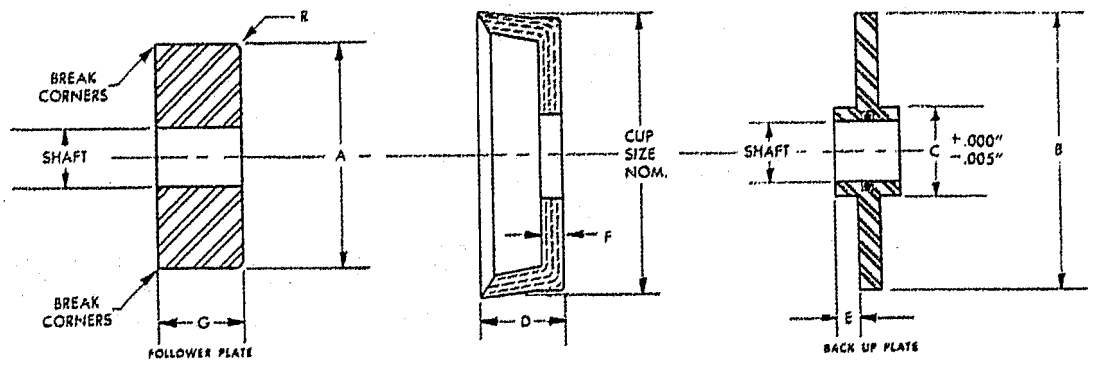
FILE NAME: Phenolic Resins (PHR)

DATE: 0000

DOC#: PHR028

DOCUMENT DESCRIPTION: Sales Literature from Crane, Pt. 2

STANDARD SIZES OF PISTON CUP PACKINGS



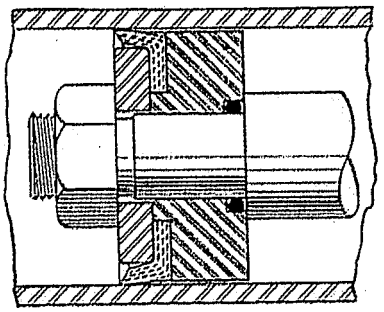
Cup Size Nom.	A	B	C Min.	G Min.	D	E +.000 -.003	F +.020 -.000	R Min.
1	.692	.990	.37	.375	.50	.120	.125	.03
1⅛	.819	1.115	.37	.375	.50	.120	.125	.03
1¼	.945	1.240	.37	.375	.50	.120	.125	.03
1⅜	1.069	1.365	.37	.375	.50	.120	.125	.03
1½	1.187	1.490	.50	.375	.50	.120	.125	.03
1⅝	1.316	1.615	.50	.375	.50	.120	.125	.03
1¾	1.443	1.740	.50	.375	.50	.120	.125	.03
1⅞	1.568	1.865	.50	.375	.50	.120	.125	.03
2	1.693	1.990	.50	.375	.50	.120	.125	.03
2⅛	1.816	2.115	.50	.375	.50	.120	.125	.03
2¼	1.943	2.240	.50	.375	.50	.120	.125	.03
2⅜	2.066	2.365	.50	.375	.50	.120	.125	.03
2½	2.187	2.490	.50	.375	.50	.120	.125	.03
2⅝	2.318	2.615	.50	.375	.50	.120	.125	.03
2¾	2.432	2.740	.50	.375	.50	.120	.125	.03
2⅞	2.569	2.865	.50	.375	.50	.120	.125	.03
3	2.625	2.990	.75	.469	.62	.151	.156	.03
3⅛	2.736	3.115	.75	.469	.62	.151	.156	.03
3¼	2.881	3.240	.75	.469	.62	.151	.156	.03
3⅜	3.006	3.365	.75	.469	.62	.151	.156	.03
3½	3.124	3.490	.75	.469	.62	.151	.156	.06
3⅝	3.251	3.615	.75	.469	.62	.151	.156	.06
3¾	3.374	3.740	.75	.469	.62	.151	.156	.06
3⅞	3.500	3.865	.75	.469	.62	.151	.156	.06
4	3.627	3.990	.75	.469	.62	.151	.156	.06

Cup Size Nom.	A	B	C Min.	G Min.	D	E +.000 -.003	F +.020 -.000	R Min.
4¼	3.875	4.240	.75	.469	.62	.151	.156	.06
4½	4.139	4.490	1.00	.469	.62	.151	.156	.06
4¾	4.377	4.740	1.00	.469	.62	.151	.156	.06
5	4.563	4.990	1.50	.563	.75	.182	.187	.06
5¼	4.826	5.240	1.50	.563	.75	.182	.187	.06
5½	5.058	5.490	1.50	.563	.75	.182	.187	.12
5¾	5.316	5.740	1.50	.563	.75	.182	.187	.12
6	5.563	5.990	1.50	.563	.75	.182	.187	.12
6¼	5.810	6.240	1.50	.563	.75	.182	.187	.12
6½	6.057	6.490	2.00	.563	.75	.182	.187	.12
6¾	6.309	6.740	2.00	.563	.75	.182	.187	.12
7	6.569	6.990	2.00	.563	.75	.182	.187	.12
7¼	6.805	7.240	2.00	.563	.75	.182	.187	.12
7½	7.068	7.490	2.50	.563	.75	.182	.187	.12
7¾	7.315	7.740	2.50	.563	.75	.182	.187	.12
8	7.451	7.990	3.75	.750	1.00	.245	.250	.12
8½	7.943	8.490	3.75	.750	1.00	.245	.250	.12
9	8.443	8.990	4.00	.750	1.00	.245	.250	.12
9½	8.937	9.490	4.00	.750	1.00	.245	.250	.12
10	9.429	9.990	5.00	1.00	1.25	.245	.250	.12
10½	9.927	10.490	5.00	1.00	1.25	.245	.250	.12
11	10.425	10.990	5.00	1.00	1.25	.245	.250	.12
11½	10.925	11.490	5.00	1.00	1.25	.245	.250	.12
12	11.424	11.990	5.00	1.00	1.25	.245	.250	.12

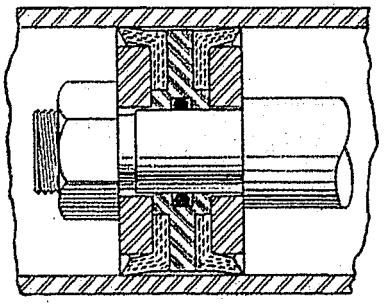
NOTES:
1. Hole size (dimension C) is minimum only and can be furnished larger.
2. R is radius of packing and inside follower plate.
3. All cups have flared walls so that lip diameter will have required interference with cylinder bore.
4. Above are standard sizes recommended for new designs. For equipment already in use, other sizes are available.

TYPICAL INSTALLATIONS

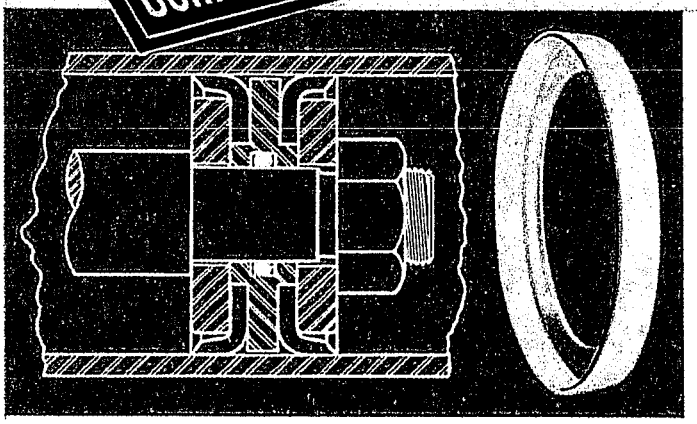
SINGLE ACTING

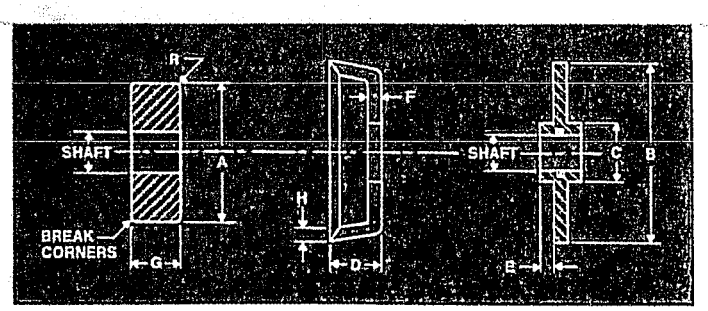


DOUBLE ACTING



TFE Piston Cup Packings





Chemlon TFE Cup Packings are precision machined in a wide range of sizes. For designers of new equipment, it is recommended that the standard cup sizes referred to in the drawing and in the accompanying table at the right be followed whenever possible, since they are the most popular sizes in use today. It is well to remember that the hole size ("C" dimension) is minimum only and can be ordered larger as required. If unable to use standard cup sizes shown, Crane Packing Company can manufacture to any size.

DESIGN and INSTALLATION

The drawing shows a typical example of a single acting and a double acting unit that includes the follower plate and spacer. Designing the plunger with a shoulder cut on the bottom accomplishes a two-fold purpose: (1) by centering the cup on the plunger proper allowance for compression of the cup bottom is made, and it is prevented from working loose under pressure and (2) undue compression of the cup base by mechanical or actuating pressure will force the heel of the cup to bind against the cylinder wall and greatly reduce packing life. Dimensions for shoulder "E" (drawing at right) should allow for proper compression of the cup bottom and prevent leakage under the inside follower plate.

Where shouldered piston rods are used, it is recommended that a TFE O-ring static seal be installed to prevent leakage along the rod. This will eliminate the necessity of employing the more expensive tapered piston rod and piston assembly. When large diameter cups are used (4" O.D. or over), several equally spaced bolts or screws are recommended in order to secure the cup installation firmly in place. All bolts should be uniformly tightened to insure even compression on the cup bottom.

CLEARANCES

It is recommended that all installations be made with close clearances and with square corners to prevent cup extrusion. The spacer or back follower plate should have a good fit in the cylinder, as this plate supports the cup heel. Excessive clearance between the spacer and the cylinder wall results in early cup failure because of the extrusion of the heel of the cup into the clearance gap. Clearances resulting from the bore diameter (cup size nominal) and shown in drawing as "B" diameter are recommended for normal operating pressures up to 2000 PSI.

The inside follower plate should have clearance as indicated by "A" diameter to prevent pinching of the lip against the cylinder bore.

For best results, cylinder bores should be finished to 15 RMS.

CUP SIZE NOM.	A	B	C MIN.	G MIN.	D	E +.000 −.003	F +.005 −.000	R MIN.	H
1	.834	.990	.37	.375	.375	.060	.062	.03	.045
1-1/8	.961	1.115	.37	.375	.375	.060	.062	.03	.045
1-1/4	1.087	1.240	.37	.375	.375	.060	.062	.03	.045
1-3/8	1.211	1.365	.37	.375	.375	.060	.062	.03	.045
1-1/2	1.329	1.490	.50	.375	.375	.060	.062	.03	.045
1-5/8	1.332	1.615	.50	.375	.437	.120	.125	.03	.045
1-3/4	1.459	1.740	.50	.375	.437	.120	.125	.03	.045
1-7/8	1.584	1.865	.50	.375	.437	.120	.125	.03	.045
2	1.709	1.990	.50	.375	.437	.120	.125	.03	.045
2-1/8	1.832	2.115	.50	.375	.437	.120	.125	.03	.062
2-1/4	1.959	2.240	.50	.375	.50	.120	.125	.03	.062
2-3/8	2.082	2.365	.50	.375	.50	.120	.125	.03	.062
2-1/2	2.203	2.490	.50	.375	.50	.120	.125	.03	.062
2-5/8	2.334	2.615	.50	.375	.50	.120	.125	.03	.062
2-3/4	2.448	2.740	.50	.375	.50	.120	.125	.03	.062
2-7/8	2.585	2.865	.50	.375	.50	.120	.125	.03	.062
3	2.703	2.990	.75	.469	.50	.120	.125	.03	.062
3-1/8	2.814	3.115	.75	.469	.50	.120	.125	.03	.062
3-1/4	2.959	3.240	.75	.469	.50	.120	.125	.03	.062
3-3/8	3.084	3.365	.75	.469	.50	.120	.125	.03	.062
3-1/2	3.202	3.490	.75	.469	.50	.120	.125	.06	.062
3-5/8	3.329	3.615	.75	.469	.50	.120	.125	.06	.062
3-3/4	3.452	3.740	.75	.469	.50	.120	.125	.06	.062
3-7/8	3.578	3.865	.75	.469	.50	.120	.125	.06	.062
4	3.705	3.990	.75	.469	.50	.120	.125	.06	.062
4-1/4	3.953	4.240	.75	.469	.50	.120	.125	.06	.062
4-1/2	4.217	4.490	1.00	.469	.50	.120	.125	.06	.062
4-3/4	4.455	4.740	1.00	.469	.50	.120	.125	.06	.062
5	4.703	4.990	1.50	.563	.50	.120	.125	.06	.062
5-1/4	4.966	5.240	1.50	.563	.50	.120	.125	.06	.062
5-1/2	5.198	5.490	1.50	.563	.56	.120	.125	.12	.062
5-3/4	5.456	5.740	1.50	.563	.56	.120	.125	.12	.062
6	5.703	5.990	1.50	.563	.56	.120	.125	.12	.062
6-1/4	5.950	6.240	1.50	.563	.56	.120	.125	.12	.062
6-1/2	6.197	6.490	2.00	.563	.56	.120	.125	.12	.062
6-3/4	6.449	6.740	2.00	.563	.62	.120	.125	.12	.062
7	6.709	6.990	2.00	.563	.62	.120	.125	.12	.062
7-1/4	6.945	7.240	2.00	.563	.62	.120	.125	.12	.062
7-1/2	7.208	7.490	2.50	.563	.62	.120	.125	.12	.062
7-3/4	7.455	7.740	2.50	.563	.62	.120	.125	.12	.062
8	7.717	7.990	3.75	.750	.75	.120	.125	.12	.062
8-1/2	8.209	8.490	3.75	.750	.75	.120	.125	.12	.062
9	8.709	8.990	4.00	.750	.75	.120	.125	.12	.062
9-1/2	9.203	9.490	4.00	.750	.75	.120	.125	.12	.062
10	9.695	9.990	5.00	1.00	.75	.120	.125	.12	.062
10-1/2	10.193	10.490	5.00	1.00	.75	.120	.125	.12	.062
11	10.691	10.990	5.00	1.00	.75	.120	.125	.12	.062
11-1/2	11.191	11.490	5.00	1.00	.75	.120	.125	.12	.062
12	11.690	11.990	5.00	1.00	.75	.120	.125	.12	.062

NOTES: 1. Hole size ("C" dimension) is recommended minimum only and can be furnished larger or smaller.
2. "R" is radius of packing and inside follower plate.
3. All cups have flared walls so that lip diameter will have required interference with cylinder bore.
4. Above are standard sizes recommended for new designs. For equipment already in use, other sizes are available.

CRANE PACKING COMPANY
6400 OAKTON STREET, MORTON GROVE, ILLINOIS 60053
Offices, Factories And Warehouses Throughout The World

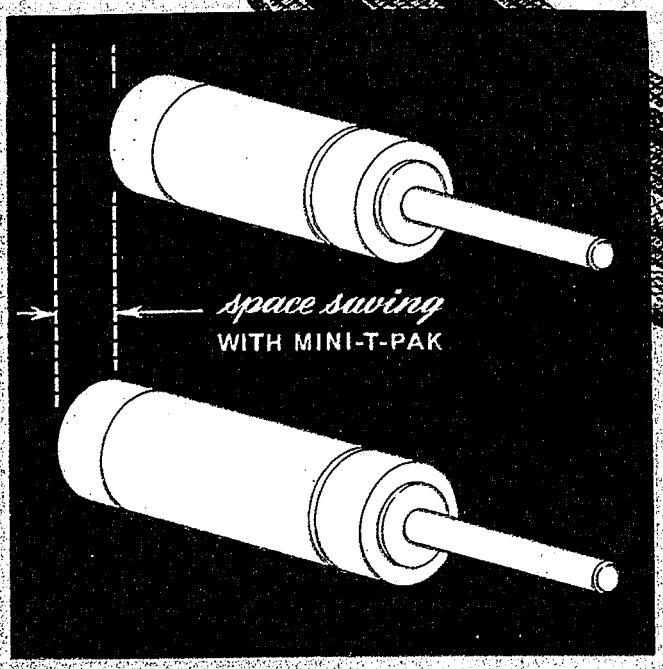
Printed in U.S.A.

BULLETIN P-374-3

John Crane

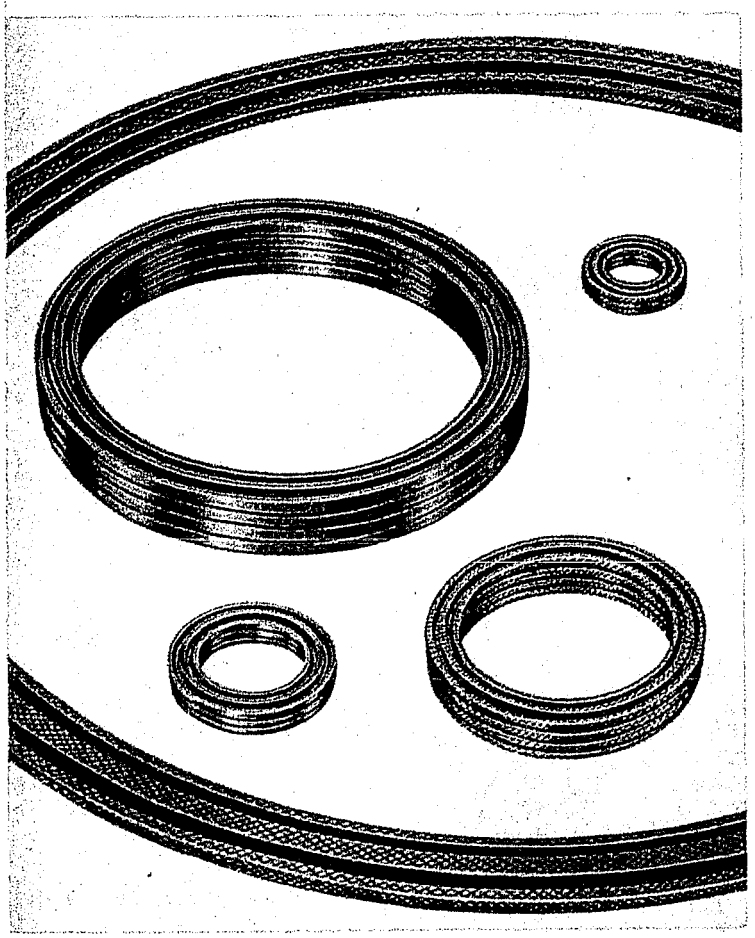
MINI-T-PAK

the *space saving* HYDRAULIC PACKING



MINI-T-PAK

John Crane Mini-T-Pak Rings provide an extremely compact packing installation in reciprocal motion applications. They offer many advantages over other type packing ring sets in both space savings and economy.



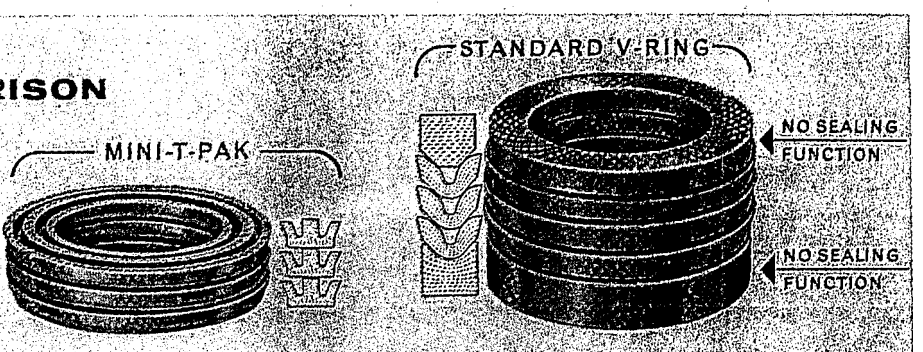
1. Longer stroke can be obtained from shorter cylinder length.
2. Adapters or special end rings are not required. This not only substantially contributes to space savings, but also eliminates the cost of these non-sealing elements.
3. Pedestal design of the rings controls the fixed height of the packing set to eliminate the need for gland adjustment. Expensive space adjusting gland follower systems are not needed. The pedestal design also assures independent action of each sealing lip. Compression adjustment against adjacent rings is not required for initial or subsequent sealing.
4. All rings are identical. There is no need to stock as sets.

Mini-T-Pak Rings can be furnished in both homogeneous rubber and fabric reinforced materials in a variety of compounds to cover a wide range of service applications. (See back pages.) While basically designed for hydraulic cylinders, they are also adaptable to pump rods and plungers, compressors, lubricators and many other reciprocating motion applications. Recommended finishes for contacting metal surfaces are 16 RMS for dynamic and 32 RMS for static.

Mini-T-Pak Rings are manufactured from synthetic rubber compounds or by carefully folding cotton duck cloth or asbestos cloth frictioned with a synthetic rubber binder to the required size. The pre-form is then precision molded and vulcanized under heat and pressure to form the proper size.

SPACE COMPARISON

Mini-T-Pak Rings are far more compact than standard V-rings. Note that male and female adapters, which have no sealing function and add to cost, are not required.



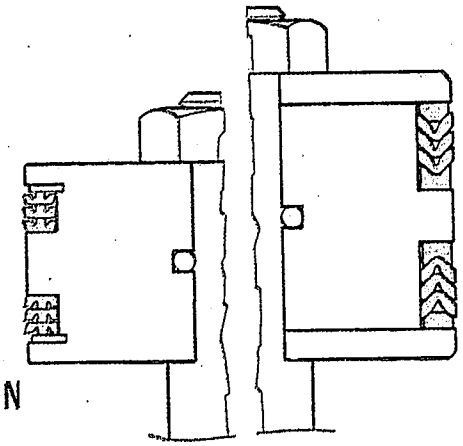
the

space saving

HYDRAULIC PACKING

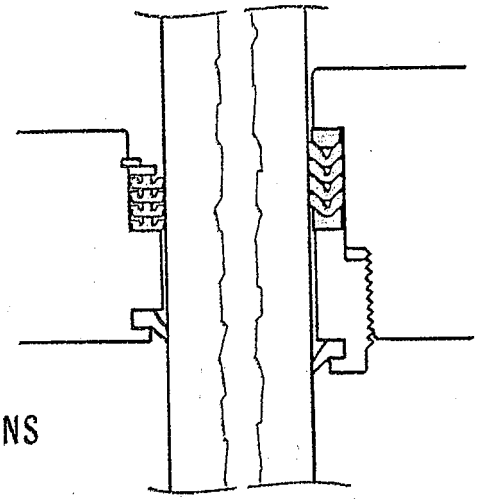
PEDESTAL DESIGN

PROVIDES MORE COMPACT PISTON INSTALLATION

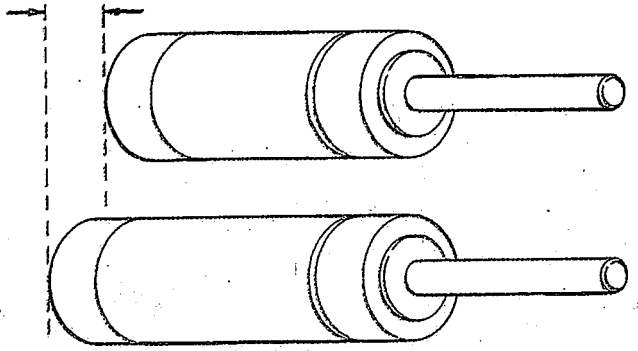


AND

ELIMINATES THE NEED FOR COSTLY GLAND FOLLOWER SYSTEMS IN ROD APPLICATIONS

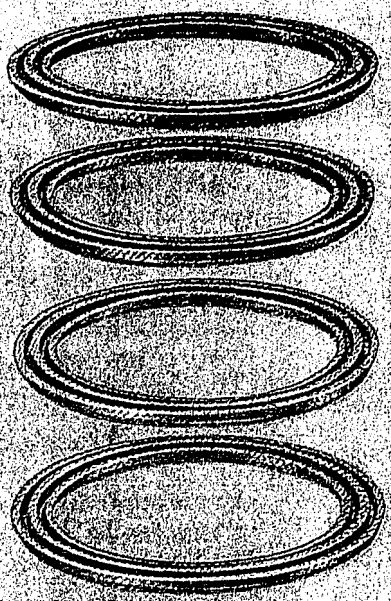


SHORTER CYLINDER LENGTH REQUIRED WITH MINI-T-PAK RINGS



LONGER CYLINDER LENGTH REQUIRED WITH OTHER TYPE PACKING RING SETS

ALL RINGS ARE IDENTICAL



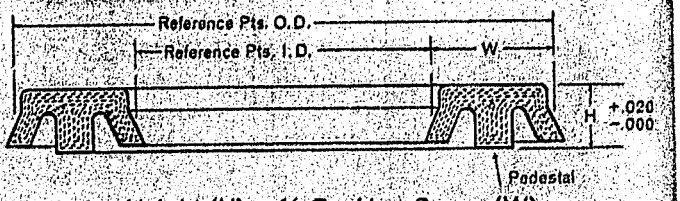
Adapters or special end rings not required.

Stocking as sets not necessary.

Inventory of rings provides a flexible stock to make-up sets or combination sets.

No left over rings.

SPACE RECOMMENDATIONS



Height (H) = ½ Packing Space (W)

PACKING SPACE	STUFFING BOX LENGTH (Installed Packing Height) NUMBER OF RINGS PER SET			
(W)	3	4	5	6
1/16	.375	.500	.625	.750
1/8	.390	.520	.650	.780
5/16	.483	.644	.805	.966
3/8	.576	.768	.960	1.152
7/16	.669	.892	1.115	1.338
1/2	.765	1.020	1.275	1.530
9/16	.858	1.144	1.430	1.716
5/8	.951	1.268	1.585	1.902
11/16	1.047	1.396	1.745	2.094
3/4	1.140	1.520	1.900	2.280

All dimensions shown in inches.

Recommended Number Of Rings Per Set

Pressure P.S.I.	Rings
0 To 500	3
500 To 2000	4
2000 And Up	5

Suggested Packing Dimensions

Rod Size	Packing Space
1/4" To 2"	1/4"
2" To 5"	3/8"
5" To 10"	1/2"
10" To 15"	5/8"
15" To 20"	3/4"
20" To 25"	7/8"
25" And Up	1"

materials and service recommendations

FABRIC REINFORCED MATERIALS

STYLE	MATERIAL	MAXIMUM SERVICE TEMP.	GENERAL RECOMMENDATIONS
821	Neoprene and cotton duck.	250°F.	Mineral base hydraulic oils, water and air. Hydraulic and pneumatic cylinder service.
824	Neoprene and asbestos cloth.	350°F.	Hot oil service.
829	Buna-N and cotton duck.	250°F.	Mineral base oils, gasoline, kerosene, fuel oil, water and water-oil emulsion hydraulic fluids.
830	Buna-N and asbestos cloth.	300°F.	Hot mineral base oils, fuels and gasoline.
820	Buna-S and cotton duck.	250°F.	Hot or cold water, water glycol hydraulic fluids, brine and aquaeous ammonia. Not suitable for mineral base oils.
823	Buna-S and asbestos cloth.	350°F.	Hot water and steam.
930	Butyl and cotton duck.	250°F.	Phosphate ester fire-resistant hydraulic fluids. Cannot be used with petroleum base oils.

HOMOGENEOUS RUBBER COMPOUNDS

STYLE NUMBER	SHORE "A" HARDNESS ±5	TEMP. °F.		GENERAL RECOMMENDATIONS
		MIN.	MAX.	
F9002	90	−40	+220	General service for air, water and mineral base hydraulic oils.
G8001	80	−40	+165	Especially developed compound for phosphate ester hydraulic fluid service. Cannot be used with mineral base oils.
O8000	80	−40	+200	
K8500	85	−20	+400	This Viton "A" compound has excellent resistance to mineral base oils and gasoline. Suitable for pneumatic applications with proper lubrication.

Special compounds and materials other than the above standard application and service types are available.

John Crane

CRANE PACKING COMPANY

6400 OAKTON STREET, MORTON GROVE, ILLINOIS 60053 *(Chicago Suburb)*

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In Australia: John Crane Mauri Pty., Ltd., 166 Eldridge Road, Bankstown, New South Wales, Australia
In Europe: Crane Packing Ltd., Slough, Bucks, England
In Japan: John Crane Japan, Inc., No. 5, Tenjinbashi-suji 6-chome, Oyodo-ku, Osaka 531, Japan

OFFICES, WAREHOUSES AND SERVICE THE WORLD OVER

Printed in U.S.A.

John Crane

Cranelite "M"

BULLETIN No. P-355

MOLDED ADAPTERS

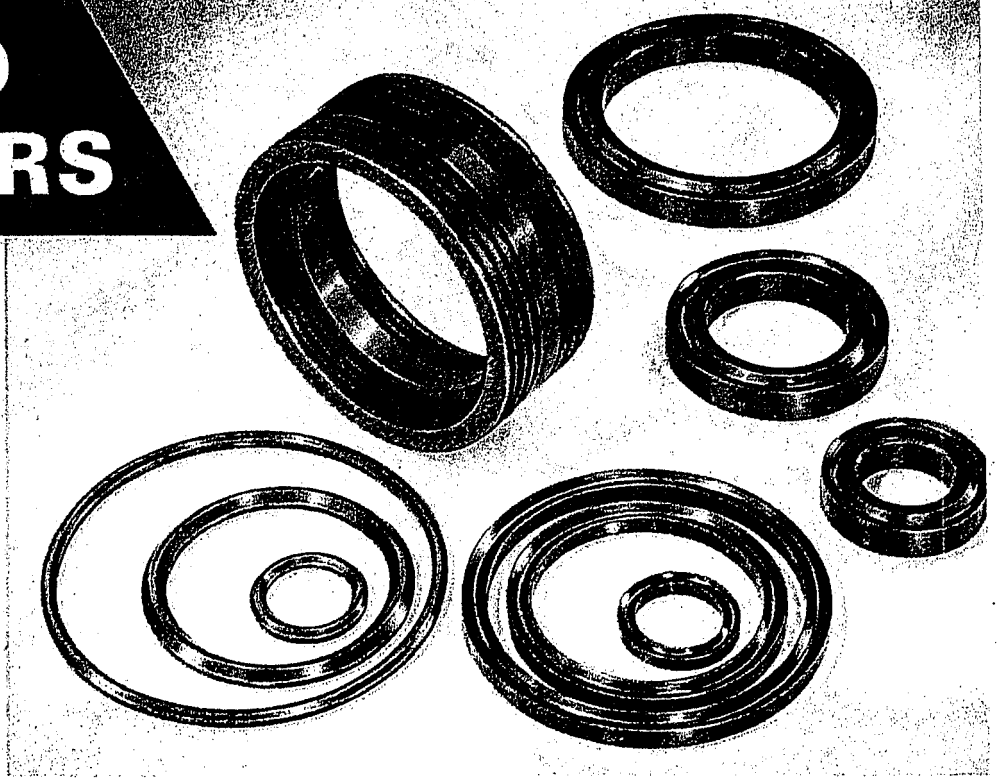
Greatly Extend Life Of V-Ring Packings

Non-Shattering

Non-Metallic

Will Not Chip Or Fracture

Last Much Longer Than Adapters Of Other Materials



Cranelite "M" Molded Phenolic Adapters and Support Rings are the most chip-resistant and break-proof on the market today. They are manufactured by an exclusive John Crane process in which interlaced cotton cords are impregnated with thermo-setting resins and molded under heat and pressure to desired shape and size. The result is an interwoven construction that reinforces in all directions and eliminates the fracture and chip prone "paths" characteristic to the layer construction of other molded and machined phenolics. This advantage, plus the inherent structural strength of Cranelite "M", permits the use of these adapters and support rings in place of expensive metal types. They actually outwear bronze and at the same time provide an excellent low-friction load carrying support surface that will not score the rod or the bore of the cylinder.

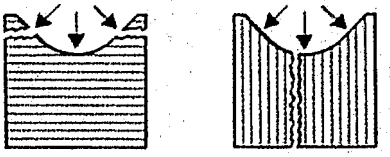
Cranelite "M" Adapters and Support Rings greatly increase the life of V-ring packings by preventing deformation due to mechanical loads and also prevent extrusion of soft packing materials. They are ideally suited for use in hydraulic and pneumatic systems and can be used with the most fire-resistant hydraulic fluids, including phosphate-ester types. Pressure range is up to 5000 psi., temperatures to 200° F.

Sizes are available up to 8" O.D., engineered to your requirements.

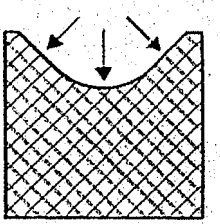
PHYSICAL PROPERTIES OF CRANELITE "M"

Durometer Hardness "D"	80 to 90
Flexural Strength ASTM D-790	26,600 PSI
Compression Strength ASTM D-695	29,400 PSI
Shear Strength ASTM D-732	7,980 PSI

WHY THE JOHN CRANE COMBINATION INTERLACED AND MOLDED CONSTRUCTION IS SUPERIOR TO OTHER TYPES



Typical examples of standard laminated construction. Cross sectional views show chipping and fracture path areas.



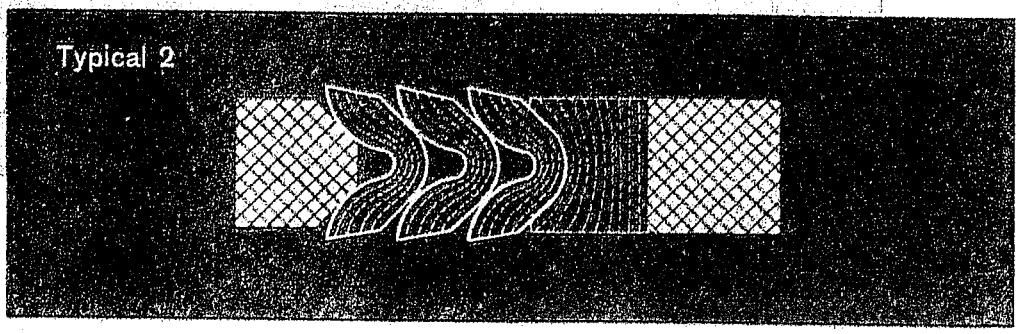
Cross section of John Crane construction. Interlaced cotton cords are impregnated with thermo-setting resins and molded under heat and pressure. This eliminates chipping and fracture path areas.

TYPICAL CRANELITE "M" APPLICATIONS

Rod Installations

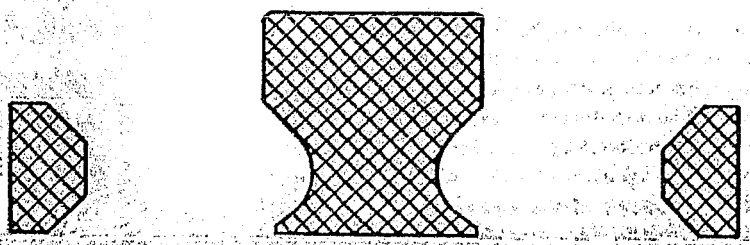
Typical 1

Typical 2

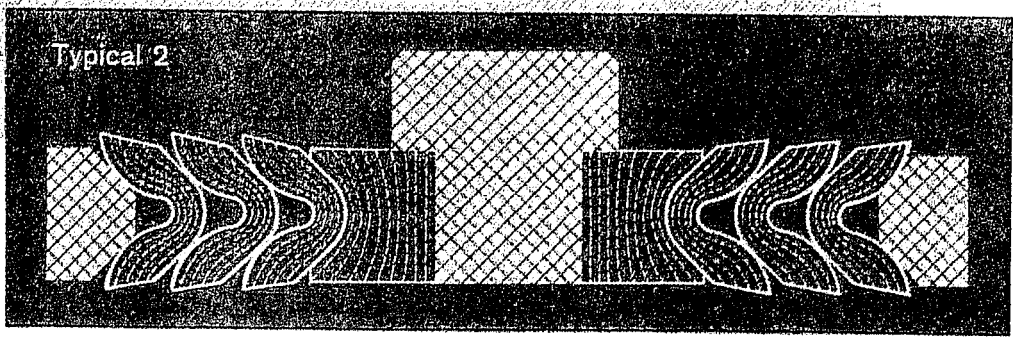


Piston Applications

Typical 1



Typical 2



CRANE PACKING COMPANY

6400 OAKTON STREET, MORTON GROVE, ILLINOIS 60053 *(Chicago Suburb)*

In Canada: Crane Packing Company, Ltd., Box 3248, Station C, Hamilton, Ont.
In Mexico: Industrias John Crane de Mexico, S.A. • Poniente 152 #679 Industrial Vallejo, Mexico, D.F.
In Brazil: John Crane Industria E Comercio, Ltda. • Avenida Jurubatuba 600, Sao Bernardo do Campo, S.P.
In Australia: John Crane Mauri Pty., Ltd., 166 Eldridge Road, Bankstown, New South Wales, Australia
In Europe: Crane Packing Ltd., Slough, Bucks, England
In Japan: John Crane Japan, Inc., No. 5, Tenjinbashi-suji 6-chome, Oyodo-ku, Osaka 531, Japan

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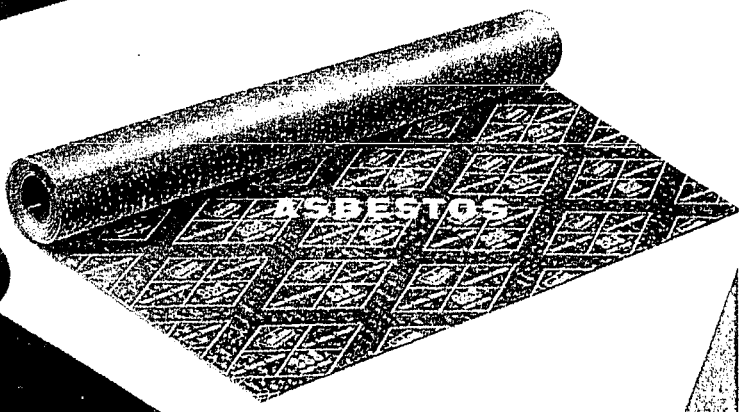
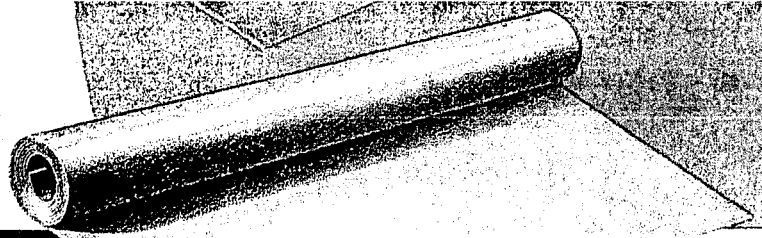
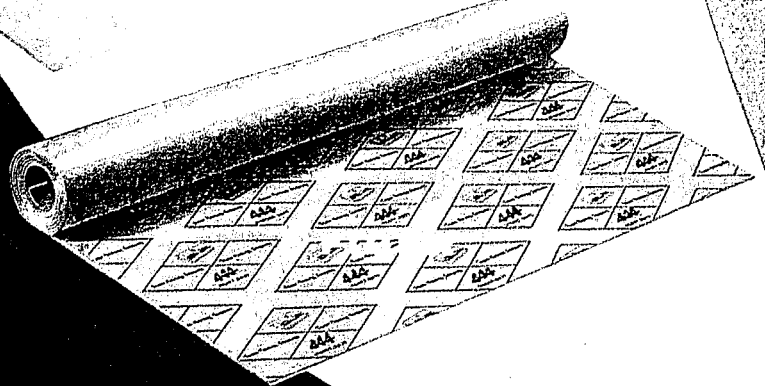
BULLETIN NO. P-328-8

John Crane



SHEET PACKING

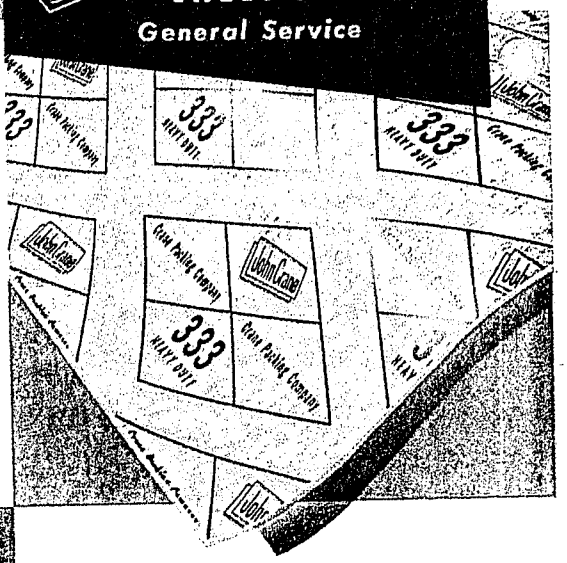




TFE

ASBESTOS SHEET PACKING

General Service



STYLE 333—Heavy Duty

Recommended for service applications too severe to be handled by general line of asbestos sheet packing, such as superheated steam, heavy duty ammonia compressors and many chemical solutions. Fabricated from over 75% long fiber Chrysotile asbestos, approximately 15% G.R.S. synthetic rubber binder, plus special curing compounds.

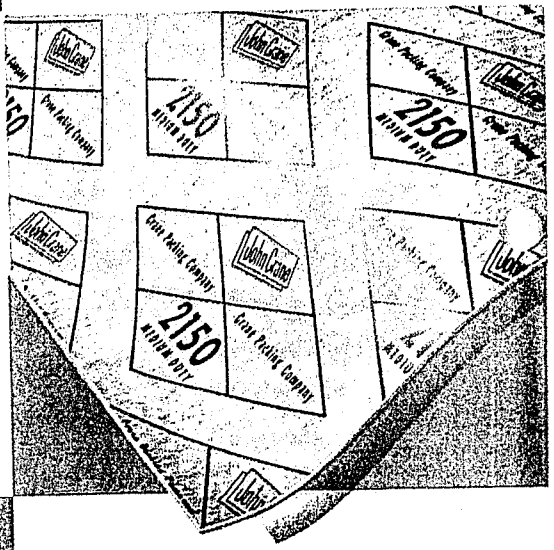
This style is supplied with a non-stick coating.

Tensile Strength: 5500 psi. average.

Standard Thicknesses: 1/64", 1/32", 1/16", 3/32", 1/8".

Sheet Sizes: 50" x 50", 60" x 60", 150" x 150" and 75" x 150", other sizes available on application.

Approx. Wt. Per Sheet: 50" x 50" x 1/16"—10 lbs., other sizes in proportion.



STYLE 2150—Medium Duty

For industrial, marine engine and general ship use at temperatures as high as +700°F., pressures to 400 psi. Fabricated from approx. 80% Chrysotile asbestos fiber, 12½% G.R.S. synthetic rubber binder, plus special curing compounds. Meets MIL-A-17472, Class II; MIL-A-7021-A Class II; and ASTM-1170-G-1111-1 specifications.

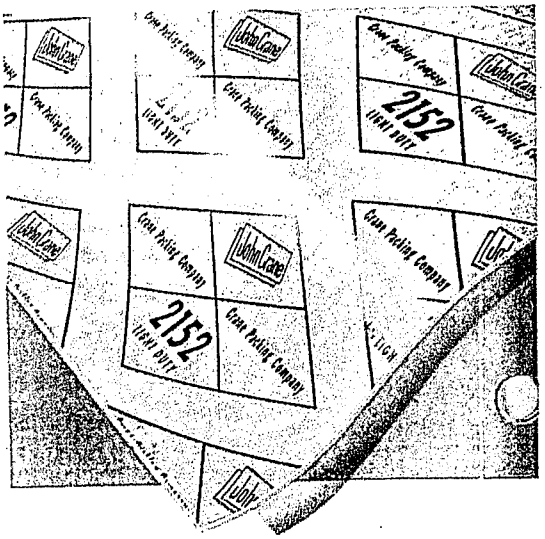
This style is supplied with a non-stick coating.

Tensile Strength: 3500 psi. average.

Standard Thicknesses: 1/64", 1/32", 1/16", 3/32", 1/8".

Sheet Sizes: 50" x 50", 150" x 150" and 50" x 150", other sizes available on application.

Approx. Wt. Per Sheet: 50" x 50" x 1/16"—10 lbs., other sizes in proportion.



STYLE 2152—Light Duty

Extensively used and recommended for automotive and general industrial purposes where service conditions are not too exacting. Fabricated from approx. 75% Chrysotile asbestos fiber, 11% synthetic rubber binder. Meets ASTM-1170-G-1111-2 specifications.

Tensile Strength: 2200 psi. average.

Standard Thicknesses: 1/64", 1/32", 1/16", 3/32", 1/8".

Sheet Sizes: 50" x 50", other sizes available on application.

Approx. Wt. Per Sheet: 50" x 50" x 1/16"—10 lbs., other sizes in proportion.

STYLE 888—Heavy Duty (BUNA-N BINDER)

For hot oil, gasoline and solvents, including vegetable and animal oils under heat and pressure. Unaffected by paraffin base and unsaturated aliphatic hydrocarbons, fatty acids found in vegetable and animal fats and oils, or by aliphatic alcohols, glycols or glycerols. Fabricated from quality asbestos, Buna-N binder. Contains no free sulphur. Will not corrode flanges. Meets AN-HH-G-171 and AMS-3232G specifications.

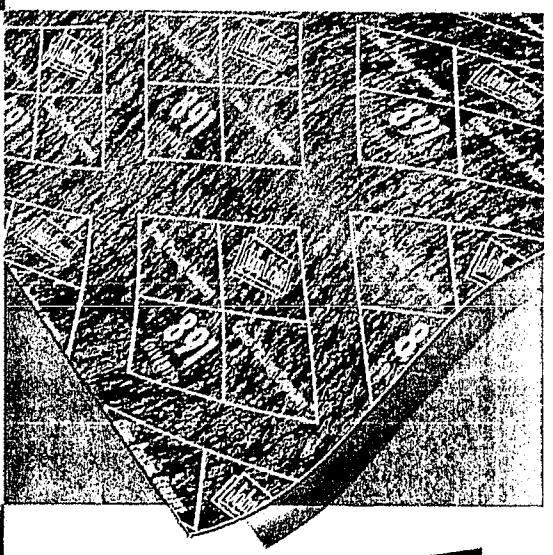
Tensile Strength: 4500 psi. average.

Standard Thicknesses: 1/64", 1/32", 1/16", 3/32", 1/8".

Sheet Sizes: 60" x 126", 60" x 63", other sizes available on application.

Approx. Wt. Per Sheet: 60" x 63" x 1/16"—15 lbs., other sizes in proportion.

STYLE 891—For Solvent Service (NEOPRENE BINDER)



Suitable for oils and solvents of gasoline and Tuluol types. Sheet is widely used in aircraft and diesel engines. Absence of sulphur adapts it to use with copper and brass, also for refrigeration work where corrosion is a problem. Fabricated from fiberized asbestos, neoprene binder. Meets difficult AMS-3232, as well as AN-G-171 and MIL-G-7021 Class I specifications. Also general automotive and aeronautical specifications G-1122 and G-1123.

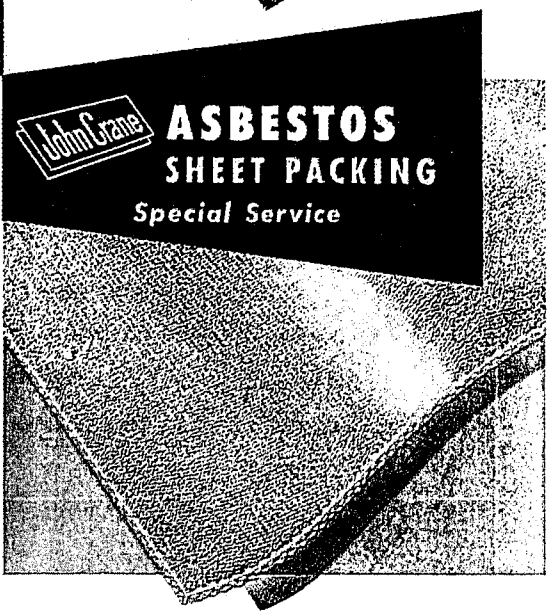
Tensile Strength: 3000 psi. average.

Standard Thicknesses: 1/64", 1/32", 1/16", 3/32", 1/8".

Sheet Sizes: 50" x 50", 60" x 60", other sizes available on application.

Approx. Wt. Per Sheet: 60" x 60" x 1/16"—16 lbs., other sizes in proportion.

STYLE 222—Woven Asbestos, Wire Inserted Gasket Sheet



Fabricated for use in high temperature installations such as diesel and gas engine manifolds, cylinder heads and the like. Also on narrow flanges where vibration is prevalent. Has low shrinkage characteristics, thus preventing loosening of flange bolts. Long fiber asbestos cloth is impregnated with a high density rubber compound and reinforced with fine brass wire for greater strength. One side is thoroughly coated with flake graphite to retard sticking and allow joint to be broken without destroying gasket.

Standard Thicknesses: 1/32", 1/16", 1/8"*.

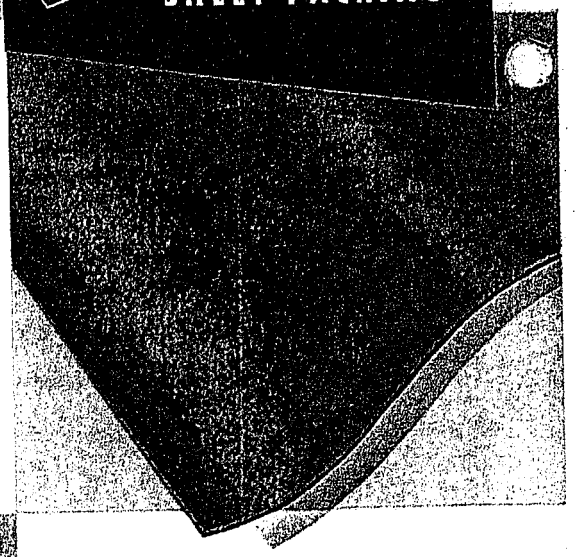
*Plied Sheets

Sheet Size: 40" wide, to specified length.

Approx. Wt.: 1/16" sheet—5 lbs. per square yard, other sizes in proportion.

RED RUBBER SHEET PACKING

STYLE 555—Heavy Duty



An exceptionally fine red rubber sheet, plate finish, compounded to remain soft and pliable in service. Suitable for use on hot or cold water, air and steam not exceeding 100 psi. Meets ASTM D-1330-66, Grade 11. Durometer 75 ± 5.

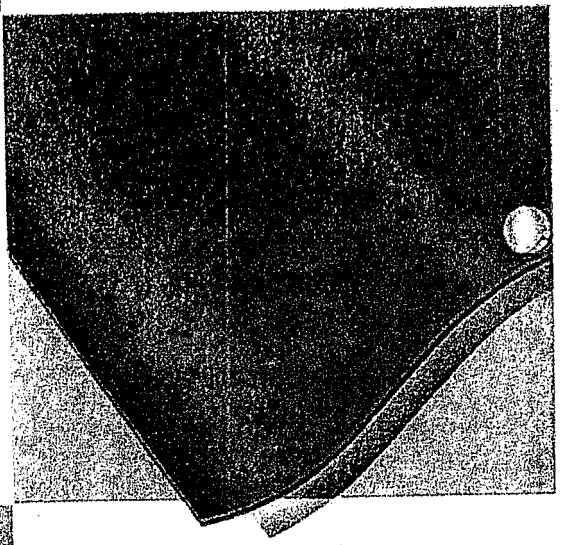
Tensile Strength: 400 psi.

Standard Thicknesses: 1/32", 1/16", 3/32", 1/8", 3/16", 1/4".

Standard Size: 36" wide, to specified length.

Approx. Wt. Per Sheet: 36" x 36" x 1/8"—11 lbs., other sizes in proportion.

STYLE 557—Medium Duty



Cloth finish. For air and hot or cold water. Also has good service-life with steam at pressures not exceeding 50 psi. A good grade for washers and gaskets used in plumbing and general service. Durometer 75 ± 5.

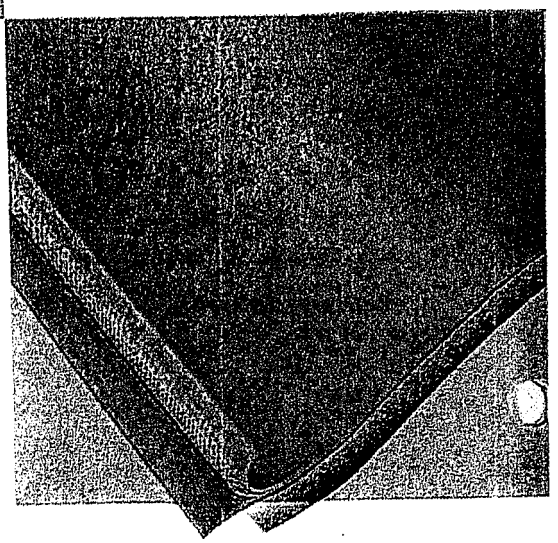
Tensile Strength: 400 psi.

Thicknesses: 1/32", 1/16", 3/32", 1/8", 3/16", 1/4".

Standard Size: 36" wide, to specified length.

Approx. Wt. Per Sheet: 36" x 36" x 1/8"—11 lbs., other sizes in proportion.

STYLE 666—Wire Inserted



A high quality red rubber sheet comparable to Style 555 reinforced with a closely woven bronze wire mesh for additional strength. Especially recommended where vibrating conditions exist or on narrow flanges. Suitable for hot or cold water, air and steam up to 150 psi. and on food processing services. Meets specifications SAE-ASTM: R-705 and MIL-R-003065A:RS-705.

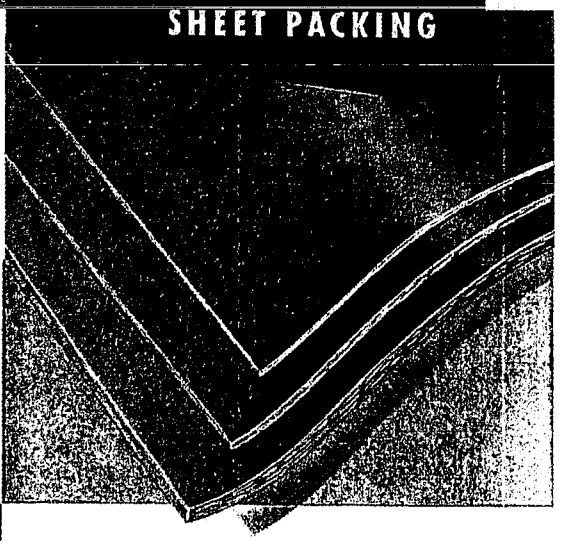
Tensile Strength: 800 psi.

Standard Thicknesses: 1/16", 1/8", 3/16", and 1/4".

Standard Size: 40" wide, to specified length.

Approx. Wt. Per Sheet: 36" x 36" x 1/8"—12 lbs., other sizes in proportion.

SYNTHETIC RUBBER SHEET PACKING



STYLE 777—Cloth Inserted (BLACK RUBBER)

Recommended for general gasket use where movement in service, bolt holes, bolts, clamps and pressures indicate a reinforced rubber sheet packing. Resists temperatures up to approximately 250°F. Fabricated from rubber compounds and high tensile cloth to resist extrusion under pressure.

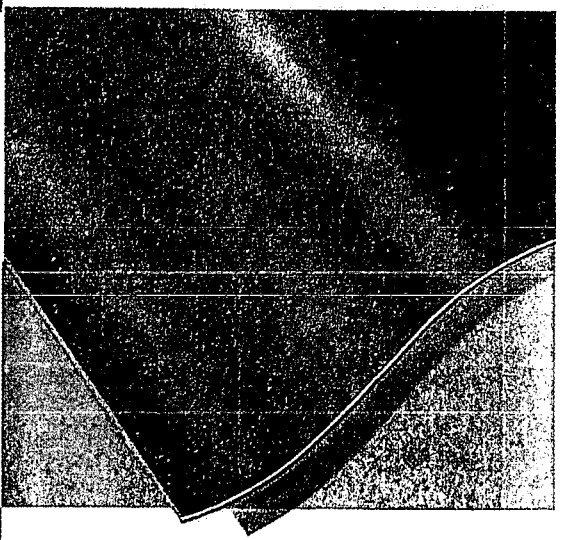
Tensile Strength: 350 psi.

Standard Thicknesses: .045", 1/16", 3/32", 1/8", 3/16", 1/4".

Standard Size: 36" wide, to specified length.

Approx. Wt. Per Sheet: 36" x 36" x 1/8"—11 lbs., other sizes in proportion.

STYLE 900—For Oils & Aromatic Fluids (BUNA-N)



A 70-durometer Buna-N sheet for all types of gaskets, washers and seals in services involving extreme exposure to oils and aromatic fluids. This sheet has superior chemical resistance and flexibility. It resists tearing, weathering and gas penetration. Meets ASTM BG-710 specifications.

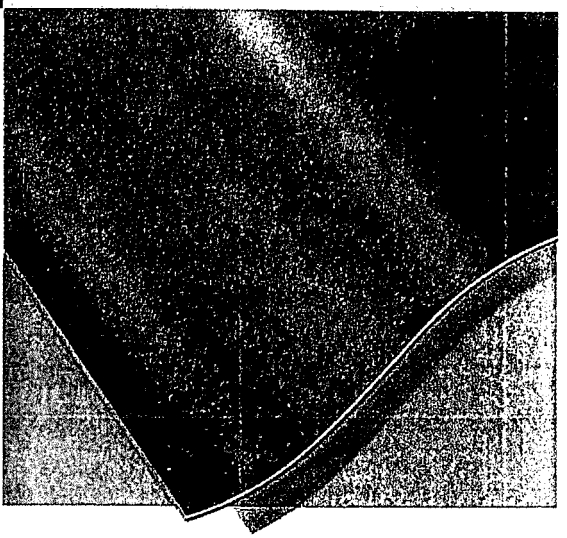
Tensile Strength: 1000 psi. average.

Standard Thicknesses: 1/64", 1/32", 3/64", 1/16", 3/32", 1/8", 3/16", 1/4".

Sheet Sizes: 36" to specified lengths.

Approx. Wt. Per Sheet: 36" x 36" x 1/8"—8 lbs., other sizes in proportion.

STYLE 999—For Oil and Solvent Service (NEOPRENE)



For handling a wide variety of oils and solvents, except chlorinated, aromatic and ketone types. Temperature range up to approximately 275°F. for most conditions, 300°F. on others. Durometer 70 ± 5.

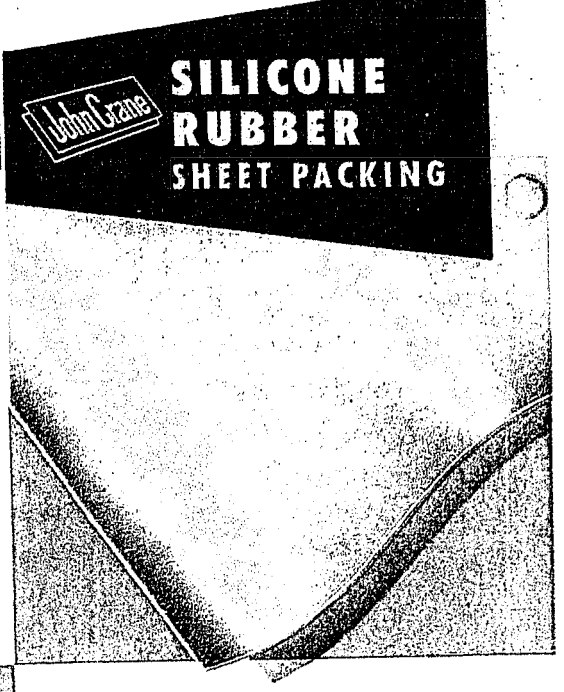
Tensile Strength: 1000 psi.

Standard Thicknesses: 1/16", 3/32", 1/8", 3/16", 1/4", 3/8".

Standard Size: 36" wide, to specified length.

Approx. Wt. Per Sheet: 36" x 36" x 1/8"—8 1/2 lbs., other sizes in proportion.

STYLE 2000 Series—For High and Low Temperature Services



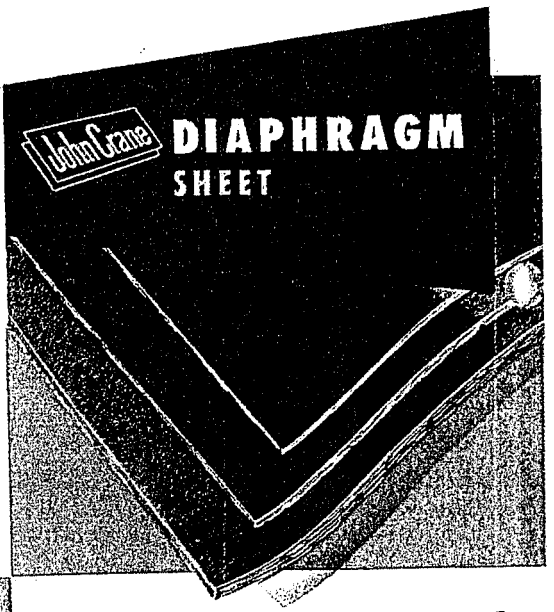
Recommended for use beyond the limitations of natural or synthetic rubbers (below —40°F. to —130°F.; above +200°F. to +500°F). Also for use where weather, oxidation, certain oils, chemicals or dielectric properties are of primary importance. Shelf storage life is greater than natural or synthetic rubbers and it stays soft and flexible when stressed and exposed to outdoor weathering for long periods of time.

Standard Thicknesses: 1/32" to and including 1/2". Thicknesses under 1/32" can be furnished on special order.

Sheet Sizes: 20" x 20", 24" x 24", other sizes available on application.

Specifications: Sheets are available to meet a wide range of durometer and tensile strength requirements and to meet AMS-3301-B, 3302-B, 3303-C, 3304-B and 3305-C specifications. Proper sheet will be recommended upon request.

STYLE 998—For Oil and General Service



Recommended for general diaphragm services, also where solvent or oil conditions exist, except chlorinated, aromatic and ketone types. Fabricated from neoprene compound and high tensile lightweight square woven fabric in laminated form. Number of laminations depends upon thickness.

Tensile Strength: 1400 psi.

Standard Thicknesses: .045", 1/16", 3/32", 1/8", 3/16", 1/4".

Standard Size: 48" wide, to specified length.

Approx. Wt. Per Sheet: 36" x 36" x 1/8"—8 1/2 lbs., other sizes in proportion.

STYLE 444—Oil-Proof

A strong, flexible and permanently oil-proof packing that is ideally suited to hydraulic and similar services up to 250°F. Also, in round gasket form it makes a very satisfactory separator ring in packing sets. Fabricated from an excellent grade vegetable fiber sheet and saturated with glue-glycerine that is rendered insoluble by means of a tanning agent. Meets MIL-P-20085, MIL-G-12803, ASTM-D-1170-54T and SAE-90R specifications and Underwriters' Approved.

Tensile Strength: 2000 psi. minimum.

Standard Thicknesses: 1/64", 1/32", 3/64", 1/16", 3/32", 1/8", 3/16".

Standard Sizes: 36" wide, to specified length in thicknesses of 1/16" and less; 36" x 36" in thicknesses over 1/16".

Approx. Wt. Per Sheet: 36" x 36" x 1/64"—3/4 lbs., other sizes in proportion.

STYLE 68C—For Severe Corrosive Service

For handling any acid, alkali, corrosive or solvent at temperatures from —120°F. up to +500°F. Fabricated from chemically inert TFE, this sheet packing also provides high mechanical strength, excellent electrical properties and very low coefficient of friction. It is absolutely non-sticking.

Tensile Strength: 1500 to 3000 psi.

Thicknesses: 1/32", 1/16", 3/32", 1/8", 5/16", 1/4", 1".

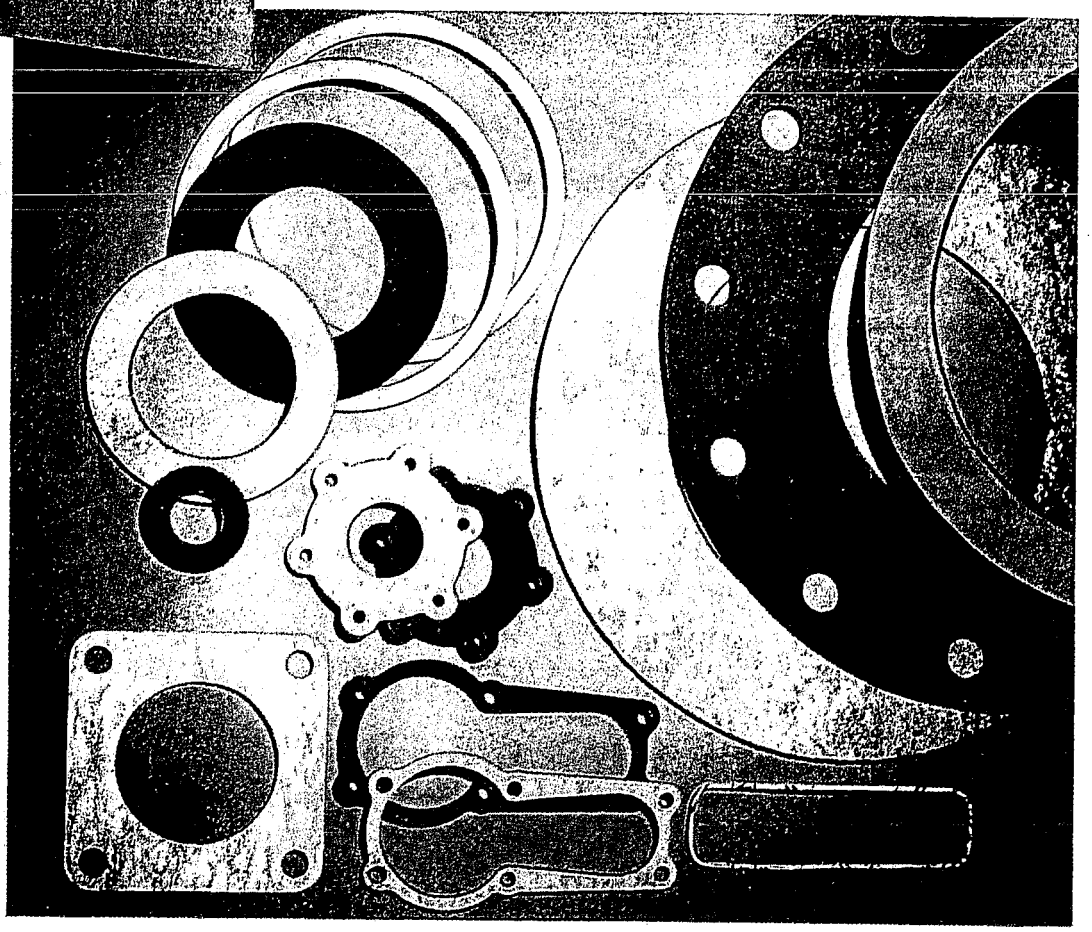
Standard Sizes: 12" x 12", 12" x 24", 18" x 18", 24" x 24". 48" x 48" available on application.

Approx. Wt. Per Sheet: 36" x 36" x 1/16", 4½ lbs., other sizes in proportion.

DIE CUT GASKETS

Crane Packing Company has full facilities to provide cut gaskets in any shape or size, standard or special, in any of the materials described in this bulletin.

For price quotations send complete specifications and quantity requirements.



JOHN CRANE GASKET RECOMMENDATIONS

Code: E = Excellent G = Good F = Fair X = Not Recommended

	555 557	2150 353	900	999	888	444	68-C
Acetaldehyde	F	X	X	F	E	X	E
Acetic Acid, 10%	E	F	F	F	F	X	E
Acetic Acid, 50%	G	F	F	X	F	X	E
Acetic Acid, Glacial	X	X	F	X	X	X	E
Acetic Anhydride	F	F	F	G	E	X	E
Acetone	G	G	X	F	F	G	E
Acetylene	E	E	E	E	E	F	E
Acrylonitrile	F	F	X	X	X	X	E
Alum	E	E	E	E	G	X	E
Aluminum Chloride	E	E	E	E	G	F	E
Aluminum Sulfate	E	E	E	E	G	F	E
Ammonium Chloride	E	E	E	E	G	F	E
Ammonium Hydroxide (Ammonia)	E	F	G	G	X	X	E
Ammonium Nitrate	E	E	E	E	F	F	E
Ammonium Sulfate	E	E	E	E	X	X	E
Amyl Acetate	X	X	X	X	X	G	E
Amyl Alcohol	E	E	E	E	E	X	E
Aniline	F	F	X	F	E	G	E
Animal Fats	X	E	E	G	G	E	E
Asphalt	X	E	F	G	E	F	F
ASTM #1 Oil	X	G	E	E	E	E	E
ASTM #3 Oil	X	G	E	G	E	E	E
Barium Chloride	E	G	E	E	G	E	E
Barium Hydroxide	E	E	E	E	G	X	E
Benzene (Benzol)	X	F	F	X	G	F	E
Benzine (Petroleum Ether)	X	F	E	G	G	F	E
Benzyl Chloride	X	F	X	X	G	F	E
Black Sulfate Liquor	G	F	G	G	F	X	E
Bleach	X	E	X	X	G	F	E
Bromine	X	F	X	X	F	X	E
Bromochloromethane	X	F	X	X	X	X	E
Bunker Oil	X	G	E	G	E	E	E
Butadiene	X	G	F	X	F	X	E
Butyl Acetate	X	F	X	X	F	X	E
Butyl Alcohol	E	E	E	E	E	X	E
Butyl Benzyl Phthalate	F	X	X	X	F	X	E
Butyl Carbitol	X	X	X	X	X	X	E
Butyl Cellosolve	E	G	E	E	G	F	E
Butyl Stearate	X	G	E	X	F	X	E
Calcium Chloride	E	E	E	E	G	F	E
Calcium Hydroxide (Caustic Lime)	E	E	G	G	G	F	E
Calcium Hypochlorite	X	E	X	X	G	F	E
Carbolic Acid (Pheno)	X	F	X	X	X	X	E
Carbon Disulfide (Bi)	X	E	F	X	F	X	E
Carbon Dioxide	E	E	E	E	G	F	E
Carbon Tetrachloride	X	E	F	X	G	E	E
Carbonic Acid	E	E	E	E	F	F	E
Castor Oil	F	G	E	E	E	E	E
Cellosolve Acetate	X	E	X	X	G	F	E
Chlorinated Solvents	X	E	X	X	F	X	E
Chlorine (Wet)	X	E	X	X	G	X	E
Chlorine (Dry)	X	E	X	X	G	X	E
Chlorobenzene	X	G	X	X	E	X	E
Chloroform	X	G	X	X	E	X	E
Chromic Acid	X	F	X	X	X	X	E

Note: Recommendations shown are for general service sheets only.

JOHN CRANE GASKET RECOMMENDATIONS

Code: E = Excellent F = Fair
G = Good X = Not Recommended

	555 557	2150 333	900	999	888	444	68-C
Citric Acid	E	E	E	E	F	X	E
Cocoanut Oil	X	E	E	G	E	E	E
Copper Chloride	F	E	E	E	G	X	E
Copper Sulfate	F	E	E	E	E	X	E
Corn Oil	X	E	E	E	E	E	E
Cottonseed Oil	X	G	E	E	E	E	E
Creosote	X	G	G	F	E	E	E
Cresols	X	X	X	X	G	F	E
Cresylic Acid	X	F	X	X	F	X	E
Cyclohexane	X	X	G	E	X	X	E
DDT in Kerosene	X	F	E	F	F	X	E
Diacetone Alcohol	G	G	G	G	F	E	E
Dibenzyl Ether	X	F	X	X	X	X	E
Dibutyl Phthalate	X	X	X	X	X	X	E
Dichlorobenzene	X	X	X	X	X	X	E
Diesel Oil	X	F	E	G	E	G	E
Diethylamine	G	G	G	G	G	F	E
Diethylene Glycol	E	E	E	E	G	F	E
Diisobutyl Ketone	F	F	X	X	X	X	E
Dioctyl Phthalate	X	X	G	X	X	X	E
Ethanolamine	G	G	G	G	F	X	E
Ethyl Acetate	X	E	X	X	F	E	E
Ethyl Alcohol (Ethanol)	E	G	E	E	E	E	E
Ethylene Dichloride	X	F	X	X	X	X	E
Ethylene Glycol	E	E	E	E	E	X	E
Ferric Chloride	E	E	E	E	E	G	E
Ferrous Chloride	E	E	E	E	E	G	E
Fluoboric Acid	E	F	X	X	X	X	E
Fluosilicic Acid	E	G	X	X	X	X	E
Formaldehyde	G	E	E	E	G	E	E
Formic Acid	G	F	F	F	X	X	E
Freon 12	X	G	G	G	G	X	E
Freon 22	X	G	X	F	G	X	E
Fuel Oil	X	F	E	G	E	E	E
Fuel A (ASTM)	X	F	E	G	E	E	E
Fuel B (ASTM)	X	F	E	F	E	E	E
Gallic Acid	E	F	X	X	X	X	E
Gasoline	X	G	E	G	E	E	E
Glycerine	E	F	E	E	E	E	E
Grease	X	G	E	G	E	E	E
Green Sulfate Liquor	E	G	E	E	F	F	E
Heptane	X	F	E	G	G	G	E
Hexane	X	F	E	G	G	G	E
Hydrobromic Acid	E	X	X	X	X	X	E
Hydrochloric Acid	E	X	X	X	X	X	E
Hydrofluoric Acid	X	X	X	X	X	X	G
Hydrofluosilicic Acid	E	X	X	X	X	X	E
Hydrogen Gas	G	E	E	E	F	X	E
Hydrogen Peroxide 10%	X	F	X	F	X	F	E
Hydrogen Peroxide over 10%	X	F	X	X	X	F	E
Iodine	X	E	X	X	X	F	E
Isooctane	X	F	E	G	E	F	E
Isopropyl Acetate	X	F	X	X	E	G	E
Isopropyl Alcohol	E	G	E	F	E	G	E
Jet Fuels	X	F	E	G	E	E	E
Kerosene	X	F	E	G	E	E	E

Note: Recommendations shown are for general service sheets only.

JOHN CRANE GASKET RECOMMENDATIONS

Code: E = Excellent G = Good F = Fair X = Not Recommended

	555 557	2150 333	900	999	888	444	68-C
Lactic Acid	G	E	G	G	F	G	E
Lard	X	G	E	G	E	E	E
Linseed Oil	X	G	E	G	E	E	E
Lubricating Oils	X	G	E	G	E	E	E
Magnesium Hydroxide	E	E	G	G	G	F	E
Magnesium Sulfate	E	E	E	E	G	F	E
Malic Acid	E	F	X	X	X	X	E
Methyl Alcohol (Methanol)	E	E	E	E	E	X	E
Methyl Chloride	X	G	X	X	E	X	E
Methyl Ethyl Ketone	F	E	X	X	E	F	E
Methyl Isobutyl Carbinol	G	F	G	G	X	X	E
Methyl Isobutyl Ketone	X	X	X	X	F	X	E
Mineral Oil	X	G	E	G	E	E	E
Mineral Spirits	X	G	E	F	E	E	E
Monochlorobenzene	X	F	X	X	F	X	E
Muriatic Acid	E	F	X	X	X	X	E
Naphtha	X	E	E	F	E	E	E
Naphthalene	X	G	X	X	E	E	E
Natural Gas	X	G	E	E	E	E	E
Nitric Acid 10%	X	X	X	X	X	X	E
20%	X	X	X	X	X	X	E
30%	X	X	X	X	X	X	E
30 to 70%	X	X	X	X	X	X	E
Nitrogen Gas	E	E	E	E	E	E	E
Oil - Petroleum	X	F	E	G	E	E	E
Olive Oil	X	G	E	X	E	E	E
Oxalic Acid	X	F	X	X	X	X	E
Oxygen	F	G	G	E	X	X	E
Ozone	X	G	X	G	G	G	E
Palmitic Acid	X	G	E	G	G	F	E
Papermaker's Alum	E	G	E	E	G	G	E
Parrafin	X	G	E	G	E	E	E
Pentane	X	F	E	G	G	G	E
Perchloroethylene	X	F	F	X	E	E	E
Petroleum—Crude	X	F	E	G	E	E	E
Petroleum—Oils	X	F	E	G	E	E	E
Phenol	X	G	X	X	E	E	E
Phosphoric Acid 10%	E	X	E	E	X	X	E
Phosphoric Acid 10% - 85%	G	X	X	X	X	X	E
Potassium Chloride	E	E	E	E	E	E	E
Potassium Hydroxide (Caustic Potash)	E	F	G	G	X	X	E
Potassium Nitrate	E	E	E	E	E	G	E
Propyl Alcohol	E	E	E	E	E	G	E
Sea Water	E	E	E	G	E	E	E
Sewage	F	E	E	E	E	E	E
Sodium Bisulfate	E	E	E	E	E	E	E
Sodium Bisulfite	E	E	E	E	E	E	E
Sodium Carbonate (Soda Ash)	E	E	E	E	G	E	E
Sodium Chloride (Brine)	E	E	E	E	G	E	E
Sodium Dichromate 30%	X	X	X	X	X	X	E
Sodium Hydroxide (Caustic Soda)	E	G	G	G	X	X	E
Sodium Hydrochlorite	X	E	X	X	G	G	E
Sodium Nitrate	E	E	E	E	F	X	E
Sodium Silicate	E	E	E	E	E	X	E
Sodium Sulfate	E	E	E	E	G	X	E
Sodium Sulfide	E	E	E	E	G	X	E

Note: Recommendations shown are for general service sheets only.

JOHN CRANE GASKET RECOMMENDATIONS

Code: E = Excellent G = Good F = Fair X = Not Recommended

	555 557	2150 333	900	999	888	444	68-C
Sodium Sulfite	E	E	E	E	G	X	E
Sodium Thiosulfate	E	E	E	E	E	E	E
Soybean Oil	X	E	E	G	E	E	E
Stannic Chloride	E	E	E	E	E	X	E
Stannous Chloride	E	E	E	E	E	X	E
Stearic Acid	X	G	E	G	G	F	E
Stoddard Solvent	X	F	E	G	F	F	E
Styrene	X	G	X	X	G	X	E
Sulfamic Acid	G	F	G	G	X	X	E
Sulfur	X	E	X	X	E	X	E
Sulfur Dioxide (Liquid)	X	G	X	X	X	X	E
Sulfuric Acid 25%	G	F	X	X	F	X	E
25% to 50%	G	F	X	X	F	X	E
50% to 96%	X	X	X	X	X	X	E
Fuming	X	X	X	X	X	X	E
Sulfurous Acid 10%	E	F	X	X	F	X	E
10% to 75%	F	F	X	X	F	X	E
Tall Oil	X	G	E	G	G	X	E
Tallow	X	E	E	G	E	E	E
Tannic Acid	E	E	G	G	E	X	E
Tar	X	E	G	G	E	F	E
Tartaric Acid	X	E	E	E	G	X	E
Toluene (Toluol)	X	F	E	X	X	E	E
Transmission "A" Oil	X	F	E	E	G	G	E
Trichloroethane	X	F	X	X	X	X	E
Trichloroethylene	X	F	X	X	X	X	E
Tricresyl Phosphate	X	F	X	X	X	X	E
Triethanolamine	X	F	G	G	F	X	E
Trisodium Phosphate	X	F	X	X	X	X	E
Turpentine	X	G	X	X	E	F	E
VM & P Naptha	X	X	X	X	F	X	E
Vegetable Oils	X	G	X	X	E	E	E
Vinegar	E	E	X	X	E	X	E
Water	E	E	X	X	E	E	E
Whiskey	E	E	X	G	E	E	E
Wines	E	E	X	X	E	X	E
White Oil	X	F	X	X	G	X	E
Xylene (Xylol)	X	F	X	X	X	X	E
Zinc Chloride	X	E	X	X	E	X	E
Zinc Sulfate	X	G	X	X	X	F	E

Note: Recommendations shown are for general service sheets only.

Sheet Packing and Gasket Testing Procedures:

When testing sheet packing or gaskets for a specific service, avoid exposing the entire gasket to the fluid, since in actual practice such contact is confined to the edges. In many cases the edges oxidize or otherwise react to set up a barrier against entrance of the fluid into the gasket proper. For proper testing it is important to enclose the gasket in a fixture closely identical to that used on the actual job. Under operating conditions swelling of gasket materials is normal in rubber and rubber-like materials. Also, it is advisable to check the flanges for warping, bending or corrosion to assure satisfactory gasket application.

CRANE PACKING COMPANY

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In Europe: Crane Packing Ltd., Slough, Bucks, England
In Japan: John Crane Japan, Inc., No. 5, Tenjinbashi-suji 6-chome, Oyodo-ku, Osaka 531, Japan

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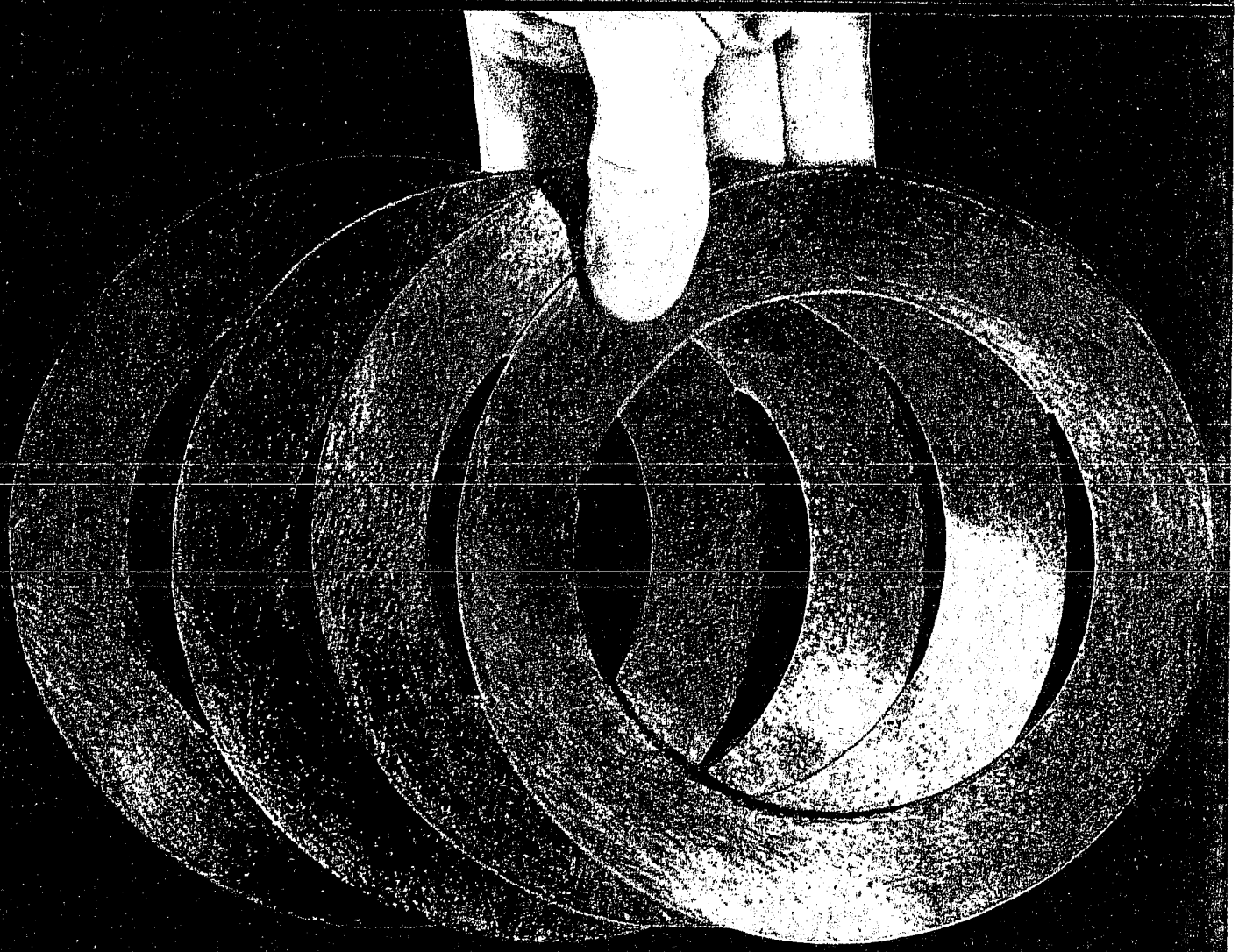
GRAFOIL GASKETS

A CORROSION-RESISTANT ALL-GRAPHITE PRODUCT
FOR OPERATION AT CRYOGENIC
TO MOLTEN-METAL TEMPERATURES



FEATURES

- LEAK-TIGHT PERFORMANCE UNDER MODERATE BOLT LOADS
- NO COLD FLOW OR CREEP
- NO NEED FOR CONTROLLED BOLT TIGHTENING
- NO FLANGE STICKING

"GRAFOIL" GASKETS

DESCRIPTION

"Grafoil" gaskets* are all graphite; they contain no resins or inorganic fillers. They feature a slim profile which makes it possible to execute complicated pipe layouts without worrying about gasket thickness. Available "off-the-shelf" for pipe sizes from 1—20 inches, these gaskets are 0.015 inches thick and have ID and OD dimensions as shown in the table below. Gasket "m" factor is 2. Gasket "y" factor is 950.

Temperature extremes have no adverse effects on "Grafoil" gaskets; dependable performance is assured from 3000°F in neutral or reducing atmospheres down to cryogenic temperatures. No cold flow characteristics are exhibited and there is no embrittlement.

Typical hydrostatic leak and burst pressures for standard 0.015 inch thick "Grafoil" gaskets, using raised face flanges with standard MSS finish, are as follows:

Bolt Torque ft/lbs	Hydrostatic Leak Pressure psig	Hydrostatic Burst Pressure psig
40	1200	1800
60	1900	2600
80	2200	2800

Although "Grafoil" gaskets do not vulcanize or bond to flange surfaces, they do adhere mechanically to the grooves in the flange face. Parting the flanges, however, poses no problem since the laminar construction of the gasket facilitates a clean break away. Any residue is readily removed with a wire brush.

STOCK SIZES (inches)

PIPE SIZE	ID	OD
1	$1\frac{5}{16}$	2
$1\frac{1}{2}$	$1\frac{29}{32}$	$2\frac{7}{8}$
2	$2\frac{3}{8}$	$3\frac{5}{8}$
3	$3\frac{1}{2}$	5
4	$4\frac{1}{2}$	$6\frac{3}{16}$
6	$6\frac{5}{8}$	$8\frac{1}{2}$
8	$8\frac{5}{8}$	$10\frac{5}{8}$
10	$10\frac{3}{4}$	$12\frac{3}{4}$
12	$12\frac{3}{4}$	15
14	14	$16\frac{1}{4}$
16	16	$18\frac{1}{2}$
18	18	21
20	20	23

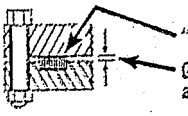
Tolerances: OD $+0, -\frac{1}{16}$; ID $+\frac{1}{16} -0$

HOW TO INSTALL

1. Remove all particles, scale, and burrs from the flange faces. Small subsurface defects cause no trouble.
2. Handling the "Grafoil" gasket with reasonable care to avoid tearing or scratching, lay it against one flange face. If the flange is vertical, the gasket can be held in place by applying a thin dab of grease to the flange face. (Do not use grease for oxygen or fluorine service).
3. Bring up the mating flange being careful that it does not scrape across the exposed surface of the gasket. Insert bolts and tighten nuts evenly.

CUSTOM SIZES

Gaskets with thicknesses and configurations varying from those shown in the table, can be supplied upon order—please furnish sketch and dimensional data for evaluation. For maximum economy, and minimum possibility of seepage, gasket thickness should not exceed 0.032 inches except where a grooved flange is used. The drawing shows a spiral-wound "Grafoil" gasket recommended for grooved flanges. This configuration permits the gasket to act as a thermal insulator in the direction perpendicular to the laminations. Tests on such gaskets show excellent sealing characteristics with low-to-moderate bolt loading.



*U.S. Patent No. 3,404,061

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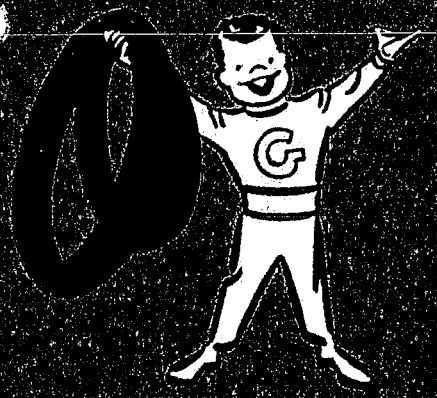
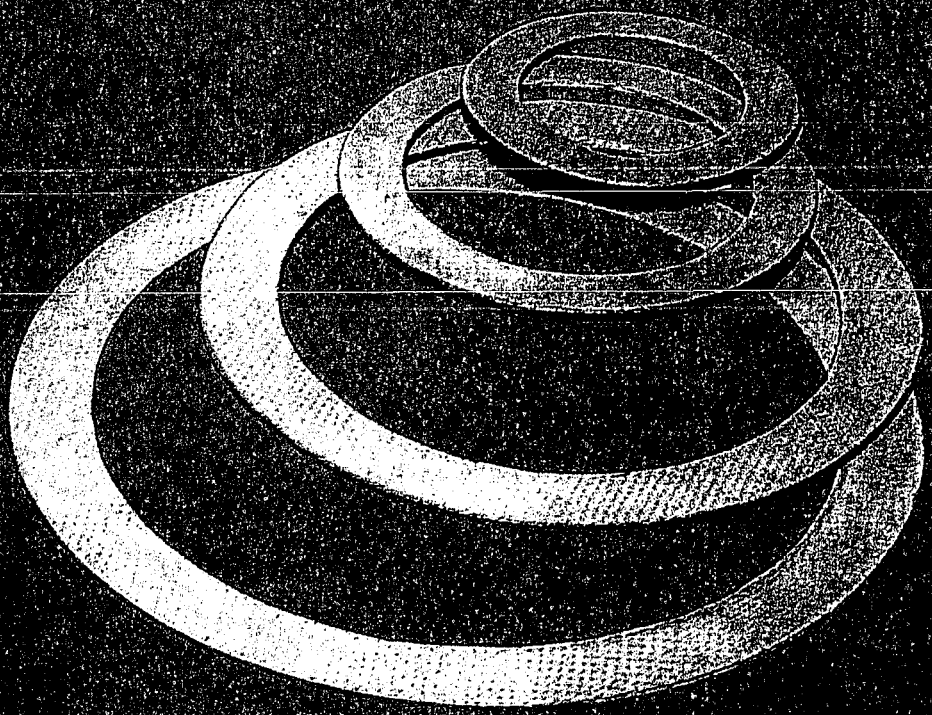


GRAFOIL METAL INSERTED GASKETS



Description and design data

"Grafoil" metal-inserted gaskets consist of "Grafoil" graphite sheets† mechanically bonded to type 316 stainless steel sheet(s). Depending on the thickness of the gasket required, multiple layers of "Grafoil" graphite and stainless steel are used. This composite construction provides a stronger gasket and in no way affects the excellent corrosion-resistance and high-temperature properties of the graphite component since "Grafoil" graphite is devoid of fillers or resins.

The metal-inserted gaskets are available for pipe sizes from ½ to 20 inches, in thicknesses of 1/32 and 1/16 inches for 150, 300, 600, 900 and 1500 pound flanges. The gaskets are self-centering when positioned by the flange bolts.

Temperature extremes have no adverse effects on "Grafoil" gaskets; dependable performance is assured from 1600°F in neutral or reducing atmospheres, down to –400°F. No cold flow characteristics are exhibited and there is no embrittlement of the "Grafoil" material.

Although "Grafoil" metal-inserted gaskets will not vulcanize or bond to flange surfaces, "Grafoil" graphite particles may adhere to the flange faces. Parting the flanges, however, poses no problem since the laminar construction of the gasket facilitates a clean breakaway. Any residue is readily removed with a wire brush or metal wool.

This catalog is designed to help select appropriate gaskets for your application. Our Technical Service Department will be glad to discuss your particular application and make recommendations.

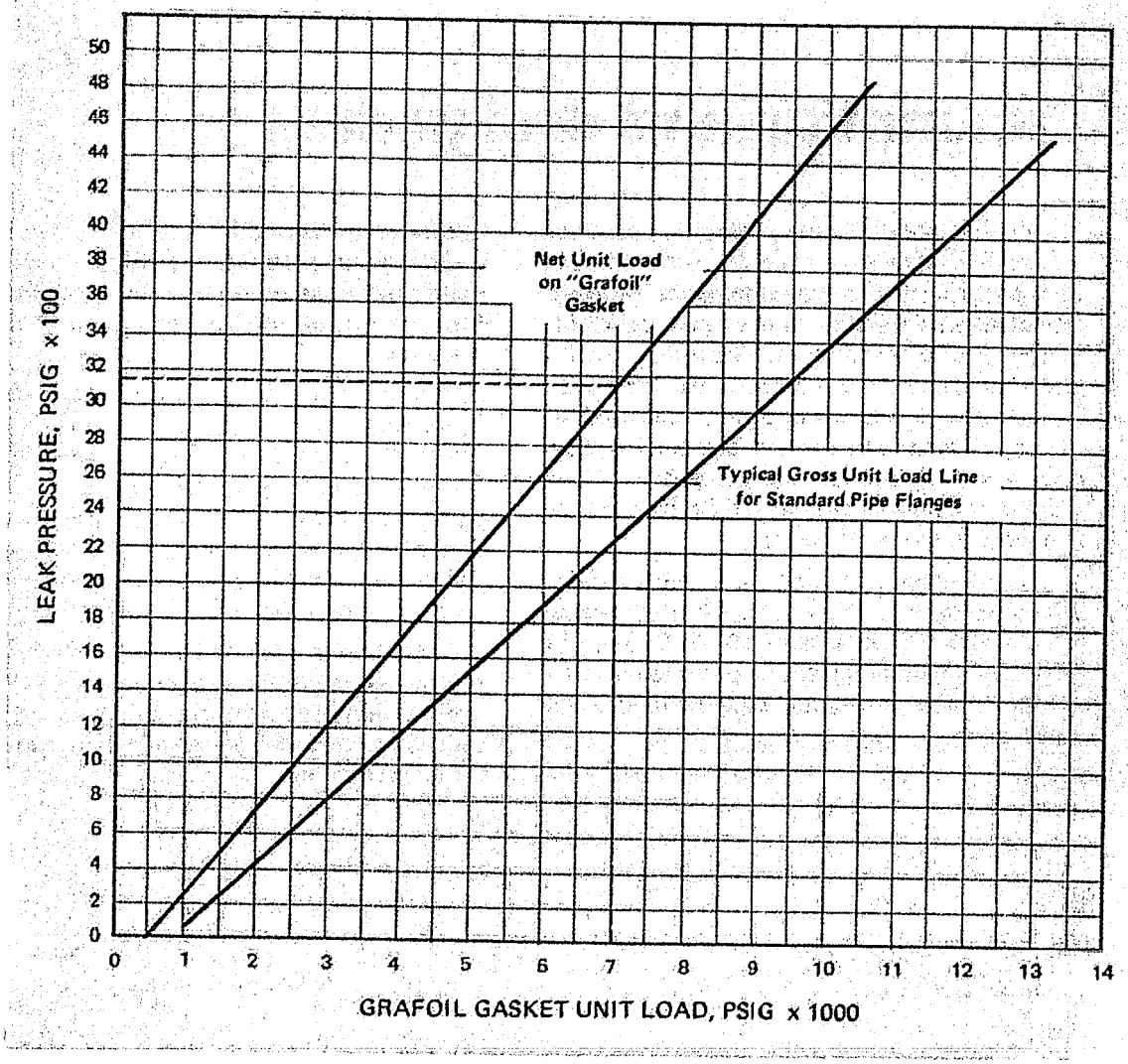
TYPICAL PROPERTIES "GRAFOIL" METAL-INSERTED GASKETS

Property	Unit	Value
"m" factor		2
"y" stress	psi	900
Maximum Gasket Load	psi	24,000
Maximum Operating Pressure	psi	10,000
Functional Temperature Range		
Neutral or Reducing Atmosphere	°F	–400 to 1600
Oxidizing Atmosphere	°F	–400 to 750*
Thermal Conductivity at RT		
⊥to Face	Btu/hr/ft²/°F/ft	2
∥ to Face	Btu/hr/ft²/°F/ft	85
Electrical Resistivity		
⊥to Face	Ohm-cm	90.4
∥ to Face	Ohm-cm	4.6×10^{-4}

*The fluid Temperature may exceed 750°F providing that *the bulk temperature of the "Grafoil" metal-inserted gasket is 750°F or below or that the fluid being handled does not come into direct contact with the graphite.* Example: a metal spiral-wound gasket with a "Grafoil" filler material.

†U.S. Patent No. 3,404,061

LEAK PRESSURE VS. "GRAFOIL" GASKET UNIT LOAD
for "Grafoil" Metal-Inserted Gaskets 1/32 and 1/16 Inches Thick



Gasket loading vs. leakage pressures

The prime requirement for satisfactory sealing with "Grafoil" metal-inserted gaskets is sufficient unit load on the gasket at all times and at all points in the gasket.

If surfaces are maintained flat within 0.005 inches, and are held to a surface finish of 125 RMS or better, "Grafoil" gaskets will seal hydrostatic pressures as shown on the graph above, "Leak Pressure vs. Gasket Unit Load for 'Grafoil' Gaskets." A Net Unit Load of 7,000 psi, for example, will seal up to 3,150 psi water pressure. The Net Unit Load is that force still exerted on the gasket surface after *all* the forces which tend to relieve the initial unit load are subtracted. One such opposing force is the "piston" action of the sealed pressure on the area within the gasket I.D. Others are: bolt stretch, piping stress, differential thermal expansion and the relaxation, under stress, of the gasket material. The initial load on "Grafoil" gaskets must be enough to end up, under operating conditions, at or above the Net Unit Load indicated on the graph.

"GRAFOIL" METAL-INSERTED GASKETS
PIPE-SIZE GASKET* DIMENSIONS

Gasket Dimension in Inches → / Pipe Size (in.) ↓	ID	O.D. for AMERICAN STANDARD STEEL FLANGES				
		150 lb.	300 lb.	600 lb.	900 lb.	1500 lb.
½	27/32	1⅞	2⅛	2⅛	2½	2½
¾	1-1/16	2¼	2⅝	2⅝	2¾	2¾
1	1-5/16	2⅝	2⅞	2⅞	3⅛	3⅛
1½	1-29/32	3⅜	3¾	3¾	3⅞	3⅞
2	2⅜	4⅛	4⅜	4⅜	5⅝	5⅝
3	3½	5⅜	5⅞	5⅞	6⅝	6⅞
4	4½	6⅞	7½	7⅝	8⅛	8¼
6	6⅝	8¾	9⅞	10½	11⅜	11⅛
8	8⅝	11	12⅛	12⅝	14⅛	13⅞
10	10¾	13⅜	14¼	15¾	17⅛	17⅛
12	12¾	16⅛	16⅝	18	19⅝	20½
14	14	17¾	19⅛	19⅜	20½	22¾
16	16	20¼	21¼	22¼	22⅝	—
18	18	21⅝	23½	—	—	—
20	20	23⅞	—	—	—	—

* Normally available from stock.

HOW TO INSTALL

1. Remove all projecting particles, scale, and burrs from the flange faces. Small subsurface defects will cause no trouble.
2. Part flanges enough to slide gasket in place, using bolts for positioning.
3. Handle the "Grafoil" gasket with reasonable care to avoid tearing or scratching.
4. Insert rest of bolts. Bring flanges together carefully. Tighten all nuts hand tight. Increase bolt loading in usual manner until required bolt load is obtained.

HOW TO ORDER

See separate Catalog Section** for pricing and standard packaging. On order, specify size, quantity, catalog number and price.

CUSTOM SIZES

Gaskets with dimensions varying from those shown in the table, can be supplied upon request—please furnish sketch and dimensional data.

"Grafoil" is a registered trademark of Union Carbide Corporation

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In Japan: John Crane Japan, Inc., No. 28, Tsuboya-cho 2-chome, Kita-ku, Osaka 530, Japan

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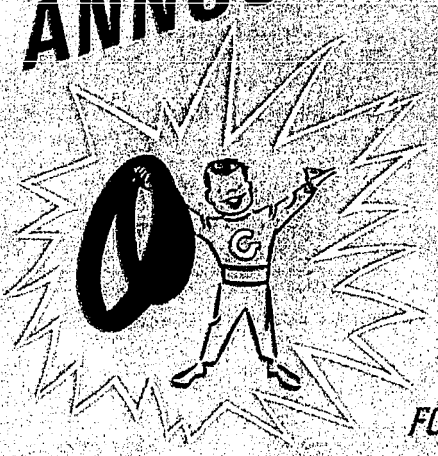
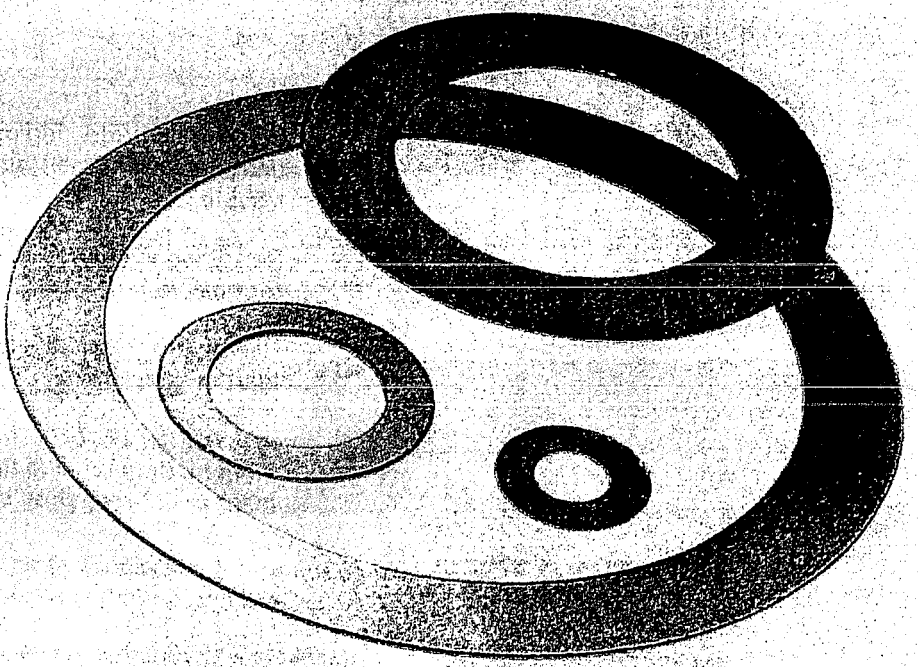
ANNOUNCING!

Our NEW...expanded line of

GRAFOIL BRAND Pipe Flange GASKETS



FOR PIPE SIZES:— 1/2 INCH THROUGH 20 INCHES
FLANGE RATINGS:—150, 300, 600, 900 AND 1500 LBS.
GASKET THICKNESS:— 1/64, 1/32, AND 1/16 INCHES
GASKET O.D.:—SAME AS I.D. OF BOLTS



A Field-Proven, Corrosion-Resistant Product for Operations from −400°F to 3000°F

FEATURES

- LEAK-TIGHT PERFORMANCE UNDER MODERATE BOLT LOADS
- NO COLD FLOW OR CREEP
- NO NEED FOR PRECISION BOLT TIGHTENING
- NO FLANGE STICKING

Description and design data

GRAFOIL all-graphite gaskets† contain no resins or inorganic fillers. They are available in thicknesses of 1/64, 1/32 and 1/16 inches for flange pressure ratings of 150, 300, 600, 900 and 1,500 pounds. These gaskets are O.D. dimensioned to be self-centering when supported by the flange bolts.

Temperature extremes have no adverse effects on GRAFOIL gaskets; dependable performance is assured from 3000°F in neutral or reducing atmospheres, down to —400°F. No cold flow characteristics are exhibited and there is no embrittlement.

Although GRAFOIL gaskets do not vulcanize or bond to flange surfaces, they may adhere to the flange faces. Parting the flanges, however, poses no problem since the laminar construction of the gasket facilitates a clean break-away. Any residue is readily removed with a wire brush or metal wool.

This catalog is intended as an aid in designing flanged gasketed joints and as a guide in solving field gasketing problems. Our Technical Service Engineers will be glad to discuss your particular application and make recommendations.

TYPICAL PROPERTIES..."GRAFOIL" GASKETS

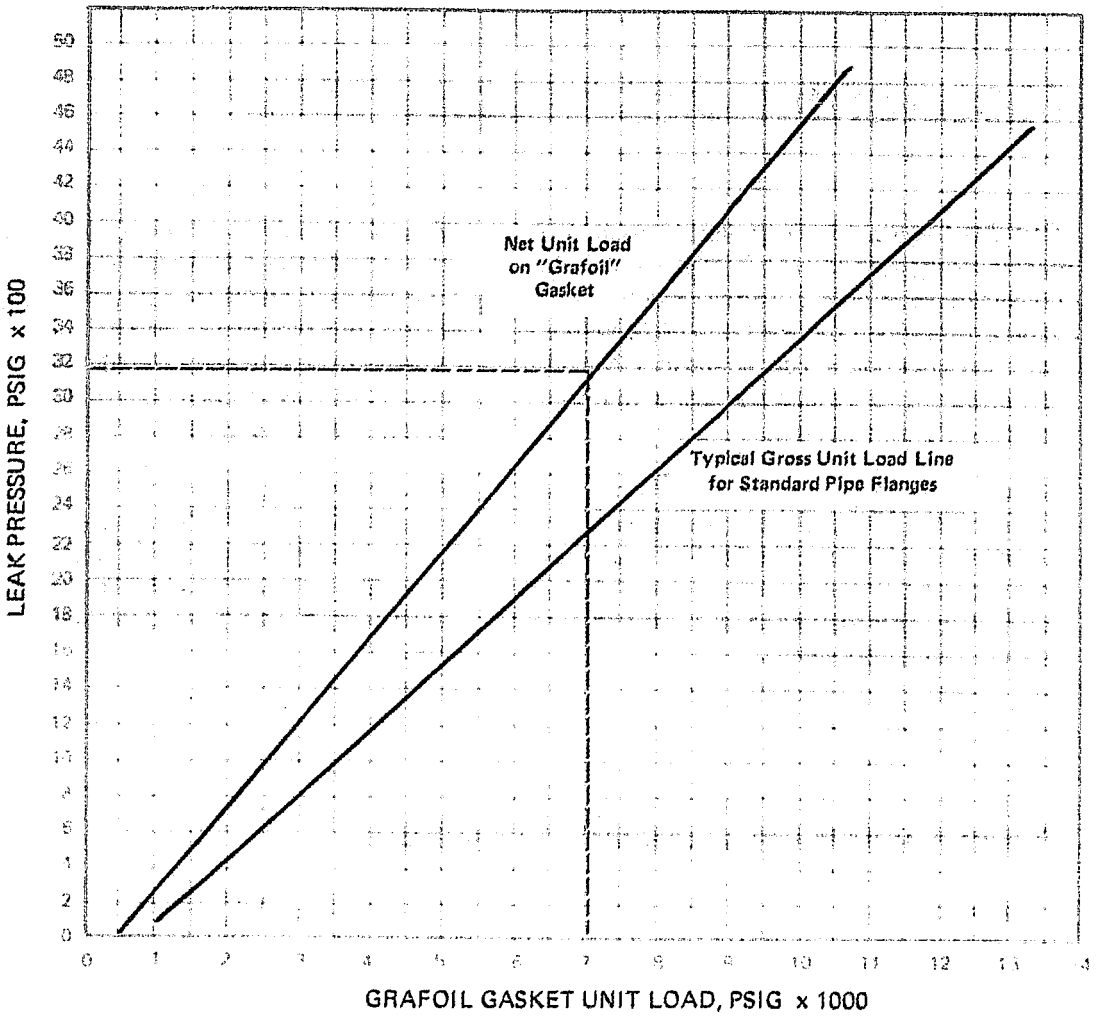
Property	Unit	Value
"m" factor	—	2
"y" stress	psi	950
Maximum Gasket Load	psi	24,000*
Maximum Operating Pressure	psi	10,000*
Functional Temperature Range (Neutral or Reducing Atmosphere)	°F	—400 to 3000*
Functional Temperature Range (Oxidizing Atmosphere)	°F	—400° to 750**
Thermal Conductivity at RT		
⊥to Face	Btu/hr/ft²/F°/ft	3
∥ to Face	Btu/hr/ft²/F°/ft	100
Electrical Resistivity		
⊥to Face	Ohm-cm	90.4
∥ to Face	Ohm-cm	4.6×10^{-4}

*Where higher operating levels are contemplated, consult with our Technical Service Department.

**The fluid temperature may considerably exceed 750°F providing that *the bulk temperature of the "Grafoil" gasket is 750°F or below or that the fluid being handled does not come into direct contact with the graphite.* Example: a metal spiral-wound gasket with a "Grafoil" filler material.

†U.S. Patent No. 3,404,061

LEAK PRESSURE VS. "GRAFOIL" GASKET UNIT LOAD
for "Grafoil" Gaskets 1/64, 1/32, and 1/16 Inches Thick



Gasket loading vs. leakage pressures

The prime requirement for satisfactory sealing with GRAFOIL gaskets is sufficient unit load on the gasket at *all* times and at all points on the gasket.

If surfaces are maintained flat within 0.005 inches, and are held to a surface finish of 125 RMS or better, GRAFOIL gaskets will seal hydrostatic pressures as shown on the graph above, "Leak Pressure vs. Gasket Unit Load for GRAFOIL Gaskets". A Net Unit Load of 7,000 psi, for example, will seal up to 3,150 psi water pressure.

The Net Unit Load is that force still exerted on the gasket surface after *all* the forces which tend to relieve the initial unit load are subtracted. One such opposing force is the "piston" action of the sealed pressure on the area within the gasket I.D. Others are: bolt stretch, piping stress, differential thermal expansion and the relaxation, under stress, of the gasket material. The initial load on GRAFOIL gaskets must be enough to end up, under operating conditions, at or above the Net Unit Load indicated on the graph.

"GRAFOIL" PIPE-SIZE GASKET* DIMENSIONS

Gasket Dimension in Inches → / Pipe Size (in.) ↓	ID	O.D. for AMERICAN STANDARD STEEL FLANGES				
		150 lb.	300 lb.	600 lb.	900 lb.	1500 lb.
½	27/32	1⅞	2⅛	2⅛	2½	2½
¾	1-1/16	2¼	2⅝	2⅝	2¾	2¾
1	1-5/16	2⅝	2⅞	2⅞	3⅛	3⅛
1½	1-29/32	3⅜	3¾	3¾	3⅞	3⅞
2	2⅜	4⅛	4⅜	4⅜	5⅝	5⅝
3	3½	5⅜	5⅞	5⅞	6⅝	6⅞
4	4½	6⅞	7½	7⅝	8⅛	8¼
6	6⅝	8¾	9⅞	10½	11⅜	11⅛
8	8⅝	11	12⅛	12⅝	14⅛	13⅞
10	10¾	13⅜	14¼	15¾	17⅛	17⅛
12	12¾	16⅛	16⅝	18	19⅝	20½
14	14	17¾	19⅛	19⅜	20½	22¾
16	16	20¼	21¼	22¼	22⅝	—
18	18	21⅝	23½	—	—	—
20	20	23⅞	—	—	—	—

*Normally available from stock.

HOW TO INSTALL

1. Remove all projecting particles, scale, and burrs from the flange faces. Small subsurface defects will cause no trouble.
2. Part flanges enough to slide gasket in place, using bolts for positioning.
3. Handle the "Grafoil" gasket with reasonable care to avoid tearing or scratching.
4. Insert rest of bolts. Bring flanges together carefully. Tighten all nuts hand tight. Increase bolt loading in usual manner until required bolt load is obtained.

HOW TO ORDER

See separate Catalog Section** for pricing and standard packaging. On order, specify size, quantity, catalog number and price. For custom gasket sizes, specify quantity, dimensions and furnish sketch or drawing.

CRANE PACKING COMPANY

6400 OAKTON STREET, MORTON GROVE, ILLINOIS 60053 (Chicago Suburb)

In Canada: Crane Packing Company, Ltd., Box 3248, Station C, Hamilton, Ont.
In Mexico: Industrias John Crane de Mexico, S.A. • Poniente 152 -679 Industrial Vallejo, Mexico, D.F.
In Brazil: John Crane Industria E Comercio, Ltda. • Avenida Jurubatuba 600, Sao Bernardo do Campo, S.P.
In Australia: John Crane Mauri Pty., Ltd., 166 Eldridge Road, Bankstown, New South Wales, Australia
In Europe: Crane Packing Ltd., Slough, Bucks, England
In Japan: John Crane Japan, Inc., No. 28, Tsuboya-cho 2-chome, Kita-ku, Osaka 530, Japan

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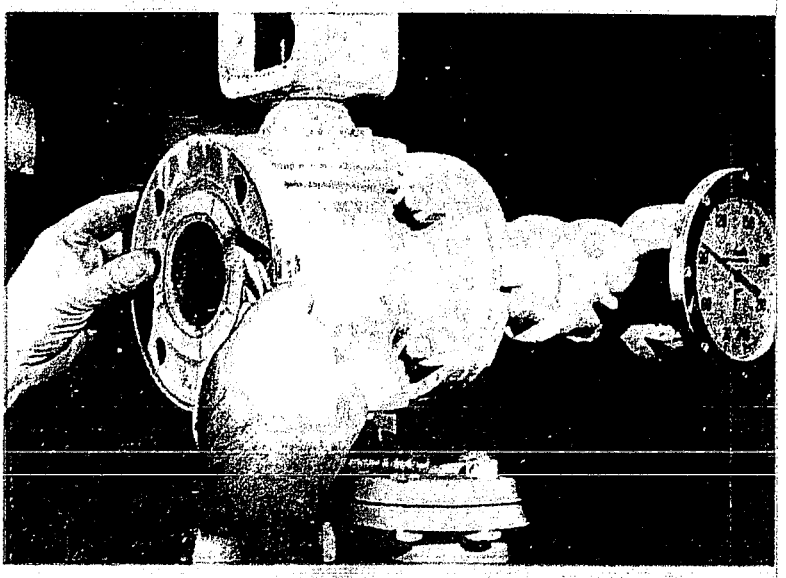
NOW! *in* **Plain and Crinkle Type**

GRAFOIL BRAND ALL-GRAPHITE GASKET TAPE

CORROSION-RESISTANT, SELF-ADHESIVE, ALL-TEMPERATURE TAPE **MAKES ANY SIZE GASKET FROM 3 INCHES UP** RIGHT AT THE JOB SITE...

New Crinkle Type For Diameters Down To 3 Inches



Plain or Crinkle Type For Straight Edges or Larger Diameters

* CONFORMS READILY—LAYS UP TO ANY DESIRED THICKNESS
* CUTS INVENTORY COSTS...NO NEED TO STOCK LARGE DIAMETER GASKETS
* EASY TO HANDLE

Why You Should Specify "GRAFOIL" Do-It-Yourself Gasket Tape

"Grafoil" gasket tape* for making gaskets is a self-adhesive, all-graphite product displaying a combination of property and application advantages never before available. It has outstanding corrosion resistance at temperatures from cryogenic to molten metal and retains compressibility at such temperatures. At high temperatures, the adhesive backing carbonizes to become part of the gasket itself—possible leaching out of the adhesive presents no problem. "Grafoil" tape resists attack by most common organic and inorganic reagents as detailed in our Catalog Section covering corrosives handled.

"Grafoil" tape is the ideal do-it-yourself gasket material for easy field fabrication of gaskets on flanges.**

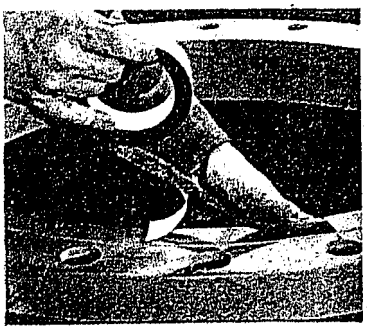
The new crinkle "Grafoil" tape permits forming gaskets down to 3 inches in diameter with little or no distortion. The plain "Grafoil" tape is recommended for forming gasket diameters 18 inches and over and for specially shaped gaskets having long straight runs.

The tape is merely laid out along the flange and may be built up to whatever multiple of its .015-mil thickness is desired. The adhesive backing bonds securely to the flange as well as layer-to-layer. No longer is it necessary to stock, transport and manipulate an assortment of large preformed gaskets to accommodate a variety of size requirements. Order "Grafoil" tape in either of two convenient size rolls—½ inch wide by 25 feet long or 1 inch wide by 50 feet long—from our sales office.

INSTALLATION INSTRUCTIONS

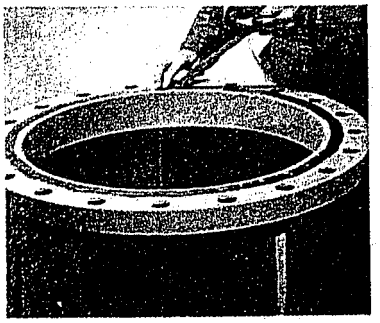
FOR SINGLE .015-MIL THICK GASKET

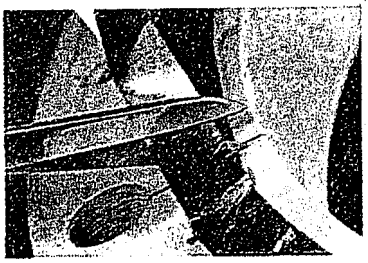
1. Brush off any rust or foreign particles. Wipe flange surface thoroughly with rag soaked in acetone or other suitable solvent to remove grease or oil.



◀ 2. Insert fingernail between the paper backing strip and the tape and strip paper back three to six inches as illustrated. Draw reference line on flange and press squared-off end of tape against it.

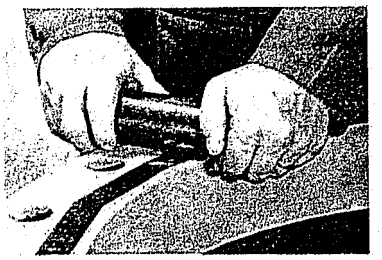
3. Now, start laying the tape along the face of ▶ the flange, peeling the paper backing as you go. To prevent the adhesive surfaces of the tape from doubling back on themselves and sticking together, strip away only a few inches of paper at a time as shown.





◀ 4. When the starting point has been reached, lap the tape not more than 1/16 inch and cut with a sharp blade as pictured.

5. When using plain tape, it may be desirable to ▶ roll it with a short length of smooth pipe to iron out any wrinkles. (This step is rarely necessary with the crinkle tape.)



FOR MULTIPLE-THICKNESS GASKET, ADD STEPS 6, 7 AND 8

6. When the starting point has been reached, do not cut the tape. Roll out the tape already laid down, using a short length of smooth pipe to iron out the wrinkles.

7. Now repeat step 3. Be sure that the top layer is positioned *exactly* above the first layer before contact is made. *Once the adhesive touches the tape, it is impossible to separate the layers without tearing them.*

8. Repeat steps 6 or 7, depending on the number of layers of tape to be laid down, and finish with steps 4 and 5.

*U.S. Patent No. 3,404,061

**Pre-formed "Grafoil" Gaskets are also available in 1/64, 1/32, and 1/16 inch thicknesses for pipe sizes ½ inch through 20 inch ID—ask for literature.

John Crane

CRANE PACKING COMPANY
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In Europe: Crane Packing Ltd., Slough, Bucks, England
In Japan: John Crane Japan, Inc., No. 28, Tsuboya-cho 2-chome, Kita-ku, Osaka 530, Japan
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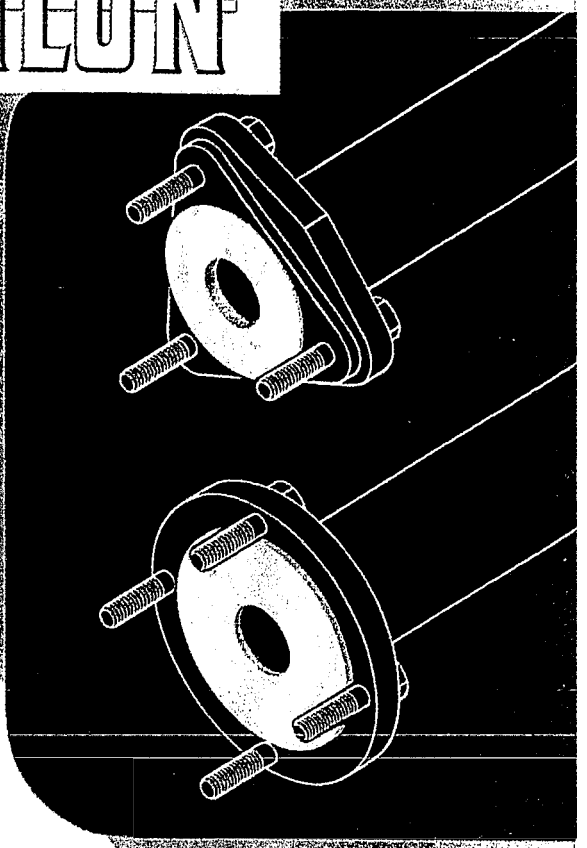
BULLETIN NO. P-327-1

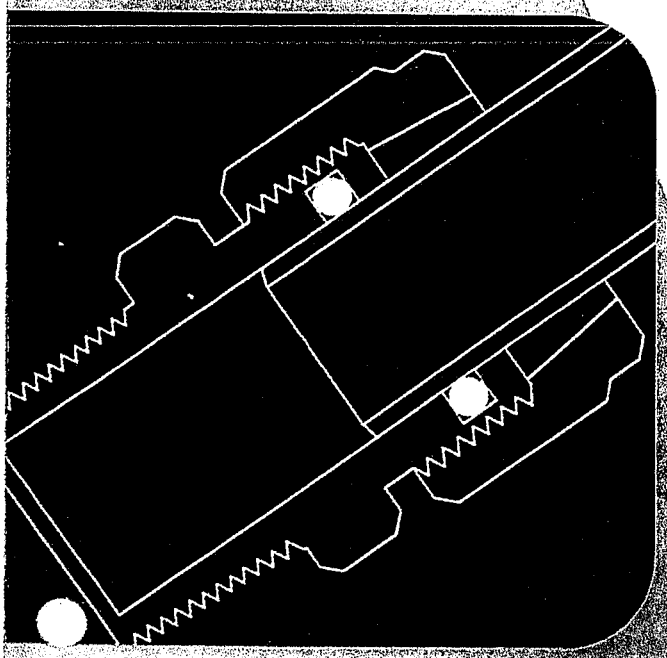
John Crane

CHEMLON®



GASKETS

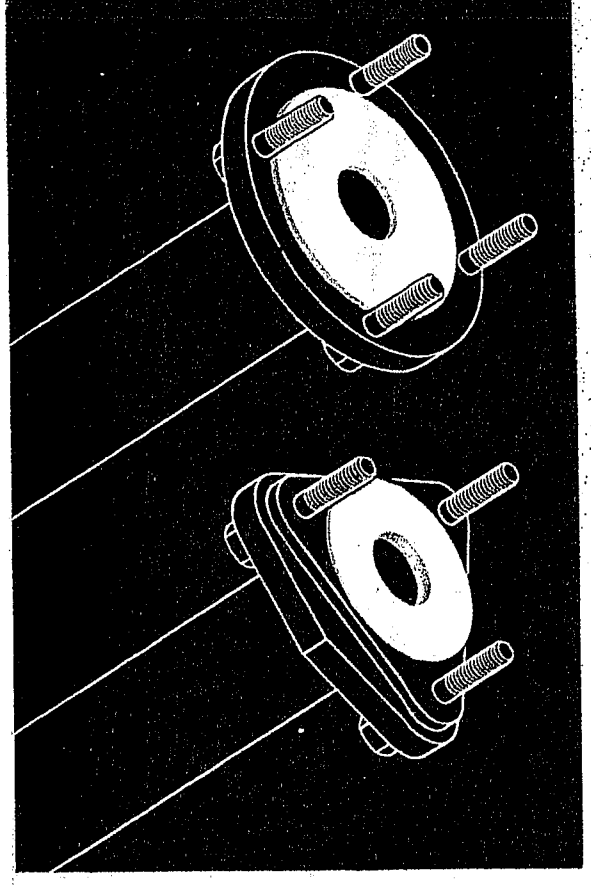
and



"O" RINGS

"JOHN CRANE" CHEMLON — The Best in TEFLON*

*Du Pont trademark

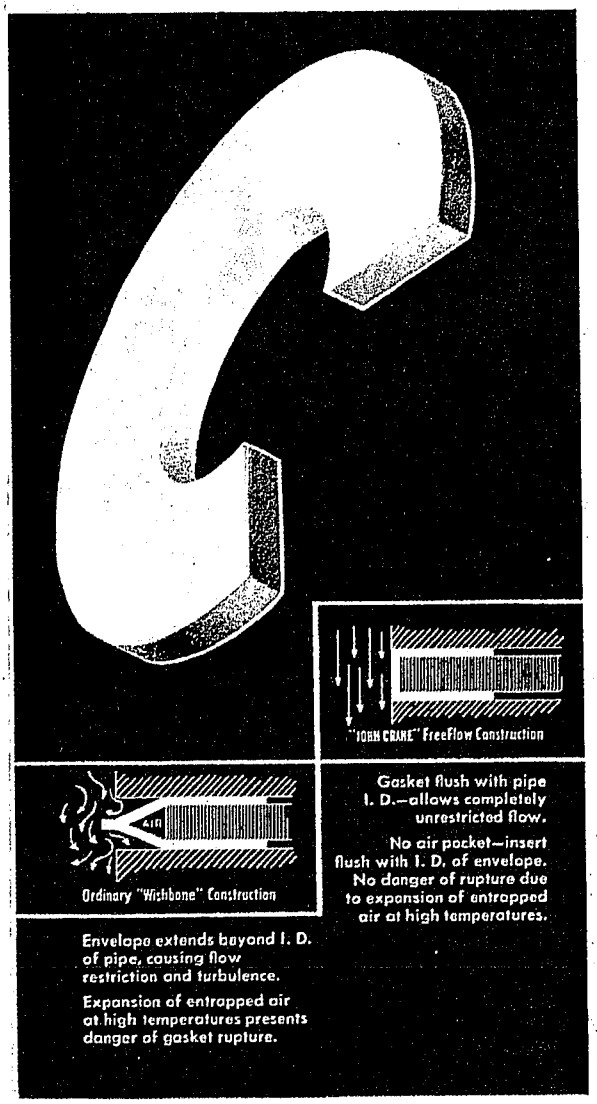


CHEMLON

Gaskets

"John Crane" Chemlon Gaskets offer many practical advantages over gaskets of other materials. Made of DuPont Teflon, they are impervious to all acids, alkalis, solvents or corrosives (with the exception of molten alkali and fluorine under extreme conditions). Within their wide temperature range (–120°F. to +500°F.), they are practically indestructible—thereby reducing maintenance, down time and replacement cost to an absolute minimum.

The excellent anti-stick characteristic of Teflon permits easy disassembly of the gasketted joint at any time without tearing or pulling. These properties, combined with durability and toughness, permit the re-use of Chemlon Gaskets time after time—a decided savings factor on applications requiring constant joint breaking for cleaning or equipment replacement.



CHEMLON

"FreeFlow" Gaskets–Construction

Chemlon "FreeFlow" Gasket design eliminates: 1) flow restriction and turbulence in the line; and 2) danger of rupture at high temperatures due to air entrapped between the gasket insert and Chemlon envelope. (See diagrams at left.) Construction also permits the gasket face to lie flat, whereas, in the "wishbone" type, compression of the insert against the inside wall of the gasket causes undesirable flaring, buckling and wrinkling.

These gaskets also provide the necessary resilience to assure a leak-proof seal regardless of temperature change. This resilience is provided by an insert material ranging from soft rubber to asbestos, depending on type of piping and temperature conditions.

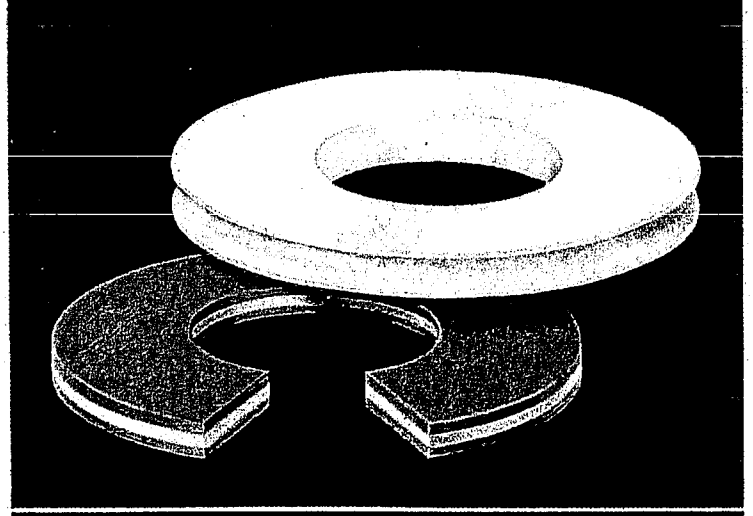
"FreeFlow" Gaskets are available for a wide variety of pipe applications, including glass lined, porcelain, Pyrex, iron and steel; also for standard and special connections on such equipment as reactor kettles, retorts, distillation columns, nozzles and sanitary couplings.

NOTES: Chemlon envelope on full face gaskets is furnished with a face width that fits within bolt circle.

A double envelope construction is also available for use where the atmosphere surrounding the gasket joint is injurious to the insert material.

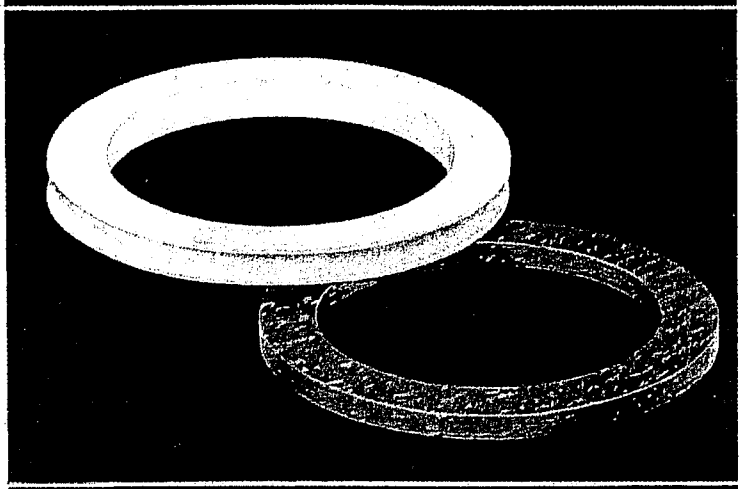
STYLE 10-C

Teflon envelope over a laminated insert of compressed asbestos, faced on both sides with soft woven asbestos. Insert thickness 3/16". For use whenever a woven or folded gasket is normally required or where the gasket should be resilient or thick to conform with irregular flange faces. Temperature range −120°F. to +500°F. Available in all standard pipe sizes to 18".



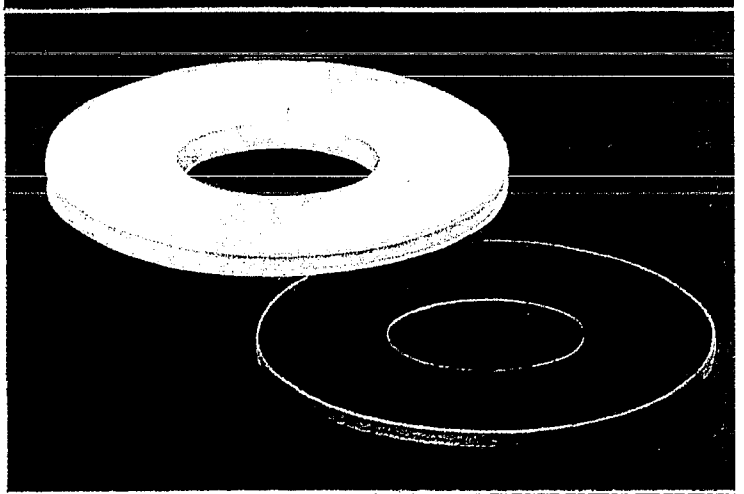
STYLE 11-C

Teflon envelope over an insert of compressed asbestos. Insert thickness 1/16" or 1/8". Recommended for cast iron, steel or alloy flanges, plates, bonnets and fittings. Can be substituted wherever a ring or full-faced compressed asbestos gasket is used. Temperature range −120°F. to +500°F. Available in all standard pipe sizes to 18".



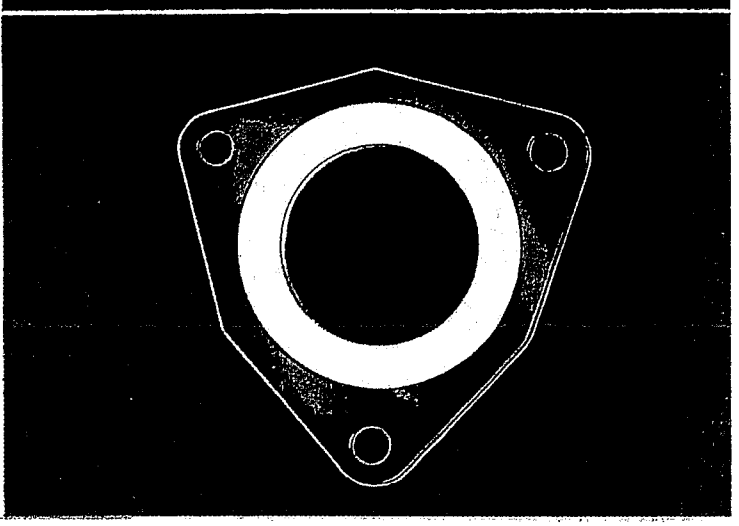
STYLE 12-C

Teflon envelope over insert of neoprene. Insert thickness 1/16" or 1/8". Hardness approximately 70 durometer. Recommended for glass, composition, ceramic, plastic, Karbate or porcelain; also wherever the softness of a rubber or neoprene gasket is required or where flange faces are uneven. Temperature range +32°F. to +300°F. Available in all standard pipe sizes to 18".

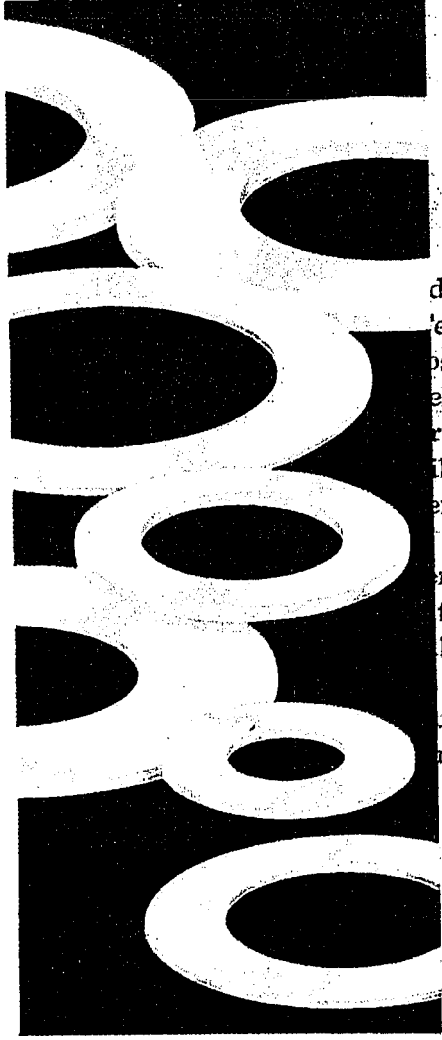


STYLE 16-C

Teflon envelope over insert of neoprene. Insert thickness 1/16" or 1/8". Hardness approximately 70 durometer. For use with a wide variety of Pyrex pipe applications; also for standard or special connections on distillation columns, retorts, reactor kettles, nozzles and like equipment where it is required that the insert extend beyond the flange bolt hole circle.



CHEMLON Solid Gaskets Style 15



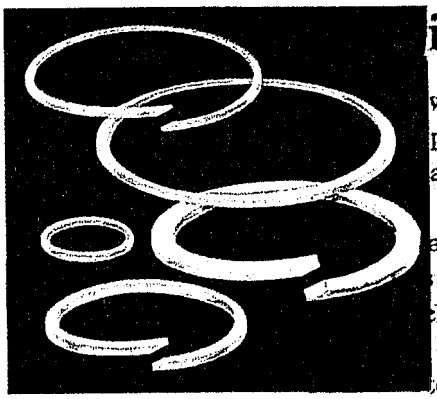
Style 15 solid Chemlon Gaskets are made from non-porous virgin Teflon and are of uniform density and thickness. Sizes are available to meet every application. Solid gasket construction offers the simplest and most economical sealing method and is recommended whenever there is little or no temperature variation. When not confined, they may be used on low pressure applications up to 300 psi. or, when properly confined, on operating pressures up to 30,000 psi.

Chemlon solid round gaskets are standard in 1/32" or 1/16" thicknesses for pipe sizes listed in table below. Gaskets of special shapes or sizes can be economically fabricated to any specification.

RING GASKETS—SIZES and DIMENSIONS

Pipe Size	25 and 125 lb. Cast Iron Flange Joints	175 and 250 lb. Cast Iron Flange Joints
1"	1" x 2 5/8"	1" x 2 7/8"
1 1/4"	1 1/4" x 3"	1 1/4" x 3 1/4"
1 1/2"	1 1/2" x 3 3/8"	1 1/2" x 3 3/4"
2"	2" x 4 1/8"	2" x 4 3/8"
2 1/2"	2 1/2" x 4 7/8"	2 1/2" x 5 1/8"
3"	3" x 5 3/8"	3" x 5 7/8"
3 1/2"	3 1/2" x 6 3/8"	3 1/2" x 6 1/2"
4"	4" x 6 7/8"	4" x 7 1/8"
5"	5" x 7 3/4"	5" x 8 1/2"
6"	6" x 8 3/4"	6" x 9 7/8"
8"	8" x 11"	8" x 12 1/8"
10"	10" x 13 3/8"	10" x 14 1/4"
12"	12" x 16 1/8"	12" x 16 5/8"

CHEMLON Back-Up Rings

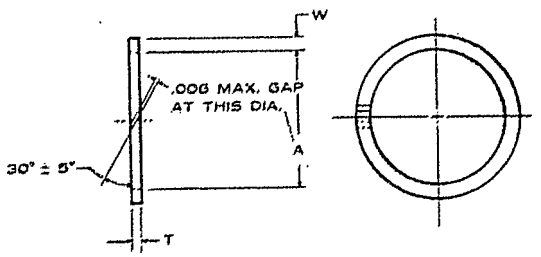


Chemlon Back-Up Rings are made from virgin Teflon and are available in either solid rings or split rings. They are designed and recommended for use with natural or synthetic rubber "O" Rings to prevent ring extrusion.

Chemlon Back-Up Rings can be supplied in a full range of standard sizes for use with "O" Ring packings, gaskets and universal tube fittings for all commercial and AN requirements.

SOLID and SPLIT RINGS—SIZES and DIMENSIONS

NO.	A DIA. BASIC	W ±.002	T ±.004	APPROX. WEIGHT LBS./100
MS9058-02	.246	.112	.056	.056
MS9058-03	.309	.112	.056	.066
MS9058-04	.360	.117	.061	.085
MS9058-05	.423	.117	.061	.096
MS9058-06	.478	.121	.061	.110
MS9058-08	.656	.125	.061	.149
MS9058-10	.769	.131	.073	.226
MS9058-12	.941	.169	.073	.342
MS9058-16	1.191	.169	.073	.419
MS9058-20	1.503	.169	.073	.515
MS9058-24	1.752	.169	.073	.592
MS9058-28	2.127	.169	.073	.707
MS9058-32	2.377	.169	.073	.784



For latest Military Standards MS28774 applying to back-up rings made of Teflon, write directly to: Crane Packing Company, Mechanical Packing Division, 6400 Oakton St., Morton Grove, Ill.

CHEMLON

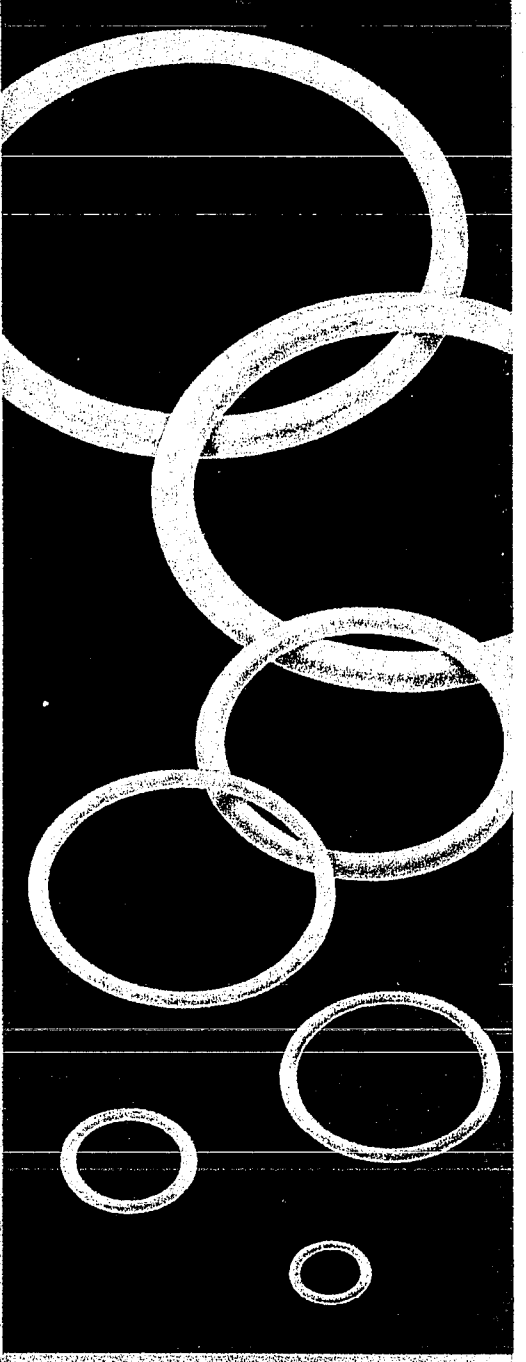
"O" Rings

"John Crane" Chemlon "O" Rings are finding an increasing use throughout industry, especially where synthetic hydraulic fluids, high temperatures or other service conditions injurious to rubber are encountered. They offer the general advantages of "O" Rings: lower production cost through product design simplification and reduced maintenance cost.

These "O" Rings are unaffected by practically all acids, alkalis, solvents or corrosives in any concentration within a wide temperature range of −120°F. to +500°F. They are normally recommended for static sealing service only. However, they have proven successful on a few slow and intermittent revolving or sliding applications.

When used as a totally confined static seal, Chemlon "O" Rings may be used under practically unlimited pressures, extreme vibration or repeated impulsing. (Allow a 5% greater diametral squeeze than that recommended for corresponding size rubber "O" Ring.)

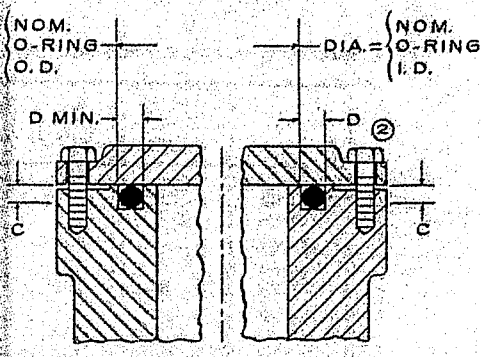
A complete line of Chemlon "O" Rings made to AN-6227 and AN-6230 sizes are available. Other special sizes to specifications may be fabricated to order.



STATIC FACE SEAL SIZES

UNIFORM DASH No.	SECTION DIA. ACTUAL	CROSS-SECTION (1) DIAMETRAL SQUEEZE (MIN.)	"C" GLAND WIDTH +.000 −.005	GROOVE LENGTH "D" REF. (2)
006-012	.070±.003	.0157	.0494	.09
110-116	.103±.003	.0178	.0789	.14
210-222	.139±.004	.0231	.1074	.19
223-258	.139±.004	.0231	.1074	.19
325-349	.210±.005	.0336	.1644	.28

PISTON GROOVE DIA.



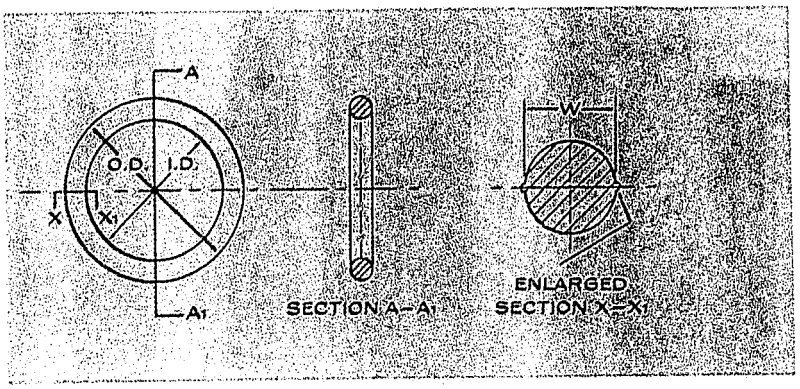
NOTES: (1) Diametral squeeze indicates min. interference between packing C.S. dia. and "C" dimension. Variation in recommended static seal squeeze may be necessary to facilitate installation.

(2) If space is limited, reduce "D" by substituting actual O-ring C.S. dia. to high tolerance plus static seal squeeze.

CHEMLON "O" RINGS

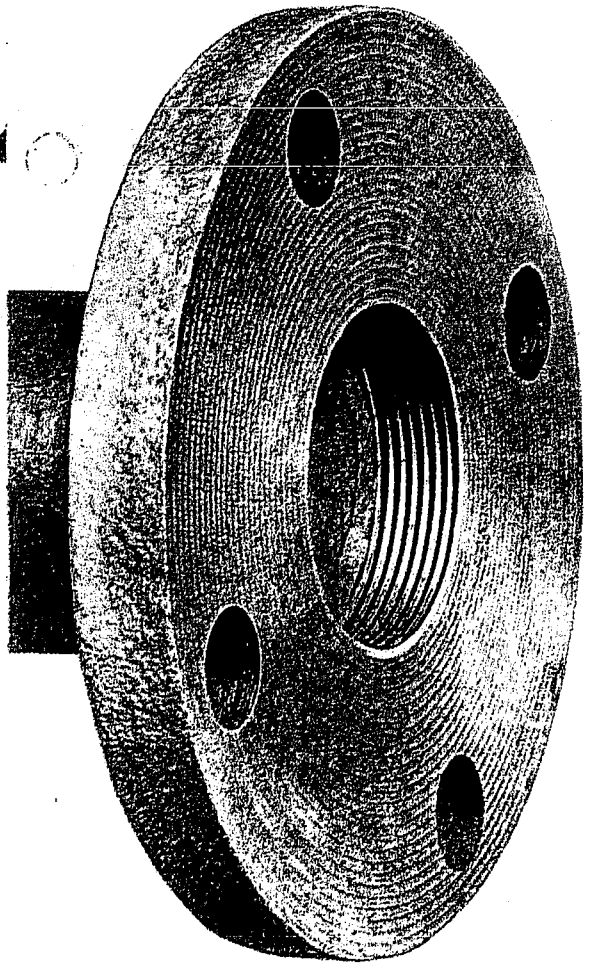
Standard Sizes and Dimensional Data

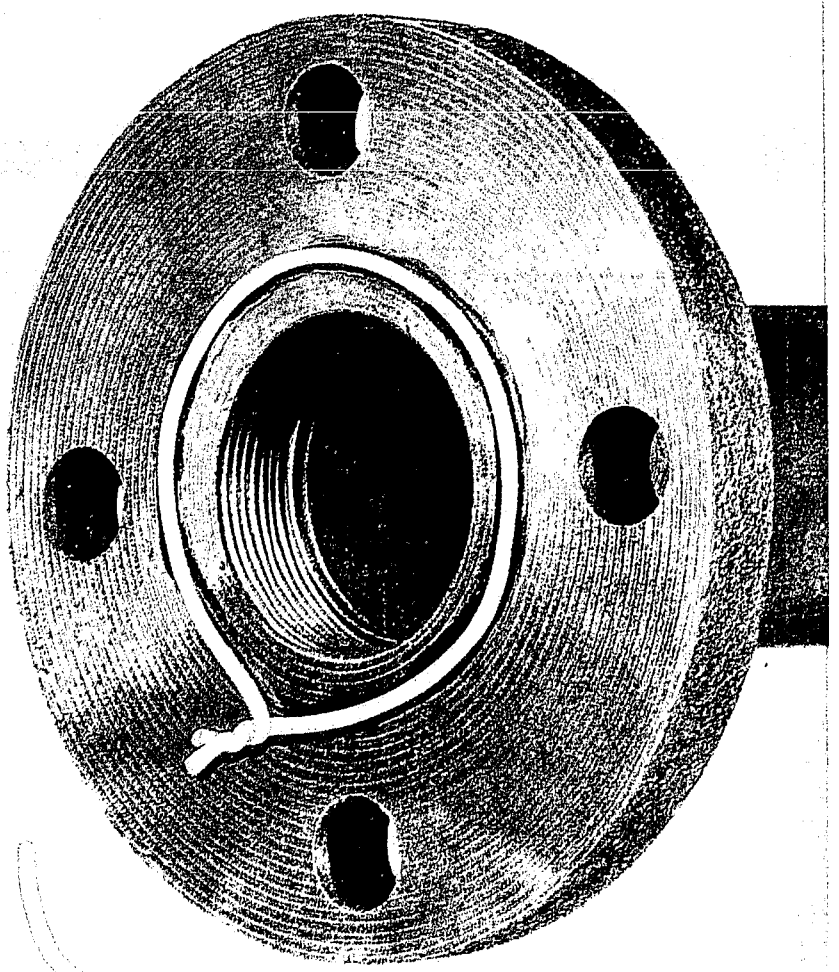
UNIFORM DASH NO.	NOMINAL SIZE			ACTUAL SIZE	
	W	I.D.	O.D.	W	I.D.
006	1/16	1/8	1/4	.070 ± .003	.114 ± .005
007	1/16	5/32	9/32	"	.145 ± "
008	1/16	3/16	5/16	"	.176 ± "
009	1/16	7/32	11/32	"	.208 ± "
010	1/16	1/4	3/8	"	.239 ± "
011	1/16	5/16	7/16	"	.301 ± "
012	1/16	3/8	1/2	"	.364 ± "
110	3/32	3/8	9/16	.103 ± .003	.362 ± "
111	3/32	7/16	5/8	"	.424 ± "
112	3/32	1/2	11/16	"	.487 ± "
113	3/32	9/16	3/4	"	.549 ± "
114	3/32	5/8	13/16	"	.612 ± "
115	3/32	11/16	7/8	"	.674 ± "
116	3/32	3/4	15/16	"	.737 ± "
210	1/8	3/4	1	.139 ± .004	.734 ± .006
211	1/8	13/16	1 1/16	"	.796 ± "
212	1/8	7/8	1 1/8	"	.859 ± "
213	1/8	15/16	1 3/16	"	.921 ± "
214	1/8	1	1 1/4	"	.984 ± "
215	1/8	1 1/16	1 5/16	"	1.046 ± "
216	1/8	1 1/8	1 3/8	"	1.109 ± "
217	1/8	1 3/16	1 7/16	"	1.171 ± "
218	1/8	1 1/4	1 1/2	"	1.234 ± "
219	1/8	1 5/16	1 9/16	"	1.296 ± "
220	1/8	1 3/8	1 5/8	"	1.359 ± "
221	1/8	1 7/16	1 11/16	"	1.421 ± "
222	1/8	1 1/2	1 3/4	"	1.484 ± "
223	1/8	1 5/8	1 7/8	"	1.609 ± .010
224	1/8	1 3/4	2	"	1.734 ± "
225	1/8	1 7/8	2 1/8	"	1.859 ± "
226	1/8	2	2 1/4	"	1.984 ± "
227	1/8	2 1/8	2 3/8	"	2.109 ± "
228	1/8	2 1/4	2 1/2	"	2.234 ± "
229	1/8	2 3/8	2 5/8	"	2.359 ± "
230	1/8	2 1/2	2 3/4	"	2.484 ± "
231	1/8	2 5/8	2 7/8	"	2.609 ± "
232	1/8	2 3/4	3	"	2.734 ± .015
233	1/8	2 7/8	3 1/8	"	2.859 ± "
234	1/8	3	3 1/4	"	2.984 ± "
235	1/8	3 1/8	3 3/8	"	3.109 ± "
236	1/8	3 1/4	3 1/2	"	3.234 ± "
237	1/8	3 3/8	3 5/8	"	3.359 ± "
238	1/8	3 1/2	3 3/4	"	3.484 ± "
239	1/8	3 5/8	3 7/8	"	3.609 ± "
240	1/8	3 3/4	4	"	3.734 ± "
241	1/8	3 7/8	4 1/8	"	3.859 ± "
242	1/8	4	4 1/4	"	3.984 ± "
243	1/8	4 1/8	4 3/8	"	4.109 ± "
244	1/8	4 1/4	4 1/2	"	4.234 ± "
245	1/8	4 3/8	4 5/8	"	4.359 ± "
246	1/8	4 1/2	4 3/4	"	4.484 ± "
247	1/8	4 5/8	4 7/8	"	4.609 ± "



UNIFORM DASH NO.	NOMINAL SIZE			ACTUAL SIZE	
	W	I.D.	O.D.	W	I.D.
248	1/8	4 3/4	5	.139 .004	4.734 ± "
249	1/8	4 7/8	5 1/8	"	4.859 ± "
250	1/8	5	5 1/4	"	4.984 ± "
251	1/8	5 1/8	5 3/8	"	5.109 ± .023
252	1/8	5 1/4	5 1/2	"	5.234 ± "
253	1/8	5 3/8	5 5/8	"	5.359 ± "
254	1/8	5 1/2	5 3/4	"	5.484 ± "
255	1/8	5 5/8	5 7/8	"	5.609 ± "
256	1/8	5 3/4	6	"	5.734 ± "
257	1/8	5 7/8	6 1/8	"	5.859 ± "
258	1/8	6	6 1/4	"	5.984 ± "
325	3/16	1 1/2	1 7/8	.210 ± .005	1.475 ± .010
326	3/16	1 5/8	2	"	1.600 ± "
327	3/16	1 3/4	2 1/8	"	1.725 ± "
328	3/16	1 7/8	2 1/4	"	1.850 ± "
329	3/16	2	2 3/8	"	1.975 ± "
330	3/16	2 1/8	2 1/2	"	2.100 ± "
331	3/16	2 1/4	2 5/8	"	2.225 ± "
332	3/16	2 3/8	2 3/4	"	2.350 ± "
333	3/16	2 1/2	2 7/8	"	2.475 ± "
334	3/16	2 5/8	3	"	2.600 ± "
335	3/16	2 3/4	3 1/8	"	2.725 ± .015
336	3/16	2 7/8	3 1/4	"	2.850 ± "
337	3/16	3	3 3/8	"	2.975 ± "
338	3/16	3 1/8	3 1/2	"	3.100 ± "
339	3/16	3 1/4	3 5/8	"	3.225 ± "
340	3/16	3 3/8	3 3/4	"	3.350 ± "
341	3/16	3 1/2	3 7/8	"	3.475 ± "
342	3/16	3 5/8	4	"	3.600 ± "
343	3/16	3 3/4	4 1/8	"	3.725 ± .015
344	3/16	3 7/8	4 1/4	"	3.850 ± "
345	3/16	4	4 3/8	"	3.975 ± "
346	3/16	4 1/8	4 1/2	"	4.100 ± "
347	3/16	4 1/4	4 5/8	"	4.225 ± "
348	3/16	4 3/8	4 3/4	"	4.350 ± "
349	3/16	4 1/2	4 7/8	"	4.475 ± "

Note: Above dash numbers correspond to new Uniform Dash Numbering System.





ANOTHER

John Crane

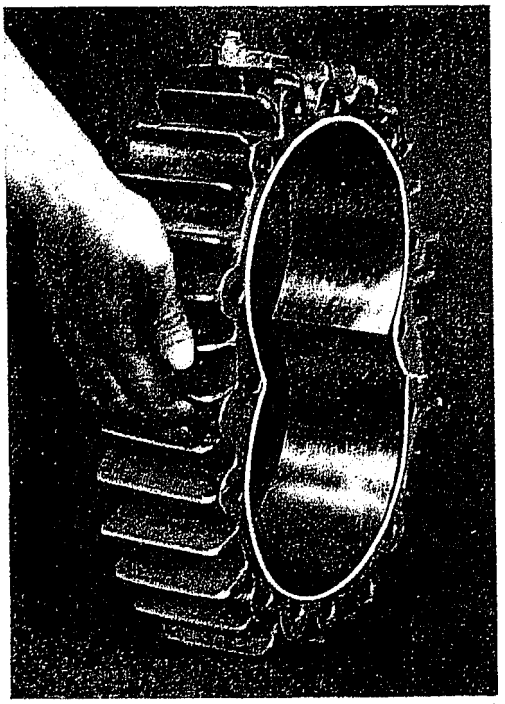
CHEMLON PRODUCT

ZIP JOINT

The Fastest Way to Make A Gasket Or Pack A Valve — Easy, Clean, Economical

Another John Crane Chemlon Product

Zip Joint



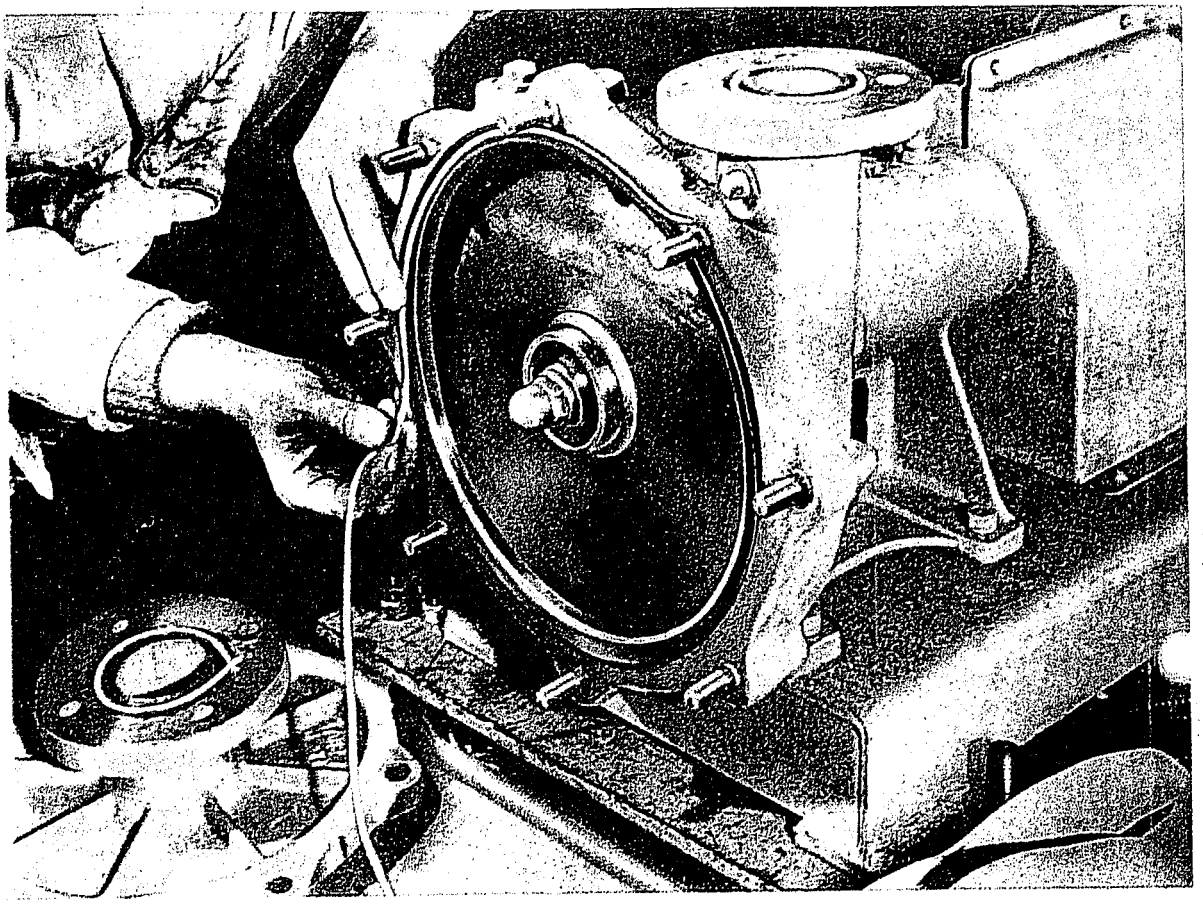
Typical flange gasket application

Zip Joint is a specially formulated Teflon* sealing material that withstands vibration, severe temperatures and high pressures to last the life of the connection. It is completely non-toxic, and its service range is practically unlimited—from water and food products to destructive chemicals, solvents and acids, liquid or gas.

AS A GASKET—Use Zip Joint on flanged connections, tanks or other pressure vessels, pump housings and all other similar mating faces. To make up a joint, it is only necessary to cut off and position a length just within the bolt circle (as in the case of a flanged connection) and twist the ends. Then reassemble mating faces in same manner as with other type gaskets. (When it is necessary to hold Zip Joint in place while making up the connection, this is easily accomplished with Zip Joint or other brand gasket adhesive.)

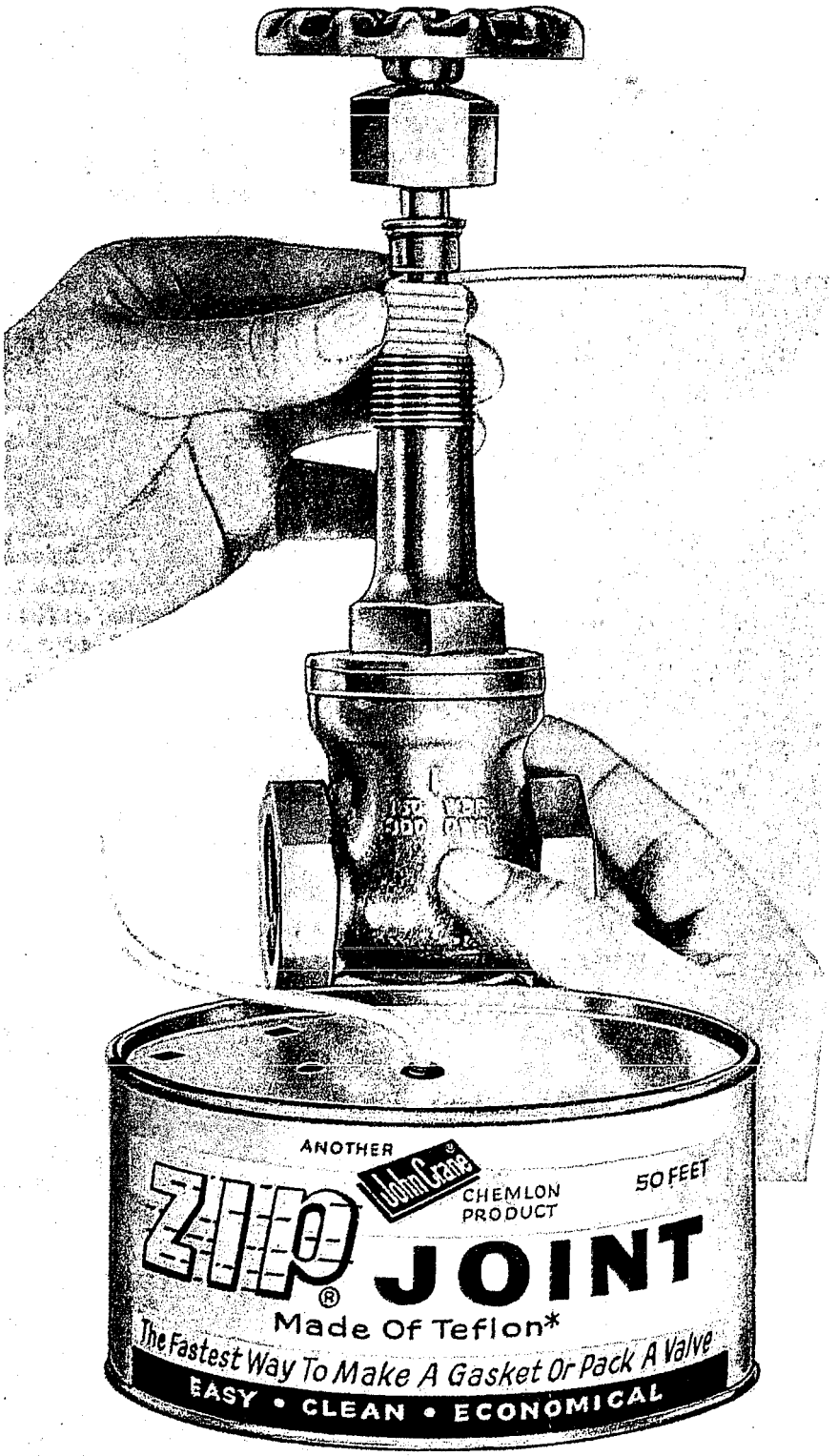
AS A PACKING—Use Zip Joint for leakproofing valves, faucets and similar gland applications. Just remove the old packing and wrap Zip Joint around the stem to the depth of the gland (as in the case of a valve). Screw down gland follower to tightness necessary to seal.

Zip Joint is available in $\frac{3}{32}$-in. dia. x 25 or 50-ft. lengths; $\frac{5}{32}$-in. dia. x 25-ft. lengths packaged in a self-dispensing container designed for tool box or maintenance bench use. It is fed from a coil through a hole in the top of the container where it is always available for pulling out and cutting off to any desired length. It is also available in $\frac{1}{4}$-in. sq. or $\frac{5}{16}$-in. dia. in either 5 or 25 ft. lengths.



Forming a gasket on a centrifugal pump

- The fastest way to make a gasket— any size, any shape
- Eliminates cutting or purchasing gaskets to size and shape
- Equally effective as a valve or faucet packing
- Simple and ***clean*** to install— saves time and money
- Has practically no liquid or gas service limitation
- Withstands temperatures from −400° to +500°F., pressures to 500 psi.†



All Sizes Now Available With Handy Zip-Clip Cutter

•

One cutter is furnished with each 6-can carton of Zip Joint. Additional cutters available at nominal cost.

Installs easily in holes provided on top of can.

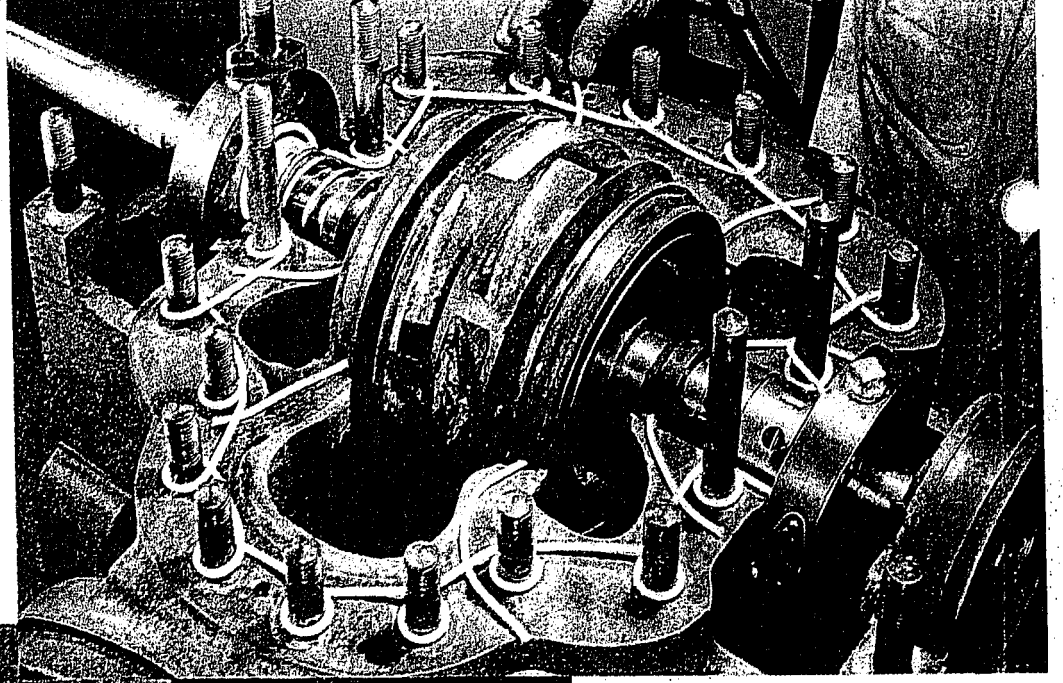
Cuts Zip Joint cleanly at press of finger.

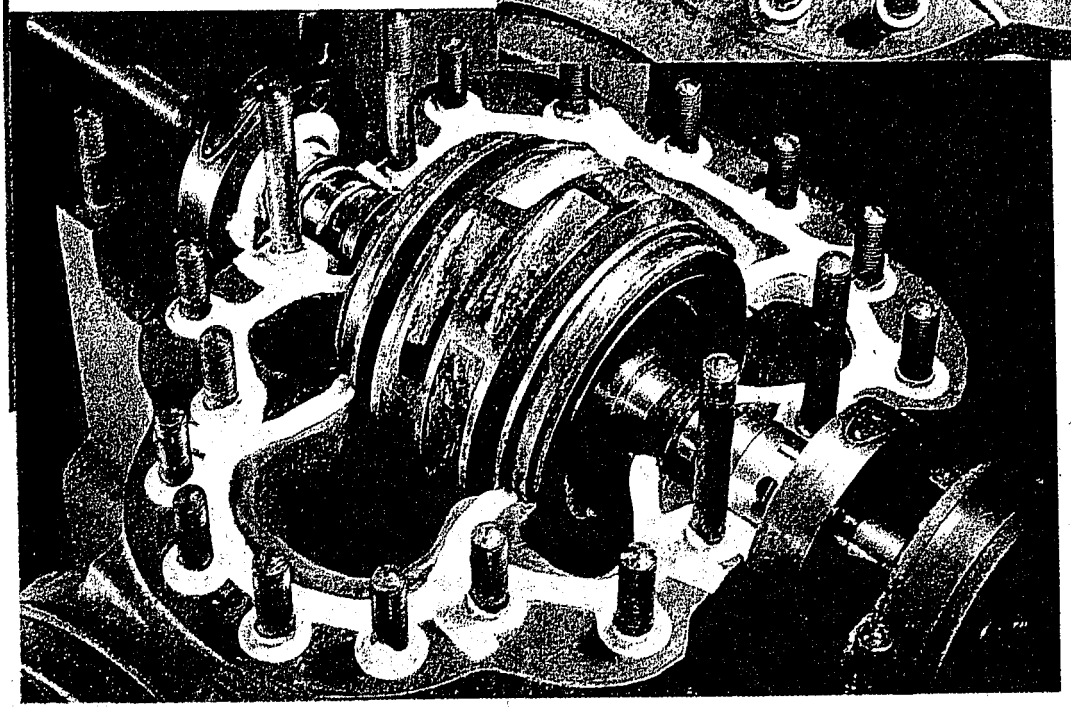
Zip Joint Adhesive remains tacky to permit sufficient time for assembly of the gasket, then holds it neatly and firmly in place while making up the connection. It is completely non-toxic and approved for food products. It will not affect the sealing effectiveness of Zip Joint or other gasket materials.

†Under favorable conditions Zip Joint will withstand pressures as high as 1500 psi.

**DuPont Trademark*

New Advance In Split-Case Pump Gaskets





Above typical split-case pump installation shows how material is applied quickly and easily in practically one continuous strip.

Left shows how material spreads out into one solid gasket to form a positive seal when mating faces are assembled.

John Crane

ZIP JOINT

MADE OF DU PONT TEFLON

Fast, easy, clean—eliminates cutting or stocking to shape and size.

For all services—water to destructive acids, temperatures from −400° to +500° F., pressures to over 500 psi.

Resilient to compensate for warpage, waviness or scratches in mating surfaces.

John Crane

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OFFICES, WAREHOUSES AND SERVICE DEPOTS THE WORLD OVER

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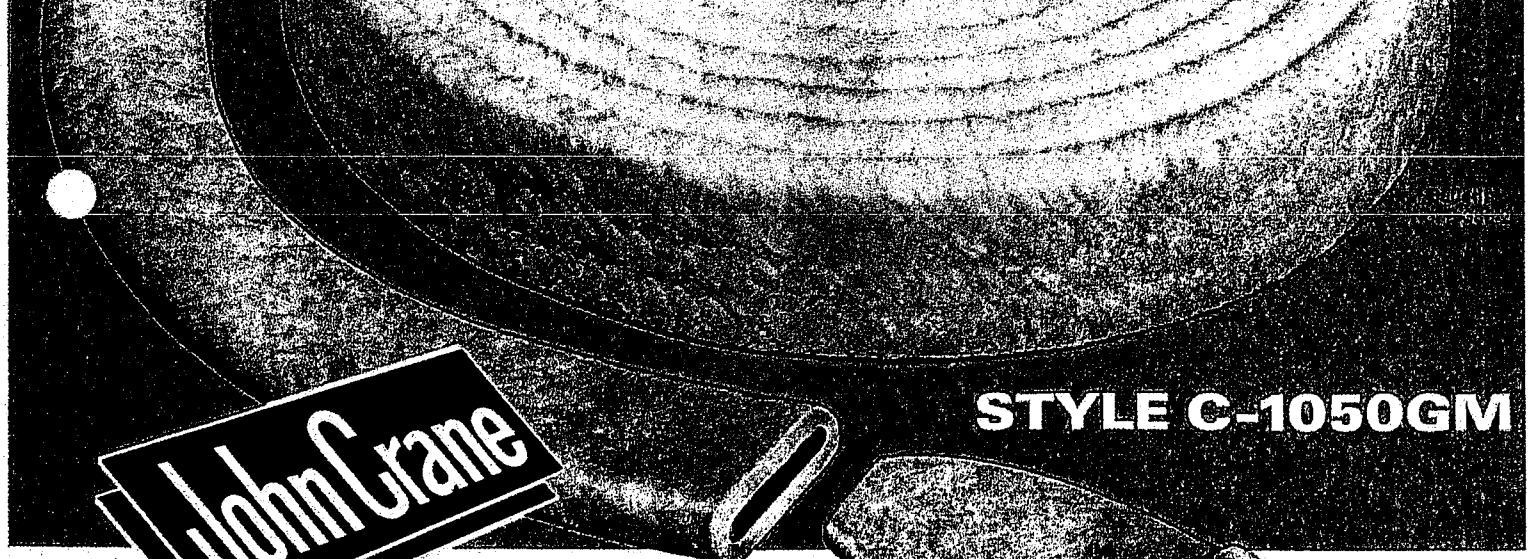


WOVEN TFE*
GASKET MATERIAL

Style C-1050GM gasket material greatly reduces inventory bulk and cost by eliminating the need for stocking a variety of shapes, sizes and materials.

Made of *DuPont Teflon, Style C-1050GM handles practically all services encountered in industry. These include water, steam, chemicals, corrosives, fuels, hydraulic fluids, solvents, liquid oxygen and gases. Temperature range is from −120° to +300° F., pressures to 300 psi. and vacuums to 28 hg.

No shimming or adjusting is required. Style C-1050GM compresses easily, conforms to irregularities and fills in surface voids at low flange pressures. (This is an important factor in preventing breakage of glass flanges.) Extrusion is negligible.

The fact that the material will not stick to the flanges when removed simplifies cleaning, reduces maintenance and down time.

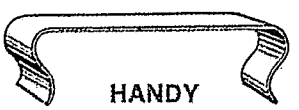
Installation is fast and easy. Just place on or attach to flange, cut to proper size, form tongue on one end and butt into hollow center at the other end. See illustration at top and handy clip fastener feature in box at lower right.

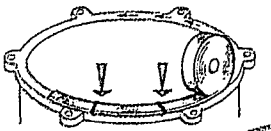
Style C-1050GM Gasket Material is available as follows:

Width	Thickness	Ft. Per Lb.	Standard Roll Length
½″	⅛″	16.3	20′
1″	⅛″	8.3	15′
1″	¼″	5.6	15′
1½″	¼″	3.3	10′
2″	¼″	2.6	10′

THE ANSWER TO ALL YOUR LARGE GASKET REQUIREMENTS

- Mixers
- Heat Exchangers
- Reactors
- Similar Equipment



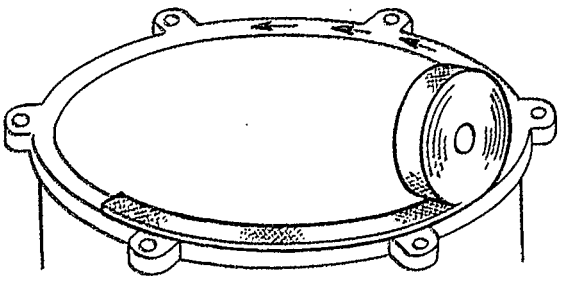


HANDY CLIP FASTENERS

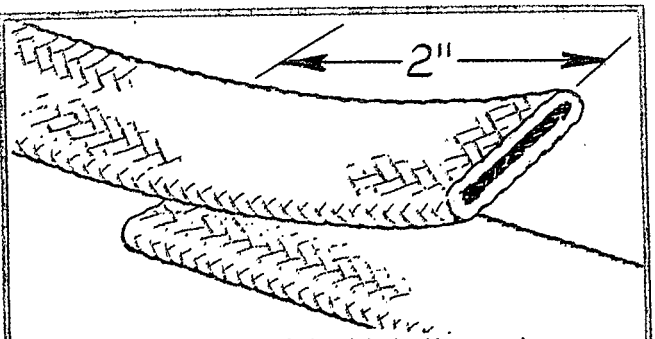
All rolls are packaged with 10 spring metal clips to facilitate easy holding of material on flange surfaces while forming gasket during installation. Clips eliminate the need for use of tape or other time consuming methods. They are reusable many times over.

DISTRIBUTED BY

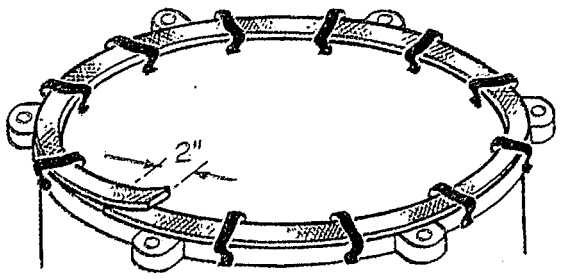
INSTALLATION INSTRUCTIONS



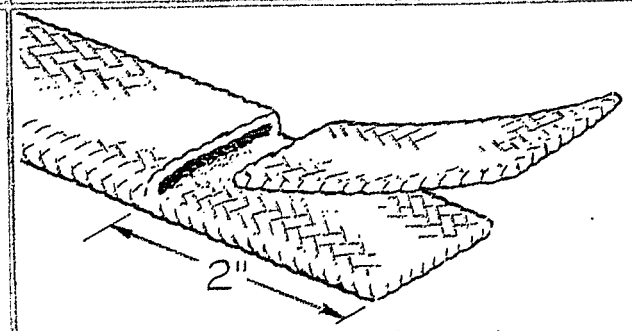
1. Roll gasket material completely around flange.



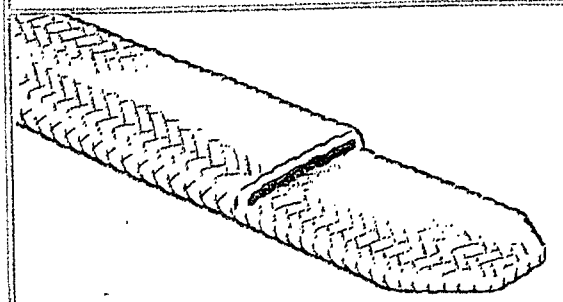
2. Cut material with knife or shears, allowing a 2-in. overlap.



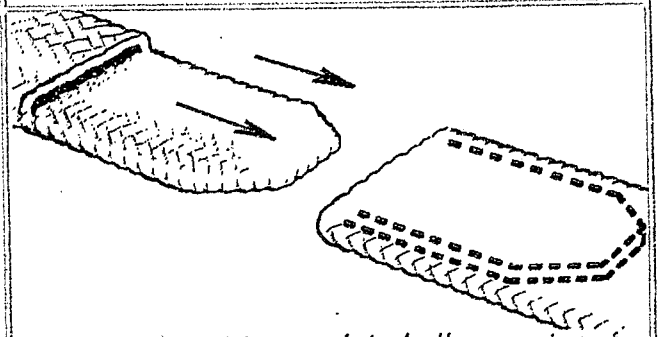
3. Use spring-metal clips to temporarily hold material on flange.



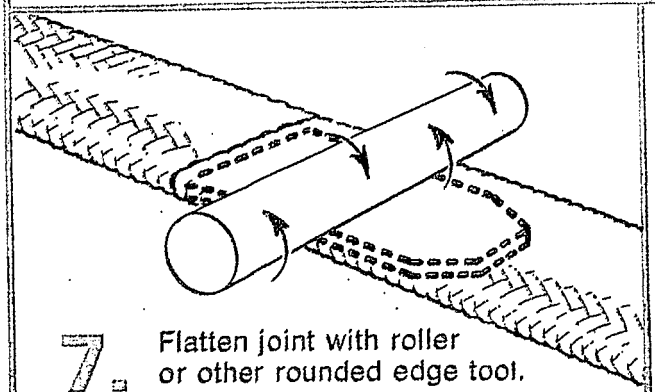
4. Cut top half of 2-in. overlap and remove.



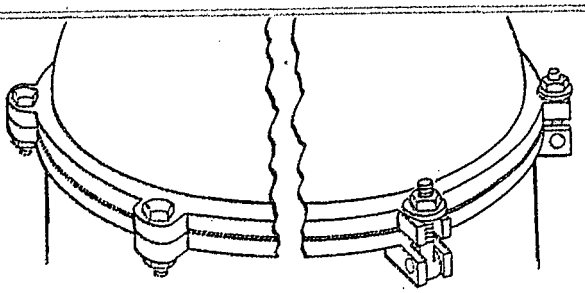
5. Cut ends of bottom half diagonally to form a tongue.



6. Insert tongue into hollow center of opposite end to form a butt fit.



7. Flatten joint with roller or other rounded edge tool.



8. Remove clips, replace cover and draw up bolts or clamps tightly.

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In Australia: John Crane Mauri Pty., Ltd., 168 Eldridge Road, Bankstown, New South Wales, Australia
In Europe: Crane Packing Ltd., Slough, Bucks, England
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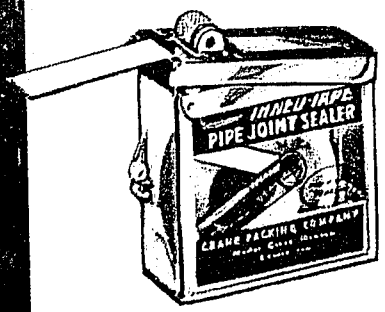

John Crane

Quality Industrial Sealers And Lubricants

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OFFICES, WAREHOUSES AND SERVICE THE WORLD OVER

John Crane

made of TFE

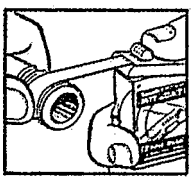
THRED-TAPE Pipe Joint Sealer

"John Crane" Thred-Tape Pipe Joint Sealer seals all types of threaded connections — pipe joints, plugs, screwed fittings — under the most difficult service conditions. Made from chemically inert TFE, it safely handles practically all chemicals, corrosives, caustics, hydraulic fluids and aromatic fuels. It is also recommended for alkali, solvent, toxic, biological and gas service.

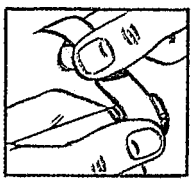
Thred-Tape can be used on all types of pipe: plastic, aluminum, stainless steel, ceramic, synthetic rubber, monel and carbon. It prevents seizing and galling and is self-lubricating to permit connections to be drawn to a maximum degree of tightness. Because Thred-Tape remains permanently plastic, connections can be easily disassembled even after years of service.

- *Temperature range −250° to +500°F.*
- *Pressures to thousands of pounds*
- *Packaged in a protective, dirt-proof, clear plastic box*

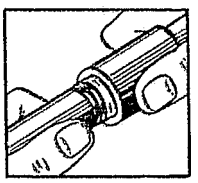
THRED-TAPE is Easy to Use



1. Simply cut off tape to proper length . . .



2. Wrap around male threads . . .

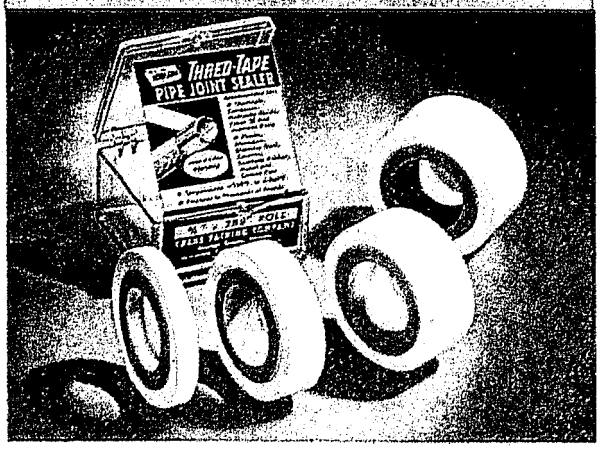


3. Make the connection in usual fashion and tighten — tape automatically provides a positive seal.

Convenient Cutter-Dispenser*

Feeds and cuts tape fast and clean—no stretching or tearing. Re-usable clear plastic container accommodates the popular ¼" or ½" width in either 288" or 576" roll.

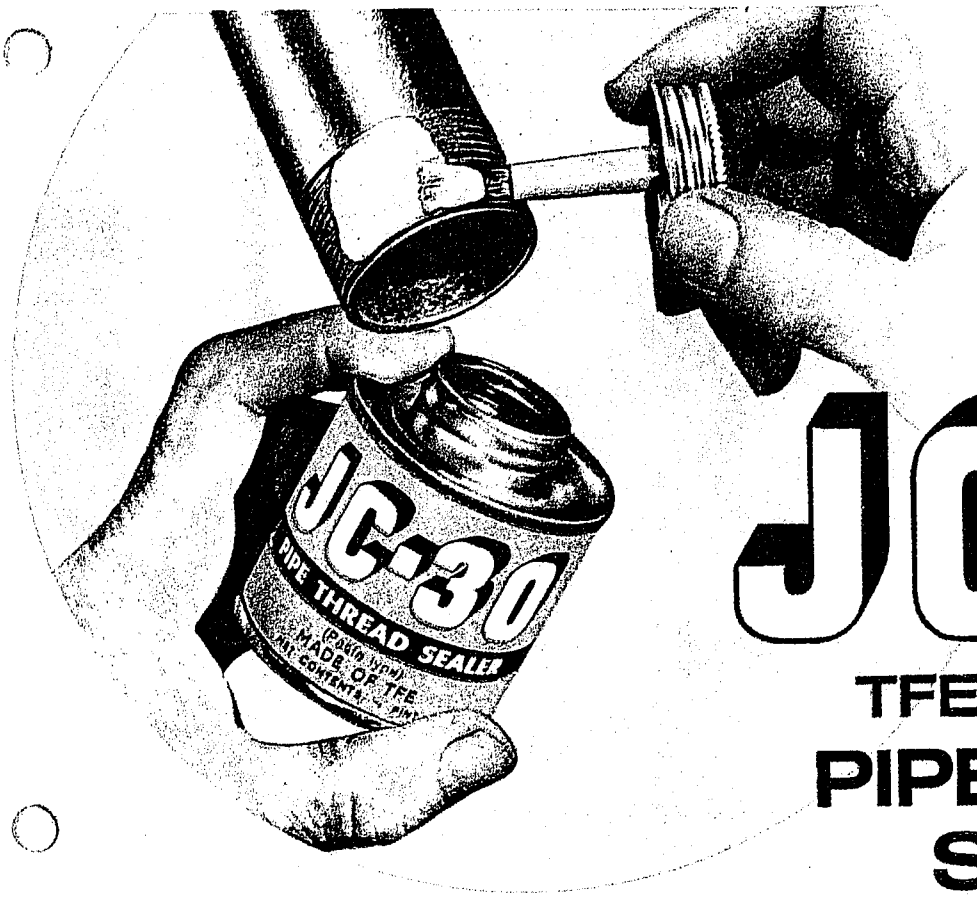
Full Range of Widths



Four widths of Thred-Tape permit the selection of the width best suited to the size of the joint to be sealed. General recommendations are as follows: ¼" width for pipe to ½", ½" width for pipe from ½" to 2", ¾" width for pipe from 2" to 4" and 1" width for pipe 4" and over.

Rolls available in ¼", ½", ¾" and 1" widths with either 288" or 576" lengths.

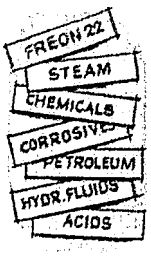
**Patented*



JC-30

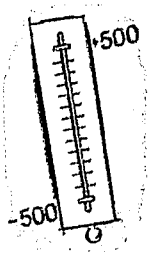
TFE Paste-Type PIPE THREAD SEALER

All The Advantages Of A TFE Thread Sealant In An Easy-To-Apply Brush-On Compound



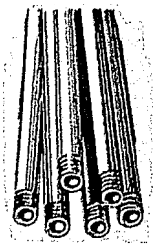
Extremely Wide Service Range

One application does it. Positively seals water, steam, chemicals, corrosives, acids, petroleum products, hydraulic fluids, natural and LP gas, Freon 22, aromatic fluids and other difficult liquids and gases. Non-toxic and safe for food products. (Not recommended for liquid oxygen.)



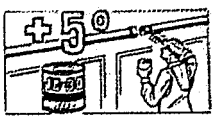
Wide Temperature And Pressure Range

JC-30 has a temperature range from −250° to +500° F. Resists pressures to pipe bursting limits. Seals for the life of the connection, yet remains plastic to withstand vibration and contraction, also to permit easy disassembly.

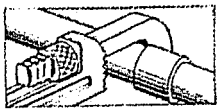


For Pipe Of Any Material

Can be used on pipe and threaded connections of all materials: iron, stainless steel, aluminum, monel, plastic, synthetic rubber and carbon.



Easy to apply at temperatures down to 5° F.

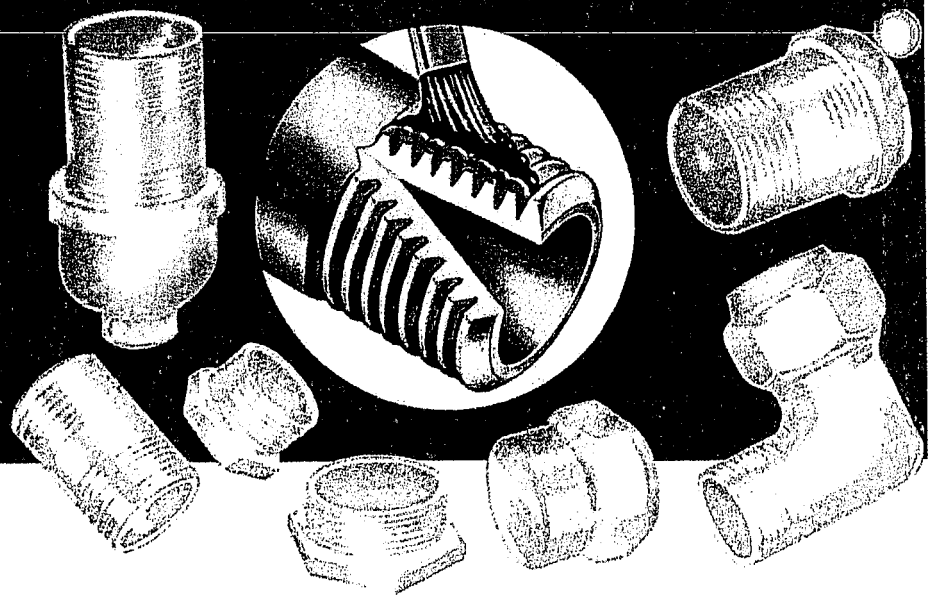


Self-lubricating. Reduces wrench torque.

Clean. Will not stain hands or clothing.

Available in ¼-pint brush-top and 1-pint friction-top cans.

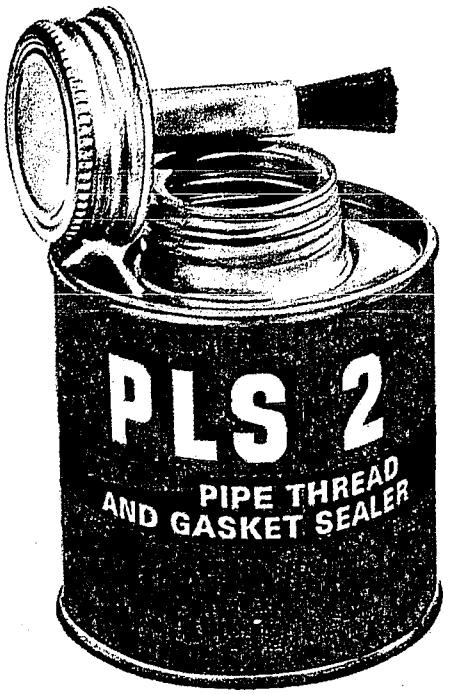
Does The Job Better...



NO. 2

PIPE THREAD and GASKET SEALER

(Paste-Type)



PLS No. 2 is industry's leading compound for sealing pipe joints, plugs, screwed fittings and gasketed connections. All materials: iron, stainless steel, aluminum, monel, plastic, synthetic rubber and carbon.

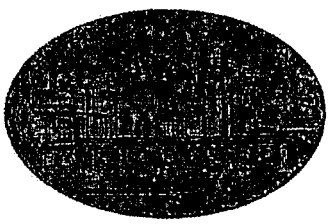
- Spreads easily but adheres firmly to threads during application—positively no dripping or run-off.
- Material reduction in break-away torque to facilitate easy disassembly of connections.
- Practically odorless.

One application seals for the life of the connection. It won't wash out or crack due to vibration, expansion or contraction. Also acts as a lubricant to prevent seizing, galling, rust and corrosion.

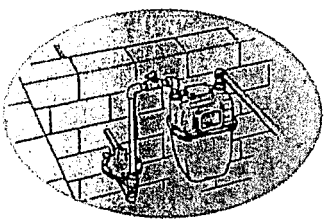
Service and operating conditions are no problem with PLS No. 2. It's a positive leakproofer for practically all industrial fluids: water, steam, petroleum products, LP and natural gas, Freon 11 and 22, distillates and many others. Withstands temperatures to 550° F., pressures to 6000 psi.

UL approved. See index of classified products.

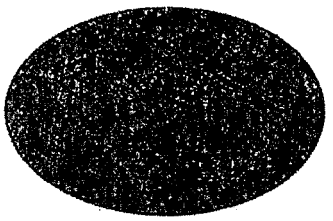
Available in 1-lb. brush-top cans, 1 and 5-lb. friction-top cans, 15 and 28-lb. pails, 85-lb. drums and 1 and 4-oz. plastic jars.



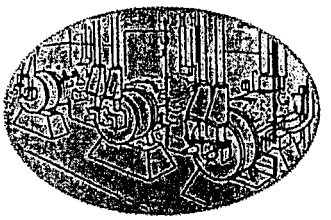
Refining Service



Gas Service



LP Gas & Anhydrous Ammonia Service



Refrigeration & Air Conditioning Service

John Crane Thred-Gard

HIGH TEMPERATURE
Anti-Seize Compound

SOLVES HIGH TEMPERATURE THREAD PROBLEMS.....

ELIMINATES SEIZING AND GALLING.....

LUBRICATES THREADED SURFACES.....

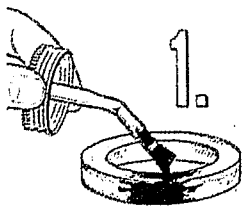
"JOHN CRANE" THRED-GARD is a high temperature thread compound that protects against the welding action of threaded connections subjected to prolonged exposure to extreme heat. It prevents seizing and galling at extremely high operating temperatures.

Thred-Gard is non-drip and non-hardening. It permits easy disassembly of threaded connections, even after lengthy service under the most severe conditions, thus greatly reducing dismantling time.

Studs, bolts, etc. can be re-used many times over. Wrench torque is greatly reduced, allowing connections to be drawn up to a greater degree of tightness without undue stress or strain. Threads are kept smooth.

Thred-Gard Is A Superior High Temperature Packing Lubricant.

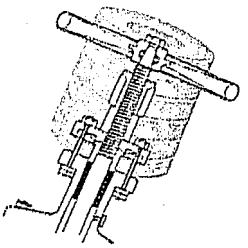
¼-Pint Brush-Top Can

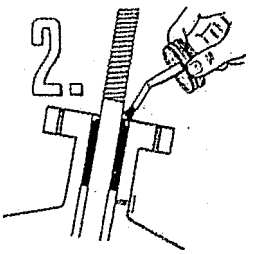


Regardless of extremely high temperatures and length of service, Thred-Gard takes all the work out of pulling packing. It prevents welding or sticking of packing to the stuffing box wall or stem...permits easy removal without strain or scraping...saves replacement time.

You can use Thred-Gard as a high temperature lubricant in two ways. Both are equally effective:

1. Coat the outside of the packing, using the brush-top applicator furnished with the ¼-pint can.
2. Coat the inside of the stuffing box. The angle stem of the brush-top applicator is a big help where access is partially blocked or space is limited.





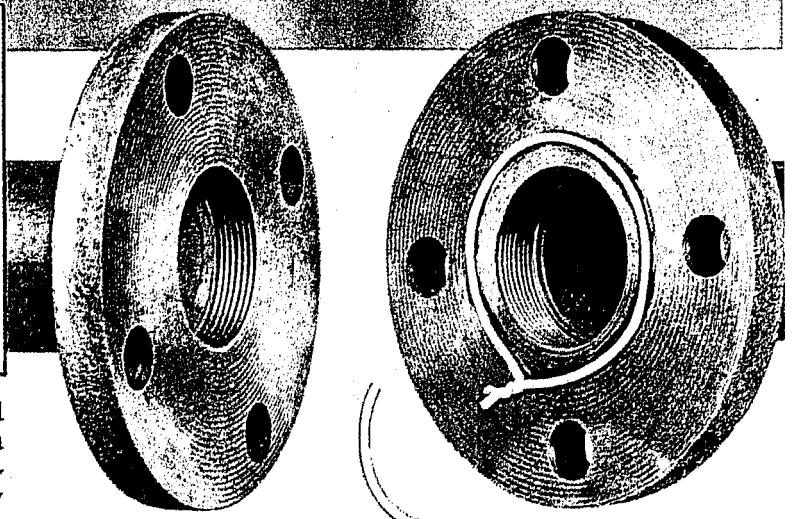
SIZES and WEIGHTS
Available in Handy Can Sizes

¼-pint brush-top	shipping wt. approx.	¾ lb.
½ pint	shipping wt. approx.	1 lb.
1 pint	shipping wt. approx.	2 lbs.
1 quart	shipping wt. approx.	4 lbs.

John Crane

John Crane ZIP JOINT

- The fastest way to make a gasket—any size, any shape.
- Eliminates cutting or purchasing gaskets to size and shape.
- Equally effective as a valve or faucet packing.
- Simple and CLEAN to install—saves time and money.
- Has practically no liquid or gas service limitation.
- Withstands temperatures from —400° to +500°F., pressures to 500 psi.†



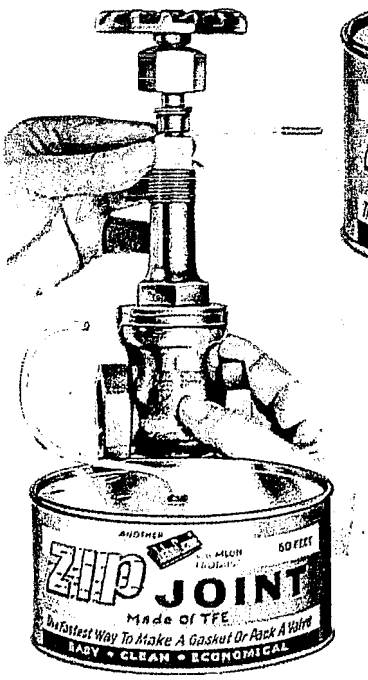
Zip Joint is a specially formulated TFE sealing material that withstands vibration, severe temperatures and high pressures to last the life of the connection. It is completely non-toxic, and its service range is practically unlimited—from water and food products to destructive chemicals, solvents and acids, liquid or gas.

AS A GASKET—Use Zip Joint on flanged connections, tanks or other pressure vessels, pump housings and all other similar mating faces. To make up a joint, it is only necessary to cut off and position a length just within the bolt circle (as in the case of a flanged connection) and twist the ends. Then reassemble mating faces in same manner as with other type gaskets. (When it is necessary to hold Zip Joint in place while making up the connection, this is easily accomplished with Zip Joint or other brand gasket adhesive.)

AS A PACKING—Use Zip Joint for leakproofing valves, faucets and similar gland applications. Just remove the old packing and wrap Zip Joint around the stem to the depth of the gland (as in the case of a valve). Screw down gland follower to tightness necessary to seal.

Zip Joint is available in 3/32-in. dia. x 25 or 50-ft. lengths; 5/32-in. dia. x 25-ft. lengths packaged in a self-dispensing container designed for tool box or maintenance bench use. It is fed from a coil through a hole in the top of the container where it is always available for pulling out and cutting off to any desired length. It is also available in 1/4-in. sq. x 25 ft. and 5/16-in. dia. x 25 ft. wound on an open spool for easy dispensing or in 5 ft. lengths in handy plastic container.

†*Under favorable conditions Zip Joint will withstand pressures as high as 1500 psi.*



All Sizes Now Available With Handy Zip-Clip Cutter

One cutter is furnished with each 6-can carton of Zip Joint. Additional cutters available at nominal cost.

Installs easily in holes provided on top of can.

Cuts Zip Joint cleanly at press of finger.

JC-24

JC-24 is certified by an independent testing laboratory to meet MIL-S-45180B specifications. Certified test report available on request.

LIQUID-TYPE

GASKET SEALER

For all types of gaskets...All services.

An easy-to-apply smooth, homogeneous and non-toxic gasket sealer. Spreads quickly without sagging. Quickly and positively seals all types of gaskets for the life of the connection, yet remains plastic to withstand vibration and permit easy disassembly.

JC-24 is extremely versatile. Can be used for practically all services, including food products. Other services include water, steam, compressed air, chemicals, alkalis, dilute acids, petroleum products, mineral and vegetable oils, hydraulic and jet fluids, LP and natural gas and refrigerants. Temperature range is from −40° to +400° F., pressures to 5000 psi.

Available in ¼ and 1-pint brush-top cans and 1 gallon pail.

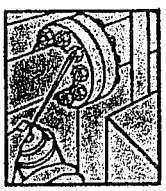
ONE SQUIRT SAVES ALL THE WORK

FREE-ALL

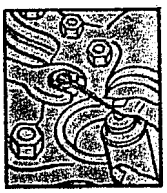
Deep Penetrating Oil

Free-All Deep Penetrating Oil is an exceptionally fast freeing agent for threaded connections, nuts, bolts, rusted parts, tools, etc. It penetrates rust, scale or corrosion and loosens red and white lead, tar, grease, dirt, carbon deposits and graphite without injury to basic metals or wood.

A Fast Freeing Agent That Saves Time and Labor For Plant...Shop... Farm...Shipyard and Garage Use



Jets easily into otherwise inaccessible places.



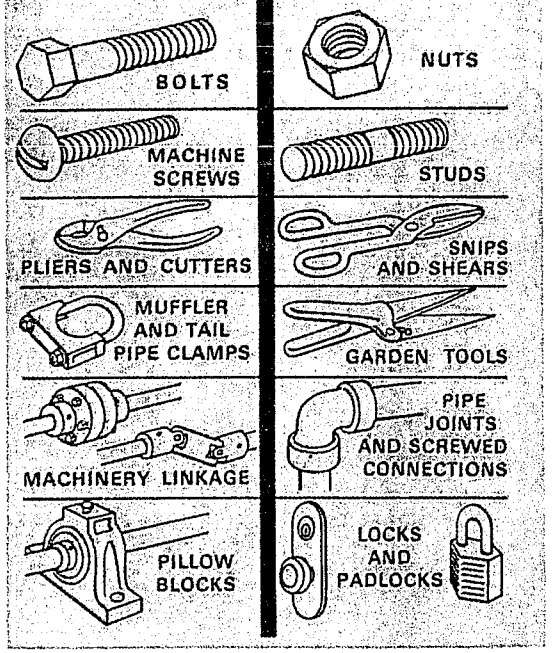
Powerful jet stream increases penetration—forces oil into tiny crevices. High strength freeing agent assures fast and deep penetration.

Free-All comes in a compact 6 or 12 oz. pressurized can* with a jet stream action. This jet stream, in combination with Free-All's high freeing strength, gives exceptional penetrating power that forces it into tiny crevices. It can be "jetted" up, down or sidewise and into inaccessible places not possible with ordinary spray or spout-type cans. The compact can is handy to use, store and put in tool kits. It will not spill or drip.

New Non-flammable Free-All permits use wherever high temperature or open flame conditions exist. Available in 6 oz. pressurized cans.

**Also available in 1-gallon containers.*

QUICKLY FREES:



DISTRIBUTED BY:

Printed in U.S.A.

WOVEN TFE*
GASKET MATERIAL

Style C-1050GM gasket material greatly reduces inventory bulk and cost by eliminating the need for stocking a variety of shapes, sizes and materials.

Made of *DuPont Teflon, Style C-1050GM handles practically all services encountered in industry. These include water, steam, chemicals, corrosives, fuels, hydraulic fluids, solvents, liquid oxygen and gases. Temperature range is from −120° to +300° F., pressures to 300 psi. and vacuums to 28 hg.

No shimming or adjusting is required. Style C-1050GM compresses easily, conforms to irregularities and fills in surface voids at low flange pressures. (This is an important factor in preventing breakage of glass flanges.) Extrusion is negligible.

The fact that the material will not stick to the flanges when removed simplifies cleaning, reduces maintenance and down time.

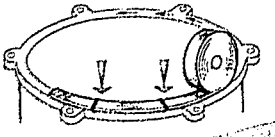
Installation is fast and easy. Just place on or attach to flange, cut to proper size, form tongue on one end and butt into hollow center at the other end. See illustration at top and handy clip fastener feature in box at lower right.

Style C-1050GM Gasket Material is available as follows:

Width	Thickness	Ft. Per Lb.	Standard Roll Length
½″	⅛″	16.3	20′
1″	⅛″	8.3	15′
1″	¼″	5.6	15′
1½″	¼″	3.3	10′
2″	¼″	2.6	10′

THE ANSWER TO ALL YOUR LARGE GASKET REQUIREMENTS

- **Mixers**
- **Heat Exchangers**
- **Reactors**
- **Similar Equipment**

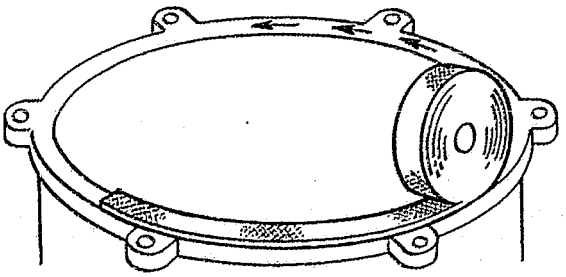


HANDY CLIP FASTENERS

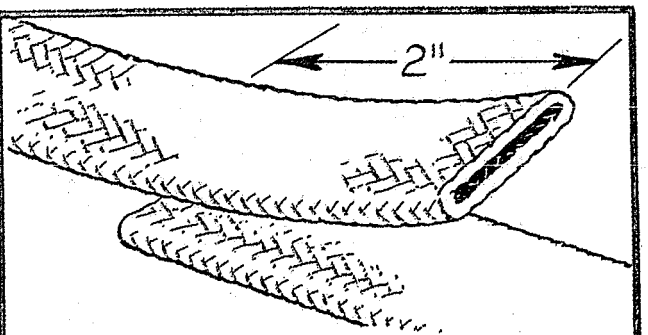
All rolls are packaged with 10 spring metal clips to facilitate easy holding of material on flange surfaces while forming gasket during installation. Clips eliminate the need for use of tape or other time consuming methods. They are reusable many times over.

DISTRIBUTED BY

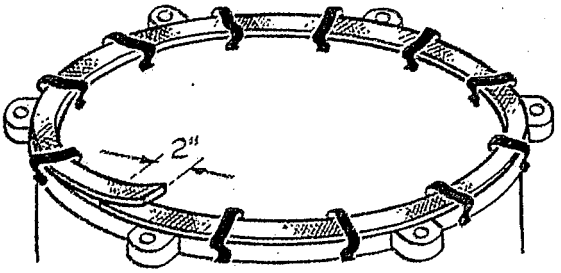
INSTALLATION INSTRUCTIONS



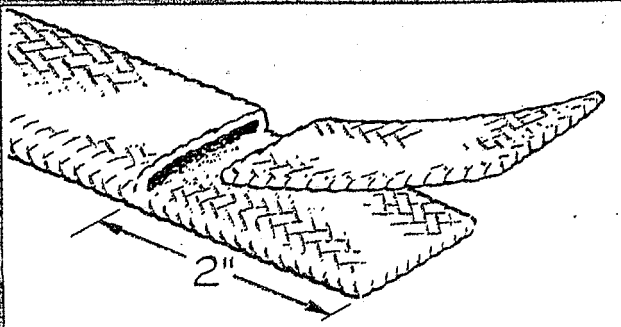
1. Roll gasket material completely around flange.



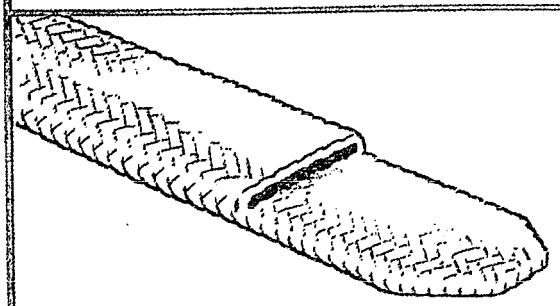
2. Cut material with knife or shears, allowing a 2-in. overlap.



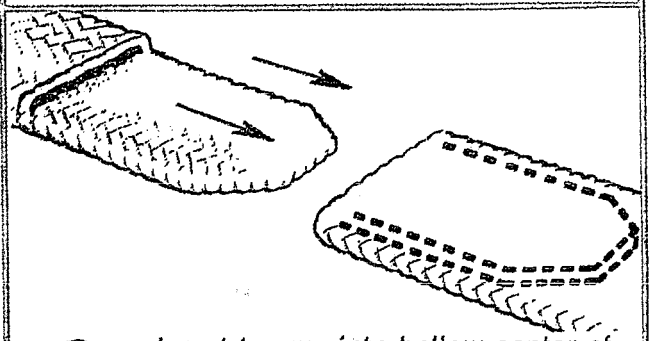
3. Use spring-metal clips to temporarily hold material on flange.



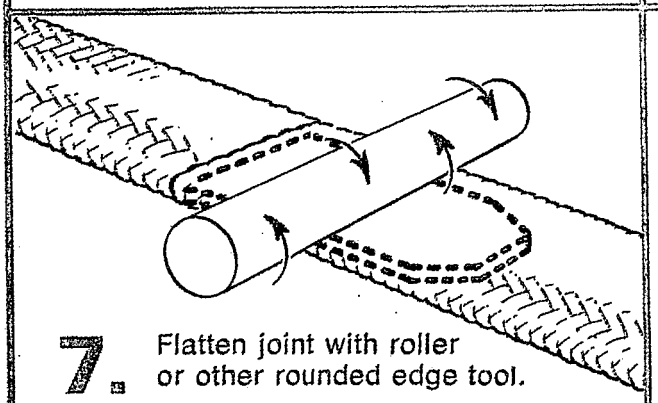
4. Cut top half of 2-in. overlap and remove.



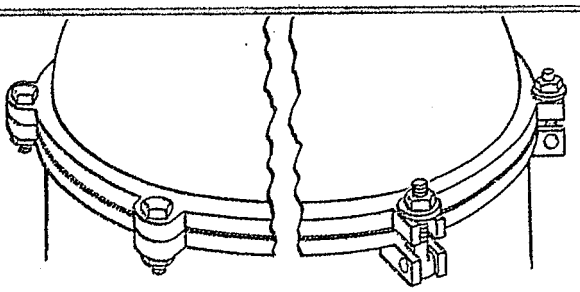
5. Cut ends of bottom half diagonally to form a tongue.



6. Insert tongue into hollow center of opposite end to form a butt fit.



7. Flatten joint with roller or other rounded edge tool.



8. Remove clips, replace cover and draw up bolts or clamps tightly.

John Crane

CRANE PACKING COMPANY

6400 OAKTON STREET, MORTON GROVE, ILLINOIS 60053 (Chicago Suburb)

In Canada: Crane Packing Company, Ltd., Box 3248, Station C, Hamilton, Ont.

In Mexico: Industrias John Crane de Mexico, S.A., Poniente 52 #679 Industrial Vallejo, Mexico, D.F.

In Brazil: John Crane Industria E Comercio, Ltda., Avenida Jurubatuba 600, Sao Bernardo do Campo, S.P.

In Australia: John Crane Maur Pty., Ltd., 160 Eldridge Road, Bankstown, New South Wales, Australia

In Europe: Crane Packing Ltd., Slough, Bucks, England

In Japan: John Crane Japan, Inc., No. 6, Tonjinbashisuji 6-chome, Oyodo-ku, Osaka 531, Japan

OFFICES, WAREHOUSES AND SERVICE THE WORLD OVER

Printed in U.S.A.

Form No. PLS-547-5

John Crane

GLOBE VALVE DISCS

- FOR *ALL* SERVICES
- HIGH AND LOW TEMPERATURES AND PRESSURES
- ELIMINATE BULKY INVENTORY
- GIVE MUCH LONGER WEAR

John Crane TFE Valve Discs handle *all* service requirements from water, high temperature steam and food products to refrigerants, corrosives, acids and alkalis.

This unique combination of properties, plus the extreme wear resistance of TFE, results in:

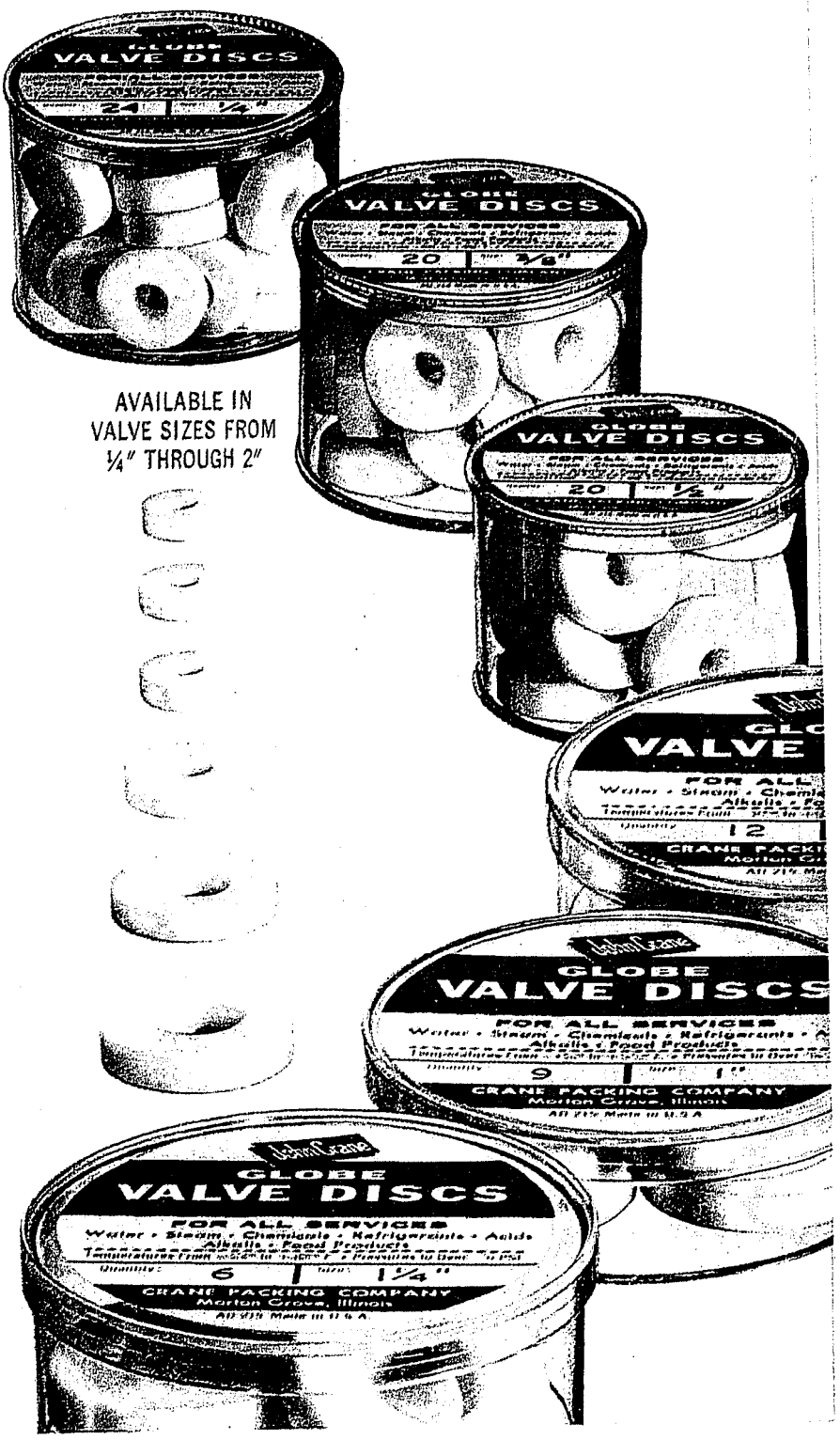
1. One all-service replacement disc that eliminates a bulky inventory of various materials.
2. Much longer service life than that of discs made of other materials.

As an added convenience, John Crane TFE Valve Discs are packaged in handy, easy-to-store transparent plastic containers that are ideal for tool box or work bench. They are available in sizes as follows:

¼" Size.....Box of 24 Discs
⅜" Size.....Box of 20 Discs
½" Size.....Box of 20 Discs
¾" Size.....Box of 12 Discs
1" Size.....Box of 9 Discs
1¼" Size.....Box of 6 Discs
1½" Size.....Box of 8 Discs
2" Size.....Box of 5 Discs

Assorted Sizes:
¼" Through 1"....Box of 16 Discs
1" Through 2".....Box of 9 Discs

AVAILABLE IN VALVE SIZES FROM ¼" THROUGH 2"



CRANE PACKING COMPANY

6400 Oakton Street, Morton Grove, Illinois 60053

In Canada: Crane Packing Company, Ltd., Box 3248, Station C, Hamilton, Ont.
In Mexico: Industrias John Crane de Mexico, S.A. Poniente 152 #679 Industrial Vallejo, Mexico, D. F.
In Europe: Crane Packing Ltd., Slough Bucks, England
In Japan: John Crane Japan, Inc., No. 5 Tenjinbashi-suji 6-chome, Oyodo-Ku, Osaka 531, Japan
In Australia: John Crane Mauri Pty., Ltd., 34 Raglan Road, Auburn, New South Wales, Australia

D I S T R I B U T E D B Y :

Printed in U.S.A.

PACKING LUBRICANTS

It is important that the correct lubricant be used to get the maximum service from your packing. Proper packing lubrication demands qualities not required of ordinary lubricants. These include the ability to resist chemical attack, the dissolving action of solvents and the ability to maintain a tenacious lubricating film and protective action under the combined effects of temperature, pressure and the "washing" action of the fluid.

John Crane Packing Lubricants are insoluble in the fluids for which they are recommended and will not harden, dry up or corrode metal parts. They provide long lubricating life and high lubricating value, increase service efficiency and reduce friction to a minimum. They also prolong packing and rod life, prevent seepage of fluids through the packing and enable control of leakage without undue gland pressure.

A generous application of lubricant to the packing is recommended before installation, with frequent replenishment at regular intervals. A force feed lubricator is ideal for this; however, in the absence of such equipment, application may be made with a hand pressure gun or compression grease cup. In the case of reciprocating rods, the lubricant may be swabbed on the moving part.

John Crane Packing Lubricants are made in five regular types. See back page.

CRANE PACKING COMPANY
6400 OAKTON STREET, MORTON GROVE, ILLINOIS 60053
PLANTS IN: Canada, Mexico, Brazil, England, Australia and Japan

LUBRICANT NO. 1 *(Petroleum Distillates)*

A medium consistency lubricant containing graphite. For general lubrication on most services.

LUBRICANT NO. 1A

Same as No. 1, except that it contains no graphite, also no soap or other emulsifiable material capable of being washed out by any water that may be present in the system. It eliminates rusting of shafts or rods during idle periods as the result of moisture content and excess free fatty acid or alkali that may be present in soap lubricants.

Recommended for all pumps, valves and other equipment handling petroleum distillates and derivatives including:

- Butane
- Fuel Oil
- Gasoline
- Kerosene
- Mineral Oil
- Petroleum Naphtha
- Petrolic Ether
- Propane

LUBRICANT NO. 3 *(Water Services)*

Recommended for general service on all equipment handling hot and cold water, low pressure steam and dilute aqueous solutions. Contains fine lubricating graphite.

LUBRICANT NO. 6 *(Chemical Services)*

A pure, white, high melting point lubricant of unusual chemical resistance recommended for mineral and organic acids, alkalis, chemical solutions, food products, paper mill fluids and some organic solvents. Typical services are:

- Acetic Acid
- Acetone
- Alcohol
- Alum
- Aluminum Chloride
- Ammonium Hydroxide
- Aniline
- Calcium Chloride
- Calcium Hypochlorite
- Caustic
- Chloride of Lime
- Carbolic Acid
- Citric Acid
- Cresols and Cresylic Acid
- Ethyl Acetate
- Ferric Chloride
- Food Products
- Formic Acid
- Furfural
- Glycerine
- Hydrochloric Acid
- Nitric Acid
- Nitrosulfuric Acid
- Oxalic Acid
- Phenol
- Phosphoric Acid
- Potassium Sulfide
- Propionic Acid
- Soapy Water
- Sodium Hydroxide
- Sulfuric Acid
- Tartaric Acid
- Water Glass

NOTE: *Consistency of lubricant requires the use of heavy duty compression cups or similar devices as it can not be injected into stuffing box with ordinary types of grease guns.*

LUBRICANT NO. 11 *(Chemical Services)*

Has a soft, semi-fluid consistency and does not contain graphite. Recommended for all coal tar solvents and similar hydrocarbons, also for dry cleaning service where the presence of graphite would be harmful. Excellent for plug valve service.

Typical services include:

- Acetone—Benzol Mixtures
- Amyl Acetate
- Benzol
- Butyl Acetate
- Carbon Disulfide
- Carbon Tetrachloride
- Ethyl Acetate
- Ethylene Dichloride
- Iso-Propyl Acetate
- Trichlorethylene
- Tuluol
- Xylol

ALL JOHN CRANE PACKING LUBRICANTS
ARE FURNISHED IN 1, 10 AND 25-LB. CONTAINERS

Printed in U.S.A.