

Metric Fittings & Valves



ENGINEERING GUIDE

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Page 33

Suitable for Oil-Free air handling to 25 psi, not for distribution of compressed air or gas See Spears[®] Product Sourcebook for product offerings



TECHNICAL INFORMATION

MATERIALS

THERMOPLASTICS

UPVC - All PVC referenced in this publication is unplasticized PVC, commonly referred to as UPVC.

PVC - Poly Vinyl Chloride

PVC is one of the most specified thermoplastics for piping system components, including valves, fittings, flanges and many specialty products. PVC has excellent chemical and corrosion resistance to a broad range of fluids including water, deionized water, most mineral acids, bases, salts and paraffinic hydrocarbon solutions. PVC is not recommended for use with chlorinated or aromatic hydrocarbons, esters or polar solvents such as ketones. Spears[®] PVC materials conform to ASTM Cell Classification 12454-B (formerly designated as Type I, Grade 1). The maximum recommended service temperature of PVC products is 60°C (140°F).

CPVC - Chlorinated Poly Vinyl Chloride

Chlorinated PVC is used for higher temperature applications than PVC, especially for handling hot corrosive liquids. With similar chemical and corrosion resistance to PVC, increased chlorine content gives CPVC superior thermal resistance. CPVC is not recommended for use with chlorinated or aromatic hydrocarbons, esters, or polar solvents such as ketones. Spears[®] CPVC materials conform to ASTM Cell Classification 23447-B (formerly designated as Type IV, Grade 1). The maximum recommended service temperature of CPVC products is 93°C (200°F).

ELASTOMERS

EPR (EPDM) Ethylene propylene rubber

Used in O-ring seals, EPR is recommended for water, chlorinated water, dilute acids and alkalines, alcohols, and has excellent resistance to ozone. EPR is not recommended for petroleum oils, di-ester lubricants, strong acids, or strong alkalines. The maximum recommended service temperature of EPR is 149°C (300°F). **FKM - Fluorocarbon elastomer**

Used in O-ring seals, FKM exhibits a very broad range of chemical resistance, including petroleum oils, di-ester based lubricants, silicate fluids and greases, halogenated hydrocarbons and mineral acids. FKM is not recommended for ketones, amines, anhydrous ammonia, hot hydrofluoric or chlorosulfonic acids or automotive brake fluids. The maximum recommended service temperature of FKM is 204°C (400°F).

NITRILE (Buna-N) - Nitrile elastomer

Used in O-ring seals, nitrile elastomers are recommended for petroleum oils and fluids, silicone oils and greases, di-ester based lubricants, ethylene glycol based fluids and cold water. Nitrile is not recommended for phosphate ester hydraulic fluids, halogenated hydrocarbons, strong acids, ketone, ozone or automotive brake fluids. The maximum recommended service temperature of nitrile is 135°C (275°F).

IMPORTANT

SPECIFICATION STANDARDS ORIGIN

Not all metric fitting sizes are the same. Today's global markets have varying standards, norms and interpretations of metric sizing. Identification of the standards origin for which fittings are being specified is essential in assuring that the proper fitting is obtained for each application.

METRIC SIZE DIAMETERS: ACTUAL (O.D.) vs. NOMINAL (I.D.)

Pipe and fitting sizes are specified according to a diameter. It is important to know if a specification of size is an actual O.D. (d), or a nominal diameter (DN) which is based on pipe I.D.

Where applicable, Spears[®] metric socket fittings in this price schedule have size columns to indicate both actual "d" and nominal "DN". It is always best to identify the actual pipe O.D. being used in order to select the proper fitting.

THREADS

Spears[®] metric thread fittings use BSP (British Standard Pipe) threads designated in inch-sizes, which also conform to ISO 7/1 metric threads. ASTM Iron Pipe Size (IPS) threads use NPT (National Pipe Thread) threads which are also designated as inch size, conforming to ASTM F 1498. BSP threads are not compatible with NPT threads.

SPEARS® METRIC FITTINGS

PN16 PVC AND CPVC METRIC FITTINGS Injection Molded.

Size Range:	20mm through 63mm socket, actual "d"
Sockets:	ISO 727
Threads - BSP:	ISO 7/1
Laying Lengths:	ISO 264
Pressure Rating:	PN16 = 16 BAR at 23°C (232 psi at 73°F)

PN10 (CLASS 10/12) PVC METRIC SOCKET FITTINGS

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160mm and 225mm socket, actual "d" 73°F
ISO 727 diameters (ASTM D 2467 socket length)
160mm: PN12 = 12 BAR at 23°C (174 psi at 73°F) 225mm: PN10 = 10 BAR at 23°C (145 psi at 73°F)



PVC ASTM SCHEDULE 40 SOCKET X BSP ADAPTER FITTINGS (WHITE & GRAY) Injection Molded.

Size Range:	3/4" through 3" socket x threaded, nominal
Sockets:	Iron Pipe Size (IPS) to ASTM D 2466
Threads - BSP:	ISO 7/1
Pressure Rating:	Designed for use with corresponding size and pressure of ASTM D 1785 Schedule 40 pipe with 50% derating of threaded system.

PVC TRANSITION UNIONS

Injection molded; specially designed for transitions between ASTM IPS (Iron Pipe Size) systems and either ISO (International Standards Organization) metric, or JIS (Japanese Industrial Standards) metric systems.

Size Range:	ASTM IPS (inch): 1	ASTM IPS (inch): 1/2" through 4", nominal						
		- connect to -						
	ISO Metric (mm): 20	0mm through 110mm socket, actual "d" 1/2" through 4" BSP threaded						
		- or to -						
	JIS Metric (mm):	16mm through 100mm socket, nominal "DN"						
Sockets:	ASTM IPS (inch): ISO Metric (mm): JIS Metric (mm):	ASTM D 2467 ISO 727 diameters (ASTM D 2467 socket length) JIS K6741 diameters (ASTM D 2467 socket length)						
Threads:	NPT BSP:	ASTM F 1498 ISO 7/1						
Pressure Rating:	16.2 BAR at 23°C (235 psi at 73°F)						

PVC & CPVC METRIC VALVES

TRUE UNION BALL VALVES & BALL CHECK VALVES

Size Range:	20mm through 110	mm socket, actual "d" 1/2" through 2" BSP threaded
Sockets:	ISO 727 diameters	(ASTM D 2467 socket length)
Threads - BSP:	ISO 7/1	
Pressure Rating:	20mm - 62mm 75mm - 110mm	16.2 BAR at 23°C (235 psi at 73°F) 10.3 BAR at 23°C (150 psi at 73°F)

GATE VALVES

Size Range:	20mm through 63mm socket, actual "d" 1/2" through 2" BSP threaded
Sockets:	ISO 727 diameters (ASTM 2467 socket length)
Threads - BSP:	ISO 7/1
Pressure Rating:	13.8 BAR at 23°C (200 psi at 73°F)

Metric Fittings Technical ASTM & Metric Dimensions & Standards Comparison



SCHEDULE 40 & SCHEDULE 80 PIPE DIMENSIONS ASTM STANDARD D 1785								ESSURE RAT	FINGS]
Mean			Minimum Wall Thicknes (inch)				Schedule 40 Schedule 80			dule 80
Nominal Pipe Size (inch)	Outside Diameter (inch)	O.D Tolerance (inch)	Schedule 40	Schedule 80	Inch	mm O.D.	psi	BAR	psi	BAR
1/2	0.840	±0.004	0.109	0.147	1/2	21.34	600	41.3	850	58.6
3/4	1.050	±0.004	0.113	0.154	3/4	26.67	480	33.1	690	47.5
1	1.315	±0.005	0.133	0.179	1	33.40	450	31.0	630	43.4
1-1/4	1.660	±0.005	0.140	0.191	1-1/4	42.16	370	25.5	520	35.8
1-1/2	1.900	±0.006	0.145	0.200	1-1/2	48.26	330	22.7	470	32.4
2	2.375	±0.006	0.154	0.218	2	60.32	280	19.3	400	27.5
2-1/2	2.875	±0.007	0.203	0.276	2-1/2	73.02	300	20.6	420	28.9
3	3.500	±0.008	0.216	0.300	3	88.90	260	17.9	370	25.5
4	4.500	±0.009	0.237	0.337	4	114.30	220	15.1	320	22.0
6	6.625	±0.011	0.280	0.420	6	168.28	180	12.4	280	19.3
8	8.625	±0.015	0.322	0.500	8	219.08	160	11.0	250	17.2
10	10.750	±0.015	0.365	0.593	10	273.05	140	9.7	230	15.8
12	12.750	±0.015	0.406	0.687	12	323.85	130	8.9	230	15.8



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Metric Fittings Technical ASTM & Metric Dimensions & Standards Comparison

PVC METRIC FABRICATED FITTINGS BASIC SOCKET DIMENSIONS \leftarrow C \rightarrow B A \downarrow A \downarrow										
Size	Socket Entrance A		Tolerance ±		Socket Bottom B		Tolerance ±		C Socket Depth (Minimum)	
	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm
110mm	4.346	110.39	0.015	0.38	4.316	109.63	0.015	0.38	2.5000	63.50
125mm	4.934	125.32	0.016	0.41	4.930	125.22	0.016	0.41	2.750	69.85
160mm	6.319	160.50	0.020	0.51	6.270	159.26	0.020	0.51	3.500	88.90
200mm	7.900	200.66	0.026	0.66	7.848	199.34	0.026	0.66	4.250	107.95
225mm	8.870	225.30	0.029	0.74	8.829	224.26	0.029	0.74	4.750	120.65
250mm	9.875	250.83	0.032	0.81	9.811	249.20	0.032	0.81	5.250	133.35
280mm	11.059	280.90	0.035	0.89	10.992	279.20	0.035	0.89	5.750	146.05
315mm	12.441	316.00	0.039	0.99	12.363	314.02	0.039	0.99	6.500	165.10





35.791

2.3091

STANDARDS COMPARISON											
JIS K6747		DIN	8062		ASTM D 17	85	NPT-ANSI B1.20.1		BSP-ISO 7/1		
m	m	m	m	Nominal	Act	ual O.D.	Tapered	Tapered Thread Parallel Thre		l Thread	
Nominal	Actual O.D.	Nominal	Actual O.D.	inches	inches	mm	Designation	Threads per inch	Designation	Threads per 25.4mm	
16	22	15	20	1/2	.840	21.34	1/2	14	1/2	14	
20	26	20	25	3/4	1.050	26.67	3/4	14	3/4	14	
25	32	25	32	1	1.315	33.40	1	11-1/2	1	11	
30	38	32	40	1-1/4	1.660	42.16	1-1/4	11-1/2	1-1/4	11	
40	48	40	50	1-1/2	1.900	48.26	1-1/2	11-1/2	1-1/2	11	
50	60	50	63	2	2.375	60.32	2	11-1/2	2	11	
75	89	80	90	3	3.500	88.90	3	8	3	11	
100	114	100	110	4	4.500	114.30	4	8	4	11	

4

11

Page 37

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