

CHAPTER 12

RADIO EQUIPMENT AND SEARCHLIGHTS FOR SURVIVAL CRAFT

12.1 General

12.1.1 The Merchant Shipping (Life-Saving Appliances) (Amendment) Regulations 1991 amended both the 1980 and 1986 Regulations such that from 1 February 1995 all ships engaged on international voyages will be required to carry radio life-saving equipment compatible with the frequencies and techniques of the Global Maritime Distress and Safety Services (GMDSS). Furthermore, (from 1 July 1991,) most sea-going ships engaged on non-international voyages are also required to carry radio life-saving equipment.

12.1.2 Radio equipment forming part of a ship's live-saving appliances will perform one or more functional requirements when used in a survival craft thereby enhancing the success of any Search and Rescue (SAR) operations. Based upon SOLAS Chapter IV Regulation 4, the functional requirements are:

12.1.2.1 transmit to-shore distress alerts;

12.1.2.2 transmit and receive on-scene communications; and

12.1.2.3 transmitting signals for locating.

The equipment and its functions are summarised in the table below:

FUNCTION	
To-Shore Alerts	Satellite EPIRB
On-Scene Communications	Two-Way VHF Radiotelephones
Locating	Radar Transponder

12.2 Two-way (VHF) radiotelephone apparatus for survival craft

12.2.1 General requirements

12.2.1.1 The two-way (VHF) Radiotelephone apparatus required by the Regulations may be fixed in the survival craft or portable with the exception that at least one should be portable. The equipment should be capable of being used for on-scene communication between survival craft, between survival

craft and ship and between survival craft and rescue unit. It may also be used for on-board communications when capable of operating on appropriate frequencies.

12.2.1.2 The equipment should conform with one of the following performance standards adopted by the IMO through Resolution:

- (i) if installed on or after 23 November 1996, Assembly Resolution A.809(19); or
- (ii) if installed before 23 November 1996, Assembly Resolution A.762(18).

Equipment installed after 1 January 1999 should comply with the Merchant Shipping (Maritime Equipment) Regulations 1998.

Equipment provided prior to 1 February 1992 is not required to comply with a IMO performance standard providing suitable arrangements have been made to render the equipment watertight and that it is capable of using the VHF frequencies required by the IMO standards. From 1 February 1999 all equipment carried on ships engaged on international voyages must conform to the appropriate IMO standard. Brief, clear, operating instructions should be provided on the equipment (or adjacent to it in the case of fixed installations).

12.2.1.3 That equipment to be used for Life-Saving purposes should be clearly identified as such through being either of a highly visible yellow/orange colour or marked with a surrounding yellow/orange marking strip. The arrangements made in individual ships and/or survival craft should be determined to the satisfaction of the marine surveyor in consultation with the radio surveyor. Surveyors should ensure adequate precautions against shock, fire and other hazards of electrical origin are provided in conformity with the appropriate requirements, particularly where the equipment may be used in any space where flammable mixtures are liable to collect.

12.2.2 Fixed installations

12.2.2.1 *Siting of the installation*

The equipment should be installed in a space large enough to accommodate both the equipment and the person using it. No separate cabin is required if the construction of a lifeboat provides a sheltered space to the satisfaction of the MCA. The apparatus should be placed as high as possible in the boat. A light should be available in the space if this is not provided as part of the radio equipment. Where 'free-fall launching' techniques are used, the surveyor should ensure adequate precautions are taken to ensure the equipment will operate satisfactorily following deployment of the survival craft.

12.2.2.2 Antenna

The antenna should be vertically polarised and be omnidirectional in the horizontal plane. Particular care should be taken with 'totally enclosed lifeboats' to ensure the integrity of the aerial should it be exposed to those conditions that may be encountered by the craft following deployment in line with its design standard.

12.2.2.3 Power supply

The source of energy should have a capacity to ensure at least 8 hour, preferably 24 hour, operation at the highest rated power of the equipment with a duty cycle of 1:9. This duty cycle is defined as 6 seconds transmission, 6 seconds reception above squelch opening level and 48 seconds below squelch opening level. The source of energy should comply with one of the following:

- (i) A sealed primary battery which should be:
 - (a) of a type which will not emit substances which may be injurious to personnel, or damaging to the equipment or fabric of the survival craft. This requirement should be met whether the power source is in a stored condition or normal use; and
 - (b) securely mounted and clearly marked with the shelf life whose expiry should not be less than 2 years from the date of survey. The battery should have sufficient capacity so that routine testing of 2 minutes once per week should not reduce its capacity below that needed to conform to the operational requirements recommended above. Where the battery is used to supply power to any other equipment, sufficient capacity should be available to operate this equipment at its maximum rated power for the period recommended in addition to the radio apparatus;

OR

- (ii) A re-chargeable battery which should:
 - (a) not emit substances which may in any way be injurious to personnel, or damaging to the equipment or fabric of a survival craft. This requirement should be met whether the power source is in a stored condition or in normal use;
 - (b) be securely mounted, capable of inversions without causing loss of electrolyte and fulfilling the capacity requirements recommended above at all times. A means of automatically charging such batteries should be provided which should be capable of recharging them to

minimum capacity requirements within 10 hours. Provision should be made for charging the battery in situ from the ship's main source of electrical power in a manner which cannot interfere with the launching of the survival craft. Where the battery is used to supply power to any other equipment, sufficient capacity shall be available to operate this equipment at its maximum rated power for the period recommended in addition to the radio apparatus.

12.2.3 Portable equipment

12.2.3.1 Siting of equipment

The equipment should be kept in a suitable place ready to be moved into a survival craft in case of emergency. Where lifeboats using 'free-fall launching' techniques are carried, and not provided with a fixed VHF installations, each should be provided with appropriate means to securely retain the portable equipment during launching. In ships where the disposition of superstructures or deck houses is such as to involve substantial fore and aft separation, all portable radio apparatus should not be located in the same area of superstructure or in the same deck house. Where the equipment is additionally used to comply with the appropriate 1999 LSA Regulations for 'On-board communications and alarm systems' (see paragraph 19.2) or for any other purpose, sufficient sealed primary batteries should be kept at a suitable place ready to be moved into a survival craft in case of emergency, ideally with any other items of equipment that may be required in such an eventuality.

12.2.3.2 Power supply

(i) The source of energy should be integrated in the equipment although provision may be made to operate the equipment using an external source of electrical energy. The source of electrical energy should have sufficient capacity to ensure at least 8 hour operation at the highest rated power of the equipment with a duty cycle of 1:9. This duty cycle is defined as 6 seconds transmission, 6 seconds reception above squelch opening level and 48 seconds below squelch opening level. The source of energy should comply with one of the following:

(a) A sealed primary battery which should be of a type which will not emit substances which may be injurious to personnel, or damaging to the equipment or fabric of the survival craft. This requirement should be met whether the power source is in a stored condition or normal use. The battery should be clearly marked with the shelf life whose expiry should not be less than 2 years from the date of survey. The battery should have sufficient capacity so that routine testing of 2 minutes once per week should not reduce its capacity below that needed to conform to the operational requirements recommended above.

OR

(b) A re-chargeable battery which should not emit substances which may in any way be injurious to personnel, or damaging to the equipment or fabric of a survival craft. This requirement should be met whether the power source is in a stored condition or in normal use. Batteries that have been in service for more than two years should not be used for this purpose. The battery should be capable of fulfilling the capacity requirements recommended above at all times. A means of automatically charging such batteries should be provided which should be capable of recharging them to minimum capacity requirements within 10 hours from the ship's main source of electrical power.

(ii) Equipment for which the source or energy is intended to be user-replaceable should be provided with a dedicated primary battery for use in the event of a distress situation. This battery should be equipped with a non-replaceable seal to indicate that it has not been used.

(iii) Equipment for which the source or energy is intended to be non-user-replaceable should be provided with a primary battery. The portable two-way radiotelephone equipment should be fitted with a non-replaceable seal to indicate that it has not been used.

(iv) Primary batteries should have a shelf life of at least 2 years, and if identified to be user replaceable should be either of a highly visible yellow/orange colour or marked with a surrounding yellow/orange marking strip.

(v) Batteries not intended for use in the event of a distress should be of a colour or marking such that they cannot be confused with batteries intended for such use.

(vi) Batteries should be disposed of strictly in accordance with manufacturer's instructions.

12.3 Satellite Emergency Position Indicating Radio Beacon (EPIRB)

12.3.1 General requirements

The equipment should be clearly marked with the manufacturer's identity, type or model identification, serial number, brief operating instructions and the expiry date for the primary batteries used. The minimum safe distance from the standard or magnetic steering compass at which the equipment may be installed should also be marked; where no marking exists surveyors should note the instructions provided in the MCA's publication "Survey of merchant shipping navigational equipment installations"- Instructions for the Guidance of Surveyors, when considering the arrangements for location. The surveyor should ensure the identity of the beacon fitted to the ship correlates with the information held on the appropriate beacon

register. The arrangements made in individual ships should be determined to the satisfaction of the marine surveyor in consultation with the radio surveyor.

12.3.2 Performance standards

The EPIRB should conform with a performance standard adopted by the IMO through Resolution. If operating on 406 MHz the EPIRB should conform with:

12.3.2.1 if installed on or after 23 November 1996, Assembly Resolution A.810(19);

12.3.2.2 if installed before 23 November 1986, Assembly Resolution A.763(18); or

12.3.2.3 if installed before 4 November 1994, Assembly Resolution A.763(18), except that they need not be provided with the 121.5 MHz homing beacon required by 2.3.14 of part A thereof.

If operating on the INMARSAT system the EPIRB should conform with:

12.3.2.1 if installed on or after 23 November 1996, Assembly Resolution A.812(19); or

12.3.2.2 if installed before 23 November 1996, Assembly Resolution A.661(16).

12.3.3 Testing of equipment

Satellite EPIRBs are provided with a 'self-test' facility which a surveyor may wish to activate. Should the beacon 'fail' the 'self-test' it must be withdrawn from service. The EPIRB should not be removed from its float-free arrangements other than by an appropriately qualified engineer. Should it be suspected that the EPIRB has been activated inadvertently, in the United Kingdom, the nearest MCA Marine Rescue Co-ordination Centre (MRCC) must be contacted **IMMEDIATELY** and informed of the ship's name, location and, if available, the EPIRB identification. Alternatively, contact the MCA on 0870 600 6505. Outside of the United Kingdom all efforts should be made to contact the appropriate Rescue Co-ordination Centre for the sea area concerned.

12.3.4 Siting of equipment

The installed EPIRB should be located in such a position that:

- upon foundering, it will automatically float free from the ship without hindrance from any item of equipment or superstructure;

- where practicable, no obstacle likely to degrade significantly the antenna performance of the equipment appears in the fore and aft directions down to -5 degrees and in the port and starboard directions down to -15 degrees. Objects, especially those within 1 metre of the antenna which cause a shadow sector or greater than 2 degrees, are likely to significantly degrade the antenna performance of the equipment; and
- it may be easily released manually and brought to the survival craft.

Surveyors should pay particular attention to requirement .1 and great care should be taken when assessing the appropriateness, or otherwise, of the location adopted. Under no circumstances should this requirement be compromised to fulfil any additional functions the EPIRB may be required to perform. Where this is not practicable using a single EPIRB, additional equipment should be provided.

12.3.5 Float free arrangements

12.3.5.1 The float free release and activation arrangements should comply with the performance standards adopted by the IMO through Assembly Resolution A.662(16).

12.3.5.2 The float free arrangements should carry a label indicating clearly the operating instructions for manual release. The installed EPIRB should be capable of local manual activation (remote activation may also be provided from the navigating bridge) while the device is installed in the float-free mounting. Any connection to the EPIRB, for example for the purpose of supply of data or power, should be corrosion resistant, protected against accidental activation and must not in any way inhibit the release of the beacon in times of emergency. Any hydrostatic release provided should be clearly marked with the date of expiry and tested in accordance with the manufacturer's instructions to ensure satisfactory operation.

12.4 Radar transponders (SARTS)

12.4.1 General requirements, siting and marking of equipment

12.4.1.1 The radar transponders required by the Regulations should comply with the performance standards adopted by the IMO through Assembly Resolution A.802(19). The equipment should be provided with simple instructions for operation.

12.4.1.2 The equipment should be kept on either side of the ship in a suitable place ready to be moved into a survival craft in case of emergency; where only one is required, it should be located at a suitable location for moving into the survival craft. In ships where the disposition of superstructures or deck houses is such as to involve substantial fore and aft separation and, where two

transponders are carried, they should not be located in the same area of superstructure or in the same deck house. See also 12.4.1.3 and 12.4.2 below.

12.4.1.3 The equipment should be clearly marked with the manufacturer's identity, type or model identification, serial number, brief operating instructions and the expiry date for the primary batteries used. The minimum safe distance from the standard or magnetic steering compass at which the equipment may be installed should also be marked; where no marking exists surveyors should note the instructions provided in MCA's publication "Survey of merchant shipping navigational equipment installations" - Instructions for the Guidance of Surveyors, when considering the arrangements for location. The arrangements made in individual ships and/or survival craft should be determined to the satisfaction of the marine surveyor in consultation with the radio surveyor who should inspect the equipment as part of each survey of Life-Saving Appliances.

12.4.2 Securing the equipment in lifeboats

Arrangements should be made in every lifeboat carried by the ship for erecting and securing the radar transponder at a height of not less than 1 metre above the water line. It is acceptable to mount the equipment within the lifeboat; e.g. 'hang', including enclosed lifeboats of GRP construction, the equipment will operate satisfactorily. Alternatively the radar transponder may form an integral part of the survival craft. If so, the transponder should conform to the appropriate technical requirements and be installed as per the requirements of paragraph 12.3; fixed VHF installations. Where lifeboats using 'free-fall launching' techniques are carried each should be provided with appropriate means to securely retain the transponder during launching. Alternatively the transponder should form an integral part of each lifeboat.

12.4.3 Securing the equipment in liferafts

Every transponder should be provided with fittings suitable for mounting in each liferaft at a height of not less than 1 metre above the water line. These fittings should be attached to, or located adjacent to, the radar transponder at all times. Clear instructions on how to use the fittings in an emergency should be marked on the radar transponder or provided in a suitable format for carrying on to the survival craft. It is acceptable to mount the equipment within the liferaft; e.g. 'hang', the equipment will operate satisfactorily. Alternatively the radar transponder may form an integral part of the survival craft, if so, the transponder should be included in the inflatable liferaft equipment when the liferaft is subject to prototype testing.

12.5 Guidance on exemptions

12.5.1 Application

12.5.1.1 Should an application for exemption from the carriage of radio Life-Saving Appliances be made, prior to granting, Regional Manager should be assured the ship to which it refers is capable of performing all functions performed by this equipment through equivalent methods.

12.5.1.2 The following acts as guidance:

- (i) Exemption from carriage of a satellite EPIRB.

Where a ship's distress would be known before any alert from an EPIRB would be received - due to a number of factors there is a delay of approximately one hour between activation and processing by the SAR authorities;

- (ii) Exemption from carriage of two-way VHF radiotelephone equipment.

The importance of this equipment's function is such that exemption from carriage should not be considered unless the ship is not provided with survival craft or it cannot be envisaged there would be the need to communicate with a rescue unit; e.g. helicopter, in the event of an emergency;

- (iii) Exemption from carriage of 9 GHz radar transponder.

Where, in all weather conditions, particularly poor visibility, the exact 'location' of a survival craft will be known.

12.6 Further information

Although MCA HQ, Navigation and Communications Branch, will be able to handle any general questions to the use of radio Life-Saving Appliances, specific guidance should be sought, in the first instance, from a Radio Surveyor appointed by GEC - Marconi - Communications. The survey of radio Life-Saving Appliances is undertaken as part of the survey of radio installations.

12.7 Searchlights for lifeboats and rescue boats

12.7.1 Construction

The searchlight should be of substantial construction. The light should be supplied by a gas-filled filament lamp of at least 30 watts. The lamp and electrical connections should be waterproof. An efficient reflector should be provided so that the searchlight can produce a beam of light with a divergence of about 6 degrees, and the apparatus must be capable of giving illumination of a light-coloured object

over a width of about 18 m at a distance of 180 m. There should be a focusing arrangement to increase the divergency to about 30 degrees.

12.7.2 Mounting

If the searchlight is mounted, the mounting should permit of an all-round horizontal movement and a vertical movement enabling the searchlight to be pointed directly overhead. As an alternative the searchlight may be held by a seaman, and in that case a substantial strap should be fitted to hang round the man's neck to help to support the weight of the searchlight.

12.7.3 Power

Sufficient power should be available to enable the searchlight to be worked for a total period of six hours, and it should be capable of working for three hours continuously. The source of power may be either an engine-driven dynamo or accumulator batteries. Sufficient capacity should be provided for the searchlight, after allowance has been made for the power required for the radio installation of the boat.

12.7.4 Spares

At least one spare bulb should be provided for each searchlight.

12.7.5 Accepted design

Designs of searchlight may be submitted for acceptance as standard designs on payments of fees prescribed in the MCA's booklet 'Fees for marine surveys and other marine services'.