Guideline No.Z-11 (202510)

Z-11

Guidelines for Polar Life-Saving Appliances

Issued Date: October 1, 2025

Foreword

The product inspection guidelines of China Classification Society (hereinafter referred to as "the Society") specify the applicable technical requirements and inspection test requirements for the classification products of ships to be applied for the Society's approval/inspection, as well as the authorized statutory products.

This guidelines does not restrict users to other test methods and requirements, but the relevant test methods and requirements shall be no lower than those required by this guidelines.

This guideline is prepared and updated by the company and published through the website http://www.ccs.org.cn. For comments on this guideline, please contact service@ccs.org.cn.

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Chapter 1 General

Section 1 General provisions

1.1.1 Application

1.1.1.1 Guidelines for Polar Life-Saving Appliances (hereinafter referred to as the Guidelines) specifies the technical requirements and test methods for life-saving appliances, survival kit and communication equipment used on polar navigation vessels. The Guidelines aims to provide guidance for the approval and inspection of polar life-saving appliances used on polar navigation vessels.

1.1.1.2 The Guidelines apply to polar life-saving appliances provided on polar ships.

1.1.2 Normative references

1.1.2.1 The contents of the Guidelines constitute an essential part of the Guidelines through normative references in the text. For dated reference documents, only the version corresponding to that date applies to the Guidelines; for undated reference documents, the latest version (including all amendments) applies to the Guidelines.

1.1.3 Definitions

1.1.3.1 Polar Life-Saving Appliances means the general term for life-saving appliances, survival kit and communication equipment used on ships in the Antarctic and Arctic regions[1].

1.1.3.2 Maximum expected time of rescue (MaxETR) means the time adopted for the design of equipment and system that provide survival support[2]. It is never to be less than 5 days.

1.1.3.3 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.

1.1.3.4 Low temperature environment means waters where the minimum daily

[1] The maximum extent of the Antarctic and Arctic regions can be found in Figure 1 and Figure 2 of the Polar Code.

[2] The calculation of the maximum expected time of rescue is to be carried out with reference to the requirements in IMO MSC.1/Circ.1614/Rev.1.

average low temperature is below -10°C, such as the Arctic Ocean, the Southern Ocean, the Gulf of St. Lawrence, the North Baltic Sea, the Sea of Okhotsk, the Bohai Sea and the North Yellow Sea, etc. Generally, in such waters, there is regional sea ice coverage in winter.

1.1.3.5 Expected minimum environment temperature means the lowest environment air temperature that a ship may encounter in its intended navigation area during its voyage. Generally, it is to be considered to be at least 20°C lower than the lowest mean daily low temperature.

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

1.1.3.7 Design Service Temperature (DST) means a temperature index set for a designed ship to measure service performances of material, equipment and system in low air temperature, which is to be determined by the shipowner according to the purpose and working condition of the ship, and generally to be set at least 10°C below the lowest MDLT for the intended area and season of operation in polar waters. The DST is to be equal to PST.

1.1.3.8 De-icing means the removal of accumulated ice and snow on the surfaces of open areas and facilities by various tools.

1.1.3.9 Polar Class (PC) means the ice class assigned to the ship based upon IACS Unified Requirements.

1.1.3.10 PC7 means the ice condition in summer/autumn where thin first-year ice is present, which may contain old ice.

1.1.3.11 Category A ship means a ship designed for operation in polar waters in at least medium first-year ice, which may include old ice.

1.1.3.12 Life-saving Appliance — refers to all equipment specified in Chapter III of the International Convention for the Safety of Life at Sea (SOLAS) and the International Life-Saving Appliance Code (LSA Code).

1.1.3.13 Personal survival kit means equipment used for individuals' survival in polar environments.

1.1.3.14 Group survival kit means equipment used for the collective survival of a group in polar environments.

1.1.3.15 Communication equipment means the equipment specified in Chapter IV of SOLAS.

1.1.4 The lowest MDLT at the South and North Poles

1.1.4.1 The lowest MDLT values specified in the Guidelines are to be implemented with reference to the diagram below. Meanwhile, the expected minimum environment temperature, polar service temperature, and design service temperature are to be determined based on the lowest MDLT values. During inspections, the applicable temperatures are to be selected according to the actual navigation routes or seasonal requirements of vessels equipped with polar life-saving appliances.

1.1.4.2 The lowest MDLT in Antarctica is shown in the figure below.

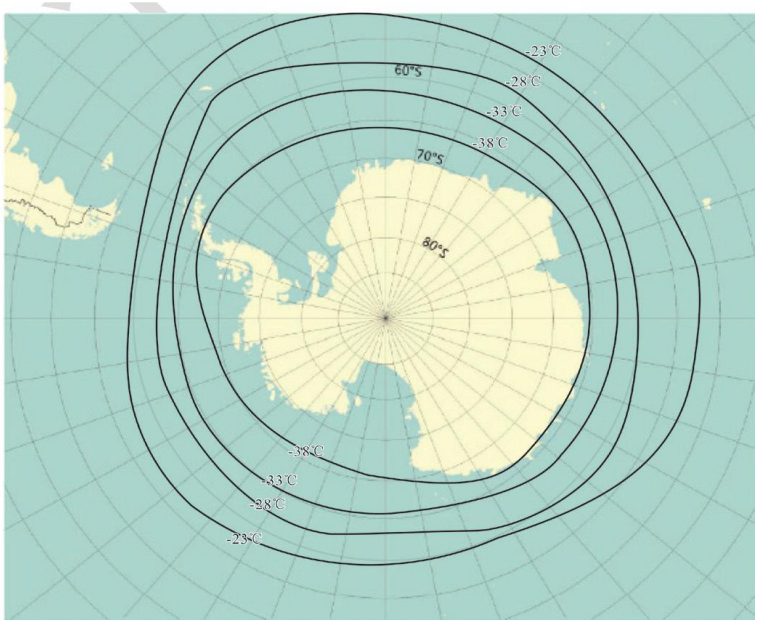

Figure 1.1.4.2 The lowest MDLT in Antarctic waters in winter

1.1.4.3 The lowest MDLT in the North Pole is shown in the figure below.

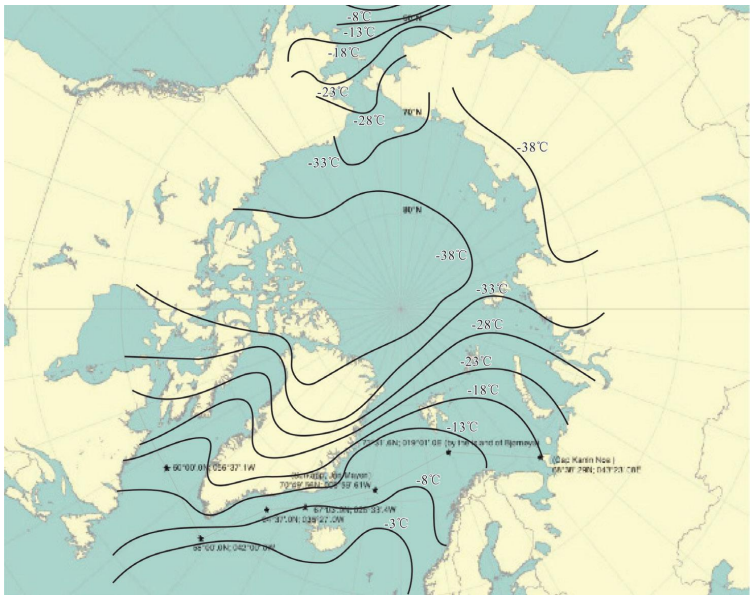

Figure 1.1.4.3 The lowest MDLT in Arctic waters in winter

1.1.4.4 Definition of temperature is shown in the figure below, where:

(1) "Average" means a statistical average of at least 10 years;

(2) "Low temperature" means the lowest temperature in a day of 24 hours;

(3) "Minimum" means the lowest temperature in a year;

(4) "Daily high temperature" means the average daily maximum temperature;

(5) "Average daily temperature" means the average daily average temperature;

(6) "Average daily low temperature" means the average daily minimum temperature.

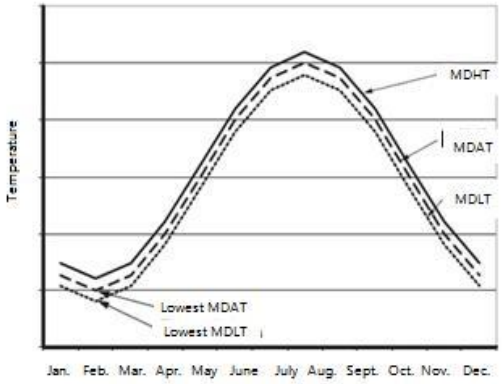

Figure 1.1.4.4 Definition of temperature

Chapter 2 Technical requirements

Section 1 Life-saving appliances

2.1.1 General requirements

2.1.1.1 This Section specifies the special requirements for life-saving appliances used in polar environments, and the relevant life-saving appliances are to also meet the requirements of the International Life-Saving Appliance Code (LSA Code).

2.1.1.2 Unless otherwise specified, life-saving appliances are to be stored without damage within a temperature range from the expected minimum ambient temperature to +65°C, and are to remain usable within a temperature range from the polar service temperature to +40°C.

2.1.1.3 Life-saving appliances that may be immersed in seawater are to remain usable within a seawater temperature range of -2°C to +30°C.

2.1.1.4 For life-saving appliances not listed in this Section, in addition to meeting the requirements specified in 2.1.1.3 of this Section, such appliances are to also comply with the requirements of the International Life-Saving Appliance Code (LSA Code).

2.1.2 Insulated immersion suit

2.1.2.1 Insulated immersion suit will cover the whole body with the exception of the face, except that covering for the hands may be provided by separate gloves which are to be permanently attached to the suit.

2.1.2.2 Insulated immersion suit is to be donned within 5 minutes when the temperature is at the polar service temperature; if a lifejacket needs to be worn together with insulated immersion suit, the time required to put on one lifejacket is also to be included.

2.1.3 Survival craft

2.1.3.1 Common requirements for survival craft

(1) The shelf life of food is to be more than 1 year. The package can be readily divided and easily opened, taking into account immersion suit gloved hands.

(2) Fresh water is to clearly indicate the date of production and expiration

date or shelf life, batch number, capacity of fresh water contained and drinking instructions. The validity period of fresh water is to be more than one year. The package is to be easily opened by immersion suit gloved hands.

(3) Survival craft is to be equipped with the survival kit required in Section 2 of this Chapter.

(4) If additional personal and group survival kit is provided, survival craft is to have sufficient space for storage.

(5) When calculating and adjusting the number of seats in survival craft, the space required for polar clothing, additional equipment (including personal survival kit that all personnel intend to use and carry), as well as the space for personnel to take turns standing and moving is to be taken into account. This space may be calculated as 1.25 times the original individual space.

(6) In survival craft, if a combination of personal life-saving appliances, ventilation, thermal insulation, and heating devices is installed, the internal temperature is still to be maintained at a suitable level when the external air temperature drops to the polar service temperature; all cold surfaces are to be insulated or made of insulating materials, especially those surfaces that come into direct contact with personnel.

(7) If survival craft is equipped with a heating system, it is to be able to provide energy supply for the longest waiting time for rescue. The energy source of the heating system is to be independent from that of the lifeboat engine, or the energy consumption of this part is to be taken into account in the fuel of the engine.

(8) Measures are to be taken to ensure the functionality of launching appliances, release mechanisms, hydrostatic release units, and marine evacuation systems under icing conditions.

(9) Measures for de-icing are to be provided for all survival craft that may accumulate ice.

(10) The power supply of the launching and lowering device of survival craft is to be independent of the main power supply of the ship.

(11) The entrance, hatch and ventilation measures of survival craft are to be designed to enable them to operate in freezing conditions to relieve and remove ice.

2.1.3.2 Lifeboats

(1) Lifeboats and rescue boats are to maintain positive metacentric height

(GM) when loaded as required by paragraph 4.4.5.1 of the LSA Code and with an additional ice load of 30 kg/m^2 on exposed horizontal surfaces and 7.5 kg/$m^2$for the projected lateral area of each side of the lifeboat.

(2) Lifeboats are to be provided with fuel and lubrication oil suitable for polar service temperature for the engine and suitable low temperature grade oil for the steering gear, as necessary, or be fitted with a heating system to maintain fuel and lubrication oil at the appropriate viscosity for operation.

(3) Means are to be provided to avoid icing or dew on the windows of the lifeboat steering position, in order to maintain a proper lookout.

(4) The lifeboat engine is to be capable of cold starting and continuous operation at the polar service temperature, and the engine power is considered to be sufficient to navigate through ice conditions of PC7.

(5) Protective measures are to be taken for the propeller and keel of the lifeboat to prevent damage caused by contact with ice, and the hull strength is to be sufficient to withstand the accumulation of ice and snow.

(6) Lifeboats are to provide radio equipment and batteries suitable for polar service temperatures.

(7) For category A polar ship, life boat hatchcover and door are to be provided with heating lines to prevent freezing.

(8) For category A polar ship, measures are to be taken to release the life boat or draw the life boat to the ice.

2.1.3.3 Liferafts

(1) For category A polar ship, the liferafts are to be equipped with devices for lowering onto the ice surface..

(2) When a liferaft is carrying all personnel (with each person's weight calculated at 82.5 kg) and equipment, and is on an even keel (with equal draft at the bow and stern), its freeboard height is not to be less than 300 mm.

(3) Liferafts are to meet the requirements of LSA 4.2.5 and 4.3.5 when carrying all personnel (with each person's weight calculated at 82.5 kg) and equipment.

(4) At the polar service temperature, an inflatable liferaft is to reach its operating pressure within 3 minutes, and is to be free from seam slippage, rupture, or other defects; it is also to be immediately usable

after testing. After inflation, the lifeboat or liferaft is to maintain its shape when carrying all occupants and equipment.

(5) After a davit-launched liferaft is stored for 6 hours at the expected minimum environment temperature, it is to be capable of supporting a load equivalent to 1.1 times its rated number of occupants (with each person's weight calculated at 82.5 kg) plus equipment, with all release valves functioning.

2.1.4 Survival craft lights

2.1.4.1 At the polar service temperature, the light intensity emitted by survival craft light in all directions of the upper hemisphere is not to be less than 4.3 cd, and the lighting duration is to be longer than the maximum expected time of rescue (at least 5 days). For the internal lighting lamp, the light intensity emitted in all directions of the upper hemisphere is not to be less than 0.5 cd, and the lighting duration is also to be longer than the maximum expected time of rescue (at least 5 days).

2.1.4.2 To meet the lighting duration at polar service temperatures, survival craft lights may consist of a single indicator light, multiple indicator lights or multiple battery packs.

Section 2 Survival kit

2.2.1 General requirements

2.2.1.1 The technical requirements for personal survival kits and group survival kits may refer to the requirements specified in this Section.

2.2.2 Personal survival kit

2.2.2.1 All personal survival kits are to be assembled in the personal survival kit carrier bag. The relevant equipment is as follows.

Table 2.2.1.1 Personal survival kit

	Personal survival kit
1	Carrier bag
2	Protective clothing (hat, gloves, socks, face and neck protection, etc.)
3	Skin protection cream
4	Thermal protective aid
5	Sunglasses
6	Whistle
7	Drinking mug

8	Multi-tool (foldable knife)
9	Polar Survival guidance
10	Emergency food and water (including water storage containers and water purification tablets)

2.2.2.2 Carrier bag[3] is to:

(1) After loading all survival kit (excluding immersion suits/anti-exposure suits), the weight is to be less than 30% of the adult weight (with each person's weight calculated at 82.5 kg);

(2) Large enough to carry all the contents of the personal survival kit enclosed in it;

(3) It is to be waterproof if it falls into mud/water;

(4) Made of the following materials:

① For ships sailing in the lowest MDLT of-10°C or higher, they are to remain flexible and not break at-10°C;

② Or can remain flexible and not break at polar service temperatures.

(5) A zipper/closure made of corrosion-resistant material;

(6) When falling into fresh water in complete packaging, it is to be able to float;

(7) It has a shoulder strap, which enables it to be carried on the shoulder or back;

(8) It has a strap or other means to attach an immersion suit or anti-exposure suit carrying bag such that both can be easily carried as one;

(9) The equipment is to be labeled appropriately, including recommended storage conditions.

2.2.2.3 Protective clothing

(1) After all protective clothing is donned, the protective clothing is to cover all parts of the body except the eyes. When goggles are worn, the protective clothing is to still cover all parts of the body except the eyes. When exposed to wind and humid environments, the material of the protective clothing is also to provide a minimum level of thermal insulation.

(2) Protective clothing is to include gloves, insulated gloves, boots, full

[3] A drop test is not required for testing the carrier bag. Testing of tightness can be performed by laying the carrying bag in water on all possible sides.

head coverings, neck warmers, warm clothes, socks, shirts and sweaters, long pants and long underwear, hooded jackets and parka coats, and a separate wind and rain protection layer (when no wind and rain protection layer is provided for trousers and jackets), of which:

① Gloves are to be made of thin wool or similar material, gloves are to be worn under cold gloves, gloves are to be thin enough to facilitate the use of various tools in personal survival kit;

② Insulated gloves/mittens are to meet the requirements of DIN EN 511:2006, which is at least convective: 4, contact: 4, permeability: 1;

③ The shoes are to meet the requirements of ISO 20877:2011.

2.2.2.4 Skin protection cream

Ships that only navigate during polar nights for 24 hours do not need to be equipped with sunscreen. Otherwise, they are to be equipped with sunscreen that meets the requirements of ISO 24444:2019/Amd 1:2022, with a sun protection factor (SPF) of at least 30 and a volume of at least 40 ml per day; the volume requirement is not to be reduced by increasing the SPF value. Unless dispensed by other means (such as aerosol cans), sunscreen containers are to be squeezable with easily dispensable nozzles/lids. Sunscreen products with an SPF of not less than 30 may also be used as substitutes for the aforementioned sunscreen.

2.2.2.5 Thermal protective aid

At least one thermal protective aid (TPA) is to be provided. The thermal protective aid is to meet the requirements specified in paragraph 2.5 of the LSA Code.

2.2.2.6 Eye protection

(1) Goggles are to meet the requirements of ASTM F659-10:2018 to protect the eyes from sunlight, wind/snow. The goggles are to be double-lens and polarized to allow only vertical polarized light to pass through to limit the typical glare in offshore and snow-covered areas.

(2) The form of the goggles is to allow wearing optical glasses below the goggles without affecting their protection.

2.2.2.7 Whistle

(1) Whistle material is not to absorb moisture or stick to the mouth in cold weather. Whistles are to be shatterproof and have a lip seal or equivalent seal to prevent air loss in extreme cold.

(2) The whistle is to have multiple tones.

(3) The shape of the whistle is to be designed in such a way that it can be held by hand, while wearing a survival suit and/or mittens.

(4) The whistle sound response is to meet the requirements of ISO 12402-8:20205.2, at least 100 db.

2.2.2.8 Drinking mug

(1) The design and manufacturing materials of the drinking mug are to ensure that the lips will not be frozen when drinking, and there is to be a sealed lid made of heat-insulating material (such as plastic). After removing the lid, the drinking mug is to be able to be placed on a stove, open flame or other heat source to thaw the contents.

(2) Mug size is to be small enough to be used with one hand while wearing the gloves/mittens provided in the protective clothing. This is to be applicable to all size options for the protective clothing. Alternatively, the mug can be provided with a handle that is sufficiently sized to be used while wearing the protective clothing gloves/mittens.

2.2.2.9 Multi-tool (foldable knives)

(1) The multi-tool is to be rust-proof. The following tools can be folded into a small package weighing no more than 300 grams:

① locking knife, 5 cm to 7 cm long;

② can opener;

③ bottle opener;

④ scissors;

⑤ pliers (needle-nosed);

⑥ flat screwdriver (5 mm);

⑦ #2 Phillips screwdriver;

⑧ wood saw.

2.2.2.10 Polar survival guidance

(1) Polar survival guidance is to be in the form of one or more booklets, printed on tear and water resistant material.

(2) Polar survival guidance is to contain information relevant for the PST,

including at least the following information:

① personal survival kit includes a specification sheet for all equipment in the Polar Survival Guidance, including (as applicable) rated temperatures and sizes;

② how to use each item provided in the PSK and the GSK, including the extra equipment suggested in this document;

③ how to use the appropriate GSK or other lifesaving appliances for survival, including the survival craft;

④ ventilation of shelters (if applicable);

⑤ how to recognize the effects of cold on the human body, and possible solutions to minimize these effects using the equipment provided;

⑥ use of communication equipment, including conserving battery life (EPIRB, airband radio, VHF radios, GMDSS, SARTs);

⑦ managing wildlife (if applicable);

⑧ if applicable, include the use of heating packs;

⑨ how to start a fire;

⑩ verifying/ensuring ice thickness is sufficient to support the mass of survivors (if applicable).

2.2.2.11 Emergency food and water

(1) Emergency provisions must include food, water, and anti-seasickness medication as specified in Articles 3.2.2, 3.2.3, and 3.2.4 of Annex to IMO MSC.1/Circ. 1614/Rev.1. These supplies are to contain multivitamins sufficient for the maximum expected time of rescue. If lifeboats, group survival kit, or other rescue devices may retain residual provisions, personal survival kit must provide at least one day's worth of food, water, and anti-seasickness medication. Otherwise the food, water, and anti-seasickness medication in personal survival kit must meet the maximum expected time of rescue..

(2) The multivitamins are to meet the requirements of NSF/ANSI 173:2021

or equivalent standards.

(3) Food rations are to contain at least 5 000 kJ of energy per person per day for ships operating in polar regions. Consideration of new or special types of packaging for food rations (e.g. self-heating pack) may be a suitable option to enhance the chance of survivability, provided that they meet the energy requirement.

(4) At least 2 L of fresh water per person per day is to be supplied: de-salting apparatus or means to melt ice or snow may supply the amount exceeding the requirements of the LSA Code. There is to be a tank or a container of adequate size to collect water from the de-salting apparatus and rainwater collectors.

(5) For non-low air temperature vessels, if desalination devices are used, they are to operate in air at a temperature of the PST or -20 °C, whichever is the lowest value, and in sea water at -2,8 °C. Water supplies can also be supplemented with water purification tablets.

(6) Containers for water are to be re-sealable and not break or leak in any direction when the contents freeze.

2.2.3 Group survival kit

2.2.3.1 All survival kits are to be assembled in the container of the group survival kit (except when the lifeboat raft is used as a shelter), and the relevant equipment is shown in the following table.

Table 2.2.3.1 Group survival kit

	Group survival kit
1	Group survival kit container
2	Shelter – tents or storm shelters or equivalent – sufficient for maximum number of persons
3	Thermal protective aids or similar
4	Sleeping bags and blankets
5	Foam sleeping mats or similar
6	Shovels (at least 2)
7	Sanitation
8	Stoves and fuel
9	Emergency food and water (including storage containers and water purification tablets)

10	Flashlights – one per shelter
11	Waterproof and windproof matches- (2 boxes per shelter)
12	Whistle
13	Signal mirror
14	Spare set of personal survival kit

2.2.3.2 Group survival kit containers

(1) The GSK container is to match the planned evacuation scenarios:

① If the planned evacuation scenario is to remain in the lifeboat/liferaft on the water (not transition to ice or land), a container may not be needed if the GSK equipment is to be contained within the lifeboat/liferaft, and the requirements of this clause do not apply.

② If a container is used to load and store the GSK equipment in lifeboats/liferafts, the container is to be designed to be easily movable into the lifeboat/liferaft, not cause damage to the lifeboat / liferaft, and utilize the minimum amount of space possible within the survival craft, to allow space for possible revision.

③ When the group survival kit container is mounted externally on lifeboats/liferafts, it must remain towable from behind the vessel or securely fastened to the raft's mooring lines in all evacuation scenarios. The container is to be designed for easy retrieval when carrying survival gear and floating alongside the vessel, ensuring immediate access during emergencies.

④ The container (including container shell, painter, attachments and handles) is to be durable enough to withstand impacts with:
(a) ice while being towed by a lifeboat at 5,5 km/h (3 kn);
(b) ice, rocks and debris while being moved by hand (sliding).

(2) The group survival kit container is to be waterproof, the waterproof level is not to be less than IPX 7, and it is to be able to float when loaded. The container is to be brightly colored and equipped with reflective materials for easy detection.

(3) Any hatches in the container are to be easily opened while wearing the mittens/gloves in the PSK.

(4) The shell of the container is to be formed in a way that makes it possible

for a team of no more than 4 people to be able to transfer the container from floating in the water up onto sea ice that is 1 metre thick (-10 cm freeboard). The ice edge can be prepared in any way necessary to aid the transition, provided the tools to do this preparation are easily accessible. If any winching mechanisms are used to pull the container onto the ice, more than one anchor point is to be used and be arranged to ensure that no person is at risk of harm if an anchor pulls out of the ice or if cables are released/broken. The bottom of the container is to be sufficiently smooth that two people can slide the container across a flat snow-covered surface. Snow is assumed to be wind packed and hard. Handles are to be provided for moving the container on the ice, and handles are to be sufficiently sized to be usable while wearing the personal survival kit mittens/gloves. Structural strength is to be sufficient to withstand impacting a large (considered to be an infinite mass as compared to the loaded container) glacial or multi-year ice floe, while fully loaded and being towed at 5,5 km/h (3 kn) while the air temperature is at the PST (- 20 °C for non-low air temperature vessels).

(5) The shell and all fittings of the group survival kit container are to be made of corrosion-resistant materials.

(6) If the container is launched by means of a launching appliance, the launching appliance is not to depend on any means other than gravity or stored mechanical power which is independent of the ship's main power supplies, and is to be rated for the fully loaded mass of the container. The launching appliance used to lower the GSK is to meet all the requirements under the LSA Code, Chapter VI. The launching appliance is to be rated for operation at the PST (- 20°C for non-low air temperature vessels).

(7) The container is to be designed to have a positive buoyancy when fully loaded with GSKs. The position and arrangement in conjunction with procedures in the PWOM are to ensure equipment availability upon evacuation. This may include float free arrangements if the container is located on an open deck.

(8) If the container is designed so people may need to climb on top, anti-slip tape is to be used to prevent them from falling into the water. If stored on the outer deck of the vessel, precautions are to be taken such that its

content may not get damaged from freezing.

(9) The container is to have a painter line attached that is sufficiently strong to tow the loaded container at 3 kn and is sufficiently long enough to attach to a fitting on the vessel's deck while the container is lowered to the water.

(10) The external part of the group survival kit container is to be equipped with the following labels, signs or similar instructions:

① "group survival kit";

② the name or trademark of the manufacturer;

③ serial number;

④ name of the certification body;

⑤ the number of people suitable for group survival kit;

⑥ date of manufacture;

⑦ date last serviced;

⑧ length of a painter;

⑨ mass of fully loaded container;

⑩ landing instructions;

⑪ recommended storage conditions (if applicable);

⑫ expiry date of equipment, if applicable.

(11) The GSK can be distributed into several containers if this makes it easier to transport. If this is the case and the container consists of multiple parts, the associated containers are to be easily identifiable and the GSK container is to be properly labelled.

2.2.3.3 Shelters

(1) Protection from environment

Shelters are to protect occupants from precipitation, freezing spray, wind, and the sun. Shelters are also to provide a safe habitable environment inside which enables control of CO_2 at safe levels while avoiding exposure to the effects of the external environment.

(2) Thermal protection

① Shelters in combination with the personal protective clothing are to provide sufficient thermal insulation for the PST (- 20 °C for vessels with an MDLT ≥ - 10 °C). The minimum overall total system thermal resistance (all equipment in PSK plus GSK/LSA without the sleeping bags/blankets) is not to be less than 0,756 m2K.W^{-1} (4,88 clo) where the MDLT ≥ -10°C.

② When the MDLT is < -10°C, the thermal resistance value is to be calculated according to the following formula:

$$R_{th}=（-0.073 \cdot Tps+3.42） \cdot 0.155$$

where

R_{th} is the thermal resistance ($m^2K \cdot W^{-1}$);

Tps is the polar service temperature (C).

(3) Anchoring

Shelters are to be capable of anchoring to the ice, snow, or frozen ground. Anchors are to be provided, suitable to properly secure the shelters, including if the liferaft is intended to be used. If tools are required to secure the anchors in place, they are also to be provided.

(4) Structure

① The shelter structure is to be able to withstand:

(a) at least 30 $m \cdot s^{-1}$ winds, including anchoring arrangements;

(2) the mass of 1 cm of freezing rain;

(c) the force equivalent to a load of snow shovelled against the shelter up to a height of 1 m or 75 % of the shelter height, (whichever is less), snow density is to be taken as 300 $kg \cdot m^{-3}$. The base of the snow piled against the shelter is to be taken as at least 40 cm thick.

② The shelter is to block the wind for the occupants inside the shelter such that the wind inside the shelter does not exceed 0,3 m/s ±

0,1 m/s while exterior winds are 30 $m \cdot s^{-1}$, irrespective of the direction of the wind relative to the shelter, in accordance with ISO 23537-1 ·2022, 5.1.3, and ISO 15831:2004.

③ Shelter structure is to be of an international or vivid reddish orange, or a comparably highly visible colour on all parts where this assists detection at sea, on land or on ice.

(5) Shelter set up

Shelters are to be capable of being erected while wearing the protective clothing provided in the PSK, in winds up to 10 $m \cdot s^{-1}$ while at the PST (-20℃ for vessels with an MDLT ≥ -10℃).

(6) Closures

Shelter closures are to be operable by occupants inside and outside while wearing gloves/mittens provided in the PSK.

(7) Sizing

① Shelter sizing is to be such that there is sufficient floor space for at least 50 % of occupants to lie down while the other 50 % are sitting. This sizing can be based on the size of the mat, if mat insulations are used.

② The inner surface of the roof is to be such that a 2 m tall person can move about on his/her knees without contacting the ceiling. This is an average height of approximately 1,5 m from floor to ceiling.

③ There is to be sufficient shelter for 110 % of all persons onboard the vessel.

2.2.3.4 Lifeboats and liferafts

(1) In the case of survival only at sea, lifeboats/liferafts are to be considered as shelters, without the need for additional shelters and without the need to meet the requirements in 2.2.3.3 of the Guidelines.

(2) If a liferaft is used on ice, the polar water operation manual and Polar survival guidance included in the personal survival kit are to contain procedures for verifying/ensuring ice thickness, and the ice thickness is to be sufficient to support the mass of the fully loaded liferaft as

well as all occupants and equipment.

(3) When used on ice or land, liferafts or lifeboats must comply with the requirements specified in 2.2.3.3 to 2.2.3.4 of the Guidelines. For relocation to ice or land areas, these vessels may serve as shelters. The equipment is to be designed for direct placement on ice surfaces or manual towing to land/ice locations, ensuring stable docking on relatively flat or horizontal surfaces.

2.2.3.5 Thermal protective aids or similar

Thermal protective aids are to meet the requirements of 2.5.1 in LSA. If an emergency blanket is made of waterproof material and has the thermal conductivity specified in paragraph 2.5.1 of the LSA Code, it may be used as a substitute for the thermal protective aid (TPA) in group survival kit.

2.2.3.6 Sleeping bags and blankets

(1) If survival is expected to take place on ice or land, one sleeping bag is to be provided for every two persons on board the vessel. Persons onboard the vessel are to be taken as 110 % of the actual maximum number of persons on board. Sleeping bags are to be in accordance with ISO 23537-1:2022 and be tested with a "comfort" level rating at the PST (-20°C for vessels with a MDLT ≥ -10°C)

(2) If survival is expected to take place only at sea, a sufficient quantity of blankets is to be provided to cover all survivors and to have a thermal resistance value of at least 0,310 m2K·W-1 (- 2 clo). A sleeping bag can be used as a blanket, provided it meets these requirements.

2.2.3.7 Foam sleeping mats or similar

(1) This provision applies to group survival kit and liferafts, and does not apply to lifeboats.

(2) The insulation form between the foam sleeping mats or similar equipment and water/ice/ground may be in the form of the insulated bottom of a liferaft, the fixed insulated bottom of a shelter, or an insulation mat. The R-value of the insulation layer is not only to meet the following formula at a minimum, but also comply with the provisions of ASTM F3340-18:2018.

$$R=-0.0896\times TPS+1.8985$$

Where:

R —— Thermal resistance value, m^2K/W;

TPS—— Polar service temperature,°C.

(3) For vessels not intended to operate in low air temperatures (no PST assigned) the minimum WIG insulation R-Value is 3,69 m^2K/W.

(4) If mats are used, the mat is to be large enough for the anticipated size of a person to lie down but not to be smaller than 183 cm x 51 cm. The quantity of mats is to be sufficient for two (2) mats per three (3) people. If mats are used in conjunction with liferafts, the quantity of mats may be reduced to cover the floor area of the liferaft, plus at least one (1) spare mat.

2.2.3.8 Shovels

(1) Shovels can have many uses in a polar survival situation on land or ice, such as shoveling snow against the shelter to increase insulation or digging a hole in the snow for sanitation purposes. A shovel has little use on the water; therefore, this is not applicable to evacuation scenarios where going to land or ice is not considered an option.

(2) Each GSK is to have at least 2 shovels.

(3) Shovel material (blade, shaft, and handle) is to remain non-brittle at the PST (- 20 oc for non-low air temperature vessels).

(4) The shovel is to be designed to be strong enough to withstand the impact of snow and ice, and the weight is to be less than or equal to 2 kg.

(5) The blade area is to be at least 30 cm x 30 cm and the shape is to be suitable for picking up loose granular snow.

(6) The handle is to be suitably sized for use while wearing the protective clothing in the PSK. For ease of storage, the handle can be telescopic or folding, provided it is sufficiently strong and reliable for the expected uses.

2.2.3.9 Sanitation

(1) Sufficient sanitary facilities are to be provided for 110% of the people on board.

(2) Only offshore

Lifeboats and liferafts that do not require landing on land or ice are to be equipped with the following facilities:

① one (1) roll of toilet paper per person per five days of maximum ETR (rounded up to the nearest whole number);

② watertight container or locker for toilet paper, waterproof rating not less than IPX4;

③ hand sanitizer, 50 ml per person per five days. Freezing point of sanitizer is to be at or below the PST (-20°C for non-low air temperature vessels);

④ designated toilet location with a privacy division;

⑤ for non-low temperature operation vessels (MDLT ≥ -10°C):

(a) waste receptacle that can be pumped or dumped to the ocean through the openings, doors, or hatches;
(b) receptacle is to have a means of securing to prevent tipping over in rough weather;
(c) handles are to be fitted for persons using the receptacle in rough weather.

⑥ for low temperature operation vessels (MDLT < - 10°C):

(a) toilet facilities that can be pumped or dumped to the ocean without opening the openings, doors or hatches;
(b) toilet facilities are to be securely fixed;
(c) handles are to be installed in toilets.

(3) Going ashore or to ice

GSKs are to be equipped with the following:

① one (1) roll of toilet paper per person per five days of maximum ETR (rounded up to the nearest whole number);

② watertight container for toilet paper, which is to have a waterproof rating of IPX4 or higher;

③ hand sanitizer, 50 mL per person per five days. Freezing point of sanitizer is to be at or below the PST (-20°C for non-low air temperature vessels);

④ there is to be a small enclosure meeting the requirements of 2.2.3.3 (1),2.2.3.3 (3),2.2.3.3 (4) and 2.2.3.3 (6) of the Guidelines for

every 50 people. Alternatively, the shelter may have a designated area that can be partitioned;

⑤ one toilet seat for every 50 people;

⑥ receptacle with attachments for the toilet seat.

2.2.3.10 Stoves and fuel

(1) The stove is to be used to cook/heat food and liquids, not as a heat source for heating shelters. The stove/fuel is to accommodate the maximum number of people on shore/ice and the maximum expected time of rescue.

(2) There is to be at least one (1) stove unit for each shelter. The number of heating locations on the stove is to be appropriate for the number of persons in the shelter but not to be less than one (1) heating location per 12 persons. A heating location is defined as a position on the stove where a pot or kettle can be positioned for heating food or melting snow/ice, e.g. a burner on a gas stove.

(3) Each heating location on the stove is to produce sufficient heat to boil (100 oc) one (1) litre of water from ambient temperature (21 oc) in five minutes or less at sea level. If the stove has multiple heating locations, each location is to meet the water boiling requirements while all are being tested simultaneously. The amount of fuel required to perform this test on a single heating location is to be considered 1 unit of fuel for the purposes of this subclause.

(4) Protective measures must be implemented to shield heating zones from wind exposure. Snow/ice melting pots or equivalent devices compatible with the provided stoves are to be installed. Each heating zone must contain one pot (with a minimum of two pots per group rescue unit). The pots are to feature insulated handles. A support frame or equivalent must be provided to position drinking mugs specified in Section 2.2.2.8 of the Guidelines for stove heating. When applicable, the frame is to allow simultaneous access to multiple cups.

(5) Four (4) units of fuel, per person per day of the maximum ETR are to be provided, unless hot water heating packs are provided, then the fuel required is to be eight (8) units per person per day of the maximum ETR. Per person is to be taken as 110 % of the actual maximum number of persons on board.

(6) The fuel and ignition system are to be suitable for operation at the PST,

or - 20 °C for non-low air temperature operations. If the stove is electrical and powered by a generator, the generator is to be proven to reliably start and run at the PST or -20°C for non-low air temperature operations.

(7) Fire extinguishers are to be provided in the group survival kit, and the following risks are also to be considered and mitigated:

① Fire in the shelter;

② CO_2 build-up within the shelter;

③ Smoke in the shelter;

④ CO build-up within the shelter;

⑤ Noxious gasses within the shelter.

2.2.3.11 Emergency food and water

(1) The emergency food and water specified in Section 2.2.2.11 of the Guidelines are to be sufficient to support 110% of the crew's needs during the maximum expected time of rescue. These provisions may be fully integrated into personal survival kit without separate group survival kit, or alternatively, provide one day's worth of emergency supplies in personal gear with the remainder stored in group survival kit.

(2) Requirements in LSA may also be considered. The water can be melted using a desalting unit (see 2.2.2.11 of the Guidelines) or a stove (see 2.2.3.10 of the Guidelines).

2.2.3.12 Electric torches (flashlights)

(1) When the performance of the flashlight meets the following requirements, the waterproof flashlight required by the life raft or lifeboat can be used:

① At least one (1) electric torch is to be provided for every shelter. Energy sources (e.g. batteries) and light emitting device (e.g. bulb) are to be suitable for operation at the PST (-20°C for non-low air temperature vessels). If the light emitting device is not

replaceable, two (2) electric torches per shelter are to be provided. If the light emitting device is replaceable, one (1) spare light emitting device is to be provided.

② Sufficient energy resources (e.g. batteries) are to be provided for continuous operation during hours of darkness for the maximum ETR. Hours of darkness can be calculated from the time of sunset to the time of sunrise. If recharging resources are used, the rated capacity of the energy capturing device is to be at least double what is required to recharge the electric torch energy storage if it is completely depleted. For example, if solar panels are used to charge the electric torch during the day, the panels are to be rated for capturing double the amount of energy needed to charge a fully depleted electric torch, considering the hours of daylight available. The energy sources are to be sufficient for no less than 12 hours of continuous use per night and suitable for operation every night for the maximum ETR. If the energy sources are of a manually operated type (i.e. crank style), units are acceptable as long as they can be operated when charge is needed.

③ The electric torch is to be suitable for Morse code signalling (S.O.S.) and is to be capable of being operated while wearing the gloves/mittens provided in the protective clothing.

④ The flashlight is to comply with ANSI/NEMA FL 1:2019 and meet the following requirements:

(a) The light output is not to be less than 90 lm;

(b) light output vs beam intensity is to be between 20 and 100 $cd \cdot lm^{-1}$ (candela per lumen);

(c) The waterproof grade is to be at least IPX7;

(d) impact resistant to 1 metre while at the PST (-20 °C for non-low air temperature vessels).

2.2.3.13 Waterproof and windproof matches

(1) Two boxes of one hundred (100) waterproof and windproof matches are to be provided for each shelter. Matches are to be provided with a watertight enclosure that can be easily opened while wearing the gloves/mittens provided in the PSK.

(2) Additionally, one flint with one strike is to be provided for every shelter.

2.2.3.14 Whistle

Each shelter is to be provided with a whistle that meets the requirements specified in 2.2.2.7 of the Guidelines.

2.2.3.15 Signal mirror

The signal mirror is to comply with the provisions of 4.23 in ISO 18813:2022 or 4.1.5.1.15 and 4.4.8.17 in LSA.

2.2.3.16 Spare personal survival kit

A complete set of personal survival kit as described in 2.2.2 of the Guidelines is to be provided. If the personal survival kit is of different sizes, the relevant equipment included in the group survival kit is to be of larger size.

Section 3 Communication equipment

2.3.1 General requirements

2.3.1.1 This Section specifies the special requirements for communication equipment to be used in polar environment during rescue or survival.

2.3.2 Satellite EPIRB equipment

2.3.2.1 Satellite EPIRB equipment is to meet the requirements of IMO Resolution A.810 (19) "Performance Standard for Self-Floating Satellite Emergency Radio Beacon (EPIRB) Operating on 406MHz".

2.3.2.2 Satellite EPIRB equipment is to be able to operate in polar service temperatures.

2.3.2.3 Satellite EPIRB equipment is to be able to operate for MaxETR (at least 5 days).

2.3.3 9GHz-Radar SART equipment

2.3.3.1 9GHz-radar SART equipment is to meet IMO A.802 (19) Resolution "Performance Standards For Float-Free Satellite Emergency Position-Indicating Radio Beacons (Epirbs) Operating On 406 Mhz".

2.3.3.2 The 9GHz radar SART equipment is to be able to operate in polar service temperatures.

2.3.3.3 The 9GHz radar SART equipment is to be able to operate for MaxETR (at least 5 days).

2.3.4 AIS-SART equipment

2.3.4.1 AIS-SART equipment is to comply with IMO MSC.246 (83) Resolution "Adoption Of Performance Standards For Survival Craft AIS Search And Rescue Transmitters (AIS-SART) For Use In Search And Rescue Operations".

2.3.4.2 AIS-SART equipment is to be able to operate in polar service temperatures.

2.3.4.3 AIS-SART equipment is to be able to operate for MaxETR (at least 5 days).

2.3.5 Two-way VHF Radiotelephone Equipment for Lifeboats and Liferafts

2.3.5.1 Lifesaving craft VHF (VHF) two-way radio equipment is to comply with Annex 1 or Annex 2 of IMO Resolution A.809(19), Performance Standards for Survival Craft Two-Way VHF Radiotelephone Apparatus, and IMO MSC.149(77), Adoption of the Revised Performance Standards for Survival Craft Portable Two-Way VHF Radiotelephone Apparatus.

2.3.5.2 Lifesaving boat and raft two-way VHF radio equipment is to be able to operate in polar service temperatures.

2.3.5.3 Lifesaving boat and raft two-way VHF radio equipment is to be able to operate for MaxETR (at least 5 days).

Chapter 3 Test methods

Section 1 Life-saving appliances

3.1.1 General requirements

3.1.1.1 This Section specifies the test methods for life-saving appliances used in polar environments. The test of relevant life-saving appliances is also to meet the requirements of revised IMO MSC.81(70).

3.1.1.2 Unless otherwise specified, low temperature tests of life-saving appliances are to be carried out at the temperature values recommended in 1.1.4 of the Guidelines, taking into account the effects of the expected minimum environment temperature.

3.1.1.3 Life-saving appliances not listed in this Section are to be tested in accordance with the requirements of 3.1.1.2 of this Section as well as those of the revised IMO MSC.81 (70).

3.1.2 Insulated immersion suit

3.1.2.1 Visual inspection of the structure of the insulated immersion suit.

3.1.2.2 Place the insulated life jacket in a cold chamber at the expected minimum environment temperature for 24 hours, and then the subject is to wear it in polar service temperature and measure the wearing time.

3.1.3 Survival craft

3.1.3.1 Common requirements for survival craft

(1) Check the documents provided by the manufacturer, and open the food with the gloves of the immersion suit to check whether there is any inconvenience.

(2) Check the documents provided by the manufacturer and open the fresh water with the gloves of the immersion suit to check whether there is any inconvenience.

(3) Visual inspection of survival craft equipment.

(4) If spare personal and group survival kit is provided, visually check whether all the equipment on the survival craft and the storage space for personal/group survival kit is sufficient.

(5) Survival craft carry all equipment, approved crew members are dressed in polar clothing and sit on them. In this case, visually check whether

all seated persons have sufficient space and headroom, and count the number of seats.

(6) Measure the internal temperature of survival craft in polar service temperatures and check the documentation provided by the manufacturer for contact surface materials.

(7) If applicable, turn on the heating device of the life raft and run continuously for 5 days or MaxETR.

(8) Requirements in 2.1.3.1(8) ~2.1.3.1(11) of the Guidelines are to be checked with the manufacturer's documentation.

3.1.3.2 Lifeboats

(1) Load the lifeboat with its engine installed with a mass equal to that of all its accessories, plus an additional ice load of 30 kg/m^2 and an additional ice load of 7.5 kg/m^2 on the projected side area of each side of the lifeboat. Half of the approved number of occupants of the lifeboat are to be seated in their specified positions on one side of the lifeboat's longitudinal centerline. Then measure the freeboard at the low gunwale; the freeboard is not to be less than 1.5% of the lifeboat's length or not less than 100 mm, whichever is greater.

(2) Install all accessories and transmission devices used on the boat onto the boat engine. Place the boat engine, together with its fuel and lubricating oil, into a cold chamber set to the polar service temperature. At the start of the test, measure the temperatures of the fuel and lubricating oil; these temperatures are not to be higher than the polar service temperature. Collect samples of each liquid at this temperature and place them in containers for observation. Start the boat engine three times. For the first two starts, allow the boat engine to run for a sufficient period to demonstrate that it can operate at the service speed. After these two starts, stop the engine and wait until all its components return to the temperature of the cold chamber. After the third start, let the engine run continuously for at least 10 minutes. During this period, operate the transmission device through all gear positions of the gearbox.

(3) For the requirements in 2.1.3.2 (3) ~2.1.3.2 (8) of the Guidelines, check the manufacturer's documentation.

3.1.3.3 Liferaft

(1) Visual inspection of the liferaft to see if it is equipped with a device for

lowering or pulling it onto the ice.

(2) When the liferaft is loaded with a mass equal to that of its approved number of occupants and accessories, and is on an even keel (with equal draft at the bow and stern), measure its freeboard height.

(3) Lifeboats carrying all equipment and all crew are to be carried out in accordance with the method specified in 5.9 of the revised IMO MSC.81 (70).

(4) Place the packaged inflatable raft in a cold chamber at the expected minimum environment temperature for at least 24 hours, and then pull the first cable to inflate the raft at polar service temperatures.

(5) The liferaft is to be loaded with the test load in a cold chamber, and the bottom of the liferaft is not to be inflated. The fully loaded inflatable liferaft is to be kept suspended for at least 5 minutes. If the liferaft must be removed from the cold chamber for suspension, it is to be suspended immediately after being taken out of the chamber. During and after the test, the inflatable liferaft is to remain suitable for its intended use.

3.1.4 Survival craft lights

3.1.4.1 Divide 12 survival craft external lights and interior lighting lights that have undergone temperature cycling into groups of 4. Take 4 lights of each type to operate at the polar service temperature; 4 lights of each type to operate at a temperature of +65°C; and 4 lights of each type to operate at ambient temperature. Measure the continuous luminous intensity in all directions of the upper hemisphere and the operating time at the polar service temperature. If it is not possible to measure the continuous luminous intensity at the polar service temperature, the minimum battery voltage of the survival craft lights during their operation at the polar service temperature may be measured, and the luminous intensity of the survival craft lights is to be measured at room temperature based on this voltage.

3.1.4.2 Perform tests at polar service temperatures according to MaxETR. If there are multiple indicator lights or battery packs, measure the luminance of each indicator light and the total working time of all indicator lights or battery packs.

Section 2 Survival kit

3.2.1 General requirements

3.2.1.1 The test methods for PSK and GSK are to be carried out in accordance with the requirements of this Section.

3.2.2 Personal survival kit

3.2.2.1 Visual inspection of equipment in personal survival kit.

3.2.2.2 Carrier bag

(1) After loading all survival kit (excluding immersion suits/anti-exposure suits) into the personal survival kit carrier bag, weigh the entire personal survival kit carrier bag.

(2) Put all the survival kit into a carrier bag, seal the carrier bag and check the condition of the carrier bag.

(3) Place the empty carrier bag on the water and turn all possible sides of the carrier bag to contact the water surface. Then take the carrier bag out to check for any water in the interior of the carrier bag.

(4) The material of the carrier bag is to be carried out in accordance with the following methods:

① For ships sailing in the lowest MDLT of-10°C or more, put the carrier bag into -10°C for 24 hours and check the carrier bag status;

② Or check the condition of the bag after 24 hours at the expected minimum environment temperature.

(5) Check the material certificate document of zipper/closure provided by the manufacturer.

(6) Put the carrier bag with all the survival kit into fresh water and check its condition.

(7) Visually check whether the carrier bag has a shoulder strap.

(8) Check whether a carrier bag with a strap or other means is fitted to the immersion suit or anti-exposure suit to see if it can be carried together.

(9) Visually inspect the label of the carrier bag.

3.2.2.3 Protective clothing

(1) After the test subject has put on all the protective clothing, visually inspect the coverage area of the protective clothing; after putting on the goggles, visually inspect the coverage area of the protective clothing again. Check the certification documents for the protective clothing materials provided by the manufacturer.

(2) Check the type and quantity of protective clothing.

(3) The gloves are to be checked with the relevant certification documents provided by the manufacturer. After wearing the gloves, wear the appropriate insulated gloves. After wearing the gloves, use the tools in the personal survival kit one by one, and check whether there is any inconvenience in using the gloves.

(4) The shoes are to check the relevant certification documents provided by the manufacturer.

3.2.2.4 Skin protection cream

Skin protection cream is to check the relevant certification documents provided by the manufacturer, and visually check the volume of the sunscreen, check the container distribution of the sunscreen. If sunscreen products are provided, check the relevant certification documents provided by the manufacturer.

3.2.2.5 Thermal protective aid

Thermal protective aid is to be tested in accordance with the methods specified in 4.4.2 of ISO 18813:2022 and 3.3 of IMO MSC.81(70).

3.2.2.6 Eye protection

(1) Goggles are to check the relevant certification documents provided by the manufacturer.

(2) Check the form of the goggles, so that the optical glasses are worn below the goggles.

3.2.2.7 Whistle

(1) Check the whistle material certification document provided by the manufacturer and visually observe the whistle shape.

(2) Blow the whistle according to the instructions provided by the manufacturer and identify the tone.

(3) Hold the whistle with bare hands, wearing survival suit and/or mittens, and check whether it is convenient to hold.

(4) Whistles are to be tested in accordance with the method 5.7 of ISO 12402-8:2020.

3.2.2.8 Drinking mug

(1) Check the certification documents for the drinking mug materials provided by the manufacturer, and visually inspect the shape of the drinking mug and its lid. Place the drinking cup on the stove equipped in the group survival kit and check whether it is stable.

(2) When wearing the insulated gloves/mittens provided in the protective clothing, the drinking mug is to be used with one hand without any

inconvenience. Insulated gloves/mittens of various sizes are to be used for this test.

3.2.2.9 Multi-tool (foldable knives)

(1) Check the material certification documents of multi-tool provided by the manufacturer, and weigh the multi-tool and packaging as a whole.

(2) Visually inspect the types of tools included in the multi-tool and measure the length of the locked knives.

3.2.2.10 Polar survival guidance

(1) Check the polar survival guidance material certification documents provided by the manufacturer and visually check the form of the polar survival guidance.

(2) Read the polar service temperature related information in the polar survival guidance.

3.2.2.11 Emergency food and water

(1) In accordance with Annex to IMO MSC.l/Circ. 1614/Rev.1, verify the quantity and type of food, water, and anti-seasickness medication as specified in Sections 3.2.2, 3.2.3, and 3.2.4, along with checking the quantity of multivitamins. If the group survival kit or other life-saving appliances contains remaining supplies of food, water, and anti-seasickness medication, check the quantity of food and water in personal survival kit.

(2) Multivitamins are to check the relevant certification documents provided by the manufacturer.

(3) For ships operating in polar areas, check the certification documents of food energy provided by the manufacturer and verify whether the energy requirements per person per day are met. Visually inspect the food packaging.

(4) Check the amount of fresh water. For those who provide de-salting apparatus or means to melt ice or snow, check whether there is a large enough tank or container.

(5) Check the relevant certification documents provided by the manufacturer of the desalination device. Check whether the water supply system is equipped with additional water purification tablets.

(6) Check the relevant certification documents provided by the manufacturer of the water container.

3.2.3 Group survival kit

3.2.3.1 Visually inspect the equipment in personal survival kit.

3.2.3.2 Group survival kit containers

(1) The group survival kit container is to undergo the following tests:

① If the planned evacuation scenario is a lifeboat/liferaft left on the water, and if the group survival kit container is contained in the lifeboat/liferaft, the following tests are not required.

② If a group survival kit container is used to load and store the group survival kit in lifeboats/liferafts, the container is to be moved into the lifeboat/liferaft. Inspect for any obstructions or potential damage. Visually inspect the storage space of the lifeboat/liferaft (this test is unnecessary if the lifeboat/liferafts are not equipped).

③ When the group survival kit container is deployed on the outside of a lifeboat/liferaft, the following tests are to be carried out:

(a) Examine the visual connection between the group survival kit container and lifeboat/raft. When the container is loaded with survival kit and floating near the lifeboat/liferaft, retrieve the equipment from the container and check for any inconvenience.

④ The group survival kit container (including the container shell, painter, attachments and handle) is to be tested as follows:

(a) Drag a container full of survival kit at a speed of 5.5 km/h (3 kn) by painter and impact it against a hard vertical surface to check whether the container (including the shell, painter, attachments and handles) is damaged;

(b) Move (slide) the container by hand and impact it against a hard vertical surface to check for damage to the container (including the shell, painter, attachments and handle).

(2) The waterproof level of the group survival kit container is to be tested according to the method in 14.2.7 of GB/T 4208:2017. The container is to be placed in water with full load to test whether it floats. The color of the container is to be visually inspected and see whether there is any reflective material.

(3) Wear mittens/gloves in the group survival kit and open all openings in the container to check for any inconvenience.

(4) Four people move the group survival kit container from the water surface onto a 10 cm-high platform. Visually inspect whether tools that facilitate the transition over the ice edge are provided. If any winch is used to pull the container of the group survival kit onto the ice, visually inspect the number of anchors and steel cables. Visually check if the bottom of the container is smooth, and have two people slide the container on a smooth surface or ice surface to test whether it slides easily. Visually inspect whether the container is equipped with handles, and test for any inconvenience when using the handles while wearing gloves/mittens from the personal survival kit. When the air temperature is at the polar service temperature (-20 °C for ships navigating in non-cold temperature environments), the fully loaded group survival kit is to be towed at a speed of 5.5 km/h (3 knots) and collided with a hard vertical surface; check whether the container structure is damaged.

(5) Check the manufacturer's material certificate for the shell and all fittings of the group survival kit container.

(6) If group survival kit container is launched using a launching device, verify its power system and review the manufacturer's documentation specifying the power specifications. The launching device for launching the equipment must undergo testing according to Chapter VI of the LSA, with temperatures set at PST (- 20 °C for non-low air temperature vessels).

(7) Place the container loaded with group survival kit into the water and check its floating condition. If the group survival kit container is located on the open deck, check whether it is equipped with a hydrostatic release unit.

(8) If the design of the group survival kit container requires personnel to climb onto its top, check whether the container is equipped with anti-slip strips. If the container is stored on the open deck of a ship, check the certificate provided by the manufacturer that guarantees the items stored inside the container will not be damaged by freezing.

(9) Painter line is to be tested together with the container as in 3.2.3.2(9) of the Guidelines. The length of painter line is to be measured.

(10) Examine labels, signs or similar instructions on the exterior of the group survival kit container.

(11) If the group survival kit is distributed into several containers and composed of multiple containers/parts, check whether there are labels on the containers/parts for identification.

3.2.3.3 Shelters

(1) Protection from environment

Visually inspect that the structure of the shelter is capable of being closed and that it is equipped with a ventilation system or a ventilating structure.

(2) Thermal protection

Check the certification documents provided by the manufacturer.

(3) Anchoring

Check to see if the shelter provides anchors and tools to secure them.

(4) Structure

① Check the certification documents provided by the manufacturer.

② Visually check the color of the shelter.

(5) Shelter construction

Check the certification documents provided by the manufacturer.

(6) Shelter closures

Wear gloves/mittens provided by the PSK to operate inside and outside the shelter and check for any inconvenience.

(7) Sizing

① Measure the internal dimensions of the shelter, verify and calculate the dimensions based on the number of people the shelter can accommodate. Among these, the lying area is to be calculated in accordance with the method specified in Clause 5.1 of GB/Z 27735:2022, and the sitting area is to be calculated at a minimum of 0.45 m^2 per person.

② Measure the height of the three lowest points of the shelter and take the average value; this average height is not to be less than the "upright kneeling height" for a person with a height closest to 2 meters specified in Appendix B of GB/T 10000:2023. Measure the height of the three highest points of the shelter, and randomly measure the height of three points of the shelter; calculate the

average value of the above nine points.

③ Check the number of people the shelter can accommodate as provided by the shelter manufacturer, and calculate the total accommodation capacity based on the number of shelters. Compare the calculated result with 110% of the ship's personnel (if the ship for which the shelters are equipped has not been determined, this test is not required).

3.2.3.4 Lifeboats and liferafts

(1) In the case of only sea survival, the following tests are not required.

(2) If a liferaft is used on ice, visually check whether there are procedures to verify/ensure the thickness of the ice in the polar water operation manual and polar survival guidance for personal survival kit.

(3) If a liferaft or lifeboat is used as shelter on ice or land, the tests in 3.2.3.3-3.2.3.4 of the Guidelines are to be carried out.

3.2.3.5 Thermal protective aids or similar

Thermal protective aids are to be tested in accordance with the method specified in GB/T 11048:2018. If emergency blankets are used as a substitute for thermal protective aids, they are also to be tested in accordance with the method specified in GB/T 11048:2018.

3.2.3.6 Sleeping bags and blankets

Check the certification documents provided by the manufacturer.

3.2.3.7 Foam sleeping mats or similar

(1) Check the material certification documents provided by the manufacturer.

(2) If mats are used, the dimensions of the mats are to be measured. If the mats are used together with the liferaft, the number of the mats is to be checked.

3.2.3.8 Shovels

(1) Check the number of shovels in the GSP.

(2) Check the material certification documents provided by the manufacturer.

(3) Measure the blade area and visually observe the blade shape.

(4) Wear the protective clothing in the group survival kit and use the shovel through the handle to check for any inconvenience and visually check the type of handle.

3.2.3.9 Sanitation

(1) Calculate the total number of people the sanitary facilities can serve based on the facilities, and compare the calculated result with 110% of the ship's personnel (if the ship for which the facilities are equipped has not been determined, this test is not required).

(2) Only offshore

The following tests are to be carried out for lifeboats and liferafts that do not require landing on land or ice:

① Visually check the number of toilet paper rolls.

② Check the material certification documents provided by the manufacturer.

③ Check if the toilet has a privacy division.

④ For ships sailing in non-low temperature environment (minimum daily average low temperature is higher than or equal to-10°C), the following facilities are to meet:

(a) To visually observe whether the waste container can be pumped or dumped into the ocean through its opening, door or hatch;

(b) To visually check whether the container is equipped with a fixing device;

(c) To visually check whether the container is equipped with a handle.

⑤ For non-low temperature operation vessels (MDLT ≥ -10°C):

(a) Check the condition of openings, doors or hatches when pumping or emptying waste receptacle;

(b) Check that waste receptacles are securely connected;

(c) Visually check whether the toilet is equipped with a handle.

(3) Going ashore or to ice

The following tests are to be carried out on GSK:

① Visually check the number of toilet paper rolls.

② Check the material certification documents provided by the manufacturer.

③ The enclosure is to be tested in accordance with the methods specified in 3.2.3.3 (1), 3.2.3.3 (3), 3.2.3.3 (4) and 3.2.3.3 (6) of the Guidelines. Calculate the number of people it can accommodate (if the ship for which it is equipped has not been determined, the test is to be conducted based on the applicable number of people provided by the manufacturer). Alternatively, visually inspect whether the shelter has a designated area that can be partitioned into separate sections;

④ Visually inspect the number of toilet seats (if the ship for which they are equipped has not been determined, the test is to be conducted based on the applicable number of people provided by the manufacturer);

⑤ Visually check the toilet seat container.

3.2.3.10 Stoves and fuel

(1) The type, number and quantity of fuel for the stove are to be visually observed.

(2) Visually observe the number of stove units and the number of heating locations in the shelter.

(3) Check the material certification documents provided by the manufacturer.

(4) Visually inspect whether the protected heating location is equipped with a method to shield against wind. Visually check for the presence of a pot or equivalent device for melting snow/ice, place it on the stove, and test whether it can function properly. Visually inspect the number of pots and check if they are equipped with heat-insulating handles. Place the drinking cups on the stove for heating using a stand or equivalent, and test whether the stand can be used to remove multiple cups simultaneously.

(5) Measure the amount of fuel. Compare the measurement result with 110% of the ship's personnel count (if the ship for which the fuel is equipped has not been determined, the calculation and test are to be conducted based on the applicable number of people provided by the manufacturer).

(6) Check the material certification documents provided by the manufacturer.

(7) Visually check whether the group survival kit is equipped with a fire extinguisher. Check the shelter instructions or manufacturer's certificate.

3.2.3.11 Emergency food and water

(1) Check the quantity of emergency food and water and compare the measurement results with 110% of the ship's crew (if the equipped ship is not determined, calculate and test according to the number of people provided by the manufacturer). Check the provision of emergency food and water in PSK and GSK.

(2) Check whether there is a desalting device or stove.

3.2.3.12 Electric torches (flashlights)

(1) When the waterproof flashlight required on the liferaft or lifeboat is applicable, the following tests are to be carried out:

① Check the number of flashlights inside the shelter and review the certification documents provided by the manufacturer. If the light-emitting devices are non-replaceable, check that there are no fewer than 2 flashlights in the shelter. If the light-emitting devices are replaceable, check whether spare light-emitting devices are provided.

② The flashlight is to operate continuously, and its operating time is to be measured—with a minimum of 12 hours counted as one day. The provided energy sources (e.g., batteries) may be replaced during this period. If the flashlight is used in polar night conditions, its continuous operating time is to be measured separately. If rechargeable energy sources are used, check the rated capacity of the energy harvesting device and review the certification documents provided by the manufacturer regarding the capacity of the flashlight's energy storage unit. If the energy source is manually operated (e.g., crank-type), test whether the flashlight can operate normally when charged manually.

③ Operate the flashlight while wearing gloves/mittens provided in the protective clothing, and visually check for a Morse code signal on the flashlight (S.O.S.) Three short, three long, three short.

④ Check the certification documents provided by the manufacturer.

3.2.3.13 Waterproof and windproof matches

(1) Check the number of windproof matches in each box at the shelter and verify the quantity of matches per box. Verify the waterproof integrity of match casings using manufacturer documentation. Put on gloves/connected-finger gloves provided with personal survival kit, open the match box, and inspect for any operational issues.

(2) Check whether the shelter is equipped with flint.

3.2.3.14 Whistle

Check whether the shelter is equipped with a whistle and test it according to the method in 3.2.2.7 of the Guidelines.

3.2.3.15 Signal mirror

Signal mirror is to be tested according to the method in 4.23 of ISO 18813:2022.

3.2.3.16 Spare personal survival kit

The personal survival kit is to be tested in accordance with the method specified in 3.2.2 of the Guidelines. If the size of the personal survival kit differs, the size of the relevant equipment included in the group survival kit is to be checked.

Section 3 Communication equipment

3.3.1 General requirements

3.3.1.1 This Section specifies the test methods for communication equipment to be used in life-saving or survival in polar environments.

3.3.2 Satellite EPIRB equipment

3.3.2.1 Satellite EPIRB equipment is to be tested in accordance with the methods or other equivalent methods specified in Chapter 6 of IEC-61097-2:2021 "Global maritime distress and safety system (GMDSS) - Part 2: Cospas-Sarsat EPIRB - Emergency position indicating radio beacon operating on 406 MHz-Operational and performance requirements, methods of testing and required test results".

3.3.2.2 Satellite EPIRB equipment is to be tested under polar service temperatures by a low temperature test procedure in accordance with Article 8.4 of IEC 60945:2002.

3.3.2.3 Satellite EPIRB equipment is to be tested according to the maximum expected time of rescue.

3.3.3 9GHz-Radar SART equipment

3.3.3.1 The 9GHz radar SART equipment is to be tested in accordance with the

methods specified in Chapter 6 of IEC 61097-1:2007 "Global maritime distress and safety system (GMDSS) -Part 1: Radar transponder -Marine search and rescue (SART) - Operational and performance requirements, methods of testing and required test results" or Chapter 7 of GB 15216:2021 "Global maritime distress and safety system —Performance and test requirements for marine search and rescue radar transponder", or other equivalent methods.

3.3.3.2 The 9GHz radar SART equipment is to be tested through the low temperature test procedures specified in Article 8.4 of IEC 60945:2002 at polar service temperatures.

3.3.3.3 The 9GHz radar SART equipment is to be tested according to the maximum expected time of rescue.

3.3.4 AIS-SART equipment

3.3.4.1 AIS-SART equipment is to be tested in accordance with the methods specified in Chapters 5-8 of IEC 61097-14:2010 "Global maritime distress and safety system (GMDSS) -Part 14: AIS search and rescue transmitter (AIS-SART) - Operational and performance requirements, methods of testing and required test results" or Chapters 6-9 of GB 43470:2023 "Global maritime distress and safety system-Performance and test requirements for automatic identification system search and rescue transmitter", or other equivalent methods.

3.3.4.2 AIS-SART equipment is to be tested under polar service temperatures by a low temperature test procedure in accordance with Article 8.4 of IEC 60945:2002.

3.3.4.3 AIS-SART equipment is to be tested according to the maximum expected time of rescue.

3.3.5 Two-way VHF Radiotelephone Equipment for Lifeboats and Liferafts

3.3.5.1 The two-way VHF (VHF) radiotelephone equipment for lifeboats and liferafts is to be tested in accordance with the methods or other equivalent methods in Chapter 5 of IEC 61097-12:1996+AMD1:2017+AMD2:2023 CSV "Global maritime distress and safety system (GMDSS) - Part 12: Survival craft portable two-way VHF radiotelephone apparatus - Operational and performance requirements, methods of testing and required test results".

3.3.5.2 Lifeboat raft two-way VHF (VHF) radio telephone equipment is to be tested through the low temperature test procedures specified in Article 8.4 of IEC 60945:2002 at polar service temperatures.

3.3.5.3 The two-way VHF (VHF) radio telephone equipment for lifeboats and liferafts is to be tested according to the maximum expected time of rescue.

Chapter 4 Inspection requirements

Section 1 General provisions

4.1.1 General requirements

4.1.1.1 In addition to meeting the requirements specified in this Chapter, the type approval and product inspection of polar life-saving appliances are also to comply with the provisions on product inspection in Chapter 3 of Part 1 of Rules for Classification of Steel Sea-Going Ships issued by the China Classification Society (CCS).

4.1.1.2 Containers and equipment for PSK and GSK are to be maintained in accordance with the manufacturer's recommendations and expired equipment is to be replaced before expiration.

Section 2 Type Approval

4.2.1 Type approval

4.2.1.1 Type tests are to be carried out in accordance with Table 4.2.1. The life-saving appliances in the Guidelines are also to undergo tests in accordance with the revised IMO MSC.81 (70).

Type test table 4.2.1

No.	Inspection of products	Method
1	Insulated immersion suit	3.1.2
2	Survival craft	3.1.3
3	Survival craft lights	3.1.4
4	Personal survival kit	3.2.2
5	Group survival kit	3.2.3
6	Satellite EPIRB equipment	3.3.2
7	9GHz-radar SART equipment	3.3.3
8	AIS-SART equipment	3.3.4
9	Two-way VHF Radiotelephone Equipment	3.3.5
Note: For Test Item 5, the corresponding test is to be selected based on the specific evacuation plan: If survival is only required at sea, the tests specified in 3.2.3.3 are not required; If survival is required on ice or land and a shelter is available, the tests specified in 3.2.3.4 are not required; If survival is required on ice or land and a lifeboat/liferaft is used as a shelter, all tests are to be		

conducted.

4.2.2 Factory inspection

4.2.2.1 Conduct the specified factory tests on polar life-saving appliances and issue a factory test report. On the basis of reviewing the factory test report, surveyors from the ship inspection agency are to classify polar life-saving appliances that are manufactured with the same process, same materials and in continuous production as one batch. Among them:

(1) The sampling proportion of personal life-saving appliances is 1%, but no less than 2 sets for inspection.

(2) The lifeboat is to be inspected one by one, and the liferaft is to be sampled one at a time according to the model.

(3) Two pieces of personal survival kit and one piece of group survival kit are sampled each time.

(4) The sampling proportion of communication equipment is 5%, but no less than 2 units for inspection.

(5) For certain functional test items, if the product manufacturer has the necessary test conditions, batch inspection may be conducted at the manufacturer's premises upon review and approval by the surveyor of the ship inspection agency, who is also to provide on-site supervision.

4.2.2.2 The factory inspection items are to be carried out according to Table 4.2.2.

Factory inspection item list 4.2.2

No.	Inspection of products	Method
1	Insulated immersion suit	Appearance, IMO MSC.81 (70) Part 2: 2.2
2	Lifeboat	Appearance, IMO MSC.81 (70) Part 2: 5.3.1, 5.3.2, 5.3.3, 5.3.4, LSA 4.6.2.2
3	Liferaft	Appearance, normal temperature pressure filling test, 2 times working pressure test, sealing and safety valve debugging, materials and components certificate, identification
4	Survival craft lights	Appearance, equipment label
5	Personal survival kit	Appearance, equipment label
6	Collective survival kit	Appearance, equipment label
7	Satellite EPIRB equipment	Appearance, equipment label, function confirmation

8	9GHz-radar SART equipment	Appearance, equipment label, function confirmation
9	AIS-SART equipment	Appearance, equipment label, function confirmation
10	Two-way VHF Radiotelephone Equipment	Appearance, equipment label, IEC 61097-7-2018:5.4.1, 5.4.2, 5.4.3
Note: For appearance requirements, refer to LSA; for specific test methods, refer to the revised IMO MSC.81(70).		