

SPECIFICATION
ROLLER BRAKE TESTERS
FOR TESTING
CLASS V VEHICLES

Issue Date: 18 November 1999

CONTENTS

| | Page |
|------------------------------------|------|
| 1. Introduction | 2 |
| 2. Technical Requirements | 2 |
| 2.1 Roller Set | 2 |
| 2.1.1 Rollers | 3 |
| 2.2 Brake Force Display | 3 |
| 2.3 User Controls | 4 |
| 2.4 Brake Efficiency and Imbalance | 5 |
| 3. Calibration | 5 |
| 3.1 Brake Force Measurement | 5 |
| 3.1.1 Accuracy | 6 |
| 4. Instruction Manual | 6 |
| 5. Identification | 6 |

MOT Scheme Management
Vehicle Inspectorate
Berkeley House
Croydon Street Tel. 0117 954 3277
BRISTOL BS5 0DA Fax. 0117 954 3440

1. INTRODUCTION

This Specification details the MINIMUM performance and constructional requirements for Roller Brake Testers (RBTs) intended to be used for the statutory annual MOT brake performance testing of Class V vehicles in accordance with the Motor Vehicle (Tests) Regulations 1981, as amended. The Specification is applicable also for RBTs intended to be used for the statutory annual MOT brake performance testing of Class VI vehicles in accordance with the same Regulations, and for Heavy Goods Vehicles in accordance with the Goods Vehicles (Plating and Testing) Regulations 1988, 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 RBT shall consist of a pair of roller sets mounted in the ground, or within a raised floor, with a separate display console. The RBT shall be safe to use, robustly constructed to acceptable engineering standards and suitable for brake testing Class V vehicles.

2.1 Roller Set

The roller sets shall have;

- a. a means of preventing either roller set operating unless a wheel is correctly located in it.
Note: Except following calibration (see Section 3.1 below).
- b. the ability to be driven independently or simultaneously by the use of suitable controls.
- c. a means of manually stopping either or both roller sets.
- d. an automatic means of stopping either roller set individually when the tyre to roller slip reaches a pre-set limit in the range 20 to 30%.

To ensure that the slip value remains constant throughout the full range of brake force, and if variations occur in the power supply, the means of stopping the roller-set shall include actual measurement of the speed of the sensing roller and the speed of the motor/drive roller train.

Note 1: A tyre to roller slip of 20% is when the surface speed of the vehicle wheel equals 80% of the surface speed of the RBT rollers.

Note 2: When both roller sets are in use and one wheel locks, only the relevant roller set should stop.

- e. the ability to measure a maximum value of 3000 kg brake force per wheel when the parking brake is tested in the 'applied mode' whereby the parking brake is fully applied prior to the rollers being started.
- f. the capability of accepting an axle load of 13000 kg.
- g. a clear, durable marking showing the normal forward 'drive-on' direction of the RBT.
- h. no part protruding more than 100 mm above the floor surface.

Note: If an existing design of RBT which is already of the list of approved equipment is modified to incorporate modern electrical technology in place of the original means of measuring and displaying brake force, and is re-submitted for approval, the requirements specified in 2.1(i) above and 2.1.1(c)(i) below may be relaxed.

If a cross-pit RBT is offered for approval, a suitable protection device shall be installed to prevent the rollers from being started when a person is in the pit within reaching distance of the RBT.

Note: Manufacturers should be aware that the latest version of the Conditions of Appointment states that when a cross-pit RBT is installed for MOT use, the length of pit taken up by the RBT shall be in addition to the length of pit specified for the under-vehicle inspection. To meet this requirement, a distance of 1.5 metres will be added to the minimum pit length required. The extra 1.5 metres will be measured to the edge of the first aperture in the top of the RBT.

2.1.1 Rollers

The rollers shall have;

- a. a surface that is durable and not likely to cause undue tyre damage.
- b. a roller to tyre co-efficient of friction of not less than 0.6 μ in wet conditions.
- c. the following dimensions;
 - i) minimum diameter 200 mm
 - ii) not greater than 500 mm between roller centres
 - iii) not greater than 880 mm between inner ends of the high friction surfaces of the left and right rollers
 - iv) not less than 2600 mm between outer ends of the high friction surfaces of the left and right rollers
- d. (when running) a constant surface speed in the range 2 to 5.5 km/h.

Note 1: The speed of the rollers shall remain within the specified range throughout the full range of brake force.

Note 2: The speed requirement does NOT apply to the applied parking brake test (see Section 2.1(e) above).

2.2 Brake Force Display

The brake force display shall;

- a. indicate in units of kilogram force (kgf)
- b. indicate the brake force individually for each wheel on an axle.
- c. be analogue and sufficiently sensitive to show the variations in brake force caused by excessive drum ovality or disc runout.
- d. if a VDU is used, include an additional digital display of brake force which shall be of a size that is readable from the vehicle driving position.

Note: If the brake force is displayed on traditional dials, an additional digital display of brake force is acceptable.

- e. have the means to display brake force values over two ranges;
 - i) low range - max brake force value in the range 600 to 800 kgf
 - ii) high range - max brake force value in the range 3500 to 4000 kgf
- f. be marked with graduations of not greater than;
 - i) 10 kgf from zero up to and including 240 kgf.
 - ii) 20 kgf from 240 kgf up to and including 800 kgf.
 - iii) 50 kgf from 800 kgf and above.

Note: If a VDU is used, a more relaxed requirement can be applied to the analogue scale provided that the digital scale exceeds the above requirement.

- g. indicate individually for each roller set when a wheel lock occurs.
- h. retain the maximum brake force values until either the indication is manually reset or the rollers are re-started.

2.3 User Controls

Note: AUTOMATIC operation of a RBT is NOT permitted for MOT testing.

The user controls shall be;

- a. manually operated.
- b. suitably identified in English or with acceptable symbols.
- c. capable of starting the roller sets independently or simultaneously.
- d. capable of stopping the roller sets.
- e. capable of being operated from the vehicle driving seat by remote control.

If the remote control unit is not hard-wired:

- f. suitable secondary operating controls shall be available on the console, or equivalent.
- g. the unit shall be resistant to spurious signals from other sources.
- h. a system shall be in place to ensure that each unit is dedicated to operate only one RBT when two or more are used in close proximity.
- i. provision of safe storage shall be provided for the remote control unit when not in use.

In addition, there shall be;

- j. a visual indication for the user on the display console showing;
 - i) when each roller set is in operation, and
 - ii) if the RBT has a bi-directional facility, whether the roller sets are operating

- in 'forward' or 'reverse' direction.
- k. a durable notice stating "RBT shall NOT be used in automatic mode for MOT Testing" if the RBT is equipped with an automatic facility.

2.4 **Brake Efficiency and Imbalance**

- a. There shall be a satisfactory means available for either the user to calculate or for the RBT to display the value of;
- brake efficiency, calculated from the total brake force and expressed as a percentage of the vehicle weight as specified in the latest version of the relevant MOT Inspection Manual, and
 - imbalance of brake force between the left and right wheels on an axle, expressed as a percentage of the higher brake force.
- b. If the RBT is equipped with a means of automatically calculating brake efficiency, the algorithm used shall be in accordance with that specified in the latest version of the relevant MOT Inspection Manual.
- c. If the RBT is equipped with a device for indicating maximum brake imbalance it shall;
- be inhibited when both left and right brake forces are 40 kgf or less,
 - function when one or both brake forces exceed 40 kgf and one brake force is less than 70% of the other, and
 - display the numerical difference between left and right brake forces as a percentage of the higher brake force, ie

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

3. CALIBRATION

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

The applicant shall provide an assurance that a system is in place to ensure all of its calibration devices used for the subject RBT are checked and certified by an accredited organisation on a regular basis.

3.1 **Brake Force Measurement**

The calibration equipment shall;

- a. be capable of checking brake force accuracy at the following values;

low range: 0, 100, 200, 400 and 600/800 kgf
high range: 0, 1200/1500, 2000/2500 and 3500/4000 kgf

Note 1: If the brake force measurement is displayed on traditional dials, the accuracy of the calibration shall be assessed via the dials and not from any secondary means.

Note 2: If the brake force measurement is displayed on a VDU, the accuracy of the brake force measurement shall be judged against the digital values.

- b. have a method and operational accuracy that is traceable to a national physical standard.
- c. be certified by a NAMAS accredited laboratory, or an equivalent European laboratory, that the whole calibration device is traceable to a national physical standard.

Note 1: All component parts of the calibration device, including any weights, shall

be individually marked with an identity number to enable all parts to be kept together as a set. The certificate shall relate to the set and each calibration device produced shall require its own certificate.

Note 2: If the certificate or any other relevant document produced for the calibration device is not in English, the applicant shall make available a translation into English.

When the static calibration has been completed, to assess the level of torque required to rotate the RBT drive train mechanism, including any unexpected cause of increased friction such as a failing roller bearing, the following test shall be carried out:

With the RBT in 'calibration mode' and with NO vehicle in the rollers, the rollers shall be rotated and the brake force displayed shall not exceed:

50 kgf

3.1.1 Accuracy

The RBT brake force readings shall be accurate to within;

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

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

The RBT brake force calibration device shall be accurate to within:

+/- 0.3 kgf of the true value from zero up to and including 100 kgf.

+/- 0.3 per cent of the true value for all readings above 100 kgf.

4. INSTRUCTION MANUAL

A comprehensive Instruction Manual shall be supplied with each RBT.

The Instruction Manual shall;

- a. be written in English.
- b. explain how to operate the RBT, including the function of each control, and how to interpret the results.
- c. detail how to use the RBT to carry out a brake performance test and make reference to the need to follow the brake test procedures 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 RBT.

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 RBT. If not, a separate Calibration Manual for use by the service engineer shall be available for assessment at the approval stage.

5. IDENTIFICATION

The RBT shall be marked with a durable identification on the exterior of the control console, or equivalent, showing the make, model and serial number.