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

GB/T 40717-2021

Fire-retardant tyres

阻燃轮胎

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Foreword

This document is the official English translation of GB/T 40717-2021, issued by the State Administration for Market Regulation and the National Standardization Administration on 11 October 2021 and in force since 1 May 2022. SAC/TC 19 is in charge of the English translation; in case of doubt about its contents, the Chinese original is authoritative.

The document was drafted according to the rules of GB/T 1.1-2020. It was proposed by the China Petroleum and Chemical Industry Federation and prepared by SAC/TC 19, the National Technical Committee on Tyres and Rims.

Attention is drawn to the possibility that some elements of this document may be the subject of patent rights; the issuing body is not responsible for identifying them.

1 Scope

China's national standard for fire-retardant tyres: the dedicated marking they carry, what they must achieve, and how that is proved. A tyre is several tens of kilograms of rubber, and once it is properly alight it is very hard to put out - which is why fleets working underground, in tunnels, in mines, on airport aprons and around fuel are asked for tyres that will not keep burning on their own. The document turns that requirement into two measurable ones: the finished tyre must stop burning within seconds of the flame being taken away, and the tread and sidewall compounds must reach a minimum oxygen index. It also defines the FR symbol moulded on the sidewall, so a buyer or an inspector can tell a conforming tyre at a glance rather than trusting a datasheet. It applies to truck tyres and passenger car tyres for which fire-retardant performance is required, and it is written for tyre makers, their compound suppliers, testing laboratories and the fleets that specify the tyres.

This document specifies the dedicated symbol, the technical requirements and the related performance testing methods for fire-retardant tyres.

It applies to truck tyres and passenger car tyres with required fire-retardant performance.

2 Normative references

The contents of the following documents constitute indispensable provisions of this document through normative reference in the text. For dated references only the edition cited applies; for undated references the latest edition applies, including any amendments.

GB/T 2941 Rubber - General procedures for preparing and conditioning test pieces for physical test methods.

GB/T 6326 Tyre terms and definitions.

GB/T 10707 Rubber - Determination of the burning.

3 Terms and definitions

The terms and definitions of GB/T 6326 apply, together with the two defined here.

3.1 fire-retardant tyre: a tyre that is self-extinguishing when removed from fire under the specified test conditions.

3.2 oxygen index: the minimum oxygen concentration, expressed as a percentage of volume, needed to maintain the combustion of rubber materials in a mixed flow of oxygen and nitrogen under specified conditions.

4 Dedicated symbol

The clause gives, as Figure 1, the symbol designed to identify tyres that conform to the technical requirements of Clause 5: the letters FR inside a circle, dimensioned in millimetres. A note allows the symbol to be enlarged proportionally.

5 Technical requirements

5.1 General requirements: a fire-retardant tyre has to meet the fire-retardant performance requirements set both for the tyre and for the tyre rubber material. Where the dimensions of the crown or the sidewall do not allow test samples to be cut, the tyre test of 6.2 is on its own sufficient to demonstrate the fire-retardant performance.

5.2 Fire-retardant performance requirements for tyres: tested according to 6.2, each tested part of the tyre has to self-extinguish, or cease to burn, in less than 10 s after removal from an open flame.

5.3 Fire-retardant performance requirements for tyre rubber material: after the oxygen index test of 6.3, the measured oxygen index of the tread rubber and of the sidewall rubber has to be not less than 24 per cent.

6 Test methods

6.1 Storage of the tyre sample: the finished tyre is kept in the test environment at 18 degrees C to 36 degrees C for at least 24 h before testing.

6.2 Fire-retardant performance test for tyres: the equipment is a portable flamethrower with an outer flame combustion temperature of 1 250 degrees C to 1 350 degrees C, such as a butane flamethrower, and a stopwatch. The procedure secures the uninflated tyre upright on concrete or cement ground, marks a point on the crown, one on the sidewall and one on the bead heel, aims the external flame vertically at the marked point for 10 s, then moves the flamethrower away and the burning at the marked point is observed and assessed. The test is carried out on crown, sidewall and bead heel in turn.

6.3 Fire-retardant performance test for tyre rubber material: samples are cut along the circumference at the crown, taking the crown centreline as the reference and preserving the surface layer, and at the middle of the sidewall; direct preparation of standard-thickness samples with a slicer according to GB/T 2941 is recommended. Cut samples do not exceed 3.5 mm in thickness, are ground or cut to the thickness required by GB/T 2941, and may not carry adjacent rubber or bonded fabric. The trimmed specimens comply with GB/T 10707, with the section names clearly indicated, and the material is then tested according to GB/T 10707 and the oxygen index recorded.