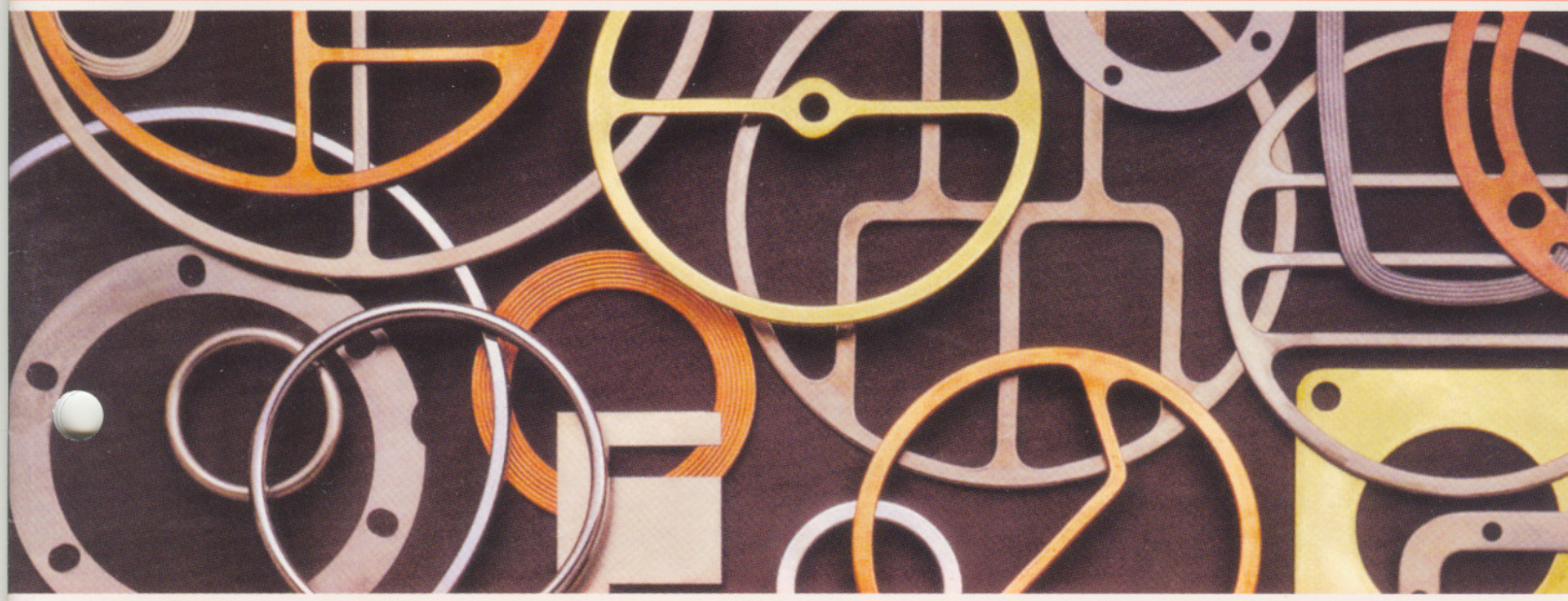
LAMONS®

LAMONS GASKET COMPANY

Web: www.lamonsgasket.com

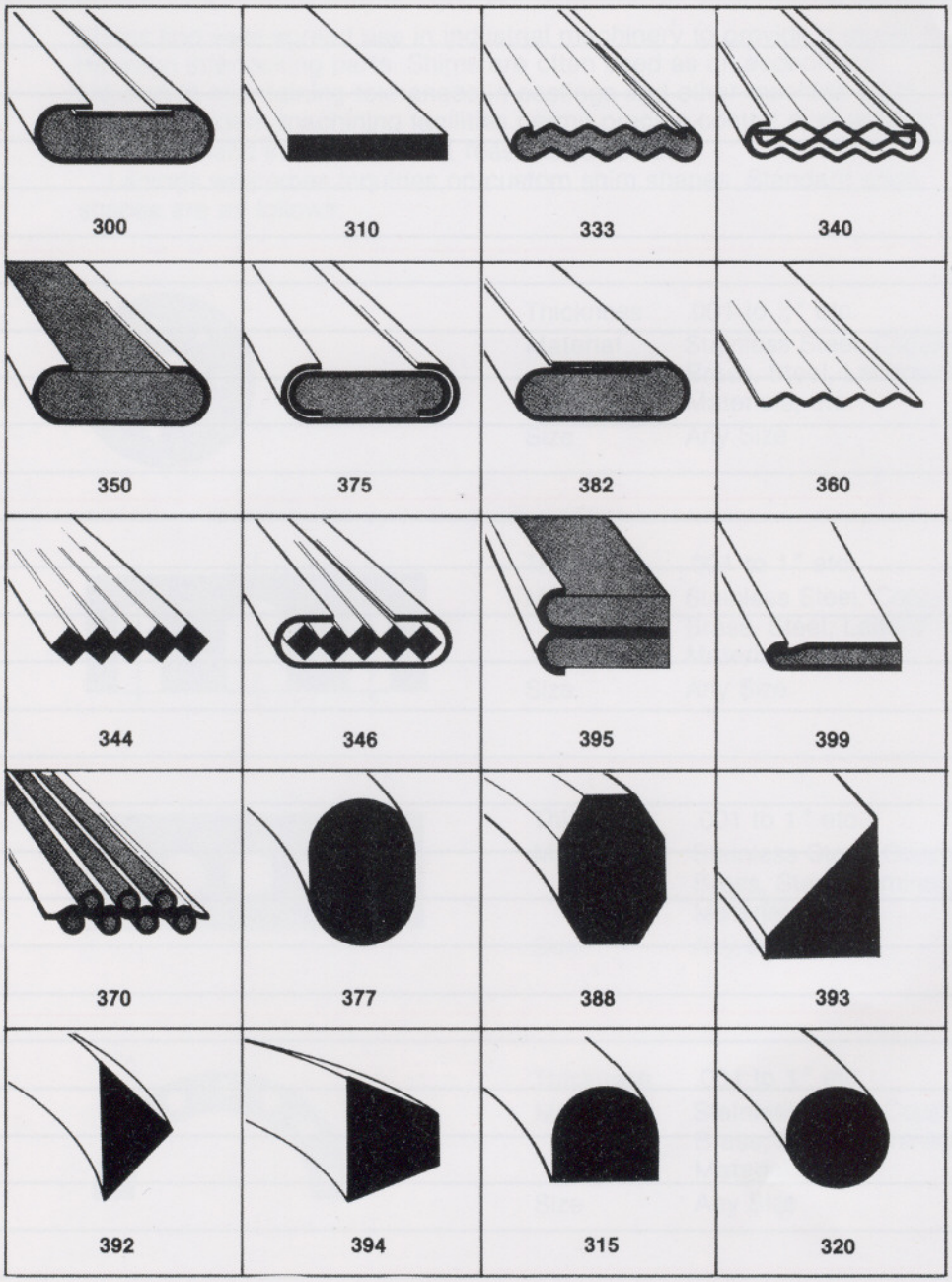


THE GASKET COMPANY

ISO - 9002 CERTIFIED

LAMONS JACKETED AND SOLID METAL GASKETS

CROSS-SECTIONAL VIEWS



METALLIC GASKET MATERIALS

Normally Stocked or Available.

Carbon Steel
304 Stainless Steel
304L Stainless Steel
316 Stainless Steel
316L Stainless Steel
321 Stainless Steel
347 Stainless Steel
410 Stainless Steel
502/501 Stainless Steel
Alloy 20
Aluminum
Brass
Copper
Cupro Nickel
Hastelloy B®
Hastelloy C-276®
Inconel 600®
Incoloy 800®
Monel 400®
Nickel 200®
Phosphor Bronze
Titanium
Other Metals

LAMONS METALLIC GASKET MATERIALS

CARBON STEEL

Commercial quality sheet steel with an upper temperature limit of approximately 1000°F., particularly if conditions are oxidizing. Not suitable for handling crude acids or aqueous solutions of salts in the neutral or acid range. A high rate of failure may be expected in hot water service if the material is highly stressed. Concentrated acids and most alkalies have little or no action on iron and steel gaskets which are used regularly for such services. Brinell hardness is approximately 120.

304 STAINLESS STEEL

An 18-8 (Chromium 18-20%, Nickel 8-10%) Stainless with a maximum recommended working temperature of 1400°F. At least 80% of applications for non-corrosive services can use Type 304 Stainless in the temperature range of −320°F. to 1000° F. Excellent corrosion resistance to a wide variety of chemicals. Subject to stress corrosion cracking and to intergranular corrosion at temperatures between 800° F. to 1500° F. in presence of certain media for prolonged periods of time. Brinell hardness is approximately 160.

304L STAINLESS STEEL

Carbon content maintained at a maximum of .03%. Recommended maximum working temperature of 1400° F. Same excellent corrosion resistance as Type 304. This low carbon content tends to reduce the precipitation of carbides along grain boundaries. Less subject to intergranular corrosion than Type 304. Brinell hardness is about 140.

316 STAINLESS STEEL

An 18-12 Chromium-Nickel steel with approximately 2% of Molybdenum added to the straight 18-8 alloy which increases its strength at elevated temperatures and results in somewhat improved corrosion resistance. Has the highest creep strength at elevated temperatures of any conventional stainless type. Not suitable for extended service within the carbide precipitation range of 800° to 1650° F. when corrosive conditions are severe. Recommended maximum working temperature of 1400° F. Brinell hardness is approximately 160.

316-L STAINLESS STEEL

Continuous maximum temperature range of 1400° to 1500° F. Carbon content held at a maximum of .03%. Subject to a lesser degree of stress corrosion cracking and also to intergranular corrosion than Type 304. Brinell hardness is about 140.

321 STAINLESS STEEL

An 18-10 Chromium-Nickel steel with a Titanium addition. Type 321 stainless has the same characteristics as Type 347. The recommended maximum working temperature is 1400° to 1500° F. and in some instances 1600° F. Brinell hardness is about 150.

347 STAINLESS STEEL

An 18-10 Chromium-Nickel steel with the addition of Columbium. Not as subject to intergranular corrosion as is Type 304. Is subject to stress corrosion. Recommended maximum working temperature of 1400° to 1500° F. and in some instances to 1700° F. Brinell hardness is approximately 160.

410 STAINLESS STEEL

A 12% Chromium steel with a maximum temperature range of 1200° F. to 1300° F. Used for applications requiring good resistance to scaling at elevated temperatures. Is not recommended for use where severe corrosion is encountered but is still very useful for some chemical applications. May be used where dampness, alone or coupled with chemical pollution, causes steel to fail quickly. Brinell hardness is around 160.

502/501	4-6% Chromium and ½ Molybdenum alloyed for mild corrosive resistance and elevated service. Maximum working temperature is 1200° F. and has a Brinell hardness of around 130. If severe corrosion is anticipated, a better grade of stainless steel would probably be a better choice. Becomes extremely hard when welded, so stress relieving is recommended for welded gaskets to maintain uniform hardness.
ALLOY 20	45% Iron, 24% Nickel, 20% Chromium, and small amounts of Molybdenum and Copper. Maximum temperature range of 1400° to 1500° F. Developed specifically for applications requiring resistance to corrosion by sulphuric acid. Brinell hardness is about 160.
ALUMINUM	Alloy 1100 is commercially pure (99% minimum). Its excellent corrosion resistance and workability makes it ideal for double jacketed gaskets. The Brinell hardness is approximately 35. For solid gaskets, stronger alloys like 5052 and 3003 are used. Maximum continuous service temperature of 800°F.
BRASS	Yellow brass 268 has 66% Copper and 34% Zinc. Offers excellent to good corrosion resistance in most environments, but is not suitable for such materials as acetic acid, acetylene, ammonia, and salt. Maximum recommended temperature limit of 500° F. Brinell hardness is about 58.
COPPER	Nearly pure copper with trace amounts of silver added to increase its working temperature. Recommended maximum continuous working temperature of 500° F. Brinell hardness is about 80.
CUPRO NICKEL	Contains 69% Copper, 30% Nickel, and small amounts of Manganese and Iron. Designed to handle high stresses, it finds its greatest application in areas where high temperatures and pressures combined with high velocity and destructive turbulence would rapidly deteriorate many less resistant alloys. Maximum recommended temperature limit of 500° F. Brinell hardness is about 70.
HASTELLOY B®	26-30% Molybdenum, 62% Nickel, and 4-6% Iron. Maximum temperature range of 2000° F. Resistant to hot, concentrated hydrochloric acid. Also resists the corrosive effects of wet hydrogen chlorine gas, sulphuric and phosphoric acids and reducing salt solutions. Useful for high temperature strength. Brinell hardness is approximately 230.
HASTELLOY C-276®	16-18% Molybdenum, 13-17.5% Chromium, 3.7-5.3% Tungsten, 4.5-7% Iron, and the balance is Nickel. Maximum temperature range of 2000° F. Very good in handling corrosives. High resistance to cold nitric acid of varying concentrations as well as boiling nitric acid up to 70% concentration. Good resistance to hydrochloric acid and sulphuric acid. Excellent resistance to stress corrosion cracking. Brinell hardness is about 210.
INCONEL 600®	Recommended maximum working temperature of 2000° F. and in some instances 2150° F. Is a nickel base alloy containing 77% Nickel, 15% Chromium and 7% Iron. Excellent high temperature strength. Frequently used to overcome the problem of stress corrosion. Has excellent mechanical properties at the cryogenic temperature range. Brinell hardness is about 150.

INCOLOY 800®

32.5% Nickel, 46% Iron, 21% Chromium. Resistant to elevated temperatures, oxidation, and carburization. Recommended maximum temperature of 1600° F. Brinell hardness is about 150.

MONEL 400®

Maximum temperature range of 1500° F. Contains 67% Nickel and 30% Copper. Excellent resistance to most acids and alkalies, except strong oxidizing acids. Subject to stress corrosion cracking when exposed to fluorosilic acid, mercuric chloride and mercury, and should not be used with these media. Brinell hardness is about 120.

NICKEL 200®

Recommended maximum working temperature is 1400° F. and even higher under controlled conditions. Corrosion resistance makes it useful in caustic alkalies and where resistance in structural applications to corrosion is a prime consideration. Does not have the all-around excellent resistance of Monel. Brinell hardness is about 110.

PHOSPHOR BRONZE

90-95% Copper, 5-10% Tin, and trace amounts of phosphorus. Maximum temperature range of 500° F. Excellent cold working capacity. Limited to low temperature steam applications. Excellent corrosion resistance, but not suitable for acetylene, ammonia, chromic acid, mercury, and potassium cyanide. Brinell hardness is approximately 65.

TITANIUM

Maximum temperature range of 2000° F. Excellent corrosion resistance even at high temperatures. Known as the "best solution" to chloride ion attack. Resistant to nitric acid in a wide range of temperatures and concentrations. Most alkaline solutions have little if any effect upon it. Outstanding in oxidizing environments. Brinell hardness is about 215.

OTHER METALS

Lamons has built a reputation on our ability to provide gaskets from unusual materials. A few of these unlisted metals Lamons carries are: 317L, INC 625, INC 825, HAST X, Tantalum and Zirconium. We welcome inquiries on your special requirements.

NOTE: Maximum temperature ratings are based upon hot air constant temperatures. The presence of contaminating fluids and cyclic conditions may drastically affect the maximum temperature range.

MATERIAL HARDNESS CONVERSION SCALE

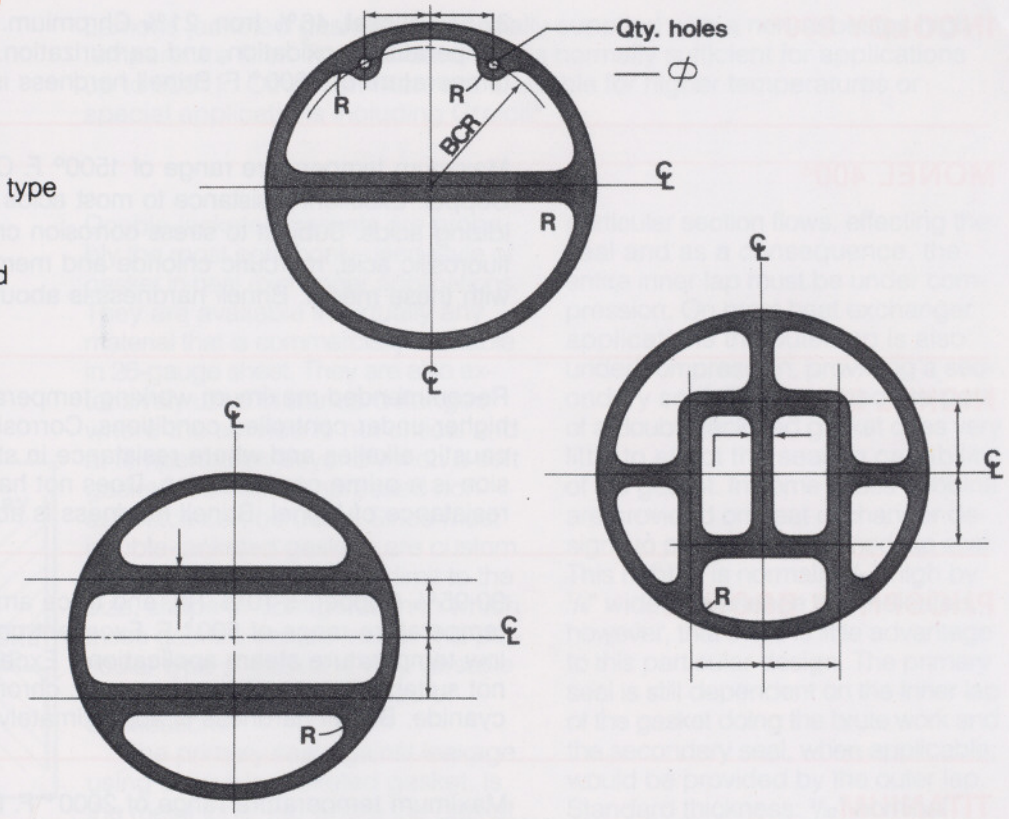
Brinell hardness figures are approximate guides only. Most materials ordered by Lamons are specified "dead soft"; however, different thicknesses and different heats of the same material will vary in hardness.

Rockwell "B"	100	95	90	85	80	75	70	65	60	55	50	40	30	20	10
Brinell 3000 Kg. Load	241	210	183	163	146	134	122	108	95	89	83	75	67	62	57

LAMONS METAL CLAD AND SOLID METAL HEAT EXCHANGER GASKETS

INFORMATION NEEDED TO FILL AN ORDER

1. Outside diameter
2. Inside diameter
3. Shape per Standard Shapes Index
4. Lamons style per catalog, or type of construction
5. Thickness
6. Materials (metal or metal and filler)
7. Rib size
8. Distance from centerline of gasket to centerline of ribs
9. Radii



SIZING METAL JACKETED GASKETS

The following sizings and tolerances are not mandatory but are suggested values based upon experience.

GASKETS CONFINED ON O.D. AND I.D.

Gasket I.D. = Groove I.D. + 1/16″
Gasket O.D. = Groove O.D. − 1/16″

GASKETS CONFINED ON O.D. ONLY

Gasket I.D. = Bore + minimum 1/8″
Gasket O.D. = Recess O.D. − 1/16″

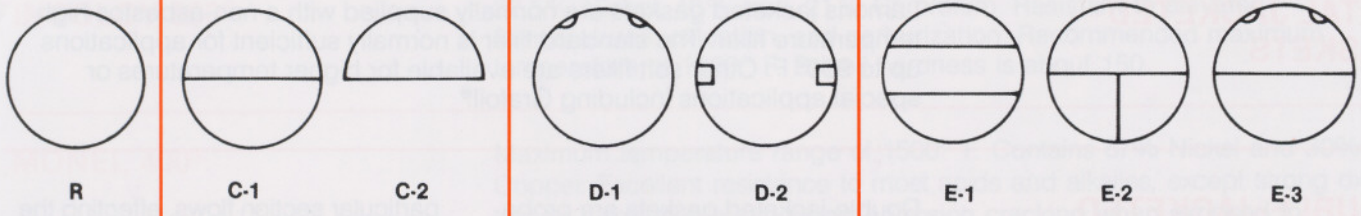
GASKETS UNCONFINED ON O.D. AND I.D.

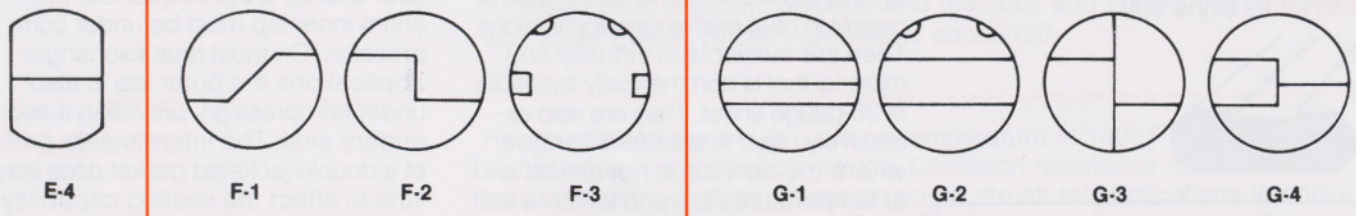
Gasket I.D. = Bore + minimum 1/8″
Gasket O.D. = Up to a maximum of the bolt hole circle diameter minus one bolt hole diameter unless gasket is to be full face. If gasket is to be full face, then the following must be specified:
(a) Bolt hole circle diameter
(b) Bolt hole diameter
(c) Number of bolt holes
(d) Desired gasket O.D.

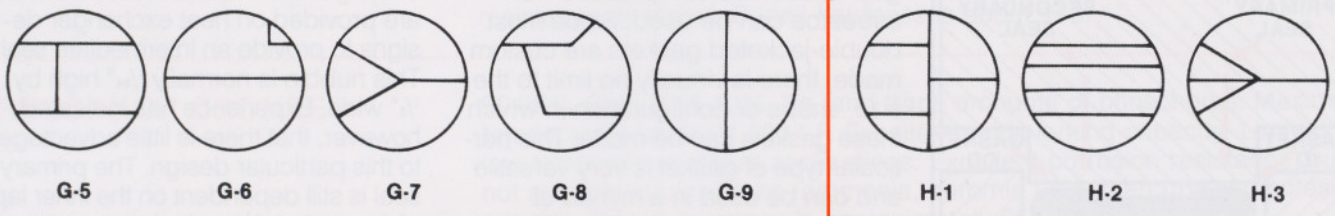
STANDARD TOLERANCES

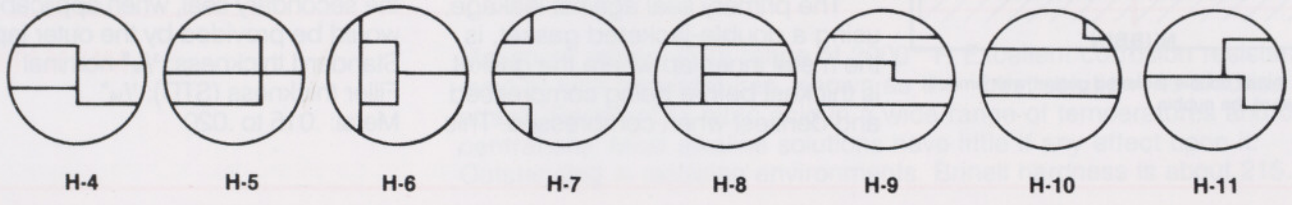
Gasket Diameter	I.D.	O.D.
Up to 6″	+1/32 −0	+0 −1/32
6″ to 60″	+1/16 −0	+0 −1/16
60″ and above	+3/32 −0	+0 −3/32

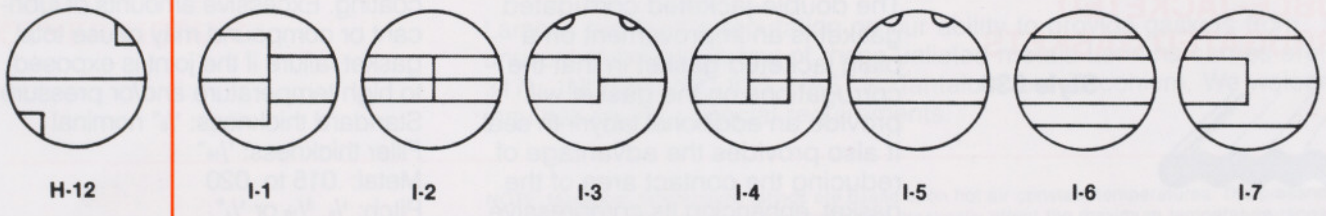
LAMONS HEAT EXCHANGER GASKETS
STANDARD SHAPE INDEX

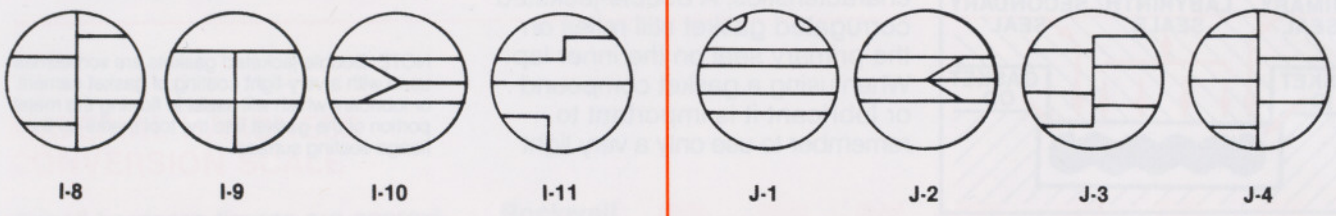


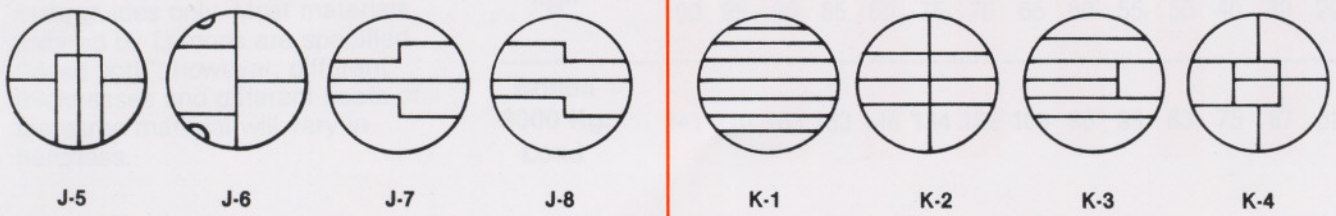








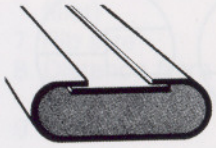


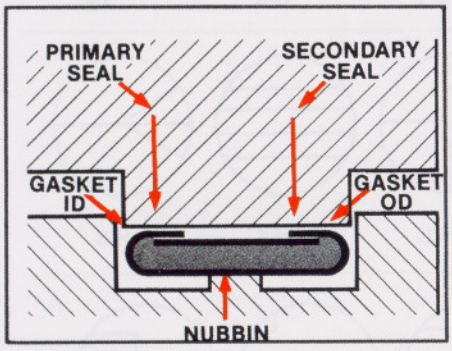


METAL JACKETED GASKETS

Lamons jacketed gaskets are normally supplied with a non-asbestos high temperature filler. The standard filler is normally sufficient for applications up to 900° F. Other soft fillers are available for higher temperatures or special applications including Grafoil®

DOUBLE-JACKETED GASKET Style 300





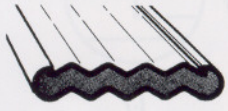
Always install double jacketed gasket with smooth side toward the nubbin.

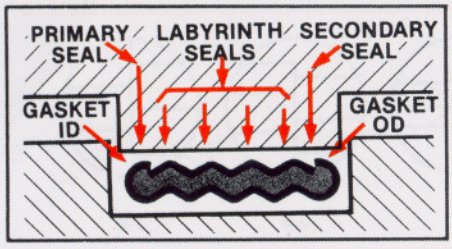
Double-jacketed gaskets are probably the most commonly used style of gasket in heat exchanger applications. They are available in virtually any material that is commercially available in 26-gauge sheet. They are also extensively used in standard flanges where the service is not critical and at temperatures beyond which a soft gasket such as compressed non-asbestos can be used. Since most double-jacketed gaskets are custom made, there is virtually no limit to the size, shape or configuration in which these gaskets can be made. This particular type of gasket is very versatile and can be used in a myriad of applications.

The primary seal against leakage, using a double-jacketed gasket, is the metal inner lap where the gasket is thickest before being compressed and densest when compressed. This particular section flows, effecting the seal and as a consequence, the entire inner lap must be under compression. On most heat exchanger applications the outer lap is also under compression, providing a secondary seal. The intermediate part of a double-jacketed gasket does very little to effect the sealing capability of the gasket. In some cases nubbins are provided on heat exchanger designs to provide an intermediate seal. This nubbin is normally 1/64" high by 1/8" wide. Experience has indicated, however, that there is little advantage to this particular design. The primary seal is still dependent on the inner lap of the gasket doing the brute work and the secondary seal, when applicable, would be provided by the outer lap.
Standard thickness: 3/32" nominal
Filler thickness (STD): 1/16"
Metal: .015 to .020

DOUBLE-JACKETED CORRUGATED GASKETS

Style 333

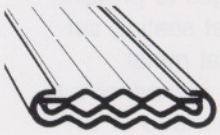




The double-jacketed corrugated gasket is an improvement on a plain jacketed gasket in that the corrugations on the gasket will provide an additional labyrinth seal. It also provides the advantage of reducing the contact area of the gasket, enhancing its compressive characteristics. A double-jacketed corrugated gasket still relies on the primary seal on the inner lap. When using a gasket compound or lubricant it is important to remember to use only a very light coating. Excessive amounts of lubricant or compound may cause total gasket failure if the joint is exposed to high temperature and/or pressure.
Standard thickness: 1/8" nominal
Filler thickness: 1/16"
Metal: .015 to .020
Pitch: 1/8, 3/16 or 1/4"

NOTE: Double-jacketed gaskets are sometimes used with a very-light coating of gasket cement or lubricant which will assist in flowing the metal portion of the gasket into the tool marks on the flange seating surface.

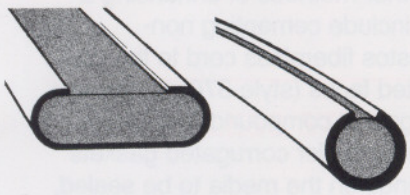
DOUBLE-JACKETED CORRUGATED GASKET WITH A CORRUGATED METAL FILLER Style 340



At temperatures in excess of 900° F., where a standard filler is normally not recommended, a double-jacketed corrugated metal gasket with a corrugated metal filler is frequently used. This construction has all the advantages of the double-jacketed corrugated metal gasket and, in addition, since the filler is normally the same material as the gasket itself, the upper temperature limit would be determined by the metal being used. This type of gasket, depending upon metal selected, makes an excellent heat exchanger gasket for high pressure, high temperature applications. As in the case of double-jacketed metal gaskets and double-jacketed corrugated metal gaskets, the primary seal would be the inner lap of metal, the secondary seal would be the outer lap of metal and some degree of labyrinth sealing can be achieved with the corrugations. This type gasket is frequently faced with Grafoil® tape to further enhance its sealability.
Standard thickness: 1/8" nominal
Filler thickness (metal): .015 to .020*
Metal: 0.15 to .020
Pitch: 1/8, 3/16 or 1/4"

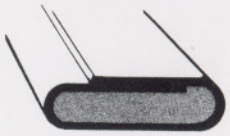
* .032 filler metal available in steel for special applications.

SINGLE-JACKETED GASKET Style 350



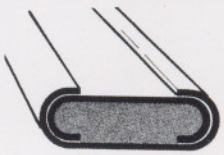
Single-jacketed gaskets are normally used for relatively narrow applications. They are made by encasing a soft filler on one face, both edges and a portion of the other face with a metal. The majority of applications for single-jacketed gaskets are normally 1/4" or less in radial width. This type of gasket is widely used in air tool applications and engine applications where space is limited, gasket seating surfaces are narrow and relatively low compressive forces are available for seating the gasket. For applications where gasket width is in excess of 1/4", a double-jacketed gasket or double-jacketed corrugated gasket is normally recommended. Most single-jacketed gaskets are supplied with copper as the jacketing material, however, other materials are available.
Standard thickness: 1/16" nominal
Filler thickness: 1/16
Metal: .010 to .020

SINGLE-JACKETED OVERLAP Style 382



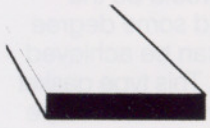
In the single-jacketed overlap construction the maximum flange width is approximately 1/4". This type of gasket is used when total enclosure of the soft filler material is required and when the flange width makes it impractical to use a double-jacketed gasket.

DOUBLE-JACKETED DOUBLE-SHELL GASKET Style 375



The double-jacketed, double-shelled gasket is similar to the double-jacketed gasket except that instead of using a shell and a washer, two shells are used in the fabrication of the gasket. It has the advantage of a double lap at both the I.D. and the O.D. of the gasket, adding greater stability to the gasket. The construction will withstand higher compressive loads. Double-shell gaskets are normally restricted to use in high pressure applications. Its temperature limitations depend upon the type of metal and filler used in construction.
Standard thickness: 1/8" nominal
Filler thickness: 1/16
Metal: .015 to .020

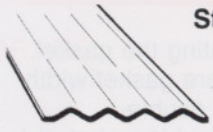
PLAIN FLAT METAL GASKETS Style 310



Flat metal gaskets are best suited for applications such as valve bonnets, ammonia fittings, heat exchangers, hydraulic presses, tongue-and-groove joints. They can be used when compressibility is not required to compensate for flange surface finish, warpage or misalignment and where sufficient clamping force is available to seat the particular metal selected. They must be sealed by the flow of the gasket metal into the imperfections on the gasket seating surfaces of the flange. This requires heavy compressive forces. The hardness of gasket metal must be less than the hardness of the flanges to prevent damage to the gasket seating surface of the flange. Flat metal gaskets are relatively inexpensive to produce and can be made of virtually any material that is available in sheet form.

OTHER STYLES OF METALLIC GASKETS

PLAIN CORRUGATED Style 360(G)

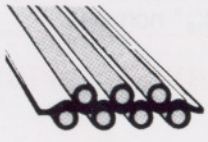


Lamons corrugated gaskets, style 360, are economical for use on relatively low pressure applications that require low bolt loads for gasket seating. Because of the corrugations and thin metal thicknesses (.010" to .031"), relatively light bolt forces are required to flow the gasket materials at the points of contact with the flange. Required bolt loads are substantially less than solid metal types such as plain flat metal, profile or serrated, fabricated of the same material. The corrugations provide resilience, the amount of which depends on their pitch, depth, and the thickness of material.

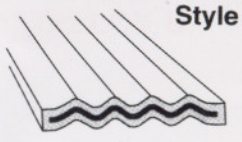
A superior sealing surface can be created using layers of Grafoil® or Grafoil® tape applied to each face (style 360G).

Other methods of enhancing a seal include cementing non-asbestos fiberglass cord to the corrugated faces (style 370), or the use of a gasket compound. The temperature range for corrugated gaskets depends on the media to be sealed, and the selection of the metal and/or facing materials. Corrugated gaskets can be fabricated in a wide variety of shapes with almost no limitations in size.

CORRUGATED INLAID GASKETS Style 370



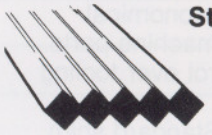
CORRUGATED WITH GRAPHITE FACING Style CMG



The CMG, similar to the 360G, is manufactured with flexible graphite sheet, instead of tape, adhered to both gasket faces. This type of gasket makes an excellent product for both standard flange gaskets and heat exchanger type gaskets where there is low bolt load or high available gasket stresses. On flange width less than 1/2" please consult Lamons engineering department. Available in metal thicknesses of .015" to .032" and flexible graphite thickness in .015" to .030". Also available with anti-stick graphite.

PROFILE GASKETS

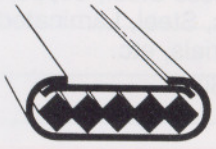
Style 344



Profile type gaskets offer the desirable qualities of plain washer types and the added advantage of a reduced contact area provided by the V-shaped surface. It is used when a solid metal gasket is required because of pressure or temperature or because of the highly corrosive effect of the fluid to be contained and also when bolting is not sufficient to seat a flat washer. This type gasket is often machined. Standard thickness is $\frac{1}{8}$", minimum thickness is $\frac{1}{16}$".

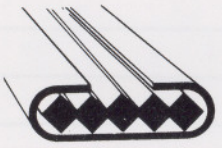
DOUBLE-JACKETED PROFILED

Style 345



SINGLE-JACKETED PROFILED

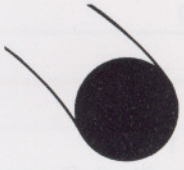
Style 346



If flange conditions require a profile type gasket, but flange protection is required as well, the profile gasket may be supplied with either a single-jacketed or a double-jacketed shield. This will provide protection for the flanges and will minimize damages to the flange faces due to the profile surface.

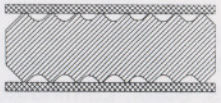
ROUND CROSS SECTION, SOLID METAL GASKETS

Style 320



Round cross section solid metal gaskets are used on specifically designed flanges grooved or otherwise faced to accurately locate the gasket during assembly. These gaskets seal by a line contact which provides an initial high seating stress at low bolt loads. This makes an ideal gasket for low pressures. The more common materials used for this type of gasket would be aluminum, copper, soft iron or steel, Monel® nickel, and 300 series stainless steels. They are fabricated from wire formed to size and welded. The weld is then polished to the exact wire diameter.

KAMMPROFILE KAMMPRO™



Lamons' style LP-1

Lamons' style LP-2

Lamons' style LP-3

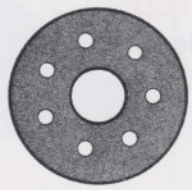
The design features of the grooves in combination with the special properties of the facing materials result in optimal performance and consistency. The simultaneous action of high compressibility facing material on the outside of the grooved metal in combination with limited penetration of the tips of the solid metal core enhance the interaction of the two materials. This allows each to perform individually to their optimum. Lamons manufactures Kammpro in a wide range of metals and alloys to exact specifications.

SHIMS

Shims find wide-spread use in industrial machinery to provide a closer fit between interlocking parts. Shims are often used as an economical solution to maintaining tolerances in castings and other machine parts. Lamons modern machining facilities permit precise control over tooling production and insure quality at reasonable costs.

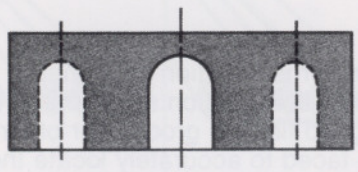
Lamons welcomes inquiries on custom shim shapes. Standard shim shapes are as follows:

RINGS—PLAIN OR WITH BOLT HOLES



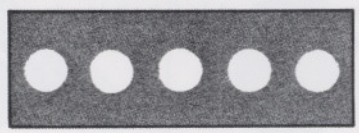
Thickness	.001 to ¼" etc.
Material	Stainless Steel, Copper, Brass, Steel, Laminated Materials, etc.
Size	Any Size

RECTANGLES WITH ONE SLOT, ETC.



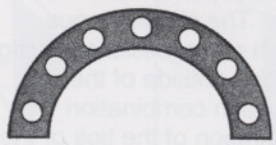
Thickness	.001 to 1" etc.
Material	Stainless Steel, Copper, Brass, Steel, Laminated Materials, etc.
Size	Any Size

RECTANGLES WITH OR WITHOUT BOLT HOLES



Thickness	.001 to 1" etc.
Material	Stainless Steel, Copper, Brass, Steel, Laminated Materials, etc.
Size	Any Size

HALF SECTION, ¼ SECTION, ETC.

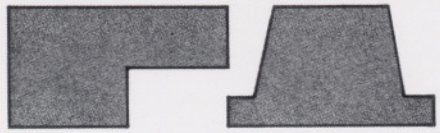


Thickness	.001 to 1" etc.
Material	Stainless Steel, Copper, Brass, Steel, Laminated Materials, etc.
Size	Any Size

ODD SHAPE SECTIONS

Thickness	.001 to ¼" etc.
Material	Stainless Steel, Copper, Brass, Steel, Laminated Materials, etc.
Size	Varies

ODD SHAPES



Thickness	.001 to ¼" etc.
Material	Stainless Steel, Copper, Brass, Steel, Laminated Materials, etc.
Size	Varies