI	Gasket Factor (m)
1/32	3200	2.00
1/16	2800	1.75
1/8	2300	1.50

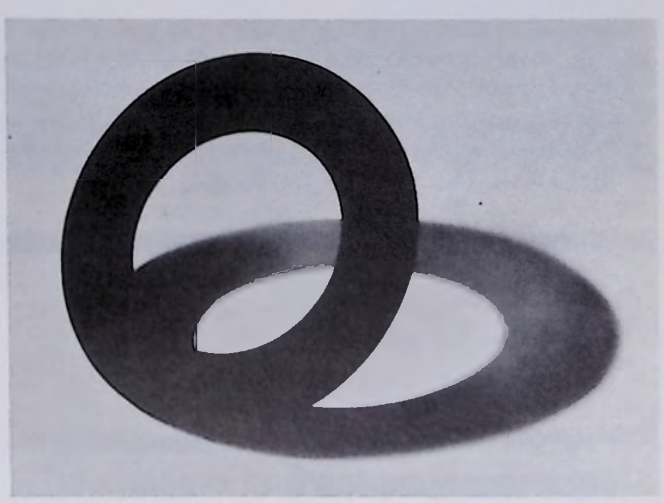
(Tests Based On Water)

Uses of GYLON Gasket Material.

GYLON gaskets should be considered for chemical applications where stress relaxation is a problem. The low compression set characteristics and excellent recovery features of GYLON gaskets make them ideal for valves, pumps, tank cars, pipe flanges, filters, strainers, mixing equipment and all processing equipment requiring chemical resistant gaskets. GYLON gaskets have solved many problems in the chemical, petrochemical and refining, and pulp and paper industries where acids, sulfanol, organic phosphates, soda ash, filtrates, etc. have been troublesome. Consult your Garlock representative for a recommendation to help you solve your tough gasketing problems.



Style 35404 (color-coded Fawn) for chemical service



Style 35402 (color-coded Black) for hydrofluoric acid service

Ordering information.

To help you order the correct GYLON gaskets for your particular requirement, refer to the following chart.

Style	Color-Code	Service	Type
35104	Fawn	General Chemical	Sheet
35102	Black	Hydrofluoric Acid	Sheet
35404	Fawn	General Chemical	Standard Flange Gaskets
35402	Black	Hydrofluoric Acid	Standard Flange Gaskets
35904	Fawn	General Chemical	Special Gaskets
35902	Black	Hydrofluoric Acid	Special Gaskets

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Garlock style 555 Type CR GUARDIAN® gaskets

Semi-metallic gaskets combining all the advantages of spiral-wound design and an integral gauge ring for sealing high pressures, high temperatures, in raised face, plain face and lapped joints.

Garlock Type CR Guardian Spiral-Wound Gaskets are manufactured under the most rigid engineering specifications and quality control standards in the industry. Gaskets are packaged at the factory in heavy duty corrugated boxes for protection and easy identification. Factory packaging of spiral-wound gaskets keeps gaskets looking new and free from contamination, eliminates separation of gasket and ring components, facilitates storing until used and assures selection of the right gasket for the right joint to make a safe seal.

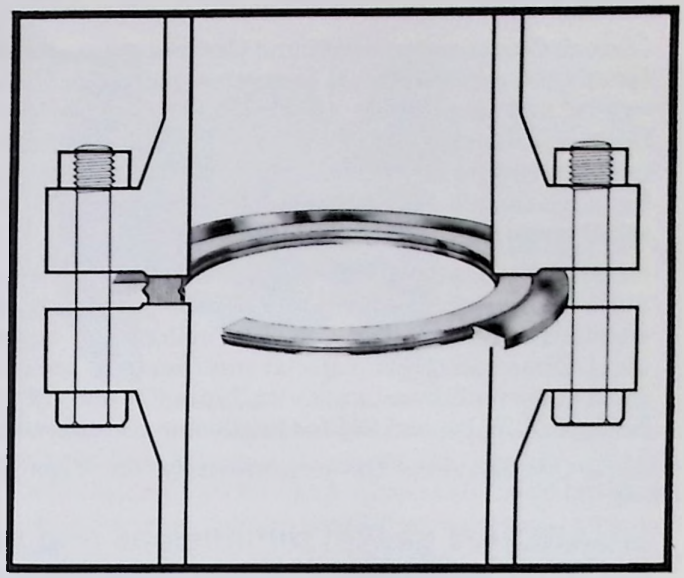
Garlock Type CR Guardian Spiral-Wound Gaskets are made of alternating plies of preformed, "V" shaped, spring-like metals and asbestos or other fillers. Gasket density, i.e. the relationship of the engineered "V" design of the preformed metal to the selected filler, is varied according to the bolting of the joint asembly to maintain gasket resiliency and to control gasket compressibility. Type 304 stainless steel and white asbestos are the standard materials used in the sealing component. The gauge ring, stamped with identifying information, is cold rolled steel, plated to resist atmospheric corrosion. The ring O.D. equals the bolt circle less the diameter of one bolt, making it easy to center the gasket assembly in the joint.

The sealing component is .175 in. nominal thickness and the gauge ring is 1/8 in. nominal thickness. The unusual resiliency and rebound characteristics of the gasket permit it to adjust to varying conditions of loading, internal pressure and temperature changes. Optimum compression, without overstressing the bolts, is achieved when flange faces are brought down to the gauge ring, compressing the gasket to a .125 in.-.135 in. thickness.

Garlock Type CR Guardian Spiral-Wound Gaskets are available for immediate delivery, in standard materials, from Garlock warehouses for USA standard flanged fittings (USA B16.5) to and including 2500 lb. series. Standard dimensions are in accordance with A.P.I. Standard 601 Specification. Type CR gaskets are also available in accordance with current Military Specifications.

Other Metals and Fillers

Garlock Type CR Guardian Spiral-Wound Gaskets for all pipe sizes and pressure series are available in combinations of metals and fillers other than Type 304 stainless steel and white asbestos. Other available metals and alloys are: plated low carbon steel, Monel*, nickel, Inconel*, Hastelloy B†, phosphor bronze and stainless steel Types 309S, 316L and 347. Compressed asbestos sheet with various types of binders as fillers are also available. Blue African asbestos, TFE and TFE-suspensoid-treated asbestos are recommended as fillers for chemical and process applications requiring a high degree of resistance to corrosion.



How to Order

To order standard gaskets, give part number from chart on next page, nominal pipe size, pressure series and material specifications.

Cast Iron Flanges

To order for cast iron plain flanges USA Standard Class 125, give part number listed in 150 psi column and for USA Standard Class 250, give part number listed in 300 psi column.

Note: Bolting-up procedures prescribed by maintenance engineering should be followed in all cases to avoid damage to cast iron flanges.

Specials

Garlock Type CR Guardian Spiral-Wound Gaskets can be designed and manufactured for special applications using other than standard fittings. When ordering, give complete details of joint design. Use the Guardian Spiral-Wound Gasket Inquiry Data Sheet for this purpose. Copies of the form are available from your Garlock sales representative.

*International Nickel Co. trademarks. †Union Carbide Co. trademark.

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Other Types

Garlock GUARDIAN Spiral-Wound Gaskets are available for all USA recessed joints in nominal pipe sizes 1/4 in. —24 in. and all pressure series to 2500 psi. Ask your Garlock sales representative for information describing Type RM for large male and female joints, Type RL for large tongue and groove joints, and Type RS for small tongue and groove joints.

Garlock GUARDIAN Spiral-Wound Gaskets for man-holes and handholes are available for practically all standard makes of high pressure boilers and equipment. Dimensions and material specifications are outlined in current literature under Types BM and BR for boiler man-holes and BH for handholes and tubecaps.

Type CRI GUARDIAN Gaskets, basically, are Type CR Gaskets with the addition of a stainless steel or carbon steel inner ring. Outer ring and sealing element materials, rings, and element thicknesses, and optimum compression are identical.

The addition of inner ring serves three functions: First, it fills flange recess to keep pipe line fluids away from gasket . . . prevents gasket movement under extremely high bolt loads . . . and minimizes turbulence. This triple action protects gasket from contamination by corrosive fluids. Second, inner ring supplements outer ring as a compression gauge. Third, the inner ring adds the benefits of a grooved flange. Does it without the expense of grooving a flange to obtain the safety of a wholly-contained gasket.

Ask for our separate catalog AD-176-3 for complete specifications.

GUARDIAN gasket dimensions and part numbers

Nominal Pipe Size (Inches)	O.D. (Inches)	150 PSI I.D. (Inches)	150 PSI Nominal Ring O.D. (Inches)	150 PSI Part No.	300 PSI I.D. (Inches)	300 PSI Nominal Ring O.D. (Inches)	300 PSI Part No.	400 PSI I.D. (Inches)	400 PSI Nominal Ring O.D. (Inches)	400 PSI Part No.	600 PSI I.D. (Inches)	600 PSI Nominal Ring O.D. (Inches)	600 PSI Part No.
*1/4	7/8	1/2	1 3/4	CR01002	1/2	1 3/4	CR03002	1/2	1 3/4	CR04002	1/2	1 3/4	CR06002
*1/2	1 1/4	3/4	1 7/8	CR01005	3/4	2 1/8	CR03005	3/4	2 1/8	CR04005	3/4	2 1/8	CR06005
*3/4	1 5/16	1	2 1/4	CR01007	1	2 5/8	CR03007	1	2 5/8	CR04007	1	2 3/4	CR06007
1	1 7/8	1 1/4	2 5/8	CR01010	1 1/4	2 7/8	CR03010	1 1/4	2 7/8	CR04010	1 1/4	2 7/8	CR06010
1 1/4	2 1/8	1 13/32	3	CR01012	1 13/32	3 1/4	CR03012	1 13/32	3 1/4	CR04012	1 13/32	3 1/4	CR06012
1 1/2	2 1/4	1 31/32	3 1/8	CR01015	1 31/32	3 3/4	CR03015	1 31/32	3 3/4	CR04015	1 31/32	3 3/4	CR06015
2	3 1/8	2 1/4	4 1/8	CR01020	2 1/4	4 3/8	CR03020	2 1/4	4 3/8	CR04020	2 1/4	4 3/8	CR06020
2 1/2	3 1/8	3 1/8	4 7/8	CR01025	3 1/8	5 1/8	CR03025	3 1/8	5 1/8	CR04025	3 1/8	5 1/8	CR06025
3	4 3/4	4	5 3/8	CR01030	4	5 7/8	CR03030	4	5 7/8	CR04030	4	5 7/8	CR06030
*3 1/2	5 1/4	4 1/2	6 3/8	CR01035	4 1/2	6 1/2	CR03035	4 1/2	6 3/8	CR04035	4 1/2	6 3/8	CR06035
4	5 7/8	5	6 7/8	CR01040	5	7 1/4	CR03040	4 3/4	7	CR04040	4 3/4	7 1/8	CR06040
*4 1/2	6 1/2	5 5/16	7	CR01045	5 5/16	7 3/4	CR03045	—	—	—	—	—	—
5	7	5 13/16	7 3/4	CR01050	5 13/16	8 1/2	CR03050	5 13/16	8 3/8	CR04050	5 13/16	9 1/2	CR06050
6	8 1/4	7 5/16	8 3/4	CR01060	7 5/16	9 1/8	CR03060	6 7/8	9 3/4	CR04060	6 7/8	10 1/2	CR06060
8	10 3/8	9 5/16	11	CR01080	9 5/16	12 1/8	CR03080	8 3/8	12	CR04080	8 3/8	12 3/4	CR06080
10	12 1/2	11 5/16	13 3/4	CR01100	11 5/16	14 1/4	CR03100	10 13/16	14 1/8	CR04100	10 13/16	15 3/4	CR06100
12	14 3/4	13 3/8	16 1/8	CR01120	13 3/8	16 5/8	CR03120	12 7/8	16 1/2	CR04120	12 7/8	18	CR06120
14	16	14 1/8	17 3/4	CR01140	14 1/8	19 1/8	CR03140	14 1/4	19	CR04140	14 1/8	19 3/8	CR06140
16	18 1/4	16 3/8	20 1/4	CR01160	16 3/8	21 1/4	CR03160	16 1/4	21 1/8	CR04160	16 1/4	22 1/4	CR06160
18	20 3/4	18 1/16	21 3/8	CR01180	18 1/16	23 1/2	CR03180	18 1/8	23 3/8	CR04180	18 1/2	24 1/8	CR06180
20	22 3/4	20 1/16	23 3/4	CR01200	20 1/16	25 3/4	CR03200	20 1/2	25 1/2	CR04200	20 1/2	26 3/8	CR06200
24	27	24 1/4	28 1/4	CR01240	24 1/4	30 1/2	CR03240	24 1/4	30 1/4	CR04240	24 3/4	31 1/8	CR06240

*Not covered in API Standard 601 Specifications. Gasket dimensions are for USA B16.5 flanges.

Nominal Pipe Size (Inches)	(Inches) O.D.	900 PSI I.D. (Inches)	900 PSI Nominal Ring O.D. (Inches)	900 PSI Part No.	1500 PSI I.D. (Inches)	1500 PSI Nominal Ring O.D. (Inches)	1500 PSI Part No.	2500 PSI I.D. (Inches)	2500 PSI Nominal Ring O.D. (Inches)	2500 PSI Part No.
*1/2	1 1/4	3/4	2 1/2	CR09005	3/4	2 1/2	CR15005	3/4	2 3/4	CR25005
*3/4	1 5/16	1	2 3/4	CR09007	1	2 3/4	CR15007	1	3	CR25007
1	1 7/8	1 1/4	3 1/8	CR09010	1 1/4	3 1/8	CR15010	1 1/4	3 3/8	CR25010
1 1/4	2 1/8	1 5/16	3 1/2	CR09012	1 5/16	3 1/2	CR15012	1 5/16	4 1/8	CR25012
1 1/2	2 1/4	1 7/8	3 7/8	CR09015	1 7/8	3 7/8	CR15015	1 7/8	4 1/8	CR25015
2	3 1/8	2 5/16	5 1/8	CR09020	2 5/16	5 1/8	CR15020	2 5/16	5 3/4	CR25020
2 1/2	3 1/8	2 3/4	6 1/2	CR09025	2 3/4	6 1/2	CR15025	2 3/4	6 3/8	CR25025
3	4 1/4	3 1/4	6 1/8	CR09030	3 1/8	6 7/8	CR15030	3 1/8	7 3/4	CR25030
4	5 7/8	4 1/4	8 1/8	CR09040	4 1/8	8 1/4	CR15040	4 1/8	9 1/8	CR25040
*5	7	5 13/16	9 1/4	CR09050	5 13/16	10	CR15050	5 1/8	11	CR25050
6	8 1/4	6 7/8	11 1/8	CR09060	6 3/4	11 1/8	CR15060	6 3/4	12 1/2	CR25060
8	10 3/8	8 7/8	14 1/8	CR09080	8 1/2	13 7/8	CR15080	8 1/2	15 1/4	CR25080
10	12 1/2	10 13/16	17 1/8	CR09100	10 5/8	17 1/8	CR15100	10 1/4	18 3/4	CR25100
12	14 3/4	12 7/8	19 3/8	CR09120	12 3/4	20 1/2	CR15120	12 3/4	21 1/8	CR25120
14	16	14 1/4	20 1/2	CR09140	14 1/4	22 3/4	CR15140	—	—	—
16	18 1/4	16 1/4	22 3/4	CR09160	16 1/4	25 1/4	CR15160	—	—	—
18	20 3/4	18 1/4	25 1/8	CR09180	18 1/4	27 3/4	CR15180	—	—	—
20	22 3/4	20 1/4	27 1/2	CR09200	20 1/4	29 3/4	CR15200	—	—	—
24	27	24 1/4	33	CR09240	24 1/4	35 1/2	CR15240	—	—	—

*Not covered in API Standard 601 Specifications. Gasket dimensions are for USA B16.5 flanges.

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Garlock engineered elastomeric expansion joints

For industrial piping systems, power stations, ships, pollution control & chemical plants.

Advantages of Garlock expansion joints

Garlock expansion joints are available in three basic designs to meet specific operating conditions:

1. Rubber-and-fabric expansion joints
2. GUARDIAN® "200" FEP*-lined rubber-and-fabric expansion joints
3. All-TFE† expansion joints and flexible couplings

The natural and synthetic materials selected for their quality and physical characteristics offer many advantages over metallic expansion joints:

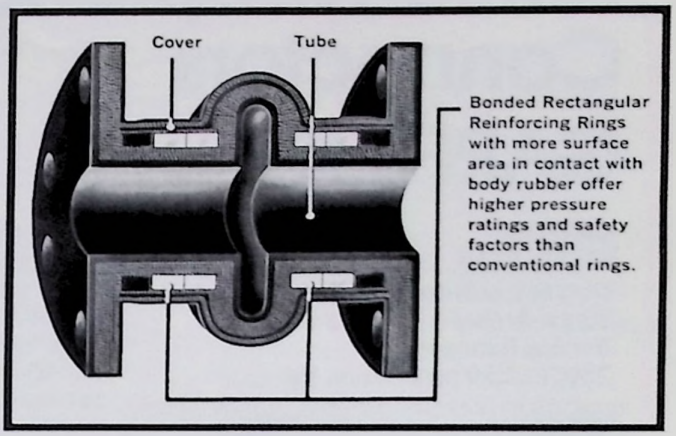
1. Less force to flex
2. Greater resistance to shock
3. Simultaneous axial and lateral deflection
4. No fatigue failure with age
5. Less space required
6. Lighter weight
7. Easier installation
8. No maintenance necessary
9. Lower initial cost
10. No stress corrosion

Construction features of rubber joints

One-Piece Construction—A leakproof lining extends through the bore and forms the outside surface of the flanges. Natural or synthetic rubber compounds are available to meet requirements of nearly all applications to assure trouble-free performance.

Longer Service—Longer life at higher pressure results from an exclusive design feature: "double-protection" construction. Bonded rectangular metal rings and the extra plies integrated with the arch reduce expansion joint failure.

*FEP—Fluorinated Ethelene Propylene Copolymer †TFE—Tetrafluoroethylene



No Gaskets—Elastomeric joints are supplied with full-face flanges of vulcanized rubber and fabric integrated with the tube, making gaskets unnecessary. The large sealing surface of the joint equalizes uneven surfaces of the pipe flange to provide a tight seal.

Resist Exposure—Cover paint of HYPALON** is specially compounded to provide optimum resistance against aging and exposure to weather or oil. It also improves the fire resistance of the joint.

Capabilities of rubber joints

Temperatures to 400° F.

Pressures to 200 PSI or vacuum to 30" Hg.

Elongation to 1/2", compression to 1 1/8" (even more for multiple arch joints).

Standard pipe sizes 3/4" through 78" (larger sizes on inquiry).

Styles and types for all applications: Concentric spool types and tapered spool types will solve most pipe movement problems. Write for our complete catalog of standard, rectangular, U-type, Navy, and special expansion joints.

Ask for our separate brochure AD-248-9R for complete specifications and standard sizes.

**Registered trademark of du Pont Co. for Chlorosulfonated Polyethylene

Garlock expansion joints compensate for these types of movement

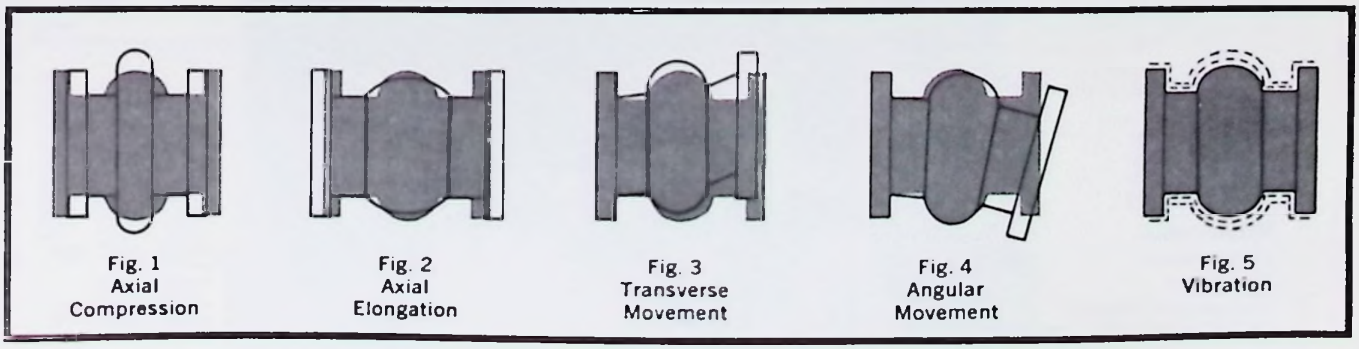


Fig. 1 Axial Compression

Fig. 2 Axial Elongation

Fig. 3 Transverse Movement

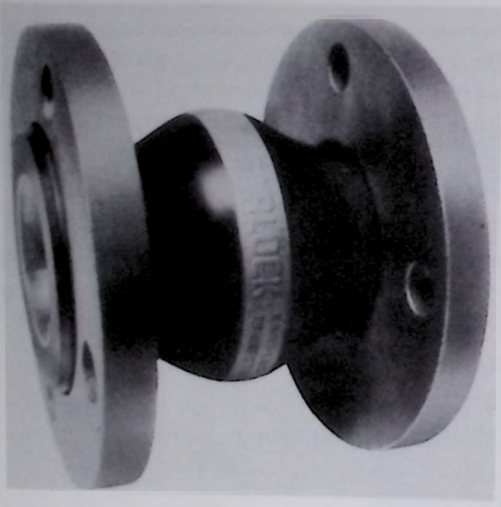
Fig. 4 Angular Movement

Fig. 5 Vibration

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Garlock molded Nitrile-Neoprene·Nylon Connectors GARFLEX®

GARFLEX®
STYLE 8100
Concentric Spool-Type Connectors, Single Arch.
Service Range to:
250°F., 250 psig, 10 in. Hg



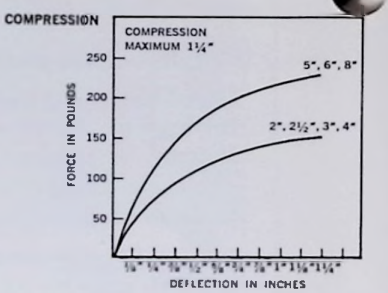
Stronger and Safer
The unique, new fully molded nitrile and neoprene bellows can absorb up to three times more movement than competitive products . . . which makes them safer. They will compress 1¼", elongate ¾", absorb transverse deflection of ± ¾" and angular deflection from 10° to 35°. All GARFLEX connectors can operate at 250 psig and 212°F., or 175 psig and 250°F.—continuously. The connector's nitrile liner withstands hot and cold water and mineral oils with up to 50% aromatic content, and the neoprene cover resists oil, flame, and ozone. The streamlined arch of GARFLEX connectors reduces turbulence and allows smooth, quiet flow—perfect for heating, piping, and air-conditioning systems.

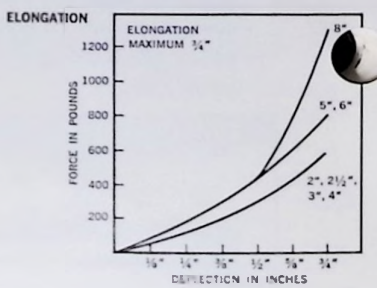
Quiet and Space-saving
GARFLEX connectors absorb more noise than rigid connectors, because nitrile, neoprene, and nylon are bonded together without any need for sound-transmitting metal reinforcement. And a 5" "face-to-face" dimension in all sizes meets the space-saving requirements of modern piping systems.

Easy Installation
The 150-pound drilled USA flanges rotate easily on the bellows, making bolt alignment easy during installation.

Lower Cost
Even with higher temperature, pressure, and movement ratings, GARFLEX molded connectors can cost you considerably *less* than you're now paying for ordinary connectors. Machine molding, that constantly produces high quality, and mass production lower the cost to you.

COMPRESSION AND ELONGATION GRAPHS





Pressure ratings for all sizes

Working Pressure	250 psig
Test Pressure	350 psig
Burst Pressure	850 psig to 1300 psig
Vacuum	10" Hg

Temperature ratings for all sizes

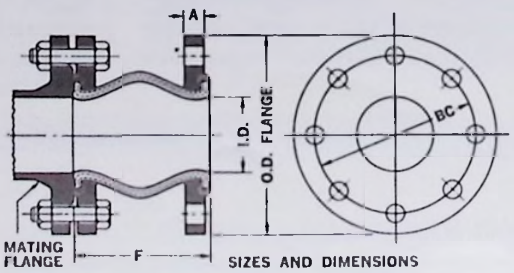
from −22°F. to +212°F. If the operating pressure is reduced to 175 psig or less, the temperature rating is increased to 250°F. maximum.

Maximum allowable angular deflection at recommended installed position

Pipe Size	Deflection	Pipe Size	Deflection
2"	35°	5"	20°
2½"	30°	6"	20°
3"	30°	8"	15°
4"	25°	10"	10°

Movements

Compression	1¼" all sizes
Elongation	¾" all sizes
Transverse Deflection (at recommended installed position)	± ¾" all sizes



SIZES AND DIMENSIONS

Dimensions for 125/150-lb. ANSI Drilling*

Connector Size (I.D.), Inches	2	2½	3	4	5	6	8	10	12
Connector F Dimension, Inches	5	5	5	5	5	5	5	5	5
Flange Dimension, Inches									
O.D. Flange	6	7	7½	9	10	11	13½	16	19
Bolt Circle (BC)	4¼	5½	6	7½	8½	9½	11¾	14½	17
Number of Bolt Holes	4	4	4	8	8	8	8	12	12
Diameter of Bolt Holes	¾	¾	¾	¾	⅞	⅞	⅞	1	1
Thickness (A)	⅝	⅝	¾	¾	¾	¾	⅞	1	1

*Control rods required unless piping is properly anchored.

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Garlock FEP*-Lined Rubber-and-Fabric Expansion Joints

GUARDIAN®"200"

GUARDIAN® "200" FEP-LINED STYLES 204 and 204HP Concentric Spool-Type Expansion Joints With or Without Single Arch. Service Range to: 400°F., 200 psig, 30 in. Hg

FEP possesses unusual characteristics of corrosion resistance, thermal stability, and non-stick surface, making this fluorocarbon ideally suited for expansion joints and flexible couplings.

Unmatched Performance

GUARDIAN "200" FEP-lined rubber joints are frequently adopted by designers, architects, and installers as standard equipment in free-movement piping systems conveying water, steam, gas sludge, slurries, and petroleum. Their greatest use, however, is in the chemical and pulp-and-paper industries, where their ability to resist corrosive attack at normal or elevated temperatures and pressures is unmatched.

FEP Lining

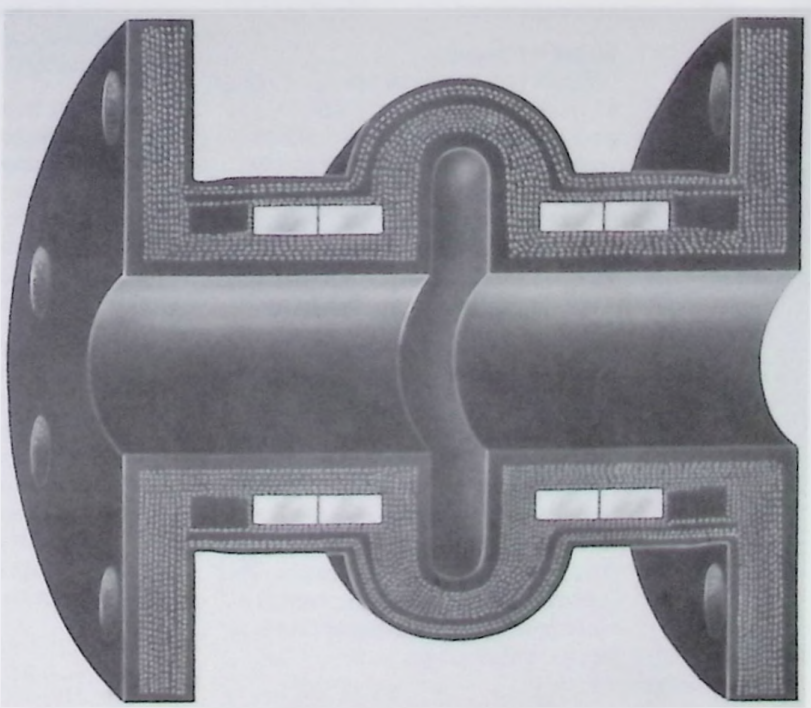
GUARDIAN "200" joints, a Garlock specialty, provide chemical resistance against almost all corrosive fluids and gases. The FEP lining is seamless and extends through the bore to the outer edge of both flanges. These joints are manufactured using a Garlock proprietary process that results in a homogeneous, durable FEP lining integrally fused to the body of the joint. The result is far superior to that obtained with conventionally attached liners, since the FEP cannot separate from the joint body in service.

The Best of Both

The result is an expansion joint combining the best features of FEP fluorocarbons—chemical resistance, anti-stick properties, thermal stability, and resistance to age-cracking—with the best features of elastomeric expansion joints—good noise and vibration dampening, high flexibility, high pressure ratings, and standard face-to-face dimensions. Temperature ratings as high as 400°F. are possible with FEP, depending on construction of the elastomeric portion of the joint.

GUARDIAN "200" joints are available in single-arch construction in standard sizes from 2" through 30" nominal pipe diameter. Joints without arches are available in the same sizes.

*Fluorinated Ethylene Propylene Copolymer



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Garlock molded all-TFE Expansion Joints and Flexible Couplings

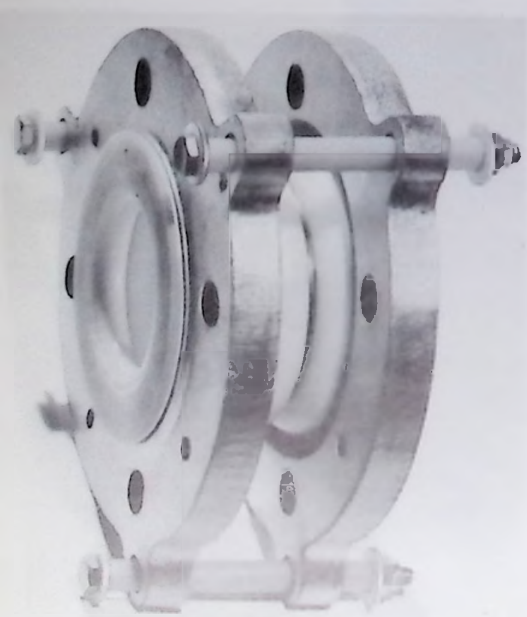
GYLON®

For Chemical Processing, Air Conditioning, and Heating Piping Systems

GYLON®
STYLE 214
Concentric Spool-Type Coupling, Single Arch.
Service Range to:
450°F., 185 psig, 29.9 in. Hg

GYLON
STYLE 215
Concentric Spool-Type Expansion Joint, Double Arch.
Service Range to:
450°F., 145 psig, 29.9 in. Hg

GYLON expansion joints and couplings were developed especially to reduce noise and vibration in chemical processing, air conditioning, and heating piping systems while compensating for expansion, contraction, and minor misalignment.



Features
They are contour-molded by a proprietary Garlock process and provide the following important advantages:
- White corrosion-resistant GYLON TFE fluorocarbon resin body
- Higher pressure ratings for modern piping systems
- Non-aging with long flex life
- Low force to deflect
- Complete assembly includes nickel-plated ductile-iron flanges, preinstalled asbestos gaskets, polyethylene-covered restriction bolts, and corrosion-resistant reinforcing rings.

Long Life
Our special molding process results in a bellows with a controlled wall thickness, and the contour and shape of each convolution have been calculated to provide extra-long flex life at high temperatures and pressures.

Superior Service
GYLON has a general service range of from −100°F. to +450°F., and it is completely resistant to water, steam, and almost all chemicals and gases. Its thermal stability, resistance to age, cracking, and anti-stick properties all combine to produce a superior bellows for couplings and expansion joints.

High Pressure Rating
GYLON expansion joints and couplings have pressure ratings high enough to handle most applications. As the pipe size gets larger, Garlock increases the bellows thickness and the strength of the reinforcing rings to compensate for the change in internal forces. This permits the same high pressure rating for large diameter sizes as for small ones.

Low Force to Deflect
A major advantage of GYLON couplings and expansion joints is the relatively low force needed to deflect or move the bellows, which makes them ideal for use in glass piping systems.

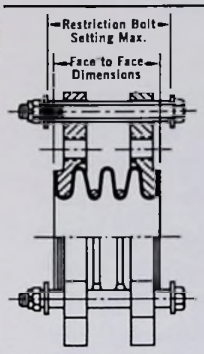
Positive Protection
GYLON expansion joints and couplings are supplied with nickel-plated ductile-iron flanges and corrosion-resistant reinforcing rings. The cadmium-plated restriction bolts are covered with a polyethylene sleeve with polyethylene washers on each end. A locknut "factory sets" the entire unit so that bellows cannot be extended beyond its limit. As a result, all metal parts are protected against corrosion and isolated from noise. In addition, all GYLON couplings and expansion joints are electrically isolated so that electrolysis is prevented. They can even be used as electrical insulators between pipe sections or connected equipment.

A Sure Seal
An asbestos gasket behind the GYLON material at the face of the flange, combined with an exclusive concentric serrated surface on the GYLON face, insures a positive seal without excessive tightening of flange bolts.

TFE
The basic TFE materials are made to conform to USA Department of Commerce, Standard PS3-66, Grade A, having the following properties: Tensile —4000 psi min./ Elongation—300% min.

GYLON expansion joints and couplings are available in standard sizes from 1" through 8" pipe I. D.

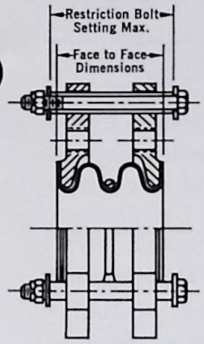
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GYLON Expansion Joints

Pipe Size (Inches)	1	1½	2	2½	3	4	5	6	8
Normal Installed Face-to-Face Dimension	1¼	2	2¼	3 3/16	3 5/8	3 5/8	4	4	6
Restriction Bolt Setting-Max.	1⅞	2 3/32	3 3/32	3 3/16	4¼	4¼	4 3/16	4 5/8	6 5/8
Max. Axial Movement Plus or Minus	½	½	¾	¾	1	1	1	1⅛	1⅛
Max. Transverse Deflection Plus or Minus°	¼	¼	5/16	5/16	½	½	½	5/16	5/16

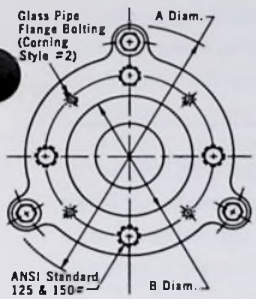
Maximum angular movement approximately 14°.
°Based on unit being in normal installed position with no axial movement or angular deflection.



GYLON Flexible Couplings

Pipe Size (Inches)	1	1½	2	2½	3	4	5	6	8
Normal Installed Face-to-Face Dimension	1 3/8	1 3/8	1 5/16	2¼	2¼	2 5/8	3¼	2¾	4
Restriction Bolt Setting-Max.	1¼	1 3/16	1 3/32	2 3/32	2¼	2 3/32	3 3/16	2¾	4
Max. Axial Movement Plus or Minus	¼	¼	¼	5/16	5/16	½	½	½	¼
Max. Transverse Deflection Plus or Minus°	⅛	1/16	1/16	1/16	3/32	¼	¼	¼	¼

Maximum angular movement approximately 7°.
°Based on unit being in normal installed position with no axial movement or angular deflection.



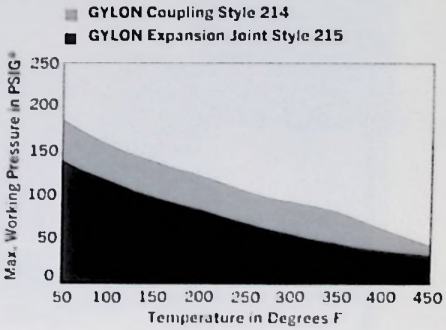
Flange Dimensions

Pipe Size (Inches) (B Diam.)	1	1½	2	2½	3	4	5	6	8
Flange Dimension (A Diam.)	5 1/16	6 7/16	7 3/8	9 1/8	10	11 1/16	12 7/8	13 7/8	15 1/2
Thickness	5/16	5/16	½	5/8	5/8	11/16	11/16	11/16	11/16
ANSI Std. Drilling Bolt Circle	3 1/8	3 7/8	4¾	5½	6	7½	8½	9½	11¾
No. Bolt Holes	4	4	4	4	4	8	8	8	8
Bolt Hole Thread	½-13	½-13	5/8-11	5/8-11	5/8-11	5/8-11	¾-10	¾-10	¾-10
Corning Style #2 Glass Pipe Bolt Circle	3 1/8	3 7/8	4¾	—	6	7½	—	9½	—
No. Bolt Holes	4	4	4	—	4	8	—	8	—
Bolt Hole Thread	5/16-18	5/16-18	5/16-18	—	5/16-18	5/16-18	—	3/8-16	—

WORKING PRESSURE VS. TEMPERATURE, ALL SIZES

Vacuum Service:
All sizes of couplings rated for vacuum service to 29.9" Hg at temperatures to 350°F. All expansion joints rated for vacuum service to 29.9" Hg at temperatures to 180°F.

Note:
All couplings have one convolution or arch and all expansion joints have two convolutions or arches. Convolutions are determined by counting the number of reinforcing rings.



*Working pressures are based on a 4-to-1 safety factor

STYLE 214 COUPLING

TOTAL FORCE FOUND TO COMPRESS, ELONGATE AND DEFLECT

Pipe Size I.D.	Elongation Movement	Elongation Force*	Compression Movement	Compression Force*	Transverse Movement	Transverse Force*
1	¼	15	¼	595	1/8	140
1½	¼	20	¼	740	1/8	145
2	¼	55	¼	825	1/8	150
2½	5/16	100	5/16	900	1/8	165
3	3/8	150	3/8	960	3/16	200
4	½	200	½	1000	¼	250
5	½	250	½	1030	¼	325
6	½	325	½	1040	¼	530
8	½	485	½	1060	¼	780

*Total force pounds

STYLE 215 EXPANSION JOINT

TOTAL FORCE FOUND TO COMPRESS, ELONGATE AND DEFLECT

Pipe Size I.D.	Elongation Movement	Elongation Force*	Compression Movement	Compression Force*	Transverse Movement	Transverse Force*
1	½	120	½	150	¼	150
1½	½	130	½	220	¼	155
2	¾	135	¾	400	3/8	170
2½	¾	145	¾	570	3/8	200
3	1	170	1	720	½	240
4	1	225	1	860	½	300
5	1	290	1	990	½	395
6	1⅛	435	1⅛	1100	9/16	560
8	1⅛	600	1⅛	1290	9/16	750

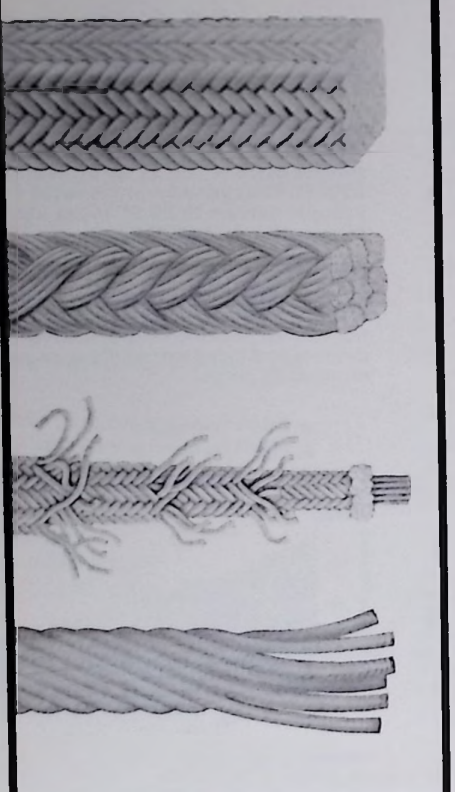
*Total force pounds

NOTES: Forces to compress, elongate, and deflect GYLON Expansion Joints are based on zero pressure conditions in the pipeline. These forces should be considered only as approximates.

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Garlock soft packings

Braided and twisted



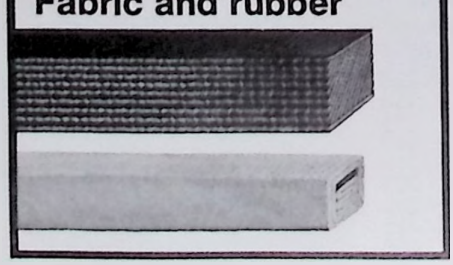
LATTICE BRAID® Packing, diagonally braided for greater strength and longer life. This packing is braided inside as well as outside. Each strand passes diagonally through the body of the packing at an angle of approximately 45°. This makes a completely unified structure. Every braided strand contributes to the strength of the entire packing. LATTICE BRAID packing has no single braid or outer cover to wear through. Lattice braiding holds together when worn far beyond the limits of ordinary packings. Lattice braiding also makes the packing much more flexible, and thus there is less stress when it is formed into rings.

Regular Braid (also called Square, Plaited or Flax Braid). Each strand passes over and under strands running in the opposite direction. Cross sections are square. These packings are especially suited for high speed rotary service, particularly at low pressures.

Braid-Over Braid (also known as Multiple or Round Braid). This packing is built up to required size by braiding one or more covers around a center core of braided, twisted or homogeneous materials. Recommended for slow speed and high pressure dynamic applications, valve stems and expansion joints. Especially good for valves where out-of-square cross sections are desired.

Twisted. Yarns or metallic strands are twisted around each other to obtain desired size. One packing size can be used for various size stuffing boxes. Because strands are easily undone, you can twist the desired size by using only the number of strands you need. This is primarily a general utility or emergency type of packing where packing space is small.

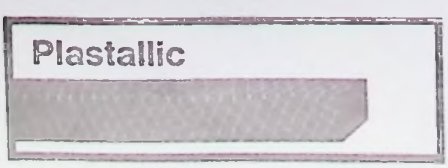
Fabric and rubber



Laminated Construction, where either duck and rubber or asbestos and rubber are laminated into slab form and then fabricated into coils, spirals or rings. All styles are laminated flat except Garlock 711, which is laminated diagonally.

Rolled Construction, made from rubber impregnated fabric rolled either around itself or a special rubber core or strip. Packings with a rubber center are designed to offer the added resiliency desirable in applications with a great deal of side movement.

Plastallic



Plastallic packings are soft and readily formable. Every style is scientifically compounded with pure asbestos, special lubricants and binders, and graphite or mica. Some styles contain soft bearing metals. All are particularly suited to sealing gases. Plastallic packings are available in coil, spiral, formed rings, and in bulk-packaged cans.

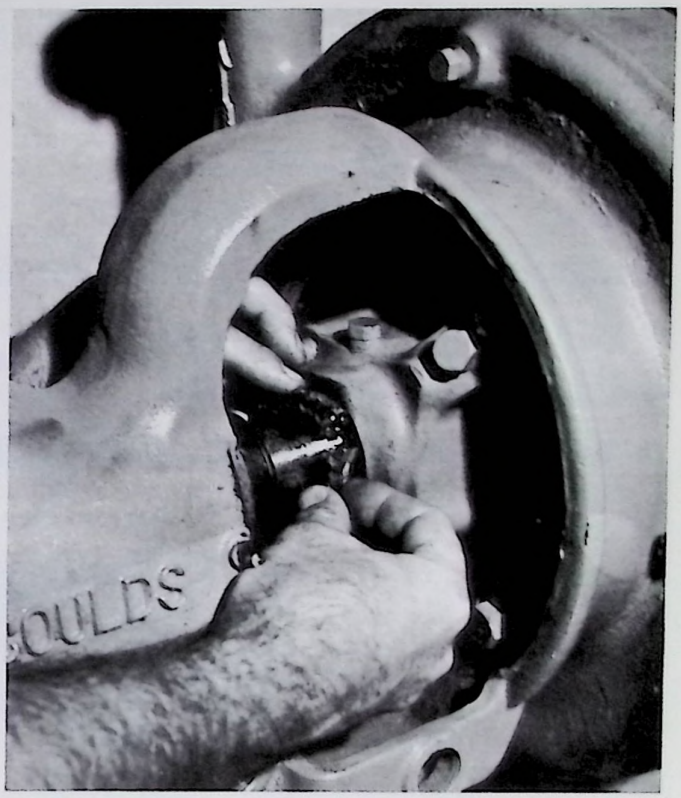
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Garlock treated graphite filament packing

When GARFITE® "100" graphite filament packing* was introduced a few years ago, it completely revolutionized industry's concepts about what a soft packing could do. Graphite filament has a high temperature tolerance . . . 650°F in an oxidizing atmosphere, 1200°F in steam and higher in neutral atmospheres. It is inert to all chemical attack except hot fuming sulfuric acid, nitric acid, dichromates, liquid oxygen or other strong oxidizers. More important, it has high thermal conductivity and low thermal expansion. High thermal conductivity means that frictional heat generated at the packing/shaft sleeve interface is readily transferred to the outside of the stuffing box at a greater rate than with any other non-metallic packing. Thus the packing can be compressed tighter against the shaft sleeve resulting in lower leakage rates. Low thermal expansion means that the packing will continue to seal effectively even though the temperature of the application fluctuates over a large range.

GARFITE "100" is graphite filament yarns in square braid construction with TFE suspensoid as additional lubrication, offering the permanent lubricity of graphite instead of added temporary lubricants. This permanent lubricity, combined with high thermal conductivity, low thermal expansion, and chemical resistance, make GARFITE "100" the packing answer for the most difficult applications.

*U.S. Patent 3,403,595



GARFITE "100" being installed in a centrifugal pump.

GARFITE "100" packing is solving problems...

in centrifugal pumps

92% Sulfuric acid with heavy slurry. GARFITE "100" installed in Durco pump, 2¼" SS shaft, 1750 RPM handling 92% sulfuric acid with heavy slurry. Temperature 50°C at 90-100 psi. Packing treated with Keystone #9 lube before installation, still running after 5 months. Previous maximum life, *TFE packing* 40 days, *mechanical seal* 3 months.

in reciprocating pumps

Gasoline and propane. The pressures here were 1200 psi and temperatures of 120°F. GARFITE "100" packing replaced a TFE impregnated asbestos packing which had been leaking so badly that the operator had installed a sump under the packing gland with the pump connected back into the suction side of the triplex pump. GARFITE "100" packing was installed and has been running with a minimum leakage rate for over five months!

in mixers

Maleic anhyride and steam. GARFITE "100" replaced conventional packing in stuffing boxes of a mixer handling maleic anhydride and steam. Shafts are 316 SS 4¾" diameter, 80 RPM. Temperature in the mixer 375°F, pressure 50 psi. Conventional packing failed after only 10 days. GARFITE "100" still running without leakage four months after installation.

in valves

Kerosene vapors. GARFITE "100" packing was installed on butterfly valves where TFE impregnated asbestos and even all-TFE packings had been tried. The other packings would extrude, char and flow from the stuffing box giving intolerable leakage. Temperatures were to 550°. GARFITE "100" packing performed for over one year of continuous service with continuous movement to the customer's complete satisfaction.

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Garfite "200"

The packing that brings you:

- easier installation
- faster sealing
- faster run-in
- fewer gland adjustments



Now GARFITE* "200" graphite filament packing is available for your toughest sealing jobs. GARFITE "200" is the ideal packing material for sealing pumps, and now mixers and agitators as well, particularly in the chemical, petrochemical, pulp and paper industries.

It is resistant to attack from all chemicals except powerful oxidizing agents. And now LATTICE BRAID* construction gives it greater strength... a big advantage in the larger packing sizes often used in mixers and agitators.

GARFITE "200" packing is dense yet highly flexible, so installation is far more efficient, far faster. GARFITE "200" also runs in quickly and requires fewer gland adjustments during run-in. On the job, GARFITE "200" means fewer packing changes—and important savings in maintenance costs plus longer shaft or sleeve life.

THE PLUS OF LATTICE BRAID CONSTRUCTION

LATTICE BRAID construction, proved superior in a wide variety of applications, gives GARFITE "200" packing a completely unified structure. The lattice-link braiding is continuous throughout the packing—inside as well as outside. Each strand passes diagonally through the packing and contributes to the total strength of the materials.

And since the lattice-linked braid is extremely flexible, GARFITE "200" packing will conform to shaft and stuffing box bore faster, reducing initial leakage rates.

There is no single braid or outer cover to wear through, and GARFITE "200" will hold together when worn far beyond the limits of ordinary packings. Fewer repackings—less downtime.

THE HIGH PERFORMANCE OF GRAPHITE FILAMENT

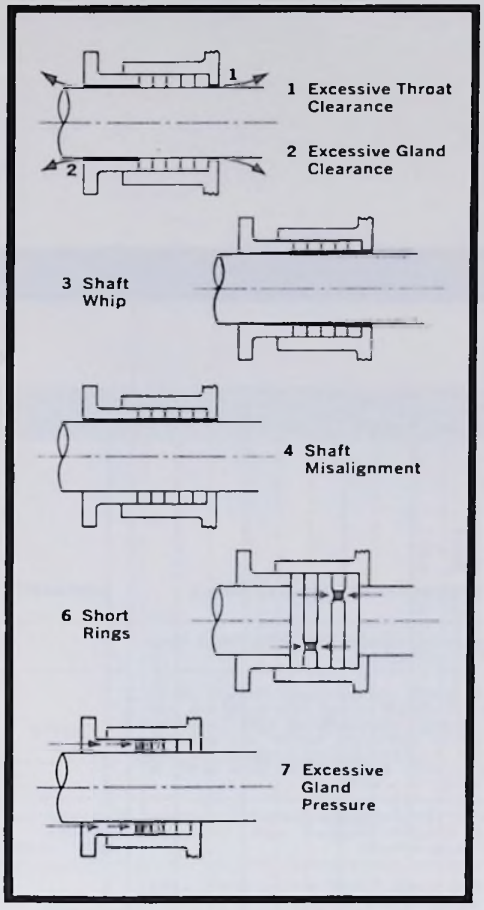
The treated graphite filament gives even lubrication throughout the long packing life of GARFITE "200", and provides superior chemical resistance.

GARFITE "200" packing withstands temperature to 343°C (650°F), and it conducts and radiates heat generated at shaft/packing interface so it dissipates easily. The low coefficient of expansion is compatible with most ferrous materials.

U.S. Pat. 3403595 & 3646846

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Possible causes of soft packing failure



Many times causes of packing failure are not readily apparent. However, careful examination of the used packing will often indicate the factors causing this failure. Listed below are some examples of how certain clues can pinpoint these underlying causes.

1. *If one or more rings are missing from the set*—Look for excessive shaft clearance allowing extrusion of rings into the system. (As a result of this condition, packing may get trapped in other equipment or contaminate the fluid being handled.)

2. *If packings tend to sheet-out or extrude between rod or shaft and gland follower*—Look for too great a clearance between rod or shaft and gland follower. Use of an anti-extrusion ring may be necessary if pressure is high or if clearances cannot be reduced.

3. *If packing radial thickness appears less than nominal in one or more places*—Look for an undersize shaft, badly worn bearings, causing shaft whip or rod or plunger wobble.

4. *If packing radial thickness directly beneath the rod, shaft or plunger is excessively reduced or early leakage occurs at top of rod or shaft*—Look for misalignment of center lines of shaft or rod and stuffing box bore.

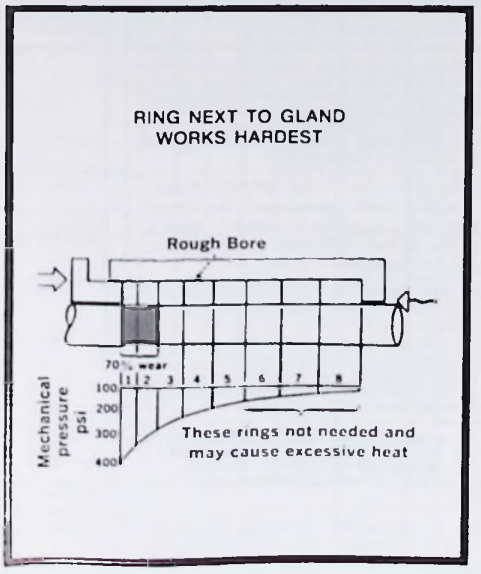
5. *If outside diameter of packing is worn*—Look for loose ring or rings rotating with shaft due to insufficient gland load.

6. *If one or more rings have "bulges" in the faces*—Look for adjacent rings cut too short, causing packing under pressure to be forced into the spaces at the joints.

7. *If bottom rings are in fair condition yet rings next to gland followers are prematurely deformed*—Look for improperly installed packings and use of excessive gland pressure.

8. *If specific packing problem is difficult to determine*—Give equal attention to I.D. & O.D. leakage, and check for a rough stuffing box bore.

Compression packing maintenance tips.



1. Always try to have a spare set of packing in stock, particularly for key pieces of equipment. But don't overstock. Store in a cool, clean place.

2. If a long stuffing box creates excessive heat, use a spacer in the bottom of the box to reduce the number of rings in the set. (See sketch.)

3. In typical compression packing installation, most of the sealing in the stuffing box is done by the ring next to the gland. Note where the wear usually occurs in the drawing at left. Be sure to compress the packing ring by ring to assure maximum sealing efficiency.

4. Clean the stuffing box thoroughly after removing old packing. Also thoroughly clean and polish the rod or shaft.

5. Over-tightening is usually the greatest single cause of packing failure.

6. Lubricate packings rings with LUBALL® packing lubricant prior to assembly.

7. When a packing set fails unexpectedly or after unusually short service life, save it for the manufacturer to examine. It can tell a lot about operating conditions and about possible causes of failure.

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Garlock soft packing description and service condition reference table

	ACID		ALKA-LIES		GASES			OILS		SOL-VENTS		MOTION								
STYLE	MILD	CORROSIVE	MILD	CORROSIVE	AIR & DRY INDUS.	BROMINE, CHLOR.	OXYGEN	PETROLEUM	SYNTHETICS	AROMATIC (BEN., ETC.)	ALIPHATIC (GAS., ETC.)	STEAM	WATER & SALT SOLU.	FLUIDS WHERE NON-CONTAM. REQUIRED	MAX. TEMP. °F	RECIPROCATING	ROTARY	HELICAL (VALVE STEM)	CONSTRUCTION AND MATERIALS	COMMENTS
31	o		o		o			o					o	o	220	o	o		Regular braid, square, flax with No. 2 long-fiber flax roving.	
90	o		o		o			o					o		220	o	o		Regular braid. Square cross-section No. 1 longest-fiber flax roving, free from tow and short fibers. Impregnated with modified marine and petroleum waxes and graphite lubricant. A relatively firm packing. For less severe service, specify Style 90-S (soft) or Style 90-VS (very soft).	
100	o	o*	o	o	o			o	o	o	o	o	o		650†	o	o	o	GARFITE "100"—Regular braid. Square cross section. Graphite filament yarn, lubricated with TFE suspensoid.	*Except strong oxidizers †1200°F in steam
117-B	o		o		o							o	o		500	o		o	Braid-over-braid. Round cross-section. Long-fiber white asbestos yarn with mineral-fat lubricant. Graphited throughout.	
117-T	o		o		o							o	o		500			o	Twisted. Round cross-section. Long-fiber white asbestos yarn with mineral-fat lubricant. Graphited throughout.	
127			o		o			o	o	o	o	o	o		1200**			o	Braided jacket. Square cross-section. Homogeneous core of white asbestos. Braided jacket of 90% Grade AAA asbestos. Inconel‡ wire inserted. Surface treated with Elastomeric material and graphite. Corrosion inhibitor. Also available without wire.	**Line Temperature ‡International Nickel Company Trademark.
150	o		o		o			o				o	o		500	o		o	Fabric jacket around a core of accordion-folded rubber-impregnated asbestos cloth, combined with resilient rubber strip. Square cross-section. Specially woven Garlock asbestos cloth, rubber impregnated (except outside surface). Externally treated with modified glycerol lubricant and graphite.	
200	o	o*	o	o	o			o	o	o	o	o	o		650†	o	o	o	GARFITE "200"—LATTICE BRAID. Graphite filament yarn impregnated throughout with proprietary lubricant to prevent leakage through the internal structure of the packing and assist in break-in.	*Except strong oxidizers †1200°F in steam
230	o	o	o	o	o										500	o	o	o	African blue asbestos yarn, lubricated and graphited throughout. Also available with mica finish.	
233	o		o		o			o				o	o		500	o		o	Braid-over-braid. Square cross section. Long-fiber white asbestos yarn, impregnated with mineral fat lubricant. Graphited throughout. Available with wire, if specified.	
234	o		o		o			o				o	o		500		o		Regular braid. Square cross-section. White asbestos yarn, impregnated with mineral fat lubricant, graphited throughout. Available unlubricated but surface graphited when specified.	
237								o			o				220		o		Regular braid. Square cross-section. Long-fiber white asbestos yarn, lubricated with soap and glycerol compound and graphited throughout.	

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Garlock soft packing description and service condition reference table

	ACID		ALKALIES		GASES			OILS		SOLVENTS		MOTION							
STYLE	MILD	CORROSIVE	MILD	CORROSIVE	AIR & DRY INDUS.	BROMINE, CHLOR.	OXYGEN	PETROLEUM	SYNTHETICS	AROMATIC (BEN., ETC.)	ALIPHATIC (GAS., ETC.)	STEAM	WATER & SALT SOLU.	FLUIDS WHERE NON-CONTAM. REQUIRED	MAX. TEMP. °F	RECIPROCATING	ROTARY	HELICAL (VALVE STEM)	CONSTRUCTION AND MATERIALS	COMMENTS
262	o		o		o			o*	o*	o*	o*	o	o	o	220	o			A laminated special white hydraulic packing of fine cotton fabric plies, treated with natural rubber compound. No graphite, no lubricant. Regular cure for most applications. Rockhard for some high pressure hot water, oil and solvent services.	*Rockhard version only.
333	o		o		o							o	o		220	o		o	A laminate consisting of plies of closely woven heavyweight cotton duck, treated with special Garlock SBR rubber compound. Graphited and mineral oil lubricated. Has rubber top and bottom covers.	
631			o		o			o	o	o	o	o	o		500	o	o	o	Twisted. Square cross-section. Lubricated and graphited lead foil twisted around an asbestos core. A highly resilient packing.	
633					o			o	o	o	o				1000	o	o	o	Twisted. Rectangular cross-section. Lubricated and graphited aluminum foil, twisted around an asbestos core.	
635					o							o	o		1500	o	o	o	Twisted. Square cross-section. Lubricated, graphited copper foil, twisted around an asbestos core. Twisting forms crevices in foil to hold high-temperature oil and provide auxiliary lubricant.	
644			o		o			o				o	o		500	o	o		Regular braid. Square cross-section. Long-fiber white asbestos yarn and strands of soft lead twisted together and braided. Thoroughly mineral-fat lubricated. Graphite coated surface.	
711	o		o		o			o				o	o		220	o		o	Heavyweight cotton duck plies, treated with special Garlock SBR rubber compound. Laminated diagonally. Top and bottom covers of rubber and fabric. Graphited and mineral oil lubricated.	
730	o		o		o			o				o	o		500	o	o		Long-fiber asbestos yarn, lubricated and graphited throughout. Relatively firm packing.	
731	o		o		o			o				o	o		500	o	o	o	Long-fiber asbestos yarn. Controlled lubrication and graphited throughout. Contains no excess lubrication.	
733	o		o		o			o				o	o		500	o	o		Long-fiber asbestos yarn, lubricated and graphited throughout. Available unlubricated and ungraphited; or, with mica finish in place of graphite. Relatively soft packing.	

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Garlock soft packing description and service condition reference table

	ACID		ALKA-LIES		GASES			OILS		SOL-VENTS		MOTION							
STYLE	MILD	CORROSIVE	MILD	CORROSIVE	AIR & DRY INDUS.	BROMINE, CHLOR.	OXYGEN	PETROLEUM	SYNTHETICS	AROMATIC (BEN., ETC.)	ALIPHATIC (GAS., ETC.)	STEAM	WATER & SALT SOLU.	FLUIDS WHERE NON-CONTAM. REQUIRED	MAX. TEMP. °F	RECIPROCATING	ROTARY	HELICAL (VALVE STEM)	CONSTRUCTION AND MATERIALS	COMMENTS
734					o			o	o						350		o		Long-fiber asbestos yarn lubricated with gasoline-resistant compound and graphited throughout. Available dry, ungraphited or with mica finish.	
735	o		o		o			o				o	o		500	o	o	o	Copper wire inserted long-fiber asbestos yarn. Controlled lubrication and graphited throughout. Available dry, ungraphited or with mica finish.	
737	o		o		o			o				o	o	o	500	o	o	o	Long-fiber asbestos yarn, lubricated throughout, but without graphite. Relatively soft packing.	
740	o		o		o			o				o	o		220	o	o		Highest grade, long-fiber flax roving. Lubricated. Not graphited. Available unlubricated or with surface coating of graphite. Relatively soft packing.	
745	o		o		o			o				o	o		220	o	o		Highest grade, long-fiber flax roving with waterproof hydraulic lubricant containing graphite. Also surface graphited.	
751	o		o		o			o				o	o		220		o		High grade cotton yarn. Lubricated and graphited. Also available dry.	
908	o		o		o			o	o	o	o	o	o		600	o	o	o	A non-metallic, dry graphited packing. Asbestos fibers and graphite, bonded together with a water-resistant, oil-resistant binder. Special corrosive inhibiting agent.	
909			o		o			o	o	o	o	o	o		500	o	o	o	A dry, graphited plastic packing of asbestos fibers, lead particles and graphite bonded with a water-and-oil-resistant binder. Has corrosion inhibiting agent.	
5005	o	o	o	o	o	o		o	o	o	o	o	o	o	500	o	o	o	Specially treated and impregnated TFE fiber yarn braided as a jacket around a core of a plastic combination of TFE powder with synthetic hydrocarbon binder.	Specially developed for use as acid tray and bell and spigot joint packing on columns and towers.

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Garlock soft packing description and service condition reference table

If a Garlock recommendation is desired, please include the following information with your request:

1. If possible, send a blueprint or sketch of stuffing box and surrounding equipment.

2. Submit information about condition of equipment. (Surface finishes, runout, etc.)

3. Normal operating hours; whether intermittent or continuous; rpm or cycles per minute, and length of stroke.

4. Medium that will come in contact with packing (be specific as possible . . . is pumpage clean or dirty . . . is it abrasive . . . is it hydrochloric acid, propane gas, etc.).

5. Temperature of medium.

6. Pressure encountered at the bottom of the stuffing box.

7. Dimensions: (a) Rod or shaft diameter(s); (b) Bore of stuffing box(es); (c) Inside depth of stuffing box(es); (d) Bevels (if any).

8. Lantern ring location, when applicable.

9. Advise if pump has a cooling jacket.

10. State problem or reason for new recommendation request.

	ACID		ALKALIES		GASES			OILS		SOLVENTS					MOTION					
STYLE	MILD	CORROSIVE	MILD	CORROSIVE	AIR & DRY INDUS.	BROMINE, CHLOR.	OXYGEN	PETROLEUM	SYNTHETICS	AROMATIC (BEN., ETC.)	ALIPHATIC (GAS., ETC.)	STEAM	WATER & SALT SOLU.	FLUIDS WHERE NON-CONTAM. REQUIRED	MAX. TEMP. °F	RECIPROCATING	ROTARY	HELICAL (VALVE STEM)	CONSTRUCTION AND MATERIALS	COMMENTS
5234	o		o		o			o	o	o	o	o	o	o	500	o	o	o	Long-fiber asbestos yarn with TFE impregnation and a white lubricant for easier run-in.	
5298	o	o	o	o	o			o	o	o	o			o	500	o	o	o	African blue asbestos yarn with TFE impregnation.	
5299	o	o	o	o	o			o	o	o	o			o	500	o	o	o	African blue asbestos yarn with TFE impregnation and white lubricant for easier run-in.	
5300							o								500	o	o	o	African blue asbestos yarn with TFE impregnation. Certified for oxygen service.	
5413	o		o		o			o					o	o	500	o	o		Regular braid. Square long fiber flax impregnated with TFE, and a surface lubricant for easier run-in.	
5501			o		o			o	o	o	o	o	o		1200*	o		o	Each ring has a plastallic core with a braided jacket of AAA asbestos reinforced with Inconel** wire. It provides high strength at high temperature, combined with excellent conformability for good sealing. The rings are individually die formed for accurate fit and easy installation.	*Line temperature. **International Nickel Company Trademark.
5555	o		o		o			o	o	o	o	o	o	o	500	o	o	o	Braided jacket. Square cross-section. A plastallic packing with powdered TFE white asbestos core and single braided asbestos yarn jacket. Impregnated with TFE suspensoid. No graphite.	
5862	o		o		o			o	o	o	o	o	o	o	500	o	o	o	Long-fiber asbestos yarn with TFE impregnation and a white lubricant for easier run-in.	
5876	o		o		o			o	o	o	o	o	o	o	500	o	o	o	Long-fiber asbestos yarn with sintered TFE powder (U.S. Patent 3124032), and a white lubricant for easier run-in.	
5888	o	o	o	o	o	o		o	o	o	o	o	o	o	500	o	o	o	TFE fiber yarn with TFE impregnation—a very fine weave.	
5889	o	o	o	o	o	o		o	o	o	o	o	o	o	500	o	o	o	Specially treated and impregnated TFE fiber yarn for improved break-in and high speed service.	
5898							o								500	o	o	o	TFE fiber yarn with TFE impregnation—a very fine weave. Specially treated for oxygen service.	
7130						o									150			o	Laminated fabric plied up and furnished in rectangular cross section. These rings are of Garlock asbestos cloth, frictioned with high grade SBR rubber binder. Rubber top and bottom covers. Treated with beeswax lubricant. Surface graphite coated. (Also available without graphite.)	Particularly recommended for use on valves on chlorine containers. Approved by the Chlorine Institute.
9166	o	o	o	o	o	o		o	o	o	o	o	o	o	500	o	o	o	A plastic packing of TFE powder, graphite and synthetic hydrocarbon binder. Coils and rings have skeleton-braided covers of TFE yarn.	

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Garlock soft packing / ordering information

Style No.	Approx. Box Wt.	APPROXIMATE FEET PER BOX												
		1/16	1/8	3/16	1/4	5/16	3/8	7/16	1/2	9/16	5/8	11/16	3/4	7/8	1
31	1		146	59	28	19	15								
	5		730	295	140	95	75	52	42	36	27				
	10						150	104	84	72	54	47	37		
	8½													24	
	9¼														20
90	1		140	57	28	19	13								
	5		700	275	140	95									
	10						130	100	78	62	46				
	15											59	50		
	10½													24	20
G-100	1		100	63	30.2	21.6	16.5	11.9	8.7	7.5	5.7				
	5		500	315	151	108	82.5	59.5	43.5	37.5	28.5				
	For ¾" & Up, Box Weight Can Be Specified By Customer.										Approximate Feet Per Pound		4.0	3	2.5
117-B	1	240	120	72	30	18	13								
	5		600	360	150	90	65	46	38	27	22				
	10											38	31		
	9½													24	
	10¼														20
117-T	1	220	77	57	26	15	11								
	5		385	275	130	75	55	45	35	25	21				
	10						110	90	70	50	42	32	30		
127	1		100	41	23	14	10								
	5		500	205	115	70	50								
	10						100	74	57	43	38				
	12¾													24	
	12¼														20
	15											45	40		
150	*														
G-200	1		100	63	30.2	21.6	16.5	11.9	8.7	7.5	5.7				
	5		500	315	151	108	82.5	59.5	43.5	37.5	28.5				
	For ¾" & Up, Box Weight Can Be Specified By Customer.										Approximate Feet Per Pound		4.0	3	2.5
230	1				24	16.0	11								
	5				118	80.0									
	10						110	75	58	47					
	11¼													24	
	12														20
	15										60	50	40		
233	1		120	72	28	18	13								
	5		600	360	140	90	65								
	10						130	91	69	54					
	10½													24	
	11¼														20
	15										67	57	47		
234	1		84	47	25	17	12								
	5		420	235	125	85									
	10						120	85	64	52					
	11													24	
	12														20
	15										63	51	45		
237	1		80	45											
	5		400	225	114	73									
	10						104	78	58						
	12													24	
	13½														20
	15									69	55	40			
	20												35		
262	*														
333	*														
631	*														
633	*														
635	*														
644	1		37	17											
	5		185	85	50										
	10					64	44								
	15							45	38						
	19½													15	
	24														15
	20									40	30				
	25											32	26		
711	*														
730	1				25	15.6	10								
	5				125	78									
	10						100	79	60	50	40				
	10¼													25	
	13½														20
	15											51	42		
731	1				29	19	14								
	5				147	95									
	10						140	91	69	58	47				
	11¾													24	
	15											60	50		
	12½														20

*See Chart on Page 48

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Style No.	Approx. Box Wt.	APPROXIMATE FEET PER BOX													
		1/16	1/8	3/16	1/4	5/16	3/8	7/16	1/2	9/16	5/8	11/16	3/4	7/8	1
733	1				26	17	11								
	5				130	85									
	10						110	89	66	53	41				
	11													24	
	12														20
	15											54	44		
734	1				25	17	12								
	5				125	85									
	10						120	82	63	50					
	12													24	
	13														20
	15										60	48	41		
735	1				24	16	12								
	5				119	80									
	10						120	74	57	48	40		29		
	11¼													24	
	13														20
	15											51	45		
737	1				29	18	14								
	5				145	90									
	10						140	91	69	58	47				
	11¼													24	20
	15											60	40		
740	1				31	18	12								
	5				155	90									
	10						120	99	74	62	50				20
	9¼													24	
	15											60	51		
745	1				29	18	12								
	5				145	90									
	10						120	92	71	61	47				
	9													24	
	10½														20
	15											56	48		
751	1				33	21									
	5				165	105									
	10						145	102	83	65	53	43			20
	8½													24	
	15												60		
908	*														
909	*														
5005 Rd.	5								33	25	20				
	10								66	50	40		28		
5005 Sq.	1				20	13	9								
	5				100	65	45		25	20	16				
	10						89		50	40	32		22		
5234	1		91	43	23	15									
	5			215	117	78	54	40	30	24					
	10										39		27		
	13													24	
	15														22
5298	1		83	42	23	14	10								
	5			210	119	71	54	38	29	23					
	10										38		26		
	12													24	
	14														22
5299	1		83	42	23	14	10								
	5			210	119	71	54	38	29	23					
	10										38		26		
	12													24	
	14														22
5300	1		83	42	23	14	10								
	5			210	119	71	54	38	29	23					
	10										38		26		
	12													24	
	14														22
5413	1		143	45											
	5				139	96	71								
	10						143	104	83	73	53		37		
	9													24	
	11														22
5501	*														
5555	1		100	44	17	14	9								
	5		500	220	85	70	45	35	28	22	18				
	10						90	70	56	45	36				
	12													24	
	12¼														20
	15											45	39		
5862	1		100	59	29	18	14	11							
	5		500	295	145	90	70	56	36	31	24	18	16		
	11													24	
	12														20
	15												48		
5876	1		108	41	27	17	11	9							
	5		540	205	135	85	55	45	30	25	23				
	10											38	33		
	11													24	20

*See Chart on Page 48

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Style No.	Approx. Box Wt.	APPROXIMATE FEET PER BOX													
		1/16	1/8	3/16	1/4	5/16	3/8	7/16	1/2	9/16	5/8	11/16	3/4	7/8	1
5888	1		67	30	19	11	9								
	5		335	150	95	55	45	32	24	20	15	13	11		
	10												22		
	16													24	
	15														20
5889	1		61	28	17	10	8								
	5		305	140	85	50	40	28	24	20	15	12	11		
	10												22		
	16													24	
	17 3/4														20
5898	1		71	29	19	11	8								
	5		355	145	95	55	40	35	30	24	16	14	12		
	16													24	
	15														20
7130	*														
9166	*														

*See chart below.

Style No.		APPROXIMATE POUNDS AND FEET PER BOX													
		1/16	1/8	3/16	1/4	5/16	3/8	7/16	1/2	9/16	5/8	11/16	3/4	7/8	1
150	Coils/Box		6	6	6	4	4	4	4	3	3	2	2	1	1
	Feet/Box		75	75	75	50	50	50	50	37.5	37.5	25	25	12.5	12.5
	Pounds/Box		1.5	2	4.5	4	6	8	10	10.5	12	10	12	8	10
	Spirals/Box		4	4	4	2	2	1	1	1	1	1	1	1	1
	Feet/Box		50	50	50	25	25	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5
	Pounds/Box		1	1.3	3.0	2.0	3.0	2	2.5	3.5	4	5	6	8	10
262	Coils/Box			4	4	3	3	2	2	2	2	2	2	1	1
	Feet/Box			60	60	45	45	30	30	30	30	30	30	15	15
	Pounds/Box			1.5	2.5	3	4.5	4.75	5.25	6.5	8	10	11.5	8	10
333	Coils/Box		6	6	6	4	4	4	4	3	3	2	2	1	1
	Feet/Box		90	90	90	60	60	60	60	45	45	30	30	15	15
	Pounds/Box		1.5	2	4.5	4	6	7	8	7.5	10.5	9.5	10	6.5	8.5
	Spirals/Box		4	4	4	2	2	1	1	1	1	1	1	1	1
	Feet/Box		60	60	60	30	30	15	15	15	15	15	15	15	15
	Pounds/Box		1	1.3	3.0	2.0	3.0	1.75	2	2.5	3.5	4.75	5	6.5	8.5
631	Spirals/Box		2	2	1	1	1	1	1		1				
	Feet/Box		25	25	12.5	12.5	12.5	12.5	12.5		12.5				
	Pounds/Box		2	3.0	1.75	3	4	6	6.25		9.75				
633	Spirals/Box				1	1	1	1	1		1				
	Feet/Box				12.5	12.5	12.5	12.5	12.5		12.5				
	Pounds/Box				1	1.25	1.5	2	2		3				
635	Spirals/Box		2	2	1	1	1	1	1		1		1		
	Feet/Box		25	25	12.5	12. 5	12.5	12.5	12.5		12.5		12.5		
	Pounds/Box		.5	1.5	1	1.5	2	2.5	3.5		4.75		7		
711	Coils/Box		6	6	6	4	4	4	4	3	3	2	2	1	1
	Feet/Box		90	90	90	60	60	60	60	45	45	30	30	15	15
	Pounds/Box		1.8	2.5	3.75	3	4	5	8	6.75	9	7	9	6	8
	Spirals/Box		4	4	4	2	2	1	1	1	1	1	1	1	1
	Feet/Box		60	60	60	30	30	15	15	15	15	15	15	15	15
	Pounds/Box		1.25	1.6	1.6	1.5	2.0	1.25	2	2.25	3	3.5	4.5	6	8
908	Spirals/Box		4		1		1		1		1		1	1	1
	Feet/Box		60		17		17		16		16		15	15	15
	Pounds/Box		1		1		2		2.5		4		6	6.5	8.75
909	Spirals/Box		4		1		1		1		1		1	1	1
	Feet/Box		60		17		17		16		16		15	15	15
	Pounds/Box		1		1.25		2.25		3.5		5.5		5	9.25	11.5
5501	Soot Blower Packing Sets Including Adapters . . . Specify I.D., O.D., and Set Height														
7130	This style is available in rings with beveled joints or "solid" if so specified. Available from stock in these standard sizes.										15/16" X 1 7/16" X 1/2" 15/16" X 1 7/16" X 1/4" 1 1/32" X 1 5/8" X 1/4"				
9166	Size	7/32 Round (0X)		1/4 X 3/16 (X)		3/8 X 7/16 (3-8X)		1/2 X 5/8 (2X)		3/4 X 7/8 (3X)			1" Square (4X)		
	Coils/Box	—		—		—		3		2			1		
	Feet/Box	—		—		—		51		26			20		
	Pounds/Box	1# or 5# Spools		1# or 5# Spools		1# or 5# Spools		13 1/4		11 3/4			12 3/4		
	AVAILABLE IN BULK IN 1#, 2# OR 5# CANS														

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Garlock molded hydraulic & pneumatic components

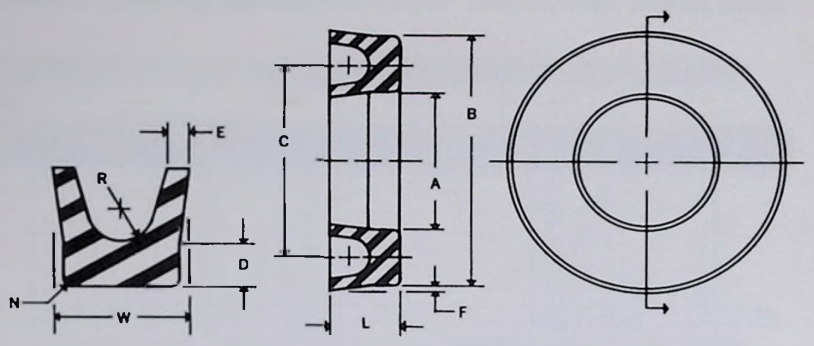
STYLE	FORM						MATERIALS OF CONSTRUCTION	RECOMMENDED FOR USE AGAINST										TEMPERATURE LIMIT °F.		RELATIVE HARDNESS	SPECIALLY RECOMMENDED FOR
STYLE	CHEVRON®	CUP	U-SEAL	FLANGE PACKING	ROD SCRAPER	PISTON WEAR RING		AIR	ACIDS	ALKALIES	OIL	PHOSPHATE ESTERS	SOLVENTS	STEAM	WATER	WATER-GLYCOL	WATER IN OIL	Min.	Max.		
79					o		Steel cased Polyurethane Elastomer				o				o	o	o	−70	225	Firm	Mobile Cylinder Rod Scraper
432	o						Cotton Duck and Nitrile Elastomer	o			o				o	o	o	−40	250	Firm	General Hydraulic Oils, water emulsions
433	o						Cotton Duck and Butyl Elastomer					o			o	o		−40	250	Firm	Phosphate ester fire resistant hydraulic fluids
532	o						Asbestos Cloth and Nitrile Elastomer	o			o			o	o	o	o	−10	300	Firm	High temperature general service including steam
540		o					Cotton Duck and SBR Elastomer								o	o		−40	250	Rockhard	Water Service High Pressure
813		o					Asbestos Cloth and SBR Elastomer							o	o	o		−40	300	Firm or Rockhard	Steam and hot water
7131		o					Fine Cotton Duck and Neoprene Elastomer	o			o							−40	250	Firm	Oil & air service, low to medium pressure
7271		o	o	o			Med. Weight Cotton Duck and Neoprene Elastomer	o			o							−40	250	Firm	Oil & air, medium to high pressure
7815	o	o					Natural Rubber with Asbestos Fibers	o			o				o	o	o	−40	225	Flex	Oil, air, water emulsions, medium to high pressure
7857	o						Cotton Duck and SBR Elastomer			o	o	o	o		o	o	o	−40	250	Rockhard	All except reactive fluids & certain solvents—very high press.
7904	o						Asbestos Cloth and TFE	o	o	o	o	o	o	o	o	o	o	cryogenic	500	Rockhard	All except very low pH fluids, hi-pressure
8048	o						Cotton Duck and Nitrile Elastomer				o				o	o	o	−10	250	Firm	Oil, water & emulsions, high performance
8051	o						Cotton Duck and White SBR								o	o		−40	250	Firm	Mild aqueous solutions where non-discoloring is required.
8136		o					Heavy Weight Cotton Duck and Neoprene Elastomer	o			o							−40	250	Firm	Oil and air, high pressure
8452	o	o	o				Homogeneous Nitrile	o			o				o	o	o	−10	250	Flex	Oil, air & water, low to med. pressure to high with back-up
8455	o	o	o				Homogeneous Silicone	o	o	o	o	o			o	o	o	−70	500	Flex	All fluids but strong acids and alkalies
8619		o	o				Med. Weight Cotton Duck and SBR Elastomer								o	o		−40	250	Rockhard or Firm	Water, high pressure
8656		o	o				Med. Weight Cotton Duck & Butyl					o			o	o		−40	250	Firm	Straight Phosphate Esters
8764	o	o	o				Virgin TFE	o	o	o	o	o	o	o	o	o	o	cryogenic	450	Hard	All fluids, medium pressure
9003						o	G.F. Nylon	o			o	o			o	o	o	−65	300	Hard	Mobile cylinder, piston or rod bearing
9188	o	o					Homogeneous Butyl					o			o	o		−40	250	Flex	Straight Phosphate Esters
9210	o	o					Polyurethane Elastomer	o			o				o	o	o	−70	200	Firm	Oil, air, water & emulsions, medium to high pressure
9220			o				Polyurethane Elastomer				o				o	o	o	−70	225	Firm	Oil, air, warm water Low to high pressure
9511			o				Homogeneous Nitrile	o			o				o	o	o	−40	225	Flex	Oil, air, water & emulsions, low to medium pressure
	o	o	o				BITAN® Leather	o			o				o		o	cryogenic	200	Firm	Most neutral fluids (pH 5-8) to very high pressure

Phosphate Ester Fluids: When ordering seals for this family of fluids, specify the specific phosphate fluid by trade name and fluid style or number.

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HOMOGENEOUS U-CUPS





FOR LOW PRESSURE AIR OR HYDRAULIC CYLINDERS AND AS WIPER RINGS ON PISTON RODS. Garlock homogeneous U-Cup Packings are molded of 70 shore durometer nitrile rubber. The U-Cup has flared sidewalls which create an interference fit and make it especially adaptable to applications involving sudden pressure changes where instantaneous sealing is needed or for applications where pressures are very low. The flared lip design provides a clearance at the heel of the packing which facilitates assembly, accommodates slight variations in cylinder bores, and reduces friction for low pressure applications.

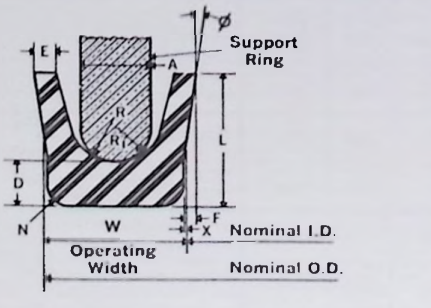
USES: Garlock rubber U-Cups are especially adapted to low-pressure air or hydraulic cylinder applications. With proper lubrication, synthetic rubber U-Cups develop very little frictional resistance.

PRESSURES: Garlock Style 9511 U-Cup Packing is recommended for pressures up to 2000 psi. When used at pressures 1000 to 2000 psi, a leather or TFE back-up washer is recommended to support the shoulder of the packing and to prevent extrusion at the heel.

SIZES: Standard sizes of Garlock homogeneous U-Cup Packings, from nominal 1/8" I.D. x 1/2" O.D. through 3" I.D. x 3¼" are listed in the table at the right. As indicated, many sizes meet J.I.C. commercial standards of dimensional design. All sizes correspond to AN–6226.

INSTALLATION: U-Cup Packings should be installed on a rod having maximum surface finish of 16 micro-inches to prevent excessive friction and subsequent wear.

The gland ring supporting the bottom or heel of the packing must be a close fit to the rod–having maximum clearance of .003 inches on a side. Clearance, however, is dependent upon pressures. Internal threads should be offset to prevent damage to the packing lips when installed. When used for air service, these cups should be lubricated to prevent excess friction.



W&L	D	E	F	R	N	ϕ	X	R_1
1/8	3/64	.030	.020	.020	1/64	13°	.008	.015
3/16	1/16	.038	.030	.050	1/32	13°	.008	.040
1/4	3/32	.045	.030	.070	1/32	11°	.008	.050
5/16	1/8	.050	.032	.093	1/32	10°	.008	.062
3/8	1/8	.054	.035	.125	3/64	8°	.008	.093

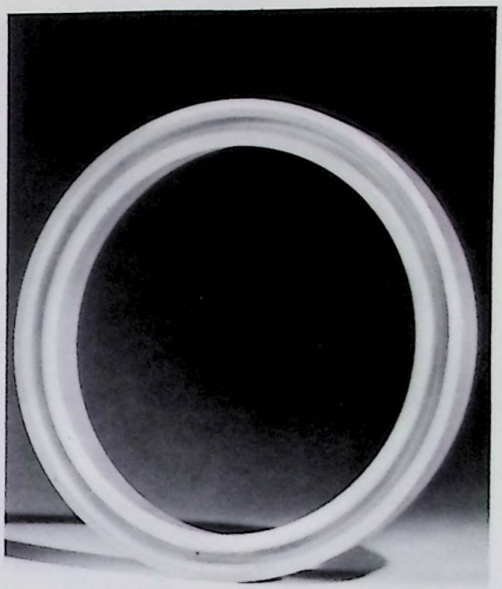
Note: A = 2xR_1.

Dash No.	W & L	Nominal I.D.	Nominal O.D.	Diameter ±.005 A	B	C	D	E	F	R	N
1	3/16	1/8	1/2	.140	.485	5/16	1/16	.038	.030	.050	1/32
2	3/16	3/16	9/16	.203	.548	3/8	1/16	.038	.030	.050	1/32
3	3/16	1/4	5/8	.265	.610	7/16	1/16	.038	.030	.050	1/32
4	3/16	5/16	11/16	.328	.673	1/2	1/16	.038	.030	.050	1/32
5	3/16	3/8	3/4	.390	.735	9/16	1/16	.038	.030	.050	1/32
6	3/16	7/16	13/16	.453	.798	5/8	1/16	.038	.030	.050	1/32
7	3/16	1/2	7/8	.515	.860	11/16	1/16	.038	.030	.050	1/32
*8	1/4	1/4	3/4	.265	.735	1/2	3/32	.045	.030	.070	1/32
9	1/4	5/16	13/16	.328	.798	9/16	3/32	.045	.030	.070	1/32
*10	1/4	3/8	7/8	.390	.860	5/8	3/32	.045	.030	.070	1/32
11	1/4	7/16	15/16	.453	.923	11/16	3/32	.045	.030	.070	1/32
*12	1/4	1/2	1	.515	.985	3/4	3/32	.045	.030	.070	1/32
13	1/4	9/16	1 1/16	.578	1.048	13/16	3/32	.045	.030	.070	1/32
*14	1/4	5/8	1 1/8	.640	1.110	7/8	3/32	.045	.030	.070	1/32
15	1/4	11/16	1 3/16	.703	1.173	15/16	3/32	.045	.030	.070	1/32
*16	1/4	3/4	1 1/4	.765	1.235	1	3/32	.045	.030	.070	1/32
17	1/4	13/16	1 5/16	.828	1.298	1 1/16	3/32	.045	.030	.070	1/32
*18	1/4	7/8	1 3/8	.890	1.360	1 1/8	3/32	.045	.030	.070	1/32
19	1/4	15/16	1 7/16	.953	1.423	1 3/16	3/32	.045	.030	.070	1/32
*20	1/4	1	1 1/2	1.015	1.485	1 1/4	3/32	.045	.030	.070	1/32
21	1/4	1 1/8	1 9/16	1.140	1.610	1 3/8	3/32	.045	.030	.070	1/32
*22	1/4	1 1/8	1 5/8	1.078	1.548	1 5/16	3/32	.045	.030	.070	1/32
23	1/4	1 3/16	1 11/16	1.203	1.673	1 7/16	3/32	.045	.030	.070	1/32
*24	1/4	1 1/4	1 3/4	1.265	1.735	1 1/2	3/32	.045	.030	.070	1/32
*25	5/16	1 1/4	1 7/8	1.265	1.860	1 9/16	1/8	.050	.032	.093	1/32
*26	5/16	1 3/8	2	1.390	1 985	1 11/16	1/8	.050	.032	.093	1/32
*27	5/16	1 1/2	2 1/8	1.515	2.110	1 13/16	1/8	.050	.032	.093	1/32
*28	5/16	1 5/8	2 1/4	1.640	2.235	1 15/16	1/8	.050	.032	.093	1/32
*29	5/16	1 3/4	2 3/8	1.765	2.360	2 1/16	1/8	.050	.032	.093	1/32
*30	5/16	1 7/8	2 1/2	1.890	2.485	2 3/16	1/8	.050	.032	.093	1/32
*31	5/16	2	2 5/8	2.015	2.610	2 5/16	1/8	.050	.032	.093	1/32
*32	5/16	2 1/8	2 3/4	2.140	2.735	2 7/16	1/8	.050	.032	.093	1/32
*33	5/16	2 1/4	2 7/8	2.265	2.860	2 9/16	1/8	.050	.032	.093	1/32
*34	5/16	2 3/8	3	2.390	2.985	2 11/16	1/8	.050	.032	.093	1/32
*35	5/16	2 1/2	3 1/8	2.515	3.110	2 13/16	1/8	.050	.032	.093	1/32
*36	3/8	2 1/2	3 1/4	2.515	3.235	2 7/8	1/8	.054	.035	.125	3/64
37	3/8	2 5/8	3 3/8	2.640	3.360	3	1/8	.054	.035	.125	3/64
*38	3/8	2 3/4	3 1/2	2.765	3.485	3 1/8	1/8	.054	.035	.125	3/64
39	3/8	2 7/8	3 5/8	2.890	3.610	3 1/4	1/8	.054	.035	.125	3/64
*40	3/8	3	3 3/4	3.015	3.735	3 3/8	1/8	.054	.035	.125	3/64
41	1/8	1/8	3/8	.135	.365	1/4	3/64	.030	.020	.020	1/64
42	1/8	3/16	7/16	.197	.427	5/16	3/64	.030	.020	.020	1/64
43	1/8	1/4	1/2	.260	.490	3/8	3/64	.030	.020	.020	1/64
44	1/8	5/16	9/16	.322	.552	7/16	3/64	.030	.020	.020	1/64
45	1/8	3/8	5/8	.385	.615	1/2	3/64	.030	.020	.020	1/64
46	1/8	7/16	11/16	.447	.677	9/16	3/64	.030	.020	.020	1/64
47	1/8	1/2	3/4	.510	.740	5/8	3/64	.030	.020	.020	1/64
48	3/16	5/8	1	.640	.984	13/16	1/16	.038	.030	.050	1/32
49	3/16	3/4	1 1/8	.765	1.109	15/16	1/16	.038	.030	.050	1/32
50	3/16	7/16	1 1/4	.890	1.234	1 1/16	1/16	.038	.030	.050	1/32
51	3/16	1	1 3/8	1.015	1.359	1 3/16	1/16	.038	.030	.050	1/32
52	3/16	1 1/8	1 1/2	1.140	1.484	1 5/16	1/16	.038	.030	.050	1/32
53	3/16	1 1/4	1 5/8	1.265	1.609	1 7/16	1/16	.038	.030	.050	1/32

NOTE: *Denotes J.I.C. Commercial Standards of Dimensional Design.
All sizes correspond with AN-6226.

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Garthane® U-Seals



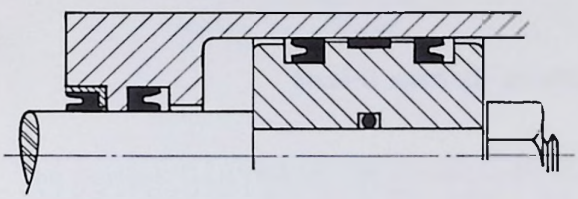
GARTHANE U-Seals are constructed of a proprietary Garlock formulation of urethane offering four times the tensile strength and tear resistance of conventional seal materials, excellent resilience, and superior heat resistance. GARTHANE U-Seals are engineered for long-life applications on hydraulic cylinder rods and pistons, press rams, accumulators, shock absorbers, lube pumps, periscope glands, quick disconnects, and valve stems.

The balanced lip configuration of this reverse bevel design affords direct interchange of the standard grooves for positive sealing on both pistons and piston rods.

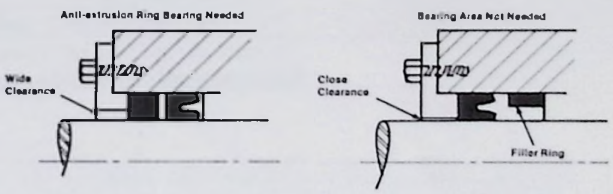
GARTHANE U-Seals have improved durability and sealing efficiency at sustained temperatures from –70°F. to +225°F., with satisfactory operation at intermittent elevated temperatures, depending on service conditions. GARTHANE material provides high resistance to compression set with temperature and pressure cycling.

GARTHANE compound is resistant to weather, ozone and the wide range of hydraulic fluids. Style 9220 GARTHANE U-Seals are available in diameters from 1/2" to 30" for heights and cross-sections from 1/8" to 2".

Equipment Designed for U-Seals



Equipment Designed for Multiple Lip Sets



Typical Physical Properties of GARTHANE U-Seals

Hardness, Durometer A	95
Tensile Strength, psi	6000
Elongation, Percent	500
Modulus at 100% Elongation at 300% Elongation	1500 2500
Brittle Point, ASTM D-746	-80°F.
Compression Set, Percent Method B, 22 hours at 158°F., Plied Discs	25
Tear, Die C, Pounds per Inch	600

Recommended Tolerances and Finishes

Groove Height Minimum	Seal Height +10% seal cross-section
Dynamic Surface Finish/Tolerance	20 RMS maximum/±.005" maximum
Static Surface Finish/Tolerance	60 RMS maximum/±.005" maximum

GARTHANE U-Seals withstand a high degree of deformation and can be stretched, bent, squeezed or folded to aid in installation. These seals are generally installed in snap-in grooves which enclose the seal as completely as possible.

When installing GARTHANE U-Seals, the following practices should be followed: • Installation tools should be free of burrs and sharp edges. • Mating metal areas or metal areas over which the seal must be applied should be free of nicks, sharp edges or burrs. Sleeves or other protective devices should be used on threads, keyways and splines. • The seal and metal area over which it must be applied should be lightly lubricated with suitable oil or the service media.

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FOR NEW DESIGN OR INTERCHANGE

The GARTHANE U-Seal is a compact and versatile lip seal for dynamic or static control of leakage on reciprocating hydraulic equipment. A high degree of radial loading is necessary for the sealing lips to assure contact with the housing for effective operation under low pressure or extreme misalignment. Mechanical loading is increased with the further application of hydraulic pressure eliminating the need for box adjustment springs or other means for axial compression of the seal. GARTHANE U-Seals are totally automatic.

GARTHANE material is your assurance of finest quality urethane formulation, providing low compression set, high tensile and modulus with exceptional abrasion resistance and resilience. It is proprietary and specifically compounded for use in reciprocating hydraulic seals.

Generally, standard U-Seal heights are selected for low and medium pressure service on cylinder rods, pistons or valve stems. Heavy-duty sizes and lengths are preferred for high pressure, extreme side loads or mechanical shock loads typical of rams, hoists or shock absorber applications.

U-Seals may be cut-down axially to fit available cavity space. To prevent rolling failure, seals of square cross section should be avoided, unless retrofit of existing cavity is required. In those cases up to 5/8" nominal cross section, height may be reduced to the cross section. For 5/8" or larger cross section, seal height may be reduced by 25 percent maximum.

The seal cavity length for GARTHANE U-Seals is unlimited except when in operation the rod stroke direction is from atmosphere to fluid side of the seal, then under low fluid pressure or vacuum. Tables 1 and 2 provide minimum seal cavity length required for the U-Seal in standard or heavy-duty height.

TABLE 1

Recommended Cross-Section and Heights for Garthane U-Seals

INCHES

Nominal Cross Section	1/8	3/16	1/4	5/16	3/8	1/2	5/8	3/4	7/8	1	1-1/8	1-1/4	1-3/8	1-1/2
Standard Height	1/4	5/16	3/8	1/2	5/8	3/4	1	1-1/8						
Heavy-Duty Height	3/8	1/2	1/2	3/4	7/8	1-1/8	1-1/8	1-3/8	1-3/8	1-1/2	1-1/2	1-3/4	1-3/4	2
Minimum I.D.	1/2	1/2	1/2	1/2	1/2	1	1-1/4	1-3/4	2	2				
Maximum I.D.	6	6-1/2	23	25	30	30	30	30	30	30	30	30	30	30

Consult Mold List ML-17002 for list of available sizes

TABLE 2

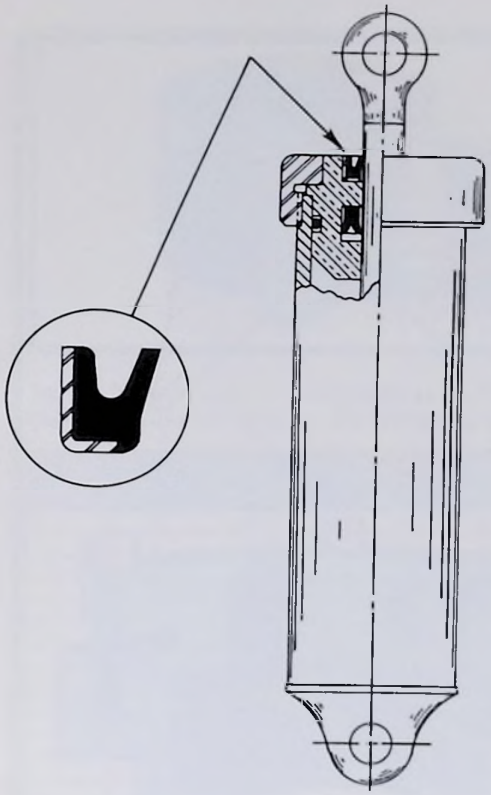
Minimum Cavity Length for a U-Seal

INCHES

Nominal Cross-Section	1/8	3/16	1/4	5/16	3/8	1/2	5/8	3/4	7/8	1	1-1/8	1-1/4	1-3/8	1-1/2
Standard U-Seal	9/32	11/32	13/32	17/32	21/32	13/16	1-1/16	1-7/32						
Heavy-Duty U-Seal	13/32	17/32	17/32	13/16	29/32	1-3/16	1-3/16	1-7/16	1-15/32	1-19/32	1-5/8	1-7/8	1-7/8	2-5/32

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GARTHANE® ROD SCRAPERS



Typical Physical Properties of Garlock Formulated GARTHANE

Hardness, Durometer A	90±5
Tensile Strength, %	6000
Elongation, %	400
Modulus at 100% Elongation at 300% Elongation	1600 3900
Low Temperature Brittleness, ASTM D-736, 5 hrs at −40° F.	Pass
Compression Set, % (Method B), 70 hrs at 158° F., Plied Discs	35
Tear, Die C, lbs/in.	600

Recommended Tolerance and Finishes

Shaft Chamfer:	*Nominal Size*	*Chamfer*
	up to 2"	30° with shaft C/L x 3/32" axially
	2" to 6"	30° with shaft C/L X 5/32" axially
	6" and up	30° with shaft C/L X 1/4" axially
Rod Hardness:	30 Rockwell C minimum	
Rod Tolerance:	±.003	
Rod Finish:	20 RMS maximum	
Rod Speed:	50 FPM typical	
Bore Chamfer:	None required	
Bore Tolerance:	up to 6" ±.001" 6"-10" ±.002" 10"-20" +.002" to .004"	
Bore Finish:	60 RMS maximum	
Bore Depth:	up to 6" +1/64" to −.000" 6" and up +1/32" to −.000"	

The Garlock GARTHANE rod scraper with the exclusive lip element of proprietary formulated polyurethane sets new standards of efficiency in excluding dirt, mud, and metal chips in demanding equipment applications. Designed for applications such as cylinders, link pin assemblies, railroad car shock absorbers, track adjusters and rollers, the GARTHANE rod scraper outlasts natural rubber scrapers as much as six times.

The GARTHANE scraper offers high tear strength, tensile, and excellent resistance to oils. It is non-scoring and accepts greater rod eccentricity and side-loading.

Simplicity of construction permits direct interchange in press-fit counterbore of existing equipment with conventional tools. The GARTHANE lip element is securely bonded to carbon steel and provides sufficient hoop strength and rebound characteristics to eliminate the need for mechanical springs. This highly engineered lip design assures proper scraping action with temperature ranges of −40°F. to +200°F.

The GARTHANE rod scraper is available in shaft sizes from 1" through 18" and for widths and flanges 3/16" through 1".

Conventional installation tools for metal shell seals are required to prevent misalignment which can lead to rod scraper damage. Exercise caution when installing over threads, splines, keyways or other obstructions. While installation can be made dry, lubrication of the scraper lip and mating surface is permissable. Normal care in handling and storage should be taken prior to installation.

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Garlock CHEVRON® packing

For rams, plungers and reciprocating rods

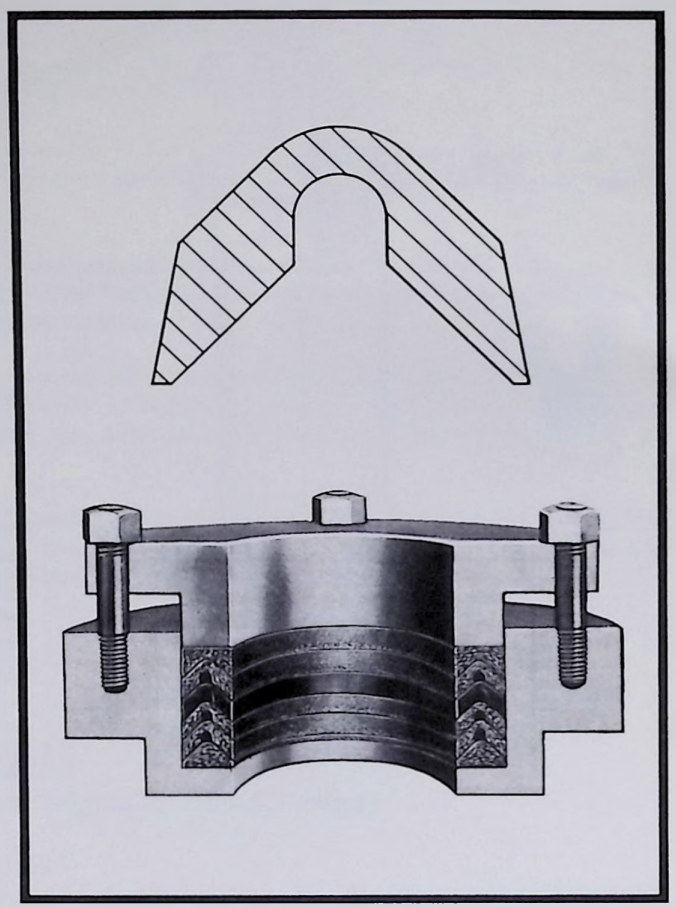
The packing that adjusts itself to automatically compensate for pressure changes. Instead of the usual inverted "V" construction, CHEVRON packing incorporates a flexible arch at the apex of the "V." See diagram. This allows the packing lips to fluctuate with changing pressures . . . tighten with increasing pressures . . . yield with diminishing pressures.

This friction relieving, pressure compensating action, plus a wide choice of materials put CHEVRON packings way ahead of ordinary V-types in trouble-free service life. Once you properly adjust the gland, no more adjustments are needed.

For the many materials in which this product is available . . . and the fluids and temperatures for which each is recommended . . . see the table on page 49.

Works efficiently in a shallow stuffing box. The design of CHEVRON packing permits nesting the rings. Thus you can use more rings in a stuffing box of given depth. A distinct advantage for shallow stuffing boxes . . . especially if pressures are high.

Furnished in rings and adapter rings. Garlock CHEVRON packing is available in ring form . . . usually in complete sets . . . a sufficient number of rings to fill required depth . . . male and female adapters are required to fit the set to the configuration of the box and gland. See depth tables Pages 48 - 51.



General recommendations for all CHEVRON packings against various pressures

This table is for general guidance. Many satisfactory CHEVRON packing installations can be made with packings smaller or larger than sizes indicated . . . and with more or less rings than shown. For sealing low pressures (static or dynamic) the use of a homogeneous ring is generally recommended. When pressures exceed 2000 psi we recommend the use of 261 male and female adapters or some other special hard material in adapter form.

Sizes from

3/16" I.D. thru 71" I.D.

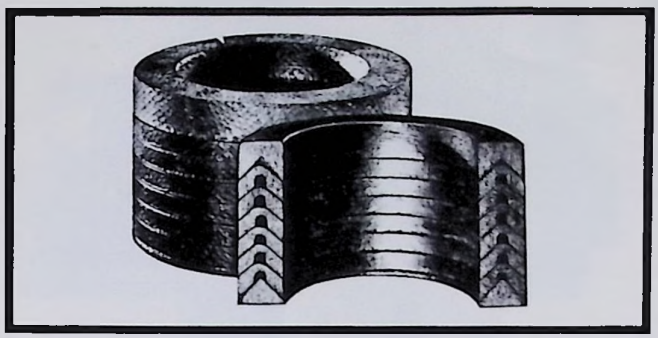
9/16" O.D. thru 72" O.D.

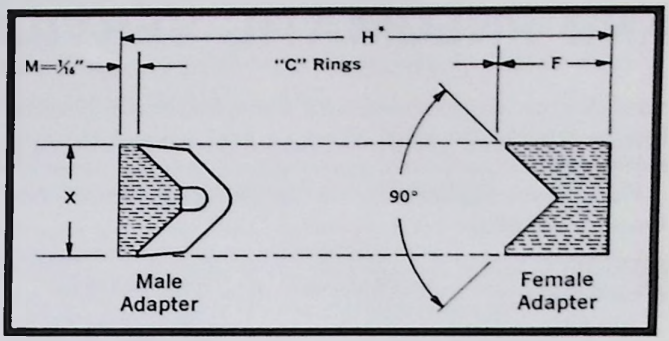
Diameter of Rod	¼" to 1½"	1½" to 2½"	2½" to 5"	5" to 16"	16" Up
Packing Space	¼	5/16	3/8	½	¾*
Pressures up to 1000 psi, use 3 rings, nominal depth of set	41/64	57/64	1	1 19/64	1 53/64
1000 to 2000 psi, use 4 rings, nominal depth of set	¾	1 1/16	1 3/16	1 17/32	2 5/32
2000 to 4000 psi, use 5 rings, nominal depth of set	55/64	1 15/64	1 3/8	1 43/64	2 31/64
4000 to 6000 psi, use 6 rings, nominal depth of set	31/32	1 13/32	1 9/16	2	2 13/16

*¾"—Other cross sections are available.

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Fabric reinforced CHEVRON® stack height standards





Special Notes: For ease in determining the nominal stack height of fabric CHEVRON packings refer to chart below. This chart does not apply to sets containing metal adapters or homogeneous CHEVRON.

Nominal Packing Space "X"	Stack Ht. of One CHEVRON "C" RING	Height of Adapter Rings M + F	Total Depth "H" (Which Includes "M" Plus "F" Plus Number of CHEVRON Rings as Indicated)					
			1 Ring	2 Rings	3 Rings	4 Rings	5 Rings	6 Rings
3/16	.109	.313	.422	.531	.641	.750	.859	.969
7/32	.109	.313	.422	.531	.641	.750	.859	.969
1/4	.109	.313	.422	.531	.641	.750	.859	.969
5/32	.156	.344	.500	.656	.813	.969	1.125	1.281
3/16	.172	.375	.547	.719	.891	1.063	1.234	1.406
11/32	.188	.406	.594	.781	.969	1.156	1.344	1.531
3/8	.188	.438	.625	.813	1.000	1.188	1.375	1.563
13/32	.188	.469	.656	.844	1.031	1.219	1.406	1.594
7/16	.234	.500	.734	.969	1.203	1.438	1.672	1.906
15/32	.234	.563	.797	1.031	1.266	1.500	1.734	1.969
1/2	.234	.594	.828	1.063	1.297	1.531	1.766	2.000
17/32	.234	.625	.859	1.094	1.328	1.563	1.797	2.031
9/16	.234	.656	.891	1.125	1.359	1.594	1.828	2.063
5/8	.281	.719	1.000	1.281	1.563	1.844	2.125	2.406
11/16	.281	.781	1.063	1.344	1.625	1.906	2.188	2.469
3/4	.328	.844	1.172	1.500	1.828	2.156	2.484	2.813
13/16	.328	.906	1.234	1.563	1.891	2.219	2.547	2.875
7/8	.375	1.000	1.375	1.750	2.125	2.500	2.875	3.250
15/16	.375	1.063	1.438	1.813	2.188	2.563	2.938	3.313
1	.406	1.125	1.531	1.938	2.344	2.750	3.156	3.563
1 1/16	.406	1.187	1.594	2.000	2.406	2.813	3.219	3.625
1 1/8	.453	1.250	1.703	2.156	2.609	3.063	3.516	3.969
1 3/16	.500	1.313	1.813	2.313	2.813	3.313	3.813	4.313
1 1/4	.500	1.375	1.875	2.375	2.875	3.375	3.875	4.375
1 5/16	.547	1.438	1.984	2.531	3.078	3.625	4.172	4.719
1 3/8	.547	1.500	2.047	2.594	3.141	3.688	4.234	4.781
1 7/16	.594	1.563	2.156	2.750	3.344	3.938	4.531	5.250
1 1/2	.641	1.625	2.266	2.906	3.547	4.188	4.828	5.547

*Depths as shown normally held to ± 1/64 of inch per inch of stack height.

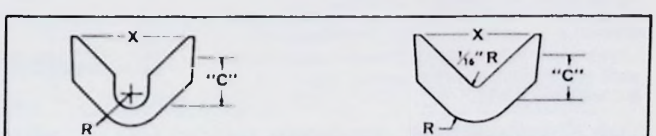
Homogeneous CHEVRON® to J.I.C. stack height standards

Garlock 7815



Garlock 8452 No-Hinge





Nominal Packing Space "X"	Stack Height of one CHEVRON "C" RING	R
3/16"	.083"	1/16"
7/32"	.083"	1/16"
1/4"	.083"	1/16"
5/16"	.140"	3/64"
3/8"	.156"	1/8"
7/16"	.197"	5/32"
1/2"	.197"	5/32"
9/16"	.197"	5/32"
5/8"	.250"	3/16"

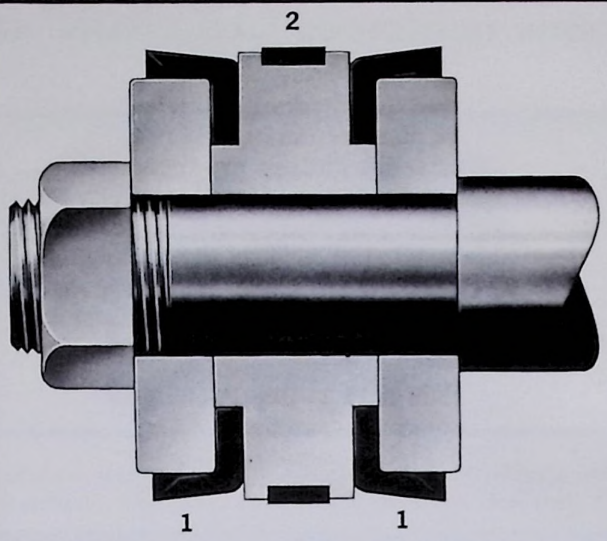
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MOLDED CUPS FOR HYDRAULIC AND PNEUMATIC SERVICE

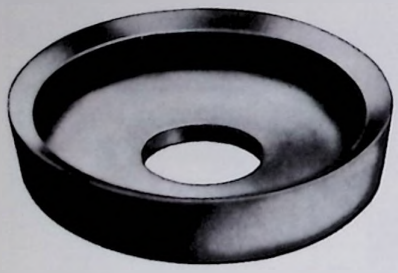
Garlock cups are produced with flared walls and beveled lips to provide the most effective seal against the cylinder wall.

For general applications the following cup dimensions are recommended.

For Cylinder Diameters	Height of Cup		Thickness of Cup	
	Minimum	Maximum	Minimum	Maximum
Below 1''	5/16''	7/16'	1/16''	3/32''
1'' to 2''	3/8''	1/2''	3/32''	1/8''
2'' to 3''	3/8''	5/8''	3/32''	3/16''
3'' to 5''	1/2''	3/4''	1/8''	3/16''
5'' to 8''	3/4''	1''	1/8''	1/4''
8'' & up	1''	1-1/4''	3/16''	1/4''



1. Garlock Molded Cup
2. Garlock 9003 (Nylon Wear Ring)—used on heavy duty hydraulic cylinder to prevent wear between piston and cylinder. Also prevents damage to piston cylinders.



FABRIC-INSERTED CUPS FOR NORMAL HYDRAULIC SERVICE

For pressures ranging from 200 p.s.i. to 2000 p.s.i., Garlock recommends a fabric-inserted cup for standard applications. Garlock offers these cups in a wide range of material combinations, formed from specially designed molds. Sizes include cylinder diameters up to and including 16''. See the following general recommendation chart for information to help you select the right molded cup.

FABRIC-INSERTED CUPS

SERVICE	GARLOCK NO.	RELATIVE HARDNESS	TYPE OF RUBBER	TYPE OF FABRIC INSERT
Mineral oils, greases or air at atmospheric temperature and high pressures. Hydraulic cylinders.	8136	Flexible	Neoprene	Heavy weight cotton duck
Mineral oils, greases or air at atmospheric temperature. Medium to high pressures.	7271	Flexible	Neoprene	Medium weight cotton duck
Mineral oils, greases or air at atmospheric temperature on hydraulic cylinder applications such as hydraulic jacks, grease guns, barber chairs, etc.	7131	Firm	Neoprene	Fine cotton duck
Water or air at atmospheric temperature. Medium to high pressures.	8619	Rockhard	SBR	Medium weight cotton duck
Suitable for most phosphate ester base fire-resistant fluids.	8656	Firm	Butyl	Medium weight cotton duck
Air at elevated temperatures, medium pressures, low pressure steam or superheated water at temperatures from 250° F and up.	813	Firm	SBR	Asbestos cloth

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METAL-BACKED CUPS FOR HIGH PRESSURE, HEAVY DUTY HYDRAULIC SERVICE



GARLOCK 9197 (U. S. PAT. NO. 2,630,357)

Metal-backed cups are made of neoprene and fabric. These cups are available for most standard cylinder diameters ranging from 1½" to 10".

Where service is too rough for ordinary cups, Garlock can furnish a rugged, metal-bonded, metal-reinforced cup for positive sealing on heavy-duty equipment. These new cups have two outstanding features that ensure durability.

1. Cup is bonded to a formed metal retainer—gives full support to heel section of cup and prevents creeping and extrusion at the heel.
2. Metal reinforcing plate bonded to cup stops flow and leakage at I.D. of cup; acts as a mechanical stop...eliminates overtightening, thus preventing distortion and deformation. Metal to metal also eliminates loss of bolt load and loosening of cup in service.

HOMOGENEOUS CUPS FOR PNEUMATIC AND LIGHT HYDRAULIC SERVICE

• Where close tolerances and fine finishes are present Garlock recommends a homogeneous cup. In most standard applications, 90 durometer material is recommended for the best ratio of low friction and wear properties. When sealing air or gas, adequate lubrication is essential for positive sealing and long service life.

Where lubrication is either impractical or impossible, Teflon (virgin or filled) should be considered for long, friction-free service.

Garlock will gladly assist you in design and testing of special Teflon or filled-Teflon cups to meet your individual requirements.

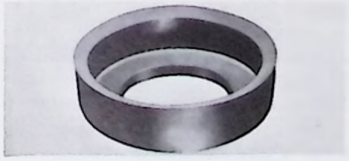


HOMOGENEOUS CUPS

SERVICE	GARLOCK NO.	MATERIAL	DUROMETER
Air, water and low pressure oil. Meets following specifications: ASTM-D-735-59T, Grade SB 915 E; MIL-D-17650; MIL-R-3065, Grade SB-910 A B E	8452	Nitrile	90
Skydrol 500, Cellulube (Not suitable for mineral base oils)	9188	Butyl	90
Most new lubricants, fuels, fluids, i.e. OS45, JP-4 fuel, high Octane gasoline, MIL-O-8200, 8515, Pydraul, Shell Iris 902	9659	Viton†	90
Air, gases without lubrication, high temperature (450° F), all solvents and acids (except HF acid).	8764	Teflon	
Cold and hot water, oil; temperatures—sub-zero to +160° F; high pressures.	57	BITAN* Leather	

†DU PONT REGISTERED TRADEMARK •GARLOCK REGISTERED TRADEMARK

CUPS FOR PUMP PISTONS



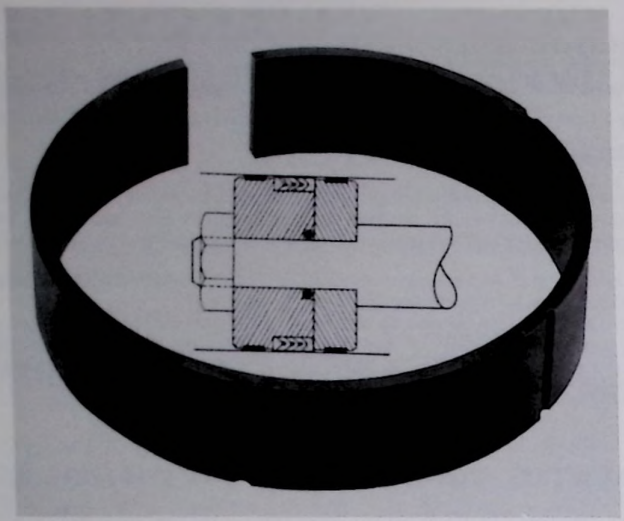
POSITIVE SEALING, LONG WEAR, MAXIMUM SEALING EFFICIENCY

Garlock Pump Cups, for inside packed reciprocating pumps, are made from molds specially designed to furnish cups that will (1) fit tightly against cylinder wall (2) not distort under high pressures. Garlock Pump Cups are made of synthetic rubber with a cotton fabric insert. The lips of these pump cups are treated with a phenolic resin to prevent liquid absorption and prolong wear. All cups are graphite-coated.

SERVICE	GARLOCK NO.	TYPE OF RUBBER	TYPE OF FABRIC INSERT
Hot water at any pressure. Cold water at pressures above 300 p.s.i.	540	SBR	Heavy weight cotton duck
Cold and warm oil at medium to high pressure	542	Neoprene	Medium weight cotton duck

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MARBLOCK® PISTON WEAR RINGS—STYLE 9003



COMPARE THE FINE ADVANTAGES OF MARBLOCK WITH OTHER WEAR RING MATERIALS:

- Greatly Extended Life
- Superior Wear Qualities
- NON-SCORE Features

Garlock MARBLOCK Wear Rings are smoother, harder . . . better bearings . . . yet, will pick up and absorb foreign particles in the cylinder, help keep cylinder area clear of metal pieces . . . yet, have no inherent imbedded materials that can score cylinder walls. For you, it adds up to smooth, unhampered piston operation, greater overall efficiency and longer cylinder life.
(U.S. Patent 3155015)

Specify Garlock MARBLOCK Wear Rings. They're available in a wide range of sizes for new equipment and will fit existing grooves in present equipment.

MARBLOCK Wear Rings are used mainly in heavy-duty hydraulic cylinders as a bearing to prevent scoring between piston and cylinder wall. Style 9003 is superior in wear qualities and life expectancy to other rings in use today.

Now...prevent damage to piston cylinders with Garlock MARBLOCK® Wear Rings

DIMENSIONS: Listed below is the design information and MARBLOCK Wear Ring size availability. As requirements dictate, additional molds will be made available. Contact your Garlock representative for more detailed information.

A NOMINAL CYLINDER DIAMETER (in.)	B TOTAL RING SPACE	C GROOVE WIDTH	D RING GAP	E RING WIDTH	WEAR RING CODE #16056-
2	.125/.131	.502/.512	5/32	.490/.500	0347
2 1/4	.125/.131	.502/.512	5/32	.490/.500	0219
2 1/4	.125/.131	.627/.637	5/32	.615/.625	0326
2 1/2	.125/.131	.315/.325	5/32	.303/.313	0325
2 1/2	.125/.131	.380/.390	5/32	.368/.378	0275
2 1/2	.125/.131	.502/.512	5/32	.490/.500	0099
2 3/4	.125/.131	.627/.637	5/32	.615/.625	0222
3	.125/.131	.502/.512	5/32	.490/.500	0126
3	.125/.131	.627/.637	5/32	.615/.625	0125
3	.125/.131	.752/.762	5/32	.740/.750	0252
3 1/8	.125/.131	.502/.512	5/32	.490/.500	0299
3 1/4	.125/.131	.627/.637	5/32	.615/.625	0279
3 1/2	.125/.131	.502/.512	5/32	.490/.500	0237
3 1/2	.125/.131	.627/.637	5/32	.615/.625	0101
3 1/2	.125/.131	1.002/1.012	5/32	.990/1.000	0344
3 5/8	.125/.131	.627/.637	5/32	.615/.625	0313
3 3/4	.125/.131	.627/.637	5/32	.615/.625	0351
3 3/4	.125/.131	1.002/1.012	5/32	.990/1.000	0332
3 15/16	.125/.131	.627/.637	5/32	.615/.625	0327
4	.125/.131	.377/.387	5/32	.365/.375	0305
4	.125/.131	.502/.512	5/32	.490/.500	0303
4	.125/.131	.627/.637	5/32	.615/.625	0119
4	.125/.131	1.002/1.012	5/32	.990/1.000	0127
4 1/4	.125/.131	.627/.637	5/32	.615/.625	0290
4 1/2	.125/.131	.502/.512	5/32	.490/.500	0161
4 1/2	.125/.131	.627/.637	5/32	.615/.625	0120
4 3/4	.125/.131	.752/.762	5/32	.740/.750	0223
5	.125/.131	.502/.512	3/16	.490/.500	0304
5	.125/.131	.627/.637	3/16	.615/.625	0121

A NOMINAL CYLINDER DIAMETER (in.)	B TOTAL RING SPACE	C GROOVE WIDTH	D RING GAP	E RING WIDTH	WEAR RING CODE #16056-
5	.125/.131	.752/.762	3/16	.740/.750	0097
5 1/8	.125/.131	.377/.387	3/16	.365/.375	0307
5 1/4	.125/.131	.492/.502	3/16	.480/.490	0232
5 1/4	.125/.131	.627/.637	3/16	.615/.625	0259
5 3/8	.125/.131	.627/.637	3/16	.615/.625	0213
5 1/2	.125/.131	.502/.512	3/16	.490/.500	0162
5 1/2	.125/.131	.627/.637	3/16	.615/.625	0093
6	.125/.131	.502/.512	3/16	.490/.500	0225
6	.125/.131	.627/.637	3/16	.615/.625	0123
6	.125/.131	1.002/1.012	3/16	.990/1.000	0122
6 1/2	.125/.131	.502/.512	3/16	.490/.500	0317
6 1/2	.125/.131	.627/.637	3/16	.615/.625	0163
7	.125/.131	.502/.512	3/16	.490/.500	0308
7	.125/.131	.627/.637	3/16	.615/.625	0104
7 1/4	.125/.131	.502/.512	3/16	.490/.500	0227
7 1/2	.125/.131	.502/.512	3/16	.490/.500	0318
7 1/2	.125/.131	.627/.637	3/16	.615/.625	0164
7 1/2	.125/.131	.752/.762	3/16	.740/.750	0124
8	.125/.131	.502/.512	3/16	.490/.500	0309
8	.125/.131	.627/.637	3/16	.615/.625	0266
8 1/4	.125/.131	.627/.637	3/16	.615/.625	0350
8 1/2	.125/.131	.502/.512	3/16	.490/.500	0226
8 1/2	.125/.131	.627/.637	3/16	.615/.625	0165
9	.186/.191	.377/.387	1/4	.365/.375	0276
9	.186/.191	.502/.512	1/4	.490/.500	0273
9	.125/.131	.627/.637	1/4	.615/.625	0319
9 1/2	.125/.131	.627/.637	1/4	.615/.625	0267
9 1/2	.186/.191	.502/.512	1/4	.490/.500	0342
9 7/8	.186/.191	.502/.512	1/4	.490/.500	0217

Specifications subject to change without notice

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Garlock industrial specialties

TFE All-purpose Lube is the most universal lubricant in the Garlock line. It is chemically inert and is an effective lubricant from –400° F to + 500° F. It has an extremely low coefficient of friction. It is not contaminated by dusty atmospheres and resists virtually all chemicals and solvents. May be used as an anti-stick or release agent and is ideal for applications where other lubricants will stain, run or congeal.

Packaging	Code No.
16 Oz. Aerosol Can	49215-2671

Dry Graphite Lube is useful where petroleum products must be avoided. Will withstand continuous temperature of 400° F and to 850° F, intermittently, depending on load demands. It is a handy lubricant for bearings, conveyors, springs, hinges, die casting machines and for general preassembly lubrication of manufactured equipment.

Packaging	Code No.
16 Oz. Aerosol Can	49211-2671

Chain Drive Lube is specially formulated to reduce wear and increase chain life. It contains a special MOLY S_2* additive which allows for maximum holding power because of its affinity for ferrous metals. Will withstand extremes in temperatures . . . will not fly off or break down.

Packaging	Code No.
16 Oz. Aerosol Can	49217-2671

Wire Rope and Gear Lube is a specially compounded lubricant designed to penetrate pores of metal. Heating is not necessary and black color is a guide to effective coverage. Will withstand severe temperature extremes, will not break down after repeated workings and has excellent rust-preventing qualities. Excellent outdoor lubricant, highly resistant to weathering.

Packaging	Code No.
16 Oz. Aerosol Can	49209-2671

Cutting Oil promotes maximum economy for metal cutting. The jet spray localizes this cutting compound exactly on work areas, reducing spillage and run-off. Will cling to curved surfaces. May be used for drilling, cutting, sawing and threading operations on the toughest stainless steels or softer metals such as aluminum.

Packaging	Code No.
14 Oz. Aerosol Can	49213-2671

Silicone Lubricant is a transparent film lubricant with excellent thermal and oxidation stability. It is noncorrosive and provides unique moisture repellent characteristics in such applications as locks, windows, instruments, latches and doors.

Packaging	Code No.
16 Oz. Aerosol Can	49212-2671

Silicone Mold Release provides a maximum release effect because of its extremely low surface tension. It is noncorrosive to most common metals even in the presence of oxygen. It cuts rejects, reduces marking, spotting or sticking of parts. Resists breakdown under mechanical shearing or heavy workload. Excellent electrical properties and high volume resistance makes it superior to petroleum products.

Packaging	Code No.
20 Oz. Aerosol Can	49218-2669

Moly-S_2 High Temp Lube is specially formulated from a concentrated dispersion of colloidal molybdenum disulfide. This unique dry lubricant provides unusually tight adhesion to practically all materials and is not affected by high pressure or temperatures up to 600°F. It is used typically during assembly and for run-in lubrication of new equipment, as a rubber mold release, as a wire drawing lubricant, and as a general maintenance lubricant.

Packaging	Code No.
16 Oz. Aerosol Can	49208-2671

*Garlock trademark for molybdenum disulfide.



Belt Dressing increases power efficiency as much as 50 per cent. Will not glaze, collect dirt or dust, and cleans belts of residual build-up. It contains no resin or asphalt and will perform effectively under wet, outdoor conditions. Use on flat, round or V belts of leather, rubber or fabric.

Packaging	Code No.
16 Oz. Aerosol Can	49210-2671

Anti-rust and Demoisturant has extremely low surface tension and high capillary action. It forms a continuous molecular film that spreads evenly and penetrates surface pores. It is compatible with other lubricants. Excellent protection for dies, jigs and fixtures, generators, ignition systems and electrical circuits.

Packaging	Code No.
16 Oz. Aerosol Can	49214-2671

Degreaser quickly turns grease and dirt into a liquid which can be easily flushed away with water. The emulsification that takes place will carry away the contaminants leaving a clean surface. It is used on all types of machinery, tools, engines and small parts that will not effect insulation or paints.

Packaging	Code No.
16 Oz. Aerosol Can	49216-2671

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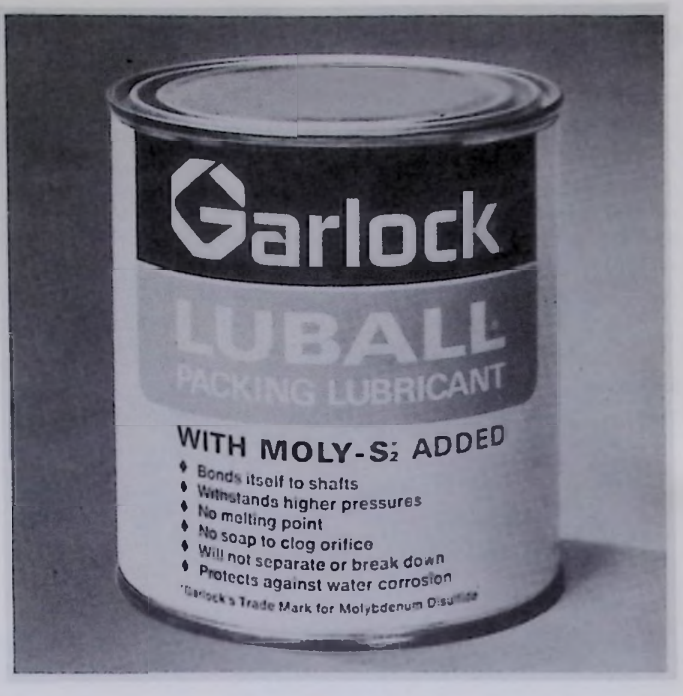
Garlock industrial specialties

Vinyl Protective Coating provides maximum convenience in protecting precision components in storage or shipping. Once applied the coating may be peeled from the sprayed areas. No solvent is required for removal. May be applied to castings, dies, lenses or any critical surface of precision components. Additional coats will build up film to desired thickness. Protects against rust, corrosion and abrasion.

Packaging	Code No.
16 Oz. Aerosol Can	49207-2671

Penetrating Oil is a special light oil formulated to release corroded and rusted parts. Its aerosol jet spray provides fast penetration right at the point of trouble. Ideal for lubrication of tight-fitting parts. Will not harm painted surfaces.

Packaging	Code No.
12 Oz. Aerosol Can	49171-2946



Luball® is a general stuffing box lubricant with Moly-S2 additive for water, steam and common chemical service from 32° up to 500° F. This completely waterproof lubricant paste contains no graphite, no soap or fillers to clog orifices. It maintains viscosity throughout its usable temperature range. It is insoluble in water and will not separate or break down.

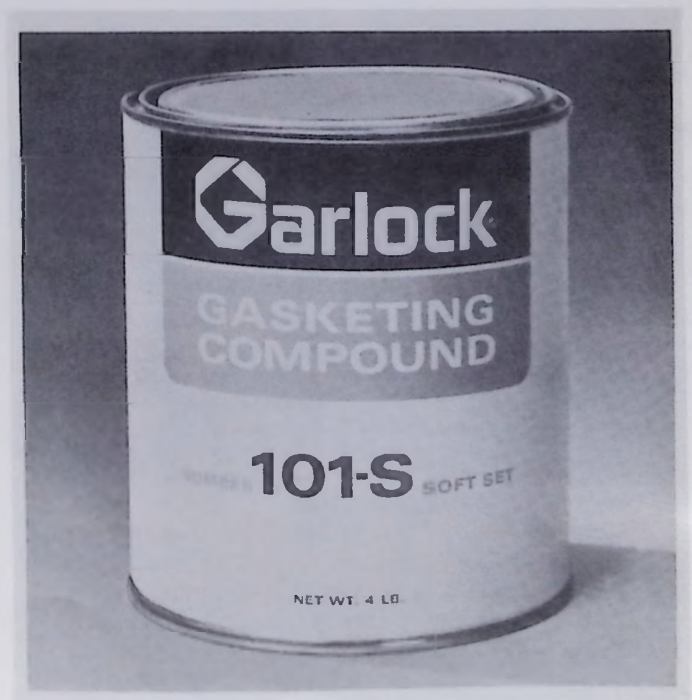
Packaging	Code No.
1 Lb. Can	49006-2671
4 Lb. Can	49006-2675
20 Lb. Pail	49006-5856
35 Lb. Pail	49006-5857

Tapping Compound is an all-purpose compound for use in drilling and tapping operations. It helps improve production and lowers costs, because it reduces the amount of torque required, permits higher speeds in metal machine operations, reduces tool breakage and work spoilage. Useful wherever there are boring, milling, reaming or lathe turning operations.

Packaging	Code No.
1 Lb. Can	49004-2671
2 Lb. Can	49004-2673
8 Lb. Can	49004-2677
40 Lb. Can	49004-2681

Lubricating Compound No. 2 is a specialized lubricant for use on rod packings, in stuffing boxes and on moving parts of die casting equipment. It has unusual heat resistance and wearing qualities.

Packaging	Code No.
20 Oz. Can	49002-2669
5 Lb. Can	49002-2676
50 Lb. Pail	49002-2684



Gasketing Compound No. 101-S is a non-hardening plastic compound used as a surface leveler on flanged joints and for temporary repair of torn or blown gaskets. Joints on which it is used do not "freeze", and are easy to disassemble at any time. Recommended for use at temperatures ranging from below 0° to +500° F on pipelines or other equipment handling water, steam, air, oil, gasoline, gas, weak acids or alkalies.

Packaging	Code No.
11 Oz. Tube	49206-0688
4 Lb. Can	49206-2675

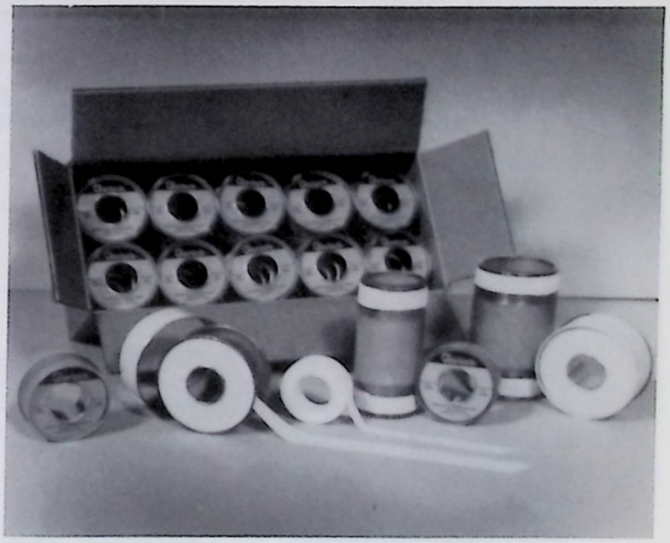
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Garlock industrial specialties



Plasti-Pak® TFE twisted packing is superior to conventional fluorocarbon packings for sealing valve stems and flanges. It is made by a special manufacturing process that twists several ribbons of Garlock PLASTI-THREAD tape into a tough, fibrous TFE cord. This added strength prevents blowouts, provides greater resistance to cold flow and allows compressibility for a positive seal. It is chemically inert, self-lubricating and unaffected by temperature extremes. It may be used with chemicals, gasoline, acids, steam, solvents, oils, liquid oxygen.

Packaging	Code No.
Metal Spool with Plastic Cover (12 rolls per case)	
3/32"x20"	49163-1320
3/32"x50"	49163-1350
5/32"x15"	49163-1515
5/32"x35"	49163-1535
7/32"x15"	49163-1715



Plasti-Thread® TFE tape is the quickest, neatest, cleanest way to seal a threaded joint. PLASTI-THREAD is 100% pure fluorocarbon in ribbon form; will seal threaded joints on any pipe including stainless steel, copper, plastic, brass, galvanized metal and aluminum. It is chemically inert and corrosion resistant. Withstands temperature extremes from –400° to +500° F. (See page 63).

Packaging	Code No. Cardboard Core (50 rolls per case)	Code No. Metal Spool
1/2"x260"	32164-1245	32164-1234
1/2"x520"	32164-1237	32164-1235
1/2"x1296"	32164-1238	32164-1236
3/4"x260"	32164-1251	32164-1239
3/4"x520"	32164-1242	32164-1242
3/4"x1296"	32164-1243	32164-1243

Pipe Thread Compound provides permanently tight, threaded joints in pipelines and other equipment. Ready to apply as it comes from the can. Available in Type A for use against steam, dry gas, water, alcohol, hot or cold heavy oils.

Packaging	Code No. Type A
1 Lb. Can	49007-2671
2 Lb. Can	49007-2673
4 Lb. Can	49007-2675
40 Lb. Can	49007-2681

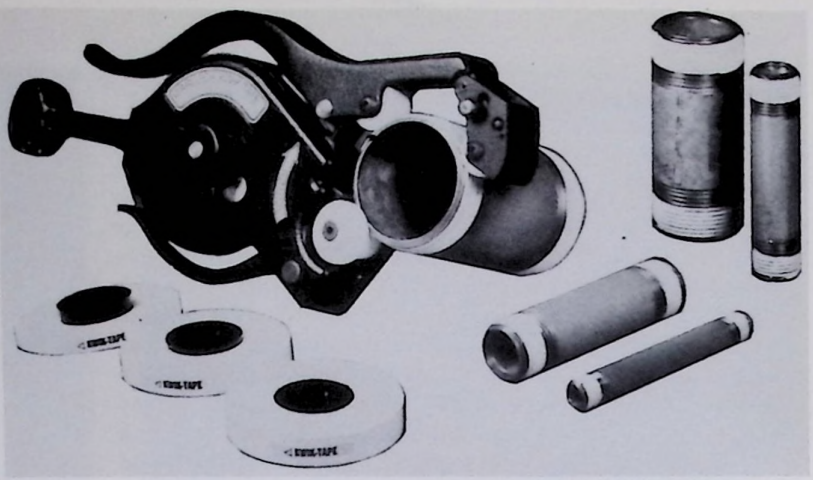
Garlock Flexible Packing Hooks. The flexible shafts of these sturdy, high-grade packing hooks make it much easier to remove old packing from cramped or hard-to-reach areas. The sharp point of the screw tip is easily inserted and anchored in the packing. And, should the tip become damaged, it can be easily unscrewed and replaced on the spot. Also, the threaded end of the flexible shaft may be used to remove tapped lanterns, bushings or other removal metal rings.

Packaging	Code No.
The complete set, "D" packaged in a strong metal box, includes:	49027-0001
Two No. 1 Flexible Hooks 7¾" long, with screw tip for packing spaces as small as 5/16". Screw thread size: 8-32	49027-0002
One Extra Screw Tip for No. 1 hook	49027-0004
Two No. 2 Flexible Hooks 10⅜" long, with screw tip, for packing spaces from ⅜" up. Screw thread size: ¼-20	49027-0005
One Extra Screw Tip for No. 2 hook	49027-0006
One No. 4 Solid Curved-End Hook with L-shaped handle	49027-0008
One No. 5 Solid Curved-End Hook with looped handle, ⅛" shank	49027-0012
One No. 6 Solid Curved-End Hook with looped handle, 3/16" shank	49027-0009
One Open End Wrench	

Extra screw tips for Nos. 1 and 2 may be purchased in sets of five using the above code numbers.

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Garlock KWIK-TAPE® portable hand tool* and PTFE thread sealant for on-the-spot sealing of male pipe threads



TAPE LOCATION: Tape located at least one turn back from lead end so there is no possibility of tape getting into the system.

EASY OPERATION: Even inexperienced workers can produce perfect wraps the first time. Tool will not wrap in wrong direction.

NO REWORK: Proper attachment of tape eliminates lost time in rework.

NO WASTE: Individually engineered tapes assure minimum tape usage for each pipe size.

RELIABILITY: PTFE, when applied with a Kwik-Tape Hand Tool, offers maximum protection against liquid and gas leaks and extends the fatigue life of sealed connections.

SHELF LIFE: Parts can be pre-wrapped, eliminating the use of messy liquid sealants.

CONSISTENT QUALITY: The Kwik-Tape Hand Tool uniformly wraps male threaded components from 1/8"-27NPT to 2"-11½NPT.

- Meets MIL-T-27730-A
- UL Approved (listing 172A)
- High Density
- High Tensile Strength
- Pure 99% PTFE (Polytetrafluorothylene)
- Nontoxic
- Nonabsorbent
- Nonflammable
- Unsintered
- Temperature range from Cryogenic to +500°F.







KWIK-TAPE TOOL in use. Place pipe in tool's jaws. Advance tape by an integral lever, rotate tool around part twice. Cut tape by built-in lever actuated knife.

Now there's a thread wrapping hand tool that goes anywhere male pipe threads must be sealed. This lightweight tool is perfect for wrapping threads on the site or for prewrapping at any location.

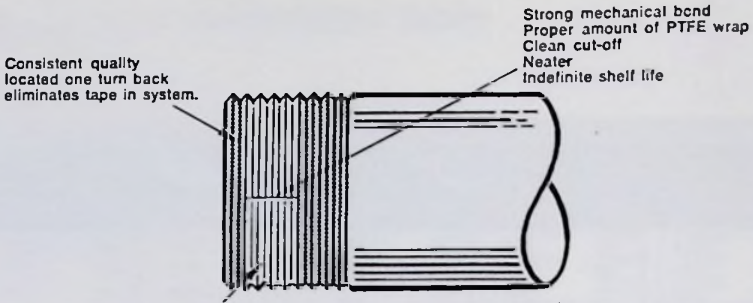
In use, the pipe is merely placed in the jaws of the tool, the tape advanced by an integral lever, the tool rotated around the part and the tape cut by the tool's built-in lever activated knife.

A Strong, tight mechanical bond between the tape and thread surface is assured. The tape is located at least one turn back from the lead end of the part. The tape will not loosen or peel during assembly, eliminating rework and the possibility of tape getting into the system.

Each Kwik-Tape hand tool accommodates a number of pipe sizes as shown in the table below. Kwik-Tape thread sealant is available in lengths and width, as shown. The thickness of this high tensile strength, high density PTFE tape is engineered to provide the optimum amount of thread sealant for a given pipe size with a minimum number of wraps.

*Patent Applied For

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HAND TOOL			TAPE				
Order Code No.	Model	Thread Size	Order Code No.	Part No.	Width	Thickness	Length
32164-2001	1	⅛"-27NPT	32164-2102	1535-4	¼"	.0035"	1500"
32164-2002	2	¼" & ⅜"-18NPT	32164-2102	1535-4	¼"	.0035"	1500"
32164-2003	3	½" & ¾"-14NPT	32164-2103	1535-6	⅜"	.0035"	1500"
32164-2004	4	1" to 2"-11½NPT	32164-2104	1044-8	½"	.0044"	1000"

Plasti—Thread® PTFE Tape Sealant

why use PTFE tape?

BETTER SEAL—Tight trouble-free seal virtually eliminates leaks.
CHEMICALLY INERT—PTFE is inert to almost all chemicals and solvents.
WIDE TEMPERATURE RANGE— −450°F to +500°F.
WIDE PRESSURE RANGE—From Hard Vacuum to 10,000 PSI.
ECONOMICAL TO USE—Easy to apply, can prewrap, no mess, no waste.
OTHER ADVANTAGES—No contamination, minimizes galling, self-lubricates joints and easy to take apart, unlimited shelf life.

why Garlock PLASTI-THREAD tape?

QUALITY—High tensile, high elongation, will not split when wrapping, not less than 99% pure PTFE and a full 3.5 mils thick. Medium density, specifically designed for optimum application. Soft enough to adhere and pull down into the threads while still enough PTFE to properly seal with minimum amount of tape. Meets MIL-T-27730-A and is UL approved under listing 172A.

PRICE—Inch for inch you can not purchase more economical, quality PTFE tape. Garlock's medium density PTFE tape requires fewer wraps to obtain a good quality leakproof seal.

PLASTI—THREAD GARLOCK PTFE TAPE SPECIFICATIONS

PROPERTIES	DATA
TENSILE STRENGTH	MINIMUM 1,300 PSI
ELONGATION	LENGTH — MINIMUM 50%
	WIDTH — MINIMUM 200%
DENSITY	1.20 ± .05
WIDTH	± 1/64"
THICKNESS	.0035 ± .0002"

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Steam table

Gauge Press. Lbs.	Temp. Deg. F.	Gauge Press. Lbs.	Temp. Deg. F.	Gauge Press. Lbs.	Temp. Deg. F.	Gauge Press. Lbs.	Temp. Deg. F.	Gauge Press. Lbs.	Temp. Deg. F.	Gauge Press. Lbs.	Temp. Deg. F.	Gauge Press. Lbs.	Temp. Deg. F.	Gauge Press. Lbs.	Temp. Deg. F.
5	228	30	274	55	302	80	324	110	344	160	370	210	391	259	409
6	230	31	275	56	303	81	324	112	345	162	371	212	392	261	409
7	233	32	277	57	304	82	325	114	346	164	372	214	393	263	410
8	235	33	278	58	305	83	326	116	348	166	373	216	394	265	411
9	237	34	279	59	306	84	327	118	349	168	374	218	394	267	411
10	240	35	281	60	307	85	327	120	350	170	375	220	395	269	412
11	242	36	282	61	308	86	328	122	351	172	376	222	396	271	413
12	244	37	283	62	309	87	329	124	352	174	377	224	397	273	413
13	246	38	284	63	310	88	330	126	353	176	378	226	397	275	414
14	248	39	285	64	311	89	330	128	354	178	378	228	398	277	415
15	250	40	287	65	312	90	331	130	355	180	379	230	399	279	415
16	252	41	288	66	312	91	332	132	356	182	380	232	400	281	416
17	254	42	289	67	313	92	332	134	357	184	381	234	400	283	416
18	255	43	290	68	314	93	333	136	359	186	382	235	401	285	417
19	257	44	291	69	315	94	334	138	360	188	383	237	401	295	420
20	259	45	292	70	316	95	334	140	361	190	384	239	402	305	423
21	261	46	293	71	317	96	335	142	362	192	384	241	403	355	437
22	262	47	294	72	317	97	336	144	363	194	385	243	403	375	442
23	264	48	295	73	318	98	336	146	364	196	386	245	404	385	444
24	265	49	297	74	319	99	337	148	365	198	387	247	405	405	449
25	267	50	298	75	320	100	338	150	366	200	388	249	405	455	460
26	268	51	299	76	321	102	339	152	367	202	388	251	406	510	472
27	270	52	300	77	321	104	340	154	368	204	389	253	407	560	481
28	271	53	301	78	322	106	341	156	368	206	390	255	407	585	486
29	273	54	302	79	323	108	343	158	369	208	391	257	408		

RPM/FPM conversion table approximate feet per minute

Shaft Dia.	RPM												
	100	300	500	1000	1500	1750	2000	2500	3000	3600	4000	4500	5000
½"	13	39	65	131	196	229	262	327	393	471	524	590	655
¾"	19	58	98	196	294	344	392	490	588	707	784	882	980
1"	26	78	131	262	392	458	524	655	785	942	1047	1178	1309
1¼"	32	98	163	327	490	573	654	817	981	1178	1309	1472	1636
1½"	39	118	195	393	589	687	785	976	1178	1414	1570	1717	1953
1¾"	45	137	229	458	687	821	916	1145	1374	1649	1832	2061	2290
2"	52	157	261	524	785	916	1057	1309	1571	1885	2094	2356	2618
2½"	65	196	327	655	982	1145	1309	1636	1963	2356	2618	2945	3271
3"	78	235	392	785	1178	1374	1571	1962	2355	2827	3141	3533	3925
3½"	91	275	458	916	1374	1604	1833	2290	2749	3299	3663	4121	4579
4"	104	314	523	1047	1570	1833	2094	2618	3141	3770	4186	4710	5233
5"	131	393	654	1309	1963	2291	2618	3272	3925	4712	5233	5890	6545
6"	157	471	785	1570	2356	2749	3141	3925	4710	5655	6280	7070	7850
7"	183	549	916	1832	2748	3207	3663	4579	5945				
8"	209	628	1047	2094	3141	3665	4187	5233					
9"	235	706	1178	2356	3533	4114	4710	5887					
10"	261	785	1309	2618	3925	4582	5233						

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Fahrenheit and centigrade conversion table

Cent.	Fahr.	Cent.	Fahr.	Cent.	Fahr.	Cent.	Fahr.	Cent.	Fahr.	Cent.	Fahr.	Cent.	Fahr.	Cent.	Fahr.
0	32	205	401	405	761	605	1121	805	1481	1005	1841	1205	2201	1405	2561
5	41	210	410	410	770	610	1130	810	1490	1010	1850	1210	2210	1410	2570
10	50	215	419	415	779	615	1139	815	1499	1015	1859	1215	2219	1415	2579
15	59	220	428	420	788	620	1148	820	1508	1020	1868	1220	2228	1420	2588
20	68	225	437	425	797	625	1157	825	1517	1025	1877	1225	2237	1425	2597
25	77	230	446	430	806	630	1166	830	1526	1030	1886	1230	2246	1430	2606
30	86	235	455	435	815	635	1175	835	1535	1035	1895	1235	2255	1435	2615
35	95	240	464	440	824	640	1184	840	1544	1040	1904	1240	2264	1440	2624
40	104	245	473	445	833	645	1193	845	1553	1045	1913	1245	2273	1445	2633
45	113	250	482	450	842	650	1202	850	1562	1050	1922	1250	2282	1450	2642
50	122	255	491	455	851	655	1211	855	1571	1055	1931	1255	2291	1455	2651
55	131	260	500	460	860	660	1220	860	1580	1060	1940	1260	2300	1460	2660
60	140	265	509	465	869	665	1229	865	1589	1065	1949	1265	2309	1465	2669
65	149	270	518	470	878	670	1238	870	1598	1070	1958	1270	2318	1470	2678
70	158	275	527	475	887	675	1247	875	1607	1075	1967	1275	2327	1475	2687
75	167	280	536	480	896	680	1256	880	1616	1080	1976	1280	2336	1480	2696
80	176	285	545	485	905	685	1265	885	1625	1085	1985	1285	2345	1485	2705
85	185	290	554	490	914	690	1274	890	1634	1090	1994	1290	2354	1490	2714
90	194	295	563	495	923	695	1283	895	1643	1095	2003	1295	2363	1495	2723
95	203	300	572	500	932	700	1292	900	1652	1100	2012	1300	2372	1500	2732
100	212	305	581	505	941	705	1301	905	1661	1105	2021	1305	2381	1505	2741
105	221	310	590	510	950	710	1310	910	1670	1110	2030	1310	2390	1510	2750
110	230	315	599	515	959	715	1319	915	1679	1115	2039	1315	2399	1515	2759
115	239	320	608	520	968	720	1328	920	1688	1120	2048	1320	2408	1520	2768
120	248	325	617	525	977	725	1337	925	1697	1125	2057	1325	2417	1525	2777
125	257	330	626	530	986	730	1346	930	1706	1130	2066	1330	2426	1530	2786
130	266	335	635	535	995	735	1355	935	1715	1135	2075	1335	2435	1535	2795
135	275	340	644	540	1004	740	1364	940	1724	1140	2084	1340	2444	1540	2804
140	284	345	653	545	1013	745	1373	945	1733	1145	2093	1345	2453	1545	2813
145	293	350	662	550	1022	750	1382	950	1742	1150	2102	1350	2462	1550	2822
150	302	355	671	555	1031	755	1391	955	1751	1155	2111	1355	2471	1555	2831
155	311	360	680	560	1040	760	1400	960	1760	1160	2120	1360	2480	1560	2840
160	320	365	689	565	1049	765	1409	965	1769	1165	2129	1365	2489	1565	2849
165	329	370	698	570	1058	770	1418	970	1778	1170	2138	1370	2498	1570	2858
170	338	375	707	575	1067	775	1427	975	1787	1175	2147	1375	2507	1575	2867
175	347	380	716	580	1076	780	1436	980	1796	1180	2156	1380	2516	1580	2876
180	356	385	725	585	1085	785	1445	985	1805	1185	2165	1385	2525	1585	2885
185	365	390	734	590	1094	790	1454	990	1814	1190	2174	1390	2534	1590	2894
190	374	395	743	595	1103	795	1463	995	1823	1195	2183	1395	2543	1595	2903
195	383	400	752	600	1112	800	1472	1000	1832	1200	2192	1400	2552	1600	2912
200	392														

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