

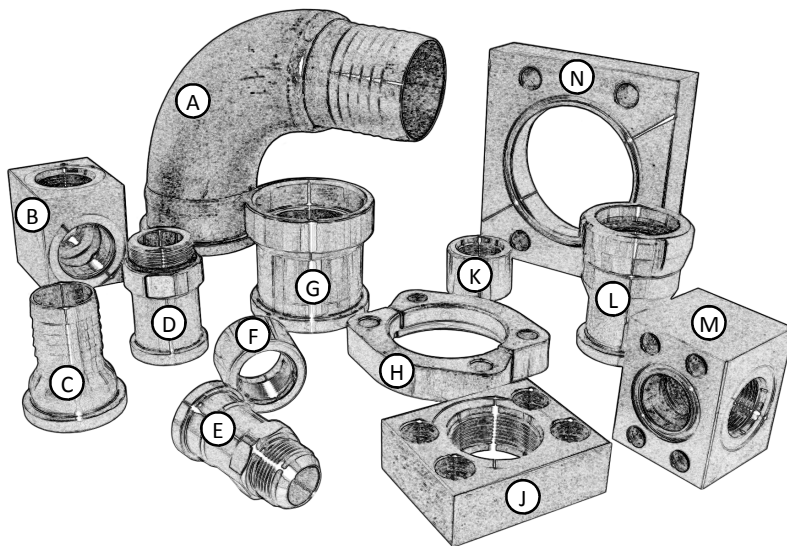
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ON THE COVER:

- A) 1670-Series – Barb / C61 ORH
- B) 2485-Series – ORB Tee
- C) 1650-Series – Barb / C61 ORH
- D) 1593-Series – ORB Male / C61 ORH
- E) 1841-Series – Male JIC / C61 ORH
- F) 1805-Series – ORB / SWP
- G) 1500-Series – SWP / C61 ORH
- H) 1585-Series – C61 Split Flange Kit
- J) 1203-Series – ORF / C61 ORF
- K) 1875-Series – ORB Coupling
- L) 2568-Series – ORFJ / C61 ORH
- M) 1815-Series – ORB / C61 ORF Elbow
- N) 1210-Series – SWP / C61 ORF

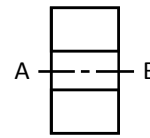
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Part Numbering System

All Sealum part numbers start with four digits. This set of numbers is considered to be the *series number*. The *series number* identifies the style of the part and its function. Each *series* of flange or adapter will come in a variety of sizes. To identify the different sizes, Sealum uses a two-digit number equal to the size in inches multiplied by sixteen. For example, 1.50" x 16 = 24. This two-digit number is called a *dash number*. The majority of flanges and adapters have two or more sides to them, therefore two or more *dash numbers*. The order in which the *dash numbers* follow the *series number* is extremely important. This is especially true in a fitting with jump sizes. The *series number* together with the *dash numbers* will now become the *part number*. On fittings with two different types of ports, there are some rules that tell us which port comes first and which comes second. The following list will show which ports take precedence over the next. Generally, the higher up on the list, the farther to the end of the part number it goes. Male threads are always higher up on the list than female threads.

- C61** SAE J518C Code 61
- C62** SAE J518C Code 62
- ORF** O'Ring Face
- ORH** O'Ring Head
- Comp** Companion Face
- ORB** O'Ring Boss
- NPT** National Pipe Thread
- JIC** Joint Industrial Council
- BSPP** British Standard Pipe thread – Parallel
- BSPT** British Standard Pipe thread – Tapered
- ORFS** O'Ring Face Seal
- SWP** Socket Weld Pipe
- BWP** Butt Weld Pipe
- SWT** Socket Weld Tube
- ORFJ** O'Ring Flex Joint



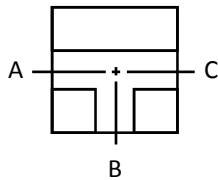
1203 - 16 - 20

Series number:

Side A:
(#16 ORB)

Side B:
(1.25" C61 ORF)

On fittings with more than two ports, such as tees and crosses, the order in which the dash numbers fall will always start at the left side of the block and go in a counterclockwise direction. The preceding list has no bearing on the order in which dash numbers fall when it comes to tees and crosses.



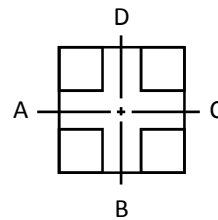
1806 - 16 - 16 - 16

Series number:

(Side A)

(Side B)

(Side C)



1810 - 16 - 16 - 16 - 16

Series number:

(Side A)

(Side B)

(Side C)

(Side D)

CONTINUED ON NEXT PAGE

Part Numbering System

Bolt Kits:

With the exception of Sandwich style flanges, all Sealum O'Ring Face flanges come standard with Imperial grade 8 bolt kits. Metric bolt kits are available upon request and must be specified in the part number by adding a 'M' to the end of the part number, for example 1203-16-16**M**. For bolt sizes and torque specifications see page 41-12.

Material Grades:

Sealum flanges and adapters are manufactured from C1018 & G40.21-44W steel, 316 Stainless Steel as well as 6061-T6 Aluminum are also available upon special request. To specify stainless steel, add '**SS**' to the end of the part number. For example 1203-16-16**SS**. To specify aluminum, add an '**A**' to the end of the part number. For example 1203-16-16**A**.

Plating:

In some instances it is preferred to have your flanges and adapters yellow zinc plated or black oxidized. For yellow zinc plating add '**ZY**' after the series number. For example 1203**ZY**-16-16. For black oxide coating add '**XB**' after the series number. For example 1203**XB**-16-16.

Pressure Rating:

While Code 61 flanges are sometimes referred to as "*3000 psi flanges*" the actual pressure rating varies between 500 psi and 5000 psi depending on the size of flange. Code 62 flanges are all rated for 6000 psi regardless of the size of flange. For the actual pressure ratings and specifications refer to page 41-12.

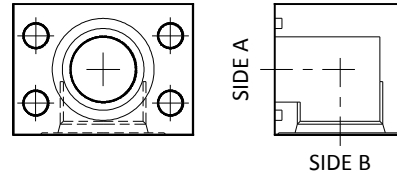
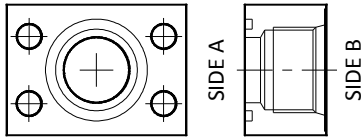
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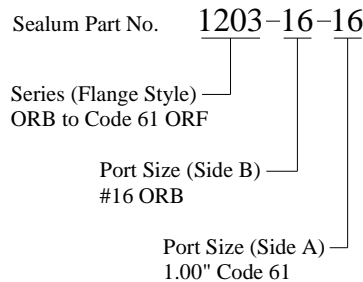


Side A	Side B	Series	Page
Code 61 O'Ring Flange	ORB	1203	42-2
	NPT	1201	42-2
	SWP	1210	42-10
	SWT	1208	42-5
	BWP (Sch 80)	2313	42-6
Code 61 Companion Flange	ORB	1202	42-2
	NPT	1200	42-3
	SWP	1211	42-10
	SWT	1209	42-5
	BWP (Sch 80)	2314	42-6
Code 62 O'Ring Flange	ORB	1856	43-2
	NPT	1858	43-3
	SWP	1852	43-4
	SWT	1854	43-5
	BWP (Sch 80)	3245	43-6
Code 62 Companion Flange	ORB	1855	43-2
	NPT	1857	43-3
	SWP	1851	43-4
	SWT	1853	43-5
	BWP (Sch 80)	2346	43-6

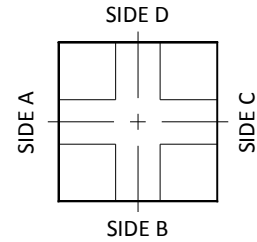
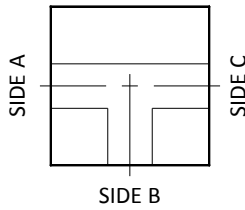
Side A	Side B	Series	Page
Code 61 O'Ring Elbow	ORB	1815	44-2
	NPT	1833	45-2
	SWP	1824	44-4
	SWT	1829	44-5
	Companion	2573	44-6
Code 61 Companion Elbow	ORB	1817	44-2
	NPT	1835	44-3
	SWP	1808	44-4
	SWT	1831	44-5
	Companion	2574	44-6
Code 62 O'Ring Elbow	ORB	1842	45-2
	NPT	1846	45-3
	SWP	1834	45-4
	SWT	1838	45-5
	Companion	2594	45-6
Code 62 Companion Elbow	ORB	1840	45-2
	NPT	1844	45-3
	SWP	1832	45-4
	SWT	1836	45-5
	Companion	2593	45-6

Example:

1.00" Code 61 O'Ring Face Flange to #16 ORB Female



Function to Part Number Index

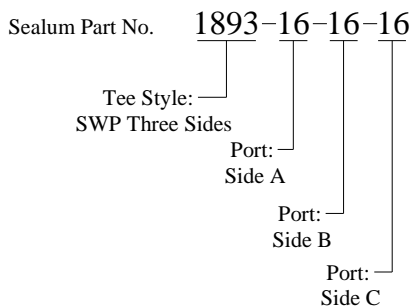


Side A	Side B	Side C	Series	Page
ORB	ORB	ORB	2485	46-18
	SWP	ORB	2481	46-19
	SWT	ORB	2483	46-19
NPT	NPT	NPT	2492	46-19
	SWP	NPT	2489	46-19
	SWT	NPT	2490	46-20
SWP	ORB	ORB	2463	46-20
		SWP	2058	46-20
	NPT	NPT	2468	46-21
		SWP	2465	46-21
	SWP	ORB	2456	46-21
		NPT	2457	46-21
SWT	ORB	ORB	2476	46-22
		SWT	2475	46-22
	NPT	NPT	2480	46-22
		SWT	2478	46-23
	SWT	ORB	2473	46-23
		NPT	2474	46-23
	SWT	2472	46-23	

Side A	Side B	Side C	Side D	Series	Page
Code 61 O'Ring Face	Comp	Comp	Comp	2599	47-3
	ORB	Comp	ORB	2601	47-3
		ORB	ORB	2600	47-3
	SWP	Comp	SWP	2598	47-3
Code 61 Companion	Comp	Comp	Comp	1810	47-4
			SWP	2596	47-4
	ORB	ORB	ORB	2628	47-4
SWP		ORB	2572	47-4	
	SWP	Comp	SWP	2597	47-5
Code 62 O'Ring Face	Comp	Comp	Comp	2635	47-3
	ORB	Comp	ORB	2637	47-3
		ORB	ORB	2636	47-3
	SWP	Comp	SWP	2634	47-3
Code 62 Companion	Comp	Comp	Comp	1811	47-4
			SWP	2630	47-4
	ORB	ORB	ORB	2632	47-4
SWP		ORB	2631	47-4	
	SWP	Comp	SWP	2633	47-5
ORB	ORB	ORB	ORB	2627	47-6
NPT	NPT	NPT	NPT	2606	47-6
SWP	ORB	ORB	ORB	2784	47-5
		SWP	ORB	2603	47-5
	NPT	NPT	NPT	2785	47-6
	SWP	SWP	SWP	2602	47-5

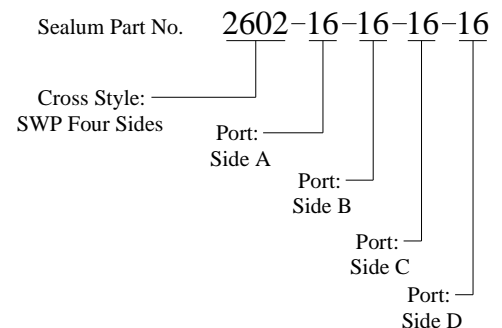
Example:

1.00" Socket Weld Pipe Tee (All Three Sides)

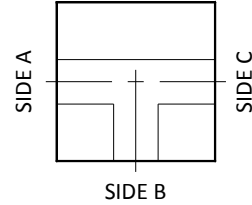


Example:

1.00" Socket Weld Pipe Cross (All Four Sides)

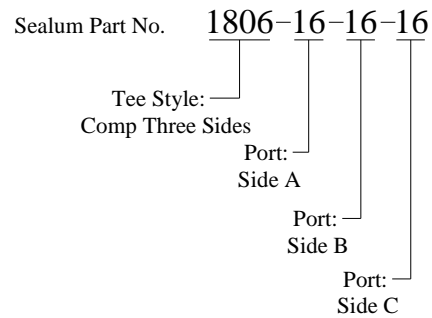


Function to Part Number Index Code 61 Tee



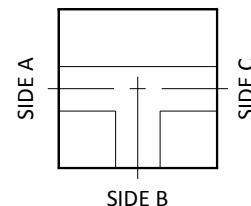
Side A	Side B	Side C	Series	Page
Code 61 Companion	ORB	ORB	2390	46-13
		SWP	2388	46-13
		SWT	2389	46-13
		Comp	2387	46-12
	NPT	NPT	2396	46-14
		SWP	2393	46-14
		SWT	2394	46-14
		Comp	2392	46-13
	SWP	ORB	2380	46-15
		NPT	2381	46-15
		SWP	2378	46-15
		Comp	2377	46-14
	SWT	ORB	2385	46-16
		NPT	2386	46-16
		SWT	2384	46-16
		Comp	2382	46-15
	Comp	ORB	2371	46-11
		NPT	2372	46-12
		SWP	1966	46-12
		SWT	2370	46-12
	ORF	Comp	1806	46-11
		ORB	2375	46-8
		NPT	2376	46-8
		SWP	2373	46-9
ORB	SWT	2374	46-9	
	Comp	2012	46-8	
	ORB	2411	46-11	
	Comp	2409	46-18	
NPT	ORB	2414	46-11	
	Comp	2413	46-18	
SWP	Comp	ORB	2398	46-16
		NPT	2399	46-17
	SWP	1865	46-17	
	ORF	ORB	2401	46-9
NPT		2402	46-9	
SWP		2014	46-10	
SWT	Comp	ORB	2404	46-17
		NPT	2405	46-17
	SWT	2403	46-18	
	ORF	ORB	2407	46-10
		NPT	2408	46-10
SWT		2406	46-10	

Example:
1.00" Code 61 Companion Tee (All Three Sides)



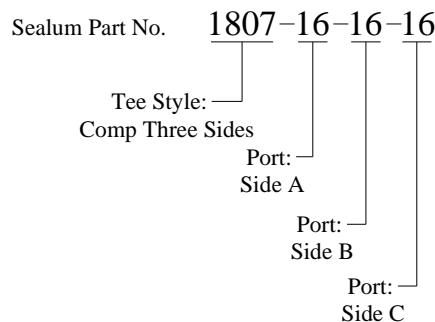
Side A	Side B	Side C	Series	Page
Code 61 O'Ring Face	ORB	ORB	2431	46-4
		SWP	2429	46-4
		SWT	2430	46-5
		Comp	1870	46-4
	NPT	NPT	2437	46-5
		SWP	2434	46-5
		SWT	2435	46-6
		Comp	2433	46-5
	SWP	ORB	2422	46-6
		NPT	2423	46-6
		SWP	2420	46-7
		Comp	1869	46-6
	SWT	ORB	2427	46-7
		NPT	2428	46-7
		SWT	2426	46-8
		Comp	2424	46-7
	Comp	ORB	2418	46-3
		NPT	2419	46-3
		SWP	2416	46-3
		SWT	2417	46-4
		Comp	2415	46-3

Function to Part Number Index Code 62 Tee



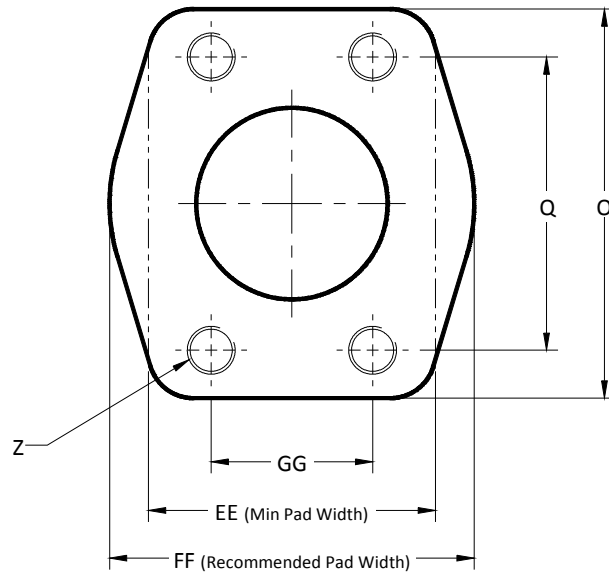
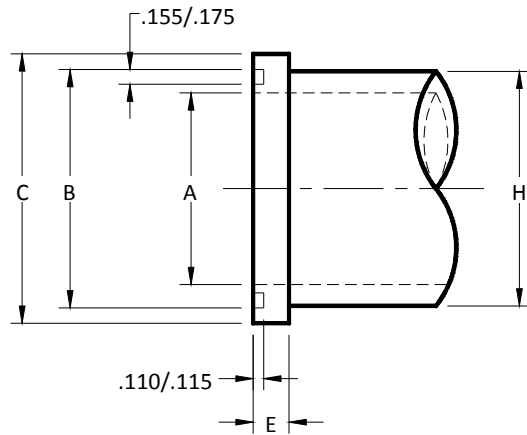
Side A	Side B	Side C	Series	Page
Code 62 Companion	ORB	ORB	2513	46-13
		SWP	2511	46-13
		SWT	2512	46-13
		Comp	2510	46-12
	NPT	NPT	2519	46-14
		SWP	2516	46-14
		SWT	2517	46-14
		Comp	2515	46-13
	SWP	ORB	2503	46-15
		NPT	2504	46-15
		SWP	2501	46-15
		Comp	2500	46-14
	SWT	ORB	2508	46-16
		NPT	2509	46-16
		SWT	2507	46-16
		Comp	2505	46-15
	Comp	ORB	2494	46-11
		NPT	2495	46-12
		SWP	1969	46-12
		SWT	2493	46-12
Comp		1807	46-11	
ORF	ORB	2498	46-8	
	NPT	2499	46-8	
	SWP	2496	46-9	
	SWT	2497	46-9	
	Comp	2015	46-8	
ORB	ORF	ORB	2452	46-11
	Comp	ORB	2450	46-18
NPT	ORF	NPT	2544	46-11
	Comp	NPT	2543	46-18
SWP	Comp	ORB	2439	46-16
		NPT	2440	46-17
	SWP	1879	46-17	
ORF	ORB	2442	46-9	
	NPT	2443	46-9	
	SWP	2017	46-10	
SWT	Comp	ORB	2445	46-17
		NPT	2446	46-17
	SWT	2444	46-18	
	ORF	ORB	2448	46-10
	NPT	2449	46-10	
	SWT	2447	46-10	

Example:
1.00" Code 62 Companion Tee (All Three Sides)



Side A	Side B	Side C	Series	Page
Code 62 O"Ring Face	ORB	ORB	2536	46-4
		SWP	2534	46-4
		SWT	2535	46-5
		Comp	1872	46-4
	NPT	NPT	2542	46-5
		SWP	2539	46-5
		SWT	2540	46-6
		Comp	2538	46-5
	SWP	ORB	2527	46-6
		NPT	2528	46-6
		SWP	2525	46-7
		Comp	1871	46-6
	SWT	ORB	2532	46-7
		NPT	2533	46-7
		SWT	2531	46-8
		Comp	2529	46-7
	Comp	ORB	2523	46-3
		NPT	2524	46-3
		SWP	2521	46-3
		SWT	2522	46-4
	Comp	2520	46-3	

SAE J518C 4-Bolt Flange Specifications



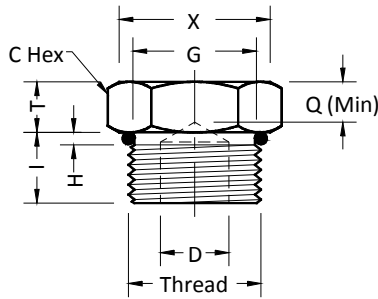
Code 61

Nom. Flange Size	A +0.00 -0.06	B +0.005 -0.000	C ±0.010	E ±0.005	H Dia Max	GG ±0.010	Q ±0.010	O	EE Min.	FF	Z Thread UNC	Z Thread Metric	Max Work. Pres.	Bolt Torque lb-in	N70 "O" Ring
1/2"	0.50	1.000	1.188	0.265	0.94	0.688	1.500	2.12	1.31	1.81	5/16-18	M8x1.25	5000 psi	175-225	2-210
3/4"	0.75	1.250	1.500	0.265	1.25	0.875	1.875	2.56	1.62	2.06	3/8-16	M10x1.50	5000 psi	250-350	2-214
1"	1.00	1.560	1.750	0.315	1.50	1.031	2.062	2.75	1.88	2.31	3/8-16	M10x1.50	5000 psi	325-425	2-219
1 1/4"	1.25	1.750	2.000	0.315	1.70	1.188	2.312	3.12	2.12	2.88	7/16-14	M10x1.50	4000 psi	425-550	2-222
1 1/2"	1.50	2.115	2.375	0.315	1.98	1.406	2.750	3.69	2.50	3.25	1/2-13	M12x1.75	3000 psi	550-700	2-225
2"	2.00	2.490	2.812	0.375	2.45	1.688	3.062	4.00	3.00	3.81	1/2-13	M12x1.75	3000 psi	650-800	2-228
2 1/2"	2.50	2.995	3.312	0.375	2.92	2.000	3.500	4.50	3.50	4.28	1/2-13	M12x1.75	2500 psi	950-1100	2-232
3"	3.00	3.615	4.000	0.375	3.55	2.438	4.188	5.31	4.19	5.16	5/8-11	M16x2.00	2000 psi	1650-1800	2-237
3 1/2"	3.50	4.095	4.500	0.442	4.00	2.750	4.750	6.00	4.69	5.50	5/8-11	M16x2.00	500 psi	1400-1600	2-241
4"	4.00	4.595	5.000	0.442	4.50	3.062	5.125	6.38	5.19	6.00	5/8-11	M16x2.00	500 psi	1400-1600	2-245
5"	5.00	5.595	6.000	0.442	5.50	3.625	6.000	7.25	6.19	7.12	5/8-11	M16x2.00	500 psi	1400-1600	2-253

Code 62

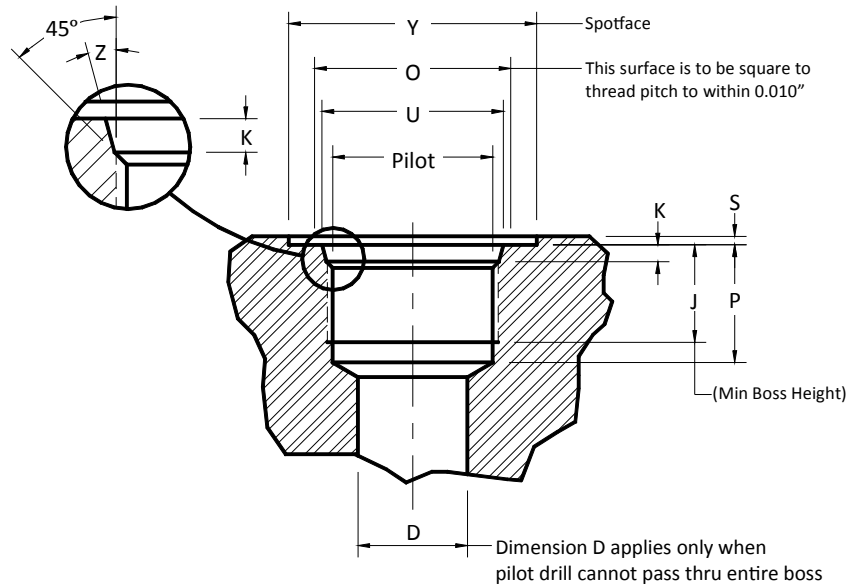
Nom. Flange Size	A +0.00 -0.06	B +0.005 -0.000	C ±0.010	E ±0.005	H Dia Max	GG ±0.010	Q ±0.010	O	EE Min.	FF	Z Thread UNC	Z Thread Metric	Max Work. Pres.	Bolt Torque lb-in	N70 "O" Ring
1/2"	0.50	1.000	1.250	0.305	0.94	0.718	1.574	2.22	1.50	1.88	5/16-18	M8x1.25	6000 psi	175-225	2-210
3/4"	0.75	1.250	1.625	0.345	1.25	0.937	2.000	2.81	1.88	2.38	3/8-16	M10x1.50	6000 psi	300-400	2-214
1"	1.00	1.560	1.875	0.375	1.50	1.093	2.250	3.19	2.12	2.75	7/16-14	M12x1.75	6000 psi	500-600	2-219
1 1/4"	1.25	1.750	2.125	0.405	1.72	1.250	2.625	3.75	2.38	3.06	1/2-13	M14x2.00	6000 psi	750-900	2-222
1 1/2"	1.50	2.115	2.500	0.495	2.00	1.437	3.125	4.44	2.75	3.75	5/8-11	M16x2.00	6000 psi	1400-1600	2-225
2"	2.00	2.490	3.125	0.495	2.62	1.750	3.812	5.25	3.38	4.50	3/4-10	M20x2.50	6000 psi	2400-2600	2-228

Male O'Ring Boss (ORB) Specifications



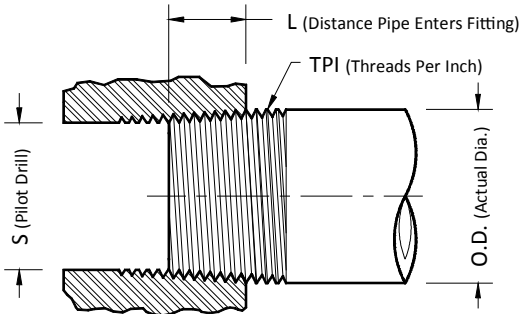
Nom. Size	Dash No.	UNF Thread	C Hex	D ^{+0.005} / _{-0.000}	G ^{+0.002} / _{-0.003}	H ^{+0.015} / _{-0.000}	I \pm .005	T	Q	X	N70 O'Ring
1/8	-02	5/16"-24	7/16	0.093	0.250	0.063	0.297	0.125	0.06	0.438	2-902
3/16	-03	3/8"-24	1/2	0.125	0.313	0.063	0.297	0.125	0.08	0.500	2-903
1/4	-04	7/16"-20	9/16	0.203	0.364	0.075	0.360	0.156	0.10	0.563	2-904
5/16	-05	1/2"-20	5/8	0.234	0.427	0.075	0.360	0.156	0.12	0.625	2-905
3/8	-06	9/16"-18	11/16	0.297	0.482	0.083	0.391	0.188	0.16	0.688	2-906
1/2	-08	3/4"-16	7/8	0.422	0.660	0.094	0.438	0.188	0.22	0.875	2-908
5/8	-10	7/8"-14	1	0.500	0.773	0.107	0.500	0.250	0.25	1.000	2-910
3/4	-12	1-1/16"-12	1-1/4	0.656	0.945	0.125	0.594	0.313	0.25	1.250	2-912
7/8	-14	1-3/16"-12	1-3/8	0.718	1.07	0.125	0.594	0.313	0.25	1.375	2-914
1	-16	1-5/16"-12	1-1/2	0.875	1.195	0.125	0.594	0.375	0.25	1.500	2-916
1-1/4	-20	1-5/8"-12	1-7/8	1.093	1.507	0.125	0.594	0.375	0.25	1.875	2-920
1-1/2	-24	1-7/8"-12	2-1/8	1.344	1.756	0.125	0.594	0.375	0.25	2.125	2-924
2	-32	2-1/2"-12	2-3/4	1.813	2.381	0.125	0.594	0.375	0.30	2.750	2-932

Female O'Ring Boss (ORB) Specifications



Nom. Size	Dash No.	UNF Thread	Y	O	U ^{+0.005} / _{-0.000}	Pilot Drill	K ^{+0.015} / _{-0.000}	S	J	P	D	Z \pm 1°
1/8	-02	5/16"-24	0.672	0.438	0.358	I	0.074	0.062	0.390	0.468	0.062	12
3/16	-03	3/8"-24	0.750	0.500	0.421	Q	0.074	0.062	0.390	0.468	0.125	12
1/4	-04	7/16"-20	0.828	0.563	0.487	25/64	0.093	0.062	0.454	0.547	0.172	12
5/16	-05	1/2"-20	0.906	0.625	0.550	29/64	0.093	0.062	0.454	0.547	0.234	12
3/8	-06	9/16"-18	0.969	0.688	0.616	33/64	0.097	0.062	0.500	0.609	0.297	12
1/2	-08	3/4"-16	1.188	0.875	0.811	11/16	0.10	0.094	0.562	0.688	0.391	15
5/8	-10	7/8"-14	1.344	1.000	0.942	13/16	0.100	0.094	0.656	0.781	0.484	15
3/4	-12	1-1/16"-12	1.625	1.250	1.148	63/64	0.130	0.094	0.750	0.906	0.609	15
7/8	-14	1-3/16"-12	1.765	1.375	1.273	1-3/32	0.130	0.094	0.750	0.906	0.719	15
1	-16	1-5/16"-12	1.910	1.500	1.398	1-15/64	0.130	0.125	0.750	0.906	0.844	15
1-1/4	-20	1-5/8"-12	2.270	1.875	1.713	1-17/32	0.132	0.125	0.750	0.906	1.078	15
1-1/2	-24	1-7/8"-12	2.560	1.125	1.962	1-51/64	0.132	0.125	0.750	0.906	1.312	15
2	-32	2-1/2"-12	3.480	2.750	2.587	2-27/64	0.132	0.125	0.750	0.906	1.781	15

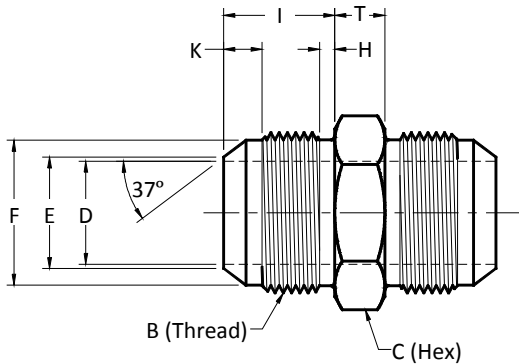
National Pipe Thread (NPT) Specifications



**Pipe size may be designated by giving a nominal pipe size and wall thickness or schedule. See chart on following page for schedules and physical dimensions.

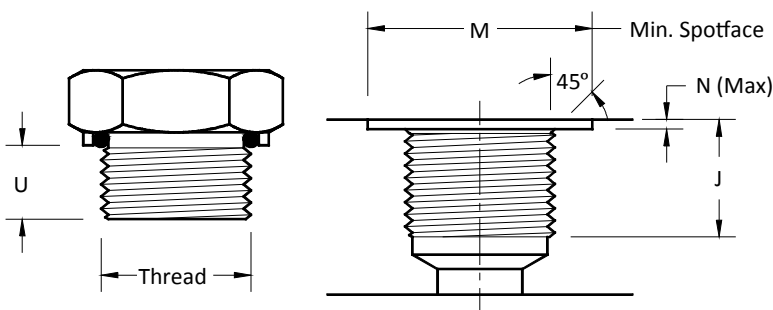
Nominal Pipe Size	TPI	OD	S	L	WALL THICKNESS**			
					Sch. 40	Sch. 80	Sch. 160	XXS
1/8	27	.405	11/32	3/16	.068	0.95	---	---
1/4	18	.540	7.16	9/32	0.88	.119	---	---
3/8	18	.675	37/64	19/64	0.91	.126	---	---
1/2	14	.840	23.32	3/8	.109	.147	.187	.294
3/4	14	1.050	59.64	13/32	.113	.154	.218	.308
1.00	11.50	1.315	1-5/32	1/2	.133	.179	.250	.358
1.25	11.50	1.660	1-1/2	35/64	.140	.191	.250	.382
1.50	11.50	1.900	1-47/64	9/16	.145	.200	.281	.400
2.00	11.50	2.375	2-7/32	37/64	.154	.218	.343	.436
2.50	8	2.875	2-5/8	7/8	.203	.276	.375	.552
3.00	8	3.50	3-1/4	15/16	.216	.300	.437	.600
3.50	8	4.00	3-3/4	1	.226	.318	---	---
4.00	8	4.50	4-1/4	1-1/16	.237	.337	.531	.674

JIC Specifications



Nom. Size	Dash No.	B UNF Thread	C Hex	D	E ± .003	F ^{+0.000} / _{-0.005}	H ^{+0.015} / _{-0.000}	I ± .015	K ^{+0.015} / _{-0.000}	T
1/8	-02	5/16"-24	7/16	.062	.083	.245	.063	.448	.177	.22
3/16	-03	3/8"-24	7/16	.125	.146	.307	.063	.479	.177	.22
1/4	-04	7/16"-20	1/2	.172	.193	.359	.075	.550	.193	.22
5/16	-05	1/2"-20	9/16	.234	.255	.421	.075	.550	.193	.22
3/8	-06	9/16"-18	5/8	.297	.318	.476	.083	.556	.198	.25
1/2	-08	3/4"-16	13/16	.391	.426	.654	.094	.657	.253	.25
5/8	-10	7/8"-14	15/16	.484	.539	.767	.107	.758	.266	.31
3/4	-12	1-1/16"-12	1-1/8	.609	.664	.938	.125	.864	.315	.38
7/8	-14	1-3/16"-12	1-1/4	.718	.788	1.063	.125	.890	.315	.38
1	-16	1-5/16"-12	1-3/8	.844	.913	1.188	.125	.911	.315	.38
1-	-20	1-5/8"-12	1-11/16	1.078	1.147	1.501	.125	.958	.367	.46
1-	-24	1-7/8"-12	2	1.312	1.381	1.750	.125	1.083	.378	.53
2	-32	2-1/2"-12	2-5/8	1.781	1.880	2.375	.125	1.333	.461	.68

British Standard Pipe Parallel (BSPP) Specifications



Dash Size	Whitworth Thread	Major Dia.	Minor Dia.	U	M	N	J
-04	1/4"-19	.52	.45	.37	.85	.059	.43
-06	3/8"-19	.66	.59	.37	1.00	.059	.43
-08	1/2"-14	.83	.74	.51	1.19	.059	.55
-12	3/4"-14	1.04	.95	.51	1.44	.059	.63
-16	1"-11	1.31	1.19	.63	1.81	.078	.75
-20	1-1/4"-11	1.65	1.54	.63	2.25	.078	.83
-24	1-1/2"-11	1.88	1.77	.63	2.50	.078	.83

A.S.A. Pipe Schedules

Pipe Size	Actual O.D.	Wall Thickness (I.D.)												
		10	20	30	40	Std.	60	80	XS	100	120	140	160	XXS
1/8	.405	.049 (.307)			.068 (.269)	.068 (.269)		.095 (.215)	.095 (.215)					
1/4	.540	.065 (.410)			.088 (.364)	.088 (.364)		.119 (.302)	.119 (.302)					
3/8	.675	.065 (.545)			.091 (.493)	.091 (.493)		.126 (.423)	.126 (.423)					
1/2	.840	.083 (.674)			.109 (.622)	.109 (.622)		.147 (.546)	.147 (.546)				.187 (.466)	.294 (.252)
3/4	1.050	.083 (.884)			.113 (.824)	.113 (.824)		.154 (.742)	.154 (.742)				.218 (.614)	.308 (.434)
1	1.315	.109 (1.097)	.100 (1.115)	.125 (1.065)	.133 (1.049)	.133 (1.049)		.179 (.957)	.179 (.957)				.250 (.815)	.358 (.599)
1 1/4	1.660	.109 (1.442)	.100 (1.460)	.125 (1.41)	.140 (1.38)	.140 (1.38)		.191 (1.218)	.191 (1.270)				.250 (1.16)	.382 (.896)
1 1/2	1.900	.109 (1.682)	.110 (1.680)	.125 (1.65)	.145 (1.61)	.145 (1.61)		.200 (1.50)	.200 (1.50)				.281 (1.338)	.400 (1.10)
2	2.375	.109 (2.157)	.125 (2.125)		.154 (2.067)	.154 (2.067)		.218 (1.939)	.218 (1.939)				.343 (1.689)	.436 (1.503)
2 1/2	2.875	.120 (2.635)			.203 (2.469)	.203 (2.469)		.276 (2.323)	.276 (2.323)				.375 (2.125)	.552 (1.771)
3	3.50	.120 (3.260)	.125 (3.25)	.188 (3.124)	.216 (3.068)	.216 (3.068)		.300 (2.90)	.300 (2.90)				.438 (2.624)	.600 (2.30)
3 1/2	4.00	.120 (3.760)			.226 (3.548)	.226 (3.548)		.318 (3.364)	.318 (3.364)					.636 (2.728)
4	4.50	.120 (4.260)			.237 (4.026)	.237 (4.026)	.281 (3.938)	.337 (3.826)	.337 (3.826)		.438 (3.624)		.531 (3.438)	.674 (3.152)
4 1/2	5.00					.247 (4.506)			.355 (4.29)					.710 (3.58)
5	5.563	.134 (5.295)			.258 (5.047)	.258 (5.047)		.375 (4.813)	.375 (4.813)		.500 (4.563)		.625 (4.313)	.750 (4.063)
6	6.625	.134 (6.357)			.280 (6.065)	.280 (6.065)		.432 (5.761)	.432 (5.761)		.562 (5.501)		.718 (5.189)	.864 (4.897)
7	7.625					.301 (7.023)			.500 (6.625)					.875 (5.875)
8	8.625	.148 (8.329)	.250 (8.125)	.277 (8.071)	.322 (7.981)	.322 (7.981)	.406 (7.813)	.500 (7.625)	.500 (7.625)	.593 (7.439)	.718 (7.189)	.812 (7.001)	.906 (6.813)	.875 (6.875)
9	9.625					.342 (8.941)			.500 (8.625)					
10	10.75	.165 (10.420)	.250 (10.25)	.307 (10.136)	.365 (10.02)	.365 (10.02)	.500 (9.75)	.593 (9.564)	.500 (9.75)	.718 (9.314)	.843 (9.064)	1.000 (8.75)	1.125 (8.50)	
11	11.75					.375 (11.00)			.500 (10.75)					
12	12.75	.180 (12.39)	.250 (12.25)	.330 (12.09)	.406 (11.938)	.375 (12.00)	.562 (11.626)	.687 (11.376)	.500 (11.75)	.843 (11.064)	1.000 (10.75)	1.125 (10.50)	1.312 (10.126)	
14	14.00	.250 (13.50)	.312 (13.376)	.375 (13.25)	.437 (13.126)	.375 (13.25)	.593 (12.814)	.750 (12.50)	.500 (13.00)	.937 (12.126)	1.093 (11.814)	1.250 (11.50)	1.406 (11.188)	
16	16.00	.250 (15.50)	.312 (15.376)	.375 (15.25)	.500 (15.00)	.375 (15.25)	.656 (14.688)	.843 (14.314)	.500 (15.00)	1.031 (13.938)	1.218 (13.564)	1.437 (13.126)	1.593 (12.814)	
18	18.00	.250 (17.50)	.312 (17.376)	.437 (17.176)	.562 (16.876)	.375 (17.25)	.750 (16.50)	.937 (16.126)	.500 (17.00)	1.156 (15.688)	1.375 (15.25)	1.562 (14.876)	1.781 (14.438)	
20	20.00	.250 (19.50)	.375 (19.25)	.500 (19.00)	.593 (18.814)	.375 (19.25)	.812 (18.376)	1.031 (17.938)	.500 (19.00)	1.280 (17.44)	1.500 (17.00)	1.750 (16.50)	1.968 (16.064)	
24	24.00	.250 (23.50)	.375 (23.25)	.562 (22.876)	.687 (22.626)	.375 (23.25)	.968 (22.064)	1.218 (21.564)	.500 (23.00)	1.531 (20.938)	1.812 (20.376)	2.062 (19.876)	2.343 (19.314)	

Pressure Losses In Pipe & Tubing

						Flow Rate (GPM) & Pressure Loss (PSI/FT) @ AVG. Velocity (FPS)									
Pipe				Pressure (PSI)		5 FPS		10 FPS		15 FPS		20 FPS		25 FPS	
Size	Sch.	O.D.	I.D.	Working	Burst	Loss	GPM	Loss	GPM	Loss	GPM	Loss	GPM	Loss	GPM
1/2	80	0.840	0.546	4,100	21,000	0.37	4	0.73	7	1.11	11	2.62	15	3.87	18
	40	0.840	0.622	2,300	15,600	0.28	5	0.57	10	1.35	14	2.23	19	3.29	24
3/4	80	1.050	0.742	3,500	17,600	0.20	7	0.40	14	1.08	20	1.79	27	2.64	34
	40	1.050	0.824	2,000	12,900	0.16	8	0.32	17	0.95	25	1.57	33	2.31	42
1	80	1.315	0.957	3,500	15,900	0.12	11	0.39	22	0.79	34	1.30	45	1.92	56
	40	1.315	1.049	2,100	12,100	0.10	14	0.34	27	0.70	40	1.16	54	1.71	67
1 1/4	80	1.660	1.278	3,000	13,900	0.07	20	0.27	40	0.55	60	0.91	80	1.34	100
	40	1.660	1.380	1,800	10,100	0.06	23	0.24	47	0.50	70	0.82	93	1.21	117
1 1/2	160	1.900	1.338	4,500	17,700	0.06	22	0.25	44	0.52	66	0.85	88	1.26	110
	80	1.900	1.500	2,800	12,600	0.05	28	0.22	55	0.45	83	0.74	110	1.09	138
	40	1.900	1.610	1,700	9,100	0.04	32	0.20	64	0.41	95	0.68	127	1.00	159
2	160	2.375	1.687	4,600	17,500	0.04	35	0.19	70	0.39	105	0.64	139	0.95	174
	80	2.375	1.939	2,500	11,000	0.05	46	0.16	92	0.33	138	0.54	184	0.79	230
	40	2.375	2.067	1,500	7,800	0.04	52	0.15	105	0.30	157	0.50	209	0.73	262
2 1/2	160	2.875	2.125	4,200	15,700	0.04	55	0.14	111	0.29	166	0.48	221	0.71	276
	80	2.875	2.323	2,800	11,500	0.04	66	0.13	132	0.26	198	0.43	264	0.63	330
	40	2.875	2.469	1,900	8,500	0.04	75	0.12	149	0.24	224	0.40	299	0.59	373
3	160	3.500	2.624	4,100	15,000	0.03	84	0.11	169	0.22	253	0.37	337	0.54	421
	80	3.500	2.900	2,600	10,300	0.03	103	0.10	206	0.20	309	0.33	412	0.48	515
	40	3.500	3.068	1,600	7,400	0.03	115	0.09	230	0.18	346	0.30	461	0.45	576

Pressure rating based on ASTM A53 grade B or A 103 grade B seamless
Based on Barlows & 55,000 type ASAB93, 4-1966
Medium hydraulic oil 220 SSU @ 120° F

						Flow Rate (GPM) & Pressure Loss (PSI/FT) @ AVG. Velocity (FPS)									
Tubing			Pressure (PSI)		5 FPS		10 FPS		15 FPS		20 FPS		25 FPS		
O.D.	I.D.	Wall	Working	Burst	Loss	GPM	Loss	GPM	Loss	GPM	Loss	GPM	Loss	GPM	
1/4	0.180	0.035	3850	15,400	1.8	0.4	3.7	0.8	6.0	1.3	7.0	1.6	9.5	2.0	
3/8	0.305	0.035	2580	10,300	0.6	1.1	1.1	2.2	2.4	3.4	3.8	4.6	5.5	6.0	
	0.245	0.065	4750	19,100	0.8	0.7	1.9	1.5	2.4	2.1	4.5	2.9	6.5	3.5	
1/2	0.430	0.035	1930	7,700	0.4	2.4	1.1	4.9	2.0	7.5	4.0	9.7	5.0	12.0	
	0.370	0.065	3580	14,300	0.2	1.8	1.0	3.5	2.0	5.2	3.5	7.1	4.4	8.6	
3/4	0.652	0.049	1800	7,200	0.15	4.8	0.5	9.4	0.9	15.0	1.7	19.0	2.5	24.0	
	0.560	0.095	3400	13,950	0.2	4.0	0.6	8.0	1.6	12.5	2.4	16.5	4.3	20.0	
1	0.870	0.065	1790	7,150	0.1	9.2	0.3	19.0	0.7	28.0	1.2	39.0	1.7	48.0	
	0.760	0.120	3300	13,200	0.13	7.9	0.5	15.5	1.0	23.0	1.4	31.0	2.5	40.0	
1 1/4	1.060	0.095	2080	8,350	0.09	14.0	0.27	27.0	0.5	41.0	1.0	54.0	1.4	70.0	
	0.010	0.120	2650	10,600	0.43	12.0	0.15	24.0	0.3	37.0	0.5	50.0	0.8	62.0	
1 1/2	1.260	0.120	2200	8,800	0.07	21.0	0.25	42.0	0.45	62.0	0.75	82.0	1.4	110.0	
2	1.500	0.250	3480	13,750	0.05	28.0	0.15	54.0	0.32	82.0	0.55	108.0	0.8	140.0	

Unified and American Screw Threads

Size	UNC Coarse Thread Series		UNF Fine Thread Series	
	Threads Per Inch	Tap Drill	Threads Per Inch	Tap Drill
	1 (.073)	64	No. 53	72
2 (.086)	56	No. 50	64	No. 50
3 (.099)	48	No. 47	56	No. 45
4 (.112)	40	No. 43	48	No. 42
5 (.125)	40	No. 38	44	No. 37
6 (.138)	32	No. 36	40	No. 33
8 (.164)	32	No. 29	36	No. 29
10 (.190)	24	No. 25	32	No. 21
12 (.216)	24	No. 16	28	No. 14
1/4	20	No. 7	28	No. 3
5/16	18	F	24	I
3/8	16	5/16	24	Q
7/16	14	U	20	25/64
1/2	13	27/64	20	29/64
9/16	12	31/64	18	33/64
5/8	11	17/32	18	37/64
3/4	10	21/32	16	11/16
7/8	9	49/64	14	13/16
1	8	7/8	12	59/64
1 1/8	7	63/64	12	1 3/64
1 1/4	7	1 7/64	12	1 11/64
1 3/8	6	1 7/32	12	1 19/64
1 1/2	6	1 11/32	12	1 27/64
1 3/4	5	1 9/16		
2	4 1/2	1 25/32		
2 1/4	4 1/2	2 1/32		
2 1/2	4	2 1/4		
2 3/4	4	2 1/2		
3	4	2 3/4		

NUMBER & LETTER DRILL SIZES							
Number Drill				Letter Drill			
No.	Size	No.	Size	No.	Size	Letter	Size
1	0.2280	28	0.1405	55	0.0520	A	0.2340
2	0.2210	29	0.1360	56	0.0465	B	0.2380
3	0.2130	30	0.1285	57	0.0430	C	0.2420
4	0.2090	31	0.1200	58	0.0420	D	0.2460
5	0.2055	32	0.1160	59	0.0410	E	0.2500
6	0.2040	33	0.1130	60	0.0400	F	0.2570
7	0.2010	34	0.1110	61	0.0390	G	0.2610
8	0.1990	35	0.1100	62	0.0380	H	0.2660
9	0.1996	36	0.1065	63	0.0370	I	0.2720
10	0.1935	37	0.1040	64	0.0360	J	0.2770
11	0.1910	38	0.1015	65	0.0350	K	0.2810
12	0.1890	39	0.0995	66	0.0330	L	0.2900
13	0.1850	40	0.0980	67	0.0320	M	0.2950
14	0.1820	41	0.0960	68	0.0310	N	0.3020
15	0.1800	42	0.0935	69	0.0292	O	0.3160
16	0.1770	43	0.0890	70	0.0280	P	0.3230
17	0.1730	44	0.0860	71	0.0260	Q	0.3320
18	0.1695	45	0.0820	72	0.0250	R	0.3390
19	0.1660	46	0.0810	73	0.0240	S	0.3480
20	0.1610	47	0.0785	74	0.0225	T	0.3580
21	0.1590	48	0.0760	75	0.0210	U	0.3680
22	0.1570	49	0.0730	76	0.0200	V	0.3770
23	0.1540	50	0.0700	77	0.0180	W	0.3860
24	0.1520	51	0.0670	78	0.0160	X	0.3970
25	0.1495	52	0.0635	79	0.0145	Y	0.4040
26	0.1470	53	0.0595	80	0.0135	Z	0.4130
27	0.1440	54	0.0550				

Thread Guide

Dash Size	NPT	ORB & JIC	BSPP	ORFS
-02	1/8"-27	5/16"-24	1/8"-28	---
-03	---	3/8"-24	---	---
-04	1/4"-18	7/16"-20	1/4"-19	9/16"-18
-05	---	1/2"-20	---	---
-06	3/8"-18	9/16"-18	3/8"-19	11/16"-16
-08	1/2"-14	3/4"-16	1/2"-14	13/16"-16
-10	---	7/8"-14	5/18"-14	1"-14
-12	3/4"-14	1-1/16"-12	3/4"-14	1-3/16"-12
-14	---	1-3/16"-12	---	---
-16	1"-11.5	1-5/16"-12	1"-11	1-7/16"-12
-20	1-1/4"-11.5	1-5/8"-12	1-1/4"-11	1-11/16"-12
-24	1-1/2"-11.5	1-7/8"-12	1-1/2"-11	2"-12
-32	2"-11.5	2-1/2"-12	2"-11	---

Conversion Factors

Equivalent Units		
1 Inch (in)	=	25.4 Millimeters (mm)
1 Kilogram (kg)	=	2.2064 Pounds (lb)
1 Liter (l)	=	61.026 Cubic inches
1 Gallon (U.S.)	=	3.79 Liters (l)
1 Pound (lb)	=	4.448 Newton
1 Horsepower (HP)	=	550 Foot Pounds per Second
1 Ton (metric)	=	1000 Kilograms (kg)
1 Foot (ft)	=	12 Inches (in)
1 Yard (yd)	=	3 Feet (ft)
1 Mile	=	1760 Yards (yd)
1 Mile	=	8 Furlong
1 league	=	3 Miles
1 fathom	=	6 Feet (ft)
1 rod	=	5.50 Yards (yd)
1 pint	=	4 Gills
1 quart	=	2 Pints
1 Gallon (British)	=	4 Quarts
1 are	=	100 Square Meters
1 Cubic Foot	=	12 Board Feet

Metric Prefixes




Prefix	Symbol	Multiplier
tera	T	1,000,000,000,000
giga	G	1,000,000,000
mega	M	1,000,000
kilo	k	1,000
hecto	h	100
deka	da	10
		1
deci	d	.1
centi	c	.01
milli	m	.001
micro	μ	.000001
nano	n	.000000001
pico	p	.000000000001

Conversion Factors						
Kilowatts	x	1.341	=	HP	x	.7457 = Kilowatts
Kilograms	x	2.205	=	Pounds	x	.4536 = Kilograms
Liters	x	.2642	=	Gallons (US)	x	3.785 = Liters
Pascals (Newton/M ²)	x	1.45x10 ⁻⁴	=	PSI	x	6897 = Pascals (Newton/M ²)
Dynes (Gram-CM/Sec ²)	x	2.248x10 ⁻⁶	=	Pounds	x	4.448x10 ⁵ = Dynes (Gram-CM/Sec ²)
Joules (Newton Meter)	x	.7376	=	Foot pounds	x	1.356 = Joules (Newton Meter)
Millimeter	x	.0394	=	Inches	x	25.4 = Millimeter
Newton (Kg M/Sec ²)	x	.2248	=	Pounds	x	4448 = Newton (Kg M/Sec ²)
Tons	x	2000	=	Pounds	x	5x10 ⁻⁴ = Tons
Tons-Long	x	2240	=	Pounds	x	4.464x10 ⁻⁴ = Tons-Long
Tons-Metric	x	2205	=	Pounds	x	4.535x10 ⁻⁴ = Tons-Metric
Atmosphers	x	14.7	=	PSI	x	.06804 = Atmosphers
Bars	x	14.5	=	PSI	x	.08695 = Bars
B.T.U.	x	778.2	=	Foot Pounds	x	.001285 = B.T.U.
Calories (Grams)	x	.003966	=	B.T.U.	x	252.2 = Calories (Grams)
Cubic Inch	x	.004329	=	Gallons	x	231 = Cubic Inch
Foot Pounds / Sec	x	.001818	=	H.P.	x	550 = Foot Pounds / Sec
BTU / Min	x	.02358	=	H.P.	x	42.41 = BTU / Min
Miles	x	1760	=	Yards	x	5.68x10 ⁻⁴ = Miles
Miles-Nautical	x	2027	=	Yards	x	4.933x10 ⁻⁴ = Miles-Nautical
Chains	x	22	=	Yards	x	.04545 = Chains
Cords	x	128	=	Cubic Foot	x	.007812 = Cords

Recommended Bolt Torque Values

For SAE Grade 2, Grade 5, Grade 8 cap screws & bolts.
Torques listed are approximate suggested values only on parts carrying residual oil of manufacture.
These values do not apply to plated or otherwise lubricated parts.
Torque-tension relationship is affected by lubrication, surface finish, thread fit, plating, lock washers, etc.
For plated cap screws and bolts, use only 75% of torque values listed.

Bolt Size	SAE Grade 2		SAE Grade 5		SAE Grade 8	
	Load	Torque	Load	Torque	Load	Torque
1/4"-20	1320 lbs.	5 ft. lbs.	2020 lbs.	8 ft. lbs.	2860 lbs.	12 ft. lbs.
1/4"-28	1500 lbs.	6 ft. lbs.	2320 lbs.	10 ft. lbs.	3280 lbs.	14 ft. lbs.
5/16"-18	2160 lbs.	11 ft. lbs.	3340 lbs.	17 ft. lbs.	4720 lbs.	24 ft. lbs.
5/16"-24	2400 lbs.	13 ft. lbs.	3700 lbs.	19 ft. lbs.	5220 lbs.	27 ft. lbs.
3/8"-16	3200 lbs.	20 ft. lbs.	4940 lbs.	30 ft. lbs.	7000 lbs.	45 ft. lbs.
3/8"-24	3620 lbs.	22 ft. lbs.	5600 lbs.	35 ft. lbs.	7900 lbs.	50 ft. lbs.
7/16"-14	4380 lbs.	30 ft. lbs.	6800 lbs.	50 ft. lbs.	9550 lbs.	70 ft. lbs.
7/16"-20	4900 lbs.	35 ft. lbs.	7550 lbs.	55 ft. lbs.	10700 lbs.	78 ft. lbs.
1/2"-13	5840 lbs.	50 ft. lbs.	9050 lbs.	75 ft. lbs.	12750 lbs.	105 ft. lbs.
1/2"-20	6600 lbs.	55 ft. lbs.	10700 lbs.	90 ft. lbs.	14400 lbs.	120 ft. lbs.
5/8"-11	8800 lbs.	90 ft. lbs.	14400 lbs.	150 ft. lbs.	20350 lbs.	210 ft. lbs.
5/8"-18	10000 lbs.	105 ft. lbs.	16950 lbs.	180 ft. lbs.	23000 lbs.	240 ft. lbs.
3/4"-10	13000 lbs.	160 ft. lbs.	21300 lbs.	270 ft. lbs.	30100 lbs.	375 ft. lbs.
3/4"-16	14550 lbs.	180 ft. lbs.	23800 lbs.	300 ft. lbs.	33600 lbs.	420 ft. lbs.
7/8"-9	9700 lbs.	145 ft. lbs.	27000 lbs.	395 ft. lbs.	41600 lbs.	610 ft. lbs.
7/8"-14	10700 lbs.	155 ft. lbs.	29800 lbs.	435 ft. lbs.	45800 lbs.	675 ft. lbs.
1"-8	12700 lbs.	210 ft. lbs.	35500 lbs.	590 ft. lbs.	54500 lbs.	910 ft. lbs.
1"-12	13900 lbs.	230 ft. lbs.	38800 lbs.	650 ft. lbs.	59700 lbs.	1000 ft. lbs.
1"-14	14300 lbs.	240 ft. lbs.	39700 lbs.	655 ft. lbs.	61000 lbs.	1015 ft. lbs.

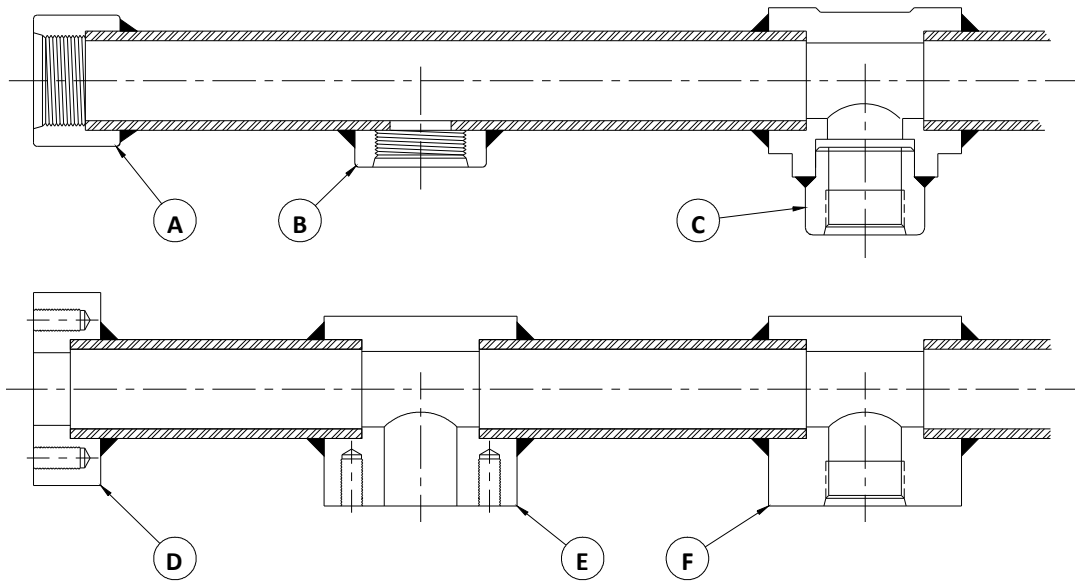
Grade	Markings	Material	Bolt & Screw Size	Proof Load (psi)	Tensile Strength min psi
2		Low Carbon Steel	1/4" thru 3/4" Over 3/4" thru 1-1/2"	55,000 33,000	74,000 60,000
5		Medium Carbon Steel Quenched & Tempered	1/4" thru 1" Over 1" thru 1-1/2"	85,000 74,000	120,000 105,000
8		Medium Carbon Alloy Steel Quenched & Tempered	1/4" thru 1-1/2"	120,000	150,000

Decimal Equivalents of Parts of an Inch in Imperial & Metric

<i>Fraction</i>	<i>Inches</i>	<i>Millimeters</i>
1/64	0.0156	0.3962
1/32	0.0313	0.7950
3/64	0.0469	1.1913
1/16	0.0625	1.5875
5/64	0.0781	1.9837
3/32	0.0938	2.3825
7/64	0.1094	2.7788
1/8	0.1250	3.1750
9/64	0.1406	3.5712
5/32	0.1563	3.9700
11/64	0.1719	4.3663
3/16	0.1875	4.7625
13/64	0.2031	5.1587
7/32	0.2188	5.5575
15/64	0.2344	5.9538
1/4	0.2500	6.3500
17/64	0.2656	6.7462
9/32	0.2813	7.1450
19/64	0.2969	7.5413
5/16	0.3125	7.9375
21/64	0.3281	8.3337
11/32	0.3438	8.7325
23/64	0.3594	9.1288
3/8	0.3750	9.5250
25/64	0.3906	9.9212
13/32	0.4063	10.3200
27/64	0.4219	10.7163
7/16	0.4375	11.1125
29/64	0.4531	11.5087
15/32	0.4688	11.9075
31/64	0.4844	12.3038
1/2	0.5000	12.7000

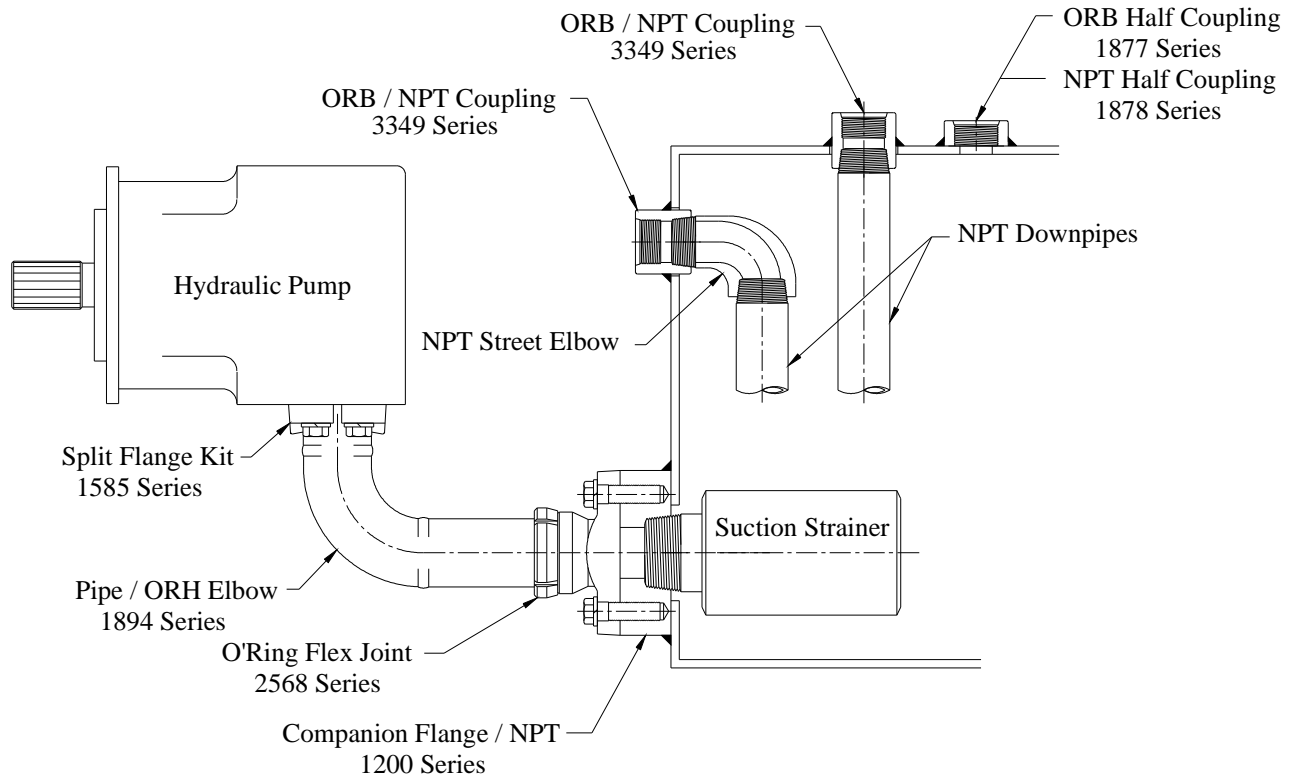
<i>Fraction</i>	<i>Inches</i>	<i>Millimeters</i>
33/64	0.5156	13.0962
17/32	0.5313	13.4950
35/64	0.5469	13.8913
9/16	0.5625	14.2875
37/64	0.5781	14.6837
19/32	0.5938	15.0825
39/64	0.6094	15.4788
5/8	0.6250	15.8750
41/64	0.6406	16.2712
21/32	0.6563	16.6700
43/64	0.6719	17.0663
11/16	0.6875	17.4625
45/64	0.7031	17.8587
23/32	0.7188	18.2575
47/64	0.7344	18.6538
3/4	0.7500	19.0500
49/64	0.7656	19.4462
25/32	0.7813	19.8450
51/64	0.7969	20.2413
13/16	0.8125	20.6375
53/64	0.8281	21.0337
27/32	0.8438	21.4325
55/64	0.8594	21.8288
7/8	0.8750	22.2250
57/64	0.8906	22.6212
29/32	0.9063	23.0200
59/64	0.9219	23.4163
15/16	0.9375	23.8125
61/64	0.9531	24.2087
31/32	0.9688	24.6075
63/64	0.9844	25.0038
1	1.0000	25.4000

Long Run Header Options



- A** *Threaded coupling, welded to the end of a pipe run in two styles, 1805 series, O' Ring Boss (ORB) to Socket Weld Pipe and 1809 series, National Pipe Thread (NPT) to Socket Weld Pipe.*
- B** *Weld-O-Let. , O' Ring Boss (2624 series) and National Pipe Thread (2625 series)*
This is an easy way to get a small port on a large pipe. Simply drill a hole in the side of your pipe and weld the Thread-O-Let in place. Disadvantage, too many too close will cause the pipe to warp due to welding.
- C** *ORB weld insert. 3348 Series*
An economical way to get an ORB port on your pipe run. This style fitting can be used in any socket weld pipe fitting such as elbows, tees, and crosses.
- D** *Companion Flange to Socket Weld Pipe. 1211 series in Code 61 and 1851 series in Code 62.*
When you want to terminate a pipe run for future expansion or to continue on in 4-bolt flange technology.
- E** *Socket Weld Pipe to 4-Bolt Flange Tees. 1865 series in Code 61 and 1879 series in Code 62*
When 4-bolt flanges are required on a pipe run. Simply cut the pipe and weld in place. Helps to eliminate pipe distortion so common with Weld-O-Lets.
- F** *Socket Weld Pipe to ORB Tees. 2058 series*
Used the same way as item E. A perfect way to get an ORB into your pipe run. Most commonly used when smaller hoses are needed off of a pipe run.

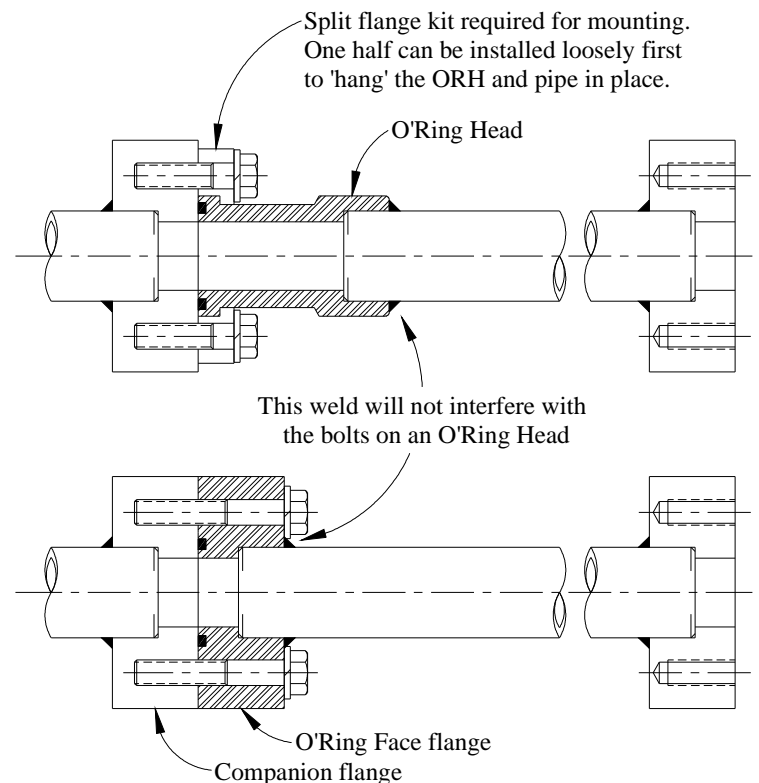
Tank Port Options



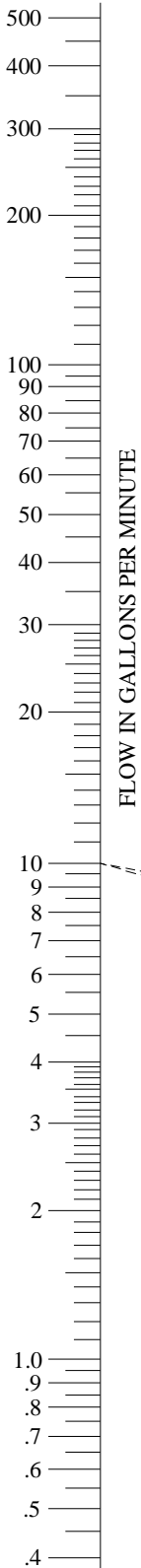
O'Ring Head versus O'Ring Face

In order to join two pieces of pipe using 4-bolt flange technology, you need two flanges. The first being a flat face flange with tapped bolt holes (companion face flange) and the second being a flange with an o'ring groove (o'ring flange). The o'ring flanges come in two styles, O'Ring Face (ORF) and O'Ring Head (ORH). The O'Ring Head style flange requires a split flange kit for mounting while the O'Ring Face flange bolts directly in place. The O'Ring Head (ORH) flange is a much superior flange and has many advantages over the O'Ring Face (ORF) flange.

- On socket weld pipe, as shown, the weld is moved farther away from the bolts, eliminating the need to grind welds in order to install the bolts when too much weld is put in place.
- There is no orientation required when welding in place as the flange itself is round.
- When installing your welded pipe together, one half of the split flange kit can be loosely installed to "hang" the pipe assembly in place as you tighten the bolts.
- The O'Ring Head style flange is the only way a larger pipe can be welded to a smaller flange as the socket for the pipe is well away from the bolt pattern of the flange and will not interfere.



Flow Capacities of Hydraulic Lines at Recommended Velocities



This nomograph will aid you in selecting the correct line size when a straight edge is placed from the left column (GPM) to the recommended velocity in the right hand column. The example shows that with 10 gallons per minute a either a 5/8" or 3/4" I.D. line will give you a flow velocity within the recommended range for pressure lines.

$$\text{Area in Square Inches} = \frac{0.321 \times \text{Flow (G.P.M.)}}{\text{Velocity in Feet per Second}}$$

Recommendations are for hydraulic oils having a maximum viscosity of 315 S.S.U. at 100° F. And operating temperatures between 60° F and 155° F

FLOW IN GALLONS PER MINUTE

INSIDE DIAMETER OF LINE IN INCHES

INSIDE AREA OF LINE IN SQUARE INCHES

VELOCITY IN FEET PER SECOND

RECOMMENDED VELOCITY RANGE FOR INTAKE LINES

RECOMMENDED VELOCITY RANGE FOR PRESSURE LINES