Designation: A 504/A 504M – 08

Standard Specification for Wrought Carbon Steel Wheels[1]

This standard is issued under the fixed designation A 504/A 504M; 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 one-wear, two-wear, and multiple-wear wrought carbon steel wheels for locomotives and cars, designated Classes L, A, B, and C, heat-treated, wheels.

1.2 The service for which the various classes are intended is as follows:

1.2.1 Class B or C wheels shall be used for freight cars in interchange service.

1.2.2 Class B or C wheels are recommended for use on locomotives.

1.2.3 For passenger car service, the various classes are intended generally as follows:

1.2.3.1 *Class L*—High speed with more severe braking conditions than other classes and light wheel loads.

1.2.3.2 *Class A*—High speed with more severe braking conditions, but moderate wheel loads.

1.2.3.3 *Class B*—High speed service with severe braking conditions and heavier wheel loads.

1.2.3.4 *Class C*—(*1*) Service with light braking conditions and heavier wheel loads.

1.2.3.5 *Class C*—(*2*) Service with heavier braking conditions where off-tread brakes are employed.

1.3 The use of two-wear wheels is recommended for freight car service.

1.4 Supplementary requirements included in Specification A 788/A 788M may be specified by the purchaser for forgings ordered to this specification.

1.5 The values stated in either inch-pound units or SI (metric) units are to be regarded separately as the standard. Within the text and tables, the SI units are shown in brackets. The values stated in each system are not exact equivalents; therefore, each system must be used independently of the other. Combining values from the two systems may result in nonconformance with the specification.

1.6 Unless the order specifies the applicable "M" specification designation, the material shall be furnished to the inch-pound units

1.7 *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:* [2]

A 275/A 275M Practice for Magnetic Particle Examination of Steel Forgings

A 388/A 388M Practice for Ultrasonic Examination of Heavy Steel Forgings

A 788/A 788M Specification for Steel Forgings, General Requirements

2.2 *SAE Documents:*[3]

SAE J 442 Test Strip, Holder and Gage for Shot Peening

SAE J 443 Recommended Practice for Procedures for Using Standard Shot Peening Test Strip

SAE J 827 Recommended Practice for Cast Steel Shot

2.3 *Military Standard:*

MIL-S-13165B Shot Peening of Metal Parts[4]

2.4 *AAR Standard:*

AAR M-107/M-208 Wheels, Carbon Steel[5]

3. Terminology

3.1 *Definitions:* (The following terminology is unique to the Rail Road industry)

3.1.1 *multi-wear wheel*, *n*—wheel that has sufficient metal in the rim for more than two turnings before it must be replaced.

3.1.2 *one wear wheel*, *n*—wheel that has only sufficient metal for the tread to be worn once to condemnable worn hollow condition.

3.1.2.1 *Discussion*—There is insufficient metal remaining in the rim to allow turning or truing of the wheel by machining to

[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.

Current edition approved March 1, 2008. Published March 2008. Originally approved in 1964 to replace A 57 and A 186. Last previous edition approved in 2007 as A 504/A 504M – 07.

[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.

[3] Available from the Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, PA 15096.

[4] Available from Standardization Documents Order Desk, Bldg. 4 Section D, 700 Robbins Ave., Philadelphia, PA 19111-5094, Attn: NPODS.

[5] Available from Association of American Railroads, 50 "F" St., Washington, DC 20001.

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

Copyright © ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959, United States.

Copyright ASTM International
Provided by IHS under license with ASTM
No reproduction or networking permitted without license from IHS
Not for Resale

the standard tread contour and still have enough metal in the rim to support service loads. Wear refers to the amount of metal on the wheel rim when new.

3.1.3 *tape size*, *n*—rail road method of expressing wheel circumference based on measurement with a steel tape placed around the tread at the taping line.

3.1.3.1 *Discussion*—For each wheel size there is a calibrated tape. Tape size is expressed as the number of one-eighth increments from the standard tape for the wheel being measured. An AAR approved tape has four lugs to correctly space the tape from the rim so that the tape will measure on the taping line.

3.1.4 *two-wear wheel*, *n*—wheel that has more metal in the rim than a one-wear wheel so that the tread can be worn to condemnable hollow condition and then be restored by machining to the original tread contour. Thus, two tread wear lives are obtained from this wheel.

4. Ordering Information and General Requirements

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

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

4.2 Orders for wheels under this specification shall include the following additional information as appropriate:

4.2.1 Class (see Table 1),

4.2.2 Full identification of wheel design, including tread and flange contour, and dimensional drawing if required,

4.2.3 Rough bore size,

4.2.4 Wear category,

4.2.5 Alternate magnetic particle acceptance criteria (15.2.3.2),

4.2.6 Intended service (see Section 1), and

4.2.7 Supplementary requirements from Specification A 788/A 788M if required.

5. Chemical Requirements

5.1 *Heat Analysis*

5.1.1 The steel shall conform to the requirements for chemical composition shown in Table 1.

6. Manufacture

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

6.2 *Temperatures*—During the manufacture, necessary care in the regulation of temperature gradients shall be exercised to obtain the mechanical properties to be expected from the chemical composition and mechanical work. Immediately after the last hot fabricating operation (coning or dishing), all wheels shall be allowed to cool to a temperature below the critical range. The cooling shall be controlled to prevent injury by too rapid cooling.

7. Heat Treatment

7.1 Heat treatment shall consist of treatment of the rim only.

7.2 *Rim-Quenching Treatment*—The wheels shall be reheated uniformly to the proper temperature to refine the grain and then the rims shall be quenched. Following quenching, the wheels shall be charged into a furnace for tempering to meet the requirements of Section 13, and subsequently cooled under controlled conditions.

8. Shot Peening

8.1 *Scope*—The plate surfaces (area between the hub and rim) of all wheels shall be shot-peened in accordance with the following requirements:

8.2 *Requirements*:

8.2.1 *Shot*—The shot shall be No. 550 or larger hardened steel as specified in SAE J 827.

8.2.2 *Shot Size Control*—The peening machines shall be equipped with a separator for continuously removing broken shot. Sufficient new shot shall be added to ensure that a minimum of 85 % of No. 550 or larger shot is maintained in the machines at all times.

8.2.3 *Peening Intensity*—The peening intensity shall be sufficient to produce an average arc height of not less than 0.008 Almen C-2 on the front plate near the hub fillet and on the back plate near the rim fillet of wheels of the standard design, and at back plate hub fillet and front plate rim fillet of the reverse plate design. The area to be peened is defined as the

TABLE 1 Chemical Requirements

Element %	Class L	Class A	Class B	Class C
Carbon	0.47 max	0.47 – 0.57	0.57 – 0.67	0.67 – 0.77
Manganese	0.60 – 0.90	0.60 – 0.90	0.60 – 0.90	0.60 – 0.90
Phosphorous, max	0.030	0.030	0.030	0.030
Sulfur	0.005 – 0.040	0.005 – 0.040	0.005 – 0.040	0.005 – 0.040
Silicon	0.15 – 1.00	0.15 – 1.00	0.15 – 1.00	0.15 – 1.00
Nickel, max[A]	0.25	0.25	0.25	0.25
Chromium, max[A]	0.25	0.25	0.25	0.25
Molybdenum, max[A]	0.10	0.10	0.10	0.10
Vanadium, max[A]	0.040	0.040	0.040	0.040
Copper, max	0.35	0.35	0.35	0.35
Aluminum, max	0.060	0.060	0.060	0.060
Titanium, max	0.03	0.03	0.03	0.03
Columbium, max (Niobium)	0.05	0.05	0.05	0.05

[A] The manufacturer may exceed the noted maximum limits for nickel, chromium, molybdenum, or vanadium provided that the following relationship (AAR M-107/M-208) is met:

$$930 - [570 \times \%C] - [80 \times \%Mn] - [50 \times \%Cr] - [30 \times \%Ni] - [20 \times (\%\,Mo + \%V)] > 390$$

Copyright ASTM International
Provided by IHS under license with ASTM
No reproduction or networking permitted without license from IHS
Not for Resale

plate area extended approximately one half of the way into the hub and rim fillet radii on the front and on the back of the wheel.

8.2.4 *Arc Height Measurement*—Measurements of arc height shall be made in accordance with SAE J 442 or SAE J 443.

8.2.5 *Coverage*—The minimum peening time shall be sufficient to ensure that full coverage is attained on the Almen C strip as defined in the Alternate Procedure of SAE J 443, or MIL-S-13165B, Paragraph 6.11.

8.2.6 *Sequence*—Shot peening shall be performed on all wheels and after any corrective surface preparation in the plate area and after completion of required non destructive examinations. Plate area is defined in 8.2.3. Peening may be performed prior to dimensional inspection.

8.2.7 *Portable Peeners*—A portable peening device may be used to re-peen small reconditioned areas (no larger than about 2 by 3 in. [50 by 75 mm]) on wheel plate surfaces excluding the critical fillet areas (front hub and back rim). The portable equipment must be capable of peening an Almen C-2 Strip to develop the required average arc height of not less than 0.008 in. [0.203 mm] with a reasonable time of peening. Peening time of wheel plates must be at least as long as the time required to develop the 0.008-in. arc height. The equipment must be tested on an Almen C Strip each 8-h shift that the portable peener is used. A record of the Almen C test results shall be maintained.

8.3 *Quality Assurance Provisions*:

8.3.1 *Wheel Surface Condition*—The peened appearance of rim and hub shall not be cause for rejection.

8.3.2 *Frequency of Test*—Arc height determinations shall be made on Almen strips attached to a test wheel at the beginning and end of each production run but not less than once in each eight operating hours.

8.3.3 *Retest*—If a test fails to meet the arc height requirements of 0.008 Almen C-2, two retests shall be made. These retests shall be averaged with the first determination. The average shall be not less than 0.008 and no more than one value of the three shall be less than 0.008.

8.3.4 *Repeening*—When test values fail to meet the provisions of 8.3.3, corrective action shall be initiated and satisfactory test values secured before proceeding with production peening. If the average Almen value of the unsatisfactory test is 0.006 or 0.007, the last half of the wheels peened prior to the unsatisfactory test, but subsequent to a satisfactory test, shall be repeened with at least ½ exposure time. If the average Almen value is less than 0.006, all the wheels peened since the last satisfactory test shall be repeened with full exposure.

9. Retreatment

9.1 Any wheel failing to meet the requirements of Section 13 may be retreated and tested in accordance with 13.1 and 13.2.

10. Mating

10.1 Wheels shall be measured and marked to the lower tape number until the next graduation is reached. Wheels shall be shipped in pairs of the same measured tape size.

NOTE 1—The tables of tape sizes may be referred to in the Wheel and Axle Manual of the Association of American Railroads.

11. Permissible Dimensional Variations

11.1 The wheels shall conform to the permissible dimension variations specified in Table 2. When the permissible dimension variations in Table 2 allow a certain percentage of the wheels to vary by a given amount from standard dimensions for tape size, the percentage of such wheels shipped by any manufacturer shall not exceed this percentage during a calendar year. No individual purchaser may receive more than this percentage in daily shipments of such wheels except by agreement with the manufacturer.

12. Finish

12.1 Wheels shall be rough bored and shall not have black spots in the rough bore. The front hub face of wheels shall be parallel to the plane of the vertical reference line and may be smooth forged or machined. The back hub face may be smooth forged or machined.

12.2 Wheels shall be machined and finished smooth without excessive tool chatter.

12.3 Wheels shall be given a thorough surface examination and gauging at the place of manufacture before being offered for inspection. They shall have a workmanlike finish and must be free of conditions likely to develop in or cause removal from service.

12.4 Wheels shall not be covered with any substance to such an extent as to hide defects.

12.5 "As forged'' surfaces shall be free of abrupt changes in section or grooves and in a clean condition free of scale prior to final inspection. Where corrective machining or grinding has been employed, such surfaces shall not exceed a roughness of 500 µin. [12.7 µm] prior to final shot peening, and a uniform transition from the machined or ground surface into the plane of the "as forged'' surface must be provided.

13. Mechanical Requirements

13.1 The Brinell hardness of the rim, when measured in accordance with the requirements of 13.2, shall show the values as listed in Table 3.

13.2 *Method of Measurement*—Measurement shall be made on the front face of the rim with the edge of the impression not less than 3⁄16 in. [5 mm] from the radius joining face and tread. Before making the impression, surface decarburization shall be removed from the front face of the rim at the point chosen for measurement. The surface of the wheel rim shall be properly prepared to permit accurate determination of hardness.

13.3 *Number of Tests*:

13.3.1 Where continuous heat-treating furnaces are used, Brinell hardness measurements shall be made on 10 % of the wheels from each heat. Where batch-type heat-treating furnaces are used, Brinell hardness measurements shall be made on 10 % of the wheels from each heat-treatment lot, provided that at least one wheel is selected for test from each heat represented in the heat treatment lot. For either process, when there are less than 20 wheels from a heat, a minimum of two wheels shall be checked for hardness except when there is only

Copyright ASTM International
Provided by IHS under license with ASTM
No reproduction or networking permitted without license from IHS
Not for Resale

TABLE 2 Permissible Variations in Wheel Dimensions

Wheel Dimensions	Narrow Flange Type		Wide Flange Type	
	in.	mm	in.	mm
Flange:				
Height of flange	+1/16 –0	+1.5 –0	+1/16 –0	+1.5 –0
Thickness of flange	+1/16 –0	+1.5 –0	+1/32 –3/32	+0.8 –2.4
Radius of throat	±1/16	±1.5	±1/16	±1.5
Rim:				
Tape sizes, less than 44 in. [110 cm]	+14 –0[A]	+14 –0[A]	+14 –0[A] 5 % –5[B]	+14 –0[A] 5 % –5[B]
Inside diameter (back face of rim)				
(x) maximum governed by rim thickness and tape size	(x) – 3/8	(x) –10	(x) –3/8	(x) –10
Inside diameter (front face of rim)				
Maximum variation from back face diameter	+0 –1/4 [C]	+0 –6 [C]	±1/4 [D]	±6 [D]
Thickness of rim (measured with AAR steel wheel gauge, or equivalent)				
Corner at inside diameter of back rim face, radius, max (sharp corner preferable)	1/8	3	1/8	3
Rotundity, opening in ring gauge, max	1/32	0.8	1/32	0.8
Width of rim	±1/8	±3	±1/8	±3
Plane of back face, distance from straightedge:				
Over entire rim face, max	. . .	. . .	1/16	1.5
Over rim face more than 1¼ in. [30 mm] from inside edge, max	1/32	0.8	. . .	. . .
Plate:				
Thickness of plate (may vary)	–0	–0	–0	–0
Hub:				
Diameter of hub	+1 –0	+25 –0	+1 –0	+25–0
Wall thickness maximum variations:				
Outer surface machined	1/8	3	. . .	. . .
Not machined	3/8	10	3/8	10
Length of hub	±1/8	±3	±1/4	±6
Depression of hub:				
Back rim face to front hub face	+0 –1/8	+0 –3	+0 –1/4	+0 –6
Projection of hub (back rim face to back hub face)	±1/8	±3	±1/4	±6
Bore:				
Diameter of bore:				
Rough bore (finished bore not specified)	+1/16 –1/8	+1.5 –3	+1/16 –1/8	+1.5 –3
Rough bore (¼ in. [6 mm] less than finished bore)	+1/16 –1/8	+1.5 –3	+1/16 –1/8	+1.5 –3
Eccentricity of bore—between rough bore and tread, max	1/16[E]	1.5[E]	1/16[E]	1.5[E]

[A] Tape sizes are not in inches or millimetres. The tables of tape sizes may be referred to in the Wheel and Axle Manual of the Association of American Railroads, latest edition.
[B] No shipment shall exceed this percentage except by agreement with the manufacturer.
[C] Not less than specified and in any one wheel shall not vary more than 1/8 in. [3 mm].
[D] Ninety-five percent shall not be less than specified. Five percent may be 1/8 in. [3 mm] less than specified. One hundred percent shall not vary more than 1/8 in. [3.2 mm] on any two radii in any one wheel.
[E] Five percent of wheels delivered may be over 1/16 in. [1.5 WM] total dial indicator reading (TDIR), and these must not exceed 3/32 in. [2.25 mm] TDIR.

TABLE 3 Rim Hardness Values

Class	Minimum Hardness, HB	Maximum Hardness, HB
L	197	277
A	255	321
B	277	341
C	321	363

one wheel from a heat, in which case a Brinell hardness measurement shall be made on the one wheel.

13.3.2 If all the wheels tested meet the requirements of Section 13, all of the wheels represented shall be accepted.

13.3.3 If any wheel tested fails to meet the requirements of Section 13, it shall be checked by making two additional hardness measurements, one on each side of the point first measured and each approximately 1 in. [25.4 mm] from that point. If both of these check measurements meet the requirements of Section 13, the wheel shall be considered to have met the requirements of Section 13.

13.3.4 When continuous heat-treating furnaces are used, should any of the wheels tested fail on check test to meet the requirements of Section 13, the manufacturer may test for individual hardness measurements all of the wheels of that heat in the lot submitted for inspection and those meeting the requirements of Section 13 shall be accepted. Where batch heat-treating furnaces are used, should any of the wheels tested fail on check test to meet the requirements of Section 13, the manufacturer may test all of the wheels in the heat-treatment lot for individual hardness measurement and those meeting the requirements of Section 13 shall be accepted.

14. Inspection

14.1 The gauges and tapes shall conform to and be used as required by the standards of the Mechanical Division, Association of American Railroads.

15. Nondestructive Examination Requirements

15.1 *Ultrasonic Examination*:

15.1.1 Wheels shall be ultrasonically examined in accordance with applicable procedures of Practice A 388/A 388M.

15.1.2 The ultrasonic examination shall be performed after final thermal processing, but before shot peening.

15.1.3 *Calibration*:

15.1.3.1 Calibration shall be conducted using a reference standard of a wheel or portion of a wheel rim containing reference reflectors. The instrument sensitivity level should be

Copyright ASTM International
Provided by IHS under license with ASTM
No reproduction or networking permitted without license from IHS
Not for Resale

adjusted to produce an approximate ½ full-scale reflection from the reference standards of 15.1.3.2, 15.1.3.3, or 15.1.3.4, if this option is used.

15.1.3.2 For axial testing the reference standard shall be a ⅛-in. [3-mm] diameter flat-bottom hole drilled perpendicular to the rim face and to a depth of 1 in. [25 mm] to 1½ in. [40 mm] at the mid-thickness of the rim (Fig. 1).

15.1.3.3 For radial testing the reference standard shall be a ⅛-in. [3-mm] diameter flat-bottom hole drilled from the inside diameter of the rim essentially parallel to the rim face. It shall be a minimum of 1¼ in. [30 mm] from the tread surface (Fig. 2).

15.1.3.4 The side of a small-diameter hole from 1⁄16-in. [1.5-mm] to ⅛-in. [3-mm] diameter may be used when it is drilled the same distance from the testing surface. For the axial scan the hole is shown in Fig. 1(b), and for the radial scan the hole is shown in Fig. 2(b). The instrument shall be adjusted to give an equal test value to that of a ⅛-in. diameter flat-bottom hole. This practice is an alternative for the reference standards of 15.1.3.2 (Fig. 1(b)) and 15.1.3.3 (Fig. 2(a)).

15.1.3.5 Reference standards for the inspection of wheels shall be fabricated from heat-treated test wheels. The reference standard need not be the same design as the wheels being inspected.

15.1.4 *Scanning*:

15.1.4.1 Wheels shall be inspected axially from either the front or the back rim face and radially from the tread surface.

15.1.4.2 One or more transducers shall be designed and located to give maximum coverage of the rim section, both radially and axially.

15.1.4.3 Scanning speed shall permit detection of reference standards.

15.1.5 *Rejection Due to Ultrasonic Indication*:

15.1.5.1 Any wheel with a flaw indication equal to or larger than that the reference standard shall be cause for rejection.

15.1.5.2 Ultrasonic indications that result from wheel geometry or spurious electrical signals shall not be valid cause for rejection.

15.1.5.3 When automated equipment is used, the final disposition of rejectable wheels may be determined by manual testing of questioned areas.

15.2 *Magnetic Particle Examination*:

15.2.1 Each wheel shall be examined by the wet fluorescent magnetic particle methods described in Practice A 275/A 275M.

15.2.2 The magnetic particle examination shall be performed after final machining but before shot peening.

15.2.3 *Acceptance Criteria*:

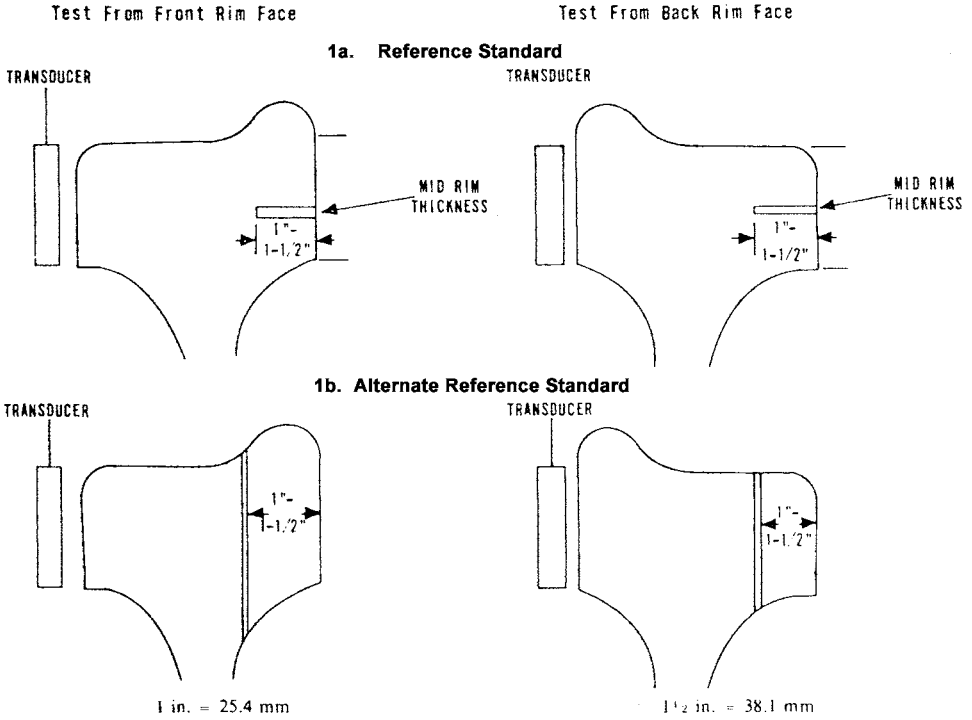
15.2.3.1 A relevant magnetic particle indication is defined as being greater than ⅛ in. [3 mm] in length.

15.2.3.2 Unless otherwise specified in the purchase order the following conditions are subject to rejection or removal:

(1) Indications with major dimensions exceeding ¼ in. [6 mm].

(2) Four or more indications exceeding 3⁄16 in. [5 mm] in major dimension that are aligned and separated by ⅛ in. [3 mm] or less end to end.

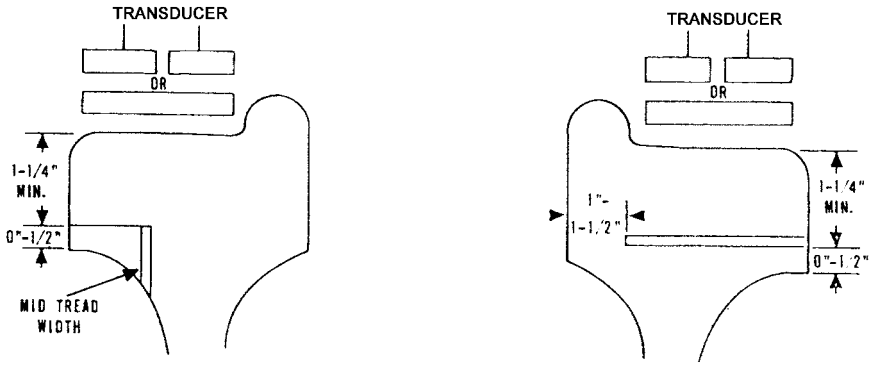
(3) Ten or more indications exceeding ⅛ in. [3 mm] in major dimension contained in any 6 in.^{2} [40cm^2] of surface with the major dimension of this area not to exceed 6 in.



Note—SI Units: 1 in. [25 mm]; 1 ½ in. [38 mm]

FIG. 1 Typical Reference Standards for Rim Face Test (Axial Testing)

Copyright ASTM International
Provided by IHS under license with ASTM
No reproduction or networking permitted without license from IHS
Not for Resale



2a Reference Standard

2b. Alternate Reference

Metric Equivalents				
in.	½	1	1¼	1½
mm	12.7	25.4	31.8	38.1

Note—SI Units: ½ in. [13 mm]; 1 in. [25 mm]; 1 ¼ in. [30 mm]; 1 ½ [38 mm]

FIG. 2 Typical Reference Standards for Rim Tread Test (Radial Testing)

[150 mm]. The area shall be taken in the most unfavorable location relative to the indications being evaluated.

15.2.4 Surface that have been machined or ground in order to remove magnetic particle indications shall be re-examined in accordance with 15.2.1.

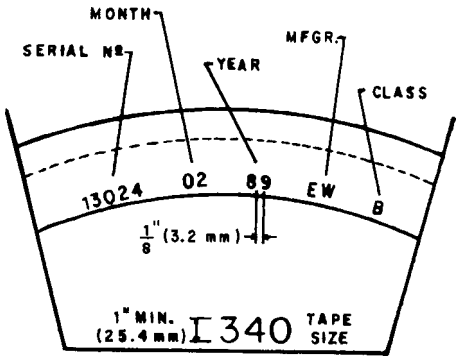
16. Marking

16.1 Identification markings shall be legibly stamped as shown in Fig. 3 or Fig. 4. Wheels for freight service must be hot stamped or cold stamped on the back hub face. If any stamped characters are missing or illegible, these shall be replaced by cold stamping in the proper place in the marking sequence. Passenger car wheels may be hot stamped or cold stamped on front or back (as specified by the purchaser) hub face. Locomotive wheels may be hot or cold stamped on the back rim face. When ordered, locomotive wheels may be cold stamped on the front hub face as shown in Fig. 4. Locomotive wheels that are to receive final hub machining by the purchaser may be ordered with markings paint stencilled on the wheel plate. After final machining, the purchaser will cold stamp the markings on the front hub face.

16.2 The tape size of all wheels shall be paint stenciled on back plates. An "H" shall also be paint stenciled on the front plate of curved plate, heat treated, freight car wheels for interchange use. The characters shall be at least 1 in. [25.4 mm] high.

16.3 Stencil paint will be zinc chromate primer or equivalent that will have a minimum service life of one year.

16.4 In addition to the above required markings, bar code tags may be applied to the wheels. If these tags are applied, it is recommended that Bar Code 39 be used. The size and location of the tags, as well as the information to be included, shall be agreed upon by the purchaser and the manufacturer.



NOTE 1—Stamping shall consist of manufacturer's serial number, date of manufacture, manufacturer's identification, and class of heat treatment. Stamping is limited to 14 characters, and the design designation shall be stencilled on the back plate with paint using characters at least 1 in. [25 mm] in height.

NOTE 2—Stamping shall be spaced a minimum of ⅛ in. [3 mm] between characters and 1⅜ in. [35 mm] between groups. The stamping shall be located not less than ¼ in. [6 mm] from the inner edge of the rim.

NOTE 3—Dies used to produce characters shall be not less than ⅜ in. [10 mm] in nominal height at crest and hot stamping shall be nominally 3⁄32 in. [2.5 mm] in depth. Italicized characters (sloped upward to right) shall be used.

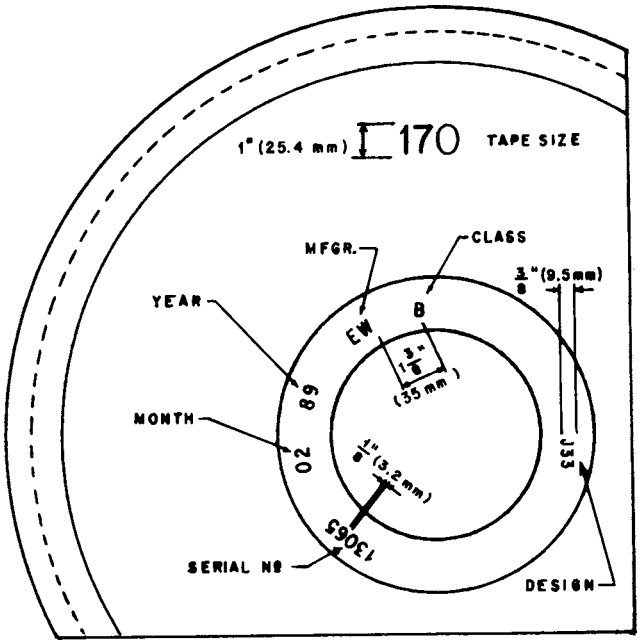
NOTE 4—All wheels shall be marked for class using letters L, A, B, or C, as appropriate.

FIG. 3 Marking of Wrought Steel Locomotive Wheels—Rim Stamping

17. Keywords

17.1 freight car wheels; locomotive wheels; passenger car wheels; rail applications; steel wheels; wrought steel

Copyright ASTM International
Provided by IHS under license with ASTM
No reproduction or networking permitted without license from IHS
Not for Resale



NOTE 1—Locomotive wheels are stamped on the front hub face; wheels for freight service are stamped on the back hub face and wheels for passenger service are stamped on the front or back (as specified by purchaser) hub face.

NOTE 2—Stamping shall consist of manufacturer's serial number, date of manufacture, manufacturer's identification, class of heat treatment and design designation in order as shown above. The hub stamping of locomotive wheels may be applied by the purchaser after final machining of the hub. Wheels that shall be marked by the purchaser should be furnished with all markings stencilled on the front plate with paint using characters at least 1 in. [25 mm] in height.

NOTE 3—Stamping shall be spaced a minimum of ⅛ in. [3 mm] between characters and a minimum of 1⅜ in. [35 mm] between groups and located approximately central of the hub face.

NOTE 4—Stamps used to produce characters shall be not less than ⅜ in. [10 mm] in height and shall not have sharp edges. Italicized characters (sloped upward to the right) shall be used.

NOTE 5—All wheels will be marked for class using letters L, A, B, or C as appropriate.

NOTE 6—The three groups: (*1*) serial number; (*2*) date of manufacture, manufacturer, and class; and (*3*) design, shall be spaced approximately equidistant around the hub face.

FIG. 4 Marking of Wrought Steel Wheels—Hub Stamping

SUMMARY OF CHANGES

Committee A01 has identified the location of selected changes to this standard since the last issue (A 504/A 504M – 07) that may impact the use of this standard. (Approved March 1, 2008.)

(*1*) Revised Titanium limit in Table 1 for Class C.

Committee A01 has identified the location of selected changes to this standard since the last issue (A 504/A 504M – 04$^{\epsilon 1}$) that may impact the use of this standard. (Approved March 1, 2007.)

(*1*) Revised Table 1.

Copyright ASTM International
Provided by IHS under license with ASTM
No reproduction or networking permitted without license from IHS
Not for Resale

ASTM International takes no position respecting the validity of any patent rights asserted in connection with any item mentioned in this standard. Users of this standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, are entirely their own responsibility.

This standard is subject to revision at any time by the responsible technical committee and must be reviewed every five years and if not revised, either reapproved or withdrawn. Your comments are invited either for revision of this standard or for additional standards and should be addressed to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee, which you may attend. If you feel that your comments have not received a fair hearing you should make your views known to the ASTM Committee on Standards, at the address shown below.

This standard is copyrighted by ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959, United States. Individual reprints (single or multiple copies) of this standard may be obtained by contacting ASTM at the above address or at 610-832-9585 (phone), 610-832-9555 (fax), or service@astm.org (e-mail); or through the ASTM website (www.astm.org).

--`,,```,,,,````-`-`,,`,,`,`,,`---

Copyright ASTM International
Provided by IHS under license with ASTM
No reproduction or networking permitted without license from IHS

Not for Resale