

Specification for Coiled Line Pipe

API SPECIFICATION 5LCP
SECOND EDITION, OCTOBER 18, 2006

EFFECTIVE DATE: APRIL 18, 2007

ERRATA, JULY 2007

REAFFIRMED, JULY 2020



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Upstream Segment

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CONTENTS

	Page
1 SCOPE.....	1
2 REFERENCES	1
3 DEFINITIONS.....	2
4 INFORMATION TO BE SUPPLIED BY THE PURCHASER	3
4.1 Purchaser Specification	3
4.2 Optional Purchaser Requirements.....	4
4.3 Requirements Subject To Agreement	4
5 PROCESS OF MANUFACTURE AND MATERIAL	5
5.1 Process Of Manufacture	5
5.2 Type Of Pipe	5
5.3 Types Of Welds	5
5.4 Welding Processes	5
5.5 Heat Treatment.....	6
5.6 Traceability.....	6
6 MATERIAL REQUIREMENTS	6
6.1 Chemical Properties.....	6
6.2 Mechanical Properties	7
7 DIMENSIONS, MASS PER UNIT LENGTH, DEFECTS, AND END FINISHES ..	8
7.1 General—dimensions And Mass Per Unit Length	8
7.2 Diameter.....	8
7.3 Wall Thickness	8
7.4 Calculated Mass Per Unit Length	13
7.5 Length	13
7.6 Pipe-to-pipe Welds.....	13
7.7 Workmanship And Defects	13
7.8 Pipe Ends	15
7.9 Drift Testing.....	15
8 INSPECTION AND TESTING	15
8.1 Test Equipment	15
8.2 Testing Of Chemical Composition	15
8.3 Testing Of Mechanical Properties.....	15
8.4 Hydrostatic Tests	17
8.5 Dimensional Testing	18
8.6 Nondestructive Inspection.....	18
8.7 Test Methods	23
8.8 Invalidation Of Tests	23
8.9 Retests	24
9 MARKING	24
9.1 General.....	24
9.2 Sequence Of Markings	25
9.3 Length	26

CONTENTS

	Page
10 COATING AND PROTECTION.....	26
10.1 Coatings	26
10.2 Protection From Corrosion.....	26
11 DOCUMENTS	26
11.1 Certification	26
11.2 Retention Of Records	27
APPENDIX A REQUIREMENTS FOR PIPE-TO-PIPE WELDING OF COILED PIPE	29
APPENDIX B SKELP-END AND PIPE-TO-PIPE WELDING PROCEDURE SPECIFICATION	31
APPENDIX C ELONGATION TABLES.....	35
APPENDIX D DIMENSIONS, MASS PER UNIT LENGTH AND TEST PRESSURES SI UNITS	37
APPENDIX E SUPPLEMENTARY REQUIREMENTS	41
APPENDIX F PURCHASER INSPECTION.....	43
APPENDIX G API MONOGRAM ANNEX	45
APPENDIX H COILED PIPE REELS	47
APPENDIX M SI (METRIC) CONVERSION PROCEDURE	49

Figures

1 Tensile Test Full Section Specimen	15
2 Orientation of Tensile Test Strip Specimen in Pipe	16
3 Tensile Test Strip Specimen	16
4 Seam Weld Inspection Reference Standard	22
B-1 Guided-bend Test Specimen.....	32
B-2 Jig for Guided Bend Test.....	34

Tables

1 Chemical Requirements by Percentage of Mass	6
2 Tensile Requirements	7
3 Coiled Line Pipe Dimensions, Mass per Unit Length and Test Pressures.....	9
4 Tolerances for Diameter of Pipe Body	12
5 Tolerances for Diameter at Pipe Ends.....	12
6 Tolerances for Wall Thickness	12
7 Maximum Trim Depth	14
8 ISO Wire 4 Percent Image Quality Indicators	20
9 ISO Wire 2 Percent Image Quality Indicators	20
10 ASTM Image Quality Indicator	20
11 Acceptance Limits	22
12 Retention of Records.....	27
B-1 Guided-bend Test Jig Dimensions	34
C-1 Elongation Table	35
D-1 Dimensions, Mass per unit Length and Test Pressures—SI Units.....	37

Specification for Coiled Line Pipe

1 Scope

1.1 The purpose of this Specification is to provide standards for pipe suitable for use in conveying gas, water, and oil in both the oil and natural gas industries.

This Specification covers welded steel continuously milled coiled line pipe in the size range 0.5 in. (12.7 mm) to 6.625 in. (168.3 mm). Pipe that is pipe-to-pipe welded outside the confines of the manufacturing plant is not included within this document.

1.2 Grades covered by this specification are X52C, X56C, X60C, X65C, X70C, X80C, and X90C. Grades shall not be mixed within a milled length, or a spool.

Note: Grade designations used herein are composed of the letter X followed by the first two digits of the specified minimum yield strength in U.S. customary units, and the letter C is added to indicate coiled pipe.

1.3 Pipe manufactured as Grade X60C or higher shall not be substituted for pipe ordered for Grade X52C without purchaser approval.

1.4 Although the coiled line pipe meeting this specification is intended to be suitable for field welding, the manufacturer will not assume responsibility for field welding.

1.5 The size designations used herein are outside-diameter sizes. Pipe sizes 2-³/₈ and larger are expressed as integers and fractions; pipe sizes smaller than 2-³/₈ are expressed to three decimal places.

1.6 US customary units are used in this specification; SI (metric) units are shown in parentheses in the text and in many tables. See Appendix M for specific information about conversion factors and rounding procedures.

1.7 The suitability of these products for use in environments containing hydrogen sulphide is outside of the scope of this document.

2 References

2.1 This specification includes by reference, either in total or in part, the latest editions of the following API, industry and government standards. In the event there are conflicting requirements, this specification shall govern.

API

RP 5C7	<i>Recommended Practice for Coiled Tubing Operations in Oil and Gas Well Services.</i>
Spec 5L	<i>Specification for Line Pipe.</i>
Std 1104	<i>Welding Pipelines and Related Facilities.</i>

ASME¹

Boiler and Pressure Vessel Code, Section IX, "Welding and Brazing Qualifications"

ASNT²

SNT-TC-1A	<i>Personnel Qualification and Certification in Nondestructive Testing.</i>
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ASTM³

A 370	<i>Methods and Definitions for Mechanical Testing of Steel Products.</i>
A 450	<i>Specification for General requirements for Carbon, Ferritic Alloy, and Austenitic Alloy Steel Tubes</i>
A 751	<i>Test Methods, Practices, and Definitions for Chemical Analysis of Steel Products</i>
E 4	<i>Practices for Force Verification of Testing Machines</i>
E 8	<i>Test methods for Tension Testing of Metallic Materials</i>
E 18	<i>Standard Test Methods for Rockwell Hardness and Rockwell Superficial Hardness of Metallic Materials</i>
E 29	<i>Practice for Using Significant Digits in Test Data to Determine Conformance With Specifications</i>

¹ASME International, 3 Park Avenue, New York, New York 10016-5900, www.asme.org

²ASNT, 1711 Arlingate Lane, Columbus, Ohio 43228, www.asnt.org

³ASTM International, 100 Barr Harbor Drive, West Conshohocken, Pennsylvania, 19428-2959, www.astm.org

E 83	<i>Practice for Verification and Classification of Extensometers.</i>
E 94	<i>Standard Guide for Radiographic Examination</i>
E 164	<i>Standard Practice for Ultrasonic Contact Examination of Weldments</i>
E 165	<i>Standard Practice for Liquid Penetrant Inspection</i>
E 213	<i>Standard Practice for Ultrasonic Examination of Metal Pipe and Tubing</i>
E 273	<i>Standard Practice for Ultrasonic Examination of the Weld Zone of Welded Pipe and Tubing</i>
E 309	<i>Standard Practice for Eddy-Current Examination of Steel Tubular Products, Using Magnetic Saturation</i>
E 570	<i>Standard Practice for Flux leakage Examination of Steel Tubular Products</i>
E 709	<i>Standard Guide for Magnetic Particle Examination</i>
E 747	<i>Design, Manufacture and Material Grouping Classification for Wire Image Quality Indicators (IQIs) used for Radiology</i>
E 1025	<i>Design, Manufacture and Material Grouping Classification for Wire Image Quality Indicators</i>

ISO⁴

ISO 1027	<i>Radiographic image quality indicators for non-destructive testing—Principles and identification</i>
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3 Definitions

For the purposes of this Specification, the following definitions apply:

3.1 Bauschinger Effect: A phenomenon that occurs in polycrystalline metals, including steel, that results in a decrease in the yield strength in one direction due to plastic deformation in another direction, such as caused by service loads, coiling, or straightening.

3.2 calibration: The adjustment of instruments to a known basic reference, often traceable to the National Institute of Standards and Technology or an equivalent organization.

3.3 coiled line pipe: Pipe manufactured to this specification.

3.4 continuously milled pipe: Carbon steel coiled tubular products manufactured using the electric welding processes in milled lengths greater than 200 ft.

3.5 defect: An imperfection of sufficient magnitude to warrant rejection of the product based on the stipulations of this specification.

3.6 imperfection: A discontinuity or irregularity in the product detected by methods outlined in this Specification.

3.7 lamination: A lamination is an internal metal separation creating layers generally parallel to the surface.

3.8 manufacturer: A firm, company, or corporation responsible for marking the product to warrant that it conforms to this specification. The manufacturer may be, as applicable, a pipe mill or processor. The manufacturer is responsible for compliance with all of the applicable provisions of this specification.

3.9 master coil: The original wide coil of steel that is supplied by the steel manufacturer and is subsequently slit into several narrower coils of skelp of the appropriate width for the manufacture of coiled line pipe.

3.10 may: Used as a verb to indicate that a provision is optional.

3.11 milled length: A single length of coiled pipe created during continuous operation of a mill. A milled length may include a number of coils of skelp. A milled length does not include pipe-to-pipe welds.

3.12 normalize: A heat treatment of steel whereby the steel is heated to a temperature above the upper critical temperature to achieve transformation to austenite then allowed to cool in air to a temperature substantially below the lower critical temperature.

3.13 pipe mill: A firm, company, or corporation that operates pipe making facilities.

3.14 reel: A wooden or metal capstan-like device for holding coiled pipe.

3.15 reference end: The end of the spool of pipe from which measurements are recorded.

⁴ISO, Case Postale 56, CH-1211, Geneva 20, Switzerland, www.iso.org

3.16 shall: Used to indicate that a provision is mandatory.

3.17 should: Used to indicate that a provision is not mandatory but is recommended as good practice.

3.18 skelp: Flat steel rolled to specified tolerances and slit to the appropriate width for the manufacture of coiled line pipe.

3.19 spool: A finished length of coiled line pipe on a supporting reel. A pipe in the spool of pipe may contain one or more pipe-to-pipe welds.

3.20 special processes: Certain operations performed during skelp joining and pipe manufacturing that affect attribute compliance required in this document (except chemistry and dimensions). The applicable special processes are as follows:

a. Welded without filler metal (seam weld):

Manufacturing Condition	Special Processes
Heat Treated Pipe	Seam weld and full body heat treatment. NDT

b. Welded with filler metal (skelp-end weld and pipe-to-pipe weld):

Manufacturing Condition	Special Processes
Heat Treated	Skelp-end weld Heat treatment of skelp-end weld Pipe-to-pipe weld. Heat treatment of pipe-to-pipe weld. NDT

3.21 standardization: The adjustment of a nondestructive inspection instrument to an arbitrary reference value.

3.22 strip: a single length of skelp, cut from a master coil.

4 Information to be Supplied by the Purchaser (See Note 1)

4.1 PURCHASER SPECIFICATION

In placing orders for line pipe to be manufactured in accordance with API Spec 5LCP, the purchaser should specify the following on the purchase order:

Information	Reference
Specification	API Spec 5LCP
Grade	Table 1 and 2
Size: Outside diameter:	7.2, Table 3
Specified wall thickness	7.3
Nominal length	7.5
Pipe-to-Pipe Welds	7.6, Appendices A and B
Pipe Ends	7.8
Shipping Reel Dimensions	Appendix H
Delivery date and shipping instructions	

4.2 OPTIONAL PURCHASER REQUIREMENTS

The purchaser should also state on the purchase order his requirements concerning the following stipulations, which are optional with the purchaser:

Information	Reference
Fracture Toughness Tests	6.2.5
Nondestructive inspection for laminations	7.7.6
Radiographic Image Quality Indicator	8.6.5.2
Nondestructive Inspection of Standard-Demonstration	8.6.1
Skelp End weld inspection by Ultrasound	8.6.6
Markings in SI (metric) units	9.1.1
Bare pipe—special coatings	10.1
Method of pipe-to-pipe welding	Appendix A, B
Purchaser Inspection	Appendix F
Monogram marking (see Note 2)	Appendix G

4.3 REQUIREMENTS SUBJECT TO AGREEMENT

The following stipulations are subject to agreement between the purchaser and the manufacturer:

Information	Reference
Chemical composition	6.1.1
Alternative Fracture Toughness Tests	6.2.5
Intermediate diameters	7.1
Intermediate wall thickness	7.1
Tolerance on length	7.5
Pipe-to-pipe welds	7.6
Height of Inside Flash	7.7.4
Gauge Ball	7.9
Additional Skelp End Weld Inspection	8.6.4.2
Hydrostatic test pressure	8.4.3
Additional Inspection of Pipe-to-pipe welds	8.6.4.4
Type of X-ray Image Quality Indicator	8.6.5.2
Seam Weld Nondestructive Test Reference Standard.	8.6.7.2
Marking requirements	9.1 and Appendix G
Drying of Coil	10.2.3
Supplementary requirements	Appendix E
Supplementary NDE	Appendix E, SR21
Shipping Reel Information	Appendix H

Notes:

1. Nothing in this specification should be interpreted as indicating a preference for any material or process or as indicating equality between the various materials or processes. In the selection of materials and processes, the purchaser must be guided by his experience and by the service for which the pipe is intended.

2. Users of this specification should note that there is no longer a requirement for marking a product with the API monogram. API continues to license use of the monogram on products covered by this specification, but it is administered by the staff of the Institute separately from the specification. The policy describing use of the monogram is contained in Appendix G. No other use of the monogram is permitted. Licensees may mark products in conformance with Appendix G or Section 9, and non-licensees may mark products in conformance with Section 9.

5 Process of Manufacture and Material

5.1 PROCESS OF MANUFACTURE

Pipe furnished to this specification shall be welded as defined in 5.2.1.

5.2 TYPE OF PIPE

5.2.1 Electric Welded Pipe

Electric welded pipe is defined as pipe having one longitudinal seam produced by the electric welding process defined in 5.4.1.1.

5.3 TYPES OF WELDS

5.3.1 Electric-Weld (Seam)

An electric-weld is a longitudinal seam weld produced by the electric-welding process defined in 5.4.1.1.

5.3.2 Skelp End Weld

A skelp end weld is a butt weld that joins skelp ends together. Skelp end welds shall be made in accordance with a qualified welding procedure, using gas-metal arc welding, plasma-arc welding or gas tungsten arc welding. (See Appendix B). Skelp end welds shall be at right angles, or at an acute angle to the edges of the skelp.

5.3.3 Pipe-to-Pipe Weld

A pipe-to-pipe weld is a circumferential butt weld that joins two pieces of pipe together. Pipe-to-pipe welds shall be made in accordance with a qualified welding procedure, using gas-metal arc welding, plasma-arc welding, gas tungsten arc welding, or a combination of such welding processes. (See Appendices A and B).

5.4 WELDING PROCESSES

5.4.1 Without Filler metal

5.4.1.1 Electric Welding

A process of forming a seam by electric resistance or electric induction welding wherein the edges to be welded are mechanically pressed together and the heat for welding is generated by resistance to flow of electric current.

5.4.2 With Filler Metal

Welds made with filler metals are for skelp-end welds and pipe-to-pipe welds only.

5.4.2.1 Gas Metal-Arc Welding

A welding process that produces coalescence of metals by heating them with an arc or arcs between a continuous consumable electrode and the work. Shielding is obtained entirely from an externally supplied gas or gas mixture. Pressure is not used, and the filler metal is obtained from the electrode.

5.4.2.2 Plasma Arc Welding

A welding process that produces coalescence of metals by heating them with a constricted arc between an electrode and the work-piece, or the electrode and a nozzle. Shielding is obtained from the hot ionized gas issuing from the torch, which may be supplemented by an auxiliary source of shielding gas. Shielding gas may be an inert gas or a mixture of gases. Pressure may or may not be used.

5.4.2.3 Gas Tungsten Arc Welding

An arc-welding process that produces coalescence of the metals by heating them with an arc between a single tungsten electrode at the work. Shielding is obtained from a gas. Pressure is not used, and a filler metal may or may not be used.

5.5 HEAT TREATMENT

The heat treating process shall be performed in accordance with a documented procedure. For all grades, the weld seam and the entire heat effected zone shall be heat treated so as to simulate a normalizing heat treatment (see note) followed by full body stress relief and/or temper, except that by agreement between the purchaser and the manufacturer, alternative heat treatments or combinations of heat treatment and chemical composition may be substituted. Where such substitutions are made, the manufacturer shall demonstrate the effectiveness of the method selected using a procedure that is mutually agreed upon. This procedure may include, but is not necessarily limited to hardness testing, microstructural evaluation, and mechanical testing.

Note: During the manufacture of electric-welded pipe, the product is in motion through the surrounding air. Normalizing is usually defined as “cooling in still air”, hence the phrase “to simulate a normalizing heat treatment” is used here.

See 9.2.6 for applicable marking requirements.

5.6 TRACEABILITY

The manufacturer shall establish and follow procedures for maintaining heat and master-coil identity until all required heat and master-coil tests are performed and conformance with specification requirements has been shown.

6 Material Requirements

6.1 CHEMICAL PROPERTIES

6.1.1 Chemical Composition

The composition of pipe furnished to this specification, shall conform to the chemical requirements specified in Table 1, except that other chemical compositions may be furnished by agreement between the purchaser and the manufacturer

Columbium, vanadium, titanium, or combinations thereof may be used at the discretion of the manufacturer. For all grades, by agreement between the purchaser and the manufacturer, element other than niobium (columbium) vanadium and titanium may be used; however, caution should be exercised in determining the quantity that may be present for any particular size and thickness of pipe, because the addition of such otherwise desirable elements may alter pipe weldability.

Note: For grades X52C through X65C, for each reduction of 0.01% below the specified maximum carbon content, an increase of 0.05% above the specified maximum manganese content is permissible, up to a maximum of 1.45% for X52C, 1.60% for grades higher than X52C, and lower than X70C, and 2.00% for grade X70C and higher.

Table 1—Chemical Requirements by Percentage of Mass

Grade	Carbon Max	Manganese Max	Phosphorus Max	Sulphur Max
X52C	0.15	1.35	0.020	0.010
X56C	0.15	1.35	0.020	0.010
X60C	0.15	1.45	0.020	0.010
X65C	0.15	1.45	0.020	0.010
X70C	0.15	1.45	0.020	0.010
X80C	0.15	1.45	0.020	0.010
X90C	0.15	1.45	0.020	0.010

6.1.2 Elements Analyzed

As a minimum, each required analysis shall include the determination of the following:

- Carbon, manganese, phosphorus, sulphur, and silicon.
- Chromium, molybdenum, niobium (columbium), vanadium, nickel, copper, titanium, and boron or combinations thereof, if added during steel making.
- Any other alloying element added during steel-making for other than for deoxidation purpose.

6.2 MECHANICAL PROPERTIES

6.2.1 Tensile Properties

6.2.1.1 All coiled line pipe products shall conform to the tensile requirements specified in Table 2. Tensile tests to determine conformance shall be conducted on samples taken prior to any spooling.

Note: Spooling and unspooling of coiled line pipe can result in a reduction of the yield strength of approximately 5 – 10% due to the Bauschinger Effect. For this reason, pipe grade will be based upon tests conducted before the first spooling step in the manufacturing process.

The yield strength shall be determined by the 0.2% offset method.

6.2.1.2 When elongation is recorded or reported, the record or report shall show the nominal width of the test specimen when strip specimens are used, or state when full section specimens are used.

Table 2—Tensile Requirements

Grade	Yield Strength (min)		Tensile Strength (min)		Tensile Strength (max)		Hardness (max)
	psi	MPa	Psi	MPa	Psi	MPa	HRC
X52C	52,000	(359)	66,000	(455)	110,000	(758)	22
X56C	56,000	(386)	71,000	(490)	110,000	(758)	22
X60C	60,000	(414)	75,000	(517)	110,000	(758)	22
X65C	65,000	(448)	77,000	(530)	110,000	(758)	22
X70C	70,000	(483)	80,000	(551)	110,000	(758)	22
X80C	80,000	(551)	88,000	(607)	120,000	(827)	22
X90C	90,000	(621)	98,000	(676)	120,000	(827)	23

The minimum elongation in 2.0 in. (50.8 mm) shall be that determined by the following equation:

U.S. Customary Equation	SI (Metric) Equation
$e = 625,000 A^{0.2}/U^{0.9}$	$1944 A^{0.2}/U^{0.9}$

where

e = minimum elongation in 2.0 in. (50.8 mm) in percent, to the nearest percent.

A = cross-sectional area of the tensile test specimen in in.² (mm²) based on specified outside diameter or nominal specimen width and specified wall thickness rounded to the nearest 0.01 in.² (10 mm²) or 0.75 in.² (485 mm²) whichever is smaller.

U = specified minimum ultimate tensile strength, psi (MPa)

See Appendix C for minimum elongation values for various size tensile specimens and grades.

6.2.1.3 Hardness shall be measured on the surfaces of skelp-end and pipe-to-pipe welds.

6.2.2 Flattening Test Acceptance Criteria

Acceptable criteria for flattening tests shall be as follows. For all pipe diameter to thickness ratios (D/t), flatten to two-thirds of the original OD without weld opening. For pipe with a D/t greater than 10, continue flattening to one-third of the original OD without cracks or breaks other than in the weld. For all pipe D/t, continue flattening until opposite walls of the pipe meet; no evidence of lamination shall develop during the entire test.

6.2.3 Weld Ductility Test

For all pipe, the weld ductility shall be determined by tests on full-section specimens of 4-in. (152.4-mm) minimum length. The specimens shall be flattened at room temperature between parallel plates. The weld shall be placed 90° from the direction of applied force (point of maximum bending). No crack or breaks exceeding 0.125 in. (3.2 mm) in any direction in the weld or the parent metal shall occur on the outside surface until the distance between the plate is less than the value of S calculated by the

equation shown below, except that cracks that originate at the edge of the specimen and that are less than 0.25 in. (6.4 mm) long shall not be cause for rejection.

US Customary Units	SI (Metric) Units
$S = 3.05t/(0.05 + 3t/D)$	$S = 77.47t/(0.05 + 3t/D)$

where

S = distance between flattening plates, in. (mm),

t = specified wall thickness of the pipe, in. (mm),

D = specified outside diameter of the pipe, in. (mm).

6.2.4 Flaring Tests—All Grades

All grades of coiled line pipe shall be subjected to a flaring test as specified in 8.3.3. The acceptable criterion is no cracking in the weld seam region or base metal up to a minimum ID expansion of ID_f (defined in 8.3.3).

6.2.5 Fracture Toughness Tests

Fracture toughness testing for Charpy v-notch energy is required where possible, considering the limitations imposed by diameter and thickness of the pipe ordered. Transverse specimens shall be used when possible to machine full size, $2/3$ size, or $1/2$ size specimens utilizing either tapered-end specimens, non-flattened specimens, or flattened specimens. Otherwise, longitudinal specimens shall be substituted and shall be limited to $1/2$ size specimens. The test specimens shall be oriented circumferentially from a location 90° from the weld with the axis of the notch oriented through the pipe wall thickness. All tests shall be conducted at 32°F (0°C). The acceptance shall be 20 ft-lb (27 joules) average, 15 ft-lb (20 joules) minimum for full size transverse specimens and 30 ft-lb (41 joules) average, 20 ft-lb (27 joules) minimum for full size longitudinal specimens. By agreement, and when specified on the purchase order, alternative tests may be used when it is not possible to machine specimens meeting the above restrictions.

6.2.6 Metallographic Examination

For all pipe, compliance with the requirement in 5.5 that the entire heat affected zone be heat treated shall be demonstrated by metallographic examination of a weld cross section. Such examinations shall be performed on both ends of each milled length.

7 Dimensions, Mass Per Unit Length, Defects, and End Finishes

7.1 GENERAL—DIMENSIONS AND MASS PER UNIT LENGTH

Coiled line pipe shall be furnished in the outside diameters, wall thicknesses, and mass per unit length specified in Table 3 as specified on the purchase order, except that pipe with outside diameters and wall thicknesses intermediate to those listed in Table 3 are available by agreement between the purchaser and the manufacturer.

7.2 DIAMETER

The outside diameter shall be within the tolerances specified in Tables 4 and 5 for product in the as-milled condition.

Diameter measurements of pipe sizes $6^{5/8}$ and smaller shall be made with a snap gauge, caliper, or other device that measures actual diameter across a single plane. Diameter measurements shall be made on both ends of each milled length, and reported as the maximum and minimum dimension across all planes.

7.3 WALL THICKNESS

Both ends of each milled length of pipe shall be measured for conformance to the specified wall thickness requirements. The wall thickness at any location shall be within the tolerances specified in Table 6, except that the weld area shall not be limited by the plus tolerance. Wall thickness measurements shall be made with a mechanical caliper or with a properly calibrated non-destructive inspection device of appropriate accuracy. In case of dispute, the measurement determined by use of the mechanical caliper shall govern.

Table 3—Coiled Line Pipe Dimensions, Mass per Unit Length and Test Pressures

(1)		(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Designation		Outside Diameter D	Wall Thickness t	Mass per Unit length wpe	Inside Diameter d	Minimum Test Pressure (psi)						
						Grade						
Size	Wall	(in.)	(in.)a	(lb/ft)	(in.)	X52C	X56C	X60C	X65C	X70C	X80C	X90C
0.500	0.035	0.500	0.035	0.17	0.430	5800	6300	6700	7300	7800	9000	10100
0.500	0.049	0.500	0.049	0.24	0.402	8200	8800	9400	10200	11000	12500	14100
0.500	0.065	0.500	0.065	0.30	0.370	10800	11600	12500	13500	14600	15000	15000
0.625	0.080	0.625	0.080	0.47	0.465	10600	11500	12300	13300	14300	15000	15000
0.625	0.083	0.625	0.083	0.48	0.459	11000	11900	12700	13800	14900	15000	15000
0.625	0.087	0.625	0.087	0.50	0.451	11600	12500	13400	14500	15000	15000	15000
0.750	0.080	0.750	0.080	0.57	0.590	8900	9600	10200	11100	11900	13700	15000
0.750	0.083	0.750	0.083	0.59	0.584	9200	9900	10600	11500	12400	14200	15000
0.750	0.087	0.750	0.087	0.62	0.576	9700	10400	11100	12100	13000	14800	15000
0.750	0.095	0.750	0.095	0.67	0.560	10500	11300	12200	13200	14200	15000	15000
0.750	0.102	0.750	0.102	0.71	0.546	11300	12200	13100	14100	15000	15000	15000
0.875	0.080	0.875	0.080	0.68	0.715	7600	8200	8800	9500	10200	11700	13200
0.875	0.083	0.875	0.083	0.70	0.709	7900	8500	9100	9900	10600	12100	13700
0.875	0.087	0.875	0.087	0.73	0.701	8300	8900	9500	10300	11100	12700	14300
0.875	0.095	0.875	0.095	0.79	0.685	9000	9700	10400	11300	12200	13900	15000
0.875	0.102	0.875	0.102	0.84	0.671	9700	10400	11200	12100	13100	14900	15000
0.875	0.109	0.875	0.109	0.89	0.657	10400	11200	12000	13000	14000	15000	15000
1.000	0.080	1.000	0.080	0.79	0.840	6700	7200	7700	8300	9000	10200	11500
1.000	0.083	1.000	0.083	0.81	0.834	6900	7400	8000	8600	9300	10600	12000
1.000	0.087	1.000	0.087	0.85	0.826	7200	7800	8400	9000	9700	11100	12500
1.000	0.095	1.000	0.095	0.92	0.810	7900	8500	9100	9900	10600	12200	13700
1.000	0.102	1.000	0.102	0.98	0.796	8500	9100	9800	10600	11400	13100	14700
1.000	0.109	1.000	0.109	1.04	0.782	9100	9800	10500	11300	12200	14000	15000
1.000	0.125	1.000	0.125	1.17	0.750	10400	11200	12000	13000	14000	15000	15000
1.000	0.134	1.000	0.134	1.24	0.732	11100	12000	12900	13900	15000	15000	15000
1.250	0.075	1.250	0.075	0.94	1.100	5000	5400	5800	6200	6700	7700	8600
1.250	0.080	1.250	0.080	1.00	1.090	5300	5700	6100	6700	7200	8200	9200
1.250	0.087	1.250	0.087	1.08	1.076	5800	6200	6700	7200	7800	8900	10000
1.250	0.095	1.250	0.095	1.17	1.060	6300	6800	7300	7900	8500	9700	10900
1.250	0.102	1.250	0.102	1.25	1.046	6800	7300	7800	8500	9100	10400	11800
1.250	0.109	1.250	0.109	1.33	1.032	7300	7800	8400	9100	9800	11200	12600
1.250	0.118	1.250	0.118	1.43	1.014	7900	8500	9100	9800	10600	12100	13600
1.250	0.125	1.250	0.125	1.50	1.000	8300	9000	9600	10400	11200	12800	14400
1.250	0.134	1.250	0.134	1.60	0.982	8900	9600	10300	11100	12000	13700	15000
1.250	0.145	1.250	0.145	1.71	0.960	9700	10400	11100	12100	13000	14800	15000
1.250	0.156	1.250	0.156	1.82	0.938	10400	11200	12000	13000	14000	15000	15000
1.250	0.175	1.250	0.175	2.01	0.900	11600	12500	13400	14600	15000	15000	15000
1.250	0.188	1.250	0.188	2.13	0.874	12500	13500	14400	15000	15000	15000	15000
1.500	0.087	1.500	0.087	1.31	1.326	4800	5200	5600	6000	6500	7400	8400
1.500	0.095	1.500	0.095	1.43	1.310	5300	5700	6100	6600	7100	8100	9100
1.500	0.102	1.500	0.102	1.52	1.296	5700	6100	6500	7100	7600	8700	9800
1.500	0.109	1.500	0.109	1.62	1.282	6000	6500	7000	7600	8100	9300	10500



Table 3—Coiled Line Pipe Dimensions, Mass per Unit Length and Test Pressures (Continued)

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	
Designation	Outside Diameter D	Wall Thickness t	Mass per Unit length wpe	Inside Diameter d	Minimum Test Pressure (psi)							
					Grade							
Size	Wall	(in.)	(in.)a	(lb/ft)	(in.)	X52C	X56C	X60C	X65C	X70C	X80C	X90C
1.500	0.118	1.500	0.118	1.74	1.264	6500	7000	7600	8200	8800	10100	11300
1.500	0.125	1.500	0.125	1.84	1.250	6900	7500	8000	8700	9300	10700	12000
1.500	0.134	1.500	0.134	1.96	1.232	7400	8000	8600	9300	10000	11400	12900
1.500	0.145	1.500	0.145	2.10	1.210	8000	8700	9300	10100	10800	12400	13900
1.500	0.156	1.500	0.156	2.24	1.188	8700	9300	10000	10800	11600	13300	15000
1.500	0.175	1.500	0.175	2.48	1.150	9700	10500	11200	12100	13100	14900	15000
1.500	0.188	1.500	0.188	2.64	1.124	10400	11200	12000	13000	14000	15000	15000
1.500	0.204	1.500	0.204	2.83	1.092	11300	12200	13100	14100	15000	15000	15000
1.750	0.095	1.750	0.095	1.68	1.560	4500	4900	5200	5600	6100	6900	7800
1.750	0.102	1.750	0.102	1.80	1.546	4800	5200	5600	6100	6500	7500	8400
1.750	0.109	1.750	0.109	1.91	1.532	5200	5600	6000	6500	7000	8000	9000
1.750	0.118	1.750	0.118	2.06	1.514	5600	6000	6500	7000	7600	8600	9700
1.750	0.125	1.750	0.125	2.17	1.500	5900	6400	6900	7400	8000	9100	10300
1.750	0.134	1.750	0.134	2.31	1.482	6400	6900	7400	8000	8600	9800	11000
1.750	0.145	1.750	0.145	2.49	1.460	6900	7400	8000	8600	9300	10600	11900
1.750	0.156	1.750	0.156	2.66	1.438	7400	8000	8600	9300	10000	11400	12800
1.750	0.175	1.750	0.175	2.95	1.400	8300	9000	9600	10400	11200	12800	14400
1.750	0.188	1.750	0.188	3.14	1.374	8900	9600	10300	11200	12000	13800	15000
1.750	0.204	1.750	0.204	3.37	1.342	9700	10400	11200	12100	13100	14900	15000
1.750	0.224	1.750	0.224	3.65	1.302	10600	11500	12300	13300	14300	15000	15000
2.000	0.109	2.000	0.109	2.20	1.782	4500	4900	5200	5700	6100	7000	7800
2.000	0.118	2.000	0.118	2.37	1.764	4900	5300	5700	6100	6600	7600	8500
2.000	0.125	2.000	0.125	2.51	1.750	5200	5600	6000	6500	7000	8000	9000
2.000	0.134	2.000	0.134	2.67	1.732	5600	6000	6400	7000	7500	8600	9600
2.000	0.145	2.000	0.145	2.88	1.710	6000	6500	7000	7500	8100	9300	10400
2.000	0.156	2.000	0.156	3.08	1.688	6500	7000	7500	8100	8700	10000	11200
2.000	0.175	2.000	0.175	3.41	1.650	7300	7800	8400	9100	9800	11200	12600
2.000	0.188	2.000	0.188	3.64	1.624	7800	8400	9000	9800	10500	12000	13500
2.000	0.204	2.000	0.204	3.92	1.592	8500	9100	9800	10600	11400	13100	14700
2.000	0.224	2.000	0.224	4.25	1.552	9300	10000	10800	11600	12500	14300	15000
2.000	0.237	2.000	0.237	4.47	1.526	9900	10600	11400	12300	13300	15000	15000
2.000	0.250	2.000	0.250	4.68	1.500	10400	11200	12000	13000	14000	15000	15000
2 3/8	0.109	2.375	0.109	2.64	2.157	3800	4100	4400	4800	5100	5900	6600
2 3/8	0.118	2.375	0.118	2.85	2.139	4100	4500	4800	5200	5600	6400	7200
2 3/8	0.125	2.375	0.125	3.01	2.125	4400	4700	5100	5500	5900	6700	7600
2 3/8	0.134	2.375	0.134	3.21	2.107	4700	5100	5400	5900	6300	7200	8100
2 3/8	0.145	2.375	0.145	3.46	2.085	5100	5500	5900	6300	6800	7800	8800
2 3/8	0.156	2.375	0.156	3.70	2.063	5500	5900	6300	6800	7400	8400	9500
2 3/8	0.175	2.375	0.175	4.12	2.025	6100	6600	7100	7700	8300	9400	10600
2 3/8	0.188	2.375	0.188	4.40	1.999	6600	7100	7600	8200	8900	10100	11400
2 3/8	0.204	2.375	0.204	4.73	1.967	7100	7700	8200	8900	9600	11000	12400
2 3/8	0.224	2.375	0.224	5.15	1.927	7800	8500	9100	9800	10600	12100	13600
2 3/8	0.237	2.375	0.237	5.42	1.901	8300	8900	9600	10400	11200	12800	14400
2 3/8	0.250	2.375	0.250	5.68	1.875	8800	9400	10100	10900	11800	13500	15000
2 3/8	0.280	2.375	0.280	6.27	1.815	9800	10600	11300	12300	13200	15000	15000



Table 3—Coiled Line Pipe Dimensions, Mass per Unit Length and Test Pressures (Continued)

(1)		(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Designation		Outside Diameter D	Wall Thickness t	Mass per Unit length wpe	Inside Diameter d	Minimum Test Pressure (psi)						
						Grade						
Size	Wall	(in.)	(in.)a	(lb/ft)	(in.)	X52C	X56C	X60C	X65C	X70C	X80C	X90C
2 5/8	0.145	2.625	0.145	3.84	2.335	4600	4900	5300	5700	6200	7100	8000
2 5/8	0.156	2.625	0.156	4.12	2.313	4900	5300	5700	6200	6700	7600	8600
2 5/8	0.175	2.625	0.175	4.58	2.275	5500	6000	6400	6900	7500	8500	9600
2 5/8	0.188	2.625	0.188	4.90	2.249	6000	6400	6900	7400	8000	9200	10300
2 5/8	0.204	2.625	0.204	5.28	2.217	6500	7000	7500	8100	8700	9900	11200
2 5/8	0.224	2.625	0.224	5.75	2.177	7100	7600	8200	8900	9600	10900	12300
2 5/8	0.237	2.625	0.237	6.05	2.151	7500	8100	8700	9400	10100	11600	13000
2 5/8	0.250	2.625	0.250	6.35	2.125	7900	8500	9100	9900	10700	12200	13700
2 5/8	0.280	2.625	0.280	7.02	2.065	8900	9600	10200	11100	11900	13700	15000
2 7/8	0.134	2.875	0.134	3.93	2.607	3900	4200	4500	4800	5200	6000	6700
2 7/8	0.145	2.875	0.145	4.23	2.585	4200	4500	4800	5200	5600	6500	7300
2 7/8	0.156	2.875	0.156	4.53	2.563	4500	4900	5200	5600	6100	6900	7800
2 7/8	0.175	2.875	0.175	5.05	2.525	5100	5500	5800	6300	6800	7800	8800
2 7/8	0.188	2.875	0.188	5.40	2.499	5400	5900	6300	6800	7300	8400	9400
2 7/8	0.204	2.875	0.204	5.82	2.467	5900	6400	6800	7400	7900	9100	10200
2 7/8	0.224	2.875	0.224	6.35	2.427	6500	7000	7500	8100	8700	10000	11200
2 7/8	0.237	2.875	0.237	6.68	2.401	6900	7400	7900	8600	9200	10600	11900
2 7/8	0.250	2.875	0.250	7.02	2.375	7200	7800	8300	9000	9700	11100	12500
2 7/8	0.280	2.875	0.280	7.77	2.315	8100	8700	9300	10100	10900	12500	14000
3 1/2	0.156	3.500	0.156	5.58	3.188	3700	4000	4300	4600	5000	5700	6400
3 1/2	0.175	3.500	0.175	6.22	3.150	4200	4500	4800	5200	5600	6400	7200
3 1/2	0.188	3.500	0.188	6.66	3.124	4500	4800	5200	5600	6000	6900	7700
3 1/2	0.204	3.500	0.204	7.19	3.092	4800	5200	5600	6100	6500	7500	8400
3 1/2	0.224	3.500	0.224	7.84	3.052	5300	5700	6100	6700	7200	8200	9200
3 1/2	0.237	3.500	0.237	8.27	3.026	5600	6100	6500	7000	7600	8700	9800
3 1/2	0.250	3.500	0.250	8.69	3.000	5900	6400	6900	7400	8000	9100	10300
3 1/2	0.280	3.500	0.280	9.64	2.940	6700	7200	7700	8300	9000	10200	11500
3 1/2	0.300	3.500	0.300	10.26	2.900	7100	7700	8200	8900	9600	11000	12300
4	0.188	4.000	0.188	7.66	3.624	3900	4200	4500	4900	5300	6000	6800
4	0.204	4.000	0.204	8.28	3.592	4200	4600	4900	5300	5700	6500	7300
4	0.224	4.000	0.224	9.04	3.552	4700	5000	5400	5800	6300	7200	8100
4	0.237	4.000	0.237	9.53	3.526	4900	5300	5700	6200	6600	7600	8500
4	0.250	4.000	0.250	10.02	3.500	5200	5600	6000	6500	7000	8000	9000
4	0.280	4.000	0.280	11.13	3.440	5800	6300	6700	7300	7800	9000	10100
4	0.300	4.000	0.300	11.87	3.400	6200	6700	7200	7800	8400	9600	10800
4	0.312	4.000	0.312	12.30	3.376	6500	7000	7500	8100	8700	10000	11200
4 1/2	0.204	4.500	0.204	9.37	4.092	3800	4100	4400	4700	5100	5800	6500
4 1/2	0.219	4.500	0.219	10.02	4.062	4000	4400	4700	5100	5500	6200	7000
4 1/2	0.224	4.500	0.224	10.24	4.052	4100	4500	4800	5200	5600	6400	7200
4 1/2	0.237	4.500	0.237	10.80	4.026	4400	4700	5100	5500	5900	6700	7600
4 1/2	0.250	4.500	0.250	11.36	4.000	4600	5000	5300	5800	6200	7100	8000
4 1/2	0.280	4.500	0.280	12.63	3.940	5200	5600	6000	6500	7000	8000	9000
4 1/2	0.300	4.500	0.300	13.47	3.900	5500	6000	6400	6900	7500	8500	9600

