## 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)

#### Binnacles

5

- 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 gimballing 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 gimballing
  - 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 (typetest 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 gimballing
- 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