

**THIS STANDARD WITHDRAWN MAY 1966
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AWWA STANDARD
for
CAST-IRON PRESSURE FITTINGS

**American Water Works Association
New England Water Works Association**

This document presents in slightly revised form the "special castings" portion of "Standard Specifications for Cast-Iron Water Pipes and Special Castings—7C.1-1908" which was adopted by AWWA on May 12, 1908. Although it has been superseded for new installations by various American Standards for cast-iron pipe and fittings (ASA specifications A21.2, A21.6, A21.8, A21.10, and A21.11), it is still valid as a basis for replacing fittings in existing pipelines, or for ordering fittings in sizes larger than 12 in., as these large sizes are not now covered by American Standards.

First Edition (7C.1 1908) approved by AWWA May 12, 1908. Second Edition (C100-52T) approved by AWWA Dec. 31, 1952, by NEWWA Jan. 22, 1953. Third Edition (C100-54T) approved by AWWA Oct. 25, 1954. by NEWWA Oct. 3, 1954. Made Standard Jun. 17, 1955.

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Latest Revisions to C100

The AWWA Board of Directors approved the advancement of this document to Standard on Jun. 17, 1955. The new designation is C100-55. As no changes were made in the text at that time, earlier printings of the Third Edition (designated C100-54T) remain equally valid.

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AWWA Standard for

Cast-Iron Pressure Fittings

Sec. 1—Description of Fittings

The fittings shall be made with bell and spigot joints and shall conform, within the specified tolerances, to the dimensions given in the tables forming a part of these specifications.

For pipe 4–12 in., one class of fittings shall be furnished, made from Class D patterns. Spigot ends shall have reduced outside diameters as shown by Table 1 and shall taper back for a distance of 6 in.

For pipe 14–24 in., two classes of fittings shall be furnished—Class B, and Class D, on which the letters “B” and “D”, respectively, shall be cast. For pipe 30–60 in., four classes of fittings—Classes A, B, C, and D, shall be furnished and they shall have cast on them the letter of the class to which they belong.

Classes A, B, C, and D fittings provide for the following working heads and pressures:

Class	Head ft	Pressure psi
A	100	43
B	200	86
C	300	130
D	400	173

The flanges on all manhole castings and manhole covers shall be faced and drilled as shown in Tables 8 and 9. The manufacturer shall furnish mild steel bolts with square heads, hexagon nuts and gaskets.

Sec. 2—Variation in Diameter

Sockets and spigots shall be tested with circular gages. Tolerances of fittings made from standard patterns are:

Size Range in.	Tolerance in.
4–16	± 0.12
18–24	± 0.15
30–42	± 0.20
48–60	± 0.24

Sec. 3—Variation in Thickness

The thickness tolerance for fittings with standard wall thickness of less than 1 in. shall be minus 0.12 in. The tolerance for fittings with standard wall thickness 1 in. and more shall be minus 0.15 in. An additional tolerance of 0.03 in. is permitted for spaces not exceeding 8 in. in length in any direction.

Sec. 4—Variation in Weight

The weight tolerance for 4–12 in. standard fittings is ± 10 per cent. For 14–60 in. fittings, the tolerance is ± 8 per cent. For bends and wyes, the tolerance is ± 12 per cent.

No weight shall be paid for that is in excess of the amount allowed by maximum tolerance. No fitting shall be accepted that weighs less than the amount allowed by minimum tolerance.

Sec. 5—Marking

Each fitting shall have cast, on the outside, the initials of the maker's name

and the class. As many as four special initials and the year may also be cast when required by the customer. The weight shall be painted conspicuously on each fitting.

Sec. 6—Quality of Iron

All fittings shall be made of cast iron of good quality. The metal of the castings shall be strong, tough, of even grain, and soft enough to drill and cut satisfactorily.

Sec. 7—Test Bars

7.1. The acceptability of the iron used in the fittings shall be determined by testing bars cast from the same iron as the fittings. The observations and the computed results hereinafter required shall be recorded, and, if requested, reported to the purchaser.

7.2. *Dimensions.* Test bars shall be 2 in. wide, 1 in. thick and not less than 26 in. long. Individual test bars may vary as much as 2 per cent from the standard width or standard thickness, or both, but the patterns and molding practice shall be such that the errors shall in general not exceed 1 per cent.

7.3. *Methods of casting.* The bars shall be cast vertically in well faced, dry sand molds provided with a suitable pouring basin and mounted on a suitable refractory foundation. Metal for the bars shall be obtained by using a small, heated ladle taking its metal from the main ladle from which the fittings are to be poured and after all alloys and other additional metal, except cast iron for cooling, have been added to the main ladle and become melted. The bars shall not be removed from the mold before they have cooled to 500 F.

7.4. *When cast and to what fittings applicable.* Except as hereinafter pro-

vided for special cases, one pair of test bars of the metal used shall be cast with iron from the first ladle, another pair with iron from the approximately middle ladle and a third pair with iron from the last ladle of iron taken during a day's run or heat, from the cupola in which the iron for the fittings is melted. If the heat lasts for more than six hours, then additional pairs of bars shall be cast at approximately uniform intervals so as to give an extra pair of bars for each three hours during which the heat lasts in excess of six hours. In case the charging of the cupola is to be changed for one or more times during the day's run or heat in order to produce a different iron, the time of taking test bars shall be varied in such a way as to obtain representative tests of the iron at least at the beginning and end of each period during which the iron is intended to be constant in quality; and in case such period exceeds four hours, additional pairs of bars shall be taken at such times as will provide a pair of bars for each two hours during which this special mixture is used. At least one bar from each pair shall be broken, but the manufacturer shall have the right to break both bars, in which case the better bar shall be taken as representative. Bars showing flaws in fracture may be disregarded.

7.5. *Test bar requirements to indicate acceptable iron.* In order that the iron shall be acceptable, the average results from the single bars representing the respective pairs of bars cast during the heat or period shall comply with the requirements hereinafter specified, and, in addition, no representative bar shall be more than 5 per cent below the minimum requirements in either corrected breaking load or corrected deflection.

7.6. *Method of testing.* The bars shall be broken as beams by placing them flatwise on supports 24 in. apart and applying the load at the center of the span. The breaking load and the corresponding deflection shall be observed and recorded.

7.7. *Correcting observed breaking loads and deflections.* The bars shall be measured at the point of application of the load and the results corrected to standard 2-in. by 1-in. cross section by the conventional beam formula as follows:

Corrected breaking load

$$= \text{Observed breaking load} \times \frac{2}{bd^2}$$

Corrected deflection at breaking

$$= \text{Observed deflection at breaking} \times d$$

where b is the measured width and d is the measured depth of the bar at the point of application of the load. In the formulas above, the deflection and all dimensions are in inches.

7.8. *Requirements on strength and deflection of 2-in. by 1-in. bars.* In order to indicate acceptable metal, the corrected breaking loads and deflections of the representative 2-in. by 1-in. test bars for a given heat or period, interpreted as provided in Sec. 7.4 above, shall comply with the following requirements:

Minimum center breaking load:

$$2,300 \text{ lb}$$

Minimum center deflection at breaking:

$$0.30 + 0.0001 (\text{breaking load} - 2,300) \text{ in.}$$

7.9. *Alternate tensile bars.* As an alternate to the 2-in. by 1-in. test bars, ASTM A48 round test bars may be cast which shall meet Class 25 requirements. To be acceptable, the tensile

strength must equal or exceed 25,000 psi.

Sec. 8—Quality of Castings

The fittings shall be smooth and free from defects of every nature which would make them unfit for the use for which they are intended. No plugging or filling will be allowed.

Sec. 9—Cleaning and Inspection

All fittings shall be thoroughly cleaned and subjected to a careful inspection.

Sec. 10—Linings, Exterior Coatings

Any particular lining or coating which is to be applied to the fittings shall be specified in the agreement made at the time of purchase. Separate standards for cement-mortar lining (ASA A21.4; also known as AWWA C104) have been provided as a part of standards for pipe.

No fittings for water works service shall be furnished without protective coating unless specifically ordered by the purchaser.

Sec. 11—Weighing

The fittings shall be weighed under the supervision of the engineer before the application of any lining or coating other than hot or cold bituminous dip or paint. If desired by the engineer, the fittings shall be weighed after their delivery, and the weights so ascertained shall be used in the final settlement, provided such weighing is done by a legalized weighmaster. Bids shall be submitted and a final settlement made upon the basis of a ton of 2,000 lb.

Sec. 12—Men and Material

The manufacturer shall provide all tools, testing machines, and labor neces-

sary for the required testing, inspection and weighing at the foundry. If specified on the order, the manufacturer shall furnish the test results and a sworn statement that all of the tests have been made as specified.

Sec. 13—Power to Inspect

The engineer shall be at liberty at all times to inspect the material at the foundry, and the molding, casting, and coating of the fittings. All castings shall be subject to his inspection and approval, and he may reject any casting which is not in conformity with the specifications or drawings.

Sec. 14—Inspector to Report

The inspector at the foundry shall report daily to the foundry office all fittings rejected, with the causes for rejection.

Sec. 15—Delivery of Fittings

All fittings must be delivered in all respects sound and conformable with

this standard. The inspection shall not relieve the manufacturer of his obligations under this section, and any defective fittings which may have passed the engineer at the works or elsewhere shall be at all times liable to rejection when discovered, until the final completion and adjustment of the contract; provided, however, that the manufacturer shall not be held liable for fittings found to be cracked after they have been accepted at the agreed point of delivery. Care shall be taken in handling the fittings not to injure the coating, and no material of any kind shall be placed inside the fittings at any time after they have been coated.

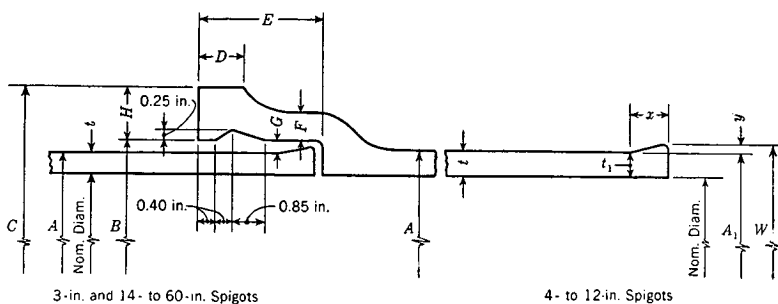
Sec. 16—Definition of “Engineer”

Wherever the word “engineer” is used herein it shall be understood to refer to the engineer or inspector acting for the purchaser and to his properly authorized agents, limited by the particular duties entrusted to them.

NOTE: Table 6—Standard Wye Branches—lists no units larger than 20 by 20 in. Designs and weights for larger sizes have not been standardized by AWWA and NEWWA.

Should a wye branch larger than 20 by 20 in. be required, consult the producer for recommendations. Larger fittings of this type may be reinforced with ribs or bolts. Practices vary and weights of units depend upon the individual producer’s design practice.

Standard tees and crosses larger than 20 by 20 in. (Table 5) should also be purchased only after the producer’s design details and weights have been ascertained.



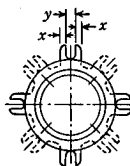
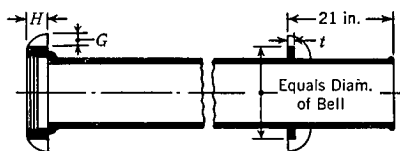
$x = \frac{3}{4}$ in. on 4-6 in.
 $y = \frac{3}{16}$ in. on 4-12 in.

$x = 1$ in. on 8-60 in.
 $y = \frac{1}{4}$ in. on 14-60 in.

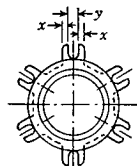
TABLE 1. Standard Dimensions of Bells and Spigots for Fittings

Size <i>in.</i>	Class	Dimensions— <i>in.</i>											
		<i>A</i>	<i>A</i> ₁ *	<i>B</i>	<i>C</i>	<i>D</i>	<i>E</i>	<i>F</i>	<i>G</i>	<i>H</i>	<i>t</i>	<i>t</i> ₁ *	<i>W</i>
3	D	3.96		4.66	7.26	1.25	3.50	0.65	0.35	1.30		0.48	4.34
4	D	5.00	4.90	5.70	8.30	1.50	4.00	0.65	0.40	1.30	0.52	0.47	5.28
6	D	7.10	7.00	7.80	10.60	1.50	4.00	0.70	0.40	1.40	0.55	0.50	7.38
8	D	9.30	9.18	10.00	13.00	1.50	4.00	0.75	0.41	1.50	0.60	0.54	9.56
10	D	11.40	11.25	12.10	15.30	1.50	4.00	0.80	0.42	1.60	0.68	0.60	11.63
12	D	13.50	13.35	14.20	17.60	1.50	4.00	0.85	0.42	1.70	0.75	0.68	13.73
14	B		15.30	16.10	19.50	1.50	4.00	0.85	0.40	1.70		0.66	15.80
14	D		15.65	16.45	20.05	1.50	4.00	0.90	0.40	1.80		0.82	16.15
16	B		17.40	18.40	22.00	1.75	4.00	0.90	0.50	1.80		0.70	17.90
16	D		17.80	18.80	22.60	1.75	4.00	1.00	0.50	1.90		0.89	18.30
18	B		19.50	20.50	24.30	1.75	4.00	0.95	0.50	1.90		0.75	20.00
18	D		19.92	20.92	25.12	1.75	4.00	1.05	0.50	2.10		0.96	20.42
20	B		21.60	22.60	26.60	1.75	4.00	1.00	0.50	2.00		0.80	22.10
20	D		22.06	23.06	27.66	1.75	4.00	1.15	0.50	2.30		1.03	22.56
24	B		25.80	26.80	31.00	2.00	4.00	1.05	0.50	2.10		0.89	26.30
24	D		26.32	27.32	32.32	2.00	4.00	1.25	0.50	2.50		1.16	26.82
30	A		31.74	32.74	37.34	2.00	4.50	1.15	0.50	2.30		0.88	32.24
30	B		32.00	33.00	37.60	2.00	4.50	1.15	0.50	2.30		1.03	32.50
30	C		32.40	33.40	38.60	2.00	4.50	1.32	0.50	2.60		1.20	32.90
30	D		32.74	33.74	39.74	2.00	4.50	1.50	0.50	3.00		1.37	33.24
36	A		37.96	38.96	43.96	2.00	4.50	1.25	0.50	2.50		0.99	38.46
36	B		38.30	39.30	44.90	2.00	4.50	1.40	0.50	2.80		1.15	38.80
36	C		38.70	39.70	45.90	2.00	4.50	1.60	0.50	3.10		1.36	39.20
36	D		39.16	40.16	46.96	2.00	4.50	1.80	0.50	3.40		1.58	39.66
42	A		44.20	45.20	50.80	2.00	5.00	1.40	0.50	2.80		1.10	44.70
42	B		44.50	45.50	51.50	2.00	5.00	1.50	0.50	3.00		1.28	45.00
42	C		45.10	46.10	52.90	2.00	5.00	1.75	0.50	3.40		1.54	45.60
42	D		45.58	46.58	54.18	2.00	5.00	1.95	0.50	3.80		1.78	46.08
48	A		50.50	51.50	57.50	2.00	5.00	1.50	0.50	3.00		1.26	51.00
48	B		50.80	51.80	58.40	2.00	5.00	1.65	0.50	3.30		1.42	51.30
48	C		51.40	52.40	60.00	2.00	5.00	1.95	0.50	3.80		1.71	51.90
48	D		51.98	52.98	61.38	2.00	5.00	2.20	0.50	4.20		1.96	52.48
54	A		56.66	57.66	64.06	2.25	5.50	1.60	0.50	3.20		1.35	57.16
54	B		57.10	58.10	65.30	2.25	5.50	1.80	0.50	3.60		1.55	57.60
54	C		57.80	58.80	66.80	2.25	5.50	2.15	0.50	4.00		1.90	58.30
54	D		58.40	59.40	68.20	2.25	5.50	2.45	0.50	4.40		2.23	58.90
60	A		62.80	63.80	70.60	2.25	5.50	1.70	0.50	3.40		1.39	63.30
60	B		63.40	64.40	71.80	2.25	5.50	1.90	0.50	3.70		1.67	63.90
60	C		64.20	65.20	73.60	2.25	5.50	2.25	0.50	4.20		2.00	64.70
60	D		64.82	65.82	75.22	2.25	5.50	2.60	0.50	4.70		2.38	65.32

* For sizes 3 in. and 14-60 in., A₁ = A and t₁ = t.



4 Lugs, 8-14 in.
8 Lugs, 42-60 in.



6 Lugs, 16-36 in.

TABLE 2. Standard Lugs

Nominal Diameter Pipe in.	Class	Number of Lugs on Each End	Dimensions in.							Weight of Lugs lb	
			G	H	T	X	Y	Diam. of Bolt	Length of Bolt	Bell End	Spigot End
8	A B	4	2.50	4.00	1.00	1.25	1.63	1.38	24.50	30	40
8	C D	4	2.50	4.00	1.00	1.25	1.63	1.38	24.50	30	40
10	A B	4	2.50	4.00	1.00	1.25	1.63	1.38	24.50	30	40
10	C D	4	2.50	4.00	1.00	1.25	1.63	1.38	24.50	30	40
12	A B	4	2.50	4.00	1.00	1.25	1.63	1.38	24.50	30	40
12	C D	4	2.50	4.00	1.00	1.25	1.63	1.38	24.50	30	45
14	A B	4	2.50	4.00	1.00	1.25	1.63	1.38	24.50	30	40
14	C D	4	2.50	4.00	1.00	1.25	1.63	1.38	24.50	30	45
16	A B	6	2.50	4.00	1.00	1.25	1.63	1.38	24.50	45	65
16	C D	6	2.50	4.00	1.00	1.25	1.63	1.38	24.50	45	70
18	A B	6	2.50	4.00	1.00	1.25	1.63	1.38	24.50	50	70
18	C D	6	2.50	4.00	1.00	1.25	1.63	1.38	24.50	50	75
20	A B	6	2.50	4.00	1.00	1.25	1.63	1.38	24.50	50	70
20	C D	6	2.50	4.00	1.00	1.25	1.63	1.38	24.50	50	75
24	A B	6	2.50	4.00	1.00	1.25	1.63	1.38	24.50	50	75
24	C D	6	2.50	4.00	1.00	1.25	1.63	1.38	24.50	50	80
30	A	6	3.00	4.50	1.50	1.50	2.00	1.75	25.50	75	115
30	B	6	3.00	4.50	1.50	1.50	2.00	1.75	25.50	75	115
30	C	6	3.00	4.50	1.50	1.50	2.00	1.75	25.50	80	125
30	D	6	3.00	4.50	1.50	1.50	2.00	1.75	25.50	85	135
36	A	6	3.00	4.50	1.50	1.50	2.00	1.75	25.50	80	120
36	B	6	3.00	4.50	1.50	1.50	2.00	1.75	25.50	80	130
36	C	6	3.00	4.50	1.50	1.50	2.00	1.75	25.50	85	135
36	D	6	3.00	4.50	1.50	1.50	2.00	1.75	25.50	85	145
42	A	8	3.00	5.00	1.50	1.50	2.00	1.75	25.50	120	185
42	B	8	3.00	5.00	1.50	1.50	2.00	1.75	25.50	125	190
42	C	8	3.00	5.00	1.50	1.50	2.00	1.75	25.50	130	205
42	D	8	3.00	5.00	1.50	1.50	2.00	1.75	25.50	135	220
48	A	8	3.00	5.00	1.50	1.50	2.00	1.75	25.50	125	190
48	B	8	3.00	5.00	1.50	1.50	2.00	1.75	25.50	130	200
48	C	8	3.00	5.00	1.50	1.50	2.00	1.75	25.50	135	220
48	D	8	3.00	5.00	1.50	1.50	2.00	1.75	25.50	140	235
54	A	8	3.00	5.50	1.50	1.50	2.00	1.75	25.50	140	215
54	B	8	3.00	5.50	1.50	1.50	2.00	1.75	25.50	145	230
54	C	8	3.00	5.50	1.50	1.50	2.00	1.75	25.50	150	245
54	D	8	3.00	5.50	1.50	1.50	2.00	1.75	25.50	150	260
60	A	8	3.00	5.50	1.50	1.50	2.00	1.75	25.50	145	220
60	B	8	3.00	5.50	1.50	1.50	2.00	1.75	25.50	145	235
60	C	8	3.00	5.50	1.50	1.50	2.00	1.75	25.50	150	255
60	D	8	3.00	5.50	1.50	1.50	2.00	1.75	25.50	155	275

NOTE: A pair of lugs is placed on the vertical axis of each bell, the others at equal distances around circumference. As there are only 6 lugs on fittings for sizes 16 through 36 in., purchaser should furnish sketch showing location of lugs. Lugs on spigot ends of pipe are located, unless otherwise ordered, with face of lug 21 in. from end of spigot. This dimension varies for fittings. Pipe and fittings furnished with lugs only when specifically ordered.

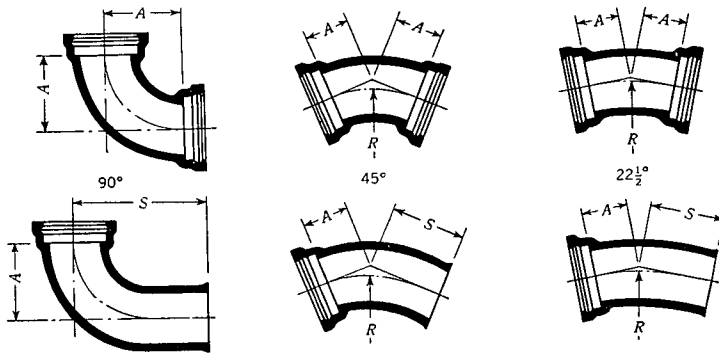


TABLE 3. Standard Bends
See Table 1 for bell and spigot dimensions.

Size in.	Class	90° Bend (¼)				45° Bend (⅛)				22½° Bend (1/16)					
		Dimensions in.		Weights lb		Dimensions in.			Weights lb		Dimensions in.			Weights lb	
		A	S	Bell and Spigot	Bell and Bell	A	S	R	Bell and Spigot	Bell and Bell	A	S	R	Bell and Spigot	Bell and Bell
4	D	16	24	90	100	9.94	15.94	24	75	90	9.55	15.55	48	75	90
6	D	16	24	135	145	9.94	15.94	24	110	125	9.55	15.55	48	110	125
8	D	16	26	200	200	9.94	15.94	24	155	180	9.55	15.55	48	155	180
10	D	16	28	285	275	9.94	15.94	24	210	240	9.55	15.55	48	210	240
12	D	16	28	365	350	9.94	15.94	24	270	305	9.55	15.55	48	270	305
14	B	18	30	410	400	14.91	20.91	36	365	400	14.32	14.32	72	315	400
14	D	18	30	495	470	14.91	20.91	36	440	475	14.32	14.32	72	380	475
16	B	24	36	590	590	14.91	20.91	36	445	500	14.32	14.32	72	385	500
16	D	24	36	740	720	14.91	20.91	36	550	605	14.32	14.32	72	480	605
18	B	24	36	705	700	14.91	20.91	36	555	590	14.32	14.32	72	460	590
18	D	24	36	895	870	14.91	20.91	36	665	730	14.32	14.32	72	580	730
20	B	24	36	835	825	19.88	25.88	48	755	825	19.10	19.10	96	670	825
20	D	24	36	1,070	1,045	19.88	25.88	48	965	1,045	19.10	19.10	96	860	1,045
24	B	30	42	1,275	1,255	24.85	30.85	60	1,165	1,255	23.87	23.87	120	1,055	1,255
24	D	30	42	1,665	1,625	24.85	30.85	60	1,520	1,625	23.87	23.87	120	1,375	1,625
30	A	36	48	1,820	1,850	24.85	30.85	60	1,480	1,645	23.87	23.87	120	1,345	1,645
30	B	36	48	2,090	2,075	24.85	30.85	60	1,690	1,830	23.87	23.87	120	1,530	1,830
30	C	36	48	2,450	2,430	24.85	30.85	60	1,980	2,145	23.87	23.87	120	1,795	2,145
30	D	36	48	2,825	2,820	24.85	30.85	60	2,285	2,490	23.87	23.87	120	2,075	2,490
36	A	48	60	3,000	3,025	37.28	37.28	90	2,500	2,885	35.80	35.80	180	2,500	2,885
36	B	48	60	3,500	3,525	37.28	37.28	90	2,920	3,360	35.80	35.80	180	2,920	3,360
36	C	48	60	4,145	4,155	37.28	37.28	90	3,450	3,960	35.80	35.80	180	3,450	3,960
36	D	48	60	4,830	4,835	37.28	37.28	90	4,020	4,605	35.80	35.80	180	4,020	4,605
42	A	48	60	3,930	4,000	37.28	37.28	90	3,280	3,820	35.80	35.80	180	3,280	3,820
42	B	48	60	4,540	4,585	37.28	37.28	90	3,785	4,370	35.80	35.80	180	3,785	4,370
42	C	48	60	5,495	5,540	37.28	37.28	90	4,580	5,280	35.80	35.80	180	4,580	5,280
42	D	48	60	6,380	6,415	37.28	37.28	90	5,315	6,115	35.80	35.80	180	5,315	6,115
48	A	54	66	5,575	5,620	37.28	37.28	90	4,250	4,905	35.80	35.80	180	4,250	4,905
48	B	54	66	6,300	6,355	37.28	37.28	90	4,800	5,545	35.80	35.80	180	4,800	5,545
48	C	54	66	7,630	7,690	37.28	37.28	90	5,815	6,710	35.80	35.80	180	5,815	6,710
48	D	54	66	8,810	8,890	37.28	37.28	90	6,715	7,755	35.80	35.80	180	6,715	7,755
54	A	..	..	6,925	7,040	37.28	37.28	90	5,180	6,025	35.80	35.80	180	5,180	6,025
54	B	..	..	7,990	8,130	37.28	37.28	90	5,975	6,960	35.80	35.80	180	5,975	6,960
54	C	..	..	9,820	9,960	37.28	37.28	90	7,330	8,510	35.80	35.80	180	7,330	8,510
54	D	..	..	11,570	11,725	37.28	37.28	90	8,635	10,020	35.80	35.80	180	8,635	10,020
60	A	..	..	7,960	8,135	37.28	37.28	90	5,960	6,975	35.80	35.80	180	5,960	6,975
60	B	..	..	9,520	9,645	37.28	37.28	90	7,110	8,245	35.80	35.80	180	7,110	8,245
60	C	..	..	11,495	11,660	37.28	37.28	90	8,585	9,970	35.80	35.80	180	8,585	9,970
60	D	..	..	13,720	13,905	37.28	37.28	90	10,230	11,870	35.80	35.80	180	10,230	11,870

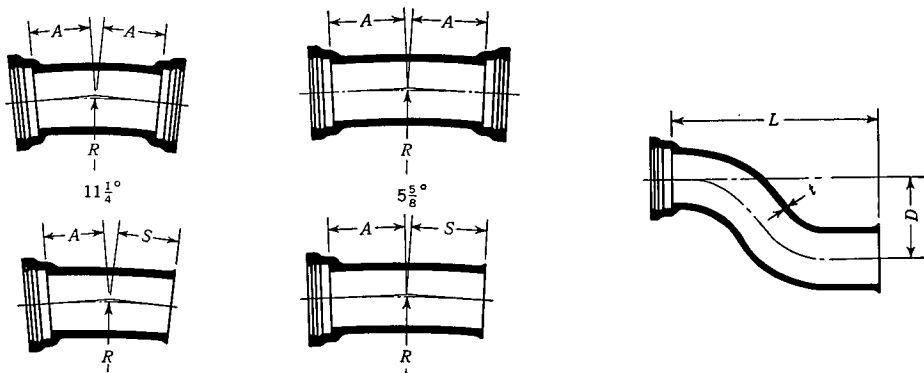


TABLE 4. Standard Bends and Offsets

Size in.	Class	11¼° Bend (1/32)					5½° Bend (1/64)					Offsets						
		Dimensions in.			Weights lb		Dimensions in.			Weights lb		Size in.	Class	Dimensions in.			Weight lb	
		A	S	R	Bell and Spigot	Bell and Bell	A	S	R	Bell and Spigot	Bell and Bell			D	L	t		
4	D	11.82	11.82	120	70	95	.....	.....	.....	.....	.....	4	D	6	27	0.52	80	
6	D	11.82	11.82	120	105	140	.....	.....	.....	.....	.....	4	D	12	30	0.52	90	
8	D	11.82	11.82	120	150	200	.....	.....	.....	.....	.....	4	D	18	38	0.52	110	
10	D	11.82	11.82	120	205	265	.....	.....	.....	.....	.....	6	D	6	28	0.55	120	
12	D	11.82	11.82	120	260	340	.....	.....	.....	.....	.....	6	D	12	34	0.55	145	
14	B	17.73	17.73	180	375	455	.....	.....	.....	.....	.....	6	D	18	41	0.55	175	
14	D	17.73	17.73	180	450	545	.....	.....	.....	.....	.....	8	D	6	29	0.60	180	
16	B	17.73	17.73	180	455	565	.....	.....	.....	.....	.....	8	D	12	36	0.60	220	
16	D	17.73	17.73	180	565	695	.....	.....	.....	.....	.....	8	D	18	43	0.60	260	
18	B	17.73	17.73	180	540	670	.....	.....	.....	.....	.....	10	D	6	30	0.68	245	
18	D	17.73	17.73	180	685	835	.....	.....	.....	.....	.....	10	D	12	38	0.68	305	
20	B	23.64	23.64	240	800	955	23.58	23.58	480	800	955	10	D	18	46	0.68	365	
20	D	23.64	23.64	240	1,030	1,215	23.58	23.58	480	1,030	1,215	12	D	6	34	0.75	350	
24	B	23.64	23.64	240	1,060	1,255	23.58	23.58	480	1,060	1,255	12	D	12	45	0.75	450	
24	D	23.64	23.64	240	1,375	1,620	23.58	23.58	480	1,375	1,620	12	D	18	56	0.75	550	
30	A	23.64	23.64	240	1,345	1,640	23.58	23.58	480	1,345	1,640	14	B	6	35	0.66	375	
30	B	23.64	23.64	240	1,530	1,830	23.58	23.58	480	1,530	1,830	14	B	12	46	0.66	475	
30	C	23.64	23.64	240	1,795	2,145	23.58	23.58	480	1,795	2,145	14	B	18	57	0.66	580	
30	D	23.64	23.64	240	2,075	2,490	23.58	23.58	480	2,075	2,490	14	D	6	35	0.82	455	
36	A	23.64	23.64	240	1,795	2,180	23.58	23.58	480	1,795	2,180	14	D	12	46	0.82	580	
36	B	23.64	23.64	240	2,095	2,540	23.58	23.58	480	2,095	2,540	14	D	18	57	0.82	710	
36	C	23.64	23.64	240	2,470	2,980	23.58	23.58	480	2,470	2,980	16	B	6	35	0.70	460	
36	D	23.64	23.64	240	2,875	3,460	23.58	23.58	480	2,875	3,460	16	B	12	48	0.70	600	
42	A	23.64	23.64	240	2,370	2,905	23.58	23.58	480	2,370	2,905	16	B	18	58	0.70	710	
42	B	23.64	23.64	240	2,720	3,305	23.58	23.58	480	2,720	3,305	16	D	6	35	0.89	570	
42	C	23.64	23.64	240	3,290	3,985	23.58	23.58	480	3,290	3,985	16	D	12	48	0.89	750	
42	D	23.64	23.64	240	3,815	4,615	23.58	23.58	480	3,815	4,615	16	D	18	58	0.89	895	
48	A	23.64	23.64	240	3,055	3,715	23.58	23.58	480	3,055	3,715	16	D	6	35	0.89	570	
48	B	23.64	23.64	240	3,455	4,195	23.58	23.58	480	3,450	4,195	16	D	12	48	0.89	750	
48	C	23.64	23.64	240	4,180	5,075	23.58	23.58	480	4,180	5,075	16	D	18	58	0.89	895	
48	D	23.64	23.64	240	4,825	5,870	23.58	23.58	480	4,825	5,870	60	A	23.64	23.64	240	4,320	5,330
54	A	23.64	23.64	240	3,740	4,585	23.58	23.58	480	3,740	4,585	60	B	23.64	23.64	240	5,125	6,260
54	B	23.64	23.64	240	4,315	5,305	23.58	23.58	480	4,315	5,305	60	C	23.64	23.64	240	6,195	7,580
54	C	23.64	23.64	240	5,285	6,470	23.58	23.58	480	5,285	6,470	60	D	23.64	23.64	240	7,370	9,015
54	D	23.64	23.64	240	6,225	7,610	23.58	23.58	480	6,225	7,610	60	D	23.64	23.64	240	7,370	9,015
60	A	23.64	23.64	240	4,320	5,330	23.58	23.58	480	4,320	5,330	60	D	23.64	23.64	240	7,370	9,015
60	B	23.64	23.64	240	5,125	6,260	23.58	23.58	480	5,125	6,260	60	D	23.64	23.64	240	7,370	9,015
60	C	23.64	23.64	240	6,195	7,580	23.58	23.58	480	6,195	7,580	60	D	23.64	23.64	240	7,370	9,015
60	D	23.64	23.64	240	7,370	9,015	23.58	23.58	480	7,370	9,015	60	D	23.64	23.64	240	7,370	9,015

* All weights are rounded out to the nearest 5-lb multiple.