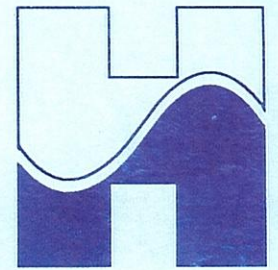


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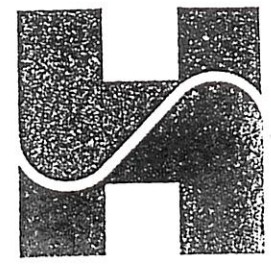
Headlamp Tester

Operation manual

Lumatest



HOFMANN



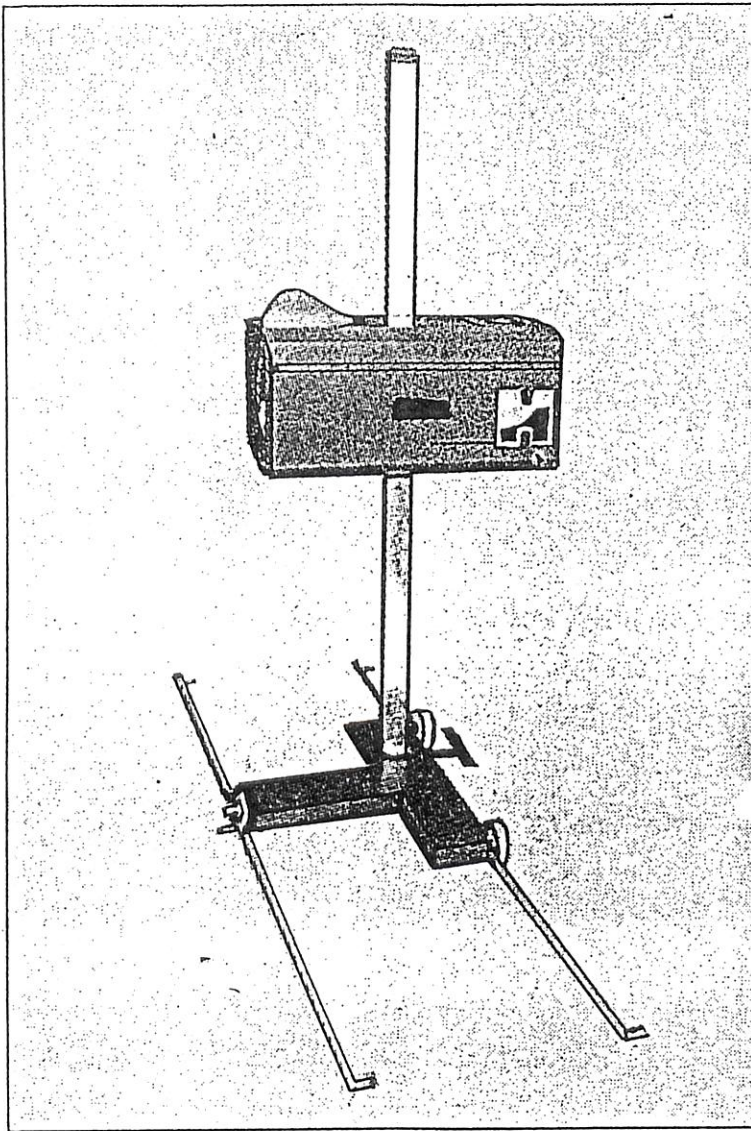
LUMATEST
HEADLAMP BEAM SETTER
OPERATOR'S MANUAL

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LUMATEST

HEADLAMP CENTRING DEVICE



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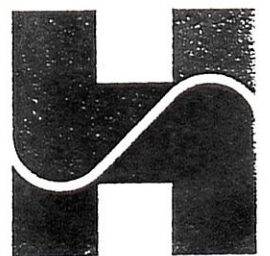


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DESCRIPTION

The **HOFMANN LUMATEST BEAM SETTER** is designed to facilitate the rapid, accurate testing and adjustment of car, motorcycle and commercial vehicle headlamps in accordance with MOT requirements.

The optical testing instrument is mounted on a vertical column with a vertical shifting device with brake, so whilst it is easily adjusted for height, it will remain in the position selected.

The column is fixed to a three-wheeled base unit and has the facility to traverse left or right to permit alignment with the longitudinal centre line of the vehicle under test, and be locked into position by means of the lock pedal fitted in the base unit.

The whole unit moves by means of rails fixed to the floor.

The optical instrument consists of a collecting lens, a calibrated screen incorporating a light intensity meter. This is viewed through the observational panel in the top of the unit.

Sighting is by means of sights fitted to the top of the optical unit and also two sights fitted on the side of the optical unit opposite the sliding handle.

The unit also has the facility to find the "hot spot" of the headlamp by means of the light intensity meter and displays an analogue reading on the top of the optical unit.

INSTALLATION

Where this headlamp tester is to be used for the MOT vehicle testing scheme in the UK it must be sited and installed in accordance with the Vehicle Inspectorate's requirements.

ASSEMBLING THE INSTRUMENT

The unit is supplied as one unit. The wheels of the base unit locate onto the rails with the single front wheel towards the designated floor area.

Check that the pedal (Fig. C.1 Page 4) is in the locking position. As a last operation it is necessary to eliminate any tolerance play between the column (Fig. C.2 Page 4) and the sliding handle (Fig. C.3 Page 4). To achieve this, tighten the two black plastic dowels (Fig. C.4 Page 4) to eliminate any play between the column and the sliding handle. Do not overtighten, preventing the regular sliding of the optical unit (Fig. C.5 Page 4). The Lumatest is now ready for calibrating.

WARNING

If the designated area where the Lumatest is to be sited is facing direct sunlight, when the unit is not in use you must place the cover supplied over the head ensuring that the collecting lens is not exposed to the sunlight. Damage will occur if this warning is not followed.

INSTALLING RAILS

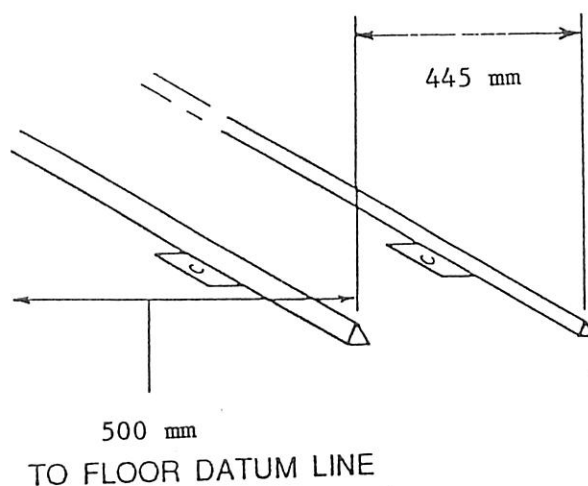
4 rails of 1490 mm fit together to make 2 rails of 2980 mm. These are secured to the floor by screws and rawlplugs.

The rails are positioned at right angles to the test vehicle's line of travel, at 445 mm centres. The two rails must be levelled with each other and if used for MOT testing, the rails' levelness must be certified as meeting the Vehicle Inspectorate's requirements. Shim up the rails as necessary and re-check the levelness after tightening them down. Place the three-wheeled base on the rails with the single wheel towards the test vehicle; check for smooth operation.

CHECK FOR SMOOTH OPERATION

e.g. The rail securing lug welds do not foul the wheels.

RAILS-PITCH DIMENSION



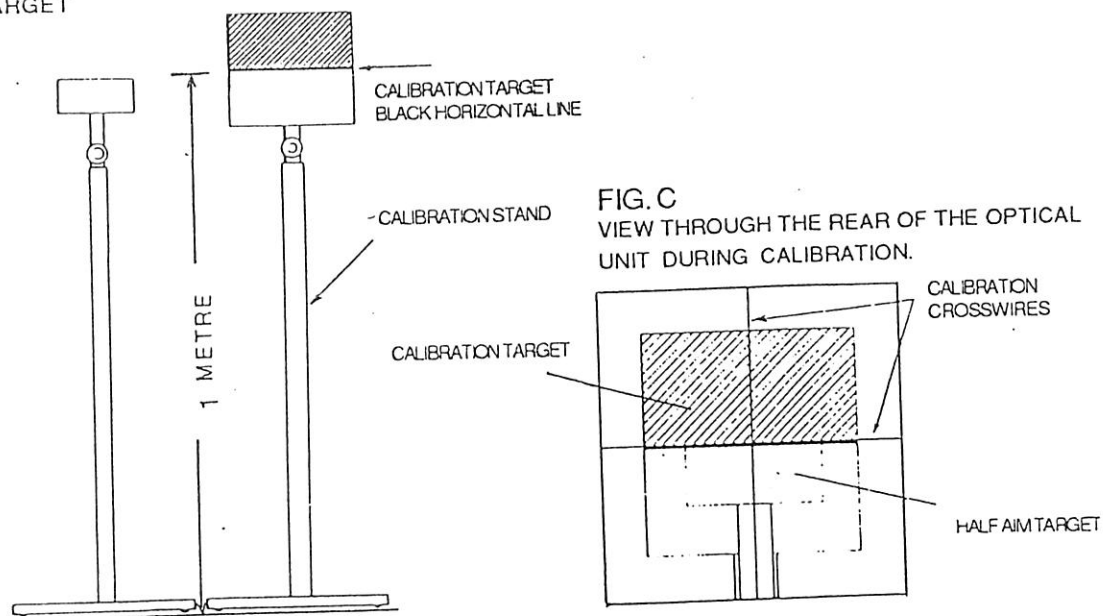
CALIBRATION

The final procedure to be carried out is calibration. This is to confirm that the angle of the optical unit is parallel with the designated vehicle standing area.

1. Set the calibrating stands (Fig. A & B Page 3) so that the height of the half aiming target top edge is the same height as the calibration target black horizontal line (example: Fig. A & B Page 3 are set at 1 metre).
2. Set the calibrating stands on the designated floor area. The half aim target (Fig. A Page 3) should be placed approximately where the vehicle's front wheel will be.
3. Place the full aiming target (with shaded top half) approximately where the rear wheels will be (see Fig. E Page 4). The shaded section should face the optical unit.

FIG. A
HALF AIM
TARGET

FIG. B
FULL AIMING TARGET



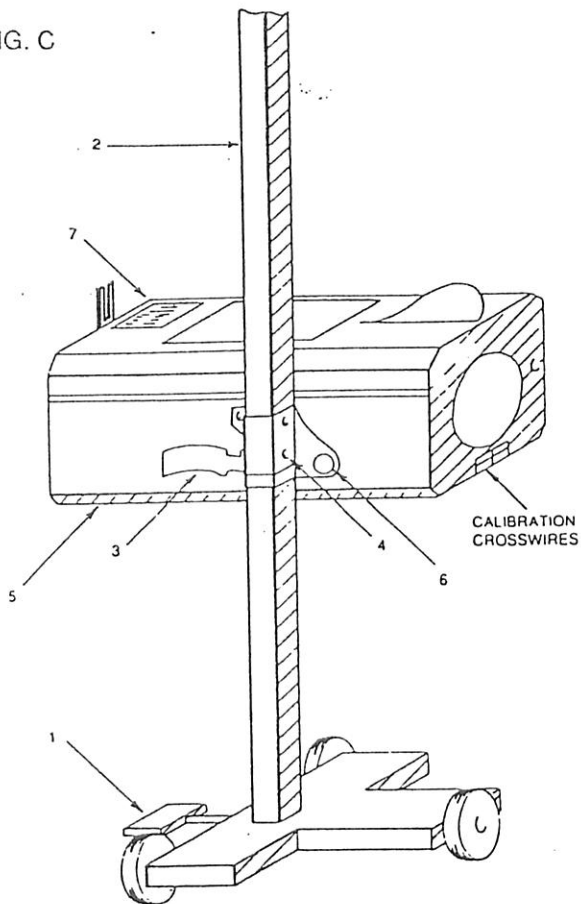
4. View the targets through the calibration sighting device at the rear of the optical unit (Fig. D.4 Page 4). Release the catch on the sliding handle (Fig. C.3 Page 4). Raise or lower the optical unit; at the same time slacken the securing bolt (Fig. C.6 Page 4) and tilt the optical unit up or down to align the calibration cross wires with the top of the half aiming target and the black horizontal line on the calibration target. The optical unit is now calibrated to the floor on which the vehicle stands. Now tighten the securing bolt.

5. When the adjustment is correct it is necessary to check for any errors over the entire wheelbase range likely to be encountered. Move the calibration stand and re-check as necessary. Repeat on the opposite side of the headlamp standing area covering all track and wheelbase variations.

Any discrepancy in excess of Vehicle Inspectorate levelness requirement must be corrected by resurfacing the floor or by correcting any error in the tester's track.

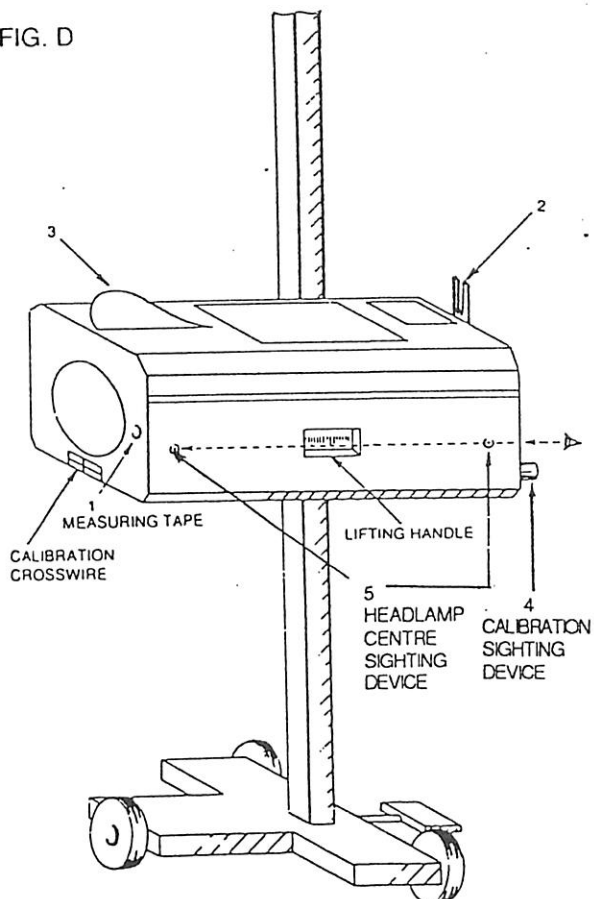
LEFT VIEW OF EQUIPMENT

FIG. C



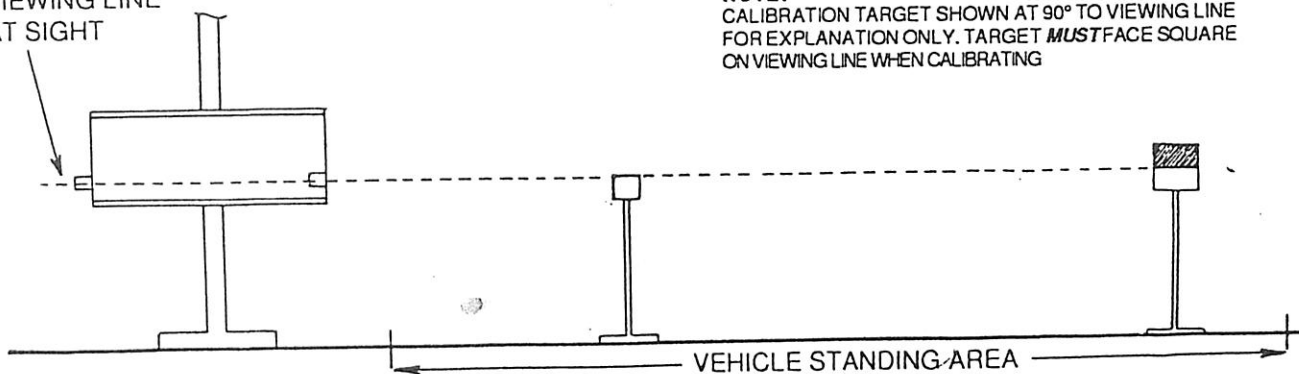
RIGHT VIEW OF EQUIPMENT

FIG. D



CALIBRATION PROCEDURE

FIG. E
VIEWING LINE
AT SIGHT



NOTE:
CALIBRATION TARGET SHOWN AT 90° TO VIEWING LINE
FOR EXPLANATION ONLY. TARGET **MUST** FACE SQUARE
ON VIEWING LINE WHEN CALIBRATING

OPERATION

Testing the headlamp for correct aim of beam

Park the vehicle to be tested with its longitudinal centre line at 90 degrees to the track and the front wheels in the straight ahead position.

* The distance from the headlamp lens to the tester lens must be 500 mm +/- 5%. This distance can be checked by pulling the measuring tape device on the front of the optical unit (Fig. D.1 Page 4). *

Adjust the vehicle position as necessary.

Lower or raise the optical unit by means of the sliding lever and check the angular relationship of the vehicle to instrument. To do this, select features on the vehicle which are parallel to the longitudinal centre line, such as bonnet fluting, wing/bonnet line or side of body if commercial vehicle. Using the sights on top of the optical unit (Fig. D.2 & D.3 Page 4), line up with a longitudinal centre line or other datum points or line being used. Release the pedal (Fig. C.1 Page 4) and turn the optical unit left or right until the back sight and fore sight are aligned with the longitudinal line or datum points selected. Tighten the lock pedal.

Using the sliding handle, lower the optical unit in front of the headlamp to be tested, and line up the two sights on the side of the optical unit opposite the sliding handle (Fig. D.5 Page 4) to the centre of the headlamp. Now position the sight on the top of the optical unit to the middle top of the headlamp.

Determine whether the headlamp should be tested on main or dipped beam. Switch on the headlamps and select dipped or main beam as appropriate and compare the pattern and position of beam on the calibrated screen with the appropriate illustration. The intensity of the "hot spot" will be shown by the analogue meter (Fig. C.7 Page 4) on the top of the optical unit.

Repeat these operations on remainder of lamps to be tested. Do not move the vehicle or release the lock pedal until all headlamps have been tested.

Headlamp setting to obtain correct aim of beam

Having tested the aim of the headlamp beam as described, it may be necessary to readjust it so that it comes within the permitted tolerances.

Adjust the aim of the headlamp by means of the headlamp adjustment screws. The correct setting can be judged visually on the screen and light intensity can be checked by the result on the analogue meter (Fig. C.7 Page 4). Re-test all headlamps after any adjustments have been made.

Aim of headlamps for MOT testing

Information

This inspection applies to: all obligatory headlamps, and optional (additional) dip beam headlamps.

Type of headlamp

The aim of headlamps must be checked on main or dipped beam according to their type. See diagrams 1, 2 or 3 on pages 7, 9 & 10, which include details appropriate to each headlamp type.

These methods of inspection involve the use of beam checking equipment with a collecting lens.

Mask or converter kits

Right hand dip headlamps can be temporarily altered for use in the UK by fitting masks or converter kits which remove the beam 'kick-up' to the right.

A headlamp altered in this way is not a reason for rejection, if

- a. the headlamp aim is not rejected for the reasons listed under diagram 1 (except that the top of the beam image will be a straight line)
- b. the light output is not unduly reduced - not usually a problem with commercially produced kits
- c. the mask or converter is securely attached

Driver's beam aim controls

Where these are fitted the beam aim should be tested without altering the controls' setting except where this would result in failure for beam aim being too low. In such cases the beam aim should be re-checked with the control set at its 'highest' position.

Method of inspection

To check headlamp aim

1. Position the vehicle on the designated headlamp aim standing area.
2. Follow the headlamp tester manufacturer's user manual instructions, and
 - a. align the headlamp aim equipment with the longitudinal axis of the vehicle
 - b. align the centre of the collecting lens with the centre of the headlamp under test

3. With an assistant sitting in the driving seat, switch on the headlamps to the beam on which the headlamp is to be checked.
Note: When checking headlamp aim on vehicles with hydropneumatic suspension systems, it is necessary to have the engine idling.

4. Determine the appropriate headlamp beam image and its aim (see diagrams 1, 2 and 3). Old vehicles (approx. pre-1950) headlamps beam image may not conform to either diagrams 1, 2 or 3. In such cases check

dip beam headlamps are aimed so they do not dazzle, i.e. the beam image brightest part is aimed at least 0.5% below the horizontal

or for headlamps which cannot be checked on dip beam, check

main beam headlamps are aimed so that the beam image centre is on or slightly below the horizontal

EUROPEAN 'E' BEAM HEADLAMP (checked on dipped beam)

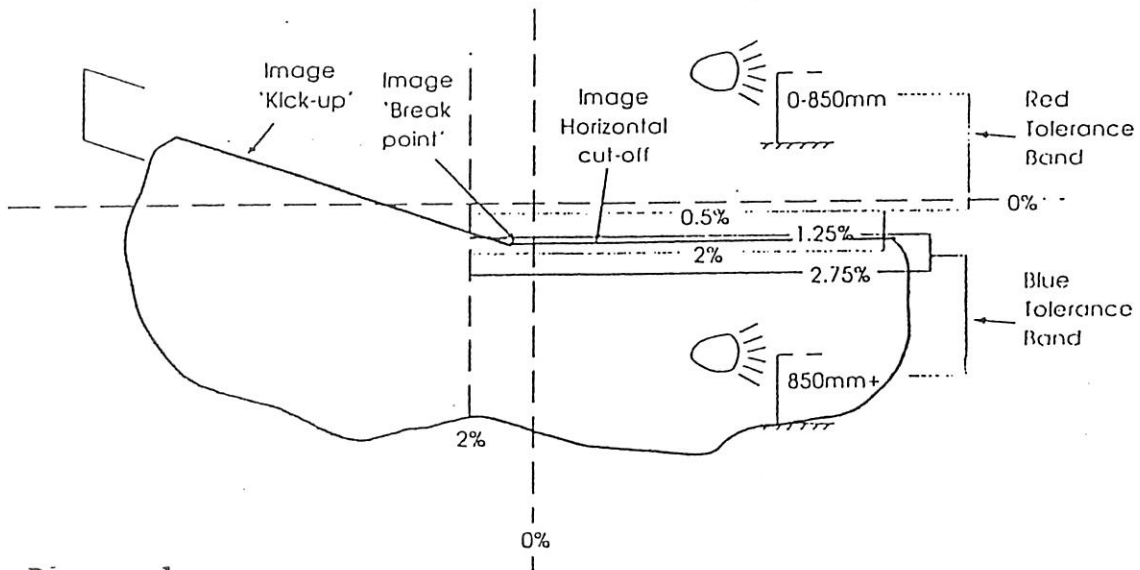


Diagram 1
Dipped beam image.

Check the position of the 'break point' and horizontal cut-off.

European type headlamp - Characteristics

- a. an asymmetric dipped beam pattern with
 - a distinctive horizontal cut-off on the right, and
 - a 15 degree wedge of light above the horizontal (the 'Kick up') towards the left
- b. a lens with one or more asymmetric stepped patterns moulded in the glass
- c. a lens may carry
 - a European approval mark - a circle containing an 'E' and a number, or
 - a rectangle containing an 'e' and a number

The European approval mark should incorporate a single or double-headed arrow.

A dipped beam is denoted by either:
a capital letter 'C' above a capital 'E'
a capital letter 'C' above an 'e'

Note: Setting 'E' Beam Headlamp Aim

Repairs adjustment must not be carried out during an MOT test.

These dip-beam headlamps should be set to aim downwards the amount shown on a marking which is either close to the vehicle manufacturer's plate or the headlamp.

For vehicles without a marking, the downward aim should be set to

- 1.3%, if the headlamp centre is not more than 850 mm from the ground
- 2.0%, if the headlamp centre is more than 850 mm from the ground

Reason for Rejection

1. For headlamps with centres not more than 850 mm from the ground the beam image horizontal cut-off is not between the horizontal 0.5% and 2% lines, i.e. the red tolerance band.
2. For headlamps with centres more than 850 mm from the ground, the beam image horizontal cut-off is not between the horizontal 1.25% and 2.75% lines, i.e. the blue tolerance band.
3. The beam image 'break point' is

To the right of the 0% vertical line, or
To the left of the vertical 2% line

BRITISH AMERICAN TYPE (checked on dipped beam)

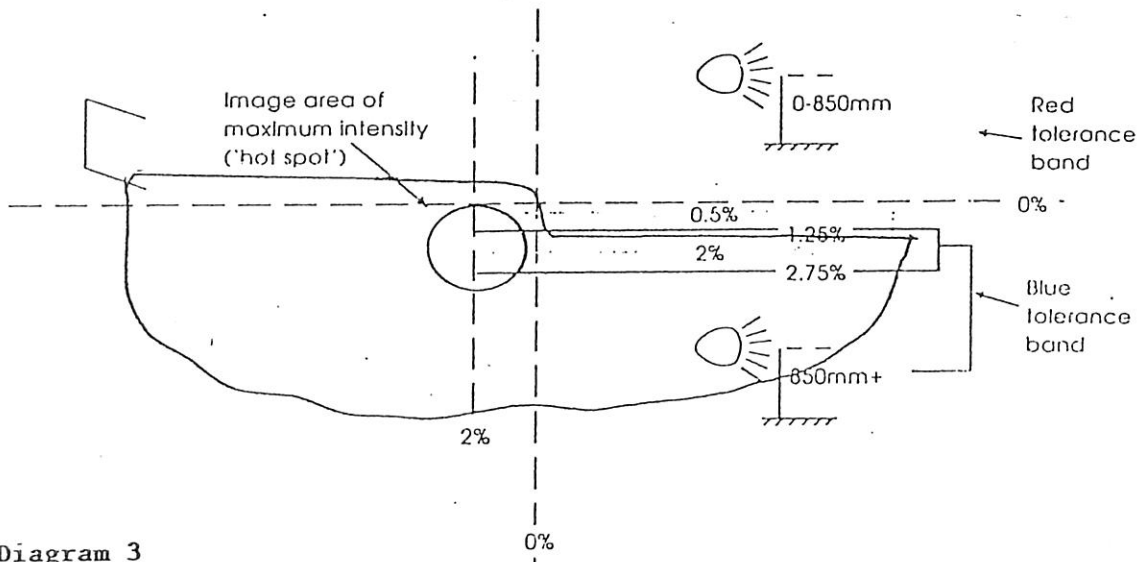


Diagram 3
Dipped beam image.

Check the position of the upper and right hand edge of the area of maximum intensity ('hot spot').

British American type (checked on dipped beam) - Characteristics:

- a. an asymmetric dipped beam pattern with an area of high intensity intended to be directed along the nearside of the road
- b. a circular lens marked the figure 2 which may also have an arrow showing the direction of dip

Reasons for Rejection

1. The upper edge of the 'hot spot' is above the horizontal 0% line.
2. The upper edge of the 'hot spot' is below the horizontal 2.75% line.
3. The right hand edge of the 'hot spot' is:
to the right of the vertical 0% line or to the left of the vertical 2% line.

MAINTENANCE

Very little maintenance is required. The unit should be kept clean and the vertical guide column lightly smeared with SAE 30 oil at weekly intervals or at any time slight stiffness develops.

Elimination of rock

This can occur between the vertical column and the optical head and can be corrected by adjusting the two black plastic dowels (Fig. C.4 Page 4).

Dimensions

Column height:	1360 mm
Base:	585 mm x 580 mm
Track length:	2980 mm
Rail centres:	445 mm
Range of height from centre of lens:	203 mm min. to 1270 mm max.
Proximity of tester lens to headlamp:	500 mm +/- 30 mm

LUMATEST HEADLIGHT TESTER

The Hofmann Lumatest Headlight Tester is designed to facilitate the quick and accurate adjustment and testing of car, commercial and motorcycle headlamps in accordance with current MOT legislation, and is approved by the DTp.

The optical unit is mounted on a vertical single column, incorporating a vertical shifting device and brake to facilitate ease of positioning of optical measuring head at correct height of individual headlights.

The whole unit is mounted onto a fixed three wheeled base allowing the user to move left or right to obtain optimum position with the longitudinal centre line of vehicle under test, and be locked into position by means of foot lock pedal fitted to base unit.

The whole unit moves by means of fixed rails mounted on the floor and is secured by screws and rawlplugs.

Features:

- * Calibrated screen with light intensity meter
- * Observational panel
- * Sights fitted to both top and side of measuring head
- * "Hot Spot" facility
- * Easily calibrated
- * Calibrated measuring device for measuring distance between optical unit and headlamp lens.

Dimensions:

Column height:	135.89 cm (53½")
Base:	58.5 cm x 58 cm (23" x 23")
Track length:	298 cm (9'9")
Rail centres:	44.5 cm (17.5½")
Range of height from centre of lens:	20.32 cm (8") min. to 127 cm (50") max.
Proximity of tester lens to headlamp:	50 cm +/- 3 cm (19¾" +/- 1¼")