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ASSOCIATION STANDARD

T/CSAE 94-2018

Tire steady state test method of longitudinal slip property

轮胎稳态纵滑特性基础试验方法

(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".

1 Scope

This standard specifies the method for testing the steady-state longitudinal slip characteristics of tires.

This standard applies to all types of tires.

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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 SAE J670 JAN2008 Vehicle Dynamics Terminology

3 Principles

The longitudinal slip characteristics of tires are important factors affecting the driving and braking performance of vehicles, and also the basis for studying the longitudinal dynamics of vehicles.

The longitudinal slip characteristics of a tire are characterized by the fact that a straight free rolling tire is driven under specific road conditions, air pressure, load and speed conditions.

Or force and torque response characteristics when braking torque.

This standard specifies the method for testing the steady-state longitudinal slip characteristics of tires.

4 Terms and definitions

The following terms and definitions defined in GB/T 6326, GB/T 12549 and SAE J670 JAN2008 apply to this standard.

4.1 Wheel geometry and tire coordinate system wheel Geometry and tire axis syste

4.1.1

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

[GB/T 12549, definition 4.1.1] (see Figure 1) 4.1.2 Wheel center wheel center the intersection of the center plane of the wheel and the centerline of the wheel's revolution.

[GB/T 12549, definition 4.1.1] (see Figure 1) 4.1.3 Tire grounding center T/CSAEXX-2018 the intersection of the intersection of the center plane of the wheel with the ground and the projection of the centerline of the wheel on the ground.

[GB/T 12549, definition 5.1.1] (see Figure 1) 4.1.4 Tire coordinate system (X, Y, Z) tire axis system (X, Y, Z) Right-handed rectangular coordinate system with the tire grounding center

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as the origin. The X axis is the intersection of the center plane of the wheel and the plane of the road, with the center of the wheel flat the direction of travel of the face is positive; the Z axis is the normal of the road plane, the upward is positive; the Y axis is in the road plane, and the direction is determined according to the right hand rule.

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

Figure 1 tire coordinate system

4.1.5

Load radius (loading radius) loaded radius the distance from the center of the wheel to the grounding center of the tire.

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

[GB/T 12549, definition 5.1.5] 4.1.6 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 ground center, the right hand rule is used to determine the sign of the right and the negative.

[GB/T 12549, definition 5.1.3] (see Figure 1) 4.1.7 T/CSAEXX-2018 Inclination angle (cab angle) the angle between the XZ plane of the tire coordinate system and the center plane of the wheel.

In the tire coordinate system, the XZ plane is turned to the center plane of the wheel, and its positive and negative signs are determined according to the right-hand rule.

[GB/T 12549, definition 5.1.8] (see Figure 1)

4.2 Tire rolling and slip characteristics Tire rolling characteristics and tire slip

4.2.1

Free rolling wheel

Rolling wheels with vertical loads but no driving or braking torque.

It is suitable for wheels that roll freely in a straight line, called straight free rolling tires.

A wheel that has a side angle or a non-linear motion with a camber angle.

4.2.2

Wheel rotation speed of free-rolling wheel the angular velocity of the free rolling wheel.

When the wheel is free to roll, it is called the wheel rotation speed of straight free-rolling.

Wheel)

4.2.3

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Rolling radius

Under the specified test conditions, the distance the tire is moved from the grounding center of the tire for one week is the rolling circumference.

The value obtained by dividing the rolling circumference of the tire by 2pi is called the rolling radius.

4.2.3

Tire travel speed tire trajectory velocity the speed at which the ground center of the tire moves relative to the reference 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.

4.2.4

Tire longitudinal slip angular velocity the difference between the wheel rolling angular velocity under driving or braking conditions and the free rolling angular velocity of the wheel.

Note: The wheel rolling angular velocity and the wheel free rolling angular velocity should be measured under the same conditions of maintaining the longitudinal speed of the tire.

4.2.5

Tire longitudinal slip ratio T/CSAEXX-2018 the ratio of the longitudinal slip speed of the tire to the free rolling angular velocity of the wheel.

Among them, 0 is the wheel free rolling angular velocity, and is the wheel rolling angular velocity at any time.

4.3 Tire force and moment tire force and moment

4.3.1

Tire normal force (tire radial force) zF the component of the force acting on the tire along the Z-axis. The absolute value of the normal force of the tire, called the tire vertical load (tire vertical load) 4.3.2 Tire lateral force (tire lateral force) yF the component of the force acting on the tire along the Y-axis.

4.3.3

Tire longitudinal force the component of the force acting on the tire along the X-axis.

4.3.4

Tire overturning moment the moment vector on which the road surface acts on the tire

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