

## PROPOSED SPECIFICATIONS FOR STEEL WHEELS AND HEAT-TREATED CARBON STEEL AXLES.

At the fourteenth annual meeting of the American Society for Testing Materials, held at Atlantic City, N.J., June 27 to July 1, 1911 the Committee A-1 on Standard Specifications for Steel presented a report in which were recommended standard specifications for forged and rolled, forged, or rolled solid steel wheels for subway and elevated railway service and standard specifications for heat-treated carbon steel axles, shafts and similar parts. These recommendations were as follows:—

### Proposed Standard Specifications for Forged and Rolled, Forged, or Rolled Solid Steel Wheels for Engine Truck, Tender and Passenger, Subway and Elevated Railway Service.

1. Steel for wheels shall be made by the open-hearth process.
2. The ingots from which the blanks are made must have sufficient discard to insure freedom from injurious pipe and segregation.
3. The steel for wheels shall conform to the following limits in chemical composition:—
 

Carbon .....	0.60 to 0.80 per cent.
Manganese .....	0.50 to 0.80 per cent.
Silicon .....	Not to exceed 0.35 per cent.
Phosphorus .....	Not to exceed 0.06 per cent.
Sulphur .....	Not to exceed 0.06 per cent.
4. Drillings from small test ingot cast with the heat shall be taken to determine whether the heat is within the limits of chemical composition specified in Paragraph 3. For check analysis the purchaser has the right to take drillings from any two points in the plate on radii at right angles to each other of any one wheel from each heat, but not at any point where the usefulness of the wheel will be impaired; drillings to be clean and free from scale, oil and dirt; and his check analysis may, at the option of the purchaser, be made from mixed drillings taken entirely through the plate at the two points.
5. When required, the purchaser or his representative is to be furnished an analysis of each heat from which rolled wheels are made, such analysis to cover elements specified in Paragraph 3.
6. All wheels must be free from injurious seams, cracks, laminations or other imperfections detrimental to strength or service.
7. Wheels shall be furnished rough bored and with hubs faced. They may be furnished with contours as rolled and without additional machine work, provided they conform to the dimensions specified within the following tolerances—
  - (a) Height of Flange.—The height of flange shall not vary more than  $1/16$  in. over nor more than  $1/32$  in. under that specified.
  - (b) Thickness of Flange.—The thickness of flange shall not vary more than  $1/16$  in. over or under that specified.
  - (c) Throat Radius.—The radius of the throat shall not vary more than  $1/16$  in. over or under that specified.
  - (d) Thickness of Rim.—The rim may vary in thickness, but the variation less than the specified thickness shall not exceed  $3/16$  in. The thickness of rim shall be measured at the center line of tread.
  - (e) Width of Rim.—The width of rim shall not vary more than  $1/8$  in. over or under that specified.
  - (f) Thickness of Plate.—The plate may vary in thickness, but the variation less than the specified thickness shall not exceed  $1/32$  in. for each  $1/8$  in. in the thickness of the plate.

(g) Limit Groove.—Where limit groove is called for, the location of the center of limit of wear groove shall not vary more than  $1/16$  in. from that specified and its distance from the inner edge of the rim at the thinnest point shall not be less than  $11/16$  in.

(h) Diameter of Bore.—The diameter of rough bore shall not be more than  $1/16$  in. greater nor more than  $1/8$  in. less than specified. When not specified the rough bore shall be  $1/4$  in. less in diameter than the finished bore, subject to the above limitations.

(i) Hub Diameter.—The hub diameter may vary, but the thickness of the wall of the finished bored hub shall not be less than  $1 1/8$  ins. at any point unless otherwise specified, and shall not vary more than  $3/8$  in. at any two points on the same wheel.

(j) Hub Length.—The length of hub shall not vary more than  $1/8$  in. over or under that specified.

(k) Depression and Projection of Hub.—For subway and elevated railway motor wheels the depression of hub from front face of rim shall not be less but may be  $1/8$  in. more than that specified. The projection of hub from back face of rim shall not be more than  $1/32$  in. over nor more than  $1/16$  in. under that specified.

(l) Black Spots in Hub.—Black spots in the rough bore shall not be longer than 2 ins. nor deeper than  $1/8$  in. Black spots longer than 2 ins. or deeper than  $1/16$  in. will not be permitted in rough bore within 2 ins. of either face.

(m) Eccentricity of Bore.—The eccentricity between the tread at its center line and the rough bore shall not exceed  $1/16$  in.

(n) Block Marks on Tread.—The maximum height of block marks must not be greater than  $1/64$  in.

(o) Rotundity.—All wheels shall be gauged with a ring gauge, and the opening between the ring gauge and tread at any one point shall not exceed  $1/32$  in.

(p) Plane.—Wheels shall be gauged with a ring gauge placed concentric with and perpendicular to the axis of the wheel. All points on the back of the rim equidistant from the center shall be within a variation of  $1/16$  in. from the plane of the gauge when so placed.

(q) Tape Sizes.—Wheels shall not vary more than five tapes under nor nine tapes over the size called for by the drawing.

(r) Mating.—All wheels shall be measured with a tape based on the standard M.C.B. tape, with tape divisions  $1/8$  in. apart. The tape numbers shall be stenciled in plain letters on each wheel. Wheels must be mated to tape sizes and shipped in pairs. A variation of one tape will be allowed in the same pair.

8. Wheels shall be stamped with the maker's brand and number in such a way that each wheel may be readily identified.

9. The inspector representing the purchaser shall have free entry to the works of the manufacturer at all times while his contract is being executed. All reasonable facilities shall be afforded the inspector by the manufacturer to satisfy him that the wheels are being furnished in accordance with the contract. All tests and inspection shall be made at the place of manufacture prior to shipment and shall be so conducted as not unnecessarily to interfere with the operation of the mill.

### Proposed Standard Specifications for Heat-Treated Carbon Steel Axles, Shafts and Similar Parts.

1. Steel under this specification shall be made by the open-hearth or other approved process.
2. A sufficient amount of discard must be made from each ingot to insure freedom from piping and undue segregation.