

# SPECIFICATION

## PLATE BRAKE TESTERS FOR TESTING CLASS III and IV VEHICLES

Issue Date: 1 October 1999  
Amended Date 08 September 2004  
Second Amendment 31 August 2006

### CONTENTS

	Page
1. Introduction	2
2. Technical Requirements	2
2.1 Physical Criteria	2
2.2 Plate Characteristics	2
2.3 User Controls	3
3. Presentation of Results	3
3.1 Brake Efficiency	3
3.2 Brake Imbalance	4
4. Calibration	4
4.1 Brake Force	4
4.1.1 Accuracy	4
5. Instruction Manual	5
6. Identification	5
Annex 1	6

This Annex applies to Plate Brake Testers to be approved for use in Class IV Automated Test Lanes (ATL's), will be identified as such on the VOSA list of approved Plate Brake Testing equipment

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## 1. INTRODUCTION

This Specification details the MINIMUM performance and constructional requirements for Plate Brake Testers (PBTs) intended to be used for the statutory annual MOT brake performance testing of Class III & IV vehicles in accordance with the Motor Vehicle (Tests) Regulations 1981, as amended.

The Specification does not rule out additional features supplied with the equipment provided that the features are acceptable on health and safety grounds and do not prevent or make it more difficult to carry out the MOT Test as prescribed.

## 2. TECHNICAL REQUIREMENTS

The PBT shall comprise two parallel sets of measuring plates, each set consisting of two plates in tandem, with a separate display console and a control computer.

The PBT shall be safe to use, robustly constructed to acceptable engineering standards and able to perform a satisfactory brake test on Class III and IV vehicles, including testing four wheel drive vehicles and the single wheel of a three-wheeled vehicle.

*Note :*            *This Specification is based on a traditional PBT. Any alternative approach that does not meet the requirements specified below will be considered and assessed on its merits. Details of any alternative approach must be submitted with the initial application.*

### 2.1 Physical Criteria

The PBT shall have the capability of accepting vehicles with a:

- a.        Gross weight of at least 3000 kg.
- b.        Individual wheel load of at least 1000 kg.

### 2.2 Plate Characteristics

The high friction working surfaces of each individual measuring plate shall have a:

- a.        Length of not less than 2200 mm.
- b.        Width of not less than 500 mm.
- c.        Surface that is durable and not likely to cause undue tyre damage.
- d.        Surface to tyre co-efficient of friction of not less than  $0.6\mu$  in wet conditions.

When installed, the PBT shall have the following overall dimensions;

- e.        Not less than 5300 mm between the extreme ends of the high friction working surfaces of each set of measuring plates
- f.        Not less than 2000 mm between the outer edges of the high friction working surfaces of each pair of plates.
- g.        Not greater than 1000 mm between the inner edges of the high friction working surfaces of each pair of plates.

- h. Any longitudinal gap between the measuring plates shall not be greater than 200 mm and the gap shall be maintained at the same height as the working surfaces.

If surface mounted, the PBT shall have:

- i. An overall height of not greater than 50 mm.
- j. Lead-on ramps with a gradient of no more than 10 per cent.

### **2.3 User Controls**

The user controls shall be:

- a. Suitably identified in English or with acceptable symbols
- b. Capable of being operated from the vehicle driving seat by a remote control handset

*Note 1: A hard-wired remote control is not acceptable*

*Note 2: There shall be provision of safe storage for the remote control handset when not in use.*

- c. Resistant to spurious signals from other sources.

A system shall be in place to ensure that each remote control unit is dedicated to operate only one PBT when two or more are used in close proximity.

## **3. PRESENTATION OF RESULTS**

The PBT shall display on the VDU screen the value of:

- a. Brake efficiency, calculated from the total brake force and expressed as a percentage of the vehicle weight.

*Note: The vehicle weight and algorithm used shall be in accordance with that defined in the latest version of the MOT Inspection Manual for Class III and IV vehicles.*

- b. Imbalance of brake force between the left and right wheels on a steered axle, expressed as a percentage of the higher brake force.

### **3.1 Brake Efficiency**

The brake force results shall be displayed clearly on a VDU screen in two forms:

- i) Graphical: such that changes in brake force can be readily examined,

and on the same screen, but separate from the graphical display:

- ii) Digital: to show the maximum brake force value achieved by each wheel displayed in increments no greater than 5 kgf.

The brake force displays shall:

- a. Be marked in kilogram force units (kgf).
- b. Show clearly the separate brake forces for each wheel in both graphical and digital form.
- c. Have a maximum brake force display value of not less than 600 kgf
- d. Be sufficiently sensitive to show the variations in brake force caused by excessive drum ovality or disc runout (graphical)
- e. Show the calculated value of brake efficiency for the whole vehicle

The brake test results described above shall be retained on the VDU screen until manually reset. A printer or plotter is not an acceptable means of achieving this requirement.

The equipment must be capable of carrying out a separate test for brake bind and the display must be sufficiently sensitive to identify variations in brake effort due to brake bind being present during the brake performance test.

### **3.2 Brake Imbalance**

Brake imbalance shall be measured over the whole range of brake force.

The algorithm used for indicating maximum brake imbalance shall;

- i) be inhibited when left and right brake forces are 40 kgf or less,
- ii) function when one or both brake forces exceed 40 kgf and one brake force is less than 75% of the other, and
- iii) display the numerical difference between left and right brake forces as a percentage of the higher brake force, ie

$$\text{Imbalance (\%)} = \frac{\text{high force} - \text{low force}}{\text{high force}} \times 100$$

## **4. CALIBRATION**

A means of calibrating the brake force shall be available and the PBT display shall be capable of showing negative numbers close to zero.

### **4.1 Brake Force**

The calibration equipment shall:

- a. Be suitable for checking brake force accuracy at the following values;
 

0, 30, 100, 200 and 600 kgf
- b. Have a method and operational accuracy that is traceable to a national physical standard
- c. Be certified by a UKAS accredited laboratory or an equivalent European laboratory, that the whole calibration system is traceable to a national physical standard.

#### **4.1.1 Accuracy**

Brake force readings shall be accurate to within;

+/- 3 kgf of the true value from zero up to and including 100 kgf, and

+/- 3 per cent of the true value for all readings above 100 kgf.

## **5. INSTRUCTION MANUAL**

A comprehensive Instruction Manual shall be supplied with each PBT.

The Instruction Manual shall;

- a. Be written in English.
- b. Explain how to operate the PBT, including the function of each control, the range of readings that can be achieved, and how to interpret the results.
- c. Detail how to use the PBT to carry out a brake performance test and make reference to the need to follow the brake test procedure detailed in the latest version of the relevant MOT Inspection Manual when carrying out a statutory MOT test.
- d.. Detail the procedure for calibrating the PBT

*Note: Inclusion of the calibration procedure in the Instruction Manual is applicable only if calibration equipment is to be offered to the purchaser of the PBT. If not, a separate Calibration Manual shall be made available for assessment at the approval stage.*

## **6. IDENTIFICATION**

The Plate Brake tester shall be marked with a durable identification on the exterior, clearly identifying the make, model and serial number, which must be readily visible after the equipment has been installed. A copy of the approval certificate will also be issued to the Vehicle Testing Station after installation, showing the make/ model / serial number, and the address of the place of installation.

## Annex 1

### **Additional Requirements for Plate Brake Testers to be Approved for Use in Class IV Automated Test Lanes (ATL's).**

The plate brake tester must incorporate a computer controlled system (CCS). The CCS must provide the tester with an automated system that:

- Prompts the tester to input vehicle make, model and registration number as a mandatory requirement.
- Automatically weighs the vehicle under test and uses the presented weight to calculate the required brake performance calculations to the standards set out in the relevant Inspection Manual. The weighing capability must be to at least the values set out in the calibration requirements (set out below)
- Has the facility to allow the tester to manually enter pass/fail result for brake judder and rate of increase before the overall test result is calculated.
- Produces a detailed printed report of brake test results on service and parking brake efficiency at the end of each brake test including time and date the test was conducted.
- Where an initial fail is recorded, it prompts the tester to conduct a second brake test to confirm the brake.
- Automatically stores data from each test result for a minimum period of 52 weeks.

#### **Weight Calibration**

The calibration equipment shall be capable of checking the accuracy of weight measurement at the following values:

- a. If weight measurement is by individual wheel:  
0, 200, and 500 kg
- b. If weight measurement is by axle:  
0, 500, and 1000 kg

There are two methods which are acceptable;

- i) applied weights, or
- ii) purpose made calibration equipment.

If weights are used they shall be certified as traceable to a national physical standard.

If purpose made calibration equipment is used the whole equipment shall be certified as traceable to a national physical standard.

#### **Accuracy**

The weight measurement shall be accurate to within:

+/- 3 per cent