

TB

**RAILWAY INDUSTRY STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

TB/T 449-2016

Replacing TB/T 449-2003

Wheel profile for locomotive and car

机车车辆车轮轮缘踏面外形

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Table of Contents

- 1 Scope
- 2 Types and contours
- Appendix B

1 Scope

TB/T 449-2016 is the Chinese railway standard that fixes the shape of the wheel: the flange and tread profile of wheels for locomotives and rolling stock. It exists because that profile is not a styling choice but the mechanism that steers the train. A railway wheel tread is a shallow cone, and it is the difference in rolling radius between the two wheels of a rigid wheelset that pulls the set back to the centre of the track and lets it negotiate a curve without a steering linkage. A profile that is too conical makes the wheelset hunt from side to side at speed; one that is too flat lets the flange climb the rail and derail. Because every wheelset has to run on the same network, and because worn wheels are re-turned on lathes shared across depots, the profile has to be one national figure rather than a manufacturer's. This standard defines the eight master tread profiles in Chinese service - LM, LMA, LMB, LMC, LMD, JM, JM2 and JM3 - together with the twenty-five thin-flange variants used when a worn wheel is re-profiled in maintenance. Appendix A gives the point coordinates of every contour, in the form a numerically controlled wheel lathe needs to cut them, and Appendix B gives the geometric construction behind the curves. It was issued on 26 May 2016 by the National Railway Administration and took effect on 1 December 2016, replacing TB/T 449-2003.

This standard specifies the type and profile of wheel rim tread profiles for railway rolling stock. This standard applies to machined rolling stock wheels.

2 Types and contours

2.1 There are 8 types of rolling stock wheel rim tread shape prototypes, the models of which are: LM, LMA, LMB, LMC, LMD, JM, JM2, JM3. The contours are as shown in Figures 1 ~ 8, respectively.

2.2 There are 25 types of thin rim tread shapes for rolling stock maintenance, including 9 types of LM thin rim treads and 16 types of JM thin rim treads, see Table 1.

2.3 See Appendix A for the point coordinates of the tread contours of LMB type and LMC type.

2.4 See Appendix B for the drawing method of rim tread contour.

2.5 See Appendix C for the comparison table between the old and new names of CN type, XP55 type, LMD type rim treads.

Appendix B

(Informative) Drawing method of rim tread contour B.1 General The drawing method of rim tread contour is divided into the tread contour drawing method and the rim contour drawing method. See Figure B.1, for the schematic outline of the LMA type rim tread. See Figure B.2, for a schematic outline of the LMB type rim tread. See Figure B.3, for a schematic outline of the LMC type rim tread. See Figure B.4, for a schematic outline of the LMD type rim tread. See Figure B.5, for a schematic outline of the rim tread of LM-28 type, LM-

27.5 type, LM-27 type, LM-26 type. See Figure B.6, for a schematic outline of LM-

31.5 type, LM-31 type, LM-30 type, LM-

29.5 type, LM-29 type, LM type, JM type, JM2 type, JM2 thin rim, JM3 type, JM3 thin rim tread. B.2 Drawing benchmark Take OX, OY as the coordinate axis, axis X as the tread baseline. The symbol markings are as shown in Figure B.1 ~ Figure B.6, respectively, according to different rim tread models. B.3 Method for drawing tread contour curve B.3.1 The specific drawing method of LMA type tread curve is as follows:

- a) Taking point O as the center and R_7 as the radius, draw an arc aa' , which intersects the straight line $x = L_3$ on the right side of the Y axis, at point O7;
- b) Taking point O7 as the center and $R_7 - R_6$ as the radius, draw an arc bb' , which intersects the straight line $x = L_2$ on the left side of the Y axis, at point O6;
- c) Taking point O6 as the center and $R_6 - R_5$ as the radius, draw an arc cc' ;
- d) Taking point F ($-70 + B_1, H_1$) as the center of the circle and R_5 as the radius, draw arc dd' . dd' and cc' intersect at point O5;
- e) Taking point O5 as the center and R_5 as the radius, draw a straight line gg' , that forms an angle of -70° with the X-axis and is tangent to the circle;
- f) Taking point O6 as the center and R_6 as the radius, draw a circle;
- g) Taking point O7 as the center and R_7 as the radius, draw a straight line segment $I'I$, which has a slope of $-1:40$ and is tangent to the circle. The tangent point is I' ; the abscissa of point I is $x = L_4$;
- h) Draw a straight line segment IM , which has a slope of $-1:15$ through point I (the length of IM is determined by the rim width);
- i) Make MN straight segment, where MN is a 5×5 chamfer. B.3.2 The specific drawing method of LMB type tread curve is as follows:

- a) Make a curve segment $G-H-I$, from the point coordinates of the tread contour;