21. Product Marking

21.1 Except as allowed by 21.5 and 21.6, each length of pipe shall be legibly marked in the following sequence to show:

21.1.1 Manufacturer's name or mark,

21.1.2 Specification number (year-date not required),

NOTE 8—Pipe that complies with multiple compatible specifications may be marked with the appropriate designation for each specification.

21.1.3 Size (NPS and weight class, schedule number, or specified wall thickness; or specified outside diameter and specified wall thickness),

21.1.4 Grade (A or B),

21.1.5 Type of pipe (F, E, or S),

21.1.6 Test pressure, seamless pipe only (if applicable, in accordance with Table 4),

21.1.7 Nondestructive electric test, seamless pipe only (if applicable, in accordance with Table 4),

21.2 Unless another marking format is specified in the purchase order, length shall be marked in feet and tenths of a foot, or metres to two decimal places, dependent upon the units to which the pipe was ordered. The location of such marking shall be at the option of the manufacturer.

21.3 Heat number, lot number, run number, or a combination thereof shall be marked at the option of the manufacturer, unless specific marking is specified in the purchase order. The location of such marking shall be at the option of the manufacturer.

21.4 Any additional information desired by the manufacturer or specified in the purchase order.

21.5 For pipe NPS 1½ [DN 40] and smaller that is bundled, it shall be permissible to mark the required information on a tag securely attached to each bundle.

21.6 If pipe sections are cut into shorter lengths by a processor for resale as pipe, the processor shall transfer the complete identification, including the name or brand of the manufacturer, to each unmarked cut length, or to metal tags securely attached to unmarked pipe bundled in accordance with the requirements of 21.5. The same material designation shall be included with the information transferred, and the processor's name, trademark, or brand shall be added.

TABLE 4 Marking of Seamless Pipe

Hydro	NDE	Marking
Yes	No	Test pressure
No	Yes	NDE
Yes	Yes	Test Pressure/NDE

21.7 *Bar Coding*—In addition to the requirements in 21.1, 21.5, and 21.6, bar coding is acceptable as a supplementary identification method. It is recommended that bar coding be consistent with the Automotive Industry Action Group (AIAG) standard prepared by the Primary Metals Subcommittee of the AIAG Bar Code Project Team.

22. Government Procurement

22.1 If specified in the contract, the pipe shall be preserved, packaged, and packed in accordance with the requirements of MIL-STD-163. The applicable levels shall be as specified in the contract. Marking for shipment of such pipe shall be in accordance with Fed. Std. No. 123 for civil agencies and MIL-STD-129 or Federal Std. No. 183 if continuous marking is required, for military agencies.

22.2 *Inspection*—Unless otherwise specified in the contract, the manufacturer is responsible for the performance of all inspection and test requirements specified herein. Except as otherwise specified in the contract, the manufacturer shall use its own or any other suitable facilities for performing the inspection and test requirements specified herein, unless otherwise disapproved by the purchaser in the contract or purchase order. The purchaser shall have the right to perform any of the inspections and tests set forth in this specification where deemed necessary to ensure that the pipe conforms to the specified requirements.

23. Packaging and Package Marking

23.1 If specified in the purchase order, packaging, marking, and loading for shipment shall be in accordance with those procedures recommended by Practices A 700.

24. Keywords

24.1 black steel pipe; seamless steel pipe; steel pipe; welded steel pipe; zinc coated steel pipe

SUPPLEMENTARY REQUIREMENTS

The following supplementary requirements shall apply only when specified in the purchase order. The purchaser may specify a different frequency of test than is provided in the supplementary requirement. Subject to agreement between the purchaser and manufacturer, retest and retreatment provisions of these supplementary requirements may also be modified.

S1. Flattening Test, Seamless Pipe

S1.1 A test specimen at least 2½ in. [60 mm] in length shall be flattened cold between parallel plates in two steps. During the first step, which is a test for ductility, except as allowed by S1.3, S1.4, and S1.5, no cracks or breaks on the inside, outside, or end surfaces shall be present before the distance between the plates is less than the value of H calculated as follows:

$$H = (1 + e)t/(e + t/D)$$

where:

H = distance between flattening plates, in. [mm],
e = deformation per unit length (constant for a given grade of steel, 0.09 for Grade A, and 0.07 for Grade B),
t = specified wall thickness, in. [mm], and
D = specified outside diameter, in. [mm]

The H values have been calculated for standard-weight and extra-heavy weight pipe from NPS 2½ to NPS 24 [DN 65 to DN 600], inclusive, and are given in Table X2.1.

S1.2 During the second step, which is a test for soundness, the flattening shall be continued until the test specimen breaks or the opposite sides of the test specimen meet. Evidence of laminated or unsound material that is revealed during the entire flattening test shall be cause for rejection.

S1.3 Surface imperfections in the test specimen before flattening, but revealed during the first step of the flattening test, shall be judged in accordance with the finish requirements in Section 12.

S1.4 Superficial ruptures as a result of surface imperfections shall not be cause for rejection.

S1.5 For pipe with a D-to-t ratio less than 10, because the strain imposed due to geometry is unreasonably high on the inside surface at the 6 and 12 o'clock locations, cracks at such locations shall not be cause for rejection.

S1.6 One test shall be made on test specimens taken from one length of pipe from each lot of each pipe size. A lot shall contain no more than one heat, and at the option of the manufacturer shall contain no more than 500 lengths of pipe (as initially cut after the final pipe-forming operation, prior to any further cutting to the required ordered lengths) or 50 tons [45 Mg] of pipe.

S1.7 If the results of a test for a lot fail to conform to the applicable requirements, the lot shall be rejected unless tests of additional pipe from the affected lot of double the number originally tested are subsequently made and each such test conforms to the specified requirements. Only one retest of any lot will be permitted. Any individual length of pipe that conforms to the test requirements is acceptable. Any individual length of pipe that does not conform to the test requirements may be resubmitted for test and will be considered acceptable if tests taken from each pipe end conform to the specified requirements.

APPENDIXES

(Nonmandatory Information)

X1. DEFINITIONS OF TYPES OF PIPE

X1.1 *Type F, Furnace-Butt-Welded Pipe, Continuous-Welded Pipe*—Pipe produced in multiple lengths from coiled skelp and subsequently cut into individual lengths, having its longitudinal butt joint forge welded by the mechanical pressure developed in rolling the hot-formed skelp through a set of round pass welding rolls.

X1.2 *Type E, Electric-Resistance-Welded Pipe*—Pipe produced in single lengths, or in multiple lengths from coiled skelp and subsequently cut into individual lengths, having a longitudinal butt joint wherein coalescence is produced by the heat obtained from resistance of the pipe to the flow of electric current in a circuit of which the pipe is a part, and by the application of pressure.

X1.3 *Type S, Seamless Pipe*—Pipe made without a welded seam. It is manufactured by hot working steel and, if necessary, by subsequently cold finishing the hot-worked tubular product to produce the desired shape, dimensions, and properties.

X2. TABLES FOR DIMENSIONAL AND CERTAIN MECHANICAL REQUIREMENTS

X2.1 Tables X2.1-X2.4 address dimensional and certain mechanical requirements.

TABLE X2.1 Calculated *H* Values for Seamless Pipe

NPS Designator	DN Designator	Specified Outside Diameter, in. [mm]	Specified Wall Thickness, in. [mm]	Distance, in. [mm], Between Plates "*H*" by Formula: $H = (1 + e)t/(e + t/D)$	
				Grade A	Grade B
2½	65	2.875 [73.0]	0.203 [5.16]	1.378 [35.0]	1.545 [39.2]
			0.276 [7.01]	1.618 [41.1]	1.779 [45.2]
3	80	3.500 [88.9]	0.216 [5.49]	1.552 [39.4]	1.755 [44.6]
			0.300 [7.62]	1.861 [47.3]	2.062 [52.4]
3½	90	4.000 [101.6]	0.226 [5.74]	1.682 [42.7]	1.912 [48.6]
			0.318 [8.08]	2.045 [51.9]	2.276 [57.8]
4	100	4.500 [114.3]	0.237 [6.02]	1.811 [46.0]	2.067 [52.5]
			0.337 [8.56]	2.228 [56.6]	2.489 [63.2]
5	125	5.563 [141.3]	0.258 [6.55]	2.062 [52.4]	2.372 [60.2]
			0.375 [9.52]	2.597 [66.0]	2.920 [74.2]
6	150	6.625 [168.3]	0.280 [7.11]	2.308 [58.6]	2.669 [67.8]
			0.432 [10.97]	3.034 [77.1]	3.419 [86.8]
8	200	8.625 [219.1]	0.277 [7.04]	2.473 [62.8]	2.902 [73.7]
			0.322 [8.18]	2.757 [70.0]	3.210 [81.5]
			0.500 [12.70]	3.683 [93.5]	4.181 [106.2]
10	250	10.750 [273.0]	0.279 [7.09][A]	2.623 [66.6]	3.111 [79.0]
			0.307 [7.80]	2.823 [71.7]	3.333 [84.7]
			0.365 [9.27]	3.210 [81.5]	3.757 [95.4]
			0.500 [12.70]	3.993 [101.4]	4.592 [116.6]
12	300	12.750 [323.8]	0.300 [7.62]	3.105 [78.9]	3.683 [93.5]
			0.375 [9.52]	3.423 [86.9]	4.037 [102.5]
			0.500 [12.70]	4.218 [107.1]	4.899 [124.4]
14	350	14.000 [355.6]	0.375 [9.52]	3.500 [88.9]	4.146 [105.3]
			0.500 [12.70]	4.336 [110.1]	5.061 [128.5]
16	400	16.000 [406.4]	0.375 [9.52]	3.603 [91.5]	4.294 [109.1]
			0.500 [12.70]	4.494 [114.1]	5.284 [134.2]
18	450	18.000 [457]	0.375 [9.52]	3.688 [93.7]	4.417 [112.2]
			0.500 [12.70]	4.628 [117.6]	5.472 [139.0]
20	500	20.000 [508]	0.375 [9.52]	3.758 [95.5]	4.521 [114.8]
			0.500 [12.70]	4.740 [120.4]	5.632 [143.1]
24	600	24.000 [610]	0.375 [9.52]	3.869 [98.3]	4.686 [119.0]
			0.500 [12.70]	4.918 [124.9]	5.890 [149.6]

[A] Special order only.

TABLE X2.2 Dimensions, Weights (Masses) per Unit Length, and Test Pressures for Plain-End Pipe

NPS Designator	DN Designator	Specified Outside Diameter, in. [mm]	Specified Wall Thickness, in. [mm]	Nominal Weight (Mass) per Unit Length, Plain End, lb/ft [kg/m]	Weight Class	Schedule No.	Test Pressure,[A] psi [kPa]	
							Grade A	Grade B
⅛	6	0.405 [10.3]	0.068 [1.73]	0.24 [0.37]	STD	40	700 [4800]	700 [4800]
			0.095 [2.41]	0.31 [0.47]	XS	80	850 [5900]	850 [5900]
¼	8	0.540 [13.7]	0.088 [2.24]	0.43 [0.63]	STD	40	700 [4800]	700 [4800]
			0.119 [3.02]	0.54 [0.80]	XS	80	850 [5900]	850 [5900]
⅜	10	0.675 [17.1]	0.091 [2.31]	0.57 [0.84]	STD	40	700 [4800]	700 [4800]
			0.126 [3.20]	0.74 [1.10]	XS	80	850 [5900]	850 [5900]
½	15	0.840 [21.3]	0.109 [2.77]	0.85 [1.27]	STD	40	700 [4800]	700 [4800]
			0.147 [3.73]	1.09 [1.62]	XS	80	850 [5900]	850 [5900]
			0.188 [4.78]	1.31 [1.95]	...	160	900 [6200]	900 [6200]
			0.294 [7.47]	1.72 [2.55]	XXS	...	1000 [6900]	1000 [6900]
¾	20	1.050 [26.7]	0.113 [2.87]	1.13 [1.69]	STD	40	700 [4800]	700 [4800]
			0.154 [3.91]	1.48 [2.20]	XS	80	850 [5900]	850 [5900]
			0.219 [5.56]	1.95 [2.90]	...	160	950 [6500]	950 [6500]
			0.308 [7.82]	2.44 [3.64]	XXS	...	1000 [6900]	1000 [6900]
1	25	1.315 [33.4]	0.133 [3.38]	1.68 [2.50]	STD	40	700 [4800]	700 [4800]
			0.179 [4.55]	2.17 [3.24]	XS	80	850 [5900]	850 [5900]
			0.250 [6.35]	2.85 [4.24]	...	160	950 [6500]	950 [6500]
			0.358 [9.09]	3.66 [5.45]	XXS	...	1000 [6900]	1000 [6900]
1¼	32	1.660 [42.2]	0.140 [3.56]	2.27 [3.39]	STD	40	1200 [8300]	1300 [9000]
			0.191 [4.85]	3.00 [4.47]	XS	80	1800 [12 400]	1900 [13 100]
			0.250 [6.35]	3.77 [5.61]	...	160	1900 [13 100]	2000 [13 800]
			0.382 [9.70]	5.22 [7.77]	XXS	...	2200 [15 200]	2300 [15 900]
1½	40	1.900 [48.3]	0.145 [3.68]	2.72 [4.05]	STD	40	1200 [8300]	1300 [9000]
			0.200 [5.08]	3.63 [5.41]	XS	80	1800 [12 400]	1900 [13 100]
			0.281 [7.14]	4.86 [7.25]	...	160	1950 [13 400]	2050 [14 100]
			0.400 [10.16]	6.41 [9.56]	XXS	...	2200 [15 200]	2300 [15 900]
2	50	2.375 [60.3]	0.154 [3.91]	3.66 [5.44]	STD	40	2300 [15 900]	2500 [17 200]
			0.218 [5.54]	5.03 [7.48]	XS	80	2500 [17 200]	2500 [17 200]
			0.344 [8.74]	7.47 [11.11]	...	160	2500 [17 200]	2500 [17 200]
			0.436 [11.07]	9.04 [13.44]	XXS	...	2500 [17 200]	2500 [17 200]
2½	65	2.875 [73.0]	0.203 [5.16]	5.80 [8.63]	STD	40	2500 [17 200]	2500 [17 200]
			0.276 [7.01]	7.67 [11.41]	XS	80	2500 [17 200]	2500 [17 200]
			0.375 [9.52]	10.02 [14.90]	...	160	2500 [17 200]	2500 [17 200]
			0.552 [14.02]	13.71 [20.39]	XXS	...	2500 [17 200]	2500 [17 200]
3	80	3.500 [88.9]	0.125 [3.18]	4.51 [6.72]	...	...	1290 [8900]	1500 [1000]
			0.156 [3.96]	5.58 [8.29]	...	...	1600 [11 000]	1870 [12 900]
			0.188 [4.78]	6.66 [9.92]	...	...	1930 [13 330]	2260 [15 600]
			0.216 [5.49]	7.58 [11.29]	STD	40	2220 [15 300]	2500 [17 200]
			0.250 [6.35]	8.69 [12.93]	...	...	2500 [17 200]	2500 [17 200]
			0.281 [7.14]	9.67 [14.40]	...	...	2500 [17 200]	2500 [17 200]
			0.300 [7.62]	10.26 [15.27]	XS	80	2500 [17 200]	2500 [17 200]
			0.438 [11.13]	14.34 [21.35]	...	160	2500 [17 200]	2500 [17 200]
			0.600 [15.24]	18.60 [27.68]	XXS	...	2500 [17 200]	2500 [17 200]
3½	90	4.000 [101.6]	0.125 [3.18]	5.18 [7.72]	...	...	1120 [7700]	1310 [19 000]
			0.156 [3.96]	6.41 [9.53]	...	...	1400 [6700]	1640 [11 300]
			0.188 [4.78]	7.66 [11.41]	...	...	1690 [11 700]	1970 [13 600]
			0.226 [5.74]	9.12 [13.57]	STD	40	2030 [14 000]	2370 [16 300]
			0.250 [6.35]	10.02 [14.92]	...	...	2250 [15 500]	2500 [17 200]
			0.281 [7.14]	11.17 [16.63]	...	...	2500 [17 200]	2500 [17 200]
			0.318 [8.08]	12.52 [18.63]	XS	80	2800 [19 300]	2800 [19 300]
4	100	4.500 [114.3]	0.125 [3.18]	5.85 [8.71]	...	...	1000 [6900]	1170 [8100]
			0.156 [3.96]	7.24 [10.78]	...	...	1250 [8600]	1460 [10 100]
			0.188 [4.78]	8.67 [12.91]	...	...	1500 [10 300]	1750 [12 100]
			0.219 [5.56]	10.02 [14.91]	...	...	1750 [12 100]	2040 [14 100]
			0.237 [6.02]	10.80 [16.07]	STD	40	1900 [13 100]	2210 [15 200]
			0.250 [6.35]	11.36 [16.90]	...	...	2000 [13 800]	2330 [16 100]
			0.281 [7.14]	12.67 [18.87]	...	...	2250 [15 100]	2620 [18 100]

TABLE X2.2 *Continued*

NPS Designator	DN Designator	Specified Outside Diameter, in. [mm]	Specified Wall Thickness, in. [mm]	Nominal Weight (Mass) per Unit Length, Plain End, lb/ft [kg/m]	Weight Class	Schedule No.	Test Pressure,[A] psi [kPa]	
							Grade A	Grade B
			0.312 [7.92]	13.97 [20.78]	...	...	2500 [17 200]	2800 [19 300]
			0.337 [8.56]	15.00 [22.32]	XS	80	2700 [18 600]	2800 [19 300]
			0.438 [11.13]	19.02 [28.32]	...	120	2800 [19 300]	2800 [19 300]
			0.531 [13.49]	22.53 [33.54]	...	160	2800 [19 300]	2800 [19 300]
			0.674 [17.12]	27.57 [41.03]	XXS	...	2800 [19 300]	2800 [19 300]
5	125	5.563 [141.3]	0.156 [3.96]	9.02 [13.41]	...	...	1010 [7000]	1180 [8100]
			0.188 [4.78]	10.80 [16.09]	...	...	1220 [8400]	1420 [9800]
			0.219 [5.56]	12.51 [18.61]	...	...	1420 [9800]	1650 [11 400]
			0.258 [6.55]	14.63 [21.77]	STD	40	1670 [11 500]	1950 [13 400]
			0.281 [7.14]	15.87 [23.62]	...	...	1820 [12 500]	2120 [14 600]
			0.312 [7.92]	17.51 [26.05]	...	...	2020 [13 900]	2360 [16 300]
			0.344 [8.74]	19.19 [28.57]	...	...	2230 [15 400]	2600 [17 900]
			0.375 [9.52]	20.80 [30.94]	XS	80	2430 [16 800]	2800 [19 300]
			0.500 [12.70]	27.06 [40.28]	...	120	2800 [19 300]	2800 [19 300]
			0.625 [15.88]	32.99 [49.11]	...	160	2800 [19 300]	2800 [19 300]
			0.750 [19.05]	38.59 [57.43]	XXS	...	2800 [19 300]	2800 [19 300]
6	150	6.625 [168.3]	0.188 [4.78]	12.94 [19.27]	...	...	1020 [7000]	1190 [8200]
			0.219 [5.56]	15.00 [22.31]	...	...	1190 [8200]	1390 [9600]
			0.250 [6.35]	17.04 [25.36]	...	...	1360 [9400]	1580 [10 900]
			0.280 [7.11]	18.99 [28.26]	STD	40	1520 [10 500]	1780 [12 300]
			0.312 [7.92]	21.06 [31.32]	...	...	1700 [11 700]	1980 [13 700]
			0.344 [8.74]	23.10 [34.39]	...	...	1870 [12 900]	2180 [15 000]
			0.375 [9.52]	25.05 [37.28]	...	...	2040 [14 100]	2380 [16 400]
			0.432 [10.97]	28.60 [42.56]	XS	80	2350 [16 200]	2740 [18 900]
			0.562 [14.27]	36.43 [54.20]	...	120	2800 [19 300]	2800 [19 300]
			0.719 [18.26]	45.39 [67.56]	...	160	2800 [19 300]	2800 [19 300]
			0.864 [21.95]	53.21 [79.22]	XXS	...	2800 [19 300]	2800 [19 300]
8	200	8.625 [219.1]	0.188 [4.78]	16.96 [25.26]	...	...	780 [5400]	920 [6300]
			0.203 [5.16]	18.28 [27.22]	...	...	850 [5900]	1000 [6900]
			0.219 [5.56]	19.68 [29.28]	...	...	910 [6300]	1070 [7400]
			0.250 [6.35]	22.38 [33.31]	...	20	1040 [7200]	1220 [8400]
			0.277 [7.04]	24.72 [36.31]	...	30	1160 [7800]	1350 [9300]
			0.312 [7.92]	27.73 [41.24]	...	...	1300 [9000]	1520 [10 500]
			0.322 [8.18]	28.58 [42.55]	STD	40	1340 [9200]	1570 [10 800]
			0.344 [8.74]	30.45 [45.34]	...	...	1440 [9900]	1680 [11 600]
			0.375 [9.52]	33.07 [49.20]	...	...	1570 [10 800]	1830 [12 600]
			0.406 [10.31]	35.67 [53.08]	...	60	1700 [11 700]	2000 [13 800]
			0.438 [11.13]	38.33 [57.08]	...	...	1830 [12 600]	2130 [14 700]
			0.500 [12.70]	43.43 [64.64]	XS	80	2090 [14 400]	2430 [16 800]
			0.594 [15.09]	51.00 [75.92]	...	100	2500 [17 200]	2800 [19 300]
			0.719 [18.26]	60.77 [90.44]	...	120	2800 [19 300]	2800 [19 300]
			0.812 [20.62]	67.82 [100.92]	...	140	2800 [19 300]	2800 [19 300]
			0.875 [22.22]	72.49 [107.88]	XXS	...	2800 [19 300]	2800 [19 300]
			0.906 [23.01]	74.76 [111.27]	...	160	2800 [19 300]	2800 [19 300]
10	250	10.750 [273.0]	0.188 [4.78]	21.23 [31.62]	...	...	630 [4300]	730 [5000]
			0.203 [5.16]	22.89 [34.08]	...	...	680 [4700]	800 [5500]
			0.219 [5.56]	24.65 [36.67]	...	...	730 [5000]	860 [5900]
			0.250 [6.35]	28.06 [41.75]	...	20	840 [5800]	980 [6800]
			0.279 [7.09]	31.23 [46.49]	...	...	930 [6400]	1090 [7500]
			0.307 [7.80]	34.27 [51.01]	...	30	1030 [7100]	1200 [8300]
			0.344 [8.74]	38.27 [56.96]	...	...	1150 [7900]	1340 [9200]
			0.365 [9.27]	40.52 [60.29]	STD	40	1220 [8400]	1430 [9900]
			0.438 [11.13]	48.28 [71.87]	...	...	1470 [10 100]	1710 [11 800]
			0.500 [12.70]	54.79 [81.52]	XS	60	1670 [11 500]	1950 [13 400]
			0.594 [15.09]	64.49 [95.97]	...	80	1990 [13 700]	2320 [16 000]
			0.719 [18.26]	77.10 [114.70]	...	100	2410 [16 600]	2800 [19 300]
			0.844 [21.44]	89.38 [133.00]	...	120	2800 [19 300]	2800 [19 300]
			1.000 [25.40]	104.23 [155.09]	XXS	140	2800 [19 300]	2800 [19 300]
			1.125 [28.57]	115.75 [172.21]	...	160	2800 [19 300]	2800 [19 300]
12	300	12.750 [323.8]	0.203 [5.16]	27.23 [40.55]	...	...	570 [3900]	670 [4600]
			0.219 [5.56]	29.34 [43.63]	...	...	620 [4300]	720 [5000]
			0.250 [6.35]	33.41 [49.71]	...	20	710 [4900]	820 [5700]
			0.281 [7.14]	37.46 [55.75]	...	...	790 [5400]	930 [6400]
			0.312 [7.92]	41.48 [61.69]	...	...	880 [6100]	1030 [7100]
			0.330 [8.38]	43.81 [65.18]	...	30	930 [6400]	1090 [7500]

TABLE X2.2 *Continued*

NPS Designator	DN Designator	Specified Outside Diameter, in. [mm]	Specified Wall Thickness, in. [mm]	Nominal Weight (Mass) per Unit Length, Plain End, lb/ft [kg/m]	Weight Class	Schedule No.	Test Pressure,[A] psi [kPa]	
							Grade A	Grade B
			0.344 [8.74]	45.62 [67.90]	...	...	970 [6700]	1130 [7800]
			0.375 [9.52]	49.61 [73.78]	STD	...	1060 [7300]	1240 [8500]
			0.406 [10.31]	53.57 [79.70]	...	40	1150 [7900]	1340 [9200]
			0.438 [11.13]	57.65 [85.82]	...	...	1240 [8500]	1440 [9900]
			0.500 [12.70]	65.48 [97.43]	XS	...	1410 [9700]	1650 [11 400]
			0.562 [14.27]	73.22 [108.92]	...	60	1590 [11 000]	1850 [12 800]
			0.688 [17.48]	88.71 [132.04]	...	80	1940 [13 400]	2270 [15 700]
			0.844 [21.44]	107.42 [159.86]	...	100	2390 [16 500]	2780 [19 200]
			1.000 [25.40]	125.61 [186.91]	XXS	120	2800 [19 300]	2800 [19 300]
			1.125 [28.57]	139.81 [208.00]	...	140	2800 [19 300]	2800 [19 300]
			1.312 [33.32]	160.42 [238.68]	...	160	2800 [19 300]	2800 [19 300]
14	350	14.000 [355.6]	0.210 [5.33]	30.96 [46.04]	...	...	540 [3700]	630 [4300]
			0.219 [5.56]	32.26 [47.99]	...	...	560 [3900]	660 [4500]
			0.250 [6.35]	36.75 [54.69]	...	10	640 [4400]	750 [5200]
			0.281 [7.14]	41.21 [61.35]	...	...	720 [5000]	840 [5800]
			0.312 [7.92]	45.65 [67.90]	...	20	800 [5500]	940 [6500]
			0.344 [8.74]	50.22 [74.76]	...	...	880 [6100]	1030 [7100]
			0.375 [9.52]	54.62 [81.25]	STD	30	960 [6600]	1120 [7700]
			0.438 [11.13]	63.50 [94.55]	...	40	1130 [7800]	1310 [9000]
			0.469 [11.91]	67.84 [100.94]	...	...	1210 [8300]	1410 [9700]
			0.500 [12.70]	72.16 [107.39]	XS	...	1290 [8900]	1500 [10 300]
			0.594 [15.09]	85.13 [126.71]	...	60	1530 [10 500]	1790 [12 300]
			0.750 [19.05]	106.23 [158.10]	...	80	1930 [13 300]	2250 [15 500]
			0.938 [23.83]	130.98 [194.96]	...	100	2410 [16 600]	2800 [19 300]
			1.094 [27.79]	150.93 [224.65]	...	120	2800 [19 300]	2800 [19 300]
			1.250 [31.75]	170.37 [253.56]	...	140	2800 [19 300]	2800 [19 300]
			1.406 [35.71]	189.29 [281.70]	...	160	2800 [19 300]	2800 [19 300]
			2.000 [50.80]	256.56 [381.83]	...	...	2800 [19 300]	2800 [19 300]
			2.125 [53.97]	269.76 [401.44]	...	...	2800 [19 300]	2800 [19 300]
			2.200 [55.88]	277.51 [413.01]	...	...	2800 [19 300]	2800 [19 300]
			2.500 [63.50]	307.34 [457.40]	...	...	2800 [19 300]	2800 [19 300]
16	400	16.000 [406.4]	0.219 [5.56]	36.95 [54.96]	...	...	490 [3400]	570 [3900]
			0.250 [6.35]	42.09 [62.64]	...	10	560 [3900]	660 [4500]
			0.281 [7.14]	47.22 [70.30]	...	...	630 [4300]	740 [5100]
			0.312 [7.92]	52.32 [77.83]	...	20	700 [4800]	820 [5700]
			0.344 [8.74]	57.57 [85.71]	...	...	770 [5300]	900 [6200]
			0.375 [9.52]	62.64 [93.17]	STD	30	840 [5800]	980 [6800]
			0.438 [11.13]	72.86 [108.49]	...	...	990 [6800]	1150 [7900]
			0.469 [11.91]	77.87 [115.86]	...	...	1060 [7300]	1230 [8500]
			0.500 [12.70]	82.85 [123.30]	XS	40	1120 [7700]	1310 [9000]
			0.656 [16.66]	107.60 [160.12]	...	60	1480 [10 200]	1720 [11 900]
			0.844 [21.44]	136.74 [203.53]	...	80	1900 [13 100]	2220 [15 300]
			1.031 [26.19]	164.98 [245.56]	...	100	2320 [16 000]	2710 [18 700]
			1.219 [30.96]	192.61 [286.64]	...	120	2740 [18 900]	2800 [19 300]
			1.438 [36.53]	223.85 [333.19]	...	140	2800 [19 300]	2800 [19 300]
			1.594 [40.49]	245.48 [365.35]	...	160	2800 [19 300]	2800 [19 300]
18	450	18.000 [457]	0.250 [6.35]	47.44 [70.60]	...	10	500 [3400]	580 [4000]
			0.281 [7.14]	53.23 [79.24]	...	...	560 [3900]	660 [4500]
			0.312 [7.92]	58.99 [87.75]	...	20	620 [4300]	730 [5000]
			0.344 [8.74]	64.93 [96.66]	...	...	690 [4800]	800 [5500]
			0.375 [9.52]	70.65 [105.10]	STD	...	750 [5200]	880 [6100]
			0.406 [10.31]	76.36 [113.62]	...	...	810 [5600]	950 [6500]
			0.438 [11.13]	82.23 [122.43]	...	30	880 [6100]	1020 [7000]
			0.469 [11.91]	87.89 [130.78]	...	...	940 [6500]	1090 [7500]
			0.500 [12.70]	93.54 [139.20]	XS	...	1000 [6900]	1170 [8100]
			0.562 [14.27]	104.76 [155.87]	...	40	1120 [7700]	1310 [9000]
			0.750 [19.05]	138.30 [205.83]	...	60	1500 [10 300]	1750 [12 100]
			0.938 [23.83]	171.08 [254.67]	...	80	1880 [13 000]	2190 [15 100]
			1.156 [29.36]	208.15 [309.76]	...	100	2310 [15 900]	2700 [18 600]
			1.375 [34.92]	244.37 [363.64]	...	120	2750 [19 000]	2800 [19 300]
			1.562 [39.67]	274.48 [408.45]	...	140	2800 [19 300]	2800 [19 300]
			1.781 [45.24]	308.79 [459.59]	...	160	2800 [19 300]	2800 [19 300]
20	500	20.000 [508]	0.250 [6.35]	52.78 [78.55]	...	10	450 [3100]	520 [3600]
			0.281 [7.14]	59.23 [88.19]	...	...	510 [3500]	590 [4100]
			0.312 [7.92]	65.66 [97.67]	...	...	560 [3900]	660 [4500]
			0.344 [8.74]	72.28 [107.60]	...	...	620 [4300]	720 [5000]

TABLE X2.2 *Continued*

NPS Designator	DN Designator	Specified Outside Diameter, in. [mm]	Specified Wall Thickness, in. [mm]	Nominal Weight (Mass) per Unit Length, Plain End, lb/ft [kg/m]	Weight Class	Schedule No.	Test Pressure,[A] psi [kPa]	
							Grade A	Grade B
			0.375 [9.52]	78.67 [117.02]	STD	20	680 [4700]	790 [5400]
			0.406 [10.31]	84.04 [126.53]	...	...	730 [5000]	850 [5900]
			0.438 [11.13]	91.59 [136.37]	...	...	790 [5400]	920 [6300]
			0.469 [11.91]	97.92 [145.70]	...	...	850 [5900]	950 [6500]
			0.500 [12.70]	104.23 [155.12]	XS	30	900 [6200]	1050 [7200]
			0.594 [15.09]	123.23 [183.42]	...	40	1170 [8100]	1250 [8600]
			0.812 [20.62]	166.56 [247.83]	...	60	1460 [10 100]	1710 [11 800]
			1.031 [26.19]	209.06 [311.17]	...	80	1860 [12 800]	2170 [15 000]
			1.281 [32.54]	256.34 [381.53]	...	100	2310 [15 900]	2690 [18 500]
			1.500 [38.10]	296.65 [441.49]	...	120	2700 [18 600]	2800 [19 300]
			1.750 [44.45]	341.41 [508.11]	...	140	2800 [19 300]	2800 [19 300]
			1.969 [50.01]	379.53 [564.81]	...	160	2800 [19 300]	2800 [19 300]
24	600	24.000 [610]	0.250 [6.35]	63.47 [94.46]	...	10	380 [2600]	440 [3000]
			0.281 [7.14]	71.25 [106.08]	...	...	420 [2900]	490 [3400]
			0.312 [7.92]	79.01 [117.51]	...	...	470 [3200]	550 [3800]
			0.344 [8.74]	86.99 [129.50]	...	...	520 [3600]	600 [4100]
			0.375 [9.52]	94.71 [140.88]	STD	20	560 [3900]	660 [4500]
			0.406 [10.31]	102.40 [152.37]	...	...	610 [4200]	710 [4900]
			0.438 [11.13]	110.32 [164.26]	...	...	660 [4500]	770 [5300]
			0.469 [11.91]	117.98 [175.54]	...	...	700 [4800]	820 [5700]
			0.500 [12.70]	125.61 [186.94]	XS	...	750 [5200]	880 [6100]
			0.562 [14.27]	140.81 [209.50]	...	30	840 [5800]	980 [6800]
			0.688 [17.48]	171.45 [255.24]	...	40	1030 [7100]	1200 [8300]
			0.938 [23.83]	231.25 [344.23]	...	...	1410 [9700]	1640 [11 300]
			0.969 [24.61]	238.57 [355.02]	...	60	1450 [10 000]	1700 [11 700]
			1.219 [30.96]	296.86 [441.78]	...	80	1830 [12 600]	2130 [14 700]
			1.531 [38.89]	367.74 [547.33]	...	100	2300 [15 900]	2680 [18 500]
			1.812 [46.02]	429.79 [639.58]	...	120	2720 [18 800]	2800 [19 300]
			2.062 [52.37]	483.57 [719.63]	...	140	2800 [19 300]	2800 [19 300]
			2.344 [59.54]	542.64 [807.63]	...	160	2800 [19 300]	2800 [19 300]
26	650	26.000 [660]	0.250 [6.35]	68.82 [102.42]	...	...	350 [2400]	400 [2800]
			0.281 [7.14]	77.26 [115.02]	...	...	390 [2700]	450 [3100]
			0.312 [7.92]	85.68 [127.43]	...	10	430 [3000]	500 [3400]
			0.344 [8.74]	94.35 [140.45]	...	...	480 [3300]	560 [3900]
			0.375 [9.52]	102.72 [152.80]	STD	...	520 [3600]	610 [4200]
			0.406 [10.31]	111.08 [165.28]	...	...	560 [3900]	660 [4500]
			0.438 [11.13]	119.69 [178.20]	...	...	610 [4200]	710 [4900]
			0.469 [11.91]	128.00 [190.46]	...	...	650 [4500]	760 [5200]
			0.500 [12.70]	136.30 [202.85]	XS	20	690 [4800]	810 [5600]
			0.562 [14.27]	152.83 [227.37]	...	...	780 [5400]	910 [6300]

[A] The minimum test pressure for outside diameters and wall thicknesses not listed shall be computed by the formula given below. The computed test pressure shall be used in all cases, except as follows:

(*1*) For specified wall thicknesses greater than the heaviest specified wall thickness listed in this table for the applicable specified outside diameter, the test pressure shall be the highest value listed for the applicable specified outside diameter and grade.

(*2*) For pipe smaller than NPS 2 [DN 50] with a specified wall thickness less than the lightest specified wall thickness listed in this table for the applicable specified outside diameter and grade.

(*3*) For all sizes of Grade A and B pipe smaller than NPS 2 [DN 50], the test pressures were assigned arbitrarily. Test pressures for intermediate specified outside diameters need not exceed those given in this table for the next larger listed size.

$P = 2St/D$

where:

P = minimum hydrostatic test pressure, psi [kPa],
S = 0.60 times the specified minimum yield strength, psi [kPa],
t = specified wall thickness, in. [mm], and
D = specified outside diameter, in. [mm].

TABLE X2.3 Dimensions, Weights (Masses) per Unit Length, and Test Pressures for Threaded and Coupled Pipe

NPS Designator	DN Designator	Specified Outside Diameter, in. [mm]	Specified Wall Thickness, in. [mm]	Nominal Weight (Mass) per Unit Length, Threaded and Coupled, lb/ft [kg/m]	Weight Class	Schedule No.	Test Pressure, psi [kPa]	
							Grade A	Grade B
⅛	6	0.405 [10.3]	0.068 [1.73]	0.25 [0.37]	STD	40	700 [4800]	700 [4800]
			0.095 [2.41]	0.32 [0.46]	XS	80	850 [5900]	850 [5900]
¼	8	0.540 [13.7]	0.088 [2.24]	0.43 [0.63]	STD	40	700 [4800]	700 [4800]
			0.119 [3.02]	0.54 [0.80]	XS	80	850 [5900]	850 [5900]
⅜	10	0.675 [17.1]	0.091 [2.31]	0.57 [0.84]	STD	40	700 [4800]	700 [4800]
			0.126 [3.20]	0.74 [1.10]	XS	80	850 [5900]	850 [5900]
½	15	0.840 [21.3]	0.109 [2.77]	0.86 [1.27]	STD	40	700 [4800]	700 [4800]
			0.147 [3.73]	1.09 [1.62]	XS	80	850 [5900]	850 [5900]
			0.294 [7.47]	1.72 [2.54]	XXS	...	1000 [6900]	1000 [6900]
¾	20	1.050 [26.7]	0.113 [2.87]	1.14 [1.69]	STD	40	700 [4800]	700 [4800]
			0.154 [3.91]	1.48 [2.21]	XS	80	850 [5900]	850 [5900]
			0.308 [7.82]	2.45 [3.64]	XXS	...	1000 [6900]	1000 [6900]
1	25	1.315 [33.4]	0.133 [3.38]	1.69 [2.50]	STD	40	700 [4800]	700 [4800]
			0.179 [4.55]	2.19 [3.25]	XS	80	850 [5900]	850 [5900]
			0.358 [9.09]	3.66 [5.45]	XXS	...	1000 [6900]	1000 [6900]
1¼	32	1.660 [42.2]	0.140 [3.56]	2.28 [3.40]	STD	40	1000 [6900]	1100 [7600]
			0.191 [4.85]	3.03 [4.49]	XS	80	1500 [10 300]	1600 [11 000]
			0.382 [9.70]	5.23 [7.76]	XXS	...	1800 [12 400]	1900 [13 100]
1½	40	1.900 [48.3]	0.145 [3.68]	2.74 [4.04]	STD	40	1000 [6900]	1100 [7600]
			0.200 [5.08]	3.65 [5.39]	XS	80	1500 [10 300]	1600 [11 000]
			0.400 [10.16]	6.41 [9.56]	XXS	...	1800 [12 400]	1900 [13 100]
2	50	2.375 [60.3]	0.154 [3.91]	3.68 [5.46]	STD	40	2300 [15 900]	2500 [17 200]
			0.218 [5.54]	5.08 [7.55]	XS	80	2500 [17 200]	2500 [17 200]
			0.436 [11.07]	9.06 [13.44]	XXS	...	2500 [17 200]	2500 [17 200]
2½	65	2.875 [73.0]	0.203 [5.16]	5.85 [8.67]	STD	40	2500 [17 200]	2500 [17 200]
			0.276 [7.01]	7.75 [11.52]	XS	80	2500 [17 200]	2500 [17 200]
			0.552 [14.02]	13.72 [20.39]	XXS	...	2500 [17 200]	2500 [17 200]
3	80	3.500 [88.9]	0.216 [5.49]	7.68 [11.35]	STD	40	2200 [15 200]	2500 [17 200]
			0.300 [7.62]	10.35 [15.39]	XS	80	2500 [17 200]	2500 [17 200]
			0.600 [15.24]	18.60 [27.66]	XXS	...	2500 [17 200]	2500 [17 200]
3½	90	4.000 [101.6]	0.226 [5.74]	9.27 [13.71]	STD	40	2000 [13 800]	2400 [16 500]
			0.318 [8.08]	12.67 [18.82]	XS	80	2800 [19 300]	2800 [19 300]
4	100	4.500 [114.3]	0.237 [6.02]	10.92 [16.23]	STD	40	1900 [13 100]	2200 [15 200]
			0.337 [8.56]	15.20 [22.60]	XS	80	2700 [18 600]	2800 [19 300]
			0.674 [17.12]	27.62 [41.09]	XXS	...	2800 [19 300]	2800 [19 300]
5	125	5.563 [141.3]	0.258 [6.55]	14.90 [22.07]	STD	40	1700 [11 700]	1900 [13 100]
			0.375 [9.52]	21.04 [31.42]	XS	80	2400 [16 500]	2800 [19 300]
			0.750 [19.05]	38.63 [57.53]	XXS	...	2800 [19 300]	2800 [19 300]
6	150	6.625 [168.3]	0.280 [7.11]	19.34 [28.58]	STD	40	1500 [10 300]	1800 [12 400]
			0.432 [10.97]	28.88 [43.05]	XS	80	2300 [15 900]	2700 [18 600]
			0.864 [21.95]	53.19 [79.18]	XXS	...	2800 [19 300]	2800 [19 300]
8	200	8.625 [219.1]	0.277 [7.04]	25.53 [38.07]	...	30	1200 [8300]	1300 [9000]
			0.322 [8.18]	29.35 [43.73]	STD	40	1300 [9000]	1600 [11 000]
			0.500 [12.70]	44.00 [65.41]	XS	80	2100 [14 500]	2400 [16 500]
			0.875 [22.22]	72.69 [107.94]	XXS	...	2800 [19 300]	2800 [19 300]
10	250	10.750 [273.0]	0.279 [7.09]	32.33 [48.80]	...	...	950 [6500]	1100 [7600]
			0.307 [7.80]	35.33 [53.27]	...	30	1000 [6900]	1200 [8300]
			0.365 [9.27]	41.49 [63.36]	STD	40	1200 [8300]	1400 [9700]
			0.500 [12.70]	55.55 [83.17]	XS	60	1700 [11 700]	2000 [13 800]
12	300	12.750 [323.8]	0.330 [8.38]	45.47 [67.72]	...	30	950 [6500]	1100 [7600]
			0.375 [9.52]	51.28 [76.21]	STD	...	1100 [7600]	1200 [8300]
			0.500 [12.70]	66.91 [99.4]	XS	...	1400 [9700]	1600 [11 000]

TABLE X2.4 Table of Minimum Permissible Wall Thicknesses on Inspection for Pipe Specified Wall Thicknesses

NOTE 1—The following equation, upon which this table is based, shall be applied to calculate minimum permissible wall thickness from specified wall thickness:

$$t_s \times 0.875 = t_m$$

where:
t_s = specified wall thickness, in. [mm], and
t_m = minimum permissible wall thickness, in. [mm].
The wall thickness is expressed to three [two] decimal places, the fourth [third] decimal place being carried forward or dropped in accordance with Practice E 29.

NOTE 2—This table is a master table covering wall thicknesses available in the purchase of different classifications of pipe, but it is not meant to imply that all of the walls listed therein are obtainable under this specification.

Specified Wall Thickness (t_s), in. [mm]	Minimum Permissible Wall Thickness on Inspection (t_m), in. [mm]	Specified Wall Thickness (t_s), in. [mm]	Minimum Permissible Wall Thickness on Inspection (t_m), in. [mm]	Specified Wall Thickness (t_s), in. [mm]	Minimum Permissible Wall Thickness on Inspection (t_m), in. [mm]
0.068 [1.73]	0.060 [1.52]	0.294 [7.47]	0.257 [6.53]	0.750 [19.05]	0.656 [16.66]
0.088 [2.24]	0.077 [1.96]	0.300 [7.62]	0.262 [6.65]	0.812 [20.62]	0.710 [18.03]
0.091 [2.31]	0.080 [2.03]	0.307 [7.80]	0.269 [6.83]	0.844 [21.44]	0.739 [18.77]
0.095 [2.41]	0.083 [2.11]	0.308 [7.82]	0.270 [6.86]	0.864 [21.94]	0.756 [19.20]
0.109 [2.77]	0.095 [2.41]	0.312 [7.92]	0.273 [6.93]	0.875 [22.22]	0.766 [19.46]
0.113 [2.87]	0.099 [2.51]	0.318 [8.08]	0.278 [7.06]	0.906 [23.01]	0.793 [20.14]
0.119 [3.02]	0.104 [2.64]	0.322 [8.18]	0.282 [7.16]	0.938 [23.82]	0.821 [20.85]
0.125 [3.18]	0.109 [2.77]	0.330 [8.38]	0.289 [7.34]	0.968 [24.59]	0.847 [21.51]
0.126 [3.20]	0.110 [2.79]	0.337 [8.56]	0.295 [7.49]	1.000 [25.40]	0.875 [22.22]
0.133 [3.38]	0.116 [2.95]	0.343 [8.71]	0.300 [7.62]	1.031 [26.19]	0.902 [22.91]
0.140 [3.56]	0.122 [3.10]	0.344 [8.74]	0.301 [7.65]	1.062 [26.97]	0.929 [26.30]
0.145 [3.68]	0.127 [3.23]	0.358 [9.09]	0.313 [7.95]	1.094 [27.79]	0.957 [24.31]
0.147 [3.73]	0.129 [3.28]	0.365 [9.27]	0.319 [8.10]	1.125 [28.58]	0.984 [24.99]
0.154 [3.91]	0.135 [3.43]	0.375 [9.52]	0.328 [8.33]	1.156 [29.36]	1.012 [25.70]
0.156 [3.96]	0.136 [3.45]	0.382 [9.70]	0.334 [8.48]	1.219 [30.96]	1.067 [27.08]
0.179 [4.55]	0.157 [3.99]	0.400 [10.16]	0.350 [8.89]	1.250 [31.75]	1.094 [27.79]
0.187 [4.75]	0.164 [4.17]	0.406 [10.31]	0.355 [9.02]	1.281 [32.54]	1.121 [28.47]
0.188 [4.78]	0.164 [4.17]	0.432 [10.97]	0.378 [9.60]	1.312 [33.32]	1.148 [29.16]
0.191 [4.85]	0.167 [4.24]	0.436 [11.07]	0.382 [9.70]	1.343 [34.11]	1.175 [29.85]
0.200 [5.08]	0.175 [4.44]	0.437 [11.10]	0.382 [9.70]	1.375 [34.92]	1.203 [30.56]
0.203 [5.16]	0.178 [4.52]	0.438 [11.13]	0.383 [9.73]	1.406 [35.71]	1.230 [31.24]
0.216 [5.49]	0.189 [4.80]	0.500 [12.70]	0.438 [11.13]	1.438 [36.53]	1.258 [31.95]
0.218 [5.54]	0.191 [4.85]	0.531 [13.49]	0.465 [11.81]	1.500 [38.10]	1.312 [33.32]
0.219 [5.56]	0.192 [4.88]	0.552 [14.02]	0.483 [12.27]	1.531 [38.89]	1.340 [34.04]
0.226 [5.74]	0.198 [5.03]	0.562 [14.27]	0.492 [12.50]	1.562 [39.67]	1.367 [34.72]
0.237 [6.02]	0.207 [5.26]	0.594 [15.09]	0.520 [13.21]	1.594 [40.49]	1.395 [35.43]
0.250 [6.35]	0.219 [5.56]	0.600 [15.24]	0.525 [13.34]	1.750 [44.45]	1.531 [38.89]
0.258 [6.55]	0.226 [5.74]	0.625 [15.88]	0.547 [13.89]	1.781 [45.24]	1.558 [39.57]
0.276 [7.01]	0.242 [6.15]	0.656 [16.66]	0.574 [14.58]	1.812 [46.02]	1.586 [40.28]
0.277 [7.04]	0.242 [6.15]	0.674 [17.12]	0.590 [14.99]	1.968 [49.99]	1.722 [43.74]
0.279 [7.09]	0.244 [6.20]	0.688 [17.48]	0.602 [15.29]	2.062 [52.37]	1.804 [45.82]
0.280 [7.11]	0.245 [6.22]	0.719 [18.26]	0.629 [15.98]	2.344 [59.54]	2.051 [52.10]
0.281 [7.14]	0.246 [6.25]				

X3. BASIC THREADING DATA

X3.1 Fig. X3.1 is to be used with Table X3.1. Fig. X3.2 is to be used with Table X3.2.

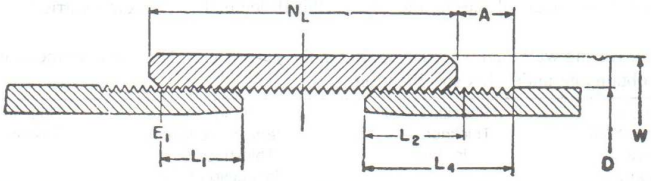

FIG. X3.1 Dimensions of Hand Tight Assembly for Use with Table X3.1

TABLE X3.1 Basic Threading Data for Standard-Weight Pipe, NPS 6 [DN 150] or Smaller

NOTE 1—All dimensions in this table are nominal and subject to mill tolerances.
NOTE 2—The taper of threads is ¾ in./ft [62.5 mm/m] on the diameter.

Pipe					Threads			Coupling		
NPS Designator	DN Designator	Specified Outside Diameter, in. [mm] *D*	Number per inch	End of Pipe to Hand Tight Plane, in. [mm] L_1	Effective Length, in. [mm] L_2	Total Length, in. [mm] L_4	Pitch Diameter at Hand Tight Plane, in. [mm] E_1	Specified Outside Diameter, in. [mm] *W*	Length, min., in. [mm] N_L	Hand Tight Stand-Off (Number of Threads) *A*
⅛	6	0.405 [10.3]	27	0.1615 [4.1021]	0.2638 [6.7005]	0.3924 [9.9670]	0.37360 [9.48944]	0.563 [14.3]	¾ [19]	4
¼	8	0.540 [13.7]	18	0.2278 [5.7861]	0.4018 [10.2057]	0.5946 [15.1028]	0.49163 [12.48740]	0.719 [18.3]	1⅛ [29]	5½
⅜	10	0.675 [17.1]	18	0.240 [6.096]	0.4078 [10.3581]	0.6006 [15.2552]	0.62701 [15.92605]	0.875 [22.2]	1⅛ [29]	5
½	15	0.840 [21.3]	14	0.320 [8.128]	0.5337 [13.5560]	0.7815 [19.8501]	0.77843 [19.77212]	1.063 [27.0]	1½ [38]	5
¾	20	1.050 [26.7]	14	0.339 [8.611]	0.5457 [13.8608]	0.7935 [20.1549]	0.98887 [25.11730]	1.313 [33.4]	1⅝ [40]	5
1	25	1.315 [33.4]	11½	0.400 [10.160]	0.6828 [17.3431]	0.9845 [25.0063]	1.23863 [31.46120]	1.576 [40.0]	1 15/16 [49]	5
1¼	32	1.660 [42.2]	11½	0.420 [10.668]	0.7068 [17.9527]	1.0085 [25.6159]	1.58338 [40.21785]	1.900 [48.3]	2 [50]	5
1½	40	1.900 [48.3]	11½	0.420 [10.668]	0.7235 [18.3769]	1.0252 [26.0401]	1.82234 [46.28744]	2.200 [55.9]	2 [50]	5½
2	50	2.375 [60.3]	11½	0.436 [11.074]	0.7565 [19.2151]	1.0582 [26.8783]	2.29627 [58.32526]	2.750 [69.8]	2 1/16 [52]	5½
2½	65	2.875 [73.0]	8	0.682 [17.323]	1.1376 [28.8950]	1.5712 [39.9085]	2.76216 [70.15886]	3.250 [82.5]	3 1/16 [78]	5½
3	80	3.500 [88.9]	8	0.766 [19.456]	1.2000 [30.4800]	1.6337 [41.4960]	3.38850 [86.06790]	4.000 [101.6]	3 3/16 [81]	5½
3½	90	4.000 [101.6]	8	0.821 [20.853]	1.2500 [31.7500]	1.6837 [42.7660]	3.88881 [98.77577]	4.625 [117.5]	3 5/16 [84]	5½
4	100	4.500 [114.3]	8	0.844 [21.438]	1.3000 [33.0200]	1.7337 [44.0360]	4.38713 [111.43310]	5.000 [127.0]	3 7/16 [87]	5
5	125	5.563 [141.3]	8	0.937 [23.800]	1.4063 [35.7200]	1.8400 [46.7360]	5.44929 [138.41200]	6.296 [159.9]	3 11/16 [94]	5
6	150	6.625 [168.3]	8	0.958 [24.333]	1.5125 [38.4175]	1.9462 [49.4335]	6.50597 [165.25164]	7.390 [187.7]	3 15/16 [100]	6

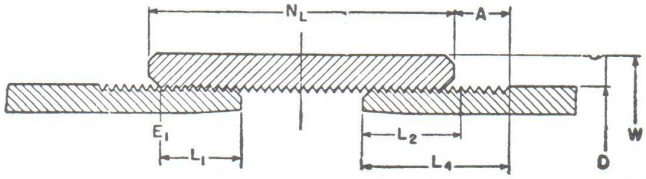

FIG. X3.2 Dimensions of Hand Tight Assembly for Use with Table X3.2

TABLE X3.2 Basic Threading Data for Standard-Weight Pipe, NPS 8 [DN 200] or Larger, and all Sizes of Extra-Strong and Double-Extra-Strong Weight Pipe

NOTE 1—The taper of threads is ¾ in./ft [62.5 mm/m] on the diameter.

Pipe				Threads								Coupling				
NPS Designator	DN Designator	Specified Outside Diameter, in.	[mm]	Number per Inch	End of Pipe to Hand Tight Plane, in.	[mm]	Effective Length, in.	[mm]	Total Length, in.	[mm]	Pitch Diameter at Hand Tight Plane, in.	[mm]	Specified Outside Diameter, in.	[mm]	Length, min, in.	[mm]	Hand Tight Stand-Off (Number of Threads)
		D			L_1		L_2		L_4		E_1		W		N_L		
⅛	6	0.405	[10.3]	27	0.1615	[4.1021]	0.2638	[6.7005]	0.3924	[9.9670]	0.37360	[9.48944]	0.563	[14.3]	1 1/16	[27]	3
¼	8	0.540	[13.7]	18	0.2278	[5.7861]	0.4018	[10.2057]	0.5946	[15.1028]	0.49163	[12.48740]	0.719	[18.3]	1⅝	[41]	3
⅜	10	0.675	[17.1]	18	0.240	[6.096]	0.4078	[10.3581]	0.6006	[15.2552]	0.62701	[15.92605]	0.875	[22.2]	1⅝	[41]	3
½	15	0.840	[21.3]	14	0.320	[8.128]	0.5337	[13.5560]	0.7815	[19.8501]	0.77843	[19.77212]	1.063	[27.0]	2⅛	[54]	3
¾	20	1.050	[26.7]	14½	0.339	[8.611]	0.5457	[13.8608]	0.7935	[20.1549]	0.98887	[25.11730]	1.313	[33.4]	2⅛	[54]	3
1	25	1.315	[33.4]	11	0.400	[10.160]	0.6828	[17.3431]	0.9845	[25.0063]	1.23863	[31.46120]	1.576	[40.0]	2⅝	[67]	3
1¼	32	1.660	[42.2]	11½	0.420	[10.668]	0.7068	[17.9527]	1.0085	[25.6159]	1.58338	[40.21785]	2.054	[52.2]	2¾	[70]	3
1½	40	1.900	[48.3]	11½	0.420	[10.668]	0.7235	[18.3769]	1.0252	[26.0401]	1.82234	[46.28744]	2.200	[55.9]	2¾	[70]	3
2	50	2.375	[60.3]	11½	0.436	[11.074]	0.7565	[19.2151]	1.0582	[26.8783]	2.29627	[58.32526]	2.875	[73.0]	2⅞	[73]	3
2½	65	2.875	[73.0]	8	0.682	[17.323]	1.1375	[28.8950]	1.5712	[39.9085]	2.76216	[70.15886]	3.375	[85.7]	4⅛	[105]	2
3	80	3.500	[88.9]	8	0.766	[19.456]	1.2000	[30.4800]	1.6337	[41.4960]	3.38850	[86.06790]	4.000	[101.6]	4¼	[108]	2
3½	90	4.000	[101.6]	8	0.821	[20.853]	1.2500	[31.7500]	1.6837	[42.7660]	3.88881	[98.77577]	4.625	[117.5]	4⅜	[111]	2
4	100	4.500	[114.3]	8	0.844	[21.438]	1.3000	[33.0200]	1.7337	[44.0360]	4.38713	[111.43310]	5.200	[132.1]	4½	[114]	2
5	125	5.563	[141.3]	8	0.937	[23.800]	1.4063	[35.7200]	1.8400	[46.7360]	5.44929	[138.41200]	6.296	[159.9]	4⅝	[117]	2
6	150	6.625	[168.3]	8	0.958	[24.333]	1.5125	[38.4175]	1.9462	[49.4335]	6.50597	[165.25164]	7.390	[187.7]	4⅞	[124]	2
8	200	8.625	[219.1]	8	1.063	[27.000]	1.7125	[43.4975]	2.1462	[54.5135]	8.50003	[215.90076]	9.625	[244.5]	5¼	[133]	2
10	250	10.750	[273.0]	8	1.210	[30.734]	1.9250	[48.8950]	2.3587	[59.9110]	10.62094	[269.77188]	11.750	[298.4]	5¾	[146]	2
12	300	12.750	[323.8]	8	1.360	[34.544]	2.1250	[53.9750]	2.5587	[64.9910]	12.61781	[320.49237]	14.000	[355.6]	6⅛	[156]	2
14	350	14.000	[355.6]	8	1.562	[39.675]	2.2500	[57.1500]	2.6837	[68.1660]	13.87263	[352.36480]	15.000	[381.0]	6⅜	[162]	2
16	400	16.000	[406.4]	8	1.812	[46.025]	2.4500	[62.2300]	2.8837	[73.2460]	15.87575	[403.24405]	17.000	[432]	6¾	[171]	2
18	450	18.000	[457]	8	2.000	[50.800]	2.6500	[67.3100]	3.0837	[78.3260]	17.87500	[454.02500]	19.000	[483]	7⅛	[181]	2
20	500	20.000	[508]	8	2.125	[53.975]	2.8500	[72.3900]	3.2837	[83.4060]	19.87031	[504.70587]	21.000	[533]	7⅝	[194]	2

X4. ELONGATION VALUES

X4.1 Tabulated in Table X4.1 are the minimum elongation values in inch-pound units, calculated using the equation given in Table 2.

TABLE X4.1 Elongation Values

Area, A, in.²	Specified Wall Thickness, in.			Elongation in 2 in., min, %	
	Tension Test Specimen			Specified Minimum Tensile Strength, psi	
	¾-in. Specimen	1-in. Specimen	1½-in. Specimen	48 000	60 000
0.75 and greater	0.994 and greater	0.746 and greater	0.497 and greater	36	30
0.74	0.980–0.993	0.735–0.745	0.490–0.496	36	29
0.73	0.967–0.979	0.726–0.734	0.484–0.489	36	29
0.72	0.954–0.966	0.715–0.725	0.477–0.483	36	29
0.71	0.941–0.953	0.706–0.714	0.471–0.476	36	29
0.70	0.927–0.940	0.695–0.705	0.464–0.470	36	29
0.69	0.914–0.926	0.686–0.694	0.457–0.463	36	29
0.68	0.900–0.913	0.675–0.685	0.450–0.456	35	29
0.67	0.887–0.899	0.666–0.674	0.444–0.449	35	29
0.66	0.874–0.886	0.655–0.665	0.437–0.443	35	29

TABLE X4.1 *Continued*

Area, A, in.^{2}	Specified Wall Thickness, in.			Elongation in 2 in., min, %	
	Tension Test Specimen			Specified Minimum Tensile Strength, psi	
	¾-in. Specimen	1-in. Specimen	1½-in. Specimen	48 000	60 000
0.65	0.861–0.873	0.646–0.654	0.431–0.436	35	29
0.64	0.847–0.860	0.635–0.645	0.424–0.430	35	29
0.63	0.834–0.846	0.626–0.634	0.417–0.423	35	29
0.62	0.820–0.833	0.615–0.625	0.410–0.416	35	28
0.61	0.807–0.819	0.606–0.614	0.404–0.409	35	28
0.60	0.794–0.806	0.595–0.605	0.397–0.403	35	28
0.59	0.781–0.793	0.586–0.594	0.391–0.396	34	28
0.58	0.767–0.780	0.575–0.585	0.384–0.390	34	28
0.57	0.754–0.766	0.566–0.574	0.377–0.383	34	28
0.56	0.740–0.753	0.555–0.565	0.370–0.376	34	28
0.55	0.727–0.739	0.546–0.554	0.364–0.369	34	28
0.54	0.714–0.726	0.535–0.545	0.357–0.363	34	28
0.53	0.701–0.713	0.526–0.534	0.351–0.356	34	28
0.52	0.687–0.700	0.515–0.525	0.344–0.350	34	27
0.51	0.674–0.686	0.506–0.514	0.337–0.343	33	27
0.50	0.660–0.673	0.495–0.505	0.330–0.336	33	27
0.49	0.647–0.659	0.486–0.494	0.324–0.329	33	27
0.48	0.634–0.646	0.475–0.485	0.317–0.323	33	27
0.47	0.621–0.633	0.466–0.474	0.311–0.316	33	27
0.46	0.607–0.620	0.455–0.465	0.304–0.310	33	27
0.45	0.594–0.606	0.446–0.454	0.297–0.303	33	27
0.44	0.580–0.593	0.435–0.445	0.290–0.296	32	27
0.43	0.567–0.579	0.426–0.434	0.284–0.289	32	26
0.42	0.554–0.566	0.415–0.425	0.277–0.283	32	26
0.41	0.541–0.553	0.406–0.414	0.271–0.276	32	26
0.40	0.527–0.540	0.395–0.405	0.264–0.270	32	26
0.39	0.514–0.526	0.386–0.394	0.257–0.263	32	26
0.38	0.500–0.513	0.375–0.385	0.250–0.256	32	26
0.37	0.487–0.499	0.366–0.374	0.244–0.249	31	26
0.36	0.474–0.486	0.355–0.365	0.237–0.243	31	26
0.35	0.461–0.473	0.346–0.354	0.231–0.236	31	25
0.34	0.447–0.460	0.335–0.345	0.224–0.230	31	25
0.33	0.434–0.446	0.326–0.334	0.217–0.223	31	25
0.32	0.420–0.433	0.315–0.325	0.210–0.216	30	25
0.31	0.407–0.419	0.306–0.314	0.204–0.209	30	25
0.30	0.394–0.406	0.295–0.305	0.197–0.203	30	25
0.29	0.381–0.393	0.286–0.294	0.191–0.196	30	24
0.28	0.367–0.380	0.275–0.285	0.184–0.190	30	24
0.27	0.354–0.366	0.266–0.274	0.177–0.183	29	24
0.26	0.340–0.353	0.255–0.265	0.170–0.176	29	24
0.25	0.327–0.339	0.246–0.254	0.164–0.169	29	24
0.24	0.314–0.326	0.235–0.245	0.157–0.163	29	24
0.23	0.301–0.313	0.226–0.234	0.151–0.156	29	23
0.22	0.287–0.300	0.215–0.225	0.144–0.150	28	23
0.21	0.274–0.286	0.260–0.214	0.137–0.143	28	23
0.20	0.260–0.273	0.195–0.205	0.130–0.136	28	23
0.19	0.247–0.259	0.186–0.194	0.124–0.129	27	22
0.18	0.234–0.246	0.175–0.185	0.117–0.123	27	22
0.17	0.221–0.233	0.166–0.174	0.111–0.116	27	22
0.16	0.207–0.220	0.155–0.165	0.104–0.110	27	22
0.15	0.194–0.206	0.146–0.154	0.097–0.103	26	21
0.14	0.180–0.193	0.135–0.145	0.091–0.096	26	21
0.13	0.167–0.179	0.126–0.134	0.084–0.090	25	21
0.12	0.154–0.166	0.115–0.125	0.077–0.083	25	20
0.11	0.141–0.153	0.106–0.114	0.071–0.076	25	20
0.10	0.127–0.140	0.095–0.105	0.064–0.070	24	20
0.09	0.114–0.126	0.086–0.094	0.057–0.063	24	19
0.08	0.100–0.113	0.075–0.085	0.050–0.056	23	19
0.07	0.087–0.099	0.066–0.074	0.044–0.049	22	18
0.06	0.074–0.086	0.055–0.065	0.037–0.043	22	18
0.05	0.061–0.073	0.046–0.054	0.031–0.036	21	17
0.04	0.047–0.060	0.035–0.045	0.024–0.030	20	16
0.03	0.034–0.046	0.026–0.034	0.017–0.023	19	16
0.02	0.020–0.033	0.015–0.025	0.010–0.016	17	14
0.01 and less	0.019 and less	0.014 and less	0.009 and less	15	12

X4.2 Tabulated in Table X4.2 are the minimum elongation values in SI units, calculated using the equation given in Table 2.

TABLE X4.2 Elongation Values

Area, *A*, mm²	Specified Wall Thickness, mm			Elongation in 50 mm, min, %	
	Tension Test Specimen			Specified Minimum Tensile Strength, MPa	
	19-mm Specimen	25-mm Specimen	38-mm Specimen	330	415
500 and greater	26.3 and greater	20.0 and greater	13.2 and greater	36	30
480-499	25.3-26.2	19.2-19.9	12.7-13.1	36	30
460-479	24.2-25.2	18.4-19.1	12.1-12.6	36	29
440-459	23.2-24.1	17.6-18.3	11.6-12.0	36	29
420-439	22.1-23.1	16.8-17.5	11.1-11.5	35	29
400-419	21.1-22.0	16.0-16.7	10.6-11.0	35	29
380-399	20.0-21.0	15.2-15.9	10.0-10.5	35	28
360-379	19.0-19.9	14.4-15.0	9.5-9.9	34	28
340-359	17.9-18.9	13.6-14.3	9.0-9.4	34	28
320-339	16.9-17.8	12.8-13.5	8.5-8.9	34	27
300-319	15.8-16.8	12.0-12.7	7.9-8.4	33	27
280-299	14.8-15.7	11.2-11.9	7.4-7.8	33	27
260-279	13.7-14.7	10.4-11.1	6.9-7.3	32	26
240-259	12.7-13.6	9.6-10.3	6.4-6.8	32	26
220-239	11.6-12.6	8.8-9.5	5.8-6.3	31	26
200-219	10.5-11.5	8.0-8.7	5.3-5.7	31	25
190-199	10.0-10.4	7.6-7.9	5.0-5.2	30	25
180-189	9.5-9.9	7.2-7.5	4.8-4.9	30	24
170-179	9.0-9.4	6.8-7.1	4.5-4.7	30	24
160-169	8.4-8.9	6.4-6.7	4.2-4.4	29	24
150-159	7.9-8.3	6.0-6.3	4.0-4.1	29	24
140-149	7.4-7.8	5.6-5.9	3.7-3.9	29	23
130-139	6.9-7.3	5.2-5.5	3.5-3.6	28	23
120-129	6.3-6.8	4.8-5.1	3.2-3.4	28	23
110-119	5.8-6.2	4.4-4.7	2.9-3.1	27	22
100-109	5.3-5.7	4.0-4.3	2.7-2.8	27	22
90-99	4.8-5.2	3.6-3.9	2.4-2.6	26	21
80-89	4.2-4.7	3.2-3.5	2.1-2.3	26	21
70-79	3.7-4.1	2.8-3.1	1.9-2.0	25	21
60-69	3.2-3.6	2.4-2.7	1.6-1.8	24	20
50-59	2.7-3.1	2.0-2.3	...	24	19
40-49	2.1-2.6	1.6-1.9	...	23	19
30-39	1.6-2.0	...	...	22	18

SUMMARY OF CHANGES

Committee A01 has identified the location of selected changes to this specification since the last issue, A 53/A 53M – 06a, that may impact the use of this specification. (Approved September 1, 2007)

(*1*) Revised 9.1.1 to require the use of full-volumetric NDE on Type E pipe produced on a hot-stretch reducing mill.

Committee A01 has identified the location of selected changes to this specification since the last issue, A 53/A 53M – 06, that may impact the use of this specification. (Approved October 1, 2006)

(*1*) Revised 1.1 to address supplementary requirements.
(*2*) Added new 3.1.16 and renumbered subsequent paragraphs.
(*3*) Revised 7.3.1.
(*4*) Revised 7.3.2.
(*5*) Deleted Note 4 and renumbered subsequent notes.
(*6*) Added Supplementary Requirement S1.

Committee A01 has identified the location of selected changes to this specification since the last issue, A 53/A 53M – 05, that may impact the use of this specification. (Approved May 1, 2006)

(*1*) Revised the minimum coupling length for NPS 6 in Table X3.1.

(*2*) Editorially corrected the minimum coupling length for NPS ¾ in Table X3.1 and the DN designation for NPS 6 in the title for Table X3.1.