



# Standard Specification for Electric-Fusion-Welded Austenitic Chromium-Nickel Stainless Steel Pipe for High-Temperature Service and General Applications<sup>1</sup>

This standard is issued under the fixed designation A358/A358M; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

## 1. Scope\*

1.1 This specification<sup>2</sup> covers electric-fusion-welded austenitic chromium-nickel stainless steel pipe suitable for corrosive or high-temperature service, or both, or for general applications.

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

1.2 This specification covers the grades of alloy and stainless steel listed in **Table 1**. The selection of the proper grade and requirements for heat treatment shall be at the discretion of the purchaser, dependent on the service conditions to be encountered.

1.3 Five classes of pipe are covered as follows:

1.3.1 *Class 1*—Pipe shall be double welded by processes employing filler metal in all passes and shall be completely radiographed.

1.3.2 *Class 2*—Pipe shall be double welded by processes employing filler metal in all passes. No radiography is required.

1.3.3 *Class 3*—Pipe shall be single welded by processes employing filler metal in all passes and shall be completely radiographed.

1.3.4 *Class 4*—Same as Class 3 except that the weld pass exposed to the inside pipe surface may be made without the addition of filler metal (see **6.2.2.1** and **6.2.2.2**).

1.3.5 *Class 5*—Pipe shall be double welded by processes employing filler metal in all passes and shall be spot radiographed.

1.4 Supplementary requirements covering provisions ranging from additional testing to formalized procedures for

manufacturing practice are provided. Supplementary Requirements S1 through S6 are included as options to be specified when desired.

1.5 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 specification. The inch-pound units shall apply unless the “M” designation of this specification is specified in the order.

1.6 *This international standard was developed in accordance with internationally recognized principles on standardization 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*:<sup>3</sup>

**A240/A240M** Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications

**A262** Practices for Detecting Susceptibility to Intergranular Attack in Austenitic Stainless Steels

**A480/A480M** Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet, and Strip

**A941** Terminology Relating to Steel, Stainless Steel, Related Alloys, and Ferroalloys

**A999/A999M** Specification for General Requirements for Alloy and Stainless Steel Pipe

**E527** Practice for Numbering Metals and Alloys in the Unified Numbering System (UNS)

<sup>1</sup> This specification is under the jurisdiction of ASTM Committee A01 on Steel, Stainless Steel and Related Alloys and is the direct responsibility of Subcommittee A01.10 on Stainless and Alloy Steel Tubular Products.

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<sup>2</sup> For ASME Boiler and Pressure Vessel Code applications see related Specifications SA-358 in Section II of that Code.

<sup>3</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard’s Document Summary page on the ASTM website.



TABLE 1 Plate and Filler Metal Specifications

Grade	Filler Metal Classification and UNS Designation <sup>a</sup> for Applicable <sup>b</sup> AWS Specification											
	A5.4/A5.4M		A5.9/A5.9M		A5.11/A5.11M		A5.14/A5.14M		A5.22/A5.22M		A5.30/A5.30M	
	Class.	UNS	Class.	UNS	Class.	UNS	Class.	UNS	Class.	UNS	Class.	UNS
...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	ENiCrMo-3	W86112	...	ERNiCrMo-3	N06625	...	...
...	...	...	...	...	...	ENiCrMo-3	W86112	...	ERNiCrMo-3	N06625	...	...
800 <sup>F</sup>	...	...	...	...	...	ENiCrFe-3	W86182	...	ERNiCr-3	N06082	...	...
800H <sup>F</sup>	...	...	...	...	...	ENiCrFe-3 <sup>F</sup>	W86182 <sup>F</sup>	...	ERNiCr-3 <sup>F</sup>	N06082 <sup>F</sup>	...	...
...	...	...	...	...	...	ENiCrFe-3 <sup>F</sup>	W86182 <sup>F</sup>	...	ERNiCr-3 <sup>F</sup>	N06082 <sup>F</sup>	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	ENiCrMo-3	W86112	...	ERNiCrMo-3	N06625	...	...
201	...	...	...	...	...	...	...	...	...	...	...	...
201LN	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...
...	E 209	W32210	ER209	S20980	...	...	...	...	...	...	...	...
XM-19	E209	W32210	ER209	S20980	...	...	...	...	...	...	...	...
XM-29	E240	W32410	ER240	S24080	...	...	...	...	...	...	...	...
304	E308	W30810	ER308	S30880	...	...	...	...	E308T	W30831	IN308	S30880
304L	E308L	W30813	ER308L	S30883	...	...	...	...	E308LT	W30835	IN308L	S30883
304H	E308H	W30810	ER308	S30880	...	...	...	...	E308T	W30831	IN308	S30880
...	...	...	...	...	...	...	...	...	...	...	...	...
304N	E308	W30810	ER308	S30880	...	...	...	...	E308T	W30831	IN308	S30880
304LN	E308L	W30813	ER308L	S30883	...	...	...	...	E308LTT	W30835	IN308L	S30883
...	...	...	...	...	...	...	...	...	...	...	...	...
309S	...	...	...	...	...	...	...	...	...	...	...	...
309Cb	E309Cb	W30917	...	...	...	...	...	...	...	...	...	...
310S	...	...	...	...	...	...	...	...	...	...	...	...
310Cb	E310Nb	W31017	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	ENiCrMo-3	W86112	...	ERNiCrMo-3	N06625	...	...
...	...	...	...	...	...	ENiCrMo-13	W86059	...	ERNiCrMo-13	N06059	...	...



TABLE 1 Continued

Grade	Filler Metal Classification and UNS Designation <sup>A</sup> for Applicable <sup>B</sup> AWS Specification											
	A5.4/A5.4M		A5.9/A5.9M		A5.11/A5.11M		A5.14/A5.14M		A5.22/A5.22M		A5.30/A5.30M	
	Class.	UNS	Class.	UNS	Class.	UNS	Class.	UNS	Class.	UNS	Class.	UNS
...	...	...	...	...	...	...	...	...	...	...	...	...
A240/A240M	E316	W31610	ER316	S31680	ENiCrMo-10	W86022	ERNiCrMo-10	N06022	E316T	W31631	IN316	S31680
A240/A240M	E316L	W31613	ER316L	W31640	...	...	...	...	E316LT	W31635	IN316L	S31683
A240/A240M	E316H	W31610	ER316H	S31683	...	...	...	...	E316T	W31631	IN316	S31680
A240/A240M	E316	W31610	ER316	S31680	...	...	...	...	E316T	W31631	IN316	S31680
A240/A240M	E316L	W31613	ER316L	S31683	...	...	...	...	E316LT	W31635	IN316L	S31683
...	...	...	...	...	...	...	...	...	...	...	...	...
A240/A240M	E317	W31710	ER 317	S31780	...	...	...	...	E317LT	W31735	...	...
A240/A240M	E317L	W34713	ER317L	S31783	...	...	...	...	E317LT	W31735	...	...
...	...	...	...	...	ENiCrMo-3	W86112	ERNiCrMo-3	N06625	...	...	...	...
A240/A240M	...	...	...	...	ENiCrMo-3	W86112	ERNiCrMo-3	N06625	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...
A240/A240M	E347	W34710	ER321	S32180	...	...	...	...	E347T	W34731	IN348	S34780
A240/A240M	...	...	ER347	S34780	...	...	...	...	E347T	W34731	IN348	S34780
A240/A240M	...	...	ER321	S32180	...	...	...	...	...	...	...	...
A240/A240M	...	...	ER347	S34780	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...
A240/A240M	E347	W34710	ER347	S34780	...	...	...	...	E347T	W34731	IN348	S34780
A240/A240M	...	...	ER347	S34780	...	...	...	...	E347T	W34731	IN348	S34780
...	...	...	...	...	...	...	...	...	...	...	...	...
A240/A240M	...	...	...	...	...	...	...	...	...	...	...	...
A240/A240M	E347	W34710	ER347	S34780	...	...	...	...	E347T	W34731	IN348	S34780
...	...	...	...	...	...	...	...	...	...	...	...	...
A240/A240M	...	...	ER347	S34780	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...
A240/A240M	E347	W34710	ER347	S34780	...	...	...	...	E347T	W34731	IN348	S34780

<sup>A</sup> New designation established in accordance with Practice E527 and SAE J1086.

<sup>B</sup> Choice of American Welding Society specification depends on the welding process used.

<sup>C</sup> Minimum carbon content of the filler metal shall be 0.040 mass %.

<sup>D</sup> In previous editions, S30600 was incorrectly shown as S01815.

<sup>E</sup> Common name, not a trademark, widely used, not associated with any one producer.

<sup>F</sup> These filler metals have a high nickel content and, therefore, lower creep strength than the parent metal at temperatures exceeding about 1470 °F [800 °C], and its resistance to sulphurous media is inferior in certain cases.