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Sharp edge testing apparatus and test procedure for lighting equipment — Tests for sharpness of edge

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National foreword

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A list of organizations represented on this committee can be obtained on request to its secretary.

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TECHNICAL REPORT

RAPPORT TECHNIQUE

Sharp edge testing apparatus and test procedure for lighting equipment – Tests for sharpness of edge

Appareil et mode opératoire pour la vérification des bords vifs des appareils d'éclairage – Essais de tranchant des bords

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SHARP EDGE TESTING APPARATUS AND TEST PROCEDURE FOR LIGHTING EQUIPMENT – TESTS FOR SHARPNESS OF EDGE

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IEC/TR 62854, which is a technical report, has been prepared by subcommittee 34D: Luminaires, of IEC technical committee 34: Lamps and related equipment.

The text of this technical report is based on the following documents:

Enquiry draft	Report on voting
34D/1088/DTR	34D/1101A/RVC

Full information on the voting for the approval of this technical report can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

SHARP EDGE TESTING APPARATUS AND TEST PROCEDURE FOR LIGHTING EQUIPMENT – TESTS FOR SHARPNESS OF EDGE

1 Scope

This technical report details a test procedure and test equipment that may be used to assist the assessment of the risk of hazardous sharp edges that may be exposed to the user or installer of lighting equipment.

2 Test equipment

Sharp-edge tester – The instrument consists essentially of a handle with a pivoted arm attached. A constant-tension spring secured to the handle is used to apply a steady force to the arm. The arm head is a piece of cylindrical steel, with an outside diameter of 12,7 mm and a length of 19 mm, located at the end of the adjustable arm. The arm head is to be wrapped with three layers of tape, the two outer layers act as sensing tapes; the inner layer acts as an indicating tape. Alternatively, the tapes are to be applied to a maximum 15,9 mm diameter removable sleeve (cap) that is placed onto the 12,7 mm steel head. See Figure 1 or 2.

Indicating tape (inner layer) – 19,1 mm wide, adhesive backed, single-adhesive coated, vinyl foam tape, black in colour, having the tape properties given in Table 1.

Sensing tape no. 2 (middle layer) – 19,1 mm wide, double-adhesive coated, vinyl foam tape, white in colour, having the tape properties given in Table 1.

Sensing tape no. 1 (outer layer) – 19,1 mm wide, single-adhesive coated skived tetra-fluorethylene tape – natural colour, having the tape properties given in Table 1. The skived tetrafluorethylene backing (film) is shaved in a thin layer from a cylindrical block of material.

Calibration equipment – A weight (mass) that can exert 6,672 ± 0,133 N and a length of string.

3 Calibration

The sharp edge tester shall be calibrated so that 6,7 ± 0,133 N force is present at the centre of the head when the arm is between stops. The length of the arm is to be adjustable for calibration purposes. For special evaluations, the force may be adjusted to a different value.

See Figure 3 for a typical calibration procedure were, the length of the arm is to be adjustable for calibration purposes:

The adjustment set screws that hold the pivoted arm in place in the main drum are to be loosened.

With the handle securely held in a horizontal position, the calibration weight is to be attached to the centre of the head.

The length of the arm within the main drum is to be adjusted so that the weighted arm remains in a horizontal position with the calibration weight attached.

The adjustment setscrew(s) are to be tightened to securely lock the pivot arm in place within the main drum.

The calibration is to be rechecked and the weight removed.

4 The preparation of the test head

The curved face of the tester head shall be covered with three layers of tape in the following order:

a) First layer (inner layer) – Indicating type, black vinyl foam tape as described in Table 1.
b) Second layer (middle layer) – Sensing tape no. 2, white vinyl foam tape as described in Table 1.
c) Third layer (outer layer) – Sensing tape no. 1, tetrafluorethylene tape as described in Table 1.

Each tape is to be applied over approximately 180° of the circumference of the test head to prevent stretching of the tape. The tapes are not to be stretched when positioned on the head. See Figure 4.

5 The test procedure

The centre of the tape-covered head of the sharp-edge tester shall be positioned on the edge to be tested in the manner illustrated in Figures 5 and 6. The arm of the tester shall be between stops so that the tape-covered head exerts a 6,7 N force on the edge. The tester shall be immediately moved along the edge a distance of 50 mm and then back to its starting position without removal of the tester from the edge. It shall then be withdrawn from the edge. The total distance of engagement between the edge and the tape-covered head is not to exceed 100 mm. The time of travel is not to take longer than 5 s nor less than 2 s. For an edge less than 50 mm long shall be tested for a distance of twice its length. (Example: For an edge 40 mm long, the tester is to be moved along its length and back to the starting position so that the total distance of engagement between the edge and tester is 80 mm.)

6 Criteria

The application of the sharp-edge tester to an accessible edge as described above shall not result in the cutting through of the two outer layers of the sensing tapes.

The tape-covered head shall be examined to determine whether or not penetration has occurred through the two sensing layers. If penetration has occurred through the two sensing layers, the black indicating tape will be visible through the resulting cut.

Table 1 – Average values of tape dimensions and properties

	Indicating tape[a]	Sensing tape no. 2[b]	Sensing tape no. 1[c]
Thickness	(1,14 mm to 2,03 mm)	(0,64 mm to 1,02 mm)	total with adhesive backing: 0,114 mm
			backing: 0,064 mm to 0,089 mm
Density	256 kg/cubic meter	224 kg/cubic meter	–
Tensile	758 kN/m^2	379 kN/m^2	110 kN/m^2
Elongation, percent	370	–	275
Dielectric strength	7,9 kV/mm to 9,8 kV/mm	–	9 000 V
Temperature resistance (continuous)	80 °C	65 °C	180 °C
Compression deflection at 25 %	90 kN/m^2	–	–
Compression modules at 25 %	–	8,5 psi (59 kN/m^2)	–
Compression set percent loss of original height	3 %	3,0 %	

[a] 3M Company Type 4516[1] or any other tape having the properties meets the requirements.

[b] 3M Company Type 4432[2] or any other tape having the properties meets the requirements.

[c] Saint Gobain Company #2045-3[3] or any other tape having the properties meets the requirements.

———————

[1] 3M Company Type 4516 is the trademark of a product supplied by 3M Company. This information is given for the convenience of users of this document and does not constitute an endorsement by IEC of the product named. Equivalent products may be used if they can be shown to lead to the same results.

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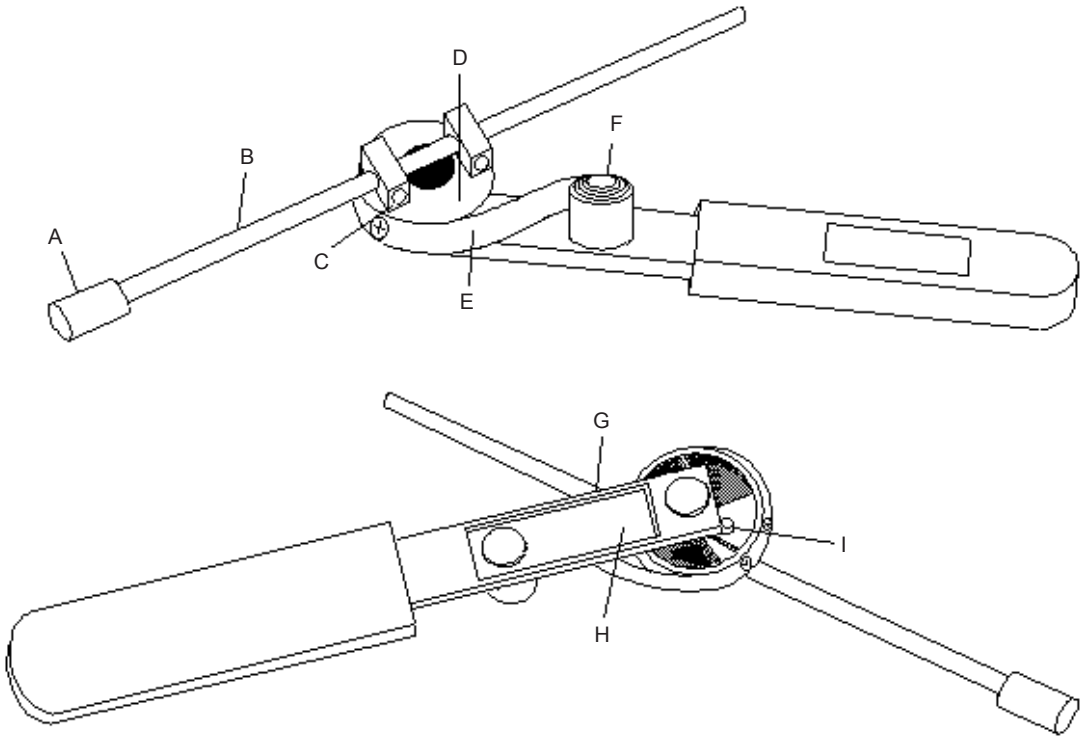


IEC 0555/14

Key

A – Head, steel, 12,7 mm diameter, 19 mm long

B – Arm, steel, 6,4 mm diameter adjustable

C – Adjustment screw

D – Main drum, free to rotate on stud, sleeve bearing

E – Negator s-ring, 12,7 mm wide,165 mm long

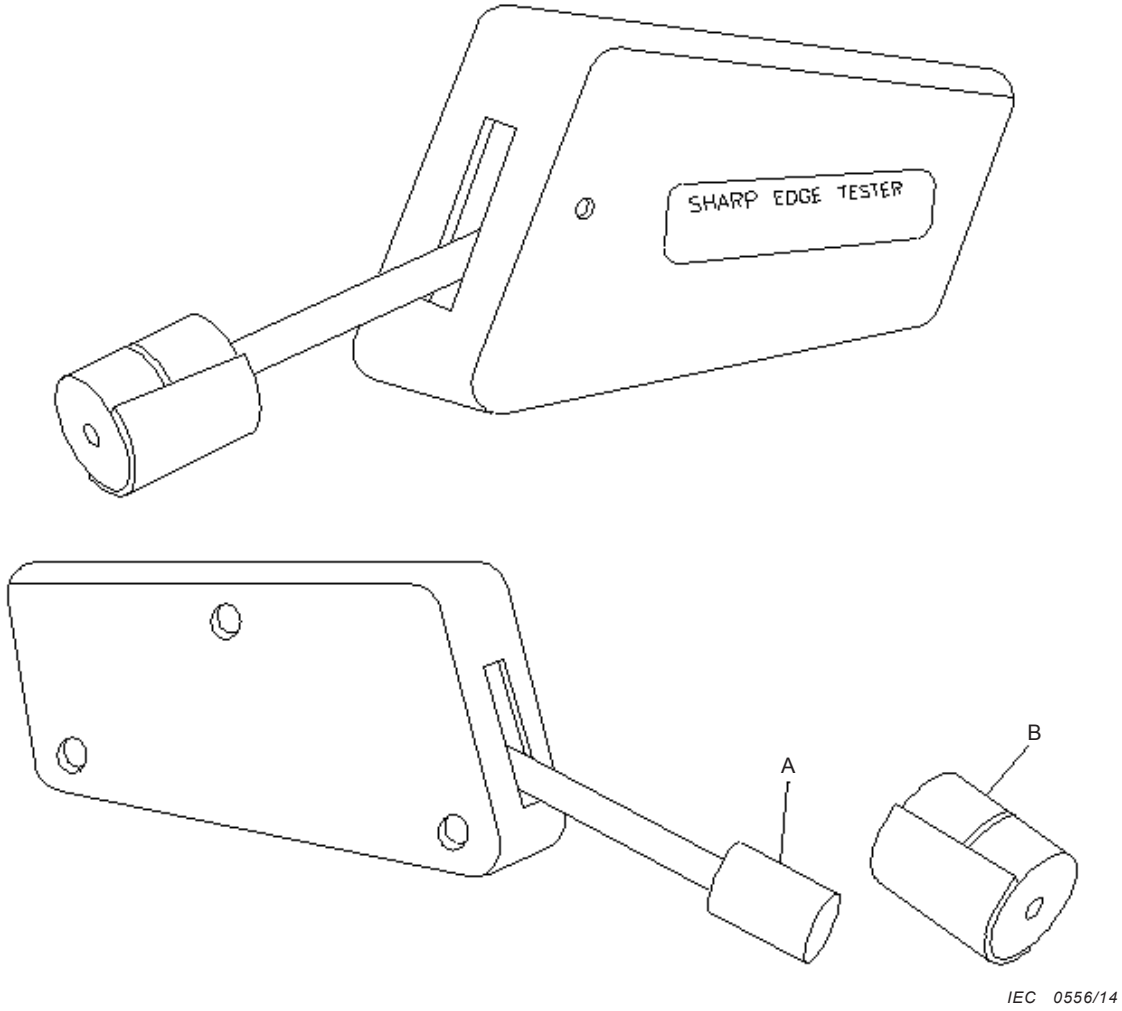
F – Storage drum, free to rotate on stud, sleeve bearing

G – Adjustable wrench

H – Handle assembly

I – Stop

Figure 1 – Sharp edge tester



Key

A – Head, steel, 12,7 mm diameter, 19 mm long

B – Tape cap, maximum 15,9 mm diameter removable sleeve

Figure 2 – Sharp edge tester with tape cap (alternate construction)

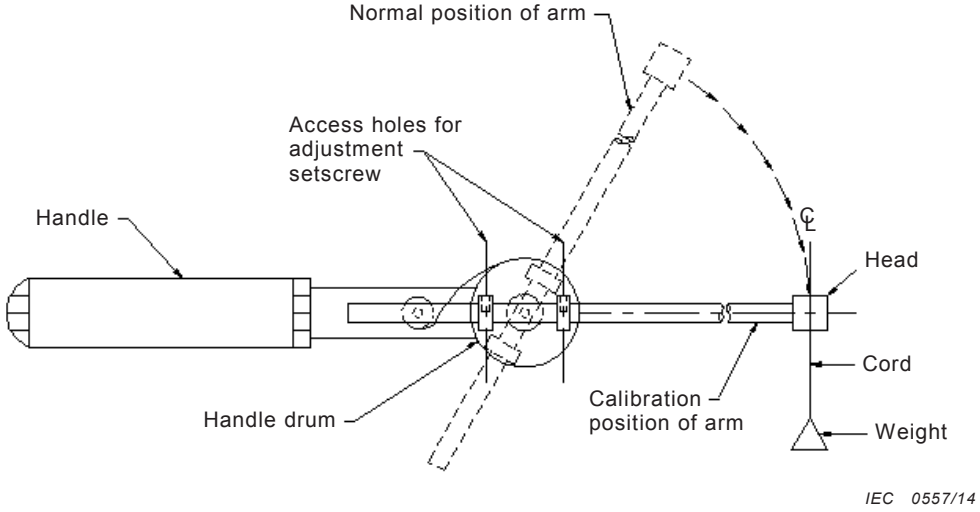
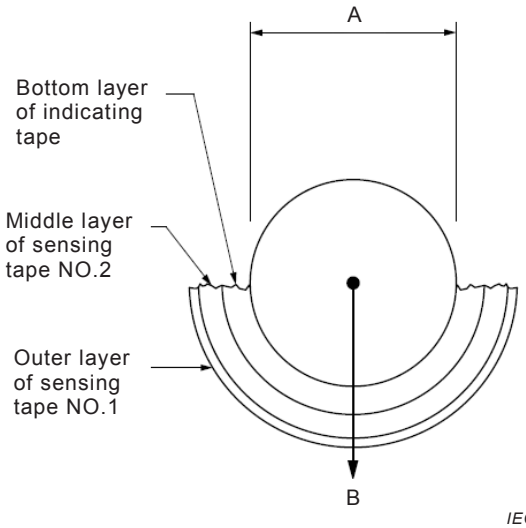


Figure 3 – Typical calibration procedure



Key

A – 12,7 mm diameter

B – 19 mm long

Figure 4 – Test Head Preparation

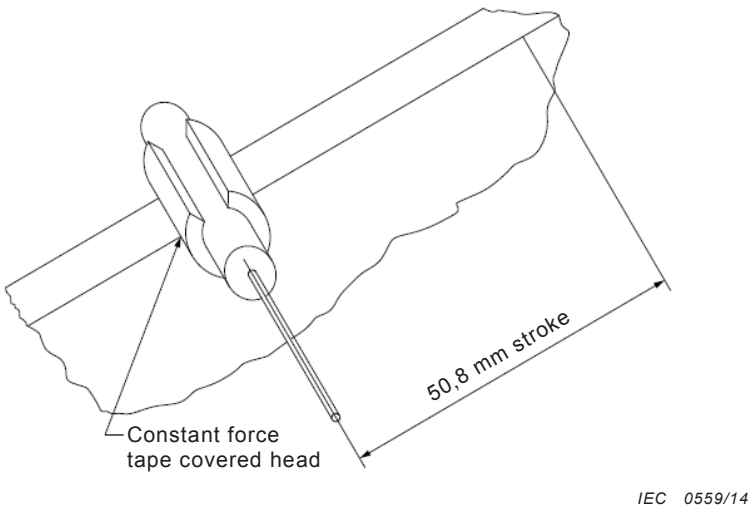


Figure 5 – Test Procedure

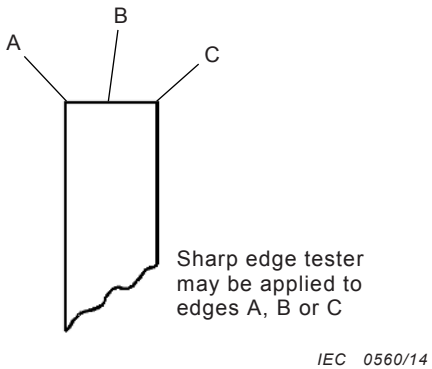


Figure 6 – Edges Tested

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