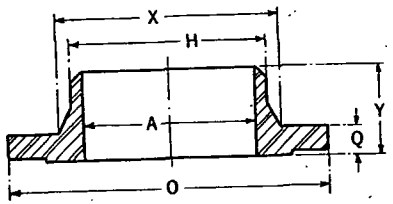
handles are often supplied to indicate the relative opening of the valve in any position. Standard roughing-in dimensions for angle-type valves are given in Table 12.

Automatic control of steam supply to individual radiators can be

TABLE 11. PROPOSED DIMENSIONS OF STEEL WELDING NECK FLANGES FOR MAXIMUM STEAM SERVICE PRESSURE OF 300 LB PER SQ IN. (GAGE) AT A TEMPERATURE OF 750 F



NOMINAL PIPE SIZE	DIAM. OF FLANGE	THICKNESS OF FLANGE MIN.	DIAM. OF HUB	HUB DIAM. BEGINNING OF CHAMFER	LENGTH THRU HUB	DIAM. FOR STANDARD PIPE	DIAM. FOR EXTRA STRONG PIPE	DIAM. OF BOLT CIRCLE	NO. OF BOLTS	SIZE OF BOLTS
	O	*Q*	*X*	*H*	*Y*	*A*	*A*			
*2	6½	⅞	3 5/16	2.38	2¾	2.07	1.94	5	8	⅝
2½	7½	1	3 15/16	2.88	3	2.47	2.32	5⅞	8	¾
3	8¼	1⅛	4⅝	3.50	3⅛	3.07	2.90	6⅝	8	¾
3½	9	1 3/16	5¼	4.00	3 3/16	3.55	3.36	7¼	8	¾
4	10	1¼	5¾	4.50	3⅜	4.03	3.83	7⅞	8	¾
5	11	1⅜	7	5.56	3⅞	5.05	4.81	9¼	8	¾
6	12½	1 7/16	8⅛	6.63	3⅞	6.07	5.76	10⅝	12	¾
8	15	1⅝	10¼	8.63	4⅜	7.98	7.63	13	12	⅞
10	17½	1⅞	12⅝	10.75	4⅝	10.02	9.75	15¼	16	1
12	20½	2	14¾	12.75	5⅛	12.00	11.75	17¾	16	1⅛
14 O. D.	23	2⅛	16¾	14.00	5⅝	13.25	.....	20¼	20	1⅛
16 O. D.	25½	2¼	19	16.00	5¾	15.25	.....	22½	20	1¼
18 O. D.	28	2⅜	21	18.00	6¼	17.25	.....	24¾	24	1¼
20 O. D.	30½	2½	23⅛	20.00	6⅜	19.25	.....	27	24	1¼
24 O. D.	36	2¾	27⅝	24.00	6⅝	23.25	.....	32	24	1½

*For sizes below 2 in. use dimensions of 600 lb flanges.

All dimensions given in inches.

A raised face of 1/16 in. is included in *thickness of flange minimum.*

It is recommended that the taper of the hub should not exceed 6 deg for a reasonable distance back of the chamfer in order to reduce the heat transfer while welding.

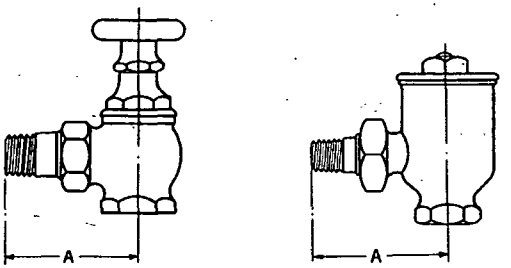
effected by use of direct-acting radiator valves having a thermostatic element at the valve, or near to it. The direct-acting valve is usually an angle-type valve containing a thermostatic element which permits the flow of steam in accordance with room temperature requirements. These valves usually are capable of adjustment to permit variation in room temperature to suit individual taste.

Ordinary steam valves may be used for hot water service by drilling a 1/16-in. hole through the web forming the seat to insure sufficient circulation to prevent freezing when the valve is closed. Valves made particularly

for use in hot water heating systems are of less complex design, one type consisting of a simple butterfly valve, and another of a quick opening type in which a part in the valve mechanism matches up with an opening in the valve body.

In one-pipe steam-heating systems, automatic air valves are required at the radiators. Two common types of air valves available are the vacuum type and the straight-pressure type. Vacuum valves permit the expulsion of air from the radiators when the steam pressure rises and, in addition, act as checks to prevent the return of air into the radiator when

TABLE 12. STANDARD ROUGHING-IN DIMENSIONS ANGLE TYPE VALVES



SIZE OF VALVE	DIMENSION A STEAM AND HOT WATER ANGLE VALVES AND UNION ELBOWS EFFECTIVE JANUARY 1, 1926	DIMENSION A MODULATING VALVES EFFECTIVE JANUARY 1, 1926	DIMENSION A RETURN LINE VACUUM VALVES EFFECTIVE JANUARY 1, 1925
½	2¼	2¾	3¼
¾	2¾	2¾	-----
1	3	3	-----
1¼	3½	3½	-----
1½	3¾	3¾	-----
2	4¼	4¼	-----
Tolerance	±⅛	±⅛	-----

All dimensions given in inches.

Connecting ends shall be threaded and gaged as to threading according to the American (Taper) Pipe Thread Standard, *A.S.A.* No. B2—1919.

The standardization of the Roughing-in Dimensions of Angle Steam and Hot Water, and Modulating Radiator Valves was made possible by the cooperation of the Manufacturers Standardization Society of the Valves and Fittings Industry.

a vacuum is formed by the condensation of steam after the supply pressure has dropped. Ordinary air valves permit the expulsion of air from the radiator when steam is supplied under pressure, but when the pressure dies down and a vacuum tends to be formed the air is drawn back into the radiator.

A system operating continuously or intermittently and supplied with vacuum valves will generally heat more quickly than one provided with non-vacuum air valves; thus, it will effect considerable economy of fuel because the idle period during which no heat is delivered is shortened. In those cases, where a system is equipped with vacuum air valves and which has been cold for several days, the system will probably have an