

CRA Line Pipe

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Foreword

This edition of API Specification 5LC supersedes the Third Edition and includes items approved by letter ballot through January 2014. Portions of this publication have been changed from the previous edition. Substantive changes are indicated with **gray shading and blue font**, but API makes no warranty as to the accuracy of such notations. Nonsubstantive changes will not be indicated with shading and colored font.

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This document was produced under API standardization procedures that ensure appropriate notification and participation in the developmental process and is designated as an API standard. Questions concerning the interpretation of the content of this publication or comments and questions concerning the procedures under which this publication was developed should be directed in writing to the Director of Standards, American Petroleum Institute, 200 Massachusetts Avenue, NW, Suite 1100, Washington, DC 20001. Requests for permission to reproduce or translate all or any part of the material published herein should also be addressed to the director.

Generally, API standards are reviewed and revised, reaffirmed, or withdrawn at least every five years. A one-time extension of up to two years may be added to this review cycle. Status of the publication can be ascertained from the API Standards Department, telephone (202) 682-8000. A catalog of API publications and materials is published annually by API, 200 Massachusetts Avenue, NW, Suite 1100, Washington, DC 20001.

Suggested revisions are invited and should be submitted to the Standards Department, API, 200 Massachusetts Avenue, NW, Suite 1100, Washington, DC 20001, standards@api.org.

Suggestions for Ordering API CRA Line Pipe

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

Specification	API Spec 5LC
Quantity	
Grade	Tables 4 and 7
Type of Pipe	Section 4.1 c)
Size	
Nominal Diameter:	
Standard-weight Plain-end Pipe	Table 12
Extra-strong Plain-end Pipe	Table 12
Double-extra-strong Plain-end Pipe	Table 12
Outside Diameter:	
Regular-weight Plain-end Pipe	Table 12
Special Plain-end Pipe	Table 12
Weight per Foot or Wall Thickness	Table 12
Nominal Length	Section 10.5
End Finish	Section 10
Delivery Date and Shipping Instructions	

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

Certificate of Compliance	Section 1.5
Chemical Analysis Test Reports	Section 6.5
Acceptance and Maximum Allowable Percent of Joints	Section 10.7
Alternative Bevel, Plain-end Pipe in Sizes	
2 ³ / ₈ in. OD and larger	Section 10.8
Defect Repair Procedures	Sections 12.7, 12.8, 12.9
Markings in Metric Units	Section 13.1 b)
Purchaser Inspection	Annex G
Monogram Marking *	Annex A, Section A.4

* Users of this specification should note that there is no longer a requirement for marking a product with the API monogram. The American Petroleum Institute 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 licensing and use of the monogram is contained in Annex A. No other use of the monogram is permitted. Nonlicensees may mark products in conformance with Section 13 and licensees may mark products in conformance with Annex A or Section 13.

Attention is called to the following stipulations which are subject to agreement between the purchaser and the manufacturer:

Chemical Composition	Section 6.1
Intermediate Grades	Section 7.1, Table D.1
Flattening Test Orientation	Section 7.9
Intermediate Diameters	Section 10.2
Intermediate Wall Thickness	Section 10.3
Supplementary Requirements	Annex B
Supplementary Hydrostatic Test	Section 9.4
Hydrostatic Test Pressure	Section 9.3
Lengths Applied to Carloads	Table 16
Nonstandard Length and Length Tolerances	Section 10.5
Repair of Welds of Electric-welded Pipe	Section 12.7 b)
Marking Requirements	Sections 13.1, 13.4, 13.5

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CRA Line Pipe

1 Scope

1.1 Coverage

This specification covers seamless, centrifugal cast, and welded alloy line pipe with improved corrosion resistant properties. The purpose of this specification is to provide standards for pipe with improved corrosion resistance suitable for use in conveying gas, water, and oil in both the oil and natural gas industries.

The size designations are nominal pipe sizes (NPS). In the text paragraphs herein, where pipe size limits (or size ranges) are given, these are outside diameter sizes except where stated to be nominal. These outside diameter size limits and ranges apply also to the corresponding nominal sizes. The primary product is beveled pipe. If plain-end square cut or other special end preparation is desired, this shall be subject to agreement between the purchaser and manufacturer. Included are NPS 1 in. through 42 in. Grades covered by this specification are LC30-1812, LC52-1200, LC65-2205, LC65-2506, LC30-2242, and [LC80-2507¹](#).

1.2 Application of the API Monogram

If product is manufactured at a facility licensed by API and it is intended to be supplied bearing the API Monogram, the requirements of Annex A apply.

2 Normative References

For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies. For a list of other documents and articles associated with this standard, please see the Bibliography. The following referenced documents, either referenced in full or in part, are indispensable for the application of this document.

API Specification 5L, *Specification for Line Pipe*

API Specification Q1, *Specification for Quality Management System Requirements for Manufacturing Organizations for the Petroleum and Natural Gas Industry*

[ANSI²/NACE³ MR0175, Petroleum and natural gas industries—Material for use in H₂S-containing environments in oil and gas production—Part 3: Cracking-resistant CRAs \(corrosion-resistant alloys\) and other alloys](#)

ASTM A262⁴, *Standard Practices for Detecting Susceptibility to Intergranular Attack in Austenitic Stainless Steels, Practice E*

ASTM A370, *Methods and Definitions for Mechanical Testing of Steel Products, Annex II—Steel Tubular Products*

ASTM A751, *Methods, Practices and Definitions for Chemical Analysis of Steel Products*

ASTM E4, *Practices for Load Verification of Testing Products*

ASTM E10, *Standard Method of Test for Brinell Hardness of Metallic Materials*

¹ [Seamless only.](#)

² American National Standards Institute, 1899 L Street, NW, 11th Floor, Washington, DC 20036, www.ansi.org.

³ NACE International, 1440 South Creek Drive, Houston, Texas 77084, www.nace.org.

⁴ ASTM International, 100 Barr Harbor Drive, West Conshohocken, Pennsylvania 19428, www.astm.org.

ASTM E18, *Standard Methods of Tests for Rockwell Hardness and Rockwell Superficial Hardness of Metallic Materials*

ASTM E83, *Method of Verification and Classification of Extensometers*

ASTM E562, *Practice for Determining Volume Fraction by Systematic Manual Point Count*

ISO/TR 9769⁵, *Steel and iron—Review of available methods of analysis*

ISO 15156-3, *Petroleum and natural gas industries-Material for use in H₂S-containing environments in oil and gas production—Part 3: Cracking-resistant CRAs (corrosion-resistant alloys) and other alloys*

3 Terms, Definitions, and Abbreviations

3.1 Terms and Definitions

For the purposes of this specification the following definitions apply.

3.1.1

heat

The metal produced by a single cycle of a batch melting process.

3.1.2

heat analysis

The chemical analysis representative of a heat as reported by the producer.

3.1.3

inspection

The process of measuring, examining, testing, gaging, or otherwise comparing the unit of product with the applicable requirements.

3.1.4

lot

A definite quantity of product manufactured under conditions that are considered uniform, for the attribute to be inspected.

3.1.5

lot size

The number of units of product in a lot.

3.1.6

manufacturer

Refers to the firm, company, or corporation responsible for marking the product to warrant that the product conforms to the specification.

NOTE The manufacturer may be either a pipe mill or a processor, as applicable. This manufacturer is responsible for compliance with all of the applicable provisions of the specification.

3.1.7

pipe mill

A firm, company, or corporation that operates pipe-making facilities.

⁵ International Organization for Standardization, 1, ch. de la Voie-Creuse, CH-1211 Geneva 20, Switzerland, www.iso.org.

3.1.8**processor**

A firm, company, or corporation that operates facilities capable of heat treating pipe made by a pipe mill.

3.2 Abbreviations

For the purposes of this specification the following abbreviations apply.

EDI	electronic data interchange
ERW	electric resistance welding
HAZ	heat-affected zone
HRC	Rockwell hardness C scale
NPS	nominal pipe size
SMYS	specified minimum yield strength
UNS	unified numbering system

4 General Information**4.1 Metric Units**

Metric units in this specification are shown in parentheses in the text and in many tables. Outside diameters and wall thicknesses are converted from inch dimensions. The converted diameters are rounded to the nearest 0.1 mm for diameters less than 18 in. and to the nearest 1.0 mm for diameters 18 in. and larger. Wall thicknesses are rounded to the nearest 0.1 mm.

Metric inside diameters are calculated from the metric outside diameters and wall thicknesses and rounded to the nearest 0.1 mm.

Metric plain-end weights are included from the metric outside diameters and wall thicknesses using the equations in 10.1 and rounded to the nearest 0.01 kg/m (0.01 lb/ft).

Metric hydrostatic pressures are calculated from metric outside diameters and wall thicknesses and metric fiber stresses shown in Section 9.

The factors used where conversions are appropriate are as follows:

1 inch (in.)	=	25.4 millimeters (mm) exactly
1 square inch (in. ²)	=	645.16 square millimeters (mm ²) exactly
1 foot (ft)	=	0.3048 meters (m) exactly
1 pound (lb)	=	0.45359 kilograms (kg)
1 pound per foot (lb/ft)	=	1.4882 kilograms per meter (kg/m)
1 pound per square inch (psi)	=	6.895 kilopascals (kPa) for pressure
	=	0.006895 megapascals (MPa) for stress
1 foot-pound (ft-lb)	=	1.3558 Joules (J) for impact energy

Equation (1) below was used to convert degrees Fahrenheit (°F) to degrees Celsius (°C):

$$^{\circ}\text{C} = \frac{5}{9} (^{\circ}\text{F} - 32) \quad (1)$$