



Designation: A587 – 22

Standard Specification for Electric-Resistance-Welded Low-Carbon Steel Pipe for the Chemical Industry¹

This standard is issued under the fixed designation A587; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope*

1.1 This specification² covers electric-resistance-welded low-carbon steel pipe intended for use as process lines.

1.2 Pipe ordered under this specification shall be suitable for severe forming operations involving flanging in all sizes and bending to close radii up to and including NPS 4 [DN 100].

1.3 This specification covers NPS ½ [DN 15] through NPS 10 [DN 250], plus additional sizes. The corresponding outside diameters and wall thicknesses for NPS ½ [DN 15] through 10 [DN 250] are listed in [Table 1](#), as are the dimensions for the additional sizes.

NOTE 1—The dimensionless designator NPS [DN] (nominal pipe size) has been substituted in this standard for such traditional terms as “nominal diameter,” “size,” and “nominal size.”

1.4 *Units*—This specification is expressed in both inch-pound units and in SI units; however, unless the purchase order or contract specifies the applicable M specification designation (SI units), the inch-pound units shall apply. The values stated in either inch-pound units or SI units are to be regarded separately as standard. Within the text, the SI units are shown in brackets. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in nonconformance with the standard.

1.5 The following precautionary caveat pertains only to the test method portion, Sections [7](#), [13](#), and [14](#), of this specification: *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.6 *This international standard was developed in accordance with internationally recognized principles on standard-*

ization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.

2. Referenced Documents

2.1 *ASTM Standards*:³

[A53/A53M](#) Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless

[A370](#) Test Methods and Definitions for Mechanical Testing of Steel Products

[A530/A530M](#) Specification for General Requirements for Specialized Carbon and Alloy Steel Pipe

[A751](#) Test Methods and Practices for Chemical Analysis of Steel Products

[A941](#) Terminology Relating to Steel, Stainless Steel, Related Alloys, and Ferroalloys

[E213](#) Practice for Ultrasonic Testing of Metal Pipe and Tubing

[E273](#) Practice for Ultrasonic Testing of the Weld Zone of Welded Pipe and Tubing

[E309](#) Practice for Eddy Current Examination of Steel Tubular Products Using Magnetic Saturation

[E570](#) Practice for Flux Leakage Examination of Ferromagnetic Steel Tubular Products

3. Terminology

3.1 *Definitions*—For definitions of terms used in this specification, refer to Terminology [A941](#).

4. Ordering Information

4.1 Orders for material under this specification should include the following as required to describe the desired material adequately:

4.1.1 Quantity (feet or number of pieces),

4.1.2 Name of material (electric-resistance-welded steel pipe),

¹ This specification is under the jurisdiction of ASTM Committee [A01](#) on Steel, Stainless Steel and Related Alloys and is the direct responsibility of Subcommittee [A01.09](#) on Carbon Steel Tubular Products.

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² For ASME Boiler and Pressure Vessel Code applications see related Specification SA-587 in Section II of that Code.

³ For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

*A Summary of Changes section appears at the end of this standard

TABLE 1 Tolerance for Outside Diameter and Wall Thickness^A

Designation		Outside Diameter			A Thickness			B Thickness	
NPS	DN	Inch	[mm]	Min	Nom	Max	Min	Nom	Max
½	15	0.840 ± 0.006	[21.3 ± 0.15]	0.095 [2.62]	0.103 [2.62]	0.111 [2.82]	0.125 [3.18]	0.140 [3.56]	0.151 [3.84]
¾	20	1.050 ± 0.006	[26.7 ± 0.15]	0.099 [2.51]	0.108 [2.74]	0.117 [2.97]	0.135 [3.42]	0.147 [3.73]	0.159 [4.04]
1	25	1.315 ± 0.006	[33.4 ± 0.15]	0.116 [2.95]	0.126 [3.20]	0.136 [3.25]	0.157 [3.99]	0.171 [4.34]	0.185 [4.70]
1 ¼	32	1.660 ± 0.007	[42.2 ± 0.17]	0.121 [3.07]	0.132 [3.35]	0.143 [3.63]	0.167 [4.24]	0.182 [4.62]	0.197 [5.00]
1 ½	40	1.900 ± 0.008	[48.3 ± 0.20]	0.127 [3.22]	0.138 [3.51]	0.149 [3.78]	0.175 [4.45]	0.190 [4.83]	0.205 [5.21]
2	50	2.375 ± 0.010	[60.3 ± 0.25]	0.135 [3.43]	0.147 [3.78]	0.159 [4.04]	0.191 [4.85]	0.208 [5.28]	0.225 [5.72]
3	90	3.500 ± 0.015	[101.6 ± 0.38]	0.189 [4.80]	0.206 [5.23]	0.223 [5.66]	0.262 [6.65]	0.286 [7.26]	0.310 [7.87]
4	100	4.500 ± 0.017	[114.3 ± 0.43]	0.207 [5.26]	0.226 [5.74]	0.245 [6.22]	0.295 [7.49]	0.322 [8.18]	0.349 [8.86]
6	150	6.625 ± 0.030	[168.3 ± 0.76]	0.245 [6.22]	0.267 [6.78]	0.289 [7.34]	0.378 [9.60]	0.412 [10.46]	0.446 [11.33]
8	200	8.625 ± 0.040	[219.1 ± 1.02]	0.282 [7.16]	0.308 [7.82]	0.334 [8.48]	0.438 [11.13]	0.478 [12.14]	0.518 [13.16]
10	250	10.750 ± 0.050	[273.0 ± 1.27]	0.319 [8.10]	0.348 [8.84]	0.377 [9.58]	0.520 [13.46]	0.567 [14.40]	0.614 [15.60]
Additional Sizes									
...	...	0.8125 ± 0.004	[20.6 ± 0.10]	0.095 [2.62]	0.103 [2.62]	0.111 [2.82]	0.129 [3.28]	0.140 [3.56]	0.151 [3.84]
...	...	1.0625 ± 0.006	[27.0 ± 0.15]	0.099 [2.51]	0.108 [2.74]	0.117 [2.97]	0.135 [3.42]	0.147 [3.73]	0.159 [4.04]
...	...	1.3125 ± 0.006	[33.3 ± 0.15]	0.116 [2.95]	0.126 [3.20]	0.136 [3.25]	0.157 [3.99]	0.171 [4.34]	0.185 [4.70]
...	...	1.875 ± 0.008	[47.6 ± 0.20]	0.127 [3.22]	0.138 [3.51]	0.149 [3.78]	0.175 [4.45]	0.190 [4.83]	0.205 [5.21]

^A Additional sizes noted in 1.3.

4.1.3 Size (NPS [DN] or outside diameter and wall thickness),

4.1.4 Length (definite cut length or random),

4.1.5 Test report required (see 15.2),

4.1.6 Specification designation A587 and year of issue,

4.1.7 Nondestructive testing practice required (E213, E273, E309, or E570), if applicable (see 14.2),

4.1.8 Special requirements, and

4.1.9 Supplementary Requirements S1 through S3, if applicable.

5. Materials and Manufacture

5.1 *Process*—The steel shall be aluminum killed steel made by one or more of the following processes: basic-oxygen, electric-furnace, or any other commercially viable process.

5.2 Steel may be cast in ingots or may be strand cast. When steels of different grades are sequentially strand cast, identification of the resultant transition material is required. The producer shall remove the transition material by any established procedure that positively separates the grades.

5.3 *Manufacture*—The pipe shall be made by electric resistance welding.

5.4 *Heat Treatment*—Pipe furnished in the as-welded condition shall be normalized at a temperature above the upper critical temperature. Cold-drawn pipe shall be normalized after the final cold-draw pass.

6. Chemical Composition

6.1 *Heat Analysis*—An analysis of each heat of steel shall be made to determine the percentages of the elements specified. The chemical composition thus determined shall conform to the requirements specified in Table 2 and the chemical analysis shall be in accordance with Test Methods, Practices, and Terminology A751.

6.2 *Product Analysis*—When requested on the purchase order, a product analysis shall be made by the supplier from one pipe or coil of steel per heat. The chemical composition thus determined shall be reported to the purchaser or the

TABLE 2 Chemical Composition Requirements

Element	Composition, %
Carbon, max	0.15
Manganese	0.27–0.63
Phosphorus, max	0.035
Sulfur, max	0.035
Aluminum	0.02–0.100

purchaser's representative and shall conform to the requirements specified in Table 2.

6.3 *Retests*—If the original test for product analysis fails, retests of two additional lengths of flat-rolled stock or pipe shall be made. Both retests for the elements in question shall meet the requirements of the specification; otherwise, all remaining material in the heat shall be rejected or, at the option of the producer, each length of flat-rolled stock or pipe may be individually tested for acceptance. Lengths of flat-rolled stock or pipe which do not meet the requirements of the specification shall be rejected.

6.4 Supplying an alloy grade of steel that specifically requires the addition of any element other than those listed in Table 2 is not permitted.

7. Mechanical Requirements

7.1 Tensile Properties:

7.1.1 The material shall conform to the requirements as to tensile properties prescribed in Table 3.

7.1.2 The yield strength shall be determined by the drop of the beam, by the halt in the gauge of the testing machine, by the use of dividers, or by other approved methods. When a definite yield point is not exhibited, the yield strength corresponding to a permanent offset of 0.2 % of the gauge length of the

TABLE 3 Tensile Requirements

Tensile strength, min, psi [MPa]	48 000 [330]
Yield strength, min, psi [MPa]	30 000 [205]
Elongation in 2 in. [50 mm], min, %	40