



Standard Specification for Seamless and Welded Ferritic, Austenitic and Duplex Alloy Steel Condenser and Heat Exchanger Tubes With Integral Fins¹

This standard is issued under the fixed designation A 1012; 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 specification describes seamless and welded ferritic, austenitic and duplex alloy steel tubing on which the external or internal surface, or both, has been modified by a cold forming process to produce an integral enhanced surface for improved heat transfer. The tubes are used in surface condensers, evaporators, heat exchangers and similar heat transfer apparatus in unfinned end diameters up to and including 1 in. (25.4 mm). Boiler tubes are excluded.

1.2 The values stated in inch-pound units are to be regarded as the standard. The values given in parentheses are for information only.

1.3 The following precautionary statement pertains to the test method portion only, Section 12, 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 and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:

A 213/A 213M Specification for Seamless Ferritic and Austenitic Alloy-Steel Boiler, Superheater, and Heat-Exchanger Tubes²

A 249/A 249M Specification for Welded Austenitic Steel Boiler, Superheater, Heat-Exchanger and Condenser Tubes²

A 268/A 268M Specification for Seamless and Welded Ferritic and Martensitic Stainless Steel Tubing for General Service²

A 269/A 269M Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service²

A 688/A 688M Specification for Welded Austenitic Stainless Steel Feedwater Heater Tubes²

A 789/A 789M Specification for Seamless and Welded Ferritic / Austenitic Stainless Steel Tubing for General Service²

A 803/A 803M Specification for Welded Ferritic Stainless Steel Feedwater Heater Tubes²

A 941 Terminology Relating to Steel, Stainless Steel, Related Alloys, and Ferroalloys²

A 1016/A 1016M Specification for General Requirements for Ferritic Alloy Steel, Austenitic Alloy Steel, and Stainless Steel Tubes²

E 1316 Terminology for Nondestructive Examinations³

3. Terminology

3.1 *Definitions*—For definition of general terms used in this specification, refer to Specification A 941.

3.2 *Symbols (Integral Fin Tube Nomenclature)*:

D	=	outside diameter of unenhanced section
D_i	=	inside diameter of unenhanced section
d_r	=	root diameter of enhanced section outside of tube
d_o	=	outside diameter of enhanced section
d_i	=	inside diameter of enhanced section
W	=	wall thickness of unenhanced section
W_f	=	wall thickness of enhanced section
F_h	=	height of fin—enhanced section outside of tube
F_m	=	mean fin thickness—enhanced section outside of tube
P	=	mean rib pitch—enhanced section inside of tube
R_h	=	height of rib—enhanced section inside of tube
H_a	=	rib helix angle—enhanced section inside of tube
T_t	=	transition taper

4. Ordering Information

4.1 It is the responsibility of the purchaser to specify all requirements that are necessary for material ordered under this specification. Such requirements may include, but are not limited to, the following:

4.1.1 ASTM designation and year of issue (this specification);

4.1.2 ASTM designation and year of issue (plain tube specification);

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 A01.10 on Stainless and Alloy Steel Tubular Products.

Current edition approved Nov. 10, 2002. Published December 2002. Originally approved in 2000. Last previous edition approved in 2000 as A 1012-00.

² Annual Book of ASTM Standards, Vol 01.01.

³ Annual Book of ASTM Standards, Vol 03.03.

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