

ICS 43.040.40

CCS Q69



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

GB/T 22309-2023

Replacing GB/T 22309-2008

**Road vehicles - Brake linings - Shear test method for disc brake
pad and drum brake shoe assemblies**

道路车辆 制动衬片 盘式制动块总成和鼓式制动蹄总成剪切强度试验方法

Issued on: December 28, 2023

Implemented on: July 1, 2024

**Issued by: State Administration for Market Regulation;
Standardization Administration of China**

Table of Contents

1	Scope
2	Normative references
3	Terms and definitions
4	Symbols
5	Sample preparation
6	Test equipment and fixtures
6.1	Test equipment
6.2	Test fixtures
6.2.2	Drum brake shoe assembly
7	Test procedure
7.4	Apply load at the rate specified in
8	Calculation of results
9	Test report
15	References...

Foreword

This document was drafted in accordance with the rules provided in GB/T 1.1-2020 Directives for standardization - Part

1.Rules for the structure and drafting of standardizing documents. This Standard replaces GB/T 22309-2008, Road vehicles - Brake linings - Shear test procedure for disc brake pad and drum brake shoe assemblies. Compared with GB/T 22309-2008, except for structural adjustment and editorial changes, the main technical changes are as follows:

- a) Change the "Scope" (see Chapter 1; Chapter 1 of the 2008 edition);
- b) Change the "Terms and definitions" (see Chapter 3; Chapter 3 of the 2008 edition);
- c) Change the "Symbols" (see Chapter 4; Chapter 4 of the 2008 edition);
- d) Change "ISO 6314" to "GB/T 26736-2011"; change "used samples" to "used products (for use in inertia test bench testing or actual vehicle)" (see 5.1; 5.1 of the 2008 edition);
- e) Add "When using a part of the assembly for testing, a load shall be applied in the radial or tangential direction relative to the vehicle installation position, and the direction shall be

indicated on the test report." (see 5.2);

f) Change "The edges of the sample shall be able to ensure good contact with the load and fixture, and the silencer sheet shall be removed" to "If necessary, the edges of the sample can be processed to ensure good contact with the load and fixture, and the silencer sheet can be removed before testing." (see 5.3;

5.3 of the 2008 edition);

g) Change the requirements for chamfers and surface areas in the General of Test fixtures (see 6.2.1;

6.2.1 of the 2008 edition);

h) Add "For linings bonded or molded on the shoe, the maximum distance from the bonding surface shall be

0.2 mm" (see 6.2.2.1);

1 Scope

GB/T 22309-2023 is the Chinese national standard on road vehicles - brake linings - shear test method for disc brake pad and drum brake shoe assemblies, in the field of road vehicles engineering. The /T suffix marks it as a recommended standard: it is not compulsory by itself, but it becomes binding as soon as a contract, a tender or a customer specification calls it up - which in practice is how most foreign buyers meet it. It was issued on 28 December 2023 by the State Administration for Market Regulation; Standardization Administration of China, and has been in force since 1 July 2024. Classification: ICS 43.040.40, CCS Q69. This page is published from the official record of the standard held by the Chinese standards administration: the identification, the dates, the classification and the issuing body are taken from there. The clause text, the tables and the numeric limits are in the document itself, which is delivered complete in English translation.

This document describes the sample preparation, test equipment and fixtures, test procedure, calculation of results and test report for the shear strength test method for disc brake pad assembly and drum brake shoe assembly. This document applies to the determination of shear strength of automotive disc brake pad assembly and drum brake shoe assembly that are integrally molded, bonded, or fitted using the two types of systems. This document is not applicable to the determination of shear strength of riveted automobile brake pad (shoe) assemblies.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies; for undated references, the latest edition of the referenced document

(including any amendments) applies.

GB/T 5620, Road vehicles - Vocabulary and definition for braking of automotive vehicles and their trailers

3 Terms and definitions

Terms and definitions determined by GB/T 5620, as well as the following, are applicable to this document.

3.1 lining Friction material component of the brake assembly.

3.2 bond area Contact area between the lining and the back plate or shoe.

3.3 shear strength The total load applied during shear failure divided by the bond area.

4 Symbols

Symbols given in Table 1 apply to this document.

5 Sample preparation

5.1 Use products under development, finished products, special treated (see GB/T 26736-2011) or used products (for use in inertia test bench testing or actual vehicle) as samples.

5.2 Use either an entire assembly or a part of the assembly (cut material) for testing. When using a part of the assembly for testing, a load shall be applied in the radial or tangential direction relative to the vehicle installation position, and the direction shall be indicated on the test report.

5.3 If necessary, the edges of the sample can be processed to ensure good contact with the load and fixture, and the silencer sheet can be removed before testing.

5.4 When testing the shoe block, the test shearing surface shall cover the entire assembly or a portion cut along the width of the lining (see Figure 1).

5.5 The number of samples is 5.

6.1 Test equipment

6.1.1 The test equipment shall be a press or tensile machine or similar machine (such as a shear testing machine) which applies sufficient shear force by driving the indenter.

6.1.2 The test equipment shall be provided with a recording device, which can correctly record the instantaneous failure shear force.

6.1.3 The test equipment shall be capable of controlling the loading rate so that the average

loading rate is $(4\,500 \pm 1\,000)$ N/s (depending on the vehicle type being evaluated). If a constant-speed crosshead testing machine is used, the crosshead speed is (10 ± 1) mm/min. Record the category of control of the testing machine (loading rate or crosshead speed) on the test report, so that the results can be compared between different test equipment. Avoid any impact load during the test.

6.2 Test fixtures

6.2.1 General The shear test fixture shall be able to hold the sample and be parallel to the indenter. To avoid sharp edges, the part of the fixture in contact with the sample shall be rounded with a radius of no more than 2 mm. If a specific radius is used, record it in the test report to avoid deviation from the test procedure. If the surface area of the fixture contains draft angles, indicate it in the test report.

6.2.2 Drum brake shoe assembly

6.2.2.1 The fixture shall be designed such that the indenter is in consistent contact with the contour surface of the lining along the length direction and has a gap of (1 ± 0.2) mm from the arc surface of the drum brake shoe (see Figure 2). For the lining bonded or molded to the shoe, the maximum distance from the bonding surface shall be

0.2 mm. In millimeters

6.2.2.2 The direction of load applied by the indenter shall be parallel to the brake shoe plate. The support of the shoe shall be uniformly loaded along the length of the sample. The width of indenter shall be greater than the width of lining.

6.2.3 Disc brake pad The fixture shall be designed according to the following requirements.

7 Test procedure

7.1 Carry out the test at room temperature of (23 ± 5) °C. If testing under other environmental conditions is required, an agreement shall be reached with the customer.

7.2 When a high-temperature shear test is required, the sample shall be placed in an oven, heated evenly from room temperature to the test temperature within (30 ± 2) minutes, and then taken out of the oven, which shall be completed within 60 s.

7.3 Place the drum brake shoe or disc brake pad in the appropriate shear test fixture in the direction indicated by the test (radial or tangential).

7.4 Apply load at the rate specified in

6.1 until the sample fails.

7.5 Record the failure load and express the residual area of the friction material after the shear test of the disc brake pad or drum shoe as a percentage in accordance with the