SLOVENSKI STANDARD
SIST EN ISO 449:2000

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Ships and marine technology - Magnetic compasses, binnacles, and azimuth reading devices - Class A (ISO 449:1997)

Ships and marine technology - Magnetic compasses, binnacles, and azimuth reading devices - Class A (ISO 449:1997)

Schiffe und Meerestechnik - Magnetkompasse, Kompaßstände und Peilvorrichtungen - Klasse A (ISO 449:1997)

Navires et technologie maritime - Compas magnétiques, habitacles et alidades - Classe A (ISO 449:1997)

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Ships and marine technology - Magnetic compasses, binnacles and azimuth reading devices - Class A (ISO 449:1997)

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This European Standard was approved by CEN on 20 May 1999.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

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Foreword

The text of the International Standard from Technical Committee ISO/TC 8 "Ships and marine technology" of the International Organization for Standardization (ISO) has been taken over as an European Standard by Technical Committee CEN/TC 300 "Sea-going vessels and marine technology", the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by January 2000, and conflicting national standards shall be withdrawn at the latest by January 2000.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

Endorsement notice

The text of the International Standard ISO 449:1997 has been approved by CEN as a European Standard without any modification.

INTERNATIONAL STANDARD

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Ships and marine technology — Magnetic compasses, binnacles and azimuth reading devices — Class A

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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.

International Standard ISO 449 was prepared by Technical Committee ISO/TC 8, *Ships and marine technology*, Subcommittee SC 6, *Navigation*.

This second edition cancels and replaces the first edition (ISO 449:1979), which has been technically revised.

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Ships and marine technology — Magnetic compasses, binnacles and azimuth reading devices — Class A

1 Scope

This International Standard gives general requirements regarding construction and performance for magnetic compasses, binnacles and azimuth reading devices, class A. According to the design of the ship, two types of binnacle are specified.

This International Standard applies to liquid-filled magnetic compasses:

— intended for sea navigation according to regulations in force;

— having a direct reading system;

— which may be of the reflecting, projecting or transmitting types.

In the context of this International Standard, a magnetic compass is an instrument consisting of a directional system supported by a single pivot inside a bowl which is completely filled with liquid, and which is supported in gimbals inside or outside the bowl. Compasses without gimbals are also covered by this International Standard. The requirements relating to gimbals do not apply to such compasses.

This International Standard does not apply to:

a) dry card compasses;

b) types of compass designed on principles different from those stated above or not complying with the descriptions given.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 613:1982, *Shipbuilding — Magnetic compasses, binnacles and azimuth reading devices — Class B.*

ISO/R 694:1968, *Positioning of magnetic compasses in ships.*

ISO 1069:1973, *Magnetic compasses and binnacles for sea navigation — Vocabulary.*

ISO 2269:1992, *Shipbuilding — Class A magnetic compasses, azimuth reading devices and binnacles — Tests and certification.*

ISO 10316:1990, *Shipbuilding — Class B magnetic compasses — Tests and certification.*

IEC 945:1994, *Marine navigational equipment — General requirements — Methods of testing and required test results.*

3 Definitions

For the purposes of this International Standard, the definitions given in ISO 1069 apply.

4 Marking

The following parts shall be marked with the information given and in the position shown in table 1.

Table 1 — Marking requirements

Part	Position of manufacturer's name or other means of type identification	Position of serial number on the part
Magnetic compass	a) card b) verge ring	a) card b) verge ring c) gimbal ring or rings
Binnacle	Any convenient position	Not required
Azimuth reading device	On top of the base of the azimuth reading device	On top of the base of the azimuth reading device
NOTE — The type of liquid used, if other than alcohol, shall be indicated on the bowl in the vicinity of the filling plug.		

5 Magnetic compasses

5.1 Construction and materials

5.1.1 The magnets used in the directional systems of magnetic compasses shall be of a suitable magnetic material having a high remanence and coercivity of at least 18 kA/m. All other materials used in magnetic compasses, other than transmitting compasses, shall be of non-magnetic material.

5.1.2 The distance between the lubber mark and the outer edge of the card shall be between 1,5 mm and 3,0 mm for direct reading and reflecting types and between 0,5 mm and 1,5 mm for projecting compasses. The width of the lubber mark shall not be greater than 0,5° of the graduation of the card. The lubber mark shall be of such design as to allow the compass to be read from the steering position when the bowl is titled 10° in the case of a gimbal compass or 30° in other cases.

5.1.3 When the verge ring and the seating for the azimuth reading device are both horizontal, the graduated edge of the card, the lubber mark if a point, the pivot point and the outer gimbal axis shall lie within 1 mm of the horizontal plane passing through the gimbal axis fixed to the bowl.

5.1.4 The gimbal axes shall be mutually perpendicular within a tolerance of 1°. The outer gimbal axis shall be in the fore-and-aft direction of the ship.

5.1.5 The thickness of the top glass cover and of the bottom glass of the compass shall be not less than 4,5 mm, if non-toughened, and not less than 3,0 mm, if toughened. These values apply also to the thickness of the top glass in hemispherical compasses. If material other than glass is used, it shall be of equivalent strength.

5.1.6 Within the temperature range – 30 °C to + 60 °C

a) the compass shall operate satisfactorily;

b) the liquid in the compass bowl shall remain clear and free from bubbles and neither emulsify nor freeze;

c) there shall be neither inward leakage of air nor outward leakage of liquid. No bubble shall form in a compass unless it is specially provided to compensate for expansion;

NOTE — A bubble provided in a compass to compensate for expansion shall not inconvenience the functioning and reading of the compass;

d) the internal paint shall not blister, crack or discolour appreciably;

e) the supporting force shall be such that the directional system always remains in contact with its pivot;

f) the material of the compass card shall not distort.

5.1.7 The compass bowl shall be balanced so that its verge ring or top glass cover settles in the horizontal plane to within 2° when the gimbal ring is fixed in a horizontal position; this shall be so whether the azimuth reading device or magnifying glass is in place or not.

5.2 Mounting

5.2.1 The bowl of the compass shall be mounted so that the verge ring remains horizontal when the binnacle is tilted 40° in any direction and in such a manner that the compass cannot be dislodged under any conditions of sea or weather.

The inner and outer gimbal bearings shall be of the same type.

5.2.2 In compasses in which no supporting gimbal is provided the freedom of the card shall be 30° in all directions.

5.3 Directional system

5.3.1 Moment of inertia

The moment of inertia of the directional system shall be approximately the same about all horizontal axes passing through the point of support on the pivot jewel.

5.3.2 Suspension

The directional system shall be retained in position by suitable means and remain free when the bowl is tilted 10° in any direction.

5.3.3 Magnetic moment

The magnetic moment of the magnets in the directional system shall not be less than the value given in figure 1.

5.3.4 Settling time

Following an initial deflection of the card of 90° from the magnetic meridian, the time taken to return finally to within 1° of the magnetic meridian, shall not exceed $\sqrt{57\,600/H}$ at a temperature of 20 °C ± 3 °C, where H is the horizontal component of the magnetic flux density in microteslas (μT) at the place of testing.

5.3.5 Tilt of the directional system with regard to the vertical field

The directional system shall be so constructed, or balanced in such a way, that it does not incline more than 0,5° from the horizontal plane when the vertical flux density is zero. The inclination shall not change by more than 3° when the vertical flux density changes 100 μT.

5.3.6 Supporting force

The force exerted on the pivot bearing, in the liquid used, by the directional system shall be between 0,04 N and 0,1 N when the card diameter is 165 mm or less, and shall be between 0,04 N and 0,14 N when the card diameter is larger than 165 mm.