Contents

RULES FOR RADIO INSTALLATIONS

Chapter 1 GENERAL

1.1 General

1.1.1 Application

1 Rules for Radio Installations (hereinafter referred to as "the Rules") apply to the radio installations of ships classed or to be classed with NIPPON KAIJI KYOKAI (hereinafter referred to as "the Society") under **Chapter 2 of the Regulations for the Classification and Registry of Ships** and intended to be registered under **Chapter 3 of the Regulations for the Classification and Registry of Ships**.

2 To radio installations fitted in passenger ships, the Society may apply additional requirements as specified in Chapter IV of the Annex to the Convention.

3 In addition to the relevant requirements in **Part P of the Rules for the Survey and Construction of Steel Ships**, radio installations in mobile offshore drilling units are to comply with the requirements in Chapter 11 of the "*2009 MODU Code*" defined in **1.2.36, Part P of the Rules for the Survey and Construction of Steel Ships**.

1.1.2 Equivalency

Radio installations which do not fully comply with the requirements of the Rules may be accepted provided that they are deemed by the Society to be equivalent to those specified in the Rules.

1.1.3 National Requirements

The Society may make special requirements as instructed by the flag-government of ships or the government of sovereign nation in which ships navigate.

1.1.4 Terms and Definitions

The terms used in the Rules are defined in accordance with the following **(1)** to **(23)**.

(1) "The Convention" means the current *International Convention for the Safety of Life at Sea, 1974, as amended* and *Protocol of 1988 relating to the International Convention for the Safety of Life at Sea, 1974*.

(2) "Ships constructed" means "ships the keels of which are laid or which are at a similar stage of construction".

(3) "Bridge-to-bridge communications" means safety radiocommunications between ships from the position from which the ships are normally navigated.

(4) "Continuous watch" means that the radio watch concerned shall not be interrupted other than for brief intervals when the ship's receiving capability is impaired or blocked by its own communications or when the facilities are under periodical maintenance or checks.

(5) "Digital Selective Calling (DSC)" means a technique using digital 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 International Telecommunication Union Radiocommunication Bureau (ITU-R).

(6) "AIS-SART" means an automatic identification system search and rescue transmitter capable of operating on frequencies dedicated for AIS (161.975 *MHz* and 162.025 *MHz*).

(7) "General Radio Communications" means operational and public correspondence traffic, other than distress, urgency and safety messages, conducted by radio.

(8) "Emergency position-indicating radio beacon (EPIRB)" means a transmitter operating in the frequency band 406.0-406.1 *MHz* capable of transmitting a distress alert via satellite to a rescue coordination centre and transmitting signals for on-scene locating.

(9) "Global Maritime Distress and Safety System (GMDSS)" means a system that performs the functions specified in **4.1-1(1)**.

(10) "Locating" means the finding of ships, aircraft, units or persons in distress.

(11) "Maritime safety information" means navigational and meteorological warnings, meteorological forecasts and other urgent safety related messages broadcast to ships.

(12) "GMDSS identities" means information which may be transmitted to uniquely identify the ship or its associated rescue boats and survival craft. These identities are the ship's call sign, Maritime Mobile Service Identity (*MMSI*), EPIRB hexadecimal identity, recognized mobile satellite service identities and equipment serial numbers.

(13) "The position from which the ship is normally navigated" means the navigation bridge such as the navigational space and chart space, etc. which are not separated by bulkheads.

(14) "Place close to the position from which the ship is normally navigated" means the location in the vicinity of the bridge such as wings outside the navigation bridge or the flying (compass) bridge if accessible by the stairs.

(15) "Sea area A1" means an area within the radiotelephone coverage of at least one VHF coast station in which continuous DSC alerting is available, as may be defined by a Contracting Government of the Convention.

(16) "Sea area A2" means an area, excluding sea area A1, within the radiotelephone coverage of at least one MF coast station in which continuous DSC alerting is available, as may be defined by a Contracting Government of the convention.

(17) "Sea area A3" means as area, excluding sea areas A1 and A2, within the coverage of a recognized mobile satellite service supported by the ship earth station carried on board, in which continuous alerting is available.

(18) "Sea area A4" means an area outside sea areas A1, A2 and A3.

(19) "Recognized mobile satellite service" means any service which operates through a satellite system and is recognized by the International Maritime Organization, for use in the GMDSS.

(20) "Maritime safety information (*MSI*)" means navigational and meteorological warnings, meteorological forecasts and other urgent safety-related messages broadcast to ships. Refer to Joint *IMO*/*IHO*/*WMO* Manual on Maritime Safety Information (*MSI*) (*MSC*.1/*Circ*.1310, as amended).

(21) "Radar SART" means a search and rescue transponder operating on radar frequencies in the frequency band 9.2-9.5 *GHz*.

(22) "Radio Regulations" means the radio regulations complementing the Constitution and Convention of the International Telecommunication Union which is in force at any given time.

(23) "Satellite service on 406 *MHz"* means a service operating through a satellite system having global availability designed to detect EPIRBs transmitting in the frequency band 406.0-406.1 *MHz*.

Chapter 2 SURVEYS

2.1 General

2.1.1 Kinds of Surveys

1 Radio installations registered or intended to be registered with the Society are to be subjected to the following surveys which are to be carried out to the satisfaction of the Surveyor.

(1) Surveys for registration of radio installations (hereinafter referred to as "Registration Surveys")

(2) Surveys for maintaining registration of the radio installations (hereinafter referred to as "Registration Maintenance Surveys")

2 Registration Maintenance Surveys are composed of following Surveys.

(1) Special Surveys

(2) Periodical Surveys

(3) Occasional Surveys

(4) Unscheduled Surveys

2.1.2 Time of Registration Surveys and Intervals between Registration Maintenance Surveys*

1 Registration Surveys are to be carried out at the time which an application for registration is made.

2 Registration Maintenance Surveys are to be carried out in accordance with the requirements specified in **(1)** through **(4)** below.

(1) Special Surveys are to be carried out at intervals specified in **1.1.3-1(3)(a), Part B of the Rules for the Survey and Construction of Steel Ships**.

(2) Periodical Surveys are to be carried out at intervals specified in **1.1.3-1, Part B of the Rules for the Survey and Construction of Steel Ships**.

(3) Occasional Surveys are to be carried out at the following occasions at times other than the Special Surveys or Periodical Surveys.

(a) When main parts of the radio installations have been damaged, or are to be repaired or renewed.

(b) When the radio installations are modified or altered.

(c) When the ship is required verification to comply with the retroactive requirements.

(d) Whenever the survey is considered necessary by the Society.

(4) The classed ships may be subject to Unscheduled Surveys when the confirmation of the status of installations by survey is deemed necessary in cases where the Society considers the installations to be subject to **1.4-3 of the Conditions of Service for Classification of Ships and Registration of Installations**.

(5) To implement the survey of before **(2)**, **(3)** or **(4)**, in lieu of the traditional ordinary surveys where a surveyor is in attendance, the Society may approve survey methods which it considers to be appropriate.

2.1.3 Registration Maintenance Surveys Carried Out in Advance

The requirements for Registration Maintenance Surveys carried out in advance are to be in accordance with the provisions specified in **1.1.4, Part B of the Rules for the Survey and Construction of Steel Ships**.

2.1.4 Postponement of Special Surveys

The requirements for postponement of Special Surveys are to be in accordance with the provisions specified in **1.1.5-1(1)** or **1.1.5-1(2), Part B of the Rules for the Survey and Construction of Steel Ships**.

2.1.5 Preparation for Surveys and Others*

1 All such preparations as required for the survey to be carried out as well as those which may be required by the Surveyor as necessary in accordance with the requirements in the Rules are to be made by the applicant of the survey. The preparations are to include necessary facilities and documents for the execution of the survey and arrangement of a radio inspector specified in **2.1.6**. Inspection, measuring and test equipment, which Surveyors rely on to make decisions affecting classification are to be individually identified and calibrated to a standard deemed appropriate by the Society. However, the Surveyor may accept simple measuring equipment without individual identification or confirmation of calibration, provided they are of standard commercial design, properly maintained and periodically compared with other similar equipment or test pieces.

2 The applicant for the survey is to arrange a supervisor who is well conversant with the survey items intended for the preparation

of the survey to provide the necessary assistance to the Surveyor according to his requests during the survey.

3 The survey may be suspended where necessary preparations have not been made, any appropriate attendant mentioned in the previous **-2** is not present, or the Surveyor considers that the safety for execution of the survey is not ensured.

4 Where repairs are deemed necessary as a result of the survey, the Surveyor will notify his recommendations to the applicant of the survey. Upon this notification, the repair is to be made to the satisfaction of the Surveyor.

5 In cases where it is necessary to replace any fittings, equipment, parts, etc. used on board, replacements are not to use any materials which contain asbestos.

2.1.6 Radio Inspector

A radio inspector is to be a qualified person who belongs to the firm engaged in servicing and testing of radio communication equipment approved by the Society according to the **Rules for Approval of Manufacturers and Service Suppliers**.

2.1.7 Execution of Surveys

The radio installation survey is to be carried out by the Surveyor with the radio inspector as a technical assistant.

2.1.8 Laid-up Ships

1 Laid-up ships are not subject to Registration Maintenance Surveys. However, Occasional Surveys may be carried out at the request of owners.

2 When laid-up ships are about to be re-entering service, the following surveys and surveys for specific matters which have been postponed due to being laid-up, if any, are to be carried out.

(1) If the due dates for Registration Maintenance Surveys have not transpired while the ship was laid-up, then an equivalent to the Periodical Surveys specified in **2.3.1** is to be carried out.

(2) If the due dates for Registration Maintenance Surveys have transpired while the ship was laid-up, then the Periodical Surveys specified in **2.3.1** are to be carried out.

2.1.9 Firms Engaged in the Testing, or Measuring, etc. of Radio Equipment

1 Unless otherwise specified in **-2** below, third parties engaged in the testing, or measuring of radio equipment, if used, are to be any of the following: firms complying with **Chapter 4, Part 3 of the Rules for Approval of Manufacturers and Service Suppliers** and approved by the Society; firms approved by the Administration; firms approved by duly authorized organizations acting on behalf of the Administration; or firms approved by other organizations which are acceptable to the Administration.

2 Third parties engaged in the annual testing of 406 *MHz* satellite *EPIRBs* for compliance with *SOLAS* regulation IV/15.9, if used, are to be any of the following: firms complying with **Chapter 4, Part 3 of the Rules for Approval of Manufacturers and Service Suppliers** and approved by the Society; firms approved by the Administration; firms approved by duly authorized organizations acting on behalf of the Administration; or firms approved by other organizations which are acceptable to the Administration.

2.2 Registration Surveys

2.2.1 Submission of Plans and Documents*

1 For ships intending to undergo a Registration Survey, the following plans and documents are to be submitted to the Society for approval. Plans and documents may be subject to examination by the Society prior to the submission of an application of the Registration Survey in accordance with the provisions specified otherwise by the Society.

(1) specifications and equipment list for *GMDSS* (including calculations of capacity of a reserve source of energy (batteries));

(2) arrangement of radio equipment and radio life-saving appliances;

(3) electrical wiring diagrams of radio installations; and

(4) arrangement of antennae.

2 The following plans and documents are to be submitted to the Society for reference in addition to the approval plans and documents specified in the preceding **-1**.

Asbestos-free declarations and supporting documents

2.2.2 Surveys*

1 After radio installations have been installed on board, a Registration Survey is to be carried out according to the requirements of the Rules.

2 Surveyors are to confirm that materials which contain asbestos are not being used.

2.3 Registration Maintenance Surveys

2.3.1 Special Surveys and Periodical Surveys*

A Special Survey or a Periodical Survey of radio installations is to be carried out according to the requirements of the Rules.

2.3.2 Occasional Surveys

In an Occasional Survey, radio installations are to be subjected to those tests, measurements and surveys determined to be necessary in each individual cases and the results thereof are to be to the satisfaction of the Surveyor.

2.3.3 Unscheduled Surveys

At Unscheduled Surveys, investigations, examinations or tests are to be made to the satisfaction of the Surveyor with respect to the matters concerned.

2.4 Other

2.4.1 Remote Surveys*

To implement the survey, in lieu of the traditional ordinary surveys where a surveyor is in attendance, the Society may approve survey methods which it considers to be appropriate.

Chapter 3 RADIO INSTALLATIONS

3.1 General

3.1.1 Arrangements and Performance*

1 Every radio installation is to be:

(1) so located that no harmful interference of mechanical, electrical or other origin affects its proper use, and so as to ensure electromagnetic compatibility and avoidance of harmful interaction with other equipment and systems;

(2) so located as to ensure the greatest possible degree of safety and operational availability;

(3) protected against harmful effects of water, extremes of temperature and other adverse environmental conditions;

(4) provided with reliable, permanently arranged electrical lighting, independent of the main and emergency sources of electrical power, for the adequate illumination of the radio controls for operating the radio installation; and

(5) clearly marked with the GMDSS identities, as applicable for the use of the radio installation operator.

2 The radio installations to be provided on board the ship are to satisfy the requirements for radio equipment specified in **3.2.1** to **3.2.7** and radio life-saving appliances specified in **3.2.8**.

3 In passenger ships, a distress panel is to be installed at the conning position, and it is to be as follows:

(1) contain either one single button which, when pressed, initiates a distress alert using all radio installations required on board for that purpose or one button for each individual installation;

(2) be capable of clearly and visually indicating whenever any button or buttons have been pressed; and

(3) be provided with means to prevent inadvertent activation of the button or buttons referred to in (1) and (2) above.

4 In passenger ships, if an EPIRB is used as the secondary means of distress alerting and is not remotely activated from the distress panel, it is acceptable to have an additional EPIRB installed in the wheelhouse near the conning position.

5 In passenger ships, a distress alarm panel is to be installed at the conning position, and it is to be capable of the following:

(1) providing visual and aural indications of any distress alert or alerts received on board;

(2) indicating through which radiocommunication service the distress alerts have been received.

6 The distress panels referred to in **-3** and **-5** above may be combined.

3.1.2 Approval of Equipment and Devices

Equipment and devices specified in **3.2.1** to **3.2.8** are, in principle, to comply with the respective applicable performance standards in Regulation 16, Chapter IV, *SOLAS* Convention. In addition, such equipment and devices are to be of a type approved by a third-party approved by the administration.

3.2 Radio Equipment

3.2.1 VHF Radio Installations*

1 A VHF radio installation is to consist of the following devices separately or in combination, each satisfying the following functional requirements.

(1) VHF DSC device

The VHF DSC device is to be capable of transmitting distress alerts, urgency and safety communications using DSC on the frequency 156.525*MHz* (channel 70).

(2) VHF radiotelephone equipment

The VHF radiotelephone equipment is to be capable of:

(a) transmitting and receiving distress, urgency and safety communications on the frequencies 156.300*MHz* (channel 6), 156.650*MHz* (channel 13) and 156.800*MHz* (channel 16); and

(b) transmitting and receiving general radio communications using radiotelephony on the band between 156 *MHz* and 174 *MHz* (hereinafter also referred to as "VHF band"). However, this general radio communication may be provided separately.

(3) VHF continuous DSC watch device

The VHF continuous DSC watch device is to be capable of maintaining a continuous watch on VHF DSC channel 70.

2 The VHF installation in **-1(2)(a)** above is to satisfy the following **(1)** and **(2)**.

(1) Control of VHF radiotelephone channels is to be immediately available on the navigation bridge convenient to the conning position and, where necessary, facilities are to be available to permit radio communications from the wings of the navigation bridge. Portable VHF radiotelephone equipment may be used to meet the latter requirement.

(2) The ship, while at sea, is to maintain a continuous listening watch on VHF Channel 16 at the position from which the ship is normally navigated.

3.2.2 MF Radio Installations*

An MF radio installation is to consist of the following devices, separately or in combination, each satisfying the following functional requirements.

(1) MF DSC device

The MF DSC device is to be capable of transmitting distress alerts and safety communications using DSC on the frequency 2,187.5*kHz*.

(2) MF radiotelephone equipment

The MF radiotelephone equipment is to be capable of transmitting and receiving:

(a) distress, urgency and safety communications using radiotelephony on the frequency 2,182*kHz*, and

(b) general radio communications using radiotelephony on working frequencies in the band between 1,605 *kHz* and 4,000 *kHz* (hereinafter also referred to as "MF band").

(3) MF DSC continuous watch device

The MF DSC continuous watch device is to be capable of maintaining a continuous watch on the DSC frequency of 2,187.5 *kHz*.

3.2.3 MF/HF Radio Installations*

An MF/HF radio installation is to consist of the following devices, separately or in combination, each satisfying the following functional requirements. This requirement may be fulfilled by addition of the capability of HF radio installation to MF radio installation.

(1) MF/HF DSC device

The MF/HF DSC device is to be capable of transmitting distress alerts, urgency and safety communications using DSC on the MF band and on working frequencies in the bands between 4,000 *kHz* and 27,500 *kHz* (hereinafter also referred to as "HF band").

(2) MF/HF radiotelephone equipment

The MF/HF radiotelephone equipment is to be capable of transmitting and receiving the following:

(a) distress, urgency and safety communications using radiotelephony on working frequencies in the bands between 4,000 *kHz* and 27,500 *kHz* and between 1,605 *kHz* and 4,000 *kHz*; and

(b) general radio communications using the radiotelephony on the MF band and HF band.

(3) MF/HF continuous DSC watch device

The MF/HF continuous DSC watch device is to be capable of maintaining a continuous watch on the distress and safety DSC frequencies 2,187.5 *kHz*, 8,414.5 *kHz*, and also on at least one of the frequencies 4,207.5 *kHz*, 6,312 *kHz*, 12,577 *kHz* or 16,804.5 *kHz*. The device is to be capable of selecting one of the frequencies at any time from among the DSC frequencies. A scan receiver is acceptable for this purpose.

3.2.4 Recognized Mobile Satellite Service Communication Installations*

A recognized mobile satellite service communication installation is to consist of the following devices, separately or in combination, each satisfying the following functional requirements.

(1) Recognized mobile satellite service ship earth station

A recognized mobile satellite service ship earth station is to be capable of transmitting and receiving:

(a) distress alerts, urgency and safety communications

(b) general radio communications; and

(c) maintaining a continuous watch for satellite shore-to-ship distress alerts.

(2) Enhanced group calling receiver

The enhanced group calling receiver is to be capable of receiving maritime safety information, and search and rescue related

information and using recognized mobile satellite service enhanced group calling.

3.2.5 Radar SART and AIS SART*

A radar SART and an AIS-SART are to be capable of being operated in the 9 *GHz* band or on frequencies dedicated for AIS

3.2.6 Maritime Safety Information and Search And Rescue Related Information Receivers*

Maritime safety information and search and rescue related information throughout the entire voyage in which the ship is engaged. An international NAVTEX receiver is to be capable of receiving broadcasts of the international NAVTEX service.

3.2.7 Satellite Emergency Position Indicating Radio Beacon(EPIRB)*

A satellite emergency position indicating radio beacon (hereinafter referred to as "satellite EPIRB") is to be as follows:

(1) installed in an easily accessible position;

(2) ready to be manually released and capable of being carried by one person into a survival craft;

(3) capable of floating free if the ship sinks and of being automatically activated when afloat; and

(4) capable of being activated manually.

3.2.8 Two-way VHF Radiotelephone Apparatus*

A two-way VHF radiotelephone apparatus is to be capable of communicating as a portable type operated on the frequency 156.800 *MHz* (Channel 16) and at least one additional channel between the site and the survival craft and the ship and the rescue unit.

Chapter 4 COMMUNICATION SYSTEMS

4.1 General

1 Every ship, while at sea, is to be capable of performing the following GMDSS functions:

(1) transmitting ship-to-shore distress alerts by at least two separate and independent means, each using a different radio communication service;

(2) receiving shore-to-ship distress alerts;

(3) transmitting and receiving ship-to-ship distress alerts;

(4) transmitting and receiving search and rescue coordinating communications;

(5) transmitting and receiving on-scene communications;

(6) transmitting and receiving signals for locating by means of radars operated in the 9 *GHz* band (Refer also to Regulations 19.2.3.2 and 19.2.4, Chapter V, *SOLAS* Convention, as appropriate);

(7) receiving maritime safety information;

(8) transmitting and receiving urgent and safety communications; and

(9) transmitting and receiving bridge-to-bridge communications.

2 Every ship, while at sea, is to be capable of transmitting and receiving general radiocommunications.

4.2 Basic Requirements for Radio Equipment

Every ship is to be provided with the following:

(1) the VHF radio installation specified in **3.2.1**;

(2) the radar SART or AIS-SART specified in **3.2.5**;

(3) the receiver capable of receiving MSI, and search and rescue related information specified in **3.2.6**; and

(4) a satellite EPIRB specified in **3.2.7**.

4.3 Radio Equipment - Sea Area A1*

1 In addition to satisfying the requirements of **4.2**, every ship engaged on voyages exclusively in sea area A1 is to be provided with a radio installation capable of initiating the transmission of ship-to-shore distress alerts from the position from which the ship is normally navigated, and operating any of the following:

(1) satellite service at 406 *MHz*; or

(2) a MF using DSC (if the ship is engaged on voyages within coverage of MF coastal stations);

(3) a HF using DSC; or

(4) through a recognized mobile satellite service.

2 Requirement **-1(1)** may be satisfied by installing any of the following:

(1) the EPIRB specified in **3.2.7** close to the position from which the ship is normally navigated but at a location whereby it can still float free of the ship in an emergency;

(2) the EPIRB specified in **3.2.7** installed at a location other than **(1)** above, provided that this EPIRB has a means of remote activation which is installed near the position from which the ship is normally navigated; or

(3) a second EPIRB installed near the position from which the ship is normally navigated.

4.4 Radio Equipment - Sea Area A2*

1 In addition to satisfying the requirements of **4.2**, every ship engaged on voyages within sea area A2, is to be provided with:

(1) the MF radio installation specified in **3.2.2**;

(2) a secondary means of initiating the transmission of ship-to-shore distress alerts by a radio service other than MF operating either:

(a) through the satellite service on 406 *MHz* as specified in **4.3-1(1)**; or

(b) on HF using DSC as specified in **4.3-1(3)**; or

(c) through a recognized mobile satellite service by a ship earth station.

2 It is to be possible to initiate distress alerts by the radio installation specified in **-1** from the position from which the ship is normally navigated.

3 Requirement **-1(2)(a)** may be satisfied by installing any of the following:

(1) the EPIRB specified in **3.2.7** close to the position from which the ship is normally navigated but at a location whereby it can still float free of the ship in an emergency; or

(2) the EPIRB specified in **3.2.7** installed at a location other than **(1)** above, provided that this EPIRB has a means of remote activation which is installed near the position from which the ship is normally navigated; or

(3) a second EPIRB installed near the position from which the ship is normally navigated.

4 In addition, the ship is to be provided with either of the following so as to be capable of transmitting and receiving general radio communications:

(1) A radio installation operating on working frequencies in the bands between 1,605 *kHz* and 4,000 *kHz* or between 4,000 *kHz* and 27,500 *kHz*. This requirement may be satisfied by the addition of this capability in the equipment required by **-1(1)** above.; or

(2) A recognized mobile satellite service ship earth station.

4.5 Radio Equipment - Sea Area A3*

1 In addition to satisfying the requirements of **4.2**, every ship engaged on voyages within sea area A3 is to be provided with the following:.

(1) the recognized mobile satellite service communication installation specified in **3.2.4**;

(2) the MF radio installation specified in **3.2.2** (except for **3.2.2(b)**); and

(3) the means of initiating the transmission of ship-to-shore distress alerts by a radio service operating in any of the following ways:

(a) through the satellite service on 406 *MHz* as specified in **4.3-1(1)**; or

(b) on HF using DSC as specified in **4.3-1(3)**; or

(c) through a recognized mobile satellite service by an additional ship earth station.

2 It is to be possible to initiate transmission of distress alerts by the radio installations specified in **-1** above from the position from which the ship is normally navigated.

3 Requirement **-1(3)(a)** may be satisfied by installing any of the following:

(1) the EPIRB specified in **3.2.7** close to the position from which the ship is normally navigated but at a location whereby it can still float free of the ship in an emergency; or

(2) the EPIRB specified in **3.2.7** installed at a location other than **(1)** above, provided that this EPIRB has a means of remote activation which is installed near the position from which the ship is normally navigated; or

(3) a second EPIRB installed near the position from which the ship is normally navigated.

4 In addition, the ships are to be capable of transmitting and receiving general radiocommunications by either of the following means:

(1) a recognized mobile satellite service ship earth station; or

(2) a radio installation operating on working frequencies in the MF band or HF band.

5 The requirements in **-4(1)** and **-4(2)** above may be satisfied by the addition of this capability in the equipment required by **-1(1)** or **-1(2)** above, respectively.

4.6 Radio Equipment - Sea Area A4*

1 In addition to satisfying the requirements of **4.2**, every ship engaged on voyages within sea area A4 is to be provided with the following:

(1) the MF/HF radio installation specified in 3.2.3; and

(2) a secondary means of initiating the transmission of ship-to-shore distress alerts through the satellite service on 406 *MHz*.

2 It is to be possible to initiate transmission of distress alerts by the radio installations specified in -1 above from the position from which the ship is normally navigated.

3 Requirement -1(2) above may be satisfied by installing any of the following:

(1) the EPIRB specified in 3.2.7 close to the position from which the ship is normally navigated but in a location whereby it can still float free of the ship in an emergency; or

(2) the EPIRB specified in 3.2.7 installed a location other than **(1)** above, provided that this EPIRB has a means of remote activation which is installed near the position from which the ship is normally navigated; or

(3) a second EPIRB installed near the position from which the ship is normally navigated.

4.7 Two-way Communication Equipment etc.

4.7.1 General

1 All two-way communication equipment (VHF, MF/HF and recognized mobile satellite service) carried on board which is capable of automatically including the ship's position in the distress alert is to be automatically provided with this information from a navigation receiver. In the case of internal or external navigation receiver malfunction, the ship's position is to be manually updated at intervals not exceeding four *hours* so that it is always ready for transmission by the equipment. Requirements related to the automatic updating of ship position are specified in *IMO* Resolutions *MSC*.511(105), *MSC*.512(105) and *MSC*.513(105).

2 If an uninterrupted input of information from the ship's navigational or other equipment to the installation required by this Rule is needed, a means is to be provided to ensure the continuous supply of such information in the event of failure of the ship's main or emergency source of electrical power.

4.8 Maintenance Requirements*

1 Equipment is to be so designed that the main units can be replaced readily, without elaborate recalibration or readjustment.

2 Where applicable, equipment is to be so constructed and installed that it is readily accessible for inspection and on-board maintenance purposes.

3 Adequate information is to be provided to enable the equipment to be properly operated and maintained (refer to *IMO* Resolutions *A*.694(17), *A*.813(19) and *MSC/Circ.*862 for more details).

4 Adequate tools and spares are to be provided to enable the equipment to be maintained.

5 On ships engaged on voyages in sea areas A1 or A2, adequate steps are to be taken to ensure that radio installations are readily available for use by using such methods as duplication of equipment, shore-based maintenance or the at-sea electronic maintenance capability, or a combination of these.

6 On ships engaged on voyages in sea areas A3 or A4, adequate steps are to be taken to ensure that radio installations are readily available for use by using a combination of at least two methods such as duplication of equipment, shore-based maintenance or at-sea electronic maintenance capability.

7 All reasonable measures are to be taken to maintain the equipment in efficient working order and to comply with all the functional requirements specified in the Rules.

8 Satellite EPIRBs is to be annually tested (refer to *IMO* Resolutions *MSC*.1/Circ.1040/Rev.2 and *MSC*.514(105) for more details), either on board the ship or at an approved testing station, for all aspects of operational efficiency, with special emphasis on checking the emissions on operational frequencies, coding and registration, at the intervals specified below:

(1) within three months before the expiry date of the Passenger Ship Safety Certificate for passenger ships; and

(2) within three months before the expiry date, or within three months before or after the anniversary date of the Cargo Ship Safety Radio Certificate for cargo ships; and

Satellite EPIRBs are to be subject to maintenance at intervals not exceeding five *years* at an approved shore-based maintenance facility in accordance with the maintenance guidelines deemed appropriate by the Society.

4.9 Radio Life-saving Appliances

4.9.1 Two-way VHF Radiotelephone Apparatus*

1 At least three two-way VHF radiotelephone apparatus are to be provided on every passenger ship and on every cargo ship of 500 *gross tonnage* or greater. At least two two-way VHF radiotelephone apparatus are to be provided on every cargo ship of 300 *tons gross tonnage* or greater but less than 500 *gross tonnage*. This two-way VHF radiotelephone apparatus may be portable or fitted in survival craft, and portable apparatuses may be stored on the navigation bridge.

2 Every passenger ship is to be provided with means for two-way on-scene radiocommunications for search and rescue purposes using the aeronautical frequencies 121.5 *MHz* and 123.1 *MHz* from the position from which the ship is normally navigated. In addition, such means may be portable.

4.9.2 Radar SART and AIS-SART

1 At least one radar SART or AIS-SART is to be carried on each side of every passenger ship and of every cargo ship of 500 *gross tonnage* or greater. At least one radar transponder or AIS-SART is to be carried on every cargo ship of 300 *gross tonnage* or greater but less than 500 *gross tonnage* or greater.

2 The radar transponders or AIS-SARTs are to be stowed in such locations that they can be rapidly placed in any survival craft other than the liferaft required by Regulation 31.1.4, Chapter III, *SOLAS* Convention. Alternatively, one radar transponder or AIS-SART is to be stowed in each survival craft other than the liferaft required by Regulation 31.1.4, Chapter III, *SOLAS* Convention.

3 On ships carrying at least two radar SARTs or AIS-SARTs and equipped with free-fall lifeboats, one of the radar SARTs or AIS-SARTs is to be stowed in a free-fall lifeboat and the other is to be located in the immediate vicinity of the navigating bridge so that it can be utilized on board and be ready for transfer to any of the other survival craft other than the liferaft required by Regulation 31.1.4, Chapter III, *SOLAS* Convention.

4.10 Sources of Energy

4.10.1 Sources of Electrical Power

There is to be available at all times, while the ship is at sea, a supply of electrical energy sufficient to operate the radio installation and to charge any batteries used as part of a reserve source or sources of energy for the radio installation.

4.10.2 Emergency Sources of Energy

An emergency source of electrical power is to be provided and is to be capable of supplying service to the VHF radio installation as well as for the applicable the MF radio installation, the recognized mobile satellite service communication installation, the MF/HF radio installation required based on the sea areas within which the ship is engaged on voyages for a period of 18 *hours* or more in the case of cargo ships of 500 *tons* gross tonnage and upwards, and for a period of 36 *hours* or more in the case of passenger ships.

4.10.3 Reserve Sources of Energy*

1 A reserve source or sources of energy are to be provided on every ship to supply the radio installation for the purpose of conducting distress, urgency and safety radio communications in the event of failure of the ship's main and emergency sources of electrical power. The reserve source or sources of energy are to be capable of simultaneously operating the VHF radio installation and, as appropriate for the sea area or sea areas for which the ship is equipped, either the MF radio installation, the MF/HF radio installation, or the recognized mobile satellite service communication installation and any of the additional loads specified in the following **-3**, **-4**, and **-7** for at least the following time periods:

(1) one *hour* on ships provided with an emergency source of electrical power when such sources of power comply fully with all relevant requirements of **4.10.2**.

(2) six *hours* on ships not provided with an emergency source of electrical power complying fully with all relevant requirements of **4.10.2**.

2 The reserve source or sources of energy are to be independent of the propelling power of the ship and the ship's electrical system.

3 Where, in addition to the VHF radio installation, two or more of the other installations, referred to in requirements of **-1**, can be connected to the reserve source or sources of energy, they are to be capable of simultaneously supplying, for the period specified, as appropriate, in **-1(1)** or **-1(2)**, the VHF radio installation and:

(1) all other radio installations which can be connected to the reserve source or sources of energy at the same time; or

(2) whichever of the other radio installations will consume the most power, if only one of the other radio installations can be connected to the reserve source or sources of energy at the same time as the VHF radio installation.

4 The reserve source or sources of energy may be used to supply the electrical lighting required by **3.1.1-1(4)**.

5 Where a reserve source of energy consists of rechargeable accumulator battery or batteries:

(1) a means of automatically charging such batteries is to be provided which is to be capable of recharging them to minimum capacity requirements within 10 *hours*; and

(2) the capacity of the battery or batteries are to be checked, using an appropriate method, at intervals not exceeding 12 *months*, when the ship is not at sea.

6 The siting and installation of accumulator batteries which provide a reserve source of energy are to be such as to ensure:

(1) the highest degree of service possible;

(2) a reasonable lifetime;

(3) reasonable safety;

(4) that the battery temperatures remain within the manufacture's specifications whether under charge or idle ; and

(5) that when fully charged, the batteries will provide at least the minimum required hours of operation under all weather conditions.

7 If an uninterrupted input of information from the ship's navigational or other equipment to a radio installation required by this chapter is needed to ensure its proper performance, means are to be provided to ensure the continuous supply of such information in the event of failure of the ship's main or emergency source of electrical power.

Chapter 5 COMMUNICATION CONCERNING SHIPS OPERATING IN POLAR WATERS

5.1 General (Related to *Polar Code*, Part I-A, 10.1)

5.1.1 Application

1 The radio installations for ships operating in polar waters are to comply with the requirements in this chapter in addition to other relevant requirements in other relevant chapters in this Rules.

2 Notwithstanding the requirements specified in **-1**, ships complying with the following **(1)** and **(2)** need not, in principle, apply the requirements of this chapter.

(1) Ships not subject to the *SOLAS* convention in accordance with *SOLAS Chapter I*; and

(2) Ships owned or operated by flag administrations which are only used for non-commercial purposes.

3 The ships subject to the requirements of this chapter are also required to comply with the requirements of **1.1.1-2, Part I of the Rules for the Survey and Construction of Steel Ships**.

5.1.2 Definitions

The terms defined in this chapter are according to the requirements specified in **1.2.1, Part I of the Rules for the Survey and Construction of Steel Ships** as well as relevant chapters in this Rules.

5.1.3 Goal

The goal of this chapter is to provide for effective communication for ships and survival craft during normal operation and in emergency situations.

5.2 Function Requirements (*Polar Code*, Part I-A, 10.2)

In order to achieve the goal set out in **5.1.3**, the following functional requirements are embodied in **5.2.1** and **5.2.2**.

5.2.1 Ship Communication

1 Two-way voice and/or data communications ship-to-ship and ship-to-shore are to be available at all points along the intended operating routes.

2 Suitable means of communications are to be provided in cases where escort and convoy operations are expected.

3 Means for two-way on-scene and SAR coordination communications for search and rescue purposes including aeronautical frequencies is to be provided.

4 Appropriate communication equipment to enable telemedical assistance in polar areas is to be provided.

5.2.2 Survival Craft and Rescue Boat Communications Capabilities*

1 For ships intended to operate in low air temperature, all rescue boats and lifeboats, whenever released for evacuation, are to maintain capability for distress alerting, locating and on-scene communications.

2 For ships intended to operate in low air temperature, all other survival craft, whenever released, are to maintain capability for transmitting signals for location and for communication.

3 Mandatory communication equipment for use in survival craft, including liferafts, and rescue boats is to be capable of operation during the maximum expected time of rescue.

5.3 Regulations (*Polar Code*, Part I-A, 10.3)

5.3.1 Ship Communication*

1 In order to comply with **5.2.1-1**, communication equipment on board is to have the capabilities for ship-to-ship and ship-to-shore communication, taking into account the limitations of communications systems in high latitudes and the anticipated low temperature.

2 In order to comply with **5.2.1-2**, ships intended to provide icebreaking escort are to be equipped with a sound signaling system

mounted to face astern to indicate escort and emergency manoeuvres to following ships as described in the International Code of Signals.

3 In order to comply with **5.2.1-3**, two-way on-scene and SAR coordination communication capability in ships is to include the following **(1)** and **(2)**:

(1) Voice and/or data communications with relevant rescue coordination centres.

(2) Equipment for voice communications with aircraft on 121.5 and 123.1 *MHz*.

4 In order to comply with **5.2.1-4**, the communication equipment is to provide for two-way voice and data communication with a Telemedical Assistance Service (TMAS).

5.3.2 Survival Craft and Rescue Boat Communications Capabilities*

1 For ships intended to operate in low air temperature, in order to comply with **5.2.2-1**, all rescue boats and lifeboats, whenever released for evacuation, are to satisfy the following **(1)** to **(3)**:

(1) For distress alerting, carry one device for transmitting ship-to-shore alerts.

(2) In order to be located, carry one device for transmitting signals for location.

(3) For on-scene communications, carry one device for transmitting and receiving on-scene communications.

2 For ships intended to operate in low air temperature, in order to comply with **5.2.2-2**, all other survival craft are to comply with the following **(1)** and **(2)**:

(1) In order to be located, carry one device for transmitting signals for location.

(2) For on-scene communications, carry one device for transmitting and receiving on-scene communications.

3 In order to comply with **5.2.2-3**, recognizing the limitations arising from battery life, procedures are to be developed and implemented such that mandatory communication equipment for use in survival craft, including liferafts, and rescue boats are available for operation during the maximum expected time of rescue.

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Chapter 2 SURVEYS

2.1 General

2.1.2 Time of Registration Surveys and Intervals of Registration Maintenance Surveys

When applying **2.1.2-2(3), of the Rules** to the ships at the beginning stage of construction before 1 January 2017 intended for operation in polar waters as defined in **1.1.1-2**, **Part I of the Rules for the Survey and Construction of Steel Ships**, a survey is to be carried out to verify compliance with the relevant requirements of **Chapter 5** by the first Special Survey held after 1 January 2018.

2.1.5 Preparation for Surveys and Others

1 "Necessary facilities and documents" referred to in **2.1.5-1 of the Rules** are as follows:

(1) the following documents are available on board ship:

(a) Certificate of Nationality;

(b) Radio Station License;

(c) documents and radio log books required by the *ITU Radio Regulations*.

(2) the self-identification code of the ship described in the Radio Station License is entered in the memory of the radio equipment, and such equipment is ready to transmit and receive at specified frequencies and powers.

(3) the appropriate number of qualified radio office(s) or operator(s) are on board ship who satisfy the requirements for assignment as radio communication personnel, including as person(s) responsible for distress communications, in accordance with the stipulations of the flag State Administration as concerns the number of such personnel, their qualifications as radio officer(s) or operator(s), certification (qualification, issuing State, effective period), whether they serve as exclusive or non-exclusive communication personnel, as well as the appropriateness of grade in terms of the means of radio maintenance to be performed and number of such personnel so engaged in communication related duties.

(4) either a maintenance agreement is available which provides for shore-based maintenance, or technical documents, tools, measuring instruments and spare parts are readily accessible on board for the purpose of ensuring adequate at-sea electronic maintenance capability.

(5) ship's station call sign and identification code are clearly displayed at the location of the radio installation.

2 Tests by radio inspectors are to be carried out at the times specified in **(1)** or **(2)** below. However, in cases where surveys are carried out in advance in accordance with **2.1.3 of the Rules**, the test period is to be as deemed appropriate by the Society.

(1) In the case of Periodical Surveys, the test period is within three *months* before or after the anniversary date of the next required Periodical Survey but not later than the date of completion of said survey.

(2) In the case of Special Surveys, the test period is within three *months* before the date of expiry of the relevant certificate but not later than the date of completion of the Special Survey.

3 With respect to **2.1.5-5 of the Rules**, surveyors are to confirm at periodical surveys that asbestos-free declarations and supporting documents are provided for any replaced or newly installed fittings, equipment, parts, etc. The wording "materials containing asbestos" means that asbestos is present in the product/material above the threshold value stipulated in Appendix 1 of *IMO* resolution *MEPC*.379(80).

2.2 Registration Surveys

2.2.1 Submission of Plans and Documents for Approval

1 The specifications and equipment list referred to in **2.2.1-1(1) of the Rules** are to include the following items:

(1) ship's name, ship builder's name and hull number, name of flag State, and gross tonnage;

(2) specifications (names of manufacturers, types, type approval numbers, sets) of radio installations and radio-lifesaving appliances;

(3) specifications of duplicated radio installations if duplication is adopted as a means of ensuring availability ;

(4) secondary means of alerting;

(5) sea areas in which the ship is engaged, and the means of maintenance (shore-based, at-sea electronic maintenance, etc.) adopted;

(6) specifications of main, emergency and reserve sources of electrical power, and calculation sheets for capacity of accumulator batteries for reserve source of energy;

(7) specifications of radio communication installations and radio navigational equipment other than *GMDSS* radio installations.

2 Drawings for arrangements specified in **2.2.1-1(2) of the Rules** are to include those for radio installations fitted in the position from which the ship is normally navigated, those for lighting provided for radio installations fed from a source which is separate from the main and the emergency sources of electrical power, and those for radio life-saving appliances.

3 Drawings for electrical wiring diagrams specified in **2.2.1-1(3) of the Rules** are to include those for power supplies to radio installations.

4 Drawings for antennae arrangements specified in **2.2.1-1(4) of the Rules** are to show the relative location of the antennae used for recognized mobile satellite service communication installations to the ship's structure in those cases where INMARSAT communication installations are mandatory.

5 The wording "in accordance with the provisions specified otherwise by the Society" referred to in **2.2.1-1 of the Rules** means as specified below:

Where an applicant for a Registration Survey intends to get an approval on plans and documents prepared for new installations or alteration work prior to submission of an application for a Registration Survey, an application for approval of plans and documents is to be submitted to the Society.

2.2.2 Surveys

1 Requirements for Registration Survey referred to **2.2.2 of the Rules** are detailed below:

(1) VHF Radio Installations

(a) verify that the VHF radio installations are fed from the required sources of electrical power with a changeover facility available among the sources.

(b) verify that a means of transmitting a distress alert and a distress alert watchkeeping alarm device are provided at the position from which the ship is normally navigated and that a wing communication facility is also provided.

(c) verity that a means for changing the VHF controller channels and switching them on/off for transmission/receiving is available, and that the controller at the position from which the ship is normally navigated has priority over all other controllers in channel changes.

(d) verify that the DSC functions for composing and storing of distress alerts and routine testing thereof are carried out, and that the self-identification code is stored in the VHF radio installations, and that messages received by the DSC watchkeeping facility are recorded.

(e) ensure that the frequency, radiation power, frequency deviation, reduced radiation power, etc. on channel 16, channel 70, and at least one other channel are measured and recorded.

(f) ensure that testing by actual communications is carried out.

(2) MF Radio Installations and MF/HF Radio Installations

(a) verify that MF and MF/HF radio installations are fed from the required sources of electrical power with a changeover facility available among the sources.

(b) verify that a means for transmitting a distress alert is provided at the position from which the ship is normally navigated.

(c) verify that the DSC functions for composing and storing of distress alerts, and routine testing thereof are carried out, that

the self-identification code is verified, and that messages received by the DSC watchkeeping facility are printed. Further, the DSC watchkeeping facility (HF band only) is maintained by a scanning receiver.

(d) verify that the DSC number is stored and that tests of NBDP functions are carried out for connecting with a nearby shore-based station and printing out of messages through either recent communication records or actual communication tests.

(e) ensure that the frequencies, radiation power, frequency deviation, final stage voltage, final stage efficiency and antenna current on the frequency 2,187.5*kHz* and at least one other frequency on the MF band, and on the frequency 4,207.5*kHz* and at least one other DSC frequency on the HF band are measured and recorded.

(f) ensure that testing by actual communications is carried out.

(3) Recognized Mobile Satellite Service Communication Installations

(a) verify that the antenna is sited in such a position that no obstacles exist which would likely degrade significantly the performance of the equipment.

(b) verify that the recognized mobile satellite service communication installations are fed from the required sources of electrical power with a changeover facility available among the sources.

(c) where INMARSAT Fleet-77 is used, verify that a stabilized antenna is capable of accurately tracking the INMARSAT using gyro signals.

(d) ensure that tests by actual communications or by receiving test messages through telex or telephone are carried out.

(e) verify the EGC functions for composing and storing of messages, entering ID information, setting up of receiving conditions, and printing. Further, verify that performance verification tests are carried out, and that such messages are received and printed out or stored properly.

(4) Radar SART

(a) verify the type of ship and survival craft radar transponders used (bouyancy), the number of sets available, where they are fitted, their condition of fitting (external condition, antenna and buoyant lanyard) as well as the type and validity of batteries used.

(b) verify that a means for easy activation, manual activation, prevention of inadvertent activation and routine testing is provided.

(c) verify that the operation of the radar transponders on board the ship is properly tested within a suitably short time period using 9*GHz* radar.

(5) International NAVTEX Receivers

(a) verify that the NAVTEX receiver is capable of operating on the frequency 518*kHz* and other frequencies.

(b) verify that messages received are stored internally.

(c) verify that the functions for storing message identifications as well as setting up receiving conditions are working properly and that routine testing is carried out.

(6) Emergency Position Indicating Radio Beacons (EPIRBs)

(a) verify the date of manufacture, date of installation, type of float-free, mounting of releasing arrangement, type and validity of the automatic release device if it is disposable type, type and validity of the batteries.

(b) verify the appropriateness of fitting location and fitting condition (external condition).

(c) verify the means for manual activation and prevention of inadvertent activation, and the indication of signals being emitted, and that routine testing without using the satellite system is carried out.

(d) verify all aspects of operational efficiency, with special emphasis on checking the emission on operational frequencies, coding and registration, according to the guidelines as listed below.

i) satellite EPIRB on 406 *MHz*: *IMO MSC/Circ.*1040

ii) VHF EPIRB: guidelines deemed appropriate by the Society

(7) Two-way VHF Radiotelephone Apparatus

(a) verify the strong condition, fitting condition (including antennae), number of channels, number of sets and chargers where rechargeable batteries are used.

(b) ensure that the frequency, radiation power, frequency deviation on channel 16 are measured and recorded.

(c) verify that the batteries and spare batteries are within the period of validity for each primary battery and that secondary batteries are in a full charged condition.

(d) ensure that testing by actual communications with other VHF apparatus on board is carried out.

(8) Secondary Means of Alerting

verify the availability of any secondary means for transmitting distress alerts.

(9) Duplicated Radio Installations

ensure that testing and measurements for duplicated radio installations in accordance with the relevant requirements specified in **2.2.2** are carried out. Also verify compliance with the functional requirements for these installations.

(10) Main Sources of Electrical Power

(a) verify that the main sources of electric power feed power to the necessary radio installations.

(b) verify the voltage, total capacity (*kVA*) and number of power sources on board.

(11) Emergency Sources of Electrical Power

(a) verify that an emergency source of electric power feeds power to the radio installations required in the Rules.

(b) verify the voltage, total capacity (*kVA* or *AH* in case of batteries), number of power sources on board, their location, radio installations operated by the emergency source or sources of electrical power for either 36 or 18 *hours* as appropriate.

(12) Reserve Sources of Energy

(a) verify that the reserve sources of energy using storage batteries fed to radio installations specified in paragraph **4.10.3 of the Rules** have a sufficient capacity to operate such installations with sufficient maintenance supplies and that records of electrical discharging/charging tests or measurement of specific gravity are kept.

(b) verify the voltage, total capacity (*AH*), number of reserve sources of power, their location, sitting condition, radio installations required to be fed, automatic charging device, operating hours required by the Rules, recharging time to minimum capacity (or charging current at the rate), specific gravity of the electrolyte.

(13) Other Radio Equipment

A check is to be made as to which of the following additional radio communication equipment and radio navigational equipment are installed on board.

(a) radio communication equipment other than radio installations and radio life-saving appliances as specified in section **3.2 of the Rules**.

(b) radio direction finder, radar, ARPA, GPS and other radio navigational equipment.

(14) Spare Parts, Tools and Measuring Instruments

(a) verify that necessary spare parts, tools and measuring instruments are available on board.

(b) verify that additional spare parts, tools, measuring instruments and maintenance manuals for "at-sea electronic maintenance" are available on board in case where "at-sea electronic maintenance" is chosen.

(15) The following items are to be verified.

(a) Types, names of manufactures, serial numbers and type approval.

(b) General requirements for shipborne radio installations are satisfied in respect of the following:

i) Location and environmental condition of radio installations;

ii) Safety facilities for high voltage electrical system and antennae;

iii) Locations of lights to illuminate for control of radio installations;

iv) Type of the measuring instruments used.

2 With respect to **2.2.2-2 of the Rules**, surveyors are to confirm the asbestos-free declarations and supporting documents specified in **2.2.1-3 of the Rules**. The wording "materials containing asbestos" means that asbestos is present in the product/material above the threshold value stipulated in Appendix 1 of *IMO* resolution *MEPC*.379(80).

2.3 Registration Maintenance Surveys

2.3.1 Special Surveys and Periodical Surveys

Requirements for Special Surveys and Periodical Surveys referred to in **2.3.1 of the Rules** are detailed below:

(1) VHF Radio Installations

(a) verify that the VHF radio installations are fed from the required sources of electrical power with a changeover facility available among the sources.

(b) verify that routine testing of DSC are carried out, and that the self-identification code is stored in the VHF radio installations, and that messages received by the DSC watchkeeping facility are recorded.

(c) ensure that the frequency, radiation power, frequency deviation, reduced radiation power, etc. on channel 16, channel 70, and at least one other channel are measured and recorded.

(d) ensure that testing by actual communications is carried out.

(2) MF Radio Installations and MF/HF Radio Installations

(a) verify that MF and MF/HF radio installations are fed from the required sources of electrical power with a changeover facility available among the sources.

(b) verify that routine testing of DSC are carried out, that the self-identification code is verified, and that messages received by the DSC watchkeeping facility are printed.

(c) verify that tests of NBDP functions are carried out for connecting with a nearby shore-based station and printing out of messages through either recent communication records or actual communication tests.

(d) ensure that the frequencies, radiation power, frequency deviation, final stage voltage, and antenna current on the frequency 2,187.5*kHz* and at least one other frequency on the MF band, and on the frequency 4,207.5*kHz* and at least one other DSC frequency on the HF band are measured and recorded.

(e) ensure that testing by actual communications is carried out.

(3) Recognized Mobile Satellite Service Communication Installations

(a) verify that the recognized mobile satellite service communication installations are fed from the required sources of electrical power with a changeover facility available among the sources.

(b) ensure that tests by actual communications or by receiving test messages through telex or telephone are carried out.

(c) verify that performance verification tests are carried out, and that messages received by EGC function are printed out or stored properly.

(4) Radar SART

(a) verify the number of sets available, their condition of fitting (external condition, antenna and buoyant lanyard) as well as validity of batteries used.

(b) verify that manual activation is provided.

(c) verify that the operation of the radar transponders on board the ship is properly tested within a suitably short time period using 9*GHz* radar.

(5) International NAVTEX Receivers

(a) verify that messages received are stored internally.

(b) verify that routine testing is carried out.

(6) Emergency Position Indicating Radio Beacons (EPIRBs)

(a) verify mounting of releasing arrangement, type and validity of the automatic release device if it is disposable type, and validity of the batteries.

(b) verify the appropriateness of fitting condition (external condition).

(c) verify that routine testing without using the satellite system is carried out.

(d) verify all aspects of operational efficiency in accordance with **2.2.2(6)(d)**.

(7) Two-way VHF Radiotelephone Apparatus

(a) verify the storing condition, fitting condition (including antennae), number of channels, number of sets and chargers where rechargeable batteries are used.

(b) verify that the batteries and spare batteries are within the period of validity for each primary battery and that secondary

batteries are in a full charged condition.

(c) ensure that testing by actual communications with other VHF apparatus on board is carried out.

(8) Secondary Means of Alerting

verify the availability of any secondary means for transmitting distress alerts.

(9) Duplicated Radio Installations

ensure that testing and measurements for duplicated radio installations in accordance with the relevant requirements specified in **2.2.2** are carried out. Also verify compliance with the functional requirements for these installations.

(10) Main Sources of Electrical Power

verify that the main sources of electric power feed power to the necessary radio installations.

(11) Emergency Sources of Electrical Power

verify that an emergency source of electric power feeds power to the radio installations required in the Rules.

(12) Reserve Sources of Energy

(a) verify that the reserve sources of energy using storage batteries fed to radio installations specified in paragraph **4.10.3 of the Rules** have a sufficient capacity to operate such installations with sufficient maintenance supplies and that records of electrical discharging/charging tests or measurement of specific gravity are kept.

(b) verify recharging time to minimum capacity (or charging current at the rate), specific gravity of the electrolyte.

(13) Spare Parts, Tools and Measuring Instruments

(a) verify that necessary spare parts, tools and measuring instruments are available on board.

(b) verify that additional spare parts, tools, measuring instruments and maintenance manuals for "at-sea electronic maintenance" are available on board in case where "at-sea electronic maintenance" is chosen.

(14) The following items are to be verified.

(a) the validity of licenses of the Radio Station and radio operators or radio officers, maintenance agreements, documents, etc.;

(b) radio installations and radio life-saving appliances approved are provided on board along with the operation, modification and breakdown records of the installations during navigation;

(c) the general condition of the installations and antennae;

(d) the means of distress alert transmission used at the position from which the ship is normally navigated;

(e) measurements of devices and equipment and actual communication tests are carried out properly;

(f) the changeover capability among the different sources and that tests of installations which are fed power from the main source of electrical power, emergency sources of electrical power and reserve sources of energy are carried out using the reserve sources of energy;

(g) the capabilities of receiving and decoding messages and alarm functions (visual and audible) of installations having a watchkeeping facility upon receiving important messages or during routine tests;

(h) operation of an automatic communication system is ensured by conducting actual communications with the equipment. Actual communication tests may be omitted provided that the installation has a good record of on-board operation and that the routine testing is conducted satisfactorily;

(i) the content of self-identification codes and messages stored in the equipment.

2.4 Other

2.4.1 Remote Survey

The wording "the Society may approve the survey methods which it considers to be appropriate" in **2.4.1 of the Rules** means those survey methods which the Society considers to be able to obtain information equivalent to that obtained through traditional ordinary surveys where a surveyor is in attendance and for which the Administration deems to be appropriate in accordance with 5.14 of *IMO* resolution *A*.1186(33).

Chapter 3 RADIO INSTALLATIONS

3.1 General

3.1.1 Arrangements and Performance

Radio installations specified in **3.1.1-1(2) of the Rules** are to be located at the position from which the ship is normally navigated. In cases where radio installations are fitted in a room designated for telecommunication equipment and separate from such position, controllers of the radio installations are to be located at such position.

3.2 Radio Equipment

3.2.1 VHF Radio Installations

1 The VHF DSC device specified in **3.2.1(1) of the Rules** is to have following characteristics with regard to DSC signal frequency :

a mark-state frequency of 1,300±10*Hz* and a space-state frequency of 2,100±10*Hz*.

2 The VHF radiotelephone equipment specified in **3.2.1(2) of the Rules** is to comply with the following requirements :

(1) The transmitter output power is to be between 6 and 25*W*.

(2) The frequency tolerance is to be within $\pm 10 \times 10^{-6}$.

(3) The occupied bandwidth is to be within 16*kHz*.

(4) The frequency deviation is to be within ±5*kHz*.

(5) Provision is to be made for reducing the transmitter output to a value between 0.1 and 1*W*.

3 A handset with an extension code, a handset with a fixed receptacle or a portable VHF radiotelephone apparatus is deemed to be adequate as means for radio communications from the wings of the navigation bridge as required by **3.2.1-2(1) of the Rules**.

4 In principle, VHF radio installations are to comply with the performance standards specified in *IMO* Resolution *MSC*.511(105).

3.2.2 MF Radio Installations

1 The MF radiotelephone equipment specified in **3.2.2(2) of the Rules** is to comply with the following requirements :

(1) The transmitter output power (the peak envelope power in case of J3E or H3E emissions, or the mean power in case of J2B or F1B emissions) is to be at least 60*W*.

(2) The frequency accuracy is to be within ±10*Hz*.

2 A transmitting antenna with a sufficient height is to be provided. A receiving antenna is to be placed sufficiently apart from the transmitting antenna. These antennae are to be independent of those of duplicated radio installations or other radio installations.

3 The MF DSC continuous watch device specified in **3.2.2(3) of the Rules** may either be:

(1) an exclusive watchkeeping receiver operating on 2,187.5*kHz* separate from the MF radio installation, or

(2) a watchkeeping receiver operating on 2,187.5*kHz* combined with the MF radio installations.

4 Where a DSC decoder is used for other DSC receivers as well, continuous watchkeeping on the MF DSC distress frequency 2,187.5*kHz* is to be made.

5 In principle, MF radio installations are to comply with the performance standards specified in *IMO* Resolution *MSC*.512(105).

3.2.3 MF/HF Radio Installations

1 The MF/HF radiotelephone equipment specified in **3.2.3(2) of the Rules** is to comply with the following requirements:

(1) The transmitter output power (the peak envelope power in case of J3E or H3E emissions, or the mean power in case of J2B or F1B emissions) is to be at least 60*W* at any range of MF frequencies.

(2) The frequency accuracy is to be ±10*Hz*.

2 The MF/HF DSC continuous watch device specified in **3.2.3(3) of the Rules** may either be:

(1) an exclusive watchkeeping receiver scanning on MF/HF DSC distress frequencies separate from the MF/HF radio installations, or

(2) a watchkeeping receiver scanning on MF/HF DSC distress frequencies combined with the MF radio installations.

3 When a DSC decoder is used in conjunction with other DSC receivers, continuous watchkeeping on the MF/HF DSC distress frequencies is to be made.

4 The MF/HF direct-printing telegraphy device need not be provided with an automatic receiving function of shore-to-ship navigational and meteorological warnings using NBDP. It may be designed to receive maritime safety information using a receiver of the MF/HF radio installations or by an exclusive maritime safety information receiver operating on the HF band. In principle, MF/HF radio installations are to comply with the performance standards specified in *IMO* Resolution *MSC*.512(105).

3.2.4 Recognized Mobile Satellite Service Communication Installations

1 Where a recognized mobile satellite service ship earth station specified in **3.2.4 of the Rules** is equipped with a tracking antenna, a ship's heading signal is to be continuously provided in the event of failure of the ship's main and emergency sources of electrical power.

2 In principle, enhanced group calling receivers are to comply with the performance standards specified in *IMO* Resolution *MSC*.306(87) and INMARSAT-C ship earth stations of recognized mobile satellite service communication installations are to comply with the performance standards specified in *IMO* Resolutions *MSC*.434(98) and *MSC*.513(105).

3.2.5 Radar SART and AIS-SART

1 The radar SART specified in **3.2.5 of the Rules** is to comply with the following requirements:

(1) The effective receiver sensitivity is to be better than -50dBm.

(2) The effective isotropically radiated power (e.i.r.p.) is not to be less than 400mW.

(3) The frequency sweep is to cover the range between 9,200 and 9,500MHz.

(4) The delay between receipt of radar signal and start of transmission is to be not more than 0.5μs.

(5) The forward sweep rate is to be within 7.5$\pm$1μs.

2 In principle, radar SARTs are to comply with the performance standards specified in *IMO* Resolution *MSC*.510(105) and AIS-SARTs are to comply with the performance standards specified in *IMO* Resolution *MSC*.246(83).

3.2.6 Maritime Safety Information and Search And Rescue Related Information Receivers

1 Maritime safety information and search and rescue related information is to be watched at the position from which the ship is normally navigated.

2 A receiver for maritime safety information and search and rescue related information received in the MF band (international NAVTEX receiver) is to be capable of receiving on the frequency 518 kHz and, at the same time, either one of two or more frequencies other than 518 kHz recognised for the transmission of NAVTEX information.

3 For the application of **3.2.6 of the Rules**, ships are to be provided with a receiver capable of receiving international NAVTEX service broadcasts if the ship is engaged on voyages in any area in which an international NAVTEX service is provided. If the ship is engaged in voyages in any area which an international NAVTEX service is not provided, the ship is to be provided with a receiver capable of receiving the HF narrow band direct printing (NBDP) service specified in *ITU-R* Recommendation M.688, or the ship is to be provided with the receiver specified in **3.2.4(2) of the Rules** capable of receiving broadcasts from an international Enhanced Group Call service that provides a service for the operating areas.

4 In principle, maritime safety information, and search and rescue related information receivers are to comply with the performance standards specified in *IMO* Resolution *MSC*.508(105).

3.2.7 Satellite Emergency Position Indicating Radio Beacon

1 A satellite EPIRB is to be equipped with a homing frequency of 121.5MHz.

2 A satellite EPIRB is to be equipped with an automatic release device which releases the EPIRB before reaching a depth of 4m.

3 Of the satellite EPIRBs specified in **3.2.7 of the Rules**, the 406/121MHz EPIRB is to comply with the following requirements:

(1) The frequency deviation is to be within $\pm$5kHz.

(2) The transmitter power output is to be within 5$W\pm2dB$.

(3) The transmission repetition rate is to be within 50$s\pm5\%$.

(4) The transmission bit rate is to be within 400$bps\pm1\%$.

(5) The CW preamble is to be within 160$ms\pm1\%$.

(6) The transmission time for a short message (112$bits$) is to be within 440$ms\pm1\%$.

4 In principle, satellite emergency position indicating radio beacons are to comply with the performance standards specified in *IMO* Resolutions *A*.662(16) and *MSC*.471(101).

3.2.8 Two-way VHF Radiotelephone Apparatus

1 Two-way VHF radiotelephone apparatus specified in **3.2.8 of the Rules** is to comply with the following requirements:

(1) The effective radiated power is to be a minimum of 0.25*W*.

(2) The frequency tolerance is to be within ±10 parts in 10^{-6}.

2 In principle, two-way VHF radiotelephone apparatuses are to comply with the performance standards specified in *IMO* Resolution *MSC*.515(105).

Chapter 4 COMMUNICATION SYSTEMS

4.3 Radio Equipment - Sea Area A1

The wording "close to the position from which the ship is normally navigated but at a location whereby it can still float free of the ship in an emergency" means, for example, the wings of navigation bridges that are not accessible by only vertical ladders, or decks located above wheelhouses that are accessible by stairs.

4.4 Radio Equipment - Sea Area A2

The wording "close to the position from which the ship is normally navigated but at a location whereby it can still float free of the ship in an emergency" means, for example, the wings of navigation bridges that are not accessible by only vertical ladders, or decks located above wheelhouses that are accessible by stairs.

4.5 Radio Equipment - Sea Area A3

1 The MF radio installation required by **4.5-1(2) of the Rules** need not be provided with a continuous watchkeeping device other than for the DSC distress frequency 2,187.5 *kHz*.

2 The wording "close to the position from which the ship is normally navigated but at a location whereby it can still float free of the ship in an emergency" means, for example, the wings of navigation bridges that are not accessible by only vertical ladders, or decks located above wheelhouses that are accessible by stairs.

4.6 Radio Equipment - Sea Area A4

The wording "close to the position from which the ship is normally navigated but at a location whereby it can still float free of the ship in an emergency" means, for example, the wings of navigation bridges not accessible by only vertical ladders, or decks located above wheelhouses accessible by stairs.

4.8 Maintenance Requirements

1 Where at-sea electronic maintenance is chosen under the provision of **4.8-5** or **-6 of the Rules**, adequate technical documents, tools, measuring instruments and spare parts in addition to standard spare parts are to be provided on board ship, and a sufficiently qualified person to carry out such shipboard maintenance and repair work as specified in the *ITU Radio Regulations* is to be present on board. These technical documents, tools, measuring instruments and spare parts are to be to the satisfaction of the Society.

2 Where shore-based maintenance is chosen under the provision of **4.8-5** or **-6 of the Rules**, a maintenance contract with a manufacturer or a service company is usually concluded. Should this be the case, the maintenance contract is to be reviewed at the time of safety radio survey.

3 Where duplication of equipment is chosen under the provision of **4.8-5** or **-6 of the Rules**, radio installations required according to the applicable sea areas are to be duplicated. A VHF DSC continuous watchkeeping device, however, need not be duplicated, except when specified otherwise by the administration.

4 The wording "the maintenance guidelines deemed appropriate by the Society" referred to in **4.8-8 of the Rules** means *IMO MSC/Circ.*1039.

4.9 Radio Life-saving Appliances

4.9.1 Two-way VHF Radiotelephone Apparatus

1 In principle, the two-way VHF radiotelephone apparatus specified in **4.9.1-1 of the Rules** are to be complied with the performance standards specified in *IMO* Resolution *MSC*.515(105).

2 In principle, the two-way on-scene radiocommunications specified in **4.9.1-2 of the Rules** are to be complied with the performance standards specified in *IMO* Resolutions *MSC*.516(105) and *MSC*.80(70).

4.10 Sources of Energy

4.10.3 Reserve Sources of Energy

1 The capacity of the reserve source of energy is to be determined in accordance with the following formula with specified load conditions to the required radio installations fed from the reserve sources.

$$C=K\times I$$

where

C: Required capacity (AH)

K: Capacity conversion factor (H)

(corresponding to ambient temperature of +5℃ and end voltage of 1.8V)

I : Total consumption current (A)

2 The capacity conversion factor K is to be determined in accordance with the following:

(1) For lead accumulator batteries of a clud or pasted vent type, K = 3.2 in the case of a 1 *hour* discharging rate and K = 7.2 in the case of a 6 *hour* discharging rates, respectively. For lead accumulator batteries of a sealed type, K = 2.0 and K = 7.1 in the case of 1 *hour* and 6 *hours* discharging rates, respectively.

(2) For lead accumulator batteries of other types and alkali accumulator batteries, K may be determined by referring to the value recommended by the manufacturer.

3 The navigation receiver may be supplied from the reserve source of energy specified in **4.10.3 of the Rules**. In this case, the electrical consumption of the receiver is to be considered for the capacity of the reserve source of energy.

Chapter 5 COMMUNICATION CONCERNING SHIPS OPERATING IN POLAR WATERS

5.2 Function Requirements

5.2.2 Survival Craft and Rescue Boat Communications Capabilities

1 The expressions "are to maintain capability for" in **5.2.2-1** and **-2 of the Rules** and "is to be capable of operation during the maximum expected time of rescue" in **5.2.2-3 of the Rules**, mean ability of mandatory communication equipment for use in survival craft, including liferafts, and rescue boats to maintain the ready-for-operation state within the maximum expected time of rescue at the Polar Service Temperature (PST) assigned to the vessel, and after that to be capable to perform its functions at the PST assigned to the vessel with the operating time not less than specified in respective existing performance standards.

For example, it is not required that an EPIRB being used for distress alerting continues distress messaging for maximum expected time of rescue, and two-way VHF radiotelephone apparatus being used for transmitting and receiving on-scene communications does not need to be technically in operation at its highest rated power with a duty cycle of 1:9 for maximum expected time of rescue, as specified in **1.2.1(17), Part I of the Rules for the Survey and Construction of Steel Ships**.

2 The "existing performance standards" mentioned in **-1** above, refer to the following.

(1) EPIRB: *IMO Res. A.*810(19) and *MSC.*471(101)

(2) Radar transponder: *IMO Res. A.*802(19)

(3) AIS-SART: *IMO Res. MSC.*246(83)

(4) Two-way VHF radiotelephone apparatus: *IMO Res. MSC.*149(77)

5.3 Regulations

5.3.1 Ship Communication

In principle, the two-way on-scene and SAR coordination radiocommunications specified in **5.3.1-3 of the Rules** are to be complied with the performance standards specified in *IMO* Resolutions *MSC.*516(105) and *MSC.*80(70).

5.3.2 Survival Craft and Rescue Boat Communications Capabilities

1 In applying **5.3.2 of the Rules**, all rescue boats, all lifeboats and all other survival crafts carried by the ship, notwithstanding the redundancy in aggregate capacity of survival crafts required by SOLAS Regulation III/21 and Regulation III/31, and taking into account the different possible distress scenarios, are considered able to be released for evacuation simultaneously and are to be provided with mandatory communication equipment as required by **5.3.2 of the Rules** accordingly.

2 The expression "are available for operation during the maximum expected time of rescue" in **5.3.2-3 of the Rules** means as specified in **5.2.2-1**.

3 The "procedures" specified in **5.3.2-3 of the Rules** may include both operational requirements and any other means including technical solutions i.e. thermal insulation, chemical heat sources, additional batteries, rechargeable batteries with respective chargers, etc., and are to be documented in Polar Water Operational Manual (PWOM).