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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 42359-2023

**Laboratory buffing method for wet, ice and snow testing of
passenger car tyres**

湿及冰雪路面试验用轿车轮胎室内磨削方法

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Foreword

This document was issued on 17 March 2023 by the State Administration for Market Regulation; Standardization Administration of the PRC and takes effect on 1 October 2023.

It is a GB/T standard: recommended rather than compulsory, but it is the text a Chinese reviewer applies when assessing a submission.

1 Scope

GB/T 42359-2023 describes how passenger car tyres are buffed in the laboratory before they go on to relative grip testing on wet, ice and snow surfaces. It fixes the grinding equipment, including the spindle device the tyre is mounted on, and the instruments used to check the result. The preparation clause imposes a wait, at least 24 hours after vulcanisation and then at least 3 hours at an ambient temperature between 5 °C and 40 °C, before anything is ground, and the grinding conditions hold that same temperature range and the specified working air pressure throughout the operation. The procedure works to marking points around the tyre whose groove depth is checked as material comes off, and judgment rules then decide whether the buffed tyre is fit to test at all. A report clause records what was done, and an informative appendix describes the pattern depth gauge. The point of the whole method is comparability: wet and winter grip is compared between tyres at a defined tread depth, and if one sample is ground hotter, faster or less evenly than another, what the track measures is the buffing and not the tyre. For tyre developers, test laboratories, and the engineers who read their reports.

This document describes the laboratory buffing method for passenger car tyres used for relative grip performance testing on wet, ice and snow roads, including test equipment and instruments, preparations before grinding, grinding conditions, grinding procedures, judgment rules of grinding inspection, and grinding test report.

This document applies to the laboratory buffing of new passenger car pneumatic tyres for testing.

2 Normative references

The following documents contain the provisions which, through normative reference in this document, constitute the essential provisions of this document. For the dated referenced documents, only the versions with the indicated dates are applicable to this document; for the undated referenced documents, only the latest version (including all the amendments) is applicable to this document.

GB/T 2978 Size designation, dimensions, inflation pressure and load capacity for passenger car tyres

GB/T 3487 Rims for passenger car

GB/T 6326 Tyre terms and definitions

GB/T 8170 Rules of rounding off for numerical values & expression and judgment of limiting values

3 Terms and definitions

The terms and definitions defined in GB/T 6326 and the followings apply to this document.

3.1 groove depth

The vertical distance from the lowest point of the groove bottom to the tangent of the tread.

3.2 target groove depth

The groove depth that is expected to be formed after a tyre is ground.

3.3 groove depth after buffing

The groove depth that is actually formed after a tyre is ground.

4 Equipment and instruments

4.1 Tyre grinding equipment

Tyre grinding equipment shall include:

- a) A spindle device, which is used to install tyres;
- b) A driving device, which is used to drive tyres to rotate;
- c) An inflation and pressure regulating device, which is used to quickly inflate and deflate tyres and control the stability of the air pressure when the tyres are running;
- d) A grinding device, which is used to grind tyres.

4.2 Inflation pressure gauge or air pressure sensor

A hand-held inflation pressure gauge or an air pressure sensor installed on the special grinding equipment for tyres, and the accuracy shall be ± 5 kPa.

4.3 Rim

4.3.1 The width of the rim shall comply with the measuring rim width stipulated in GB/T 2978 or related industry technical documents.

NOTE: The relevant industry technical documents are only applicable to the specifications of passenger

car tyres that are not within the scope of GB/T 2978.

4.3.2 The specified diameter and the inner contour of the rim shall comply with the provisions of GB/T 3487. In order to facilitate loading and unloading and to ensure that the bead of the tyre is in place correctly, other requirements for the rim are as follows:

- a) The fillet radius of the bead seat of the rim is less than 2.5 mm;
- b) The rim flange height is not less than 9.6 mm, but not higher than the flange height of the measuring rim;
- c) The bead seat of the tyre may not have peaks.

4.3.3 The difference between the diameters of the two bead seats of the rim shall be less than 0.1 mm.

4.3.4 When the rim is installed on the equipment, the maximum radial circle runout

tolerance (the bead seat part) and the maximum transverse circle runout tolerance (the inner surface of the rim) at the bead seat of the rim shall be less than 0.25 mm.

4.3.5 The rim shall be rigid enough to ensure that the deflection in any direction of the bead seat shall be less than 0.13 mm when running under the working air pressure (inflation pressure during tyre size measurement and grinding).

4.4 Pattern depth measuring instrument

The measurement accuracy of the pattern depth measuring instrument shall be ± 0.02 mm. It is advisable to use a pattern depth gauge, see Appendix A.

4.5 Surface roughness measuring instrument

The accuracy of the surface roughness measuring instrument shall be ± 0.05 μm .

5 Preparation before grinding

5.1 The tyre shall be parked for at least 24 hours after vulcanization.

5.2 The tyre shall be parked at an operating ambient temperature of 5°C ~ 40°C for at least 3 hours before grinding.

5.3 The tyre shall be installed on the rim specified in 4.3. Lubricant can be used when installing the tyre.

5.4 Inflate the tyre with the working air pressure; for snow and ice tyres, the working air pressure shall be $240\text{ kPa} \pm 5\text{ kPa}$, and for other tyres, it shall be $220\text{ kPa} \pm 5\text{ kPa}$; observe whether the tyre and rim slip through trial grinding.

5.5 Mark the groove depth measuring points on the tyre. The mark shall be at a position where the groove is obvious and easy to measure, and try to avoid the position that affects the measurement of the groove depth (such as the position of the tread wear indicator). The measuring point position shall be marked according to the following requirements.

- a) Tyre circumferential markings. The tyre circumferential marks are distributed at 5 points at approximately equal intervals, as shown in Figure 1.
- b) Tyre transverse markings. For tyres with significant longitudinal groove patterns, mark $n+4$ marking points in the transverse direction of the tyre (n is