APPENDIX E2
PIPE PROPERTIES

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TABLE E2.1 Principal Properties of Commercial Pipe (in U.S. Customary Units)

Nominal pipe size, outside diam. (in)	Schedule number*			Wall thickness (in)	Inside diam. (in)	Inside area (in^2)	Metal area (in^2)	Ft^2 outside surface per ft	Ft^2 inside surface per ft	Weight per ft (lb)†	Weight of water per ft (lb)	Moment of inertia (in^4)	Elastic section modulus (in^3)	Radius gyration (in)	Plastic section modulus (in^3)
	a	b	c												
	. . .	. . .	5S	0.065	0.710	0.396	0.158	0.220	0.186	0.538	0.171	0.012	0.029	0.275	0.039
	. . .	. . .	10S	0.083	0.674	0.357	0.197	0.220	0.177	0.671	0.155	0.014	0.034	0.269	0.048
½	40	Std	40S	0.109	0.622	0.304	0.250	0.220	0.163	0.851	0.132	0.017	0.041	0.261	0.059
0.840	80	XS	80S	0.147	0.546	0.234	0.320	0.220	0.143	1.088	0.101	0.020	0.048	0.251	0.072
	160	. . .	. . .	0.187	0.466	0.171	0.383	0.220	0.122	1.304	0.074	0.022	0.053	0.240	0.082
	. . .	XXS	. . .	0.294	0.252	0.050	0.504	0.220	0.066	1.714	0.022	0.024	0.058	0.220	0.096
	. . .	. . .	5S	0.065	0.920	0.665	0.201	0.275	0.241	0.684	0.288	0.025	0.047	0.349	0.063
	. . .	. . .	10S	0.083	0.884	0.614	0.252	0.275	0.231	0.857	0.266	0.030	0.057	0.343	0.078
¾	40	Std	40S	0.113	0.824	0.533	0.333	0.275	0.216	1.131	0.230	0.037	0.071	0.334	0.100
1.050	80	XS	80S	0.154	0.742	0.432	0.435	0.275	0.194	1.474	0.188	0.045	0.085	0.321	0.125
	160	. . .	. . .	0.218	0.614	0.296	0.570	0.275	0.161	1.937	0.128	0.053	0.100	0.304	0.154
	. . .	XXS	. . .	0.308	0.434	0.148	0.718	0.275	0.114	2.441	0.064	0.058	0.110	0.284	0.179
	. . .	. . .	5S	0.065	1.185	1.103	0.2553	0.344	0.310	0.868	0.478	0.0500	0.0760	0.443	0.102
	. . .	. . .	10S	0.109	1.097	0.945	0.413	0.344	0.2872	1.404	0.409	0.0757	0.1151	0.428	0.159
1	40	Std	40S	0.133	1.049	0.864	0.494	0.344	0.2746	1.679	0.374	0.0874	0.1329	0.421	0.187
1.315	80	XS	80S	0.179	0.957	0.719	0.639	0.344	0.2520	2.172	0.311	0.1056	0.1606	0.407	0.233
	160	. . .	. . .	0.250	0.815	0.522	0.836	0.344	0.2134	2.844	0.2261	0.1252	0.1903	0.387	0.289
	. . .	XXS	. . .	0.358	0.599	0.2818	1.076	0.344	0.1570	3.659	0.1221	0.1405	0.2137	0.361	0.343
	. . .	. . .	5S	0.065	1.770	2.461	0.375	0.497	0.463	1.274	1.067	0.1580	0.1663	0.649	0.219
	. . .	. . .	10S	0.109	1.682	2.222	0.613	0.497	0.440	2.085	0.962	0.2469	0.2599	0.634	0.350
1½	40	Std	40S	0.145	1.610	2.036	0.799	0.497	0.421	2.718	0.882	0.310	0.326	0.623	0.448
1.900	80	XS	80S	0.200	1.500	1.767	1.068	0.497	0.393	3.631	0.765	0.391	0.412	0.605	0.581
	160	. . .	. . .	0.281	1.338	1.406	1.429	0.497	0.350	4.859	0.608	0.483	0.508	0.581	0.744
	. . .	XXS	. . .	0.400	1.100	0.950	1.885	0.497	0.288	6.408	0.412	0.568	0.598	0.549	0.921
	. . .	. . .	5S	0.065	2.245	3.96	0.472	0.622	0.588	1.604	1.716	0.315	0.2652	0.817	0.347
	. . .	. . .	10S	0.109	2.157	3.65	0.776	0.622	0.565	2.638	1.582	0.499	0.420	0.802	0.560
2	40	Std	40S	0.154	2.067	3.36	1.075	0.622	0.541	3.653	1.455	0.666	0.561	0.787	0.761
2.375	80	XS	80S	0.218	1.939	2.953	1.477	0.622	0.508	5.022	1.280	0.868	0.731	0.766	1.018
	160	. . .	. . .	0.343	1.689	2.240	2.190	0.622	0.422	7.444	0.971	1.163	0.979	0.729	1.430
	. . .	XXS	. . .	0.436	1.503	1.774	2.656	0.622	0.393	9.029	0.769	1.312	1.104	0.703	1.667

TABLE E2.1 Principal Properties of Commercial Pipe (in U.S. Customary Units) (*Continued*)

Nominal pipe size, outside diam. (in)	Schedule number*			Wall thickness (in)	Inside diam. (in)	Inside area (in^2)	Metal area (in^2)	Ft^2 outside surface per ft	Ft^2 inside surface per ft	Weight per ft (lb)†	Weight of water per ft (lb)	Moment of inertia (in^4)	Elastic section modulus (in^3)	Radius gyration (in)	Plastic section modulus (in^3)
	a	b	c												
	...	...	5S	0.083	3.334	8.73	0.891	0.916	0.873	3.03	3.78	1.301	0.744	1.208	0.969
	...	...	10S	0.120	3.260	8.35	1.274	0.916	0.853	4.33	3.61	1.822	1.041	1.196	1.372
3	40	Std	40S	0.216	3.068	7.39	2.228	0.916	0.803	7.58	3.20	3.02	1.724	1.164	2.333
3.500	80	XS	80S	0.300	2.900	6.61	3.02	0.916	0.759	10.25	2.864	3.90	2.226	1.136	3.081
	160	...	...	0.437	2.626	5.42	4.21	0.916	0.687	14.32	2.348	5.03	2.876	1.094	4.128
	...	XXS	...	0.600	2.300	4.15	5.47	0.916	0.602	18.58	1.801	5.99	3.43	1.047	5.118
	...	...	5S	0.083	4.334	14.75	1.152	1.178	1.135	3.92	6.40	2.811	1.249	1.562	1.620
	...	...	10S	0.120	4.260	14.25	1.651	1.178	1.115	5.61	6.17	3.96	1.762	1.549	2.303
	40	Std	40S	0.237	4.026	12.73	3.17	1.178	1.054	10.79	5.51	7.23	3.21	1.510	4.312
4	80	XS	80S	0.337	3.826	11.50	4.41	1.178	1.002	14.98	4.98	9.61	4.27	1.477	5.853
4.500	120	...	...	0.437	3.626	10.33	5.58	1.178	0.949	18.96	4.48	11.65	5.18	1.445	7.242
	160	...	...	0.531	3.438	9.28	6.62	1.178	0.900	22.51	4.02	13.27	5.90	1.416	8.415
	...	XXS	...	0.674	3.152	7.80	8.10	1.178	0.825	27.54	3.38	15.29	6.79	1.374	9.968
	...	...	5S	0.109	6.407	32.2	2.231	1.734	1.677	5.37	13.98	11.85	3.58	2.304	4.628
	...	...	10S	0.134	6.357	31.7	2.733	1.734	1.664	9.29	13.74	14.40	4.35	2.295	5.647
	40	Std	40S	0.280	6.065	28.89	5.58	1.734	1.588	18.97	12.51	28.14	8.50	2.245	11.280
6	80	XS	80S	0.432	5.761	26.07	8.40	1.734	1.508	28.57	11.29	40.5	12.23	2.195	16.600
6.625	120	...	...	0.562	5.501	23.77	10.70	1.734	1.440	36.39	10.30	49.6	14.98	2.153	20.718
	160	...	...	0.718	5.189	21.15	13.33	1.734	1.358	45.30	9.16	59.0	17.81	2.104	25.176
	...	XXS	...	0.864	4.897	18.83	15.64	1.734	1.282	53.16	8.17	66.3	20.03	2.060	28.890
	...	...	5S	0.109	8.407	55.5	2.916	2.258	2.201	9.91	24.07	26.45	6.13	3.01	7.905
	...	...	10S	0.148	8.329	54.5	3.94	2.258	2.180	13.40	23.59	35.4	8.21	3.00	10.636
	20	...	...	0.250	8.125	51.8	6.58	2.258	2.127	22.36	22.48	57.7	13.39	2.962	17.540
	30	...	...	0.277	8.071	51.2	7.26	2.258	2.113	24.70	22.18	63.4	14.69	2.953	19.311
	40	Std	40S	0.322	7.981	50.0	8.40	2.258	2.089	28.55	21.69	72.5	16.81	2.938	22.210
8	60	...	...	0.406	7.813	47.9	10.48	2.258	2.045	35.64	20.79	88.8	20.58	2.909	27.448
8.625	80	XS	80S	0.500	7.625	45.7	12.76	2.258	1.996	43.39	19.80	105.7	24.52	2.878	33.050
	100	...	...	0.593	7.439	43.5	14.96	2.258	1.948	50.87	18.84	121.4	28.14	2.847	38.326
	120	...	...	0.718	7.189	40.6	17.84	2.258	1.882	60.63	17.60	140.6	32.6	2.807	45.013
	140	...	...	0.812	7.001	38.5	19.93	2.258	1.833	67.76	16.69	153.8	35.7	2.777	49.745
	...	XXS	...	0.875	6.875	37.1	21.30	2.258	1.800	72.42	16.09	162.0	37.6	2.757	52.778
	160	...	...	0.906	6.813	36.5	21.97	2.258	1.784	74.69	15.80	165.9	38.5	2.748	54.230

TABLE E2.1 Principal Properties of Commercial Pipe (in U.S. Customary Units) (*Continued*)

Nominal pipe size, outside diam. (in)	Schedule number*			Wall thickness (in)	Inside diam. (in)	Inside area (in^2)	Metal area (in^2)	Ft^2 outside surface per ft	Ft^2 inside surface per ft	Weight per ft (lb)†	Weight of water per ft (lb)	Moment of inertia (in^4)	Elastic section modulus (in^3)	Radius gyration (in)	Plastic section modulus (in^3)
	a	b	c												
	...	...	5S	0.134	10.482	86.3	4.52	2.815	2.744	15.15	37.4	63.7	11.85	3.75	15.103
	...	...	10S	0.165	10.420	85.3	5.49	2.815	2.728	18.70	36.9	76.9	14.30	3.74	18.489
	20	...	...	0.250	10.250	82.5	8.26	2.815	2.683	28.04	35.8	113.7	21.16	3.71	27.568
	...	...	...	0.279	10.192	81.6	9.18	2.815	2.668	31.20	35.3	125.9	23.42	3.70	30.597
	30	...	...	0.307	10.136	80.7	10.07	2.815	2.654	34.24	35.0	137.5	25.57	3.69	33.490
10	40	Std	40S	0.365	10.020	78.9	11.91	2.815	2.623	40.48	34.1	160.8	29.90	3.67	39.381
10.750	60	XS	80S	0.500	9.750	74.7	16.10	2.815	2.553	54.74	32.3	212.0	39.4	3.63	52.573
	80	...	...	0.593	9.564	71.8	18.92	2.815	2.504	64.33	31.1	244.9	45.6	3.60	61.246
	100	...	...	0.718	9.314	68.1	22.63	2.815	2.438	76.93	29.5	286.2	53.2	3.56	72.384
	120	...	...	0.843	9.064	64.5	26.24	2.815	2.373	89.20	28.0	324	60.3	3.52	82.939
	140	...	...	1.000	8.750	60.1	30.6	2.815	2.291	104.13	26.1	368	68.4	3.47	95.396
	160	...	...	1.125	8.500	56.7	34.0	2.815	2.225	115.65	24.6	399	74.3	3.43	104.695
	...	...	5S	0.156	12.438	121.4	6.17	3.34	3.26	20.99	52.7	122.2	19.20	4.45	24.744
	...	...	10S	0.180	12.390	120.6	7.11	3.34	3.24	24.20	52.2	140.5	22.03	4.44	28.443
	20	...	...	0.250	12.250	117.9	9.84	3.34	3.21	33.38	51.1	191.9	30.1	4.42	39.068
	30	...	...	0.330	12.090	114.8	12.88	3.34	3.17	43.77	49.7	248.5	39.0	4.39	50.917
	...	Std	40S	0.375	12.000	113.1	14.58	3.34	3.14	49.56	49.0	279.3	43.8	4.38	57.445
	40	...	...	0.406	11.938	111.9	15.74	3.34	3.13	53.53	48.5	300	47.1	4.37	61.886
12	...	XS	80S	0.500	11.750	108.4	19.24	3.34	3.08	65.42	47.0	362	56.7	4.33	75.073
12.750	60	...	...	0.562	11.626	106.2	21.52	3.34	3.04	73.16	46.0	401	62.8	4.31	83.543
	80	...	...	0.687	11.376	101.6	26.04	3.34	2.978	88.51	44.0	475	74.5	4.27	100.078
	100	...	...	0.843	11.064	96.1	31.5	3.34	2.897	107.20	41.6	562	88.1	4.22	119.717
	120	...	...	1.000	10.750	90.8	36.9	3.34	2.814	125.49	39.3	642	100.7	4.17	138.396
	140	...	...	1.125	10.500	86.6	41.1	3.34	2.749	139.68	37.5	701	109.9	4.13	152.508
	160	...	...	1.312	10.126	80.5	47.1	3.34	2.651	160.27	34.9	781	122.6	4.07	172.399

TABLE E2.1 Principal Properties of Commercial Pipe (in U.S. Customary Units) (*Continued*)

Nominal pipe size, outside diam. (in)	Schedule number*			Wall thickness (in)	Inside diam. (in)	Inside area (in^2)	Metal area (in^2)	Ft^2 outside surface per ft	Ft^2 inside surface per ft	Weight per ft (lb)†	Weight of water per ft (lb)	Moment of inertia (in^4)	Elastic section modulus (in^3)	Radius gyration (in)	Plastic section modulus (in^3)
	a	b	c												
	...	...	5S	0.156	13.688	147.20	6.78	3.67	3.58	23.0	63.7	162.6	23.2	4.90	29.900
	...	...	10S	0.188	13.624	145.80	8.16	3.67	3.57	27.7	63.1	194.6	27.8	4.88	35.867
	10	...	...	0.250	13.500	143.1	10.80	3.67	3.53	36.71	62.1	255.4	36.5	4.86	47.271
	20	...	...	0.312	13.376	140.5	13.42	3.67	3.50	45.68	60.9	314	44.9	4.84	58.467
	30	Std	...	0.375	13.250	137.9	16.05	3.67	3.47	54.57	59.7	373	53.3	4.82	69.633
	40	...	...	0.437	13.126	135.3	18.62	3.67	3.44	63.37	58.7	429	61.2	4.80	80.416
	...	XS	...	0.500	13.000	132.7	21.21	3.67	3.40	72.09	57.5	484	69.1	4.78	91.167
	...	...	...	0.562	12.876	130.2	23.73	3.67	3.37	80.66	56.5	537	76.7	4.76	101.545
14 *14.000*	60	...	...	0.593	12.814	129.0	24.98	3.67	3.35	84.91	55.9	562	80.3	4.74	106.660
	...	...	...	0.625	12.750	127.7	26.26	3.67	3.34	89.28	55.3	589	84.1	4.73	111.889
	...	...	...	0.687	12.626	125.2	28.73	3.67	3.31	97.68	54.3	638	91.2	4.71	121.869
	80	...	...	0.750	12.500	122.7	31.2	3.67	3.27	106.13	53.2	687	98.2	4.69	131.813
	...	...	...	0.875	12.250	117.9	36.1	3.67	3.21	122.66	51.1	781	111.5	4.65	150.956
	100	...	...	0.937	12.126	115.5	38.5	3.67	3.17	130.73	50.0	825	117.8	4.63	160.166
	120	...	...	1.093	11.814	109.6	44.3	3.67	3.09	150.67	47.5	930	132.8	4.58	182.519
	140	...	...	1.250	11.500	103.9	50.1	3.67	3.01	170.22	45.0	1127	146.8	4.53	203.854
	160	...	...	1.406	11.188	98.3	55.6	3.67	2.929	189.12	42.6	1017	159.6	4.48	223.931
	...	...	5S	0.165	15.670	192.90	8.21	4.19	4.10	28.00	83.5	257	32.2	5.60	41.375
	...	...	10S	0.188	15.624	191.7	9.34	4.19	4.09	32.00	83.0	292	36.5	5.59	47.006
	10	...	...	0.250	15.500	188.7	12.37	4.19	4.06	42.05	81.8	384	48.0	5.57	62.021
	20	...	...	0.312	15.376	185.7	15.38	4.19	4.03	52.36	80.5	473	59.2	5.55	76.798
	30	Std	...	0.375	15.250	182.6	18.41	4.19	3.99	62.58	79.1	562	70.3	5.53	91.570
	...	...	...	0.437	15.126	179.7	21.37	4.19	3.96	72.64	77.9	648	80.9	5.50	105.872
	40	XS	...	0.500	15.000	176.7	24.35	4.19	3.93	82.77	76.5	732	91.5	5.48	120.167
	...	...	...	0.562	14.876	173.8	27.26	4.19	3.89	92.66	75.4	813	106.6	5.46	134.002
16	...	...	...	0.625	14.750	170.9	30.2	4.19	3.86	102.63	74.1	894	112.2	5.44	147.826
16.000	60	...	...	0.656	14.688	169.4	31.6	4.19	3.85	107.50	73.4	933	116.6	5.43	154.542
	...	...	...	0.687	14.626	168.0	33.0	4.19	3.83	112.36	72.7	971	121.4	5.42	161.201
	...	...	...	0.750	14.500	165.1	35.9	4.19	3.80	122.15	71.5	1047	130.9	5.40	174.563
	80	...	...	0.843	14.314	160.9	40.1	4.19	3.75	136.46	69.7	1157	144.6	5.37	193.866
	...	...	...	0.875	14.250	159.5	41.6	4.19	3.73	141.35	69.1	1193	154.1	5.36	200.393
	100	...	...	1.031	13.938	152.5	48.5	4.19	3.65	164.83	66.1	1365	170.6	5.30	231.383
	120	...	...	1.218	13.564	144.5	56.6	4.19	3.55	192.29	62.6	1556	194.5	5.24	266.745
	140	...	...	1.437	13.126	135.3	65.7	4.19	3.44	223.64	58.6	1760	220.0	5.17	305.750
	160	...	...	1.593	12.814	129.0	72.1	4.19	3.35	245.11	55.9	1894	236.7	5.12	331.993

TABLE E2.1 Principal Properties of Commercial Pipe (in U.S. Customary Units) (*Continued*)

Nominal pipe size, outside diam. (in)	Schedule number*			Wall thickness (in)	Inside diam. (in)	Inside area (in^2)	Metal area (in^2)	Ft^2 outside surface per ft	Ft^2 inside surface per ft	Weight per ft (lb)†	Weight of water per ft (lb)	Moment of inertia (in^4)	Elastic section modulus (in^3)	Radius gyration (in)	Plastic section modulus (in^3)
	a	b	c												
18 *18.000*	...	...	5S	0.165	17.670	245.20	9.24	4.71	4.63	31.00	106.2	368	40.8	6.31	52.486
	...	...	10S	0.188	17.624	243.90	10.52	4.71	4.61	36.00	105.7	417	46.4	6.30	59.649
	10	...	...	0.250	17.500	240.5	13.94	4.71	4.58	47.39	104.3	549	61.0	6.28	78.771
	20	...	...	0.312	17.376	237.1	17.34	4.71	4.55	59.03	102.8	678	75.5	6.25	97.624
	...	Std	...	0.375	17.250	233.7	20.76	4.71	4.52	70.59	101.2	807	89.6	6.23	116.508
	30	...	...	0.437	17.126	230.4	24.11	4.71	4.48	82.06	99.9	931	103.4	6.21	134.824
	...	XS	...	0.500	17.000	227.0	27.49	4.71	4.45	93.45	98.4	1053	117.0	6.19	153.167
	40	...	...	0.562	16.876	223.7	30.8	4.71	4.42	104.75	97.0	1172	130.2	6.17	170.954
	...	...	...	0.625	16.750	220.5	34.1	4.71	4.39	115.98	95.5	1289	143.3	6.15	188.763
	...	...	...	0.687	16.626	217.1	37.4	4.71	4.35	127.03	94.1	1403	156.3	6.13	206.029
	60	...	...	0.750	16.500	213.8	40.6	4.71	4.32	138.17	92.7	1515	168.3	6.10	223.313
	...	...	...	0.875	16.250	207.4	47.1	4.71	4.25	160.04	89.9	1731	192.8	6.06	256.831
	80	...	...	0.937	16.126	204.2	50.2	4.71	4.22	170.75	88.5	1834	203.8	6.04	273.078
	100	...	...	1.156	15.688	193.3	61.2	4.71	4.11	207.96	83.7	2180	242.2	5.97	328.496
	120	...	...	1.375	15.250	182.6	71.8	4.71	3.99	244.14	79.2	2499	277.6	5.90	380.904
	140	...	...	1.562	14.876	173.8	80.7	4.71	3.89	274.23	75.3	2750	306	5.84	423.335
	160	...	...	1.781	14.438	163.7	90.7	4.71	3.78	308.51	71.0	3020	336	5.77	470.386
20 *20.000*	...	...	5S	0.188	19.634	302.40	11.70	5.24	5.14	40	131.0	574	57.4	7.00	71.869
	...	...	10S	0.218	19.564	300.6	13.55	5.24	5.12	46	130.2	663	66.3	6.99	85.313
	10	...	...	0.250	19.500	298.6	15.51	5.24	5.11	52.73	129.5	757	75.7	6.98	97.521
	...	...	...	0.312	19.376	294.9	19.30	5.24	5.07	65.40	128.1	935	93.5	6.96	120.947
	20	Std	...	0.375	19.250	291.0	23.12	5.24	5.04	78.60	126.0	1114	111.4	6.94	144.445
	...	...	...	0.437	19.126	287.3	26.86	5.24	5.01	91.31	124.6	1286	128.6	6.92	167.273
	30	XS	...	0.500	19.000	283.5	30.6	5.24	4.97	104.13	122.8	1457	145.7	6.90	190.167
	...	...	...	0.562	18.876	279.8	34.3	5.24	4.94	116.67	121.3	1624	162.4	6.88	212.403
	40	...	...	0.593	18.814	278.0	36.2	5.24	4.93	122.91	120.4	1704	170.4	6.86	223.412
	...	...	...	0.625	18.750	276.1	38.0	5.24	4.91	129.33	119.7	1787	178.7	6.85	234.701
	...	...	...	0.687	18.626	272.5	41.7	5.24	4.88	141.71	118.1	1946	194.6	6.83	256.354
	...	...	...	0.750	18.500	268.8	45.4	5.24	4.84	154.20	116.5	2105	210.5	6.81	278.063
	60	...	...	0.812	18.376	265.2	48.9	5.24	4.81	166.40	115.0	2257	225.7	6.79	299.140

TABLE E2.1 Principal Properties of Commercial Pipe (in U.S. Customary Units) (*Continued*)

Nominal pipe size, outside diam. (in)	Schedule number*			Wall thickness (in)	Inside diam. (in)	Inside area (in^2)	Metal area (in^2)	Ft^2 outside surface per ft	Ft^2 inside surface per ft	Weight per ft (lb)†	Weight of water per ft (lb)	Moment of inertia (in^4)	Elastic section modulus (in^3)	Radius gyration (in)	Plastic section modulus (in^3)
	a	b	c												
	...	...	...	0.875	18.250	261.6	52.6	5.24	4.78	178.73	113.4	2409	240.9	6.77	320.268
	80	...	...	1.031	17.938	252.7	61.4	5.24	4.70	208.87	109.4	2772	277.2	6.72	371.343
	100	...	...	1.281	17.438	238.8	75.3	5.24	4.57	256.10	103.4	3320	332	6.63	449.564
	120	...	...	1.500	17.000	227.0	87.2	5.24	4.45	296.37	98.3	3760	376	6.56	514.500
	140	...	...	1.750	16.500	213.8	100.3	5.24	4.32	341.10	92.6	4220	422	6.48	584.646
	160	...	...	1.968	16.064	202.7	111.5	5.24	4.21	379.01	87.9	4590	459	6.41	642.442
	...	...	5S	0.188	21.624	367.3	12.88	5.76	5.66	44	159.1	766	69.7	7.71	89.446
	...	...	10S	0.218	21.564	365.2	14.92	5.76	5.65	51	158.2	885	80.4	7.70	103.435
	10	...	...	0.250	21.500	363.1	17.16	5.76	5.63	58	157.4	1010	91.8	7.69	118.271
	20	Std	...	0.375	21.250	354.7	25.48	5.76	5.56	87	153.7	1490	135.4	7.65	175.383
	30	XS	...	0.500	21.000	346.4	33.77	5.76	5.50	115	150.2	1953	177.5	7.61	231.167
22	...	...	...	0.625	20.750	338.2	41.97	5.76	5.43	143	146.6	2400	218.2	7.56	285.638
22.000	...	...	...	0.750	20.500	330.1	50.07	5.76	5.37	170	143.1	2829	257.2	7.52	338.813
	60	...	...	0.875	20.250	322.1	58.07	5.76	5.30	197	139.6	3245	295.0	7.47	390.706
	80	...	...	1.125	19.750	306.4	73.78	5.76	5.17	251	132.8	4029	366.3	7.39	490.711
	100	...	...	1.375	19.250	291.0	89.09	5.76	5.04	303	126.2	4758	432.6	7.31	585.779
	120	...	...	1.625	18.750	276.1	104.02	5.76	4.91	354	119.6	5432	493.8	7.23	676.034
	140	...	...	1.875	18.250	261.6	118.55	5.76	4.78	403	113.3	6054	550.3	7.15	761.602
	160	...	...	2.125	17.750	247.4	132.68	5.76	4.65	451	107.2	6626	602.4	7.07	842.607
	...	...	5S	0.218	23.564	436.1	16.29	6.28	6.17	55	188.9	1152	96.0	8.41	123.301
	10	...	10S	0.250	23.500	434	18.65	6.28	6.15	63.41	188.0	1316	109.6	8.40	141.021
	...	...	...	0.312	23.376	430	23.20	6.28	6.12	78.93	186.1	1629	135.8	8.38	175.080
	20	Std	...	0.375	23.250	425	27.83	6.28	6.09	94.62	183.8	1943	161.9	8.35	209.320
	...	...	...	0.437	23.126	420	32.4	6.28	6.05	109.97	182.1	2246	187.4	8.33	242.657
	...	XS	...	0.500	23.000	415	36.9	6.28	6.02	125.49	180.1	2550	212.5	8.31	276.167
	30	...	...	0.562	22.876	411	41.4	6.28	5.99	140.80	178.1	2840	237.0	8.29	308.788
24	...	...	...	0.625	22.750	406	45.9	6.28	5.96	156.03	176.2	3140	261.4	8.27	341.576
24.000	40	...	...	0.687	22.626	402	50.3	6.28	5.92	171.17	174.3	3420	285.2	8.25	373.490
	...	...	...	0.750	22.500	398	54.8	6.28	5.89	186.24	172.4	3710	309	8.22	405.563
	60	...	...	0.968	22.064	382	70.0	6.28	5.78	238.11	165.8	4650	388	8.15	513.800
	80	...	...	1.218	21.564	365	87.2	6.28	5.65	296.36	158.3	5670	473	8.07	632.768
	100	...	...	1.531	20.938	344	108.1	6.28	5.48	367.40	149.3	6850	571	7.96	774.131
	120	...	...	1.812	20.376	326	126.3	6.28	5.33	429.39	141.4	7830	652	7.87	894.044
	140	...	...	2.062	19.876	310	142.1	6.28	5.20	483.13	134.5	8630	719	7.79	995.313
	160	...	...	2.343	19.314	293	159.4	6.28	5.06	541.94	127.0	9460	788	7.70	1103.215

TABLE E2.1 Principal Properties of Commercial Pipe (in U.S. Customary Units) (*Continued*)

Nominal pipe size, outside diam. (in)	Schedule number*			Wall thickness (in)	Inside diam. (in)	Inside area (in^2)	Metal area (in^2)	Ft^2 outside surface per ft	Ft^2 inside surface per ft	Weight per ft (lb)†	Weight of water per ft (lb)	Moment of inertia (in^4)	Elastic section modulus (in^3)	Radius gyration (in)	Plastic section modulus (in^3)
	a	b	c												
26 *26.000*	...	...	...	0.250	25.500	510.7	19.85	6.81	6.68	67	221.4	1646	126.6	9.10	165.771
	10	...	...	0.312	25.376	505.8	25.18	6.81	6.64	86	219.2	2076	159.7	9.08	205.891
	...	Std	...	0.375	25.250	500.7	30.19	6.81	6.61	103	217.1	2478	190.6	9.06	246.258
	20	XS	...	0.500	25.000	490.9	40.06	6.81	6.54	136	212.8	3259	250.7	9.02	325.167
	...	...	...	0.625	24.750	481.1	49.82	6.81	6.48	169	208.6	4013	308.7	8.98	402.513
	...	...	...	0.750	24.500	471.4	59.49	6.81	6.41	202	204.4	4744	364.9	8.93	478.313
	...	...	...	0.875	24.250	461.9	69.07	6.81	6.35	235	200.2	5458	419.9	8.89	552.581
	...	...	...	1.00	24.000	452.4	78.54	6.81	6.28	267	196.1	6149	473.0	8.85	625.333
	...	...	...	1.125	23.750	443.0	87.91	6.81	6.22	299	192.1	6813	524.1	8.80	696.586
28 *28.000*	...	...	...	0.250	27.500	594.0	21.80	7.33	7.20	74	257.3	2098	149.8	9.81	192.521
	10	...	...	0.312	27.376	588.6	27.14	7.33	7.17	92	255.0	2601	185.8	9.78	239.197
	...	Std	...	0.375	27.250	583.2	32.54	7.33	7.13	111	252.6	3105	221.8	9.77	286.195
	20	XS	...	0.500	27.000	572.6	43.20	7.33	7.07	147	248.0	4085	291.8	9.72	378.167
	30	...	...	0.625	26.750	562.0	53.75	7.33	7.00	183	243.4	5038	359.8	9.68	468.451
	...	...	...	0.750	26.500	551.6	64.21	7.33	6.94	218	238.9	5964	426.0	9.64	557.063
	...	...	...	0.875	26.250	541.2	74.56	7.33	6.87	253	234.4	6865	490.3	9.60	644.018
	...	...	...	1.000	26.000	530.9	84.82	7.33	6.81	288	230.0	7740	552.8	9.55	729.333
	...	...	...	1.125	25.750	520.8	94.98	7.33	6.74	323	225.6	8590	613.6	9.51	813.023
30 *30.000*	...	...	5S	0.250	29.500	683.4	23.37	7.85	7.72	79	296.3	2585	172.3	10.52	221.271
	10	...	10S	0.312	29.376	677.8	29.19	7.85	7.69	99	293.7	3201	213.4	10.50	275.000
	...	Std	...	0.375	29.250	672.0	34.90	7.85	7.66	119	291.2	3823	254.8	10.48	329.133
	20	XS	...	0.500	29.000	660.5	46.34	7.85	7.59	158	286.2	5033	335.5	10.43	435.167
	30	...	...	0.625	28.750	649.2	57.68	7.85	7.53	196	281.3	6213	414.2	10.39	539.388
	40	...	...	0.750	28.500	637.9	68.92	7.85	7.46	234	276.6	7371	491.4	10.34	641.813
	...	...	...	0.875	28.250	620.7	90.06	7.85	7.39	272	271.8	8494	566.2	10.30	742.456
	...	...	...	1.000	28.000	615.7	91.11	7.85	7.33	310	267.0	9591	639.4	10.26	841.333
	...	...	...	1.125	27.750	604.7	102.05	7.85	7.26	347	262.2	10653	710.2	10.22	938.461

TABLE E2.1 Principal Properties of Commercial Pipe (in U.S. Customary Units) (*Continued*)

Nominal pipe size, outside diam. (in)	Schedule number*			Wall thickness (in)	Inside diam. (in)	Inside area (in^2)	Metal area (in^2)	Ft^2 outside surface per ft	Ft^2 inside surface per ft	Weight per ft (lb)†	Weight of water per ft (lb)	Moment of inertia (in^4)	Elastic section modulus (in^3)	Radius gyration (in)	Plastic section modulus (in^3)
	a	b	c												
	...	...	...	0.250	31.500	779.2	24.93	8.38	8.25	85	337.8	3141	196.3	11.22	252.021
	10	...	...	0.312	31.376	773.2	31.02	8.38	8.21	106	335.2	3891	243.2	11.20	313.299
	...	Std	...	0.375	31.250	766.9	37.25	8.38	8.18	127	332.5	4656	291.0	11.18	375.070
	20	XS	...	0.500	31.000	754.7	49.48	8.38	8.11	168	327.2	6140	383.8	11.14	496.167
32	30	...	...	0.625	30.750	742.5	61.59	8.38	8.05	209	321.9	7578	473.6	11.09	615.326
32.000	40	...	...	0.688	30.624	736.6	67.68	8.38	8.02	230	319.0	8298	518.6	11.07	674.652
	...	...	...	0.750	30.500	730.5	73.63	8.38	7.98	250	316.7	8990	561.9	11.05	732.563
	...	...	...	0.875	30.250	718.3	85.52	8.38	7.92	291	311.6	10372	648.2	11.01	847.893
	...	...	...	1.000	30.000	706.8	97.38	8.38	7.85	331	306.4	11680	730.0	10.95	961.333
	...	...	...	1.125	29.750	694.7	109.0	8.38	7.79	371	301.3	13023	814.0	10.92	1072.898
	...	...	...	0.250	33.500	881.2	26.50	8.90	8.77	90	382.0	3773	221.9	11.93	284.771
	10	...	...	0.312	33.376	874.9	32.99	8.90	8.74	112	379.3	4680	275.3	11.91	354.093
	...	Std	...	0.375	33.250	867.8	39.61	8.90	8.70	135	376.2	5597	329.2	11.89	424.008
	20	XS	...	0.500	33.000	855.3	52.62	8.90	8.64	179	370.8	7385	434.4	11.85	561.167
34	30	...	...	0.625	32.750	841.9	65.53	8.90	8.57	223	365.0	9124	536.7	11.80	696.263
34.000	40	...	...	0.688	32.624	835.9	72.00	8.90	8.54	245	362.1	9992	587.8	11.78	763.575
	...	...	...	0.750	32.500	829.3	78.34	8.90	8.51	266	359.5	10829	637.0	11.76	829.313
	...	...	...	0.875	32.250	816.4	91.01	8.90	8.44	310	354.1	12501	735.4	11.72	960.331
	...	...	...	1.000	32.000	804.2	103.67	8.90	8.38	353	348.6	14114	830.2	11.67	1089.333
	...	...	...	1.125	31.750	791.3	116.13	8.90	8.31	395	343.2	15719	924.7	11.63	1216.336
	...	...	...	0.250	35.500	989.7	28.11	9.42	9.29	96	429.1	4491	249.5	12.64	319.521
	10	...	...	0.312	35.376	982.9	34.95	9.42	9.26	119	426.1	5565	309.1	12.62	397.384
	...	Std	...	0.375	35.250	975.8	42.01	9.42	9.23	143	423.1	6664	370.2	12.59	475.945
	20	XS	...	0.500	35.000	962.1	55.76	9.42	9.16	190	417.1	8785	488.1	12.55	630.167
36	30	...	...	0.625	34.750	948.3	69.50	9.42	9.10	236	411.1	10872	604.0	12.51	782.201
36.000	40	...	...	0.750	34.500	934.7	83.01	9.42	9.03	282	405.3	12898	716.5	12.46	932.063
	...	...	...	0.875	34.250	920.6	96.50	9.42	8.97	328	399.4	14903	827.9	12.42	1079.768
	...	...	...	1.000	34.000	907.9	109.96	9.42	8.90	374	393.6	16851	936.2	12.38	1225.333
	...	...	...	1.125	33.750	894.2	123.19	9.42	8.89	419	387.9	18763	1042.4	12.34	1368.773
	...	...	...	0.250	41.500	1352.6	32.82	10.99	10.86	112	586.4	7126	339.3	14.73	435.771
	...	Std	...	0.375	41.250	1336.3	49.08	10.99	10.80	167	579.3	10627	506.1	14.71	649.758
	20	XS	...	0.500	41.000	1320.2	65.18	10.99	10.73	222	572.3	14037	668.4	14.67	861.167
42	30	...	...	0.625	40.750	1304.1	81.28	10.99	10.67	276	565.4	17373	827.3	14.62	1070.013
42.000	40	...	...	0.750	40.500	1288.2	97.23	10.99	10.60	330	558.4	20689	985.2	14.59	1276.313
	...	...	...	1.000	40.000	1256.6	128.81	10.99	10.47	438	544.9	27080	1289.5	14.50	1681.333
	...	...	...	1.250	39.500	1225.3	160.03	10.99	10.34	544	531.2	33233	1582.5	14.41	2076.554
	...	...	...	1.500	39.000	1194.5	190.85	10.99	10.21	649	517.9	39181	1865.7	14.33	2461.500

TABLE E2.1 Principal Properties of Commercial Pipe (in U.S. Customary Units) (*Continued*)

Notes: The following formulas were used in the computation of the values shown in the table:

Weight† of pipe per foot (pounds)	$= 10.6802t(D - t)$
Weight of water per foot (pounds)	$= 0.3405d^2$
Square feet outside surface per foot	$= 0.2618D$
Square feet inside surface per foot	$= 0.2618d$
Inside area (square inches)	$= 0.785d^2$
Area of metal (square inches)	$= 0.785(D^2 - d^2)$
Moment of inertia (inches^4)	$= 0.0491(D^4 - d^4)$
	$= A_M R_g^2$
Elastic section modulus (inches^3)	$= \dfrac{0.0982(D^4 - d^4)}{D}$
Plastic section modulus	$= \dfrac{(D^3 - d^3)}{6}$
Radius of gyration (inches)	$= 0.25\sqrt{D^2 + d^2}$

A_M = area of metal (square inches)
d = inside diameter (inches)
D = outside diameter (inches)
R_g = radius of gyration (inches)
t = pipe wall thickness (inches)

* Schedule numbers: Standard weight pipe and Schedule 40 are the same in all sizes through 10 in; from 12 in through 24 in, standard weight pipe has a wall thickness of ⅜ in. Extra-strong weight pipe and Schedule 80 are the same in all sizes through 8 in; from 8 in through 24 in, extra-strong weight pipe has a wall thickness of ½ in. Double extra-strong weight pipe has no corresponding schedule number.

a: ANSI/ASME B36.10 Steel Pipe Schedule Numbers.
b: ANSI/ASME N36.10 Steel Pipe Nominal Wall Thickness Designations.
c: ANSI/ASME B36.19 Stainless Steel Pipe Schedule Numbers.

† The ferritic stainless steels may be about 5 percent less and the austenitic stainless steels about 2 percent greater than the values shown in this table which are based on weights for carbon steel.

TABLE E2.1M Principal Properties of Commercial Pipe (Metric Data)

d_n		D	t	d	A_i	A_m	S_o	S_i	w_p	w_w	I	z_e	R_g	z_p
Nom dia	Schedule	Outside dia	Wall thick	Inside dia	Inside area	Metal area	Outside surf	Inside surf	Pipe wt.	Water wt.	Mom of inert	Elast sec mod	Rad of gyr	Plast sec mod
mm		mm	mm	mm	cm^2	cm^2	m^2/m	m^2/m	kg/m	kg/m	cm^4	cm^3	cm	cm^3
3	10S	10.3	1.2446	7.811	0.479	0.354	0.0324	0.0245	0.277	0.048	0.037	0.072	0.323	0.103
	Std 40	10.3	1.7272	6.846	0.368	0.465	0.0324	0.0215	0.364	0.037	0.044	0.086	0.309	0.129
	XS 80	10.3	2.413	5.474	0.235	0.598	0.0324	0.0172	0.468	0.024	0.051	0.099	0.292	0.155
6	10S	13.7	1.651	10.398	0.849	0.625	0.0430	0.0327	0.489	0.085	0.116	0.169	0.430	0.241
	Std 40	13.7	2.235	9.23	0.669	0.805	0.0430	0.0290	0.630	0.067	0.137	0.200	0.413	0.298
	XS 80	13.7	3.023	7.654	0.460	1.014	0.0430	0.0240	0.794	0.046	0.156	0.228	0.392	0.354
10	10S	17.145	1.651	13.843	1.505	0.804	0.0539	0.0435	0.629	0.151	0.244	0.285	0.551	0.398
	Std 40	17.145	2.311	12.523	1.232	1.077	0.0539	0.0393	0.843	0.123	0.303	0.354	0.531	0.513
	XS 80	17.145	3.2	10.745	0.907	1.402	0.0539	0.0338	1.098	0.091	0.359	0.418	0.506	0.633
15	5S	21.336	1.651	18.034	2.554	1.021	0.0670	0.0567	0.799	0.255	0.498	0.467	0.698	0.641
	10S	21.336	2.108	17.12	2.302	1.273	0.0670	0.0538	0.997	0.230	0.596	0.558	0.684	0.782
	Std 40	21.336	2.769	15.798	1.960	1.615	0.0670	0.0496	1.265	0.196	0.711	0.667	0.664	0.962
	XS 80	21.336	3.734	13.868	1.510	2.065	0.0670	0.0436	1.617	0.151	0.836	0.783	0.636	1.174
	160	21.336	4.75	11.836	1.100	2.475	0.0670	0.0372	1.938	0.110	0.921	0.863	0.610	1.342
	XXS	21.336	7.468	6.4	0.322	3.254	0.0670	0.0201	2.547	0.032	1.009	0.946	0.557	1.575
20	5S	26.67	1.651	23.368	4.289	1.298	0.0838	0.0734	1.016	0.429	1.020	0.765	0.886	1.035
	10S	26.67	2.108	22.454	3.960	1.627	0.0838	0.0705	1.273	0.396	1.236	0.927	0.872	1.275
	Std 40	26.67	2.87	20.93	3.441	2.146	0.0838	0.0658	1.680	0.344	1.541	1.156	0.848	1.634
	XS 80	26.67	3.912	18.846	2.790	2.797	0.0838	0.0592	2.190	0.279	1.864	1.398	0.816	2.046
	160	26.67	5.537	15.596	1.910	3.676	0.0838	0.0490	2.878	0.191	2.193	1.645	0.772	2.529
	XXS	26.67	7.823	11.024	0.954	4.632	0.0838	0.0346	3.626	0.095	2.411	1.808	0.721	2.938
25	5S	33.401	1.651	30.099	7.115	1.647	0.1049	0.0946	1.289	0.712	2.081	1.246	1.124	1.666
	10S	33.401	2.769	27.863	6.097	2.665	0.1049	0.0875	2.086	0.610	3.151	1.887	1.087	2.605
	Std 40	33.401	3.378	26.645	5.576	3.186	0.1049	0.0837	2.494	0.558	3.635	2.177	1.068	3.058
	XS 80	33.401	4.547	24.307	4.640	4.122	0.1049	0.0764	3.227	0.464	4.396	2.632	1.033	3.817
	160	33.401	6.35	20.701	3.366	5.396	0.1049	0.0650	4.225	0.337	5.208	3.119	0.982	4.732
	XXS	33.401	9.093	15.215	1.818	6.944	0.1049	0.0478	5.436	0.182	5.846	3.501	0.918	5.624
32	5S	42.164	1.651	38.862	11.862	2.101	0.1325	0.1221	1.645	1.186	4.318	2.048	1.434	2.711
	10S	42.164	2.769	36.626	10.536	3.427	0.1325	0.1151	2.683	1.054	6.681	3.169	1.396	4.305
	Std 40	42.164	3.556	35.052	9.650	4.313	0.1325	0.1101	3.377	0.965	8.104	3.844	1.371	5.316
	XS 80	42.164	4.851	32.462	8.276	5.686	0.1325	0.1020	4.452	0.828	10.063	4.773	1.330	6.792
	160	42.164	6.35	29.464	6.818	7.145	0.1325	0.0926	5.594	0.682	11.815	5.604	1.286	8.230
	XXS	42.164	9.703	22.758	4.068	9.895	0.1325	0.0715	7.747	0.407	14.198	6.734	1.198	10.529
40	5S	48.26	1.651	44.958	15.875	2.418	0.1516	0.1412	1.893	1.587	6.573	2.724	1.649	3.588
	10S	48.26	2.769	42.722	14.335	3.957	0.1516	0.1342	3.098	1.433	10.275	4.258	1.611	5.737
	Std 40	48.26	3.683	40.894	13.134	5.158	0.1516	0.1285	4.038	1.313	12.899	5.345	1.581	7.335
	XS 80	48.26	5.08	38.1	11.401	6.891	0.1516	0.1197	5.395	1.140	16.283	6.748	1.537	9.516

TABLE E2.1M Principal Properties of Commercial Pipe (Metric Data) (*Continued*)

d_n		D	t	d	A_i	A_m	S_o	S_i	w_p	w_w	I	z_e	R_g	z_p
Nom dia	Schedule	Outside dia	Wall thick	Inside dia	Inside area	Metal area	Outside surf	Inside surf	Pipe wt.	Water wt.	Mom of inert	Elast sec mod	Rad of gyr	Plast sec mod
mm		mm	mm	mm	cm^2	cm^2	m^2/m	m^2/m	kg/m	kg/m	cm^4	cm^3	cm	cm^3
	160	48.26	7.137	33.986	9.072	9.220	0.1516	0.1068	7.219	0.907	20.078	8.321	1.476	12.191
	XXS	48.26	10.16	27.94	6.131	12.161	0.1516	0.0878	9.521	0.613	23.635	9.795	1.394	15.098
	—	48.26	13.335	21.59	3.661	14.631	0.1516	0.0678	11.455	0.366	25.560	10.593	1.322	17.056
	—	48.26	15.875	16.51	2.141	16.151	0.1516	0.0519	12.645	0.214	26.262	10.884	1.275	17.983
50	5S	60.325	1.651	57.023	25.538	3.043	0.1895	0.1791	2.383	2.554	13.106	4.345	2.075	5.685
	10S	60.325	2.769	54.787	23.575	5.007	0.1895	0.1721	3.920	2.357	20.780	6.890	2.037	9.180
	Std 40	60.325	3.912	52.501	21.648	6.933	0.1895	0.1649	5.428	2.165	27.713	9.188	1.999	12.470
	XS 80	60.325	5.537	49.251	19.051	9.530	0.1895	0.1547	7.461	1.905	36.124	11.977	1.947	16.677
	160	60.325	8.712	42.901	14.455	14.126	0.1895	0.1348	11.059	1.446	48.379	16.039	1.851	23.429
	XXS	60.325	11.074	38.177	11.447	17.134	0.1895	0.1199	13.415	1.145	54.579	18.095	1.785	27.315
	—	60.325	14.275	31.775	7.930	20.652	0.1895	0.0998	16.168	0.793	60.002	19.893	1.705	31.242
	—	60.325	17.45	25.425	5.077	23.504	0.1895	0.0799	18.402	0.508	62.955	20.872	1.637	33.850
65	5S	73.025	2.108	68.809	37.186	4.696	0.2294	0.2162	3.677	3.719	29.550	8.093	2.508	10.605
	10S	73.025	3.048	66.929	35.182	6.701	0.2294	0.2103	5.246	3.518	41.092	11.254	2.476	14.935
	Std 40	73.025	5.156	62.713	30.889	10.993	0.2294	0.1970	8.607	3.089	63.662	17.436	2.406	23.796
	XS 80	73.025	7.01	59.005	27.344	14.538	0.2294	0.1854	11.382	2.734	80.089	21.935	2.347	30.665
	160	73.025	9.525	53.975	22.881	19.002	0.2294	0.1696	14.876	2.288	97.928	26.820	2.270	38.696
	XXS	73.025	14.021	44.983	15.892	25.990	0.2294	0.1413	20.348	1.589	119.49	32.726	2.144	49.734
	—	73.025	17.145	38.735	11.784	30.098	0.2294	0.1217	23.564	1.178	128.54	35.204	2.067	55.218
	—	73.025	20.32	32.385	8.237	33.645	0.2294	0.1017	26.341	0.824	134.19	36.752	1.997	59.243
80	5S	88.9	2.108	84.684	56.324	5.748	0.2793	0.2660	4.500	5.632	54.15	12.183	3.069	15.883
	10S	88.9	3.048	82.804	53.851	8.221	0.2793	0.2601	6.436	5.385	75.84	17.061	3.037	22.475
	Std 40	88.9	5.486	77.928	47.696	14.376	0.2793	0.2448	11.255	4.770	125.58	28.251	2.956	38.227
	XS 80	88.9	7.62	73.66	42.614	19.458	0.2793	0.2314	15.233	4.261	162.09	36.466	2.886	50.490
	160	88.9	11.1	66.7	34.942	27.130	0.2793	0.2095	21.240	3.494	209.44	47.119	2.779	67.644
	XXS	88.9	15.24	58.42	26.805	35.267	0.2793	0.1835	27.610	2.680	249.43	56.114	2.659	83.871
	—	88.9	18.415	52.07	21.294	40.777	0.2793	0.1636	31.925	2.129	270.52	60.859	2.576	93.572
	—	88.9	21.59	45.72	16.417	45.654	0.2793	0.1436	35.743	1.642	285.15	64.151	2.499	101.173
90	5S	101.6	2.108	97.384	74.485	6.589	0.3192	0.3059	5.158	7.448	81.56	16.055	3.518	20.870
	10S	101.6	3.048	95.504	71.636	9.437	0.3192	0.3000	7.388	7.164	114.68	22.575	3.486	29.614
	Std 40	101.6	5.74	90.12	63.787	17.286	0.3192	0.2831	13.533	6.379	199.27	39.226	3.395	52.810
	XS 80	101.6	8.077	85.446	57.342	23.731	0.3192	0.2684	18.579	5.734	261.39	51.455	3.319	70.823
	XXS	101.6	16.154	69.292	37.710	43.363	0.3192	0.2177	33.949	3.771	409.89	80.686	3.074	119.348
100	5S	114.3	2.108	110.084	95.179	7.430	0.3591	0.3458	5.817	9.518	116.94	20.462	3.967	26.537
	10S	114.3	3.048	108.204	91.955	10.653	0.3591	0.3399	8.340	9.196	164.94	28.861	3.935	37.735
	—	114.3	4.775	104.75	86.179	16.430	0.3591	0.3291	12.863	8.618	246.83	43.189	3.876	57.317

TABLE E2.1M Principal Properties of Commercial Pipe (Metric Data) (*Continued*)

d_n		D	t	d	A_i	A_m	S_o	S_i	w_p	w_w	I	z_e	R_g	z_p
Nom dia	Schedule	Outside dia	Wall thick	Inside dia	Inside area	Metal area	Outside surf	Inside surf	Pipe wt.	Water wt.	Mom of inert	Elast sec mod	Rad of gyr	Plast sec mod
mm		mm	mm	mm	cm^2	cm^2	m^2/m	m^2/m	kg/m	kg/m	cm^4	cm^3	cm	cm^3
	Std 40	114.3	6.02	102.26	82.130	20.478	0.3591	0.3213	16.033	8.213	301.05	52.677	3.834	70.656
	XS 80	114.3	8.56	97.18	74.173	28.436	0.3591	0.3053	22.262	7.417	400.02	69.995	3.751	95.920
	120	114.3	11.1	92.1	66.621	35.988	0.3591	0.2893	28.175	6.662	484.63	84.800	3.670	118.676
	—	114.3	12.7	88.9	62.072	40.537	0.3591	0.2793	31.736	6.207	531.22	92.952	3.620	131.782
	160	114.3	13.487	87.326	59.893	42.715	0.3591	0.2743	33.442	5.989	552.36	96.652	3.596	137.892
	XXS	114.3	17.12	80.06	50.341	52.267	0.3591	0.2515	40.920	5.034	636.16	111.314	3.489	163.356
	—	114.3	20.32	73.66	42.614	59.994	0.3591	0.2314	46.970	4.261	693.31	121.315	3.399	182.271
	—	114.3	23.495	67.31	35.584	67.025	0.3591	0.2115	52.474	3.558	737.06	128.970	3.316	198.056
125	5S	141.3	2.769	135.762	144.760	12.051	0.4439	0.4265	9.435	14.476	289.20	40.934	4.899	53.148
	10S	141.3	3.404	134.492	142.064	14.747	0.4439	0.4225	11.545	14.206	350.72	49.642	4.877	64.743
	Std 40	141.3	6.553	128.194	129.070	27.740	0.4439	0.4027	21.718	12.907	631.07	89.324	4.770	119.077
	XS 80	141.3	9.525	122.25	117.379	39.432	0.4439	0.3841	30.871	11.738	860.37	121.779	4.671	165.690
	120	141.3	12.7	115.9	105.501	51.309	0.4439	0.3641	40.170	10.550	1071.0	151.595	4.569	210.719
	160	141.3	15.875	109.55	94.257	62.553	0.4439	0.3442	48.973	9.426	1249.8	176.894	4.470	251.075
	XXS	141.3	19.05	103.2	83.647	73.164	0.4439	0.3242	57.280	8.365	1400.0	198.155	4.374	287.014
	—	141.3	22.225	96.85	73.670	83.141	0.4439	0.3043	65.091	7.367	1524.9	215.834	4.283	318.791
	—	141.3	25.4	90.5	64.326	92.484	0.4439	0.2843	72.406	6.433	1627.5	230.357	4.195	346.663
150	5S	168.275	2.769	162.737	208.000	14.398	0.5287	0.5113	11.272	20.800	493.1	58.607	5.852	75.858
	10S	168.275	3.404	161.467	204.766	17.631	0.5287	0.5073	13.804	20.477	599.3	71.232	5.830	92.544
	—	168.275	5.563	157.149	193.961	28.437	0.5287	0.4937	22.263	19.396	942.2	111.980	5.756	147.342
	Std 40	168.275	7.112	154.051	186.389	36.009	0.5287	0.4840	28.191	18.639	1171.4	139.219	5.704	184.847
	XS 80	168.275	10.973	146.329	168.171	54.226	0.5287	0.4597	42.454	16.817	1685.4	200.310	5.575	271.961
	120	168.275	14.275	139.725	153.334	69.063	0.5287	0.4390	54.070	15.333	2065.0	245.426	5.468	339.522
	160	168.275	18.237	131.801	136.436	85.962	0.5287	0.4141	67.300	13.644	2454.6	291.738	5.344	412.570
	XXS	168.275	21.946	124.383	121.510	100.887	0.5287	0.3908	78.985	12.151	2761.0	328.151	5.231	473.444
	—	168.275	25.4	117.475	108.388	114.009	0.5287	0.3691	89.258	10.839	3001.0	356.683	5.131	523.970
	—	168.275	28.575	111.125	96.987	125.410	0.5287	0.3491	98.184	9.699	3187.4	378.829	5.041	565.461
200	5S	219.075	2.769	213.537	358.127	18.817	0.6882	0.6708	14.732	35.813	1100.7	100.483	7.648	129.566
	10S	219.075	3.759	211.557	351.516	25.427	0.6882	0.6646	19.907	35.152	1474.0	134.563	7.614	174.292
	—	219.075	5.563	207.949	339.629	37.315	0.6882	0.6533	29.214	33.963	2127.8	194.251	7.551	253.665
	20	219.075	6.35	206.375	334.507	42.437	0.6882	0.6483	33.224	33.451	2402.6	219.336	7.524	287.441
	30	219.075	7.036	205.003	330.074	46.870	0.6882	0.6440	36.694	33.007	2637.0	240.738	7.501	316.465
	Std 40	219.075	8.179	202.717	322.754	54.190	0.6882	0.6369	42.425	32.275	3017.3	275.456	7.462	363.968
	60	219.075	10.312	198.451	309.313	67.631	0.6882	0.6235	52.949	30.931	3693.3	337.175	7.390	449.792
	XS 80	219.075	12.7	193.675	294.604	82.340	0.6882	0.6084	64.464	29.460	4400.2	401.708	7.310	541.595
	100	219.075	15.062	188.951	280.407	96.536	0.6882	0.5936	75.578	28.041	5049.8	461.010	7.233	628.052
	120	219.075	18.237	182.601	261.877	115.067	0.6882	0.5737	90.086	26.188	5849.4	534.012	7.130	737.642
	140	219.075	20.625	177.825	248.357	128.587	0.6882	0.5587	100.671	24.836	6398.4	584.126	7.054	815.203
	160	219.075	23.012	173.051	235.201	141.743	0.6882	0.5437	110.970	23.520	6904.6	630.343	6.979	888.677
	—	219.075	25.4	168.275	222.398	154.546	0.6882	0.5287	120.994	22.240	7370.8	672.906	6.906	958.236
	—	219.075	28.575	161.925	205.930	171.014	0.6882	0.5087	133.887	20.593	7932.2	724.149	6.811	1044.792

TABLE E2.1M Principal Properties of Commercial Pipe (Metric Data) (*Continued*)

d_n		D	t	d	A_i	A_m	S_o	S_i	w_p	w_w	I	z_e	R_g	z_p
Nom dia	Schedule	Outside dia	Wall thick	Inside dia	Inside area	Metal area	Outside surf	Inside surf	Pipe wt.	Water wt.	Mom of inert	Elast sec mod	Rad of gyr	Plast sec mod
mm		mm	mm	mm	cm^2	cm^2	m^2/m	m^2/m	kg/m	kg/m	cm^4	cm^3	cm	cm^3
250	5S	273.05	3.404	266.242	556.729	28.836	0.8578	0.8364	22.576	55.673	2621.2	191.993	9.534	247.519
	10S	273.05	4.191	264.668	550.166	35.399	0.8578	0.8315	27.714	55.017	3199.3	234.337	9.507	302.978
	—	273.05	5.563	261.924	538.817	46.748	0.8578	0.8229	36.599	53.882	4182.7	306.372	9.459	398.094
	20	273.05	6.35	260.35	532.361	53.204	0.8578	0.8179	41.654	53.236	4733.1	346.684	9.432	451.763
	30	273.05	7.798	257.454	520.583	64.982	0.8578	0.8088	50.874	52.058	5719.9	418.966	9.382	548.826
	Std 40	273.05	9.271	254.508	508.738	76.828	0.8578	0.7996	60.148	50.874	6690.2	490.036	9.332	645.349
	XS 60	273.05	12.7	247.65	481.690	103.875	0.8578	0.7780	81.324	48.169	8822.0	646.179	9.216	861.533
	80	273.05	15.062	242.926	463.488	122.077	0.8578	0.7632	95.574	46.349	10191.0	746.454	9.137	1003.653
	100	273.05	18.237	236.576	439.574	145.991	0.8578	0.7432	114.296	43.957	11909.5	872.331	9.032	1186.168
	120	273.05	21.412	230.226	416.294	169.272	0.8578	0.7233	132.523	41.629	13495.1	988.470	8.929	1359.143
	—	273.05	22.225	228.6	410.434	175.131	0.8578	0.7182	137.110	41.043	13880.6	1016.705	8.903	1401.933
	140	273.05	25.4	222.25	387.949	197.616	0.8578	0.6982	154.714	38.795	15309.1	1121.341	8.802	1563.289
	160	273.05	28.575	215.9	366.097	219.468	0.8578	0.6783	171.822	36.610	16620.3	1217.382	8.702	1715.683
	—	273.05	31.75	209.55	344.879	240.687	0.8578	0.6583	188.434	34.488	17820.8	1305.313	8.605	1859.372
	—	273.05	38.1	196.85	304.342	281.223	0.8578	0.6184	220.170	30.434	19915.0	1458.708	8.415	2121.655
300	5S	323.85	3.962	315.926	783.902	39.817	1.0174	0.9925	31.172	78.390	5093.7	314.570	11.311	405.454
	10S	323.85	4.572	314.706	777.859	45.859	1.0174	0.9887	35.903	77.786	5844.7	360.948	11.289	466.104
	20	323.85	6.35	311.15	760.380	63.339	1.0174	0.9775	49.588	76.038	7984.3	493.084	11.228	640.218
	30	323.85	8.382	307.086	740.646	83.072	1.0174	0.9647	65.037	74.065	10341.3	638.650	11.157	834.390
	Std	323.85	9.525	304.8	729.660	94.058	1.0174	0.9576	73.638	72.966	11626.7	718.031	11.118	941.379
	40	323.85	10.312	303.226	722.144	101.574	1.0174	0.9526	79.523	72.214	12495.1	771.659	11.091	1014.118
	XS	323.85	12.7	298.45	699.575	124.144	1.0174	0.9376	97.192	69.957	15048.5	929.349	11.010	1230.249
	60	323.85	14.275	295.3	684.885	138.833	1.0174	0.9277	108.692	68.489	16666.8	1029.292	10.957	1369.066
	80	323.85	17.45	288.95	655.747	167.971	1.0174	0.9078	131.505	65.575	19775.4	1221.267	10.850	1640.027
	—	323.85	19.05	285.75	641.303	182.415	1.0174	0.8977	142.813	64.130	21266.2	1313.335	10.797	1772.143
	100	323.85	21.412	281.026	620.274	203.444	1.0174	0.8829	159.276	62.027	23377.3	1443.711	10.720	1961.840
	—	323.85	22.225	279.4	613.117	210.601	1.0174	0.8778	164.879	61.312	24079.7	1487.092	10.693	2025.678
	120	323.85	25.4	273.05	585.565	238.153	1.0174	0.8578	186.450	58.557	26707.9	1649.398	10.590	2267.947
	140	323.85	28.575	266.7	558.646	265.072	1.0174	0.8379	207.525	55.865	29158.9	1800.766	10.488	2499.205
	—	323.85	31.75	260.35	532.361	291.357	1.0174	0.8179	228.104	53.236	31441.0	1941.699	10.388	2719.710
	160	323.85	33.325	257.2	519.557	304.162	1.0174	0.8080	238.128	51.956	32512.8	2007.891	10.339	2825.182
350	5S	355.6	3.962	347.676	949.381	43.768	1.1172	1.0923	34.266	94.938	6765.7	380.524	12.433	489.929
	10S	355.6	4.775	346.05	940.521	52.628	1.1172	1.0872	41.202	94.052	8098.1	455.460	12.405	587.746
	—	355.6	5.334	344.932	934.454	58.695	1.1172	1.0836	45.952	93.445	9003.4	506.375	12.385	654.472
	—	355.6	5.563	344.474	931.974	61.175	1.1172	1.0822	47.894	93.197	9371.7	527.091	12.377	681.683
	10	355.6	6.35	342.9	923.477	69.672	1.1172	1.0773	54.547	92.348	10626.3	597.656	12.350	774.646

TABLE E2.1M Principal Properties of Commercial Pipe (Metric Data) (*Continued*)

d_n		D	t	d	A_i	A_m	S_o	S_i	w_p	w_w	I	z_e	R_g	z_p
Nom dia	Schedule	Outside dia	Wall thick	Inside dia	Inside area	Metal area	Outside surf	Inside surf	Pipe wt.	Water wt.	Mom of inert	Elast sec mod	Rad of gyr	Plast sec mod
mm		mm	mm	mm	cm^2	cm^2	m^2/m	m^2/m	kg/m	kg/m	cm^4	cm^3	cm	cm^3
	—	355.6	7.137	341.326	915.018	78.131	1.1172	1.0723	61.169	91.502	11863.8	667.256	12.323	866.759
	20	355.6	7.925	339.75	906.588	86.561	1.1172	1.0674	67.769	90.659	13085.8	735.987	12.295	958.142
	—	355.6	8.738	338.124	897.931	95.218	1.1172	1.0623	74.546	89.793	14328.9	805.902	12.267	1051.541
	Std 30	355.6	9.525	336.55	889.590	103.559	1.1172	1.0573	81.076	88.959	15515.3	872.628	12.240	1141.100
	40	355.6	11.1	333.4	873.016	120.133	1.1172	1.0474	94.052	87.302	17840.1	1003.381	12.186	1317.833
	—	355.6	11.913	331.774	864.521	128.628	1.1172	1.0423	100.703	86.452	19014.7	1069.441	12.158	1407.764
	XS	355.6	12.7	330.2	856.338	136.811	1.1172	1.0374	107.110	85.634	20135.3	1132.469	12.132	1493.984
	60	355.6	15.062	325.476	832.011	161.138	1.1172	1.0225	126.155	83.201	23403.7	1316.294	12.052	1747.856
	—	355.6	15.875	323.85	823.718	169.431	1.1172	1.0174	132.647	82.372	24496.3	1377.743	12.024	1833.553
	80	355.6	19.05	317.5	791.732	201.417	1.1172	0.9975	157.689	79.173	28608.1	1609.006	11.918	2160.063
	100	355.6	23.8	308	745.062	248.087	1.1172	0.9676	194.228	74.506	34315.6	1930.010	11.761	2624.718
	120	355.6	27.762	300.076	707.218	285.931	1.1172	0.9427	223.855	70.722	38689.1	2175.988	11.632	2990.990
	140	355.6	31.75	292.1	670.122	323.027	1.1172	0.9177	252.898	67.012	42754.9	2404.665	11.505	3340.638
	160	355.6	35.712	284.176	634.258	358.891	1.1172	0.8928	280.976	63.426	46477.6	2614.039	11.380	3669.605
400	5S	406.4	4.191	398.018	1244.218	52.957	1.2767	1.2504	41.460	124.422	10709.7	527.051	14.221	678.025
	10S	406.4	4.775	396.85	1236.926	60.248	1.2767	1.2467	47.168	123.693	12149.4	597.902	14.201	770.272
	10	406.4	6.35	393.7	1217.368	79.807	1.2767	1.2368	62.481	121.737	15969.2	785.885	14.146	1016.360
	20	406.4	7.925	390.55	1197.965	99.209	1.2767	1.2270	77.671	119.797	19698.4	969.409	14.091	1258.541
	Std 30	406.4	9.525	387.35	1178.414	118.760	1.2767	1.2169	92.977	117.841	23395.5	1151.355	14.036	1500.599
	XS 40	406.4	12.7	381	1140.094	157.080	1.2767	1.1969	122.978	114.009	30465.5	1499.286	13.927	1969.218
	60	406.4	16.662	373.076	1093.165	204.010	1.2767	1.1721	159.719	109.316	38805.6	1909.727	13.792	2532.479
	80	406.4	21.4412	363.5176	1037.867	259.307	1.2767	1.1420	203.012	103.787	48183.0	2371.209	13.631	3180.791
	100	406.4	26.187	354.026	984.376	312.798	1.2767	1.1122	244.889	98.438	56790.9	2794.826	13.474	3791.705
	120	406.4	30.937	344.526	932.255	364.919	1.2767	1.0824	285.695	93.226	64740.3	3186.038	13.320	4371.222
	140	406.4	36.5	333.4	873.016	424.158	1.2767	1.0474	332.074	87.302	73250.5	3604.847	13.141	5010.459
	160	406.4	40.462	325.476	832.011	465.164	1.2767	1.0225	364.177	83.201	78814.1	3878.645	13.017	5440.481
450	5S	457.2	4.191	448.818	1582.091	59.645	1.4363	1.4100	46.696	158.209	15301.4	669.354	16.017	860.107
	10S	457.2	4.775	447.65	1573.867	67.869	1.4363	1.4063	53.135	157.387	17366.7	759.699	15.997	977.443
	10	457.2	6.35	444.5	1551.795	89.941	1.4363	1.3964	70.415	155.180	22856.6	999.853	15.942	1290.849
	20	457.2	7.925	441.35	1529.879	111.857	1.4363	1.3865	87.573	152.988	28231.1	1234.956	15.887	1599.844
	Std	457.2	9.525	438.15	1507.775	133.961	1.4363	1.3765	104.878	150.777	33574.3	1468.691	15.831	1909.259
	30	457.2	11.1	435	1486.173	155.563	1.4363	1.3666	121.790	148.617	38720.9	1693.826	15.777	2209.458
	XS	457.2	12.7	431.8	1464.388	177.348	1.4363	1.3565	138.846	146.439	43835.9	1917.581	15.722	2510.002
	40	457.2	14.275	428.65	1443.100	198.636	1.4363	1.3466	155.512	144.310	48761.2	2133.034	15.668	2801.532
	60	457.2	19.05	419.1	1379.514	262.222	1.4363	1.3166	205.294	137.951	63043.5	2757.807	15.506	3659.509
	80	457.2	23.8	409.6	1317.683	324.054	1.4363	1.2868	253.702	131.768	76314.6	3338.348	15.346	4475.070
	100	457.2	29.362	398.476	1247.083	394.653	1.4363	1.2519	308.974	124.708	90723.7	3968.667	15.162	5383.123
	120	457.2	34.925	387.35	1178.414	463.322	1.4363	1.2169	362.735	117.841	103977.6	4548.450	14.981	6242.017
	140	457.2	39.675	377.85	1121.320	520.416	1.4363	1.1871	407.434	112.132	114426.0	5005.513	14.828	6937.385
	160	457.2	45.237	366.726	1056.268	585.468	1.4363	1.1521	458.363	105.627	125698.5	5498.624	14.653	7708.342

TABLE E2.1M Principal Properties of Commercial Pipe (Metric Data) (*Continued*)

500	5S	508	4.775	498.45	1951.345	75.489	1.5959	1.5659	59.101	195.135	23897.7	940.853	17.792	1209.260
	10S	508	5.537	496.926	1939.431	87.404	1.5959	1.5611	68.428	193.943	27586.5	1086.081	17.766	1398.006
	10	508	6.35	495.3	1926.760	100.075	1.5959	1.5560	78.349	192.676	31484.9	1239.563	17.737	1598.112
	Std 20	508	9.525	488.95	1877.672	149.162	1.5959	1.5361	116.779	187.767	46345.8	1824.637	17.627	2367.082
	XS 30	508	12.7	482.6	1829.218	197.616	1.5959	1.5161	154.714	182.922	60638.8	2387.354	17.517	3116.336
	40	508	15.062	477.876	1793.582	233.252	1.5959	1.5013	182.613	179.358	70912.3	2791.821	17.436	3661.096
	60	508	20.625	466.75	1711.038	315.797	1.5959	1.4663	247.238	171.104	93932.8	3698.142	17.247	4902.169
	—	508	22.225	463.55	1687.657	339.178	1.5959	1.4563	265.543	168.766	100256.3	3947.100	17.193	5248.361
	80	508	26.187	455.626	1630.452	396.383	1.5959	1.4314	310.329	163.045	115360.9	4541.769	17.060	6085.257
	100	508	32.537	442.926	1540.825	486.010	1.5959	1.3915	380.497	154.082	137979.1	5432.247	16.849	7367.108
	120	508	38.1	431.8	1464.388	562.447	1.5959	1.3565	440.340	146.439	156258.5	6151.908	16.668	8431.313
	140	508	44.45	419.1	1379.514	647.320	1.5959	1.3166	506.787	137.951	175466.0	6908.112	16.464	9580.820
	160	508	49.987	408.026	1307.575	719.260	1.5959	1.2819	563.109	130.757	190848.8	7513.732	16.289	10527.913
550	5S	558.8	4.775	549.25	2369.360	83.110	1.7555	1.7255	65.067	236.936	31889.7	1141.363	19.588	1465.722
	10S	558.8	5.537	547.726	2356.230	96.240	1.7555	1.7207	75.347	235.623	36827.3	1318.084	19.562	1694.966
	10	558.8	6.35	546.1	2342.261	110.209	1.7555	1.7156	86.283	234.226	42050.0	1505.013	19.533	1938.150
	Std 20	558.8	9.525	539.75	2288.106	164.364	1.7555	1.6957	128.680	228.811	62004.3	2219.193	19.423	2874.067
	XS 30	558.8	12.7	533.4	2234.585	217.885	1.7555	1.6757	170.582	223.459	81266.5	2908.608	19.313	3788.219
	—	558.8	15.875	527.05	2181.697	270.772	1.7555	1.6558	211.988	218.170	99852.9	3573.835	19.204	4680.862
	—	558.8	19.05	520.7	2129.443	323.027	1.7555	1.6358	252.898	212.944	117779.6	4215.447	19.095	5552.253
	60	558.8	22.225	514.35	2077.822	374.648	1.7555	1.6159	293.312	207.782	135062.3	4834.011	18.987	6402.648
	80	558.8	28.575	501.65	1976.480	475.989	1.7555	1.5760	372.652	197.648	167757.8	6004.218	18.773	8041.472
	100	558.8	34.925	488.95	1877.672	574.798	1.7555	1.5361	450.009	187.767	198062.3	7088.844	18.563	9599.384
	120	558.8	41.275	476.25	1781.398	671.072	1.7555	1.4962	525.383	178.140	226095.2	8092.168	18.355	11078.432
	140	558.8	47.625	463.55	1687.657	764.813	1.7555	1.4563	598.773	168.766	251972.9	9018.356	18.151	12480.663
	160	558.8	53.975	450.85	1596.449	856.021	1.7555	1.4164	670.179	159.645	275808.8	9871.469	17.950	13808.127
600	10	609.6	6.35	596.9	2798.299	120.343	1.9151	1.8752	94.217	279.830	54748.3	1796.203	21.329	2310.964
	Std 20	609.6	9.525	590.55	2739.077	179.565	1.9151	1.8553	140.581	273.908	80843.9	2652.360	21.219	3430.214
	XS	609.6	12.7	584.2	2680.489	238.153	1.9151	1.8353	186.450	268.049	106111.3	3481.341	21.108	4525.651
	30	609.6	14.275	581.05	2651.660	266.981	1.9151	1.8254	209.020	265.166	118343.5	3882.662	21.054	5060.300
	—	609.6	15.875	577.85	2622.534	296.108	1.9151	1.8154	231.823	262.253	130568.0	4283.725	20.999	5597.532
	40	609.6	17.45	574.7	2594.020	324.622	1.9151	1.8055	254.147	259.402	142404.6	4672.068	20.945	6120.590
	—	609.6	19.05	571.5	2565.213	353.429	1.9151	1.7954	276.700	256.521	154231.5	5060.090	20.890	6646.112
	5S	609.6	5.537	598.526	2813.565	105.077	1.9151	1.8803	82.265	281.356	47930.7	1572.531	21.358	2020.505
	—	609.6	22.225	565.15	2508.525	410.117	1.9151	1.7755	321.081	250.852	177119.3	5811.002	20.782	7671.646
	60	609.6	24.587	560.426	2466.763	451.879	1.9151	1.7606	353.776	246.676	193653.4	6353.456	20.702	8419.783
	80	609.6	30.937	547.726	2356.230	562.412	1.9151	1.7207	440.313	235.623	236075.8	7745.267	20.488	10369.359
	100	609.6	38.887	531.826	2221.417	697.225	1.9151	1.6708	545.858	222.142	285184.5	9356.446	20.225	12685.870
	120	609.6	46.025	517.55	2103.757	814.885	1.9151	1.6259	637.974	210.376	325680.9	10685.069	19.992	14651.104

TABLE E2.1M Principal Properties of Commercial Pipe (Metric Data) (*Continued*)

d_n		D	t	d	A_i	A_m	S_o	S_i	w_p	w_w	I	z_e	R_g	z_p
Nom dia	Schedule	Outside dia	Wall thick	Inside dia	Inside area	Metal area	Outside surf	Inside surf	Pipe wt.	Water wt.	Mom of inert	Elast sec mod	Rad of gyr	Plast sec mod
mm		mm	mm	mm	cm^2	cm^2	m^2/m	m^2/m	kg/m	kg/m	cm^4	cm^3	cm	cm^3
	140	609.6	52.375	504.85	2001.777	916.865	1.9151	1.5860	717.814	200.178	358998.2	11778.156	19.788	16310.639
	160	609.6	59.512	490.576	1890.181	1028.460	1.9151	1.5412	805.182	189.018	393560.2	12912.079	19.562	18078.760
650	—	660.4	6.35	647.7	3294.873	130.477	2.0747	2.0348	102.151	329.487	69775.7	2113.133	23.125	2716.552
	10	660.4	7.925	644.55	3262.903	162.448	2.0747	2.0249	127.181	326.290	86459.2	2618.390	23.070	3374.093
	Std	660.4	9.525	641.35	3230.584	194.766	2.0747	2.0149	152.482	323.058	103159.0	3124.138	23.014	4035.523
	XS 20	660.4	12.7	635	3166.929	258.421	2.0747	1.9949	202.318	316.693	135565.4	4105.554	22.904	5328.634
	—	660.4	15.875	628.65	3103.907	321.443	2.0747	1.9750	251.658	310.391	167014.0	5057.965	22.794	6596.139
	—	660.4	19.05	622.3	3041.519	383.832	2.0747	1.9550	300.502	304.152	197523.9	5981.949	22.685	7838.294
	—	660.4	22.225	615.95	2979.764	445.587	2.0747	1.9351	348.850	297.976	227114.1	6878.076	22.577	9055.357
	—	660.4	25.4	609.6	2918.642	506.709	2.0747	1.9151	396.702	291.864	255803.0	7746.912	22.469	10247.582
	—	660.4	28.575	603.25	2858.154	567.197	2.0747	1.8952	444.059	285.815	283609.3	8589.017	22.361	11415.227
700	—	711.2	6.35	698.5	3831.984	140.612	2.2343	2.1944	110.085	383.198	87328.4	2455.805	24.921	3154.914
	10	711.2	7.925	695.35	3797.500	175.096	2.2343	2.1845	137.082	379.750	108264.6	3044.561	24.866	3919.915
	Std	711.2	9.525	692.15	3762.629	209.967	2.2343	2.1745	164.384	376.263	129243.7	3634.526	24.810	4689.995
	XS 20	711.2	12.7	685.8	3693.906	278.690	2.2343	2.1545	218.186	369.391	170021.2	4781.247	24.700	6197.165
	30	711.2	15.875	679.45	3625.817	346.779	2.2343	2.1346	271.493	362.582	209681.5	5896.554	24.590	7676.682
	—	711.2	19.05	673.1	3558.362	414.234	2.2343	2.1146	324.304	355.836	248245.3	6981.026	24.480	9128.801
	—	711.2	22.225	666.75	3491.539	481.057	2.2343	2.0947	376.619	349.154	285732.9	8035.235	24.372	10553.779
	—	711.2	25.4	660.4	3425.351	547.245	2.2343	2.0747	428.439	342.535	322164.7	9059.750	24.263	11951.871
		711.2	28.575	654.05	3359.795	612.801	2.2343	2.0548	479.762	335.980	357560.6	10055.134	24.156	13323.334
750	5S	762	6.35	749.3	4409.632	150.746	2.3939	2.3540	118.019	440.963	107602.6	2824.216	26.717	3626.052
	10	762	7.925	746.15	4372.635	187.743	2.3939	2.3441	146.984	437.263	133458.8	3502.857	26.662	4506.642
	Std	762	9.525	742.95	4335.209	225.169	2.3939	2.3341	176.285	433.521	159392.3	4183.524	26.606	5393.628
	XS 20	762	12.7	736.6	4261.420	298.958	2.3939	2.3141	234.054	426.142	209870.9	5508.421	26.496	7131.247
	30	762	15.875	730.25	4188.264	372.114	2.3939	2.2942	291.328	418.826	259060.7	6799.494	26.385	8839.163
	40	762	19.05	723.9	4115.741	444.637	2.3939	2.2742	348.106	411.574	306983.9	8057.321	26.276	10517.633
	—	762	22.225	717.55	4043.852	516.526	2.3939	2.2543	404.389	404.385	353662.5	9282.480	26.167	12166.913
	—	762	25.4	711.2	3972.596	587.782	2.3939	2.2343	460.175	397.260	399118.1	10475.541	26.058	13787.259
	—	762	28.575	704.85	3901.973	658.405	2.3939	2.2144	515.465	390.197	443372.3	11637.069	25.950	15378.927
800	—	812.8	6.35	800.1	5027.817	160.880	2.5535	2.5136	125.953	502.782	130794.5	3218.368	28.513	4129.964
	10	812.8	7.925	796.95	4988.306	200.391	2.5535	2.5037	156.886	498.831	162286.8	3993.277	28.458	5134.272
	Std	812.8	9.525	793.75	4948.327	240.370	2.5535	2.4936	188.186	494.833	193898.9	4771.134	28.402	6146.424
	XS 20	812.8	12.7	787.4	4869.470	319.226	2.5535	2.4737	249.923	486.947	255506.8	6287.076	28.291	8130.878
	30	812.8	15.875	781.05	4791.247	397.450	2.5535	2.4537	311.163	479.125	315642.1	7766.783	28.181	10083.580
	40	812.8	17.475	777.85	4752.068	436.629	2.5535	2.4437	341.837	475.207	345395.9	8498.915	28.126	11055.669
	—	812.8	19.05	774.7	4713.657	475.039	2.5535	2.4338	371.909	471.366	374328.4	9210.836	28.071	12004.789
	—	812.8	22.225	768.35	4636.701	551.996	2.5535	2.4138	432.158	463.670	431589.2	10619.813	27.962	13894.759
	—	812.8	25.4	762	4560.378	628.319	2.5535	2.3939	491.911	456.038	487447.8	11994.286	27.853	15753.746
	—	812.8	28.575	755.65	4484.688	704.008	2.5535	2.3740	551.168	448.469	541927.2	13334.824	27.745	17582.007
850	—	863.6	6.35	850.9	5686.538	171.014	2.7131	2.6732	133.887	568.654	157100.1	3638.261	30.309	4666.651
	10	863.6	7.925	847.75	5644.513	213.039	2.7131	2.6633	166.788	564.451	194993.2	4515.823	30.254	5802.806

TABLE E2.1M Principal Properties of Commercial Pipe (Metric Data) (*Continued*)

d_n		D	t	d	A_i	A_m	S_o	S_i	w_p	w_w	I	z_e	R_g	z_p
Nom dia	Schedule	Outside dia	Wall thick	Inside dia	Inside area	Metal area	Outside surf	Inside surf	Pipe wt.	Water wt.	Mom of inert	Elast sec mod	Rad of gyr	Plast sec mod
mm		mm	mm	mm	cm^2	cm^2	m^2/m	m^2/m	kg/m	kg/m	cm^4	cm^3	cm	cm^3
	Std	863.6	9.525	844.55	5601.981	255.571	2.7131	2.6532	200.087	560.198	233057.7	5397.354	30.198	6948.382
	XS 20	863.6	12.7	838.2	5518.057	339.495	2.7131	2.6333	265.791	551.806	307321.2	7117.211	30.087	9196.058
	30	863.6	15.875	831.85	5434.767	422.785	2.7131	2.6133	330.999	543.477	379915.9	8798.423	29.977	11409.935
	40	863.6	17.475	828.65	5393.034	464.518	2.7131	2.6033	363.671	539.303	415874.7	9631.187	29.921	12512.862
	—	863.6	19.05	825.5	5352.110	505.442	2.7131	2.5934	395.711	535.211	450867.0	10441.571	29.867	13590.269
	—	863.6	22.225	819.15	5270.087	587.465	2.7131	2.5734	459.927	527.009	520199.6	12047.234	29.757	15737.316
	—	863.6	25.4	812.8	5188.697	668.855	2.7131	2.5535	523.647	518.870	587938.3	13615.987	29.648	17851.332
	—	863.6	28.575	806.45	5107.940	749.612	2.7131	2.5335	586.872	510.794	654108.0	15148.401	29.540	19932.573
900	—	914.4	6.35	901.7	6385.796	181.148	2.8727	2.8328	141.821	638.580	186715.7	4083.894	32.105	5236.113
	10	914.4	7.925	898.55	6341.258	225.687	2.8727	2.8229	176.690	634.126	231823.0	5070.493	32.050	6512.244
	Std	914.4	9.525	895.35	6296.172	270.772	2.8727	2.8128	211.988	629.617	277163.1	6062.184	31.994	7799.502
	XS 20	914.4	12.7	889	6207.181	359.763	2.8727	2.7929	281.659	620.718	365706.4	7998.827	31.883	10326.788
	30	914.4	15.875	882.65	6118.824	448.120	2.8727	2.7729	350.834	611.882	452372.6	9894.413	31.773	12818.226
	40	914.4	19.05	876.3	6031.100	535.844	2.8727	2.7530	419.513	603.110	537188.3	11749.525	31.663	15274.073
	—	914.4	22.225	869.95	5944.009	622.935	2.8727	2.7330	487.696	594.401	620180.1	13564.744	31.553	17694.585
	—	914.4	25.4	863.6	5857.552	709.392	2.8727	2.7131	555.383	585.755	701374.3	15340.646	31.444	20080.017
	—	914.4	28.575	857.25	5771.728	795.216	2.8727	2.6931	622.575	577.173	780797.1	17077.802	31.335	22430.627
1050	—	1066.8	6.35	1054.1	8726.790	211.551	3.3515	3.3116	165.623	872.679	297383.2	5575.237	37.493	7141.147
	Std	1066.8	9.525	1047.75	8621.965	316.376	3.3515	3.2916	247.691	862.196	442100.1	8288.341	37.382	10647.836
	XS 20	1066.8	12.7	1041.4	8517.773	420.568	3.3515	3.2717	329.263	851.777	584209.6	10952.561	37.271	14112.276
	30	1066.8	15.875	1035.05	8414.214	524.127	3.3515	3.2517	410.339	841.421	723743.2	13568.488	37.160	17534.723
	40	1066.8	19.05	1028.7	8311.289	627.052	3.3515	3.2318	490.919	831.129	860732.1	16136.710	37.050	20915.433
	—	1066.8	25.4	1016	8107.339	831.002	3.3515	3.1919	650.592	810.734	1127201	21132.369	36.830	27552.668
	—	1066.8	31.75	1003.3	7905.922	1032.419	3.3515	3.1520	808.281	790.592	1383862	25944.162	36.612	34026.029
	—	1066.8	38.1	990.6	7707.039	1231.302	3.3515	3.1121	963.987	770.704	1630959	30576.656	36.395	40337.565