



Designation: A 288 – 91 (Reapproved 1998)

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 the standard.

2. Referenced Documents

2.1 ASTM Standards:

A 275/A 275M Test Method for Magnetic Particle Examination of Steel Forgings²

A 531/A 531M Practice for Ultrasonic Inspection of Turbine-Generator Steel Retaining Rings²

A 788 Specification for Steel Forgings, General Requirements²

3. Ordering Information

3.1 In addition to the ordering information required by Specification A 788, 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 A 788 shall be applicable except that the basic electric furnace process shall be used if separate refining or remelting is not employed.

4.2 *Vacuum Degassing*—For Class 3 machined forgings over 2 1/2 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 A 788 shall comply with Table 1.

5.3 *Product Analysis*—The purchaser may use the product analysis provision of Table 1 of Specification A 788 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.

7. General Requirements

7.1 Material supplied to this specification shall conform to the requirements of Specification A 788 which outlines additional ordering information, manufacturing, requirements, testing and retesting methods, and procedures, marking, certification, product analysis variations, and additional supplementary requirements.

¹ This specification is under the jurisdiction of ASTM Committee A-1 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 *Annual Book of ASTM Standards*, Vol 01.05.