

ICS 43.040.50  
CCS T 23



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

**GB/T 12549-2013**

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**Terms and definitions for vehicle controllability and stability  
(English Translation)**

**Issued on: November 27, 2013**

**Implemented on: July 1, 2014**

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**Issued by: General Administration of Quality Supervision, Inspection and  
Quarantine of PRC**

## Table of Contents

|                                                            |    |
|------------------------------------------------------------|----|
| Foreword...                                                | 3  |
| 1 Scope...                                                 | 4  |
| 2 Normative references...                                  | 4  |
| 3 Steering system...                                       | 4  |
| 4 Suspension system...                                     | 7  |
| 5 Tires and wheels...                                      | 13 |
| 6 Axis systems and motion...                               | 22 |
| 7 Movement characteristics...                              | 32 |
| 8 Characteristics of limit maneuver and abnormal motion... | 40 |
| 9 Test and evaluation...                                   | 43 |
| 10 Aerodynamics...                                         | 51 |
| Index in English...                                        | 68 |

### 1 Scope

This standard specifies the terms and definitions of vehicle controllability and stability.

This standard applies to all types of vehicles.

### 2 Normative references

The following documents are essential to the application of this document. For the dated documents, only the versions with the dates indicated are applicable to this document;

for the undated documents, only the latest version (including all the amendments) is applicable to this standard.

GB/T 3730.3-1992 Motor vehicles and towed vehicles - Dimensions of vehicles -

Terms and definitions

GB/T 6326-2005 Tyre terms and definitions

GB/T 16638.1-2008 Aerodynamics - Concepts quantities and symbols - Part 1.

Aerodynamic terms in common use

### **3.1 Angles in steering system**

#### **3.1.1**

Steer angle

$\delta_s$

The angle, BETWEEN the vehicle's longitudinal symmetry plane (see 6.1.6) and the center plane of the steering wheel (see 4.1.1) AND the intersection of the pavement (see Figure 1).

#### **3.1.2**

Steering wheel angle

$\delta_{sw}$

Steering wheel's angular displacement, which is measured based on the position of the steering wheel, when the vehicle is going straight.

### **4.1 Suspension geometry**

#### **4.1.1**

Wheel plane

For a single wheel, the wheel plane is the plane, which is equidistant from the inner edge of the wheel rim, on both sides.

#### **4.1.6**

Caster angle

The angle, between the projection of the centerline of the steering kingpin on the longitudinal plane of symmetry of the vehicle (see 6.1.6) AND the plumb line. If the upper end of the steering kingpin is inclined backward, this angle is positive; if the upper end of the steering kingpin is inclined forward, the angle is negative (see

Figure 3).

#### **4.1.10**

Kingpin offset

The length of the projection of the line, which connects the intersection of the kingpin's extension line and the pavement AND the center of tire contact (see 5.1.1), on the Y'-axis (see 5.1.2). If the center of tire contact is outside the intersection of the kingpin's extension line and the pavement relative to the vehicle body, the kingpin offset is positive; otherwise, it is negative.

#### 4.1.11

##### Lateral slip

The lateral slip value of the straight-running tire, per unit travel distance, which is measured on the lateral slip test bench. It is expressed in m/km, mm/m.

#### 4.1.12

##### Wheelbase

The distance, between two planes that pass through point A or (B) of two adjacent wheels on the same side of the vehicle AND are perpendicular to the Y and X planes, respectively.

### **4.2 Suspension system mechanics**

#### 4.2.1

##### Suspension vertical stiffness

Under a certain load state, the change in the vertical load of the wheel, which is corresponding to the unit displacement of the sprung center of mass, as relative to the center of the wheel, in the vertical direction.

#### 4.2.2

##### Suspension longitudinal stiffness

The change in longitudinal force at the wheel center, which is corresponding to a unit displacement of the wheel center, as relative to the sprung center of mass, in the longitudinal [x-axis (see 6.1.3) direction].

#### 4.2.10

##### Roll axis

A line, which connects the front and rear roll centers.

#### 4.2.11

##### Suspension compliance

Reciprocal of suspension stiffness.

#### 4.2.12

##### Damping force characteristic

The relationship between the damping force of a shock absorber and its piston speed.

#### 4.2.13

##### Overturning couple

Moment of the force acting on the vehicle, relative to the longitudinal axis of the vehicle on the pavement, due to the effects of lateral acceleration (see 6.4.16) and roll angular acceleration.

## **5.1 Tire axis system and variables**

### **5.1.1**

Center of tire contact

The intersection, BETWEEN the intersection line of wheel plane and the ground AND the projection of the wheel rotation center line on the ground (see Figure 1, Figure 4).

### **5.1.2**

Tire axis system ( $X'$ ,  $Y'$ ,  $Z'$ )

A right-handed rectangular axis system, which uses the center of tire contact as the origin. The  $X'$  axis is the intersection of the wheel plane and the road plane, wherein the travel direction of the wheel plane is positive

### **5.1.3**

Slip angle of tire

The angle, between the traveling direction of the center of tire contact and the  $X'$  axis of the tire axis system (see Figure 4 and Figure 5).

### **5.4.6**

Cornering stiffness

The increment of lateral force, which is corresponding to a unit increment of tire slip angle (usually refers to the measured value, when the tire slip angle is zero).

### **5.4.9**

Aligning stiffness (aligning torque stiffness)

The increment of the aligning torque, which is corresponding to the unit increment of the tire slip angle (usually refers to the measured value, when the tire slip angle is zero).

### **5.4.10**

Cornering stiffness coefficient

The ratio of cornering stiffness to vertical load, for a free-rolling wheel.

### **5.4.11**