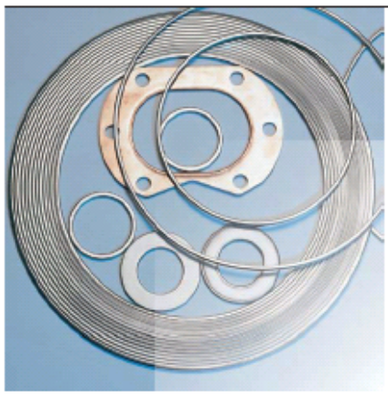
Philippe Jans
The perfect fit for rubber solutions

METAL - JACKETED GASKETS



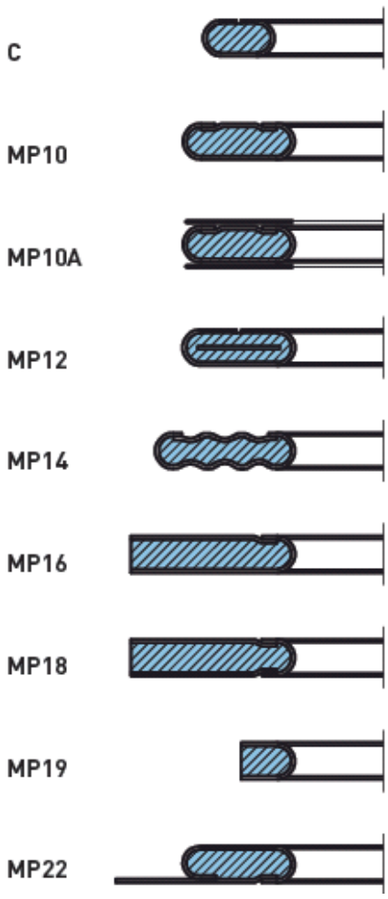
PROPERTIES AND APPLICATION

Metal - jacketed gaskets are particularly suitable for sealing flat surfaces of heat exchangers, gas pipes, cast iron flanges, autoclaves and similar. By their sealing efficiency, provided by exerting strong pressure on circular rims of the flanges, metal - jacketed gaskets can stand up to 30% deviation from the initial thickness, which is very useful in case of irregular or faulty flange rims. The chemical compatibility of the metal and the medium being sealed should be considered.

ADVANTAGES

Suitableforhighassemblystress.
Highly resistant against blow-out.

SHAPE AND CONSTRUCTION



Metal-jacketed gaskets are produced in several types to meet the requirements of the most demanding applications. Inside a metallic jacket they feature a soft filler as shown in the figure.

Material	ASTM	DIN Material No.
Low Carbon Steel	Soft iron (CS)	1.0333
Stainless steel	AISI 304	1.4301
Stainless steel	AISI 316,316 L	1.4401, 1.4404
Stainless steel	AISI 321	1.4541
Stainless steel	AISI 316 Ti	1.4571
Monel (NiCu30Fe)	Alloy 400	2.4360
Copper	Copper	2.0090
Brass	Brass Ms 63	2.0321

The metallic jacket is normally 0.4 mm thick. Other materials are available on customer request.

Filler

The standard filler material is Flexible Graphite.
Other fillers I ike ceramic, mineral or other can be also used.

SIZE

The metal jacketed gaskets come in sizes according to EN 1514-4 ASMEB16.21 standards.

Maximum size:

Outside diameter: up to 4000 mm
Thickness: from 2 to 12 mm

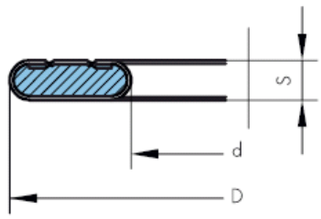
MANUFACTURING TOLERANCES		
Gasket inside diameter (mm)	Diameter tolerance (mm)	
	Inside diameter	Outside diameter
Up to 150	+ 0.8; -0.0	+ 0.0; -0.8
from 150 to 1500	+ 1.6;-0.0	+ 0.0; -1.6
1500 or greater	+ 2.4;-0.0	+ 0.0; -2.4

		DIN 2505		ASME	
Gasket Type	MATERIAL (Jacket)	ki [mm]	koxKD[N/mm]	m	y [MPa]
MP 10, MP 12, MP 16, MP 18, MP 19, MP 22	Cr-Ni steel	2.0XDD	100xbD	2.0	100
	Soft iron	1 .8XDD	70xbD	1.8	70
	Cu	1 .6XDD	60XDD	1.6	60
	Ms	1 .6XDD	60xbD	1.6	60

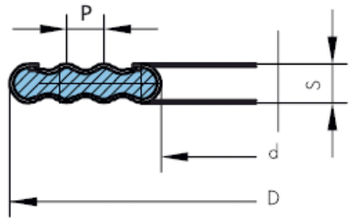
STANDARDS FOR METAL JACKETED GASKETS USED WITH FLANGES	
METAL JACKETED GASKETS - Standard	Flange Standard
EN 1514-4	EN 1092
ASME B 16.20	ASME B 16.5
ASME B 16.20	ASME B 16.47

MP10 and MP14 dimensions for ASME B 16.5 flange

NPS (in)	d (mm)	D (mm)						
	Class (lb)	150	300	400	600	900	1500	2500
1/2"	23.8	44.5	50.8	50.8	50.8	60.4	60.4	66.8
3/4"	31.8	54	63.5	63.5	63.5	66.7	66.7	73.1
1"	36.5	63.5	69.9	69.9	69.9	76.2	76.2	82.5
1 1/4"	46	73	79.4	79.4	79.4	85.8	85.8	101.6
1 1/2"	52.4	82.6	92.1	92.1	92.1	95.3	95.3	114.3
2"	73.2	101.6	108	108	108	139.7	139.7	143
2 1/2"	85.9	120.6	127	127	127	161.9	161.9	165.1
3"	107.8	133.4	146.1	146.1	146.1	165.1	171.5	193.8
4"	131.8	171.5	177.8	174.7	190.5	203.2	206.5	231.9
5"	152.4	193.8	212.8	209.5	238.2	244.6	250.9	276.3
6"	190.5	219.1	247.7	244.5	263.6	285.8	279.4	314.5
8"	238.3	276.3	304.8	301.7	317.5	355.6	349.3	384.3
10"	285.8	336.6	358.8	355.6	396.9	431.8	431.8	473.2
12"	342.9	406.4	419.1	415.9	454.1	495.3	517.6	546.1
14"	374.7	447.7	482.6	479.5	489	517.6	574.7	
16"	425.5	511.2	536.6	533.4	562	571.5	638.2	
18"	489	546.1	593.7	590.6	609.6	635	701.8	
20"	533.4	603.3	650.9	644.5	679.5	695.5	752.5	
24"	641.4	714.4	771.6	765.3	787.4	835.1	898.6	



MP14



Gasket dimensions for ASME B16.47 Series A raised face flanges

NPS (in)	d (mm)	D (mm)				
	Class (lb)	150	300	400	600	900
26"	673.1	771.6	831.8	828.8	863.6	879.6
28"	723.9	828.8	895.3	889	911.3	943.1
30"	774.7	879.6	949.4	943.1	968.5	1006.6
32"	825.5	936.7	1003.3	1000.2	1019.3	1070.1
34"	876.3	987.5	1054.1	1051	1070.1	1133.6
36"	927.1	1044.7	1114.7	1114.5	1127.2	1197.1
38"	977.9	1108.2	1051	1070.1	1101.8	1197.1
40"	1028.7	1159	1111.2	1124	1152.6	1248
42"	1079.5	1286.1	1162	1174.7	1216.1	1298.7
44"	1130.3	1273.3	1216.1	1228.8	1267	1365.2
46"	1181.1	1324.1	1270	1286	1324.1	1432
48"	1231.9	1381.2	1320.8	1343.1	1387.6	1482.8
50"	1282.7	1432	1374.9	1400.3	1444.7	
52"	1333.5	1489.2	1425.7	1451.1	1495.5	
54"	1384.3	1546.3	1489.2	1514.6	1552.7	
56"	1431.1	1603.5	1540	1565.4	1603.5	
58"	1485.9	1660.6	1590.8	1616.2	1660.6	
60"	1536.7	1711.4	1641.6	1679.7	1730.5	

TOLERANCE (mm)

	up to 24"	above 24"
D	+ 1.58	+ 3.3
	0	0
d	+ 1.58	+ 3.3
	0	0
s	+ 0.8	+ 0.8
	0	0

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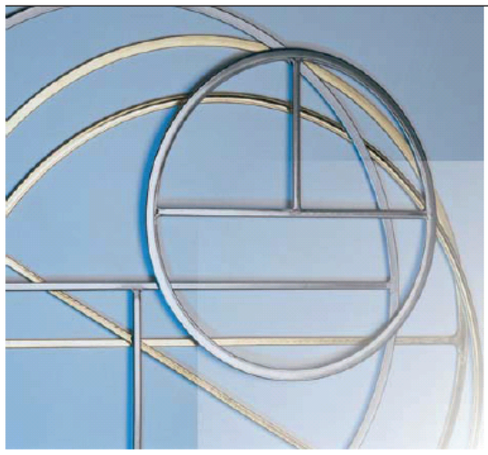
GASKETS FOR HEAT EXCHANGERS

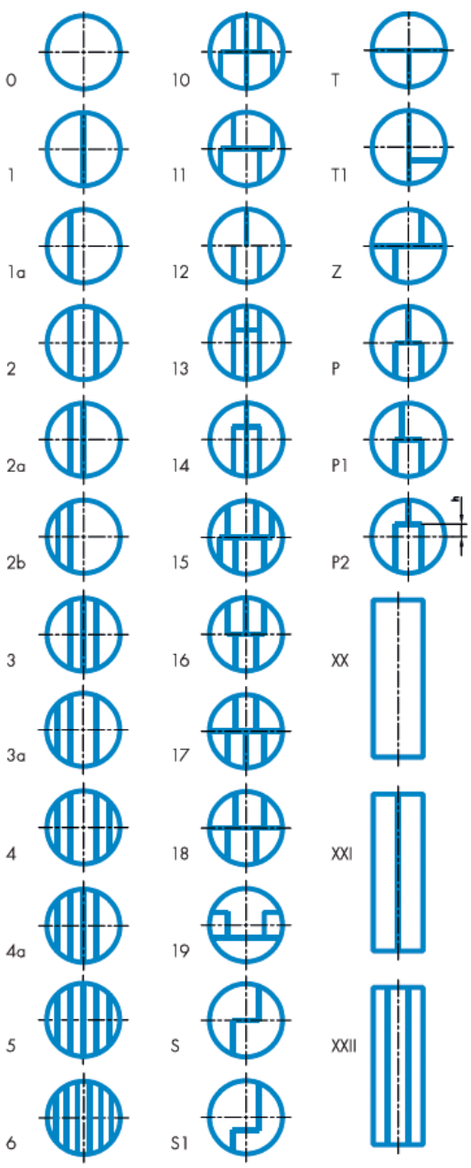


PROPERTIES AND APPLICATION

Heat Exchanger Gasket is a term that has been given to gasket used in heat exchangers. The structure of the gasket or its type varies according to the operating conditions of the exchangers. The heat exchanger gaskets come in a wide spectre of types including single ordoubl jacketed, corrugated, plain metal, soft and many other. A large selection of different materials allows heat exchangers to operate at temperatures beyond the capabilities of most soft gasket materials.

ADVANTAGES

• Available in wide range of materials, since they are all custom made. There are
few limitations regarding size and shape.
• The Metal jacket provides mechanic strength to contain the filler and improves chemical resistance.
• Unique construction provides stability and ensures trouble-free handling and
installation.

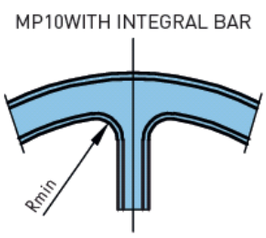


SHAPE AND CONSTRUCTION

These gaskets are used in shell and tube type heat exchangers. They can be manufactured in very different sizes, shapes, with or without bars. The primary seal is at the inner diameter of the gasket, the outer gasket diameter acts as a secondary seal. The bars seal between the heat exchangers passages.
The Heat exchanger gaskets are produced in several types to meet the most demanding applications. Gaskets for heat exchangers can be manufactured in metal or alloy with a thickness 0.4 mm featuring a soft core inside a metallic jacket.

Gaskets with integrated bars

Traditionally double-jacketed gaskets for heat exchangers are manufactured with integrated bars. There is a radius between the bars and an internal diameter of the gaskets.



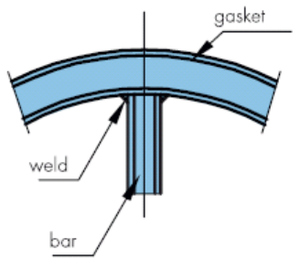
The values of the corresponding radius for the most commonly used metals and alloys are shown in the following table. If a radius is less than R min, the material can crack, reducing the sealing properties of the gaskets.

GASKET MATERIALS and R min	
Gasket material	Rmin
Copper	8m
Soft iron (CS)	8 mm
Brass, Monel	10 mm
Stainless steel	10 mm

Gaskets with welded bars

Gaskets with welded bars have eliminated one of the greatest problems of conventional gaskets, which are cracks in the radius area. Metal or alloys are commercially available in sheets or rolls of 1000 mm width.

The primary and secondary seals are continuous all around the gasket. The gasket has an excellent sealability, reducing leaks to the environment. The bars which seal between the heat exchangers passages are plasma or TIG welded with spot welds at each end. These welds should be soft and small to avoid areas of increased resistance to seating.



MP10 WITH WELDED BAR

Materials For Heat Echanger Gaskets

The selection of the jacket material depended on operating conditions. The standard filler is Flexible Graphite.

Metallic jacket

MATERIAL	ASTM	DIN Material No.
Low Carbon Steel	Soft iron (CS)	1.0333
Stainless steel	AISI 304	1.4301
Stainless steel	AISI 316, 316 L	1.4401, 1.4404
Stainless steel	AISI 321	1.4541
Stainless steel	AISI 316 Ti	1.4571
Monel (NiCu30Fe)	Alloy 400	2.4360
Copper	Copper	2.0090
Brass	Brass Ms 63	2.0321
Titanium	B348 Gr.1	3.7025

Other alloys available on request

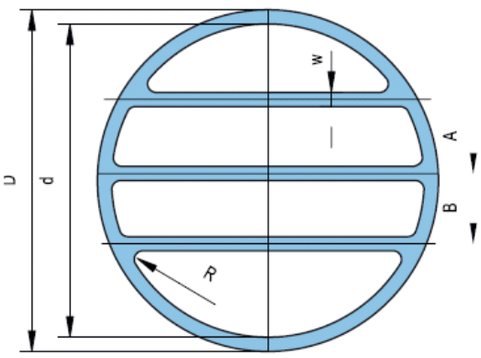
Filler

Flexible graphite, ceramic, calandered sealing materials,

SIZES

STANDARD DIMENSIONS	
gasket thickness	3.2 mm
gasket width	10, 13 and 16 mm
bar width	8, 10 and 13 mm

Gaskets with outside diameter to 1000 mm are normally made with integrated bars. Gaskets with an outside diameter greater than 1000 mm are normally made with welded bars. According to the heat exchangers shapes and sizes other dimensions can be manufactured on request.



MP10