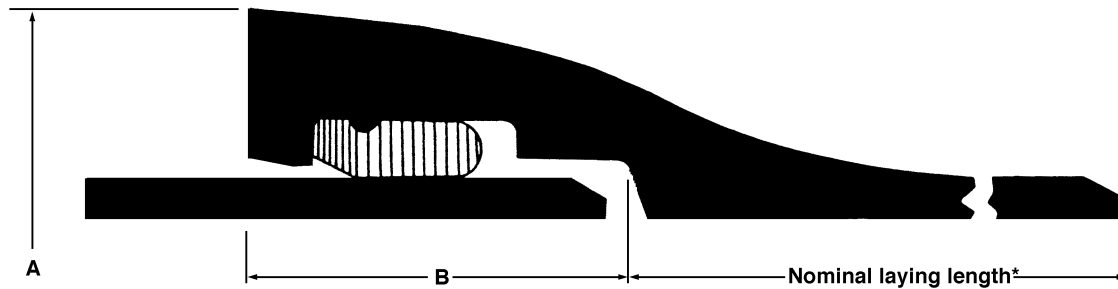


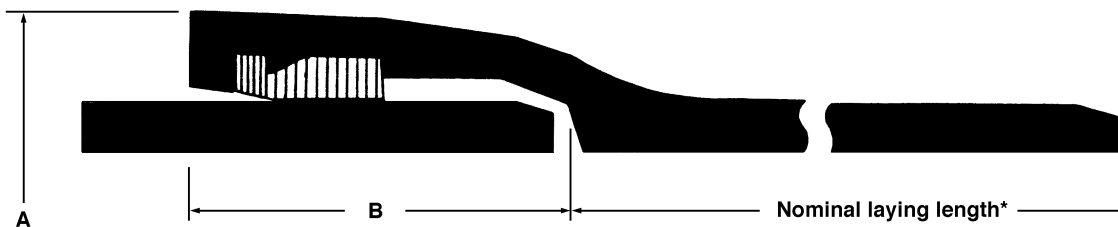
### TYTON® JOINT PIPE

Sizes 3" - 24"



### FASTITE® JOINT PIPE

Sizes 30" - 36"



## NOMINAL THICKNESS FOR STANDARD PRESSURE CLASSES OF DUCTILE IRON PIPE

Size Inches	Outside Diameter Inches	Pressure Class*				
		150	200	250	300	350
		Normal Thickness Inches				
3	3.96	...	...	...	...	0.25**
4	4.80	...	...	...	...	0.25**
6	6.90	...	...	...	...	0.25
8	9.05	...	...	...	...	0.25
10	11.10	...	...	...	...	0.26
12	13.20	...	...	...	...	0.28
14	15.30	...	...	0.28	0.30	0.31
16	17.40	...	...	0.30	0.32	0.34
18	19.50	...	...	0.31	0.34	0.36
20	21.60	...	...	0.33	0.36	0.38
24	25.80	...	0.33	0.37	0.40	0.43
30	32.00	0.34	0.38	0.42	0.45	0.49
36	38.30	0.38	0.42	0.47	0.51	0.56

\*Pressure Classes are defined as the rated water pressure of the pipe in psi. The thicknesses shown are adequate for the rated water working pressure plus a surge allowance of 100 psi. Calculations are based on a minimum yield strength of 42,000 and a 2.0 safety factor times the sum of the working pressure and 100 psi surge allowance.

\*\*Calculated thicknesses for these sizes and pressure ratings are less than those shown above. Presently these are the lowest nominal wall thicknesses available in these sizes.

NOTE: Per ANSI/AWWA C150/A21.50 the thicknesses above include the 0.08" service allowance and the casting tolerance listed below by size ranges.

SIZE (Inches)	CASTING TOLERANCES (Inches)
3-8	- 0.05
10-12	- 0.06
14-36	- 0.07



## STANDARD DIMENSIONS AND WEIGHTS OF 3" THROUGH 36" PUSH-ON-JOINT DUCTILE IRON PIPE

Size (Inches)	Pressure Class	Thickness	Outside Diameter*	18-Foot Laying Length	
				Weight Per Length†	Avg. Weight Per Foot††
				Inches	
3**	350	0.25	3.96	185	9.2
4**	350	0.25	4.80	225	11.3
6	350	0.25	6.90	300	16.6
8	350	0.25	9.05	395	22.0
10	350	0.26	11.10	510	28.4
12	350	0.28	13.20	655	36.4
14	250	0.28	15.30	770	42.9
14*	300	0.30	15.30	825	45.8
14*	350	0.31	15.30	850	47.2
16	250	0.30	17.40	940	52.3
16*	300	0.32	17.40	1000	55.5
16*	350	0.34	17.40	1060	58.8
18	250	0.31	19.50	1090	60.5
18*	300	0.34	19.50	1185	65.9
18*	350	0.36	19.50	1250	65.9
20	250	0.33	21.60	1290	71.6
20*	300	0.36	21.60	1395	77.6
20*	350	0.38	21.60	1470	81.6
24	200	0.33	25.80	1550	86.1
24*	250	0.37	25.80	1725	95.8
24*	300	0.40	25.80	1855	103.5
24*	350	0.43	25.80	1985	110.2
30	150	0.34	32.00	2000	11.2
30*	200	0.38	32.00	2220	123.2
30*	250	0.42	32.00	2435	135.2
30*	300	0.45	32.00	2595	144.2
30*	350	0.49	32.00	2810	156.1
36	150	0.38	38.30	2675	148.7
36*	200	0.42	38.30	2935	163.1
36*	250	0.47	38.30	3260	181.1
36*	300	0.51	38.30	3520	195.5
36*	350	0.56	38.30	3840	213.4

\* Tolerance of O.D. of spigot end: 3-12 in., ±0.06 in., 14-24 in., +0.05 in., -0.08 in., 30-36 in., +0.08 in., -0.06 in.

\*\* Available in 20' lengths.

† Including bell; calculated weight of pipe rounded off to nearest 5 lbs.

†† Including bell; average weight, per foot, based on calculated weight of pipe before rounding.

## RATED WORKING PRESSURE AND MAXIMUM DEPTH OF COVER

Sizes (Inches)	Pressure† Class (psi)	Nominal Thickness (Inches)	Laying Condition				
			Type 1 Trench	Type 2 Trench	Type 3 Trench	Type 4 Trench	Type 5 Trench
			Maximum Depth of Cover ± - feet				
3	350	0.25	78	88	99	100§	100§
4	350	0.25	53	61	69	85	100§
6	350	0.25	26	31	37	47	65
8	350	0.25	16	20	25	34	50
10	350	0.26	11**	15	19	28	45
12	350	0.28	10**	15	19	28	44
14	250	0.28	††	11**	15	23	36
14	300	0.30	††	13	17	26	42
14	350	0.31	††	14	19	27	44
16	250	0.30	††	11**	15	24	34
16	300	0.32	††	13	17	26	39
16	350	0.34	††	15	20	28	44
18	250	0.31	††	10**	14	22	31
18	300	0.34	††	13	17	26	36
18	350	0.36	††	15	19	28	41
20	250	0.33	††	10	14	22	30
20	300	0.36	††	13	17	26	35
20	350	0.38	††	15	19	28	38
24	200	0.33	††	8**	12	17	25
24	250	0.37	††	11	14	20	29
24	300	0.40	††	12	17	24	32
24	350	0.43	††	15	19	28	37
30	150	0.34	††	...	9	14	22
30	200	0.38	††	8**	12	16	24
30	250	0.42	††	10	14	19	27
30	300	0.45	††	12	16	21	29
30	350	0.49	††	15	19	25	33
36	150	0.38	††	...	9	14	21
36	200	0.42	††	8**	12	15	23
36	250	0.47	††	10	14	18	25
36	300	0.51	††	12	16	20	28
36	350	0.56	††	15	19	24	32

† Ductile-iron pipe is adequate for the rated working pressure indicated for each nominal size plus a surge allowance of 100 psi. Calculations are based on a 2.0 safety factor times the sum of working pressure and 100 psi surge allowance. (See ANSI/AWWA C150 A21.50 for design formula.)

Ductile-iron pipe for working pressures higher than 350 psi is available.

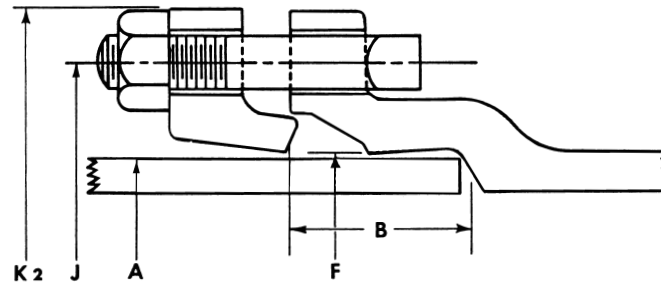
† An allowance for a single H-20 truck with 1.5 impact factor is included for all depths of cover.

§ Calculated maximum depth of cover exceeds 100 ft.

\*\* Minimum allowable depth of cover is 3 ft.

†† For pipe 14 in. and larger, consideration should be given to the use of laying conditions other than Type 1.

## MECHANICAL JOINT FOR PIPE AND FITTINGS ANSI/AWWA-C111/A21.11 Standard



Mechanical Joint for Pipe and Fittings

ALL DIMENSIONS ARE IN INCHES

Size	Dimensions				K2†	Bolts Per Joint	Accessories
	A	B	F	J			Wgt. in Lbs.††
3	3.96	2.50	4.06	6.19	7.69	4-5/8 x 3	7
4	4.80	2.50	4.90	7.50	9.12	4-3/4 x 3 1/2	10
6	6.90	2.50	7.00	9.50	11.12	6-3/4 x 3 1/2	16
8	9.05	2.50	9.15	11.75	13.37	6-3/4 x 4	25
10	11.10	2.50	11.20	14.00	15.62	8-3/4 x 4	30
12	13.20	2.50	13.30	16.25	17.88	8-3/4 x 4	40
14	15.30	3.50	15.44	18.75	20.25	10-3/4 x 4 1/2	45
16	17.40	3.50	17.54	21.00	22.50	12-3/4 x 4 1/2	55
18	19.50	3.50	19.64	23.25	24.75	12-3/4 x 4 1/2	65
20	21.60	3.50	21.74	25.50	27.00	14-3/4 x 4 1/2	85
24	25.80	3.50	25.94	30.00	31.50	16-3/4 x 5	105
30*	32.00	4.00	32.17	36.88	39.12	20-1 x 6	170
36*	38.30	4.00	38.47	43.75	46.00	24-1 x 6	235

\*Available on fittings only.

† K2 is outside diameter of glands across bolt holes.

†† Shows total weight of gland, gasket, and a set of bolts required to complete one joint.

### MECHANICAL JOINT DUCTILE IRON FITTINGS

Mechanical Joint fittings are used with Mechanical Joint, Push-On and other plain end centrifugally cast pipe of the same outside diameter. To permit assembly with Push-On pipe, plain ends of all Mechanical Joint fittings are beveled.

Mechanical Joint fittings are available in ductile iron for the pressure ratings shown in the various tables.

Unless specifically ordered otherwise, Mechanical Joint fittings are always shipped complete with joint accessories.

The successful operation of the mechanical joint requires that the plain end be centrally located in the bell and that adequate anchorage shall be provided where abrupt changes in direction and dead ends occur.

The rubber gasket seals most effectively (particularly when sealing air) if the surfaces with which it comes in contact are brushed thoroughly with a wire brush just prior to assembly. This thorough brushing removes all loose rust or foreign material which may be present and provides clean surfaces which should be brushed with soapy water just prior to slipping the gasket over the plain end and into the bell. Soapy water brushed over the gasket prior to installation also removes loose dirt and lubricates the gasket as it is forced into its retaining space.

**Accessories—gland, gasket, and bolts—are not assembled on pipe and fittings when shipped.**

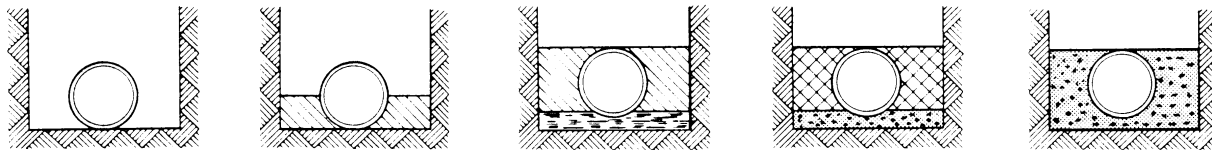
Note: Unless specifically ordered otherwise, mechanical joint bends, tees, and crosses will always be furnished with MJ BELL on ALL openings.

## STANDARDS APPLICABLE TO DUCTILE IRON PIPE AND FITTINGS

Thickness Design of Ductile Iron Pipe Ductile Iron Pipe for Water and Other Liquids	ANSI/AWWA C150/A21.50 ANSI/AWWA C151/A21.51 FEDERAL WWP421 D, Grade C ANSI/ASTM A746
Ductile Iron Pipe for Gravity Flow Service Ductile Iron Fittings for Water and Other Liquids 30" through 36"	ANSI/AWWA C110/A21.10
Ductile Iron Compact Fittings 3" through 24"	ANSI/AWWA C153/A21.53 ANSI/AWWA C110/A21.10 ANSI B16-1
Flanged Fittings	ANSI/AWWA C115/21.15
Ductile Iron Pipe with Threaded Flanges Coatings and Linings: Asphaltic	ANSI/AWWA C151/A21.51 ANSI/AWWA C110/A21.10 ANSI/AWWA C153/A21.53 ANSI/AWWA C104/A21.4 MANUFACTURER'S STAN-
DARD Cement Lining Various Epoxy Linings and Coatings	
Exterior Polyethylene Encasement	ANSI/AWWA C105/A21.5
Joints—Pipe and Fittings Push-On and Mechanical Rubber-Gasket Joints	ANSI/AWWA C111/A21.11 FEDERAL WWP421 D ANSI/AWWA C115/A21.15
Flanged ANSI B16.1 Grooved and Shouldered	ANSI/AWWA C606 ANSI B2.1 ANSI/AWWA C600
Pipe Threads Installation	

## LAYING CONDITIONS

Type 1†	Type 2	Type 3	Type 4	Type 5
Flat-bottom trench.*Loose backfill.	Flat-bottom trench.*Backfill lightly consolidated to centerline of pipe.	Pipe bedded in 4-in. minimum loose soil.**Backfill lightly consolidated to top of pipe.	Pipe bedded in sand, gravel or crushed stone to depth of 1/8 pipe diameter, 4-in. minimum. Backfill compacted to top of pipe. (Approximately 80% Standard Proctor AASHTO &T-99.	Pipe bedded in compacted granular material to centerline of pipe. Compacted granular or selected** material to top of pipe (Approximately 90% Standard Proctor AASHTO &T-99.



Notes: Consideration of the pipe-zone embedment conditions included in this figure may be influenced by factors other than pipe strength. For additional information on pipe bedding and backfill, see ANSI/AWWA C600.

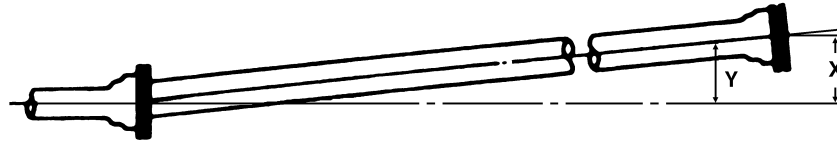
\* For nominal pipe sizes 14 in. and larger, consideration should be given to the use of laying conditions other than Type 1.

† Flat bottom is defined as undisturbed earth.

\*\* Loose soil or select material is defined as native soil excavated from the trench, free of rocks, foreign materials, and frozen earth.

American Association of State Highway and Transportation Officials, 444 N. Capitol St. N.W., Suite 225, Washington, DC 20001

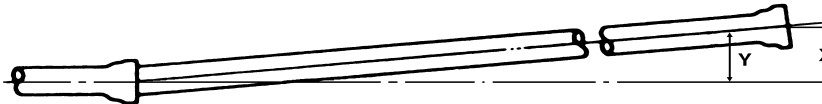
## MECHANICAL JOINT PIPE MAXIMUM ALLOWABLE JOINT DEFLECTION



Size of Pipe	Y-Maximum Joint Deflection in Degrees	X-Deflection in Inches 18 Ft. Length	Approximate Radius in Feet of Curve Produced by Succession of Joints 18 Ft. Length
3	8° - 18'	35*	140*
4	8° - 18'	35*	140*
6	7° - 7'	30	145
8	5° - 21'	20	195
10	5° - 21'	20	195
12	5° - 21'	20	195
14	3° - 35'	13.5	285
16	3° - 35'	13.5	285
18	3° - 0'	11	340
20	3° - 0'	11	340
24	2° - 23'	9	450

\*20 Ft. Length

## PUSH-ON JOINT PIPE MAXIMUM ALLOWABLE JOINT DEFLECTION



Size of Pipe	Y-Maximum Joint Deflection in Degrees	X-Deflection in Inches		Approximate Radius in Feet of Curve Produced by Succession of Joints 3" same as 4"	
		18 Ft. Length	20 Ft. Length	18 Ft. Length	20 Ft. Length
3	5°	...	21	...	230
4	5°	...	21	...	230
6	5°	19	...	206	...
8	5°	19	...	206	...
10	5°	19	...	206	...
12	5°	19	...	206	...
14	5°	19	...	206	...
16	5°	19	...	206	...
18	5°	19	...	206	...
20	5°	19	...	206	...
24	5°	19	...	206	..
30	5°	11	...	206	...
36	4°	11	...	260	...



## DIMENSIONS AND WEIGHTS FOR SPECIAL CLASSES OF PUSH-ON-JOINTS AND MECHANICAL JOINT DUCTILE IRON PIPE

Pipe manufactured in accordance with ANSI/AWWA C151/A21.51-91 under method of design outlined in ANSI/AWWA C150/A21.50

Size Inches	Thickness Class	Thickness Inches	OD* Inches	Wt. of Barrel Per Ft. Lb.	Push-on-Joint			Mechanical Joint		
					Wt. of Bell Lb.	Wt. Per Lgth.† Lb.	Avg. Wt. Per Ft.± lb.	Wt. of Bell Lb.	Wt. Per Lgth.† Lb.	Avg. Wt. Per Ft.±Lb.
3	51	.25	3.96	8.9	9	185	9.4	11	190	9.4
3	52	.28	3.96	9.9	9	205	10.4	11	210	10.4
3	53	.31	3.96	10.9	9	225	11.4	11	230	11.4
3	54	.34	3.96	11.8	9	245	12.2	11	245	12.4
3	55	.37	3.96	12.8	9	265	13.2	11	265	13.4
3	56	.40	3.96	13.7	9	285	14.2	11	285	14.2
4	51	.26	4.80	11.3	11	235	11.8	16	240	12.1
4	52	.29	4.80	12.6	11	265	13.2	16	270	13.4
4	53	.32	4.80	13.8	11	285	14.4	16	290	14.6
4	54	.35	4.80	15.0	11	310	15.6	16	315	15.8
4	55	.38	4.80	16.1	11	335	16.6	16	340	16.9
4	56	.41	4.80	17.3	11	355	17.8	16	360	18.1
6	50	.25	6.90	16.0	15	305	16.8	18	305	17.0
6	51	.28	6.90	17.8	15	335	18.6	18	340	18.8
6	52	.31	6.90	19.6	15	370	20.4	18	370	20.6
6	53	.34	6.90	21.4	15	400	22.2	18	405	22.4
6	54	.37	6.90	23.2	15	435	24.0	18	435	24.2
6	55	.40	6.90	25.0	15	465	25.8	18	470	26.0
6	56	.43	6.90	26.7	15	495	27.5	18	500	27.7
8	50	.27	9.05	22.8	22	430	24.0	24	435	24.1
8	51	.30	9.05	25.2	22	475	26.4	24	480	26.5
8	52	.33	9.05	27.7	22	520	28.9	24	525	29.0
8	53	.36	9.05	30.1	22	565	31.3	24	565	31.4
8	54	.39	9.05	32.5	22	605	33.7	24	610	33.8
8	55	.42	9.05	34.8	22	650	36.0	24	650	36.1
8	56	.45	9.05	37.2	22	690	38.4	24	695	38.5
10	50	.29	11.10	30.1	29	570	31.7	31	575	31.8
10	51	.32	11.10	33.2	29	625	34.8	31	630	34.9
10	52	.35	11.10	36.2	29	680	37.8	31	685	37.9
10	53	.38	11.10	39.2	29	735	40.8	31	735	40.9
10	54	.41	11.10	42.1	29	785	43.7	31	790	43.8
10	55	.44	11.10	45.1	29	840	46.7	31	845	46.8
10	56	.47	11.10	48.0	29	895	49.6	31	895	49.7
12	50	.31	13.20	38.4	35	725	40.3	37	730	40.5
12	51	.34	13.20	42.0	35	790	43.9	37	795	44.1
12	52	.37	13.20	45.6	35	855	47.5	37	860	47.7
12	53	.40	13.20	49.2	35	920	51.1	37	925	51.3
12	54	.43	13.20	52.8	35	985	54.7	37	985	54.9
12	55	.46	13.20	56.3	35	1050	58.2	37	1050	58.4
12	56	.49	13.20	59.9	35	1115	61.8	37	1115	62.0
14	50	.33	15.30	47.5	60	915	50.8	61	915	50.9
14	51	.36	15.30	51.7	60	990	55.0	61	990	55.1
14	52	.39	15.30	55.9	60	1065	59.2	61	1065	59.3
14	53	.42	15.30	60.1	60	1140	63.4	61	1145	63.5

continued on the next page



Size Inches	Thickness Class	Thickness Inches	OD* Inches	Wt. of Barrel Per Ft. Lb.	Push-on-Joint			Mechanical Joint		
					Wt. of Bell Lb.	Wt. Per Lgth.† Lb.	Avg. Wt. Per Ft.± lb.	Wt. of Bell Lb.	Wt. Per Lgth.† Lb.	Avg. Wt. Per Ft.±Lb.
14	54	.45	15.30	64.2	60	1215	67.5	61	1215	67.5
14	55	.48	15.30	68.4	60	1290	71.7	61	1290	71.8
14	56	.51	15.30	72.5	60	1365	75.8	61	1365	75.9
16	50	.34	17.40	55.8	68	1070	59.6	74	1080	59.9
16	51	.37	17.40	60.6	68	1160	64.4	74	1165	64.7
16	52	.40	17.40	65.4	68	1245	69.2	74	1250	69.5
16	53	.43	17.40	70.1	68	1330	73.9	74	1335	74.2
16	54	.46	17.40	74.9	68	1415	78.7	74	1420	79.0
16	55	.49	17.40	79.7	68	1505	83.5	74	1510	83.8
16	56	.52	17.40	84.4	68	1585	88.2	74	1595	88.5
18	50	.35	19.50	64.4	78	1235	68.7	85	1245	69.1
18	51	.35	19.50	69.3	78	1335	74.1	85	1340	74.5
18	52	.41	19.50	75.2	78	1430	79.5	85	1440	79.9
18	53	.44	19.50	80.6	78	1530	84.9	85	1535	85.3
18	54	.47	19.50	86.0	78	1625	90.3	85	1635	90.7
18	55	.50	19.50	91.3	78	1720	95.6	85	1730	96.0
18	56	.53	19.50	96.7	78	1820	101.0	85	1825	101.4
20	50	.36	21.60	73.5	87	1410	78.3	98	1420	78.9
20	51	.39	21.60	79.5	87	1520	84.3	98	1530	84.9
20	52	.42	21.60	85.5	87	1625	90.3	98	1635	90.9
20	53	.45	21.60	91.5	87	1735	96.3	98	1745	96.9
20	54	.48	21.60	97.5	87	1840	102.3	98	1855	102.9
20	55	.51	21.60	103.4	87	1950	108.2	98	1960	108.8
20	56	.54	21.60	109.3	87	2055	114.1	98	2065	114.7
24	50	.38	25.80	92.9	105	1775	98.7	123	1795	99.7
24	51	.41	25.80	100.1	105	1905	105.9	123	1925	106.9
24	52	.44	25.80	107.3	105	2035	113.1	123	2055	114.1
24	53	.47	25.80	114.4	105	2165	120.2	123	2180	121.2
24	54	.50	25.80	121.6	105	2295	127.4	123	2310	128.4
24	55	.53	25.80	128.8	105	2425	134.6	123	2440	135.6
24	56	.56	25.80	135.9	105	2550	141.7	123	2570	142.7
30	50	.39	32.00	118.5	170	2305	127.9	...	...	...
30	51	.43	32.00	130.5	170	2520	139.9	...	...	...
30	52	.47	32.00	142.5	170	2735	151.9	...	...	...
30	53	.51	32.00	154.4	170	2950	163.8	...	...	...
30	54	.55	32.00	166.3	170	3165	175.7	...	...	...
30	55	.59	32.00	178.2	170	3180	187.6	...	...	...
30	56	.63	32.00	190.0	170	3590	199.4	...	...	...
36	50	.43	38.30	156.5	239	3055	169.8	...	...	...
36	51	.48	38.30	174.5	239	3380	187.8	...	...	...
36	52	.53	38.30	192.4	239	3700	205.7	...	...	...
36	53	.58	38.30	210.3	239	4025	223.6	...	...	...
36	54	.63	38.30	228.1	239	4345	241.4	...	...	...
36	55	.68	38.30	245.9	239	4665	259.2	...	...	...
36	56	.73	38.30	263.7	239	4985	277.0	...	...	...

† Including Bell; calculated weight of pipe rounded off to nearest 5 lbs.

† Including Bell; average weight per foot, based on calculated weight of pipe before rounding.

Weights and dimensions are nominal per above standards.

\* Tolerances of OD of spigot end: 3-12 in., +0.06 in., 14-24 in., +0.05 in., -0.08 in., 30-36 in., +0.08 in., -0.06 in. 3"-4" in., Nominal 20' laying length.

6"-36" Nominal 18' laying length.