Designation: A 748/A 748M – 87 (Reapproved 2003)

Standard Specification for Statically Cast Chilled White Iron-Gray Iron Dual Metal Rolls for Pressure Vessel Use[1]

This standard is issued under the fixed designation A 748/A 748M; 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 covers statically cast dual metal rolls with the outer layer of the roll body being chilled white iron of different chemical composition than the core and journals of the roll which is gray cast iron. The castings are suitable for pressure containing parts, the design strength of which is based on the gray iron portion of the cylinder. The castings are suitable for service at temperatures up to 450°F [232°C].

1.2 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 are not exact equivalents; therefore, each system must be used independent of the other. Combining values from the two systems may result in nonconformance with the specification.

1.3 The following safety hazards statement pertains only to the test method portion, 9, 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 278 Specification for Gray Iron Castings for Pressure-Containing Parts for Temperatures Up to 650°F (350°C)[2]

A 278M Specification for Gray Iron Castings for Pressure-Containing Parts for Temperatures Up to 345°C [Metric][3]

A 667/A667M Specification for Centrifugally Cast Dual Metal (Gray and White Cast Iron) Cylinders[2]

3. Ordering Information

3.1 Orders for material under this specification shall include the following information:

3.1.1 ASTM designation and year of issue,

3.1.2 Dimensions of dual rolls,

3.1.3 Class of gray iron in the roll core (see 4.2),

3.1.4 Inspection requirements, if different (see 10.1),

3.1.5 Certification, if required (see 11.1), and

3.1.6 Special position of marking information, if required (see 12.1).

3.2 Any additional requirements not covered in this specification are subject to agreement between the manufacturer and purchaser.

4. Materials and Manufacture

4.1 The melting procedure shall be optional with the foundry.

4.2 The chilled white iron exterior of the roll body shall be made to a minimum hardness of 60 Scleroscope "C". The gray iron portion of the roll shall conform to the applicable class of Specifications A 278 and A 278M, as determined by design requirements. The scope of this specification shall include Nos. 20, 25, 30, and 35 of Specification A 278 [Nos. 150, 175, 200, and 250 of Specification A 278M].

4.3 The casting process shall be controlled to produce a metallurgical bond between the chilled white iron exterior and gray iron interior of the roll body.

5. Test Requirements

5.1 *Tensile Requirements*—Tensile bars removed from a prolongation at one end of the roll journal, in accordance with Specifications A 278 and A 278M, shall have a tensile strength not less than 80 % of that specified by the applicable class of Specifications A 278 and A 278M.

5.2 *Thickness of Chilled White Iron*:

5.2.1 The thickness of the clear chilled white iron plus the mottled iron at the roll face shall not be more than 30 % of the total finished wall thickness.

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[1] This specification is under the jurisdiction of ASTM Committee A04 on Iron Castings and is the direct responsibility of Subcommittee A04.01 on Grey and White Iron Castings.

Current edition approved May 10, 2003. Published May 2003. Originally approved in 1977. Last previous edition approved in 1998 as A 748/A 748M – 87 (1998).

[2] *Annual Book of ASTM Standards*, Vol 01.02.

[3] Discontinued. Replaced by A 278/A 278M. See 2000 *Annual Book of ASTM Standards*, Vol 01.02.

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5.2.2 The thickness of the chilled white iron exterior of the roll body shall be determined by measuring the chill depth at the ends of the roll face.

6. Finish

6.1 All surfaces shall be machined or ground, or both, prior to the rolls being placed into service.

7. Number of Tests

7.1 The number of tension tests shall be in accordance with Specifications A 278 and A 278M.

8. Specimen Preparation

8.1 Test bars representing the gray iron portion of the roll shall be made from a prolongation at one end of the roll journal in accordance with Specifications A 278 and A 278M. Tension test specimens machined from this prolongation shall conform to the dimensions shown for Specimen "C" in Specifications A 278 and A 278M.

9. Test Method

9.1 Tension test specimens shall fit the holders of the testing machine in such a way that the load shall be axial. The use of self-aligning shackles is suggested. After reaching a stress equivalent to 15 000 psi [100 MPa], the speed of the moving head of the testing machine shall not exceed ⅛ in. [3.2 mm]/min.

10. Inspection

10.1 The inspector representing the purchaser shall have free entry at all times, while work on the contract of the purchaser is being performed, to all parts of the manufacturer's works that concern the manufacture of the material ordered. The manufacturer shall afford the inspector all reasonable facilities to satisfy him that the material is being furnished in accordance with this specification. Unless otherwise specified, all tests and inspections shall be made at the place of manufacture prior to the shipment, and shall be so conducted as not to interfere unnecessarily with the operation of the works.

11. Acceptance and Certification

11.1 Final acceptance of the casting shall follow complete machining of the casting. Upon request of the purchaser and when so specified in the purchase order, a certification shall be made on the basis of acceptance of the material. This shall consist of a copy of the manufacturer's test report or a statement by the supplier, accompanied by a copy of the test results, that the material has been sampled, tested, and inspected in accordance with the provisions of this specification. Each certification so furnished shall be signed by an authorized agent of the supplier or manufacturer.

12. Product Marking

12.1 Pressure-containing castings made in accordance with this specification shall have the name of the manufacturer or his recognized trademark and the class of iron to which it conforms, cast or indelibly stamped on the surface indicated by the purchaser or in such a position as not to injure the usefulness of the casting.

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