
4 ALBERT EMBANKMENT
LONDON SE1 7SR
Telephone: +44 (0)20 7735 7611 Fax: +44 (0)20 7587 3210

MSC.1/Circ.1642
14 May 2021

**GUIDELINES FOR SAFETY MEASURES FOR PLEASURE YACHTS
OF 300 GROSS TONNAGE AND ABOVE NOT ENGAGED
IN TRADE OPERATING IN POLAR WATERS**

1 The Maritime Safety Committee, at its 103rd session (5 to 14 May 2021), approved the *Guidelines for pleasure yachts of 300 gross tonnage and above not engaged in trade operating in polar waters*, as set out in the annex, prepared by the Sub-Committee on Ship Design and Construction, at its seventh session (3 to 7 February 2020).

2 Member States are invited to use the annexed Guidelines and to bring them to the attention of all parties concerned.

ANNEX

GUIDELINES FOR SAFETY MEASURES FOR PLEASURE YACHTS OF 300 GROSS TONNAGE AND ABOVE NOT ENGAGED IN TRADE OPERATING IN POLAR WATERS

PREAMBLE

These Guidelines for pleasure yachts of 300 gross tonnage and above have been developed to supplement existing industry and/or national standards by providing additional guidance aimed at increasing the safety of yachts and persons on board, to mitigate the additional risk arising from the climatic conditions and other hazards when operating in polar waters.

These Guidelines are recommendatory and their wording is designed to provide guidance rather than mandatory direction and not intended to infringe on national systems of shipping control.

INTRODUCTION

1 Purpose

These Guidelines provide for the enhanced safety of pleasure yachts of 300 gross tonnage and above not engaged in trade and persons on board by addressing risks specific to their operation in polar waters.

2 Background

These Guidelines were developed in acknowledgement that operating in polar waters imposes additional demands on yacht systems, including navigation, communications, life-saving, main and auxiliary machinery, environmental protection and damage control, beyond those normally encountered.

These Guidelines also recognize that safe operation in such conditions requires special attention to human factors including crewing arrangements and training in emergency and operational procedures to ensure their safety in a polar environment.

These Guidelines focus on the need to ensure that yacht systems are capable of functioning effectively under anticipated operating conditions and to provide adequate levels of safety in accident and emergency situations.

In June 2018, the Maritime Safety Committee reviewed the safety measures for non-SOLAS ships operating in polar waters. The Committee noted the lack of a legal framework to allow for the mandatory application of the Polar Code to non-SOLAS ships, together with evidence regarding the number of accidents involving non-SOLAS ships operating in polar waters, particularly in the Antarctic area. Concluding that these facts revealed a significant risk to the safety of lives at sea and a continuing threat to the marine environment, the Committee determined that urgent action needed to be taken. These Guidelines are the result of the Committee's decision to develop recommendatory safety measures for pleasure yachts of 300 gross tonnage and above not engaged in trade, operating in polar waters.

3 Source of hazards

These Guidelines consider hazards which may expose pleasure yachts to elevated levels of risk, some of which are unique to polar conditions. These include:

- .1 ice, as it may affect hull structure, stability characteristics, machinery systems, navigation, the outdoor working environment, maintenance and emergency preparedness tasks and malfunction of safety equipment and systems;
- .2 experiencing topside icing, with potential reduction of stability and equipment functionality;
- .3 low temperature, as it affects the working environment and human performance, maintenance and emergency preparedness tasks, material properties and equipment efficiency, survival time and performance of safety equipment and systems;
- .4 extended periods of darkness or daylight as it may affect navigation and human performance;
- .5 high latitude, as it affects navigation systems, communication systems and the quality of ice imagery information;
- .6 remoteness and possible lack of accurate and complete hydrographic data and information, reduced availability of navigational aids and seamarks with increased potential for groundings compounded by remoteness, limited readily deployable search and rescue (SAR) facilities, delays in emergency response and limited communications capability, with the potential to affect incident response;
- .7 potential lack of experience in polar operations, with potential for human error;
- .8 potential lack of suitable emergency response equipment, with the potential for limiting the effectiveness of mitigation measures; and
- .9 rapidly changing and severe weather conditions, with the potential for escalation of incidents.

The risk level within polar waters may differ depending on the geographical location, time of the year with respect to daylight, ice-coverage, etc. Therefore, mitigating measures suitable to address the above specific hazards may vary within polar waters and may be different in Arctic waters and the Antarctic area.

These Guidelines also recognize that while Arctic waters and the Antarctic area have a number of similarities, there are also significant differences and that the specific features of the legal and political regimes applicable to their respective vulnerable marine environments should be taken into account.

CHAPTER 1 GENERAL

1.1 Purpose

This chapter provides guidance on general operating and safety arrangements.

1.2 Application

These Guidelines provide guidance for pleasure yachts of 300 GT and over not engaged in trade operating in polar waters. However, Administrations are encouraged to apply them, as appropriate, to all yachts seeking to operate in polar waters.

1.3 Definitions

The following definitions are applicable to these Guidelines.

1.3.1 *Antarctic area* means the sea area south of latitude 60° S (see figure 1).

1.3.2 *Arctic waters* means those waters which are located north of a line from the latitude 58°00'.0 N and longitude 042°00'.0 W to latitude 64°37'.0 N, longitude 035°27'.0 W and thence by a rhumb line to latitude 67°03'.9 N, longitude 026°33'.4 W and thence by a rhumb line to the latitude 70°49'.56 N and longitude 008°59'.61 W (Sørkapp, Jan Mayen) and by the southern shore of Jan Mayen to 73°31'.6 N and 019°01'.0 E by the Island of Bjørnøya, and thence by a great circle line to the latitude 68°38'.29 N and longitude 043°23'.08 E (Cap Kanin Nos) and hence by the northern shore of the Asian Continent eastward to the Bering Strait and thence from the Bering Strait westward to latitude 60° N as far as Il'pyrskiy and following the 60th North parallel eastward as far as and including Etolin Strait and thence by the northern shore of the North American continent as far south as latitude 60° N and thence eastward along parallel of latitude 60° N, to longitude 056°37'.1 W and thence to the latitude 58°00'.0 N, longitude 042°00'.0 W (see figure 2).

1.3.3 *Directional control system* means any device or devices intended either as a primary or auxiliary means of steering the ship. The directional control system includes all associated power sources, linkages, controls and actuating systems.

1.3.4 *Escort* means any ship with superior ice capability in transit with another ship.

1.3.5 *Hull penetrations* means areas where water can get into the hull, including seawater inlets, rudder pintles and propeller shaft seals.

1.3.6 *Ice-covered waters* means polar waters where local ice conditions present a structural risk to a ship.

1.3.7 *Icebreaker* means any ship whose operational profile may include escort or ice management functions, whose powering and dimensions allow it to undertake aggressive operations in ice-covered waters.

1.3.8 *Ice of land origin* means ice formed on land or in an ice shelf, found floating in water.¹

1.3.9 *Maximum expected rescue time* means the time adopted for the design of equipment and systems that provide survival support. It should typically be not less than five days.

¹ Refer to the WMO Sea-Ice Nomenclature.

1.3.10 *Mean Daily Low Temperature (MDLT)* means the mean value of the daily low temperature for each day of the year over a minimum 10-year period. A data set acceptable to the Administration may be used if 10 years of data is not available.

1.3.11 *Open water* means a large area of freely navigable water in which sea ice is present in concentrations less than 1/10. No ice of land origin is present.²

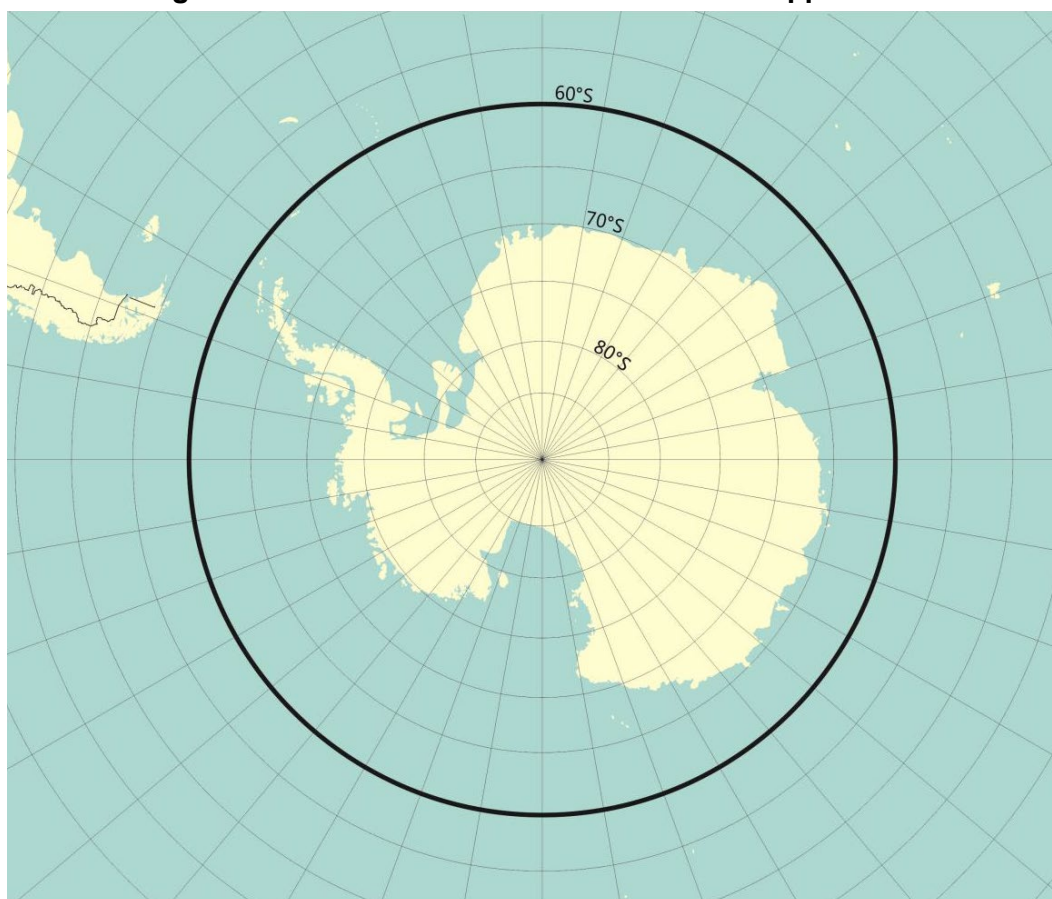
1.3.12 *Polar service temperature (PST)* means a temperature specified for a ship which is intended to operate in low air temperature, which should be set at least 10°C below the lowest MDLT for the intended area and season of operation in polar waters.

1.3.13 *Polar waters* includes both Arctic waters and the Antarctic area.

1.3.14 *Sea ice* means any form of ice found at sea which has originated from the freezing of sea water.

1.3.15 *Ship intended to operate in low air temperature* means a ship which is intended to undertake voyages to or through areas where the lowest MDLT is below -10°C.

Figure 1 – Maximum extent of Antarctic area application



² Refer to the WMO Sea-Ice Nomenclature.

Figure 2 – Maximum extent of Arctic waters application

1.4 Performance standards

1.4.1 Yachts and their equipment should be designed, constructed and maintained in compliance with the applicable national standards of the Administration or the appropriate requirements of a recognized organization or competent body which provide an equivalent level of safety for its intended service.

1.4.2 The structures, equipment and arrangements essential for the safety and operation of the yacht should take account of the anticipated temperatures.

1.4.3 Special attention should be given to essential operating and safety equipment and associated systems. For example, the potential for ice building up inside the ballast tanks and sea chests and in other potential areas that can be penetrated through the hull affecting the ballast and piping system respectively should be considered. The life-saving and fire-extinguishing equipment specified in chapters 4 and 5, respectively, when stored or located in an exposed position, should be of a type that is rated to perform its design functions at the MDLT. In particular, attention should be given to the inflation of life-saving equipment and the starting of engines in lifeboats and rescue boats.

1.4.4 Operations in polar waters should take account of factors such as: yacht class, environmental conditions, icebreaker escort, prepared tracks, routeing, crew experience, support technology and services such as ice-mapping, availability of hydrographic information, communications, safe ports, repair facilities and the maximum expected rescue time.

1.5 Operational arrangement

1.5.1 The yacht should not be operated outside the worst intended conditions and design limitations, the details of which should be set out in the operational guidelines.

1.5.2 Yachts operating in polar waters should take account of the distance from search and rescue facilities.

CHAPTER 2 CONSTRUCTION AND WATERTIGHT INTEGRITY

2.1 Purpose

This chapter sets out standards sufficient to maintain the structural construction and watertight integrity of yachts and their equipment operating in polar conditions.

2.2 General

2.2.1 Yachts should be strong and stable. Yachts undertaking regular expeditions in polar waters should be made of alloy or steel construction.

2.2.2 The structure should be designed to resist both global and local loads anticipated under the expected ice conditions.

2.2.3 For sailing yachts intended to operate in low air temperature, materials used should be suitable for operation at the yacht's PST.

2.2.4 The structure should be designed so as to maintain weather and watertight integrity in the anticipated sea and ice conditions.

2.2.5 Deck areas should be fitted with safety harness, jackstays and attachment points.

2.2.6 Yachts should be fitted with a sturdy boarding ladder or platform suitable for operations in the anticipated environmental conditions.

CHAPTER 3 MACHINERY AND ELECTRICAL INSTALLATIONS

3.1 Purpose

This chapter sets out the required functionality for machinery and electrical installations necessary for the yacht's safe operation.

3.2 General

3.2.1 The design, rating, installation, operation and maintainability of all onboard machinery and equipment should be suitable for operation and navigation in polar waters and the harsh weather conditions that often occur. Factors to be taken into account include:

- .1 ice accretion and/or snow accumulation;
- .2 ice ingestion from seawater;

- .3 freezing and increased viscosity of liquids;
- .4 seawater intake temperature; and
- .5 snow ingestion.

3.2.2 In addition, for yachts intended to operate in low air temperatures, factors to be taken into account include:

- .1 cold and dense inlet air; and
- .2 loss of performance of battery or other stored energy devices.

3.2.3 Materials used for machinery and electrical installations should be suitable for operation at the yacht's PST. In particular, machinery and electrical installations which are essential for safe operation when:

- .1 located outside and above the waterline in any operating condition; or
- .2 in unheated locations inside,

should not be susceptible to brittle fracture within the range of operating conditions.

3.2.4 For yachts intended to operate in ice-covered waters, machinery and electrical installations should provide functionality under the anticipated environmental conditions, taking into account loads imposed directly by ice interaction.

3.2.5 The layout and construction of machinery essential for the safe operation of the yacht should be such that repairs which can be effected using the resources on board may be completed safely and effectively. Ventilation systems should provide sufficient air at an appropriate temperature for the operation of machinery.

3.3 Main propulsion systems

3.3.1 The main propulsion machinery should be designed and protected against the effects of the anticipated environmental and operational conditions. The reliability and availability of the equipment and systems, including spare parts for components which can be readily repaired, should be considered.

3.3.2 Main propulsion machinery and all auxiliary machinery essential to the propulsion system should be:

- .1 designed for loads and vibrations appropriate to the anticipated environmental and operational conditions;
- .2 located to provide protection from freezing spray, ice and snow; and
- .3 designed to operate when the yacht is inclined at any combined angle of heel or trim that may be expected during operations in ice.

3.3.3 The installed propulsive power should be sufficient to ensure that the yacht can navigate safely without risk of structural damage under the design ice, weather and anticipated operational conditions.

3.3.4 Piping and intake systems associated with the main propulsion plant and auxiliary machinery essential to the propulsion system should be designed so as not to be affected by the impact of the polar environment.

3.4 Auxiliary machinery systems

3.4.1 Equipment and systems should be designed so that the exposure of persons on board to cold temperatures and other environmental hazards during normal operations including routine maintenance is minimized.

3.4.2 Ventilation systems should provide sufficient air for the operation of auxiliary machinery, air conditioning and heating purposes.

3.4.3 Essential equipment or systems located within spaces subject to outside ambient air temperatures upon failure of the primary heating system should be:

- .1 provided with an independent source of heat; and
- .2 fabricated from materials that are not susceptible to brittle fracture under the anticipated loads and temperatures.

3.5 Directional control systems

3.5.1 Directional control systems, if fitted, should be of adequate strength and suitable design to enable efficient operation in ice-covered waters.

3.5.2 Where interaction between the yacht's directional control systems and propulsion systems occurs or where dual purpose components are fitted, the provisions of this chapter relating to propulsion systems should also be followed.

3.6 Electrical installations

3.6.1 Electrical installations should be designed for operation in polar waters and for the provision of emergency heat and power.

3.6.2 Precautions should be taken to minimize the risk of supplies to essential and emergency services being interrupted by the inadvertent or accidental opening of switches or circuit breakers due to vibrations or accelerations during any icebreaking operations.

3.6.3 Emergency power batteries, including the reserve source of energy for the radio installation, including those stored in deck boxes, should be secured in a position where excessive movement is prevented during ice-transiting operations and explosive gas ventilation is not restricted by the accumulation of ice or snow.

3.6.4 Control systems based on computers and other electronic hardware installations necessary for the proper functioning of essential equipment should be designed for redundancy and resistance to vibration, dampness and low humidity.

CHAPTER 4

LIFE-SAVING APPLIANCES AND ARRANGEMENTS

4.1 Purpose

This chapter sets out standards for the safe escape, evacuation and survival of persons on board.

4.2 General life-saving appliances and survival arrangements

4.2.1 Yachts should carry life-saving appliances and survival equipment suited to the polar environment. Components of life-saving appliances should be designed to ensure availability and effectiveness under polar conditions.

4.2.2 Adequate supplies of protective clothing and thermal insulating materials should be provided, taking into account the intended voyage.

4.2.3 Training in the use of all emergency equipment, as appropriate, should be included as an element of the operating procedures and drills. Where appropriate, dedicated training equipment, including additional personal and group survival kits, should be carried to avoid compromising the performance of the emergency equipment itself.

4.2.4 Insulated immersion suits should be carried.

4.3 Categories of life-saving equipment

4.3.1 Yachts should carry life-saving appliances and survival equipment according to their environmental conditions of operation.

4.3.2 Personal survival kits (PSKs) should be carried whenever a voyage is anticipated to encounter mean daily temperatures below 0°C.

4.3.3 Group survival kits (GSKs) should be carried whenever a voyage is anticipated to encounter ice conditions which may prevent the lowering and operation of survival craft.

4.3.4 Sufficient PSKs and GSKs (as applicable) should be carried to cover at least 110% of the persons on board.

4.3.5 Personal survival kits should be stored so that they may be easily retrieved in an emergency situation. Arrangements such as storage in dedicated lockers near the assembly station(s) might be considered.

4.3.6 Group survival kits should be stored so that they may be easily retrieved and deployed in an emergency situation. Any containers should be located adjacent to the survival craft and liferafts. Containers should be designed so that they may be easily moved over the ice and be floatable.

4.4 Personal survival kit (PSK)

4.4.1 A sample of the contents of a personal survival kit is listed in table 4.1.

Table 4.1: Sample of items for inclusion in a personal survival kit

Suggested equipment
Protective clothing (hat, gloves, socks, face and neck protection, thermal underwear, etc.)
Skin protection cream
Insulated immersion suit
Handwarmers
Sunglasses
Survival candle
Signal mirror
Personal Locator Beacon
Drinking mug
Emergency food
Penknife
Handbook (Polar Survival)
Carrying bag

4.4.2 Personal survival kits should not be opened for training purposes.

4.4.3 The contents of personal survival kits should be reviewed no less frequently than annually.

4.5 Group survival kit (GSK)

4.5.1 A sample of the contents of the group survival kit is listed in table 4.2.

Table 4.2: Sample of items for inclusion in a group survival kit

Suggested equipment
Shelter – tents or storm shelters or equivalent – sufficient for maximum number of persons
Foam sleeping mats or similar – sufficient for at least one between two persons
Sleeping bags – sufficient for at least one between two persons
Shovels – at least 2
Sanitation (e.g. toilet paper)
Stove and fuel – sufficient for maximum number of persons ashore and maximum anticipated time of rescue
Emergency food – sufficient for maximum number of persons ashore and maximum anticipated time of rescue
One first aid kit in a waterproof case
Flashlights – one per shelter

Suggested equipment
Waterproof and windproof matches – two boxes per shelter
Whistle
Signal mirror
Emergency Position Indicating Radio Beacon
Appropriate communications equipment, separate from that carried on the vessel or survival craft
Water containers and water purification tablets
Spare set of personal survival equipment
Snow saw and snow knife
Tarpaulin
Group survival equipment container (waterproof and floatable)

4.5.2 Group survival kits should not be opened for training purposes.

4.5.3 The contents of group survival kits should be reviewed no less frequently than annually.

4.6 Lifeboats (where applicable)

4.6.1 Lifeboats should be either of the partially or totally enclosed type to provide adequate shelter from the anticipated operating environment.

4.6.2 The capacity of lifeboats should be evaluated with regard to operability, accessibility, seating capacity and overall space, considering the needs of persons wearing suitable polar clothing.

4.6.3 Any ice accretion should be regularly removed from the lifeboats, launch area and launching equipment to ensure readiness for launching when required. An icing removal mallet should be available in the vicinity of the lifeboats.

4.6.4 Lifeboat engines should be equipped with a means to ensure they start readily when required at the minimum anticipated operating temperature.

4.6.5 The lifeboat engine fuel oil should be suitable for operation in the minimum anticipated operating temperature.

4.6.6 Lifeboats and containers for group survival equipment in their stowed position should have means to mitigate the freezing of drinking water supplies.

4.6.7 Consideration should be given to the provision of additional emergency rations to account for high rates of energy expenditure under polar conditions.

4.7 Liferrafts

4.7.1 Any ice accretion should be regularly removed from the liferafts, cradles, launch area and launching equipment to ensure readiness for launching and inflation when required. An icing removal mallet should be available in the vicinity of the liferafts.

4.7.2 Yachts should carry manual inflation pumps that are proven to be effective in PST, in a warm space and the vicinity of the liferafts.

4.7.3 Air or other proven cold temperature gas should be used for the inflation of life-saving equipment according to their environmental conditions of operation.

4.7.4 Consideration should be given to the provision of additional emergency rations to account for high rates of energy expenditure under polar conditions.

CHAPTER 5

FIRE PROTECTION, FIRE DETECTION, FIRE EXTINCTION AND FIRE FIGHTING

5.1 Purpose

This chapter sets out standards for fire safety systems and appliances on yachts to ensure they are effective and operable in polar conditions and that means of escape remain available so persons on board can safely and swiftly escape under the expected environmental conditions.

5.2 General

5.2.1 Components of fire safety systems and appliances should be designed to ensure availability and effectiveness under PST.

5.2.2 Components of the fire-fighting system and appliances, which may be exposed to icing and snow accumulation that could interfere with the proper functioning of that component, should be adequately protected.

5.2.3 Local equipment and machinery controls should be arranged so as to avoid freezing, snow accumulation and ice accretion and to remain accessible at all times.

5.2.4 The design of fire safety systems and appliances should take into consideration the need for persons to wear bulky and cumbersome polar clothing.

5.2.5 Means should be provided to remove or prevent ice and snow accretion from accesses.

5.2.6 Extinguishing media should be suitable for the intended operation.

5.3 Ventilation

Closing apparatus for ventilation inlets and outlets should be designed and located to protect them from ice or snow accumulation that could interfere with the effective closure of such systems.

5.4 Fire detection and fire-extinguishing systems

5.4.1 Fire-extinguishing systems should be designed or located so that they are not made inaccessible or inoperable by ice or snow accumulation or low temperature such that:

- .1 equipment, appliances, systems and extinguishing agents should be protected from freezing for the intended voyage;

- .2 precautions should be taken to prevent nozzles, piping and valves of any fire extinguishing system from becoming clogged by impurities, corrosion or ice build-up; and
- .3 exhaust gas outlets and pressure vacuum arrangements should be protected from ice build-up that could interfere with effective operation.

5.4.2 Water or foam extinguishers should not be located in any position that is exposed to freezing temperatures. These locations should be provided with extinguishers capable of operation under such conditions.

5.5 Fire pumps and associated equipment

5.5.1 Where a fixed water-based fire-extinguishing system or alternative fire-extinguishing system situated in a space separate from the compartment containing the main fire pumps utilizes its own independent sea suction, this sea suction should be capable of being cleared of ice accumulation.

5.5.2 Fire pumps, including emergency fire pumps, water mist and water spray pumps should, wherever reasonable and practicable, be installed in heated compartment(s) and in any event should be adequately protected from freezing.

5.5.3 Isolating valves should be located so that they are accessible. Any isolating valves located in exposed positions should not be subject to icing from freezing spray. The fire main should be arranged so that exposed sections can be isolated and means of draining exposed sections should be provided.

5.5.4 Hydrants should be positioned or designed to remain operable under all anticipated temperatures. Ice accumulation and freezing should be taken into account.

5.5.5 All hydrants should be equipped with an efficient two-handed valve handle.

5.5.6 In addition, portable and semi-portable extinguishers should be located in positions protected from freezing temperatures, as far as practical. Locations subject to freezing should be provided with extinguishers capable of operation under PST.

5.6 Firefighters' outfits

Sufficient firefighters' outfits, including one spare, should be readily available to the accommodation area and elsewhere as appropriate. Such firefighters' outfits should be stored in warm positions as widely separated as practical.

CHAPTER 6 RADIOCOMMUNICATIONS

6.1 Purpose

This chapter provides standards for effective communication for yachts and survival craft in polar waters during normal operation and in emergency situations.

6.2 General

6.2.1 Communications equipment should be suitable to provide adequate ship-to-ship and ship-to-shore communication at all points along the intended operating routes, taking into account the limitations of communications systems in high latitudes and the anticipated low temperature.

6.2.2 All two-way portable radio communication equipment should be operable at the PST.

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

6.2.4 Appropriate communication equipment to enable telemedical assistance in polar areas should be provided.

6.2.5 Emergency power for communications equipment provided by battery should be provided with a means whereby the batteries are protected from extreme low temperatures.

6.3 Survival craft and rescue boat communications capabilities

6.3.1 For yachts intended to operate in low air temperature, all rescue boats and lifeboats, if fitted, whenever released for evacuation, should maintain capability for distress alerting, locating and on-scene communications.

6.3.2 For yachts intended to operate in low air temperature, all other survival craft, whenever released, should maintain capability for transmitting signals for location and on scene communications.

6.3.3 Communication equipment intended for use in survival craft, including liferafts and rescue boats should be capable of operation during the maximum expected time of rescue.

CHAPTER 7 NAVIGATIONAL EQUIPMENT

7.1 Purpose

This chapter provides for safe navigation in polar waters.

7.2 General

7.2.1 Taking account of the fact that use in high latitudes may affect their performance, navigational equipment and systems for providing reference headings and position fixing should be designed, constructed and installed to retain their functionality under polar conditions.

7.2.2 Yachts should have means of receiving and displaying current and forecasted information on ice conditions in the intended area of operation.

7.2.3 Sensors, antennas and other navigational equipment should be protected from ice accretion.³

³ See also *Guidance for navigation and communication equipment intended for use on ships operating in polar waters* (MSC.1/Circ.1612).

7.3 Heading equipment

Yachts should be fitted with two non-magnetic means to determine and display their heading.

7.4 Speed and distance measurement

Yachts should be fitted with at least one appropriate speed and distance measuring system.

7.5 Depth sounding device

Yachts should be fitted with at least two independent echo-sounding devices which provide an indication of the depth of water under the keel. Due account should be taken of the potential for ice interference or damage to any device designed to operate below the waterline.

7.6 Radar installations

7.6.1 Yachts should be fitted with a total of at least two functionally independent radar systems. One of these should operate in the 3 GHz (10 cm, S-band) frequency range.

7.6.2 Radar plotting systems that may be installed should have the capability of operating in both the sea and the ground-stabilized mode.

7.7 Electronic positioning and electronic chart systems

7.7.1 Yachts should be provided with an electronic position fixing system.

7.7.2 A Global Navigation Satellite System (GNSS) (GPS or GLONASS or equivalent) should be fitted on any yacht intending to navigate in areas outside of reliable coverage by a terrestrial hyperbolic system.

7.8 Automatic identification system (AIS)

Yachts should be provided with automatic identification system (AIS).

7.9 Rudder angle indicator

7.9.1 Separate rudder angle indicators should be provided for each rudder on yachts with more than one independently operable rudder.

7.9.2 In yachts without a rudder, indication should be given of the direction of steering thrust.

7.10 Searchlights and visual signals

7.10.1 Yachts operating in polar waters should be equipped with at least two suitable searchlights which should be controllable from helm positions.

7.10.2 The searchlights described in paragraph 7.10.1 should be installed to provide, as far as is practicable, all-round illumination suitable for docking, astern manoeuvres or emergency towing and should be fitted with an adequate means of de-icing to ensure proper directional movement.

7.11 Vision enhancement equipment

7.11.1 Yachts should be fitted with a suitable means to sufficiently de-ice helm position windows to provide unimpaired forward and astern vision from helm positions.

7.11.2 The windows described in paragraph 7.11.1 should be fitted with an efficient means of clearing melted ice, freezing rain, snow, mist and spray from outside and accumulated condensation from inside. A mechanical means to clear moisture from the outside face of a window should have operating mechanisms protected from freezing or the accumulation of ice that would impair effective operation.

7.11.3 Persons engaged in navigating the yacht should be provided with adequate protection from direct and reflected glare from the sun.

7.11.4 Indicators providing information to the helm positions should be fitted with means of illumination control to ensure readability under all operating conditions.

CHAPTER 8 DRILLS AND EMERGENCY INSTRUCTIONS

8.1 Purpose

This chapter sets out standards to ensure that persons on board yachts are adequately trained and familiar with emergency procedures, their duties and musters specific to an emergency in polar waters.

8.2 General

8.2.1 Onboard instructions for evacuation and the operation of fire and damage control appliances and systems should include appropriate cross training for all persons on board with appropriate emphasis to changes to standard procedure made necessary by operations in polar waters.

8.2.2 Emergency drills should be carried out on a regular basis.

8.2.3 Persons on board undertaking drills should be familiar with and capable in respect of the drills for which they are assigned.

8.3 Evacuation

8.3.1 Evacuation drill scenarios should be varied so that different emergency conditions can be simulated, including abandonment into the water, onto the ice if appropriate or a combination of the two.

8.3.2 Each evacuation drill should include:

- .1 exercises in control of persons on board in cold temperatures, as appropriate;
- .2 checking that all persons on board are suitably dressed;
- .3 donning of immersion suits or thermal protective clothing;
- .4 testing of emergency lighting for assembling and abandonment; and

- .5 giving instructions in the use of the yacht's life-saving appliances and in survival at sea, on the ice or a combination of both, as appropriate.

8.3.3 Rescue boat drills, if a rescue boat is on board, should be conducted as far as is reasonable and practicable.

8.3.4 Each person on board should be given instructions which should include but not necessarily be limited to:

- .1 problems of cold shock, hypothermia, first-aid treatment of hypothermia and other appropriate first-aid procedures; and
- .2 special instructions necessary for use of the yacht's life-saving appliances in severe weather and severe sea conditions on the ice, or in a combination of water and ice cover.

8.4 Fire drills

Fire drill scenarios should be varied so that emergency conditions are simulated for different compartments of the yacht, with appropriate emphasis on those changes to standard procedures made necessary by operations in polar waters and low temperatures.

8.5 Damage control

Damage control drill scenarios should be varied so that emergency conditions are simulated for different damage conditions with appropriate emphasis to those conditions resultant from operations in polar waters.

CHAPTER 9 OTHER SAFETY MEASURES

9.1 Purpose

This chapter sets out standards for additional emergency equipment that could be carried and other safety measures to improve the safety of yachts and those on board.

9.2 Medical equipment

9.2.1 Yachts should be provided with an adequate number of first-aid kits and equipment with contents suitable to the onboard location and the recognized provisions for safety hazards of such locations.

9.2.2 Medical equipment, medicines and facilities should be considered with a view to the nature of the voyage, yacht operations and the ability to communicate and obtain timely medical aid, medical evacuation or other medical assistance.

9.2.3 Crews should be provided with appropriate equipment and training to safely evacuate an individual in a medical emergency from the yacht.

9.3 Reserve supplies

9.3.1 Special consideration should be given to the reserve supply of fuel and lubricants, taking into account the effect of heavy ice on fuel consumption of the yacht.

9.3.2 Single screw yachts may require special consideration (redundancy) in remote areas where conditions impose a risk of damage to machinery components.

9.4 Voyage planning

When planning a route through polar waters, in order to avoid potential hazards, the master of the yacht should be taking into account the following factors:

- .1 any limitations of the hydrographic information and aids to navigation available;
- .2 current information on the extent and type of ice and icebergs in the vicinity of the intended route;
- .3 statistical information on ice and temperatures from former years;
- .4 places of refuge;
- .5 current information and measures to be taken when marine mammals are encountered relating to known areas with densities of marine mammals, including seasonal migration areas;
- .6 current information on relevant routing systems, speed recommendations and vessel traffic services relating to known areas with densities of marine mammals, including seasonal migration areas;⁴
- .7 national and international designated protected areas along the route; and
- .8 operation in areas remote from SAR capabilities.

⁴ Refer to *Guidance document for minimizing the risk of ship strikes with cetaceans* (MEPC.1/Circ.674).