

National Standard
for
Commercial Vessels

PART C
DESIGN AND CONSTRUCTION

SECTION 7
EQUIPMENT

SUBSECTION 7B
COMMUNICATIONS EQUIPMENT

Edition 1.3

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- Amendment 1, November 2009;
- Amendment No.2, 2016 that was approved by the National Marine Safety Regulator on 22 December 2016 to commence on 1 February 2017;
- Amendment No.2, 2018 that was approved by the National Marine Safety Regulator on 23 July 2018 to commence on 24 July 2018.

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FOREWORD

This Subsection of the National Standard for Commercial Vessels (NSCV) was developed following a review of the Uniform Shipping Laws (USL) Code and replaces Section 12: Radio Equipment of the USL Code.

In reviewing the USL Code and preparing this Subsection, consideration was given to a number of factors including:

- a) The National Marine Safety Strategy.
- b) Current designs, practices and materials.
- c) Coronial reports and incident investigations.
- d) Relevant national and international standards.
- e) Provisions no longer used.
- f) Current survey practice, both formal and informal.
- g) Discretionary requirements that rely on authority approval.
- h) Current technical standards format and style.

This Subsection of the National Standard for Commercial Vessels shall be read in conjunction with Part B—General Requirements. It should also be read in conjunction with Part C—Design and Construction, Section 7—Equipment, Subsection 7A—Safety Equipment of the NSCV and *Marine Order 504 (Certificates of operation and operation requirements — national law) 2018*.

This Subsection of the NSCV was prepared by the NMSC in consultation with a reference group comprising representatives from the various State, Territory and Commonwealth marine authorities, equipment manufacturers and vessel operators. In addition specialist advice was sought on a number of issues.

Italics are used in this Subsection to indicate a hyperlink to an explanation of an abbreviation or to a defined term.

This draft subsection was released for public comment on 22 June 2007, along with a draft Regulatory Impact Statement (RIS). A reference group comprising industry and government representatives reviewed the public comment on 19 September 2007 and made recommendations to the NMSC.

NMSC approved this subsection on 5 December 2007, with the Office of Best Practice Regulation reporting that the final RIS was satisfactory on the 29 January 2008. The Australian Transport Council (ATC) endorsed this document on 2 May 2008.

The first edition was later subject to a correction amendment. Correction Amendment 1 to Clause 8.2 was endorsed by NMSC on 23 November 2009 and published in December 2009.

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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 communications equipment to be carried on vessels.

NOTE: Communications equipment includes equipment that is used for the interactive exchange of information for safety and distress purposes. For the purposes of this standard, it also includes signaling lights and lamps, signal flags and public address and call systems for internal use within a vessel.

Chapters 3 through to 7 deal with design and manufacture, type and quantity to be carried, installation, servicing and operation respectively, while the Annexes provide further detail on the standards to be met for certain items of communications 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.

NOTE: Special vessels include fast craft, hire and drive vessels and novel vessels.

1.3 OBJECTIVE

The objective of this Subsection is to provide vessels with certain key items of communications equipment in order to:

- a) Minimise the likelihood and consequences of incidents;
- b) Access and provide Maritime Safety Information;
- c) Report hazards to navigation; and
- d) Assist in the safe navigation of the vessel.

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 4: Fire Safety

Section 5: Engineering

Subsection 5A—Machinery

Subsection 5B—Electrical

Section 7: Safety Equipment

Subsection 7A—Safety Equipment

Part D—Crew Competencies

Part F—Special Vessels

STANDARDS AUSTRALIA

AS/NZS 4280.1—406 MHz distress beacons – Part 1 – Emergency position-indicating radio beacons (EPIRB) (IEC 61097-2:2002, MOD)

AS/NZS 4415.1—Radiotelephone transmitters and receivers for the maritime mobile service operating in the VHF bands – Part 1 – Technical characteristics and methods of measurement - Shipborne equipment and limited coast stations (including DSC) (IEC 61097-7:1996, MOD)

AS/NZS 4415.2—Radiotelephone transmitters and receivers for the maritime mobile service operating in the VHF bands –Part 2 – Technical characteristics and methods of measurement - Major coast stations, limited coast stations, ship stations and handheld stations (non DSC) (ETS 300 162:1998, MOD)

AS/NZS 4582—MF and HF radiocommunications equipment in the international maritime mobile radiotelephone service (ETS 300 337:1995, MOD)

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

INTERNATIONAL MARITIME ORGANIZATION

International Code of Signals

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

INTERNATIONAL TELECOMMUNICATIONS UNION

Radio Regulations

Recommendation ITU-R M.493—Digital Selective-Calling System for Use in the Maritime Mobile Service

AUSTRALIAN MARITIME SAFETY AUTHORITY

Marine Order 21 (Safety and emergency arrangements) 2016

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

Marine Order 504 (Certificates of operation and operation requirements — national law) 2018 (Marine Order 504)

Australian Global Maritime Distress and Safety System (GMDSS) Handbook

AUSTRALIAN COMMUNICATIONS AND MEDIA AUTHORITY

Radiocommunications Act 1992

Telecommunications Act 1997

AUSTRALIAN RADIATION PROTECTION AND NUCLEAR SAFETY AGENCY (ARPANSA)

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

AUSTRALIAN MARITIME COLLEGE

Marine Radio Operators Handbook

Marine VHF Radio Operators Handbook

1.5 DEFINITIONS

For the purpose of this Subsection of the NSCV—

- a) the definitions provided in Part B of the NSCV and those in this Clause apply unless otherwise indicated; and
- b) where there is any duplication in the terms defined between this Clause and Part B, the definitions in this Clause apply.

digital selective calling (DSC)—

a technique using digital signaling codes which enables a radio station to establish contact with, and transfer information to, another station or group of stations, and complying with the relevant recommendations of the *ITU*.

DSC watchkeeping receiver—

a radio installation maintaining a continuous watch on one or more specified *DSC* frequencies.

installation—

any piece of communication equipment, complete with their associated antenna infrastructure, interconnections and ancillary equipment.

International Code of Signals—

any published manual containing the current International Code of Signals adopted by the International Maritime Organization.

Limited Coast Station—

a land based station in the maritime mobile service established by or on behalf of a public utility, the fishing industry or other commercial enterprise or port or harbour authorities for the exchange of communications.

For the purposes of this Subsection, a Limited Coast Station is a station that maintains a continuous manned loudspeaker watch on the *VHF* marine distress and calling frequency of 156.8 MHz (channel 16).

maritime safety information—

information that assists in the safe operation of a vessel and includes but is not limited to weather reports, weather or navigation warnings and urgent safety-related messages.

NOTE: The maritime safety information may take the form of scheduled or unscheduled transmissions.

National Coast Radio Network (NCRN) —

the network established under the auspices of the Australian Transport Council (2005) via the States and Northern Territory to provide 24 hour distress and safety communications services for vessels that operate outside the provisions of the SOLAS Convention in coastal waters to a distance of 200 nautical miles from the Australian coast and to provide the radio communications interface between vessels that operate within the service area and the SAR authority in each State and Northern Territory.

The scope of the National Coast Radio Network includes the monitoring of HF distress and safety voice frequencies for coastal waters within 200 nautical miles of the Australian coast which encompasses operational areas B, C, D and E as well as limited VHF Ch 16 distress monitoring in some areas.

radio operator—

a person holding an appropriate certificate complying with the provisions of the *Radio Regulations* for the radiotelephony or satellite installation fitted to the vessel.

NOTE: AMSA is the compliance body for GMDSS qualifications and the ACMA is the compliance body for non-GMDSS qualifications.

Radio Regulations—

the Radio Regulations annexed to the most recent International Telecommunication Convention issued by the ITU which may be in force at any time.

radio watch—

listening on the appropriate Distress and Safety frequency for the type of installation on the vessel.

radiotelephone—

a radio communication device set up for the transmission and reception of speech over a radio link or circuit.

radiotelephony high frequency band—

the band of radio frequencies encompassing 3—30 MHz.

radiotelephony medium frequency band—

the band of radio frequencies encompassing 300—3 000 kHz

radiotelephony very high frequency band—

the band of radio frequencies encompassing 30—300 MHz.

two methods—

two distinct arrangements not dependent upon each other.

1.6 ABBREVIATIONS

ACMA—

Australian Communications and Media Authority

AMSA—

Australian Maritime Safety Authority

AusSAR—

Australian Search and Rescue; a part of AMSA that is responsible for operating the Australian Rescue Co-ordination Centre.

DSC—

Digital Selective Calling

EPIRB—

Emergency Position Indicating Radio Beacon

GMDSS—

Global Maritime Distress and Safety System

HF—

High frequency band

IMO—

International Maritime Organization

ITU—

International Telecommunication Union

LCS—

Limited Coast Station

MF—

radiotelephony medium frequency band

MMSI—

Maritime Mobile Service Identity

MSI—

Maritime Safety Information

SAR—

Search and Rescue

SOLAS—

International Convention for the Safety of Life at Sea

VHF—

Very high frequency band

CHAPTER 2 COMMUNICATIONS EQUIPMENT OUTCOMES AND SOLUTIONS

2.1 SCOPE

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

REQUIRED OUTCOMES

2.2 TYPE AND QUANTITY

A vessel must be provided with communications equipment of type and quantity appropriate to control to acceptable levels the risks associated with the operation of the vessel, taking into account its area of operation as well as other risk factors that might be relevant.

NOTES:

1. Risks associated with design, construction and servicing failures of communications equipment include failure to properly operate in acquiring *MSI*, failure to perform a communications function when initiating distress assistance requests and failure to perform a communications function over the likely period until rescue.
2. Consequences arising from these risks include increased risk to operating the vessel in a safe manner, delay in or failure to rescue, personal injury, fatalities and potential environmental damage (e.g. fuel oil spill).

2.3 PERFORMANCE

Communications equipment must be designed, constructed and arranged to enable communication that reduces navigation risks associated with operating the vessel and to significantly enhance the probability of survival in the event of an incident.

2.4 AVAILABILITY

Communications equipment must be installed and located so as to be readily available for its purpose in the event of an incident.

2.5 RELIABILITY

Communications equipment must be designed and constructed so as to function reliably at time of need.

2.6 MAINTENANCE OF FUNCTION

Arrangements must be provided to maintain the effectiveness of communications equipment and systems over the life of the vessel.

Arrangements must be provided to ensure that the reliability of items of communications equipment does not reduce over time.

2.7 OPERATING INSTRUCTIONS

Persons must be provided with sufficient information to effectively use all available communications equipment at time of need.

2.8 MEANS TO COMMUNICATE DISTRESS, REQUESTS FOR ASSISTANCE AND LOCATION FROM VESSEL TO SHORE

A minimum of *two methods* must be provided for vessel to shore communication of a distress message or a request for assistance and to provide the vessel's location in order to initiate and facilitate rapid assistance or rescue.

NOTE: Examples of assistance include breakdown requiring a tow where the vessel is not in imminent danger of foundering or an injury on board requiring external medical advice.

2.9 MEANS TO COMMUNICATE DISTRESS, REQUESTS FOR ASSISTANCE AND LOCATION FROM VESSEL TO VESSEL

A minimum of one method must be provided for vessel to vessel communication of distress or a request for assistance and location in order to initiate and facilitate rapid assistance or rescue.

NOTE: Examples of assistance include breakdown requiring a tow where the vessel is not in imminent danger of foundering or an injury on board requiring external medical advice.

2.10 MEANS TO COMMUNICATE SAFETY INFORMATION

A minimum of one method must be provided to communicate safety information to other vessels and to the shore.

NOTE: For the purposes of this Clause, safety information includes but is not limited to the notification of weather conditions, vessel position and navigation hazards.

2.11 MEANS TO RECEIVE DISTRESS OR SAFETY INFORMATION

A minimum of one reliable means must be provided to readily access safety information and to receive distress and location information from other vessels and the shore.

NOTE: For the purposes of this Clause, safety or distress information includes but is not limited to information from or about another vessel in distress, *MSI*, and information about hazards to navigation.

2.12 SEARCH AND RESCUE

Communications equipment must be designed, constructed and arranged so as to facilitate the coordination of *SAR* operations.

2.13 ON BOARD COMMUNICATIONS SYSTEMS

Arrangements must be provided for alerting persons on the vessel of imminent danger, summoning persons to assembly stations and initiating the actions included in the emergency plan.

NOTE: Marine Order 504 contains requirements for emergency planning.

2.14 EMERGENCY ELECTRICAL SYSTEMS

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

DEEMED-TO-SATISFY SOLUTIONS

2.15 COMPLIANCE

For the purpose of this National Standard, the distress and safety communications equipment fitted to a vessel shall be deemed to satisfy the Required Outcomes in Clauses 2.2 to 2.14 of this Chapter if it complies with the relevant provisions of Chapter 3 to Chapter 7 inclusive.

EQUIVALENT SOLUTIONS

2.16 ASSESSMENT METHODS

Equivalent solutions applicable to communications equipment shall be verified in a manner appropriate to the risks that would arise should the equipment fail to perform at time of need.

CHAPTER 3 COMMUNICATIONS EQUIPMENT DESIGN AND CONSTRUCTION

3.1 SCOPE

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

3.2 OBJECTIVE

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

3.3 STANDARDS FOR COMMUNICATIONS EQUIPMENT

3.3.1 Specification

The items of communications equipment specified in Column 1 of Table 1 shall comply with the applicable Annex of this Subsection or with the equipment class specified in Column 2 of Table 1 and the standard specified in Column 3 of Table 1.

In addition, radio communications equipment shall meet all standards and labelling requirements of the Radiocommunications Act 1992.

Table 1 — Construction and performance requirements for communications equipment

Item of equipment	Equipment Class (A1)	Annex or standard to which item shall comply
<i>VHF Radiotelephone</i>	NA	Annex A
<i>VHF(DSC) Radiotelephone</i>	(A2)	Annex A
<i>MF/HF Radiotelephone</i>	Class 2	Annex B
<i>MF/HF(DSC) Radiotelephone</i>	(A3)	Annex B
<i>Survival craft radiotelephone</i>	NA	NSCV Part C Subsection 7A
<i>GMDSS Satellite Systems [SOLAS]</i>	NA	Schedule 4 of Marine Order 27 and Chapter V of SOLAS
<i>Non—GMDSS Satellite Systems</i>	NA	Annex C
<i>Satellite Telephone</i>	NA	Annex D
<i>EPIRB, 406 MHz</i>	Class 2 Class 3	AS/NZS 4280.1
<i>Signalling Light</i>	NA	Annex E
<i>Daylight Signalling Lamp [SOLAS]</i>	NA	IMO Resolution MSC.95(72)
<i>International Code flags [SOLAS]</i>	NA	<i>International Code of Signals</i>
<i>Public Address Systems</i>	NA	NSCV Part C Subsection 7A
<i>Engineering Communications</i>	NA	NSCV Part C Subsection 5A
<i>Fire Call Systems</i>	NA	NSCV Part C Section 4

KEY:

(A1) – Equipment Class refers to the Class specified in the Standard referenced in Column 3 of the Table. It does not refer to class of vessel as specified in Part B.

(A2) – The Equipment Class for the *VHF DSC* component of the equipment is specified in Annex A.

(A3) – The Equipment Class for the *HF DSC* component of the equipment is specified in Annex B

CHAPTER 4 TYPE AND QUANTITY OF COMMUNICATIONS EQUIPMENT

4.1 SCOPE

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

NOTES:

1. In addition to the equipment specified in this Subsection, Marine Order 504 may require that an operator demonstrate, through emergency plans or ship safety management processes, that the type and performance of communications equipment carried on board is appropriate to the specific vessel operations.
2. Factors to consider when satisfying Marine Order 504 may include, but are not limited to, type of vessel, geographical area of operation, availability of LCS facilities, and availability of SAR services.

4.2 OBJECTIVE

The objective of this Chapter is to specify minimum standards for the type and quantity of communications equipment and associated ancillary equipment to be carried on a vessel appropriate for the risks that are likely to be encountered.

4.3 RADIOTELEPHONE AND SATELLITE COMMUNICATIONS EQUIPMENT

Class 1A, 2A and 3A vessels shall comply with the provisions of *Marine Order 27 (Safety of navigation and radio equipment) 2016*.

All other vessels shall comply with—

- a) the provisions of Table 2 as applicable; or
- b) *Marine Order 27 (Safety of navigation and radio equipment) 2016*.

Portable hand held units should not be used as primary distress and safety equipment. Primary distress and safety equipment should be console mounted.

NOTES:

1. The risks of relying on portable hand held units as primary distress and safety equipment are that they could be lost, left behind on a voyage, dropped overboard or that the batteries may be holding insufficient charge.
2. The additional carriage of a waterproof VHF marine handheld radio as a contingency backup to the minimum required by this standard offers the ability to make a call for assistance even in the event that the primary radio communications equipment and/or batteries are rendered ineffective due to having been swamped or submerged.

In addition to the provisions of Table 2, the following shall apply:

- a) All vessels operating in open water more than 2 nautical miles seaward from the coast shall be fitted with an *EPIRB*.
- b) Class 1A, 2A and 3A vessels shall be fitted with an *EPIRB* in accordance with *Marine Order 27 (Safety of navigation and radio equipment) 2016*.

c) All vessels operating in Operational Areas B or C or operating in open water more than 2 nautical miles seaward from the coast shall be fitted, as appropriate for the type of vessel, with a—

i) Class 3 *EPIRB*; or

ii) Class 2 *EPIRB*.

NOTES:

1. *EPIRB* signals on the 121.5/243 MHz frequencies will not be received by satellite systems after February 2009. Marine Authorities will begin to phase in, from July 2008, a requirement for vessels to be fitted with 406 MHz *EPIRBs* only.
2. 406 MHz *EPIRBs* must be registered in order to ensure vessel and contact details can be readily monitored by *SAR* organisations. Details for the registration of 406 MHz *EPIRBs* are contained in AS/NZS 4280.1 or may be obtained from AMSA.

The type and quantity of survival craft *EPIRBs* and *radiotelephones* shall comply with the provisions of NSCV Part C Subsection 7A.

4.4 ELECTRICAL ENERGY SOURCE FOR RADIOTELEPHONE AND SATELLITE COMMUNICATIONS EQUIPMENT

There shall be available at all times, while the ship is undertaking a voyage between the berth at one port of call and the berth at the next port of call, a source of electrical energy sufficient to operate the installations and the emergency lighting source referred to in Clause 4.6 b) and to charge any batteries used as a reserve source of energy for the installations and the emergency lighting source.

In addition, a sufficient supply of electrical energy shall be available for testing the installations on the vessel at all reasonable times whilst in port.

The source of electrical energy for *radiotelephone* and satellite communications equipment on Class 1A, 2A and 3A vessels shall comply with the provisions of *Marine Order 27 (Safety of navigation and radio equipment) 2016*.

For all other vessels, the source of electrical energy for *radiotelephone* and satellite communications equipment indicated in Columns 2 to 7 of Table 2 shall comply with—

a) the provisions of Annex F; or

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

4.5 ANTENNAS FOR RADIOTELEPHONE AND SATELLITE COMMUNICATIONS EQUIPMENT

All *radiotelephone* and satellite communications equipment on the vessel shall be provided with an efficient antenna system.

The antenna system on Class 1A, 2A and 3A vessels shall comply with the provisions of *Marine Order 27 (Safety of navigation and radio equipment) 2016*.

For all other vessels with the *radiotelephone* and satellite equipment indicated in Columns 2 to 7 of Table 2, the antenna systems shall comply with—

- a) the provisions of Annex G; or
- b) *Marine Order 27 (Safety of navigation and radio equipment) 2016.*

4.6 **ANCILLARY EQUIPMENT ASSOCIATED WITH RADIOTELEPHONE AND SATELLITE COMMUNICATIONS EQUIPMENT**

Vessels complying with the provisions of Table 2 shall be fitted with the following ancillary equipment:

- a) Suitable operating instructions in addition to the documents specified in Clause 8.1, which explain in simple terms the use of the radio or satellite equipment to an unskilled person for use in an emergency.
- b) Emergency lighting source.

EXAMPLES

Examples of emergency lighting sources include:

incandescent or fluorescent lights

torches

- c) A secondary loud speaker with independent volume control where *radiotelephones*, including those fitted with *DSC*, or satellite voice communications equipment is not fitted in the place from which the vessel is normally navigated.
- d) A secondary alarm where satellite equipment without voice communication capability is not fitted in the place from which the vessel is normally navigated.

4.7 **SIGNAL LIGHTS, LAMPS AND FLAGS**

All vessels shall comply with the provisions of Table 3 as applicable to their Class and measured length.

In addition to the requirements of Table 3 all vessels shall carry the flags of *International Code of Signals* appropriate to their activities, as required to maintain safety of operations,

EXAMPLE

The “Alpha” flag to indicate that divers are in the water on vessels that include, as part of their operations, acting as a base for divers.

4.8 **INTERNAL COMMUNICATIONS EQUIPMENT**

The type and quantity of public address systems shall comply with the provisions of NSCV Part C Subsection 7A.

The type and quantity of engineering communications shall comply with the provisions of NSCV Part C Section 5A.

The type and quantity of fire call systems shall comply with the provisions of NSCV Part C Section 4.

Table 2 — Scales of radiotelephone and satellite communications equipment

Operational Area	Equipment Type							
	VHF Radiotelephone ¹	VHF Radiotelephone (with DSC) ²	HF Radiotelephone ³	HF Radiotelephone ^{3, 4} (with DSC)	Satellite	Satellite telephone ^{5, 6}	EPIRB	Mobile telephone ⁷
Within specified waters designated by the Authority as being LCS areas of coverage ^{8, 9}	YES (A1)	YES (A2)	NA	NA	NA	NA	See Clause 4.3	OPTIONAL (A6)
Beyond specified waters designated by the Authority as being LCS areas of coverage	YES (A1)	YES (A2)	YES (A3),	YES (A3)	YES (A3), (A4)	YES (A5)	See Clause 4.3	OPTIONAL (A6)

KEY:

(A1) – A reduction in radio communications equipment capacity may be allowed for vessels operating in Operational Areas D and E following assessment in accordance with Clause 2.16. 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.

(A2) – VHF radiotelephones fitted with DSC are an alternative solution to VHF radiotelephones. A VHF radiotelephone fitted with DSC is also considered to include a DSC watchkeeping receiver.

(A3) – Vessels shall be fitted with either an HF radiotelephone or a satellite system as a minimum. HF radiotelephones fitted with DSC are an alternative solution to HF radiotelephones. An HF radiotelephone fitted with DSC is also considered to include a DSC watchkeeping receiver.

(A4) – Satellite includes GMDSS satellite systems [SOLAS] and non-GMDSS satellite systems.

(A5) – Satellite telephones shall be used only where a minimum of 2 broadcast systems are also fitted (e.g. VHF and EPIRB) and shall meet the installation requirements of Clauses 5.3 to 5.5 inclusive.

(A6) – Mobile Telephones are supplementary devices only confined to use within mobile phone range using the generic 000 emergency number. They do not replace any requirement for the fitting of primary or secondary communications equipment as specified in Table 2.

NOTES:

1 – VHF is recognised as the principle ship to ship means of communication. Although operations limited to sheltered waters may have lesser requirements, boat builders/operators are encouraged to fit VHF as a minimum.

2 – Australian waters are declared as “Sea Area A3” which does not require the monitoring of VHF (DSC) by shore installations and subsequently the National Coast Radio Network will not be monitoring VHF (DSC), therefore the use of DSC in VHF applications is confined to ship to ship communication only; reception of a VHF (DSC) distress signal is most likely to be by other similarly outfitted vessels or by SOLAS vessels. In order to support alerting using DSC, MMSI numbers are issued and recorded by AMSA.

3 – Most HF radiotelephones are designed and constructed as MF/HF radiotelephones. MF use in the GMDSS system is confined to ship to ship alerting, however it is no longer recommended for distress and safety monitoring by IMO. MF is no longer generally monitored by the National Coast Radio Network or by SOLAS vessels although some SOLAS vessels may continue to do so. Also some marine rescue organisations may continue to do so, however continuous monitoring can not be guaranteed as they may not maintain a 24 hour watch. MSI is still provided on MF (see note in Table B1).

(Continued)

Table 2 (Continued)

4 – Vessels installing *HF radiotelephones* fitted with *DSC (HF)* are provided with enhanced automated access to additional ship to shore alerting services and ship to ship alerting capability; reception of a *DSC (HF)* distress signal is most likely to be by AusSAR or by other similarly outfitted vessels or by SOLAS vessels. In order to support alerting using DSC, MMSI numbers are issued and recorded by AMSA.

5 – Where a satellite telephone is fitted with the intent of use for distress calling, the operator should ensure that the coverage footprint of the service provider is appropriate for the area of vessel operations.

6 – Where a satellite telephone is fitted with the intent of use for distress calling, the operator should identify and record the appropriate emergency number(s) to call based on the area of operation. The provision of state marine emergency numbers is a function of each state/NT local *SAR* authority. Where local *SAR* organisations have the technology capability, satellite telephones may be used for safety working as well.

7 – Although Mobile phones can provide a useful emergency backup on rivers, inland waterways and coastal metropolitan areas (subject to reception), they are not a substitute for a marine radio, especially in an emergency.

8 – Vessel operation will be limited to within the *LCS* area of coverage. Contact the relevant State or Territory Authority for details of any areas nominated as designated *LCS* areas of coverage within their jurisdictions.

9 – 20 nautical miles is considered to be the average reliable operational range for VHF between a vessel and an *LCS* when considering variations in *LCS* configurations and variations in propagation characteristics due to environmental conditions.

Key to Table 2:

1. “YES” means that the specific requirement applies to vessels in the operational area as indicated.
 2. “NA” means not applicable.
-

Table 3 — Scales of signal lights, lamps and flags

Equipment Type	Vessel Class														
	1A	1B	1C	1D	1E	2A	2B	2C	2D	2E	3A	3B	3C	3D	3E
Daylight Signalling Lamp	YES ≥35 m	YES ≥35 m	NA	NA	NA	YES ≥35 m	YES ≥35 m	NA	NA	NA	YES ≥35 m	YES ≥35 m	NA	NA	NA
Signalling Light	YES <35 m	YES <35 m	YES	YES	YES	YES <35 m	YES <35 m	YES	YES	YES	YES <35 m	YES <35 m	YES	YES	YES
1 copy '<i>International Code of Signals</i>'	YES ≥35 m	YES ≥35 m	NA	NA	NA	YES ≥35 m	YES ≥35 m	NA	NA	NA	YES ≥35 m	YES ≥35 m	NA	NA	NA
1 set of International Code flags	YES ≥35 m	YES ≥35 m	NA	NA	NA	YES ≥35 m	YES ≥35 m	NA	NA	NA	YES ≥35 m	YES ≥35 m	NA	NA	NA

Key to Table 3:

1. "YES" means that the specific requirement applies to vessels in that Class, operational area and measured length as indicated.
2. "NA" means not applicable.

CHAPTER 5 INSTALLATION OF COMMUNICATIONS EQUIPMENT

5.1 SCOPE

This Chapter specifies requirements for the installation of communications equipment on board vessels including the arrangements for antennas and sources of electrical energy.

5.2 OBJECTIVE

The objective of this Chapter is to ensure that all communications installations on a vessel are located and installed so as to provide operating conditions appropriate for the risks that are likely to be encountered.

5.3 GENERAL PROTECTION FROM VOLTAGES

Class 1A, 2A and 3A vessels shall comply with the provisions of *Marine Order 27 (Safety of navigation and radio equipment) 2016*.

Communications equipment on all other vessels 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 radio frequency voltage) of greater than 40 volts under normal conditions of operation.

5.4 RADIOTELEPHONE AND SATELLITE COMMUNICATIONS EQUIPMENT

5.4.1 General

Radiotelephone and satellite communications equipment for Class 1A, 2A and 3A vessels shall be installed in accordance with *Marine Order 27 (Safety of navigation and radio equipment) 2016*.

Radiotelephone and satellite communications equipment for all other vessels shall be installed in accordance with—

- a) Clauses 5.4.2 and 5.4.3; or
- b) *Marine Order 27 (Safety of navigation and radio equipment) 2016*.

NOTES:

1. Hand held units of any type of device should not be used as primary distress and safety equipment because there is the risk they could be lost, left behind on a voyage, dropped overboard, or that the batteries may be holding insufficient charge. Primary equipment should be console mounted.
2. When installing *radiotelephone* and satellite communications equipment, 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.

5.4.2 Location

The *radiotelephone* and satellite equipment shall be installed—

- a) in the vessel in as high a position as is practicable;
- b) so that it is protected against the harmful effects of moisture and extremes of temperature; and

- c) in a location that will not affect any of the vessel's compasses or other navigational equipment in accordance with Clause 5.4.3.

5.4.3 Interference

Communications equipment onboard a vessel undertaking a voyage between berths at one port of call and the berth at the next port of call shall not be hindered by interference caused by electrical or other equipment. To this end—

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

5.5 SOURCES OF ELECTRICAL ENERGY

The sources of electrical energy for *radiotelephone* and satellite communications equipment for Class 1A, 2A and 3A vessels shall be installed in accordance with *Marine Order 27 (Safety of navigation and radio equipment) 2016*.

The sources of energy for *radiotelephone* and satellite communications equipment for all other vessels shall be installed in accordance with—

- a) Annex F; or
- b) *Marine Order 27 (Safety of navigation and radio equipment) 2016*

Where electrical generating devices in the vessel are used that may create voltage fluctuations or electrical noise having the potential to cause damage to *Radiotelephone* and satellite communications equipment, filters shall be installed so that the electrical energy provided to that equipment meets the manufacturers specified requirements for operation.

5.6 ANTENNAS

The installation of antennas on Class 1A, 2A and 3A vessels shall comply with the provisions of *Marine Order 27 (Safety of navigation and radio equipment) 2016*.

The installation of antennas on all other vessels shall comply with—

- a) the provisions of Annex G; or
- b) *Marine Order 27 (Safety of navigation and radio equipment) 2016*.

5.7 ANCILLARY EQUIPMENT ASSOCIATED WITH RADIOTELEPHONE AND SATELLITE COMMUNICATIONS EQUIPMENT

5.7.1 General

Ancillary equipment associated with *radiotelephone* and satellite communications equipment shall be installed in accordance with Clauses 5.7.2 to 5.7.5 inclusive.

5.7.2 Operating instructions

The operating instructions for the equipment shall be located so as to be easily identifiable and readily accessible from where the person will operate the radio or satellite equipment.

5.7.3 Emergency lighting source

The emergency lighting source shall be installed so as to be capable of illuminating all communications equipment controls and the operating instructions referred to in Clause 4.6a), and so that it can be controlled both from the immediate area of the equipment and from every entrance to the space in which the equipment is fitted.

NOTE: Where the communications equipment and associated operating instructions are installed in a control station of the vessel, the emergency lighting source specified in NSCV Part C Subsection 5B may meet the requirements of this Clause.

5.7.4 Secondary loud speaker

The secondary loud speaker shall be installed in the control station from which the vessel is normally navigated and in a location so that when the volume control is adjusted to its minimum position, the output from the loud speaker is of sufficient volume to maintain an effective listening watch from all parts of that control station.

5.8 DAYLIGHT SIGNALING LAMPS AND SIGNALING LIGHTS

Daylight signalling lamps (SOLAS) shall be installed in accordance with the installation standards mentioned in IMO Resolution MSC.95(72) *Performance standards for daylight signalling lamps*.

Portable non-SOLAS signaling lights shall be installed so as to be readily available to the master of the vessel and shall contain an internal energy source.

NOTE: The specification of the electrical energy source for signaling lamps is included in NSCV Part C Subsection 5B.

5.9 INTERNAL COMMUNICATIONS EQUIPMENT

The location and installation of public address systems shall comply with the provisions of NSCV Part C Subsection 7A.

The location and installation of engineering communications equipment shall comply with the provisions of NSCV Part C Section 5A.

The location and installation of fire call systems shall comply with the provisions of NSCV Part C Section 4.

CHAPTER 6 SERVICING OF RADIOTELEPHONE AND SATELLITE COMMUNICATIONS EQUIPMENT

6.1 SCOPE

This chapter specifies requirements for the maintenance of communications equipment on board vessels including the arrangements for spare parts.

6.2 OBJECTIVE

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

6.3 MAINTENANCE

The installation shall be maintained so that, while the vessel is undertaking a voyage between the berth at one port of call and the berth at the next port of call, the installation is at all times capable of fulfilling the requirements of this Subsection.

An EPIRB shall, at intervals of 12 months or such longer intervals as recommended by the manufacturer and approved at the time the product is assessed and verified, be inspected, tested and, if necessary, have its source of energy replaced.

6.4 SPARE COMPONENTS

Class 1A, 2A and 3A vessels shall carry spare components in accordance with the maintenance provisions of *Marine Order 27 (Safety of navigation and radio equipment) 2016*.

On all other vessels, spare components commensurate with the installations shall be carried on board and shall include—

- a) four of each type of fuse used in each *installation*; and
- b) one globe or fluorescent tube for the emergency lighting source referred to in Clause 4.6 b).

6.5 TESTS

The installations on Class 1A, 2A and 3A vessels shall be tested in accordance with the provisions of *Marine Order 27 (Safety of navigation and radio equipment) 2016*.

On all other vessels, the installations shall be operationally tested once daily while the vessel is undertaking a voyage between the berth at one port of call and the berth at the next port of call.

The VHF installation shall be tested by communicating the vessel's position to an *LCS*, if within reception range or other ship station.

In addition, the *HF* and satellite installations, where fitted, shall be tested by making a test call or by reporting the vessel's position.

The results of the tests shall be recorded in the vessel's log book referred to in Clause 8.2

CHAPTER 7 OPERATION OF COMMUNICATIONS EQUIPMENT

7.1 SCOPE

This Chapter specifies requirements for the operation of communications equipment on board vessels including the arrangements for log books.

7.2 OBJECTIVE

The objective of this Chapter is to ensure that all communications equipment on a vessel is operated in a reliable manner to maximise the probability of assistance or rescue when required, to coordinate the provision of assistance when required and to provide navigational warnings.

7.3 QUALIFICATIONS OF OPERATORS

The radiotelephony and satellite equipment in each vessel shall be operated by those persons holding *radio operator* qualifications in accordance with NSCV Part D, specific to the type of equipment installed on the vessel.

NOTE: AMSA is the compliance body for GMDSS qualifications and the ACMA is the compliance body for non-GMDSS qualifications.

7.4 RADIO WATCH

A *radio watch* shall be maintained in accordance with Marine Order 504, specific to the type of equipment installed on the vessel.

CHAPTER 8 COMMUNICATIONS EQUIPMENT DOCUMENTATION

8.1 OPERATIONS DOCUMENTATION

Operations documentation shall be carried on Class 1A, 2A and 3A vessels in accordance with the provisions of *Marine Order 27 (Safety of navigation and radio equipment) 2016*.

The following operations documents shall be carried on all other vessels 7.5 metres or more in measured length:

- a) A current edition of the “Marine VHF Radio Operators Handbook” where the vessel operates only within specified waters designated by the Authority as being *LCS* areas of coverage and is fitted with a *VHF radiotelephone* only.
- b) A current edition of the “Marine Radio Operators Handbook” where the vessel operates beyond specified waters designated by the Authority as being *LCS* areas of coverage.

In addition, vessels other than Class 1A, 2A and 3A vessels equipped with *GMDSS* equipment that is not a *VHF* or *HF radiotelephone* fitted with *DSC*, shall carry the latest edition of the Australian Global Maritime Distress and Safety System (*GMDSS*) Handbook.

8.2 LOGBOOK

- A1 | A logbook shall be carried on all vessels in accordance with Marine Order 504 and shall include details of communications and incidents connected with communications as specified in that Part.

ANNEX A CRITERIA FOR VHF RADIOTELEPHONES

A1 SCOPE

This Annex A provides requirements for the construction and performance of *VHF radiotelephones*. It forms a normative (mandatory) part of this document.

This Annex is referenced in Table 1 of this Subsection.

A2 DESIGN AND CONSTRUCTION

A2.1 VHF radiotelephones not fitted with DSC

VHF Radiotelephones not fitted with *DSC* carried on Class 1, 2, and 3 vessels operating within the operational areas specified in Column 1 of Table 2 shall comply with the requirements specified in—

- a) AS/NZS 4415.2; and
- b) this Annex.

Where there is any conflict in requirements between the AS/NZS 4415.2 specifications and this Annex, the requirements in this Annex shall apply.

A2.2 VHF Radiotelephones fitted with DSC

VHF Radiotelephones fitted with *DSC* carried on Class 1, 2, and 3 vessels operating within the operational areas specified in Column 1 of Table 2 shall comply with the requirements specified in—

- a) AS/NZS 4415.1; and
- b) this Annex.

In addition, the *DSC* component of the *VHF Radiotelephones* fitted with *DSC* shall comply with the requirements specified in ITU-R M.493 for—

- i) Equipment Class D;
- ii) Equipment Class B; or
- iii) Equipment Class A.

Where there is any conflict in requirements between AS/NZS 4415.1 and this Annex, the requirements in this Annex shall apply.

A3 FREQUENCY ASSIGNMENT AND USE

VHF radiotelephones shall be capable of transmitting and receiving on the frequencies specified in Column 1 of Table A.1 that are designated as the channels indicated in Column 2 of Table A.1 for the purposes indicated in Column 3 of Table A.1.

Table A.1 — VHF Frequency assignment and use

Frequency (MHz)	Channel number	Purpose
156.800	16	Distress, Urgency, Safety and Calling only
156.525 (B1)	70	Digital selective calling for Distress, Urgency, Safety and Calling only ¹
156.375	67	Supplementary to Channel 16 and reception of <i>MSI</i> ²
156.300	06	Air/sea search and rescue coordination
156.650	13	Intership navigation safety communication

KEY:

(B1) – This frequency is only required where Digital Selective Calling is fitted to the *radiotelephone*.

NOTES:

1 – In order to support ship to ship alerting using *DSC*, MMSI numbers are issued and recorded by AMSA.

2 – *MSI* broadcasts may include marine weather information (scheduled) and weather warnings (unscheduled) provided by the Australian Bureau of Meteorology and navigation warnings.

In addition to the frequencies specified in Table A.1, the *VHF radiotelephones* shall be configured with additional frequencies for safety working purposes in accordance with AS/NZS 4415.1 or AS/NZS 4415.2 as applicable.

NOTE: Additional frequencies may also be used for accessing VHF marine repeater stations in the network. Where additional frequencies are assigned for safety working purposes, the broadcast of marine safety or weather information, or for repeater stations, these frequencies must be published so as to ensure users are aware of them.

ANNEX B CRITERIA FOR MF/HF RADIOTELEPHONES

B1 SCOPE

This Annex B provides requirements for the construction and performance of MF/HF radiotelephones. It forms a normative (mandatory) part of this document.

This Annex is referenced in Table 1 of this Subsection.

NOTE: Although one of the equipment options in Table 2 for vessels operating beyond specified waters designated by the Authority as being LCS areas of coverage is for the carriage of HF radiotelephones, generally the products available are designed and constructed as MF/HF radiotelephones, therefore design and performance requirements for MF/HF radiotelephones are specified. The design and construction requirements for operation at both MF and HF frequencies are contained in the same standard.

B2 DESIGN AND CONSTRUCTION

MF/HF Radiotelephones carried on Class 1A, 2A and 3A vessels and shall comply with the provisions of *Marine Order 27 (Safety of navigation and radio equipment) 2016*.

MF/HF Radiotelephones carried on all Class 1, 2 or 3 vessels operating within the operational areas B, C, D and E and beyond specified waters designated by the Authority as being LCS areas of coverage shall comply with the requirements specified in—

- a) AS/NZS 4582; and
- b) this Annex.

In addition, on MF/HF Radiotelephones fitted with DSC (HF), the DSC component shall comply with the requirements specified in ITU-R M.493 for—

- i) Equipment Class E; or
- ii) Equipment Class A.

Where there is any conflict in requirements between AS/NZS 4582 and this Annex, the requirements in this Annex shall apply.

B3 FREQUENCY ASSIGNMENT AND USE

HF radiotelephones shall be capable of transmitting and receiving on the frequencies specified in column 1 of Table B.1 for the purposes indicated in column 2 of Table B.1.

In addition to the frequencies specified in Table B.1, MF/HF radiotelephones fitted with DSC shall be configured with DSC frequencies in accordance with *Marine Order 27 (Safety of navigation and radio equipment) 2016* or AS/NZS 4582 as applicable to the vessel's area of operations.

Table B.1 — HF Frequency assignment and use

Frequency (kHz) ¹	Purpose
4125.0	Distress, Urgency, Safety and Calling only
6215.0	Distress, Urgency, Safety and Calling only
8291.0	Distress, Urgency, Safety and Calling only
8176.0	Reception of <i>MS</i> ²
4146.0	Safety working
6227.0	Safety working
8294.0	Safety working

NOTES:

1 – The MF frequency 2182 kHz has not been included in the table as a requirement because it is no longer recommended for distress and safety monitoring by *IMO*. It is no longer generally monitored by the National Coast Radio Network or by *SOLAS* vessels. Also Volunteer Marine Rescue organisations may continue to do so, although continuous monitoring can not be guaranteed as they may not maintain a 24 hour watch.

2 – *MSI* broadcasts include marine weather information (scheduled) provided by the Australian Bureau of Meteorology and navigation warnings. The Bureau of Meteorology broadcasts scheduled marine weather information, warnings and coastal reports via *HF* radio transmitters at Charleville in Queensland; covering the central and eastern regions of Australia and Wiluna in Western Australia; covering the western and central regions. Charleville (Call sign VMC) broadcasts: 2201 kHz, 4426 kHz, 6507 kHz, 8176 kHz, 12365 kHz and 16546 kHz. Wiluna (Call sign VMW) broadcasts: 2056 kHz, 4149 kHz, 6230 kHz, 8113 kHz, 12362 kHz and 16528 kHz

ANNEX C CRITERIA FOR NON-GMDSS SATELLITE SYSTEMS

C1 SCOPE

This Annex C provides requirements for the construction and performance of non-*GMDSS* satellite systems. It forms a normative (mandatory) part of this document.

This Annex is referenced in Table 1 of this Subsection.

C2 DESIGN SPECIFICATION

Non-*GMDSS* satellite equipment shall be designed so as to be compatible for use with the *GMDSS*.

NOTE: the model of satellite equipment installed should be type approved for use with the *GMDSS* by the *GMDSS* satellite infrastructure provider.

C3 CONSTRUCTION SPECIFICATION

Non-*GMDSS* satellite equipment shall be constructed so that all external components are adequately protected from the adverse effects of weather and salt water.

ANNEX D CRITERIA FOR SATELLITE TELEPHONES

D1 SCOPE

This Annex D provides requirements for the construction and performance of satellite telephones. It forms a normative (mandatory) part of this document.

This Annex is referenced in Table 1 of this Subsection.

D2 DESIGN SPECIFICATION

The design of satellite telephone equipment shall comply with the relevant requirements of the Radiocommunications Act 1992 and the Telecommunications Act 1997.

NOTE: satellite telephone equipment may be considered compliant with this standard where the equipment has been supplied by a satellite provider authorised by the ACMA to supply satellite-based telephone services in Australia.

D3 CONSTRUCTION SPECIFICATION

Satellite telephone equipment shall be constructed so that all external components are adequately protected from the adverse effects of weather and salt water.

ANNEX E CRITERIA FOR SIGNALLING LIGHTS

E1 SCOPE

This Annex E provides requirements for the construction and performance of signalling lights. It forms a normative (mandatory) part of this document.

This Annex is referenced in Table 1 of this Subsection.

E2 DESIGN SPECIFICATION

The design of a non-SOLAS signalling light may be such that it is portable or fixed.

NOTES:

1. Signalling lights include signalling torches or similar apparatus.
2. The hand held emergency lighting referred to in NSCV Part C Subsection 7A may fulfil the requirements for a signalling light.

E3 CONSTRUCTION SPECIFICATION

A signalling light shall be constructed so that all external components are adequately protected from the adverse effects of weather and salt water.

ANNEX F CRITERIA FOR SOURCES OF ELECTRICAL ENERGY

F1 SCOPE

This Annex F provides requirements for the type, installation and performance of electrical energy sources used to provide the operating energy for *radiotelephone* and satellite communications equipment. It forms a normative (mandatory) part of this document.

This Annex is referenced in Clause 4.4 and Clause 5.5 of this Subsection.

F2 TYPES OF ELECTRICAL ENERGY SOURCES

Radiotelephone and satellite communications equipment shall be provided with sources of electrical energy in accordance with Clauses F2.1 and F2.2 inclusive.

F2.1 Main source

A main source of electrical energy for *radiotelephone* and satellite communications equipment shall be provided in accordance with NSCV Part C Subsection 5B. This main electrical energy source shall be sufficient to effectively operate the communication equipment under normal operating conditions on the vessel.

NOTE: A common main source of electrical energy is generally used to supply all equipment in a vessel. Clause 5.5 specifies the methods to be used to mitigate the possibility of damage to *radiotelephone* and satellite communications equipment from this common supply.

F2.2 Reserve source

A reserve source of electrical energy for *radiotelephone* and satellite communications equipment shall be provided in accordance with Clauses F2.2.1 to F2.2.3 inclusive.

F2.2.1 Types of reserve source

A reserve source of electrical energy shall be provided to operate the communications equipment under abnormal vessel operating conditions when the main source of electrical energy is unavailable.

The reserve source of electrical power shall consist of—

- a) a self contained emergency generator that complies with NSCV Part C Subsection 5B as pertains to the general requirements for emergency electrical installations and to emergency generator requirements for emergency electrical installations; or
- b) a battery bank that complies with Clause F3 and with NSCV Part C Subsection 5B as pertains to the general requirements for emergency electrical installations and to the requirements for batteries used for emergency electrical installations.

F2.2.2 Use of reserve source

The reserve source of electrical energy shall operate—

- a) the *VHF radiotelephone installation*;
- b) the *HF radiotelephone installation* (if fitted);
- c) the satellite communications *installation* (if fitted);
- d) the base station for a satellite telephone (if fitted) ; and
- e) the emergency lighting source referred to in Clause 4.6 b) of this Section.

NOTE: Depending on where the installations are fitted in the vessel, some emergency lighting sources may include a self contained reserve energy source e.g. torches.

Where the reserve source supplies additional electrical devices, then a means shall be provided at the communication installation to isolate other non-emergency loads from the reserve supply.

F2.2.3 Reserve source capacity

The reserve source shall be able to supply a total current equal to the sum of—

- a) one half of the current required to operate the *VHF radiotelephone* transmitter for the transmission of speech, and DSC, where fitted with the transmitter operating at its full rated radio frequency output power;
- b) the current required to operate the *VHF radiotelephone* receiver;
- c) if the vessel carries an *HF radiotelephone*, one half of the current required to operate the *HF radiotelephone* transmitter for the transmission of speech and DSC, with the transmitter operating at its full rated radio frequency output power;
- d) the current required to operate the *HF radiotelephone* receiver;
- e) if the vessel carries a satellite communications installation, the current required to operate the satellite communications installation; and
- f) the current consumed by the emergency lighting source referred to in Clause 4.6 b).

The reserve source shall be capable of supplying this total current for durations not less than those for the emergency power supply capacity durations specified in NSCV Part C Subsection 5B. Where the reserve source supplies additional emergency services, the capacity of the reserve supply shall be sufficient to meet the requirements of this Clause and also maintain any other emergency services for the durations specified in NSCV Part C Subsection 5B for emergency power supply capacity.

F3 INSTALLATION, OPERATION AND CHARGING OF BATTERY SOURCES

The installation, operation and charging of battery sources shall be in accordance with the requirements of NSCV Part C Subsection 5B pertaining to battery installation, operation and charging.

ANNEX G CRITERIA FOR ANTENNA SYSTEMS

G1 SCOPE

This Annex G provides requirements for the type and performance of antennas used for *radiotelephone* and satellite communications equipment. It forms a normative (mandatory) part of this document.

This Annex is referenced in Clause 4.5 and Clause 5.6 of this Subsection.

G2 GENERAL DESIGN AND INSTALLATION

Each antenna and antenna tuner shall be designed and installed so that it—

- a) is adequately protected from mechanical damage;
- b) precludes danger to personnel as a result of accidental contact;
- c) does not interfere with the safe navigation or working of the vessel; and
- d) is adequately protected from the adverse effects of salt water.

G3 VHF RADIOTELEPHONE ANTENNA

The antenna for a *VHF radiotelephone* shall be mounted as high as practicable on the vessel with minimal obstructions in any direction. It shall be vertically polarized and omni directional in the horizontal plane.

G4 HF RADIOTELEPHONE ANTENNA EARTH

If the vessel is fitted with an *HF radiotelephone* installation, an efficient radio frequency earth together with a suitable connection to the *radiotelephone* installation shall be provided and fitted.

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