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Road vehicles — Special warning lamps — Dimensions

Véhicules routiers — Feux spéciaux d'avertissement — Dimensions

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Foreword

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International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 4148 was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 8, *Lighting and signalling*.

This fourth edition cancels and replaces the third edition (ISO 4148:1998), which has been technically revised. It also incorporates the Draft amendment ISO 4148:1998/DAmd1.

Road vehicles — Special warning lamps — Dimensions

1 Scope

This International Standard specifies the dimensions of special warning lamps for road vehicles, in order to ensure interchangeability and accurate positioning, bearing in mind the rapid change of light intensity from such devices in a vertical cross-section of the projected beam.

It also specifies (see Annex A) methods for testing the magnetic-base mountings used to install special warning lamps directly on the steel sheet of the roof or body of a vehicle (special warning lamps of Category D).

NOTE In certain countries and international bodies, the term “light” is sometimes used instead of “lamp”.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 2813, *Paints and varnishes — Determination of specular gloss of non-metallic paint films at 20 degrees, 60 degrees and 85 degrees*

ISO 4091, *Road vehicles — Connectors for the electrical connection of towing and towed vehicles — Definitions, tests and requirements*

ISO 4130, *Road vehicles — Three-dimensional reference system and fiducial marks — Definitions*

ISO 4165, *Road vehicles — Electrical connections — Double-pole connection*

ISO 4892 (all parts), *Plastics — Methods of exposure to laboratory light sources*

ISO 9227, *Corrosion tests in artificial atmospheres — Salt spray tests*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
magnetic holder
device used to fix the lamp by magnetic forces on an unalloyed steel surface

3.2
magnetic system
combination of one or more permanent magnets with additional magnetic flux reluctance material for the concentration of the magnetic flux to the holding surface

NOTE Such additional materials could be pots, pole shoes, etc. of unalloyed steel.

3.3
lifting force
F_a
force perpendicular to the holding surface required to detach the magnetic-base mounting from the mounting surface

3.4
horizontal force
F_b
force applied during testing to simulate the horizontal component of any external loading in the X-plane or Y-plane as defined in ISO 4130

NOTE The force is applied at a distance from the mounting surface equating to 50 % of the combined height of the magnetic-base mounting and lamp.

3.5
reference axis
axis perpendicular to the surface on which the unladen vehicle stands

3.6
vertical angle
α
angle above and below the horizontal plane passing through the centre of the light source within which light intensities are specified

4 Categories of special warning lamps

This International Standard defines five categories of special warning lamps:

— Category A: tube-mounted lamp (see Figures 1 to 3);

— Category B: flat-base-mounted lamp (see Figure 4);

— Category C: single-stem-mounted lamp (see Figure 5);

— Category D: magnetic-base-mounted lamp (see Figure 6);

— Category E: warning signal unit (see Figure 7).

5 Intermediate quick-release devices

An intermediate quick-release device may be used if it accepts warning lamps of Categories A, B or C, if it yields the desired accuracy, and if national requirements so permit.

6 Requirements for mounting

6.1 Interchangeability

The warning lamps shall comply with the requirements of Figures 1 to 7, as appropriate.

6.2 Mounting accuracy

When mounted correctly, each lamp shall be within 1° of the position specified. In the case of intermediate quick-release devices, the mounting shall be made on a fixture representing the fixing zone for which it is

intended. To check mounting accuracy, the lamp shall be mounted five times on an appropriate test fixture, and its attitude determined. In no case shall the inclination vary by more than 1° from the mounting plane for Categories B, C and D or from a plane perpendicular to the mounting tube axis for Category A.

6.3 Geometric visibility

The apparent surface of a warning lamp shall be visible within the field defined by the following angles of geometric visibility:

a) horizontal angle: 360°;

b) vertical angle α:

   1) $\alpha = 4°$ for blue special warning lamps,

   2) $\alpha = 8°$ for amber special warning lamps.

The vertical angle below the horizontal plane may be smaller if the geometric visibility of the lamp is met at points located 1 m above the surface on which the vehicle stands and at 20 m from the vehicle.

In the case where more than one lamp is fitted, the requirements of this International Standard are met if at least one lamp is visible under the conditions specified.

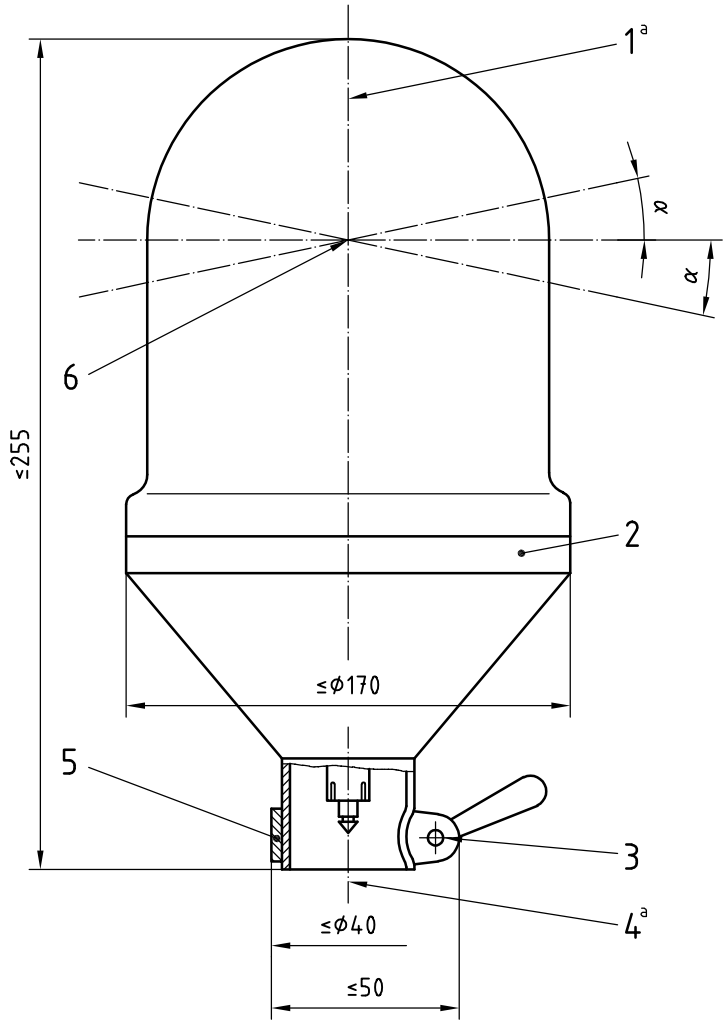
7 Identification

Identification shall include the following:

a) the manufacturer's name, the model number and the category of device;

b) the colour and any special conditions (insulated return, ADR, etc.).

Dimensions in millimetres



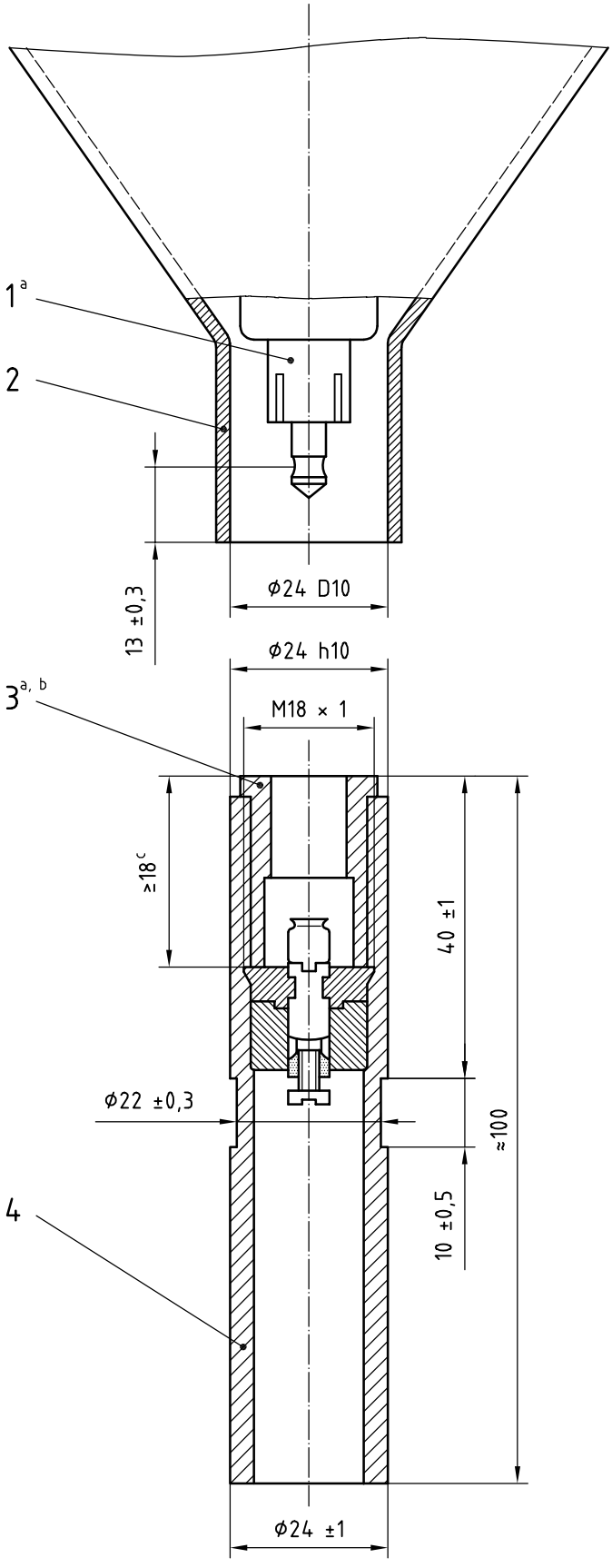
Key

1 reference axis
2 housing
3 fixing device
4 mounting tube axis
5 mounting
6 reference centre (centre of the light source)

[a] The mounting tube axis shall be parallel to the reference axis.

Figure 1 — Tube-mounted special warning lamp (Category A)

Dimensions in millimetres



Key

1 plug

2 mounting tube

3 socket

4 acceptor

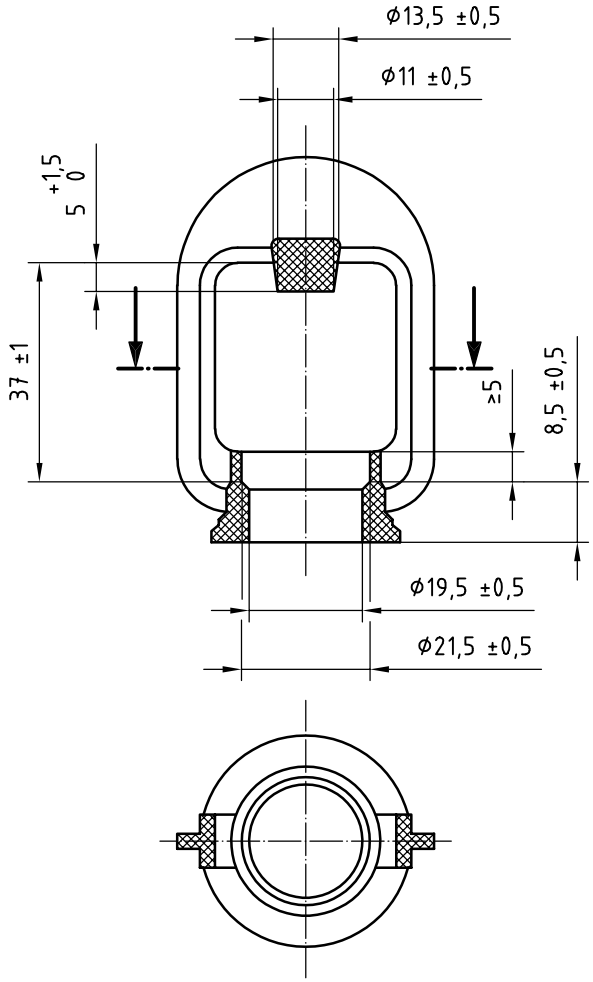
a Plug and socket dimensions shall meet the requirements of ISO 4165.

b A rubber cover shall be used when the special warning lamp is not mounted (see Figure 3).

c Internal thread reach.

Figure 2 — Tube-mounted special warning lamp (category A) — Mounting tube and acceptor dimensions

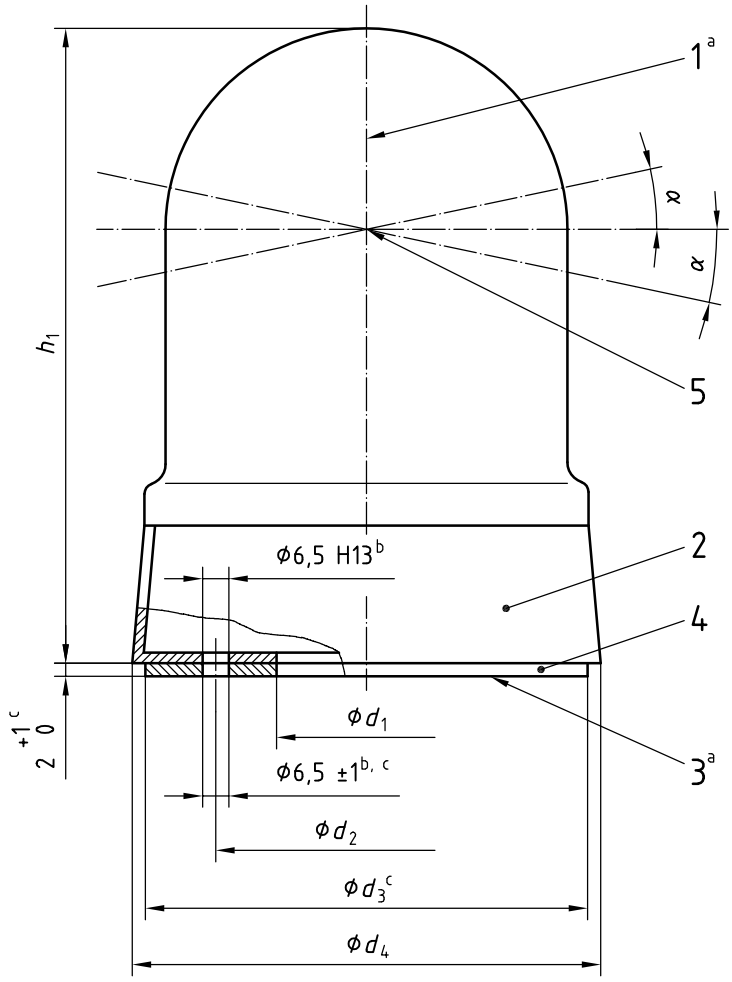
Dimensions in millimetres



NOTE Other solutions are acceptable if they give comparable protection.

Figure 3 — Example of rubber cover for use on when special warning lamp Category A is not mounted

Dimensions in millimetres



Key

1 reference axis
2 housing
3 mounting plane
4 sealing ring
5 reference centre (centre of light source)

a The mounting plane of the lamp shall be perpendicular to the reference axis.

b Three holes, 120° apart.

c The hole diameter 6,5 ± 1, dimension d_3 and the thickness $2\,^{+1}_{0}$ apply only to separate sealing rings; they are not relevant to sealing integral with the body.

Size	d_1 min.	d_2 [a]	d_3 min.	d_4 min.	h_1 min.
1	108	130	145	190	235
2	170	200	220	240	255

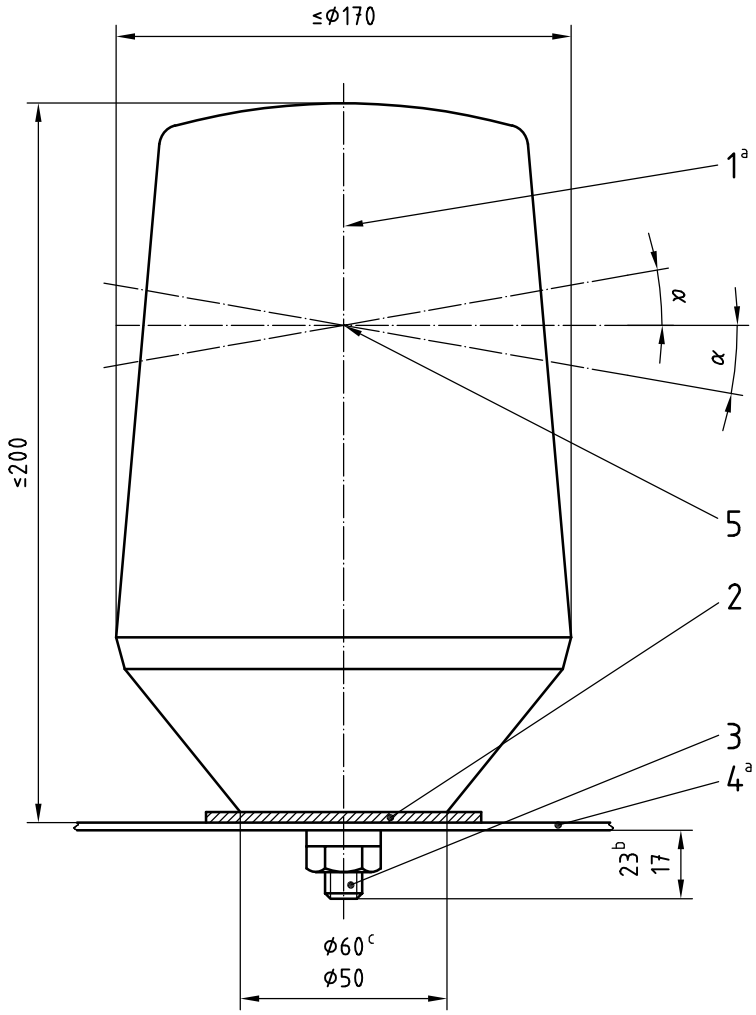
[a] Tolerances:

— for the housing: ± 0,5;

— for a separate sealing ring: ± 1.

Figure 4 — Flat-base-mounted special warning lamp (Category B)

Dimensions in millimetres



Key

1 reference axis
2 sealing ring
3 hollow bolt ($\varnothing \leqslant 12$)
4 mounting plane
5 reference centre (centre of the light source)

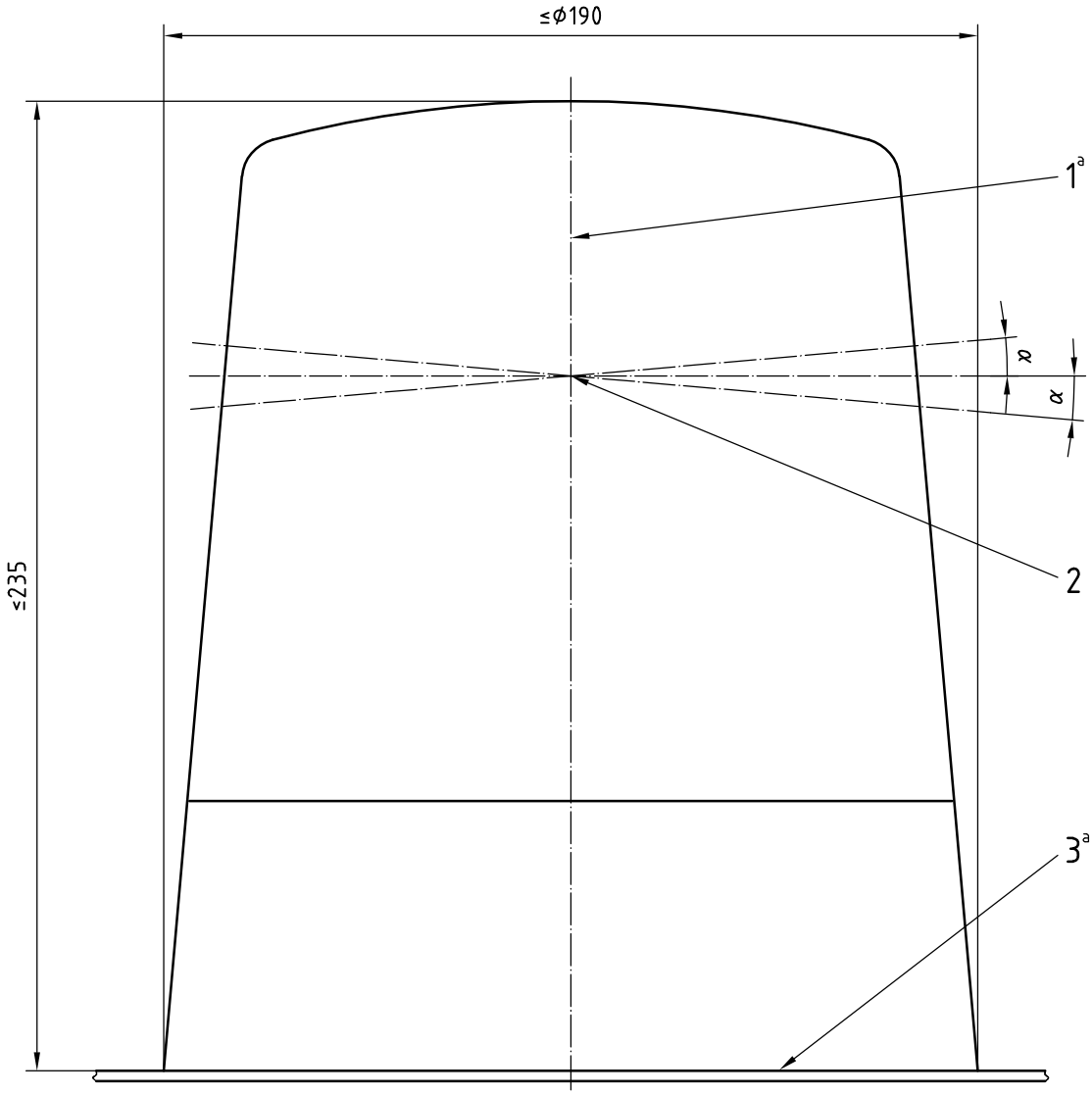
a The mounting plane of the lamp shall be perpendicular to the reference axis.

b Dimension applies with the device on a 1 mm thick flat plane.

c The maximum value of this dimension, the diameter of the seating surface, will be the outer diameter of the sealing ring or the flat base of the device, whichever is the smaller.

Figure 5 — Single-stem-mounted special warning lamp (Category C)

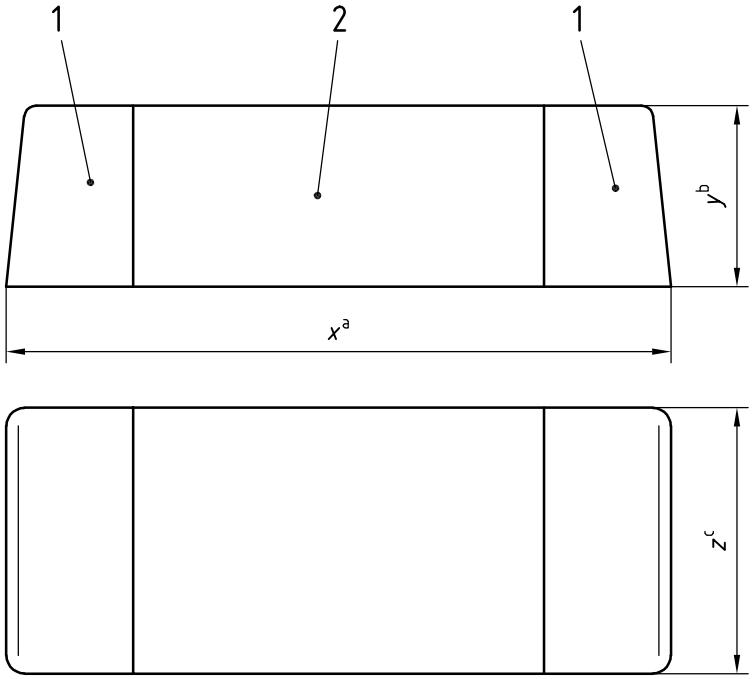
Dimensions in millimetres



Key

1 reference axis
2 reference centre (centre of the light source)
3 mounting plane
[a] The mounting plane of the lamp shall be perpendicular to the reference axis.

Figure 6 — Magnetic-base-mounted special warning lamp (Category D)



Key

1 special warning lamp

2 sound signalling device and/or inscription area

a $x \leqslant$ 1 250 mm, size 1, if the unit is mounted on a passenger car;

$x \leqslant$ 2 500 mm, size 2, if the unit is mounted on a commercial vehicle.

b $y \leqslant$ 305 mm; the means for the attachment are not included.

c $z \leqslant$ 450 mm.

Figure 7 — Warning signal unit (Category E)

Annex A
(normative)

Test of effectiveness of attachment of magnetic-base-mounted special warning lamps

A.1 General requirements

A.1.1 Each test should be performed on a new, clean test sample. However, there is always the possibility of combining different tests on the same test sample.

A.1.2 The test sample shall be of steel sheeting, ST14 specification, $0{,}70\,^{+0{,}10}_{0}$ mm thick, painted with a thickness of 120 µm ± 20 µm and with a surface gloss factor of 85 at a gloss angle of 20°, in accordance with ISO 2813.

The size of the test sample shall be sufficient to meet the requirements for mounting to the text fixture and movements resulting from the test methods.

The test sample shall be mounted to a rigid non-magnetic block having a surface with a single curvature generated by a radius of not less than 5 000 mm.

The fixtures for mounting the test sample to the block shall be outside the area of the magnetic-base mounting to be tested, permitting the potential movement generated by the shock test (see A.2.3).

A.1.3 Unless specified otherwise, tests shall be performed under the following conditions:

— temperature: 23 °C ± 5 °C;

— humidity range: 25 % to 75 %.

A.2 Test requirements

A.2.1 Measurement of lifting force, F_a

The base mounting, after being magnetically attached to the test piece, shall be subjected to a force perpendicular to the test piece, the application of this force having a movement of not more than 10 mm/min.

The applied force shall be monitored until the magnetic-base mounting separates from the test piece. The maximum value of the force shall be recorded.

The test shall be performed at 23 °C and than repeated at −30 °C and 80 °C. For these repeat tests, the test piece may be removed from the oven after attaining the required temperatures and the test performed within 3 min after removal from the oven.

A.2.2 Measurement of horizontal force, F_b

The base mounting, after being magnetically attached to the test piece, shall be subjected to a force in the direction of the curvature of the test piece and parallel to the area of the test piece to which the magnetic base is mounted, the application of this force having a movement of not more than 10 mm/min.

The force applied shall be monitored until the magnetic-base mounting either separates from the test piece or moves at least 3 mm. The maximum value of the force shall be recorded.

The height from the test piece at which the force is applied shall also be recorded.

A.2.3 Resistance to Shock

The assembly of the base mounting magnetically attached to the test piece shall be subject to a minimum acceleration of 16 g during a period of 30 ms.

The direction of the acceleration shall be in the direction of the curvature of the test piece to which the magnetic base is mounted.

The magnetic-base mounting shall not move by more than 200 mm from the original mounting position.

A.2.4 Resistance to corrosion

Expose the complete magnetic holding device assembly to the neutral salt spray test (NSS), with 5 % of sodium chloride, for 168 h. This test shall be performed in accordance with ISO 9227. After this test, the tests in accordance with A.2.1 and A.2.2 shall be repeated. The values measured before and after this test shall not differ by more than 10 %.

After being tested in accordance with this subclause, no active corrosion affecting the basic function of any part shall appear.

A.2.5 Resistance to other agents

The materials used in the construction of the magnetic-base mounting shall fulfil the requirements of A.2.1 and A.2.2 and shall exhibit resistance to ultraviolet exposure and ozone ageing in accordance with ISO 4892.

These requirements may be met by either of the following:

a) material certification and report showing that it is suitable for this application;

b) direct testing under the above-mentioned extreme conditions.

A.3 Additional requirements and recommendations

A magnetic-base mounting shall have a secondary retention system to prevent loss. It shall not be possible for the lamp unit to be separated unintentionally from the vehicle during driving. This may be a function of the electrical cable connection or other equivalent means.

The mechanical and/or electrical connections shall comply with the test methods and performance requirements given in ISO 4091.

Means should be provided to ensure the correct orientation of the magnetic-base mounting, both for direction and horizontal level.

A.4 Instructions

A.4.1 Instructions for mounting

The magnetic-base mounting device manufacturer shall provide instructions containing the following minimum information:

a) a description for proper installation and aiming of the special warning lamp so that, after installation, the orientation of the light distribution of the lamp is in conformance with this International Standard;

b) for safety reasons, instructions that

   1) the magnetic holding device be checked after mounting,

   2) the magnetic fixing device not be placed, completely or partially, on sun roofs made of plastics, aluminium or glass,

   3) when magnetic devices are put on a steel sun roof, the roof be in the closed position and not operating,

   4) mounting on panels with excessive curvature be avoided, and

   5) installation on re-painted parts of the vehicle be avoided;

c) a warning that explains

   1) the importance of correctly following the instructions for installation/fitting and use, and

   2) the need for any additional holding device to be tightened correctly.

A.4.2 Instructions for use

Instructions shall be given to the user to

a) store magnetic holding devices away from electric or electronic appliances,

b) not stick together magnetic plates or holders,

c) check that the surface of the magnet is clean, dry and undamaged,

d) check that the surface of the car roof is clean, free of snow and ice and undamaged,

e) carefully store the cable when not in use,

f) ensure that the magnetic system is not exposed to high magnetic fields, and

g) not expose the warning lamps together with the magnetic fixing device to temperatures lower than −30 °C or higher than 8 °C.

A.5 Marking

Magnetic fixing devices shall have the following marking:

a) name or trademark of the manufacture, importer or distributor;

b) type of magnetic fixing device;

c) maximum load for one set and kind of load defined according to this International Standard.

Bibliography

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[3] ISO 7227, *Road vehicles — Lighting and light signalling devices — Vocabulary*

[4] EN 10025, *Hot rolled products of non-alloy structural steels — Technical delivery conditions*

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