

# BRAKE PERFORMANCE

## APPLICATION

This inspection applies to all vehicles.

## PROCEDURE AND STANDARDS

To avoid damage to the vehicle or the equipment, no tyre must be obviously under inflated. Articulated buses should be treated as one vehicle.

In this section of the manual, the term "drum" includes "discs".

If the vehicle can be tested on a roller brake test machine proceed, as follows:

## PREPARATION

Fit Air Pressure Sensors to the vehicle in accordance with the test equipment manufacturers instructions, and enter where necessary the vehicle details i.e. gross weight, axle weight and the guaranteed air pressure.

### **Note:**

Air pressure test points are required to be fitted to vehicles used on or after 1 April 1983. Each braking circuit should have at least one test point, therefore axles which share the same brake circuit only require one test point e.g. on a rear bogie, the test point may be on any one axle of that bogie.

## ROLLER BRAKE TEST

Place the road wheels in the brake tester rollers in turn. The rollers will start automatically. Follow the sequence of instructions as displayed and prompted on screen.

- Check for binding.

### **Note:**

Before failing a vehicle for binding, examiners should be aware that drag at a wheel may be recorded which is not necessarily due to brakes, but may be due to transmission drag, or by the deformation of the tyres on the rollers.

- Apply the brake slowly and check for abnormal time lag in operation.
- Hold at a steady pedal pressure and check for brake force fluctuations. (While this check is carried out on all wheels, the results only apply to the steered wheels).

**Note:**

Brake effort fluctuation of more than 70% of the higher brake effort shown at a steady pedal pressure should be considered as a Reason for Failure.

- Continue to apply the foot brake until the road wheels lock up, or until the service brake is fully applied, whichever occurs first.
- Using the maximum recorded force for each wheel on an axle, check that the braking effort from any wheel is 70% or more of the effort of the other wheel on the same axle. (This will be calculated automatically by the brake test equipment and either passed or failed accordingly)
- Little or no brake effort recorded at any road wheel should be considered a Reason for Failure.
- Release all brakes and store results.
- Repeat for each axle in turn.

## LOAD SIMULATION

If one third of the guaranteed air pressure cannot be obtained at the brake actuator, then the load simulator must be used. Care must be taken when fitting the simulator to the vehicle, as damage may be caused to vehicle components e.g. Pipes, valves, wiring, body or chassis members etc.

## DECELERATION TEST

If the vehicle cannot be roller brake tested, or for any other reason a decelerometer test is required, proceed as follows;

1. Set the decelerometer on the vehicle in accordance with the instrument manufacturer's instructions.
2. At a speed of approximately 20 mph, have the service brake applied; note the reading on the decelerometer and whether the vehicle deviates from a straight line.

## ELECTRONIC BRAKING SYSTEMS

The purpose of this system is to improve vehicle control, reaction and stability during braking over and above that currently possible from a conventional pneumatic system. This is achieved by using electrical signals to operate pneumatic valves. A back up system is usually retained in case of an electrical failure. One of the benefits of EBS is that it can simultaneously fulfil the operation of an anti-lock system (ABS) and a load sensing system with a superior reaction time.

## **BRAKE ROLLER TESTING OF VEHICLES FITTED WITH EBS**

When testing a bus with an electronic braking system the following criteria must be met;

When switching on ignition allow time for ECUs' to communicate with each other, failure to do so may cause a fault in the system

Ensure ignition is on at all times during brake test.

Where load simulation is required to achieve 1/3 of the guaranteed air pressure at an axle, there may be braking systems that will not increase the brake system pressure at the wheels until the vehicle is driven over 7 km/h or is put into 'test mode'. The test mode can be selected by switching on the ignition, then allowing the brake rollers to run for 20 seconds before making the first brake application. The normal driving mode is reactivated automatically when the vehicle achieves a speed above 7 km/h.

| <b>PSV SERVICE BRAKE EFFICIENCY REQUIREMENTS</b> |                                  |  |                   |  |
|--|----------------------------------|--|-------------------|--|
| Motor Vehicles                                   | First used before 1 January 1968 | First used from 1 January 1968 and before 1 April 1982 | Any other vehicle |  |
| Specified Efficiency                             | 45% MAM                          | 50% MAM  | 50% MAM           |  |

MAM = Maximum Authorised Mass; The maximum gross weight permissible in UK.

## REASONS FOR FAILURE

### Deficiency Category

#### ROLLER BRAKE TEST

- |    |  |           |
|----|--|-----------|
| 1. | A brake on any wheel binding.  | MAJOR     |
| 2. | Brake mechanism on any wheel sticking, indicated by an abnormal time lag before, an increased reading is obtained.   | MAJOR     |
| 3. | With service brake applied at a steady pedal pressure, the indication of brake effort fluctuates regularly with each revolution of the road wheel, on a steered axle, so much that the ovality of any brake drum is obvious. A fluctuation of recorded reading in excess of 70%, between highest and lowest indicated readings is to be considered a Reason for Failure. | MAJOR     |
| 4. | With the service brake fully applied:  |           |
|    | a. There is very little brake effort at any wheel.   | MAJOR     |
|    | b. There is no brake effort at any wheel.  | DANGEROUS |
|    | c. Braking effort from any wheel on an axle is less than 70% of the brake effort from another wheel on the same axle.  | MAJOR     |
|    | d. Braking effort from any wheel on an axle is less than 50% of the brake effort from another wheel on the same axle in the case of steered axles.   | DANGEROUS |
|    | e. The specified brake efficiency is not met.  | MAJOR     |
|    | f. The specified brake effort is not met and is less than 50% of the minimum required brake efficiency.  | DANGEROUS |
| 5. | Air pressure test points not fitted, accessible or serviceable where required.   | MAJOR     |
| 6. | unable to lower lift axle for purpose of the brake test'   | MAJOR     |

#### DECELEROMETER TEST.

- |    |  |       |
|----|--|-------|
| 1. | The braking efficiency recorded by decelerometer is below the specified efficiency for the vehicle under test, or the vehicle deviates appreciably from a straight line. | MAJOR |
| 2. | The vehicle deviates significantly from a straight line.   | MAJOR |

# SECONDARY BRAKE PERFORMANCE

## APPLICATION

This inspection applies to all motor vehicles.

### Note:

Most vehicles to-day have brake systems split in such away that it is impossible to assess separately with a roller brake tester, the performance of the secondary brake. In these cases, the vehicle should be accepted, unless there is clear evidence that either half of the system is defective.

## PROCEDURE AND STANDARDS

After the Service brake has been checked on a wheel/axle, carry out a Secondary brake test where possible.

Follow the sequence of instructions as displayed and prompted on screen.

Apply the Secondary brake gradually. Check for functional application and for leaks in the system.

| SECONDARY BRAKE EFFICIENCY REQUIREMENTS |   |  |                   |
|---|---|--|-------------------|
| Motor Vehicles                          | 2 Axle Rigid Vehicle first used before 1 January 1968 | Rigid vehicle with more than 2 axles or any articulated tractor first used before 1 January 1968 | Any other vehicle |
| Specified Efficiency                    | 20% MAM   | 15% MAM  | 25% MAM           |

MAM = Maximum Authorised Mass; The maximum gross weight permissible in UK.

## REASONS FOR FAILURE

Deficiency Category

1. With the secondary brake fully applied.
  - a. There is very little braking effort at any wheel equipped with a brake operated by the secondary brake system.

MAJOR

- |    |   |           |
|----|---|-----------|
| b. | There is no braking effort at all on any wheel equipped with a brake operated by the secondary brake system.                                    | DANGEROUS |
| c. | Braking effort from any wheel on an axle is less than 70% of the brake effort from another wheel on the same axle.                              | MAJOR     |
| d. | Braking effort from any wheel on an axle is less than 50% of the brake effort from another wheel on the same axle in the case of steered axles. | DANGEROUS |
| e. | There is a leak in the secondary brake system when brake applied.   | MAJOR     |

## **PARKING BRAKE PERFORMANCE**

### **APPLICATION**

This inspection applies to all motor vehicles.

### **PROCEDURE AND STANDARDS**

After checking the Service brake and the Secondary brake (where possible) on each wheel/axle, check the Parking brake performance. Follow the sequence of instructions displayed and prompted on screen. Apply the Parking brake fully and release any power assistance.

Note: Both brake rollers will start allowing the vehicle to be aligned in the rollers. When this has taken place, stop one roller and test each wheel individually.

#### **TRANSMISSION PARKING BRAKES**

If the parking brake is a transmission brake, all wheels on the same axle braked by it must be driven by the roller test machine at the same time

Apply the Parking brake as slowly as possible, constantly keeping the release button depressed, when road wheel slip occurs or maximum brake effort is achieved release the brake quickly, and store results.

## **PARKING BRAKE EFFICIENCY REQUIREMENTS**

|                      |  |   |
|----------------------|--|---|
| Motor Vehicles       | Any vehicle first used before 1 January 1968 | Any vehicle first used on or after 1 January 1968 |
| Specified Efficiency | -  | 16% MAM   |

MAM = Maximum Authorised Mass; The maximum gross weight permissible in UK.

## **REASONS FOR FAILURE**

### Deficiency Category

With the parking brake fully applied:

- |    |  |           |
|----|--|-----------|
| a. | There is very little braking effort at any wheel equipped with a brake operated by the parking brake system. | MAJOR     |
| b. | There is no braking effort at all on any wheel equipped with a brake operated by the parking brake system.   | DANGEROUS |
| c. | The specified brake effort is not met.   | MAJOR     |
| d. | The specified brake effort is not met and is less than 50% of the minimum required braking efficiency.       | DANGEROUS |