

National Standard for Commercial Vessels

Part C Design and construction

Subsection 7C Navigation equipment

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CHAPTER 1 PRELIMINARY

1.1 SCOPE

This Subsection of the NSCV specifies requirements for the design, manufacture, installation, operation, and scale of navigation equipment to be carried on vessels.

NOTES:

1. Navigation equipment includes the suite of equipment and its layout, configuration and installation, logs, nautical charts and publications needed to navigate the vessel safely having regard to voyage planning, position fixing and collision avoidance, avoidance of grounding and pilotage.
2. The design of navigating equipment is important to the design of a navigation control station layout in a vessel. Design of the navigating station requires consideration of all the types of equipment required in that area.

Chapters 3 through to 5 deal with design and manufacture; type and quantity to be carried; installation; and servicing respectively, while the Annexes provide further detail on the standards to be met for certain items of navigation equipment.

This Subsection of the NSCV shall be read in conjunction with Part B—General Requirements.

1.2 APPLICATION

This Subsection applies to all commercial vessels, excluding Special Vessels as defined in Part F of this standard unless Part F specifies otherwise.

1.3 OBJECTIVE

The objective of this Subsection is to ensure vessels are equipped with certain key items of navigation equipment necessary to permit safe navigation of the vessel throughout a voyage.

NOTE: The objective of this National standard implicitly includes the avoidance of collisions with other vessels in accordance with the International Regulations for Preventing Collisions at Sea including any local rules.

1.4 REFERENCED DOCUMENTS

The following documents are referred to in this Subsection.

Any document referenced in this Subsection should be considered to be the latest revision of the document including amendments.

TRANSPORT AND INFRASTRUCTURE COUNCIL

National Standard for Commercial Vessels

Part B—General Requirements

Part C—Design and Construction

Section 5: Engineering

Subsection 5B—Electrical

Section 7: Equipment

Subsection 7B—Communication Equipment

Part D—Crew Competencies

Part E—Operations

Part F—Special Vessels

Section 1: Fast Craft

Subsection 1C—Category F2 – Fast Craft

STANDARDS AUSTRALIA

AS/NZS IEC 62287.1—*Maritime navigation and radiocommunication equipment and systems—Class B shipborne equipment of the automatic identification system (AIS) —Carrier-sense time division multiple access (CSTDMA) techniques*

INTERNATIONAL ELECTROTECHNICAL COMMISSION

IEC 60533—*Electrical and electronic installations in ships—Electromagnetic compatibility*

IEC 60945—*Maritime navigation and radiocommunication equipment and systems—General requirements—Methods of testing and required test results*

IEC 61993-2—*Maritime navigation and radiocommunication equipment and systems—Automatic identification systems (AIS) —Part 2: Class A shipborne equipment of the universal automatic identification system (AIS) —Operational and performance requirements, methods of test and required test results*

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION

ISO 25862:2009 *Ships and marine technology – Marine magnetic compasses, binnacles and azimuth reading devices*

ISO 14227:2001 *Small craft—Magnetic compasses*

INTERNATIONAL MARITIME ORGANIZATION

International Convention for the Safety of Life at Sea (SOLAS), 1974

International Regulations for Preventing Collisions at Sea

AUSTRALIAN MARITIME SAFETY AUTHORITY

Marine Order 27 (Safety of navigation and radio equipment) 2016

Marine Order 30 (Prevention of collisions) 2016

AUSTRALIAN COMMUNICATIONS AND MEDIA AUTHORITY

Radiocommunications Licence Conditions (Maritime Ship Licence) Determination 2002

Radiocommunications (Maritime Ship Station – 27 MHz and VHF) Class Licence 2001

AUSTRALIAN RADIATION PROTECTION AND NUCLEAR SAFETY AGENCY (ARPANSA)

ARPANSA Standard RPS 3—*Maximum exposure levels to Radiofrequency Fields—3 kHz to 300 GHz (2002)*

1.5 DEFINITIONS

For the purpose of this Subsection of the NSCV, the definitions provided in Part B of the NSCV shall apply.

1.6 ABBREVIATIONS

ACMA—

Australian Communications and Media Authority

AIS—

Automatic Identification System

AMSA—

Australian Maritime Safety Authority

ECDIS—

Electronic Chart Display and Information System

ECS—

Electronic Chart System

ENC—

Electronic Navigational Chart

GNSS—

Global Navigation Satellite System

MMSI—

Maritime Mobile Service Identity

RNC—

Raster Navigation Chart

SAR—

Search and Rescue

SOLAS—

International Convention for the Safety of Life at Sea

UTC—

Coordinated Universal Time

1.7 LENGTH—TONNAGE RELATIONSHIP

The NSCV is predominantly length based; however, international conventions such as SOLAS are tonnage based. Not all operators of small vessels are aware of their gross tonnage which is a relatively complicated measurement based on the enclosed volume of the vessel. Please see section 3.5 of NSCV Part B for how to determine a vessel's gross tonnage.

CHAPTER 2 NAVIGATION EQUIPMENT OUTCOMES AND SOLUTIONS

2.1 SCOPE

This Chapter specifies required safety outcomes and solutions applicable to vessels.

REQUIRED OUTCOMES

2.2 TYPE AND QUANTITY

A vessel must be provided with navigation equipment of a type and quantity appropriate to control to acceptable levels the risks associated with navigating the vessel during normal and emergency operating conditions taking into account the type of operation, time of operation, area of operation and environmental conditions, as well as other risk factors that might be relevant.

NOTE: The type of operation would include the capacity to participate in SAR operations.

2.3 PERFORMANCE AND RELIABILITY

Navigation equipment must be designed, constructed and arranged to function reliably and enable its effective use at time of need so as to minimise navigation risks associated with operating or evacuating the vessel.

2.4 MAINTENANCE OF FUNCTION

Arrangements must be provided to maintain the effectiveness of navigation equipment and systems over the life of the vessel and to ensure that the reliability of the equipment does not reduce over time.

2.5 ROUTE PLANNING AND POSITION MONITORING

Means must be provided to plan and display the vessel's route for the intended voyage and then to establish, monitor and plot the vessel's position throughout the voyage in relation to the planned route, as well as to known and reported dangers to navigation, that is sufficiently comprehensive and maintained up to date to facilitate the safe navigation of the vessel by those engaged to do so.

2.6 MEANS TO DETERMINE AND DISPLAY HEADING

Means must be provided to determine the vessel's heading and display the reading at the main steering position while operating the vessel, including during any emergency situations.

2.7 MEANS TO DETERMINE TRUE HEADINGS AND BEARINGS

Means must be provided to determine and apply any corrections required in order to obtain true headings and bearings at all times.

2.8 MEANS TO VISUALLY INDICATE VESSEL PRESENCE AND MANOEUVRING INTENTIONS AND LIMITATIONS

Arrangements must be provided to indicate the vessel's presence, location, type, orientation, manoeuvring intentions and any special operating conditions affecting its ability to manoeuvre in a manner that satisfies the requirements of the International Regulations for Preventing Collisions at Sea including any local rules.

2.9 MEANS TO PROVIDE VESSEL IDENTIFICATION AND POSITION INFORMATION

Means must be provided to broadcast navigation information to enable vessel identification and collision avoidance by third parties.

NOTE: Commonwealth, State and Territory Authorities may require certain information to be transmitted by vessels for traffic management or security reasons.

2.10 PROVISION FOR NON-VISUAL DETECTION OF THE VESSEL

Means must be provided to enable the vessel to be detected by radar.

2.11 EMERGENCY ELECTRICAL SYSTEMS

Electrical power essential for the operation of onboard navigation equipment must be maintained during emergency situations for a period sufficient for the emergency to be overcome or for evacuation of the vessel.

2.12 OPERATING INSTRUCTIONS

Persons engaged in the navigation of a vessel must be provided with sufficient information to allow them to effectively use all available navigation equipment at time of need.

NOTE: Operating instructions will normally need to be supplemented by training in the use of the navigation equipment.

DEEMED-TO-SATISFY SOLUTIONS**2.13 COMPLIANCE**

For the purpose of this National Standard, the navigation equipment fitted to a vessel shall be deemed to satisfy the Required Outcomes in Clauses 2.2 to 2.12 of this Chapter if it complies with the relevant provisions of Chapter 3 to Chapter 6 inclusive.

EQUIVALENT SOLUTIONS**2.14 ASSESSMENT METHODS**

Equivalent solutions applicable to navigation equipment shall be verified in a manner appropriate to the risks that would arise should the equipment be found wanting.

NOTE: Any limitations that may be related to the normal training of mariners and their required competencies in accordance with current certification requirements should also be considered when assessing the risks.

CHAPTER 3 NAVIGATION EQUIPMENT DESIGN AND CONSTRUCTION

3.1 SCOPE

This Chapter specifies the requirements for the design and construction of navigation equipment to be carried on vessels.

3.2 OBJECTIVE

The objective of this Chapter is to ensure that navigation equipment to be carried on board a vessel is suitable for the purpose for which it is to be used.

3.3 STANDARDS FOR NAVIGATION EQUIPMENT

3.3.1 Specification

The navigation equipment specified in Chapter 4 as being for use on all vessels 35 metres and over in length; as well as on Operational Area A vessels 24 metres and over in length, shall comply with the provisions of *Marine Order 27 (Safety of navigation and radio equipment) 2016*.

NOTES:

1. *Marine Order 27 (Safety of navigation and radio equipment) 2016* is the Australian implementation of SOLAS Chapter V. This reference is to the performance requirements for navigation equipment in accordance with *Marine Order 27 (Safety of navigation and radio equipment) 2016*.
2. Navigation equipment requirements contained in SOLAS Chapter V are based on gross tonnage and not on length. For information on the tonnage-length relationship, see Clause 1.7.

For all other vessels, the items of navigation equipment set out in Column 1 of Table 1 shall comply with the applicable Annex of this Subsection, or the applicable standard, specified in Column 3 of Table 1.

NOTE: Many standards for navigation equipment exist that are not widely used by industry in the design and manufacture of non-SOLAS equipment. Only equipment specified in Table 2 for which an appropriate standard can be identified has been included in Table 1.

Where equipment is specified in Clause 4.3 or and does not appear in Table 1, the equipment shall be of a type suitable for use in a marine environment and installed in accordance with the requirements of this Subsection.

Navigation lights, shapes and sound signals shall comply with the design and performance provisions of *Marine Order 30 (Prevention of collisions) 2016*.

Radar reflectors shall be suitable for use with radar operating in the 3 GHz and 9 GHz bands.

If additional items of equipment intended for use in the navigation of the vessel are carried, over and above the minimum specified in Table 2, that additional equipment shall also comply with the applicable requirements set out in this Subsection.

3.3.2 Assessment and verification

Unless otherwise specified, demonstration of compliance with the standards nominated in Column 3 of Table 1 for items of navigation equipment does not imply a requirement for certification by any third-party certifier.

Table 1 — Construction and performance requirements for navigation equipment

Item of equipment	Equipment Class or type	Annex or standard to which item shall comply
Magnetic compass		Annex A
Nautical charts and publications	Includes both paper and electronic charts (vector and raster)	Annex B
Nautical chart systems	Includes both paper charts and electronic chart systems	Annex C
AIS ¹	Class A	IEC 61993-2
	Class B	AS/NZS IEC 62287.1
Radar	Radar equipment	Radiocommunications Licence Conditions (Maritime Ship Licence) Determination 2002 ¹ , or Radiocommunications (Maritime Ship station – 27 MHz and VHF) Class Licence 2001 ¹

NOTE:

1. The Radiocommunications Licence Conditions (Maritime Ship Licence) Determination 2002 and the Radiocommunications (Maritime Ship Station – 27 MHz and VHF) Class Licence 2001 permit the use of AIS and navigation radar and specify their frequencies and maximum transmitter output power. The Determination and Class Licence are both administered by the ACMA.

CHAPTER 4 TYPE AND QUANTITY OF NAVIGATION EQUIPMENT

4.1 SCOPE

This Chapter specifies the type and minimum quantity of navigation equipment, and associated ancillary equipment required to effectively operate the navigation equipment that is to be carried on board a vessel.

NOTES:

1. In addition to the equipment specified in this Subsection, NSCV Part E may require that an operator demonstrate, through emergency plans or ship safety management processes, that the type and performance of navigation equipment carried on board is appropriate to the specific vessel operations.
2. Factors to consider when satisfying NSCV Part E may include, but are not limited to, type of vessel, geographical area of operation, and availability of SAR services.

4.2 OBJECTIVE

The objective of this Chapter is to specify the minimum type and quantity of navigation equipment and associated ancillary equipment to be carried on a vessel as appropriate to control to acceptable levels the risks likely to be encountered.

4.3 NAVIGATION EQUIPMENT TO BE CARRIED

All vessels 35 metres and over in length; as well as Operational Area A vessels 24 metres and over in length shall comply with the provisions of *Marine Order 27 (Safety of navigation and radio equipment) 2016*.

NOTES:

1. *Marine Order 27 (Safety of navigation and radio equipment) 2016* is the Australian implementation of SOLAS Chapter V. This reference is to the quantity and type of navigation equipment for vessels of various sizes in accordance with *Marine Order 27 (Safety of navigation and radio equipment) 2016*.
2. Navigation equipment requirements contained in SOLAS Chapter V are based on gross tonnage and not on length. For information on the tonnage-length relationship, see Clause 1.7.

All other vessels shall comply with the provisions of Table 2 as applicable.

NOTE: Although not mandatory, it is good navigation practice for vessels to also be fitted with a suitable barometer to assist in the foreshadowing of imminent changes in the weather.

Table 2 — Scales of navigation equipment for vessels

Equipment Type	Vessel type			
	Operational Area A Vessels <24 metres in length	Operational Area B Vessels <35 metres in length	Operational Area C Vessels <35 metres in length	Operational Areas D & E Vessels <35 metres in length
Magnetic compass	YES	YES	YES	YES
ECDIS or ECS or nautical paper charts (A1)	YES	YES	YES ¹	YES for vessels 12 metres and over ^{1, 2}
Nautical publications	YES	YES	YES	YES
GNSS receiver (A2)	YES	YES	YES	YES
Radar	YES	YES	YES for Class 1 vessels 12 metres and over	YES for Class 1 vessels 12 metres and over
Radar reflector	YES for vessels less than 12 metres	YES for vessels less than 12 metres	YES for vessels less than 12 metres	YES for vessels less than 12 metres
AIS Class B [TX/RX] (A3)³	YES	YES	YES for Class 1 vessels 12 metres and over	NO
Speed and distance indicator	YES	YES	YES	YES
Echo sounder	YES	YES	YES	YES
Clock⁵	YES	YES	YES	YES
Communication system to emergency steering position (A4)	YES	YES	YES	YES
Binoculars	YES	YES	YES	YES

KEY:

(A1) Using the *ECDIS* or *ECS* options includes the requirement for backup (see Annex C).

(A2) Where equipment that plots the vessel's position is fitted to the vessel e.g. *ECDIS*, *ECS* or radar with plotting, a GNSS receiver that is suitable to interface with the plotting equipment and to establish and update the ship's position by automatic means will be required.

(A3) NSCV Part F Subsection 1C specifies the fitting of *AIS* Class A on some Category F2 fast craft. *AIS* Class A devices fitted to Category F2 fast craft shall meet the design and construction requirements specified in Clause 3.3.1 for *AIS* Class A.

(A4) This requirement applies where an emergency steering position is fitted to the vessel and where communication of navigation information between the primary navigation control station and the emergency steering position is not possible without assistance. The communication system must be appropriate to enable effective communications in the environment of the emergency steering position.

'YES' means the specified equipment shall be carried.

'NO' means the specified equipment is not required to be carried.

(Continued)

Table 2 (Continued)

NOTES:

1. Individual Authorities may permit modification of chart system backup requirements as local equivalent solutions for vessels operating within designated sheltered waters, following assessment in accordance with Clause 2.14. It would be expected that any proposed equivalent solution would be assessed taking into account the vessel operating conditions and local operating environment in the proposed area of operation.
 2. It is good operational practice to carry appropriate nautical paper charts on vessels less than 12 metres in length operating outside port or harbour limits.
 3. The transmission of vessel information by AIS requires that the vessel has an *MMSI* number assigned; *MMSI* numbers are issued and recorded by *AMSA*.
 4. The clock may be the display of an internal clock contained in another piece of navigation equipment mentioned in this Table. It is good practice to have any internal clock synchronised to *UTC* as broadcast by *GNSS*.
-

4.4 NAVIGATION LIGHTS, SHAPES AND SOUND SIGNALS

The type and quantity of navigation lights, navigation shapes and sound signalling equipment to be fitted shall comply with the provisions of *Marine Order 30 (Prevention of collisions) 2016*.

NOTE: *Marine Order 30 (Prevention of collisions) 2009* is the Australian implementation of the International Regulations for Preventing Collisions at Sea. This reference is to the performance requirements for navigation lights, navigation shapes and sound signalling equipment in accordance with *Marine Order 30 (Prevention of collisions) 2016*.

4.5 ELECTRICAL ENERGY SOURCE FOR ELECTRONIC NAVIGATION EQUIPMENT

There shall be available at all times while the vessel is operating a source of electrical energy sufficient to operate the electronic navigation equipment.

In addition, a reserve source of electrical energy shall be provided to operate the navigation equipment when the main source of electrical energy is unavailable.

NOTES:

1. The requirements for main and emergency sources of electrical energy are specified in NSCV Part C Subsection 5B.
2. Alternative energy requirements may be allowed for vessels operating in Operational Areas D and E following assessment in accordance with Clause 2.14. It would be expected that any proposed equivalent solution would be assessed taking into account the local operating conditions in the proposed area of operation.

4.6 WIPERS AND CLEARVIEW SCREENS

Wipers or clearview screens adequate for the effective navigation of the vessel shall be provided on vessels with enclosed navigation control stations adequate for the effective navigation of the vessel.

4.7 OPERATING INSTRUCTIONS

Sufficient information shall be provided to allow the effective use of all available navigation equipment including the ability to effectively manage irregular or abnormal equipment function and continue to maintain safe navigation.

NOTE: Sufficient information may include operating procedures in addition to operating manuals where required to maintain the effective use of the equipment.

CHAPTER 5 INSTALLATION OF NAVIGATION EQUIPMENT

5.1 SCOPE

This Chapter specifies requirements for the installation of navigation equipment.

5.2 OBJECTIVE

The objective of this Chapter is to ensure that the installation of navigation equipment facilitates safe operation of the vessel.

5.3 ARRANGEMENT OF NAVIGATION EQUIPMENT

5.3.1 General

Decisions affecting the arrangement of navigation equipment shall be taken with the aim of—

- a) facilitating the tasks to be performed in making full appraisal of the situation and in navigating the vessel safely under all operational conditions;
- b) promoting effective and safe navigation control station resource management;
- c) enabling convenient and continuous access to essential information which is presented in a clear and unambiguous manner, using standardised symbols and coding systems for controls and displays;
- d) providing operators with a clear and unambiguous indication of the operational status of automated functions and integrated components, systems and/or sub-systems;
- e) allowing for expeditious, continuous and effective information processing and decision-making;
- f) preventing or minimising excessive or unnecessary work and any conditions or distractions in the navigational areas which may contribute to fatigue or interfere with the safe operation of the vessel; and
- g) reducing the risk of human error, in particular single person error.

NOTE: Guidance on ergonomic aspects is given in IEC 60945

5.3.2 Location of navigation equipment

Electronic navigation equipment shall be installed in such a location and manner that—

- a) it is protected against the harmful effects of the marine environment; and

NOTE: Examples of the sources of harmful effects in a marine environment include sunlight, moisture, spray and extremes of temperature.

- b) it will not affect any of the vessel's compasses or other navigational equipment in accordance with Clause 5.3.3.

NOTES:

1. When installing AIS and radar antenna systems, the positioning of the systems should be considered with respect to effective operation.

2. Where appropriate, an AIS antenna may be coupled into the VHF radiocommunications equipment's antenna system. Guidance on the installation of VHF antennas is contained in NSCV Part C, Section 7B.
3. In addition, when installing transmitter antenna systems, the exposure of persons on board to electromagnetic radiation must also be taken into consideration. Guidance on acceptable electromagnetic radiation exposure levels is contained in ARPANSA RPS 3.

5.3.3 Interference

When underway the effectiveness of navigational equipment onboard a vessel shall not be hindered by interference caused by electrical or other equipment. To this end—

- a) navigation equipment shall be installed in a position and manner to eliminate the effects of electrical or other interference; and
- b) all electrical equipment in the vicinity of communications equipment shall be equipped with devices to eliminate or reduce interference in accordance with IEC 60533.

5.4 GENERAL PROTECTION FROM VOLTAGES

Electronic navigation equipment shall be installed so that protection is provided from accidental access to any parts including wiring that is, at any time, at an instantaneous voltage (other than radiofrequency voltage) of greater than 40 volts under normal conditions of operation.

CHAPTER 6 SERVICING OF NAVIGATION EQUIPMENT

6.1 SCOPE

This Chapter specifies requirements for the maintenance of navigation equipment.

6.2 OBJECTIVE

The objective of this Chapter is to ensure that all navigation installations on a vessel are maintained so as to be available in a fully operational condition when required.

6.3 MAINTENANCE

Navigation equipment shall be maintained so that, at the commencement of a voyage, the Installation equipment is capable of fulfilling the requirements of this Subsection.

NOTE: There is no expectation of repair to failures in electronic navigation equipment while undertaking a voyage, however, to maintain safe operations equipment failures should be repaired as soon as practicable. This is not intended to infer maintenance when convenient.

6.4 COMPASS ADJUSTMENT

Compasses shall be adjusted in accordance with Annex A.

ANNEX A COMPASSES

A1 SCOPE

This Annex provides requirements for the construction and location of magnetic compasses, as well as the adjustment of compasses. It forms a normative (mandatory) part of this Subsection.

This Annex is referenced in Table 1 and Clause 6.4 of this Subsection.

A2 REQUIREMENTS FOR MAGNETIC COMPASSES

Magnetic compasses shall comply with Clauses A2.1 to A2.4 inclusive.

A2.1 General

Any compass fitted on board shall be either—

- a) capable of being used as a magnetic compass in the event of a power failure; or
- b) provided with an emergency electrical supply capable of operating the installation as specified in NSCV Part C Subsection 5B.

A2.2 Design and construction

Magnetic compasses shall comply with the standards specified in Table A.1 as applicable.

Table A.1—Design standards for magnetic compasses

Compass Class or application	Standard to which item shall comply
Class A	ISO 25862:2009
Class B	ISO 25862:2009
Vessel less than 20 m in length	ISO 14227:2001

A2.3 Compass adjustment

Compasses shall be capable of adjustment to a deviation of not more than 5 degrees in any direction.

A2.4 Compass card

Magnetic compasses shall be provided with a magnetic compass card of a size according to Table A.2.

Table A.2—Magnetic compass cards

Measured length of vessel metres	Compass card diameter mm
Less than 10	75
10 and over but less than 20	100
20 and over	125

A3 INSTALLATION

A3.1 Location and installation

A magnetic compass in a vessel shall be—

- a) located forward of the steering wheel/controls in such a manner that it can be easily read from the normal steering position;
- b) located in such a position so as to permit adjustment;
NOTE: Further guidance on the positioning of compasses is contained in ISO 25862:2009.
- c) fitted with a means of illumination, together with a device for dimming the illumination; and
- d) designed or installed so that the card remains horizontal when the vessel is up to 40° from the horizontal in any direction.

A3.2 Other equipment in the vicinity of compasses

When installing electrical instruments close to a magnetic compass, the following conditions shall be observed:

- a) Electrical equipment should not be installed nearer to any magnetic compass than the 'safe distance' as recommended by the manufacturer of such equipment, or which has been determined by test in accordance with ISO 25862:2009.
NOTE: Portable electrical equipment such as hand microphones, mobile telephones and telephone handsets should not be operated in close proximity to a compass.
- b) Where the structure of the vessel does not allow magnetic materials to be placed at or outside the required minimum distance in accordance with item a) above, the compass shall be sited in the best possible position compatible with these requirements. The owner or master of the vessel should ensure that a record of satisfactory performance of the compass in service is kept.

A4 ADJUSTMENT OF COMPASSES

A4.1 For the proper adjustment of a magnetic compass on a vessel, the details of any compass deviations observed during the operation of the vessel must be recorded by the master.

NOTE: NSCV Part E requires a system of regular programmed inspection and maintenance for a vessel, its machinery and equipment to be developed and maintained, which includes any compass on board. This requirement ensures compass accuracy is periodically monitored.

A4.2 A magnetic compass on a vessel must be adjusted if:

- a) observations show a deviation of the compass on any heading of more than 5°; or
- b) the vessel has undergone repairs or alterations which may affect the accuracy of the compass; or
- c) the vessel has not previously operated from any port or place in Australia.

NOTE: For circumstances in which it is recommended that a compass be adjusted, see Annex G of ISO 25862:2009 *Ships and marine technology— Marine magnetic compasses, binnacles and azimuth reading devices*.

A4.3 A magnetic compass may only be adjusted by a person who has acquired the knowledge and skills to carry out the adjustment through experience, training or qualification.

A4.4 For Clause A4.3, **training or qualification** includes the training completed, or qualification held, by a person who is a **qualified compass adjuster** for *Marine Order 27 (Safety of navigation and radio equipment) 2016*.

NOTE: A further example of a qualification for Clause A4.4 is a licence issued by a State, Territory or overseas marine authority for the adjustment of compasses.

A4.5 The nature of any changes to a magnetic compass, including to the position of magnets or soft iron correctors, must be properly recorded by the person making the compass adjustments with the record retained on board the vessel.

ANNEX B NAUTICAL CHARTS AND PUBLICATIONS

B1 SCOPE

This Annex provides requirements for nautical charts and publications. It forms a normative part of this Subsection.

This Annex is referenced in Table 1 of this Subsection.

B2 REQUIREMENTS FOR CHARTS AND PUBLICATIONS

Nautical charts and publications shall be—

- a) originated by a relevant government authority or an authorised national Hydrographical Office;

NOTES:

1. Nautical charts and publications include paper Nautical Charts, manuscript publications, digital publications, official *ENCs* and official *RNCs*.
2. Details of the latest versions of all published charts, including all Notices to Mariners applicable to each chart, are available from the Australian Hydrographic Service website at www.hydro.gov.au.

- b) appropriate for the vessel's area of operation; and
- c) up to date.

Nautical charts and publications may consist of, but are not restricted to, the following:

- i) Charts of the largest scale available for the vessel's area of operation.
- ii) Charts specifically for use with electronic position finding aids.
- iii) Notices to Mariners.

NOTE: Commercial services which package or otherwise re-transmit official Notices to Mariners are considered to meet this requirement.

- iv) Sailing Directions.
- v) List of Lights.
- vi) Tide Tables.

B3 REQUIREMENTS FOR UPDATING NAVIGATION INFORMATION

A means shall be in place to track and record the updating of navigational charts whenever applicable new editions and Notices to Mariners are published.

NOTES:

1. Regular update services are available for official paper charts, *ENCs* and *RNCs*.
2. Vessel operators should regularly review Notices to Mariners for changes which may affect their operations.

ANNEX C NAUTICAL CHART SYSTEMS

C1 SCOPE

This Annex provides requirements for nautical chart systems. It forms a normative part of this Subsection.

This Annex is referenced in Table 1 and Clause 3.3.1 of this Subsection.

C2 REQUIREMENTS FOR CHART SYSTEMS

Nautical chart systems shall comply with Clauses C2.1 to C2.2 inclusive.

C2.1 Paper chart based systems

Instruments required for navigation using paper charts shall include, but not be limited to:

- a) A means to measure, transfer and plot bearings.
NOTE: Examples include a rolling rule or parallel rules.
- b) A means to measure, transfer and mark distances and ranges.
NOTE: Examples include dividers or drawing compass.
- c) A means to mark and remove positions and tracks on the chart.

C2.2 Electronic navigation display systems

C2.2.1 ECDIS

ECDIS shall comply with the provisions of *Marine Order 27 (Safety of navigation and radio equipment) 2016*.

ECDIS shall be used with charts complying with the requirements of Clause B2.

NOTES:

1. *Marine Order 27 (Safety of navigation and radio equipment) 2016* is the Australian implementation of SOLAS Chapter V. This reference is to the performance requirements for navigation equipment in accordance with *Marine Order 27 (Safety of navigation and radio equipment) 2016*.
2. The specification for ECDIS includes the system having adequate backup arrangements. Paper nautical charts that comply with the requirements of Annex B may be used as a backup arrangement for ECDIS.
3. Compliant ECDIS Original Equipment Manufacturers are listed on the International Hydrographic Organisation website at www.iho.shom.fr/ECDIS/s63intro.htm#oemlist.

C2.2.2 ECS

ECS shall meet the requirements of Clauses C.2.2.2.1 to C.2.2.2.3.

NOTE: ECS electronically displays vessel position and relevant nautical chart data and information from an ECS Database on a display screen, but does not meet all the requirements for ECDIS. ECS equipment ranges from simple hand held GNSS enabled devices to sophisticated stand-alone computer equipment interfaced to other ship systems.

C.2.2.2.1 Backup

An ECS shall include adequate backup arrangements.

NOTE: A second ECS or paper nautical charts that comply with the requirements of Annex B may be used as backup arrangements for ECS.

C.2.2.2.2 *Displayed information*

ECS shall be used with charts complying with the requirements of Clause B2.

The *ECS* display shall include, but not be limited to the following:

- a) Planned track and course.
- b) Vessel position.
- c) Vessel heading.
- d) Course made good.
- e) Speed over ground.

C.2.2.2.3 *Display legibility*

The display shall be viewable and all text legible by day and night at a minimum distance of 1 metre from the *ECS* or where the design of the navigation control station does not allow a 1 metre viewing distance, the maximum distance that the person responsible for navigation may be from the *ECS* while navigating the vessel.