

are included in the American Standard. Larger sizes also are available in some types of fittings. The welding bevel which is a straight $37\frac{1}{2}$ -deg V for wall thickness $\frac{3}{4}$ in. and below, and a U-bevel for thicknesses heavier than $\frac{3}{4}$ in., conforms to the recommended practice of A.S.A.

TABLE 9. AMERICAN STANDARD DIMENSIONS OF STEEL WELDING NECK AND SLIP-ON WELDING FLANGES FOR STEAM SERVICE PRESSURE RATING OF 150 PSI (GAGE) AT A TEMPERATURE OF 500 F, AND 100 PSI (GAGE) AT 750 F, A.S.A. B16e-1939

WELDING NECK

SLIP-ON WELDING

NOMINAL PIPE SIZE	WELDING NECK		SLIP-ON WELDING							NO. OF BOLTS	SIZE OF BOLTS
	DIAMETER OF FLANGE O	THICKNESS OF FLG. ^a MIN. Q	DIAMETER OF HUB X	HUB DIAM. BEGINNING OF CHAMFER ^{b-c} H	LENGTH THRU HUB ^a Y	INSIDE DIAM. OF PIPE SCHEDULE 40 ^a J	BORE OF SLIP-ON FLANGES MIN. W	DIAM. OF BOLT CIRCLE			
1/2	3 1/2	7/16	1 1/8	0.84	1 7/8	0.62*	0.88	2 3/8	4	1 1/2	
3/4	3 7/8	7/16	1 1/2	1.05	2 1/16	0.82*	1.09	2 3/4	4	1 1/2	
1	4 1/4	9/16	1 5/8	1.32	2 3/16	1.05*	1.38	3 1/8	4	1 1/2	
1 1/4	4 5/8	5/8	2 1/8	1.66	2 1/4	1.38*	1.72	3 1/2	4	1 1/2	
1 1/2	5	11/16	2 3/8	1.90	2 1/2	1.61*	1.97	3 3/8	4	1 1/2	
2	6	3/4	3 1/8	2.38	2 1/2	2.07*	2.44	4 1/4	4	1 1/2	
2 1/2	7	7/8	3 3/8	2.88	2 3/4	2.47*	2.94	5 1/2	4	1 1/2	
3	7 1/2	15/16	4 1/4	3.50	2 3/4	3.07*	3.56	6	4	1 1/2	
3 1/2	8 1/2	15/16	4 3/8	4.00	2 13/16	3.55*	4.06	7	8	1 1/2	
4	9	15/16	5 1/8	4.50	3	4.03*	4.56	7 1/2	8	1 1/2	
5	10	15/16	5 3/8	5.56	3 1/2	5.05*	5.66	8 1/2	8	1 1/2	
6	11	1	7 1/8	6.63	3 1/2	6.07*	6.72	9 1/2	8	1 1/2	
8	13 1/2	1 1/8	9 1/16	8.63	4	7.98*	8.72	11 3/4	8	1 1/2	
10	16	1 1/8	12	10.75	4	10.02*	10.88	14 1/4	12	1 1/2	
12	19	1 1/4	14 3/8	12.75	4 1/2	-----	12.88	17	12	1 1/2	
14 O.D.	21	1 3/8	15 3/8	14.00	5	To Be	14.19	18 3/4	12	1	
16 O.D.	23 1/2	1 7/8	18	16.00	5	Specified	16.19	21 1/4	16	1	
18 O.D.	25	1 7/8	19 7/8	18.00	5 1/8	by	18.19	22 3/4	16	1 1/8	
20 O.D.	27 1/2	1 11/16	22	20.00	5 11/16	Purchaser	20.19	25	20	1 1/4	
24 O.D.	32	1 7/8	26 1/8	24.00	6	-----	24.19	29 1/2	20	1 1/4	

All dimensions given in inches.

*A raised face of $\frac{1}{8}$ in. is included in thickness of flange minimum and in length through hub.

bThe outside surface of the welding end of the hub shall be straight or tapered at not more than 6 deg.

cDimensions H and J correspond to the outside and inside diameters of pipe as given in A.S.A. B36.10-1939, Schedule 40.

*These diameters are identical with the diameters of what was formerly designated as Standard Weight Pipe of the corresponding sizes.

Standard B16e-1939, American Standard for Steel Pipe Flanges and Flanged Fittings. The latter also contains dimensions for steel welding neck flanges for pressures up to 2500 psi, and slip-on welding flanges for 150 and 300 psi. Table 9 gives these dimensions for welding-neck and slip-on welding flanges suitable for 150 psi gage pressure.

Socket-welding fittings also are commercially available. These fittings have a machined recess for inserting the pipe which is attached by a fillet weld between the pipe wall and socket end. Use of socket-welding fittings generally is restricted to nominal pipe sizes 3 in. and smaller in

which range commercial fittings are available. This type of fitting has gained rapid acceptance owing to its ease of installation, low cost, and ability to make a pressure tight joint without weakening the pipe as is the case with threading. Dimensions for socket-welding fittings as offered by most manufacturers of the product are given in Table 10.

VALVES

Valves are made with both threaded and flanged ends for screwed and bolted connections just as are pipe fittings.

The material used for valves of small size is generally brass or bronze for low pressures and forged steel for high pressures, while in the larger

TABLE 10. PROPOSED AMERICAN STANDARD DIMENSIONS OF SOCKET-WELDING ELBOWS, TEES, CROSSES, 45-DEG ELBOWS, AND COUPLINGS

NOMINAL PIPE SIZE	MINIMUM DEPTH OF SOCKET	CENTER TO BOTTOM OF SOCKET				COUPLINGS DISTANCE BETWEEN BOTTOM SOCKETS	BORE DIAMETER OF SOCKET, MINIMUM	MINIMUM SOCKET WALL THICKNESS			BORE DIAMETER OF FITTINGS				
		90-Deg Elbs, Tees, Crosses		45-Deg Elbs				Sched. 40	Sched. 80	Sched. 160	Sched. 40	Sched. 80	Sched. 160		
		Sched. 40 & 80	Sched. 160	Sched. 40 & 80	Sched. 160										
		A		A		E	B	C ^a			D				
$\frac{1}{2}$	$\frac{3}{8}$	$\frac{17}{16}$	$\frac{17}{16}$	$\frac{17}{16}$	$\frac{17}{16}$	$\frac{17}{16}$	0.555	0.156	0.156		0.364	0.302			
$\frac{3}{4}$	$\frac{7}{8}$	$\frac{17}{16}$	$\frac{17}{16}$	$\frac{17}{16}$	$\frac{17}{16}$	$\frac{17}{16}$	0.690	0.156	0.153		0.493	0.423			
1	1	$\frac{17}{16}$	$\frac{17}{16}$	$\frac{17}{16}$	$\frac{17}{16}$	$\frac{17}{16}$	0.855	0.156	0.184	0.234	0.622	0.546	0.466		
$1\frac{1}{4}$	$1\frac{1}{4}$	$\frac{17}{16}$	$\frac{17}{16}$	$\frac{17}{16}$	$\frac{17}{16}$	$\frac{17}{16}$	1.065	0.156	0.193	0.273	0.824	0.742	0.814		
$1\frac{1}{2}$	$1\frac{1}{2}$	$\frac{17}{16}$	$\frac{17}{16}$	$\frac{17}{16}$	$\frac{17}{16}$	$\frac{17}{16}$	1.330	0.166	0.224	0.313	1.049	0.957	0.815		
2	$1\frac{3}{4}$	$\frac{17}{16}$	$\frac{17}{16}$	$\frac{17}{16}$	$\frac{17}{16}$	$\frac{17}{16}$	1.675	0.175	0.239	0.313	1.390	1.278	1.160		
$2\frac{1}{2}$	$2\frac{1}{2}$	$\frac{17}{16}$	$\frac{17}{16}$	$\frac{17}{16}$	$\frac{17}{16}$	$\frac{17}{16}$	1.915	0.181	0.250	0.351	1.610	1.500	1.338		
3	$2\frac{3}{4}$	$\frac{17}{16}$	$\frac{17}{16}$	$\frac{17}{16}$	$\frac{17}{16}$	$\frac{17}{16}$	2.406	0.193	0.273	0.429	2.067	1.939	1.699		
		$\frac{17}{16}$	$\frac{17}{16}$	$\frac{17}{16}$	$\frac{17}{16}$	$\frac{17}{16}$	2.906	0.254	0.345	0.469	2.469	2.323	2.125		
		$\frac{17}{16}$	$\frac{17}{16}$	$\frac{17}{16}$	$\frac{17}{16}$	$\frac{17}{16}$	3.535	0.270	0.375	0.546	3.068	2.900	2.626		

All dimensions are given in inches.

*Dimension C is $1\frac{1}{4}$ times the nominal pipe thickness, minimum, but not less than $\frac{1}{8}$ in.

Reducing sizes have same center to bottom of socket dimension as the largest size of reducing fitting.

sizes either cast-iron, cast-steel or some of the steel alloys are employed. Practically all iron or steel valves intended for steam or water work are bronze-mounted or trimmed.

Brass, bronze, and iron valves are generally designed for standard or extra heavy service, the former being used up to 125 lb and the latter up to 250 lb saturated steam working pressure, although most manufacturers also make valves for medium pressure up to 175 lb steam working pressure. The more common types are gate valves or straightway valves, globe valves, angle valves, check valves and automatic valves, such as reducing and back-pressure valves.

Gate valves are the most frequently used of all valves since in their open position the resistance to flow is a minimum, but they should not be used where it is desired to throttle the flow; globe valves should be used for this purpose. Gate valves may be secured with either a rising or a non-