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# International Standard



# 6312

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INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

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## Road vehicles — Brake linings — Shear strength of disc brake pad and drum brake shoe assemblies — Test procedure

*Véhicules routiers — Garnitures de frein — Résistance au cisaillement des ensembles de plaquettes de frein à disque et de segments de frein à tambour — Méthode d'essai*

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**Descriptors** : road vehicles, brake linings, disk brakes, tests, shear tests, drum brakes.

## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been set up has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 6312 was developed by Technical Committee ISO/TC 22, *Road vehicles*, and was circulated to the member bodies in December 1979.

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It has been approved by the member bodies of the following countries :

Australia	Germany, F. R.	ISO 6312:1981	South Africa, Rep. of
Belgium	Italy	<a href="https://standards.iteh.ai/catalog/standards/sist/744-7266-425b-889d-3c4e638171b6/iso-6312-1981">https://standards.iteh.ai/catalog/standards/sist/744-7266-425b-889d-3c4e638171b6/iso-6312-1981</a>	Spain
Brazil	Japan		Sweden
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Chile	Korea, Rep. of		United Kingdom
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Egypt, Arab Rep. of	New Zealand		
France	Poland		

No member body expressed disapproval of the document.

# Road vehicles — Brake linings — Shear strength of disc brake pad and drum brake shoe assemblies — Test procedure

## 0 Introduction

The specification for the average rate of load and the recommendation for variations in the instantaneous rate of load given in this International Standard take into account current practice and are based upon examination of equipment in use.

The property is related to stresses developed during braking at the area of contact between lining and carrier.

## 1 Scope

This International Standard describes a method for measuring the shear strength of disc brake pad and drum brake shoe assemblies with regard to the adhesive/bond connection between the brake lining material and the lining carrier.

## 2 Field of application

This International Standard applies to integral moulded or bonded disc brake pad assemblies and integral moulded or bonded drum brake shoe assemblies for road vehicles.

## 3 Reference

ISO 611, *Braking of motor vehicles and their trailers — Terminology*.

## 4 Symbols and units

	Symbol	Unit
Shear force	$F$	N
Area under stress	$A$	mm <sup>2</sup>
Shear strength	$\tau$	N/mm <sup>2</sup>

## 5 Definition

**shear strength** : The shear strength according to this method is the ratio of load which causes the shearing and the area to be stressed.

## 6 Sampling and conditioning

The sample shall be taken from stock.

Testing can be performed on a complete assembly or on a part of the lining area.

Sample edges may be ground to ensure good contact with the stamp.

When testing parts of the lining, the test area shall be confined by saw cutting down to the carrier on all sides.

## 7 Test rig and fixtures

### 7.1 Test rig

The test rig shall be a compression or tensile testing machine or similar equipment (shear testing machine) of sufficient capacity and hydraulically operated to apply the shearing load by activating a ram.

The test machine shall be provided with equipment to register the exact load applied at the moment of shear.

The rate of load application shall be controlled in such a way that the load increases at an average rate of  $4\,500 \pm 500$  N/s maximum.

It is further recommended that the unit controlling the rate of load functions so that the instantaneous rate is within the limits of  $4\,500 \pm 2\,250$  N/s, when the shear force is above 5 000 N.

NOTE — In the case of hydraulically-operated tensile or compression testing machines, this specification can be satisfied by setting the unloaded movement of the piston. The rate of travel of the ram (in millimetres per second) depends on the type of machine.

## 7.2 Fixtures (See figures 1 and 2)

The shearing fixture shall have means to hold the test sample firmly.

The fixture shall be designed so that in fulfilling the requirements given in 7.2.1 and 7.2.2, it is suitable for the brake shoe or disc brake pad and the load application equipment.

### 7.2.1 Drum brake pad

The fixture shall be so designed that the stamp contacts the edge of the lining for the full sample length and thickness within  $1 \pm 0,2$  mm of the shoe table or rim.

Load application on the stamp shall be in a parallel direction to the plane of the shoe rim. The shoe shall be supported to maintain uniform loading along the length of the lining sample.

### 7.2.2 Disc brake shoe

The fixture shall be so designed that

- the location of the plane of the backplate is parallel to the plane of the stamp;
- the stamp contacts the edge of the lining within  $1 \pm 0,2$  mm of the backing plate and conforms adequately with the sample lining contour;
- the stamp contacts the full sample length of the lining edge parallel to the disc periphery;
- the load bearing edge of the backing plate rests against a rigid support with a thickness equal to that of the backing plate;
- to simulate operating conditions under testing, a pressure fixture applies a load of  $0,5 \text{ N/mm}^2$  of lining area at a right angle to the shear load;
- the load is applied in such a way that no friction force influences the shear load measurement.

When shear strength measurements at elevated temperatures are specified, the sample shall be uniformly heated to such temperature within 30 min and tested immediately after removal from the heating unit.

Place the brake shoe or disc brake pad in the appropriate shear test fixture.

The correct position of the fixture and stamp in relation to the test requirements shall be controlled, and especially so that the direction of load and contact of stamp to lining edge are in accordance with clause 7.

Apply the load at the rate as specified in 7.1; continuing until failure has occurred. The load shall be applied without shocks.

Record the load at which complete shear or destruction of lining material occurs together with the shear pattern as specified in figure 3.

## 9 Calculation of shear strength

The shear strength is calculated from the formula :

$$\tau = \frac{F}{A} \text{ N/mm}^2$$

The sample area  $A$  is calculated from surface geometry.

The shear strength is expressed as the average of five measurements.

## 10 Presentation of results

With reference to this International Standard the test report must state :

- type and supplier of the brake shoe or disc brake pad;
- the mean shear strength and range;
- a description of the shear pattern, classified by the numbers given in figure 3;
- comments on deviations from normal test conditions such as test temperature, contact of shear stamp to lining edge.

## 8 Test procedure

Normally shear tests are conducted at ambient temperature.

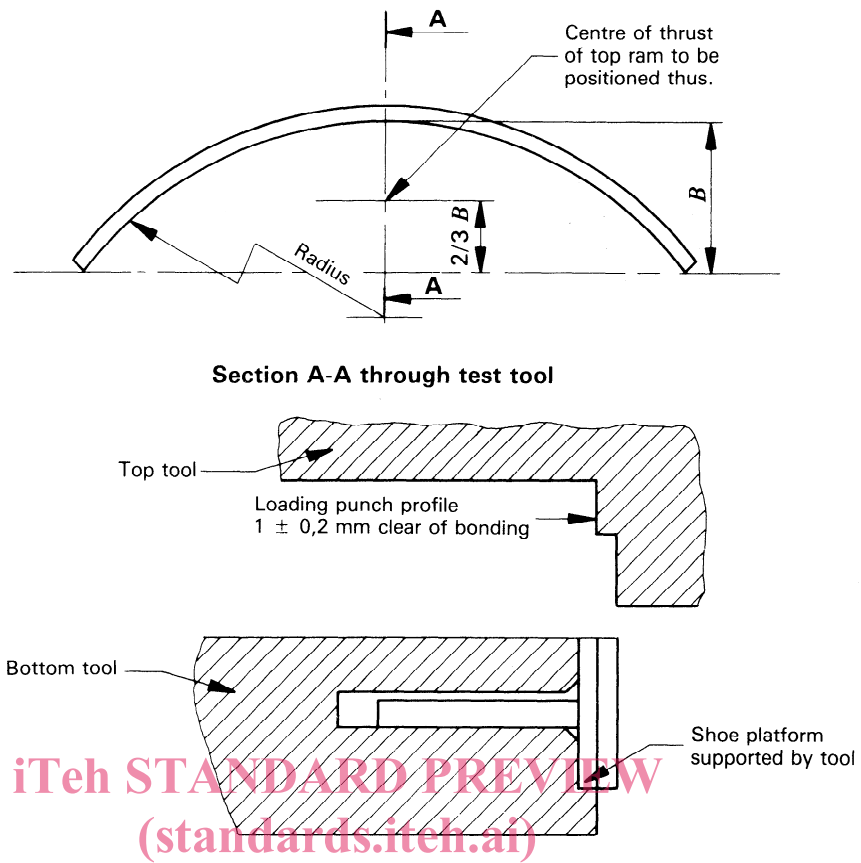


Figure 1 — Principles of test fixture — Drum brake shoes  
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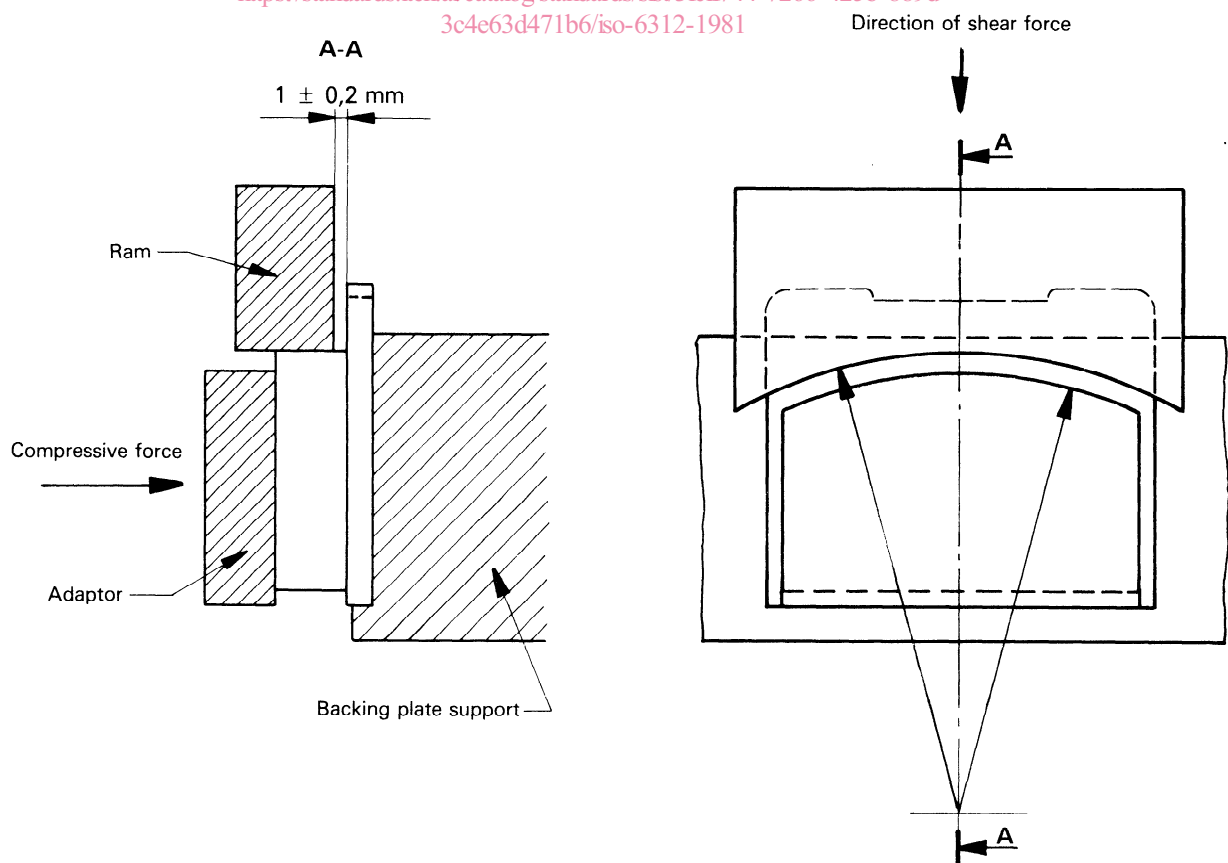
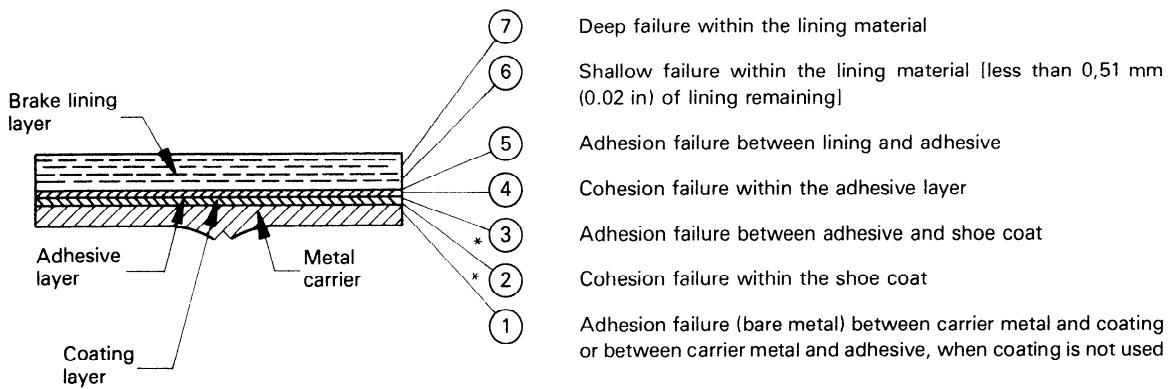


Figure 2 — Principles of test fixture — Disc brake pad



\* Eliminate when shoe coat is not used.

Figure 3 — Shear pattern of a brake lining

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