



Standard Specification for Vacuum-Treated Steel Forgings for Generator Rotors¹

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1. Scope

1.1 This specification covers vacuum-treated basic electric steel forgings for generator rotors.

1.2 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 341 Test Method for Direct-Current Magnetic Properties of Materials Using D-C Permeameters and the Ballistic Test Methods³

A 370 Test Methods and Definitions for Mechanical Testing of Steel Products⁴

A 418 Test Method for Ultrasonic Examination of Turbine and Generator Steel Rotor Forgings²

A 773 Test Method for D-C Magnetic Properties of Materials Using Ring and Permeameter Procedures with D-C Electronic Hysteresisgraphs³

A 788 Specification for Steel Forgings, General Requirements²

3. Ordering Information and General Requirements

3.1 In addition to the ordering information required by Specification A 788, the purchaser shall include with the inquiry and order, a dimensioned drawing showing the mechanical test specimen locations, and details of magnetic permeability tests, if required.

3.2 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, production analysis variations, and additional supplementary requirements.

3.3 If the requirements of this specification are in conflict with the requirements of Specification A 788, the requirements of this specification shall prevail.

4. Materials and Manufacture

4.1 The vacuum degassing requirements of Specification A 788 are mandatory. In addition to these requirements, hydrogen testing per Supplementary Requirement S4 is mandatory.

4.1.1 When the ladle degassing process is used, the evacuation system shall be capable of reducing the system vacuum pressure to a low level (usually less than 1000 μm). The molten metal shall be adequately stirred for a sufficient length of time to maximize exposure to the evacuated atmosphere. When this process is used, hydrogen testing per Supplementary Requirement S4 is mandatory.

4.1.2 Other methods of degassing may be used if the supplier can demonstrate their adequacy to the satisfaction of the purchaser. When other processes are used, hydrogen testing per Supplementary Requirement S4 is mandatory.

4.2 Heat Treatment:

4.2.1 If possible, forgings should be heat treated in the vertical position. Supplementary Requirement S3 makes this mandatory, if activated in the ordering information.

4.2.2 The heat treatment for mechanical properties shall consist of quenching and tempering, but normalizing and tempering is permissible with prior purchaser approval. Also, with prior purchaser approval, the post rough machining stress relief in 4.2.3 may be omitted when double tempering is used, instead of a single temper, to complete this heat treatment cycle.

4.2.3 After heat treatment and the subsequent rough machining, the forging shall be stress relieved at a minimum temperature of 1050°F (566°C), unless otherwise specified by the purchaser.

4.3 Machining:

4.3.1 *Boring*—The manufacturer may bore the forging at any time prior to stress-relief anneal. (See Supplementary Requirement S1).

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.

³ *Annual Book of ASTM Standards*, Vol 03.04.

⁴ *Annual Book of ASTM Standards*, Vol 01.03.