

# ISO 25862:2019 (E)

## Ships and marine technology — Marine magnetic compasses, binnacles and azimuth reading devices

---

### Contents

	Foreword
1	Scope
2	Normative references
3	Terms and definitions
4	Magnetic compasses
4.1	General
4.1.1	Class A magnetic compass
4.1.2	Class B magnetic compass
4.2	Construction and materials
4.2.1	Magnetic material
4.2.2	Lubber mark
4.2.3	Position of the card (class A only)
4.2.4	Angle of gimbal axes and intersection of vertical planes passing through them
4.2.5	Thickness of the top glass cover (class A only)
4.2.6	Constructional condition within the temperature range
4.2.7	Horizontal position
4.3	Mounting
4.3.1	Tilt of supporting device
4.3.2	Freedom of the compass card with no supporting gimbal
4.4	Directional system
4.4.1	Moment of inertia
4.4.2	Suspension (class A only)
4.4.3	Magnetic moment
4.4.4	Settling time
4.4.5	Tilt of the directional system with regard to the vertical field (class A only)
4.4.6	Supporting force (class A only)
4.5	Compass card
4.5.1	Graduation
4.5.2	Diameter of the card
4.5.3	Readability
4.5.4	Bearing compasses
4.6	Accuracy
4.6.1	Directional error
4.6.2	Error of lubber marks
4.6.3	Error due to friction
4.6.4	Swirl error
4.6.5	Induction error (class A only)
4.6.6	Mounting error of azimuth reading device
4.6.7	Error due to eccentricity of the verge ring (class A only)
4.7	Environmental conditions tests of magnetic compasses (class A only)
5	Binnacles
5.1	General
5.2	Binnacle type A1
5.2.1	General
5.2.2	Construction and materials
5.2.3	Provision for correction of deviation (if combined with class B compasses)
5.2.3.1	Material
5.2.3.2	Compensation for horizontal permanent magnetism

- 5.2.3.3 Correction for heeling error
- 5.2.3.4 Compensation for horizontal induced fields due to the horizontal component of the Earth's magnetic field in the soft iron in a ship
- 5.2.3.5 Compensation for horizontal induced fields due to the vertical component of the Earth's magnetic field in the soft iron in a ship
- 5.2.3.6 Positions and attachment of correcting devices
- 5.2.3.7 Corrector coils
- 5.2.4 Accuracy of fore and aft marks
- 5.2.5 Illumination
- 5.2.6 Environmental conditions requirements (class A only)
- 5.3 Binnacle type A2
- 5.3.1 General
- 5.3.2 Construction and materials
- 5.3.3 Provision for correction of deviation
- 5.3.3.1 Material
- 5.3.3.2 Compensation for horizontal permanent magnetism
- 5.3.3.3 Correction for heeling error
- 5.3.3.4 Compensation for horizontal induced fields due to the horizontal component of the Earth's magnetic field in the soft iron of the ship
- 5.3.3.5 Compensation for horizontal induced fields due to the vertical component of the Earth's magnetic field in the soft iron of the ship
- 5.3.3.6 Attachment of correcting devices
- 5.3.4 Accuracy of fore and aft marks
- 5.3.5 Illumination
- 5.3.6 Environmental conditions requirements (class A only)
- 6 Azimuth reading devices
  - 6.1 General
  - 6.2 Azimuth sight
  - 6.3 Azimuth reading devices with vanes
  - 6.4 Level
- 7 Marking
- 8 Designation
- Annex A (normative) Testing and certification of marine magnetic compasses, binnacles and azimuth reading devices — General requirements
  - A.1 Introduction
  - A.2 Scope of testing
  - A.3 Types of compasses to be tested
  - A.4 Test conditions
  - A.5 Certification
- Annex B (normative) Testing and certification of marine magnetic compasses
  - B.1 Manufacturer's statement
  - B.2 Marking
  - B.3 Compass and gimbaling checks and tests
    - B.3.1 Construction and material
      - B.3.1.1 Condition of compass bowl
      - B.3.1.2 Non-magnetic properties (type-test only)
      - B.3.1.3 Condition at high temperature
      - B.3.1.4 Condition at low temperature
      - B.3.1.5 Thickness of top and bottom glass covers (type-test only)
      - B.3.1.6 Heading transmitting system
    - B.3.2 Compass gimbaling
      - B.3.2.1 Plane of gimbal axes (type-test only)
      - B.3.2.2 Angle of gimbal axes and intersection of vertical planes passing through them (type-test only)
      - B.3.2.3 Freedom of movement within gimbal ring
      - B.3.2.4 Horizontal position
      - B.3.2.5 Friction of inner gimbal axis
      - B.3.2.6 Inner and outer gimbal bearings (type-test only)
    - B.3.3 Compass bowl

- B.3.3.1 Relative verge ring graduation (if any)
- B.3.3.2 Error due to eccentricity of verge ring graduation (if any verge ring graduation)
- B.3.3.3 Accuracy of centring of azimuth reading device (type-test only)
- B.3.4 Compass card bearing
  - B.3.4.1 Height of pivot bearing (type-test only)
  - B.3.4.2 Protection of directional system against displacement
  - B.3.4.3 Freedom of tilt of directional system
- B.3.5 Lubber marks
  - B.3.5.1 Number of lubber marks
  - B.3.5.2 Visibility of lubber mark(s)
  - B.3.5.3 Width of lubber mark(s)
  - B.3.5.4 Distance between lubber mark(s) and card outer edge
- B.3.6 Directional system
  - B.3.6.1 Compass card
    - B.3.6.1.1 Graduation
    - B.3.6.1.2 Diameter of the card
    - B.3.6.1.3 Readability
    - B.3.6.1.4 Relationship of edge of compass card and pivot bearing (type-test only)
  - B.3.6.2 Directional system magnets
    - B.3.6.2.1 Magnetic moment
    - B.3.6.2.2 Induction error (type-test only)
    - B.3.6.2.3 Coercivity (type-test only)
    - B.3.6.2.4 Change in tilt when vertical flux density has changed (type-test only)
  - B.3.6.3 Settling time
- B.3.7 Accuracy
  - B.3.7.1 Directional error
  - B.3.7.2 Error of lubber marks
  - B.3.7.3 Error due to friction
  - B.3.7.4 Swirl error
  - B.3.7.5 Environmental condition test of magnetic compasses (class A only) (type-test only)
- B.4 Test certificate

#### **Annex C (normative) Testing and certification of azimuth reading devices**

- C.1 General
  - C.1.1 Groups of azimuth devices to be tested
  - C.1.2 Manufacturer's statement for azimuth reading devices
- C.2 Azimuth reading device checks and tests
  - C.2.1 Material
    - C.2.2 Mounting upon compass
    - C.2.3 Adjustment of spirit level
    - C.2.4 Field of view and range of altitude (type-test only)
  - C.2.5 Accuracy
    - C.2.5.1 Sights or telescope-sights (group I)
      - C.2.5.1.1 Parallelism of vanes
      - C.2.5.1.2 Perpendicularity of vanes upon base
      - C.2.5.1.3 Attachment and adjustment of observation mirror
      - C.2.5.1.4 Freedom of distortion of mirror and shades
      - C.2.5.1.5 Prismatic magnifying glass (if any)
    - C.2.5.2 Azimuth mirror or prism instruments such as Thomson type (group II)
      - C.2.5.2.1 Construction
      - C.2.5.2.2 Focal length of lens
      - C.2.5.2.3 Error caused by mechanical inaccuracy
        - C.2.5.2.3.1 Prism axis not at right angles to line of sight
        - C.2.5.2.3.2 Prism axis not parallel to plane of compass top glass
      - C.2.5.2.4 Card diameter
      - C.2.5.2.5 Error in shades of azimuth mirror
      - C.2.5.2.6 Level
  - C.2.6 Shadow pin (if any)
  - C.2.7 Pelorus
- C.3 Test certificate

#### **Annex D (normative) Type-testing and certification of binnacles**

- D.1 General
  - D.1.1 Overview

- D.1.2 Binnacles and correcting devices to be tested
- D.1.3 Manufacturer's statement for binnacles
- D.2 Binnacles
  - D.2.1 Construction and material
    - D.2.1.1 Dimensions
    - D.2.1.2 Non-magnetic properties
  - D.2.2 Compass suspension
    - D.2.2.1 Outer gimbal axis
    - D.2.2.2 Tilt of supporting device
    - D.2.2.3 Precautions against dislodging
    - D.2.2.4 Friction of gimbal and compass axes
    - D.2.2.5 Play in outer gimbal axis bearing
    - D.2.2.6 Compass suspensions provided with springs
      - D.2.2.6.1 Horizontal movement of compass bowl and gimbaling
        - D.2.2.6.2 Effect of azimuth reading device
  - D.2.3 Provisions to correct misalignment
  - D.2.4 Correcting devices, marking, coercivity and securing (type A1 binnacles and, if fitted, type A2 binnacles)
    - D.2.4.1 General
    - D.2.4.2 Heeling error corrector magnets
    - D.2.4.3 Mounting of horizontal corrector magnets
      - D.2.4.3.1 Error of alignment
      - D.2.4.3.2 Position error
      - D.2.4.3.3 Minimum distance of horizontal correcting magnets from directional system and their strength
    - D.2.4.4 Attachment of quadrantal correctors
    - D.2.4.5 Flinders' bar
  - D.2.5 Corrector coils
  - D.2.6 Illumination
    - D.2.6.1 General
    - D.2.6.2 Magnetic influence of lamps, plugs, sockets, switches, dimmers and wiring
    - D.2.6.3 Readability of reflector and projector compasses
    - D.2.6.4 Environmental condition test of binnacle (class A only) (type-test only)
- D.3 Test certificate

**Annex E (normative) Positioning of magnetic compasses in ships**

- E.1 General
- E.2 General
  - E.2.1 Compass positions
  - E.2.2 Safe distances
  - E.2.3 Accuracy of magnetic compasses
  - E.2.4 Functions of magnetic compasses
- E.3 Minimum distance requirements concerning the ship's structure
- E.4 Safe-distance requirements for magnetic and electrical equipment and electric cables

**Annex F (normative) Determination of safe distances**

**Annex G (normative) Adjustment of magnetic compass deviation**

- G.1 General
- G.2 When to adjust compass
- G.3 Compass adjusters
- G.4 Adjustment by Flinders' bars
- G.5 Means to correct the heading to a true heading
- G.6 Description of the adjustment
- G.7 Deviation table or curve

**Annex H (normative) Requirements of magnetic compass for lifeboats/rescue boats**

- H.1 General
- H.2 Requirements of magnetic compass for lifeboats/rescue boats
  - H.2.1 General
    - H.2.2 Diameter of the card
    - H.2.3 Width of lubber mark(s)
  - H.2.4 Environmental conditions test of magnetic compasses