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ASSOCIATION STANDARD

T/CSAE 93-2018

Basic tire testing method for steady state lateral slip property

轮胎稳态侧偏特性基础试验方法

(English Translation)

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Foreword

This standard is drafted in accordance with the rules given in GB/T 1.1-2009 "Standardization Work Guide Part 1. Standard Structure and Compilation".

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Introduction

Tires are indispensable parts of vehicles, airplanes and other vehicles and even spacecraft. They are the only parts that come into contact with the road surface.

Load and motion functions. Tire dynamics covers the theory and technology of testing, simulation and application. It is the independent development of technologies such as automobiles and airplanes.

One of the bottlenecks.

The steady-state side-off characteristics of the tire characterize the straight-rolling tires at the side angles under certain conditions of road surface, air pressure, load and speed.

Steady-state force and torque response characteristics under and/or roll angle. In order to understand the test method of the steady-state cornering characteristics of the tire, and to standardize the steady-state side bias of the tire the terminology involved in the characteristic test needs to be standardized.

T/CSAEXX-2018

Basic test method for steady-state lateral deflection characteristics of tires

1 Scope

This standard specifies the basic method for testing the steady-state lateral deflection characteristics of tires.

This standard applies to all types of tires.

2 Normative references

The following documents are indispensable for the application of this document. For dated references, only the dated version applies to this document.

For undated references, the latest edition (including all amendments) applies to this document.

GB/T 6326 tire terminology and its definition GB/T 12549 Vehicle handling stability terminology and its definition

3 Terms and definitions

The following terms and definitions defined in GB/T 6326 and GB/T 12549 apply to this standard.

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3.1 Wheel geometry and tire coordinate system wheel geometry and tire axis system

The following defines terms related to wheel geometry and tire coordinate system.

3.1.1

Wheel center plane wheel plane A plane equidistant from the inner edges of the two sides of the wheel rim, the normal of which is parallel to the centerline of rotation of the wheel.

[GB/T 12549-2013, definition 4.1.1] (see Figure 1) 3.1.2 Wheel center wheel center the intersection of the center plane of the wheel and the centerline of the wheel's revolution.

[GB/T 12549-2013, meaning 4.1.2] (see Figure 1) 3.1.3 Tire grounding center the intersection of the intersection of the center plane of the wheel and the road surface and the projection of the center line of the wheel on the road surface.

[GB/T 12549-2013, definition 5.1.1] (see Figure 1) 3.1.4 Tire coordinate system (X, Y, Z) tire axis system (X, Y, Z) T/CSAEXX-2018 Right-handed rectangular coordinate system with the tire grounding center as the origin. The X axis is the intersection of the center plane of the wheel and the road surface, with the center plane of the wheel the direction of travel is positive; the Z-axis is the normal to the road surface, and the upward direction is positive; the Y-axis is in the road surface, and the direction is determined according to the right-hand rule.

[GB/T 12549-2013, definition 5.1.2] (see Figure 1)

Figure 1 tire coordinate system

3.1.5

Load radius

The distance from the center of the wheel to the grounding center of the tire.

The load radius of a static tire under a vertical load is a static loaded radius.

[GB/T 12549-2013, definition 5.1.5] 3.1.6 Side angle slip angle the angle between the direction of travel of the tire grounding center and the X-axis of the tire coordinate system.

In the tire coordinate system, from the X-axis to the direction of travel of the tire grounding center, the right-hand rule is used to judge the sign of its right and negative, as shown in Figure 1.

The side angle is negative.

[GB/T 12549-2013, definition 5.1.3] (see Figure 1) 3.1.7 Inclination angle T/CSAEXX-2018 the angle between the XZ plane of the tire coordinate system and the center plane of the wheel.

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In the tire coordinate system, from the XZ plane to the center plane of the wheel, determine the positive and negative signs according to the right-hand rule, the roll angle shown in Figure 1.

It is positive.

3.2 Tire rolling and slip characteristics tire rolling characteristics and tire slip

3.2.1

Free rolling tire

Rolling tires with a vertical load (see 3.3.2) but no driving torque (see 3.3.9) or braking torque (see 3.3.10). free the rolling tire can have a side angle and a roll angle, and the track of the tire ground center on the road surface can be a straight line or a curve.

3.2.2

Tire free rolling speed the product of the angular velocity of the rolling tire and the effective rolling radius of the tire (see 3.2.3).

3.2.3

Tire effective rolling radius the value obtained by dividing the distance moved by the free rolling tire from the grounding center of the tire by 2pi is called the effective rolling radius of the tire.

3.2.4

Tire travel speed tire trajectory velocity the speed at which the grounding center of the tire moves on the road surface.

Its component in the X direction of the tire coordinate system is called the tire longitudinal velocity, which is in the tire coordinate system Y direction.

The component is called the tire lateral velocity.

3.2.5

Tire longitudinal slip velocity the difference between the free rolling speed of the tire under driving or braking conditions and the longitudinal speed of the tire at this time.

3.2.6

Tire longitudinal slip ratio or the longitudinal slip ratio of the tire is the ratio of the longitudinal slip speed of the tire to the free rolling speed of the tire, expressed as.

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The longitudinal slip ratio of the tire is the ratio of the longitudinal slip speed of the tire to the longitudinal speed of the tire, expressed as.

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