



Designation: A288 – 91 (Reapproved 2013)

Standard Specification for Carbon and Alloy Steel Forgings for Magnetic Retaining Rings for Turbine Generators¹

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1. Scope

1.1 This specification covers quenched and tempered carbon and alloy steel forgings for magnetic retaining rings for turbine generators.

1.2 Supplementary requirements of an optional nature are provided. These shall apply only when specified by the purchaser.

1.3 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

2. Referenced Documents

2.1 *ASTM Standards*:²

[A275/A275M Practice for Magnetic Particle Examination of Steel Forgings](#)

[A531/A531M Practice for Ultrasonic Examination of Turbine-Generator Steel Retaining Rings](#)

[A788/A788M Specification for Steel Forgings, General Requirements](#)

3. Ordering Information

3.1 In addition to the ordering information required by Specification [A788/A788M](#), the purchaser shall include with the inquiry and order a detailed drawing, sketch, or written description of the forging, including the number and location of mechanical test specimens.

4. Manufacture

4.1 The melting processes of Specification [A788/A788M](#) shall be applicable except that the basic electric furnace process shall be used if separate refining or remelting is not employed.

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 A01.06 on Steel Forgings and Billets.

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² 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.

4.2 *Vacuum Degassing*—For Class 3 machined forgings over 2½ in. (63.5 mm) wall thickness, and Classes 4 to 8, the molten steel shall be vacuum treated immediately prior to or during the operation of pouring the ingot in order to remove objectionable gases, especially hydrogen.

4.3 *Discard*—Sufficient discard shall be made from each ingot to secure freedom from piping and undue segregation.

4.4 *Heat Treatment*:

4.4.1 *Heat Treatment for Mechanical Properties*—Heat treatment for properties shall be by quenching and tempering.

4.4.2 *Tempering Temperature*—The final tempering temperature shall be not less than 1100°F (595°C).

4.5 *Machining*:

4.5.1 *Preliminary Machining*—Forgings shall be machined all over prior to quenching and tempering for mechanical properties.

4.5.2 *Machine to Purchaser's Requirements for Shipment*—If required, forgings shall be machined to the dimensions shown on the purchaser's drawing prior to shipment.

5. Chemical Composition

5.1 The steel shall conform to the chemical composition prescribed in [Table 1](#).

5.2 *Heat Analysis*—The heat analysis obtained from sampling in accordance with Specification [A788/A788M](#) shall comply with [Table 1](#).

5.3 *Product Analysis*—The purchaser may use the product analysis provision of [Table 1](#) of Specification [A788/A788M](#) to obtain a product analysis from a forging representing each heat or multiple heat.

6. Mechanical Properties

6.1 *Tensile Requirements*—The material shall conform to the requirements for tensile properties prescribed in [Table 2](#).

6.2 *Notch Toughness Requirements*—The material shall conform to the requirements for notch toughness as prescribed in [Table 2](#).