MONROE SEALS

ABOUT US

Monroe Seals is your online source for O-rings, gaskets, extruded rubber, oil seals, spring-energized seals and custom molded rubber of various compounds.

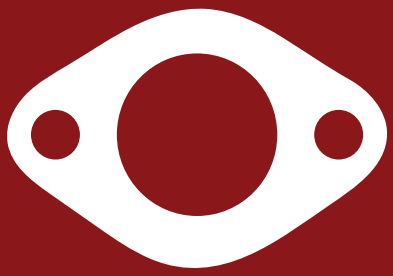
We are proud to serve customers across North America in the automotive, medical, filtration, heavy equipment, oil & gas, and transportation industry sectors.

Why should you partner with Monroe Seals? Combined, we have over 150 years of rubber and sealing experience.

> "Our team is passionate about seals advancement in process, materials, and profiles for unique applications. We love this industry!"

- Monroe Seals

MONROE



GASKETS SEALS

GASKET SEALS

Gasket applications cover a large spectrum of materials ranging from acrylic to aluminum.

Your gasket manufacturing options are as varied as Die Cutting and Lathe Cutting to Pressure Sensitive Adhesives and Vulcanization.

Monroe Seals has over 40 years of gasket experience, working with the materials listed below for a wide range of applications. We understand the importance of a “proper” gasket and the cost considerations.

One very cost effective method of cutting gaskets is utilizing steel rule dies; others are lathe-cutting, throp-cutting, flash-cutting, water-jet cutting. Not all methods will produce the same tolerances and some materials only lend themselves to certain methods of manufacturing. Perhaps you have a critical dimension, this may require a hardened steel tool or perhaps it will be best produced by water jet cutting or even molding. Let Monroe Seals be the source for all your gasket requirements. Contact Monroe Seals and we will put our experts to work for you. Our knowledgeable sales staff will assist you in pairing the right gasket material with the right manufacturing process. Slitting, pressure sensitive adhesives, assembly and special packaging are some of the additional services offered.

MONROE WILL QUOTE ON BOTH LONG AND SHORT RUN DIE CUT PRODUCTS.

GASKET MATERIALS- NOT ALL INCLUSIVE

- ACRYLIC
- EPOXY GLASS
- PAPER
- ALUMINUM
- FELT
- POLYETHYLENE (FOAM-SOLID)
- ARMITE FIBERBOARD
- POLYPROPYLENE
- BUNA (NITRILE)
- FISHPAPER
- POLYURETHANE (SPONGE-SOLID)
- CELLULOSE FIBERS
- GUM RUBBER
- PRESS BOARD
- CERAMIC PAPER
- HYPALON®
- RED RUBBER
- CLOTH INSERTED RUBBER
- LAMINATED DACRONIPOLVESTER
- SANTOPRENE®
- COPACO
- LEXAN®
- SILICONE (SPONGE-SOLID)
- CORK
- MYLAR®
- SPONGE RUBBER
- CORK & RUBBER
- NATSYN®
- TETRA GLASS
- CRANEGLAS®
- NEOPRENE (SPONGE-SOLID)
- VITON®
- CROSS LINKED P.E. FOAM
- NOMEX®
- (SPONGE-SOLID)
- EPDM (SPONGE-SOLID)
- NON-ASBESTOS FIBER

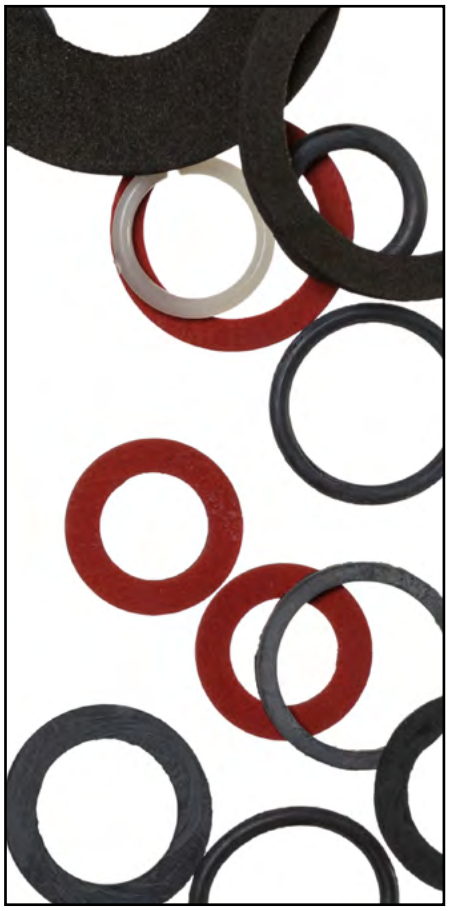
O-RINGS

The O-Ring is the most widely used seal in industry. It is easy to install, can be used as a double-acting seal, can seal pressures to over 5,000 psi in static and dynamic applications and is very economical.

While simple in concept, the O-Ring can be sophisticated in application. The information in this catalog is intended to give a brief overview of O-ring design and selection.

Specifying O-Rings

O-rings are specified by calling out the O-Ring size, and the compound.



Size

0-rings are available in 349 sizes as set up by the Aerospace Standard 568 published by the Society of Automotive Engineers. These sizes are designated by dash numbers as shown on the 568 DASH Chart. For instance, an O-ring with an inside diameter (I.D.) of .362 ± .005" and a cross section (W) of .103 ± .003 is designated as: "AS568-110."

Compound Selection

Compounds are available in a variety of elastomers such as Nitrile, Neoprene, Ethylene Propylene, Fluoroelastomer, etc. To select the proper elastomer, check the following in properties:

- Fluid Compatibility Chart
- Temperature Range Chart
- General Elastomeric Properties

For O-Ring sizes other than standard sizes, specify the actual dimensions desired for the inside diameter (I.D.) and the cross section (W). There may be a tooling charge for such non-standards.

Usually you will be able to find one best base elastomer to meet these requirements. The next step is to determine the durometer (hardness) needed, from the "Durometer-Pressure-Gap Chart" (see Properties section).

GROOVE DESIGN CHART FOR O-RING INSTALLATION

A = Uniform Dash Number
B = Actual Cross Section Dia.
C = Dynamic
D = Static
E = Dynamic + .000/-.001
F = Static +.000/-.004
G = No Backup Ring
H = One Backup Ring
I = Two Backup Rings
J = 500 PSI
K = 1500 PSI
L = Eccentricity (Maximum)
M = Radius (R)

		Diametral Squeeze (Minimun)		Gland Depth F		Groove Width G + .003			Diametral[2] Clearance (Max) D			
SEE A ABOVE	SEE B ABOVE	SEE C ABOVE	SEE D ABOVE	SEE E ABOVE	SEE F ABOVE	SEE G ABOVE	SEE H ABOVE	SEE I ABOVE	SEE J ABOVE	SEE K ABOVE	SEE L ABOVE	SEE M ABOVE
-001	.040+.003	.004	.006	.033	.031	.056	-	-	.005	.0025	.002	.010
-002	.050 +.003	.005	.008	.042	.039	.070	-	-	.006	.003	.002	.010
-003	.060 +.003	.006	.009	.051	.048	.084	-	-	.007	.0035	.002	.016
-004THRU-050	.070 +.003	.007	.011	.060	.056	.098	.140	.207	.008	.004	.002	.016
-102THRU-178	.103 +.003	.010	.015	.090	.085	.144	.173	.204	.009	.004	.002	.016
-201THRU-284	.139 +.004	.014	.021	.121	.114	.195	.210	.277	.010	.006	.003	.031
-309THRU-395	.210 +.005	.021	.032	.184	.173	.294	.313	.412	.011	.007	.004	.031
-425THRU-475	.275 +.006	.028	.042	.241	.227	.385	.410	.540	.012	.008	.005	.047

1. The following sizes are not normally recommended for dynamic service, although special applications may permit their use:

-001 thru -003
-013 thru -050
-117 thru -178
-223 thru -284
-350 thru -395
-461 thru -475

2. Clearances shown are based on 70 durometer materials. The clearances must be held to an absolute minimum consistent with design requirements for temperature variations and should not exceed the values shown.

3. Total indicator reading between groove and adjacent bearing surface. All surfaces and corners must be free of tool marks and scratches.

SURFACE FINISHES FOR O-RING INSTALLATION		
TYPE	POSSIBLE RESULT	COMMENTS
Polished (non-porous)	Lubrication will be lost resulting in high friction rate and possible seal failure.	Not recommended
Rough	Tearing and abrasion of seal may occur, possible seal failure.	Not recommended
Burnished/Mandrel	A surface finish exceeding the recommended surface finish range, possible seal failure.	Although these methods produce a very accurate diameter, they are not recommended.
Ideal	20-24 RMS (.5-.6 Bar) 20-32 RMS (.5-.81 Bar) Not to be finer than 16 RMS (.4 Bar)	Recommended

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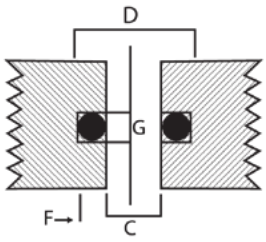
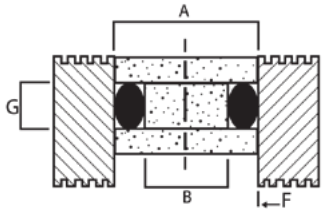
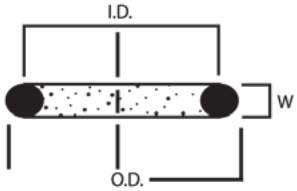
O-RING GROOVE DIMENSIONS MAY BE CALCULATED AS FOLLOWS:







ROD SEAL GIVEN: ROD DIAMETER **C** O-RING CROSS SECTION **W** DYNAMIC APPLICATION NO BACK-UPS REQUIRED	EXAMPLE: = .500" = 3/32" NOMINAL
DETERMINE: O-RING SIZE GLAND DEPTH **F** GROOVE WIDTH **G** ROD GLAND **D**	EXAMPLE: = AS-568-112 (1/2" **ID** X 3/32" **W** NOMINAL DIMENSIONS) = .090 +.000/-.001" (FROM CHART, PAGE 2) = .144 ± .003" (FROM CHART, PAGE 2) = **C** + 2F = .500" + 2X.090"= .680"
PISTON SEAL GIVEN: CYLINDER BORE **A** O-RING CROSS SECTION **W** STATIC APPLICATION NO BACK-UPS REQUIRED	EXAMPLE: = 1.000" = 1/8" NOMINAL
DETERMINE: O-RING SIZE GLAND DEPTH **F** PISTON GROOVE **B**	EXAMPLE: = AS 568-210 (1" **OD** X 1/8" **W** NOMINAL DIMENSIONS) = .114 $^{+.000"}_{-.004"}$ (FROM CHART, PAGE 2) GROOVE WIDTH C = .195 + .003" (FROM CHART, PAGE 2) = **A**-2F = 1.000" -2X.114" = .772"

ENCAPASULATED O-RINGS

A circular shaped seal with a round cross section consisting of two components, a PTFE jacket and an internal (core) energizer, which imparts memory to the seal. The encapsulated O-ring is intended to close off potential leak paths between mating surfaces in both static and dynamic applications.

Encapsulated O-rings are offered in two PTFE grades, **FEP** and **PFA** with a selection of three different energizers which give the user a choice depending on temperature and operating environment.

PTFE GRADES

FEP

The most versatile when considering overall corrosion resistance, sealing capability and temperature. Temperature range -450°F to +400°F (-267°C to 205°C).

PFA

A fluorocarbon copolymer similar to FEP but it also offers greatly improved mechanical and creep properties at elevated operating temperatures. Temperature range -450°F to + 500°F (-267°C to +260°C).

FEATURES

When considering the encapsulated concept, one should take into account the many features which FEP and PFA PTFE have to offer:

- Corrosion resistance
- Ultra low moisture absorption
- Uniformity
- Low cold flow
- Broad temperature range
- Good dialectic properties
- Flexibility
- Low coefficient of friction
- Permeation resistance
- Abrasion resistance
- Non-flammable
- Good impact strength
- Excellent resilience
- Lubricity
- No swelling
- Reusable

FDA Approval The United States Federal Food and Drug Administration have published amendment 21 CFR 177.1550 which permits the use of FEP and PFA as articles or components of articles intended for use in contact with food. There is no general approval for use of these grades in medical applications.

CORE MATERIALS

The core material is the component which imparts 'life' or 'memory' to the encapsulated O-ring when it is subjected to compressive force.

VITON®

A fluoroelastomer compound with a combination of exceptional mechanical properties and compression set resistance. This particular energizer gives an O-ring excellent memory and the ability to recover rapidly from deformation. This core has a Shore A hardness of 75 with a suggested operating temperature range of -10°F to +300°F (-23°C to +150°C) in encapsulated applications.

SILICONE

This elastomer possesses mechanical properties similar to Viton®, with the exception of its slightly lower compression set resistance. It is more suitable for sensitive applications where lighter compressive forces are applied to energize the seal. This core has a Shore A hardness of 70 but it also offers a broader operating temperature range of -80°F to +500°F. (-62°C to +260°C).

ASTRA SEAL

The spring energizer, made from precision rolled stainless high strength steel gives a very high compression set resistance. The stainless spring core maintains its resilience during in long term exposure to cryogenic temperatures -420°F to +500°F (-250°C to +260°C). It offers superior sealing characteristics in face seal applications, especially in liquid oxygen and hydrogen service.

HOLLOW CORE

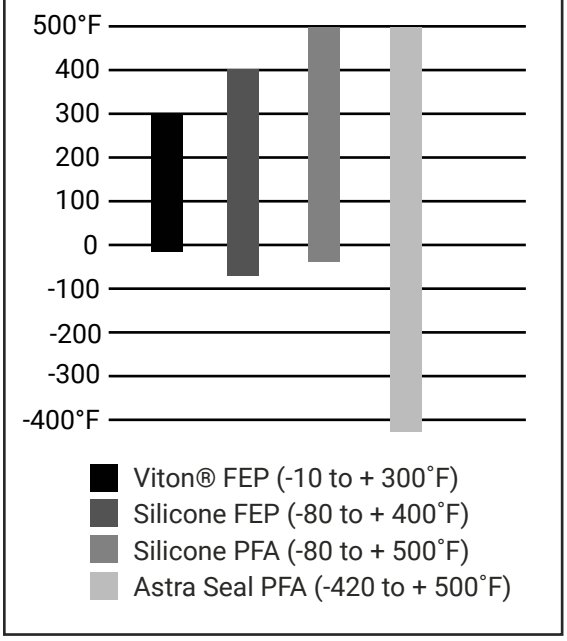
Hollow core O-rings provide effective sealing properties in applications where lower compressive forces may limit sealing ability of our standard O-rings. The combination of a hollow core insert with a slightly lower hardness offers a more flexible, easier to squeeze O-ring requiring less energy to activate its sealing capability.

Note: Hollow core energizers are available in a limited size range. Please contact Monroe Seals for specific details.

ENCAPSULATED MATERIALS CHART

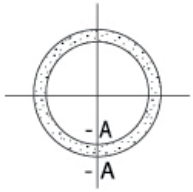
Comparison of Properties	FEP 160	PFA
EXCELLENT RESILIENCY	1	1
CORROSION RESISTANCE	1	1
MECHANICAL PROPERTIES OF ELEVATED	2	1
DIELECTRIC PROPERTIES	1	1
FLEXIBILITY	1	1
LOW MOISTURE ABSORPTION	2	2
PERMEATION RESISTANCE	2	2
COLD FLOW	4	3
NON-STICK CHARACTERISTICS	1	1
LOW COEFFICIENT OF FRICTION	1	1
ABRASION RESISTANCE	3	3
OPERATING TEMPERATURE RANGE	2	1
IMPACT STRENGTH	3	2
NON-FLAMMABILITY	1	1
F.D.A. APPROVAL	yes	yes
SHORE DUROMETER (D)	55	60
TEMPERATURE HIGH F	400	500
TEMPERATURE LOW L	– 400	– 400
1 - EXCELLENT 2 = GOOD 3 = FAIR 4 = POOR		

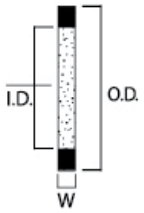
Encapsulated Temperature Range Chart

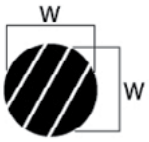


AEROSPACE STANDARD 568 DASH NUMBERS

The following is a list of O-Ring sizes published by the Society of Automotive Engineers and are designated by dash numbers.







(Enlarged Sections A-A)
Flash .003 inches high by .005 inches thick maximum permissible.

Example:
ID (inside diameter) of .362" ± .005" and W (cross section) of .103" ± .003 is designated as AS568-110

Size Ref. AS568-	Nominal Size Inches			Actual Size Inches				Actual Size Millimeters			
	ID	OD	W	ID	ID Tol. ±	W	W Tol. ±	ID	ID Tol. ±	W	**W Tol. ±**
-001	1/32	3/32	1/32	0.029	0.004	0.040	0.003	0.74	0.10	1.02	0.08
-002	3/64	9/64	3/64	0.042	0.004	0.050	0.003	1.07	0.10	1.27	0.08
-003	1/16	3/16	1/16	0.056	0.004	0.060	0.003	1.42	0.10	1.52	0.08
-004	5/64	13/64	1/16	0.070	0.005	0.070	0.003	1.78	0.12	1.78	0.08
-005	7/64	15/64	1/16	0.101	0.005	0.070	0.003	2.57	0.12	1.78	0.08
-006	1/8	1/4	1/16	0.114	0.005	0.070	0.003	2.90	0.12	1.78	0.08
-007	5/32	9/32	1/16	0.145	0.005	0.070	0.003	3.68	0.12	1.78	0.08
-008	3/16	5/16	1/16	0.176	0.005	0.070	0.003	4.47	0.12	1.78	0.08
-009	7/32	11/32	1/16	0.208	0.005	0.070	0.003	5.28	0.12	1.78	0.08
-010	1/4	3/8	1/16	0.239	0.005	0.070	0.003	6.07	0.12	1.78	0.08
-011	5/16	7/16	1/16	0.301	0.005	0.070	0.003	7.65	0.12	1.78	0.08
-012	3/8	1/2	1/16	0.364	0.005	0.070	0.003	9.25	0.12	1.78	0.08
-013	7/16	9/16	1/16	0.426	0.005	0.070	0.003	10.82	0.12	1.78	0.08
-014	1/ 2	5/8	1/16	0.489	0.005	0.070	0.003	12.42	0.12	1.78	0.08
-015	9/16	11/16	1/16	0.551	0.007	0.070	0.003	14.00	0.17	1.78	0.08
-016	5/8	3/4	1/16	0.614	0.009	0.070	0.003	15.60	0.22	1.78	0.08
-017	11/16	13/16	1/16	0.676	0.009	0.070	0.003	17.17	0.22	1.78	0.08
-018	3/4	7/8	1/16	0.739	0.009	0.070	0.003	18.77	0.22	1.78	0.08
-019	13/16	15/16	1/16	0.801	0.009	0.070	0.003	20.35	0.22	1.78	0.08
-020	7/8	1	1/16	0.864	0.009	0.070	0.003	21.95	0.22	1.78	0.08
-021	15/16	1-1/16	1/16	0.926	0.009	0.070	0.003	23.52	0.22	1.78	0.08
-022	1	1-1/8	1/16	0.989	0.010	0.070	0.003	25.12	0.25	1.78	0.08
-023	1-1/16	1-3/16	1/16	1.051	0.010	0.070	0.003	26.70	0.25	1.78	0.08
-024	1-1/8	1-1/4	1/16	1.114	0.010	0.070	0.003	28.30	0.25	1.78	0.08
-025	1-3/16	1-5/16	1/16	1.176	0.011	0.070	0.003	29.87	0.28	1.78	0.08
-026	1-1/4	1-3/8	1/16	1.239	0.011	0.070	0.003	31.47	0.28	1.78	0.08
-027	1-5/16	1-7/16	1/16	1.301	0.011	0.070	0.003	33.05	0.28	1.78	0.08
-028	1-3/8	1-1/2	1/16	1.364	0.013	0.070	0.003	34.65	0.33	1.78	0.08
-029	1-1/2	1-5/8	1/16	1.489	0.013	0.070	0.003	37.82	0.33	1.78	0.08
-030	1-5/8	1-3/4	1/16	1.614	0.013	0.070	0.003	41.00	0.33	1.78	0.08
-031	1-3/4	1-7/8	1/16	1.739	0.015	0.070	0.003	44.17	0.38	1.78	0.08
-032	1-7/8	2	1/16	1.864	0.015	0.070	0.003	47.35	0.38	1.78	0.08
-033	2	2-1/8	1/16	1.989	0.018	0.070	0.003	50.52	0.46	1.78	0.08
-034	2-1/8	2-1/4	1/16	2.114	0.018	0.070	0.003	53.70	0.46	1.78	0.08
-035	2-1/4	2-3/8	1/16	2.239	0.018	0.070	0.003	56.87	0.46	1.78	0.08

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AEROSPACE STANDARD 568 DASH NUMBERS CONTINUED

SIZE REF. AS568-	NOMINAL SIZE INCHES			ACTUAL SIZE INCHES				ACTUAL SIZE MILLIMETERS			
	ID	OD	W	ID	ID TOL. ±	W	W TOL. ±	ID	ID TOL. ±	W	W TOL. ±
-036	2-3/8	2-1/2	1/16	2.364	0.018	0.070	0.003	60.05	0.46	1.78	0.08
-037	2-1/2	2-5/8	1/16	2.489	0.018	0.070	0.003	63.22	0.46	1.78	0.08
-038	2-5/8	2-3/4	1/16	2.614	0.020	0.070	0.003	66.40	0.50	1.78	0.08
-039	2-3/4	2-7/8	1/16	2.739	0.020	0.070	0.003	69.57	0.50	1.78	0.08
-040	2-7/8	3	1/16	2.864	0.020	0.070	0.003	72.75	0.50	1.78	0.08
-041	3	3-1/8	1/16	2.989	0.024	0.070	0.003	75.92	0.61	1.78	0.08
-042	3-1/4	3-3/8	1/16	3.239	0.024	0.070	0.003	82.27	0.61	1.78	0.08
-043	3-1/2	3-5/8	1/16	3.489	0.024	0.070	0.003	88.62	0.61	1.78	0.08
-044	3-3/4	3-7/8	1/16	3.739	0.027	0.070	0.003	94.97	0.69	1.78	0.08
-045	4	4-1/8	1/16	3.989	0.027	0.070	0.003	101.32	0.69	1.78	0.08
-046	4-1/4	4-3/8	1/16	4.239	0.030	0.070	0.003	107.67	0.76	1.78	0.08
-047	4-1/2	4-5/8	1/16	4.489	0.030	0.070	0.003	114.02	0.76	1.78	0.08
-048	4-3/4	4-7/8	1/16	4.739	0.030	0.070	0.003	120.37	0.76	1.78	0.08
-049	5	5-1/8	1/16	4.989	0.037	0.070	0.003	126.72	0.94	1.78	0.08
-050	5-1/4	5-3/8	1/16	5.239	0.037	0.070	0.003	133.07	0.94	1.78	0.08
-102	1/16	1/4	3/32	0.049	0.005	0.103	0.003	1.24	0.12	2.62	0.08
-103	3/32	9/32	3/32	0.081	0.005	0.103	0.003	2.06	0.12	2.62	0.08
-104	1/8	5/16	3/32	0.112	0.005	0.103	0.003	2.84	0.12	2.62	0.08
-105	5/32	11/32	3/32	0.143	0.005	0.103	0.003	3.63	0.12	2.62	0.08
-106	3/16	3/8	3/32	0.174	0.005	0.103	0.003	4.42	0.12	2.62	0.08
-107	7/32	13/32	3/32	0.206	0.005	0.103	0.003	5.23	0.12	2.62	0.08
-108	1/4	7/16	3/32	0.237	0.005	0.103	0.003	6.02	0.12	2.62	0.08
-109	5/16	1/2	3/32	0.299	0.005	0.103	0.003	7.59	0.12	2.62	0.08
-110	3/8	9/16	3/32	0.362	0.005	0.103	0.003	9.19	0.12	2.62	0.08
-111	7/16	5/8	3/32	0.424	0.005	0.103	0.003	10.77	0.12	2.62	0.08
-112	1/2	11/16	3/32	0.487	0.005	0.103	0.003	12.37	0.12	2.62	0.08
-113	9/16	3/4	3/32	0.549	0.005	0.103	0.003	13.94	0.17	2.62	0.08
-114	5/8	13/16	3/32	0.612	0.009	0.103	0.003	15.54	0.22	2.62	0.08
-115	11/16	7/8	3/32	0.674	0.009	0.103	0.003	17.12	0.22	2.62	0.08
-116	3/4	15/16	3/32	0.737	0.009	0.103	0.003	18.72	0.22	2.62	0.08
-117	13/16	1	3/32	0.799	0.010	0.103	0.003	20.29	0.25	2.62	0.08
-118	7/8	1-1/16	3/32	0.862	0.010	0.103	0.003	21.89	0.25	2.62	0.08
-119	15/16	1-1/8	3/32	0.924	0.010	0.103	0.003	23.47	0.25	2.62	0.08
-120	1	1-3/16	3/32	0.987	0.010	0.103	0.003	25.07	0.25	2.62	0.08
-121	1-1/16	1-1/4	3/32	1.049	0.010	0.103	0.003	26.64	0.25	2.62	0.08
-122	1-1/8	1-5/16	3/32	1.112	0.010	0.103	0.003	28.24	0.25	2.62	0.08
-123	1-3/16	1-3/8	3/32	1.174	0.012	0.103	0.003	29.82	0.30	2.62	0.08
-124	1-1/4	1-7/16	3/32	1.237	0.012	0.103	0.003	31.42	0.30	2.62	0.08
-125	1-5/16	1-1/2	3/32	1.299	0.012	0.103	0.003	32.99	0.30	2.62	0.08
-126	1-3/8	1-9/16	3/32	1.362	0.012	0.103	0.003	34.59	0.30	2.62	0.08
-127	1-7/16	1-5/8	3/32	1.424	0.012	0.103	0.003	36.17	0.30	2.62	0.08
-128	1-1/2	1-11/16	3/32	1.487	0.012	0.103	0.003	37.77	0.30	2.62	0.08
-129	1-9/16	1-3/4	3/32	1.549	0.015	0.103	0.003	39.34	0.38	2.62	0.08
-130	1-5/8	1-13/16	3/32	1.612	0.015	0.103	0.003	40.94	0.38	2.62	0.08
-131	1-11/16	1-7/8	3/32	1.674	0.015	0.103	0.003	42.52	0.38	2.62	0.08

AEROSPACE STANDARD 568 DASH NUMBERS CONTINUED

Size Ref.	Nominal Size Inches			Actual Size Inches				Actual Size Millimeters			
	ID	OD	W	ID	ID TOL. ±	W	W TOL. ±	ID	ID TOL. ±	W	W TOL. ±
-132	1-3/4	1-15/16	3/32	1.737	0.015	0.103	0.003	44.12	0.38	2.62	0.08
-133	1 13/16	2	3/32	1.799	0.015	0.103	0.003	45.69	0.38	2.62	0.08
-134	1-7/8	2-1/16	3/32	1.862	0.015	0.103	0.003	47.29	0.38	2.62	0.08
-135	1-15/16	2-1/8	3/32	1.925	0.017	0.103	0.003	48.90	0.43	2.62	0.08
-136	2	2-3/16	3/32	1.987	0.017	0.103	0.003	50.47	0.43	2.62	0.08
-137	2-1/16	2-1/4	3/32	2.050	0.017	0.103	0.003	52.07	0.43	2.62	0.08
-138	2-1/8	2-5/16	3/32	2.112	0.017	0.103	0.003	53.64	0.43	2.62	0.08
-139	2-3/16	2-3/8	3/32	2.175	0.017	0.103	0.003	55.25	0.43	2.62	0.08
-140	2-1/4	2-7/16	3/32	2.237	0.017	0.103	0.003	56.82	0.43	2.62	0.08
-141	2-5/16	2-1/2	3/32	2.300	0.020	0.103	0.003	58.42	0.50	2.62	0.08
-142	2-3/8	2-9/16	3/32	2.362	0.020	0.103	0.003	59.99	0.50	2.62	0.08
-143	2-7/16	2-5/8	3/32	2.425	0.020	0.103	0.003	61.60	0.50	2.62	0.08
-144	2-1/2	2 11/16	3/32	2.487	0.020	0.103	0.003	63.17	0.50	2.62	0.08
-145	2-9/16	2-3/4	3/32	2.550	0.020	0.103	0.003	64.77	0.50	2.62	0.08
-146	2-5/8	2-13/16	3/32	2.612	0.020	0.103	0.003	66.34	0.50	2.62	0.08
-147	2 11/16	2-7/8	3/32	2.675	0.022	0.103	0.003	67.95	0.55	2.62	0.08
-148	2-3/4	2-15/16	3/32	2.737	0.022	0.103	0.003	69.52	0.55	2.62	0.08
-149	2-13/16	3	3/32	2.800	0.022	0.103	0.003	71.12	0.55	2.62	0.08
-150	2-7/8	3-1/16	3/32	2.862	0.022	0.103	0.003	72.69	0.55	2.62	0.08
-151	3	3-3/16	3/32	2.987	0.024	0.103	0.003	75.87	0.61	2.62	0.08
-152	3-1/4	3-7/16	3/32	3.237	0.024	0.103	0.003	82.22	0.61	2.62	0.08
-153	3-1/2	3-11/16	3/32	3.487	0.024	0.103	0.003	88.57	0.61	2.62	0.08
-154	3-3/4	3-15/16	3/32	3.737	0.028	0.103	0.003	94.92	0.71	2.62	0.08
-155	4	4-3/16	3/32	3.987	0.028	0.103	0.003	101.27	0.71	2.62	0.08
-156	4-1/4	4-7/16	3/32	4.237	0.030	0.103	0.003	107.62	0.76	2.62	0.08
-157	4-1/2	4-11/16	3/32	4.487	0.030	0.103	0.003	113.97	0.76	2.62	0.08
-158	4-3/4	4-15/16	3/32	4.737	0.030	0.103	0.003	120.32	0.76	2.62	0.08
-159	5	5-3/16	3/32	4.987	0.035	0.103	0.003	126.67	0.89	2.62	0.08
-160	5-1/4	5-7/16	3/32	5.237	0.035	0.103	0.003	133.02	0.89	2.62	0.08
-161	5-1/2	5-11/16	3/32	5.487	0.035	0.103	0.003	139.37	0.89	2.62	0.08
-162	5-3/4	5-15/16	3/32	5.737	0.035	0.103	0.003	145.72	0.89	2.62	0.08
-163	6	6-3/16	3/32	5.987	0.035	0.103	0.003	152.07	0.89	2.62	0.08
-164	6-1/4	6-7/16	3/32	6.237	0.040	0.103	0.003	158.42	1.02	2.62	0.08
-165	6-1/2	6-11/16	3/32	6.487	0.040	0.103	0.003	164.77	1.02	2.62	0.08
-166	6-3/4	6-15/16	3/32	6.737	0.040	0.103	0.003	171.12	1.02	2.62	0.08
-167	7	7-3/16	3/32	6.987	0.040	0.103	0.003	177.47	1.02	2.62	0.08
-168	7-1/4	7-7/16	3/32	7.237	0.045	0.103	0.003	183.82	1.14	2.62	0.08
-169	7-1/2	7-11/16	3/32	7.487	0.045	0.103	0.003	190.17	1.14	2.62	0.08
-170	7-3/4	7-15/16	3/32	7.737	0.045	0.103	0.003	196.52	1.14	2.62	0.08
-171	8	8-3/16	3/32	7.987	0.045	0.103	0.003	202.87	1.14	2.62	0.08

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AEROSPACE STANDARD 568 DASH NUMBERS CONTINUED

Size Ref.	Nominal Size Inches			Actual Size Inches				Actual Size Millimeters			
	ID	OD	W	ID	ID TOL. ±	W	W TOL. ±	ID	ID TOL. ±	W	W TOL. ±
-172	8-1/4	8-7/16	3/32	8.237	0.050	0.103	0.003	209.22	1.25	2.62	0.08
-173	8-1/2	8-11/16	3/32	8.487	0.050	0.103	0.003	215.57	1.25	2.62	0.08
-174	8-3/4	8-15/16	3/32	8.737	0.050	0.103	0.003	221.92	1.25	2.62	0.08
-175	9	9-3/16	3/32	8.987	0.050	0.103	0.003	228.27	1.25	2.62	0.08
-176	9-1/4	9-7/16	3/32	9.237	0.055	0.103	0.003	234.62	1.40	2.62	0.08
-177	9-1/2	9-11/16	3/32	9.487	0.055	0.103	0.003	240.97	1.40	2.62	0.08
-178	9-3/4	9-15/16	3/32	9.737	0.055	0.103	0.003	247.32	1.40	2.62	0.08
-201	3/16	7/16	1/8	0.171	0.005	0.139	0.004	4.34	0.12	3.53	0.10
-202	1/4	1/2	1/8	0.234	0.005	0.139	0.004	5.94	0.12	3.53	0.10
-203	5/16	9/16	1/8	0.296	0.005	0.139	0.004	7.52	0.12	3.53	0.10
-204	3/8	5/8	1/8	0.359	0.005	0.139	0.004	9.12	0.12	3.53	0.10
-205	7/16	11/16	1/8	0.421	0.005	0.139	0.004	10.69	0.12	3.53	0.10
-206	1/2	3/4	1/8	0.484	0.005	0.139	0.004	12.29	0.12	3.53	0.10
-207	9/16	13/16	1/8	0.546	0.007	0.139	0.004	13.87	0.17	3.53	0.10
-208	5/8	7/8	1/8	0.609	0.009	0.139	0.004	15.47	0.23	3.53	0.10
-209	11/16	15/16	1/8	0.671	0.009	0.139	0.004	17.04	0.23	3.53	0.10
-210	3/4	1	1/8	0.734	0.010	0.139	0.004	18.64	0.25	3.53	0.10
-211	13/16	1-1/16	1/8	0.796	0.010	0.139	0.004	20.22	0.25	3.53	0.10
-212	7/8	1-1/8	1/8	0.859	0.010	0.139	0.004	21.82	0.25	3.53	0.10
-213	15/16	1-3/16	1/8	0.921	0.010	0.139	0.004	23.39	0.25	3.53	0.10
-214	1	1-1/4	1/8	0.984	0.010	0.139	0.004	24.99	0.25	3.53	0.10
-215	1-1/16	1-5/16	1/8	1.046	0.010	0.139	0.004	26.57	0.25	3.53	0.10
-216	1-1/8	1-3/8	1/8	1.109	0.012	0.139	0.004	28.17	0.30	3.53	0.10
-217	1-3/16	1-7/16	1/8	1.171	0.012	0.139	0.004	29.74	0.30	3.53	0.10
-218	1-1/4	1-1/2	1/8	1.234	0.012	0.139	0.004	31.34	0.30	3.53	0.10
-219	1-5/16	1-9/16	1/8	1.296	0.012	0.139	0.004	32.92	0.30	3.53	0.10
-220	1-3/8	1-5/8	1/8	1.359	0.012	0.139	0.004	34.52	0.30	3.53	0.10
-221	1-7/16	1 11/16	1/8	1.421	0.012	0.139	0.004	36.09	0.30	3.53	0.10
-222	1-1/2	1-3/4	1/8	1.484	0.015	0.139	0.004	37.69	0.38	3.53	0.10
-223	1-5/8	1-7/8	1/8	1.609	0.015	0.139	0.004	40.87	0.38	3.53	0.10
-224	1-3/4	2	1/8	1.734	0.015	0.139	0.004	44.04	0.38	3.53	0.10
-225	1-7/8	2-1/8	1/8	1.859	0.018	0.139	0.004	47.22	0.46	3.53	0.10
-226	2	2-1/4	1/8	1.984	0.018	0.139	0.004	50.39	0.46	3.53	0.10
-227	2-1/8	2-3/8	1/8	2.109	0.018	0.139	0.004	53.57	0.46	3.53	0.10
-228	2-1/4	2-1/2	1/8	2.234	0.020	0.139	0.004	56.74	0.50	3.53	0.10
-229	2-3/8	2-5/8	1/8	2.359	0.020	0.139	0.004	59.92	0.50	3.53	0.10
-230	2-1/2	2-3/4	1/8	2.484	0.020	0.139	0.004	63.09	0.50	3.53	0.10
-231	2-5/8	2-7/8	1/8	2.609	0.020	0.139	0.004	66.27	0.50	3.53	0.10
-232	2-3/4	3	1/8	2.734	0.024	0.139	0.004	69.44	0.61	3.53	0.10
-233	2-7/8	3-1/8	1/8	2.859	0.024	0.139	0.004	72.62	0.61	3.53	0.10
-234	3	3-1/4	1/8	2.984	0.024	0.139	0.004	75.79	0.61	3.53	0.10
-235	3-1/8	3-3/8	1/8	3.109	0.024	0.139	0.004	78.97	0.61	3.53	0.10

AEROSPACE STANDARD 568 DASH NUMBERS CONTINUED

Size Ref. AS568-	Nominal Size Inches			Actual Size Inches				Actual Size Millimeters			
	ID	OD	W	ID	ID TOL. ±	W	W TOL. ±	ID	ID TOL. ±	W	W TOL. ±
-236	3-1/4	3-1/2	1/8	3.234	0.024	0.139	0.004	82.14	0.61	3.53	0.10
-237	3-3/8	3-5/8	1/8	3.359	0.024	0.139	0.004	85.32	0.61	3.53	0.10
-238	3-1/2	3-3/4	1/8	3.484	0.024	0.139	0.004	88.49	0.61	3.53	0.10
-239	3-5/8	3-7/8	1/8	3.609	0.028	0.139	0.004	91.67	0.71	3.53	0.10
-240	3-3/4	4	1/8	3.734	0.028	0.139	0.004	94.84	0.71	3.53	0.10
-241	3-7/8	4-1/8	1/8	3.859	0.028	0.139	0.004	98.02	0.71	3.53	0.10
-242	4	4-1/4	1/8	3.984	0.028	0.139	0.004	101.19	0.71	3.53	0.10
-243	4-1/8	4-3/8	1/8	4.109	0.028	0.139	0.004	104.37	0.71	3.53	0.10
-244	4-1/4	4-1/2	1/8	4.234	0.030	0.139	0.004	107.54	0.76	3.53	0.10
-245	4-3/8	4-5/8	1/8	4.359	0.030	0.139	0.004	110.72	0.76	3.53	0.10
-246	4-1/2	4-3/4	1/8	4.484	0.030	0.139	0.004	113.89	0.76	3.53	0.10
-247	4-5/8	4-7/8	1/8	4.609	0.030	0.139	0.004	117.07	0.76	3.53	0.10
-248	4-3/4	5	1/8	4.734	0.030	0.139	0.004	120.24	0.76	3.53	0.10
-249	4-7/8	5-1/8	1/8	4.859	0.035	0.139	0.004	123.42	0.89	3.53	0.10
-250	5	5-1/4	1/8	4.984	0.035	0.139	0.004	126.59	0.89	3.53	0.10
-251	5-1/8	5-3/8	1/8	5.109	0.035	0.139	0.004	129.77	0.89	3.53	0.10
-252	5-1/4	5-1/2	1/8	5.234	0.035	0.139	0.004	132.94	0.89	3.53	0.10
-253	5-3/8	5-5/8	1/8	5.359	0.035	0.139	0.004	136.12	0.89	3.53	0.10
-254	5-1/2	5-3/4	1/8	5.484	0.035	0.139	0.004	139.29	0.89	3.53	0.10
-255	5-5/8	5-7/8	1/8	5.609	0.035	0.139	0.004	142.47	0.89	3.53	0.10
-256	5-3/4	6	1/8	5.734	0.035	0.139	0.004	145.64	0.89	3.53	0.10
-257	5-7/8	6-1/8	1/8	5.859	0.035	0.139	0.004	148.82	0.89	3.53	0.10
-258	6	6-1/4	1/8	5.984	0.035	0.139	0.004	151.99	0.89	3.53	0.10
-259	6-1/4	6-1/2	1/8	6.234	0.040	0.139	0.004	158.34	1.02	3.53	0.10
-260	6-1/2	6-3/4	1/8	6.484	0.040	0.139	0.004	164.69	1.02	3.53	0.10
-261	6-3/4	7	1/8	6.734	0.040	0.139	0.004	171.04	1.02	3.53	0.10
-262	7	7-1/4	1/8	6.984	0.040	0.139	0.004	177.39	1.02	3.53	0.10
-263	7-1/4	7-1/2	1/8	7.234	0.045	0.139	0.004	183.74	1.14	3.53	0.10
-264	7-1/2	7-3/4	1/8	7.484	0.045	0.139	0.004	190.09	1.14	3.53	0.10
-265	7-3/4	8	1/8	7.734	0.045	0.139	0.004	196.44	1.14	3.53	0.10
-266	8	8-1/4	1/8	7.984	0.045	0.139	0.004	202.79	1.14	3.53	0.10
-267	8-1/4	8-1/2	1/8	8.234	0.050	0.139	0.004	209.14	1.25	3.53	0.10
-268	8-1/2	8-3/4	1/8	8.484	0.050	0.139	0.004	215.49	1.25	3.53	0.10
-269	8-3/4	9	1/8	8.734	0.050	0.139	0.004	221.84	1.25	3.53	0.10
-270	9	9-1/4	1/8	8.984	0.050	0.139	0.004	228.19	1.25	3.53	0.10
-271	9-1/4	9-1/2	1/8	9.234	0.055	0.139	0.004	234.54	1.40	3.53	0.10
-272	9-1/2	9-3/4	1/8	9.484	0.055	0.139	0.004	240.89	1.40	3.53	0.10
-273	9-3/4	10	1/8	9.734	0.055	0.139	0.004	247.24	1.40	3.53	0.10
-274	10	10-1/4	1/8	9.984	0.055	0.139	0.004	253.59	1.40	3.53	0.10
-275	10-1/2	10-3/4	1/8	10.484	0.055	0.139	0.004	266.29	1.40	3.53	0.10

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AEROSPACE STANDARD 568 DASH NUMBERS CONTINUED

Size Ref.	Nominal Size Inches			Actual Size Inches				Actual Size Millimeters			
	ID	OD	W	ID	ID TOL. ±	W	W TOL. ±	ID	ID TOL. ±	W	W TOL. ±
-276	11	11-1/4	1/8	10.984	0.065	0.139	0.004	278.99	1.65	3.53	0.10
-277	11-1/2	11-3/4	1/8	11.484	0.065	0.139	0.004	291.69	1.65	3.53	0.10
-278	12	12-1/4	1/8	11.984	0.065	0.139	0.004	304.39	1.65	3.53	0.10
-279	13	13-1/4	1/8	12.984	0.065	0.139	0.004	329.79	1.65	3.53	0.10
-280	14	14-1/4	1/8	13.984	0.065	0.139	0.004	355.19	1.65	3.53	0.10
-281	15	15-1/4	1/8	14.984	0.065	0.139	0.004	380.59	1.65	3.53	0.10
-282	16	16-1/4	1/8	15.955	0.075	0.139	0.004	405.26	1.90	3.53	0.10
-283	17	17-1/4	1/8	16.955	0.080	0.139	0.004	430.66	2.05	3.53	0.10
-284	18	18-1/4	1/8	17.955	0.085	0.139	0.004	456.06	2.15	3.53	0.10
-309	7/16	13/16	3/16	0.412	0.005	0.210	0.005	10.46	0.12	5.33	0.12
-310	1/12	7/8	3/16	0.475	0.005	0.210	0.005	12.07	0.12	5.33	0.12
-311	9/16	15/16	3/16	0.537	0.007	0.210	0.005	13.64	0.17	5.33	0.12
-312	5/8	1	3/16	0.600	0.009	0.210	0.005	15.24	0.22	5.33	0.12
-313	11/16	1-1/16	3/16	0.662	0.009	0.210	0.005	16.81	0.22	5.33	0.12
-314	3/4	1-1/8	3/16	0.725	0.010	0.210	0.005	18.42	0.25	5.33	0.12
-315	13/16	1-3/16	3/16	0.787	0.010	0.210	0.005	19.99	0.25	5.33	0.12
-316	7/8	1-1/4	3/16	0.850	0.010	0.210	0.005	21.59	0.25	5.33	0.12
-317	15/16	1-5/16	3/16	0.912	0.010	0.210	0.005	23.16	0.25	5.33	0.12
-318	1	1-3/8	3/16	0.975	0.010	0.210	0.005	24.77	0.25	5.33	0.12
-319	1-1/16	1-7/16	3/16	1.037	0.010	0.210	0.005	26.34	0.25	5.33	0.12
-320	1-1/8	1-1/2	3/16	1.100	0.012	0.210	0.005	27.94	0.30	5.33	0.12
-321	1-3/16	1-9/16	3/16	1.162	0.012	0.210	0.005	29.51	0.30	5.33	0.12
-322	1-1/4	1-5/8	3/16	1.225	0.012	0.210	0.005	31.12	0.30	5.33	0.12
-323	1-5/16	1 11/16	3/16	1.287	0.012	0.210	0.005	32.69	0.30	5.33	0.12
-324	1-3/8	1-3/4	3/16	1.350	0.012	0.210	0.005	34.29	0.30	5.33	0.12
-325	1-1/2	1-7/8	3/16	1.475	0.015	0.210	0.005	37.47	0.38	5.33	0.12
-326	1-5/8	2	3/16	1.600	0.015	0.210	0.005	40.64	0.38	5.33	0.12
-327	1-3/4	2-1/8	3/16	1.725	0.015	0.210	0.005	43.82	0.38	5.33	0.12
-328	1-7/8	2-1/4	3/16	1.850	0.015	0.210	0.005	46.99	0.38	5.33	0.12
-329	2	2-3/8	3/16	1.975	0.018	0.210	0.005	50.17	0.46	5.33	0.12
-330	2-1/8	2-1/2	3/16	2.100	0.018	0.210	0.005	53.34	0.46	5.33	0.12
-331	2-1/4	2-5/8	3/16	2.225	0.018	0.210	0.005	56.52	0.46	5.33	0.12
-332	2-3/8	2-3/4	3/16	2.350	0.018	0.210	0.005	59.69	0.46	5.33	0.12
-333	2-1/2	2-7/8	3/16	2.475	0.020	0.210	0.005	62.87	0.50	5.33	0.12
-334	2-5/8	3	3/16	2.600	0.020	0.210	0.005	66.04	0.50	5.33	0.12
-335	2-3/4	3-1/8	3/16	2.725	0.020	0.210	0.005	69.22	0.50	5.33	0.12
-336	2-7/8	3-1/4	3/16	2.850	0.020	0.210	0.005	72.39	0.50	5.33	0.12
-337	3	3-3/8	3/16	2.975	0.024	0.210	0.005	75.57	0.61	5.33	0.12
-338	3-1/8	3-1/2	3/16	3.100	0.024	0.210	0.005	78.74	0.61	5.33	0.12
-339	3-1/4	3-5/8	3/16	3.225	0.024	0.210	0.005	81.92	0.61	5.33	0.12
-340	3-3/8	3-3/4	3/16	3.350	0.024	0.210	0.005	85.09	0.61	5.33	0.12
-341	3-1/2	3-7/8	3/16	3.475	0.024	0.210	0.005	88.27	0.61	5.33	0.12
-342	3-5/8	4	3/16	3.600	0.028	0.210	0.005	91.44	0.71	5.33	0.12
-343	3-3/4	4-1/8	3/16	3.725	0.028	0.210	0.005	94.62	0.71	5.33	0.12

AEROSPACE STANDARD 568 DASH NUMBERS CONTINUED

SIZE REF. AS568-	NOMINAL SIZE INCHES			ACTUAL SIZE INCHES				ACTUAL SIZE MILLIMETERS			
	ID	OD	W	ID	ID TOL. ±	W	W TOL. ±	ID	ID TOL. ±	W	W TOL. ±
-344	3-7/8	4-1/4	3/16	3.850	0.028	0.210	0.005	97.79	0.71	5.33	0.12
-345	4	4-3/8	3/16	3.975	0.028	0.210	0.005	100.97	0.71	5.33	0.12
-346	4-1/8	4-1/2	3/16	4.100	0.028	0.210	0.005	104.14	0.71	5.33	0.12
-347	4-1/4	4-5/8	3/16	4.225	0.030	0.210	0.005	107.32	0.76	5.33	0.12
-348	4-3/8	4-3/4	3/16	4.350	0.030	0.210	0.005	110.49	0.76	5.33	0.12
-349	4-1/2	4-7/8	3/16	4.475	0.030	0.210	0.005	113.67	0.76	5.33	0.12
-350	4-5/8	5	3/16	4.600	0.030	0.210	0.005	116.84	0.76	5.33	0.12
-351	4-3/4	5-1/8	3/16	4.725	0.030	0.210	0.005	120.02	0.76	5.33	0.12
-352	4-7/8	5-1/4	3/16	4.850	0.030	0.210	0.005	123.19	0.76	5.33	0.12
-353	5	5-3/8	3/16	4.975	0.037	0.210	0.005	126.37	0.94	5.33	0.12
-354	5-1/8	5-1/2	3/16	5.100	0.037	0.210	0.005	129.54	0.94	5.33	0.12
-355	5-1/4	5-5/8	3/16	5.225	0.037	0.210	0.005	132.72	0.94	5.33	0.12
-356	5-3/8	5-3/4	3/16	5.350	0.037	0.210	0.005	135.89	0.94	5.33	0.12
-357	5-1/2	5-7/8	3/16	5.475	0.037	0.210	0.005	139.07	0.94	5.33	0.12
-358	5-5/8	6	3/16	5.600	0.037	0.210	0.005	142.24	0.94	5.33	0.12
-359	5-3/4	6-1/8	3/16	5.725	0.037	0.210	0.005	145.42	0.94	5.33	0.12
-360	5-7/8	6-1/4	3/16	5.850	0.037	0.210	0.005	148.59	0.94	5.33	0.12
-361	6	6-3/8	3/16	5.975	0.037	0.210	0.005	151.77	0.94	5.33	0.12
-362	6-1/4	6-5/8	3/16	6.225	0.040	0.210	0.005	158.12	1.02	5.33	0.12
-363	6-1/2	6-7/8	3/16	6.475	0.040	0.210	0.005	164.47	1.02	5.33	0.12
-364	6-3/4	7-1/8	3/16	6.725	0.040	0.210	0.005	170.82	1.02	5.33	0.12
-365	7	7-3/8	3/16	6.975	0.040	0.210	0.005	177.17	1.02	5.33	0.12
-366	7-1/2	7-5/8	3/16	7.225	0.045	0.210	0.005	183.52	1.14	5.33	0.12
-367	7-1/2	7-7/8	3/16	7.475	0.045	0.210	0.005	189.87	1.14	5.33	0.12
-368	7-3/4	8-1/8	3/16	7.725	0.045	0.210	0.005	196.22	1.14	5.33	0.12
-369	8	8-3/8	3/16	7.975	0.045	0.210	0.005	202.57	1.14	5.33	0.12
-370	8-1/4	8-5/8	3/16	8.225	0.050	0.210	0.005	208.92	1.30	5.33	0.12
-371	8-1/2	8-7/8	3/16	8.475	0.050	0.210	0.005	215.27	1.30	5.33	0.12
-372	8-3/4	9-1/8	3/16	8.725	0.050	0.210	0.005	221.62	1.30	5.33	0.12
-373	9	9-3/8	3/16	8.975	0.050	0.210	0.005	227.97	1.30	5.33	0.12
-374	9-1/4	9-5/8	3/16	9.225	0.055	0.210	0.005	234.32	1.40	5.33	0.12
-375	9-1/2	9-7/8	3/16	9.475	0.055	0.210	0.005	240.67	1.40	5.33	0.12
-376	9-3/4	10-1/8	3/16	9.725	0.055	0.210	0.005	247.02	1.40	5.33	0.12
-377	10	10-3/8	3/16	9.975	0.055	0.210	0.005	253.37	1.40	5.33	0.12
-378	10-1/2	10-7/8	3/16	10.475	0.060	0.210	0.005	266.07	1.52	5.33	0.12
-379	11	11-3/8	3/16	10.975	0.060	0.210	0.005	278.77	1.52	5.33	0.12
-380	11-1/2	11-7/8	3/16	11.475	0.065	0.210	0.005	291.47	1.65	5.33	0.12
-381	12	12-3/8	3/16	11.975	0.065	0.210	0.005	304.17	1.65	5.33	0.12
-382	13	13-3/8	3/16	12.975	0.065	0.210	0.005	329.55	1.65	5.34	0.12
-383	14	14-3/8	3/16	13.975	0.070	0.210	0.005	354.97	1.78	5.33	0.12
-384	15	15-3/8	3/16	14.975	0.070	0.210	0.005	380.37	1.78	5.33	0.12
-385	16	16-3/8	3/16	15.955	0.075	0.210	0.005	405.26	1.90	5.33	0.12
-386	17	17-3/8	3/16	16.955	0.080	0.210	0.005	430.66	2.05	5.33	0.12

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AEROSPACE STANDARD 568 DASH NUMBERS CONTINUED

SIZE REF.	NOMINAL SIZE INCHES			ACTUAL SIZE INCHES				ACTUAL SIZE MILLIMETERS			
	ID	OD	W	ID	ID TOL. ±	W	W TOL. ±	ID	ID TOL. ±	W	W TOL. ±
-387	18	18-3/8	3/16	17.955	0.085	0.210	0.005	456.06	2.15	5.33	0.12
-388	19	19-3/8	3/16	18.955	0.090	0.210	0.005	481.46	2.25	5.33	0.12
-389	20	20-3/8	3/16	19.955	0.095	0.210	0.005	506.86	2.25	5.33	0.12
-390	21	21-3/8	3/16	20.955	0.095	0.210	0.005	532.26	2.25	5.33	0.12
-391	22	22-3/8	3/16	21.955	0.100	0.210	0.005	557.66	2.55	5.33	0.12
-392	23	23-3/8	3/16	22.940	0.105	0.210	0.005	582.65	2.65	5.33	0.12
-393	24	24-3/8	3/16	23.940	0.110	0.210	0.005	608.10	2.80	5.33	0.12
-394	25	25-3/8	3/16	24.940	0.115	0.210	0.005	633.50	2.90	5.33	0.12
-395	26	26-3/8	3/16	25.940	0.012	0.210	0.005	658.88	3.05	5.33	0.12
-400	1-3/8	1-7/8	1/4	1.350	0.015	0.275	0.006	34.29	0.38	6.99	0.15
-401	1-1/2	2	1/4	1.475	0.015	0.275	0.006	37.47	0.38	6.99	0.15
-402	1-5/8	2-1/8	1/4	1.600	0.015	0.275	0.006	40.64	0.38	6.99	0.15
-403	1-3/4	2-1/4	1/4	1.725	0.015	0.275	0.006	43.82	0.38	6.99	0.15
-404	1-7/8	2-3/8	1/4	1.850	0.018	0.275	0.006	46.99	0.38	6.99	0.15
-405	2	2-1/2	1/4	1.975	0.018	0.275	0.006	50.17	0.46	6.99	0.15
-406	2-1/8	2-5/8	1/4	2.100	0.018	0.275	0.006	53.34	0.46	6.99	0.15
-407	2-1/4	2-3/4	1/4	2.225	0.018	0.275	0.006	56.52	0.46	6.99	0.15
-408	2-3/8	2-7/8	1/4	2.350	0.020	0.275	0.006	59.69	0.46	6.99	0.15
-409	2-1/2	3	1/4	2.475	0.020	0.275	0.006	62.87	0.51	6.99	0.15
-410	2-5/8	3-1/8	1/4	2.600	0.020	0.275	0.006	66.04	0.51	6.99	0.15
-411	2-3/4	3-1/4	1/4	2.725	0.020	0.275	0.006	69.22	0.51	6.99	0.15
-412	2-7/8	3-3/8	1/4	2.850	0.020	0.275	0.006	72.39	0.51	6.99	0.15
-413	3	3-1/2	1/4	2.975	0.024	0.275	0.006	75.57	0.61	6.99	0.15
-414	3-1/8	3-5/8	1/4	3.100	0.024	0.275	0.006	78.74	0.61	6.99	0.15
-415	3-1/4	3-3/4	1/4	3.225	0.024	0.275	0.006	81.92	0.61	6.99	0.15
-416	3-3/8	3-7/8	1/4	3.350	0.024	0.275	0.006	85.09	0.61	6.99	0.15
-417	3-1/2	4	1/4	3.475	0.024	0.275	0.006	88.27	0.61	6.99	0.15
-418	3-5/8	4-1/8	1/4	3.600	0.028	0.275	0.006	91.44	0.71	6.99	0.15
-419	3-3/4	4-1/4	1/4	3.725	0.028	0.275	0.006	94.62	0.71	6.99	0.15
-420	3-7/8	4-3/8	1/4	3.850	0.028	0.275	0.006	97.79	0.71	6.99	0.15
-421	4	4-1/2	1/4	3.975	0.028	0.275	0.006	100.97	0.71	6.99	0.15
-422	4-1/8	4-5/8	1/4	4.100	0.028	0.275	0.006	104.14	0.71	6.99	0.15
-423	4-1/4	4-3/4	1/4	4.225	0.030	0.275	0.006	107.32	0.76	6.99	0.15
-424	4-3/8	4-7/8	1/4	4.350	0.030	0.275	0.006	110.49	0.76	6.99	0.15
-425	4-1/2	5	1/4	4.475	0.033	0.275	0.006	113.67	0.83	6.99	0.15
-426	4-5/8	5-1/8	1/4	4.600	0.033	0.275	0.006	116.84	0.83	6.99	0.15
-427	4-3/4	5-1/4	1/4	4.725	0.033	0.275	0.006	120.02	0.83	6.99	0.15
-428	4-7/8	5-3/8	1/4	4.850	0.033	0.275	0.006	123.19	0.83	6.99	0.15
-429	5	5-1/2	1/4	4.975	0.037	0.275	0.006	126.37	0.93	6.99	0.15
-430	5-1/8	5-5/8	1/4	5.100	0.037	0.275	0.006	129.54	0.93	6.99	0.15
-431	5-1/4	5-3/4	1/4	5.225	0.037	0.275	0.006	132.72	0.93	6.99	0.15
-432	5-3/8	5-7/8	1/4	5.350	0.037	0.275	0.006	135.89	0.93	6.99	0.15
-433	5-1/2	6	1/4	5.475	0.037	0.275	0.006	139.07	0.93	6.99	0.15
-434	5-5/8	6-1/8	1/4	5.600	0.037	0.275	0.006	142.24	0.93	6.99	0.15

AEROSPACE STANDARD 568 DASH NUMBERS CONTINUED

SIZE REF. AS568-	NOMINAL SIZE INCHES			ACTUAL SIZE INCHES				ACTUAL SIZE MILLIMETERS			
	ID	OD	W	ID	ID TOL. ±	W	W TOL. ±	ID	ID TOL. ±	W	W TOL. ±
-435	5-3/4	6-1/4	1/4	5.725	0.037	0.275	0.006	145.42	0.93	6.99	0.15
-436	5-7/8	6-3/8	1/4	5.850	0.037	0.275	0.006	148.59	0.93	6.99	0.15
-437	6	6-1/2	1/4	5.975	0.037	0.275	0.006	151.77	0.93	6.99	0.15
-438	6-1/4	6-3/4	1/4	6.225	0.040	0.275	0.006	158.12	1.01	6.99	0.15
-439	6-1/2	7	1/4	6.475	0.040	0.275	0.006	164.47	1.01	6.99	0.15
-440	6-3/4	7-1/4	1/4	6.725	0.040	0.275	0.006	170.82	1.01	6.99	0.15
-441	7	7-1/2	1/4	6.975	0.040	0.275	0.006	177.17	1.01	6.99	0.15
-442	7-1/4	7-3/4	1/4	7.225	0.045	0.275	0.006	183.52	1.14	6.99	0.15
-443	7-1/2	8	1/4	7.475	0.045	0.275	0.006	189.87	1.14	6.99	0.15
-444	7-3/4	8-1/4	1/4	7.725	0.045	0.275	0.006	196.22	1.14	6.99	0.15
-445	8	8-1/2	1/4	7.975	0.045	0.275	0.006	202.57	1.14	6.99	0.15
-446	8-1/2	9	1/4	8.475	0.055	0.275	0.006	215.27	1.40	6.99	0.15
-447	9	9-1/2	1/4	8.975	0.055	0.275	0.006	227.97	1.40	6.99	0.15
-448	9-1/2	10	1/4	9.475	0.055	0.275	0.006	240.67	1.40	6.99	0.15
-449	10	10-1/2	1/4	9.975	0.055	0.275	0.006	253.37	1.40	6.99	0.15
-450	10-1/2	11	1/4	10.475	0.060	0.275	0.006	266.07	1.52	6.99	0.15
-451	11	11-1/2	1/4	10.975	0.060	0.275	0.006	278.77	1.52	6.99	0.15
-452	11-1/2	12	1/4	11.475	0.060	0.275	0.006	291.47	1.52	6.99	0.15
-453	12	12-1/2	1/4	11.975	0.060	0.275	0.006	304.17	1.52	6.99	0.15
-454	12-1/2	13	1/4	12.475	0.060	0.275	0.006	316.87	1.52	6.99	0.15
-455	13	13-1/2	1/4	12.975	0.060	0.275	0.006	329.57	1.52	6.99	0.15
-456	13-1/2	14	1/4	13.475	0.070	0.275	0.006	342.27	1.78	6.99	0.15
-457	14	14-1/2	1/4	13.975	0.070	0.275	0.006	354.97	1.78	6.99	0.15
-458	14-1/2	15	1/4	14.475	0.070	0.275	0.006	367.67	1.78	6.99	0.15
-459	15	15-1/2	1/4	14.975	0.070	0.275	0.006	380.37	1.78	6.99	0.15
-460	15-1/2	16	1/4	15.475	0.070	0.275	0.006	393.07	1.78	6.99	0.15
-461	16	16-1/2	1/4	15.955	0.075	0.275	0.006	405.26	1.90	6.99	0.15
-462	16-1/2	17	1/4	16.455	0.075	0.275	0.006	417.96	1.90	6.99	0.15
-463	17	17-1/2	1/4	16.955	0.080	0.275	0.006	430.66	2.05	6.99	0.15
-464	17-1/2	18	1/4	17.455	0.085	0.275	0.006	443.36	2.15	6.99	0.15
-465	18	18-1/2	1/4	17.955	0.085	0.275	0.006	456.06	2.15	6.99	0.15
-466	18-1/2	19	1/4	18.455	0.085	0.275	0.006	468.76	2.15	6.99	0.15
-467	19	19-1/2	1/4	18.955	0.090	0.275	0.006	481.46	2.25	6.99	0.15
-468	19-1/2	20	1/4	19.455	0.090	0.275	0.006	494.16	2.25	6.99	0.15
-469	20	20-1/2	1/4	19.955	0.090	0.275	0.006	506.86	2.45	6.99	0.15
-470	21	21-1/2	1/4	20.955	0.090	0.275	0.006	532.26	2.45	6.99	0.15
-471	22	22-1/2	1/4	21.955	0.100	0.275	0.006	557.66	2.55	6.99	0.15
-472	23	23-1/2	1/4	22.940	0.105	0.275	0.006	582.65	2.65	6.99	0.15
-473	24	24-1/2	1/4	23.940	0.110	0.275	0.006	608.10	2.80	6.99	0.15
-474	25	25-1/2	1/4	24.940	0.115	0.275	0.006	633.50	2.90	6.99	0.15
-475	26	26-1/2	1/4	25.940	0.12	0.275	0.006	658.85	3.05	6.99	0.15

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AEROSPACE STANDARD 568 DASH NUMBERS CONTINUED

SIZE REF. AS568-	TUBE SIZE O.D.	ACTUAL SIZE INCHES				ACTUAL SIZE MILLIMETERS			
		ID	ID TOL. ±	W	W TOL. ±	ID	ID TOL. ±	W	W TOL. ±
901	3/32	0.185	0.005	0.056	0.003	4.7	0.13	1.42	0.08
902	1/ 8	0.239	0.005	0.064	0.003	6.07	0.13	1.63	0.08
903	3/16	0.301	0.005	0.064	0.003	7.65	0.13	1.63	0.08
904	1/ 4	0.351	0.005	0.072	0.003	8.92	0.13	1.83	0.08
905	5/16	0.414	0.005	0.072	0.003	10.52	0.13	1.83	0.08
906	3/ 8	0.468	0.005	0.078	0.003	11.89	0.13	1.98	0.08
907	7/16	0.530	0.005	0.082	0.003	13.46	0.18	2.08	0.08
908	1/ 2	0.644	0.009	0.087	0.003	16.36	0.23	2.21	0.08
909	9/16	0.706	0.009	0.097	0.003	17.93	0.23	2.46	0.08
910	5/ 8	0.755	0.009	0.097	0.003	19.18	0.23	2.46	0.08
911	11/16	0.863	0.009	0.116	0.004	21.92	0.23	2.95	0.10
912	3/ 4	0.924	0.009	0.116	0.004	23.47	0.23	2.95	0.10
913	13/16	0.986	0.010	0.116	0.004	25.04	0.26	2.95	0.10
914	7/ 8	1.047	0.010	0.116	0.004	26.59	0.26	2.95	0.10
916	1	1.171	0.010	0.116	0.004	29.74	0.26	2.95	0.10
918	1 1/ 8	1.355	0.012	0.116	0.004	34.42	0.30	2.95	0.10
920	1 1/ 4	1.475	0.014	0.118	0.004	37.47	0.36	3.00	0.10
924	1 1/ 2	1.720	0.014	0.118	0.004	43.69	0.36	3.00	0.10
928	1 3/ 4	2.090	0.018	0.118	0.004	53.09	0.46	3.00	0.10
932	2	2.337	0.018	0.118	0.004	59.36	0.46	3.00	0.10

METRIC SIZES

Inside Diameter mm		Cross Section mm	Size Cross Reference
1.80	X	0.70	
22.80	X	0.80	
5.36	X	0.81	
6.10	X	0.84	
22.80	X	0.90	
2.54	X	0.97	
1.15	X	1.00	
1.25	X	1.00	
1.50	X	1.00	
1.80	X	1.00	
2.00	X	1.00	
2.50	X	1.00	
2.70	X	1.00	
3.00	X	1.00	
3.30	X	1.00	
3.50	X	1.00	
4.00	X	1.00	
4.50	X	1.00	
5.00	X	1.00	
5.50	X	1.00	
6.00	X	1.00	
6.50	X	1.00	
7.00	X	1.00	
7.20	X	1.00	
7.50	X	1.00	
8.00	X	1.00	
8.50	X	1.00	
9.00	X	1.00	
9.50	X	1.00	
10.00	X	1.00	
10.50	X	1.00	
11.00	X	1.00	
11.50	X	1.00	
12.00	X	1.00	
12.50	X	1.00	
13.00	X	1.00	
13.50	X	1.00	
14.00	X	1.00	
14.50	X	1.00	
15.00	X	1.00	
15.50	X	1.00	
16.00	X	1.00	
16.50	X	1.00	
17.00	X	1.00	
17.50	X	1.00	
18.00	X	1.00	
18.50	X	1.00	
19.00	X	1.00	
19.50	X	1.00	
20.00	X	1.00	
20.50	X	1.00	
21.00	X	1.00	
21.50	X	1.00	
22.00	X	1.00	
22.50	X	1.00	
23.00	X	1.00	

Inside Diameter mm		Cross Section mm	Size Cross Reference
23.50	X	1.00	
24.00	X	1.00	
24.50	X	1.00	
25.00	X	1.00	
28.00	X	1.00	
29.40	X	1.00	
29.90	X	1.00	
30.50	X	1.00	
31.80	X	1.00	
32.00	X	1.00	
39.00	X	1.00	
42.00	X	1.00	
60.00	X	1.00	
0.74	X	1.02	001
1.78	X	1.02	BS606
2.54	X	1.02	BS607
42.10	X	1.15	
4.32	X	1.19	
2.50	X	1.20	
2.60	X	1.20	
3.50	X	1.20	
5.00	X	1.20	
24.00	X	1.20	
26.00	X	1.20	
28.00	X	1.20	
35.00	X	1.20	
40.00	X	1.20	
53.50	X	1.20	
98.00	X	1.20	
3.80	X	1.25	
8.00	X	1.25	
16.00	X	1.25	
1.07	X	1.27	002
3.25	X	1.27	
3.91	X	1.27	
4.47	X	1.27	
2.50	X	1.30	
8.00	X	1.30	
10.00	X	1.30	
11.00	X	1.30	
13.50	X	1.30	
20.00	X	1.30	
4.70	X	1.42	901
1.80	X	1.50	
1.85	X	1.50	
2.00	X	1.50	
2.50	X	1.50	S3
2.80	X	1.50	
3.00	X	1.50	
3.50	X	1.50	S4
4.00	X	1.50	
4.50	X	1.50	S5
5.00	X	1.50	
5.50	X	1.50	S6
6.00	X	1.50	
6.50	X	1.50	S7

Inside Diameter mm		Cross Section mm	Size Cross Reference
7.00	X	1.50	
7.50	X	1.50	S8
8.00	X	1.50	
8.50	X	1.50	S9
9.00	X	1.50	
9.50	X	1.50	S10
10.00	X	1.50	
10.50	X	1.50	
10.70	X	1.50	S11.2
11.00	X	1.50	
11.50	X	1.50	S12
12.00	X	1.50	S12.5
12.50	X	1.50	
13.00	X	1.50	
13.25	X	1.50	
13.50	X	1.50	S14
14.00	X	1.50	
14.50	X	1.50	S15
15.00	X	1.50	
15.50	X	1.50	S16
16.00	X	1.50	
16.50	X	1.50	
17.00	X	1.50	
17.50	X	1.50	S18
18.00	X	1.50	
18.50	X	1.50	
19.00	X	1.50	
19.50	X	1.50	S20
20.00	X	1.50	
20.50	X	1.50	
21.00	X	1.50	
21.50	X	1.50	S22
22.00	X	1.50	
22.50	X	1.50	
23.00	X	1.50	
23.50	X	1.50	
24.00	X	1.50	
24.50	X	1.50	
25.00	X	1.50	
25.50	X	1.50	
26.00	X	1.50	
26.50	X	1.50	
27.00	X	1.50	
27.50	X	1.50	
28.00	X	1.50	
28.50	X	1.50	
29.00	X	1.50	
29.50	X	1.50	
30.00	X	1.50	
30.50	X	1.50	
31.00	X	1.50	
31.50	X	1.50	
32.00	X	1.50	
32.50	X	1.50	
33.00	X	1.50	
33.50	X	1.50	

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Inside Diameter mm		Cross Section mm	Size Cross Reference
34.00	X	1.50	
34.50	X	1.50	
35.00	X	1.50	
35.50	X	1.50	
36.00	X	1.50	
36.50	X	1.50	
37.00	X	1.50	
37.50	X	1.50	
38.00	X	1.50	
38.50	X	1.50	
39.00	X	1.50	
39.50	X	1.50	
40.00	X	1.50	
41.00	X	1.50	
42.00	X	1.50	
43.00	X	1.50	
44.00	X	1.50	
45.00	X	1.50	
46.00	X	1.50	
47.00	X	1.50	
48.00	X	1.50	
49.00	X	1.50	
50.00	X	1.50	
51.00	X	1.50	
52.00	X	1.50	
53.00	X	1.50	
54.00	X	1.50	
55.00	X	1.50	
56.00	X	1.50	
57.00	X	1.50	
58.00	X	1.50	
59.00	X	1.50	
60.00	X	1.50	
61.00	X	1.50	
62.00	X	1.50	
63.00	X	1.50	
64.00	X	1.50	
65.00	X	1.50	
66.00	X	1.50	
67.00	X	1.50	
68.00	X	1.50	
69.00	X	1.50	
70.00	X	1.50	
71.00	X	1.50	
72.00	X	1.50	
73.00	X	1.50	
74.00	X	1.50	
75.00	X	1.50	
76.00	X	1.50	
77.00	X	1.50	
78.00	X	1.50	
79.00	X	1.50	
80.00	X	1.50	
81.00	X	1.50	
82.00	X	1.50	
83.00	X	1.50	

Inside Diameter mm		Cross Section mm	Size Cross Reference
84.00	X	1.50	
85.00	X	1.50	
86.00	X	1.50	
87.00	X	1.50	
88.00	X	1.50	
89.00	X	1.50	
90.00	X	1.50	
91.00	X	1.50	
92.00	X	1.50	
93.00	X	1.50	
94.00	X	1.50	
95.00	X	1.50	
96.00	X	1.50	
97.00	X	1.50	
98.00	X	1.50	
99.00	X	1.50	
100.00	X	1.50	
1.42	X	1.52	3
2.20	X	1.60	
2.75	X	1.60	
2.80	X	1.60	
3.10	X	1.60	
3.20	X	1.60	
3.70	X	1.60	
4.10	X	1.60	
4.70	X	1.60	
5.00	X	1.60	
5.10	X	1.60	
6.10	X	1.60	
7.10	X	1.60	
8.10	X	1.60	
9.10	X	1.60	
10.10	X	1.60	
11.10	X	1.60	
12.10	X	1.60	
13.10	X	1.60	
14.10	X	1.60	
15.10	X	1.60	
16.10	X	1.60	
17.10	X	1.60	
18.10	X	1.60	
19.10	X	1.60	
20.30	X	1.60	
21.10	X	1.60	
22.10	X	1.60	
25.10	X	1.60	
27.10	X	1.60	
29.10	X	1.60	
32.10	X	1.60	
35.10	X	1.60	
37.10	X	1.60	
51.10	X	1.60	
86.00	X	1.60	
96.60	X	1.60	
115.00	X	1.60	
6.07	X	1.63	902

Inside Diameter mm		Cross Section mm	Size Cross Reference
7.65	X	1.63	903
1.78	X	1.78	4
2.57	X	1.78	5
2.90	X	1.78	6
3.17	X	1.78	BS801
3.68	X	1.78	7
4.47	X	1.78	8
4.76	X	1.78	BS802
5.28	X	1.78	9
6.07	X	1.78	10
6.35	X	1.78	BS803
6.75	X	1.78	BS610
7.65	X	1.78	11
7.94	X	1.78	BS804
8.73	X	1.78	BS611
9.25	X	1.78	12
9.52	X	1.78	
10.82	X	1.78	13
11.11	X	1.78	BS806
11.91	X	1.78	
12.42	X	1.78	14
14.00	X	1.78	15
15.60	X	1.78	16
17.17	X	1.78	17
18.77	X	1.78	18
19.05	X	1.78	
19.15	X	1.78	
20.35	X	1.78	19
21.47	X	1.78	
21.95	X	1.78	20
23.52	X	1.78	21
25.12	X	1.78	22
26.70	X	1.78	23
28.30	X	1.78	24
29.87	X	1.78	25
31.47	X	1.78	26
33.05	X	1.78	27
34.65	X	1.78	28
36.00	X	1.78	
36.27	X	1.78	BS517
37.82	X	1.78	29
39.45	X	1.78	BS519
41.00	X	1.78	30
44.17	X	1.78	31
45.84	X	1.78	
47.35	X	1.78	32
50.52	X	1.78	33
53.70	X	1.78	34
56.87	X	1.78	35
60.05	X	1.78	36
63.22	X	1.78	37
66.40	X	1.78	38
69.57	X	1.78	39
72.75	X	1.78	40
75.92	X	1.78	41
79.00	X	1.78	BS532

Inside Diameter mm		Cross Section mm	Size Cross Reference
82.27	X	1.78	42
85.34	X	1.78	BS534
88.62	X	1.78	43
91.70	X	1.78	BS536
94.97	X	1.78	44
98.05	X	1.78	BS538
101.32	X	1.78	45
104.40	X	1.78	BS540
107.67	X	1.78	46
110.74	X	1.78	BS542
114.02	X	1.78	47
117.10	X	1.78	BS544
120.37	X	1.78	48
123.44	X	1.78	BS546
126.72	X	1.78	49
129.40	X	1.78	BS548
133.07	X	1.78	50
135.76	X	1.78	BS550
138.94	X	1.78	BS551
142.11	X	1.78	BS552
145.29	X	1.78	BS553
148.46	X	1.78	BS554
151.64	X	1.78	BS555
154.81	X	1.78	BS556
158.00	X	1.78	BS557
161.16	X	1.78	BS558
164.34	X	1.78	BS559
167.51	X	1.78	BS560
170.69	X	1.78	BS561
173.87	X	1.78	BS562
1.80	X	1.80	
2.00	X	1.80	
2.24	X	1.80	
2.50	X	1.80	
2.80	X	1.80	
3.15	X	1.80	
3.55	X	1.80	
3.75	X	1.80	
4.00	X	1.80	
4.50	X	1.80	
4.87	X	1.80	
5.00	X	1.80	
5.15	X	1.80	
5.30	X	1.80	
5.60	X	1.80	
6.00	X	1.80	
6.30	X	1.80	
6.70	X	1.80	
6.90	X	1.80	
7.10	X	1.80	
7.50	X	1.80	
8.00	X	1.80	
8.50	X	1.80	
8.76	X	1.80	
9.00	X	1.80	
9.50	X	1.80	

Inside Diameter mm		Cross Section mm	Size Cross Reference
10.00	X	1.80	
10.60	X	1.80	
11.20	X	1.80	
11.80	X	1.80	
12.50	X	1.80	
13.20	X	1.80	
14.00	X	1.80	
15.00	X	1.80	
16.00	X	1.80	
17.00	X	1.80	
8.92	X	1.83	904
10.52	X	1.83	905
2.40	X	1.90	
2.60	X	1.90	
2.80	X	1.90	P3
3.40	X	1.90	
3.70	X	1.90	
3.80	X	1.90	P4
4.20	X	1.90	
4.80	X	1.90	P5
4.90	X	1.90	
5.70	X	1.90	
5.80	X	1.90	P6
6.40	X	1.90	
6.80	X	1.90	P7
7.20	X	1.90	
7.80	X	1.90	P8
8.00	X	1.90	
8.80	X	1.90	P9
8.90	X	1.90	
9.80	X	1.90	P10
67.10	X	1.92	
11.89	X	1.98	906
2.00	X	2.00	
2.50	X	2.00	
2.60	X	2.00	
3.00	X	2.00	
3.50	X	2.00	
4.00	X	2.00	
4.50	X	2.00	
4.60	X	2.00	
5.00	X	2.00	
5.50	X	2.00	
6.00	X	2.00	
6.50	X	2.00	
7.00	X	2.00	
7.50	X	2.00	
8.00	X	2.00	
8.50	X	2.00	
9.00	X	2.00	
9.50	X	2.00	
10.00	X	2.00	
10.50	X	2.00	
11.00	X	2.00	
11.50	X	2.00	
12.00	X	2.00	

Inside Diameter mm		Cross Section mm	Size Cross Reference
12.50	X	2.00	
13.00	X	2.00	
13.50	X	2.00	
14.00	X	2.00	
14.50	X	2.00	
15.00	X	2.00	
15.50	X	2.00	
16.00	X	2.00	
16.50	X	2.00	
17.00	X	2.00	
17.50	X	2.00	
18.00	X	2.00	
18.50	X	2.00	
19.00	X	2.00	
19.50	X	2.00	
20.00	X	2.00	
20.50	X	2.00	
21.00	X	2.00	
21.50	X	2.00	
21.90	X	2.00	S22.4
22.00	X	2.00	
22.50	X	2.00	
23.00	X	2.00	
23.50	X	2.00	S24
24.00	X	2.00	
24.50	X	2.00	S25
25.00	X	2.00	
25.50	X	2.00	S26
26.00	X	2.00	
26.50	X	2.00	
27.00	X	2.00	
27.50	X	2.00	S28
28.00	X	2.00	
28.50	X	2.00	S29
29.00	X	2.00	
29.50	X	2.00	S30
30.00	X	2.00	
30.50	X	2.00	
31.00	X	2.00	S31.5
31.50	X	2.00	S32
32.00	X	2.00	
32.50	X	2.00	
33.00	X	2.00	
33.50	X	2.00	S34
34.00	X	2.00	
34.50	X	2.00	S35
35.00	X	2.00	S35.5
35.50	X	2.00	S36
36.00	X	2.00	
36.50	X	2.00	
37.00	X	2.00	
37.50	X	2.00	S38
38.00	X	2.00	
38.50	X	2.00	S39
39.00	X	2.00	
39.50	X	2.00	S40

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Inside Diameter mm		Cross Section mm	Size Cross Reference
40.00	X	2.00	
41.00	X	2.00	
41.50	X	2.00	S42
42.00	X	2.00	
42.00	X	2.00	
42.50	X	2.00	S43
43.00	X	2.00	
43.50	X	2.00	S44
44.00	X	2.00	
44.50	X	2.00	S45
45.00	X	2.00	
45.50	X	2.00	S46
46.00	X	2.00	
47.00	X	2.00	
47.50	X	2.00	S48
48.00	X	2.00	
49.00	X	2.00	
49.50	X	2.00	S50
50.00	X	2.00	
51.00	X	2.00	
52.00	X	2.00	
52.50	X	2.00	S53
53.00	X	2.00	
54.00	X	2.00	
54.50	X	2.00	S55
55.00	X	2.00	
55.50	X	2.00	S56
56.00	X	2.00	
57.00	X	2.00	
58.00	X	2.00	
59.00	X	2.00	
59.50	X	2.00	S60
60.00	X	2.00	
61.00	X	2.00	
62.00	X	2.00	
62.50	X	2.00	S63
63.00	X	2.00	
64.00	X	2.00	
64.50	X	2.00	S65
65.00	X	2.00	
66.00	X	2.00	
66.50	X	2.00	S67
67.00	X	2.00	
68.00	X	2.00	
69.00	X	2.00	
69.50	X	2.00	S70
70.00	X	2.00	
70.50	X	2.00	S71
71.00	X	2.00	
72.00	X	2.00	
73.00	X	2.00	
74.00	X	2.00	
74.50	X	2.00	S75
75.00	X	2.00	
76.00	X	2.00	
77.00	X	2.00	

Inside Diameter mm		Cross Section mm	Size Cross Reference
78.00	X	2.00	
79.00	X	2.00	
79.50	X	2.00	S80
80.00	X	2.00	
81.00	X	2.00	
82.00	X	2.00	
83.00	X	2.00	
84.00	X	2.00	
84.50	X	2.00	S85
85.00	X	2.00	
86.00	X	2.00	
87.00	X	2.00	
88.00	X	2.00	
89.00	X	2.00	
89.50	X	2.00	S90
90.00	X	2.00	
91.00	X	2.00	
92.00	X	2.00	
93.00	X	2.00	
94.00	X	2.00	
94.50	X	2.00	S95
95.00	X	2.00	
96.00	X	2.00	
97.00	X	2.00	
98.00	X	2.00	
99.00	X	2.00	
99.50	X	2.00	S100
100.00	X	2.00	
102.00	X	2.00	
104.50	X	2.00	S105
105.00	X	2.00	
109.00	X	2.00	
109.50	X	2.00	S110
110.00	X	2.00	
111.50	X	2.00	S112
114.50	X	2.00	S115
115.00	X	2.00	
119.50	X	2.00	S120
120.00	X	2.00	
124.50	X	2.00	S125
125.60	X	2.00	
129.50	X	2.00	S130
130.00	X	2.00	
131.50	X	2.00	S132
134.50	X	2.00	S135
139.50	X	2.00	S140
140.00	X	2.00	
144.50	X	2.00	S145
149.50	X	2.00	S150
165.00	X	2.00	
180.00	X	2.00	
194.00	X	2.00	
13.46	X	2.08	907
12.40	X	2.18	
194.00	X	2.18	
6.00	X	2.20	

Inside Diameter mm		Cross Section mm	Size Cross Reference
9.00	X	2.20	
10.00	X	2.20	
12.40	X	2.20	
18.00	X	2.20	
16.36	X	2.21	908
3.30	X	2.40	
3.60	X	2.40	
4.30	X	2.40	
4.60	X	2.40	
5.30	X	2.40	
5.50	X	2.40	
5.60	X	2.40	
6.30	X	2.40	
6.60	X	2.40	
7.30	X	2.40	
7.50	X	2.40	
7.60	X	2.40	
8.00	X	2.40	
8.30	X	2.40	
8.60	X	2.40	
9.30	X	2.40	
9.60	X	2.40	
9.80	X	2.40	P10A
10.30	X	2.40	
10.50	X	2.40	
10.60	X	2.40	
10.80	X	2.40	P11
11.00	X	2.40	P11.2
11.30	X	2.40	
11.50	X	2.40	
11.60	X	2.40	
11.80	X	2.40	P12
12.30	X	2.40	P12.5
12.60	X	2.40	
13.30	X	2.40	
13.50	X	2.40	
13.60	X	2.40	
13.80	X	2.40	P14
14.30	X	2.40	
14.50	X	2.40	
14.60	X	2.40	
14.80	X	2.40	P15
15.30	X	2.40	
15.50	X	2.40	
15.60	X	2.40	
15.80	X	2.40	P16
15.90	X	2.40	
16.30	X	2.40	
16.60	X	2.40	
17.30	X	2.40	
17.50	X	2.40	
17.60	X	2.40	
17.80	X	2.40	P18
18.30	X	2.40	
18.60	X	2.40	
19.30	X	2.40	

Inside Diameter mm		Cross Section mm	Size Cross Reference
19.60	X	2.40	
19.80	X	2.40	P20
20.30	X	2.40	
20.50	X	2.40	
20.80	X	2.40	P21
21.30	X	2.40	
21.50	X	2.40	
21.60	X	2.40	
21.80	X	2.40	P22
22.30	X	2.40	
22.60	X	2.40	
23.30	X	2.40	
23.50	X	2.40	
23.60	X	2.40	
24.30	X	2.40	
24.50	X	2.40	
24.60	X	2.40	
25.00	X	2.40	
25.30	X	2.40	
25.60	X	2.40	
27.30	X	2.40	
27.50	X	2.40	
27.60	X	2.40	
29.60	X	2.40	
30.30	X	2.40	
31.60	X	2.40	
33.30	X	2.40	
34.60	X	2.40	
36.50	X	2.40	
37.60	X	2.40	
39.60	X	2.40	
41.60	X	2.40	
44.60	X	2.40	
47.60	X	2.40	
49.60	X	2.40	
51.60	X	2.40	
54.60	X	2.40	
57.60	X	2.40	
59.60	X	2.40	
61.60	X	2.40	
64.60	X	2.40	
67.60	X	2.40	
69.60	X	2.40	
161.60	X	2.40	
17.93	X	2.46	909
19.18	X	2.46	910
4.00	X	2.50	
4.60	X	2.50	
5.00	X	2.50	
5.50	X	2.50	
6.00	X	2.50	
6.50	X	2.50	
7.00	X	2.50	
7.50	X	2.50	
8.00	X	2.50	
8.50	X	2.50	

Inside Diameter mm		Cross Section mm	Size Cross Reference
9.00	X	2.50	
9.50	X	2.50	
10.00	X	2.50	
10.50	X	2.50	
11.00	X	2.50	
11.50	X	2.50	
12.00	X	2.50	
12.50	X	2.50	
13.00	X	2.50	
13.50	X	2.50	
14.00	X	2.50	
14.50	X	2.50	
15.00	X	2.50	
15.50	X	2.50	
16.00	X	2.50	
16.50	X	2.50	
17.00	X	2.50	
17.50	X	2.50	
18.00	X	2.50	
18.50	X	2.50	
19.00	X	2.50	
19.50	X	2.50	
20.00	X	2.50	
20.50	X	2.50	
21.00	X	2.50	
21.50	X	2.50	
22.00	X	2.50	
22.50	X	2.50	
23.00	X	2.50	
23.50	X	2.50	
24.00	X	2.50	
24.50	X	2.50	
25.00	X	2.50	
25.50	X	2.50	
26.00	X	2.50	
26.50	X	2.50	
27.00	X	2.50	
27.50	X	2.50	
28.00	X	2.50	
28.50	X	2.50	
29.00	X	2.50	
29.50	X	2.50	
30.00	X	2.50	
30.50	X	2.50	
31.00	X	2.50	
31.50	X	2.50	
32.00	X	2.50	
32.50	X	2.50	
33.00	X	2.50	
33.50	X	2.50	
34.00	X	2.50	
34.50	X	2.50	
35.00	X	2.50	
35.50	X	2.50	
36.00	X	2.50	
36.50	X	2.50	

Inside Diameter mm		Cross Section mm	Size Cross Reference
37.00	X	2.50	
37.50	X	2.50	
38.00	X	2.50	
38.50	X	2.50	
39.00	X	2.50	
39.50	X	2.50	
40.00	X	2.50	
41.00	X	2.50	
42.00	X	2.50	
43.00	X	2.50	
44.00	X	2.50	
45.00	X	2.50	
46.00	X	2.50	
47.00	X	2.50	
48.00	X	2.50	
49.00	X	2.50	
50.00	X	2.50	
51.00	X	2.50	
52.00	X	2.50	
53.00	X	2.50	
54.00	X	2.50	
55.00	X	2.50	
56.00	X	2.50	
57.00	X	2.50	
58.00	X	2.50	
59.00	X	2.50	
60.00	X	2.50	
61.00	X	2.50	
62.00	X	2.50	
63.00	X	2.50	
64.00	X	2.50	
65.00	X	2.50	
66.00	X	2.50	
67.00	X	2.50	
68.00	X	2.50	
69.00	X	2.50	
70.00	X	2.50	
71.00	X	2.50	
72.00	X	2.50	
73.00	X	2.50	
74.00	X	2.50	
75.00	X	2.50	
76.00	X	2.50	
77.00	X	2.50	
78.00	X	2.50	
79.00	X	2.50	
80.00	X	2.50	
81.00	X	2.50	
82.00	X	2.50	
83.00	X	2.50	
84.00	X	2.50	
85.00	X	2.50	
86.00	X	2.50	
87.00	X	2.50	
88.00	X	2.50	
89.00	X	2.50	

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Inside Diameter mm		Cross Section mm	Size Cross Reference
90.00	X	2.50	
91.00	X	2.50	
92.00	X	2.50	
93.00	X	2.50	
95.00	X	2.50	
96.00	X	2.50	
98.00	X	2.50	
100.00	X	2.50	
101.00	X	2.50	
103.00	X	2.50	
105.00	X	2.50	
106.00	X	2.50	
107.00	X	2.50	
108.00	X	2.50	
109.00	X	2.50	
110.00	X	2.50	
111.00	X	2.50	
112.00	X	2.50	
113.00	X	2.50	
114.00	X	2.50	
115.00	X	2.50	
116.00	X	2.50	
117.00	X	2.50	
118.00	X	2.50	
119.00	X	2.50	
120.00	X	2.50	
121.00	X	2.50	
122.00	X	2.50	
123.00	X	2.50	
124.00	X	2.50	
125.00	X	2.50	
126.00	X	2.50	
127.00	X	2.50	
128.00	X	2.50	
129.00	X	2.50	
130.00	X	2.50	
131.00	X	2.50	
132.00	X	2.50	
133.00	X	2.50	
134.00	X	2.50	
135.00	X	2.50	
136.00	X	2.50	
137.00	X	2.50	
138.00	X	2.50	
139.00	X	2.50	
140.00	X	2.50	
141.00	X	2.50	
142.00	X	2.50	
143.00	X	2.50	
144.00	X	2.50	
145.00	X	2.50	
146.00	X	2.50	
147.00	X	2.50	
148.00	X	2.50	
149.00	X	2.50	
150.00	X	2.50	

Inside Diameter mm		Cross Section mm	Size Cross Reference
29.10	X	2.55	
1.24	X	2.62	102
2.06	X	2.62	103
2.84	X	2.62	104
3.63	X	2.62	105
4.42	X	2.62	106
5.23	X	2.62	107
6.02	X	2.62	108
7.59	X	2.62	109
9.13	X	2.62	
9.19	X	2.62	110
9.90	X	2.62	BS613
10.77	X	2.62	111
11.91	X	2.62	BS614
12.37	X	2.62	112
12.70	X	2.62	BS807
13.10	X	2.62	BS615
13.94	X	2.62	113
15.08	X	2.62	BS616
15.08	X	2.62	
15.54	X	2.62	114
15.88	X	2.62	BS809
17.12	X	2.62	115
17.46	X	2.62	BS810
17.86	X	2.62	BS617
17.86	X	2.62	
18.72	X	2.62	116
20.29	X	2.62	117
20.64	X	2.62	BS812
21.89	X	2.62	118
22.23	X	2.62	BS813
22.23	X	2.62	
23.47	X	2.62	119
23.81	X	2.62	BS814
25.07	X	2.62	120
26.64	X	2.62	121
28.24	X	2.62	122
29.82	X	2.62	123
31.42	X	2.62	124
32.99	X	2.62	125
34.59	X	2.62	126
36.17	X	2.62	127
37.77	X	2.62	128
39.34	X	2.62	129
40.94	X	2.62	130
42.52	X	2.62	131
44.12	X	2.62	132
45.69	X	2.62	133
47.29	X	2.62	134
48.90	X	2.62	135
50.47	X	2.62	136
52.07	X	2.62	137
53.64	X	2.62	138
55.25	X	2.62	139
56.82	X	2.62	140
58.42	X	2.62	141

Inside Diameter mm		Cross Section mm	Size Cross Reference
59.99	X	2.62	142
61.60	X	2.62	143
63.17	X	2.62	144
64.77	X	2.62	145
66.34	X	2.62	146
67.95	X	2.62	147
69.52	X	2.62	148
71.12	X	2.62	149
72.69	X	2.62	150
74.30	X	2.62	BS640
75.87	X	2.62	151
77.50	X	2.62	BS641
77.50	X	2.62	
80.60	X	2.62	BS642
82.22	X	2.62	152
83.80	X	2.62	BS643
83.80	X	2.62	
88.57	X	2.62	153
92.75	X	2.62	
94.92	X	2.62	154
101.62	X	2.62	155
107.62	X	2.62	156
113.97	X	2.62	157
120.32	X	2.62	158
126.67	X	2.62	159
133.02	X	2.62	160
139.37	X	2.62	161
145.72	X	2.62	162
152.07	X	2.62	163
158.42	X	2.62	164
164.77	X	2.62	165
171.12	X	2.62	166
177.47	X	2.62	167
183.82	X	2.62	168
190.17	X	2.62	169
196.52	X	2.62	170
202.87	X	2.62	171
209.22	X	2.62	172
215.57	X	2.62	173
221.92	X	2.62	174
228.27	X	2.62	175
234.62	X	2.62	176
240.97	X	2.62	177
247.32	X	2.62	178
14.00	X	2.65	
15.00	X	2.65	
16.00	X	2.65	
17.00	X	2.65	
18.00	X	2.65	
19.00	X	2.65	
20.00	X	2.65	
21.20	X	2.65	
22.40	X	2.65	
23.60	X	2.65	
25.00	X	2.65	
25.80	X	2.65	

Inside Diameter mm		Cross Section mm	Size Cross Reference
26.50	X	2.65	
28.00	X	2.65	
30.00	X	2.65	
31.50	X	2.65	
32.50	X	2.65	
33.50	X	2.65	
34.50	X	2.65	
35.50	X	2.65	
36.50	X	2.65	
37.50	X	2.65	
38.70	X	2.65	
8.35	X	2.70	
8.90	X	2.70	
10.50	X	2.70	
12.10	X	2.70	
13.60	X	2.70	
15.10	X	2.70	
16.90	X	2.70	
18.40	X	2.70	
18.60	X	2.70	
27.30	X	2.70	
28.40	X	2.70	
117.00	X	2.70	
9.53	X	2.93	
21.92	X	2.95	911
23.47	X	2.95	912
25.04	X	2.95	913
26.59	X	2.95	914
29.74	X	2.95	916
34.42	X	2.95	918
3.00	X	3.00	
3.50	X	3.00	
4.00	X	3.00	
4.50	X	3.00	
5.00	X	3.00	
5.50	X	3.00	
6.00	X	3.00	
6.50	X	3.00	
7.00	X	3.00	
7.50	X	3.00	
8.00	X	3.00	
8.50	X	3.00	
9.00	X	3.00	
9.50	X	3.00	
10.00	X	3.00	
10.50	X	3.00	
11.00	X	3.00	
11.50	X	3.00	
12.00	X	3.00	
12.50	X	3.00	
13.00	X	3.00	
13.50	X	3.00	
14.00	X	3.00	
14.50	X	3.00	
15.00	X	3.00	
15.50	X	3.00	

Inside Diameter mm		Cross Section mm	Size Cross Reference
16.00	X	3.00	
16.50	X	3.00	
17.00	X	3.00	
17.50	X	3.00	
18.00	X	3.00	
18.20	X	3.00	
18.50	X	3.00	
19.00	X	3.00	
19.20	X	3.00	
19.50	X	3.00	
20.00	X	3.00	
20.50	X	3.00	
21.00	X	3.00	
21.50	X	3.00	
22.00	X	3.00	
22.20	X	3.00	
22.50	X	3.00	
23.00	X	3.00	
23.50	X	3.00	
24.00	X	3.00	
24.20	X	3.00	
24.50	X	3.00	
24.60	X	3.00	
25.00	X	3.00	
25.20	X	3.00	
25.50	X	3.00	
26.00	X	3.00	
26.20	X	3.00	
26.50	X	3.00	
27.00	X	3.00	
27.50	X	3.00	
28.00	X	3.00	
28.50	X	3.00	
29.00	X	3.00	
29.20	X	3.00	
29.50	X	3.00	
30.00	X	3.00	
30.20	X	3.00	
30.50	X	3.00	
31.00	X	3.00	
31.50	X	3.00	
32.00	X	3.00	
32.20	X	3.00	
32.50	X	3.00	
33.00	X	3.00	
33.50	X	3.00	
34.00	X	3.00	
34.20	X	3.00	
34.50	X	3.00	
35.00	X	3.00	
35.50	X	3.00	
36.00	X	3.00	
36.20	X	3.00	
36.50	X	3.00	
37.00	X	3.00	
37.20	X	3.00	

Inside Diameter mm		Cross Section mm	Size Cross Reference
37.47	X	3.00	920
37.50	X	3.00	
38.00	X	3.00	
38.50	X	3.00	
39.00	X	3.00	
39.20	X	3.00	
39.50	X	3.00	
40.00	X	3.00	
40.20	X	3.00	
41.00	X	3.00	
41.50	X	3.00	
42.00	X	3.00	
42.20	X	3.00	
42.50	X	3.00	
43.00	X	3.00	
43.69	X	3.00	924
44.00	X	3.00	
44.20	X	3.00	
44.50	X	3.00	
45.00	X	3.00	
46.00	X	3.00	
47.00	X	3.00	
48.00	X	3.00	
49.00	X	3.00	
49.50	X	3.00	
50.00	X	3.00	
50.50	X	3.00	
51.00	X	3.00	
52.00	X	3.00	
53.00	X	3.00	
53.09	X	3.00	928
54.00	X	3.00	
54.20	X	3.00	
54.50	X	3.00	
55.00	X	3.00	
56.00	X	3.00	
56.20	X	3.00	
57.00	X	3.00	
58.00	X	3.00	
59.00	X	3.00	
59.36	X	3.00	932
59.50	X	3.00	
60.00	X	3.00	
61.00	X	3.00	
62.00	X	3.00	
62.20	X	3.00	
63.00	X	3.00	
64.00	X	3.00	
64.50	X	3.00	
65.00	X	3.00	
66.00	X	3.00	
67.00	X	3.00	
68.00	X	3.00	
69.00	X	3.00	
69.50	X	3.00	
70.00	X	3.00	

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Inside Diameter mm		Cross Section mm	Size Cross Reference
71.00	X	3.00	
72.00	X	3.00	
73.00	X	3.00	
74.00	X	3.00	
74.50	X	3.00	
75.00	X	3.00	
76.00	X	3.00	
77.00	X	3.00	
78.00	X	3.00	
79.00	X	3.00	
79.50	X	3.00	
80.00	X	3.00	
81.00	X	3.00	
82.00	X	3.00	
83.00	X	3.00	
84.00	X	3.00	
84.50	X	3.00	
85.00	X	3.00	
86.00	X	3.00	
87.00	X	3.00	
88.00	X	3.00	
89.00	X	3.00	
89.50	X	3.00	
90.00	X	3.00	
91.00	X	3.00	
92.00	X	3.00	
93.00	X	3.00	
94.00	X	3.00	
94.50	X	3.00	
95.00	X	3.00	
96.00	X	3.00	
97.00	X	3.00	
98.00	X	3.00	
99.00	X	3.00	
99.50	X	3.00	
100.00	X	3.00	
101.00	X	3.00	
102.00	X	3.00	
103.00	X	3.00	
104.00	X	3.00	
104.50	X	3.00	
105.00	X	3.00	
106.00	X	3.00	
107.00	X	3.00	
108.00	X	3.00	
109.00	X	3.00	
109.50	X	3.00	
110.00	X	3.00	
111.00	X	3.00	
112.00	X	3.00	
113.00	X	3.00	
114.00	X	3.00	
114.50	X	3.00	
115.00	X	3.00	
116.00	X	3.00	
117.00	X	3.00	

Inside Diameter mm		Cross Section mm	Size Cross Reference
118.00	X	3.00	
119.00	X	3.00	
119.50	X	3.00	
120.00	X	3.00	
121.00	X	3.00	
122.00	X	3.00	
123.00	X	3.00	
124.00	X	3.00	
124.50	X	3.00	
125.00	X	3.00	
126.00	X	3.00	
126.50	X	3.00	
127.00	X	3.00	
128.00	X	3.00	
129.00	X	3.00	
129.50	X	3.00	
130.00	X	3.00	
131.00	X	3.00	
132.00	X	3.00	
133.00	X	3.00	
134.00	X	3.00	
134.50	X	3.00	
135.00	X	3.00	
136.00	X	3.00	
137.00	X	3.00	
138.00	X	3.00	
139.00	X	3.00	
139.50	X	3.00	
140.00	X	3.00	
141.00	X	3.00	
142.00	X	3.00	
143.00	X	3.00	
144.00	X	3.00	
144.50	X	3.00	
145.00	X	3.00	
146.00	X	3.00	
147.00	X	3.00	
148.00	X	3.00	
149.00	X	3.00	
149.50	X	3.00	
150.00	X	3.00	
151.00	X	3.00	
152.00	X	3.00	
153.00	X	3.00	
154.00	X	3.00	
154.50	X	3.00	
155.00	X	3.00	
156.00	X	3.00	
157.00	X	3.00	
158.00	X	3.00	
159.00	X	3.00	
159.50	X	3.00	
160.00	X	3.00	
161.00	X	3.00	
162.00	X	3.00	
163.00	X	3.00	

Inside Diameter mm		Cross Section mm	Size Cross Reference
164.00	X	3.00	
164.50	X	3.00	
165.00	X	3.00	
166.00	X	3.00	
167.00	X	3.00	
168.00	X	3.00	
169.00	X	3.00	
169.50	X	3.00	
170.00	X	3.00	
171.00	X	3.00	
172.00	X	3.00	
173.00	X	3.00	
174.00	X	3.00	
174.50	X	3.00	
175.00	X	3.00	
176.00	X	3.00	
177.00	X	3.00	
178.00	X	3.00	
179.00	X	3.00	
179.50	X	3.00	
180.00	X	3.00	
181.00	X	3.00	
182.00	X	3.00	
183.00	X	3.00	
183.50	X	3.00	
184.00	X	3.00	
184.50	X	3.00	
185.00	X	3.00	
186.00	X	3.00	
187.00	X	3.00	
188.00	X	3.00	
189.00	X	3.00	
189.50	X	3.00	
190.00	X	3.00	
191.00	X	3.00	
192.00	X	3.00	
193.00	X	3.00	
194.00	X	3.00	
194.50	X	3.00	
195.00	X	3.00	
196.00	X	3.00	
197.00	X	3.00	
198.00	X	3.00	
199.00	X	3.00	
199.50	X	3.00	
200.00	X	3.00	
201.00	X	3.00	
202.00	X	3.00	
203.00	X	3.00	
204.00	X	3.00	
204.50	X	3.00	
205.00	X	3.00	
206.00	X	3.00	
207.00	X	3.00	
208.00	X	3.00	
209.00	X	3.00	

Inside Diameter mm		Cross Section mm	Size Cross Reference
209.50	X	3.00	
210.00	X	3.00	
211.00	X	3.00	
212.00	X	3.00	
213.00	X	3.00	
214.00	X	3.00	
215.00	X	3.00	
216.00	X	3.00	
217.00	X	3.00	
218.00	X	3.00	
219.00	X	3.00	
219.50	X	3.00	
220.00	X	3.00	
221.00	X	3.00	
222.00	X	3.00	
223.00	X	3.00	
224.00	X	3.00	
225.00	X	3.00	
226.00	X	3.00	
227.00	X	3.00	
228.00	X	3.00	
229.00	X	3.00	
229.50	X	3.00	
230.00	X	3.00	
231.00	X	3.00	
232.00	X	3.00	
233.00	X	3.00	
234.00	X	3.00	
235.00	X	3.00	
236.00	X	3.00	
237.00	X	3.00	
238.00	X	3.00	
239.00	X	3.00	
239.50	X	3.00	
240.00	X	3.00	
241.00	X	3.00	
242.00	X	3.00	
243.00	X	3.00	
244.00	X	3.00	
245.00	X	3.00	
246.00	X	3.00	
247.00	X	3.00	
248.00	X	3.00	
249.00	X	3.00	
249.50	X	3.00	
250.00	X	3.00	
255.00	X	3.00	
259.30	X	3.00	
260.00	X	3.00	
264.00	X	3.00	
270.00	X	3.00	
280.00	X	3.00	
300.00	X	3.00	
315.00	X	3.00	
320.00	X	3.00	
350.00	X	3.00	

Inside Diameter mm		Cross Section mm	Size Cross Reference
440.00	X	3.00	
505.00	X	3.00	
518.50	X	3.00	
24.40	X	3.10	G25
29.40	X	3.10	G30
34.40	X	3.10	G35
39.40	X	3.10	G40
44.40	X	3.10	G45
49.40	X	3.10	G50
54.40	X	3.10	G55
59.40	X	3.10	G60
64.40	X	3.10	G65
69.40	X	3.10	G70
74.40	X	3.10	G75
79.40	X	3.10	G80
84.40	X	3.10	G85
89.40	X	3.10	G90
94.40	X	3.10	G95
99.40	X	3.10	G100
104.40	X	3.10	G105
109.40	X	3.10	G110
114.40	X	3.10	G115
114.40	X	3.10	G145
119.40	X	3.10	G120
124.40	X	3.10	G125
129.40	X	3.10	G130
134.40	X	3.10	G135
139.40	X	3.10	G140
144.40	X	3.10	G145
174.00	X	3.20	
219.50	X	3.20	
227.00	X	3.20	
5.00	X	3.50	
8.00	X	3.50	
9.00	X	3.50	
9.20	X	3.50	
10.00	X	3.50	
11.00	X	3.50	
12.00	X	3.50	
13.00	X	3.50	
14.00	X	3.50	
15.00	X	3.50	
16.00	X	3.50	
17.00	X	3.50	
17.50	X	3.50	
18.00	X	3.50	
19.00	X	3.50	
20.00	X	3.50	
21.00	X	3.50	
21.70	X	3.50	P22A
22.00	X	3.50	
22.10	X	3.50	P22.4
23.00	X	3.50	
23.70	X	3.50	P24
24.00	X	3.50	
24.70	X	3.50	P25

Inside Diameter mm		Cross Section mm	Size Cross Reference
25.00	X	3.50	
25.20	X	3.50	P25.5
25.70	X	3.50	P26
26.00	X	3.50	
27.00	X	3.50	
27.70	X	3.50	P28
28.00	X	3.50	
28.70	X	3.50	P29
29.00	X	3.50	
29.20	X	3.50	P29.5
29.70	X	3.50	P30
30.00	X	3.50	
30.50	X	3.50	
30.70	X	3.50	P31
31.00	X	3.50	
31.20	X	3.50	P31.5
31.70	X	3.50	P32
32.00	X	3.50	
33.00	X	3.50	
33.70	X	3.50	P34
34.00	X	3.50	
34.70	X	3.50	P35
35.00	X	3.50	
35.20	X	3.50	P35.5
35.70	X	3.50	P36
36.00	X	3.50	
37.00	X	3.50	
37.70	X	3.50	P38
38.00	X	3.50	
38.70	X	3.50	P39
39.00	X	3.50	
39.70	X	3.50	P40
40.00	X	3.50	
40.70	X	3.50	P41
41.00	X	3.50	
41.70	X	3.50	P42
42.00	X	3.50	
43.00	X	3.50	
43.70	X	3.50	P44
44.00	X	3.50	
44.70	X	3.50	P45
45.00	X	3.50	
45.70	X	3.50	P46
46.00	X	3.50	
47.00	X	3.50	
47.70	X	3.50	P48
48.00	X	3.50	
48.70	X	3.50	P49
49.00	X	3.50	
49.70	X	3.50	P50
50.00	X	3.50	
51.00	X	3.50	
52.00	X	3.50	
53.00	X	3.50	
54.00	X	3.50	
55.00	X	3.50	

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Inside Diameter mm		Cross Section mm	Size Cross Reference
56.00	X	3.50	
57.00	X	3.50	
58.00	X	3.50	
59.00	X	3.50	
60.00	X	3.50	
61.00	X	3.50	
62.00	X	3.50	
63.00	X	3.50	
64.00	X	3.50	
65.00	X	3.50	
66.00	X	3.50	
67.00	X	3.50	
68.00	X	3.50	
69.00	X	3.50	
70.00	X	3.50	
71.00	X	3.50	
72.00	X	3.50	
73.00	X	3.50	
74.00	X	3.50	
75.00	X	3.50	
76.00	X	3.50	
77.00	X	3.50	
78.00	X	3.50	
79.00	X	3.50	
80.00	X	3.50	
81.00	X	3.50	
82.00	X	3.50	
83.00	X	3.50	
84.00	X	3.50	
85.00	X	3.50	
86.00	X	3.50	
87.00	X	3.50	
88.00	X	3.50	
89.00	X	3.50	
90.00	X	3.50	
91.00	X	3.50	
92.00	X	3.50	
93.00	X	3.50	
94.00	X	3.50	
95.00	X	3.50	
96.00	X	3.50	
97.00	X	3.50	
98.00	X	3.50	
99.00	X	3.50	
100.00	X	3.50	
101.00	X	3.50	
102.00	X	3.50	
103.00	X	3.50	
104.00	X	3.50	
105.00	X	3.50	
106.00	X	3.50	
107.00	X	3.50	
108.00	X	3.50	
109.00	X	3.50	
110.00	X	3.50	
111.00	X	3.50	

Inside Diameter mm		Cross Section mm	Size Cross Reference
112.00	X	3.50	
113.00	X	3.50	
114.00	X	3.50	
115.00	X	3.50	
116.00	X	3.50	
117.00	X	3.50	
118.00	X	3.50	
119.00	X	3.50	
120.00	X	3.50	
121.00	X	3.50	
122.00	X	3.50	
123.00	X	3.50	
124.00	X	3.50	
125.00	X	3.50	
126.00	X	3.50	
127.00	X	3.50	
128.00	X	3.50	
129.00	X	3.50	
130.00	X	3.50	
131.00	X	3.50	
132.00	X	3.50	
133.00	X	3.50	
134.00	X	3.50	
135.00	X	3.50	
136.00	X	3.50	
137.00	X	3.50	
138.00	X	3.50	
139.00	X	3.50	
140.00	X	3.50	
141.00	X	3.50	
142.00	X	3.50	
143.00	X	3.50	
144.00	X	3.50	
145.00	X	3.50	
146.00	X	3.50	
147.00	X	3.50	
148.00	X	3.50	
149.00	X	3.50	
150.00	X	3.50	
151.00	X	3.50	
152.00	X	3.50	
153.00	X	3.50	
154.00	X	3.50	
155.00	X	3.50	
156.00	X	3.50	
157.00	X	3.50	
158.00	X	3.50	
159.00	X	3.50	
160.00	X	3.50	
161.00	X	3.50	
162.00	X	3.50	
163.00	X	3.50	
164.00	X	3.50	
165.00	X	3.50	
166.00	X	3.50	
167.00	X	3.50	

Inside Diameter mm		Cross Section mm	Size Cross Reference
168.00	X	3.50	
169.00	X	3.50	
170.00	X	3.50	
171.00	X	3.50	
172.00	X	3.50	
173.00	X	3.50	
174.00	X	3.50	
175.00	X	3.50	
176.00	X	3.50	
177.00	X	3.50	
178.00	X	3.50	
179.00	X	3.50	
180.00	X	3.50	
181.00	X	3.50	
182.00	X	3.50	
183.00	X	3.50	
184.00	X	3.50	
185.00	X	3.50	
186.00	X	3.50	
187.00	X	3.50	
188.00	X	3.50	
189.00	X	3.50	
190.00	X	3.50	
191.00	X	3.50	
192.00	X	3.50	
193.00	X	3.50	
194.00	X	3.50	
195.00	X	3.50	
196.00	X	3.50	
197.00	X	3.50	
198.00	X	3.50	
199.00	X	3.50	
200.00	X	3.50	
201.00	X	3.50	
202.00	X	3.50	
203.00	X	3.50	
204.00	X	3.50	
205.00	X	3.50	
206.00	X	3.50	
207.00	X	3.50	
208.00	X	3.50	
209.00	X	3.50	
210.00	X	3.50	
211.00	X	3.50	
212.00	X	3.50	
213.00	X	3.50	
214.00	X	3.50	
215.00	X	3.50	
216.00	X	3.50	
217.00	X	3.50	
218.00	X	3.50	
219.00	X	3.50	
220.00	X	3.50	
221.00	X	3.50	
222.00	X	3.50	
223.00	X	3.50	

Inside Diameter mm		Cross Section mm	Size Cross Reference
224.00	X	3.50	
225.00	X	3.50	
226.00	X	3.50	
227.00	X	3.50	
228.00	X	3.50	
229.00	X	3.50	
230.00	X	3.50	
231.00	X	3.50	
232.00	X	3.50	
233.00	X	3.50	
234.00	X	3.50	
235.00	X	3.50	
236.00	X	3.50	
237.00	X	3.50	
238.00	X	3.50	
239.00	X	3.50	
240.00	X	3.50	
241.00	X	3.50	
242.00	X	3.50	
243.00	X	3.50	
244.00	X	3.50	
245.00	X	3.50	
246.00	X	3.50	
247.00	X	3.50	
248.00	X	3.50	
249.00	X	3.50	
250.00	X	3.50	
251.00	X	3.50	
252.00	X	3.50	
253.00	X	3.50	
254.00	X	3.50	
255.00	X	3.50	
256.00	X	3.50	
257.00	X	3.50	
258.00	X	3.50	
259.00	X	3.50	
260.00	X	3.50	
261.00	X	3.50	
262.00	X	3.50	
263.00	X	3.50	
264.00	X	3.50	
265.00	X	3.50	
266.00	X	3.50	
267.00	X	3.50	
268.00	X	3.50	
269.00	X	3.50	
270.00	X	3.50	
271.00	X	3.50	
272.00	X	3.50	
273.00	X	3.50	
274.00	X	3.50	
275.00	X	3.50	
276.00	X	3.50	
277.00	X	3.50	
278.00	X	3.50	
279.00	X	3.50	

Inside Diameter mm		Cross Section mm	Size Cross Reference
280.00	X	3.50	
281.00	X	3.50	
282.00	X	3.50	
283.00	X	3.50	
284.00	X	3.50	
285.00	X	3.50	
286.00	X	3.50	
287.00	X	3.50	
288.00	X	3.50	
289.00	X	3.50	
290.00	X	3.50	
291.00	X	3.50	
292.00	X	3.50	
293.00	X	3.50	
294.00	X	3.50	
295.00	X	3.50	
296.00	X	3.50	
297.00	X	3.50	
298.00	X	3.50	
299.00	X	3.50	
300.00	X	3.50	
301.00	X	3.50	
302.00	X	3.50	
303.00	X	3.50	
304.00	X	3.50	
305.00	X	3.50	
306.00	X	3.50	
307.00	X	3.50	
308.00	X	3.50	
309.00	X	3.50	
310.00	X	3.50	
311.00	X	3.50	
312.00	X	3.50	
313.00	X	3.50	
314.00	X	3.50	
315.00	X	3.50	
316.00	X	3.50	
317.00	X	3.50	
318.00	X	3.50	
319.00	X	3.50	
320.00	X	3.50	
321.00	X	3.50	
322.00	X	3.50	
323.00	X	3.50	
324.00	X	3.50	
325.00	X	3.50	
326.00	X	3.50	
327.00	X	3.50	
328.00	X	3.50	
329.00	X	3.50	
330.00	X	3.50	
331.00	X	3.50	
332.00	X	3.50	
333.00	X	3.50	
334.00	X	3.50	
335.00	X	3.50	

Inside Diameter mm		Cross Section mm	Size Cross Reference
336.00	X	3.50	
337.00	X	3.50	
338.00	X	3.50	
339.00	X	3.50	
340.00	X	3.50	
341.00	X	3.50	
342.00	X	3.50	
343.00	X	3.50	
344.00	X	3.50	
345.00	X	3.50	
346.00	X	3.50	
347.00	X	3.50	
348.00	X	3.50	
349.00	X	3.50	
350.00	X	3.50	
351.00	X	3.50	
352.00	X	3.50	
353.00	X	3.50	
354.00	X	3.50	
355.00	X	3.50	
356.00	X	3.50	
357.00	X	3.50	
358.00	X	3.50	
359.00	X	3.50	
360.00	X	3.50	
361.00	X	3.50	
362.00	X	3.50	
363.00	X	3.50	
364.00	X	3.50	
365.00	X	3.50	
366.00	X	3.50	
367.00	X	3.50	
368.00	X	3.50	
369.00	X	3.50	
370.00	X	3.50	
371.00	X	3.50	
372.00	X	3.50	
373.00	X	3.50	
374.00	X	3.50	
375.00	X	3.50	
376.00	X	3.50	
377.00	X	3.50	
378.00	X	3.50	
379.00	X	3.50	
380.00	X	3.50	
381.00	X	3.50	
382.00	X	3.50	
383.00	X	3.50	
384.00	X	3.50	
385.00	X	3.50	
386.00	X	3.50	
387.00	X	3.50	
388.00	X	3.50	
389.00	X	3.50	
390.00	X	3.50	
391.00	X	3.50	

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Inside Diameter mm		Cross Section mm	Size Cross Reference
392.00	X	3.50	
393.00	X	3.50	
394.00	X	3.50	
395.00	X	3.50	
396.00	X	3.50	
397.00	X	3.50	
398.00	X	3.50	
399.00	X	3.50	
400.00	X	3.50	
401.00	X	3.50	
402.00	X	3.50	
403.00	X	3.50	
404.00	X	3.50	
405.00	X	3.50	
406.00	X	3.50	
407.00	X	3.50	
408.00	X	3.50	
409.00	X	3.50	
410.00	X	3.50	
411.00	X	3.50	
412.00	X	3.50	
413.00	X	3.50	
414.00	X	3.50	
415.00	X	3.50	
416.00	X	3.50	
417.00	X	3.50	
418.00	X	3.50	
419.00	X	3.50	
420.00	X	3.50	
421.00	X	3.50	
422.00	X	3.50	
423.00	X	3.50	
424.00	X	3.50	
425.00	X	3.50	
426.00	X	3.50	
427.00	X	3.50	
428.00	X	3.50	
429.00	X	3.50	
430.00	X	3.50	
431.00	X	3.50	
432.00	X	3.50	
433.00	X	3.50	
434.00	X	3.50	
435.00	X	3.50	
436.00	X	3.50	
437.00	X	3.50	
438.00	X	3.50	
439.00	X	3.50	
440.00	X	3.50	
4.34	X	3.53	201
5.94	X	3.53	202
7.52	X	3.53	203
9.34	X	3.53	204
10.69	X	3.53	205
12.29	X	3.53	206
13.87	X	3.53	207

Inside Diameter mm		Cross Section mm	Size Cross Reference
15.47	X	3.53	208
17.04	X	3.53	209
18.64	X	3.53	210
20.22	X	3.53	211
21.82	X	3.53	212
23.39	X	3.53	213
24.99	X	3.53	214
25.80	X	3.53	BS618
26.57	X	3.53	215
28.17	X	3.53	216
29.74	X	3.53	217
31.34	X	3.53	218
32.92	X	3.53	219
34.52	X	3.53	220
36.09	X	3.53	221
37.69	X	3.53	222
39.70	X	3.53	BS824
40.87	X	3.53	223
41.26	X	3.53	BSW825
41.28	X	3.53	BS825
42.86	X	3.53	BS826
44.04	X	3.53	224
44.45	X	3.53	BS827
46.04	X	3.53	BS828
47.22	X	3.53	225
47.62	X	3.53	BS829
49.20	X	3.53	BS830
50.39	X	3.53	226
50.80	X	3.53	BS831
52.40	X	3.53	BS832
53.57	X	3.53	227
53.97	X	3.53	BS833
55.56	X	3.53	BS834
56.74	X	3.53	228
57.15	X	3.53	BS835
58.74	X	3.53	BS836
59.92	X	3.53	229
60.32	X	3.53	BS837
61.90	X	3.53	BS838
63.09	X	3.53	230
63.50	X	3.53	BS839
63.50	X	3.53	
65.10	X	3.53	BS840
66.27	X	3.53	231
66.67	X	3.53	BS841
68.26	X	3.53	BS842
69.44	X	3.53	232
69.85	X	3.53	BS843
71.44	X	3.53	BS844
72.62	X	3.53	233
73.02	X	3.53	BS845
74.60	X	3.53	BS846
75.79	X	3.53	234
78.97	X	3.53	235
82.14	X	3.53	236
85.32	X	3.53	237

Inside Diameter mm		Cross Section mm	Size Cross Reference
88.49	X	3.53	238
91.67	X	3.53	239
94.84	X	3.53	240
98.02	X	3.53	241
101.19	X	3.53	242
104.37	X	3.53	243
107.54	X	3.53	244
110.72	X	3.53	245
113.89	X	3.53	246
117.07	X	3.53	247
120.24	X	3.53	248
123.42	X	3.53	249
126.59	X	3.53	250
129.77	X	3.53	251
132.94	X	3.53	252
136.12	X	3.53	253
139.29	X	3.53	254
142.47	X	3.53	255
145.64	X	3.53	256
148.82	X	3.53	257
151.99	X	3.53	258
158.34	X	3.53	259
158.82	X	3.53	
164.69	X	3.53	260
171.04	X	3.53	261
177.39	X	3.53	262
183.74	X	3.53	263
190.09	X	3.53	264
196.44	X	3.53	265
202.79	X	3.53	266
209.14	X	3.53	267
215.49	X	3.53	268
221.84	X	3.53	269
228.19	X	3.53	270
234.54	X	3.53	271
240.89	X	3.53	272
247.24	X	3.53	273
253.59	X	3.53	274
266.29	X	3.53	275
278.99	X	3.53	276
291.69	X	3.53	277
304.39	X	3.53	278
319.20	X	3.53	
329.79	X	3.53	279
355.19	X	3.53	280
380.59	X	3.53	281
405.26	X	3.53	282
430.66	X	3.53	283
456.06	X	3.53	284
18.00	X	3.55	
19.00	X	3.55	
20.00	X	3.55	
21.20	X	3.55	
22.40	X	3.55	
23.60	X	3.55	
25.00	X	3.55	

Inside Diameter mm		Cross Section mm	Size Cross Reference
25.80	X	3.55	
26.50	X	3.55	
28.00	X	3.55	
30.00	X	3.55	
31.50	X	3.55	
32.50	X	3.55	
33.50	X	3.55	
34.50	X	3.55	
35.50	X	3.55	
36.50	X	3.55	
37.50	X	3.55	
38.70	X	3.55	
40.00	X	3.55	
41.20	X	3.55	
42.50	X	3.55	
43.70	X	3.55	
45.00	X	3.55	
46.20	X	3.55	
47.50	X	3.55	
48.70	X	3.55	
50.00	X	3.55	
51.50	X	3.55	
53.00	X	3.55	
54.50	X	3.55	
56.00	X	3.55	
58.00	X	3.55	
60.00	X	3.55	
61.50	X	3.55	
63.00	X	3.55	
65.00	X	3.55	
67.00	X	3.55	
69.00	X	3.55	
71.00	X	3.55	
73.00	X	3.55	
75.00	X	3.55	
77.50	X	3.55	
80.00	X	3.55	
82.50	X	3.55	
85.00	X	3.55	
87.50	X	3.55	
90.00	X	3.55	
92.50	X	3.55	
95.00	X	3.55	
97.50	X	3.55	
100.00	X	3.55	
103.00	X	3.55	
106.00	X	3.55	
109.00	X	3.55	
112.00	X	3.55	
115.00	X	3.55	
118.00	X	3.55	
122.00	X	3.55	
125.00	X	3.55	
128.00	X	3.55	
132.00	X	3.55	
136.00	X	3.55	

Inside Diameter mm		Cross Section mm	Size Cross Reference
140.00	X	3.55	
145.00	X	3.55	
150.00	X	3.55	
155.00	X	3.55	
160.00	X	3.55	
165.00	X	3.55	
170.00	X	3.55	
175.00	X	3.55	
180.00	X	3.55	
185.00	X	3.55	
190.00	X	3.55	
195.00	X	3.55	
200.00	X	3.55	
18.30	X	3.60	
19.80	X	3.60	
21.30	X	3.60	
23.00	X	3.60	
24.60	X	3.60	
26.20	X	3.60	
27.80	X	3.60	
29.30	X	3.60	
30.80	X	3.60	
32.50	X	3.60	
34.10	X	3.60	
35.60	X	3.60	
37.30	X	3.60	
43.40	X	3.60	
4.00	X	4.00	
5.00	X	4.00	
6.00	X	4.00	
7.00	X	4.00	
7.60	X	4.00	
8.00	X	4.00	
9.00	X	4.00	
10.00	X	4.00	
11.00	X	4.00	
12.00	X	4.00	
13.00	X	4.00	
14.00	X	4.00	
14.50	X	4.00	V15
15.00	X	4.00	
16.00	X	4.00	
17.00	X	4.00	
18.00	X	4.00	
19.00	X	4.00	
20.00	X	4.00	
21.00	X	4.00	
22.00	X	4.00	
23.00	X	4.00	
23.50	X	4.00	V24
24.00	X	4.00	
25.00	X	4.00	
26.00	X	4.00	
27.00	X	4.00	
28.00	X	4.00	
29.00	X	4.00	

Inside Diameter mm		Cross Section mm	Size Cross Reference
30.00	X	4.00	
31.00	X	4.00	
32.00	X	4.00	
33.00	X	4.00	
33.50	X	4.00	V34
34.00	X	4.00	
35.00	X	4.00	
36.00	X	4.00	
37.00	X	4.00	
38.00	X	4.00	
39.00	X	4.00	
39.50	X	4.00	V40
40.00	X	4.00	
41.00	X	4.00	
42.00	X	4.00	
43.00	X	4.00	
44.00	X	4.00	
45.00	X	4.00	
46.00	X	4.00	
47.00	X	4.00	
48.00	X	4.00	
49.00	X	4.00	
50.00	X	4.00	
51.00	X	4.00	
52.00	X	4.00	
53.00	X	4.00	
54.00	X	4.00	
54.50	X	4.00	V55
55.00	X	4.00	
56.00	X	4.00	
57.00	X	4.00	
58.00	X	4.00	
59.00	X	4.00	
60.00	X	4.00	
61.00	X	4.00	
62.00	X	4.00	
63.00	X	4.00	
64.00	X	4.00	
65.00	X	4.00	
66.00	X	4.00	
67.00	X	4.00	
68.00	X	4.00	
69.00	X	4.00	V70
70.00	X	4.00	
71.00	X	4.00	
72.00	X	4.00	
73.00	X	4.00	
74.00	X	4.00	
75.00	X	4.00	
76.00	X	4.00	
77.00	X	4.00	
78.00	X	4.00	
79.00	X	4.00	
80.00	X	4.00	
81.00	X	4.00	
82.00	X	4.00	

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Inside Diameter mm		Cross Section mm	Size Cross Reference
83.00	X	4.00	
84.00	X	4.00	V85
84.00	X	4.00	
85.00	X	4.00	
86.00	X	4.00	
86.50	X	4.00	
87.00	X	4.00	
88.00	X	4.00	
89.00	X	4.00	
90.00	X	4.00	
91.00	X	4.00	
92.00	X	4.00	
93.00	X	4.00	
94.00	X	4.00	
95.00	X	4.00	
96.00	X	4.00	
97.00	X	4.00	
98.00	X	4.00	
99.00	X	4.00	V100
100.00	X	4.00	
101.00	X	4.00	
102.00	X	4.00	
103.00	X	4.00	
104.00	X	4.00	
105.00	X	4.00	
106.00	X	4.00	
107.00	X	4.00	
108.00	X	4.00	
109.00	X	4.00	
110.00	X	4.00	
111.00	X	4.00	
112.00	X	4.00	
113.00	X	4.00	
114.00	X	4.00	
115.00	X	4.00	
116.00	X	4.00	
117.00	X	4.00	
118.00	X	4.00	
119.00	X	4.00	V120
120.00	X	4.00	
121.00	X	4.00	
122.00	X	4.00	
123.00	X	4.00	
124.00	X	4.00	
125.00	X	4.00	
126.00	X	4.00	
127.00	X	4.00	
128.00	X	4.00	
129.00	X	4.00	
130.00	X	4.00	
131.00	X	4.00	
132.00	X	4.00	
133.00	X	4.00	
134.00	X	4.00	
135.00	X	4.00	
136.00	X	4.00	

Inside Diameter mm		Cross Section mm	Size Cross Reference
137.00	X	4.00	
138.00	X	4.00	
139.00	X	4.00	
140.00	X	4.00	
141.00	X	4.00	
142.00	X	4.00	
143.00	X	4.00	
144.00	X	4.00	
145.00	X	4.00	
146.00	X	4.00	
147.00	X	4.00	
148.00	X	4.00	
148.50	X	4.00	V150
149.00	X	4.00	
150.00	X	4.00	
151.00	X	4.00	
152.00	X	4.00	
153.00	X	4.00	
154.00	X	4.00	
155.00	X	4.00	
156.00	X	4.00	
157.00	X	4.00	
158.00	X	4.00	
159.00	X	4.00	
160.00	X	4.00	
161.00	X	4.00	
162.00	X	4.00	
163.00	X	4.00	
164.00	X	4.00	
165.00	X	4.00	
166.00	X	4.00	
167.00	X	4.00	
168.00	X	4.00	
169.00	X	4.00	
170.00	X	4.00	
171.00	X	4.00	
172.00	X	4.00	
173.00	X	4.00	V175
173.00	X	4.00	
174.00	X	4.00	
175.00	X	4.00	
176.00	X	4.00	
177.00	X	4.00	
178.00	X	4.00	
179.00	X	4.00	
180.00	X	4.00	
181.00	X	4.00	
182.00	X	4.00	
183.00	X	4.00	
184.00	X	4.00	
185.00	X	4.00	
186.00	X	4.00	
187.00	X	4.00	
188.00	X	4.00	
189.00	X	4.00	
190.00	X	4.00	

Inside Diameter mm		Cross Section mm	Size Cross Reference
191.00	X	4.00	
192.00	X	4.00	
193.00	X	4.00	
194.00	X	4.00	
195.00	X	4.00	
196.00	X	4.00	
197.00	X	4.00	
198.00	X	4.00	
199.00	X	4.00	
200.00	X	4.00	
201.00	X	4.00	
202.00	X	4.00	
203.00	X	4.00	
204.00	X	4.00	
205.00	X	4.00	
206.00	X	4.00	
207.00	X	4.00	
208.00	X	4.00	
209.00	X	4.00	
210.00	X	4.00	
211.00	X	4.00	
212.00	X	4.00	
213.00	X	4.00	
214.00	X	4.00	
215.00	X	4.00	
216.00	X	4.00	
217.00	X	4.00	
218.00	X	4.00	
219.00	X	4.00	
220.00	X	4.00	
221.00	X	4.00	
222.00	X	4.00	
223.00	X	4.00	
224.00	X	4.00	
225.00	X	4.00	
226.00	X	4.00	
227.00	X	4.00	
228.00	X	4.00	
229.00	X	4.00	
230.00	X	4.00	
231.00	X	4.00	
232.00	X	4.00	
233.00	X	4.00	
234.00	X	4.00	
235.00	X	4.00	
236.00	X	4.00	
237.00	X	4.00	
238.00	X	4.00	
239.00	X	4.00	
240.00	X	4.00	
241.00	X	4.00	
242.00	X	4.00	
243.00	X	4.00	
244.00	X	4.00	
245.00	X	4.00	
246.00	X	4.00	

Inside Diameter mm		Cross Section mm	Size Cross Reference
247.00	X	4.00	
248.00	X	4.00	
249.00	X	4.00	
250.00	X	4.00	
251.00	X	4.00	
252.00	X	4.00	
253.00	X	4.00	
254.00	X	4.00	
255.00	X	4.00	
256.00	X	4.00	
257.00	X	4.00	
258.00	X	4.00	
259.00	X	4.00	
260.00	X	4.00	
261.00	X	4.00	
262.00	X	4.00	
263.00	X	4.00	
264.00	X	4.00	
265.00	X	4.00	
266.00	X	4.00	
267.00	X	4.00	
268.00	X	4.00	
269.00	X	4.00	
270.00	X	4.00	
271.00	X	4.00	
272.00	X	4.00	
273.00	X	4.00	
274.00	X	4.00	
275.00	X	4.00	
276.00	X	4.00	
277.00	X	4.00	
278.00	X	4.00	
279.00	X	4.00	
280.00	X	4.00	
281.00	X	4.00	
282.00	X	4.00	
283.00	X	4.00	
284.00	X	4.00	
285.00	X	4.00	
286.00	X	4.00	
287.00	X	4.00	
288.00	X	4.00	
289.00	X	4.00	
290.00	X	4.00	
291.00	X	4.00	
292.00	X	4.00	
293.00	X	4.00	
294.00	X	4.00	
295.00	X	4.00	
296.00	X	4.00	
297.00	X	4.00	
298.00	X	4.00	
299.00	X	4.00	
300.00	X	4.00	
301.00	X	4.00	
302.00	X	4.00	

Inside Diameter mm		Cross Section mm	Size Cross Reference
303.00	X	4.00	
304.00	X	4.00	
305.00	X	4.00	
306.00	X	4.00	
307.00	X	4.00	
308.00	X	4.00	
309.00	X	4.00	
310.00	X	4.00	
311.00	X	4.00	
312.00	X	4.00	
313.00	X	4.00	
314.00	X	4.00	
315.00	X	4.00	
316.00	X	4.00	
317.00	X	4.00	
318.00	X	4.00	
319.00	X	4.00	
320.00	X	4.00	
321.00	X	4.00	
322.00	X	4.00	
323.00	X	4.00	
324.00	X	4.00	
325.00	X	4.00	
326.00	X	4.00	
327.00	X	4.00	
328.00	X	4.00	
329.00	X	4.00	
330.00	X	4.00	
331.00	X	4.00	
332.00	X	4.00	
333.00	X	4.00	
334.00	X	4.00	
335.00	X	4.00	
336.00	X	4.00	
337.00	X	4.00	
338.00	X	4.00	
339.00	X	4.00	
340.00	X	4.00	
341.00	X	4.00	
342.00	X	4.00	
343.00	X	4.00	
344.00	X	4.00	
345.00	X	4.00	
346.00	X	4.00	
347.00	X	4.00	
348.00	X	4.00	
349.00	X	4.00	
350.00	X	4.00	
351.00	X	4.00	
352.00	X	4.00	
353.00	X	4.00	
354.00	X	4.00	
355.00	X	4.00	
356.00	X	4.00	
357.00	X	4.00	
358.00	X	4.00	

Inside Diameter mm		Cross Section mm	Size Cross Reference
359.00	X	4.00	
360.00	X	4.00	
361.00	X	4.00	
362.00	X	4.00	
363.00	X	4.00	
364.00	X	4.00	
365.00	X	4.00	
366.00	X	4.00	
367.00	X	4.00	
368.00	X	4.00	
369.00	X	4.00	
370.00	X	4.00	
371.00	X	4.00	
372.00	X	4.00	
373.00	X	4.00	
374.00	X	4.00	
375.00	X	4.00	
376.00	X	4.00	
377.00	X	4.00	
378.00	X	4.00	
379.00	X	4.00	
380.00	X	4.00	
381.00	X	4.00	
382.00	X	4.00	
383.00	X	4.00	
384.00	X	4.00	
385.00	X	4.00	
386.00	X	4.00	
387.00	X	4.00	
388.00	X	4.00	
389.00	X	4.00	
390.00	X	4.00	
391.00	X	4.00	
392.00	X	4.00	
393.00	X	4.00	
394.00	X	4.00	
395.00	X	4.00	
396.00	X	4.00	
397.00	X	4.00	
398.00	X	4.00	
399.00	X	4.00	
400.00	X	4.00	
401.00	X	4.00	
402.00	X	4.00	
403.00	X	4.00	
404.00	X	4.00	
405.00	X	4.00	
406.00	X	4.00	
407.00	X	4.00	
408.00	X	4.00	
409.00	X	4.00	
410.00	X	4.00	
411.00	X	4.00	
412.00	X	4.00	
413.00	X	4.00	
414.00	X	4.00	

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Inside Diameter mm		Cross Section mm	Size Cross Reference
415.00	X	4.00	
416.00	X	4.00	
417.00	X	4.00	
418.00	X	4.00	
419.00	X	4.00	
420.00	X	4.00	
421.00	X	4.00	
422.00	X	4.00	
423.00	X	4.00	
424.00	X	4.00	
425.00	X	4.00	
426.00	X	4.00	
427.00	X	4.00	
428.00	X	4.00	
429.00	X	4.00	
430.00	X	4.00	
431.00	X	4.00	
432.00	X	4.00	
433.00	X	4.00	
434.00	X	4.00	
435.00	X	4.00	
436.00	X	4.00	
437.00	X	4.00	
438.00	X	4.00	
439.00	X	4.00	
440.00	X	4.00	
441.00	X	4.00	
442.00	X	4.00	
443.00	X	4.00	
444.00	X	4.00	
445.00	X	4.00	
446.00	X	4.00	
447.00	X	4.00	
448.00	X	4.00	
449.00	X	4.00	
450.00	X	4.00	
451.00	X	4.00	
452.00	X	4.00	
453.00	X	4.00	
454.00	X	4.00	
455.00	X	4.00	
456.00	X	4.00	
457.00	X	4.00	
458.00	X	4.00	
459.00	X	4.00	
460.00	X	4.00	
461.00	X	4.00	
462.00	X	4.00	
463.00	X	4.00	
464.00	X	4.00	
465.00	X	4.00	
466.00	X	4.00	
467.00	X	4.00	
468.00	X	4.00	
469.00	X	4.00	
470.00	X	4.00	

Inside Diameter mm		Cross Section mm	Size Cross Reference
471.00	X	4.00	
472.00	X	4.00	
473.00	X	4.00	
474.00	X	4.00	
475.00	X	4.00	
476.00	X	4.00	
477.00	X	4.00	
478.00	X	4.00	
479.00	X	4.00	
480.00	X	4.00	
481.00	X	4.00	
482.00	X	4.00	
483.00	X	4.00	
484.00	X	4.00	
485.00	X	4.00	
486.00	X	4.00	
487.00	X	4.00	
488.00	X	4.00	
489.00	X	4.00	
490.00	X	4.00	
491.00	X	4.00	
492.00	X	4.00	
493.00	X	4.00	
494.00	X	4.00	
495.00	X	4.00	
496.00	X	4.00	
497.00	X	4.00	
498.00	X	4.00	
499.00	X	4.00	
500.00	X	4.00	
139.00	X	4.20	
6.00	X	4.50	
8.00	X	4.50	
9.00	X	4.50	
9.50	X	4.50	
10.00	X	4.50	
10.50	X	4.50	
11.00	X	4.50	
12.00	X	4.50	
13.00	X	4.50	
15.00	X	4.50	
15.50	X	4.50	
16.00	X	4.50	
17.00	X	4.50	
18.00	X	4.50	
19.00	X	4.50	
20.00	X	4.50	
21.00	X	4.50	
21.50	X	4.50	
22.00	X	4.50	
22.50	X	4.50	
23.00	X	4.50	
24.00	X	4.50	
24.50	X	4.50	
25.00	X	4.50	
26.00	X	4.50	

Inside Diameter mm		Cross Section mm	Size Cross Reference
27.00	X	4.50	
27.50	X	4.50	
28.00	X	4.50	
28.50	X	4.50	
29.00	X	4.50	
29.50	X	4.50	
30.00	X	4.50	
31.00	X	4.50	
31.50	X	4.50	
32.00	X	4.50	
33.00	X	4.50	
34.00	X	4.50	
34.50	X	4.50	
35.00	X	4.50	
35.50	X	4.50	
36.00	X	4.50	
37.00	X	4.50	
37.50	X	4.50	
38.00	X	4.50	
39.00	X	4.50	
40.00	X	4.50	
40.50	X	4.50	
41.00	X	4.50	
42.00	X	4.50	
43.00	X	4.50	
44.00	X	4.50	
45.00	X	4.50	
46.00	X	4.50	
47.00	X	4.50	
48.00	X	4.50	
49.00	X	4.50	
50.00	X	4.50	
51.00	X	4.50	
53.00	X	4.50	
56.00	X	4.50	
57.00	X	4.50	
60.00	X	4.50	
61.00	X	4.50	
62.00	X	4.50	
63.00	X	4.50	
64.00	X	4.50	
65.00	X	4.50	
66.00	X	4.50	
68.00	X	4.50	
69.00	X	4.50	
70.00	X	4.50	
71.00	X	4.50	
73.00	X	4.50	
74.00	X	4.50	
75.00	X	4.50	
76.00	X	4.50	
80.00	X	4.50	
81.00	X	4.50	
83.00	X	4.50	
85.00	X	4.50	
86.00	X	4.50	

Inside Diameter mm		Cross Section mm	Size Cross Reference
89.00	X	4.50	
90.00	X	4.50	
92.00	X	4.50	
93.50	X	4.50	
95.00	X	4.50	
97.50	X	4.50	
98.00	X	4.50	
99.50	X	4.50	
100.00	X	4.50	
100.50	X	4.50	
101.00	X	4.50	
103.50	X	4.50	
105.00	X	4.50	
106.00	X	4.50	
110.00	X	4.50	
115.00	X	4.50	
118.00	X	4.50	
120.00	X	4.50	
122.00	X	4.50	
124.00	X	4.50	
126.00	X	4.50	
128.00	X	4.50	
130.00	X	4.50	
131.50	X	4.50	
134.50	X	4.50	
137.00	X	4.50	
140.00	X	4.50	
140.50	X	4.50	
150.00	X	4.50	
153.00	X	4.50	
155.00	X	4.50	
157.00	X	4.50	
160.00	X	4.50	
165.00	X	4.50	
167.00	X	4.50	
172.00	X	4.50	
178.00	X	4.50	
180.00	X	4.50	
185.00	X	4.50	
186.00	X	4.50	
189.50	X	4.50	
192.00	X	4.50	
208.00	X	4.50	
215.00	X	4.50	
218.00	X	4.50	
225.00	X	4.50	
227.00	X	4.50	
250.00	X	4.50	
267.00	X	4.50	
280.00	X	4.50	
315.00	X	4.50	
7.93	X	4.76	
4.00	X	5.00	
5.00	X	5.00	
6.00	X	5.00	
7.00	X	5.00	

Inside Diameter mm		Cross Section mm	Size Cross Reference
8.00	X	5.00	
9.00	X	5.00	
10.00	X	5.00	
11.00	X	5.00	
12.00	X	5.00	
13.00	X	5.00	
14.00	X	5.00	
15.00	X	5.00	
16.00	X	5.00	
17.00	X	5.00	
18.00	X	5.00	
19.00	X	5.00	
20.00	X	5.00	
21.00	X	5.00	
22.00	X	5.00	
23.00	X	5.00	
24.00	X	5.00	
25.00	X	5.00	
26.00	X	5.00	
27.00	X	5.00	
28.00	X	5.00	
29.00	X	5.00	
30.00	X	5.00	
31.00	X	5.00	
32.00	X	5.00	
33.00	X	5.00	
34.00	X	5.00	
35.00	X	5.00	
36.00	X	5.00	
37.00	X	5.00	
38.00	X	5.00	
39.00	X	5.00	
40.00	X	5.00	
41.00	X	5.00	
42.00	X	5.00	
43.00	X	5.00	
44.00	X	5.00	
45.00	X	5.00	
46.00	X	5.00	
47.00	X	5.00	
48.00	X	5.00	
49.00	X	5.00	
50.00	X	5.00	
51.00	X	5.00	
52.00	X	5.00	
53.00	X	5.00	
54.00	X	5.00	
55.00	X	5.00	
56.00	X	5.00	
57.00	X	5.00	
58.00	X	5.00	
59.00	X	5.00	
60.00	X	5.00	
61.00	X	5.00	
62.00	X	5.00	
63.00	X	5.00	

Inside Diameter mm		Cross Section mm	Size Cross Reference
64.00	X	5.00	
65.00	X	5.00	
66.00	X	5.00	
67.00	X	5.00	
68.00	X	5.00	
69.00	X	5.00	
70.00	X	5.00	
71.00	X	5.00	
72.00	X	5.00	
73.00	X	5.00	
74.00	X	5.00	
75.00	X	5.00	
76.00	X	5.00	
77.00	X	5.00	
78.00	X	5.00	
79.00	X	5.00	
80.00	X	5.00	
81.00	X	5.00	
82.00	X	5.00	
83.00	X	5.00	
84.00	X	5.00	
85.00	X	5.00	
86.00	X	5.00	
87.00	X	5.00	
88.00	X	5.00	
89.00	X	5.00	
90.00	X	5.00	
91.00	X	5.00	
92.00	X	5.00	
93.00	X	5.00	
94.00	X	5.00	
95.00	X	5.00	
96.00	X	5.00	
97.00	X	5.00	
98.00	X	5.00	
99.00	X	5.00	
100.00	X	5.00	
101.00	X	5.00	
102.00	X	5.00	
103.00	X	5.00	
104.00	X	5.00	
105.00	X	5.00	
106.00	X	5.00	
107.00	X	5.00	
108.00	X	5.00	
109.00	X	5.00	
110.00	X	5.00	
111.00	X	5.00	
112.00	X	5.00	
113.00	X	5.00	
114.00	X	5.00	
115.00	X	5.00	
116.00	X	5.00	
117.00	X	5.00	
118.00	X	5.00	
119.00	X	5.00	

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Inside Diameter mm		Cross Section mm	Size Cross Reference
120.00	X	5.00	
121.00	X	5.00	
122.00	X	5.00	
123.00	X	5.00	
124.00	X	5.00	
125.00	X	5.00	
126.00	X	5.00	
127.00	X	5.00	
128.00	X	5.00	
129.00	X	5.00	
130.00	X	5.00	
131.00	X	5.00	
132.00	X	5.00	
133.00	X	5.00	
134.00	X	5.00	
135.00	X	5.00	
136.00	X	5.00	
137.00	X	5.00	
138.00	X	5.00	
139.00	X	5.00	
140.00	X	5.00	
141.00	X	5.00	
142.00	X	5.00	
143.00	X	5.00	
144.00	X	5.00	
145.00	X	5.00	
146.00	X	5.00	
147.00	X	5.00	
148.00	X	5.00	
149.00	X	5.00	
150.00	X	5.00	
151.00	X	5.00	
152.00	X	5.00	
153.00	X	5.00	
154.00	X	5.00	
155.00	X	5.00	
156.00	X	5.00	
157.00	X	5.00	
158.00	X	5.00	
159.00	X	5.00	
160.00	X	5.00	
161.00	X	5.00	
162.00	X	5.00	
163.00	X	5.00	
164.00	X	5.00	
165.00	X	5.00	
166.00	X	5.00	
167.00	X	5.00	
168.00	X	5.00	
169.00	X	5.00	
170.00	X	5.00	
171.00	X	5.00	
172.00	X	5.00	
173.00	X	5.00	
174.00	X	5.00	
175.00	X	5.00	

Inside Diameter mm		Cross Section mm	Size Cross Reference
176.00	X	5.00	
177.00	X	5.00	
178.00	X	5.00	
179.00	X	5.00	
180.00	X	5.00	
181.00	X	5.00	
182.00	X	5.00	
183.00	X	5.00	
184.00	X	5.00	
185.00	X	5.00	
186.00	X	5.00	
187.00	X	5.00	
188.00	X	5.00	
189.00	X	5.00	
190.00	X	5.00	
191.00	X	5.00	
192.00	X	5.00	
193.00	X	5.00	
194.00	X	5.00	
195.00	X	5.00	
196.00	X	5.00	
197.00	X	5.00	
198.00	X	5.00	
199.00	X	5.00	
200.00	X	5.00	
201.00	X	5.00	
202.00	X	5.00	
203.00	X	5.00	
204.00	X	5.00	
205.00	X	5.00	
206.00	X	5.00	
208.00	X	5.00	
209.00	X	5.00	
210.00	X	5.00	
211.00	X	5.00	
212.00	X	5.00	
213.00	X	5.00	
214.00	X	5.00	
215.00	X	5.00	
216.00	X	5.00	
217.00	X	5.00	
218.00	X	5.00	
219.00	X	5.00	
220.00	X	5.00	
221.00	X	5.00	
222.00	X	5.00	
223.00	X	5.00	
224.00	X	5.00	
225.00	X	5.00	
226.00	X	5.00	
227.00	X	5.00	
228.00	X	5.00	
229.00	X	5.00	
230.00	X	5.00	
231.00	X	5.00	
232.00	X	5.00	

Inside Diameter mm		Cross Section mm	Size Cross Reference
233.00	X	5.00	
234.00	X	5.00	
235.00	X	5.00	
236.00	X	5.00	
237.00	X	5.00	
238.00	X	5.00	
239.00	X	5.00	
240.00	X	5.00	
241.00	X	5.00	
242.00	X	5.00	
243.00	X	5.00	
244.00	X	5.00	
245.00	X	5.00	
246.00	X	5.00	
247.00	X	5.00	
248.00	X	5.00	
249.00	X	5.00	
250.00	X	5.00	
251.00	X	5.00	
252.00	X	5.00	
253.00	X	5.00	
254.00	X	5.00	
255.00	X	5.00	
256.00	X	5.00	
257.00	X	5.00	
258.00	X	5.00	
259.00	X	5.00	
260.00	X	5.00	
261.00	X	5.00	
262.00	X	5.00	
263.00	X	5.00	
264.00	X	5.00	
265.00	X	5.00	
266.00	X	5.00	
267.00	X	5.00	
268.00	X	5.00	
269.00	X	5.00	
270.00	X	5.00	
271.00	X	5.00	
272.00	X	5.00	
273.00	X	5.00	
274.00	X	5.00	
275.00	X	5.00	
276.00	X	5.00	
277.00	X	5.00	
278.00	X	5.00	
279.00	X	5.00	
280.00	X	5.00	
281.00	X	5.00	
282.00	X	5.00	
283.00	X	5.00	
284.00	X	5.00	
285.00	X	5.00	
286.00	X	5.00	
287.00	X	5.00	
288.00	X	5.00	

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Inside Diameter mm		Cross Section mm	Size Cross Reference
289.00	X	5.00	
290.00	X	5.00	
291.00	X	5.00	
292.00	X	5.00	
293.00	X	5.00	
294.00	X	5.00	
295.00	X	5.00	
296.00	X	5.00	
297.00	X	5.00	
298.00	X	5.00	
299.00	X	5.00	
300.00	X	5.00	
301.00	X	5.00	
301.00	X	5.00	
302.00	X	5.00	
303.00	X	5.00	
304.00	X	5.00	
305.00	X	5.00	
306.00	X	5.00	
307.00	X	5.00	
308.00	X	5.00	
309.00	X	5.00	
310.00	X	5.00	
311.00	X	5.00	
312.00	X	5.00	
313.00	X	5.00	
314.00	X	5.00	
315.00	X	5.00	
316.00	X	5.00	
317.00	X	5.00	
318.00	X	5.00	
319.00	X	5.00	
320.00	X	5.00	
321.00	X	5.00	
322.00	X	5.00	
323.00	X	5.00	
324.00	X	5.00	
325.00	X	5.00	
326.00	X	5.00	
327.00	X	5.00	
328.00	X	5.00	
329.00	X	5.00	
330.00	X	5.00	
331.00	X	5.00	
332.00	X	5.00	
333.00	X	5.00	
334.00	X	5.00	
335.00	X	5.00	
336.00	X	5.00	
337.00	X	5.00	
338.00	X	5.00	
339.00	X	5.00	
340.00	X	5.00	
341.00	X	5.00	
342.00	X	5.00	
343.00	X	5.00	

Inside Diameter mm		Cross Section mm	Size Cross Reference
344.00	X	5.00	
345.00	X	5.00	
346.00	X	5.00	
347.00	X	5.00	
348.00	X	5.00	
349.00	X	5.00	
350.00	X	5.00	
351.00	X	5.00	
352.00	X	5.00	
353.00	X	5.00	
354.00	X	5.00	
355.00	X	5.00	
356.00	X	5.00	
357.00	X	5.00	
358.00	X	5.00	
359.00	X	5.00	
360.00	X	5.00	
361.00	X	5.00	
362.00	X	5.00	
363.00	X	5.00	
364.00	X	5.00	
365.00	X	5.00	
366.00	X	5.00	
367.00	X	5.00	
368.00	X	5.00	
369.00	X	5.00	
370.00	X	5.00	
371.00	X	5.00	
372.00	X	5.00	
373.00	X	5.00	
374.00	X	5.00	
375.00	X	5.00	
376.00	X	5.00	
377.00	X	5.00	
378.00	X	5.00	
379.00	X	5.00	
380.00	X	5.00	
381.00	X	5.00	
382.00	X	5.00	
383.00	X	5.00	
384.00	X	5.00	
385.00	X	5.00	
386.00	X	5.00	
387.00	X	5.00	
388.00	X	5.00	
389.00	X	5.00	
390.00	X	5.00	
391.00	X	5.00	
392.00	X	5.00	
393.00	X	5.00	
394.00	X	5.00	
395.00	X	5.00	
396.00	X	5.00	
397.00	X	5.00	
398.00	X	5.00	
399.00	X	5.00	

Inside Diameter mm		Cross Section mm	Size Cross Reference
400.00	X	5.00	
415.00	X	5.00	
460.00	X	5.00	
470.00	X	5.00	
40.00	X	5.30	
41.20	X	5.30	
41.40	X	5.30	
42.50	X	5.30	
43.70	X	5.30	
45.00	X	5.30	
46.20	X	5.30	
47.50	X	5.30	
48.70	X	5.30	
50.00	X	5.30	
51.50	X	5.30	
53.00	X	5.30	
54.40	X	5.30	
54.50	X	5.30	
56.00	X	5.30	
58.00	X	5.30	
60.00	X	5.30	
61.50	X	5.30	
63.00	X	5.30	
65.00	X	5.30	
67.00	X	5.30	
69.00	X	5.30	
71.00	X	5.30	
73.00	X	5.30	
75.00	X	5.30	
77.50	X	5.30	
80.00	X	5.30	
82.50	X	5.30	
85.00	X	5.30	
87.50	X	5.30	
90.00	X	5.30	
92.50	X	5.30	
95.00	X	5.30	
97.50	X	5.30	
100.00	X	5.30	
103.00	X	5.30	
106.00	X	5.30	
109.00	X	5.30	
112.00	X	5.30	
115.00	X	5.30	
118.00	X	5.30	
122.00	X	5.30	
125.00	X	5.30	
128.00	X	5.30	
132.00	X	5.30	
136.00	X	5.30	
140.00	X	5.30	
145.00	X	5.30	
150.00	X	5.30	
155.00	X	5.30	
160.00	X	5.30	
165.00	X	5.30	

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Inside Diameter mm		Cross Section mm	Size Cross Reference
170.00	X	5.30	
175.00	X	5.30	
180.00	X	5.30	
185.00	X	5.30	
190.00	X	5.30	
195.00	X	5.30	
200.00	X	5.30	
10.46	X	5.33	309
12.07	X	5.33	310
13.64	X	5.33	311
15.24	X	5.33	312
16.81	X	5.33	313
18.42	X	5.33	314
19.99	X	5.33	315
21.59	X	5.33	316
23.16	X	5.33	317
24.77	X	5.33	318
26.34	X	5.33	319
27.94	X	5.33	320
29.51	X	5.33	321
31.12	X	5.33	322
32.69	X	5.33	323
34.29	X	5.33	324
37.47	X	5.33	325
40.64	X	5.33	326
43.82	X	5.33	327
46.99	X	5.33	328
50.17	X	5.33	329
53.34	X	5.33	330
56.52	X	5.33	331
59.69	X	5.33	332
62.87	X	5.33	333
66.04	X	5.33	334
69.22	X	5.33	335
72.39	X	5.33	336
74.63	X	5.33	BS619
75.57	X	5.33	337
78.74	X	5.33	338
79.73	X	5.33	BS620
81.92	X	5.33	339
85.09	X	5.33	340
88.27	X	5.33	341
89.69	X	5.33	BS621
91.44	X	5.33	342
94.62	X	5.33	343
97.79	X	5.33	344
100.00	X	5.33	BS622
100.97	X	5.33	345
104.14	X	5.33	346
107.32	X	5.33	347
109.54	X	5.33	BS623
110.49	X	5.33	348
113.67	X	5.33	349
116.84	X	5.33	350
117.48	X	5.33	BS860
120.02	X	5.33	351

Inside Diameter mm		Cross Section mm	Size Cross Reference
120.65	X	5.33	BS861
123.19	X	5.33	352
123.83	X	5.33	BS862
126.37	X	5.33	353
127.00	X	5.33	BS863
129.54	X	5.33	354
130.18	X	5.33	BS864
132.72	X	5.33	355
133.35	X	5.33	BS865
135.89	X	5.33	356
136.53	X	5.33	BS866
139.07	X	5.33	357
139.70	X	5.33	BS867
142.24	X	5.33	358
142.88	X	5.33	BS868
145.42	X	5.33	359
146.05	X	5.33	BS869
148.59	X	5.33	360
149.23	X	5.33	BS870
151.77	X	5.33	361
155.00	X	5.33	BS644
158.12	X	5.33	362
161.30	X	5.33	BS645
164.47	X	5.33	363
167.70	X	5.33	BS646
170.82	X	5.33	364
174.00	X	5.33	BS647
177.17	X	5.33	365
183.52	X	5.33	366
189.87	X	5.33	367
196.22	X	5.33	368
202.57	X	5.33	369
208.92	X	5.33	370
215.27	X	5.33	371
221.62	X	5.33	372
227.97	X	5.33	373
234.32	X	5.33	374
240.67	X	5.33	375
247.02	X	5.33	376
253.37	X	5.33	377
266.07	X	5.33	378
278.77	X	5.33	379
291.47	X	5.33	380
291.69	X	5.33	
304.17	X	5.33	381
329.55	X	5.33	382
354.97	X	5.33	383
380.37	X	5.33	384
405.26	X	5.33	385
430.66	X	5.33	386
456.06	X	5.33	387
481.46	X	5.33	388
491.49	X	5.33	
506.86	X	5.33	389
532.26	X	5.33	390
557.66	X	5.33	391

Inside Diameter mm		Cross Section mm	Size Cross Reference
582.65	X	5.33	392
608.10	X	5.33	393
633.50	X	5.33	394
658.88	X	5.33	395
702.66	X	5.33	
34.00	X	5.50	
72.00	X	5.50	
75.00	X	5.50	
145.00	X	5.50	
24.20	X	5.70	
35.20	X	5.70	
36.20	X	5.70	
37.20	X	5.70	
39.20	X	5.70	
41.20	X	5.70	
44.20	X	5.70	
44.30	X	5.70	
45.20	X	5.70	
45.30	X	5.70	
47.20	X	5.70	
47.60	X	5.70	P48A
49.20	X	5.70	
49.30	X	5.70	
49.60	X	5.70	P50A
51.20	X	5.70	
51.60	X	5.70	P52
52.20	X	5.70	
52.30	X	5.70	
52.50	X	5.70	
52.60	X	5.70	P53
53.00	X	5.70	
54.20	X	5.70	
54.30	X	5.70	
54.60	X	5.70	P55
55.20	X	5.70	
55.30	X	5.70	
55.60	X	5.70	P56
57.20	X	5.70	
57.60	X	5.70	P58
59.20	X	5.70	
59.30	X	5.70	
59.60	X	5.70	P60
59.70	X	5.70	
61.20	X	5.70	
61.60	X	5.70	P62
62.00	X	5.70	
62.20	X	5.70	
62.30	X	5.70	
62.60	X	5.70	P63
64.00	X	5.70	
64.20	X	5.70	
64.30	X	5.70	
64.60	X	5.70	P65
66.60	X	5.70	P67
67.20	X	5.70	
67.60	X	5.70	P68

Inside Diameter mm		Cross Section mm	Size Cross Reference
69.00	X	5.70	
69.20	X	5.70	
69.30	X	5.70	
69.60	X	5.70	P70
70.20	X	5.70	
70.60	X	5.70	P71
71.20	X	5.70	
72.20	X	5.70	
72.30	X	5.70	
74.00	X	5.70	
74.20	X	5.70	
74.30	X	5.70	
74.60	X	5.70	P75
77.20	X	5.70	
79.00	X	5.70	
79.20	X	5.70	
79.30	X	5.70	
79.60	X	5.70	P80
81.20	X	5.70	
82.20	X	5.70	
84.00	X	5.70	
84.10	X	5.70	
84.20	X	5.70	
84.30	X	5.70	
84.60	X	5.70	P85
87.20	X	5.70	
89.00	X	5.70	
89.10	X	5.70	
89.20	X	5.70	
89.30	X	5.70	
89.60	X	5.70	P90
92.20	X	5.70	
94.00	X	5.70	
94.10	X	5.70	
94.20	X	5.70	
94.30	X	5.70	
94.60	X	5.70	P95
97.20	X	5.70	
99.00	X	5.70	
99.10	X	5.70	
99.20	X	5.70	
99.30	X	5.70	
99.60	X	5.70	P100
101.60	X	5.70	P102
104.00	X	5.70	
104.10	X	5.70	
104.20	X	5.70	
104.30	X	5.70	
104.60	X	5.70	P105
109.00	X	5.70	
109.10	X	5.70	
109.20	X	5.70	
109.30	X	5.70	
111.60	X	5.70	P112
114.00	X	5.70	
114.20	X	5.70	

Inside Diameter mm		Cross Section mm	Size Cross Reference
114.30	X	5.70	
114.60	X	5.70	P115
119.00	X	5.70	
119.20	X	5.70	
119.30	X	5.70	
119.50	X	5.70	
119.60	X	5.70	P120
124.00	X	5.70	
124.30	X	5.70	
124.60	X	5.70	P125
125.30	X	5.70	
129.20	X	5.70	
129.30	X	5.70	
129.60	X	5.70	P130
131.60	X	5.70	P132
132.20	X	5.70	
133.20	X	5.70	
134.20	X	5.70	
134.30	X	5.70	
134.60	X	5.70	P135
139.20	X	5.70	
139.30	X	5.70	
139.60	X	5.70	P140
144.20	X	5.70	
144.30	X	5.70	
144.60	X	5.70	P145
149.20	X	5.70	
149.30	X	5.70	G150
149.60	X	5.70	P150
154.30	X	5.70	G155
159.30	X	5.70	G160
164.20	X	5.70	
164.30	X	5.70	G165
168.00	X	5.70	
169.30	X	5.70	G170
174.20	X	5.70	
174.30	X	5.70	G175
179.30	X	5.70	G180
184.30	X	5.70	G185
189.20	X	5.70	
189.30	X	5.70	G190
194.20	X	5.70	
194.30	X	5.70	G195
199.20	X	5.70	
199.30	X	5.70	G200
204.20	X	5.70	
209.20	X	5.70	
209.30	X	5.70	G210
219.30	X	5.70	G220
229.30	X	5.70	G230
234.30	X	5.70	
239.30	X	5.70	G240
249.30	X	5.70	G250
259.30	X	5.70	G260
269.30	X	5.70	G270
279.30	X	5.70	G280

Inside Diameter mm		Cross Section mm	Size Cross Reference
289.20	X	5.70	
289.30	X	5.70	G290
299.30	X	5.70	G300
319.30	X	5.70	
329.30	X	5.70	
339.30	X	5.70	
349.30	X	5.70	
359.30	X	5.70	
379.30	X	5.70	
399.30	X	5.70	
419.30	X	5.70	
439.30	X	5.70	
449.20	X	5.70	
459.30	X	5.70	
479.30	X	5.70	
499.30	X	5.70	
519.30	X	5.70	
529.30	X	5.70	
594.00	X	5.70	
594.30	X	5.70	
725.00	X	5.70	
11.70	X	5.80	
218.00	X	5.80	
6.00	X	6.00	
7.00	X	6.00	
9.00	X	6.00	
10.00	X	6.00	
11.00	X	6.00	
12.00	X	6.00	
13.00	X	6.00	
14.00	X	6.00	
15.00	X	6.00	
16.00	X	6.00	
18.00	X	6.00	
19.00	X	6.00	
19.50	X	6.00	
20.00	X	6.00	
21.00	X	6.00	
22.00	X	6.00	
23.00	X	6.00	
23.50	X	6.00	
24.00	X	6.00	
25.00	X	6.00	
26.00	X	6.00	
27.00	X	6.00	
28.00	X	6.00	
29.00	X	6.00	
30.00	X	6.00	
31.00	X	6.00	
32.00	X	6.00	
33.00	X	6.00	
34.00	X	6.00	
35.00	X	6.00	
36.00	X	6.00	
37.00	X	6.00	
38.00	X	6.00	

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Inside Diameter mm		Cross Section mm	Size Cross Reference
39.00	X	6.00	
39.50	X	6.00	
40.00	X	6.00	
41.00	X	6.00	
41.50	X	6.00	
42.00	X	6.00	
43.00	X	6.00	
44.00	X	6.00	
44.50	X	6.00	
45.00	X	6.00	
46.00	X	6.00	
47.00	X	6.00	
48.00	X	6.00	
49.00	X	6.00	
50.00	X	6.00	
51.00	X	6.00	
52.00	X	6.00	
53.00	X	6.00	
54.00	X	6.00	
55.00	X	6.00	
56.00	X	6.00	
57.00	X	6.00	
58.00	X	6.00	
59.50	X	6.00	
60.00	X	6.00	
61.00	X	6.00	
62.00	X	6.00	
63.00	X	6.00	
64.00	X	6.00	
65.00	X	6.00	
66.00	X	6.00	
67.00	X	6.00	
68.00	X	6.00	
69.00	X	6.00	
70.00	X	6.00	
71.00	X	6.00	
72.00	X	6.00	
73.00	X	6.00	
74.00	X	6.00	
75.00	X	6.00	
76.00	X	6.00	
78.00	X	6.00	
78.50	X	6.00	
79.00	X	6.00	
80.00	X	6.00	
81.00	X	6.00	
81.50	X	6.00	
84.00	X	6.00	
85.00	X	6.00	
86.00	X	6.00	
88.00	X	6.00	
89.00	X	6.00	
90.00	X	6.00	
92.00	X	6.00	
93.00	X	6.00	
95.00	X	6.00	

Inside Diameter mm		Cross Section mm	Size Cross Reference
96.00	X	6.00	
98.00	X	6.00	
99.00	X	6.00	
100.00	X	6.00	
101.00	X	6.00	
103.00	X	6.00	
104.00	X	6.00	
104.50	X	6.00	
105.00	X	6.00	
106.00	X	6.00	
108.00	X	6.00	
110.00	X	6.00	
111.00	X	6.00	
112.00	X	6.00	
114.00	X	6.00	
115.00	X	6.00	
118.00	X	6.00	
120.00	X	6.00	
122.00	X	6.00	
123.00	X	6.00	
124.00	X	6.00	
125.00	X	6.00	
126.00	X	6.00	
128.00	X	6.00	
130.00	X	6.00	
132.00	X	6.00	
134.00	X	6.00	
135.00	X	6.00	
136.00	X	6.00	
138.00	X	6.00	
139.20	X	6.00	
140.00	X	6.00	
142.00	X	6.00	
143.00	X	6.00	
145.00	X	6.00	
146.00	X	6.00	
148.00	X	6.00	
150.00	X	6.00	
153.00	X	6.00	
154.00	X	6.00	
155.00	X	6.00	
155.50	X	6.00	
156.00	X	6.00	
157.00	X	6.00	
158.00	X	6.00	
159.00	X	6.00	
160.00	X	6.00	
162.00	X	6.00	
165.00	X	6.00	
166.00	X	6.00	
169.00	X	6.00	
170.00	X	6.00	
172.00	X	6.00	
175.00	X	6.00	
176.00	X	6.00	
180.00	X	6.00	

Inside Diameter mm		Cross Section mm	Size Cross Reference
182.00	X	6.00	
184.00	X	6.00	
185.00	X	6.00	
188.00	X	6.00	
190.00	X	6.00	
191.20	X	6.00	
193.00	X	6.00	
195.00	X	6.00	
196.00	X	6.00	
198.00	X	6.00	
200.00	X	6.00	
201.00	X	6.00	
202.00	X	6.00	
203.00	X	6.00	
203.50	X	6.00	
204.00	X	6.00	
205.00	X	6.00	
206.00	X	6.00	
208.00	X	6.00	
210.00	X	6.00	
212.00	X	6.00	
215.00	X	6.00	
216.00	X	6.00	
217.00	X	6.00	
218.00	X	6.00	
220.00	X	6.00	
221.00	X	6.00	
222.50	X	6.00	V225
222.50	X	6.00	
225.00	X	6.00	
226.00	X	6.00	
229.00	X	6.00	
230.00	X	6.00	
235.00	X	6.00	
236.00	X	6.00	
237.00	X	6.00	
237.50	X	6.00	
238.00	X	6.00	
240.00	X	6.00	
242.00	X	6.00	
244.00	X	6.00	
247.00	X	6.00	
249.00	X	6.00	
250.00	X	6.00	
258.00	X	6.00	
259.00	X	6.00	
260.00	X	6.00	
262.00	X	6.00	
265.00	X	6.00	
266.00	X	6.00	
270.00	X	6.00	
272.00	X	6.00	V275
272.00	X	6.00	
278.00	X	6.00	
280.00	X	6.00	
284.00	X	6.00	

Inside Diameter mm		Cross Section mm	Size Cross Reference
285.00	X	6.00	
288.00	X	6.00	
290.00	X	6.00	
294.00	X	6.00	
295.00	X	6.00	
300.00	X	6.00	
301.00	X	6.00	
305.00	X	6.00	
310.00	X	6.00	
311.00	X	6.00	
315.00	X	6.00	
320.00	X	6.00	
321.50	X	6.00	V325
321.50	X	6.00	
324.00	X	6.00	
325.00	X	6.00	
330.00	X	6.00	
333.00	X	6.00	
335.00	X	6.00	
338.00	X	6.00	
340.00	X	6.00	
345.00	X	6.00	
347.00	X	6.00	
348.00	X	6.00	
350.00	X	6.00	
355.00	X	6.00	
358.00	X	6.00	
360.00	X	6.00	
365.00	X	6.00	
368.00	X	6.00	
370.00	X	6.00	
375.00	X	6.00	
376.00	X	6.00	V380
376.00	X	6.00	
380.00	X	6.00	
385.00	X	6.00	
386.00	X	6.00	
388.00	X	6.00	
389.00	X	6.00	
390.00	X	6.00	
392.00	X	6.00	
394.00	X	6.00	
395.00	X	6.00	
398.00	X	6.00	
400.00	X	6.00	
415.00	X	6.00	
422.00	X	6.00	
425.50	X	6.00	V430
429.00	X	6.00	
446.00	X	6.00	
448.00	X	6.00	
450.00	X	6.00	
453.00	X	6.00	
470.00	X	6.00	
478.00	X	6.00	
480.00	X	6.00	

Inside Diameter mm		Cross Section mm	Size Cross Reference
483.00	X	6.00	
486.00	X	6.00	
489.00	X	6.00	
500.00	X	6.00	
504.00	X	6.00	
505.00	X	6.00	
508.00	X	6.00	
510.00	X	6.00	
516.00	X	6.00	
530.00	X	6.00	
540.00	X	6.00	
544.00	X	6.00	
549.00	X	6.00	
552.00	X	6.00	
555.00	X	6.00	
560.00	X	6.00	
569.00	X	6.00	
575.00	X	6.00	
579.00	X	6.00	
422.20	X	6.20	
610.00	X	6.35	
50.00	X	6.50	
57.00	X	6.50	
422.20	X	6.90	
34.29	X	6.99	400
37.47	X	6.99	401
40.64	X	6.99	402
43.82	X	6.99	403
45.59	X	6.99	405
46.99	X	6.99	404
53.34	X	6.99	406
56.52	X	6.99	407
59.69	X	6.99	408
62.87	X	6.99	409
66.04	X	6.99	410
69.22	X	6.99	411
72.39	X	6.99	412
75.57	X	6.99	413
78.74	X	6.99	414
81.92	X	6.99	415
85.09	X	6.99	416
88.27	X	6.99	417
91.44	X	6.99	418
94.62	X	6.99	419
97.79	X	6.99	420
100.97	X	6.99	421
104.14	X	6.99	422
107.32	X	6.99	423
110.49	X	6.99	424
113.67	X	6.99	425
114.70	X	6.99	BS624
116.84	X	6.99	426
120.02	X	6.99	427
123.19	X	6.99	428
124.60	X	6.99	BS625
126.37	X	6.99	429

Inside Diameter mm		Cross Section mm	Size Cross Reference
129.54	X	6.99	430
132.72	X	6.99	431
134.50	X	6.99	BS626
135.89	X	6.99	432
139.07	X	6.99	433
142.24	X	6.99	434
145.42	X	6.99	435
148.59	X	6.99	436
151.77	X	6.99	437
155.60	X	6.99	BS872
158.12	X	6.99	438
159.50	X	6.99	BS627
161.90	X	6.99	BS874
164.47	X	6.99	439
166.70	X	6.99	BS628
168.30	X	6.99	BS876
170.82	X	6.99	440
174.60	X	6.99	BS878
177.17	X	6.99	441
181.00	X	6.99	BS880
183.52	X	6.99	442
187.30	X	6.99	BS882
189.87	X	6.99	443
193.70	X	6.99	BS884
196.22	X	6.99	444
200.00	X	6.99	BS886
202.57	X	6.99	445
208.92	X	6.99	BS674
215.27	X	6.99	446
221.62	X	6.99	BS676
227.97	X	6.99	447
234.32	X	6.99	BS678
240.67	X	6.99	448
247.00	X	6.99	BS680
253.37	X	6.99	449
259.70	X	6.99	BS682
266.07	X	6.99	450
272.40	X	6.99	BS684
278.77	X	6.99	451
285.10	X	6.99	BS686
291.47	X	6.99	452
297.80	X	6.99	BS688
304.17	X	6.99	453
310.50	X	6.99	BS648
316.87	X	6.99	454
323.20	X	6.99	BS649
329.57	X	6.99	455
335.90	X	6.99	BS650
342.27	X	6.99	456
354.97	X	6.99	457
367.67	X	6.99	458
380.37	X	6.99	459
393.07	X	6.99	460
405.26	X	6.99	461
417.96	X	6.99	462
430.66	X	6.99	463

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Inside Diameter mm		Cross Section mm	Size Cross Reference
443.36	X	6.99	464
456.06	X	6.99	465
468.76	X	6.99	466
481.46	X	6.99	467
494.16	X	6.99	468
506.86	X	6.99	469
532.26	X	6.99	470
557.66	X	6.99	471
582.65	X	6.99	472
608.10	X	6.99	473
633.50	X	6.99	474
658.85	X	6.99	475
675.16	X	6.99	
12.00	X	7.00	
54.00	X	7.00	
60.00	X	7.00	
70.00	X	7.00	
75.00	X	7.00	
82.00	X	7.00	
90.00	X	7.00	
95.00	X	7.00	
105.00	X	7.00	
110.00	X	7.00	
192.00	X	7.00	
206.00	X	7.00	
212.00	X	7.00	
218.00	X	7.00	
224.00	X	7.00	
230.00	X	7.00	
236.00	X	7.00	
243.00	X	7.00	
250.00	X	7.00	
250.37	X	7.00	
258.00	X	7.00	
265.00	X	7.00	
272.00	X	7.00	
280.00	X	7.00	
290.00	X	7.00	
300.00	X	7.00	
307.00	X	7.00	
315.00	X	7.00	
325.00	X	7.00	
335.00	X	7.00	
345.00	X	7.00	
355.00	X	7.00	
360.00	X	7.00	
365.00	X	7.00	
375.00	X	7.00	
387.00	X	7.00	
400.00	X	7.00	
412.00	X	7.00	
425.00	X	7.00	
437.00	X	7.00	
450.00	X	7.00	
457.20	X	7.00	
462.00	X	7.00	

Inside Diameter mm		Cross Section mm	Size Cross Reference
475.00	X	7.00	
487.00	X	7.00	
490.00	X	7.00	
494.67	X	7.00	
500.00	X	7.00	
515.00	X	7.00	
530.00	X	7.00	
545.00	X	7.00	
545.47	X	7.00	
560.00	X	7.00	
580.00	X	7.00	
596.27	X	7.00	
600.00	X	7.00	
615.00	X	7.00	
630.00	X	7.00	
647.07	X	7.00	
650.00	X	7.00	
670.00	X	7.00	
699.00	X	7.00	
724.00	X	7.00	
730.50	X	7.00	
745.00	X	7.00	
760.00	X	7.00	
880.00	X	7.00	
75.00	X	7.50	
25.00	X	8.00	
42.00	X	8.00	
57.00	X	8.00	
60.00	X	8.00	
97.00	X	8.00	
100.00	X	8.00	
108.00	X	8.00	
114.00	X	8.00	
150.00	X	8.00	
160.00	X	8.00	
180.00	X	8.00	
195.00	X	8.00	
216.00	X	8.00	
226.00	X	8.00	
230.00	X	8.00	
240.00	X	8.00	
242.00	X	8.00	
260.00	X	8.00	
265.00	X	8.00	
280.00	X	8.00	
310.00	X	8.00	
326.00	X	8.00	
330.00	X	8.00	
350.00	X	8.00	
360.00	X	8.00	
400.00	X	8.00	
425.00	X	8.00	
450.00	X	8.00	
460.00	X	8.00	
490.00	X	8.00	
500.00	X	8.00	

Inside Diameter mm		Cross Section mm	Size Cross Reference
520.00	X	8.00	
630.00	X	8.00	
638.00	X	8.00	
800.00	X	8.00	
125.00	X	8.30	
144.10	X	8.40	
149.10	X	8.40	
149.50	X	8.40	P150A
154.10	X	8.40	
154.50	X	8.40	P155
159.10	X	8.40	
159.50	X	8.40	P160
164.10	X	8.40	
164.50	X	8.40	P165
169.10	X	8.40	
169.50	X	8.40	P170
174.10	X	8.40	
174.50	X	8.40	P175
179.10	X	8.40	
179.50	X	8.40	P180
184.10	X	8.40	
184.50	X	8.40	P185
189.10	X	8.40	
189.50	X	8.40	P190
194.10	X	8.40	
194.50	X	8.40	P195
199.10	X	8.40	P200
204.10	X	8.40	
204.50	X	8.40	P205
208.50	X	8.40	P209
209.10	X	8.40	
209.50	X	8.40	P210
214.50	X	8.40	P215
219.10	X	8.40	
219.50	X	8.40	P220
224.50	X	8.40	P225
229.10	X	8.40	
229.50	X	8.40	P230
234.10	X	8.40	
234.50	X	8.40	P235
239.10	X	8.40	
239.50	X	8.40	P240
244.50	X	8.40	P245
249.10	X	8.40	
249.50	X	8.40	P250
254.50	X	8.40	P255
259.50	X	8.40	P260
264.50	X	8.40	P265
269.50	X	8.40	P270
274.50	X	8.40	P275
279.50	X	8.40	P280
284.50	X	8.40	P285
289.50	X	8.40	P290
294.50	X	8.40	P295
299.50	X	8.40	P300
304.00	X	8.40	

Inside Diameter mm		Cross Section mm	Size Cross Reference
314.50	X	8.40	P315
319.50	X	8.40	P320
334.50	X	8.40	P335
339.50	X	8.40	P340
354.50	X	8.40	P355
359.50	X	8.40	P360
374.50	X	8.40	P375
375.00	X	8.40	
384.50	X	8.40	P385
399.50	X	8.40	P400
75.00	X	9.00	
84.00	X	9.00	
205.00	X	9.00	
316.00	X	9.00	
335.00	X	9.00	
360.00	X	9.00	
402.00	X	9.00	
451.00	X	9.00	
480.00	X	9.00	
545.00	X	9.00	
35.00	X	10.00	
38.00	X	10.00	
92.00	X	10.00	
105.00	X	10.00	
120.00	X	10.00	
140.00	X	10.00	
160.00	X	10.00	
195.00	X	10.00	
205.00	X	10.00	
228.00	X	10.00	
264.00	X	10.00	
270.00	X	10.00	
280.00	X	10.00	
292.00	X	10.00	
300.00	X	10.00	
315.00	X	10.00	
325.00	X	10.00	
330.00	X	10.00	
340.00	X	10.00	
360.00	X	10.00	
380.00	X	10.00	
450.00	X	10.00	
475.00	X	10.00	V480
524.50	X	10.00	V530
579.00	X	10.00	V585
633.50	X	10.00	V640
683.00	X	10.00	V690
700.00	X	10.00	
732.50	X	10.00	V740
782.00	X	10.00	V790
836.50	X	10.00	V845
1044.00	X	10.00	V1055

Your Notes

Inside Diameter mm		Cross Section mm	Size Cross Reference

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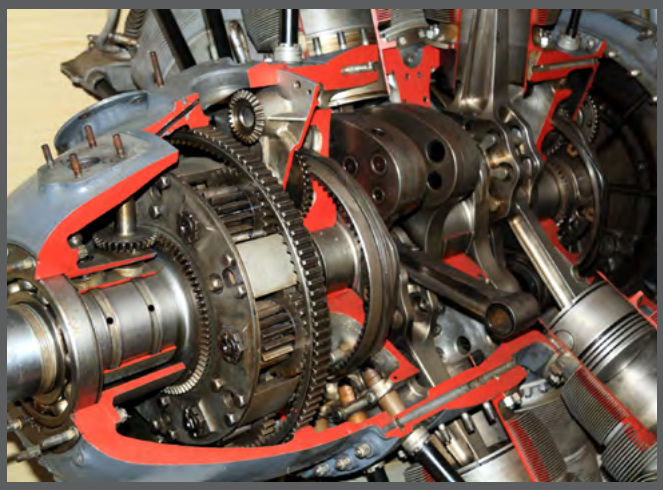
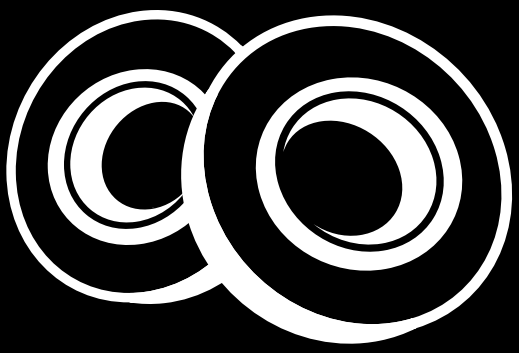




OIL SEALS

OIL SEALS

Oil Seals are a good resource for any application where foreign media such as oil, grease and dust are concerns. A variety of Lip, Case, and Spring materials are available for your review while you make your seal selection.

LIP, CASE AND SPRING MATERIALS

LIP MATERIALS

NITRILE BUNA-N 70 DUROMETER

Nitrile Buna-N 70 durometer compound is the standard material for our seals and is recommended for a majority of common applications.

Nitrile lip seals work well within the temperature range of -65°F to 250°F and provide compatibility with water and most common mineral oil and greases.

POLYACRYLATE

Polyacrylate compounds are recommended for higher temperature applications, ranging from -30°F to 300°F.

They also work well with mineral oils, EP additives and greases. However, they offer poor sealing in dry running conditions and cost more than Nitrile.

SILICONE

Silicone compounds offer the widest range of normal operating temperatures ranging from -90°F to 340°F.

However, they do not perform well in dry running conditions, and should not be used with EP compounds and oxidized oils.

VITON®

Viton® compounds are premium lip materials offering the widest temperature range and chemical resistance. Viton® will handle temperatures from -40°F to over 400°F (-40°C to over 240°C). Viton® will resist most special lubricants and chemicals that can destroy Nitrile, Polyacrylates and Silicones.

Viton® is extremely resistant to abrasion and provides superior wear performance. Viton® works in dry running applications, but only for intermittent periods.

Graphite is available as an additive to any compound. Normally graphite is added at a 3% factor to aid in lubricity.

CASE AND SPRING MATERIALS

The cases and springs for our seal products are produced from carbon steel. In applications where corrosion resistance is important, either case or spring or both can be produced from stainless steel. In addition, rubber coated seals can provide the best resistance to corrosive environments in the most economical design. HYPALON® coating is an O.D. sealant which is available on any metal case design by customer request.

LIP, CASE AND SPRING TABLES

The following tables identify the most common lip and case designs. Additional, more complex designs are available for special applications; however, the lip and case designs below represent those which will fill the needs of most seal requirements.

LIP DESIGN

The following designations indicate the configuration of the sealing members:

V = Single Lip
K = Double Lip
S = Single Lip, Spring Loaded
OB = Oil Bath (Prefix)
T = Double Lip, Spring Loaded
WS = Wiper w/Bronze Scraper
U = Triple Lip
D = Double Lip, Double Spring Loaded
WP = Wiper Lip Design
O = External Seal Type

CASE AND SPRING DESIGN

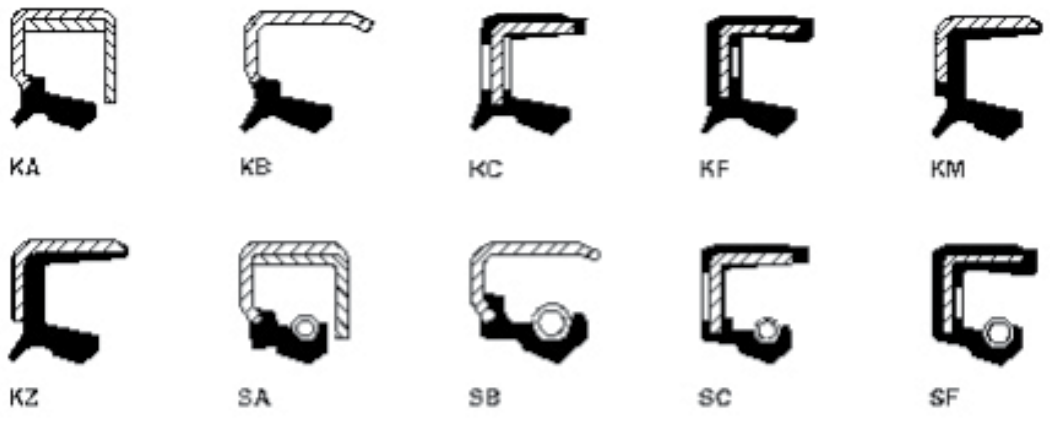
The following designations indicate the case type or any special features of the basic case designs. The designations for lip designs, attachment configuration and case style are then put together to indicate the specific seal type desired.

A = Double Case
B = Lip Attached to End of Case Only
C = Fully Rubberized Casing
E = Metal Reinforced Sealing Lip
F = Special Fully Encased Design
G = Ridged Rubber Coated O.D.
H = Reverse Case Style
J = Special Flanged Indented Case
M = Fully Rubberized Inner Case
N = Short Flex High Pressure Design
P = Flanged Case
Q = All Rubber Split Seal Design
SP = Other Special Feature
X = Special Fitting Condition Design
Y = Indented Back Case
Z = Rubber Covered Chamber

NOTE: Basic single case design has no designation

OIL SEAL LIP DESIGN CHART

The following Lip Seal designs are the most common, if your application calls for a design not listed below, please contact Monroe.




SM


SZ


TA


TB


TC


TF


TM


TZ


VA


VB


KBJ


KBP


KCJ


SAP


SBJ


SCJ


SH


SL


TAP


TBJ


TBP


TCJ


TEA


TEB


TEC


TL


VAP


VBJ


VBP


VCJ


SEC

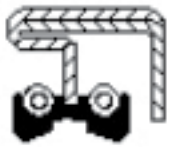

TXA

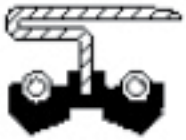

TXB


TXC


VAY


VG


DA


DB


DC


SCN


SG


SO


SQS


TCN


TG


VA


VB

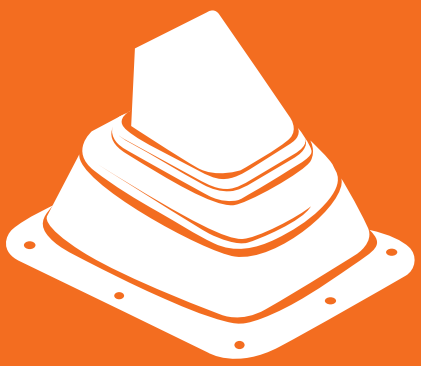

VC


WPB


WPC


WPM


WPR

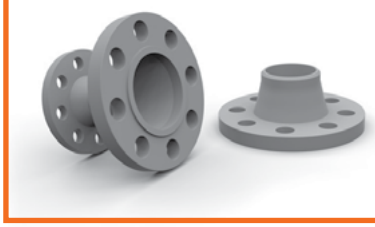


CUSTOM MOLDINGS

CUSTOM MOLDINGS

Custom molded parts are very design specific. Whether they are compression, injection or transfer molded, Monroe has years of experience providing customers with custom molded parts that are unique to their application. Our custom molded part experience incorporates the certification of the material within the confines of each specification, while meeting and overseeing necessary quality reports.

COMPRESSION MOLDED CUSTOM PARTS



This process is typically used when an application calls for high quantities in production runs, medium shore in durometer or hardness, or if the material call-out is one that requires less common, but more expensive materials.

An excess of your chosen material is placed into the cavity of the mold to guarantee total cavity fill. Heat and pressure are applied, which causes the rubber compound to flow and fill the cavity, with any overflow going through the overflow grooves. This overflow, or flash, can be a concern when the parts are of critical dimension, larger diameter or of a more expensive variety of a rubber compound.

Compression molding reduces the amount of flash created in the molding process. Further reduction of this flash on your custom molded part is done in the deflashing process for any type of molding you may choose. Depending on your parts specifications, this deflashing is done either by tear trimming, tumbling, grinding or cryogenic deflashing.

LIQUID INJECTION MOLDING (LIM)

Liquid injection molding is done very similar to standard injection molding. The mold is heated and closed before uncured rubber is injected into the mold.

One difference is liquid injection materials come in pails or barrels and are two parts mixed together; one being the catalyst which uses platinum in the process, the other being liquid silicone. The curing time is much shorter than with a typical injection process. This will often lead to a lower cost with high volume requirements.

The raw materials are also received in sealed containers and are typically pumped directly from the barrels to the machine, significantly decreasing any contamination. It is a preferred form of molding in the medical industry as it is considered a closed molding system. Monroe is able to provide product certified to a Class VI environment.

INJECTION MOLDED CUSTOM PARTS

This very automated process is commonly used for simple designs that have a high quantity required for production. The rubber compound is heated to such a degree that it can flow with ease through a number of runners into the mold, after being injected under pressure from its heating chamber. This process can be ideal, but for just the right compound and the right application.

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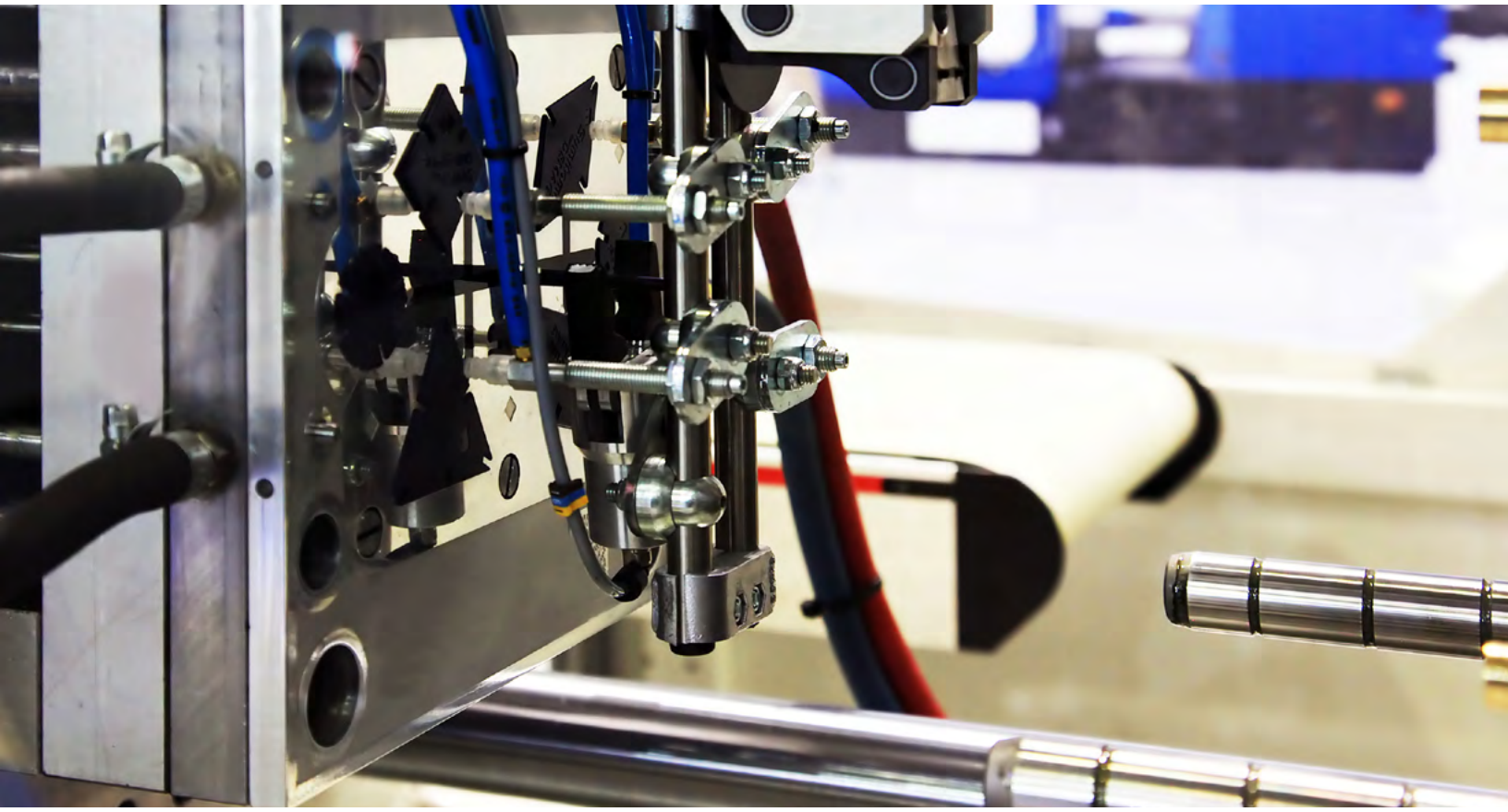
TRANSFER MOLDED CUSTOM PARTS

This process is different than compression molding. Your material is placed in a pot below the top plate and above the gates, creating an even flow of material into the cavity.

The rubber compound is then forced from the pot and into the gates. With your finished product, you will see what are known as gate marks, which indicate where gates come into play with the cavity.



Along with our custom molding capabilities Monroe Seals offers many other processes for various materials and profiles for unique applications. We serve customers across North America in the automotive, medical, filtration, heavy equipment, oil & gas, and transportation industry sectors.

OUR CAPABILITIES


Calendering

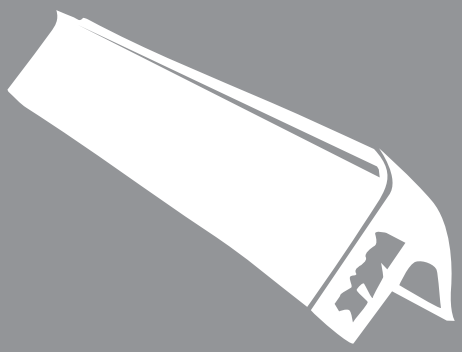

Cutting Extrusions


Machining


Molding


Stamping


Vulcanizing



EXTRUDED RUBBER

EXTRUDED RUBBER

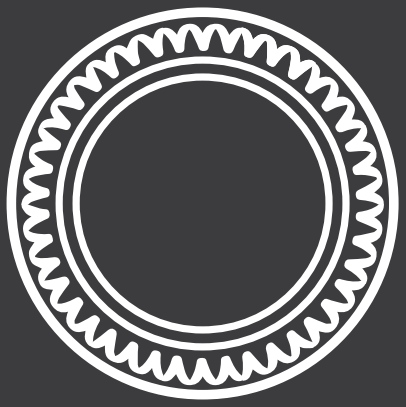
The use of extruded seals is extremely diverse. You will find extrusions in many types of manufacturing processes for a variety of purposes. Applications include, but are not limited to: door and window seals in the architectural environment and automotive, appliance and aircraft industries; bearing seals; bumpers; heater gaskets; radiator overflow tubing; vacuum cleaner belts; ladder foot grips, and cushions on bars or handles. The applications are endless and expanding rapidly with innovative engineering of extrudable materials.

Materials which can be extruded include dense and sponge rubber from a variety of compounds to meet your specific environment and application.
Some of these compounds include:

- Nitrile
- EPDM
- Natural rubber
- Neoprene
- Viton®
- Urethane
- Silicone

Whether your application requires a long or short run, Monroe will service your needs with the appropriate compound.

Extrusions can be diversified for use by many secondary operations such as cut lengths, vulcanized to be endless, and formed and notched to allow a variety of shapes and sizes of products.
Most extrusions are custom profiles which are tooled to meet your blueprint requirements. This is an extremely competitive method of manufacturing due to reasonable tooling costs. There are also standard cord (rod), tubing and channels available.



SPRING ENERGIZED SEALS

SPRING ENERGIZED SEALS

Due to the nature of spring energized seal applications, a wide range of available seal jacket and seal spring materials are offered to customers to provide an engineered product that fits with the entire scope of their various applications.

Spring energized seals are a last resort for most companies that consider using them in their application. Typically, by the time a company has to resort to the use of a spring energized seal, all other attempts at using more conventional seals have failed. This is exactly why such a wide range of materials for these seals are available; to provide the right combination of materials to completely meet the specifications set by the parameters of an application. This section will touch on seal jacket materials, seal spring materials and describe their use.

SEAL JACKET MATERIALS

Seal Jacket Materials fall into four general categories: PTFE (Virgin Teflon®, Filled PTFE, Alloyed PTFE and Thermoplastics). Each has specific application niches, with benefits as well as shortcomings. An attempt will be made to inform the reader of the relative shortcomings of each material so that you may be aware of potential trouble spots when applying a material to specific applications.

PTFE

PTFE is the premium of spring energized seal materials. It is readily available from a number of sources in resin form or as compression molded shapes. For seals, the material should be processed for maximum amorphousity (highest elongation, smallest grain structure).

PTFE is excellent for most low and medium pressure static applications. PTFE will handle temperatures up to approximately 350°F without sacrificing most of its properties. It is excellent for dynamic applications where speeds and/or cycles are minimal. It provides the lowest friction of any seal material and is also very kind to the metal speed operation.

FILLED PTFE

5% Molybdenum Disulphide Filled PTFE.
5% Moly filled PTFE is used for increased temperature (up to 400°F) and pressure applications. It provides good sealing characteristics (low compressive modulus) while offering better extrusion resistance and lower wear than unfilled PTFE. It is useful for liquids and gasses where high temperatures, pressures and cycling rates are present. It loses some sealability to PTFE in lower temperature and pressure applications. It should be processed for maximum amorphousity.

15% Graphite Filled PTFE
15% Graphite filled PTFE is useful at high temperatures (up to 500°F). It is generally used for liquids and steam at moderate (up to 3,000 psi) pressures. Because of the heavy fill, the material becomes somewhat porous to high pressure gasses. It should be processed for maximum crystallinity.

15% Glass, Moly Filled PTFE
15% Glass, Moly Filled PTFE material was developed for sealing at very high pressures. With the right jacket design, pressures up to 40,000 psi have been successfully sealed with this material. Like 15% graphite filled PTFE, it has some porosity to high pressure and temperature gasses, however, may be the only choice in very high pressure gas systems. It should be processed for maximum crystallinity.

ALLOYED PTFE

PTFE/Ryton® alloy is a required material for seal applications involving very high speed reciprocating or rotary motions. It has a high temperature rating (up to 575°F) that makes it an excellent general purpose material with mid-range pressure requirements.

THERMOPLASTICS

UHMW Polyethylene

UHMWPE has two exceptional characteristics which make it an excellent choice for spring energized seals. It is an extremely abrasion resistant material and may be used with an abrasive media such as paint or fluids with high levels of particle contamination. It is also FDA approved for elongation properties at cryogenic temperatures. It is the best choice for cryogenic pumps, valves, etc., however, it should not be used at temperatures above 180°F.

GUR® UHMW POLYMER

GUR® UHMW, extremely close in relation to UHMW, has the following advantages: superior performance against virtually all acids, solvents, salts, etc; zero moisture absorption; and superior wear surface to nylon and other materials. Because of its self-lubricating, non-stick and wear-resistant characteristics, GUR® UHMW has been used in such applications as ore/coal, cement, gravel and mining industries. As its sister material, UHMW, GUR® has a temperature limit, it is 140°F.

Hytrel® (DuPont Polyester Elastomers)

Hytrel® is included as a material because of its high resistance to radiation. It should be specified in all nuclear applications, valves, cylinders, actuators, pipe snubbers, etc.

SEAL SPRING MATERIALS AND DESIGNS

The primary function of the spring is to provide energy to the sealing jacket for effective sealing at low system pressures. The spring also is used to compensate for the low resiliency or lack of memory of the jacket materials in relation to wear in dynamic applications. When operating conditions permit, an elastomer energizer may be used as an alternative to the metal energizer.

301 Stainless Steel Spring-MIL-S-5059 This stainless steel is the general purpose spring material. It may be used in applications involving most corrosive chemicals at all ranges of pressure and moderate temperatures.

Elgiloy Spring Elgiloy is an extremely strong cobalt/nickel alloy used in highly corrosive environments.

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V-Section Finger Spring The V-Section Finger Spring is designed to provide maximum deflection capability. Designing for deflection provides a low rate spring.

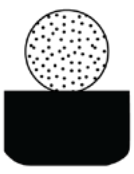
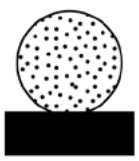
Having a low rate spring heavily deflected provides a fairly constant spring load transmittance to the sealing lip throughout most dynamic applications. It is most useful if wear compensation, low constant friction or high shaft runouts and/or disparities are design requirements.

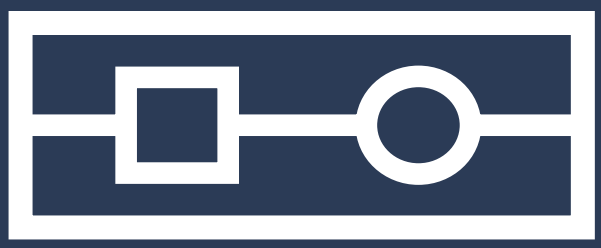
Helical Wound Spring The Helical Wound Spring is designed especially for maximum load capability. Designing for load provides a high rate spring useful for applications where maximum contact pressure is desired to provide minimum leakage.

It is useful in most static applications and in dynamic applications where shaft runouts are low and sealing requirements are stringent.

MACHINED SEAL DESIGN CHART

PTFE seals can be used to upgrade existing designs as well as to provide a positive seal for newly designed products. The following diagrams are a few of the many machined designs available from Monroe. If you do not see your required design or are unsure of the right one, please inquire. We will be glad to assist you.

 Standard Double Pump General purpose "V spring	 Standard Single Bump General purpose for rougher surfaces "V" spring	 Silicone Filled FDA approved "V" spring	 Large Cross Section Large gland cross-section "V" spring spring	 Flange Seal Prevents seal rotation "V" spring	 Scraper - Standard Can make different OD-ID designs "V" spring
 Helical spring seal Cryogenics	 Wiper High abrasion resistance	 Back-ups and wear band	 Metric, all styles and sizes	 Piston cups	 Slyd-ring, skive-cut
 Standard double bump O-ring actuated	 Glyd-ring O-ring	 V-packing	 Back-up ring O-ring	 U-packing	 Double delta O-ring



VULCANIZED SEALS

VULCANIZED SEALS

Vulcanization is a process which uses heat, rubber adhesive, pressure and time to chemically bond the two ends together. There are a variety of joints which can be bonded. Round cord or irregular profiles may be vulcanized to endless gaskets. Applications such as window frame gaskets, door gaskets, filter housing gaskets and lid gaskets. The uses are as unlimited as your imagination will allow.

Rubber extrusions may be converted to endless gaskets with a variety of vulcanization methods.

Butt Splice
Typically used for endless gaskets where there is limited or no stress at the splice.

Bevel Splice
If the cross sectional area does not allow for butt splice this may be used as an alternative providing more surface area for bonding.

Molded Splice
Many gaskets and seals can be produced economically by splicing extruded shapes to form gaskets, a radius corner or square comer can be spliced to fit a specified shape.

Step Splice
Used when a bond of maximum strength is required, yet permitting nominal deformation under compression or tension when used as a static seal.

Corner Splice
Used to produce gaskets of special configurations, they work well where the bond is not under strain and is a static application.

CONTACT OUR KNOWLEDGEABLE SALES STAFF TO DISCUSS YOUR NEEDS. WE ARE YOUR TOTAL RUBBER SOLUTION EXPERTS.

QUICK REFERENCE GUIDE TO PROPERTIES

PROPERTIES

The properties of any application are vital in considering the right seal. From atmospheric considerations to fluid pressure, elastomer hardness and other variables, Monroe offers you the following information to assist you with the selection of your seal.

- General Elastomeric Properties
- Temperature Range Chart
- Durometer Chart
- Comparison of Properties Chart
- Fluid Compatibility Tables

GENERAL ELASTOMERIC PROPERTIES

NATURAL RUBBER (NR)

Two types are most commonly used - smoked sheets and pale crepe. They are alike except in color and odor. Pale crepe is used for light colors and when odor is objectionable. Both possess exceptional elastic qualities and have good resistance to water and acids. They are compatible with synthetic rubbers and are often used in blends. Low compression set and stress relaxation, good electrical insulation and good resistance to abrasion, tear and fatigue.

Best choice for applications requiring low heat build-up, such as tires, vibration, mounts springs and bearings. Other applications include hoses, conveyor belts, gaskets, seals, rolls and rubberized fabrics.

C.R. CHLOROPRENE RUBBER (CR)

(Neoprene) Resists fats, oils and petroleum products. Stands up well in sunlight. Low flammability - burns when exposed to flames, but self-extinguishes when flame is removed. Generally good ozone, aging and chemical resistance. It has good mechanical properties over a wide temperature range.

POLYISOPRENE (IR)

A substitute for natural rubber and has very similar characteristics. Can be used in lower temperature applications than natural rubber.

STYRENE BUTADIENE RUBBERS (SBR)

Synthetic substitutes for natural rubber. Cures more slowly than natural rubber. Resistant to non-petroleum based automotive brake fluids, silicone oils and greases, glycols, alcohols, water, solutions of acids, alkalis and salts.

ISOPRENE-ISOBUTYLENE RUBBER (I.I.R., BUTYL)

Has excellent resistance to aging, heat, sunlight and ozone. Low gas & moisture permeability; high damping, excellent electrical insulation; good resistance to dry heat and steam.

CHLORINATED BUTYL (CHLOROBUTYL)

Exceptional heat stability, low compression set, low permeability to gasses and good resistance to chemicals, oxidation and tearing. Used for O-rings, gaskets, vacuum seals, membranes, steam hoses and pharmaceutical closures.

NITRILE BUTADIENE RUBBER (N.B.R., BUNA N)

Nitrile, chemically, is a copolymer of butadiene and acrylonitrile. Acrylonitrile content is varied in commercial products from %18 to %48. As the nitrile content increases, resistance to petroleum base oils and hydrocarbon fuels increases, but low temperature flexibility decreases.

Due to its excellent resistance to petroleum products, and its ability to be compounded for service over a temperature range of 65- to °275+F(54- to °135+C), nitrile is the most widely used elastomer in the seal industry today.

Inherently nitrile does not possess good resistance to ozone, sunlight or weather, but this can be substantially improved through compounding.

POLYACRYLIC (ACM)

High oil resistance and dry heat resistance up to °350F. Used primarily in applications requiring combined resistance to heat, oils, and oil additives such as O-rings, lip seals and gaskets.

EPICHLOROHYDRIN (HYDRIN) (CO, ECO, GECO)

Ozone resistance, broad temperature range and oil resistance. Typical applications include seals, gaskets, diaphragms, hoses, belting, wire and cable jackets, coated fabrics and printing rolls.

THIOKOL POLYSULFIDE (T)

More inert than most synthetics. High resistance to oil, gasoline and aromatic solvents-lacquer thinners.

Applications include gasoline and aromatic fuel hoses, coating and printing rolls, gas meter diaphragms, O-rings, pulleys, sealants and coated paper gaskets.

SILICONE AND FLUORO-SILICONE RUBBER (Q, MQ, VMQ, FMQ, FVMQ)

High and low temperature stability, exceptional release from sticking, resistance to aging, ozone and sunlight, good dielectrics and outstanding water repellency.

Applications include electrical insulators, ignition cables, gaskets, O-rings, static seals, oxygen masks, food and medical grade tubing and roll coverings.

MILLABLE URETHANES (AU/EU)

Exceptional tensile strength. Abrasion and low temperature resistance. Typical applications include hydraulic seals, gaskets, diaphragms, hoses, and wheels for skate boards.

HYPALON®, CHLOROSULFONATED POLYETHYLENE RUBBER (CSM)

High ozone and corona resistance, heat resistance up to 300°F and good color stability. Widely used in electrical applications as protective jacketing when resistance to heat, flame, ozone, weather, corrosion, chemicals and oils are important.

Other applications include coatings, weather resistant membranes, hoses and acid tank linings.

FLUORO ELASTOMERS, FLUOROCARBON (VITON®, FLUOREL) (FKM)

For extreme heat resistance-temperatures ranging to +500°F. Resistance to abrasion, oil and chemicals is outstanding. Good resistance to ozone, weathering and flame.

Main uses are as O-rings, shaft seals, gaskets, fuel hoses, diaphragms, and cable sheathing for extreme conditions.

POLYBUTADIENE (BR)

Excellent abrasion resistance. Good low temperature qualities. It is mainly used in blends with other rubbers to manufacture mechanical goods in order to increase resilience, to improve their low temperature flexibility, or to reduce their heat build-up on flexing.

ETHYLENE PROPYLENE DIENE TERPOLYMER (EPDM)

Excellent in water, steam, heat, weather, detergents, ozone and many chemicals.

Applications include O-rings, gaskets, window and door seals, wire and cable insulation, under-hood applications, hoses, and waterproofing sheets.

TFE PROPYLENE (AFLAS) TETRAFLUOROETHYLENE-PROPYLENE RUBBERS(CSM)

This elastomer is a copolymer of Tetrafluoroethylene (TFE) and propylene. Its chemical resistance is excellent across a wide range of aggressive media.

PTFE (POLYTETRAFLUOROETHYLENE)

This compound is impervious to virtually all fluids and gasses ranging from -320°F to 450°F Only molten alkaline metals and certain halogenated compounds will attack it.

ETHYLENE PROPYLENE COPOLYMER (EPM)

Resistance to chemicals, chemical solutions, heat and ozone.

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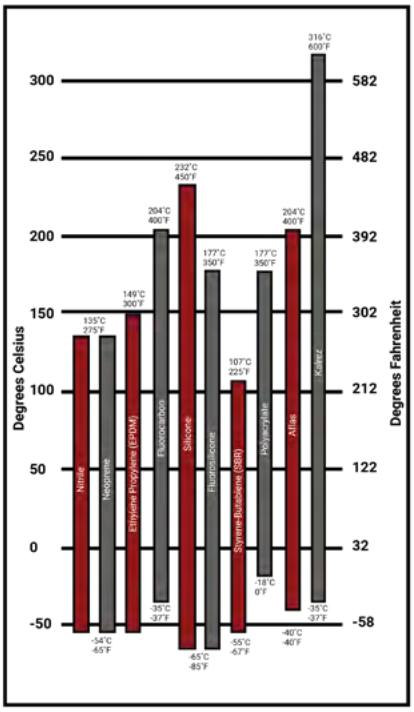
TEMPERATURE RANGE CHART

The temperature range for any compound is determined by the base elastomer used. This chart depicts the maximum temperature range for each elastomer.

The temperature range for a specific compound may not reach these maximum limits. Higher temperatures may be considered if exposure is short term or intermittent.

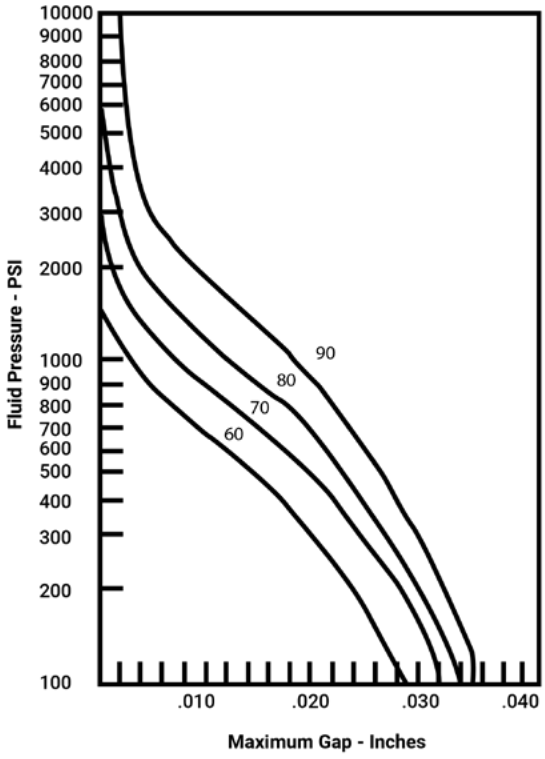


DUROMETER CHART

The hardness of rubber compounds is measured by Shore A durometer; the higher the durometer number, the harder the compound. Wherever possible 70 durometer hardness should be used as it offers the best combination of properties for most O-ring applications.

Softer compounds stretch easier and seal better on rough surfaces. Harder compounds offer greater abrasion resistance and resistance to extrusion.

Extrusion must always be considered when high pressures are used. The proper hardness may be selected from this chart by matching the fluid pressure with the maximum extrusion gap.



COMPARISON OF PROPERTIES CHART

This chart matches the general rubber properties required in most O-ring applications with the capabilities of commonly used elastomers. Since no one elastomer is rated “excellent” for all properties, compromises are sometimes necessary when selecting an elastomer for a specific O-ring application. Start with the most critical properties to narrow your choices.

E = EXCELLENT G = GOOD F = FAIR P = POOR		(1) = PROPERTY (2) = NITRILE (3) = SBR (4) = NEOPRENE (5) = ETHYLENE PROPYLENE			(6) = FLUOROCARBON (7) = FLUOROSILICONE (8) = POLYACRYLATE (9) = POLYURETHANE (10) = SILICONE				
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Ozone Resistance	P	P	GE	E	E	E	E	E	E
Weather Resistance	F	F	E	E	E	E	E	E	E
Heat Resistance	G	FG	G	E	E	E	E	F	E
Chemical Resistance	FG	FG	FG	E	E	E	P	F	GE
OIL RESISTANCE	E	P	FG	P	E	G	E	G	PG
IMPERMEABILITY COLD	G	F	G	G	G	P	E	G	P
RESISTANCE TEAR	G	G	FG	GE	FP	GE	P	G	E
RESISTANCE	FG	FG	FG	GE	F	P	FG	GE	P
Abrasion Resistance	G	G	G	GE	G	P	G	E	P
Set Resistance	GE	G	F	GE	GE	GE	F	F	GE
Dynamic Properties	GE	G	F	GE	GE	P	F	E	P
Acid Resistance	F	F	FG	G	E	FG	P	P	FG
Tensile Strength	GE	GE	G	GE	GE	F	F	E	P
Electrical Properties	F	G	F	G	F	E	F	FG	E
Water/Steam	FG	FG	F	E	FG	F	P	P	F
Flame Resistance	P	P	G	P	E	G	P	P	F

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The recommendations shown in this table are based on data supplied by Monroe's polymer manufacturers and comparison made with similar materials. These are general guidelines, and users must conduct functional tests to determine the suitability of any compound for a particular application. To aid in your selection, materials are ranked in order of increasing cost, starting with Nitriles and ending with Aflas.

R = recommended M = marginal U = unsatisfactory X = insufficient data			(1) = Fluid (2) = Nitrile (3) = SBR (4) = EPDM (5) = Neoprene (6) = Polyacrylate				(7) = Urethane (8) = Silicone (9) = Fluoroelastomer (10) = Fluorosilicone (11) = Aflas			
1	2	3	4	5	6	7	8	9	10	11
Acetaldehyde	U	U	R	U	U	U	R	U	U	X
Acetamide	R	U	R	R	U	U	M	U	R	R
Acetic Acid	M	M	R	R	U	U	R	U	U	U
Acetone	U	M	R	M	U	U	M	U	U	U
Acetophenone	U	U	R	U	U	U	U	U	U	X
Acetylene	R	R	R	R	X	X	R	R	X	X
Ammonia	R	R	R	R	U	X	R	U	U	R
Ammonium Hydroxide	R	R	R	R	U	U	R	R	R	R
Amyl Acetate	U	U	M	U	U	U	U	U	U	U
Anderol L-774	M	U	U	U	R	U	U	R	M	X
Antifreeze	R	R	R	R	U	U	R	R	X	X
Aniline	U	U	R	U	U	U	U	M	M	R
Ansul Ether	M	U	M	U	U	R	U	U	M	U
Aroclors	M	U	R	U	U	X	M	R	M	R
Askarel	R	U	U	U	U	U	U	R	M	R
ASTM #1	R	U	U	R	R	R	R	R	R	R
ASTM #3	R	U	U	U	R	R	U	R	R	R
ASTM Fuel A	R	U	U	R	R	R	U	R	R	M
ASTM Fuel B	R	U	U	U	U	R	U	R	R	U
ASTM Fuel C	R	U	U	U	U	R	U	R	M	U
ASTM Fuel D	M	U	U	U	U	R	U	R	X	X
Auto Transmission Fluid	R	U	U	M	R	R	M	R	X	R
Beer	R	R	R	R	U	U	R	R	R	R
Benzaldehyde	U	U	R	U	U	U	U	U	U	M
Benzene	U	U	U	U	U	U	U	R	R	M
Benzine	R	U	U	R	R	R	U	R	R	M
Benzoic Acid	U	U	U	U	U	U	U	R	M	R
Benzophenone	U	U	R	X	U	U	U	R	R	X
Bezyl Alcohol	U	U	R	R	U	U	X	R	M	R

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1	2	3	4	5	6	7	8	9	10	11
Butyl Amine	M	U	U	U	U	U	R	U	U	M
Butyl Carbitol	U	U	R	M	U	X	U	M	U	M
Butyl Cellosolve	M	U	R	M	U	U	X	U	U	X
Butylraldhyde	U	U	R	U	U	U	U	U	U	X
Carbitol	R	R	R	R	U	U	R	R	M	R
Carbitol Acetate	U	U	U	U	U	U	U	R	X	R
Carbon Disulfide	U	U	U	U	U	X	U	R	R	R
Carbon Tetrachloride	R	U	U	U	U	U	U	R	M	M
Carbonic Acid	R	R	R	R	R	R	R	R	R	R
Castor Oil	R	R	R	R	R	R	R	R	R	R
Cellosolve	U	R	U	U	U	U	U	U	U	M
Chassis Grease	R	U	M	R	R	X	U	R	X	X
Chloracetic Acid	U	U	R	U	U	U	X	U	U	X
Chloracetone	U	U	R	X	X	X	U	R	X	U
Chlordane	R	U	U	M	X	X	U	R	M	X
Chlorine	U	U	R	U	U	U	X	R	R	X
Chlorobenzol	U	U	U	U	U	U	U	R	X	X
Chloroform	U	U	U	U	U	U	U	R	M	U
Chorosulfonic Acid	U	U	U	U	U	U	U	U	U	M
Chrome Plating Solution	U	U	R	U	U	U	R	R	U	R
Chromic Acid	U	U	X	U	X	X	M	R	U	R
Citric Acid	R	R	R	R	X	X	R	R	R	R
Cod Liver Oil	R	U	R	R	R	U	R	R	R	R
Coffee	R	R	R	R	U	U	R	R	R	X
Corn Oil	R	U	U	U	R	U	R	R	R	R
Creosote	R	U	U	R	R	M	U	R	R	R
Creosote Oil	R	U	U	X	X	X	M	R	X	X
Creosylic Acid	U	U	U	U	U	U	U	R	M	R
Crude Oil	R	U	U	U	R	X	U	R	M	X
Cycloherxane	R	U	U	M	R	R	U	R	R	M
Cyclohexanol	R	U	U	R	X	X	U	R	R	R
Decalin	U	U	U	U	U	U	U	R	R	M
Denatured Alcohol	R	R	R	R	U	R	R	R	R	R
Diacetone	U	U	R	U	U	U	U	U	U	M
Dibutyl Amine	U	U	R	M	U	U	U	U	U	R
Dibutyl Phthalate	U	U	U	U	U	X	X	M	U	M
Dichloro Aniline	U	U	U	U	U	U	U	M	X	X
Dichloro Butane	R	U	U	U	U	U	U	R	M	R
Diesel Oil	R	U	U	M	U	U	U	R	R	R
Diethylamine	R	R	R	R	U	M	R	U	U	M
Diethyl Benzene	M	U	U	U	X	X	X	R	X	X
Diethylene Glycol	R	R	R	R	U	U	R	R	R	R
Dimrthyl Ether	U	U	U	M	M	R	U	U	U	U
Dimethyl Formamide	U	X	R	X	X	X	R	U	X	M
Dimethyl Phthalate	U	U	R	U	U	X	X	R	X	M
Dimethyl Terephthal-ate	U	U	U	U	U	U	U	R	X	X
Dioctyl Phthalate	U	U	R	U	U	U	M	R	M	M
Dioxane	U	U	R	U	U	U	U	U	U	U
Diphenyl	U	U	U	U	U	U	U	R	M	U
Dow Corning 550	U	R	R	R	R	R	R	R	R	X

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1	2	3	4	5	6	7	8	9	10	11
Dow Gard	R	R	R	R	M	M	R	R	R	X
Dowtherm A&E	U	U	U	U	U	U	U	R	M	X
Elco 28	R	U	U	M	R	R	R	R	R	X
Epoxy Resins	X	X	R	R	X	X	X	U	X	X
Ethane	R	U	U	R	R	M	U	R	M	R
Ethanol	R	R	R	R	U	R	R	R	R	X
Ethanolamine	R	R	R	R	U	M	R	U	U	R
Ethyl Acetate	U	U	R	U	U	U	R	U	U	U
Ethyl Benzene	U	U	U	U	U	U	U	R	R	U
Ethyl Cellulose	R	R	R	R	U	R	R	U	U	R
Ethyl Chloride	R	R	R	R	M	R	U	R	R	M
Ethyl Ether	M	U	M	U	U	R	U	U	M	U
Ethyl Formate	U	U	R	R	X	X	X	R	R	R
Ethyl Hexanol	M	R	R	R	X	X	X	R	R	X
Ethyl mercaptan	U	U	X	M	X	X	M	R	X	M
Ethylene Chloride	U	U	U	U	U	U	U	R	X	R
Ethylene Oxide	U	U	R	U	U	U	U	U	X	U
Formaldehyde	M	M	R	M	U	U	R	U	U	M
Formic Acid	M	R	R	R	X	X	M	U	X	X
Freon 12	R	R	R	R	X	R	U	R	U	X
Fuel Oil	R	U	U	R	R	U	U	R	R	R
Furan	U	U	X	U	U	X	X	X	X	X
Furfural	U	U	R	U	U	X	U	U	X	X
Furfuryl alcohol	U	U	R	U	U	U	U	X	U	X
Fyrquel	U	U	R	U	U	U	R	R	U	X
Gallic Acid	R	R	R	R	U	U	X	R	R	R
Gasoline	R	U	U	U	U	R	U	R	R	M
Gelatin	R	R	R	R	U	U	R	R	R	R
Glucose	R	R	R	R	X	U	R	R	R	R
Glycerine	R	R	R	R	U	U	R	R	R	R
Heptane	R	U	U	R	R	R	U	R	R	X
Hexaldehyde	U	U	R	R	X	X	R	U	U	U
Hexane	R	U	U	R	R	R	U	R	R	M
Hexanol	R	R	M	R	U	U	R	R	X	X
Home Heating Oil	R	U	U	M	R	R	R	R	X	X
Hydrazine	R	R	R	R	X	X	R	X	X	X
Hydrochloric Acid	R	M	R	R	M	U	U	R	U	R
Hydrocyanic Acid	R	R	R	R	U	X	M	R	U	R
Hydrogen Peroxide	R	R	R	R	U	X	R	R	R	R
Hydrogen Sulfide	U	U	R	R	U	X	M	U	U	R
Hydroquinone	M	U	U	U	U	X	X	R	M	X
Hypoid Gear Lube	R	U	U	M	R	R	M	R	X	X
Iodine	R	R	R	U	X	X	X	R	R	X
Isocyanate	X	X	X	X	X	X	X	R	X	X
Isooctane	R	U	U	R	R	R	U	R	R	M

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R = recommended M = marginal U = unsatisfactory X = insufficient data			(1) = Fluid (2) = Nitrile (3) = SBR (4) = EPDM (5) = Neoprene				(7) = Urethane (8) = Silicone (9) = Fluoroelastomer (10) = Fluorosilicone (11) = Aflas			
1	2	3	4	5	6	7	8	9	10	11
Iso Phorone	U	U	R	U	U	U	U	U	M	U
Isopar	R	X	U	R	R	R	U	R	X	X
Isopropanol	R	R	R	R	U	U	R	R	R	X
Isopropyl Acetate	U	U	R	U	U	U	U	U	U	X
JP-4(MIL-J5624)	R	U	U	U	R	R	U	R	M	X
JP-5(MIL-5624)	R	U	U	U	R	R	U	R	M	X
Kerosene	R	U	U	R	R	R	U	R	R	R
Lactic Acid	R	R	R	R	U	X	X	R	R	R
Lacquers	U	U	U	U	U	U	U	U	U	U
Lard	R	U	R	R	R	R	R	R	R	R
Linoleic Acid	R	U	U	R	X	X	R	R	X	R
Linseed Oil	R	U	M	M	R	X	R	R	R	R
Lye Solutions	R	R	R	R	U	U	R	R	M	R
Malathion	R	U	U	X	X	X	U	R	M	X
Maleic Acid	U	U	U	U	U	X	X	R	X	R
Mercury	R	R	R	R	X	X	X	R	X	R
Meter-Cresol	U	U	U	R	U	U	U	R	X	X
Methane	R	U	U	R	R	M	U	R	M	R
Methanol	R	R	R	R	U	U	R	U	R	X
Methyl Acetate	U	U	R	R	U	U	U	U	U	U
Methacrylic Acid	U	U	R	R	U	U	U	M	U	X
Methyl Cellosolve	M	U	R	M	U	U	U	U	U	X
Methylene Chloride	U	U	U	U	U	U	U	R	M	X
Methyl Ethyl Ketone	U	U	R	U	U	U	U	U	U	U
Methyl Mercaptan	X	X	R	X	X	X	X	X	X	X
Milk	R	R	R	R	U	U	R	R	R	R
Mineral Oil	R	U	M	R	R	R	R	R	R	R
Mineral Spirits	R	U	U	U	R	R	U	R	X	X
Monovinyl Acetylene	R	R	R	R	X	X	R	R	X	R
Mustard	X	E	R	X	X	X	R	R	X	X
Naphtha	R	U	U	U	R	R	U	R	M	M
Naphthalene	U	U	U	U	X	X	U	R	R	M
Naphthenic Acid	R	U	U	U	X	X	U	R	R	M
Natural Gas	R	R	U	R	R	R	R	R	M	R
Neatsfoot Oil	R	U	R	U	R	R	R	R	R	R
Nitric Acid	U	M	R	U	U	U	U	M	U	R
Nitrobenzene	U	U	U	U	U	U	U	R	U	X
Nitropropane	U	U	R	U	U	U	U	U	U	X
Octane	R	U	U	U	U	U	U	R	M	M
Octanol	R	R	R	R	U	U	R	R	X	X
Oleic Acid	M	U	U	M	X	X	U	R	X	R
Oleum	R	U	U	M	X	X	U	R	X	R
Oronite 8200	R	U	U	R	X	R	U	R	R	X
Oxalic Acid	R	R	R	R	X	X	R	R	R	R
Peanut Oil	R	U	M	M	R	X	R	R	R	R

R = recommended M = marginal U = unsatisfactory X = insufficient data			(1) = Fluid (2) = Nitrile (3) = SBR (4) = EPDM				(7) = Urethane (8) = Silicone (9) = Fluoroelastomer (10) = Fluorosilicone			
1	2	3	4	5	6	7	8	9	10	11
Pentane	R	M	U	R	R	U	U	R	M	X
Perchlorethylene	R	U	U	U	U	U	U	R	M	X
Petroleum Ether	U	U	U	U	U	U	U	R	X	X
Phenol	U	U	U	U	U	U	U	R	M	X
Phenylhydrazine	U	M	U	U	U	X	X	R	X	R
Phosphoric Acid	R	R	R	R	M	U	R	R	M	R
Pine Oil	R	U	U	U	X	X	U	R	R	R
Potassium Hydroxide	R	R	R	R	U	U	M	U	M	R
Propane	R	U	U	R	R	M	U	R	M	R
Propanol	R	R	R	R	U	U	R	R	X	X
Propyl Acetate	U	U	R	R	U	U	U	U	U	U
Pydraul	U	U	R	R	U	U	U	R	U	R
Pyranol	R	U	U	R	R	R	U	R	X	R
Pyridine	U	R	U	U	U	X	U	U	X	R
Rapeseed Oil	R	U	R	R	R	R	U	R	R	R
Resorcinol	X	R	R	X	X	X	X	X	X	X
SAE 10W30	R	U	U	M	R	R	R	R	X	X
Seawater	R	R	R	R	U	U	R	X	R	R
Silicone Grease	R	R	R	R	R	R	R	R	R	R
Silver Nitrate	R	R	R	R	R	R	R	R	R	R
Skelly Solvent	R	U	U	U	X	X	X	R	R	X
Skydrol	U	U	R	U	U	U	U	R	X	R
Skydrol 500	U	U	R	U	U	U	U	U	M	R
Sodium Hydroxide	R	R	R	R	U	R	R	R	M	R
Sovasol	R	U	U	R	R	R	U	R	R	X
Soy Bean Oil	R	U	M	M	R	X	R	R	R	R
Stearic Acid	R	R	R	R	X	X	R	X	X	R
Stoddard Solvent	R	U	U	R	R	R	U	R	R	M
Sucrose	R	R	R	R	U	U	R	R	R	R
Sulfuric Acid	R	R	R	R	R	U	U	R	U	R
Tail Oil	R	U	U	M	R	U	X	R	X	X
Tannic Acid	R	R	R	R	U	X	R	R	X	R
Tar	R	U	U	M	U	X	R	R	R	R
Tartaric Acid	R	R	R	R	X	X	R	R	R	R
Tetrachloro Ethane	U	U	U	U	U	U	U	R	M	X
Tetralin	U	U	U	U	U	U	U	R	R	X
Tidewater Oil	R	U	U	R	R	R	R	R	R	X
Toluene	U	U	U	U	U	U	U	R	M	U
Trichloroethylene	M	U	U	U	U	U	U	R	M	X
Triethanol amine	M	R	R	R	U	U	X	U	U	X
Turbine Oil	R	U	U	U	R	R	U	R	R	R
Turpentine	R	U	U	U	R	U	U	R	M	R
UCDN 50HB280X	R	R	R	R	X	X	R	R	X	X
Univs J-43	R	U	U	R	R	R	U	R	X	X
Varnish	R	U	U	U	U	M	U	R	M	X
Vinegar	R	R	R	R	U	U	R	R	M	R
Water	R	R	R	R	U	U	R	R	R	R
Wheat Germ Oil	R	U	U	M	R	R	R	R	X	X
Whiskey & Wine	R	R	R	R	U	U	R	R	R	R
Wood Oil	R	U	U	R	X	M	U	R	M	R

CONVERSION FROM ASTM D735-DSAE J14 TO ASTM D2000–SAE J200

Equivalents for Conversion		
ASTM D-735SAE J14 Material Designation (Type and Class)	**ASTM D-2000SAE J200 Material Designation (Type and Class)**	**Type of Polymer Normally Used**
R	AA	NATURAL RUBBER, RECLAIMED RUBBER, SBR BUTYL
R	BA	HIGH TEMPERATURE SBR AND BUTYL COMPOUNDS
SC	BC	CHLOROPRENE POLYMERS (NEOPRENE)
. . .	BE	CHLOROPRENE POLYMERS (NEOPRENE)
. . .	BF	NBR PLYMERS
SB	BG	NBR POLYMERS, URETHANES
SA	BK	ORGANIC DIHALIDE POLYMERS (THIOKOL), NBR
. . .	CA	ETHYLENE PROPYLENE
. . .	CE	CHLOROSULFONATED POLYETHYLENE (HYPALON®)
. . .	CH	NBR POLYMERS
. . .	DF	POLYACRYLIC (BUTYL-ACRYLATE TYPE)
TB	DH	POLYACRYLIC POLYMERS
TA	FC	SILICONES (HIGH STRENGTH)
. . .	FE	SILCONES
. . .	FK	FLUORINATED SILICONES
TA	GE	SILICONES
. . .	HK	FLUORINATED ELASTOMERS (VITON®)

ASTM COMPOUND CONVERSION KEYS

Natural and Synthetic Rubber Compounds Identification				
Prefix-Type	**1st Number "A" Durometer Hardness**	**Next 2 Numbers Tensile Strength**	**Suffix - Characteristics**	
RN - Natural Rubber	3=30±5	05=500	A - Heat Aging	H - Flexing
S - Synthetic non-oil resistance Usually GRS	4=40±5	10=1000	B - Compression set	J - Abrasion
SA - Very low oil swell Usually Thiokol	5=50±5	15=1500	C - Weather resistance	K - Adhesion
SB - Low oil swell Usually Buna N	6=60±5	20=2000	D - Load deflection	L - Moisture absorption
SC - Medium oil swell Usually Neoprene	7=70±5	25=2500	E - Oil immersion	M - Flame resistance
TA - Heat and cold resistance	8=8±5	30=3000	F1 or F	N - Impact P - Staining
TB - Heat and oil resistance Usually Polyacrylate	9=90±5	35=3500	F2 or FF -60°F cold G-Tear	R - Resilience Z - Special requirements as noted

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CONVERSION FROM ASTM D735 D-SAE J114 TO ASTM D2000-SAE J200

Conversion of Suffix Letters	
ASTM D735-SAE J14	ASTM D2000-SAE J200
A1	A14
B	B13, B14, B36, OR B17
C	C20
D	D11
E1	E14 OR E16
E3	E34 OR E36
F1	F17
F2	F19
G	G11 ORG21
H	H
K1	K11
K2	K31
L	L14
M	M
N	N
P	P
R	R
Z	Z

Examples of Specification Conversions	
TM D735-SAE	**ASTM D2000-SAE J200**
R420B	4AA420A13B13
SB620B	2BG620B14
SB620E3	2BG620E34
R515	4AA515A13
SC520	2BC520A14
SB510	BG510

S.A.E. (Society Automotive Engineers)
A.S.T.M. D735-S.A.E. J14 (American Society Testing Materials)

SHELF LIFE

Maximum (Up to 20 Years)				
Type of Rubber	**Common or Trader Name**	**ASTM D141S Abbreviation**	**ASTM D2000 Designation**	**MIL-STD-417**
Silicone	Silicone	Q	FE	TA
Fluorosiltcone	Silastic LS	FVMO	FK	TA
Polysulfide	Thickol	T	EK	SA
Florocarbons	Flurel. Won*	FKM	HK	
Polyacrylale	Acrylic	ACM. ANM	DF. DH	TB

Average (5 to 10 years)				
Type of Rubber	**Common or Trader Name**	**ASTM D141S Abbreviation**	**ASTM D2000**	**MIL-STD-417**
Chlorosulfonated polyethylene Isobutylene	Hypalon”	CSM	CE	
Isoprene	Butyl	MR	AA, BA	RS
Polypropylene	Neoprene	CR	BC, BE	SC
Polyether Urethane	Urethanane	EU	EG	
Polypropylene Oxide	Propylene oxide	GPOO		
Ethylene/propylene diene	Ethylene propylene terpolymer	EPDM	BA,CA	...
Ethylene/propylene copolymer	Ethylene propylene	EPM	BA,CA	...
Epichlorohydrin homopolymer	Hydrin 100, Herclor H	CO		
Epichlorohydrin ethylene oxide	Hydrin 200, Herclor C	ECO	...	...

Minimum (2 to 5 Years)				
Type of Rubber	**Common or Trader Name**	**ASTM DM13 Abbreviation**	**ASTM D2000 Designation**	**MIL-STD-417**
Butadiene/acrylonitrile[1]	Nitrite. NBR	NBR	BF. BG. BK. CH	SB
Butadiene/styrene	SBR	SBR	AA. BA	RS
Cis-potyisoprene	Butadiene	BR	AA	RN
Cis 1, 4, polyisoprene	Natural, pale crepe	NR	AA	RN
Cis 1, 4, polyisoprene	Synthetic natural	IR	AA	RN
Polyester urethane	Urethane	AU	...	...

[1] NBR, when compounded for O-ring seals, may have a shelf life as high as 10 years when aging resistance requirements are specified in the specification.

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HOW CAN WE HELP?

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