



Innovations in Fluid Sealing.

Engineered Sealing Materials... Compression Packing Guide.



Introduction

INMARCO is a leading manufacturer of fluid sealing products since 1984. It has dedicated itself to promulgate non-asbestos culture contributing to safe environment practices. Hundred percent non-asbestos fluid sealing materials include compression packings, metallic, semi-metallic and non-metallic gasketing and thermal insulation. The R & D team continuously strives to find newer raw materials and composites in order to produce desired results. Today's advanced technology demands periodic upgradation of compositions and materials. This guide serves as a reference to the user so as to choose most appropriate sealing material. INMARCO packings are relatively easy to install and maintain. With proper attention, a high degree of successful operation is achievable. INMARCO engineers are available, handy, round the clock to discuss and help customers find efficient sealing solutions.

Compression Packings

Control of fluid loss is essential for successful operation of any mechanical equipment. Various techniques of sealing is applied to restrict fluid/gas loss. The oldest and still common method of sealing is compression packing. These packings are made from relatively soft plaint materials. This packing is then cut and preformed into number of rings to fit in the annular space (stuffing box). By tightening the gland follower against the top or board, pressure is transmitted, thus expanding packing rings radially to achieve effective seal. A typical compression packing arrangement is shown below (fig.1.)

Applications

Packing applications are found in process industries such as petro chemical, pharmaceuticals, pulp and paper, chemical, steel mills, service industries, utilities, marine, water, sewage, food and fossil and nuclear power plants. Packings can seal all types of fluids including water, steam, acids, solvents, gases, oil, gasoline, numerous chemicals over a broad range of temperature and pressure conditions. Packings can be used in rotary, centrifugal/reciprocating pumps, mixers, agitators, dryers, valves, expansion joints, soot blowers and many other types of mechanical equipments.

How packings work?

Packings will work based on a fluid film present, between the surface of the moving member (eg. shaft) and the packing itself. The source of this fluid film is usually the built in lubricants contained in the yarn used to construct packings. On equipment start-up these lubricants ooze out of the packings to facilitate smooth take of and prevents burning of packings. Upon start up, the media running through the equipments / external lubrication system take over cooling of the system. Gland pressure to be regulated to achieve best results.

Lubricants

INMARCO packings contain Hi-performance lubrications which are built in and or externally lubricated. These lubricants are very essential for equipments where frictional heat is generated. These lubricants provide resiliency and allow the packing to deform and recover under mechanical flexing. Selection of the correct lubricant is very important. INMARCO has expertise and uses proprietary lubricants namely: infion® intherm® and inlube®.

INMARCO GUIDELINES FOR STUFFING BOX DIMENSIONS

Rotating Shafts: Dimension A shown on this drawing is the total depth of packing including lantern gland. A standard depth of $7W$ or 7 times the packing space has been established when a lantern gland is used. A depth dimension is used where lantern gland is omitted. (Refer Fig.1).

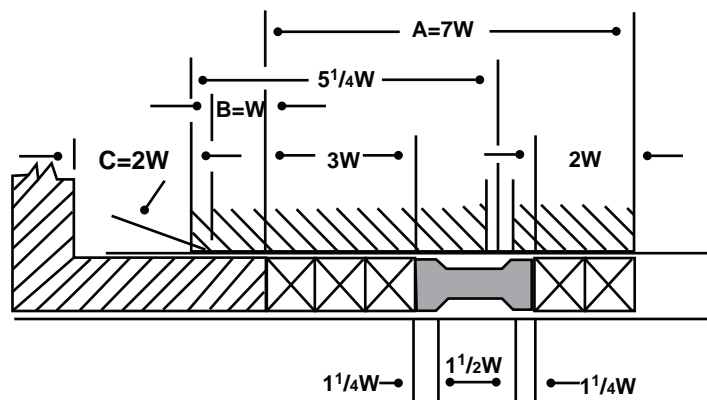


Fig.1

Lantern Gland Position: It should be noted that the illustration shows the dimension of $2W$ on the pressure side of the lantern ring and $3W$ on the gland end of the stuffing box. While this is a common practice, it should be noted that $3W$ on the pressure side and $2W$ on the gland end of the stuffing box can also be used.

For proper set up consult INMARCO sales personnel.

Gland Take-up: This gland take-up is limited to 40% of the packing. The reason for this limitation is to include those packings' which will have the largest volume loss. Additional gland take-up is not recommended, in order to prevent galling of the shafts. This means that complete take-up will take place before equipment is damaged; therefore, packing replacement would be indicated. This is based on the theory that most damage is done during the late running of packing life.

Lantern Ring: (Also known as Seal Cage) – The suggested depth or length of lantern ring is set at $2W$.

Chamfer Depth: A minimum of $1/8''$ (3mm) is recommended. It is felt that less than $1/8''$ (3mm) will not contribute to easy entry of packing.

Chamfer Angle: Wedging or guiding action is between 15 and 30 degrees.

Gland Entrance: It is recommended that a minimum of $1W$ be maintained to minimize the probability of gland cocking and allow for general variations of soft packing, molded and other types.

Size Limitation: In designing equipment with shaft below $5/8''$ (16mm) diameter, consult INMARCO regarding packing space required (W).

Clearance: Clearances should be as per acceptable machining practices, taking into consideration thermal expansion and contraction of metals.

Finishes: Finishes of rotating elements in contact with packing should be best economically possible, bearing in mind that the finer or smoother the finish, the longer the packing life expectancy.

Pressure: These standard dimensions are intended for the use up to approximately 1500psi (102bar)

Performance : Performance at various high speeds is a function of the material used rather than the stuffing box dimensions and recommendations for speed limits are not considered here. Consideration of high – speed problems should be referred to INMARCO'S customer service department.

4. Install one ring at a time : Make sure it is clean and has not picked up any dirt in handling. Seat rings firmly (except PTFE filament and graphite yarn packing, which should be snugged up very gently, then tightened gradually after the pump is operating). Joints of successive rings should be staggered and kept at least 90° apart. Each individual ring should be firmly seated with a tamping tool.
5. After the last ring is installed, take-up gland bolts should be finger tight or very slightly snugged up. Do not jam the packing into place by excessive gland loading. Start the pump and tighten take up gland bolts until leakage is reduced to a tolerable minimum. Make sure gland bolts are taken up evenly. Stopping leakage entirely at this point will cause the packing to burn, harden and damage equipment.
6. Allow packing to leak freely starting up a newly packed pump. Excessive leakage during the first hour of operation will result in a better packing job over a longer period of time. Take up gradually on the gland as the packing seats, until leakage is reduced to a tolerable level, preferably 8 – 10 drops per minute, per inch of shaft diameter. Some packing can run virtually leak free. Contact INMARCO for specific recommendations.
7. If specified by INMARCO , provide means of lubricating the Shaft and packing through the lantern ring by supplying water, oil, grease or liquid handled in the pump Fittings for this purpose are standard on many pumps. Flush pressure should be minimum 15 psi (~ 1 bar) above stuffing box pressure.

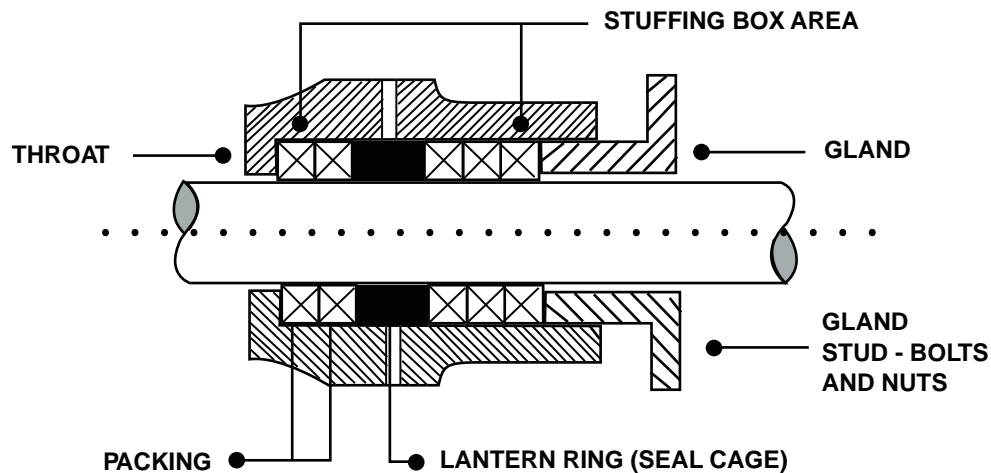


Fig 3

8. If the stuffing box has a lantern ring (See figure 3), make sure that the lantern ring is installed properly so it will remain in place as gland pressure is applied.
9. Replace packing when leakage cannot be controlled by further take-up on the gland. Do not add more packing rings
10. On both centrifugal and reciprocating pumps, about 70% of wear is on the outer two packings nearest the gland. However, each additional ring does throttle some fluid pressure. On most pumps, there must be enough rings so if one fails, another does the sealing, and the pump need not be shutdown.

PACKING VALVES CORRECTLY

As with pump packing, the first step in getting the most out of valve packing is correct installation.

1. Carefully perform all operations listed under pump packing steps 1-5. Rings used on valves are cut with a butt or skive joint (illustrated in fig 2). Be sure the first ring is cut carefully and tested on the stem.
2. Slide gland forward until it contacts the packing, Tighten the gland bolts to the point where heavy resistance to wrenching is felt. During this time, turn valve stem back and forth to determine ease of turning. Do not torque down to the point where the stem won't turn.
3. Inspect the valve after it has been on line. If leakage is observed, adjust the gland in accordance with safe maintenance procedures.
4. Live loading of valve stem packing gland: In its simplest form, live loading is the application of a spring load to the gland follower of a packed valve. A Belleville spring between the gland follower assists fastening studs and nuts to provide an effective way to establish and maintain a controlled amount of stress in the packing set. The amount of the packing stress in a live loaded system can be controlled by the size of the Belleville spring used and the extent to which it is compressed or deflected.

In a live loaded packing system, the follower will continue to push against the packing even when packing volume is lost (by friction, extrusion, consolidation etc.). The spring load will be slightly reduced as the springs expand, but this reduction in load will be much less than the load that is lost if the packing set was not live loaded. This remaining load allows the packing stress to remain at a level above the minimum sealing stress and may enable the packing to remain leak free (see figure 4).

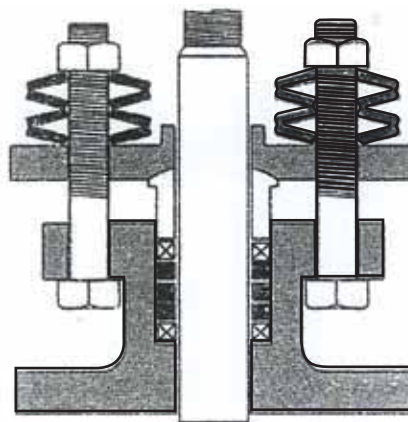


Fig 4

Selection of Correct Packing

To determine the Packing to be used the following 6 parameters of equipment should be available, commonly known as "STAMPS"

S=Size / Cross section

T=Temperature of media (°c)

A=Application (Type of pump / valve / equipments)

M=Media

P=Pressure (bar)

S=Shaft speed in RPM

Selection of correct packing material according to pH Value

Packing Size Selection Chart

Shaft Size	w
16mm to and including 29mm	8mm
29mm to and including 48mm	10mm
48mm to and including 75mm	13mm
75mm to and including 120mm	16mm
120mm to and including 300mm	19mm

Table 1 w= width of packing

pH Factor Determination of Correct Packing Material	
Range:	
0 - 1	PTFE Fiber, Carbonaceous Fiber, Flexible Graphite.
2 - 3	PTFE Fiber, Carbonaceous Fiber, Flexible Graphite, Aramid PTFE, Dispersed Acrylic, PTFE Dispersed, Glass.
4 - 5	PTFE Fiber, Carbonaceous Fiber, Flexible Graphite, Lube and Graphite, Aramid PTFE Dispersed, Lube and Graphite Acrylic-PTFE Dispersed, Lube and Graphite Glass.
6 - 7	PTFE Fiber, Carbonaceous Fiber, Flexible Graphite, Lube and Graphite, Aramid PTFE Dispersed, Lube and Graphite Acrylic PTFE Dispersed, Lube and Graphite Glass.
8 - 9	PTFE Fiber, Carbonaceous Fiber, Flexible Graphite, Lube and Graphite, Aramid PTFE Dispersed, Lube and Graphite Acrylic-PTFE Dispersed, Lube and Graphite Glass.
10 - 11	PTFE Fiber, Carbonaceous Fiber, Flexible Graphite, Aramid PTFE, Dispersed Acrylic-PTFE Dispersed, Glass PTFE Dispersed.
12 - 13	PTFE Fiber, Carbonaceous Fiber, Flexible Graphite.
14	PTFE Fiber, Carbonaceous Fiber, Flexible Graphite.

Table 2

pH Chart		
14		
13	}	Highly alkaline
12		
11		
10	}	Mild alkaline
9		
8	}	Neutral Distilled Water
7		
6	}	Mild Acidic
5		
4		
3	}	Acidic
2		
1	}	Highly Acidic
0		

Table 3

pH factor: The pH factor is a numerical measure of the intensity or severity of an acid or Alkali. In table 2, pH valves are given for a wide range of acid and Alkali services. Distilled water is neutral at 7 (see table 3). The above tables should be considered as a guide or starting point for the selection of the proper packing.

INSTALLATION OF INMARCO PUMP PACKINGS.

The importance of packing the pump correctly cannot be overemphasized. Many failures are due to incorrect installation of packings. The following steps have been devised to ensure effective installation of packing on pumps.

1. Remove all the old packing from the stuffing box. Clean box and shaft thoroughly and examine shaft or sleeve for wearing and scoring. Replace shaft or sleeve if wear is excessive.
2. Use the correct cross - section of packing or die-formed rings . To determine the correct packing size, measure the diameter of the shaft (inside the stuffing box area if possible) and then measure the diameter of the stuffing box (to give the OD of the ring). Subtract the ID measurement from the OD measurement and divide by two. The result is required size (w).
3. When using coil or spiral packing, always cut the packing into separate rings. Never wind a coil of packing into a stuffing box. Rings can be cut with butt (square), skive (or diagonal) joints, depending on the method used for cutting. The following illustration shows these methods of preparing bulk packing. The best way is to cut them on a mandrel of same diameter as that of a shaft. If there is no shaft wear, rings can be cut on the shaft outside the stuffing box. Hold the packing tightly on the mandrel, but do not stretch. Cut the ring and insert it into the stuffing box, making sure it fits the packing space properly. Each additional ring can be cut in the same manner. When cutting diagonal joints, use a miter board so that each successive ring can be cut at the correct angle. It is necessary that the rings be cut to the correct size. otherwise, service life is reduced. This is where die-cut rings are of great advantage, as they give the exact size.

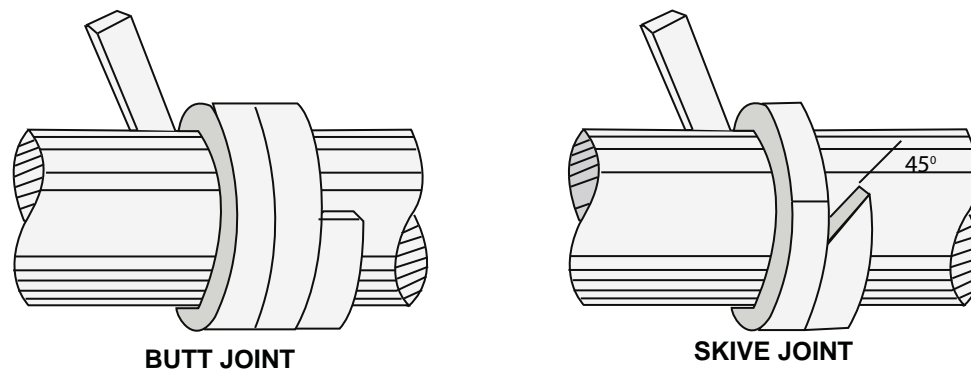


Fig 2

CHART SHOWING YIELD IN METERS PER KILOGRAM

NEW STYLE	6.5	8	10	12.5	16	18	20	25
Style: 100FXI Special	17.2	11.5	7.5	4.2	3.8	3	2.5	1.2
Style: 101	17.5	11.5	6.67	5	3	2.4	1.92	1.23
Style: 105 SUT	14.2	9.2	6.5	3.9	2.4	2	1.5	0.9
Style: 106 SSW	14.9	9.9	7	4.4	2.9	2.4	1.6	1.1
Style: 107 PT	13.5	8.5	6	3.8	2.5	1.9	1.6	1
Style: 124	18	9.6	6.1	4.1	2.4	1.8	1.52	0.92
Style: 124 T	17.2	9.6	6.1	4.1	2.4	1.8	1.54	0.92
Style: 124IG	17.5	9.4	5.8	3.9	2.3	1.75	1.5	0.85
Style: 125 f	19	11.2	7.2	4.5	2.6	2.1	1.8	1.05
Style: 125 f t	18.9	11.2	7.1	4.3	2.5	2	1.8	1.14
Style: 125T /125F	19	11.5	7.2	4.5	2.6	2.1	1.8	1.05
Style: 175	14.9	9.8	6.3	3.9	2.5	1.8	1.55	1
Style: 501	n/a	11.1	7.14	4.57	2.79	2.2	1.79	1.14
Style: 503	19.7	11.6	7.2	4.5	2.7	2.15	1.75	1.15
Style: 504	17.4	9.4	6.2	3.9	2.4	1.95	1.5	1.05
Style: 508	17.2	9.6	6.2	4	2.4	1.9	1.5	1
Style: 509	17	9.5	6.1	4	2.3	1.8	1.5	1
Style: 900	17.2	10.9	7.2	4.2	2.8	2.2	1.8	1.2

*** The above data is Approximate. Please consult Inmarco if you wish to order in lengths

TROUBLESHOOTING INMARCO PACKING FAILURES

Besides improper installation, packing failures are often due to worn out faulty equipment, shaft misalignment, uneven take-up on the gland bolts and other causes. If you are having trouble, carefully remove and examine the old packing set. Do not throw the set away, because it often give clues as to the condition of the equipment and may be the means of solving the problem. The following common clues and possible causes were identified by INMARCO.

Clue 1: Excessive reduction in cross-section of packing directly beneath the shaft or plunger.

Possible Cause: Misalignment of shaft, wornout shaft or wornout stuffing box area.

Clue 2: Excessive reduction in the thickness of the packing directly over the shaft.

Possible Cause: Misalignment of shaft or wornout bearings.

Clue 3: A whole ring or part of a ring is missing from set.

Possible Cause: Bottom of stuffing box badly worn, with packing being extruded into the system

Clue 4: Wear on the outside of one or more rings.

Possible Cause: Rings rotating with shaft or loose in the box. Packing size too small.

Clue 5: Axial bulge in one or more rings.

Possible Cause: Adjacent rings cut too short or too long, depending on the style of material used, causing Packing under pressure to be deformed.

Clue 6: Packing show tendency to extrude between shaft and the gland follower.

Possible Cause: Excessive gland bolt pressure and / or too much clearance between shaft and the gland follower.

Clue 7: Rings next to gland follower badly damaged, with bottom rings in fair condition.

Possible Cause: Improper installation of packings and excessive gland bolt pressure.

Clue 8: Wearing surface of rings dried and charred with rest of packings in good condition.

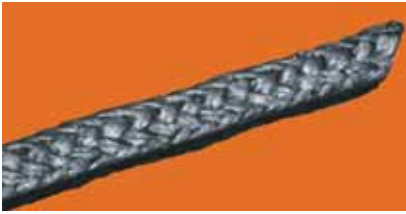
Possible Cause: High temperature and lack of adequate lubrication.

Clue 9: Innermost ring deteriorated.

Possible Cause: Packing incompatible with fluid handled.

COMPRESSION PACKING STYLE REFERENCE, SERVICE & MEDIA GUIDE																											
Recommended Service Type	Product name	SERVICE CAPABILITIES										MEDIA GUIDE										INDUSTRY SECTOR					
		Rotary		Reciprocating		Valve		Temperatures		pH		Steam	Gases	Process H ₂ O	Potable H ₂ O	Strong acids	Caustic alkalis	Oils	Solvents	Chemical	Food	Marine Service	Petroleum	Pulp & Paper	Power generation	Water & Sewage	
		Shaft Speed (m/s)	Pressure (bar)	Rod (m/s)	Pressure (bar)	Shaft Speed (m/s)	Pressure (bar)	MIN (°C)	MAX (°C)	Range																	
Rotary	Style:101	25	200	25	200	25	250	-200	650	0-14	S	S	N	N	S	S	S	N	S	N	N	S	S	N	N		
	Style:300	28	150	24	250	...	300	-200	600	0-14	S	S	N	N	S	S	S	N	S	N	N	S	S	N	N		
	Style:501	25	150	15	300	...	350	-200	650	0-14	S	S	N	N	S	S	S	N	S	N	N	S	S	N	N		
	Style:175	25	150	35	200	...	250	-200	280	3-14	N	N	N	S	S	N	N	S	N	S	N	N	S	S	N		
	Style:509	10	150	5	200	...	300	-240	260	0-14	N	N	S	S	S	S	S	S	S	S	N	N	S	S	N		
	Style:508	28	150	24	350	...	300	-240	290	0-14	N	N	S	S	S	S	S	S	S	S	N	N	S	S	N		
	Style:504	25	100	10	200	...	350	-200	300	0-14	N	N	S	S	S	S	S	S	S	S	N	N	S	S	N		
	Style:105 SUT	25	150	30	500	...	500	-200	280	1-13	N	N	S	S	N	N	S	S	N	S	N	N	S	S	N		
	Style:106 SSW	25	500	25	500	25	500	-200	300	1-13	N	N	N	N	S	S	S	S	N	S	N	N	S	S	N		
	Style:107 PT	25	150	20	500	...	500	-240	280	1-13	N	N	N	N	S	S	S	S	N	S	N	N	S	S	N		
	Style:125T /125F	7	50	1	125	...	150	ambient to +150	4-10	N	N	S	S	N	N	N	N	N	N	N	N	N	N	N	N		
	Style:110	7	25	1	50	...	150	ambient to +100	5-10	N	N	S	S	N	N	N	N	N	N	N	N	N	N	N	N		
	Style:120	10	65	ambient to +80	4-10	N	N	S	S	N	N	N	N	N	N	N	N	N	N	N		
	Cartseal	25	350	25	350	-240	650	0-14	N	N	S	S	N	N	S	S	S	S	N	N	S	S	N		
	Valve																										
	Style:100FXI Special	500	-240	650	0-14	S	S	N	N	S	S	S	S	S	N	N	S	S	N	N	
	Style:300	300	-200	600	0-14	S	S	N	N	S	S	S	S	S	N	N	S	S	N	N	
Style:900	300	-200	600	0-14	S	S	N	N	S	S	S	S	S	N	N	S	S	N	N		
Ingraf BF	30	250	30	250	...	250	-200	650	0-14	S	S	N	N	S	N	N	S	N	S	N	N	S	S	N	N		
Style:175	25	150	35	200	...	250	-200	280	3-14	N	N	S	S	S	N	N	S	N	S	N	N	S	S	N			
Style:509	10	100	5	150	...	300	-240	260	0-14	N	N	S	S	S	S	S	S	S	S	N	N	S	S	N			
Style:508	28	150	24	350	...	300	-240	290	0-14	N	N	S	S	S	S	S	S	S	S	N	N	S	S	N			
Style:504	25	100	10	200	...	350	-200	280	0-14	N	N	S	S	S	S	S	S	S	S	N	N	S	S	N			
Style:503	...	...	...	...	...	...	500	-250	650	0-14	S	S	N	N	S	S	S	S	S	N	N	S	S	N
Style:105 SUT	25	150	30	500	...	500	200	280	1-13	N	N	S	S	N	N	S	N	S	N	S	N	N	S	S			
Style:106 SSW	25	500	25	500	25	500	200	300	1-13	N	N	N	N	S	S	S	S	N	S	N	N	S	S	N			
Style:107 PT	25	150	20	500	...	500	240	280	1-13	N	N	N	N	S	S	S	S	N	S	N	N	S	S	N			
Style:110	7	25	1	50	...	150	ambient to +100	5-10	N	N	S	S	N	N	N	N	N	N	N	N	N	N	N	N			
Style:120	...	...	10	65	...	...	...	...	4-10	N	N	S	S	N	N	N	N	N	N	N	N	N	N	N
Cartseal	25	350	25	350	...	...	-240	650	0-14	N	N	S	S	N	N	S	S	S	S	N	N	S	S	N	
Reciprocating																											
Style:175	25	150	35	200	...	250	-200	280	3-14	N	N	S	S	N	N	S	N	S	N	S	N	N	S	S			
Style:509	10	150	5	250	...	300	-240	260	0-14	N	N	S	S	S	S	S	S	S	S	N	N	S	S	N			
Style:508	28	150	24	250	...	300	-240	290	0-14	N	N	S	S	S	S	S	S	S	S	N	N	S	S	N			
Style:504	25	100	10	200	...	350	-200	280	0-14	N	N	S	S	S	S	S	S	S	S	N	N	S	S	N			
Style:105 SUT	25	150	30	500	...	500	200	280	1-13	N	N	N	N	S	N	N	S	N	S	N	N	S	S	N			
Style:106 SSW	25	500	25	500	25	500	200	300	1-13	N	N	N	N	S	S	S	S	N	S	N	N	S	S	N			
Style:107 PT	25	150	20	500	...	500	240	280	1-13	N	N	N	N	S	S	S	S	N	S	N	N	S	S	N			
Style:110	7	25	1	50	...	150	ambient to +100	5-10	N	N	S	S	N	N	N	N	N	N	N	N	N	N	N	N			
Style:120	...	...	10	65	...	...	...	...	4-10	N	N	S	S	N	N	N	N	N	N	N	N	N	N	N
Cartseal	25	350	25	350	...	...	-240	650	0-14	N	N	S	S	N	N	S	S	S	S	N	N	S	S	N	
Static																											
Style:310	...	...	...	...	...	...	300	-200	600	0-14	S	S	N	N	S	S	S	S	S	N	N	S	S	N
Ingraf FJ	...	...	...	300	...	...	300	-200	450	0-14	S	S	N	N	S	S	S	S	S	N	N	S	S	N
Style:124	5	100	0.5	150	...	...	300	-240	600	0-14	S	S	N	N	S	S	S	S	S	N	N	S	S	N	

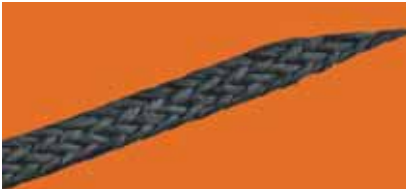
INMARCO STYLE 100 FXI SPECIAL



OPERATIONAL PARAMETERS

PROPERTIES	↻	↔	↔
pH	0 - 14		
TEMPERATURE (°C)	-240 to +650		
PRESSURE (BAR)	----	----	----
VELOCITY (m/s)	----	----	----
SIZE	5mm ² to 50mm ²		

INMARCO STYLE 101



OPERATIONAL PARAMETERS

PROPERTIES	↻	↔	↔
pH	0 - 14		
TEMPERATURE (°C)	-200 to +650		
PRESSURE (BAR)	200	200	250
VELOCITY (m/s)	25	25	25
SIZE	5mm ² to 50mm ²		

INMARCO STYLE 300

INMARCO Ingraf Flexible Pure Graphite die moulded ring



OPERATIONAL PARAMETERS

PROPERTIES	↻	↔	↔
pH	0 - 14		
TEMPERATURE (°C)	-200 to +600		
PRESSURE (BAR)	----	----	300
VELOCITY (m/s)	----	----	----
SIZE	Customary Sizes made to order		

Carbon / Graphite Packings

Style 100FXI SPECIAL is a premium expanded pure graphite (carbon content 99.5 to 99.9%) fibre yarn braided packing, each yarn of which is reinforced with multiple inconel wires, thoroughly incorporated with non metallic inorganic passive corrosion inhibitor and special oil lubricating agents. Each yarn is jacketed with inconel wire mesh. The reinforcement and jacketing with inconel wire mesh in each yarn enables the packing to withstand extreme mechanical stress and cyclic loads.

APPROVALS

FIRE SAFE CERTIFIED UNDER API CLAUSE 589 & 607.

Type testing of process valve for fugitive emission under clause API 622.

BENEFITS

Special lubricating agents reduces stem friction and corrosion inhibitor prevents pitting due to galvanic corrosion. Very high sealing efficiency even on oscillating valve stems without much wear and tear. The reinforcement & jacketing of inconel wire enhances the strength of packing & also to withstand high temp. & pressure. This special jacketed graphite fibre is designed for high performance sealings even at elevated temperature & pressure.

ADVANTAGES

Provides excellent sealing under mechanical and thermal stress or cyclic loads. Low wear and tear means long sealing life emission much below the API limits. Highly resistant to pressure and extrusion.

SERVICE MEDIA

All non-oxidising liquids and gases, super heated and saturated steam, hot dry ash, flue gases, dyes and chemicals, emissive fluids, fuel oil & lube oil, hydrocarbons etc.

TYPICAL APPLICATIONS

Valves, Screw conveyers, Dryers etc.

Style 101 is a special packing manufactured from Carbon fibre yarn. The packing is thoroughly impregnated with naturally cured Graphite based Intherm[®] dispersion to act as blocking agent. The interbraid construction and the blocking agent prevents body leakage of any gaseous or liquid material. To prevent Galvanic Corrosion on the Steam, Molybdenum based Metal Corrosion Inhibitor also is incorporated in the packing. A special corrosion inhibitor is incorporated to prevent galvanic corrosion.

ADVANTAGES

- ◆ Adequate lubrication for low Friction runs.
- ◆ No Embrittlement or Abrasion to Metallic parent equipment.
- ◆ Strong but pliable without Brittleness.
- ◆ Excellent heat dissipation for Cooler Shaft runs without reduction in packing volume to ensure excellent sealing services.

SERVICE MEDIA

Acids, Alkalis, Solvent, Organic Chemicals, Gases, Steam, Thermic Fluids etc.

APPLICATIONS

Pumps, Valves, Agitators, Dryers, Mixers, Soot Blowers etc

Style Ingraf[®] 300 is a high purity (99% to 99.9% carbon) self lubricating and antifrictional die moulded pre-formed gland packing ring manufactured from Flexible Pure Graphite foil. These rings are manufactured in endless form or in 2 halves in oblique cut containing no Oil or Grease or Binder / Additives of any kind. The packing however is incorporated with sacrificial metal corrosion inhibitor to avoid Galvanic Corrosion on parent body.

Ingraf[®] 300 packing ring is totally free from any kind of contamination for compression resistance and retention of size and shape

Ingraf[®] 300 is manufactured with accurate specific density suitable to the working condition. These packing rings have high thermal and dimensional stability and extremely low gas/liquid permeability, very low thermal expansion and extremely high chemical resistance. These rings have low coefficient of Friction (0.08 to 0.1 against steel) and hence, with continuous operation it polishes the stem / shaft and also Non abrasive in nature.

Ingraf[®] 300 flexible pure graphite rings adjusts to any irregularities under moderate pressure and has resistance to pressure surge and thermal shock. These packing rings are chemically inert and also fire safe.

Ingraf[®] 300 packing ring has inherent characteristics of basic graphite and hence have high degree of flexibility, compactibility and resiliency. These rings expand radially to form perfect seal against the shaft and housing. Graphite is an extremely good thermal conductor and as such the packing dissipates heat away from the body leading to a longer life of the packing.

Ingraf[®] 300 is also manufactured for nuclear applications with improved chemical properties. These packings are stable even under exposure to high doses of nuclear radiation.

SERVICE MEDIA

Super heated & saturated steam, Hydrocarbon, Fuel oil, Lube oil, all non oxidizing liquids and gases, dyes and chemicals but not recommended for use in aqua regia, fuming nitric acid, oleum and strong oxidizing media.

TYPICAL APPLICATIONS

Valves & Pumps.

INGRAF FJ



OPERATIONAL PARAMETERS

PROPERTIES	⊗	↔	⊥
pH	0 - 14		
TEMPERATURE (°C)	-200 to +450		
PRESSURE (BAR)	Vacum 28" Hg to 300		
VELOCITY (m/s)	----	----	----
SIZE	1/4" X 25ft, 1/2" X 25ft, 3/4" X 50ft, 1" X 50ft		

INGRAF BF

STUFFING BOX FOIL PACKING



OPERATIONAL PARAMETERS

PROPERTIES	⊗	↔	⊥
pH	0 - 14		
TEMPERATURE (°C)	-200 to +300, -200 to +650 in steam		
PRESSURE (BAR)	Vacum 28" Hg to 250		
VELOCITY (m/s)	30	3	----
SIZE	1/4" X 25ft, 1/2" X 25ft, 3/4" X 50ft, 1" X 50ft		

INMARCO REBACKLON 175



OPERATIONAL PARAMETERS

PROPERTIES	⊗	↔	⊥
pH	0 - 14		
TEMPERATURE (°C)	-200 to +280		
PRESSURE (BAR)	150	200	250
VELOCITY (m/s)	25	325	----
SIZE	5mm ² to 50mm ²		

GASKET TAPE FOR FLANGE JOINTS

Ingraf Fj gasket tape is made from 100% pure flexible graphite, specially corrugated to enable ease of installation over flanges with circular or with complex sealing area. The tape has a unique self adhesive backing for overhead or vertical flange surfaces. At high temperature, the adhesive would integrate itself with the graphite by carbonizing. This tape is also available without any adhesive.

Construction: Corrugated foil with or without adhesive backing. Chlorides content: Less than 50ppm. Ash content: max.0.5%

Ingraf Tapes are available in 2 basic versions: Ingraf FJ[®] Generally used for Flange Joints and Ingraf BF used for Box foil.

ADVANTAGES

- ◆ Can be used in tandem as a complete gasket with conventional gasket types such as PTFE, spiral wound, metallic etc.
- ◆ Can be used to form gaskets from a small diameter as 1" to every large diameters
- ◆ Nuclear compatibility, radiation resistance – 1.5 x 100 rads
Conforms to surface irregularities. Non sticking while dismantling

TYPICAL APPLICATIONS

Heat exchangers, reactors, pumps, valves, bonnets & for various service conditions. As a filler to spiral wound & metallic gaskets. Flanges made from fragile material like glass. To encapsulate & enhance the sealing efficiency of other gasketing materials, such as PTFE & other gasketing materials

Ingraf[®] box foil gasket tape is made from 100% pure flexible graphite with knurled surface. Simply wind around valve stem and top up.

ADVANTAGES

- ◆ Could be used by itself or in combination with other packings for effective sealing & possible nuclear compatibility.
- ◆ Wide range of pressure and thermal compatibility.
- ◆ Low friction & permeability, eliminates wear & associated risks in equipment ensuring plant safety.
- ◆ Emergency replacement packing for virtually any equipment

TYPICAL APPLICATIONS

Pumps and valve glands, mixers, agitators, autoclaves handling variety of fluids & gases.

PTFE / Hybirds

REBACKLON 175 is a combination of duplex braided packing with red Inmalon yarn and expanded PTFE intimately bonded with special quality graphite yarn incorporating break-in-lubricant in a special process. This is a dense packing having high degree of resiliency and chemical properties. Presence of graphite enables the packing dissipate heat leading to longer life of the packing. The break-in-lubricant ensures extra lubrication during the complete operational life.

REBACKLON 175 is highly antifrictional and hence able to safeguard shaft and sleeves from wear and erosion. This Packing is having excellent resistance to almost all known chemicals and is compatible to wide range of industrial media and it is affected by strong oxidizers, Molten Alkali metal, Fluorine compounds, concentrated fuming acids etc.

REBACKLON 175 is suitable for dynamic as well as static application. It is dimensionally stable and ensures leakage free operational life for a longer period.

SERVICE MEDIA

Raw Water, Surface Water, DM Water, Industrial Water, Coolant, Hydrocarbon, Paints, Synthetic Resins, Emulsions, etc.

TYPICAL APPLICATIONS

Pumps, Valves, Mixers, Reactors, etc.

INMARCO STYLE 900



OPERATIONAL PARAMETERS

PROPERTIES	↻	↔	↔
pH	0 - 14		
TEMPERATURE (°C)	-200 to +600		
PRESSURE (BAR)	----	----	300
VELOCITY (m/s)	----	----	----
SIZE	5mm ² to 50mm ²		

Style 900 is a premium flexible expanded graphite fiber packing with high carbon content impregnated with proprietary thermolube® dispersion reinforced with inconel wire / SS wire in each strand. The packing also incorporates of inorganic passive corrosion inhibitor to safeguard parent body from galvanic corrosion and reduce loss on ignition.

Style 900 is a soft Expanded Graphite Fibre Packing secured by strong but resilient Inconel wires / SS wires which ensures flexibility for wrapping around small diameter shaft and spindle. Moreover, reinforcement of Inconel wire of special grade enhances the mechanical strength of the packing which increases the resistance to pressure surge.

ADVANTAGES

- ◆ The thermolube® dispersion acts as a blocking agent and fill up the hair gap between the yarns to ensure zero leakage.
- ◆ Self-generating lubrication accommodates and aids self-adjustment on tightening of the gland.
- ◆ There is no volume loss due to loss on ignition.

SERVICE MEDIA

Superheated & Saturated Steam, Hydrocarbon, Thermic Fluid, Acids and Alkalis, Solvent, Gases, Petrochemicals, etc.

TYPICAL APPLICATIONS

Valves, Dryers, Rotary Kiln, etc.

INMARCO STYLE 310

FLEXIBLE PURE GRAPHITE SELF SEALING RING



TECHNICAL SPECIFICATION

Carbon Content	99.5% to 99.9%
Ash Content	0.5% Max.
Leachable Chloride Content	< 50 ppm
Density	1.8 - 2 gms/cc

OPERATIONAL PARAMETERS

PROPERTIES	↻	↔	↔
pH	0 - 14		
TEMPERATURE (°C)	-200 to +600		
PRESSURE (BAR)	----	----	300
VELOCITY (m/s)	----	----	----
SIZE	Customary Sizes made to order		

Flexible pure graphite self sealing ring/ pressure sealing gasket is made from Graphite Foil and die moulded to required cross sectional profile reinforced with SS wire net/SS strip. This increases the mechanical strength of the ring / gasket which leads to extremely high pressure resistance.

This has high carbon content of 99.5% to 99.9%. These are manufactured in angular cross sectional profile, square or rectangular with high density. These are dimensionally stable under extreme pressure surge, and is highly thermally conductive with high stability. It is a better substitute of soft Iron pressure seal gasket because of very good compressibility and recovery factor.

These are also highly resistant to Chemicals and can work in the entire PH range.

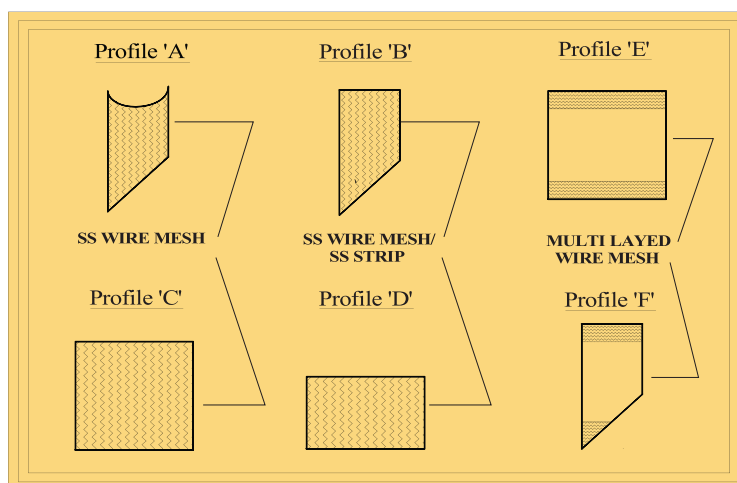
SERVICE MEDIA

Super heated & saturated steam, hydrocarbon, thermic fluid, acids, alkalis, lube oil etc.

APPLICATIONS

Valve bonnet, metallic flanges, etc.

CROSS SECTIONAL PROFILES



INMARCO STYLE 501



OPERATIONAL PARAMETERS

PROPERTIES	↻	↔	↔
pH	0 - 14		
TEMPERATURE (°C)	-200 to +650		
PRESSURE (BAR)	150	300	300
VELOCITY (m/s)	25	15	----
SIZE	5mm ² to 50mm ²		

Style 501 is a specially developed hybrid combination packing of non metallic expanded pure graphite yarn at the faces, reinforced with carbon fibre yarn at the corners. The packing is impregnated with proprietary Hitherm® graphite based dispersion and also sacrificial metal corrosion inhibitor.

This is a combination of softness of expanded pure graphite and toughness of carbon fibre yarn. The packing is highly chemical resistant and has very good thermal conductivity. This can be used both in dynamic & static application.

ADVANTAGES

- ◆ Excellent dry run capabilities and hence reduce continuous water flushing.
- ◆ Corrosion inhibitor prevents corrosion and pitting on parent equipment.
- ◆ Hitherm® dispersion acts as a blocking agent.
- ◆ The packing adapts to worn out surface and pitting with smooth running.
- ◆ Dissipates heat without chemical hardening.

SERVICE MEDIA

Hydrocarbon, Steam, Water, FCC Catalyst and Bottom Slurry, DM Water, Hypo, Fuel oil, Lube oil, Thermic Fluid, Acids & Alkalis, etc.

TYPICAL APPLICATIONS

Pumps, Valves, Autoclaves, Converters, Mixers, Reactors, etc.

INMARCO STYLE 508



OPERATIONAL PARAMETERS

PROPERTIES	↻	↔	⚙
pH	0 - 14		
TEMPERATURE (°C)	-200 to +290		
PRESSURE (BAR)	150	350	300
VELOCITY (m/s)	28	24	----
SIZE	5mm ² to 50mm ²		

INMARCO STYLE 509



OPERATIONAL PARAMETERS

PROPERTIES	↻	↔	⚙
pH	0 - 14		
TEMPERATURE (°C)	-240 to +260		
PRESSURE (BAR)	150	200	300
VELOCITY (m/s)	10	5	----
SIZE	5mm ² to 50mm ²		

INMARCO STYLE 504



OPERATIONAL PARAMETERS

PROPERTIES	↻	↔	⚙
pH	0 - 14		
TEMPERATURE (°C)	-200 to +300		
PRESSURE (BAR)	100	200	350
VELOCITY (m/s)	25	10	----
SIZE	5mm ² to 50mm ²		

Style 508 is a Pure PTFE Fibre yarn duplex braided packing incorporating special inlube® break-in-lubricant PTFE Suspensoid. The Break-in-lubricant ensures extra lubrication during the complete operational life and dispersion acts as blocking agent as well as antifrictional additives.

Style 508 is non toxic and inert in nature, hence ensures safety and purity of the fluid media. It is dimensionally stable and ensures trouble free operation reducing maintenance cost.

Style 508 is suitable for dynamic as well as static application. As it is dimensionally stable it ensures leakage free operational life for a longer period.

SERVICE MEDIA

Acids & Alkalis of any concentration, Solvents, Organic/ Inorganic Chemicals, Petrochemicals, Dyestu s, Paints, Synthetic Resins, etc.

TYPICAL APPLICATIONS

Pumps, Valves, Mixers, Reactors, Agitators, Dryers, Air Compressors, etc.

Style 509 is a dry pure PTFE fibre yarn interlocked braided packing. This packing is manufactured without any lubricants or additives of any kind. The packing is most suitable for food & pharma industries and also for oxygen, nitrogen & hydrogen services.

It is a self lubricating packing with very low coefficient of friction, hence ensures easy operation. This packing needs very little gland adjustment after initial installation.

It is highly antifrictional and as such safeguards the parent equipments from erosion during operation.

It is inert to almost all known chemicals except molten alkali metals and aquaregia, hence volume loss due to chemical attack is negligible which leads to longer leakage free operational life.

SERVICE MEDIA

Acids & Alkalis of any concentration, Solvents, Organic/ Inorganic Chemicals, Oxygen, Nitrogen and Hydrogen services, Salt Slurry, Food & Pharma services, etc.

TYPICAL APPLICATIONS

Pumps, Valves, Mixers, Reactors, Agitators, Extruders, etc.

Style 504 is a universal duplex braided packing manufactured from expanded PTFE intimately bonded with special quality graphite in a single molecular structure incorporating break-in-lubricant in a special process. This is a dense packing having high degree of resiliency and chemical properties. Presence of graphite enables the packing dissipate heat evenly leading to longer life of the packing.

Style 504 is highly antifrictional and hence able to safeguard shaft and sleeves from wear and erosion. This packing is having excellent resistance to almost all known chemicals and is compatible to wide range of industrial media and is only affected by strong oxidizers, molten alkali metal and fluorine compounds.

Style 504 is dimensionally stable and requires minimum gland loading to effect perfect seal. This is also compatible to very high peripheral speed with extremely low leakage rate.

SERVICE MEDIA

Acids & Alkalis of any concentration, Solvents, Hydrocarbons, Phosphoric Acids, Raw Water, DM Water, Condensate, Cooling Water, etc.

TYPICAL APPLICATIONS

Centrifugal & Reciprocating Pumps, Valves, Large diameter Shafts, Reactor vessels, Agitators, Mixers, Autoclaves, etc.

INMARCO STYLE 503

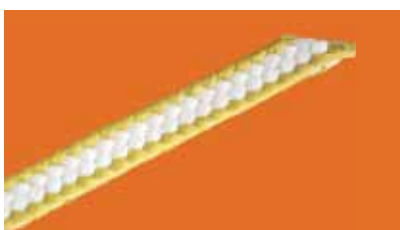


OPERATIONAL PARAMETERS

PROPERTIES	⊗	↔	⊠
pH	0 - 14		
TEMPERATURE (°C)	-250 to +650		
PRESSURE (BAR)	----	----	500
VELOCITY (m/s)	----	----	----
SIZE	5mm ² to 50mm ²		

INMARCO STYLE 105 SUT

ARAMID AND PTFE YARN COMBINATION PACKING



PROPERTIES	⊗	↔	⊠
pH	1 - 13		
TEMPERATURE (°C)	-200 to +280		
PRESSURE (BAR)	150	500	500
VELOCITY (m/s)	25	30	----
SIZE	5mm ² to 50mm ²		

INMARCO STYLE 106 SSW



OPERATIONAL PARAMETERS

PROPERTIES	⊗	↔	⊠
pH	1 - 13		
TEMPERATURE (°C)	-200 to +300		
PRESSURE (BAR)	150	500	500
VELOCITY (m/s)	25	25	25
SIZE	5mm ² to 50mm ²		

Style 503 is a unique combination packing of expanded graphite yarn and carbon fibre yarn. This is one of the best solutions of sealing for all types of high pressure and high temperature Valves specially control valves.

Style 503 is having a core consisting of expanded graphite yarn reinforced with multiple inconel wire and jacketed with fine inconel wire mesh. The outer cover of the packing is braided with high strength-low friction- non scoring Carbon yarn.

Style 503 is finally incorporated with sacrificial metal corrosion inhibitor and graphite based proprietary Hitherm[®] dispersion.

ADVANTAGES

- ◆ This packing does not disintegrate on cutting.
- ◆ Hitherm[®] dispersion acts as a blocking agent.
- ◆ This packing adapts to worn out surface and pitting with smooth running.
- ◆ Dissipates heat without chemical hardening.
- ◆ Extremely smooth removal during shutdown.

SERVICE MEDIA

Hydrocarbon, Super heated & Saturated Steam, Thermic Fluid, Fuel Oil, Lube Oil, Non Oxidizing liquids and Gases, Dyes & Chemicals, etc

TYPICAL APPLICATIONS

All types of Valves.

Strength of Aramid and Hybrids

STYLE 105SUT is highly dense braided combination gland packing having aramid yarn corners and PTFE yarn faces. Highly resilient with high tensile extruded and expanded PTFE core. The aramid yarn is lubricated with highly antifrictional fluoropolymer dispersion and break-in-lubricant, while the PTFE faces are lubricated with high temperature resisting inert lubricant. This packing offers excellent strength coupled with dimensional stability in service. Strong aramid fiber avoid corner failures in reciprocating plunger pump. The PTFE fiber ensures low friction, cool shaft runs eliminating wear and tear to plunger and valve stems. The strong PTFE core provides extremely high pressure resistance.

ADVANTAGES

- ◆ Dense construction & excellent sealability.
- ◆ High pressure & Compatibility.
- ◆ Extremely durable packing for ammonia and carbamate solution.
- ◆ Can be used as lip seals
- ◆ Wide chemical resistance, abrasion resistance & high penetration.

SERVICE MEDIA

Ammonia, Urea & Carbamate condensate in fertilizer industry, Amide, fine slurries, detergents, pigments, dyestuffs, paints, emulsions, synthetic molten materials, Tri Sodium Phosphate, Hydrazine, Sodium Hexameta Phosphate, Water, etc.

APPLICATIONS

Centrifugal reciprocating and plunger pumps, valves, agitators, extruders, mixers, reactors etc.

An excellent abrasion/ brine resistant packing manufactured from co-polymer fibre yarn thoroughly impregnated with PTFE based inflon[®] dispersion which is further impregnated with break-in lubricant and a surface run-in-lubricant. This packing also is very good resistant to corrosive/ acidic reaction. The run-in-lubricant ensures improvement of antifrictional property of the packing leading to avoid erosion of sleeves/ shaft.

ADVANTAGES

- ◆ The basic co-polymer yarn is highly resistant to abrasion and corrosion.
- ◆ Incorporation of break-in-lubricant and run-in-lubricant ensures extremely low friction.
- ◆ The tough co-polymer yarn construction enables dimensional stability and resistance to deformation on arduous duties.
- ◆ Excellent performance against turbid saline water.

SERVICE MEDIA

Ash Slurry, Fly Ash Water, Chemical Slurries, Wood Pulp, Coolant, Coal Dust, Dry Powdered Chemicals, Turbid Water, Surface Water, Saline Sea Water, Brines, Crude Oil, Fuel Oil etc.

TYPICAL APPLICATIONS

Pumps, Valves, Mixers, Reactors, Clinker Grinder, Autoclaves, Door Seals, Agitators, Blenders, Extruders, Rotary Vacuum Dryer etc.

INMARCO STYLE 107 PT



OPERATIONAL PARAMETERS

PROPERTIES	⌚	↔	⚡
pH	1 - 13		
TEMPERATURE (°C)	-240 to +280		
PRESSURE (BAR)	150	500	500
VELOCITY (m/s)	25	20	----
SIZE	5mm ² to 50mm ²		

INMARCO STYLE 124

Style 124 IG

Style 124I / 124IF



APPLICATION PARAMETERS

PROPERTIES	⌚	↔	⚡
pH	0 - 14		
TEMPERATURE (°C)	-240 to +600*		
PRESSURE (BAR)	100	150	500
VELOCITY (m/s)	5	0.5	----
SIZE	5mm ² to 50mm ²		

*Hi-therm impregnated

INMARCO STYLE 125T*/F*



Application Parameters:

PROPERTIES	⌚	↔	⚡
pH	4 - 10		
TEMPERATURE (°C)	Ambient to +150		
PRESSURE (BAR)	50	125	150
VELOCITY (m/s)	7	1.0	----
SIZE	3mm ² to 35mm ²		

*125f impregnated with inflon® dispersion.

*125t impregnated with intherm® dispersion.

Style 107 PT is a special combination packing manufactured with a tough but smooth aramid fibre yarn at the corners and PTFE graphite solid yarn at the faces having core of high density extruded and expanded PTFE cord. The aramid yarn is impregnated with highly antifrictional fluoropolymer dispersion and special break-in-lubricant.

Style 107 PT is resistant to almost all known chemicals and also resistant to abrasion. This packing has excellent heat dissipation properties and cool run due to integral graphite on the faces. The aramid yarn at the corners prevents corner failures in reciprocating plunger pump. The strong extruded and expanded PTFE core provides extremely high pressure resistance and resiliency.

Style 107PT is compact and dimensionally stable packing which ensures longer leakage free performance.

ADVANTAGES

- ◆ Dense Construction & Excellent Sealability
- ◆ High Pressure Compatibility.
- ◆ Extremely durable packing for Ammonia and Carbamate solution.
- ◆ Can be used as lip seals
- ◆ Wide Chemical Resistance, Abrasion Resistance & High Penetration

SERVICE MEDIA

Fine Chemical Slurry, Liquid Ammonia and Ammonium compounds, Carbamate solutions, Hydrazine, Emulsions, Tri sodium Phosphates, Sodium Hexameta Phosphate, Black & Green Liquor, Paper Pulp, Pulp diluted with Water etc.

TYPICAL APPLICATIONS

Pumps, Valves, Reactor, Autoclaves, Mixers, Agitators, etc.

Glass / Silica Packings

Style 124 is manufactured from premium electrical glass fibers braided and proprietary dispersed in Intherm®/ Inflon®. The fibers are of high tenacity, superior thermal dissipation properties. This Packing is also available with wire reinforcements (refer table below) Major applications include furnaces, fill glass flange and kiln covers. chemical and glass flanges in exhaust and chimneys and equipments handling, highly corrosives, alcohol and solvents except HF, HCL and hot phosphoric acid. Can be supplied in roll / square / rectangular / cross section.

STYLE	DESCRIPTION	*Temp
124	Dry Glass fiber Packing	-240 - +540°C
124T	Dry glass fiber with Intherm® dispersed	-240 - +540°C
124F	Inflon® dispersed	-240 - +540°C
124I	Reinforced inconal wires	-240 - +560°C
124IF	Reinforced inconal wires & PTFE dispersed	-240 - +560°C
124IG	Reinforced inconal wires & Intherm® dispersed	-240 - +600°C

Synthetic and Vegetable Fiber Packings

Style 125 is a specially developed packing to cater to low/medium application, built out of drefed acrylic over a synthetic core. This packing can be produced with inflon® / intherm® dispersion. This packing can also be manufactured with or without inert break in lubricant.

ADVANTAGES

- ◆ Proprietary Inflon® dispersion enhances the density and the sealing ability.
- ◆ Safe & stays clean under operation.
- ◆ Comparatively better mechanical strength as against natural & vegetable fibers.
- ◆ Excellent lubrication leading to minimal shaft wear.
- ◆ An economical choice for fluid handling equipment.

SERVICE MEDIA

Water and neutral chemicals

Applications:

Water handling equipment, applications involving salt solutions, equipment handling mild acids and alkalis.

INMARCO STYLE 110



Application Parameters:

PROPERTIES	↻	↔	↔
pH	5 - 10		
TEMPERATURE (°C)	Ambient 100		
PRESSURE (BAR)	25	50	150
VELOCITY (m/s)	7	1	----
SIZE	5mm ² to 50mm ²		

Style 110 is made of natural flax fibre. Specially designed for application in low and medium loading equipments in marine industries involving stern tubes, rudder shafts etc oil & water pumps in hydro electric power stations. Supplied with proprietary dispersion to Inflon®, Inthern®, Inlube® & Inblend®.

ADVANTAGES

- ◆ Economical for Moderate applications as against asbestos and other synthetic packings.
- ◆ Flexibility, water resistance, elasticity and lubricity can be enhanced by dispersing with Inflon®, Inlube®, Interm®, Inblend®

Applications:

Hydraulic equipments in Marine Industries. Stern Tube in ships, brine pumps, oil & water pumps in paper industry, valves handling sea water, rudder shafts, water wheel glands used in hydro power station.

INMARCO STYLE 120



Application Parameters:

PROPERTIES	↻	↔	↔
pH	4 - 10		
TEMPERATURE (°C)	Ambient 80		
PRESSURE (BAR)	----	65	----
VELOCITY (m/s)	----	10	----
SIZE	5mm ² to 50mm ²		

Style 120 is a specially developed ramie fibre packing with a highly tenacious synthetic reinforcement which enhances the tensile strength, increases operational life of packing. This packing is dispersed with pure PTFE and does excellent sealing in stern tubes.

ADVANTAGES

- ◆ Proprietary Inflon® dispersion enhances the density and the sealing ability. Safe & stays clean under operation.
- ◆ Highest quality ramie fiber with aramid reinforcement..
- ◆ Comparatively better mechanical strength.
- ◆ Excellent lubrication leading to minimal shaft wear
- ◆ Special water absorption capabilities of ramie fiber enhances the sealing capabilities.

Applications:

Stern Tubes, Water handling equipment.

Hi Performance Sealing materials

EXPANDABLE VALVE CARTSEAL



Application Parameters:

PROPERTIES	↻	↔	↔
pH	0 - 14		
TEMPERATURE (°C)	-240 to +650		
PRESSURE (BAR)	350	350	----
VELOCITY (m/s)	25	25	----
SIZE	Customary Sizes made to order		

EXPANDABLE VALVE CART SEAL

Fugitive emissions are hazardous and costly, as large process costs are involved in fluid or gas handling. VOCs find leak paths in valves along the stem. The steam leakages prove extremely costly on control of turbine valves, due to pressure and thermal fluctuations

EVCS is a state of the art and new generation seal designed specifically to conform to fugitive emission norms. V shape design permits effective sealings at all times due to radial expansion of tips under live loadings. These seals have high performance capabilities and give excellent results in critical fluid and gas applications. These are custom built and manufactured to custom orders.

- ◆ Performace beyond Set Standards for VOC, Hazardous Chemicals.
- ◆ Friction Reduces by 15-25%
- ◆ Self Adjustments to Thermal and Pressure Cycles.

Applications:

The variable densities of selected packing rings, adjust to wide range of chemicals including fluids, gases, VOCs or solids at variable temperature and pressure The excellent sealability of Valve Cartseal enables total leak free performance over long runs. The costly on-line leak sealing can be eliminated.

INSEAL COMPOUNDS

BULK GLAND SEALING COMPOUND



APPLICATION PARAMETERS

PROPERTIES	↻	↔	↔
pH	0 - 14		
TEMPERATURE (°C)	-200 to +300		
PRESSURE (BAR)	50	100	200
VELOCITY (m/s)	20	25	----
SIZE	Sticks In 1 Kg Packs		

Inseal or bulk sealing compounds are combinations of several chemicals, resins and chopped high performance fibres, blended to perform in critical fluid sealing problems. It acts as a compliment to compressor packing and can delay the shut down of plant & equipment. It is Available in cake or stick form.

Grades: inseal availability

GP type I	CR type IV	HT / HTF type VII
GPL type II	FG type V	HTC type VIII
Super type III	AR type VI	HTN type IX

Advantages:

- ◆ Enables efficient sealing in cases where the fluid film is absent.
- ◆ Repairs grooved shafts by conforming the surface. Resists cold and hot flow.
- ◆ Survives shaft 'Whips' & 'Wobbles'. Excellent flexibility and resilience.
- ◆ Enhances the sealability & complements braided gland packings

Typical Application:

Equipments where fluid film is absent. Marine applications such as stern glands. Rudder posts & bilge pumps. Pumps and valve glands involving corrosive chemicals. As a preseat to flange gaskets on distorted surfaces.

CARTSEAL



APPLICATION PARAMETERS

PROPERTIES	↻	↔	↔
pH	0 - 14		
TEMPERATURE (°C)	-240 to +650		
PRESSURE (BAR)	350	350	----
VELOCITY (m/s)	20	25	----
SIZE	Customary Size made to order		

This is yet another new generation seal supplied in the form of ready cartridge ready to install. The combination of various rings in the set is determined based on the application parameter provided by customer. This combination packing not only seals effectively but also increases the left time of seals by 25% over conventional one type packing rings.

Advantages:

- ◆ Custom made for various media & application parameters.
- ◆ Excellent lubrication and heat dissipation for cool runs.
- ◆ Seals even in dry runs

Applications:

Vertical equipment glands where fluid film is absent. Valves handling hazardous chemicals. Screw pump, centrifugal & plunger pumps

Gland Extractor



Extraction of used gland packing from within the stuffing box has always been a complicated task for technician on job. Inmarco gland extractor set is manufactured with a special metallurgical material of construction to perform the extraction job ease. It has a long flexible shank with cork screw tips which can even reach inside the narrow space available in the stuffing box. Thanks to the hard screw tips which can penetrate the hardened and packing rings enabling easy extraction

Availability:

Extractor is available for one set generally takes care of most sizes.

Disclaimer:

All the information available in this catalogue is intended for general guidelines. The user is expected to understand the products well for prior use, suitability and meet appropriate safety and health standards. In view of variety of applications and the operating conditions, we cannot draw the final conclusion about behavior of this product within the catalogue. Inmarco does not make any warranty of any statement of this catalogue and disclaims the liability for incidental and sequential damages arising out of equipment damage, injury or any other complications arising out of the utility of products. Please consult our technical cell for appropriate recommendations.

FAHRENHEIT AND CENTIGRADE CONVERSION TABLE

C°	F°	C°	F°	C°	F°	C°	F°	C°	F°	C°	F°	C°	F°	C°	F°
-100	-148	100	212	300	572	500	932	700	1292	900	1652	1100	2012	1300	2372
-95	-139	105	221	305	581	505	941	705	1301	905	1661	1105	2021	1305	2381
-90	-130	110	230	310	590	510	950	710	1310	910	1670	1110	2030	1310	2390
-85	-121	115	239	315	599	515	959	715	1319	915	1679	1115	2039	1315	2399
-80	-112	120	248	320	608	520	968	720	1328	920	1688	1120	2048	1320	2408
-75	-103	125	257	325	617	525	977	725	1337	925	1697	1125	2057	1325	2417
-70	-94	130	266	330	626	530	986	730	1346	930	1706	1130	2066	1330	2426
-65	-85	135	275	335	635	535	995	735	1355	935	1715	1135	2075	1335	2435
-60	-76	140	284	340	644	540	1004	740	1364	940	1724	1140	2084	1340	2444
-55	-67	145	293	345	653	545	1013	745	1373	945	1733	1145	2093	1345	2453
-50	-58	150	302	350	662	550	1022	750	1382	950	1742	1150	2102	1350	2462
-45	-49	155	311	355	671	555	1031	755	1391	955	1751	1155	2111	1355	2471
-40	-40	160	320	360	680	560	1040	760	1400	960	1760	1160	2120	1360	2480
-35	-31	165	329	365	689	565	1049	765	1409	965	1769	1165	2129	1365	2489
-30	-22	170	338	370	698	570	1058	770	1418	970	1778	1170	2138	1370	2498
-25	-13	175	347	375	707	575	1067	775	1427	975	1787	1175	2147	1375	2507
-20	-4	180	356	380	716	580	1076	780	1436	980	1796	1180	2156	1380	2516
-17.8	0	185	365	385	725	585	1085	785	1445	985	1805	1185	2165	1385	2525
-15	5	190	374	390	734	590	1094	790	1454	990	1814	1190	2174	1390	2534
-10	14	195	383	395	743	595	1103	795	1463	995	1823	1195	2183	1400	2552
-5	23	200	392	400	752	600	1112	800	1472	1000	1832	1200	2192	1410	2570
0	32	205	401	405	761	605	1121	805	1481	1005	1841	1205	2201	1420	2588
5	41	210	410	410	770	610	1130	810	1490	1010	1850	1210	2210	1430	2606
10	50	215	419	415	779	615	1139	815	1499	1015	1859	1215	2219	1440	2624
15	59	220	428	420	788	620	1148	820	1508	1020	1868	1220	2228	1450	2642
20	68	225	437	425	797	625	1157	825	1517	1025	1877	1225	2237	1460	2660
25	77	230	446	430	806	630	1166	830	1526	1030	1886	1230	2246	1470	2678
30	86	235	455	435	815	635	1175	835	1535	1035	1895	1235	2255	1480	2696
35	95	240	464	440	824	640	1184	840	1544	1040	1904	1240	2264	1490	2714
40	104	245	473	445	833	645	1193	845	1553	1045	1913	1245	2273	1500	2732
45	113	250	482	450	842	650	1202	850	1562	1050	1922	1250	2282	1510	2750
50	122	255	491	455	851	655	1211	855	1571	1055	1931	1255	2291	1520	2768
55	131	260	500	460	860	660	1220	860	1580	1060	1940	1260	2300	1530	2786
60	140	265	509	465	869	665	1229	865	1589	1065	1949	1265	2309	1540	2804
65	149	270	518	470	878	670	1238	870	1598	1070	1958	1270	2318	1550	2822
70	158	275	527	475	887	675	1247	875	1607	1075	1967	1275	2327	1560	2840
75	167	280	536	480	896	680	1256	880	1616	1080	1976	1280	2336	1570	2858
80	176	285	545	485	905	685	1265	885	1625	1085	1985	1285	2345	1580	2876
85	185	290	554	490	914	690	1274	890	1634	1090	1994	1290	2354	1590	2894
90	194	295	563	495	923	695	1283	895	1643	1095	2003	1295	2363	1600	2912
95	203														

INCH/METRIC EQUIVALENTS

Metric(in mm)	0.3968	0.7924	1	1.5875	2	3	3.175	4	4.7625	5	6	6.35	7	7.9375	8	9
Decimal(inch)	0.0156	0.311	0.394	0.0625	0.787	0.1181	0.125	0.1575	0.1875	0.1968	0.2362	0.25	0.2756	0.3125	0.315	0.3543
Fraction(inch)	1/64	1/32		1/16			1/8		3/16			1/4		5/16		

Metric(in mm)	9.525	10	11	11.1125	12	12.7	13	14	14.2875	15	15.876	16	17	18	19	19.05
Decimal(inch)	0.375	0.3937	0.4331	0.4375	0.4724	0.5	0.5118	0.5512	0.5625	0.5905	0.625	0.6299	0.6693	0.7087	0.748	0.75
Fraction(inch)	3/8			7/16		1/2			9/16		5/8					3/4

Metric(in mm)	20	21	22	22.23	23	24	25	25.4	26	27	28	29	30	35	38.1	40
Decimal(inch)	0.7874	0.8268	0.8661	0.875	0.9055	0.9449	0.9842	1	1.0236	1.063	1.1024	1.1417	1.1811	1.3779	1.5	1.5748
Fraction(inch)				7/8			1								1 1/2	

Metric(in mm)	45	50	50.8	55	60	63.5	65	70	75	76.2	80	85	90	95	100	101.6
Decimal(inch)	1.7716	1.9685	2	2.1653	2.3622	2.5	2.559	2.7559	2.9527	3	3.1496	3.3464	3.5433	3.7041	3.937	4
Fraction(inch)		2							3							4

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