



# 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 reappraisal. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reappraisal.

## 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.

Current edition approved Nov. 1, 2019. Published November 2019. Originally approved in 1952. Last previous edition approved in 2015 as A358/A358M – 15. DOI: 10.1520/A0358\_A0358M-19.

<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.

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



TABLE 1 Plate and Filler Metal Specifications

Grade	UNS Designation	Material Type	ASTM Plate Specification No. and 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			
...	N08020	...	A240/A240M N08020	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	N08967	...	A240/A240M N08967	...	...	...	...	ENiCrMo-3	W86112	ERNiCrMo-3	N06625	...	...	...	...	...	...	...
...	N08700	...	A240/A240M N08700	...	...	...	...	ENiCrMo-3	W86112	ERNiCrMo-3	N06625	...	...	...	...	...	...	...
800 <sup>F</sup>	N08800	...	A240/A240M N08800	...	...	...	...	ENiCrFe-3	W86182	ERNiCr-3	N06082	...	...	...	...	...	...	...
800H <sup>F</sup>	N08810	...	A240/A240M N08810	...	...	...	...	ENiCrFe-3 <sup>F</sup>	W86182 <sup>F</sup>	ERNiCr-3 <sup>F</sup>	N06082 <sup>F</sup>	...	...	...	...	...	...	...
...	N08811	...	A240/A240M N08811	...	...	...	...	ENiCrFe-3 <sup>F</sup>	W86182 <sup>F</sup>	ERNiCr-3 <sup>F</sup>	N06082 <sup>F</sup>	...	...	...	...	...	...	...
...	N08904	...	A240/A240M N08904	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	N08926	...	A240/A240M N08926	...	...	...	...	ENiCrMo-3	W86112	ERNiCrMo-3	N06625	...	...	...	...	...	...	...
201	S20100	201	Type 201	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
201LN	S20153	201LN	A240/A240M Type 201LN	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	S20400	...	A240/A240M S20400	E 209	W32210	ER209	S20980	...	...	...	...	...	...	...	...	...	...	...
XM-19	S20910	XM-19	Type XM-19	E209	W32210	ER209	S20980	...	...	...	...	...	...	...	...	...	...	...
XM-29	S24000	XM-29	A240/A240M Type XM-29	E240	W32410	ER240	S24080	...	...	...	...	...	...	...	...	...	...	...
304	S30400	304	A240/A240M Type 304	E308	W30810	ER308	S30880	...	...	...	...	...	...	...	...	...	...	...
304L	S30403	304L	A240/A240M Type 304	E308L	W30813	ER308L	S30883	...	...	...	...	...	...	...	...	...	...	...
304H	S30409	304H	A240/A240M Type 304H	E308H	W30810	ER308	S30880	...	...	...	...	...	...	...	...	...	...	...
...	S30415	...	A240/A240M S30415	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
304N	S30451	304N	A240/A240M Type 304N	E308	W30810	ER308	S30880	...	...	...	...	...	...	...	...	...	...	...
304LN	S30453	304LN	A240/A240M Type 304LN	E308L	W30813	ER308L	S30883	...	...	...	...	...	...	...	...	...	...	...
...	S30600 <sup>D</sup>	...	A240/A240M S30600 <sup>D</sup>	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	S30815	...	A240/A240M S30815	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
309S	S30908	309S	A240/A240M Type 309S	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
309Cb	S30940	309Nb	A240/A240M Type 309Cb	E309Cb	W30917	...	...	...	...	...	...	...	...	...	...	...	...	...
310S	S31008	310S	A240/A240M Type 310S	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
310Cb	S31040	310Cb	A240/A240M Type 310Cb	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	S31254	...	A240/A240M S31254	...	...	...	...	ENiCrMo-3	W86112	ERNiCrMo-3	N06625	...	...	...	...	...	...	...
...	S31266	...	A240/A240M S31266	...	...	...	...	ENiCrMo-13	W86059	ERNiCrMo-13	N06059	...	...	...	...	...	...	...



TABLE 1 Continued

Grade	UNS Designation	Material, Type	ASTM Plate Specification No. and 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			
...	S31266	...	A240/A240M S31266	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
316	S31600	316	A240/A240M Type 316	E316	W31610	ER316	S31680 W31640	ER316	S31680 W31640	ER316	W31610	ER316	S31680 W31640	E316T	W31631	IN316	S31680	
316L	S31603	316L	A240/A240M Type 316L	E316L	W31613	ER316L	S31683	ER316L	S31683	ER316L	W31613	ER316L	S31683	E316LT	W31635	IN316L	S31683	
316H	S31609	316H	A240/A240M Type 316H	E316H	W31610	ER316H	S31680	ER316H	S31680	ER316H	W31610	ER316H	S31680	E316T	W31631	IN316	S31680	
316N	S31651	316N	A240/A240M Type 316N	E316	W31610	ER316	S31680	ER316	S31680	ER316	W31610	ER316	S31680	E316T	W31631	IN316	S31680	
316LN	S31653	316LN	A240/A240M Type 316LN	E316L	W31613	ER316L	S31683	ER316L	S31683	ER316L	W31613	ER316L	S31683	E316LT	W31635	IN316L	S31683	
...	S31655	...	A240/A240M S31655	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
317	S31700	317	A240/A240M Type 317	E317	W31710	ER 317	S31780	ER 317	S31780	ER 317	W31710	ER 317	S31780	E317LT	W31735	...	...	
317L	S31703	317L	A240/A240M Type 317L	E317L	W34713	ER317L	S31783	ER317L	S31783	ER317L	W34713	ER317L	S31783	E317LT	W31735	...	...	
...	S31725	...	A240/A240M S31725	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
...	S31726	...	A240/A240M S31726	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
...	S31727	...	A240/A240M S31727	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
...	S32050	...	A240/A240M S32050	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
...	S32053	...	A240/A240M S32053	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
321	S32100	321	A240/A240M Type 321	E347	W34710	ER321	S32180 S34780	ER321	S32180 S34780	ER321	W34710	ER321	S32180 S34780	E347T	W34731	IN348	S34780	
321H <sup>C</sup>	S32109 <sup>C</sup>	321H <sup>C</sup>	A240/A240M Type 321H <sup>C</sup>	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
...	S32654	...	A240/A240M S32654	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
...	S34565	...	A240/A240M S34565	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
347	S34700	347	A240/A240M Type 347	E347	W34710	ER347	S34780	ER347	S34780	ER347	W34710	ER347	S34780	E347T	W34731	IN348	S34780	
347H <sup>C</sup>	S34709 <sup>C</sup>	347H <sup>C</sup>	A240/A240M Type 347H <sup>C</sup>	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
347LN	S34751	347LN	A240/A240M Type 347LN	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
...	S34752	...	A240/A240M S34752	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
348	S34800	348	A240/A240M Type 348	E347	W34710	ER347	S34780	ER347	S34780	ER347	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.