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**Road vehicles — Brake linings — Shear  
test procedure for disc brake pad and drum  
brake shoe assemblies**

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

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## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established 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. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 6312 was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 2, *Braking systems and equipment*.

This second edition cancels and replaces the first edition (ISO 6312:1981), which has been technically revised.

Annex A forms a normative part of this International Standard. Annex B is for information only.

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## Introduction

The shear property relates to stresses at the area of contact between lining and carrier in disc brake pad and drum brake shoe assemblies.

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, being based upon an examination of equipment in use.

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# Road vehicles — Brake linings — Shear test procedure for disc brake pad and drum brake shoe assemblies

## 1 Scope

This International Standard specifies a method for measuring the strength of the bond connection between the lining material and the carrier in disc brake pad and drum brake shoe assemblies (shear strength). This International Standard is applicable to integrally moulded, riveted and bonded assemblies of both types of brake on road vehicles.

## 2 Normative reference

The following normative document contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent edition of the normative document indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 611, *Road vehicles — Braking of automotive vehicles and their trailers — Vocabulary*.

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## 3 Terms and definitions

For the purposes of this International Standard, the terms and definitions given in ISO 611 and the following apply.

### 3.1

#### **lining**

friction material component of a brake lining assembly

### 3.2

#### **carrier**

component of a brake lining assembly to which the friction pad is attached

### 3.3

#### **bond area**

contact area between lining and carrier

### 3.4

#### **shear strength**

ratio of the load at failure divided by the bond area

## 4 Symbols and units

The symbols and preferred units used in this International Standard are given in Table 1.

Table 1 — Symbols and units

Quantity	Symbol	Unit
Shear force at failure	$F$	N
Area of bond	$A$	mm <sup>2</sup>
Shear strength at failure	$\tau$	MPa

### 5 Sampling and conditioning

This procedure may be used on samples during product development, on finished products, or after special treatment (such as that covered by ISO 6314) or usage.

Testing may be performed on a complete assembly or section of an assembly.

Sample edges may be prepared to ensure good contact with the loading and fixed tools. Shims should be removed.

When testing a lined shoe, the test area may cover the full assembly or segments of an assembly confined by saw cutting down to the carrier (see Figure 1).

Five samples should be used.

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NOTE The test procedure applies a load in a direction which might not be in accordance with the loading direction of the product in service. The shear behaviour could be influenced by high aspect ratio, chamfered or slotted pads.

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Dimensions in millimetres

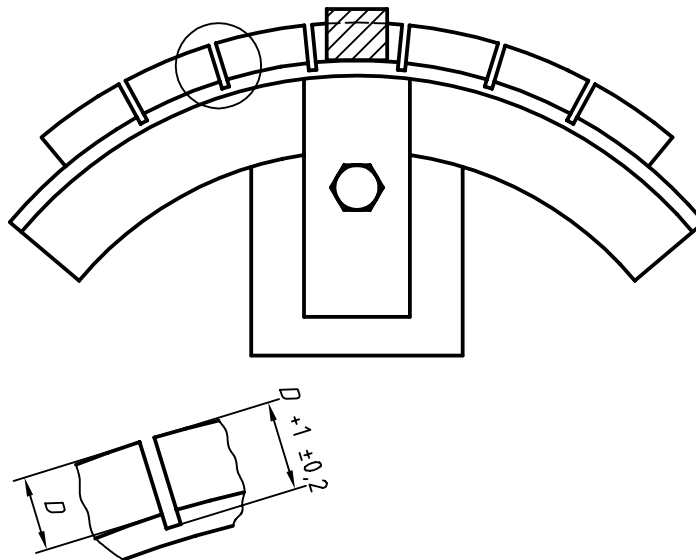


Figure 1 — Lined shoe in segmental test condition



## 6 Test rig and fixtures

### 6.1 Test rig

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

The test rig shall be provided with equipment to register the exact load applied at the instant of shear failure.

The load application rate shall be controlled in such a way that the load increases at an average rate of  $(4\,500 \pm 1\,000)$  N/s (as determined from typical vehicle-based evaluation). If a constant crosshead speed machine is being used the load rate shall be set to  $(10 \pm 1)$  mm/min. This shall be indicated in the results, which, it shall be noted, cannot be compared to tests conducted on machines of the constant load type. Shock loading shall be avoided.

### 6.2 Fixtures

#### 6.2.1 General

The shearing test fixture shall have the means to hold a test sample such that it is parallel to the loading tool. This tool shall have a radius of 1,5 mm at the part in contact with the test sample.

#### 6.2.2 Drum brake shoe assembly

The fixture (see Figure 2) shall be designed so that the loading tool is in contact with the edge of the lining for the full sample length and thickness within  $(1 \pm 0,2)$  mm of the shoe platform.

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

The width of the loading tool shall be greater than the width,  $W$ , of the lining.

#### 6.2.3 Disc brake pad

The fixture (see Figure 3) shall be designed such that:

- the location of the plane of the backplate is parallel to the plane of the loading tool;
- the loading tool is in contact with the edge of the lining within  $(1 \pm 0,2)$  mm of the backing plate (carrier) and conforms to the sample lining profile including taper angles;
- the loading tool is self-aligning;
- the loading tool is in contact with the full sample length of the lining edge parallel to the backplate support;
- the load bearing edge of the backing plate rests against a rigid support with a thickness no greater than that of the backing plate;
- in order to prevent assembly movement under testing, a pressure fixture applies a face load of  $(0,5 \pm 0,15)$  N/mm<sup>2</sup> of the lining area at a right angle to the shear load;
- the face load is applied in such a way that friction force is minimized and does not significantly influence the shear load measurement.