

**RULES
FOR TECHNICAL SUPERVISION OF
SEA-GOING SHIPS**

*Part 20 - PROTECTION AT WORK AND
CREW ACCOMMODATION*

2015

CROATIAN REGISTER OF SHIPPING

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By the decision of the General Committee of Croatian Register of Shipping,

RULES FOR TECHNICAL SUPERVISION OF SEA-GOING SHIPS
Part 20 – PROTECTION AT WORK AND CREW ACCOMODATION

have been adopted on 24th December 2014 and shall enter into force on 1st January 2015

REVIEW OF MODIFICATIONS AND ADDITIONS IN RELATION TO 2002 EDITION

RULES FOR TECHNICAL SUPERVISION OF SEA-GOING SHIPS Part 20 - Protection at work and crew accommodation

All major changes in respect to 2002 edition throughout have not been indicated due to extent of changes. Requirements of MLC 2006 have been introduced.

The grammar and print errors, have been corrected throughout the text of the Rules and are not subject to above indication of changes.

The subject Rules includes the requirements of the following international Organisations:

International Maritime Organisation (IMO)

Conventions: International Convention for the Safety of Life at Sea 1974 (SOLAS 1974) and all subsequent amendments up to and including the 2012 amendments (Res. MSC.338(91))
International Convention on Load Lines 1966 (LL 1966) and all subsequent amendments up to and including 1983 amendments (Res. A.514(13))

Resolutions: A.272(VIII), A.330(IX), A.468(XII), A.708(17)

Circulars: MSC.256(84), MSC.266(84) and MSC.337(91)
MSC/Circ.982, MSC.1/Circ.1331 and MSC-MEPC.2/Circ.3

International Labour Organization (ILO)

Conventions: 92, 119, 133, 134, 147, 148, 152 and 186 (MLC 2006)

Recommendations: 142, 155, 156, 160

International Organization for Standardization (ISO)

ISO 5488, ISO 7061, ISO/TR 25417, ISO 2041, ISO R (1996), ISO 717 (2006), ISO 140-3 (2004), ISO 2923 (1996), ISO 4867 (1984), ISO 5488 (1979), ISO 5620-1, ISO 6954 (2000), ISO 7061(1993), ISO 7364 (1983), ISO 7726 (1998), ISO 8041 (2007), ISO 15748-1 (2002) and ISO 15748-2 (2002)

International Organization for Standardization (IEC)

IEC 61672-1 (2002)

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1 GENERAL

1.1 GENERAL REQUIREMENTS

1.1.1 The purpose of the requirements in this Part of the *Rules for technical supervision of se-going ships* (hereinafter referred to as: the *Rules*) of *Croatian Register of Shipping* (hereinafter referred to as: the *Register*) is to provide decent accommodations and recreational facilities for crew and special personnel living and working on board ship, at sea and in port, as well as to ensure for all personnel occupational safety, health protection and prevention of accidents and to establish measures to prevent and/or reduce the risks of exposure to excessive harmful levels of the workplace ambient factors and chemicals, including the risks of injuries and/or diseases that may arise from the use of machinery and equipment.

The requirements provided in the *Rules* are based on the *Register*' interpretation of the Part A requirements and what the *Register* considers satisfactory compliance with Part A requirements of the MLC 2006 Regulations 3.1, 3.2 and 4.3.

The *Rules* are intended for use by vessel Owners / Companies requesting assignment of the additional class notation **PW-CA** by the *Register*.

Application of the *Rules* in respect to statutory interpretations of the Flag State Administration

When authorised by the Flag State Administration the *Register* will act on its behalf within limits of such authorisation. When certifying systems and items of equipment falling under the scope of the *Rules* the *Register* will take into account any specific or additional requirements of the Flag State Administration.

Therefore, the *Rules*, or any part of it, should be applied only if the Flag State Administration has not provided the *Register* with written instruction to apply different interpretation of the particular item. In the case of discrepancy between such national requirements and those of the *Rules* the former shall take precedence.

1.1.2 In addition to complying with the requirements for accommodation spaces and occupational safety, health protection and prevention of accidents on board ship, specified in Sections 2, 3 and 4 of the *Rules*, all ships (see 1.2) shall comply with the requirements of the following Rules of the *Register*:

- .1 *Rules for the classification of ships, Part 4 - Stability;*
- .2 *Rules for the classification of ships, Part 17 - Fire protection;*
- .3 *Rules for technical supervision of sea-going ships, Part 19 - Cargo handling gear and lifting appliances;*
- .4 *Rules for the classification of ships, Part 27 - Chemical tankers;*

as well as to the requirements of International Load Convention, 1966 and SOLAS 74 Ch. III - Life-saving appliances and arrangements, referring to general safety and protection of life on board ship, as applicable, and shall have

an approved *Book on operating instructions for safety at work and health protection* including, but not limited to, instructions (see ILO code of practice: *Accident prevention on board ship at sea and in port, 1996*) for:

- .1 general conditions for safety and health;
- .2 safe access to ship and safe movement about the ship;
- .3 entry and work in enclosed spaces, including permit-to-work systems;
- .4 use of working clothes and footwear and personal protective equipment;
- .5 work on weather deck, in engine room and cargo spaces;
- .6 work involving elevated fire and electric current risks;
- .7 special safety measures for work on weather deck and below deck;
- .8 transport of hazardous cargoes and use of ballast;
- .9 work with harmful, hazardous and irritating substances;
- .10 work aloft, over the side or where there is a risk of falling;
- .11 safety in accommodation area and work in galley, pantry and food stores;
- .12 effects of noise and vibration at the workstations and in the accommodations;
- .13 effects of environmental factors non specified in paragraph .12, including extremely low and high temperatures of any surfaces which may be encountered on board ship;
- .14 unexpected events on board ship and use of emergency equipment; and
- .15 safety and health hazards on special types of ships.

1.1.3 It is a responsibility of the Master and/or person designated by the Master to ensure afterwards, with frequent inspections and checks, the ongoing compliance with required and achieved standards of living, work and safety on board, especially in relation to:

- .1 cleanliness and adequacy of accommodation spaces for living, as well as maintaining them in good condition;
- .2 food provision and drinking/fresh water reserves;
- .3 condition of all stores and equipment for storing provisions;
- .4 storing and supply of drinking/fresh water;
- .5 condition of rooms and equipment intended for preparing and serving meals;
- .6 elimination of unsafe living and working conditions, and, when necessary, continuous improvement of safety at work and health protection.

1.1.4 The results of every inspection and every correction of inadequate and unsafe conditions (see 1.1.3.1 to 1.1.3.5) shall be recorded and be available for review and evaluation. Possible occupational accidents, if any, shall be investigated and reported.

1.1.5 The ship shall have programme(s) for preventing accidents at work, injuries and diseases and for continuous improvement of safety at work and health protection, on board, which take into account all relative precaution meas-

ures (for ships subject to the ISM Code see MSC-MEPC.2/Circ.3 dated 2 June 2006, *Guidelines on the basic elements of a shipboard occupational health and safety programme* (SOHSP)) and, when necessary, utilisation of personal protective equipment in accordance with published national guidelines for managing safety at work and health on board.

1.1.6 One copy of the Maritime Labour Convention, 2006 (MLC 2006), in English or in ship's work language, shall be placed on board and be available to ship's crew and special personnel.

1.1.7 The ship shall have an established procedure for impartial, effective and swift dealing with complaints from the members of the ship's crew and special personnel referring to violation of the requirements of MLC 2006, including complaints concerning the violation of their rights.

1.2 APPLICATION

1.2.1 The requirements in this part of the *Rules* shall apply to new ships and technical floating objects (hereinafter called ships) depending on the type of the ship, gross tonnage, intended purpose, service area, duration of the voyages and/or periods of operation and number of persons on board, as may be specified elsewhere. The application of the requirements of the *Rules* to existing ships is subject to special consideration and decision by the *Register*.

1.2.2 The requirements in this part of the *Rules* shall also apply to existing ships when undergoing substantial reconstruction and/or alterations, i.e. to those parts of the equipment and installations on which such reconstruction and/or alterations have been carried out, insofar as the *Register* deems reasonable and practical.

Notes in respect to application of section 4.7 of the *Rules*

1.2.3 Section 4.7 contains provisions of SOLAS Reg. II-1/3-12 and IMO Code on noise levels on board ships adopted by resolution MSC.337(91).

- .1 The requirements of section 4.7 shall apply to ships of 1,600 gross tonnage and above:
 - 1.1 for which the building contract is placed on or after 1 July 2014; or
 - in the absence of a building contract, the keels of which are laid or which are at a similar stage of construction on or after 1 January 2015; or
 - the delivery of which is on or after 1 July 2018,
 unless the Flag State Administration deems that compliance with a particular provision is unreasonable or impractical.
 - 1.2 on ships delivered before 1 July 2018 and:
 - contracted for construction before 1 July 2014 and the keels of which are laid or which are at a similar stage of construction on or after 1 January 2009 but before 1 January 2015; or

- in the absence of a building contract, the keels of which are laid or which are at a similar stage of construction on or after 1 January 2009 but before 1 January 2015, measures in accordance IMO Res. A.468(XII) shall be taken to reduce machinery noise in machinery spaces to acceptable levels as determined by the Administration. If this noise cannot be sufficiently reduced the source of excessive noise shall be suitably insulated or isolated or a refuge from noise shall be provided if the space is required to be manned. Ear protectors shall be provided for personnel required to enter such spaces, if necessary.

- .2 requirements of section 4.7 do not apply to types of ships as listed in 4.7.7 of the *Rules*.

1.3 DEFINITIONS AND EXPLANATIONS

1.3.1 Definitions and explanations relating to the general terminology are given in the *Rules for the classification of ships, Part 1 - General Requirements, Chapter 1 - general information and Chapter 2 - Survey during construction and initial survey of existing ships*.

In this part of the *Rules* definitions and explanations as specified in 1.3.2 to 1.3.28 shall apply:

1.3.2 Permanent workstation - a position at which one or several tasks constituting a particular activity are carried out by the personnel permanently.

1.3.3 Temporary workstation - a position at which the tasks constituting a particular activity such as control, inspection and maintenance of installations and equipment are carried out by the personnel temporarily.

1.3.4 One-direction passageway - a passageway the width of which is sufficient for passing of one person only, without possibility of passing by.

1.3.5 Two-direction passageways - passageways the width of which is sufficient for passing by.

1.3.6 Stairway - a means of access between various levels, provided with flat steps fitted on inclined stringers.

1.3.7 Single stairway - a stairway without a platform throughout the whole length between two levels.

1.3.8 Double stairway - a stairway provided with a resting platform between two levels.

1.3.9 Ladder - a means of access used for vertical or sloping climbing. It is provided with treads or rungs fitted on appropriate stringers or on the vertical or sloped wall following the climbing.

1.3.10 Accommodation ladder - a means of access between ship and shore. It has the adjustable steps or similar which provide an appropriate foothold for all inclination an-

gles from the horizontal between 0° and 55°, and is permanently secured to the ship's side.

1.3.11 Gangway - a means of access between the ship and shore or between two ships. It has a flat walkway with means to prevent slipping and is appropriated for small angles of inclination.

1.3.12 Liquid cargoes - means crude oil, petroleum products and other flammable liquids which may present fire hazard.

1.3.13 Flammable liquid - a liquid having the flash point up to, and including 61°C (closed cup test).

1.3.14 Tank washing - a procedure of removing sediments remained from oil cargo by steam, sea water, hot water, chemicals or by the oil cargo itself.

1.3.15 Tank cleaning - hand or mechanical procedure of removing sediments remained in tank after washing.

1.3.16 Gas freeing - a procedure which enables freeing the atmosphere in cargo tank of inert gas and of gases and vapours remained from liquid cargo.

1.3.17 Engine room crane and shaft tunnel crane - a mechanically or hand operated gear used for hoisting, lowering and horizontal transporting of engine parts and similar, located above the main and auxiliary machinery and equipment.

1.3.18 Working insulation - an insulation necessary for operation of installations providing basic protection against electric shock.

1.3.19 Double insulation - an insulation applied in electrical equipment with accessible metal parts achieved in a way that additional insulation is provided on working insulation which, irrespective of working insulation effect, provides protection against electric shock in case of damage of working insulation.

1.3.20 Increased insulation - an insulation between the parts under voltage and accessible metal parts. It is stronger than the working insulation by its mechanical or electric properties and is equal to the double insulation.

1.3.21 Accommodation spaces - crew and special personnel living and rest accommodations including: sleeping rooms (cabins), public spaces, sanitary spaces, service spaces, medical spaces, offices etc.

1.3.22 Public spaces - spaces used for mess-rooms, day rooms, recreational spaces, etc.

1.3.23 Sanitary spaces - toilets, washing rooms, bath-rooms, dressing rooms, etc, common and personal.

1.3.24 Service spaces - galleys, pantries, bakeries, provision store rooms, handy provision stores (larders), etc.

1.3.25 Medical spaces - spaces intended for providing medical aid such as:

- .1 hospital - space intended for medical treatment and stay of patients;
- .2 dispensary - a room intended for check up of patients;
- .3 medical cabinet - a room or a locker intended for storing of medicines and medical equipment.

1.3.26 Lifting appliances - cranes, derricks, davits, blocks and sheaves, etc. intended for the ship's service such as lifting and replacing of machinery, installations, equipment, spare parts, provisions, fishing nets, etc.

1.3.27 Noise - all sound (audible air pressure fluctuations) generated by ship's machinery, systems or structure which, at the certain level, can result in hearing impairment or be harmful to health or otherwise dangerous (frequency range 20-20,000 Hz). For basic noise definitions see ISO/TR 25417.

1.3.28 Vibration - any oscillation/vibration (structural motion) which is transmitted to the human body through solid structures and may be harmful to health or otherwise dangerous (frequency range 1.0 - 80 Hz). For basic vibration definitions see ISO 2041.

1.4 SCOPE OF SURVEY (INSPECTION) AND TECHNICAL DOCUMENTATION

1.4.1 General requirements for survey during construction are given in the *Rules for the classification of ships, Part 1 - General requirements, Chapter 2 - Survey during construction and initial survey of existing ships, Sec. 1.*

Technical documentation to be submitted to the *Register* for review and/or approval, as applicable, is specified as follows:

- .1 General arrangement and specification of equipment for accommodation, public, sanitary, domestic and medical spaces.
- .2 General arrangement of fixed and removable rails, handrails and life lines including specification and design details.
- .3 General arrangement of stairways, platforms and ladders including specification and design details.
- .4 Accommodation ladders and gangways.
- .5 Thermal and acoustic insulation plan (including calculations and design details).
- .6 General arrangement of ventilation, air conditioning and heating (including calculations and design details).
- .7 Plan of warnings and name plates.
- .8 Elaboration on sufficient illumination.
- .9 Elaboration on noise level.
- .10 Hoists and lifting appliances intended for ship's service.
- .11 Passengers and cargo lifts.
- .12 Arrangements of oxygen and acetylene bottles storage room and piping system.
- .13 Arrangements and piping for drinking/fresh water.
- .14 Elaboration on vibration level.

1.4.2 Before starting a construction of the new ship or the reconstruction and/or alteration of the existing ship, the relevant drawings and information relating to the accommodation spaces and occupational safety, health protection and prevention of accidents shall be submitted to the *Register* to be reviewed for compliance with applicable requirements (see 1.1.2).

The drawings and information submitted shall include, but not necessarily be limited to, the following:

- .1 general arrangement plan of the ship;

- .2 detailed plans and/or information concerning the location, arrangement and equipment of the accommodation spaces, control stations, machinery spaces, cargo spaces, workshops, means of access, passageways and workstations; and
- .3 information about ventilation, heating and air-conditioning system, thermal and noise insulation, electrical shock and radiation protection, health protection, food and water supply, lifting appliances, personal protective equipment, inscriptions and warning notices, etc.

1.4.3 During the construction or the reconstruction and/or alteration of a ship and prior to the entering service, the “as built” arrangement for items covered under 1.4.2.1 to 1.4.2.3 shall be checked and inspected against the reviewed documentation (see 1.4.2).

1.4.4 Subject to supervision by the *Register* during manufacture are:

- .1 means of access (gangways, accommodation ladders and similar);
- .2 lifting appliances (engine room cranes, provision cranes and similar);
- .3 insulation materials and products; and
- .4 other appliances and equipment for which the *Register* might consider that supervision is necessary.

2 OCCUPATIONAL SAFETY REQUIREMENTS

2.1 WORKSTATIONS

2.1.1 Workstations and means of access to such positions and utilisation of equipment and machines on board ship shall be free and protected from everything imperilling health and life of the crew and special personnel, such as slipping, falling, burns, electric shocks, injuries from movable parts of the machinery, weathering factors, excessive noise, harmful vibrations, excessive temperature and excessive or insufficient draught (see 4.1 to 4.10). A suitable safe access shall be provided to the equipment and installations for the purpose of inspection, maintenance and repairs, including equipment and installations located at elevated positions and in narrow spaces.

2.1.2 A clear head-room of not less than 2,030 mm shall be ensured at permanent workstations to enable a person to work in standing posture; this height may be reduced to 1,850 mm in temporary workstations. At temporary workstations where the work is performed for a short time, such height may be reduced to 1,600 mm. Workstations shall be such that the person employed shall not be exposed for a longer period to dangerous and uncomfortable posture and/or cause excessive efforts.

2.1.3 The equipment in permanent workstations such as in wheelhouse, engine control room, radio room and similar shall be arranged so that undisturbed movement of at least hand length shall be enabled. Means of control as well as control equipment shall be so arranged as to be easily operated from the posture when performing the work. Means of control shall be such that no accidental starting of equipment and installations shall be possible. At permanent workstations where the work is mostly performed in standing posture, except on the navigating bridge, a sitting place is recommended to be provided for resting. At temporary workstations, necessary free movement shall be ensured for the purpose of performing anticipated work. Walls and ceilings in workstations shall be painted in light pastel colours without high reflecting enamel.

2.1.4 Means and devices for controlling machinery as well as measuring instruments and gauges, tanks, covers, manholes, dampers, valves, vent pipes, sounds, hand wheels, levers, starters, switches, circuit breakers etc. shall be clearly marked with inscriptions indicating their purpose.

2.1.5 Means and devices for controlling cranes and winches of cargo handling gear in ships intended for international voyages shall be provided with inscriptions written in the crew native language and in English.

2.1.6 Valves, switches, circuit breakers, levers, wheels etc. shall be provided with indications for the open/close position and/or opening/closing direction.

2.1.7 All piping systems shall be clearly marked/painted indicating their purpose in accordance with the international standards.

2.1.8 Dangerous places close to the passageways and workstations, if cannot be adequately guarded, shall be con-

spicuously marked. In very dangerous places, the additional marks shall be displayed indicating kind of danger.

2.1.9 All marks, instructions, inscriptions and similar shall be fitted in the conspicuous place and shall be clearly and permanently written.

2.1.10 All movable parts of machinery and installations shall be adequately guarded as to avoid accidental touch and injury of the personnel. Guard rails and handholds shall be fitted in dangerous places close to the machinery and devices near passageways and workstations to protect personnel from falling, accidental touch and injuries.

2.1.11 All heated surfaces exposed to accidental touch shall be adequately guarded or insulated so that their temperature shall not exceed 60°C and in places of permanent attendance shall not exceed 45°C. The thermal insulation material shall not give off toxic gases/vapours or offensive odours.

2.1.12 All workstations, devices and means of control, control instruments and means of access to such places shall be so illuminated as to ensure safe performing of work and clear visibility of installations and means of control, marks and inscriptions as well as the data of the instrument readings.

2.1.13 Devices and means of control shall be arranged in accordance with their functions and, where necessary, provided with the corresponding schemes. Control instrumentation shall be arranged and fitted on panels in accordance with the kind of information they offer.

2.1.14 Provision shall be made for adequate work clothes and footwear as well as other protective means for the personnel with respect to the kind of service and danger to which they may be exposed at their workstations.

2.2 MEANS OF ACCESS

2.2.1 General requirements

2.2.1.1 For the safe embarkation and disembarkation, access to the ship's spaces and workstations, machinery and installations, provision shall be made for the suitable means of access and/or passageways. Means of access and passageways shall be of the sufficient strength and safe enough under all normal service conditions of the ship. Means of access which are not of the built-in type and/or permanently secured to the ship's structure shall be securely fixed (sea fastened).

2.2.1.2 Means of access and passageways shall be located:

- .1 at the safe distance from anchoring, mooring and towing equipment as well as from the cargo handling gear; and
- .2 parallel as practicable and as close as possible to the ship's centreline.

2.2.1.3 Floor and deck surfaces in the passageways' areas shall be free from protrusions or obstacles which may cause stumbling, such as eye plates, valves, plugs, pipes, cables, ropes, etc. Where they cannot be avoided, such protrusions and obstacles shall be suitably overbridged and/or conspicuously marked.

2.2.1.4 Inclination of floors and decks in the passageways' areas shall not be inclined more than 10° from the horizontal and shall have an effective non-slip surface.

2.2.1.5 Suitable footsteps, ladders with handhold or stairs with rail, as applicable, shall be provided for access from the lower to the higher level of passageways, when vertical distance between levels is 380 mm or over.

2.2.1.6 Means of access and passageways with limited strength shall have an inscription indicating the permitted load capacity.

2.2.1.7 The floor and deck surfaces in the passageways' areas shall be free from oil and grease. If the grease may be occasionally expected, a box with sand and an appropriate warning sign shall be placed in the near vicinity.

2.2.1.8 Stairways' steps, ladders' and accommodation ladders' footsteps as well as gangways' battens shall be equally spaced apart.

2.2.1.9 The size and design of the steps and footsteps shall be such as to enable safe and comfortable movement along stairways, ladders, accommodation ladders and gangways.

2.2.1.10 Stairways' and accommodation ladders' steps and/or footsteps shall have an effective non-slip surface.

2.2.1.11 For the requirements relating to means of access to the parts of ship's structure and their structural elements, serving during the survey of the ship, see the *Rules for the classification of ships, Part 3 - Hull equipment*, 8.6.

2.2.2 Doors, corridors, passageways and accesses to work spaces and workstations

2.2.2.1 Doors shall be provided for access to the interior of the ship and ship's spaces, including accommodation spaces, control stations, machinery spaces, cargo spaces, except cargo holds and cargo tanks, and other similar spaces which require regular access under normal service conditions of the ship.

Clear opening of doors for access to the ship's spaces and passageways leading to the permanent workstations shall be not less than 600 mm in width, and of the height not less than 1,980 mm, measured from the floor and/or deck level.

2.2.2.2 In places where due to convenience and/or service requirements doors need to be left open, means shall be provided to keep the doors secured in open position.

2.2.2.3 Except for cabins' doors, opening of doors in all spaces, including exterior doors, shall be in the direction of the ship and/or space abandonment.

2.2.2.4 For door coamings heaving height 380 mm or over the footstep and/or platform and handhold on both sides of the bulkhead shall be provided. The footstep with depth of at least 180 mm shall be placed, approximately, at mid-height of the coaming and extended over, not less than, 70% of door clear opening width.

2.2.2.5 Corridors and passageways in the ship's interior and on the weather decks leading to the permanent workstations shall be as smooth as possible, free from sharp construc-

tion edges or protruding devices which may encumber passage and cause injuries to the personnel.

2.2.2.6 Free height of corridors and accesses in ship's interior to the permanent workstations shall be not less than 2,030 mm. Free height of accesses to temporary workstations and to the machinery and equipment service places shall be not less than 1,980 mm.

2.2.2.7 Free width of the two-direction corridors shall be not less than 1,200 mm and that of one-direction corridors not less than 900 mm. The access width to the permanent workstations shall be not less than 800 mm, and that of temporary workstations not less than 600 mm. The free width of the accesses to the machinery and equipment service places shall not be less than 600 mm.

2.2.2.8 In ships of less than 200 gross tonnage, free height and width of corridors in accommodation spaces and accesses to permanent and temporary workstations as well as of the accesses to the machinery and equipment service spaces are subject to special consideration by the *Register* in each particular case.

2.2.2.9 In cargo ships provision shall be made for the passage of not less than 600 mm in width along the cargo holds hatches on the weather deck on either side of the ship, even when the hatch covers are stowed on deck.

A passageway of not less than 600 mm in width, at the fore or aft end of the cargo holds hatches, or a suitable passageway across the hatch covers, shall be provided on the weather deck from one side of the ship to another side.

2.2.2.10 A toe board of not less than 150 mm in height shall be provided at deck and platform ends on the weather decks where bulwark is not fitted.

2.2.2.11 Free height of the stairways passageway measured perpendicularly to the step surface shall be not less than 2,030 mm. In ships of less than 200 gross tonnage the free height of the stairways passageway is subject to special consideration by the *Register* in each particular case.

2.2.2.12 Permanent and temporary workstations located at the height of 500 mm or more above the deck or floor level shall be provided with platform fitted with the toeboard and guard rail. A suitable access to the platform shall also be provided.

2.2.2.13 In cargo ships provision shall be made for safe passage between superstructure and deck houses on the weather deck and between these spaces and spaces located in fore and aft part of the ship, to protect the personnel against rough sea and heavy weather. Such passage may be a tunnel located below the weather deck, gangway raised above the weather deck level, permanent passageway on the weather deck which may include safety rope and/or handholds. The type, design and arrangement of this passage, depending on the freeboard height and the type of the ship, are subject to special consideration by the *Register* in each particular case. (see *International Load Line Convention, 1966*).

2.2.2.14 Where a tunnel is provided below the deck instead of a passageway on deck, for the access to the ship's fore and aft spaces, its unobstructed height shall be not less than 2.0 m, and width not less than 750 mm. Access doors and openings through bulkheads, deep frames and similar shall be not less than 600 mm in width. The tunnel shall have adequate

ventilation and lighting, handholds and/or rails, where necessary.

2.2.2.15 The raised gangway, if provided, shall be fitted at the superstructure deck level and as close as possible to the centreline of the ship. Its walkway shall be of the slip-proof construction and have a free width of not less than 600 mm and guard rail on either side of not less than 1.0 m in height.

2.2.2.16 The permanent deck passageway, if provided, shall be suitably marked and located as close as possible to the centreline of the ship or shall be located on both sides of the ship and shall be not less than 600 mm in width and fitted with guard rails and/or handholds, where necessary, on both sides.

2.2.3 Stairways and accesses to stairways

2.2.3.1 A space (platform) enabling unhindered access to and egress from the stairway shall be provided at the beginning and at the end of each stairway. In the way of platform there shall be no obstacles, passageways, doors, etc.

2.2.3.2 The length of the stairways platform on the weather deck shall be not less than 600 mm and the width not less than that of the stairway. Interior stairways shall be provided with platform of the length and width not less than that of the stairway. Where a bulwark is not provided, a stairway platform on the weather deck shall be fitted with the toeboard of not less than 150 mm in height, or 70 mm if fitted in interior locations.

2.2.3.3 Stairways on the weather deck shall be located not less than 800 mm from the ship's side, except when guarded by shell plating or a bulwark of not less than 1.1 m in height.

2.2.3.4 Fitting of spiral stairways is subject to special consideration by the *Register* in each particular case.

2.2.3.5 Clear width of the stairways, between stringers and/or handholds, within accommodation spaces shall be not less than 700 mm; angle of inclination from the horizontal 50° or less and the steps depth not less than 260 mm.

The steps shall be equally spaced apart and shall have a height of not less than 180 mm and not exceeding 250 mm.

2.2.3.6 The clear width of the stairways in machinery spaces shall be not less than 600 mm; angle of inclination from the horizontal 60° or less and the steps depth not less than 180 mm. The machinery spaces stairways which are rarely used may be inclined up to 70° from the horizontal. Their width shall be not less than 500 mm and the steps depth not less than 160 mm.

2.2.3.7 In ships of less than 200 gross tonnage, the width and angle of inclination of stairways in accommodation and machinery spaces are subject to special consideration by the *Register* in each particular case.

2.2.3.8 Single stairways in accommodation spaces shall be not longer than 2.5 m, i.e. not longer than the tweendeck height, and in machinery spaces not longer than 3 metres, otherwise a resting platform of width and length not less than those of the stairway width shall be provided for every mentioned stairway length or a part thereof.

2.2.3.9 The stairways shall be guarded on both sides by walls, bulwarks and/or guard rails having height of not less than 1.0 m. Rails shall be fitted with at least one midcourse.

2.2.3.10 The walls and bulwarks guarding stairways shall be fitted with handhold on each side at the height of not less than 1.0 m above the steps' level.

2.2.4 Ladders and accesses to ladders

General requirements

2.2.4.1 Ladders shall be located in an easily accessible and conspicuous place and the passageways leading to ladders shall be as straight as possible.

2.2.4.2 Access to the ladders and ladder access hatch shall be of not less than 600 mm in width and without any obstructions.

2.2.4.3 The suitable handholds shall be provided at the upper end of the ladders and, where necessary, the footstep also, enabling a safe ascent and descent from the ladders.

2.2.4.4 Ladders may be vertical (angle of inclination from the horizontal exceeding 70°), or sloping (angle of inclination from the horizontal up to 70°).

The sloping ladders are preferable, wherever practicable.

2.2.4.5 The ladders footsteps shall be equally spaced apart at a distance from, measured vertically, between 200 mm and 300 mm.

The width of the footsteps on vertical ladders, between stringers, shall be not less than 350 mm, and on sloping ladders not less than 400 mm. The sloping ladders shall have a handhold on each side and vertical ladders only when *Register* considers it necessary. The distance between the handholds shall be not less than 500 mm, measured horizontally.

2.2.4.6 In places where ladders are not continuous or change the direction and/or inclination, the resting platform shall be provided and fitted, where necessary, with guard rails.

2.2.4.7 The vertical ladders may have single rung footsteps, while sloping ladders shall be fitted with suitably formed treads or with pairs of rungs.

Cargo holds

2.2.4.8 Cargo holds shall be fitted with at least one access hatch and ladders for the safe and unobstructed access from the weather deck to the double bottom top or cargo hold bottom. Where the general cargo hold is more than 20 metres in length, at least two access hatches and ladders shall be provided and spaced as far apart longitudinally as practicable. In bulk carriers the distance to ladders shall nowhere in the hold be greater than 35 metres.

2.2.4.9 The number of ladders in the bulk cargo holds which do not require personnel access during loading, unloading and carriage of cargo and in cargo holds intended for carriage of dangerous goods, is subject to special consideration by the *Register* in each particular case.

For quick rescue and evacuation of an injured person from cargo holds intended for carriage of dangerous goods see 2.9.12 and 2.9.13.

2.2.4.10 In cargo holds where in accordance with 2.2.4.8 and 2.2.4.9 two or more ladders are fitted and the height between decks or between deck and the cargo hold bottom exceeds 6 metres, at least one ladder shall be of the sloping type. In this case the uppermost 2 m of the cargo space measured clear of the overhead obstructions, and the lowest 4 metres may employ vertical ladders, provided that vertical extent of the sloping ladders connecting those ladders is not less than 2.5 m.

2.2.4.11 Access to the cargo hold shall be gained through special access hatch providing a clear opening of not less than 600 mm x 600 mm measured from the middle of the ladders tread or rung. The edges of deck opening for access hatch shall be well rounded.

2.2.4.12 Treads or rungs shall meet the following requirements:

- .1 the width of the foot-steps, between stringers, shall be not less than 400 mm;
- .2 treads shall be of slip-proof construction and of a depth of not less than 115 mm. The front edge shall be rounded;
- .3 double rungs shall be fitted adjacent to each other on the same horizontal level with the clear gap between them not exceeding 50 mm;
- .4 the rungs shall be made from square steel bar, a side of the square shall not be less than 22 mm. The rungs sharp edge shall be turned upright and the front edge shall be rounded; and
- .5 treads shall be fastened to stringers by the continuous full penetration fillet weld. Rungs shall penetrate the stringers and shall be welded on either side of the stringer.

2.2.4.13 The ladders shall be fitted as follows:

- .1 the vertical ladders shall have in front of the rung a clearance of not less than 750 mm. The sloping ladders shall have a clearance of 1,850 mm measured vertically from the middle of the ladder treads or rungs;
- .2 behind the treads or rungs clearance shall be not less than 150 mm; and
- .3 the vertical ladders stringers shall have clearance of not less than 75 mm.

2.2.4.14 The vertical ladders stringers shall be smooth finished and shall provide a secure handhold. The sloping ladders shall be fitted with bar handholds of 25 mm in diameter. The handholds shall be fitted at the height of 1.0 m measured vertically from the middle of the ladders tread and/or rungs and the clearance between handholds shall be not less than 500 mm. The sloping ladders shall be securely attached to the ship's structure to reduce vibration to a practical minimum, where necessary.

2.2.4.15 The continuous length, i.e. height of the ladders shall not exceed 6 metres. If the length exceeds 6 metres, the

resting platforms shall be provided for every 6 metres of ladders' length or fraction thereof.

2.2.4.16 The resting platforms shall provide a free area of not less than 750 mm x 750 mm and shall be fitted with guard rails having height of 1.0 m above the platform level and at least one course fitted about midway between the rail's top and the platform level. The platform shall be fitted with the toeboard extending to a height of not less than 150 mm.

2.2.4.17 The access hatch coaming of the height 600 mm or over in the interior shall have footsteps from inside in the continuation of the ladder which shall meet the following requirements:

- .1 the footsteps shall terminate at the distance of 450 mm from the coaming top;
- .2 the footsteps width shall be not less than 300 mm and the clearance from its rear side not less than 150 mm; and
- .3 the footsteps shall be of slip-proof construction.

If the top of hatch coaming is of such design that is unsuitable as a handhold, a special handhold shall be fitted on the coaming. The hatch coamings of 900 mm in height and over shall be provided with a footstep and a handhold from outside also.

2.2.4.18 The suitable ladders and/or footsteps with guard rails and handholds, where necessary, shall be provided on either cargo hold end to facilitate passage over tunnel or similar structure.

2.2.4.19 Where the passage tunnel below the deck is used for the access to cargo hold, its unobstructed height shall be not less than 2.0 m and width not less than 750 mm. The access doors and openings through the ship's structure shall have free width of not less than 600 mm. The tunnel shall have adequate ventilation and lighting as well as rails and handholds, where necessary.

Ro-Ro cargo spaces

2.2.4.20 In all ro-ro cargo spaces in which the ships' crew is normally employed, a sufficient number of means of escape, which may include stairways, ladders, doors and/or rows and hatches, leading to the weather deck shall be provided. In no case the number of means of escape shall be less than two and they shall be as widely separated as practicable.

Cargo tanks

2.2.4.21 Cargo tanks having length of 35 metres and above shall be fitted with at least two access hatches and ladders, located as far apart as practicable longitudinally.

Cargo tanks less than 35 metres in length shall be served by at least one access hatch and ladder. The distance to the ladders shall nowhere in the tank be greater than 35 metres.

2.2.4.22 The dimensions of any access hatch shall be sufficient to allow a person wearing a self-contained air-breathing apparatus and protective equipment to ascend or descend the ladder without obstruction and also to provide a clear opening to facilitate the hoisting of an injured person from the bottom

of the tank. In no case shall the clear opening be less than 600 mm x 600 mm.

2.2.4.23 In general, the ladders shall not be inclined from the horizontal at an angle exceeding 70°. The flights of ladders shall be not more than 9 metres in actual length. Where necessary, the part of the ladder for the length of free height of 2 m with respect to the adjacent structure, as well as the bottom part of the ladder for the length of up to 2 m, may be vertical provided that the sloping portion of the ladder is not less than 2.5 m.

Resting platforms of adequate dimensions shall be provided for each ladders flight and at the places where ladders change the angle of inclination.

2.2.4.24 The ladder rungs and platforms in cargo tanks shall be made from square steel bar with a side of 22 mm and with rung sharp edge turned upright.

2.2.4.25 As far as other design/construction requirements for the access hatches, ladders, platforms, rails and handholds for the cargo tanks are concerned, the same provisions shall apply as for the cargo holds.

2.2.4.26 Materials and corrosion protection of ladders, platforms, rails and handholds shall be in accordance with the relevant standards and provisions required for the cargo tank structure.

Cofferdams, dry spaces, ballast tanks, fuel oil tanks, etc.

2.2.4.27 In general, access to cofferdams, dry spaces, ballast tanks, fuel oil tanks and similar spaces shall be gained through the special access hatches providing a clear opening of not less than 600 mm x 600 mm or oval manholes of not less than 600 mm x 400 mm. The access hatches or oval manholes shall be located on the weather deck, as far as practicable.

2.2.4.28 For access to spaces having height of 4 metres or more, which need permanent and/or occasional inspections and maintenances, the fixed ladders shall be provided. In spaces having height of less than 4 metres, the *Register* may permit, where found practicable, fitting of suitably formed footsteps and handholds only.

The arrangement and fitting of ladders, handholds and footsteps necessary to access different parts and locations of these spaces is subject to special consideration by the *Register* in each particular case.

2.2.4.29 The distance to ladders or footsteps serving for exiting from these spaces to weather deck or to adjacent spaces, where provided, shall nowhere in the space be greater than 35 metres. The same shall apply to the exit from the double bottom tanks if the exit is gained through tunnel.

2.2.4.30 The ladders shall not exceed 6 metres in length. When the height of these spaces is more than 6 metres, the resting platforms fitted with a guard rail with height of 1.0 m and at least one course fitted about midway between the rail top and the platform level, shall be provided for every 6 metres of the ladders length or the fraction thereof.

2.2.4.31 To provide access within space (tank) a passageway shall be provided having a free width of not less than 600 mm. For access through vertical openings and ease of movement through the length and breadth of the space, the

minimum clear opening shall be not less than 600 mm x 800 mm and for access through horizontal openings not less than 600 mm x 600 mm. For the openings at a height exceeding 600 mm, the suitable footsteps and handholds shall be provided.

2.2.4.32 As far as other design/construction requirements for the access hatches, ladders, platforms, rails, handholds and/or footsteps for cofferdams, dry spaces, ballast tanks, fuel oil tanks and similar spaces are concerned, the same provisions shall apply as for the cargo holds.

2.2.4.33 For access to fuel oil tanks, lubrication oil tanks and similar spaces, provision shall be made for suitable footsteps and/or handholds. The *Register* may require the fitting of the fixed ladders instead of footsteps, wherever considered necessary due to the tank size and its extension. In general, fuel oil tanks and lubrication oil tanks shall be provided with at least two access oval manholes with clear opening of not less than 600 mm x 400 mm, located as far apart as practicable.

Masts, posts, deck houses and cranes

2.2.4.34 The fixed ladders shall be fitted on masts, posts, deck houses, cranes and similar locations in order to provide safe access to lights, aerials and other equipment, as well as to control posts for cargo handling gear, where it is necessary to climb higher than 2 m above the deck level.

For places located less than 2 m above the deck level the *Register* may allow the footsteps and handholds to be fitted if it is satisfied that they are at least as safe and practicable as the ladders itself.

2.2.4.35 In general, the length of ladders shall not exceed 3 metres. The ladders exceeding 3 metres in length shall be provided with resting platforms.

2.2.4.36 The ladders having length 3 metres or more, located at a height exceeding 3 metres from the deck level or, irrespective to the length and height, if located in such manner as to expose personnel to risk of falling down, into sea or cargo holds and similar, shall be fitted with guard hoops which shall meet the following requirements:

- .1 the hoops shall be equally spaced at intervals not exceeding 900 mm apart and secured by transversal strips equally spaced to the circumference of the hoop;
- .2 the hoops shall have a clearance of 750 mm from the rung to the back of the hoop; and
- .3 the height of the first hoop above the deck level shall not exceed 2 m.

2.2.4.37 The ladders shall be not less than 350 mm in width, with the clearance behind the footsteps of not less than 150 mm.

2.2.4.38 The footsteps shall be spaced at equal intervals not exceeding 250 mm. The footsteps and platforms shall be made from square steel bar with a side of not less than 17 mm and with the bar sharp edge turned upright.

2.2.4.39 Sloping ladders shall be provided with suitable handholds placed on each side and fitted not less than 500 mm apart, measured horizontally.

2.2.4.40 Sloping ladders shall be fitted inside the crane structure for access to crane control post, where practicable.

2.2.4.41 The suitable platform with guard rail having height of not less than 1.0 m and an intermediate course, shall be fitted, where practicable, on masts, posts, deck houses and cranes, as well as on other locations at the height of 500 mm and more above the deck level, where the normal activities are carried out permanently and/or occasionally.

2.2.4.42 Ladders and platforms shall also comply with the following requirements:

- .1 minimum head-room under any obstruction shall be not less than 2 m;
- .2 platform's floor shall be of the slip-proof construction; and
- .3 platform free area shall be not less than 600 mm x 600 mm and shall be fitted with the toe board extending 150 mm in height.

Cargo pump-rooms

2.2.4.43 Access to the cargo pump-room, where provided, shall be from the weather deck. Clear opening for the access to the space shall enable undisturbed passage for a person wearing a personal protective equipment including breathing apparatus.

2.2.4.44 Access ladders, where provided, shall be of the slopping type and so arranged as to ensure unrestricted passage at all times from any platform and from the floor of the space. Where the height of the space is more than 3 metres ladders shall incorporate platforms at intervals not exceeding 3 metres.

2.2.4.45 Guard rails and/or handholds, where necessary, shall be installed on all ladders and platforms.

2.2.4.46 As far as design/construction requirements for the access hatches, ladders, platforms, rails and handholds are concerned, the same provisions shall apply as for the cargo tanks.

2.2.4.47 Unrestricted access, including footsteps and handholds, where necessary, shall be ensured to all valves necessary for cargo handling for a person wearing the required personal protective equipment, including the breathing apparatus.

2.2.4.48 The floor surface in the area of passages and accesses to cargo handling valves and controls shall have an effective non slip surface.

2.2.4.49 Permanent arrangements (see 2.9.12) shall be provided for hoisting an injured person with a rescue line from the space floor and any platform while avoiding any projecting obstacles.

2.2.5 Means of embarkation on and disembarkation from ships

General requirements

2.2.5.1 All ships shall be provided with means for safe and convenient embarkation and disembarkation for use in port and in port related operations, such as gangways and accommodation ladders, in accordance with 2.2.5.4, unless the

Register deems that compliance with a particular provision is unreasonable and/or impractical such as:

- .1 the ship has small freeboards and is provided with boarding ramps; or
- .2 the ship is engaged in voyages between designated ports where appropriate shore accommodation/embarkation ladders (platforms) are provided.

2.2.5.2 The means of embarkation and disembarkation when in use shall be located, as far as practicable, clear of the deck working areas and shipside discharges and shall not be placed where cargo and other suspended loads may pass overhead.

2.2.5.3 Wherever practicable, the means of embarkation and disembarkation shall be the accommodation ladders. Where their use is not practicable, the access on and from ship may be gained by the means of gangway.

2.2.5.4 The construction and installation of the means of embarkation and disembarkation required in 2.2.5.1, including securing to the ship's structure as well as the hoisting and lowering equipment shall comply with requirements as specified in this chapter (see also MSC.1/Circ.1331 dated 11 June 2009, *Guidelines for construction, installation, maintenance and inspection/survey of means of embarkation and disembarkation*) and shall be approved by the *Register*.

2.2.5.5 When the means of embarkation and disembarkation are manufactured from different metallic materials, provision shall be made for the galvanic protection against deterioration or corrosion of the materials.

2.2.5.6 The means of embarkation and disembarkation including their platforms shall be fitted with guard rail on both sides. Unless elsewhere otherwise specified, the rail shall be of not less than 1.0 m in height and shall have not less than one intermediate course fitted about midway, which may be a rope or chain. In this case the rails shall be provided with safety rope net of mesh diagonal which does not exceed 185 mm and the rope diameter of not less than 6 mm. Where the rail is fitted with more than one intermediate course, the maximum distance between rail ropes shall be 380 mm and the clear opening below the bottom rail rope shall not exceed 230 mm. In that case the safety net may be omitted. The distance between rail stanchions shall not exceed 1.5 m.

2.2.5.7 The rails fitted on means of embarkation and disembarkation may be of the fixed or foldable type. When the rails are foldable, the stanchions and rails shall be properly secured against loosening/collapsing.

2.2.5.8 The means of embarkation and disembarkation which in turned out position may rest on quay or similar, shall be fitted with a roller or wheels at the lower end, of 100 mm minimum outside diameter. Roller and/or wheels shall be provided with self-lubricated bearings or fitted with lubrication nipples. Hooks and eyes shall be fitted underneath the means of embarkation and disembarkation for securing the safety net, if provided.

2.2.5.9 The walkway surface of the means of embarkation and disembarkation shall be of the effective slip-proof design.

2.2.5.10 The means of embarkation and disembarkation shall have in readily visible place at each end an inscription

plate showing restrictions on the safe operation and loading, including maximum/minimum permitted design inclination angle, design load, maximum load on lower platform, etc.

Where the maximum operational load is lower than designed load, it shall be also indicated on the inscription plate.

2.2.5.11 The means of embarkation and disembarkation shall be constructed with a safety factor of not less than 2.5 with respect to the yield point of the used materials.

2.2.5.12 Fixed rails which form an integral part of the means of embarkation and disembarkation may be taken into account in calculating their strength.

2.2.5.13 The rails on the means of embarkation and disembarkation shall be calculated for the static load of 50 kg per metre of the rail length or 50 kg per stanchion, whichever is greater, provided that the load is applied horizontally to the top of the rail i.e. of the stanchion.

2.2.5.14 Chains, shackles, eye plates (rings), etc. which are used for suspension or lowering and lifting of the means of embarkation and disembarkation shall have a safety factor against breaking of not less than 5.

2.2.5.15 Fibre ropes shall have safety factor of not less than 8 and wire ropes not less than 6, against breaking.

2.2.5.16 Access deck surfaces and means of embarkation and disembarkation, including controls of the arrangement, shall be properly illuminated and a life buoy with a self igniting light and the buoyant life line of adequate length shall be provided in immediate vicinity, when they are in use.

2.2.5.17 The accommodation ladders and gangways, including the associated winch and fittings, shall be maintained in suitable condition for their intended purpose, taking account of any restrictions related to safe working.

The inspection of accommodation ladders and gangways, including examination and operational testing shall be carried out at appropriate intervals as required by the *Register*, in accordance with manufacturers' instructions (see MSC.1/Circ.1331 dated 11 June 2009, *Guidelines for construction, installation, maintenance and inspection/survey of means of embarkation and disembarkation*).

Gangways

2.2.5.18 A gangway with a flat walkway may be accepted, as means of embarkation and disembarkation, for use at angles of inclination not exceeding 30° from the horizontal.

2.2.5.19 If the gangway exceeding 100 kg in weight is not located within the operational range of the cargo handling gear, the ship shall be provided with the suitable mechanically operated lifting appliance for its transfer and installation.

2.2.5.20 The gangways intended for the cargo loading shall be provided, at the readily visible place, with an inscription indicating the maximum permitted operational angle of inclination in addition to that indicating maximum permitted operational load.

2.2.5.21 Clear width, between guard rails, of one-direction gangway shall be not less than 600 mm. Clear width of two-direction gangway shall be not less than 800 mm. The

gangway used for cargo loading shall be not less than 1,000 mm in width.

2.2.5.22 Toeboards shall be fitted on each side of the gangway to a minimum height of 150 mm. The battens shall be fitted transversally on the gangway walkway at the intervals of not less than 300 mm and not exceeding 400 mm lengthwise, to suit to the maximum permitted operational angle of inclination of the gangway. The battens shall be of a minimum height of 30 mm. A distance between ends of the battens and toeboard shall not exceed 25 mm.

2.2.5.23 The gangway guard rail shall have:

- .1 a rigid handhold; or
- .2 a continuous and adequately tensioned sisal, manila, polypropylene or wire rope. Wire rope shall be plastic covered. Polypropylene ropes shall be resistant against degradation for two years exposure in tropical conditions. Minimum rope diameter shall not be less than 16 mm. The means to retighten such rails shall be provided.

2.2.5.24 One-direction gangway of up to 3 metres in length intended for the use at angle of inclination up to 25° from the horizontal may be provided with the rail on one side only.

2.2.5.25 The eye plates of adequate strength fitted on the deck and the gangway and suitable lashing equipment shall be provided for a gangway securing to the ship's side.

2.2.5.26 Where a gangway rests upon the bulwark or the ship's guard rail, designed for that purpose, a suitable ladder or steps with handhold shall be provided for access to deck level.

2.2.5.27 The strength calculation for the gangway shall correspond to the evenly distributed static load of 0.4 t/m² plus the weight of the gangway. The gangway shall be safe against buckling and shall have adequate local strength. The strength of the gangway intended for the cargo loading is subject to special consideration and approval by the *Register* in each particular case.

2.2.5.28 A gangway prototype shall be load tested in the horizontal position, supported only at both ends, with the test load of 0.5 t/m² evenly distributed. The deflection shall not exceed 1/100 of the gangway length for the steel gangway, or 1/75 for aluminium gangway. After test loading the gangway shall have no permanent deformations.

2.2.5.29 Prior to its use, a gangway shall be tested with the test load in accordance with the requirements specified in 2.2.5.27.

Accommodation ladders

2.2.5.30 The accommodation ladders shall not be used at an angle of inclination greater than 55° from the horizontal, unless designed and constructed for use at angles greater than these and marked as such, as required in 2.2.5.10.

2.2.5.31 Lowering and lifting of the accommodation ladders shall be mechanised. The use of manual operation only may be permitted, while in case of motor drive, provision shall be made for manual operation also. When the lowering and lifting of accommodation ladders are motor operated, the

crank for the manual operation shall be so secured as not to rotate.

2.2.5.32 Accommodation ladders shall have adjustable steps which provide satisfactory footsteps for all angles of inclination between 0° and 55° from the horizontal. Accommodation ladders with fixed, curved steps, are permitted for use at the operational angles between 20° to 50° from the horizontal.

2.2.5.33 The spacing between the steps at the angle of inclination of 55° from the horizontal (50° for the accommodation ladders with the fixed steps) shall not exceed 250 mm with the clear depth of the footsteps not less than 160 mm.

2.2.5.34 Clear width of one-direction accommodation ladders shall be not less than 600 mm and that of two-direction accommodation ladders not less than 800 mm.

2.2.5.35 In all ships accommodation ladders shall be of such length to ensure that, at a maximum design operational angle of inclination, the lowest platform will be not more than 600 mm above the waterline in the lightest sea-going condition (lightest ballast condition of the ship with the most adverse trim).

For ships on which the height of the embarkation/disembarkation deck exceeds 20 metres above this waterline and on other ships for which the *Register* considers compliance with the above provisions impractical, an alternative means of providing safe access to the ship or supplementary means of safe access to the bottom platform of the accommodation ladder may be accepted.

2.2.5.36 The accommodation ladders shall be provided with the lower and upper platform and those of 20 m in length and over shall be provided with an intermediate platform at the distance not exceeding 15 m. The length of the platforms shall be not less than 600 mm and the width not less than the accommodation ladders width.

2.2.5.37 The length of telescopic accommodation ladders shall not exceed 30 m.

2.2.5.38 The accommodation ladders' rail shall be of at least 1.1 m in height, measured at right angle to the longitudinal axis of the ladder, and shall be fitted with a rigid handhold.

2.2.5.39 The strength of the accommodation ladders of 600 mm in width shall be calculated for a static load of 0.075 t per each step plus the weight of the accommodation ladder. Where the width of accommodation ladders is more than 600 mm but not exceeding 1,000 mm, the design load shall be at least equal to static load of 0.15 t per each step plus the weight of the accommodation ladder. The accommodation ladders shall be safe against buckling and shall have adequate local strength. The strength of the accommodation ladders exceeding 1,000 mm in width or of those intended for the cargo loading, is subject to special consideration by the *Register* in each particular case.

2.2.5.40 Accommodation ladders shall be type tested in the horizontal position, supported at both ends only and in a normal way as on board, with the test load of 0.1 t (i.e. 0.2 t for the accommodation ladders exceeding 600 mm in width) per each step. Deflection shall not exceed 1/100 of the accommodation ladder length for steel accommodation ladders, or 1/75 for those of aluminium. After test loading, the accommodation ladders shall have no permanent deformations.

2.2.5.41 Prior to its use, accommodation ladders shall be tested with the test load in accordance with the requirements specified in 2.2.5.39. During the testing the accommodation ladders shall be positioned at the angle of 30° from the horizontal.

2.2.5.42 The distance between the accommodation ladders upper platform and the deck shall not exceed 300 mm and the distance between the platform and the ship's side shall not exceed 40 mm.

2.2.5.43 The upper platform shall provide direct access between the ladder head and the ship's deck securely guarded by guard rail and suitable handholds, where considered necessary, and shall enable the accommodation ladder turning in the horizontal plane from 0° to 90°. The accommodation ladders shall be securely attached to the ship to prevent overturning.

2.2.5.44 The strength of the upper platform and the intermediate platform shall be calculated for the evenly distributed static load of 0.4 t/m² plus the weight of the suspended accommodation ladder with the load as specified in 2.2.5.39, for the most unfavourable position. The lower platform strength shall be calculated for the evenly distributed static load of 0.5 t/m².

2.2.5.45 For the purpose of type approval the platforms shall be tested together with the accommodation ladder. The test load for the upper platform and/or intermediate platform shall be not less than 0.5 t/m² and 50 per cent of the total weight of the accommodation ladder and the lower platform as stated in 2.2.5.40.

During the testing the platform shall be suspended in a normal way as on board and the test load for accommodation ladder and the lower platform shall be applied to the intended points of suspension. The lower platform shall be suspended in a normal way from the accommodation ladder and the test load shall be not less than 0.6 t/m². After test loading, platforms shall have no permanent deformations.

2.2.5.46 Prior to their use, platforms shall be tested on board together with the accommodation ladder with the test load in accordance with the requirements as specified in 2.2.5.44.

Davits, winches and suspension of accommodation ladders

2.2.5.47 When the accommodation ladders are suspended by yokes, the clear height of the passageway below the yokes shall be not less than 2.0 m.

2.2.5.48 Where the total length of the accommodation ladder exceeds 20 metres, the suspension by yokes shall not be permitted. The suspension shall be carried out by means of double steel wires of sufficient strength each so that in case of breaking of one of them, the accommodation ladder is still kept in the suspended position with the load of accommodation ladder and the platforms thereof in accordance with the requirements as specified in 2.2.5.39 and 2.2.5.44.

2.2.5.49 Provision shall be made for special davit and winch of the approved type for the lowering and lifting of the accommodation ladder.

2.2.5.50 The strength of the accommodation ladder davit and winch shall correspond to the design load of the accom-

modation ladder and its platforms in accordance with the requirements as specified in 2.2.5.39 and 2.2.5.44.

2.2.5.51 The construction and testing of the accommodation ladder winch shall comply with the specifications in ISO 7364-1983. The accommodation ladder winch shall be of the self-locking type for the force which is not less than 1.5 times the load as specified in 2.2.5.48.

2.2.5.52 For the purpose of type approval, the accommodation ladder davit and winch shall be tested with the static load specified in 2.2.5.40 and 2.2.5.45.

2.2.5.53 Prior to their use, the accommodation ladder davit and winch shall be tested with a load in accordance with the requirements specified in 2.2.5.50.

2.2.5.54 After installation and static testing, the winch and accommodation ladder shall be operationally tested as the complete accommodation ladder unit through a minimum of two times hoisting and lowering of the accommodation ladder from the lowest to the highest position and turning into the sea-fastening position.

2.3 RAILS AND HANDHOLDS

2.3.1 Rails

2.3.1.1 The passageways and accesses to workstations as well as the decks and platforms areas where the height difference between adjacent levels is 300 mm and more shall be provided with guard rails.

2.3.1.2 The rails on the weather decks shall be not less than 1.1 m in height and in ships of less than 200 gross tonnage operating in service area 6, 7 and 8 not less than 1.0 m in height.

2.3.1.3 The height of the rails in interior locations shall be not less than 1.0 m.

2.3.1.4 Where the height of the rails, to which refers specified in 2.3.1.2, would interfere with the normal operation of the ship's equipment, a lesser height may be accepted if the *Register* is satisfied that adequate protection is provided.

2.3.1.5 Where the deck equipment is placed close to the deck or platform end the rails may be interrupted in such a way that the gap between the rails and the equipment does not exceed 150 mm.

2.3.1.6 The rails shall have a handhold and, on weather decks, at least two courses while in the ship's interior at least one course. The clear opening below the lowest course of the rails shall not exceed 230 mm. The other courses shall be spaced not more than 380 mm apart.

2.3.1.7 The distances between rails stanchions shall not exceed 1.5 m. The stanchions shall be additionally supported, where found necessary.

2.3.1.8 On weather decks with rounded sheer strake, the rails shall be fitted on the flat deck area.

2.3.1.9 Free ends of weather decks and platforms' areas, where not surrounded by walls, bulwarks, coamings or similar, shall be fitted with the toe board of not less than 150 mm in height, in addition to the guard rail. The ends of decks and

platforms in interior locations, except in cargo holds, shall have a toe board of not less than 70 mm in height.

2.3.1.10 Detachable rails and handholds shall be fitted in such a way that they cannot be accidentally loosened or collapsed. Arrangement of detachable rails and handholds shall enable easy and quick installation.

2.3.2 Handholds

2.3.2.1 The storm handholds shall be fitted on the weather decks alongside the passageways, against walls and bulkheads and in interior locations in corridors, stairway trunks and sanitary spaces and, where found necessary, at workstations.

2.3.2.2 The handholds shall be fitted uniformly at the same height from the deck level of not less than 1.0 m, and shall extend continuously as much as possible. The storm handholds shall be fitted at the same height and in continuation of the stairways handholds.

2.3.2.3 The handholds shall be such as to provide safe hold and shall be suitably shaped.

2.3.2.4 Handholds of round profile shall have not less than 25 mm and not more than 42 mm in diameter and those of square profile shall be not less than 40 mm and not more than 70 mm in width.

2.3.2.5 The clearance between the handholds and the walls or another solid parts shall nowhere be less than 50 mm.

2.3.2.6 The rope and chain handholds, where provided, shall be fitted with a tightening device. The fitting of rope and chain handholds is subject to special consideration by the *Register* in each particular case.

2.4 ANCHORING AND MOORING EQUIPMENT

2.4.1 The deck areas in the locations where the anchoring and mooring equipment is arranged shall not be obstructed with other objects or structures which do not serve for anchoring and mooring operations or which disturb control of windlasses and mooring winches in normal use and operations with anchor chains and mooring ropes.

2.4.2 Deck and platform areas surrounding the anchoring and mooring equipment shall have an effective non-slip surface.

2.4.3 Where the height of the bulwark on forecastle exceeds 1.5 m, or is even less but is in-practicably inclined, footsteps and handholds shall be fitted in order for anchors, anchor chains and mooring ropes to be observed when outside of the ship. A footsteps shall terminate at the position not higher than 1.0 m below the bulwark top.

2.4.4 Where necessary, owing to the design and size of windlasses and mooring winches, provision shall be made for elevated fixed platforms, footsteps, rails and/or handholds, as found practicable, to enable safe control of anchoring and/or mooring machinery operation for operators.

2.4.5 The position from which the anchor windlasses and mooring winches are controlled shall be such as to pro-

vide watching of anchor chain passing into chain locker as well as the passing of mooring ropes through fairleads and their reeling onto the mooring winch drum.

2.4.6 The passing of anchor chains through the hawse pipe openings and the storage into the chain locker shall be ensured without requiring manual operation.

2.4.7 Stoppers holding the anchors and anchor chains shall be so designed as to ensure their release easily and safely.

2.4.8 Spare anchor shall be properly secured. The stowage place is recommended to be within the range of cargo handling gear or the anchor shall be in a position that can be freely dropped into the sea.

2.4.9 Hawse pipe openings on deck shall be fitted with a suitably shaped cover or guarded with the rail of not less than 600 mm in height. The rail shall be provided with at least one course fitted about midway.

2.4.10 The releasing arrangement of the anchor chains, in emergency, shall be accessible from outside the chain locker.

2.4.11 Provision shall be made, where practicable, for the water jets fitted in the hawse pipe for washing of the anchor chains. The means of control shall be provided on the weather deck in the vicinity of anchoring equipment.

2.4.12 Position and arrangement of mooring winches, fairleads and bitts shall be such as to ensure the operation of mooring equipment on either side of the ship as well as the safe transfer and throwing of mooring ropes on bitts and rollers.

2.4.13 Vertical distance measured from the middle of the capstan drum to the deck or platform level shall not exceed 1,300 mm. The angle of inclination from the horizontal of the mooring ropes passing from fairleads to bitts shall not exceed 20°.

2.4.14 Baskets, gratings or drums of sufficient capacity shall be provided for the stowage of the mooring ropes.

2.4.15 The mooring rope drums shall be provided with a foot brake and means for automatic stopping which shall prevent uncontrollable unreeling of the rope. The drum operating handle shall be secured against uncontrollable fall and shall automatically be disconnected when the rope start unreeling. The force necessary for the mooring rope reeling onto the drum shall not exceed 240 N.

2.5 NAVIGATING BRIDGE AND WHEELHOUSE

2.5.1 The size of the wheelhouse shall be such as to enable accommodation of all required equipment and installations and of such arrangement which will ensure free movement and safe operation for the personnel in charge.

2.5.2 In ships of 500 gross tonnage or over the clear width of the passageways on the navigating bridge shall be not less than 0.8 m, and in ships of less than 500 gross tonnage, not less than 0.6 m.

2.5.3 The wheelhouse shall have an exit to both sides of the ship and clear access to the navigating bridge wings.

2.5.4 The number and size of the wheelhouse windows shall be such as to ensure good visibility from the wheelhouse over the stem, the stern and the sides of the ship as well as to provide enough daylight in the wheelhouse.

2.5.5 In front of the main navigating and manoeuvring workstations, the wheelhouse windows shall be fitted with the special clear-view windows and/or window wipers and adjustable sunscreens, as well as window heaters, where necessary.

2.5.6 To reduce the daylight reflection, the wheelhouse front windows shall be inclined from the vertical plane top out, at an angle of not less than 15° and not more than 25°.

2.5.7 The lighting of the installations and instruments in the wheelhouse shall have the possibility to be adjusted individually and switched off completely.

2.5.8 The chart table shall be provided with the separate lighting with the possibility to be regulated for its intensity or to be completely switched off.

2.5.9 The chart table is recommended to be turned towards the stem and located at the rear side of the watch officer post.

2.5.10 Wheelhouse and the chartroom, if provided as separate rooms, shall have direct way of communication through a common door.

2.5.11 The door leading to wheelhouse from an interior location shall be provided with a limit switch to switch off the lighting in the access corridor and/or stairway, when opening the door.

2.5.12 Where the distance between the navigating bridge and the area where the anchoring and mooring equipment is situated exceeds 25 metres, such places shall be provided with a talkback communication system.

2.5.13 The navigating bridge wings in the fore part shall be protected with a bulwark of not less than 1.3 m in height. The design and construction of the bulwark shall be such as to provide an effective wind-screen.

2.5.14 Where navigation sidelights are fitted on bridge wings, the access to these lights shall be possible from the wings.

2.5.15 The access on the navigating bridge deck shall be possible by using the outside and inside stairways.

2.5.16 Permanent and temporary workstations on the wheelhouse top shall be provided with suitable protection against rough wind.

2.5.17 In the vicinity of radar antennas and radio equipment the warning notices shall be provided indicating the danger of radiation.

2.5.18 Where necessary, the platform shall be fitted at the front wall of the wheelhouse for the maintenance of installations, as well as washing of windows. The platform shall be provided with guard rail of 1.1 m in height (see 2.3.1).

2.5.19 For general and special requirements regarding work environment and occupational safety of the personnel

working on the navigating bridge and in the wheelhouse see MSC/Circ.982.

2.6 LOOK-OUT POSTS

2.6.1 The permanent look-out posts shall be guarded with fixed and/or removable rails and, where necessary, efficiently protected against heavy weather.

2.6.2 The enclosed look-out posts shall be provided with a talkback communication system with the wheelhouse. Where necessary, these places shall be heated.

2.6.3 The access to look-out posts shall comply with the requirements applicable to access to masts, posts and cranes.

2.7 PROTECTION OF OPENINGS

Hatches

2.7.1 All permanent and temporary openings on decks, bulkheads and ship's sides where there is a danger for personnel of falling down from elevated position or similar, shall be provided with suitable means of closing or, if no coaming of not less than 750 mm in height is fitted, with a guard rail of not less than 1.0 m in height (see 2.7.2), or any other means approved by the *Register*. Such means of closing may not be applied while and where these openings are used.

2.7.2 All cargo hatches in tweendecks, where there is a risk of a person falling from a height of 2 m or more, shall be fitted with a guard rail of not less than 1.0 m in height which may be of a removable type, or shall be provided with a suitable protective net.

The rail shall be provided with a rigid handhold and with at least one course fitted about midway, as well as stanchions fitted at intervals of not less than 2 m and securely fastened. The rail need not be fitted in the way of hatch side which is used for cargo loading and unloading.

2.7.3 Cargo hatch covers and other covers which are not mechanically operated, shall be fitted with suitable means for safe opening, relocating and adjusting into closed position.

2.7.4 All hatch covers shall have a possibility of being secured in open position and those covers which are mechanically operated shall be effectively secured against accidental fall and/or closure in case of failure of the operating device.

2.7.5 Shifting beams shall be provided with stoppers to prevent shifting lengthwise the hatch opening and with suitable means for their securing against the fall into the hold during cargo handling.

2.7.6 Construction of shifting beams and hatch covers and supporting bearings on hatch coamings shall ensure that any horizontal shifting lengthwise shall not cause that its overlapping is less than 65 mm for hatch covers and 75 mm for shifting beams, at any position.

2.7.7 The shifting beams shall be so constructed that the personnel need not come on them for their opening, relocating and adjusting into closed position.

2.7.8 Hatch covers and shifting beams shall be adequately marked with deck and hatch number and hatch cover position, unless all hatch covers and/or shifting beams are replaceable among themselves.

2.7.9 Hatch covers and shifting beams shall be safely stowed and secured, and located in such manner that a free passage of not less than 750 mm in width is ensured around hatches when opened.

2.7.10 Hatch covers intended for cargo stowage or passage of cargo handling vehicles, shall be fitted with an inscription, in a readily visible place, indicating the maximum permitted load capacity.

2.7.11 When due to the hatch coaming height, the clear surveillance of the hold is rendered impossible, provision shall be made for suitable elevated platforms and/or footsteps fitted at the position not higher than 1.0 metres below the upper edge of the coaming.

Miscellaneous

2.7.12 The access hatch coamings having height greater than 600 mm shall be fitted with footsteps and handholds from inside, in conjunction with access ladders, and/or outside, as found practicable.

2.7.13 All doors and other means of closing shall bear the mark indicating the deck and/or the room/space they lead to.

2.7.14 Removable covers, platforms, rails and similar items having weight of 50 kg or more shall be provided with eye plates and devices for their securing, replacing and/or fitting.

2.7.15 Skylights and covers located at remote locations, not easily accessible, shall be fitted with remote controls for opening and closing.

2.7.16 Waste receptacle shall be fitted with foot operating mechanism for opening and automatic closing.

2.8 CARGO HANDLING GEAR AND LIFTING APPLIANCES

2.8.1 Safe means of access shall be provided for access to cargo handling gear and lifting appliances control posts, including locations for the inspection and maintenance, where necessary (see 2.2.4).

2.8.2 The free space and/or passageway, where necessary, of the clear width not less than 600 mm shall be ensured between adjacent ship's structure, equipment and installations, where the personnel is normally at work or is passing by in all normal operational positions of the rotating and movable cranes.

2.8.3 Cargo handling vehicles and movable cranes shall be fitted with automatically operated visible and audible warning signals indicating vehicle's and/or crane's operation.

2.8.4 The crane control post, where practicable, shall be located on the crane in closed cabin which shall meet the following requirements:

- .1 safe access shall be provided to the cabin (see 2.2.4.34 to 2.2.4.42);
- .2 control post shall be adequately protected from direct sunlight, as well as against noise, vibrations and heat produced by the crane driving mechanism;
- .3 cabin shall be properly illuminated and provided with ventilation and heating arrangement, where necessary;
- .4 clear surveillance of the cargo and cargo handling area under all weather conditions shall be ensured;
- .5 observing the cargo without leaving the control post and simultaneous control of crane operation shall be ensured;
- .6 cabin shall be of fire-proof construction and provided with door readily opened from both inside and outside;
- .7 suitable fire extinguisher shall be provided in the cabin; and
- .8 an emergency exit shall be provided with means for safe evacuation of an injured and/or sick operator, where the *Register* deems it necessary.

2.8.5 The crane control post located in the open shall be suitably protected from direct sunlight and atmospheric precipitation.

2.8.6 The force necessary for permanently used hand controls of cargo handling gear and/or lifting appliances shall not exceed 40 N; 120 N for those used from time to time and 160 N for those rarely used. The force necessary for foot operated controls shall not exceed 300 N.

2.8.7 Provision shall be made for suitable sea lashing for all cranes, jibs, derricks as well as portable gear. For that purpose, where necessary, a safe access shall be provided to the relevant parts of the lifting appliance or cargo handling gear, respectively.

2.8.8 The responsible person shall, prior to each use of cargo handling gear or lifting appliance, inspect visually, as far as practicable, the proper condition of the cargo handling gear and/or lifting appliances. All defects found and alterations or minor repairs carried out shall be regularly entered into the book *Register of cargo gear, lifting appliances and items of loose gear*, kept on board.

2.8.9 The responsible person shall report any damage of the cargo handling gear or lifting appliance and shall ensure the survey and repair of the damaged parts in the presence of a surveyor to the *Register* prior to their next use.

2.8.10 For the purpose of lifting and replacing of machinery, installations, equipment and the parts thereof, exceeding 20 kg in weight, during inspection, repair or similar, provision shall be made for suitably placed fixed eye plates and/or rings, shackles, etc. of adequate strength.

2.8.11 Provision shall be made for a suitable crane located in the engine room and capable to reach the workstations in the engine workshop for transport of machinery, installations, equipment and the parts thereof exceeding 50 kg in weight.

2.8.12 For the requirements regarding construction, installation, inspection and testing for cargo handling gear and

lifting appliances see the *Rules for technical supervision of sea-going ships, Part 19 - Cargo handling gear and lifting appliances*.

2.9 SYSTEMS AND INSTALLATIONS IN OIL TANKERS AND COMBINATION CARRIERS

2.9.1 The permanent gangway fitted above the cargo tanks deck level or other equivalent means of access, complying with the requirements of Rules of the *Register*, shall be provided between crew accommodation superstructure and forecabin for the safe access during heavy weather and rough sea, see *International Load Line Convention, 1966*.

2.9.2 The gangway shall be provided with stairways or ladders at the appropriate intervals for access to cargo deck area and, where necessary, to enable passing from one ship's side to the other.

2.9.3 The cargo pump-room, where provided, shall be fitted with the mechanical ventilation system. The system shall be automatically started and operated for the period necessary to ensure at least two air changes before entering the space and switching on the light.

2.9.4 The ventilation system in the cargo pump-room shall be of the positive extraction type and shall ensure uniform distribution of fresh air in the whole room, including the space below floor plates, necessary for the safe stay and work of the personnel.

2.9.5 The suitable warning notices shall be provided on conspicuous places in the cargo deck area indicating a fire hazard.

2.9.6 Cargo tanks shall be provided with mechanical devices for cleaning and washing which shall minimise the necessity for hand cleaning. Provision shall be made for preventing the washing and cleaning devices from operation while the personnel is in the cargo tanks.

2.9.7 Cargo tanks shall be provided, wherever practicable, with the fixed mechanical ventilation system for toxic and flammable gas freeing. For gas freeing of the spaces adjacent to cargo tanks (double bottom, double hull, cofferdams, duct keels, pipe ducts etc.), if fixed mechanical ventilation is not provided, a portable fan of spark-proof design with the associated flexible pipes of adequate length shall be provided on board. Where necessary, the *Register* may require fixed ventilation ducts to be installed.

2.9.8 Access to cargo tanks, cofferdams, ballast tanks and other spaces in the cargo area shall be direct from the weather deck and such as to ensure their complete inspection. Access to double-bottom tanks may be through a cargo pump-room, pump-room, cofferdam, pipe tunnel and similar. Clear opening for access to space and passage through structural elements shall be sufficient as to ensure undisturbed passage for a person wearing a protective equipment including the breathing apparatus as well as the carrying out of the injured person from the bottom of the room.

2.9.9 Pipe tunnel in the cargo area shall have no openings other than those for exit to weather deck and to cargo pump-room or pump-room. Dimensions and design of the tun-

nel shall be such as to ensure undisturbed survey and repair of the pipeline to a person wearing a protective equipment including the breathing apparatus and carrying out of the injured person to weather deck.

2.9.10 Construction of pipe tunnel shall ensure possibility of the efficient mechanical ventilation of the space.

2.9.11 The double-bottom tanks and pipe tunnel shall have two independent exits located as far apart as practicable.

2.9.12 For quick rescue and evacuation of an injured person from the cargo pump-room, cargo tanks, cofferdams, ballast tanks and other spaces in the cargo area, as well as from cargo holds (see 2.2.4.9), where adequate equipment for cargo handling does not exist, the following shall be provided:

- .1 portable davit fitted with a winch of light construction, suitable for installing and fixing above access hatch. Cargo pump-room davit shall be of the fixed type; and
- .2 basket or adequate stretcher equipped with ropes for guiding at the lower end.

2.9.13 The entrance to spaces specified in 2.9.13 shall be monitored by the person in charge. Before entering the space, the following safety measures shall be taken:

- .1 the equipment required in 2.9.13 shall be on its place and ready to be used;
- .2 the space shall be free from hazardous gases and vapours as much as possible, and the oxygen content in tank's atmosphere shall be around 21%; and
- .3 the personnel shall carry breathing apparatus and other protective equipment, when necessary.

2.9.14 Protective and safety equipment provided on chemical tankers shall comply with the requirements of the *Rules for the classification of ships, Part 27 – Chemical tankers, section 10*.

2.10 ENGINE ROOM

2.10.1 The safe access to engine room from the accommodation spaces shall be provided under all sea and weather conditions.

2.10.2 The exits and means of escape from the engine room in emergency shall comply with the requirements of the *Rules* (see the *Rules for the classification of ships, Part 17 – Fire protection, 2.2.10 and 2.3.4*). All exits and means of escape from the engine room shall be clearly marked.

2.10.3 The clear opening of the emergency trunk exit from the engine room shall be such as to ensure the passage of a person wearing a breathing apparatus and carrying out of the injured person from the bottom of the room. In no case the dimensions of such trunk opening shall be less than 800 mm x 800 mm. Eye plates of adequate strength shall be fitted at the suitable position above the emergency exit trunk.

2.10.4 Engine room doors shall be sound insulated and equipped, where practicable, with self-closing device. The exits from engine room and other rooms making integral part thereof, which are permanently employed by the crew and where the crew works, shall not be locked while the engines are in operation or during job activities in engine room and

shall have possibility for being opened from inside even if they are locked from outside.

2.10.5 In ships where the height from the engine room floor plates level to the accommodation deck level exceeds 14 m, the personnel elevator is recommended to be provided.

2.10.6 The space below the engine room floor plates having installations which require frequent survey and servicing shall be provided with the adequate ventilation and lighting. Where deemed necessary for the safe access, the *Register* may require the fitting of footsteps and handholds.

2.10.7 The engine room floors shall be made of slip-proof plates and shall be provided with toe board of at least 40 mm in height at the outer ends and around machinery and/or equipment foundations. The design, size and weight of floor plates shall be such as to ensure easy lifting and replacing of the floor plates. Where the heavy items are intended to be stowed on floor plates, the floor plates shall be adequately strengthened.

2.10.8 The engine room floor plates shall be securely fastened. The openings in floor plates for access to installations and valves below floor plates shall be provided with suitable covers which shall not be loosened and/or displaced due to vibrations and/or ship motions.

2.10.9 Materials and products used for the manufacture and guarding of machinery and installations, including engine room insulation, shall not give off hazardous and harmful gases when heated or, under other ambient conditions, be detrimental for the health of personnel.

2.10.10 Heavy machinery and installation items and the parts thereof shall be provided with eye plates or other equivalent means for holding when being lifted or replaced.

2.10.11 Suitable platforms, ladders, footsteps, guard rails and/or handholds shall be provided for access to measuring and control instruments fitted at the raised levels on machinery and installations, where necessary.

2.10.12 Exposed parts of machinery and installations which may cause injuries to personnel during their operation shall be guarded with the protective structure which may form a part of the machinery or installations (casing) or with the guard rail, shielding or similar. The design and strength of such structure shall correspond to its purpose, while its detachable parts shall be secured against loosening due to vibrations. The protective structure shall not occupy too much room and shall not impair the servicing of the machinery and installations.

2.10.13 Removable protective structure shall be fitted with a securing device for opened and closed position and its internal surface shall be painted in conspicuous colour to warn when it is in the open position.

2.10.14 All controls and control devices in the engine room shall suit to the operation of corresponding machinery and installations and ergonomic principles shall be followed as much as practicable. Their shape, position, colour, etc. shall differ from other devices in the engine room.

2.10.15 Controls and control devices shall be provided with adequate name plates and marks indicating their purpose and function.

2.10.16 Machinery and installations in the engine room, in addition to product name plates, shall be provided with the name plates indicating their purpose and system they belong to.

2.10.17 All tanks in engine room shall be fitted with name plates indicating their purpose, system they belong to and volume. Structural and double bottom tanks shall have such name plates close to their access openings/covers.

2.10.18 The spacing between machinery and installations in the engine room shall be such as to ensure undisturbed passage, access to the measuring instruments and means of control and similar, and sufficient room for their maintenance, repair and survey.

2.10.19 Covers of the internal combustion engine casings shall be provided with the warning inscription: *"If there is any doubt of overheating inside the casing, the cover of inspection opening shall not be opened before the engine cooling time is over after the engine is stopped"*.

2.10.20 The propulsion machinery, depending on their height, shall be provided with the suitable fixed platforms, ladders and handholds which shall ensure the safe access to all parts thereof.

2.10.21 The hand gear shall be not used in case when the force necessary for turning the engine driving shaft exceeds 500 N.

2.10.22 The instructions for boiler servicing shall be fitted in the conspicuous place near the boiler.

2.10.23 No hand torch shall be used for ignition of boiler burners. Provision shall be made for the adequate burner cleaning equipment.

2.10.24 Auxiliary machinery and installations shall be located in the vicinity of propulsion machinery and arranged with respect to their service.

2.11 CENTRAL CONTROL POST

2.11.1 Central control post in the engine room, if envisaged, shall be insulated against noise sources, as much as practicable, and located on the place not exposed to excessive vibrations.

2.11.2 It is recommended to provide for the central control post a separate enclosed space (engine control room) thermally and sound insulated from general noise and heat in the engine room.

Engine control room shall be efficiently ventilated and air conditioned.

2.11.3 Arrangement and location of the measuring and alarm instruments and means of control at the central control desk shall comply with general requirements for permanent and temporary workstations (see 2.1).

2.11.4 Engine control room shall be provided with a lockers and shelves for keeping necessary technical documentation and record desk with adequate number of chairs.

2.11.5 All measuring and alarm instruments and means of control shall be provided with corresponding name plates indicating their purpose and instructions how to use them, when necessary.

2.11.6 For the requirements for exits and means of escape in emergency from the engine control room forming the integral part of the engine room see 2.20.2.

2.12 WORKSHOPS

2.12.1 Accesses and entrances to workshops shall ensure undisturbed transport of installations, equipment and materials.

2.12.2 Provision shall be made for transport of parts weighting more than 50 kg by means of a suitable light trolley, lifting appliances and eye plates of adequate load capacity for their suspension above working desks and areas.

2.12.3 Arrangement of machinery installations, working desks and other equipment in the workshop shall be such as to ensure free passage and access to the workstations and emergency exit from the space. For the exits and escape routes from the workshops forming the integral part of the engine room see 2.10.2.

2.12.4 Machinery, installations, working desks, lockers, shelves, boxes and other workshop equipment shall be safely secured. Shelves shall be fitted with guards, as applicable, to prevent parts and equipment from falling down and means shall be provided to keep drawers secured in closed position.

2.12.5 Machinery rotating parts such as grinding units, circular saws etc. shall be fitted with guards from tool parts and chipped-off item pieces which might cause injury during the machining of the item. The warning notices shall be fitted above or close to these machines specifying the obligatory protective equipment which shall be available at any time at the respective workstation.

2.12.6 The surfaces of working desks shall be of solid wood or metal and the places intended for tools and small miscellaneous items shall be fenced with ribband.

2.12.7 Local lighting shall be provided for workstations in the workshop, where necessary. If portable electric bulb or a bulb with flexible portable cable is used, the electrical shock protection shall be considered (safe voltage or similar).

2.12.8 Adequate warning and "no smoking" notices shall be exhibited in workshops where the combustible materials are used.

2.12.9 Notices indicating general warnings and instruction manuals shall be exhibited in the workshop in conspicuous places.

2.12.10 In all ships work requiring the use of electric arc or gas welding equipment, cutting burner equipment or other forms of naked flame, as well as heating or spark generating tools, (hot work), shall be performed, whenever possible in designated space, workshop.

2.12.11 Ships subject to the ISM Code shall be provided with adequate guidance included in the SMS on control of hot work on board.

2.12.12 For hot work performed outside workshop the Master or designated responsible officer (person) shall ensure that adequate safe procedures, including work area preparation and isolation as well as fire safety precautions and fire equipment preparations, are followed (see MSC/Circ.1084).

2.12.13 Workstations for electrical welding shall be fitted with removable screens and adequate warning notices.

2.12.14 Portable electrical welding equipment shall have a possibility of being secured.

2.12.15 Workshops forming an integral part of the engine room shall be, in so far as practicable, sound insulated against noise in the engine room.

2.12.16 Separate metallic receptacles shall be provided for solid waste and means for cleaning.

2.13 SPARE PARTS

2.13.1 Spare parts for machinery installation and other machinery in engine room and shall be stored in a separate room, ship's store or on suitable locations in engine room and workshop, intended for that purpose.

2.13.2 Special locations shall be provided for storage of spare parts and installations of larger size and indicated on the respective arrangement plan. These locations shall be within the reach of the engine room crane or the engine workshop crane and as close as practicable to the place of their use.

2.13.3 Spare parts and installations shall be adequately secured and marked with relevant name plates.

2.13.4 Spare parts and installations of lesser dimensions shall be stored in lockers, on shelves and in boxes. Individual spare parts shall bear fixed marks and spare parts in packages shall be provided with corresponding list of spare parts.

2.14 ELECTRICAL EQUIPMENT

2.14.1 All electrical installations and electrical equipment on board shall be of design and construction (type) intended and/or approved by the *Register* for use on ships.

2.14.2 Any electrical faults or defects of electrical installations and equipment on board shall be immediately reported to the appropriate person. Repairs shall be carried out only by a competent person and/or when a "permit-to-work" has been issued.

2.14.3 Portable electrical tools and appliances shall not be used in a potentially flammable or explosive atmosphere, unless they are of a type certified for a use in such an atmosphere and the action is authorised by a responsible officer.

2.14.4 When members of the crew use portable equipment or portable lamps they shall ensure that any flexible cables passing through doors, hatches, manholes, etc; are protected and that their insulation is not damaged by the closing of doors, covers or lids.

2.14.5 The following notices shall be exhibited at suitable places:

- .1 a warning notice prohibiting unauthorised persons from entering electrical equipment rooms, interfering with switchboards, and handling or interfering with electrical apparatus; and
- .2 a warning notice indicating that the use of portable electrical equipment which is not explosion-proof is not permitted until an

authorised person is satisfied that the air in the room is free from flammable vapours and gases, shall be exhibited at the entrances into spaces with the risk of explosion.

2.14.6 The floor area below the main and emergency switchboard having the voltage higher than safety voltage (50 V) shall be laid with adequate insulation material resistant to mechanical damage.

2.14.7 In ships fitted with electrical equipment having the voltage which exceeds safety voltage, accessories for preventing electrical shock shall be provided consisting of:

- .1 devices for detecting the voltage, (universal instrument with testing lamp);
- .2 insulating gloves; and
- .3 insulating carpet of non-hygroscopic material of dimensions not less than 800 mm x 800 mm.

2.14.8 The first aid instructions for treatment of persons injured from electrical shock shall be provided on conspicuous places in the accommodation spaces' corridors, while on the places with the risk of electrical shock the appropriate warning notices and marks shall be fitted.

2.15 ROOMS FOR NAVIGATIONAL AIDS AND COMMUNICATION EQUIPMENT

2.15.1 Decks in rooms with radio equipment, gyrocompasses and other similar equipment shall be fitted with adequate insulating carpet.

2.15.2 Aerials and open wire feeders shall be placed and guarded in a way to make them inaccessible to unauthorised persons.

2.15.3 Conductors that pass through areas of electromagnetic flux shall be insulated or otherwise protected in areas to which members of the crew have access.

2.15.4 Suitable means shall be provided and maintained to exclude any persons from the vicinity of the equipment where there is a danger from shock, radio frequency burns and injury from X-rays or other radiation.

2.15.5 Warning notices of the danger of high voltages shall be located near radio transmitter aerials and lead-through insulators. Any work in the vicinity of transmitting aerials shall be carried out within the "permit-to-work" system. Warning notices shall be posted at appropriate places until the work has been completed.

2.15.6 No members of the crew shall be allowed to work in the vicinity of transmitting aerials whilst there is a possibility that such aerials may be energised. When crew members are working near aerials and scanners, equipment shall be isolated from the mains supply and radio transmitters earthed.

2.16 REFRIGERATING MACHINERY AND ROOMS

2.16.1 In all ships bulkheads and decks, including access doors, of the separate refrigerating machinery rooms and refrigerant store room, where provided, shall be gas-tight and exits from these spaces (for refrigerants for group II and III) shall lead to weather deck (see the *Rules for the classification of ships, Part 11 - Refrigerating Plants, 3.1 and 3.2*).

2.16.2 Material used for the thermal insulation and lining of the refrigerating machinery (including piping) and refrigerated rooms shall not be detrimental to health or give off unpleasant odours.

2.16.3 In ships fitted with separate refrigerant store room, provision shall be made for the separate fixed piping system with corresponding fittings for shore connection and filling with the refrigerant.

2.16.4 Refrigerant piping shall not be led through accommodation spaces and control stations.

2.16.5 Instruction manuals necessary for operation and maintenance of the refrigerating machinery and emergency procedures in case of failure in operation of refrigerating machinery shall be fitted at the conspicuous place in the refrigerating machinery room and/or refrigerant store room.

2.16.6 Provision shall be made in the ammonia refrigerating machinery room for suitable respiratory and eye protection and spare filters in a number sufficient for all persons employed simultaneously in this room.

2.16.7 In special cupboard, close to every entrance door leading to refrigerating machinery room, the following shall be available:

- .1 two respiratory and eye protection;
- .2 one breathing apparatus;
- .3 one protective clothing with pair of gloves and boots; and
- .4 one instrument for measuring the concentration or detecting the leakage of the refrigerant.

2.17 BATTERY ROOMS AND PAINT ROOMS

2.17.1 In all ships battery room and/or paint room shall be located apart from the accommodation spaces and control stations and shall be entered from the weather deck only.

2.17.2 Battery room and/or paint room shall be adequately ventilated to avoid accumulation of explosive gases and/or flammable vapours, as applicable.

2.17.3 Light fittings and any electrical equipment used in the battery room and/or paint room shall be of a type certified as being suitable for a hydrogen atmosphere and/or flammable atmosphere, as applicable.

2.17.4 Only authorised persons shall enter battery room. Battery room door and paint room door shall be kept locked at all times.

2.17.5 Battery room and paint room shall be kept clear of any equipment, including any other electrical equipment,

likely to act as a source of ignition, and shall not be used as store rooms.

2.17.6 The battery room shall be fitted with wooden shelves for vessels with electrolyte and distilled water; one set of protective equipment consisting of apron, pair of gloves and shoes and glasses shall be provided in the room.

2.17.7 The warning notices shall be exhibited at suitable places prohibiting the use of naked flames in the vicinity of the battery room and smoking in the battery room and paint room.

2.18 USE AND CONTROL OF ASBESTOS CONTAINING MATERIALS

2.18.1 Since 1 July 2002, the installation of materials that contain asbestos has been prohibited for all ships, except for some vanes, joints and insulation. From 1 January 2011, any installation of asbestos containing materials (ACMs) on board ship is prohibited, for all ships without exceptions (see MSC.1/Circ.1379 and MSC.1/Circ.1426). This requirement shall also apply to new installations on existing ships (see MSC.1/Circ.1374).

2.18.2 The *Register* shall verify that materials which contain asbestos (as prohibited in 2.18.1) are not installed on ships by reviewing asbestos-free declarations and supporting documentation for the structure, machinery, electrical installations and equipment covered by the requirements of the *Rules*, which shall be provided to the *Register* by shipyards, repair yards and equipment manufacturers.

2.18.3 Ships built before 1 July 2002 are allowed to have ACMs on board. However ACMs are only allowed as long as they don't pose risk to the personal health. The crew and special personnel shall be aware of the danger of asbestos and shall know how to deal with asbestos in case disturbance of the ACMs cannot be avoided (see MSC/Circ.1045).

2.18.4 The Company shall make provisions, including the nomination of a responsible person to control the maintenance and monitoring program (see annex 1 to the MSC/Circ.1045) for asbestos in their Safety Management System (developed for compliance with the ISM Code) for the maintenance and monitoring of on-board ACMs in line with the provisions of MSC/Circ.1045 guidelines.

These guidelines shall not apply to ACMs on board ships built on 1 July 2002 and later.

2.18.5 Planned repairs or removal of ACMs shall be carried out by specialist and/or contractors authorised for such job and not normally by the ship's crew. In cases where the crew is involved in urgent repair work at sea special measures shall be observed as listed in annex 1 to the MSC/Circ.1045. Procedures shall be developed for the safe retention of any waste asbestos on-board the ship before it can be transferred and disposed of ashore (see also 1.1.5).

3 ACCOMMODATION SPACES REQUIREMENTS

3.1 APPLICATION

3.1.1 The requirements of this section shall apply, without exemptions, to all ships (see 1.2), as required with regard to certain type, gross tonnage and/or intended purpose of the ship, except as specified in 3.1.2 and 3.1.3.

3.1.2 The *Register* may exempt ships of less than 200 gross tonnage, where it is reasonable to do so, taking into account the size of the ship and the number of persons on board, in relation to the requirements specified in paragraphs:

1. 3.2.14, 3.3.22.5 and 3.9; and;
2. 3.3.4 and 3.3.6 to 3.3.10 inclusive, with respect to floor area only.

3.1.3 In the case of ships where there is a need to take account, without discrimination, of the interests of the ship's crew and the special personnel having differing and distinctive religious and social practices, the *Register* may permit fairly applied variations in respect of the requirements of this section, on condition that such variations do not result in overall facilities less favourable than those which would result from the application of the requirements specified in paragraphs 3.2 to 3.11.

3.1.4 Any exemptions with respect to application of the requirements of this section may be made only when they are expressly permitted in this section and only for particular circumstances in which such exemptions can be clearly justified on strong grounds and subject to protecting the health and safety of the ship's crew and special personnel.

3.2 GENERAL

3.2.1 The height in all accommodation spaces shall be adequate (see 1.3.21); the minimum permitted headroom in such spaces where full and free movement is necessary shall be not less than 203 centimetres. The *Register* may permit some limited reduction in headroom in any space, or in part of any space, in such accommodations on condition that such reduction:

- .1 is reasonable;
- .2 will not result in discomfort to the crew and the special personnel; and
- .3 is permanently and adequately marked, where necessary.

3.2.2 In ships other than passenger ships, sleeping rooms (cabins) shall be situated above the load line amidships or aft, except in exceptional cases, where the size, type or intended service of the ship renders such location impracticable. In such cases cabins may be located in the fore part of the ship, but in no case forward of the collision bulkhead.

3.2.3 In passenger ships, and in special purpose ships (see IMO Res. MSC.266(84)), the *Register* may, on condition that satisfactory arrangements are made for lighting and ventilation, permit the location of cabins below the load line, but in no case shall they be located immediately beneath working alleyways.

3.2.4 There shall be no direct openings into accommodation spaces from cargo and machinery spaces, workshops or similar; and from galleys, pantries, ship storerooms, washing/drying rooms and communal sanitary areas to cabins.

Those parts (of bulkheads and decks) separating above mentioned spaces and external bulkheads and decks shall be constructed of steel or other equivalent material and shall be of watertight and/or gas-tight construction, whatever applicable.

3.2.5 Due to special conditions and needs of living and working on board, measures must be taken for health and safety protection and accident prevention in all accommodation spaces, including preventing the risk of exposure to hazardous levels of noise and vibration and other ambient factors and chemicals, in conformity with the relevant ILO documents and other international standards and recommendations (see 1.1.2 and 4.7 and 4.8).

3.2.6 Accommodation spaces shall be located as far apart as practicable from propulsion and auxiliary engines, steering gears, deck winches, as well as from ventilation, heating and air-conditioning equipment and other noisy machinery and apparatus.

3.2.7 The constructions separating accommodation spaces, including corridors, from sound-producing spaces shall be adequately sound-insulated.

3.2.8 Accommodation spaces shall not be situated at the location exposed to excessive vibration.

3.2.9 External bulkheads of accommodation spaces shall be thermally insulated. All other bulkheads and decks of accommodation spaces, including corridors, shall be adequately insulated to prevent condensation and overheating. All machinery room casings and all boundary bulkheads and decks of galleys and other spaces in which heat is produced shall be insulated where there is a possibility of resulting heat effects in adjoining accommodation spaces, including corridors.

3.2.10 The materials and construction of all internal bulkheads, ceilings, linings, floors, as well as fixed and removable furniture and equipment, including their relevant joints, in accommodation spaces shall be approved by the *Register* and shall comply with general standards for healthy environment and maintenance, for the relevant purpose, including, but not restricted to:

- .1 protection from vermin and maintenance of cleanliness;
- .2 imperviousness to damp and odours;
- .3 corrosion resistance, durability and light colour; and
- .4 for floors, non slip surface and the sides protected against the crevices.

3.2.11 All accommodation spaces shall have proper artificial lighting and, when applicable, sufficient drainage shall be provided (see 4.2 and 4.3).

Unless otherwise specified (see 3.2.2 and 3.2.3), cabins and mess rooms shall, in addition, be lit by natural light.

3.2.12 Cabins and mess rooms shall be adequately ventilated. All service and sanitary spaces shall have ventilation to the open air, and service spaces, as far as practicable, inde-

pendently of any other accommodation space ventilation (see 4.5).

3.2.13 All accommodation spaces shall be provided with an appropriate heating system except in ships engaged exclusively on voyages in tropical climates. The system of heating the accommodation shall be in operation at all times when crew and special personnel are living or working on board and climate conditions require its use (see 4.4).

3.2.14 All ships, except those regularly engaged on voyages where temperate climatic conditions do not require this, shall be equipped with air conditioning (see 4.6) for:

- .1 accommodation spaces;
- .2 any separate radio room; and
- .3 any centralised machinery control room (engine control room).

3.2.15 Weather deck doors leading to/from accommodation spaces shall not be situated on the superstructures/deck-houses' front walls. These doors shall be fitted with side scuttle of an approved type or otherwise glazed and in the case of doors fitted to side wall, they shall be opened in forward direction.

3.2.16 The arrangement of corridors and stairs in accommodation spaces shall ensure direct communication between all spaces on one deck and also communication between all spaces on one deck and spaces on another deck, without requiring to exit on open deck, and shall ensure at least two exits on open deck and access to the life saving appliances in emergency.

3.2.17 Pipelines, other than those that serve accommodation spaces, shall not pass through accommodation spaces, including corridors. Where this is not practicable, piping system may pass through corridor area which serves for access to accommodation spaces on condition that the piping is as short as possible, adequately encased and leakproof. Steam and hot water pipe systems shall be appropriately heat insulated.

3.2.18 Passageway leading from the ship's fore part to aft part of the ship and vice versa shall not pass through accommodation spaces.

3.2.19 Edges of wall and bulkhead corners, door frames and similar openings and all other exposed edges which may injure the personnel passing by and/or through shall have a radius of curvature not less than 0.75 mm.

3.2.20 A carpet, doormat or similar shall be provided in places where occasional watering and other liquids may cause slipping, if the floor is not of slip proof construction.

3.3 CABINS

3.3.1 When, due to the activity in which the ship is to be engaged or any other reason, cabins on board ship are provided, the requirements of this chapter shall apply.

3.3.2 In all ships, other than passenger ships, an individual cabin shall be provided for each member of the crew and special personnel. In case of ships of less than 3,000 gross tonnage or special purpose ships, exemptions from this requirement may be granted by the *Register*. However, separate cabins shall be provided for men and women in all circumstances and a separate berth for each member of the crew and special personnel.

3.3.3 Cabins shall be of adequate size and equipped with the adequate berth arrangements, furniture and equipment so as to ensure reasonable comfort and rest and to facilitate tidiness, including, whenever possible, for the partner who may accompany the crew member.

3.3.4 In single berth cabins the floor area shall not be less than:

- .1 4.5 square meters in ships of less than 3,000 gross tonnage;
- .2 5.5 square meters in ships of 3,000 gross tonnage or over but less than 10,000 gross tonnage; and
- .3 7 square meters in ships of 10,000 gross tonnage or over.

3.3.5 However, notwithstanding the requirement in 3.3.4, in order to provide single berth cabins on ships of less than 3,000 gross tonnage, passenger ships and special purpose ships, the *Register* may, taking into consideration the size of the ship and the service area, allow a reduced floor area. However, the floor area, under no circumstances, shall be less than:

- .1 4 square meters in ships of less than 3,000 but not less than 1,600 gross tonnage;
- .2 3.5 square meters in ships of less than 1,600 but not less than 800 gross tonnage; and
- .3 3 square meters in ships of less than 800 gross tonnage.

3.3.6 In ships of less than 3,000 gross tonnage other than passenger ships and special purpose ships, cabins may be occupied by a maximum of two crew members; the floor area of such cabins shall not be less than 7 square meters.

3.3.7 On passenger ships and special purpose ships the floor area of cabins for crew members not performing the duties of ships' officers shall not be less than:

- .1 7.5 square meters in rooms accommodating two persons;
- .2 11.5 square meters in rooms accommodating three persons; and
- .3 14.5 square meters in rooms accommodating four persons.

3.3.8 On special purpose ships cabins may accommodate more than four persons; the floor area of such cabins shall not be less than 3.6 square meters per person.

3.3.9 On ships other than passenger ships and special purpose ships, the floor area per person in the cabins for the crew members who perform the duties of ships' officers, where no private sitting room or day room is provided, shall not be less than:

- .1 7.5 square meters in ships of less than 3,000 gross tonnage;
- .2 8.5 square meters in ships of 3,000 or over but less than 10,000 gross tonnage; and
- .3 10 square meters in ships of 10,000 gross tonnage or over.

3.3.10 On passenger ships and special purpose ships the floor area per person for crew members performing duties of ships' officers, where no private sitting room or day room is provided, shall not be less than:

- .1 7.5 square meters for junior officers; and
- .2 8.5 square meters for senior officers.

Junior officers are understood to be at the operational level, and senior officers at the management level.

3.3.11 The Master, the chief engineer and the chief navigating officer and, when the size of the ship makes it practicable, the second engineer officer, shall have, in addition to their cabins, an adjoining sitting room, day room or equivalent additional space; ships of less than 3,000 gross tonnage may be exempted by the *Register* from this requirement.

3.3.12 Whenever possible, a sufficient number of cabins shall be provided in order to ensure that:

- .1 watches are separated and that no crew member working during the day shares a room with the watchkeepers; and
- .2 in the case of crew members performing the duty of petty officers there shall be no more than two persons per sleeping room.

3.3.13 Space occupied by berths and lockers, chests of drawers and seats may be included in the measurement of the minimum required floor area. Small or irregularly shaped spaces which do not add effectively to the space available for free movement and cannot be used for installing furniture shall be excluded.

3.3.14 Where the size of the ship, the activity in which it is to be engaged and its layout make it reasonable and practicable, cabins shall be planned and equipped with a private bathroom, including a toilet, so as to provide reasonable comfort and tidiness for the occupants (see 3.5.6).

3.3.15 The berths in cabins, whenever possible, shall be arranged lengthwise of the ship and well apart from the door and draft spaces. Hot and cold walls close to the berth shall be adequately insulated and/or lined.

3.3.16 Access to the berth shall be ensured from its longer side and, if practicable, along its entire length. In the cabins with multiple berths a suitable portable ladder shall be provided for access to the upper berth, and curtain shall be fitted around the berths.

3.3.17 The lower berth in the cabins equipped with the double tier berth (two beds total) shall not be less than 300 mm above the floor; the upper berth shall be placed so as to ensure equal free height above each berth, and not less than 610 mm. The floor of the upper berth shall be made of solid material and shall be dustproof.

In case of the berths placed along the ship's side, there may be only one berth placed where the window or scuttle is situated above the berth.

3.3.18 The minimum inside dimensions of a berth shall be not less than 1980 mm x 800 mm.

3.3.19 The framework of the berths shall not harbor vermin and shall be made of low thermal conductivity material.

All framework corners and surfaces used for climbing to bed shall be rounded and smooth.

The lee-board extending at least two-thirds of the berth length and having height of not less than 250 mm shall be provided close to the head and feet.

3.3.20 Each berth shall be fitted with the spring mattress or shall be of another approved construction. Material likely to harbor vermin shall not be used.

3.3.21 A suitable lamp located at appropriate position shall be provided above each berth's head.

3.3.22 In addition to berths, cabins shall be fitted with the following furniture and equipment:

- .1 clothes locker of sufficiently ample space for each occupant (minimum volume shall be 0.475 m³). It shall be fitted with a shelf and ventilation openings (holes) located up and down and be able to be locked. Free space above the locker, where provided, shall be fitted with doors;
- .2 a table or a desk, which may be of fixed, drop-leaf or slide-out type, and with comfortable seating accommodation as necessary;
- .3 a drawer or equivalent space for each occupant (volume not less than 0.056 m³). If the drawer is incorporated in the clothes locker then the combined minimum volume of the clothes locker shall be 0.5 m³.
- .4 a book rack;
- .5 a small cabinet for toilet requisites and a wash basin with hot and cold fresh water, on ships other than passenger ships, if a cabin is not fitted with a separate sanitary space;
- .6 a waste receptacle and an electric shaver socket;
- .7 a bedside carpet;
- .8 a sufficient number of coat hooks but not less than two; and
- .9 a curtain or blind for each window or scuttle.

3.3.23 Instead of and in addition to the specified in 3.3.22, the master's and officer's cabins (see 3.3.9 and 3.3.10) shall also include:

- .1 a writing desk with drawer and a chair (instead of small table); and
- .2 a settee with back of 1850 mm in length and 800 mm in width, placed perpendicularly to the berth.

3.3.24 On ships of 3,000 gross tonnage or over, other than passenger ships and special purpose ships, the cabins to which the requirements specified in 3.3.23 do not apply, instead of and in addition to the requirements in 3.3.22.2, shall be provided with a settee with back, of no less than, 1800 mm x 700 mm, placed perpendicularly to the berth.

3.3.25 Every crew and special personnel member shall be provided with:

- .1 clean bedding of good quality; and
- .2 sufficient number of towels, soap and adequate amount of toilet paper.

3.3.26 Warning notices about the fire hazards of smoking in berth and health hazards of smoking shall be displayed in an adequate place in the cabins.

3.4 PUBLIC SPACES

3.4.1 All ships shall have a mess room and a day room. In ships of less than 1,600 gross tonnage mess room and

a day room may be located in the same room and be common for all crew members.

3.4.2 Ships of 1,600 gross tonnage or over but less than 3,000 shall have separate mess room and a day room for senior officers. A separate mess room and a separate day room shall be provided on ships of 3,000 gross tonnage or over for senior officers. On ships of 10,000 gross tonnage or over a separate mess room and a separate day room shall also be provided for other members of the crew.

3.4.3 Mess rooms shall be located apart from the cabin area and as close as practicable to the galley. Ships of less than 3,000 gross tonnage may be exempted from this requirement by the *Register*.

3.4.4 Mess rooms shall be of adequate size and comfort and properly furnished and equipped. On ships other than passenger ships, the floor area (see 3.3.13) of mess room and day room shall not be less than 1.5 m² per person of the planned seating capacity.

3.4.5 The mess room shall be provided with a sufficient number of tables and appropriate seats for at least two thirds of the total number of persons for whom the room is intended, in cargo ships, or one half in passenger ships, but not less than the greatest number of persons likely to use them at any one time.

3.4.6 Table arrangement and dimensions in the mess room shall comply with the following requirements:

- .1 for every seating place at least 600 mm table width and 380 mm table depth shall be ensured;
- .2 waiting aisle width shall not be less than 800 mm;
- .3 spacing between the tables with seats back to back shall be at least 1,200 mm; and
- .4 distance between the side of the table with seats and the nearest barrier shall be at least 750 mm.

3.4.7 The height of the tables shall be from 720 mm to 780 mm, and the space between the surface of the seat and the lower edge of the table structure at least 180 mm.

3.4.8 The table surface shall be smooth, moisture-proof and suitable for cleaning and table edges shall be fitted with lathes. The mess room tables shall be of the fixed type and chairs shall be fitted with sea-fastening.

3.4.9 For crew and special personnel members' needs, the mess room shall be provided with:

- .1 adequate locker for mess utensils and proper facilities for washing utensils, if the same is not provided in the pantry;
- .2 refrigerator of adequate capacity;
- .3 facilities for hot beverages, if the same is not provided in the pantry;
- .4 cool drinking water facility; and
- .5 sufficient number of coat hooks.

3.4.10 The day room shall be provided with sufficient number of armchairs, settees and tables and/or small tables for at least one half of the total number of persons for whom the room is intended. Subject to the number of persons on board the *Register* may require a larger number of seats in the day room.

A separate recreation area shall be provided in the day room with adequate facilities for games, radio, television, book case and PC with programmes.

3.4.11 The day room shall be fitted with sufficient number of coat hooks.

3.4.12 Crew members and special personnel shall have, where practicable, reasonable access to ship – to– shore telephone communication, and email and Internet facilities, where available, with any charges for the use of these services being reasonable in amount.

3.4.13 Depending on the size of the ship and the number of persons on board all ships shall have a suitable place on the weather deck equipped with a tent and assigned to the members of the personnel when off duty.

3.4.14 In addition to the above in ships of 10,000 gross tonnage or over the following shall be provided:

- .1 a separate room with appropriate equipment for recreational activities/practising sport; and
- .2 a recreation area arranged on the super-structure weather deck which shall comply with the following:
 - .1 tents shall be fitted for protection against sun and rain;
 - .2 location shall not be exposed to noise, vibrations and exhaust gases; and
 - .3 deck area shall be of slip-proof construction and shall be sufficient for not less than one quarter of the total number of persons on board and in no case less than 1.5 m² per person.

3.4.15 A swimming pool is recommended to be provided in ships of unrestricted service of 20,000 gross tonnage or over.

3.4.16 Smoking may be allowed in public rooms in a space designated for it, separated and adequately ventilated, appropriate warnings and prohibitions shall be placed in a visible position.

3.5 SANITARY SPACES

3.5.1 All crew and special personnel members shall have convenient access to sanitary facilities on board, meeting minimum standards of health and hygiene and reasonable standards of comfort, with separate sanitary facilities being provided for men and women.

3.5.2 All ships shall be provided, at a convenient location, separately for officers and separately for the crew and special personnel, with no less than one toilet, urinal and shower and two washbasins for every six persons, or for a part thereof which do not have cabin with a separate sanitary facility. For less than three persons no urinal and no more than one washbasin is required.

Above mentioned facilities may be located in the same room, provided that toilets are located in an appropriate separate and screened room with individual entrances.

3.5.3 Toilets shall be situated in vicinity of, but separate from, cabins and common wash rooms/bathrooms, without direct access from cabins or from a passage between cab-

ins and other spaces to which there is no other access; this requirement shall not apply to toilet which is located in common sanitary space between two cabins accommodating totally not more than 4 persons.

3.5.4 Under no circumstances a total number of separate toilet facilities on the ship (see 3.5.2 and 3.5.17) shall be less than:

- .1 six (6) on ships of 3,000 gross tonnage or over;
- .2 four (4) on ships of less than 3,000 gross tonnage but not less than 1,600;
- .3 three (3) on ships of less than 1,600 gross tonnage but not less than 500; and
- .4 two (2) on ships of less than 500 gross tonnage.

3.5.5 In passenger ships normally engaged on voyages of not more than four hours duration, the *Register* may allow special arrangements and/or a reduction in the number of sanitary facilities required in 3.5.2.

3.5.6 In ships of 3,000 gross tonnage or over, except passenger ships and special purpose ships, each cabin shall be provided with a separate sanitary facility with a washbasin, shower and toilet.

3.5.7 Common sanitary facility shall be located on a same deck and in close proximity of cabins for which it is intended. Common washrooms/bathrooms shall not be located in the same room as toilets, although they can share same lobby (see 3.5.2 and 3.5.3).

3.5.8 Common sanitary facilities shall not be located above medical spaces and service spaces. Entrance to common sanitary facilities shall not be located in close proximity of galley, mess room and hospital.

3.5.9 Bulkheads and decks enclosing common sanitary spaces shall be made of steel or other equivalent material and shall be of gas-tight and watertight construction up to, at least, 230 mm above the floor level, except in proximity of doors where the height shall not be less than 100 mm. Bulkheads and decks separating sanitary spaces from weather deck spaces shall be thermally insulated and lined.

3.5.10 Floors, linings and ceilings in sanitary spaces shall be made of approved durable material impervious to moisture and easily cleaned and disinfected.

3.5.11 Floors in sanitary spaces shall be of slip-proof construction and fitted with suitably located deck scuppers to ensure quick drainage of water under normal service conditions of the ship.

3.5.12 All common sanitary spaces shall be provided with tap fitted with connection for washing pipe.

3.5.13 All common sanitary spaces shall be sufficiently lighted, heated and ventilated (see 3.2.12).

3.5.14 A common wash-basin room shall be fitted with:

- .1 adequate number of wash basins with running hot and cold fresh water, mirror, shelf, lamp and soap holder;
- .2 towel and coat hooks; and
- .3 a storm handhold.

3.5.15 The common bathroom shall be provided with enclosed showers, separated from the rest of the bathroom by simple doors or curtain.

A shower shall be fitted with a sill of at least 230 mm in height.

A bathroom shall be fitted with:

- .1 adequate number of showers with running, hot and cold fresh water and soap holder;
- .2 suitable grating or mat;
- .3 towel and coat hooks;
- .4 fixed or folding seat; and
- .5 storm handhold.

3.5.16 Common water closets shall be provided with separate toilet stalls, separated from the rest of the water closet by simple door.

Water closet room shall be provided with:

- a lobby:
 - .1 adequate number of urinals; and
 - .2 storm handhold.
- a toilet stall(s):
 - .3 toilet;
 - .4 toilet brush and paper; and
 - .5 coat hooks.

3.5.17 Ships of 1,600 gross tonnage or over shall be provided with common sanitary rooms for the use of the personnel on the watch and personnel with special duties, as follows:

- .1 a water closet room with a wash basin on the bridge for the personnel on the watch in the wheel house and radio room;
- .2 a water closet with a wash basin in the vicinity of the exit from the engine room and, additionally, shower with running hot and cold fresh water for those not having single berth cabin with the separate sanitary room, for the personnel on the watch in the engine room; and
- .3 a toilet with wash basin in the vicinity of galley, for the use of those working in the galley.

The *Register* may exempt ships of less than 1,600 gross tonnage from complying with the requirements specified in .1 and .2, and ships of less than 3,000 gross tonnage from the requirements specified in .3.

3.5.18 In cargo ships of 3,000 gross tonnage or over, a toilet with a wash basin accessible from the weather deck, shall be provided for dockers.

3.5.19 Wash basins and urinals shall be placed, as much as possible, in such way that, while using it, a person faces stern or bow.

3.5.20 All toilets shall be of approved pattern and provided with an ample flush of water or with some other suitable flushing means, such as air, which are available at all times and independently controllable.

3.5.21 Common sanitary rooms shall be, where applicable, clearly recognisable for use (men/women), without requiring to enter into the room.

3.6 SERVICE SPACES

3.6.1 The arrangement, size and characteristics of equipment and appliances in service spaces shall be determined by taking into consideration the number of persons on board and the anticipated duration of the voyage.

3.6.2 Service spaces shall not be adjacent to common sanitary spaces and medical spaces.

3.6.3 The location of service spaces shall be such that:

- .1 the provisions from food store rooms and prepared meals from galleys shall not be transported over the weather deck and/or through accommodation spaces' corridors to the galley, mess room and/or pantry;
- .2 the provisions from the food store room shall not be transported to the galley through the pantry;
- .3 galley, pantry and mess room are as a rule located on the same deck and if that is not feasible, means shall be provided for transport of meals and dishes from the galley to the mess room and/or pantry.

3.6.4 Service spaces shall be located, as far as practicable, to permit the usage of the passages leading to those spaces only to persons working in those spaces.

3.6.5 The bulkheads and decks enclosing service spaces shall be made of steel or other equivalent material and shall be of gas-tight construction. Bulkheads, decks and walls exposed to weather deck spaces shall be thermally insulated and lined.

3.6.6 Floors, linings and ceilings in service spaces shall be made of material impervious to moisture and odours. The galley floor shall be of slip-proof construction and it shall be provided with a suitably located deck scupper(s).

3.6.7 Walls, linings and ceiling surfaces in service spaces shall be smooth and easily cleaned and disinfected. Cables, ventilating ducts and piping shall be placed behind the linings and above the ceiling.

3.6.8 Appliances and equipment in service spaces shall be of material which is resistant to corrosion and impervious to moisture and odours, capable of being easily cleaned and not harmful to food and human health.

All appliances and equipment in service spaces shall be safely fixed.

3.6.9 A waste receptacle with foot-operated lever mechanism shall be provided in service spaces for collecting and removal of waste.

3.6.10 Windows, side scuttles and doorways of service spaces for access to weather deck shall be fitted with mosquito screens.

3.6.11 A doormat shall be provided in front of the access to service spaces.

3.6.12 The galley and pantry, if envisaged, shall be provided with all necessary appliances and equipment for storing and preparing food, cooking and serving meals and washing and keeping dishes and utensils. It is recommend to

provide a separate space in the galley or pantry for washing dishes and utensils.

3.6.13 The arrangement of the appliances and equipment in the galley shall provide easy access to all parts of the galley and undisturbed access to all appliances. An ample space shall be provided for the workstations and corridors in width of no less than:

- .1 900 mm in front of the oven;
- .2 700 mm around the cooking range, soup kettle and similar appliances; and
- .3 600 mm in front of other appliances.

3.6.14 The cooking range shall be situated transversely of the ship and, where practicable, accessible from all sides. The cooking range shall be fitted with handhold and guard to prevent shifting of dishes. Solid fuel for heating of cooking range shall not be permitted.

3.6.15 A range hood with trunked mechanical ventilation of the extraction type shall be provided for discharge of vapours, odours and hot air from the galley.

3.6.16 A wash basin with running, hot and cold drinking water and tap fitted with connection for washing pipe and deck scupper, shall be provided in the galley. No salt water tap shall be fitted in the galley, nor in any place intended for food preparation.

3.7 PROVISION STORE ROOMS

3.7.1 Separate store rooms, food stores, shall be provided for storing food provisions on board.

3.7.2 The number and the size of food stores for storing all necessary types of food provisions shall be determined on the basis of the total number of persons on board and the anticipated duration of the voyage, taking into consideration the quantity, nutritional value and the quality of the food that shall be provided for all personnel and having regard of religious and cultural practices of the personnel.

3.7.3 Cold store rooms or refrigerators shall be provided for the storage of food provisions, for the maintenance of which a permanent temperature (cooling) is required. Separate cold store rooms shall be arranged according to different food provisions being stored and have a common thermally insulated lobby.

3.7.4 Bulkheads and decks enclosing cold store rooms shall be watertight and gas-tight. Walls, floors and ceilings in cold store rooms shall be insulated and lined with non-harmful material. The wall and floor surfaces shall be easily cleaned and disinfected.

3.7.5 Access to food stores shall be provided in the vicinity of galley and/or pantry. If this is not practicable, it is recommended to provide an elevator for the transport of food provisions to the galley/pantry.

3.7.6 A fresh water tap fitted with a pipe connection and deck scupper with a cover shall be provided in an adequate place for washing the store rooms.

3.7.7 Cold store rooms shall be equipped with remotely read-out thermometers from outside the rooms and with the lighted push button for the sound signal in the galley. Meat hooks shall be so arranged as to ensure proper air circu-

lation and to provide enough space for the meat not to come into contact with the store room walls under normal service conditions.

3.7.8 The store rooms for dry and/or packaged provisions shall be fitted with sufficient number of shelves, cupboards and bins. Shelves, cupboards and bins shall be so constructed as to enable them to be easily cleaned.

3.7.9 A handy store room for daily food requirements, equipped with the refrigerator, shall be provided in the galley/pantry or in the close vicinity of the galley/pantry.

3.8 LAUNDRIES, DRYING ROOMS AND LINEN STORE ROOMS

3.8.1 Appropriately situated and furnished laundry facilities shall be available on board to accommodate the needs for washing and drying personal linen and clothing and bed linen of the crew and special personnel, taking into consideration the total number of persons, type of the ship, service area and duration of voyage. If separate room is provided for that purpose, laundry/drying room, it shall have direct access from the accommodation area.

3.8.2 The laundry shall be fitted with:

- .1 the washing machine(s) and a basin and tap with hot and cold fresh water;
- .2 the drying machine(s) or adequately heated and ventilated drying room; and
- .3 the iron(s) and ironing board(s) or their equivalent.

3.8.3 Number and characteristics of machines, devices and equipment in the laundry and drying room shall be sufficient to ensure clean and dry underwear for the members of the crew and, when applicable, special personnel at least once every two days and clean and dry upperwear and bed linen at least once a week.

Separate machines, devices and equipment shall be provided for senior officers on ships of 3,000 gross tonnage or over and a separate laundry/drying room shall be provided on ships of 10,000 gross tonnage or over.

3.8.4 Laundry floor shall be watertight and of slip-proof construction. The space around machines shall be enclosed with the appropriate sill and it shall be fitted with deck scupper unless the drainage of the leaked water is not otherwise ensured.

3.8.5 Exhaust ventilation ducts from laundry/drying room shall lead directly to the weather deck.

3.8.6 Separate lockers for storing clean and dirty bed linen with sufficient number of boxes and shelves shall be provided in an adequate place, close to the accommodation area.

3.9 STORE ROOMS FOR WORK CLOTHES AND FOOTWEAR

3.9.1 A separate, well ventilated stores or lockers with coat hooks shall be provided in adequate place near cabins for storing and keeping work clothes and footwear, for the officers and for the crew members.

3.9.2 If a common sanitary room is provided to accommodate the needs of the part of the crew on the watch in the engine room (see 3.5.17.2) their lockers for clothes and footwear shall be placed in the same room.

3.9.3 An adequate number of lockers shall be provided in the vicinity of service spaces for storing and keeping work clothes of the personnel in charge of preparing and serving meals, if the same is not provided in the kitchen or pantry.

3.10 MEDICAL SPACES

3.10.1 All ships with more than 15 members of the crew and special personnel and engaged on voyages of more than three days' duration shall have a separate room, appropriate for providing medical care, including consultation and giving of first aid and preventing the spread of infectious diseases (ship's hospital). The *Register* may exempt from this requirement ships of restricted service (coastal trade).

3.10.2 Ship's hospital shall be adequately separated from other spaces and it shall be situated in the area not exposed to excessive noise and vibrations and which ensures a daylight in the hospital.

3.10.3 Ship's hospital shall at all times be ready to receive and care for patients and injured persons and it shall be used exclusively for medical purposes.

3.10.4 The access to hospital shall be secure and it shall allow easy and fast transport of the person on the stretcher to the berth.

3.10.5 Ventilation, heating, air conditioning and lighting of the hospital shall ensure proper comfort for the occupants under all service conditions of the ship and the arrangement of the berths and relevant equipment shall facilitate the treatment of the occupants.

3.10.6 Floor, walls and ceiling in ship's hospital shall be painted in light colour and shall be constructed of the materials whose exposed area can be easily cleaned and disinfected.

3.10.7 In ships with 20 and more crew and special personnel members the ship's hospital shall have no less than 2 berths. In ships having multiple berth cabins one additional berth shall be provided for every six crew and special personnel members, or for a part thereof that don't have single berth cabin, considering that the total number of berths need not be greater than six.

3.10.8 In ship's hospital with more than 2 berths, berths may be double tier berths, on condition that the upper berth shall be of a folding or detachable type.

3.10.9 In addition to a berth(s), ship's hospital shall be provided with the following furniture and equipment:

- .1 bedside cabinet;
- .2 chair and table, that can be of a folding type;
- .3 clothing and linen locker;
- .4 coat hooks;
- .5 push button next to a berth, for the audible signal in the wheelhouse and the room of the officer in charge; and
- .6 lamp next to a headboard.

The furniture shall be constructed in the adequate manner for the hospital.

3.10.10 Ship's hospital shall have a separate sanitary space with a shower and a toilet, and a wash basin with running hot and cold fresh water, unless the same is provided in the hospital. The entrance to the sanitary space shall be from the hospital. Doors shall open towards outside and, if the lock is provided, it shall be able to be unlocked from the outside.

3.10.11 All ships having ship's hospital shall also have a ship's dispensary situated in the separate room next to the hospital. Dispensary shall not have direct communication with the hospital.

3.10.12 Ship's dispensary shall be provided with the following furniture and equipment:

- .1 medicine chest, medical equipment, prescribed medical guide and relevant list and certificate (see 3.10.14);
- .2 berth for examination and providing of first aid;
- .3 working table, chair and screw-stool;
- .4 wash basin with running hot and cold fresh water;
- .5 refrigerator of 50 litres capacity;
- .6 water heater;
- .7 lamp above the working table; and
- .8 coat hooks.

3.10.13 Ships not required to have the ship's hospital shall have medicine chest, medical equipment, prescribed medical guide and relative list and certificate (see 3.10.14) placed in a separate room (pharmacy), deck office or wheel-house.

3.10.14 The quantity and the type of medicine, medical equipment and medical guide stored for usage and utilisation on board shall comply with the specific requirements specified of the particular Flag State Administration.

Medicine chest and medical equipment shall be maintained and updated on regular basis, and inspected within prescribed terms.

The ship shall be provided with a certificate issued by the authorised legal entity confirming the above mentioned.

3.10.15 Medical stretchers shall be of adequate construction for usage on ships, including winch hoisting, folding, floating and standing upright in water and be convenient for tight spaces.

3.10.16 Medicine drugs shall be kept locked in a separate compartment of medicine chest.

3.10.17 The key for the dispensary and medicine chest and equipment shall be kept by the Master, unless the ship is provided with a doctor, or the person authorised by the Master.

3.10.18 All ships (see SOLAS 74, Ch. IV - Radiocommunications) shall carry complete and up-to-date list of radio-stations through which medical advice can be obtained, and, if equipped with a system of satellite communication, carry an up-to-date and complete list of coast earth stations through which medical advice can be obtained.

3.10.19 Ships engaged in international voyages of more than three days duration with 100 or more persons on board shall carry a qualified medical doctor, responsible for administering medical care.

It is to be noted that the Flag State Administration may also require for other ships to carry a medical doctor, taking into consideration, inter alia, factors such as duration, nature and conditions of the voyage and the total number of the persons on board.

3.11 OFFICES

3.11.1 All ships shall have the engine office and the deck office, which may be in the common space (ship's office) or in separate spaces, whatever is considered more appropriate. The the *Register* may exempt from this requirement ships of less than 3,000 gross tonnage.

3.11.2 The engine office and the deck office shall be placed in a convenient place in the accommodation area.

3.11.3 The offices shall have a space equipped for working with clients, shelves and locker for storing and archiving written documents.

4 COMFORT SYSTEMS AND SPECIAL SAFETY REQUIREMENTS

4.1 WATER SUPPLY

4.1.1 In every ship, with regard to the ship's service, duration of voyage and number of persons on board, there shall be available at all times sufficient amount of water supply for the purpose of drinking, preparing food, cooking and dish washing and similar (drinking water) and water for sanitary purposes, e.g. washing, bathing and rinsing (fresh water). Water quality shall comply with relevant (recognised) sanitary standards imposed for drinking or fresh water respectively.

4.1.2 Drinking and fresh water systems shall be separated from each other and completely separated from other ship's systems, except that fresh water system may be common for sanitary and technological uses. If a common system is envisaged for drinking and fresh water supply (only for sanitary purposes) water quality shall comply with sanitary standards for drinking water.

4.1.3 If drinking/fresh water is supplied to other devices and users that could deteriorate its required quality, relevant requirements for system and water quality shall be ensured with special arrangement and/or pipe fittings at the connection point.

4.1.4 For minimum requirements that drinking/fresh water system shall comply with to protect and ensure water quality see ISO 15748-1:2002.

4.1.5 The capacity of drinking/fresh water supply system on board, including storage tanks and/or equipment for processing sea water, shall be determined in agreement with Owners and based on imposed condition of the ship's autonomy, taking into consideration the type of the ship, service area and the duration of the voyage, respectively, and the number and type of water supply points, and if envisaged, other users.

4.1.6 For guidelines and evaluation of the consumption of drinking/fresh water per person and/or individual supply points, per day, see ISO 15748-2:2002.

4.1.7 The quantity of drinking/fresh water stored on board, i.e. the capacity of water storage tanks, shall not be less than:

- .1 estimated five day consumption (see 3.12.6) for the service area 1;
- .2 three day consumption for service area 2, and two day consumption for service area 3, 4 and 5; and
- .3 one day consumption, for service area 6, 7 and 8.

If the equipment for processing sea water into drinking/fresh water is used, no more than three day consumption is required for service area 1; two day consumption for service area 2, 3, and 4; and one day consumption for service area 5.

4.1.8 Sea water may be used for swimming pools and showers on the weather deck and for flushing water closets and urinals.

4.1.9 Drinking water may be stored in non-structural and/or structural tanks other than double bottom tanks and tanks situated in the fore and aft peak. Where the shell plating forms an integral part of the drinking water tank it shall be of the welded structure and have as few joints as practicable. Weather deck may form top of drinking water tank, if of welded structure and having as few seams as practicable, and if there are no other openings within that deck area, other than a filling pipe and tank vent pipe.

4.1.10 Drinking water tanks shall not be located in spaces having impurity sources and, if possible, heat sources, in which case they shall be thermally insulated.

4.1.11 Drinking water structural tanks shall be separated from fuel oil tanks, lubricating oil tanks, waste water tanks and tanks containing other liquids, other than fresh water, by means of a cofferdam.

4.1.12 Drinking water tanks shall be constructed of stainless steel or any other material which is not detrimental for health and which shall not deteriorate water properties. The *Register* may accept the use of other approved material in case the internal tank surfaces are covered with suitable resistant lining or coated with appropriate agent which is not detrimental for health and shall not deteriorate water properties.

4.1.13 The total required quantity of drinking/fresh water stored on board is recommended to be distributed into two equal capacity tanks each having separate connection to pipeline for supply of drinking/fresh water.

4.1.14 The fresh water may be stored in the fore and aft peak tanks but not in double bottom tanks. Fresh water tanks shall be separated from fuel oil tanks, lubricating oil tanks and waste water tanks by means of a cofferdam.

4.1.15 Non-structural tanks for drinking/fresh water shall have structural reinforcement on the outside of tanks.

4.1.16 Drinking/fresh water tank shall be fitted with at least one manhole with watertight cover for entrance into tank for the purpose of inspection, cleaning and maintenance. If a manhole is fitted on the tank top, it shall have a coaming of not less than 200 mm in height. The design of tank shall enable thorough water drainage and taking of water sample from the deepest tank level.

4.1.17 No sanitary spaces shall be located on the deck area which is a part of drinking water tank top. No piping systems, other than those serving drinking/fresh water tanks, shall pass through drinking/fresh water tanks.

4.1.18 Drinking/fresh water tank shall be fitted with the filling and vent/overflow pipes which comply with the requirements of the *Rules for the classification of ships, Part 8 – Pipelines*. Filling pipe connection shall comply with specifications in ISO 5620-1 and the vent pipe shall be so designed as to prevent ingress of impurities, sea and insects into tank.

4.1.19 Gauging device for drinking water tanks shall be of type which shall not deteriorate water properties. Where considered acceptable, the *Register* may allow gauging of water level in tank by using special stainless sonde used solely for that purpose and which is stored in a special box.

4.1.20 Drinking/fresh water pipeline shall not pass through tanks intended for storage of other liquids.

4.1.21 Portable flexible pipes and connections to the water supply at shore shall be of special design, used only for that purpose and adequately marked. When not in use they shall be stored in a special chest.

4.1.22 Fittings and connections of the drinking water supply system shall be of such design as to prevent any risk of water contamination and shall be provided with adequate inscriptions. Warning notices shall be displayed in positions where available water may not be used as drinking water.

4.1.23 Drinking/fresh water supply system on board shall have a sterilisation device, approved by the *Register*, for water obtained from shore and water stored on board for longer periods (five or more days). Drinking/fresh water obtained by processing sea water with temperature no higher than 80°C shall be additionally sterilised.

4.1.24 Design of drinking/fresh water supply system, including sea water processing plant shall be such as to allow inspection, maintenance and repairs, when necessary, to be carried in adequate manner.

4.1.25 Sea suction for plant processing sea water into drinking/fresh water, swimming pool and showers on the weather deck, shall be located on the ship's bottom, sufficiently spaced forward of the waste water discharge openings as to prevent contamination of sea water supplied on board.

4.1.26 After the first filling of drinking water tank, water sample from the tank shall be tested by authorised sanitary institution, and the certification on quality of examined water shall be kept on board until the next testing.

4.1.27 Microbiological quality testing of drinking/fresh water shall be carried out once a year considering there is no full certainty that drinking/fresh water supplied from shore or by processing sea water shall continually have or maintain required quality.

4.1.28 Drinking water fountain fitted with cooling arrangement shall be provided in public spaces (see 3.4.9) and in ships of 3,000 gross tonnage or over in a suitable place in the engine room. In ships of 10,000 gross tonnage or over drinking water fountain fitted with cooling arrangement shall be fitted, additionally, in the accommodation area corridor.

4.2 DRAINAGE OF WASTE WATERS AND REMOVAL OF SOLID WASTE

4.2.1 For the purpose of requirements of this chapter the term 'waste waters' comprises:

- .1 black waters, which include:
 - .1.1 drainages from water closets and urinals,
 - .1.2 drainages from medical spaces,
 - .1.3 drainages from cargo spaces for carriage of animals,
 - .1.4 other drainages mixed with aforementioned drainages; and
- .2 grey or polluted waters, which include:
 - .2.1 drainages from sanitary spaces (excluding water closets and urinals),
 - .2.3 drainages from laundry rooms,
 - .2.4 drainages from galleys and provision store rooms.

4.2.2 For requirements on providing individual spaces with deck drainages see 3.5 to 3.8. The requirements for arrangements and equipment for treatment and discharge of black waters are specified in the *Rules for technical supervision of sea-going ships, Part 22 – Pollution Prevention, 5.2*.

4.2.3 A common treatment plant is recommended to be provided in ships for collecting, treatment and discharge of black and grey waters other than drainages from provision store rooms which shall be separate.

4.2.4 All black and grey water drainages shall be fitted with a removable grid and siphon.

4.2.5 Black and grey drainage pipeline shall not be laid above drinking water tanks.

4.2.6 In ships with combined black and grey water piping system, a grey water drainage pipeline is recommended to be led directly to collecting tank. Measures shall be taken to prevent penetration of black waters into grey waters drainage pipeline. Combined drainage pipeline leading from galley and pantry shall be fitted with grease trap, siphon and venting arrangement.

4.2.7 Drainage pipeline from provision store rooms may be connected to the drainage pipeline leading from galley and pantry only in case such drainages are not connected to the black water drainage pipeline.

4.2.8 Vent pipes for the collecting tanks and arrangements for treatment and discharge of black waters shall be so positioned as to prevent penetration of unpleasant odours and dangerous gases into accommodation spaces and control stations.

4.2.9 All ships shall be provided with the garbage collecting equipment or garbage processing equipment (comminuters or incinerator).

4.2.10 Garbage rooms for waste collection (solid waste) shall have smooth surfaces suitable for cleaning and disinfecting.

4.2.11 Garbage rooms shall not be adjacent to the accommodation spaces, service spaces and control stations.

4.2.12 If a garbage containers of portable type are provided, a total mass of container and garbage shall not exceed 50 kg.

4.2.13 Dry solid waste shall be collected separately from food scraps and food waste from galley.

4.2.14 For other requirements relating to collecting and removal of garbage see the *Rules for technical supervision of sea-going ships, Part 22 – Pollution Prevention, 6.2*.

4.3 LIGHTING

4.3.1 Natural lighting shall, unless the *Register* approves otherwise, be provided in cabins, mess rooms/day rooms, galley and hospital.

4.3.2 In cabins, mess rooms/day rooms the natural lighting factor representing the ratio between lighting of one post inside a room at a height of 0.85 m above the deck and lighting of a horizontal surface at the open air, calculated in percentages, shall amount to no less than 50.

Natural lighting shall be obtained by an adequate arrangement of windows and/or scuttles and furniture/equipment in a room, selection of adequate colours for ceiling, walls and furniture so that the degree of uniform lighting representing ratio between minimum and maximum lighting in the room shall be not less than 0.3.

4.3.3 In order to provide adequate shading in the room the windows and/or scuttles shall be fitted with curtains and/or screens.

4.3.4 All accommodation spaces including corridors, staircases and belonging passages and exits to weather decks shall be fitted with artificial (electric) lighting.

4.3.5 Lamps in the room shall be so arranged that, at the full lighting of workstation and passages, no sharp changes appear in lighting of other parts of the room. The lamps shall not glare and shall be fitted with shades, when necessary.

4.3.6 The mean value of artificial lighting in the room (in luxes) shall comply with the requirements specified in Table 4.3.6-1.

Table 4.3.6-1
Minimum mean lighting

Designation of rooms and spaces	Lighting [lux]	
	Total	At workstation
Cabins	50	150
Mess room/day room	120	-
Galley and pantry	100	100
Dispensary	100	500
Hospital:		
- sleeping time	20	-
- other time	100	-
Sanitary spaces	50	-
Laundry room	100	-
Drying room/Ironing room	20/30	75
Provision store rooms	40	-
Lobby to provision store rooms	50	-
Corridors, staircases, passageways and accesses	30	-
Workshops	100	200
Store rooms for overalls/footwear	30	-
Ship store rooms	30	-
Weather decks, in places visited by personnel	10	-
Outside stairs, passageways and accommodation ladder	20	-
Dry cargo spaces and decks	25	-
Notes: Lighting values refer to incandescent lamps. If other types of lamps are used (luminescent, voltage, gas) with higher lighting temperature, lighting values shall be increased to obtain equal physiological effect.		

4.3.7 On ships having lighting circuits supplied by voltage below 30 V, the lighting of rooms is subject to special consideration by the *Register* in each particular case separately.

4.3.8 For requirements regarding safety at work and safe construction of electrical machinery, devices and equipment and requirements for room and space lighting not men-

tioned in Table 4.3.6-1 see the requirements of the *Rules for technical classification of ships, Part 12 – Electrical equipment*.

4.3.9 If two independent sources of supply for electrical lighting are not envisaged, additional lighting shall be provided for use in emergency, complying with the *Rules for technical classification of ships, Part 12 – Electrical equipment*, 6.3.

4.4 HEATING

4.4.1 In all ships required to have a heating system (see 3.2.13), heating shall also be provided for control stations and workshops, in addition to accommodation spaces.

4.4.2 Heating shall be by means of hot water, warm air, electricity, steam or equivalent, except for accommodation spaces where steam shall not be used. Heating system using solid, liquid and gas fuel is prohibited.

4.4.3 Heating system shall be such as to enable independent control of heat supply in a room and disconnection of heating units in the room being heated.

4.4.4 Pipes connecting radiators in cabins with heating main shall not pass under beds and berths. If not practicable, branch pipes shall be thermally insulated.

4.4.5 The arrangement of radiators shall contribute to adequate air circulation and ensure uniform distribution of heat in a room. Where necessary, pipes and radiators of steam heating system shall be adequately guarded in order to avoid direct contact.

4.4.6 The radiators shall not be placed in the immediate proximity of the bed headboard, near ventilation trunk openings and below the furniture. The electric radiators shall not be placed in positions exposed to risk of water leakage.

4.4.7 The heating system shall be capable of maintaining the temperature in individual enclosed spaces, under normal conditions of weather and climate likely to be met within the trade area in which the ship is regularly engaged, as follows:

- .1 cabins, public spaces, service spaces and offices, not less than 21°C;
- .2 medical spaces, not less than 22°C;
- .3 common sanitary spaces:
 - wash basin rooms/bathrooms, not less than 24°C;
 - toilets, not less than 16°C;
- .4 control stations, not less than 18°C; and
- .5 workshops, not less than 16°C.

Specified temperatures shall be achieved at a required minimum fresh air supply as specified in Table 4.5.1-1.

4.4.8 In order to ensure required air humidity, each radiator in the cabins shall be fitted with an appropriate water tray.

4.4.9 For ships engaged in voyages in service area 3, 4, 5 and 6 respective outside temperature for determining capacity of the heating system shall not be higher than -2°C (see 4.4.7).

4.4.10 Heating system shall be in operation at all times when the crew and special personnel live/work on board, and conditions require it. Emergency heating source is not required.

4.5 VENTILATION

4.5.1 Enclosed accommodation spaces shall be provided with built-in mechanical ventilation system in order to ensure minimum quantity of fresh air supply in all weather

and climate conditions which the ship is likely to encounter during voyages in service area where it is engaged, in accordance with the requirements specified in Table 4.5.1-1. The ventilation system shall be additional to any side scuttles, windows, skylights, trunks, doors and other apertures not intended solely for ventilation.

Table 4.5.1-1
Quantity (volume) of air and number of fresh air changes in enclosed spaces

Designation of rooms and spaces	Fresh air supply (greater value shall apply)		Air (used) exhaust
	Number of air changes per hour	Volume of air per person [m ³ /h]	Number of air changes per hour/volume
Cabins	6	25 ¹	-
Public spaces	8	25	10 (20% more than supply)
Laundries	-	-	15
Ironing/drying rooms	-	-	15
Private sanitary spaces	-	-	10
Common sanitary spaces	-	-	20
Store rooms for overalls/footwear	-	-	10
Galleys	20	-	40
Pantries and larders	8	-	10
Hospital	-	30	10% more than supply
Dispensary	8	-	10
Wheelhouse and radio room	8	-	-
Battery room	-	-	According to calculation on removal of dangerous gases
Workshops	-	-	10
Ship store rooms	-	-	6
Paint store	-	-	10
Engine room and boiler room	40	-	Air Exhaust from the places where oil vapours may accumulate
Electric switchboard room	-	-	6
Steering gear room	-	-	20
Cargo pump-room	-	-	10
Room for CO ₂ cylinders	-	-	30 (during work)
Welding room	-	-	10 (during summer) 6 (per day during winter)
Dry provision stores	-	-	6 (during navigation) 12 (during loading/unloading)
Ro-ro cargo spaces	-	-	10 (during navigation) 20 (during loading/unloading)
Special category spaces	-	-	3
Void spaces (temporarily attended)	-	-	

Notes:

25 m³ of air per person but not less than 60 m³ of air for single berth cabin

4.5.2 Power for the operation of ventilation system shall be available at all times when the crew and special personnel live and/or work on board, and conditions require it; but emergency power source is not required.

4.5.3 Suction ventilation openings on the weather deck shall be located in such place as to prevent entry of used and contaminated air, exhaust gases and sea.

4.5.4 In ships engaged on regular basis on voyages to mosquito-infested ports, all ventilation openings on the

weather deck for accommodation spaces and control stations shall be fitted with screening against insects, unless equivalent protection measures are provided.

4.5.5 Enclosed spaces, attended temporarily by the personnel or normally not attended, shall be provided with natural ventilation or the ventilation of the room shall be ensured by portable ventilator.

4.5.6 In cargo ships where large quantities of dust may be produced during cargo handling operations, the fresh air

inlets to accommodation spaces and control stations shall be provided with water filters.

4.5.7 Arrangement of ventilation openings in spaces shall ensure adequate air circulation and uniform temperature and prevent draught in the room.

4.5.8 Inlet and outlet openings in cabins shall not be placed near berths and create draught on the berth. The air flow velocity in the room where personnel resides shall comply with the recommendations set out in Diagram 4.5.8-1.

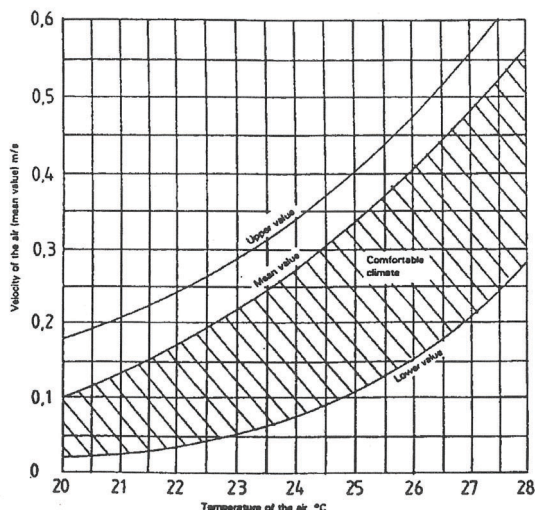


Diagram 4.5.8-1

4.5.9 The ventilation system provided for accommodation spaces and control stations shall ensure independent control of fresh air supply to the room.

4.5.10 Ventilation system provided for galleys shall be separate from other ventilation systems (see the *Rules for the classification of ships, Part 17. – Fire protection, 2.1.7*). Pantries and provision store rooms close to the galley may be connected to the galley ventilation system.

4.5.11 Exhaust ventilation from sanitary spaces in the accommodation area, including toilets, wash basin rooms/bathrooms and dressing rooms, washing rooms and drying/ironing rooms may serve for the ventilation of linen store room, converter room and similar spaces.

4.5.12 Hospital exhaust ventilation shall be separate from all other ventilation systems.

4.5.13 The ventilation system for ro-ro cargo spaces and special category spaces shall ensure the number of air changes as specified in Table 4.5.1-1, and content of carbon monoxide and nitrogen oxide in the room during loading/unloading shall not exceed 35 ppm and 5ppm, respectively.

4.5.14 In ships with an engine room protected by carbon dioxide fire-extinguishing system the ventilation system shall be such as to ensure carbon dioxide extraction from the bottom of the space without the necessity of personnel entering the space.

4.5.15 The storage rooms for fire-extinguishing media of fixed gas fire-extinguishing systems which are located below weather deck or spaces where access from the open deck

is not provided, shall be fitted with mechanical ventilation system designed to take exhaust air from the bottom of the space and shall be sized to provide at least 6 air changes per hour. The storage rooms for fire-extinguishing media shall be adequate thermal insulated, taking into account their location and maximum expected ambient temperature.

4.5.16 Oxygen and acetylene store rooms shall be provided with natural ventilation. Natural ventilation shall be separate for each room. Fitting of natural ventilation with branch ducting shall not be accepted, except for air supply in the lower part of a space.

4.5.17 Natural ventilation inlet cowls and mushrooms on the weather deck shall be of adequate design and located in such manner as to ensure, as much as possible, fresh and clean air supply under normal weather conditions.

4.6 AIR CONDITIONING

4.6.1 Air conditioning system (see 3.2.14) shall, under normal temperature and outside air humidity, in the service area where the ship is engaged on voyages on regular basis and at the minimum fresh air supply, according to requirements specified in Table 4.5.1-1, ensure during summer and winter season the following climate conditions in air-conditioned spaces:

- .1 temperature, 22°C to 25 °C; and
- .2 relative humidity, minimum 30% to maximum 70%.

The above mentioned values refer to central or zone adjustment of conditioned air temperature. If individual temperature adjustment in spaces is provided, temperature range shall be 22°C to 27°C during winter and 20°C to 25°C during summer.

4.6.2 For service area 3, 4, 5 and 6 outdoor air conditions for determining capacity of the air conditioning system shall be considered as follows:

- .1 temperature, not higher than -0°C during winter and not lower than 32°C during summer; and
- .2 relative humidity, at least 55-65% during summer.

4.6.3 Air re-circulation may be accepted. The quantity of re-circulated air shall, in no case, exceed 50% during winter and 25% during summer, in relation to total required supply of conditioned air.

4.6.4 Temperature of conditioned air, measured at the center of air flow and 300 mm apart from the air supply opening in the room, shall not be lower for more than 10°C and higher for more than 23°C than the mean required room temperature (see 4.6.1) during summer and winter, respectively.

4.6.5 When using central automatic temperature and air humidity control, temperature variation shall not exceed $\pm 2\%$ and relative humidity $\pm 10\%$. A thermostat or any other adequate appliance shall be provided in every cabin for individual adjustment of conditioned air supply.

4.6.6 Functioning of air conditioning system shall be positively balanced at any time; total quantity of supplied air shall always exceed the quantity of exhaust air.

4.6.7 Air conditioning system shall comply with the following requirements:

- .1 it shall be appropriate for functioning at the sea environment conditions;
- .2 it shall be easily cleaned and decontaminated in order to prevent or monitor the spreading of diseases through the system; and
- .3 it shall not create excessive noise and vibrations.

4.6.8 Power supply for the air conditioning system shall be available at all times when the crew and special personnel live and/or work on board, and environment conditions require it. However this power need not be provided from an emergency source.

4.7 NOISE PROTECTION

General

4.7.1 The noise on board ships in general, in places where crew and special personnel lives and works, shall be within limits which do not impede safe working conditions, are not detrimental to health and do not disturb prescribed comfort and deserved rest. For that purpose, ships to which this Part of the *Rules* applies, depending on gross tonnage, service type, duration of voyage and duration of service, shall comply with the requirements of this chapter regarding the maximum allowed noise levels and measures which shall be carried out to limit exposure to noise. (see 4.7.4 to 4.7.7 and to *Code on noise levels on board ships* (Code) (IMO Res. MSC.337(91)).

4.7.2 The requirements and recommendations of this chapter are developed for application to conventional passenger and cargo ships of a gross tonnage of 1,600 and more and cover standards for:

- .1 measurement of noise level and exposure;
- .2 protecting the personnel from the risk of noise-induced hearing loss under conditions where at present it is not feasible to limit the noise to a level which is not potentially harmful;
- .3 limits on acceptable maximum noise levels for all spaces to which personnel normally has access; and
- .4 verification of acoustic insulation between accommodation spaces.

Application

4.7.3 The requirements of this chapter shall apply to ships in port or at sea with personnel on board and cover only noise sources related to the ship such as machinery, equipment and propulsion but do not include wind/wave/ice noise, alarms, public address systems, etc.

4.7.4 Dispensations from certain requirements may in special circumstances be granted by the *Register*, if it is documented that compliance will not be possible despite

relevant and reasonable technical noise reduction measures. Such dispensation shall not include cabins, unless exceptional

circumstances prevail. If dispensation is granted, it shall be ensured that the goal of the Code is achieved, and the noise exposure limits shall be considered in conjunction with 4.7.27.

4.7.5 For ships designed for and employed on voyages of short duration, or on other services involving short periods of operation of the ship, to the satisfaction of the *Register*, the requirements for noise level limits for accommodation and service spaces may be applied only with the ship in the port condition, provided that the periods under such conditions are adequate for seafarers' rest and recreation.

4.7.6 Ships of gross tonnage of less than 1,600 shall comply with requirements and recommendations of this chapter as far reasonable and practical, to the satisfaction of the *Register*. The full application of the requirements and recommendations of this chapter to ships that differ appreciably from conventional types of ships regarding design and operations is subject to special consideration of the *Register* in each particular case.

4.7.7 The requirements and recommendations of this chapter do not apply to:

- .1 dynamically supported craft;
- .2 high-speed craft;
- .3 fishing vessels;
- .4 pipe-laying barges;
- .5 crane barges;
- .6 mobile offshore drilling units;
- .7 pile driving vessels; and
- .8 dredgers.

Measuring equipment

4.7.8 For measuring equipment, including equipment specifications and use of equipment, the requirements as specified in chapter 2 of the Code shall apply.

Operating and environmental conditions

4.7.9 On completion of the construction of the ship, or as soon as practicable thereafter, measurement of noise levels in all spaces specified in Table 4.7.16-1 shall take place under the operating and environmental conditions specified in sections 3.3 to 3.5 of the Code and shall be suitably recorded as required in 4.7.19.

Measurements and measurement procedures

4.7.10 Measurements of the A-weighted equivalent continuous sound level, $L_{Aeq}(T)$, shall be made for the purpose of ensuring compliance with noise level limits (dB(A)) as specified in Table 4.7.16-1.

4.7.11 Measurements of the C-weighted equivalent continuous sound level, $L_{Ceq}(T)$, and the C-weighted peak sound level, L_{Cpeak} , shall be made in spaces where $L_{Aeq}(T)$ exceeds 85 dB(A) for the purpose of determining appropriate hearing protection according to the HML-method, see 3.18.32.

4.7.12 The measurement procedures, points of measurement and measurement locations in different spaces shall be as specified in sections 3.6 and 3.8 to 3.14 of the Code.

Determination of noise exposure

4.7.13 In addition to the continuous sound level measurements, the noise exposure level of personnel (see chapter 5 of the Code) shall be determined based upon ISO 9612:2009. A simplified procedure based on ISO 9612 and a work place related noise exposure is given in appendix 4 of the Code.

Measuring experts requirements

4.7.14 In order to ensure an acceptable and comparable quality of the measurement results and the reports, the measuring institutes or experts shall prove their competence with view to noise measurements (Testing institutions which support a quality management system according to ISO 17020/25 are considered to fulfil these requirements).

4.7.15 The person conducting measurements shall have:

- .1 knowledge in the field of noise, sound measurements and handling of used (utilised) equipment; and
- .2 training concerning the procedures specified in the Code.

Maximum acceptable sound pressure levels

4.7.16 The limits for noise levels (dB(A)), as specified for various spaces in Table 4.7.16-1, shall be regarded as maximum levels and not as desirable levels. Where reasonably practicable, it is desirable for the noise level to be lower than the maximum levels specified.

Table 4.7.16-1
Noise level limits

Designation of rooms and spaces	Ship size	
	1,600 up to 10,000 GT	≥ 10,000 GT
Noise level limits (dB(A))		
4.7.16.1 Work spaces		
Machinery spaces ¹	110	110
Machinery control rooms	75	75
Workshops other than those forming part of machinery spaces	85	85
Non-specified work spaces ² (other work areas)	85	85
4.7.16.2 Navigation spaces		
Navigating bridge and chartrooms	65	65
Look-out posts, incl. Navigating bridge wings ³ and windows	70	70
Radio rooms (with radio equipment operating but not producing audio signals)	60	60
Radar rooms	65	65
4.7.16.3 Accommodation spaces		
Cabin and hospitals ⁴	60	55
Messrooms	65	60
Recreation rooms	65	60
Open recreation areas (external recreation areas)	75	75
Offices	65	60
4.7.16.4 Service spaces		
Galleys, without food processing equipment operating	75	75
Serveries and pantries	75	75
4.7.16.5 Normally unoccupied spaces		
Spaces referred to in section 3.14 of the Code	90	90

4.7.17 Before the ship is put in service, the limits specified in Table 4.7.16-1 shall be assessed by the equivalent continuous sound level measurement for that space. In large rooms with many measurement positions the individual positions shall be compared to the limits.

4.7.18 Personnel entering spaces with nominal noise levels greater than 85 dB(A) shall be required to wear hearing protectors while in those spaces (see 4.7.22). The limit of 110 dB(A) given in 4.7.16.1 (see Table 4.7.16-1) assumes that hearing protectors, giving protection meeting the requirements for hearing protectors in 4.7.31 and 4.7.32, are worn.

¹ If the maximum noise levels are exceeded when machinery is operating (only permitted if dispensation is granted in accordance with 4.7.4) stay shall be limited to very short periods or not allowed at all. The area shall be marked according to 4.7.35.

² Examples are open deck workspaces that are not machinery spaces, and open deck workspaces where communication is relevant.

³ Reference is made to the *Recommendation on methods of measuring noise levels at listening posts* (resolution A.343(IX)) which also applies.

⁴ Hospitals: treatment rooms with beds.

Survey report

4.7.19 A noise survey report shall be made for each ship. The report shall comprise information on the noise levels in the various spaces on board. The report shall show the reading at each specified measuring point. The points shall be marked on a general arrangement plan, or on accommodation drawings attached to the report, or shall otherwise be identified.

4.7.20 The format for noise survey report is set out in appendix 1 to the Code. The noise survey report shall always be carried on board and be accessible for the crew.

Noise exposure limits

4.7.21 The noise level limits as set out in Table 4.7.16-1 are designed so that if they are complied with the personnel will not be exposed to an $L_{ex}(24)$ exceeding 80 dB(A), i.e. within each day or 24-hour period the equivalent continuous noise exposure would not exceed 80 dB(A). For a new ship, compliance with these criteria shall be verified on the basis of sea trial measurements of noise levels by calculation of the expected noise exposure of each category of personnel in accordance with the method prescribed in 4.7.13.

4.7.22 In spaces with sound pressure levels exceeding 85 dB(A), suitable hearing protection shall be used, or time limits for exposure applied, as set out in 4.7.27.1 to 4.7.27.5, to ensure that an equivalent level of protection is maintained.

4.7.23 No member of personnel shall be exposed unprotected to peak values exceeding 135 dB(C).

4.7.24 Each ship to which these regulations apply shall include in their Safety Management System a section on the company's policy regarding hearing protection, exposure limits and conduct training on those matters, which will be logged in their training records.

4.7.25 Consideration shall be given to the instruction of the personnel on these aspects, as recorded in appendix 2 to the Code.

4.7.26 In order to comply with the exposure criteria of this chapter, the use of hearing protectors complying with 4.7.30 to 4.7.32 is permitted. Even when hearing protectors are required for compliance with this chapter, the *Register* may require that risk assessments, a hearing conservation programme and other measures are to be implemented.

4.7.27 The personnel shall not be exposed to noise in excess of the levels and duration shown in Figure 4.7.27-1 and described in paragraphs .1 to .5:

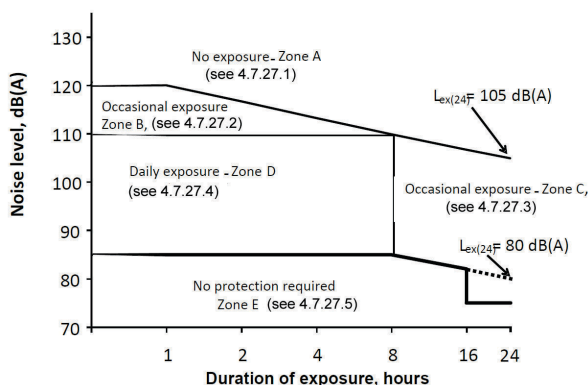


Figure 4.7.27-1: Allowable daily and occasionally occupational zones

Note: To work in Zone A-D hearing protectors attenuating the sound to the ear down to below 85 dB(A) are required. To work in Zone E hearing protectors are not required but shall be accessible if the sound level is over 80 dB(A) for more than eight hours.

.1 Maximum exposure with protection (zone A)

No member of personnel, even when wearing hearing protectors, shall be exposed to levels exceeding 120 dB(A) or to an $L_{eq}(24)$ exceeding 105 dB(A);

.2 Occasional exposure (zone B)

Only occasional exposures shall be allowed in zone B and hearing protectors with an attenuation between 25 and 35 dB(A) shall be used;

.3 Occasional exposure (zone C)

In zone C only occasional exposures shall be allowed and hearing protectors with an attenuation of at least 25 dB(A) shall be used;

.4 Daily exposure (zone D)

If members of personnel routinely work (daily exposure) in spaces with noise levels within zone D hearing protectors with an attenuation up to at least 25 dB(A) shall be used and risk assessment and a hearing conservation programme may be considered; and

.5 Maximum exposure without protection (zone E)

For exposures of less than eight hours, members of personnel without hearing protection shall not be exposed to noise levels exceeding 85 dB(A). When members of personnel remain for more than eight hours in spaces with a high noise level, an $L_{eq}(24)$ of 80 dB(A) shall not be exceeded. Consequently, for at least a third of each 24 hours each member of personnel shall be subject to an environment with a noise level below 75 dB(A).

24-hour equivalent continuous sound level limit

4.7.28 As an alternative to compliance with the provisions of 4.7.27.1 to 4.7.27.5, no unprotected member of personnel shall be exposed to a 24-hour equivalent continuous sound level greater than 80 dB(A). Each individual's daily exposure duration in spaces requiring the use of hearing protectors shall not exceed four hours continuously or eight hours in total.

Hearing conservation programme

4.7.29 A hearing conservation programme may be provided for the members of personnel working in spaces with $L_{Aeq} > 85$ dB(A) in order to train them in the hazards of noise and use of hearing protection, and to monitor hearing acuity. For some elements of a hearing conservation programme and an optional element of a hearing conservation programme see 5.5 of the Code.

Hearing protection and warning information

4.7.30 When the application of means for controlling sound at source does not reduce the noise level in any space to that specified in 4.7.18, the members of the personnel who are required to enter such spaces shall be supplied with effective hearing protection on an individual basis. The provision of hearing protectors shall not be considered to be a substitute for effective noise control. Appendix 3 to the Code summarises current noise abatement methods which may be applied on new ships.

4.7.31 The individual hearing protectors shall be so selected as to eliminate the risk to hearing or to reduce the risk to an acceptable level as specified in 4.7.32. The ship operator shall make every effort to ensure the wearing of hearing protectors and shall be responsible for checking the effectiveness of measures taken in compliance of the Code.

4.7.32 Hearing protectors shall be of a such type that they can reduce sound pressure levels to 85 dB(A) or less (see 4.7.21 to 4.7.25). Selection of suitable hearing protectors shall be in accordance with the HML-method described in ISO 4869-2:1994 (see explanation and example in appendix 2 to the Code). For the guidance to ship operators in choosing proper hearing protection, a short description of the HML-method and its use is given in appendix 2 to the Code.

4.7.33 Noise-cancelling technology may be used if the headset(s) have equivalent performance to hearing protectors in their unpowered condition. Noise-cancelling headsets specifications shall be as per confirmed manufacturer specifications.

4.7.34 The ship operator shall be responsible for ensuring that means for noise reduction and control are applied and maintained such that the requirements of the Code are met. Personnel shall be instructed in the proper use of hearing protectors as provided or used on board (see appendix 2 of the Code).

4.7.35 Where the noise level in machinery spaces (or other spaces) is greater than 85 dB(A), entrances to such spaces shall carry a warning notice comprising symbol and supplementary sign in the working language of the ship as prescribed by the *Register*. If only a minor portion of the space

has such noise levels the particular location(s) or equipment shall be identified at eye level, visible from each direction of access.

4.7.36 Where hand tools, galley and other portable equipment produce noise levels above 85dB(A) in normal working conditions, ship operators shall ensure that warning information shall be provided.

4.7.37 For the guidance on the inclusion of noise issues in Safety Management Systems see appendix 2 to the Code.

Acoustic insulation between accommodation spaces

4.7.38 Consideration shall be given to the acoustic insulation between accommodation spaces in order to make rest and recreation possible even if activities are going on in adjacent spaces, e.g. music, talking, cargo handling, etc.

4.7.39 The airborne sound insulation properties for bulkheads and decks within the accommodation shall comply at least with the following weighted sound reduction index (R_w) according to ISO Standard 717-1:1996 as amended (1:2006), part 1:

- .1 Cabin to cabin $R_w = 35$;
- .2 Messrooms, recreation rooms, public spaces and entertainment areas to cabins and hospitals $R_w = 45$;
- .3 Corridor to cabin $R_w = 30$; and
- .4 Cabin to cabin with communicating door $R_w = 30$.

4.7.40 The airborne sound insulation properties shall be determined by laboratory tests in accordance with ISO 10140-2:2010, to the satisfaction of the *Register*.

4.7.41 Care shall be taken in the erection of materials and in the construction of accommodation spaces. During sea trial testing, if the erection of materials is in doubt then measurements shall be taken on board ships for a representative selection of each type of partition, floors, doors as requested in 4.7.39 and to the satisfaction of the *Register*⁵. The apparent weighted sound reduction index R_w shall comply with the requirements of 4.7.39 with tolerance of up to 3 dB.

4.8 VIBRATION PROTECTION

4.8.1 Requirements for vibration protection, in this chapter, refer to motions imposed to (human) body as a whole, transmitted from surrounding structure (most commonly deck or floor) through the feet of standing person.

4.8.2 The requirements of this chapter shall apply to spaces and places where the ship's crew and special personnel lives and/or performs normal everyday duties lasting 20 minutes and longer, in any given time, including accommodation spaces and control stations in general, and access spaces (cor-

⁵ Field measurements shall be performed according to ISO 140-4:1998. When the area of the materials tested is < 10 m², a minimum value of 10 m² shall be considered for the calculation of the R_w index.

ridors, stairways and passageways), when the *Register* considers it reasonable.

4.8.3 The level (intensity) of multi-axis mechanical vibrations in places, as specified in 4.8.2, expressed as the value of acceleration or velocity and calculated by using the following expression:

$$a_w = \sqrt{a^2_{xw} + a^2_{yw} + a^2_{zw}}, \text{ [m/sek}^2\text{]}$$

where:

a_w = mean multi-axis acceleration; and
 a_{xw} , a_{yw} and a_{zw} = mean accelerations for three axis (x, y and z) of possible body movement calculated and determined in compliance with ISO 6954:2000,

shall not exceed the values specified in Table 4.8.3-1.

Table 4.8.3-1

Greatest permitted mean value of vibration level

Frequency area	Highest level
1,0 – 80 Hz	214 mm/s ² or 6 mm/s

4.8.4 The *Register* shall decide upon the necessity of vibration measurement at certain positions on board based on consideration of actual findings during the survey of the ship.

4.8.5 Vibration measurements shall be carried out under the operating and environmental conditions complying with the requirements specified in 4.7.9, except as follows (see ISO 4867:1984):

- .1 measurements shall be carried out, as much as possible, at the location where sea depth is equal to, at least, 5 times the draught of the ship, unless otherwise specified, and with the ship proceeding at a constant speed and course (rudder angle $0^\circ \pm 2^\circ$);
- .2 sea state shall not exceed 3. If not possible, measured values shall be within permitted limits (see 4.8.3); and
- .3 the ship shall be ballasted to displacements as close as possible to the operating conditions within the ordinary ballasting capacity of the vessel. The draught aft shall ensure full immersion of the propeller.

4.8.6 Vibration measurements shall be carried out in accordance with the procedures specified in ISO 4867/4868:1984 and measuring equipment shall be of Type 1 or 2, in accordance with ISO 8041:2007.

4.8.7 For each vibration measuring position there shall be separate data recording obtained by measurement not shorter than 60 seconds, presented in the frequency domain (frequency spectra) and evaluated according to ISO 6954:2000.

4.8.8 A test program, the number and the selection of measuring positions shall be approved by the *Register* prior to starting of measurement.

The test program shall at least include the following information:

- .1 a list and distribution of measuring positions;
- .2 envisaged loading conditions;
- .3 envisaged operating conditions for machinery;
- .4 description of instrumentation to be used; and
- .5 distribution and a list of all vibration sources.

4.8.9 The report on vibration measurement shall contain the following information (see ISO 4867:1984):

- .1 ship and machinery particulars;
- .2 conditions during the measurements such as power output, propeller/engine speed, draught, depth of water under keel, wind and sea state;
- .3 sketches showing the location of the measuring positions and direction of measurements;
- .4 tables of all significant components of the vibration levels and corresponding frequencies. Alternatively the frequency spectra for the different measuring positions may be presented or the significant vibration levels components may be plotted in a graph; and
- .5 instrumentation which has been used, including type of analyser, window function which has been applied, averaging time and resolution.

4.9 RADIATION PROTECTION

4.9.1 Personnel shall not be exposed to dangerous levels of microwave radiation. Instructions contained in manufacturer’s manuals shall be strictly followed.

4.9.2 In locations exposed to the effect of high and ultra high frequency magnetic fields generated by radio or radar equipment, precautions shall be taken (casing, insulation, screenings) as to attenuate the intensity of radiation and propagation of magnetic fields within permissible limits at workstations and spaces permanently occupied by the personnel. Such precautions shall be provided both during manufacture of equipment and when mounting it on board ship. In this case the intensity of generators of cm waves at workstations shall not exceed maximum permissible values, as specified:

- .1 daily radiation: 0,01 mW/cm²;
- .2 mostly 2 hours of radiation daily: 0,1 mW/cm²; and
- .3 mostly 10-20 min of radiation: 1 mW/cm².

4.9.3 No work shall be carried out within the marked safety radius of a satellite terminal antenna unless its transmitter has been switched off.

4.10 PROTECTION AGAINST RODENTS AND INSECTS

4.10.1 In every ship adequate measures shall be taken to prevent entry of rodents on board, as specified:

- .1 all sheltered places in holds, service spaces, provision store rooms, lockers and openings in machinery foundations shall be avoided:
- .2 all wooden surfaces shall be sheathed to prevent chewing (doors, covers, provision lockers etc.);
- .3 all openings shall be fitted with ingress protection nets, (with eyes not exceeding 12 mm); and
- .4 rat guards shall be fitted on mooring ropes during ship's stay in port.

4.10.2 In ships engaged regularly on voyages to mosquito infested ports, mosquito nets for protection against insects shall be provided for all outside doors in addition to openable scuttles and windows in accommodation spaces and control stations (see 4.5.4).

4.10.3 In ships equipped with an air conditioning plant, protection nets against insects (see 4.10.2) in door openings are not required if the door is provided with an effective door closer.