

**RULES  
FOR THE CLASSIFICATION  
AND CONSTRUCTION  
OF SHIPS  
(Rev.2020)**



# INTERMARITIME CERTIFICATION SERVICES (ICS Class)

## Chapter 6 Fire Protection

---

### Section

- 1 **General**
  - 2 **Structural fire protection**
  - 3 **Fire-fighting equipment and systems**
  - 4 **Fire detection and alarm systems**
  - 5 **Fire fighting outfit, spares and tools**
- 

### SECTION 1

#### General

#### 1.1 Application

- 1.1.1 This Chapter applies to ship's structural fire protection, fire extinguishing systems and fire detection and alarm systems, as well as firefighting equipment and outfit.
- 1.1.2 The fire protection requirements relating to the structural items of the ship hull, machinery and parts thereof, electrical equipment, pumping and piping, ship's arrangements, fuel and lubricating oil tanks, construction and location of boilers, refrigerating plants, ship's spaces, etc. are set out in the relevant parts of the Rules.

#### 1.2 Definitions and explanations

- 1.2.1 The definitions and explanations relating to the general terminology of the Rules are given in the *General Regulations for the Supervision*.
- 1.2.2 The following definitions have been adopted in this Chapter.  
**Dangerous goods:** For the purpose of these Rules and in accordance with the existing classification the following is considered as dangerous goods:
  - **Class 1:** Explosives (Subclasses 1.1; 1.3; 1.4; 1.5).

- **Class 2:** Gases: compressed, liquefied or dissolved under pressure.
- **Class 3:** Flammable liquids.
- **Class 4:** Flammable solids (Subclass 4.1); substances liable to spontaneous combustion (Subclass 4.2); substances, which in contact with water, emit flammable gases (Subclass 4.3).
- **Class 5:** Oxidizing substances (Subclass 5.1) and organic peroxides (Subclass 5.2).
- **Class 6:** Poisonous and infectious substances. (Subclass 6.1 "Poisonous substances").
- **Class 7:** Radioactive substances.
- **Class 8:** Caustic and corrosive substances.
- **Class 9:** Miscellaneous dangerous substances.

#### **Explosives of Subclass 1.4, compatibility group S:**

Are substances and articles which present only a small hazard and are so packaged or designed that any hazardous effects are confined within the package.

**Flammable liquids:** Are liquids, or mixtures of liquids, or liquids containing solids in solution or suspension (e. g. paints, varnishes, lacquers, etc.) which give off flammable vapors at or below 60 °C closed cup test.

**Main vertical fire zones:** Are those sections into which the hull, superstructures and deckhouses are divided lengthwise by "A" class divisions in accordance with 2.2.1.2.

**A standard fire test:** Is a test of the specimen's ability to resist heating from any side during the test to the following temperatures, in °C, measured from the initial furnace temperature:

- At the end of the first 5 min.: 556.
- At the end of the first 10 min.: 659.
- At the end of the first 15 min.: 718.
- At the end of the first 30 min.: 821.
- At the end of the first 60 min.: 925.

**"A" class or fire-resisting divisions:** Are those divisions which comply with the requirements set out in 2.1.2.1 to 2.1.2.8, 2.1.3.1 to 2.1.3.6, 2.1.3.9 and 2.1.3.10.

# INTERMARITIME CERTIFICATION SERVICES (ICS Class)

## Chapter 6 Fire Protection

**"B" class or fire-retarding divisions:** Are those divisions which comply with the provisions set out in 2.1.2.9, 2.1.3.1, 2.1.3.7 to 2.1.3.10.

**"C" class divisions:** Are those divisions which are constructed of approved non-combustible materials. They need meet no requirements relative to the passage of smoke and flame nor the limiting of temperature rise.

**Material equivalent to steel:** Means any non-combustible material which, by itself or due to insulation provided, has structural and integrity properties equivalent to steel at the end of the applicable fire exposure during a standard fire test (e. g., aluminum alloy with suitable insulation).

**Continuous "B" class ceilings or linings:** Are those "B" class ceilings or linings which terminate at an "A" or "B" class division or at outer surfaces of the ship.

**Lower flammable limit (LFL):** Is minimum concentration of oil gases and vapors in air capable of igniting from a source of ignition and propagating combustion in the mixture.

**Standard fire test specimen:** A standard fire test specimen is a specimen of the bulkhead or deck, having a heat-exposed surface of not less than 4,65 m<sup>2</sup> and a height (or length, in the case of decks) of 2,44 m resembling as closely as possible the intended construction and including, where appropriate, at least one insulation joint (butt).

**Adjacent compartments or spaces:** Are those compartments or spaces which are separated from one another by a bulkhead, deck, platform, or any other fixed division without openings or with openings provided with means of closure. Compartments or spaces continuous to one another at the corners only are not considered as adjacent. Compartments and spaces separated from one another by removable divisions (i. e. those removable under normal service conditions) or having openings not fitted with means of closing, in the bulkhead or deck that separates them, are considered as one single space.

**Protected space:** Is a space equipped with one of the fire extinguishing systems or with an automatic fire detection system.

**Rooms containing furniture and furnishings of restricted fire risk:** Are accommodation spaces in which:

- Decks, wardrobes and similar furniture as well as frames of other furniture (chairs, sofas, tables) are constructed of non-combustible materials. Combustible veneer not exceeding 2 mm in thickness may be used on the working surface of such articles.
- Curtains, blinds and other suspended articles are made of hardly flammable materials.
- Exposed surfaces of bulkheads, linings and ceilings, as well as carpets have low flame spread characteristics.
- Soft furniture lining constructed with fire-resisting materials in accordance with 1.6.5.

**Fire control station:** Is a position where starting controls of fire extinguishing systems or items of fire fighting outfit or fire alarm indicating units for a particular part of the ship (compartment, main vertical fire zone, individual spaces) are arranged.

**Main fire control station:** Is a space or a part of a space which contains indicating units of fire detection systems and remote starting controls of fire extinguishing systems (where these are provided). Main fire control stations shall be located on the bridge or in other control stations having direct communication with the bridge and a twenty-four-hour watch when the ship is under way.

**A system equivalent to a deck foam system for cargo tanks:** Is a system which shall be capable of extinguishing spill fires, precluding ignition of spilled oil not yet ignited and combating fires in ruptured tanks.

**A system equivalent to a fixed inert gas system:** Is a system which shall be capable of preventing dangerous accumulations of explosive mixtures in intact cargo tanks during normal service throughout the ballast voyage and necessary in tank operations and so designed as to minimize the risk of ignition from the generation of static electricity by the system itself.

**Combustible medium:** Are flammable liquids, flammable gases, compressed, liquefied or dissolved under pressure; solid combustible materials and substances.

# INTERMARITIME CERTIFICATION SERVICES (ICS Class)

## Chapter 6 Fire Protection

**Crude oil:** Means any oil occurring naturally in the earth whether or not treated to render it suitable for transportation and includes:

- Crude oil from which certain distillate fractions may have been removed and
- Crude oil to which certain distillate fractions may have been added.

**Flash point:** Is the lowest temperature at which the vapors of a flammable liquid form with the ambient air a mixture capable of igniting at an open flame.

The flash point of flammable liquids shall be determined in closed cup by means of an approved flash point apparatus.

For the purpose of this Chapter the following explanations have been adopted:

**Structural fire protection:** Is a complex of the passive means of structural fire protection intended for:

- Prevention of fire.
- Containment of flame and smoke spreading throughout the ship.
- Creation of conditions for safe evacuation of people from the ship's spaces and from the ship, as well as for effective extinguishment of the fire.

**Foam expansion ratio:** Is the ratio of the volume of foam produced to the volume of the mixture of water and foam-making concentrate required.

**Fire fighting equipment and systems:** Are those active fire fighting measures which are intended for extinguishing and containment of fire spreading throughout the ship.

**Rated volume of a protected space:** Is the gross volume of a space bounded by watertight or gastight bulkheads and decks without any deduction for the volume occupied by equipment, machinery, structural items, tanks, cargo, etc.

**Fire fighting outfit:** Is portable firefighting equipment (apparatus, appliances, consumable materials) intended for:

- Extinguishing a fire.
- Ensuring effective fire fighting actions of the crew.
- Ensuring operation of fire fighting system, providing the necessary consumable materials.

**Water-screen systems:** Are systems which create a water barrier in the form of sufficiently thick curtain of water fed through spray nozzles. Such systems are fitted where the use of fire resisting divisions is impracticable.

**Water drenching systems:** Are those systems which supply water onto vertical or horizontal ship's structures.

**Fire detection and fire alarm systems:** Are subdivided into:

Fire detection systems designed for sending signal (automatically and/or manually) from the place where a fire has broken out to the main fire control station and fire warning alarms designed to inform the crew and special personnel in the protected space that a fire extinguishing medium is on the point of being discharged.

**Fixed fire extinguishing systems:** Are those systems which are intended to supply fire extinguishing medium to the protected spaces or directly therein and structurally fixed to the ship's hull.

**Smothering:** Is filling of a protected space with a medium not supporting combustion.

**Surface extinction:** Is cooling, wetting or restriction of oxygen access to burning surfaces.

**Slop tank:** Is a tank intended for accumulation of slops after washing of cargo tanks and contaminated ballast water.

**Cargo area:** Is the part of the ship in which are located the cargo tanks, slop tanks and pumps compartments, cofferdams, ballast tanks and empty spaces adjacent to cargo tanks, as well as the parts of the deck in the ship above the mentioned compartments.

### 1.3 Scope of supervision

1.3.1 General regulations for the classification, supervision of ships under construction and classification surveys, as well as the requirements for the documentation to be submitted for consideration are set out in *General Regulations for the Supervision* and in *Ch 1*.

# INTERMARITIME CERTIFICATION SERVICES (ICS Class)

## Chapter 6 Fire Protection

- 1.3.2 Subject to supervision of during construction of a ship are: structural fire protection, materials used for the interior finishing of ship's spaces, as regards fire hazardous properties thereof, fire extinguishing, fire detection and alarm systems subject to the provisions of this Chapter, except for fire-fighting outfit which is only to be checked for complete availability in accordance with the rates specified in this Chapter and for correct location.
- 1.3.3 The following shall be submitted to for approval of newly applied active fire fighting means and passive measures of structural fire protection:
- .1 Type Approval Certificates (if available), test records and other essential documents on fire tests run by competent bodies, confirming the efficiency of a fire extinguishing medium with the recommended standards on composition and application rates, as well as information on storage life and conditions.
  - .2 Type Approval Certificates (if available) and other essential documents on the fire tests of "A" and "B" class fire-proof divisions and closures of openings in such divisions ("A" and "B" class doors included).
  - .3 Drawings of fire-proof divisions together with the data which certify their compliance with "A" and "B" class divisions according to the requirements of these Rules.
  - .4 Data on the combustibility of the materials with reference to the documents certifying the performance of appropriate tests of the materials concerned.
  - .5 Drawings and calculations for individual standard assemblies (equipment) of the fire extinguishing, fire detection and alarm systems.
  - .6 Drawings of standard components of the ventilation system of accommodation, service, cargo, machinery and working spaces, indispensable for ensuring fire safety of the ship.
- 1.4 Plans and schemes**
- 1.4.1 At the main fire control station, wheelhouse or in conspicuous positions in corridors and lobbies of any ship, there shall be exhibited general arrangement plans clearly showing the following for each deck:
- .1 Location of control stations.
  - .2 Arrangement of fire-resisting and fire-retarding divisions.
  - .3 Spaces protected by the fire detection and alarm system.
  - .4 Spaces protected by fixed fire extinguishing systems with indication of the location of instruments and fittings for their control and also the disposition of fire hydrants.
  - .5 Means of access to different compartments, decks, etc., with indication of escape routes, corridors and doors.
  - .6 Ventilation system, including the particulars of the master controls of fans and showing the disposition of dampers and the identification numbers of the fans serving individual zones.
  - .7 Arrangement of fire fighting outfit.
  - .8 Location of the documents referred to in 1.4.6.
- 1.4.2 In lieu of the plans, information specified in 1.4.1, may be set out in a booklet, a copy of which shall be supplied to each officer, and one copy at all times shall be available on board in an accessible position.
- 1.4.3 A duplicate set of the plans or the booklet protected against marine environment shall be permanently stowed outside the deckhouse in a weathertight enclosure, for to be used by the shore side fire - fighting personnel. This enclosure shall be painted with red color and marked as indicated in *fig 1.4.3-1*. In cargo ships of less than 150 tons gross tonnage the duplicate set may be omitted. The enclosure shall be capable of being easily opened, be readily available to the shoreside fire fighting personnel, be located in a well-illuminated position, and if possible, shall include illumination from an emergency source. In oil tankers, chemical tankers and gas carriers the enclosure of fire control plans shall not be located on exterior bulkheads of superstructures which face cargo area and the surfaces within 3 m from them along the side.

# INTERMARITIME CERTIFICATION SERVICES (ICS Class)

## Chapter 6 Fire Protection

If the enclosure is not adjacent to the gangway, there shall be guide signs as indicated in *fig 1.4.3-2* showing the way thereto. The dimensions of the signs are to be not less than 300X400 mm.

1.4.4 Description in such plans and booklets shall be in the State and in the English languages. For ships not engaged on international voyages, translation into English is not required.

1.4.5 All alterations in the fire protection of a ship shall be entered in the ship's documents stated in *1.4.1* and *1.4.2*.

1.4.6 The technical instructions for maintenance and use of all ship's installations for extinguishing and containment of fire, shall be kept in a separate file in an accessible position.

### 1.5 Categories of ship's spaces

#### 1.5.1 Control stations

.1 Spaces containing the main navigational instruments and ship's control equipment, radio equipment, public address system stations, main fire control stations, fire extinction stations, spaces containing storage batteries and generators for radio stations, main control station (see *Ch 7, Subsection 1.2*) provided it is located beyond the machinery space.

.2 Spaces containing emergency sources of power and inert gas generators (see *3.9.9.2*).

#### 1.5.2 Accommodation spaces:

.1 Crew's quarters, cabins for passengers and special personnel, including medical service rooms and offices.

.2 Public spaces, such as lounges, messrooms, dining rooms, smoking rooms, cinema halls, libraries, reading rooms, gymnasiums, hairdresser's and barber's saloons, sheltered verandahs and nurseries.

.3 Sanitary spaces: toilets, lavatories, wash-rooms, shower-rooms, bathrooms, changing rooms, indoor swimming pools, operating rooms, etc.

#### 1.5.3 Service spaces:

##### 1.5.3.1 Domestic service spaces:

.1 Galleys, water heater rooms, bakeries, confectionaries, etc., containing solid-fuel-fired, oil-fired or gas-fired equipment.

.2 Same as under *1.5.3.1.1*, but containing electrically heated equipment, as also ironing rooms, saunas, shoe-repair and tailor's shops, main pantries, post offices.

.3 Provision rooms, sculleries, food preparation shops.

##### 1.5.3.2 Storerooms, garages and hangars:

.1 Storerooms for explosives.

.2 Storerooms for readily flammable materials and substances: lockers for oil lanterns, paint lockers, spaces for flammable liquids, flammable liquefied and compressed gases, hangars for helicopters, sheltered garages, fuel distribution systems.

.3 Storerooms for combustible materials: boatswain's and carpenter's stores, ship's document files rooms, film stowage rooms, baggage rooms, rooms of articles for recreation, customs rooms, mail rooms, overall lockers, linen lockers, drying rooms, manufactured goods sale shops, bookstalls, laundries.

.4 Storerooms for non-combustible materials: stores of spare parts, storerooms for mechanical and electrical shops other than those forming part of machinery spaces, pantries.

#### 1.5.4 Cargo spaces:

.1 Cargo tanks intended for the carriage of liquids in bulk, slop tanks included.

.2 Spaces for dry cargoes other than ship stores: dry cargo and refrigerated cargo holds and tween decks, including those intended also for carriage of containers and portable tanks, dangerous goods in packaged form or in bulk, motor vehicles without fuel in their tanks; storage spaces for ready produce, utilizable refuse, fishing equipment, packages, etc., as well as produce discharge trunks, cargo lifts and access trunks leading to such spaces.

.3 Ro/Ro cargo spaces not normally subdivided in any way and extending to either a substantial length or the entire length of the ship in which goods (packaged or in bulk, in or on rail or road cars,

# INTERMARITIME CERTIFICATION SERVICES (ICS Class)

## Chapter 6 Fire Protection

vehicles including road or rail tanks, trailers, containers, pallets, demountable tanks or in or on similar stowage units or other receptacles) can be loaded and unloaded normally in a horizontal direction.

- .4 Closed ro/ro cargo spaces, ro/ro cargo spaces not opened neither weather decks.
- .5 Open ro/ro cargo spaces either open at both ends, or open at one and provided with adequate natural ventilation effective over their entire length through permanent openings in the side plating or deck head.
- .6 Weather deck which is completely exposed to the weather from above and from at least two sides.

1.5.5 **Machinery spaces** - see definition of *Ch 7, Subsection 1.2*.

1.5.6 **Oil fuel and lubricating oil tanks** are main storage tanks, service tanks, drainage tanks, overflow tanks, settling and other tanks.

1.5.7 **Pump rooms** are spaces containing cargo pumps in oil tankers and combination carriers.

1.5.8 **Working spaces** are shops and workshops (other than those forming part of machinery spaces), laboratories and other spaces where:

- .1 Oil fuel or flammable liquids are used or combustible materials are processed, as well as incinerator's compartments.
- .2 Neither flammable liquids are used, nor combustible materials are processed.

1.5.9 **Special category space** is that enclosed space in a passenger ship intended for the carriage of motor vehicles with fuel in their tanks for their own propulsion, into and from which such vehicles can be driven and to which passengers have access.

1.5.10 **Special electrical spaces** (see *Ch 11, rule 1.2.12*).

1.6 **Division of materials according to combustibility, flame spread and ignitability.**

1.6.1 All non-metal materials except those referred to in *1.6.4*, are to be tested according to the *IMO Resolution A.472*

(XII). *Improved recommendation on test method for qualifying marine construction materials as non - combustible* and shall be subdivided into non-combustible and combustible.

On the basis of test results non-metal materials are defined as follows:

**Non-combustible-materials:** Are those which neither burn nor give off flammable vapors in quantity sufficient for self-ignition when heated to 750 °C in the process of testing.

**Combustible materials:** Are those which in the process of testing burn or give off flammable vapors in a quantity sufficient for self-ignition.

1.6.2 The materials used for bulkhead platings, half beams and decks shall be checked to the surface flammability according to the *IMO Resolution A. 653(16). Recommendation on improved fire test procedures for surface flammability of bulkhead, ceiling and deck finish materials.*

The positive results of the checks shall be determined by means of a slow transfer of the flame on the surface.

1.6.3 Permanent deck coverings of 5 mm and more in thickness are to be tested according to *IMO Resolution A.587(17). Fire test procedures for ignitability of primary deck coverings* and shall be subdivided into:

Not readily ignitable and readily ignitable.

On the basis of test results fixed deck coverings are defined as follows:

**Not readily ignitable deck coverings:** Are permanent deck coverings of 5 mm and more in thickness, which in the process of testing do not give off flammable vapors in sufficient quantity to maintain flame burning during more than 10 s.

**Readily ignitable deck coverings:** Are permanent deck coverings of 5 mm and more in thickness, which in the process of testing maintain flame burning during more than 10 s.

1.6.4 Textiles and films used for manufacture of curtains, blinds and other hanging articles are to be submitted to the test established by

# INTERMARITIME CERTIFICATION SERVICES (ICS Class)

## Chapter 6 Fire Protection

IMO Resolution A. 471/XII/ and A. 563(XIV). Recommendation on test method for determining the resistance to flame of vertically supported textiles and films and are defined as: hardly flammable and readily flammable.

Fig 1.4.3-1 Special marks

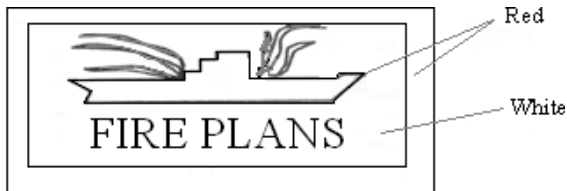
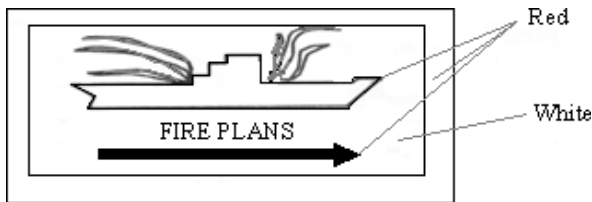


Fig 1.4.3-2 Special marks for the enclosure not adjacent to the gangway



- 1.6.5 The materials (or its combination) used for the furniture's covering are to be tested to ignitability resistance and flames conductivity according to the *IMO Resolution A. 652(16). Recommendations on fire test procedures for upholstered furniture*. The materials (and its combination) are considered resistant if during one hour since the starting of the ignitability resistance and flame conductivity test, are not observed flames or continuous burning

## SECTION 2

### Structural fire protection

#### 2.1 General requirements

##### 2.1.1 Requirements for materials

- 2.1.1.1 In all ship's spaces, other than cargo spaces and refrigerated provision storerooms of service spaces, insulating materials shall be non-combustible. In spaces where penetration of oil products is possible the surface of insulation shall be impervious to oil or oil vapors.

- 2.1.1.2 Casings and crowns of machinery spaces of category "A" shall be of steel constructions with adequate insulation. Openings in such crowns and casings shall be so arranged and protected as to prevent the spread of fire. Spaces for oil fuel purifiers similar spaces specified in *Ch 7, rule 1.12.8*, shall be restricted by steel bulkheads extending from deck to deck.

- 2.1.1.3 Where superstructures and deckhouses, as well as ships under 300 tons gross tonnage are constructed of aluminium alloys, the following provisions shall be complied with:
- .1 The metallic core of load-bearing "A" or "B" class divisions made of aluminium alloy is to be so covered with an insulating material of sufficient thickness that the temperature of the structural core of the specimen does not rise more than 200 °C above the initial temperature at any time during the applicable fire exposure to the standard fire test. For ships of less than 300 tons gross tonnage the period of fire test of "A" class divisions may be 30 min instead of 1 hour.
  - .2 Adequate measures are to be taken to ensure that for aluminum alloy components of columns, stanchions and other structural members required to support lifeboat and liferafts stowage, launching and embarkation areas and "A" class divisions, the temperature rise limitation shall apply at the end of one hour and for such members required to support "B" class divisions, the temperature rise limitation shall apply at the end of half an hour.



# INTERMARITIME CERTIFICATION SERVICES (*ICS Class*)

## Chapter 6 Fire Protection

- .3 The use of combustible materials for the construction of structural details, grounds, supports, linings of bulkheads, furniture, etc. in superstructures and deckhouses constructed of aluminum alloy shall be limited.  
Ceilings in corridors and spaces shall be constructed of non-combustible materials.
- 2.1.1.4 The amount of combustible materials used for the construction of partition bulkheads, grounds, supports, linings, finishes, furniture and other equipment of controls stations, accommodation and domestic service spaces (other than refrigerated storerooms) where the use of such materials is not prohibited by this Chapter, shall be not in excess of 45 kg per 1 m<sup>2</sup> floor area of such spaces.  
*ICS Class* may revise the limit indicated on the basis of the type and purpose of the ship.
- 2.1.1.5 The hull, superstructures, deckhouses, structural bulkheads and decks shall be constructed of steel or other equivalent material.  
If aluminum alloys or glass-reinforced plastics are utilized, the requirements of 2.1.1.3 or 2.9, shall be met, respectively.  
*ICS Class* may allow the use of other materials according to the purpose and the size of a ship.
- 2.1.1.6 In control stations, accommodation, service and working spaces and corridors leading thereto, permanent deck coverings of 5 mm and more in thickness shall be not readily ignitable in compliance with 1.6.3 and shall not give off toxic or explosive vapors at high temperatures.
- 2.1.1.7 For interior finishing of the ship varnishes, paints and similar preparations having a nitrocellulose or other highly flammable base shall not be used.  
The above finishes shall not give off excessive quantity of smoke or other toxic vapors.  
In oil tankers and oil recovery vessels the use of aluminum paints in cargo oil tanks, cofferdams, pump rooms, in way of cargo tank decks and in other places where explosion-dangerous vapors can accumulate, is not permitted.
- 2.1.1.8 Ceilings, linings, draught stops and grounds in corridors and stairway enclosures of control stations, accommodation and service spaces shall be of non-combustible materials. All exposed surfaces in corridors and stairway enclosures shall not have high flame spread characteristics.  
  
Surfaces in concealed and inaccessible spaces (behind panellings, linings, etc.) including grounds, as well as exposed surfaces of ceilings in control stations, accommodation and service spaces shall not have high flame spread characteristics.
- 2.1.1.9 Mattresses and pillows made of cotton, wool and similar combustible materials shall not be permitted.
- 2.1.1.10 Where non-combustible bulkheads, linings and ceilings are fitted in accommodation and service spaces, they may have combustible veneer with a calorific capacity not greater than 45 MJ/m<sup>2</sup> taking into account the thickness of materials used.
- 2.1.1.11 All waste-paper receptacles shall be constructed of non-combustible materials with no openings in the sides and bottom.
- 2.1.2 Fire-resisting and fire-retarding divisions.**
- 2.1.2.1 Fire-resisting or "A" class divisions are those divisions which are formed by bulkheads or decks complying with the following provisions:
- .1 They shall be constructed of steel or other equivalent material.
  - .2 They shall be suitably stiffened.
  - .3 They shall be so constructed as to be capable of preventing the passage of smoke and flame up to the end of the 60 min standard fire test.
  - .4 They shall be so insulated with non-combustible material that the average temperature of the unexposed side will not rise more than 139 °C above the original temperature, nor will the temperature, at any one point, including any joint, rise more than 180 °C above the original temperature.  
Depending on the time during which the above indicated temperature rise is ensured in the course of the standard fire test, the

# INTERMARITIME CERTIFICATION SERVICES (*ICS Class*)

## Chapter 6 Fire Protection

following symbols are conferred to divisions:

Class	minutes
"A - 60"	60
"A - 30"	30
"A - 15"	15
"A - 0"	0

- 2.1.2.2 Transverse watertight bulkheads shall be used as the metallic cores of main fire-resisting bulkheads. Fire-resisting bulkheads above the bulkhead deck shall be in line, as far as practicable, with the bulkheads of the watertight compartments.
- 2.1.2.3 Where it is impossible to place main fire-resisting bulkheads extending in different spaces between decks in one vertical line, the deck portions forming such steps and recesses shall be "A" class divisions, and the number of such steps and recesses shall be limited to a minimum.
- 2.1.2.4 Main fire-resisting bulkheads shall extend from the outer shell plating on one side to that on the other side, and from deck to deck in each space between them both inside the hull and in the superstructures and deckhouses.  
In cases where main vertical zones are subdivided by horizontal divisions into horizontal zones, such divisions shall extend to the shell and bulkheads bounding the main vertical zones.
- 2.1.2.5 In order to reduce heat transfer in places where the metallic cores of "A" class divisions other than "A-0" class divisions joint metal decks, bulkheads, sides and the framing of the hull, as well as where the metallic cores of "A" class divisions are pierced by pipes, cables, air ducts, etc. provision shall be made for insulation of abutting structures with non-combustible material on one or both sides for a total length of 500 mm from "A" class division. The insulation may be permitted to extend for lesser distance, if such reduction in the extent of insulation is proved by the standard fire test results.
- 2.1.2.6 "A" class divisions having an aluminum alloy core and separating adjacent spaces,

each containing a combustible medium, shall be insulated on both sides of the core.

- 2.1.2.7 If an "A" class division separates two adjacent spaces, one of which does not contain any combustible medium or it is an outer surface of a superstructure or a deckhouse, including those referred to in 2.4.3, such a division may be "A-0" class division, if it is made of steel, or it may not be fitted with insulation on the side facing the space that contains no-combustible medium, if this division has the core of aluminum alloy.
- 2.1.2.8 Where the Rules require the subdivision of the ship into main vertical fire zones, but structural considerations do not permit the bulkheads to be installed (for example, in passenger ferries used for the carriage of wheeled vehicles), on special agreement with *ICS Class*, water screens or other equivalent and proved means for controlling and containing a fire may be provided instead of "A" class divisions.
- 2.1.2.9 Fire-retarding or "B" class divisions are those divisions which are formed by bulkheads, decks, ceilings or linings which comply with the following provisions:
- .1 They are fully made of non-combustible materials. Use of combustible veneer is permitted (see 2.1.1.8 and 2.1.1.10 and for passenger ships, 2.2.2.8).
  - .2 Divisions shall be so constructed as to remain capable of preventing the passage of flame up to the end of the 30 -minute standard fire test.
  - .3 Divisions shall have an insulation value such that the average temperature on the unexposed side during the fire test will not rise more than 139 °C above the original temperature, nor will the temperature at any one point, including any joint, rise more than 225 °C above the original temperature when either side is exposed to the fire test.
- According to the time during which the above mentioned temperature rise is ensured in the course of the standard fire test, the

# INTERMARITIME CERTIFICATION SERVICES (ICS Class)

## Chapter 6 Fire Protection

following symbols are conferred to divisions:

Class	Minutes
"B - 15"	15
"B - 0"	0

2.1.2.10 Fire-resisting and fire-retarding divisions are to be tested according to the *IMO Resolution A.517(13)*. *Recommendation for fire test procedures for "A" and "B" class divisions.*

2.1.2.11 Continuous "B" class ceilings and linings in association with the relevant decks or bulkheads, may be accepted as contributing wholly or in part, to the required insulation and integrity of "A" class divisions specified in the appropriate fire integrity tables.

2.1.2.12 All "B" class bulkheads shall extend from deck to deck and to the shell or other boundaries, unless continuous "B" class ceilings and/or linings are fitted on both sides of the bulkhead, in which case the bulkhead may terminate at the continuous ceiling or lining.

### 2.1.3 Closures of openings in fire-resisting and fire-retarding divisions.

2.1.3.1 Closures of openings in "A" and "B" class divisions shall be of the same class as the divisions in which they are fitted.

Closures of openings in "A" class divisions shall be capable of preventing the passage of smoke and flame during the 60 - minute standard fire test and shall be made of steel or other equivalent material.

Closures of openings in "B" class divisions shall be capable of preventing the passage of flame during the 30-minute standard fire test and shall be made of non-combustible material.

All windows and scuttles in bulkheads within accommodation and service spaces shall be so fitted as to ensure that the fire resistance of the bulkhead is not impaired.

This requirement shall not apply to the glass partitions, windows and side scuttles in the outer boundaries of the ship and to the exterior doors in superstructures and deckhouses.

All windows and side scuttles in the outer bulkheads of accommodation spaces, service spaces and control stations are to meet the provisions of *Ch 3, rule 7.2.3.4*.

2.1.3.2 The doors designed in compliance with the provisions of *Ch 3, rule 7.5.2 and Subsection 7.12* and fitted according to *7.12* of the above Chapter, in certain cases (e. g., for providing gas tightness), if specially agreed with *ICS Class*, may be fitted in "A" class bulkheads. Such doors need not be insulated.

2.1.3.3 Doors in all fire-resisting bulkheads (self-closing and automatically closing doors included) shall be so arranged as to be capable of being opened manually from either side of the bulkhead by one person only.

2.1.3.4 Doors in the bulkheads of main vertical zones, in stairway enclosures and doors to the machinery spaces of category A, other than power-operated watertight doors and outer and normally closed doors, shall be of the self-closing type. Such doors shall be capable of closing against an inclination of 3,5 deg. opposing closure. They shall be permanently closed or shall have hold-back arrangements so that the doors are capable of release remotely from the navigating bridge or from the area permanently watched when in port, either simultaneously or in groups, and also individually from a position at the door. The release mechanism shall be so designed that the door will automatically close in the event of disruption or de-energizing of the control system.

Approved power-operated watertight doors will be considered acceptable for this purpose.

When double swing doors are permitted, they shall have a latch arrangement which is engaged by the operation of the door release system.

Door fastening device is to be so arranged as to ensure its automatic closure even being broken such device as well as the remote controlled system.

In spaces for oil fuel purifiers and similar spaces specified in *Ch 7, rule 1.12.8*, doors shall be of the self-closing type.

# INTERMARITIME CERTIFICATION SERVICES (*ICS Class*)

## Chapter 6 Fire Protection

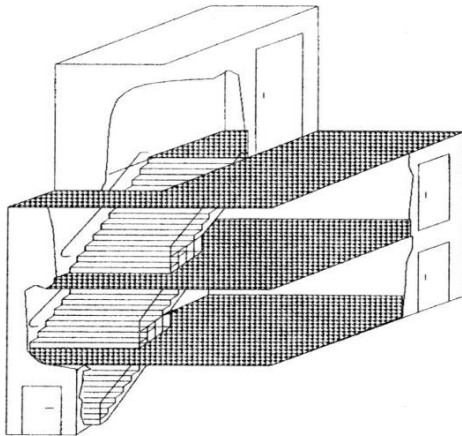
- 2.1.3.5 In the lower corner of doors fitted in fire-resisting bulkheads, other than doors in the main fire-resisting bulkheads, it is permissible to have a closing opening, somewhat larger in size than the diameter of couplings for the fire hoses and hose nozzles used in the ship, to ensure that the door can be closed, with a hose passing through the doorway.
- 2.1.3.6 Ventilation openings and louvers in "A" class doors shall not be permitted.
- 2.1.3.7 Ventilation openings may be permitted in the lower portion or under "B" class doors, except for the doors in stairway enclosures. The total net area of any such opening or openings shall not exceed 0,05 m<sup>2</sup>. When such openings are cut in a door, it shall be fitted with a grill made of non-combustible material.
- 2.1.3.8 The upper portion of "B" class doors may be glazed for which purpose either specially manufactured fire-resistant or wire-reinforced glass shall be used. The glass panels shall be mounted in frames of steel or other non-combustible material. At all times only, those glazed doors of "B" class shall be permitted the specimens of which comply with the provisions for "B" class divisions when exposed to the standard fire test. Where doors fitted in large public spaces fail to comply with the provisions for "B" class divisions, owing to the excessively large area glazed, such doors may be permitted on agreement with *ICS Class*, on condition that water screens meeting the applicable provisions of *Subsection 3.5* are provided.
- 2.1.3.9 The hinges of "A" and "B" class doors and parts of dogs and locks of "A" class doors are to be manufactured of materials with a melting point not below 950 °C, and parts of dogs and locks of "B" class doors are to be made of materials having a melting point not below 845 °C except where it has been proved by the tests that materials with a melting point below 845 °C do not impair fire integrity of the doors.
- 2.1.3.10 Where "A" or "B" class divisions are penetrated by framing members, electric cables, pipes, trunks, ducts, etc. or are pierced for fitting of ventilation terminals, lighting fixtures and similar devices, arrangements shall be made to ensure that the fire resistance is not impaired.
- 2.1.4 Closure of doorways, access trunks and other openings**
- 2.1.4.1 Opening and closing arrangements are to be provided for skylights. Openings for ventilation in the funnels, clappers of ventilation, doors having a mechanism from the power source or which is brought into operation when are released, as well as other openings leading to spaces protected by smothering systems, shall have closing arrangements. Control devices are to be installed outside of service spaces or in places where such devices may not be cut out in the event of fire. In passenger ships, control devices are to be installed only in one place or in the minimum number of places leading through a free and safe passage to weather deck.
- 2.1.4.2 No glass panels are to be fitted in machinery space and cargo pump room skylights. Windows are not to be fitted in machinery space boundaries. This does not preclude the use of glass in control stations within the machinery spaces. In case the fitting of glass in skylights is extremely necessary, these glasses, as well as glasses of side scuttles (windows) fitted in compliance with *Ch 11, 2.16.4.4.2*, shall be wire-reinforced. The requirements of *Ch 3, rule 7.7.5* are also to be met.
- 2.1.4.3 In accommodation and service spaces, as well as in control stations stairways and lift trunks shall be protected in the following way:
- .1 Stairways which penetrate only a single deck shall be protected at least at one level by at least "B-O" class divisions and self-closing doors. Lifts which penetrate only a single deck shall be surrounded by "A-O" class divisions with steel doors at both levels. Stairways and lift trunks which penetrate more than a single deck shall be surrounded by at least "A-O" class divisions and protected by self-closing doors at all levels.

# INTERMARITIME CERTIFICATION SERVICES (ICS Class)

## Chapter 6 Fire Protection

- .2 On ships having accommodation for 12 persons or less, where stairways penetrate more than a single deck and where there are at least two escapes direct to the open deck at every accommodation level, stairways and lift trunks may be protected by "B-0" class divisions.  
Stairway enclosures may be arranged so as to allow to go from one stair to a superimposed stair within such enclosure (see *fig 2.1.4.3-1*), or to enclose the stairs only with doors at each end of the stair (see *fig 2.1.4.3-2*), or to enclose the stairs only in combination with fully closed steel stairs and doors fitted at one end of each stair (see *fig 2.1.4.3-3*).
- .3 Trunks are to be so fitted as to prevent the passage of smoke and flame from one deck to another.
- .4 Insulation of passenger lift trunks within stairway enclosures is not compulsory. In this case, the doors in lift trunks need not be of fire-resisting type.
- .5 Where a hold-back hook is fitted it is to comply with 2.1.3.4.
- .6 The construction of stairways shall comply with the requirements of *Ch 3, rule 8.4.4*.
- .7 On passenger ships stairways and lift trunks are to be protected as under 2.1.4.3.3 to 2.1.4.3.6 and 2.2.2.4.

**Fig 2.1.4.3-1**  
Stairway enclosures may be arranged so as to allow to go from one stair to a superimposed stair within such enclosure



2.1.4.4 Air spaces enclosed behind ceilings, paneling, or linings shall be divided by close-fitting draught stops spaced not more than 14 m apart.

In the vertical direction, such air spaces, including those behind linings or stairways, trunks, etc. are to be closed at each deck.

2.1.4.5 In machinery spaces from which two means of escape are provided in compliance with *Ch 7, rule 1.11.3* one of the ladder sets over the entire length of escape shall provide continuous fire shelter in the form of protecting these ladders by "A-15" class divisions or by "A-0" class divisions with drenching operated from the lower part of the space and from outside in the vicinity of the entrance (see *table 3.1.2.1, item 15*). In the lower part of the shelter the door of a self-closing type complying with the requirements of 2.1.3.1 shall be provided.

2.1.4.6 In addition to a watertight door separating the machinery space of category A from the shaft tunnel, from the side of the latter a light steel fire-screen door shall be fitted to be operated from each side.

### 2.1.5 Storerooms for readily flammable materials and substances (except hangars and garages)

2.1.5.1 Storerooms for readily flammable materials shall not be generally situated in common with accommodation spaces in superstructure or deckhouse. Access to the storerooms is to be provided from the open deck directly or through a corridor and/or a stairway leading only to these storerooms.  
In ships of less than 300 tons gross tonnage storerooms may be arranged in way of the accommodation spaces, but not adjacent thereto.

2.1.5.2 Flammable liquids with a flash point below 43 °C shall be kept in ventilated storerooms in metal tanks, each of which is to be provided with:

- Fittings for sampling with self-closing valve.
- A measuring device of a closed type.
- A device for filling the tank from outside the storeroom.

# INTERMARITIME CERTIFICATION SERVICES (ICS Class)

## Chapter 6 Fire Protection

- An air pipe led beyond the storeroom and complying with the requirements of *Ch 8, rules 5.1.4, 5.1.6, 5.1.8, 5.1.9 and 5.1.11.*
- A tray.

Where the amount of some flammable liquid does not exceed 35 l, it is permitted to store it in metal cans with tight-closing lids.

Where the total capacity of the tanks exceeds 250 l (but is not more than 2500 l), the storeroom shall be equipped with independent power exhaust ventilation to remove the air from the lower part of the space ensuring at least 20 air changes per hour. The supply ventilation may be natural. The operation of fans may be interlocked with opening of doors to the storeroom. Electrical equipment in the storeroom shall be flameproof as required in *Ch 11, Subsection 2.9.*

Where the quantity of flammable liquids exceeds 2500 l the tanks for their storage shall be arranged in compliance with *2.1.12.*

- 2.1.5.3 n *2.1.5.2*, is impeded, it is permissible to keep such liquids in steel ventilated lockers or cases. The lockers or cases shall not be continuous to accommodation spaces. The doors of such lockers or cases shall open outside. The liquids shall be kept in metal cans with tight-closing lids of total capacity not more than 50 l.

### 2.1.6 Storerooms for combustible materials

- 2.1.6.1 It is recommended that means of escape from storerooms for combustible materials lead to the open deck or a corridor directly communicating with the open deck.

### 2.1.7 Storerooms for explosives (magazines)

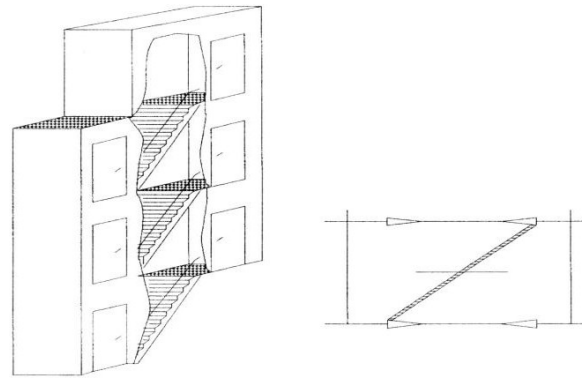
- 2.1.7.1 In special purpose ships the arrangement of storerooms for explosives (magazines) may be permitted on condition that the requirements set forth in *2.1.7.2 - 2.1.7.22* are fulfilled. The magazines may be of the following categories:

- .1 **Integral magazines:** Forming an integral part of the ship.
- .2 **Independent magazines:** That are non-integral, portable magazines with a capacity of 3 m<sup>3</sup> or greater.

- .3 **Magazine boxes:** That are non-integral, portable magazines with a capacity of less than 3 m<sup>3</sup>.

- 2.1.7.2 Integral magazines are to be located in the forward or after portion of the ship and be well removed from the propeller shaft, propeller and rudder (in any case as far off as one watertight space). They are not to be located below accommodation spaces, control stations, fuel tanks and be adjacent to them.

**Fig 2.1.4.3-2**  
Stairway enclosures may be arranged so as to allow to enclose the stairs only with doors at each end of the stair



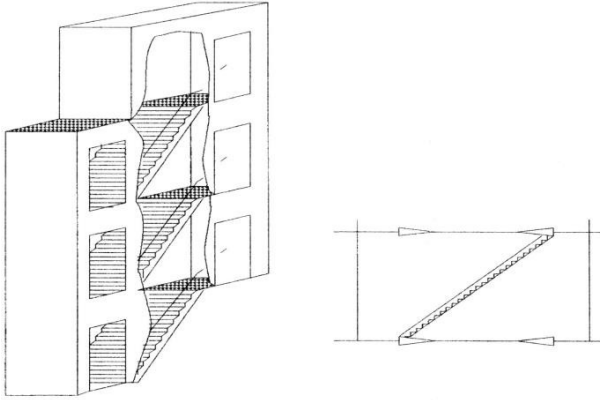
- 2.1.7.3 Integral magazines are not to be located adjacent to machinery spaces of category A, galleys or other spaces presenting a fire hazard. If it is necessary to construct the magazines in proximity to these areas, a cofferdam of at least 0,6 m is to be provided separating the two spaces. Such a cofferdam is not to be used for stowage and is to be provided with ventilation. One of the bulkheads forming the cofferdam is to be of "A-15" class unless there is adjacent machinery space of category A in which case "A-30" is appropriate.

# INTERMARITIME CERTIFICATION SERVICES (ICS Class)

## Chapter 6 Fire Protection

Fig 2.1.4.3-3

Stairway enclosures may be arranged so as to allow to enclose the stairs only in combination with fully closed steel stairs and doors fitted at one end of each stair



2.1.7.4 Access to integral magazines is preferably to be from the open deck through a water or gastight door, but in no case through spaces mentioned in 2.1.7.2 and 2.1.7.3.

2.1.7.5 Independent magazines and magazine boxes are to be located on an open deck in a location protected from direct impact of the sea. The location is to provide sufficient protection against warm air hazardous vapors being emitted from galleys, pump rooms, etc. Due regard is to be paid to the possible risk of subjecting certain explosives to radio emissions.

2.1.7.6 Magazine boxes are to be located on a weather deck at least 0,1 m from the deck and any deckhouse and in a position suitable for jettisoning the contents.

2.1.7.7 Bulkheads and decks bounding integral magazines are to be of steel watertight construction and of "A-15" class (see 2.1.2.7). Insulation is to be provided to prevent the condensation of moisture.

2.1.7.8 Piping of fresh or salt water and drainage systems and piping of systems installed in the magazines themselves may be routed through magazines. Piping of other systems

are to be permitted only if they are enclosed in a watertight trunk.

2.1.7.9 Doors and lids of magazines are to be provided with locks.

2.1.7.10 Racks are to be installed, the construction and capacity of which are to provide safe stowage of explosives in their approved shipping containers and to prevent them from shifting and falling when the ship is rolling. The upper rack is not to be located higher than 1,8 m above the deck. The racks are to have holes for water flowing from the upper to the lower racks during operation of the drenching system.

2.1.7.11 Decks of magazines are to be covered with a permanent nonslip, nonpark covering (for example, with mats or two layers of linoleum).

2.1.7.12 A free volume of the magazine, when loaded, is to be at least 70 per cent of the entire magazine volume. The volume of the space is to be not less than 1 m<sup>3</sup> for each 100 kg of explosives or 1000 detonators.

2.1.7.13 Integral magazines are to be provided with natural or mechanical ventilation fitted with flame screen sufficient to maintain the magazine temperature not higher than 38 °C.

2.1.7.14 Independent magazines are to be provided with efficient natural ventilation fitted with flame screens.

2.1.7.15 Magazines are to be fitted with automatic heat detectors operating at temperatures rising above 40 °C. An appropriate indicating unit is to be provided in the wheelhouse and in the chief mate's cabin.

2.1.7.16 Integral and portable magazines are to be fitted with drenching systems for racks in compliance with Subsection 3.6. The controls are to be clearly marked as to their function.

2.1.7.17 Scuppers are to be fitted in the magazine deck. The scupper pipes are to be provided with valves which are to be kept permanently closed under normal service

# INTERMARITIME CERTIFICATION SERVICES (ICS Class)

## Chapter 6 Fire Protection

	conditions. The valves are to be controlled from outside the magazines.			
2.1.7.18	A portable magazine is to bear a label indicating mass in light condition and maximum permissible mass of explosives.	.1	2.1.8.1	Spaces for the storage of oxygen and acetylene cylinders shall be arranged, having regard to the following: Oxygen and acetylene cylinders shall be stored in a vertical position, both in special closed spaces provided with natural ventilation and on the open deck.
2.1.7.19	Magazine boxes are to be of watertight metal construction having a body and lid thickness of not less than 3 mm. Where the box may be exposed to direct sun, sun shields are to be provided.	.2		Locations where cylinders are stored shall be fitted with stands having sockets, straps or other arrangements to ensure efficient securing and quick releasing of the cylinders.
2.1.7.20	Integral and independent magazines are to be clearly labeled indicating:	.3		Locations for the storage of cylinders on the open deck shall be so chosen as to preclude mechanical damage to the cylinders. The cylinders shall be properly protected from the access of the unauthorized persons thereto. Sun shades painted in white shall be fitted in order to protect the cylinders from direct sunbeams. On the barrier around the cylinder storage there shall be provided warning plates: "Danger of explosion!" and "No smoking!". Fastening of cylinders to bulkheads of accommodation spaces shall not be permitted.
.1	"The space is a magazine".			
.2	"Open lights and flame are to be kept away".			
.3	"The magazine door is to be kept shut".			
.4	"Matches and lighters are to be removed prior to entering".			
.5	"Not to lift with contents" (in the case of independent magazines).			
2.1.7.21	Magazine boxes are to be clearly labeled indicating:	.4		Locations for the storage of cylinders shall be located at a distance not less than 2 m from the accommodation spaces and control stations and not less than 4 m from the spaces where readily flammable substances or fuel oil are stored or where essential ship equipment is installed.
.1	"The container is a magazine box".			
.2	"Open lights and flame are to be kept away".			
.3	"The box is to be kept shut".			
2.1.7.22	Electrical equipment in magazines is to comply with the requirements of <i>Ch 11, rule 19.4.3</i> and other requirements as appropriate.			The storage space for acetylene cylinders shall be independent of the oxygen cylinder storage space. Such spaces shall have direct entrances from the open deck, the doors opening outside. Danger warning inscriptions shall be provided on the doors of the spaces and cabinets.
2.1.7.23	Detonators are to be stowed separately from other explosives.			The spaces mentioned in <i>2.1.8.1.4</i> shall be separated from adjacent space by "A-60" class divisions (see <i>2.1.2.7</i> ). The doors of these spaces shall be fitted with locks.
2.1.7.24	Charging of cartridges and other preparatory operations for using explosives are to be made in charging rooms which are to be specially provided for that purpose. Charging rooms are to be arranged in steel enclosures and located on the weather deck well removed from control stations, accommodation and service spaces. Bulkheads, decks and equipment of the charging rooms are to be faced with nonspark materials.	.5		
			2.1.8.2	Spaces for electric and gas welding operations in ships shall be arranged, having regard to the following:
		.1		The space shall have an exit to the open deck and be separated from adjacent spaces by "A-60" class divisions (see <i>2.1.2.7</i> ).
2.1.8	<b>Spaces for electric and gas welding operations and for the storage of cylinders</b>	.2		The door shall be fitted with a lock.



# INTERMARITIME CERTIFICATION SERVICES (ICS Class)

## Chapter 6 Fire Protection

- 2.1.8.3 In addition to fulfillment of the requirements of 2.1.8.2 the space for electric and gas welding operations in oil tankers shall meet the below listed requirements:
- .1 The space shall be located aft of cargo oil tanks, slop tanks and their cofferdams.
  - .2 The space shall not be located in machinery spaces of category A or less than 5 m to the spaces intended for storage and carriage of explosion and fire-hazardous substances.
  - .3 The distance from the space to vents of cargo oil tanks and slop tanks shall be not less than 9 m.
  - .4 The space shall be provided with power ventilation ensuring not less than 20 air changes per hour.
  - .5 Source of power for welding operations shall be interlocked to prevent the possibility of its switching with the entrance door opened.
  - .6 An illuminated board with inscription "Do not enter! Welding!" shall be provided near the entrance door.
- 2.1.9 Film show rooms (cinema halls)**
- 2.1.9.1 The following requirements are framed on the understanding that only safe films are used in cinematograph installations on board ship. The use of nitrocellulose-based films shall not be permitted.
- 2.1.9.2 Spaces for arranging film shows for 50 persons and over are to meet the requirements of *Ch 3, rule 8.4.2* for cinema halls and are to be provided with a motion picture projecting room complying with the following requirements:
- .1 Bulkheads and decks separating the motion picture projection room from the cinema hall and adjacent spaces shall be enclosed by divisions of not below "A-0" class.
  - .2 The motion picture projection room shall have at least one means of escape. Communication of the projector room with the cinema hall through doors is not permitted.
  - .3 The sight and projection holes shall have permanently attached means of closing made of noncombustible materials and operated both from outside and inside the space.
  - .4 Stowage of films in the motion picture projection rooms may be permitted provided the requirements of 2.1.6.1 are met.
- 2.1.9.3 In ships where a special motion picture projection room is not provided, the film projector may be installed in one of the public spaces. In so doing, the film projector is not to be installed in the escape route.
- 2.1.10 Galleys, bakeries and saunas**
- 2.1.10.1 The bulkheads and decks of galleys, bakeries and saunas are to be of steel.
- 2.1.10.2 Oil-, coal or gas-fired galleys and bakeries shall not be adjacent to storerooms for readily flammable and combustible materials or to fuel and lubricating oil storage spaces.
- 2.1.10.3 The decks of galleys and bakeries shall be covered with ceramic tiles or other equivalent covering of non-combustible materials.
- 2.1.10.4 Any galley serving 50 persons and more shall have at least two means of escape, except for steam or electric galleys which may have only one.
- 2.1.10.5 The equipment of oil-, coal- and gas-fired galleys shall be constructed of non-combustible materials. Where so needed, wood (preferably hardwood) may be permitted for the equipment of galleys.
- 2.1.10.6 The smoke stacks of galleys and bakeries shall be insulated within the ship spaces with non-combustible materials.
- 2.1.10.7 If exhaust ventilation ducts from galley ranges and bakeries pass through accommodation spaces or spaces containing combustible materials, such ducts shall be made of "A-0" class divisions (see also *Ch 8, rule 7.2.7*).
- 2.1.10.8 In the case of oil-fired equipment it is permitted to use oil fuel with a flash point not less than 60° C. The capacity of fuel service tanks located in galleys shall not exceed the daily consumption requirement. A shut-off valve on the supply pipe shall be remotely controlled from readily accessible place outside the galley. It is recommended that quick-closing type valves be used.

# INTERMARITIME CERTIFICATION SERVICES (ICS Class)

## Chapter 6 Fire Protection

Tanks, fuel pumps and heaters shall be placed at least 2 m from the nearest point on the heating equipment, and at least at a 0,5 m distance from the same in the plan view of the space.

If the galley space is sufficiently large, it is recommended that the fuel tanks, pumps and other appliances of the fuel system should be placed in special enclosures.

All oil-fired equipment, burners included, shall be fitted with trays underneath (or an equivalent protection provided directly on the steel deck) being greater than the equipment, with beads not less than 75 mm in height, extending not less than 100 mm outside the equipment perimeter.

2.1.10.9 Sauna's lining and doors may be made of wood. The heating element is to be electrical and to meet the requirements of Ch 11, Section 15, and the cables and conductors, the requirements of the rule 2.13.1.4. The heating elements are to be separated from bulkhead and decks by a screen of non-combustible material.

### 2.1.11 Hangars for helicopters, helicopter decks

2.1.11.1 A hangar shall be well removed from the spaces where large amounts of heat are produced; where practicable, it shall not be adjacent to accommodation, service, cargo and working spaces. If a hangar is adjacent to the above-mentioned spaces, the separating bulkheads (decks) shall be "A-60" class divisions.

2.1.11.2 The bulkheads and decks that enclose a hangar shall be constructed of steel.

2.1.11.3 All equipment, arrangements and machinery shall be so constructed and mounted as to preclude spark formation. This failing, other effective measures shall be taken to preclude ignition and explosion of fuel or fuel vapors.

2.1.11.4 Helicopter decks and areas for refueling shall be clearly marked and provided with coamings to prevent fuel from spreading beyond the limits of these areas.

2.1.11.5 Spaces below the helicopter deck shall be isolated from the deck by "A-60" Class divisions (see 2.1.2.7).

Helicopter decks shall be made of steel or other equivalent material. ICS Class may permit the use of aluminum of equivalent materials in the following cases:

.1 If a hanging platform is installed at ship's side, then after each fire in the ship or in the platform, is to be carried out a structural analysis for determining its subsequent exploitation.

.2 If the platform is located on the superstructure or something similar, then it shall be in compliance with the following requirements:

.1 The upper deck of the superstructure and the lower of the platform shall not have openings.

.2 All the windows below the platform are to be provided of metallic covers.

.3 After each fire in the platform or near to this place is to be carried out a structural analysis for determining its subsequent exploration.

2.1.11.6 Provision shall be made for warning notices prohibiting smoking.

2.1.11.7 The following firefighting equipment shall be stored in two containers near the helicopter deck: 3 sets of fireman's outfits in one container and a power saw with spare disk, cutting shears and 3x3 m blanket in another container. Close to containers a fire hook of not less than 3 m in length shall be kept.

2.1.11.8 The requirements of 3.2.6.2, 3.7.2.12, table 5.1.2, items 4.15, 6.2, 6.4, 6.5, rule 5.1.15, as well as general aircraft provisions for supporting aids of helicopter in ships shall be taken into account.

### 2.1.12 Storage of fuel. Fuel distribution stations

2.1.12.1 Storage tanks for the fuel with a flash point below 43 °C shall comply with the following provisions:

.1 The tanks shall be placed within the hull as close as possible to the ship's ends.

.2 On all sides and corners, except for the ship side, below the light-ship waterline the tanks shall be surrounded by cofferdams filled up with inert gas under service conditions. The cross-section area of the air (ventilation) pipes shall comply with the requirements of

# INTERMARITIME CERTIFICATION SERVICES (*ICS Class*)

## Chapter 6 Fire Protection

- Ch 8, rule 5.1.10 and 5.1.11.* The cofferdams shall be fitted with a sounding pipe led to the upper open deck.
- .3 Each fuel tank shall be provided with a filling, service, sounding and air pipe. The open end of the filling pipe shall not be placed higher than 300 mm above the tank bottom. The sounding pipe shall terminate at a distance of 30 - 50 mm from the tank bottom and shall be led out to the upper open deck. It is recommended that a closed-type level indicator should be fitted instead of sounding pipes.
- .4 Fuel tank air pipes shall terminate not less than 2,4 m above the open deck. The open ends of the pipes shall be located at a distance of at least 9 m from openings in deckhouses and superstructures and shall be fitted with flame-arresting wire gauzes or some other equivalent devices approved by *ICS Class*.
- .5 Fuel, air and sounding pipes leading from fuel tanks to a distribution station shall be laid in a separate gastight steel trunk, sufficiently large to provide access for a man throughout the length of the trunk. The trunk shall be of "A-60" class divisions. Where provision is made for filling the trunk with water or inert gas, the trunk may be made of "A-0" class divisions. In any case, the trunk shall be provided with supply and exhaust ventilation. The open ends of the ventilation pipes shall be fitted with flame-restricting gauzes or other flame-restricting devices. No other pipes or electric cables shall be laid through the trunks.
- .6 In order to preclude the accumulation of static electricity, all fuel pipes, tanks, fittings and instruments associated with the storage and carriage of fuel shall be efficiently earthed to the ship's hull.
- 2.1.12.2 Distribution stations of fuel with a flash point below 43° C to ships and helicopters shall comply with the following requirements:
- .1 The stations shall be situated on the open decks and shall be as remote as practicable from accommodation spaces and areas containing a source of vapor ignition.
- .2 The spaces of the stations shall be enclosed by "A-60" class bulkheads and decks (see 2.1.2.7), the doors may be of steel and have no insulation. All the boundary surfaces of such spaces shall be gastight.
- .3 Coverings shall preclude spark formation.
- .4 The means of closing the doors leading into the station shall exclude the possibility of spark formation.
- .5 A fuel distribution arrangement shall consist of a metering device to record the quantity of supplied fuel, a flexible hose with a nozzle provided with a self-closing valve.
- .6 Fuel overflow tanks shall be made of a material excluding the possibility of spark formation.
- .7 All outgoing pipes shall be so fitted as to secure the gas tightness of the bulkheads.
- .8 Provision shall be made for the arrangement whereby a fuel spillage may be collected and drained to a slop tank.
- 2.1.12.3 Fixed tanks for storage of fuel for helicopters may be installed on the open decks. In so doing, the tanks shall be protected against physical damage and from direct influence of the sunbeams. The tanks shall be installed in compliance with the requirements of 2.1.12.2.1. Where such tanks are equipped with arrangements for their emergency jettisoning, measures shall be taken to prevent a jettisoned tank from striking the unit structure
- 2.1.12.4 Storage tanks shall be provided with remote controlled means of closure positioned in a readily accessible place.
- 2.1.12.5 Fuel storage in transported tanks is permitted at specially provided locations. Such tanks shall be efficiently secured, closed and bonded. The tanks shall be readily accessible for inspection.
- 2.1.12.6 The tanks referred to in 2.1.12.3, 2.1.12.4, and 2.1.12.5 are to be fitted with means for collecting and draining to a slop tank the fuel spillage.
- 2.1.12.7 The fuel pump shall be capable or draw off fuel only from a tank if there are other tanks. The pipes between the pump and the tank are to be made of steel or other homogenous material, and according to the possibilities, are to be short and shock - protected

# INTERMARITIME CERTIFICATION SERVICES (ICS Class)

## Chapter 6 Fire Protection

<b>2.1.13 Heating</b>			Where provision is made for stowage of not more than two gas containers, they may be arranged in an enclosed recess in the superstructure or deckhouse, or in a steel locker.
2.1.13.1	Electric heating shall be in compliance with the requirements of <i>Ch 11, Section 15</i> .		Furthermore, the stowage compartment for gas containers shall meet the following requirements:
2.1.13.2	All radiators shall be so constructed and located as to preclude the danger of setting fire to the equipment and also to the clothes and baggage of the persons accommodated in the space concerned.	.1	Efficient natural ventilation shall be provided, account being taken of the provisions of <i>Ch 8, rule 7.1.4</i> and <i>7.4.7</i> . In addition to natural ventilation, mechanical ventilation may be used, being taken into consideration the requirements of <i>Ch 8, rule 7.1.4</i> .
2.1.13.3	Steam and electric radiators shall be located at a distance of at least 50 mm from the ship's sides or bulkheads. If the ship's sides or bulkheads are lined with wood, veneer, or other combustible material, the portions located against the heating elements shall be protected with heat insulation of non-combustible material. In the absence of such heat insulation the heating elements shall be located at a distance of not less than 150 mm from the wood, veneer or other combustible lining.	.2	Where necessary, structural arrangements shall be made to prevent the temperature in the compartment from exceeding + 50 °C.
		.3	Electric illumination and electrical equipment at a distance of 2 m from openings to the compartment shall comply with the provisions of <i>Ch 11, Subsection 2.9</i> .
		.4	A warning notice recalling of the risk of explosion and prohibiting the use of naked flame and smoking shall be displayed on the door.
<b>2.1.14 Liquefied gas system for domestic needs</b>			
2.1.14.1	The use of gas meeting the provisions of current national standards is permitted.	2.1.14.6	The installation of gas containers in the compartment shall comply with the following requirements:
2.1.14.2	Liquefied gas may be used for galley ranges, as also for straight-through liquid heaters (including provision refrigerators) consuming not more than 1 kg of liquefied gas per hour. The use of liquefied gas system in passenger ships and oil tankers is subject to special consideration by <i>ICS Class</i> in each case.	.1	Cylinders shall be installed with stop valves upwards and be secured with quick-detachable arrangements. Other measures shall be taken to quickly release containers
		.2	A reducing valve shall generally be fitted on the container head; in this case, short rubber reinforced hose may be used for connection of the reducing valve to the liquefied gas pipeline.
2.1.14.3	Only standard gas containers and gas consuming appliances of type approved by competent technical supervision bodies may be installed on board the ship.	.3	Where a group of containers is connected to a manifold, only one reducing valve may be provided, this being fitted on the manifold. In this case, containers shall be connected to manifold by copper pipes.
2.1.14.4	An automatic safety gas cut-off device shall be fitted on gas-consuming appliances, which operates in the event of flame failure. For straight-through heaters this device shall have a flame control.	.4	Where more than one container is connected to the manifold, shut-off valve or cock shall be fitted between each container and the manifold. A notice prohibiting the simultaneous use of more than one container shall be displayed in the compartment.
2.1.14.5	Gas containers shall be stowed in a special compartment on the open deck, complying with the requirements of <i>2.1.5.1</i> with direct access to the open deck.	2.1.14.7	Compartments containing gas-consuming appliances shall be equipped in compliance

# INTERMARITIME CERTIFICATION SERVICES (*ICS Class*)

## Chapter 6 Fire Protection

- with 2.1.10 and meet the following requirements:
- .1 They shall not be arranged below the upper deck and be provided with efficient natural ventilation for extraction of combustion products and air taking from the lower part of the compartment.
  - .2 Where the compartment is partially below the open deck, it shall be provided with mechanical ventilation.
  - .3 Straight-through gas-consuming appliances shall be provided with separate lines for removal of combustion products.
- 2.1.14.8 Pipes shall be of seamless steel or copper. Steel pipes shall be protected against corrosion.
- 2.1.14.9 The thickness of pipe walls shall meet the requirements of *Ch 8, table 1.3.4.3, columns 2 or 8*.
- 2.1.14.10 Pipes from gas containers to gas-consuming appliances shall be laid over the open deck and be protected against mechanical damages.
- 2.1.14.11 Pipe joints shall be welded. Threaded or flange joints are permitted only in places of connection of instrumentation lines, gas-consuming appliances and fittings.
- 2.1.14.12 A shut-off valve or cock shall be fitted on the pipe where it pierces the bulkhead of the container compartment, this valve or cock being operated from outside the compartment. The valve or cock shall be provided with a turning limiter and a plug position indicator.
- 2.1.14.13 Where more than one gas-consuming appliance is installed, a shut-off valve or cock provided with a turning limiter and a plug position indicator shall be fitted on branches from a common pipe line to each gas-consuming appliance.  
Where these valves or cocks are fitted in the container compartment, provision shall be made for their operation from outside the compartment; in this case, the installation of a cock or valve on the common pipe line may be omitted (see 2.1.14.12).
- 2.1.14.14 The reducing valve shall provide the pressure of not more than 5 kPa in the system.
- 2.1.14.15 A safety valve with a setting pressure less than 7 kPa with gas outlets piped to a safe place of the upper deck shall be fitted in the reducing valve or after it on the pipe line. Where the reducing valve is so designed that gas outlet to a low pressure pipe line is closed in case of failure or break of the diaphragm, the safety valve need not be provided.
- 2.1.14.16 Fittings may be of bronze, brass or other corrosion-resisting material.
- 2.1.14.17 Liquefied gas pipe lines from containers to reducing valves shall be tested:  
- In a shop, by hydraulic pressure of 2,5 MPa.  
- On the ship, by air pressure of 1,7 MPa.
- Pipe lines from reducing valves to gas-consuming appliances shall be tested by air pressure of 0,02 MPa after installation on board.
- 2.1.15 The arrangement of fuel oil and lubricating oil tanks within accommodation, service and refrigerated spaces is permitted only on condition that they are separated from these spaces by cofferdams. For the dimensions and design of the cofferdams, see *Ch 2, rule 2.13.1.2*.  
On agreement with *ICS Class* and on condition that special measures are taken, the above spaces may be separated from the tanks without arranging cofferdams.  
The arrangement of cofferdam manholes within accommodation and service spaces is not permitted
- 2.2 Passenger ships**
- 2.2.1 General requirements**
- 2.2.1.1 The requirements of this Chapter are additional to those set out in 2.1.1 - 2.1.6, 2.1.8 - 2.1.13 and 2.1.15.
- 2.2.1.2.1 For ships carrying more than 36 passengers, the hull, superstructure and deckhouses, and in ships carrying not more than 36

# INTERMARITIME CERTIFICATION SERVICES (ICS Class)

## Chapter 6 Fire Protection

passengers, the hull, superstructure and deckhouses in way of accommodation and service spaces are to be subdivided into main fire vertical zones by "A" class divisions in such a way that the length of each zone on any deck does not, in general, exceed 40 m.

Where a part of the spaces within one main fire vertical zone is protected by an automatic sprinkler system and another part is not protected by the system concerned, horizontal divisions of the class meeting the provisions of *tables 2.2.1.3-3* or *2.2.1.5-2* are to be provided between such groups of the spaces.

2.2.1.3 The minimum fire integrity of all bulkheads and decks separating adjacent spaces in ships carrying 36 passengers and more is to be as prescribed in *table 2.2.1.3-1* - *2.2.1.3-4*.

For the purpose of determining the class of structures between adjacent spaces, such spaces are classified according to their fire risk as follows:

- 1) **Control stations**, see *1.5.1*.
- 2) **Stairways**  
Interior stairways beyond the machinery spaces with enclosures thereto and trunks of lifts for passengers and crew.  
A stairway which is enclosed at only one level shall be regarded as part of the space from which it is not separated by a fire door.
- 3) **Corridors and lobbies**
- 4) **Lifeboat and liferafts handling and embarkation stations**  
Open deck spaces and enclosed promenades forming these stations.
- 5) **Open deck spaces**  
Open deck spaces and enclosed promenades clear of lifeboat and liferafts embarkation and lowering stations.
- 6) **Accommodation spaces of low fire risk**  
Spaces containing furniture and furnishings of restricted fire risk (see *Subsection 1.2*) and having a deck area of less than 50 m<sup>2</sup>.
- 7) **Accommodation spaces of moderate fire risk**  
Spaces containing furniture and furnishings other than restricted fire risk.  
Public spaces containing furniture and furnishings of restricted fire risk and having a deck area of 50 m<sup>2</sup>.

Isolated lockers and small storerooms in accommodation spaces with an area less than 4 m<sup>2</sup>.

Sales shops.

Motion picture projection and film rooms.

Cleaning gear lockers.

Laboratories (in which flammable liquids are not stowed).

Small drying rooms (having a deck area of 4 m<sup>2</sup> or less).

Diet kitchens (using no open flame).

Specie rooms.

8) **Accommodation spaces of high fire risk**

Public spaces containing furniture and furnishings of other than restricted fire risk and having a deck area of 50 m<sup>2</sup> and greater.

Barber shops and beauty parlours.

9) **Sanitary and similar spaces**

Communal sanitary facilities, showers, baths, water closets, etc.

Small laundry rooms.

Indoor swimming pool area.

Operating rooms.

Isolated serving pantries in accommodation spaces.

Enclosed private sanitary facilities shall be considered a portion of the spaces in which they are located.

10) **Tanks, voids and auxiliary machinery spaces having little or no fire risk**

Water tanks forming part of the ship's structure.

Voids and cofferdams.

Auxiliary machinery spaces which do not contain machinery having a pressure lubrication system and where storage of combustibles is prohibited, such as: ventilation and air-conditioning rooms; windlass room; steering gear room; stabilizer equipment room; electrical propulsion motor room; rooms containing section switchboards and purely electrical equipment, shaft alleys and pipe tunnels; spaces for pumps and refrigeration machinery (not handling or using flammable liquids).

Closed trunks serving the spaces listed above.  
Other closed trunks such as pipe and cable trunks.

11) **Auxiliary machinery spaces, cargo spaces, special category spaces, cargo and other oil tanks and other similar spaces of moderate fire risk**

# INTERMARITIME CERTIFICATION SERVICES (ICS Class)

## Chapter 6 Fire Protection

	Cargo oil tanks.	2.2.1.3	Where the space is protected by an automatic sprinkler system or has a continuous "B" class ceiling, openings in the deck not being a part of main vertical or horizontal zones shall comply with the provisions of 2.1.4.4.
	Cargo holds, trunk ways and hatchways.		
	Refrigerated chambers.		
	Oil fuel tanks (where installed in a separate space with no machinery).		
	Shaft alleys and pipe tunnels allowing storage of combustibles.	2.2.1.5	The minimum fire integrity of all bulkheads and decks separating adjacent spaces in ships carrying not more than 36 passengers is to be as prescribed in <i>tables 2.2.1.5-1</i> and <i>2.2.1.5-2</i> with regard to the following:
	Auxiliary machinery spaces as in category (10) which contain machinery having a pressure lubrication system or where storage of combustibles is permitted.	.1	For determining the appropriate fire integrity standards to be applied to divisions between adjacent spaces, such spaces are classified according to their fire risk as shown in categories (1) to (11) below:
	Oil fuel filling stations.	1)	Control stations as defined in <i>1.5.1</i> .
	Spaces containing turbine and reciprocating steam engine driven auxiliary generators and small internal combustion engines up to 110 kW driving emergency generators, sprinkler, drencher or fire pumps, bilge pumps, etc.	2)	Corridors and lobbies.
	Special category spaces ( <i>Tables 2.2.1.3-1</i> and <i>2.2.1.3-3</i> only apply).	3)	Accommodation spaces as defined in <i>1.5.2</i> .
	Closed trunks serving the spaces listed above.	4)	Interior stairways and lifts (other than those wholly contained within the machinery spaces) and enclosure thereto.
12)	<b>Machinery spaces and main galleys</b>		In this connexion, a stairway which is enclosed only at one level is to be regarded as part of the space from which it is not separated by a fire door.
	Main propelling machinery rooms (other than electric propulsion motor rooms) and boiler rooms.	5)	Service spaces (low fire risk).
	Auxiliary machinery spaces other than those in categories (10) and (11) which contain internal combustion machinery or other oil-burning heating or pumping units.		Lockers and combustible materials, storerooms having areas of less than 4 m <sup>2</sup> , non-combustible materials, storerooms, drying rooms and laundries.
	Main galleys and annexes.	6)	Machinery spaces of category A.
13)	<b>Storerooms, workshops, pantries, etc.</b>	7)	Spaces as defined in <i>Ch 7, Subsection 1.2</i> .
	Trunks and casings to the spaces listed above.		Other machinery spaces.
	Main pantries, not annexed to galleys.		Machinery spaces excluding spaces referred to in (6) and special electrical spaces in compliance with <i>1.5.10</i> .
	Main laundry, sauna.	8)	Cargo spaces as defined in <i>1.5.4</i> .
	Large drying rooms (having a deck area of more than 4 m <sup>2</sup> ).	9)	Service spaces (high fire risk) as defined in <i>1.5.3</i> , excluding spaces referred to in (5), incinerators rooms.
	Miscellaneous stores.	10)	Open decks.
	Mail and baggage rooms.		Open deck spaces and enclosed promenades having no fire risk.
	Garbage rooms.		Air spaces (the space outside superstructures and deckhouses).
	Workshops (not part of machinery spaces, galleys, lockers and storerooms with area less than 4 m <sup>2</sup> , unconditioned for flammable liquids stowage).	11)	Special category spaces as defined in <i>1.5.9</i> .
14)	<b>Other spaces in which flammable liquids are stowed</b>	.1	The doors from the cabins to individual sanitary spaces may be of combustible materials.
	Lamp rooms.		
	Paint rooms.		
	Store rooms containing flammable liquids (including dyes, medicines, etc.).		
	Laboratories (in which flammable liquids are stowed).		
	Incinerators rooms.	2.2.1.6	Public compartments (such as shops, restaurants, agencies, etc.) where there are

# INTERMARITIME CERTIFICATION SERVICES (ICS Class)

## Chapter 6 Fire Protection

void spaces, which extend through two or three decks with fire risk elements (furniture), are to be provided in all the main vertical zone, with a fire-fighting automatic irrigation system and a smoke fire detection system with signals lamps.

These spaces are to be considered as in *Ch 3, rule 8.4.2* and *Ch 8, Subsection 7.3*.

### 2.2.2 Accommodation and service spaces within main fire vertical zones.

2.2.2.1 Bulkheads which are not to be of "A" class divisions shall be "B" or "C" class divisions in accordance with *tables 2.2.1.3-2* or *2.2.1.5-1*.

2.2.2.2 Corridor bulkheads where not required to be of "A" class shall be of "B" class divisions and extend from deck to deck.

2.2.2.3 Draught stops made of non-combustible materials shall be fitted in air spaces behind "B" class ceilings above corridor bulkheads.

2.2.2.4 Stairways in accommodation and service spaces shall be protected as follows:

.1 Stairways shall be enclosed in trunks formed by divisions specified in *tables 2.2.1.3-1 - 2.2.1.3-4* or *2.2.1.5-1* and *2.2.1.5-2*.

.2 Stairways connecting only two decks may be protected only in one between deck space by fire-resisting bulkheads and doors in compliance with *table 2.2.1.3-4* or *2.2.1.5-2*.

.3 Stairways may be fitted in the open in a public space, provided they lie wholly within such public space.

.4 Stairway enclosures shall have direct communication with the corridors and be of sufficient area, having in view the number of persons likely to use them in an emergency. No service lockers and other similar spaces shall be arranged in stairway enclosures; in so far as practicable, stairway enclosures shall not give direct access to cabins, lockers and other spaces containing combustibles.

.5 One of the means of escape from a watertight compartment or a main fire vertical zone as required in *Ch 3, rule 8.4.2.1* is to consist of enclosed stairways which provide a continuous shelter according to the provisions of *2.2.1.3* or *2.2.1.5*.

2.2.2.5 In all spaces, except for refrigerating provision storerooms, cargo spaces, mail and baggage cabins, the ceilings, bulk headings, linings, draught stops and grounds shall be made of non-combustible materials.

Partial bulkheads or decks used for the division of the space for practical or decorative reasons shall also be made of non-combustible materials.

2.2.2.6 The total volume of combustible materials used in moldings, decorations and veneers in any accommodation and service space shall not exceed volume equivalent to 2,5-mm veneer on the combined area of walls and ceilings.

In the case of ships fitted with an automatic sprinkler system, combustible materials used for the erection of "C" class divisions may be included in the above volume.

2.2.2.7 The construction of ceiling and bulk heading shall be such that it will be possible, without impairing the efficiency of the fire protection, for the fire patrols to detect any smoke originating in concealed and inaccessible places, except where there is no risk of fire originating in such places.

2.2.2.6.1 Exposed surfaces of the bulkheads in all accommodation and service spaces and control stations are not to have high flame spread characteristics.

Veneers used on surfaces and linings which are not to have high flame spread characteristics (see also *2.1.1.8*) are to have a calorific value not exceeding 45 MJ/m<sup>2</sup> with due regard to the thickness of the used material.

2.2.2.9 Furniture in the corridors and stairway enclosures is to be kept to a minimum.

### 2.2.3 Special category spaces.

2.2.3.1 When the above spaces cannot be protected by main vertical fire zones, their protection shall be ensured by subdivision into horizontal zones.

These zones may cover more than one deck, but their overall height shall not exceed 10 m.



# INTERMARITIME CERTIFICATION SERVICES (ICS Class)

## Chapter 6 Fire Protection

2.2.3.2 Bulkhead or deck class shall meet the requirements of tables 2.2.1.3-1 and 2.2.1.3-3 or 2.2.1-5 for category (11) spaces.

2.2.3.3 Indicators shall be provided on the navigating bridge, which shall show the position of door in the spaces concerned.

**Table 2.2.1.3-1 Bulkheads bounding main vertical zones or horizontal zones**

Spaces	Category	1)	2)	3)	4)	5)	6)	7)	8)	9)	10)	11)	12)	13)	14)
Control stations	1)	A-60	A-30	A-30	A-0	A-0	A-60	A-60	A-60	A-0	A-0	A-60	A-60	A-60	A-60
Stairways	2)		A-0	A-0	A-0	A-0	A-15 A-0	A-30 A-0	A-60 A-15	A-0	A-0	A-30	A-60	A-15 A-0	A-60
Corridors and lobbies	3)			A-0	A-0	A-0	A-0	A-30 A-0	A-30 A-0	A-0	A-0	A-30	A-60	A-15 A-0	A-60
Lifeboat and liferafts handling and embarkation stations	4)				-	-	A-0	A-0	A-0	A-0	A-0	A-0	A-60	A-0	A-60
Open deck spaces	5)					-	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0
Accommodation spaces of low fire risk	6)						A-15 A-0	A-30 A-0	A-30 A-0	A-0	A-0	A-15 A-0	A-30	A-15 A-0	A-30
Accommodation spaces of moderate fire risk	7)							A-30 A-0	A-60 A-15	A-0	A-0	A-30 A-0	A-60	A-30 A-0	A-60
Accommodation spaces of high fire risk	8)								A-60 A-15	A-0	A-0	A-60 A-15	A-60	A-30 A-0	A-60
Sanitary and similar spaces	9)									A-0	A-0	A-0	A-0	A-0	A-0
Tanks, voids and auxiliary machinery spaces having little or no fire risk	10)										A-0	A-0	A-0	A-0	A-0
Auxiliary machinery spaces, cargo spaces, special category spaces, cargo and other oil tanks and other similar spaces of moderate fire risk	11)											A-0	A-60	A-0	A-60
Machinery spaces and main galleys	12)												A-60	A-30 <sup>1</sup> A-15	A-60
Storerooms, workshops, pantries, etc.	13)													A-0	A-30
Other spaces in which flammable liquids are stowed	14)														A-60

**Table 2.2.1.3-2 Bulkheads not bounding main vertical zones nor horizontal zones**

# INTERMARITIME CERTIFICATION SERVICES (ICS Class)

## Chapter 6 Fire Protection

Spaces	Category	1)	2)	3)	4)	5)	6)	7)	8)	9)	10)	11)	12)	13)	14)
Control stations	1)	B-0 <sup>2</sup>	A-0	A-0	A-0	A-0 A-0 B-0	A-60	A-60	A-60	A-0	A-0	A-60	A-60	A-60	A-60
Stairways	2)		A-0 <sup>2</sup>	A-0	A-0	A-0	A-0	A-15 A-0	A-30 A-0	A-0	A-0	A-15	A-30	A-15 A-0	A-30
Corridors and lobbies	3)			C	A-0	A-0 B-0	B-0	B-15 B-0	B-15 B-0	B-0	A-0	A-15	A-30	A-0	A-60
Lifeboat and liferaft handling and embarkation stations	4)				-	-	A-0	A-0	A-0	A-0	A-0	A-0	A-15	A-0	A-15 A-0
Open deck spaces	5)					-	A-0 B-0	A-0 B-0	A-0 B-0	A-0 B-0	A-0	A-0	A-0	A-0 B-0	A-0 B-0
Accommodation spaces of low fire risk	6)						B-0 C	B-15 C	B-15 C	B-0 C	A-0	A-15 A-0	A-30	A-0	A-30 A-0
Accommodation spaces of moderate fire risk	7)							B-15 C	B-15 C	B-0 C	A-0	A-15 A-0	A-60	A-15 A-0	A-60 A-15
Accommodation spaces of high fire risk	8)								B-15 C	B-0 C	A-0	A-30 A-0	A-60	A-15 A-0	A-60 A-15
Sanitary and similar spaces	9)									C	A-0	A-0	A-0	A-0	A-0
Tanks, voids and auxiliary machinery spaces having little or no fire risk	10)										A-0 <sup>2</sup>	A-0	A-0	A-0	A-0
Auxiliary machinery spaces, cargo spaces, special category spaces, cargo and other oil tanks and other similar spaces of moderate fire risk	11)											A-0 <sup>2</sup>	A-0	A-0	A-30 <sup>1</sup> A-15

**Table 2.2.1.3-2 Continuous bulkheads not bounding main vertical zones nor horizontal zones**

Spaces	Category	1)	2)	3)	4)	5)	6)	7)	8)	9)	10)	11)	12)	13)	14)
Machinery spaces and main galleys	12)												A-0	A-0	A-60
Storerooms, workshops, pantries, etc.	13)													A-0 <sup>2</sup>	A-30
Other spaces in which flammable liquids are stowed	14)														A-30 <sup>1</sup> A-15

**Table 2.2.1.3-3 Decks forming steps in main vertical zones or bounding horizontal zones**

# INTERMARITIME CERTIFICATION SERVICES (ICS Class)

## Chapter 6 Fire Protection

Space	Category	Space above													
		1)	2)	3)	4)	5)	6)	7)	8)	9)	10)	11)	12)	13)	14)
Control stations	1)	A-60	A-60	A-30	A-0	A-0	A-15	A-30	A-60	A-0	A-0	A-30	A-60	A-15	A-60
Stairways	2)	A-15	A-0	A-0	A-0	A-0	A-0	A-15 A-0	A-15 A-0	A-0	A-0	A-0	A-60	A-0	A-60
Corridors and lobbies	3)	A-30	A-0	A-0	A-0	A-0	A-0	A-15 A-0	A-15 A-0	A-0	A-0	A-0	A-60	A-0	A-60
Lifeboat and liferaft handling and embarkation stations	4)	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0
Open deck spaces	5)	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0
Accommodation spaces of low fire risk	6)	A-60	A-30 A-0	A-15 A-0	A-0	A-0	A-0	A-15 A-0	A-30 A-0	A-0	A-0	A-15 A-0	A-15	A-0	A-15
Accommodation spaces of moderate fire risk	7)	A-60	A-60 A-15	A-30 A-0	A-15 A-0	A-0	A-15 A-0	A-30 A-0	A-60 A-15	A-0	A-0	A-30 A-0	A-30	A-0	A-30
Accommodation spaces of high fire risk	8)	A-60	A-60 A-15	A-60 A-15	A-60 A-15	A-0	A-30 A-0	A-60 A-15	A-60 A-15	A-0	A-0	A-30 A-0	A-60	A-15 A-0	A-60
Sanitary and similar spaces	9)	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0
Tanks, voids and auxiliary machinery spaces having little or no fire risk	10)	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0
Auxiliary machinery spaces, cargo spaces, special category spaces, cargo and other oil tanks and other similar spaces of moderate fire risk	11)	A-60	A-60	A-60	A-60	A-0	A-30 A-0	A-60 A-15	A-60 A-15	A-0	A-0	A-0	A-30	A-30 <sup>1</sup> A-0	A-30

**Table 2.2.1.3-3 Continuous decks forming steps in main vertical zones or bounding horizontal zones**

Space	Category	Space above														
		1)	2)	3)	4)	5)	6)	7)	8)	9)	10)	11)	12)	13)	14)	
Machinery spaces and main galleys	12)	A-60	A-60	A-60	A-60	A-0	A-60	A-60	A-60	A-60	A-0	A-0	A-60	A-60	A-60	A-60
Storerooms, workshops, pantries, etc.	13)	A-60	A-60 A-15	A-30 A-0	A-15	A-0	A-15 A-0	A-30 A-0	A-60 A-15	A-0	A-0	A-0	A-30	A-0	A-30	
Other spaces in which flammable liquids are stowed	14)	A-60	A-60	A-60	A-60	A-0	A-60	A-60	A-60	A-0	A-0	A-60	A-60	A-60	A-60	

# INTERMARITIME CERTIFICATION SERVICES (ICS Class)

## Chapter 6 Fire Protection

**Table 2.2.1.3-4 Decks not forming steps in main vertical zones nor bounding horizontal zones**

Space below	Category	Space above													
		1)	2)	3)	4)	5)	6)	7)	8)	9)	10)	11)	12)	13)	14)
Control stations	1)	A-30 A-0	A-30 A-0	A-15 A-0	A-0	A-0 B-0	A-0	A-15 A-0	A-30 A-0	A-0	A-0	A-0	A-60	A-0	A-60 A-15
Stairways	2)	A-0	A-0	A-0	A-0	A-0 B-0	A-0	A-0	A-0	A-0	A-0	A-0	A-30	A-0	A-30 A-0
Corridors and lobbies	3)	A-15 A-0	A-0	A-0 <sup>2</sup> B-0 <sup>2</sup>	A-0	A-0 B-0	A-0 B-0	A-15 B-0	A-15 B-0	A-0 B-0	A-0	A-0	A-30	A-0	A-30 A-0
Lifeboat and liferafts handling and embarkation stations	4)	A-0	A-0	A-0	A-0	-	A-0 B-0	A-0 B-0	A-0 B-0	A-0 B-0	A-0	A-0	A-0	A-0	A-0
Open deck spaces	5)	A-0	A-0	A-0 B-0	A-0	-	A-0 B-0	A-0 B-0	A-0 B-0	A-0 B-0	A-0	A-0	A-0	A-0 B-0	A-0
Accommodation spaces of low fire risk	6)	A-60	A-30 A-0	A-15 A-0	A-15 A-0	A-0 B-0	A-0 B-0	A-15 B-0	A-30 B-0	A-0 B-0	A-0	A-15 A-0	A-30 A-0	A-0	A-30 A-0
Accommodation spaces of moderate fire risk	7)	A-60	A-60 A-15	A-30 A-0	A-15 A-0	A-0	A-15 A-0	A-30 A-0	A-60 A-15	A-0	A-0	A-30 A-0	A-30	A-0	A-30
Accommodation spaces of high fire risk	8)	A-60	A-60 A-15	A-60 A-0	A-30 A-0	A-0 B-0	A-15 B-0	A-30 B-0	A-60 B-0	A-0 B-0	A-0	A-30 A-0	A-30 A-0	A-0	A-30 A-0
Sanitary and similar spaces	9)	A-0	A-0	A-0 B-0	A-0	A-0 B-0	A-0 B-0	A-0 B-0	A-0 B-0	A-0 B-0	A-0	A-0	A-0	A-0	A-0
Tanks, voids and auxiliary machinery spaces having little or no fire risk	10)	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0 <sup>2</sup>	A-0	A-0	A-0	A-0

**Table 2.2.1.3-4 Continuous decks not forming steps in main vertical zones nor bounding horizontal zones**

# INTERMARITIME CERTIFICATION SERVICES (ICS Class)

## Chapter 6 Fire Protection

Space below	Category	Space above													
		1)	2)	3)	4)	5)	6)	7)	8)	9)	10)	11)	12)	13)	14)
Auxiliary machinery spaces, cargo spaces, special category spaces, cargo and other oil tanks and other similar spaces of moderate fire risk	11)	A-60	A-60 A-15	A-60 A-15	A-30 A-0	A-0	A-0	A-15 A-0	A-30 A-0	A-0	A-0	A-0 <sup>2</sup>	A-0	A-0	A-30 <sup>1</sup> A-15
Machinery spaces and main galleys	12)	A-60	A-60	A-60	A-60	A-0	A-60	A-60	A-60	A-0	A-0	A-30	A-30 <sup>2</sup>	A-0	A-60
Storerooms, workshops, pantries, etc.	13)	A-60	A-30 A-0	A-15 A-0	A-15 A-0	A-0 B-0	A-15 A-0	A-30 A-0	A-30 A-0	A-0 B-0	A-0	A-0	A-0	A-0	A-15 <sup>1</sup> A-0
Other spaces in which flammable liquids are stowed	14)	A-60	A-60 A-30	A-60 A-30	A-60	A-0	A-30 A-0	A-60 A-15	A-60 A-15	A-0	A-0	A-30 <sup>1</sup> A-0	A-30 <sup>1</sup> A-0	A-0	A-30 <sup>1</sup> A-0

NOTES: (to tables 2.2.1.3-1 - 2.2.1.3-4)

- .1 The smaller of the two values given in the tables shall apply for the case where each of the adjacent spaces is protected by a automatic sprinkler system.
- .2 Reference (1) means that the smaller of the two values given in the tables may apply for the case where at least one of the adjoining spaces is protected by an automatic sprinkler system.
- .3 Reference (2) means that bulkheads and decks between the spaces of the categories concerned need not be fitted.
- .4 A dash means that no special provisions are imposed on the material and fire-resisting watertight constructions.
- .5 If from peculiarities of the ship's structure the difficulties arise in determining from the tables the minimum fire resistance of the divisions, it shall be subject to special agreement with ICS.
- .6 Where there is a doubt as to classification of a space, it shall be treated as a space within the relevant category having the most stringent requirements.
- .7 Application of the table 2.2.1.3 in relation to category (5) outside bulkheads and decks, shall be considered by ICS in each case.

**Table 2.2.1.5-1 Fire integrity of bulkheads separating adjacent spaces**

Spaces	Category	1)	2)	3)	4)	5)	6)	7)	8)	9)	10)	11)
Control stations	1)	A-0 <sup>1</sup>	A-0	A-60	A-0	A-15	A-60	A-15	A-60	A-60	*	A-60
Corridors and lobbies	2)		C <sup>2</sup>	B-0 <sup>2</sup>	A-0	B-0 <sup>2</sup>	A-60	A-0	A-0	A-15 A-0 <sup>2</sup>	*	A-15
Accommodation spaces	3)			C <sup>2</sup>	A-0	B-0 <sup>2</sup>	A-60	A-0	A-0	A-15 A-0 <sup>3</sup>	*	A-30 A-0 <sup>3</sup>
Stairways and lifts	4)				A-0	A-0	A-60	A-0	A-0	A-15 A-0 <sup>3</sup>	*	A-15
Service spaces (low fire risk)	5)					C <sup>2</sup>	A-60	A-0	A-0	A-0	*	A-0
Machinery spaces of category "A"	6)						*	A-0	A-0	A-60	*	A-60
Other machinery spaces	7)							A-0 <sup>4</sup>	A-0	A-0	*	A-0
Cargo spaces	8)								*	A-0	*	A-0
Service spaces (high fire risk)	9)									A-0 <sup>4</sup>	*	A-30
Open decks	10)										-	A-0
Special category spaces	11)											A-0

# INTERMARITIME CERTIFICATION SERVICES (ICS Class)

## Chapter 6 Fire Protection

**Table 2.2.1.5-2 Fire integrity of decks separating adjacent spaces**

Spaces below	Category	1)	2)	3)	4)	5)	6)	7)	8)	9)	10)	11)
Control stations	1)	A-0	A-0	A-0	A-0	A-0	A-60	A-0	A-0	A-0	*	A-30
Corridors and lobbies	2)	A-0	*	*	A-0	*	A-60	A-0	A-0	A-0	*	A-0
Accommodation spaces	3)	A-60	A-0	*	A-0	*	A-60	A-0	A-0	A-0	*	A-30 A-0 <sup>3</sup>
Stairways and lifts	4)	A-0	A-0	A-0	*	A-0	A-60	A-0	A-0	A-0	*	A-0
Service spaces (low fire risk)	5)	A-15	A-0	A-0	A-0	*	A-60	A-0	A-0	A-0	*	A-0
Machinery spaces of category "A"	6)	A-60	A-60	A-60	A-60	A-60	*	A-60 <sup>5</sup>	A-30	A-60	*	A-60
Other machinery spaces	7)	A-15	A-0	A-0	A-0	A-0	A-0	*	A-0	A-0	*	A-0
Cargo spaces	8)	A-60	A-0	A-0	A-0	A-0	A-0	A-0	*	A-0	*	A-0
Service spaces (high fire risk)	9)	A-60	A-30 A-0 <sup>3</sup>	A-30 A-0 <sup>3</sup>	A-30 A-0 <sup>3</sup>	A-0	A-60	A-0	A-0	A-0	*	A-30
Open decks	10)	*	*	*	*	*	*	*	*	*	*	A-0
Special category spaces	11)	A-60	A-15	A-30 A-0 <sup>3</sup>	A-15	A-0	A-30	A-0	A-0	A-30	A-0	A-0

**NOTES:** (to tables 2.2.1.5-1 and 2.2.1.5-2)

- .1 Bulkheads separating the wheelhouse and chartroom from each other may be "B-O" rating.
  - .2 "B-O" or "C" class bulkheads, where appearing in the table as main fire-proof divisions required by 2.2.1.2 shall be read as "A-O".
  - .3 Where each of the adjacent spaces is protected by an automatic sprinkler system, the lower of the two values given in the tables may be used.
  - .4 Where the spaces are used for the same purpose, no divisions may be fitted between them.
  - .5 Where other machinery spaces of category (7) are the spaces of little fire risk, i. e. they do not contain machinery operating on fuel oil or having a pressure lubrication system, "A-O" class divisions are permitted.
  - \* Where an asterisk appears in the tables the division is required to be of steel or equivalent material but is not required to be of "A" class standard.
- For the application of rule 2.2.1.2 an asterisk, where appearing in table 2.2.1.5-2, except for categories (8) and (10) is to be read as "A-O".

2.2.3.4 Special category spaces shall have means of escape leading to the lifeboat and liferafts embarkation places complying with the requirements of *Ch 3, rules 8.4.1, 8.4.2.3, and rule 2.2.2.4.1* of this Chapter. Escape routes from the machinery spaces where the crew is normally employed shall avoid direct access to any special category space.

2.2.4 In passenger ships of less than 300 tons gross tonnage which are not equipped with berths for passengers, the provisions of 2.2.1.1, 2.2.1.3 and 2.2.1.5 ("A-60", "A-30" and "A-15" class standards given in tables 2.2.1.3-2, 2.2.1.3-4 and 2.2.1.5 may be replaced by "A-30", "A-15" and "A-0" class

standards, respectively) 2.2.2.1, 2.2.2.2, 2.2.2.3, 2.2.2.5 and 2.2.2.6 are to be met.

### 2.3 Cargo ships

2.3.1 The provisions of this Subsection are additional to those set out in 2.1 and apply to cargo ships of 500 tons gross tonnage and upwards.

2.3.2 In accommodation and service spaces one of the following methods of protection shall be adopted:

- **Method IC:** The construction of all internal divisional bulkheading of non-combustible "B" or "C" class divisions or

# INTERMARITIME CERTIFICATION SERVICES (*ICS Class*)

## Chapter 6 Fire Protection

- **Method IIC:** The fitting of an automatic sprinkler and fire alarm system for the detection and extinction of fire in all spaces in which fire might be expected to originate, generally with no restriction on the type of internal divisional bulkheading or
- 11) **Ro/ro cargo spaces**, as defined in 1.5.4.3.
- **Method IIIC:** The fitting of an automatic fire detection and alarm system in all spaces in which a fire might be expected to originate, generally with no restriction on the type of internal divisional bulkheading, except that in no case must the area of any accommodation space or spaces bounded by "A" or "B" class division exceed 50 m<sup>2</sup>.  
Consideration may be given by *ICS Class* to increasing this area for public spaces.
- 2.3.3 The minimum fire integrity of the bulkheads and decks separating adjacent spaces is to be as prescribed in *tables 2.3.3-1* and *2.3.3-2*. For determining the appropriate fire integrity standards to be applied to divisions between adjacent spaces, the spaces are classified according to their fire risk as follows:
- 1) **Control stations** in accordance with 1.5.1.  
2) **Corridors and lobbies**.  
3) **Accommodation spaces** in accordance with 1.5.2.  
4) **Interior stairways and lifts** (other than those wholly contained within the machinery spaces) and enclosures thereto.  
A stairway which is enclosed only at one level shall be regarded as part of the space from which it is not separated by a fire door.  
5) **Service spaces (low fire risk)**.  
Combustible material lockers and storerooms having areas of less than 4 m<sup>2</sup>, non-combustible material storerooms, drying rooms and laundries, working spaces in compliance with 1.5.8.2.  
6) **Machinery spaces of category "A"**  
Spaces as defined in *Ch 7, Subsection 1.2*.  
7) **Other machinery spaces**  
Machinery spaces excluding those specified in (6) and special electrical spaces in compliance with 1.5.10.  
8) **Cargo spaces** in compliance with 1.5.4.  
9) **Service spaces (high fire risk)** in compliance with 1.5.3, excluding those specified in (5), as well as working spaces in compliance with 1.5.8.1.  
10) **Open decks**
- 2.3.4 In case of Method IC in control stations, accommodation and service spaces, all linings, ceilings, draught stops and their associated grounds shall be of non-combustible materials.
- 2.3.5 In accommodation and service spaces bulkheads not required to be "A" or "B" class divisions, depending on the method employed, shall be:
- .1 **Method IC:** shall be at least "C" class divisions.  
.2 **Method IIC:** not subject to any restrictions, except in cases where class "C" bulkheads are required in accordance with *table 2.3.3-1*.  
.3 **Method IIIC:** not subject to any restrictions except that in no case must the area of any accommodation space or spaces bounded by "A" or "B" class divisions exceed 50 m<sup>2</sup> (except in cases where "C" bulkheads are required in accordance with *table 2.3.3-1*).  
Consideration may be given by *ICS Class* to increasing this area for public spaces.
- 2.4 **Oil tankers**
- 2.4.1 The requirements of this Subsection are additional to those set out in 2.1 and 2.3, except for 2.3.3, when only method IC fire protection is adopted and apply to oil tankers and combination carriers of 500 tons gross tonnage and upwards.
- 2.4.2 The minimum fire integrity of bulkheads and decks separating adjacent spaces is to be as prescribed in *tables 2.4.2-1* and *2.4.2-2*, with regard to the following.  
For determining the appropriate fire integrity standards to be applied to divisions between adjacent spaces, the spaces are to be classified according to their fire risk as follows:  
1) **Control stations** as defined in 1.5.1.  
2) **Corridors and lobbies**.  
3) **Accommodation spaces** as defined in 1.5.2.  
4) **Interior stairways and lifts** (other than those wholly contained within the machinery spaces) and enclosure.

# INTERMARITIME CERTIFICATION SERVICES (*ICS Class*)

## Chapter 6 Fire Protection

- A stairway which is enclosed only at one level is to be regarded as part of the space from which it is not separated by a fire door.
- 5) **Service spaces (low fire risk).**  
Combustible material lockers and storerooms having areas of less than 4 m<sup>2</sup>, non-combustible materials, storerooms, drying rooms and laundries.
- 6) **Machinery spaces of category "A".**
- 7) **Other machinery spaces.**  
Machinery spaces excluding spaces referred to in (6) and special electrical spaces in compliance with 1.5.10.
- 8) **Cargo pump rooms** as defined in 1.5.7.
- 9) **Service spaces (high fire risk)** as defined in 1.5.3 excluding those referred to category (5), cargo control stations, as well as incinerators rooms.
- 10) **Open decks.**  
Open deck spaces and enclosed promenades having no fire risk. Air spaces (spaces surrounding superstructures and deckhouses).
- 2.4.3 Exterior, boundaries of superstructures and deckhouses enclosing accommodation and including any overhanging decks which support such accommodation are to be insulated to "A-60" standard for the whole of the portions which face the cargo area and for 3 m aft of the front boundary at a height of three tiers from the weather deck.
- 2.4.4 Windows and side scuttles facing the cargo area and on the sides of the superstructures and deckhouses at a distance of at least 4 per cent of the length of the ship but not less than 3 m (this distance need not exceed 5 m) from the end of the superstructure or deckhouse are to be of the fixed (non-opening) type as required in *Ch 3, Subsection 7.2*.  
This requirement does not apply to wheelhouse windows which may be of the opening type so long as they are designed to ensure that the wheelhouse can be made rapidly and efficiently gas and vapor tight.
- 2.4.5 Doors are not to be fitted in the bulkheads referred to in 2.4.4.  
In these boundaries doors may be fitted leading to cargo control stations, provision rooms and storerooms not having access to accommodation and service spaces and control stations.  
Where such doors are fitted, the boundaries enclosing cargo control stations and store rooms shall be insulated to "A-60" standard (see 2.1.2.7).  
These provisions are not to apply to navigating bridge doors which are to be so designed that rapid and efficient gas and vapor tightening of the navigating bridge can be ensured.  
In the bulkheads referred to in 2.4.4 bolt plates for the removal of machinery may be fitted in such boundaries.
- 2.4.6 Control stations shall generally be positioned outside the cargo area, slop tanks, cargo pump rooms and cofferdams which separate these tanks from machinery spaces. Where control stations, in which main navigational instruments and equipment (wheelhouses) are arranged, are fitted above the cargo area, they shall also be separated there from by means of an open space with a height of at least 2 m.
- 2.4.7 Machinery spaces are to be positioned aft of the cargo tanks and slop tanks; they are to be also situated aft of the pump rooms and cofferdams, but not necessarily aft of the oil fuel bunkers tanks.  
Machinery spaces are to be isolated from cargo tanks by cofferdams, pump rooms, oil fuel bunker tanks or permanent ballast tanks. Pump rooms containing pumps and their accessories for ballasting, for oil fuel transfer and for slop tanks, may be used for isolation of machinery spaces from cargo tanks and slop tanks, provided such spaces have the same safety standards for fire-fighting as the forward cargo spaces.  
The bulkhead in the lower part of the cargo pump room may be stepped in the machinery space of category A, thus forming the recess for arranging pumps. The top of the step shall not rise for more than 1/3 of the moulded depth above the keel. In ships over 25000 dwt to access the piping and in other cases, *ICS Class* may permit the increasing of the top of the step to 1/2 of the moulded depth above the keel.



# INTERMARITIME CERTIFICATION SERVICES (*ICS Class*)

## Chapter 6 Fire Protection

Cargo tanks or slop tanks adjoining the machinery spaces by a corner shall be separated by an enclosure forming a corner cofferdam.

The design and dimensions of cofferdams shall comply with the provisions set forth in *Ch 2, rule 2.13.1.2*.

2.4.8 Control stations, cargo control stations, accommodation and service spaces (excluding the storerooms) are to be positioned aft of all cargo tanks, slops tanks, pump rooms and cofferdams which isolate cargo or slop tanks from machinery spaces, but not necessarily aft of the oil fuel bunker tanks and ballast tanks and shall be so fitted as to avoid the access of steam or gases from cargo tanks to those spaces, in case of damage of the decks and bulkheads. A recess provided in accordance with the *rule 2.4.7* need not be taken into account when the position of these spaces is being determined. Enclosed smoking rooms shall be provided within the accommodation spaces. These spaces shall be formed by "B-15" class divisions and facings shall be made of materials having low flame spread characteristics.

2.4.9 In case of to be necessary and being permitted by *ICS Class*, the control stations, cargo control stations, accommodation and service spaces may be positioned forward of the cargo and slop tanks, which are to be isolated from machinery spaces, but not necessarily forward of the permanent ballast tanks and oil fuel bunker tanks. Machinery rooms other than those of category "A", may be located forward of the cargo and slop tanks, provided they are isolated from such spaces by means of cofferdams, pump rooms, oil fuel bunker tanks or permanent ballast tanks. All these spaces are to have equivalents safety standards as those mentioned in *2.4.7* as well as suitable fire fighting equipment.

Control stations, cargo control stations an accommodation spaces are to be so arranged as to preclude the possibility of access of steam and gases from cargo tanks in case of damage in the deck or bulkheads.

For ensuring the safety during navigation, is permitted that machinery spaces containing internal combustion machinery having an output greater than 375 kW, may be located forward of the cargo area.

2.4.10 No access holes to oil fuel tanks located in the double bottom below cargo tanks are permitted in cargo tanks and in the machinery space.

2.4.11 On the upper deck at a distance of 2 m from the superstructure where accommodation and service spaces are located, a continuous coaming shall be provided not less than 150 mm high extending from side to side. If there is hoisting equipment located aft, the aforementioned coaming is to be installed in the side of the superstructure aft bulkhead.

2.4.12 Manholes, openings for cleaning cargo tanks and other openings shall not be arranged in completely enclosed or in semi enclosed spaces.

2.4.13 Deck openings for the ropes supporting the repair suspension sites shall comply with the following requirements:

.1 The number and arrangement of the openings are subject to special consideration by *ICS Class*. These openings shall be easily accessible for inspection and maintenance.

The upper and lower surfaces of threaded plates are to be so arranged as to achieve a smooth transition on the upper and lower surfaces of the deck plate.

.2 Closures for openings may be metal thread plugs or plugs made of acceptable synthetic material. Metal plugs shall have a fine thread with the sufficient number of threads in the joint.

.3 Plugs and threaded joints shall be manufactured of material resistant to sea atmosphere and any cargoes carried in the ship.

.4 Spare plugs shall be provided in any ship in a number not less than 10 per cent of the total number of openings.

.5 Special tool shall be used to make the torque moment necessary for tightening the plugs and to set the efficient tightness

.6 As for the tightness to cargo, the closures shall comply with the provisions of *Ch 3, rule 7.11.3*.

# INTERMARITIME CERTIFICATION SERVICES (ICS Class)

## Chapter 6 Fire Protection

- 2.4.14 Rubbing strakes shall be made of, or efficiently faced with, materials precluding spark formation.  
Rubbing strakes shall not be fastened to the shell plating with through bolts.
- 2.4.15 The following requirements are to be also met in combination carriers:
- .1 The slop tanks are to be surrounded by cofferdams, except where the boundaries of the slop tanks are the hull, main cargo deck, cargo pump room bulkhead or oil fuel bunker tank. These cofferdams are not to be open to a double bottom, pipe tunnel, pump room or other enclosed space.  
Means are to be provided for filling the cofferdams with water and draining them.  
Where the boundary of the slop tank is the cargo pump room bulkhead, the pump room is not to be open to the double bottom, pipe tunnel or other enclosed space. However, openings provided with gastight bolted covers may be permitted.
- .2 Hatches and tank cleaning openings to slop tanks are to be only permitted on the open deck; they are to be fitted with closing arrangements, except where they consist of bolted plates with bolts at watertight spacing. These closing arrangements are to be provided with locking arrangements to prevent them from being opened by an unauthorized person.
- .3 An approved fixed gas warning system capable of monitoring flammable vapors is to be provided in cargo pump rooms, pipe ducts, cofferdams and spaces adjacent to slop tanks, referred to in 2.4.10.  
Suitable arrangements are to be made to facilitate measurement of flammable vapors in all other spaces within the cargo tank area. Such measurements are to be made possible from open deck or easily accessible positions.
- .4 Protection of deck water seal from freezing.
- .5 Arrangement of openings for cargo handling operations in decks and bulkheads separating the spaces for the carriage of oil and oil products from the spaces not intended or fitted for their carriage, is permitted only provided equivalent tightness for oil products and their vapors is ensured.
- .6 Detailed instructions are to be exhibited on board, covering safety measures to be taken during loading or unloading of the ship and when dry cargoes are carried with oil product residues in the slop tanks.
- 2.5 Ships serving oil tankers**
- 2.5.1 The requirements of this *Subsection* are additional to those set forth in 2.1 and apply to oil lighters and harbor vessels serving oil tankers carrying flammable liquids.
- 2.5.2 Rubbing strakes shall be made of, or faced with, materials precluding spark formation. Rubbing strakes shall not be fastened to the shell plating by means of through bolts.
- 2.5.3 The use of strake fenders with the outside surface formed by steel ropes is not permitted.
- 2.5.4 Emergency lighting is to be electrical.
- 2.5.5 Spare lights for signals are to be electrical.
- 2.6 Special purpose ships**
- 2.6.1 The requirements of this *Subsection* are additional to those set forth in 2.1.
- 2.6.2 For ships carrying not more than 50 persons of special personnel, including small ships less than 300 tons gross tonnage, the fire protection requirements for cargo ships more than 500 tons gross tonnage are to be applied.
- 2.6.3 For ships carrying more than 50, but not more than 200 persons of special personnel the fire protection requirements for passenger ships carrying not more than 36 passengers are to be applied.
- 2.6.4 For ships carrying more than 200 persons of special personnel the fire protection requirements for passenger ships carrying more than 36 passengers are to be applied.
- 2.7 Oil tankers (≥ 60° C).**
- 2.7.1 The requirements of this *Subsection* are additional to those set out in 2.1 and 2.3 and

# INTERMARITIME CERTIFICATION SERVICES (ICS Class)

## Chapter 6 Fire Protection

- apply to ships of 500 tons gross and upwards.
- 2.7.2 Cargo tanks shall not be adjacent to accommodation spaces.
- 2.7.3 No doors leading to accommodation spaces shall be permitted in the front bulkhead of superstructures and deckhouses.
- 2.7.4 A continuous coaming not less than 150 mm high extending from side to side shall be fitted on the upper deck at a distance of about 2 m from a superstructure where accommodation and service spaces are arranged.
- 2.7.5 Machinery spaces of category "A" shall be arranged aft beyond cargo and slop tank area.
- 2.7.6 Where cargo heating arrangements are fitted, provision is to be made to prevent cargo from heating above 50 °C.
- 2.8 **Ships fitted for carriage of dangerous goods.**
- 2.8.1 The requirements of this Subsection are additional to those set out in 2.1, 2.2, 2.3 and 2.6 and apply to passenger, dry cargo (including ro/ro ships), special purpose ships, as well as cargo spaces fitted for the carriage of dangerous goods.
- 2.8.2 Depending on the class of non-bulk dangerous goods, ships and cargo spaces intended for the carriage of such goods are to meet the provisions set forth in *table 2.8.2*.
- 2.8.3 Cargo spaces in ships other than in ro/ro ships are not to be adjacent to accommodation and service spaces.

**Table 2.3.3-1 Fire integrity of bulkheads separating adjacent spaces**

Spaces	Category	1)	2)	3)	4)	5)	6)	7)	8)	9)	10)	11)
Control stations	1)	A-0	A-0	A-60	A-0	A-15	A-60	A-15	A-60	A-60	*	A-60
Corridors and lobbies	2)		C	B-0	A-0 <sup>2</sup> B-0	B-0	A-60	A-0	A-0	A-0	*	A-30
Accommodation spaces	3)			C <sup>3,4</sup>	A-0 <sup>2</sup> B-0	B-0	A-60	A-0	A-0	A-0	*	A-30
Stairways and lifts	4)				A-0 <sup>2</sup> B-0	A-0 <sup>2</sup> B-0	A-60	A-0	A-0	A-0	*	A-30
Service spaces (low fire risk)	5)					C	A-60	A-0	A-0	A-0	*	A-0
Machinery spaces of category "A"	6)						*	A-0	A-0 <sup>5</sup>	A-60	*	A-60 <sup>6</sup>
Other machinery spaces	7)							A-0 <sup>7</sup>	A-0	A-0	*	A-0
Cargo spaces	8)								*	A-0	*	A-0
Service spaces (high fire risk)	9)									A-0 <sup>7</sup>	*	A-30
Open decks	10)										-	A-0
Ro/ro cargo spaces	11)											* <sup>8</sup>

# INTERMARITIME CERTIFICATION SERVICES (ICS Class)

## Chapter 6 Fire Protection

**Table 2.3.3-2 Fire integrity of decks separating adjacent spaces**

Space below	Category	Space above										
		1)	2)	3)	4)	5)	6)	7)	8)	9)	10)	11)
Control stations	1)	A-0	A-0	A-0	A-0	A-0	A-60	A-0	A-0	A-0	*	A-60
Corridors and lobbies	2)	A-0	*	*	A-0	*	A-60	A-0	A-0	A-0	*	A-30
Accommodation spaces	3)	A-60	A-0	*	A-0	*	A-60	A-0	A-0	A-0	*	A-30
Stairways and lifts	4)	A-0	A-0	A-0	*	A-0	A-60	A-0	A-0	A-0	*	A-30
Service spaces (low fire risk)	5)	A-15	A-0	A-0	A-0	*	A-60	A-0	A-0	A-0	*	A-0
Machinery spaces of category "A"	6)	A-60	A-60	A-60	A-60	A-60	*	A-60 <sup>9</sup>	A-30	A-60	*	A-60
Other machinery spaces	7)	A-15	A-0	A-0	A-0	A-0	A-0	*	A-0	A-0	*	A-0
Cargo spaces	8)	A-60	A-0	A-0	A-0	A-0	A-0	A-0	*	A-0	*	A-0
Service spaces (high fire risk)	9)	A-60	A-0	A-0	A-0	A-0	A-60	A-0	A-0	A-0 <sup>7</sup>	*	A-30
Open decks	10)	*	*	*	*	*	*	*	*	*	-	*
Ro/ro cargo spaces	11)	A-60	A-30	A-30	A-30	A-0	A-60	A-0	A-0	A-30	*	* 8

**NOTES TO tables 2.3.3-1 and 2.3.3-2**

- .1 Bulkheads separating the wheelhouse, chartroom and radio room from each other may be "B-0" rating.
  - .2 In order to select the type of bulkhead, see rule 2.1.4.3.
  - .3 Doors separating cabins from individual sanitary accommodation may be constructed of combustible materials in Method IC fire protection. No special provisions are imposed upon bulkheads in Method IIC and IIIC.
  - .4 In case of Method IIIC bulkheads of "B-0" rating shall be provided between spaces or groups of spaces of 50 m<sup>2</sup> and over in area.
  - .5 For cargo spaces intended for carriage of dangerous goods see 2.8.4.
  - .6 "A-0" rating may be used if no dangerous goods are intended to be carried.
  - .7 Where spaces are used for the same purpose, divisions between them need not be fitted.
  - .8 Openings in bulkheads and decks shall be closed reasonably gastight.
  - .9 Where other machinery spaces of category (7) are the spaces of little fire risk, i. e. they do not contain machinery operating on fuel oil or having a pressure lubrication system, "A-0" class divisions are permitted.
- \* Where an asterisk appears in the tables the division is required to be of steel or equivalent but is not required to be of "A" class standard.

# INTERMARITIME CERTIFICATION SERVICES (ICS Class)

## Chapter 6 Fire Protection

**Table 2.4.2-1 Fire integrity of bulkheads separating adjacent spaces**

Spaces	Category	1)	2)	3)	4)	5)	6)	7)	8)	9)	10)
Control stations	1)	A-0 <sup>1</sup>	A-0	A-60	A-0	A-15	A-60	A-15	A-60	A-60	*
Corridors and lobbies	2)		C	B-0	A-0 B-0 <sup>2</sup>	B-0	A-60	A-0	A-60	A-0	*
Accommodation spaces	3)			C	A-0 B-0 <sup>2</sup>	B-0	A-60	A-0	A-60	A-0	*
Stairways and lifts	4)				A-0 B-0 <sup>2</sup>	A-0 B-0 <sup>2</sup>	A-60	A-0	A-60	A-0	*
Service spaces (low fire risk)	5)					C	A-60	A-0	A-60	A-0	*
Machinery spaces of category "A"	6)						*	A-0	A-0 <sup>3</sup>	A-60	*
Other machinery spaces	7)							A-0 <sup>4</sup>	A-0	A-0	*
Cargo pump rooms	8)								*	A-60	*
Service spaces (high fire risk)	9)									A-0 <sup>4</sup>	*
Open decks	10)										-

**Table 2.4.2-2 Fire integrity of decks separating adjacent spaces**

Spaces below	Category	Space above									
		1)	2)	3)	4)	5)	6)	7)	8)	9)	10)
Control stations	1)	A-0	A-0	A-0	A-0	A-0	A-60	A-0	-	A-0	*
Corridors and lobbies	2)	A-0	*	*	A-0	*	A-60	A-0	-	A-0	*
Accommodation spaces	3)	A-60	A-0	*	A-0	*	A-60	A-0	-	A-0	*
Stairways and lifts	4)	A-0	A-0	A-0	*	A-0	A-60	A-0	-	A-0	*
Service spaces (low fire risk)	5)	A-15	A-0	A-0	A-0	*	A-60	A-0	-	A-0	*
Machinery spaces of category "A"	6)	A-60	A-60	A-60	A-60	A-60	*	A-60 <sup>5</sup>	A-0	A-60	*
Other machinery spaces	7)	A-15	A-0	A-0	A-0	A-0	A-0	*	A-0	A-0	*
Cargo pump rooms	8)	-	-	-	-	-	A-0 <sup>3</sup>	A-0	*	-	*
Service spaces (high fire risk)	9)	A-60	A-0	A-0	A-0	A-0	A-60	A-0	-	A-0 <sup>4</sup>	*
Open decks	10)	*	*	*	*	*	*	*	*	*	*

NOTES to tables 2.4.2-1 and 2.4.2-2

- .1 Bulkheads separating the wheelhouse, chartroom and radio room from each other may be "B-O" rating.
  - .2 For determining the class of bulkhead see rules 2.1.4.3 and 2.1.5.1.
  - .3 Where bulkheads and decks are penetrated by cargo pump shafts, electric cables, etc. the provisions of 2.4.9 shall be met.
  - .4 Where spaces are used for the same purpose, divisions between them need not be fitted.
  - .5 Where other machinery spaces of category (7) are the spaces of little fire risk, i. e. they do not contain machinery operating on fuel oil or having a pressure lubrication system, "A-O" class divisions are permitted.
- \* Where an asterisk appears in the tables the division is required to be of steel or other equivalent material but is not required to be of "A" class standard.

**Table 2.8.2 Classes of dangerous goods**

# INTERMARITIME CERTIFICATION SERVICES (ICS Class)

## Chapter 6 Fire Protection

N°	Requirements	Class of goods							
		1	2	3	4	5.1	5.2 *	6.1	8
1	To be non-adjacent with accommodation spaces (see 2.8.3)	+ <sup>1</sup>	+	+	+ <sup>2,3</sup>	-	-	+	+ <sup>2,3</sup>
2	"A-60" class divisions (see 2.8.4)	+ <sup>1</sup>	+	+	+	+ <sup>12</sup>	-	+ <sup>12</sup>	+ <sup>12</sup>
3	Automatic fire alarm and fire detection system (see 4.2.1)	+	+	+	+	+	-	+	+
4	Vapor concentration monitoring (see 2.8.5; 2.8.6; 2.8.7 and item 17 of table 5.1.2)	-	+ <sup>2,3</sup>	+	+ <sup>2,3</sup>	+ <sup>4</sup>	-	+ <sup>2,3</sup>	+ <sup>2,3</sup>
5	Temperature monitoring (see 2.8.8)	-	-	-	+ <sup>4</sup>	-	+	-	-
6	Fire extinguishing agents (see 3.1.2.1)	+	+	+	+	+	-	+	+
7	Water fire extinguishing								
7.1	Immediate water supply (see 2.8.9.1)	+	+	+	+ <sup>12</sup>	+	+	+	+
7.2	Four jets (see 2.8.9.2) <sup>6</sup>	+	+	+	+ <sup>12</sup>	+	+	-	-
7.3	Cooling (see 2.8.9.3)	+ <sup>1</sup>	-	-	-	-	-	-	-
8	Water spraying (see 2.8.10) <sup>7</sup>	+	+	+ <sup>8</sup>	+ <sup>4</sup>	+	-	+ <sup>8</sup>	+ <sup>6</sup>
9	Bilge system arrangement (Ch 8, rule 2.11.6)	-	-	+ <sup>8</sup>	-	-	-	+ <sup>9</sup>	+ <sup>8</sup>
10	Additional fire extinguishers (see 2.8.11) <sup>10</sup>	-	+	+	+	+	+	+	+
11	Additional means for personnel protection (see 2.8.12)	-	+	+	+	+	+	+ <sup>12</sup>	+ <sup>12</sup>
12	Tightness of doors (see 2.8.13) <sup>8</sup>	+ <sup>1</sup>	+ <sup>2,3</sup>	+	+ <sup>2,3</sup>	+ <sup>4</sup>	-	+ <sup>2,3</sup>	+ <sup>2,3</sup>
13	Hatch covers (Ch 3, rule 7.10.8.4)	+	+ <sup>2</sup>	+ <sup>8</sup>	+ <sup>4</sup>	+ <sup>4</sup>	-	+ <sup>8</sup>	+ <sup>8</sup>
14	Spark arresters (Ch 8, rule 6.1.3)	+ <sup>1</sup>	+ <sup>2</sup>	+ <sup>8</sup>	+ <sup>4</sup>	-	+	+ <sup>8</sup>	+ <sup>8</sup>
15	Ventilation (Ch 8, rule 7.1.7, 7.1.8, 7.7.1, 7.7.3 and 7.7.5) <sup>11</sup>	-	+ <sup>2,3</sup>	+ <sup>8</sup>	+ <sup>12</sup>	+ <sup>12</sup>	-	+ <sup>8,12</sup>	+ <sup>8,12</sup>
16	Construction of ventilating fans, and flame arresters' devices (Ch 8, rule 7.7.4)	-	+ <sup>2</sup>	+ <sup>8</sup>	+ <sup>2</sup>	-	-	+ <sup>8,12</sup>	+ <sup>8,12</sup>
17	Electrical equipment (Ch 11, rule 2.9.10, 2.9.11, 16.8.4.5 and 16.8.6.1)	+ <sup>1</sup>	+ <sup>2</sup>	+ <sup>8</sup>	+ <sup>2</sup>	-	-	+ <sup>8,12</sup>	+ <sup>8,12</sup>

# INTERMARITIME CERTIFICATION SERVICES (ICS Class)

## Chapter 6 Fire Protection

- 2.8.4 Bulkheads and decks separating machinery space of category "A" from cargo spaces are to be of "A-60" class. Explosives are to be stowed at least 3 m horizontally away from such divisions. These bulkheads may be of "A-0" class provided measures are taken that dangerous goods other than explosives are stowed at least 3 m horizontally away from these bulkheads.
- 2.8.5 Provision is to be made for air sampling from cargo spaces.
- 2.8.6 It is recommended that a fixed gas warning system be fitted in cargo spaces to monitor explosive vapor concentration. Detectors are to be provided in the places where vapor are most likely to accumulate. They are to operate when the concentration reaches at least 25 per cent of the lower explosive limit. In this case, the provisions of 2.8.5, and table 5.1.2, item 17 need not be met.
- 2.8.7 Where a fire detection and fire alarm system or a gas warning system utilizes samples of atmosphere drawn from cargo spaces, provision is to be made to prevent, in the event of cargo leakage, the discharge of contaminated atmosphere through the sampling system into the space in which the detection apparatus is situated. A notice stating that the samples are to be discharged to the open air are to be permanently exhibited.
- 2.8.8 It is recommended that means should be provided for remote indicating the temperature in the cargo spaces.
- 2.8.9 Water fire extinguishing system is to comply with the following additional requirements:
- .1 Immediate availability of water supply at required pressure is to be ensured by continuously maintaining the pressure in the mains, or by remote start of fire pumps from locations specified under 3.2.3.9.
- .2 It is to ensure the supply of the quantity of water to four nozzles with applicators provided on board under the pressure as specified in 3.2.1.1 to any part of the cargo spaces.
- .3 Means to effectively cool the cargo space by a pressure water-spraying system with a rate of water supply specified in 3.4.2.1 or by flooding the cargo space with water (see 3.6.4). Hoses capable to ensure the above application rate may be used for this purpose in small cargo spaces. In any event the drainage and pumping arrangements are to be such as to prevent the build-up of free surfaces. If this is not possible, a calculation is to be made proving that the ship with the cargo space (spaces) flooded with water meets the requirements of Ch 5, Sections 2, 3. In lieu of the fulfillment of the provisions of 2.8.9.3 the cargo space may be flooded with high expansion foam in compliance with 3.7.3 using the rate of solution supply and time of continuous operation referred to in table 3.7.1.3 for machinery and other spaces.
- 2.8.10 In ro/ro ships each open cargo space and each closed cargo space not capable of being sealed are to be protected by a fixed pressure water-spraying system (see table 3.1.2, item 7) in lieu of fire extinguishing media specified in table 2.8.2, item 6. In any event the drainage and pumping arrangements are to be such as to prevent the build - up of free surfaces.
- 2.8.11 In addition to portable fire extinguishers specified in 5.1.2, the ships are to be provided with portable fire extinguishers with a total capacity of at least 12 kg of dry powder or equivalent for fire fighting in cargo spaces.
- 2.8.12 The ships are to be provided with the following outfit (in addition to the fireman's outfits required in table 5.1.2, item 10):
- .1 Four sets of approved full protective clothing resistant to chemical attack. The protective clothing is to cover all skin, so that no part of the body is unprotected.
- .2 At least two self-contained breathing apparatus.
- 2.8.13 All exits to cargo spaces from accommodation, machinery and service spaces (including stairway enclosures and lifts) are to be provided with arrangements to prevent dangerous vapors from penetrating into these spaces. If it is impracticable, air overpressure to prevent

# INTERMARITIME CERTIFICATION SERVICES (ICS Class)

## Chapter 6 Fire Protection

	penetration of vapor into these space is to be ensured in adjacent spaces.	.2	Bulkheads and decks separating control stations from adjacent spaces containing a combustible medium.
2.8.14	For open cargo spaces of ro/ro ships the requirements of <i>table 2.8.2, items 3, 9, 15 and 16</i> , may not be met.	.3 .4	Crowns of machinery spaces. Side shell plating in way of machinery spaces from the level 200 mm below the waterline to the crown of the machinery spaces.
2.8.15	The open deck of ro/ro ships is considered to be fitted for the carriage of dangerous goods provided the fulfillment of the requirements of <i>table 2.8.2, items 2, 7.1, 7.2, 10 and 11</i> is ensured.	.5	Bulkheads and decks separating spaces referred to in <i>1.5.3.1.1, 1.5.3.2.2 and 1.5.3.2.3</i> from adjacent spaces containing a combustible medium.
2.8.16	In barge carriers requirements of <i>table 2.8.2, items 2, 5, 7.2, 8, 9, 10 and 11</i> need not be met. In case where the barges are capable of containing flammable vapor or alternatively if they are capable of discharging flammable vapor to a safe space outside the barge carrier compartment by means of ventilation ducts connected to the barges, requirements of <i>table 2.8.2, items 3, 15, 16, 17</i> need not be met for these compartments.	.6 2.9.3	Bulkheads and decks in way of stowage of lifeboats and liferafts. In other ships divisions referred to in <i>2.9.2</i> shall be constructed as "A-15" class divisions with the difference that their core is to be made of glass reinforced plastic and the standard fire test may last 30 min instead of 1 hour.
2.8.17	Depending on the class of solid dangerous goods carried in bulk, ships and cargo spaces intended for the carriage of such goods are to meet the requirements set forth in <i>table 2.8.17</i> .	2.9.4	Insulation of divisions referred to in <i>2.9.2</i> and <i>2.9.3</i> shall be such that the temperature of the glass-reinforced plastic core by the end of a half an hour (see <i>2.9.2</i> ) and 15 min (see <i>2.9.3</i> ) standard fire test, respectively, does not exceed the level at which the glass-reinforced plastic strength is reduced to 50 per cent of the original value.
<b>2.9</b>	<b>Ships of glass-reinforced plastic</b>		
2.9.1	The requirements of the present Subsection apply to the ships whose hull and superstructures have been manufactured of structural glass-reinforced plastic having low flame spread characteristics. The requirements set forth in <i>2.1.1- 2.1.6, 2.1.10</i> (except <i>2.1.10.1</i> ), <i>2.1.13</i> and <i>2.1.14</i> , shall be fulfilled to the extent which is reasonable for the glass-reinforced plastic ships.	2.9.5	Insulating materials, grounds, supports, linings of bulkheads and ceilings shall be made of non-combustible materials. Bulkheads, linings of sides and ceilings may be faced with combustible materials having low flame spread characteristics and being not more than 1,5 mm in thickness.
2.9.2	In passenger ships and special purpose ships the following decks and bulkheads shall be constructed as "A-30" class division with the difference that their core is made of glass-reinforced plastic and the standard fire test may last 30 min instead of 1 hour:	2.9.6	Desks, wardrobes and similar furniture, as also frames of other furniture shall be made of non-combustible materials. Such furniture may- be faced with combustible materials of not more than 1,5 mm in thickness.
.1	Bulkheads and decks separating machinery spaces of category "A" from adjacent spaces.	2.9.7 2.9.8	Bulkheads of corridors in accommodation and service spaces shall be of "B-15" class. The requirements set forth in <i>Ch 8, rules 7.2.4</i> and <i>8.7.5</i> shall also be taken into account.



# INTERMARITIME CERTIFICATION SERVICES (ICS Class)

## Chapter 6 Fire Protection

- 2.10 Ships for the carriage of motor vehicles with fuel in their tanks**
- 2.10.1 The requirements of this Subsection, are additional to those set forth in *Sections 2.1* and *2.3* and apply to cargo spaces in which motor vehicles with fuel (other than diesel oil) in their tanks are carried. The provisions are framed on the understanding that motor vehicles are efficiently secured to preclude their displacement during the voyage, the quantity of fuel in tanks does not exceed the value established by competent bodies and no dangerous cargoes are carried in the same space where motor vehicles are transported. Where motor vehicles are to be carried together with dangerous goods, the provisions of *2.8* are to be met.
- 2.10.2 Entrances to cargo spaces from accommodation machinery and special electrical spaces are to be fitted with permanently closed self-closing doors. The height of door sills shall be not less than 450 mm.
- 2.10.3 There shall be provided notices at the entrances to cargo spaces prohibiting smoking.
- 2.10.4 Cargo spaces shall meet the requirements of *4.2.1, 4.2.2, 4.14* of *table 5.1.2* and *rule 5.1.14.3*, as well as *Ch 8, Subsection 7.6* and *Ch 11, Subsection 19.3*.

**Table 2.8.17 Classes of dangerous solid bulk cargoes**

N°	Requirements	Class of goods						
		4.1	4.2	4.3	5.1	6.1	8	9
1	To be non-adjacent with accommodation spaces. (2.8.3)	-	+ 1, 2	+ 1, 2	-	+	+ 1, 2	-
2	"A-60" class divisions (2.8.4)	+	+	+	+ 3	+ 3	+ 3	+
3	Vapor concentration monitoring (2.8.5, 2.8.6, 2.8.7 and table 5.1.2, item 17)	-	+ 1	+	-	+ 1	+ 1	-
4	Temperature monitoring (2.8.8)	-	+	-	-	-	+	-
5	Fire extinguishing agents (3.1.2.1)	+	+	+	+	+ 3	+ 3	+ 3
6	Water fire extinguishing:							
6.1	Immediate water supply (2.8.9.1)	+	+	-	+	+ 3	+ 3	+
6.2	Four jets (2.8.9.2) 4	+	+	-	+	-	-	+
7	Additional means for personnel protection (2.8.12)	+	+	+	+	+	+	+
8	Hatch covers (Ch 3, rule 7.10.8.4)	+	+	+	-	-	-	-
9	Spark arresters (Ch 8, rule 6.1.3)	+ 1	+	+	-	-	-	-
10	Ventilation (Ch 8, rule 7.1.7, 7.1.8 and 7.7.1)	+ 1, 2	+ 1, 2	+	+ 1, 2	-	-	+ 1, 2
11	Construction of ventilating fans and spark arresters devices (Ch 8, rule 7.7.4)	+	+ 1	+	+ 1	-	-	+ 1
12	Electrical equipment (Ch 11, rule 2.1.3.9, 2.1.3.12, 2.13.4.5 and 2.13.6.1)	+	+ 1	+	+ 1	-	-	+ 1

# INTERMARITIME CERTIFICATION SERVICES (ICS Class)

## Chapter 6 Fire Protection

### NOTES:

- .1 Only for substances giving off readily flammable vapors and gases.
- .2 Only for substances giving off toxic vapors and gases.
- .3 Only for readily flammable substances.
- .4 When the characteristics of the substance call for large quantities of water for firefighting.
- .5 Reference is made to the International Maritime Dangerous Goods Code (Resolution A. 81 (IV) as amended) or the *Code of Safe Practice for Solid Bulk Cargoes (Resolution A. 434 (XI) as amended)* as appropriate.

### 2.11 Oil recovery ships

2.11.1 The requirements of this Subsection are additional to those stated in *Subsection 2.1* and apply to oil recovery ships.

For ships of less than 500 tons gross tonnage *ICS Class* can assume deviations from the provisions of the present Subsection.

The requirements of the present Chapter are fully applicable to ships which will be eligible for class notation **oil recovery ships** and the descriptive note **suitable for operation in waters covered by oil** appended thereto.

For a ship whose class notation contains only **oil recovery ship** the requirements of *rules 2.1.1.7, 2.11.2, 2.11.5, 2.11.8, 2.11.10.1, 2.11.16, 2.11.17, 2.11.18, 2.11.20 and table 3.1.2.1, item 8* are applicable. If cargo tanks of this ship are aft of the superstructure situated not less than 10 m from the fire dangerous zone, its fire protection shall comply with the provisions of *2.1.11.7, 2.3.2.4, 2.4.10, 2.4.2, 2.4.17, 2.11.2, 2.11.6, 2.11.7, 2.11.8, 2.11.16, 2.11.17 and table 3.1.2.1, item 8*.

2.11.2 The hull, superstructures, deckhouses and decks shall be manufactured of steel. The use of aluminum alloys for this purpose is not permitted.

2.11.3 In all ship's spaces the insulating materials shall be of a non-combustible type.

2.11.4 Combustible materials used for the purposes specified in *2.1.1.4*, shall not exceed 30 kg per 1 m<sup>2</sup> floor area of control stations, accommodations and service spaces.

2.11.5 To apply structural fire protection, suitable provisions specified in *2.4.2, 2.4.3, 2.4.4, 2.4.5, 2.4.7, 2.4.8 and 2.4.9* shall be complied with.

2.11.6 The exits from the superstructures and deckhouses to the open deck in the explosion dangerous zone shall be provided with air locks consisting of two gastight steel doors distanced from each other by not less than 1,5 m. The inner door shall be of a self-closing type. The door coamings shall be not less than 300 mm in height.

The spaces insulated from the inhabited compartments and having means of escape from the open deck need not be provided with air locks if they are permanently closed and remain unmanned during oil recovery operations or if they are fitted with the electrical equipment of an explosive-proof type.

The exits from the wheelhouse to the open deck need not be provided with air locks either.

2.11.7 All cargo tanks installed in ships shall be reliably closed.

2.11.8 Fire integrity decks and bulkheads of the enclosed spaces intended for removable equipment used for oil products recovery shall comply with the provisions of *tables 2.4.2-1 and 2.4.2-2* as applicable to the spaces of Category 9.

2.11.9 The spaces intended for electrical and gas welding works shall be safe for operation (see *Ch 7, Subsection 1.2*).

2.11.10 In addition to the provisions of *rule 2.4.7*, the spaces intended for removable equipment which is applicable for oil recovery shall be used as cofferdams.

On agreement with *ICS Class*, for ships of restricted area of navigation the cofferdams need not be provided between the machinery spaces of Category A and cargo tankers on condition that the bulkhead is constructed

# INTERMARITIME CERTIFICATION SERVICES (ICS Class)

## Chapter 6 Fire Protection

	from the solid plate, access for inspection is ensured and hydraulic tests are carried out during each special survey.				
2.11.11	The ship shall be provided with the water drenching system for drenching of superstructure outside walls according to 3.6 with the rate of water discharge 10 l/min/m and with the foam fire extinguishing system of cargo tanks having regard for the requirements of 3.1.3 and 3.7.	.2	.3		shall comply with the following requirements: Be capable of continuous operation (when the ship is docked or when recovering the oil spillage). To consist of the components complying with the provisions of <i>Ch 11</i> . Be provided with sampling arrangements or detectors manufactured of the materials which are resistant to sea water, gas and vapor influence. The diameter and length of piping are determined on condition that samples of atmosphere are supplied to gas analyzer during not more than 60 s.
2.11.12	The water fire main system shall comply with the following additional provisions:			.4	To ensure the consecutive control of atmosphere at all sites of sampling arrangements or detectors by means of automatic switches. These switchings shall be recorded for a period of time sufficient for the sample of atmosphere to pass to the analyzer.
.1	It shall be applicable to the oil tankers in compliance with the provisions of rule 3.2.5.4.				Be provided with audible and visual alarms indicating that concentration of oil gases and vapor is increased by 30 per cent of the lower flammable limit (LFL) with alarms being operated on the navigating bridge, power supply to gas analyzer is failed and samples of atmosphere do not pass through the piping.
.2	To supply water by fire pumps only from the bottom sea valve.				In small multi-purpose ships (with a deadweight not greater than 1000 t), which carry out oil recovery operations on the sea surface the atmosphere monitoring automatic fixed system, in accordance with <i>ICS Class</i> , may be replaced by a monitoring system with portable equipments as is determined in table 5.1.2 and in the <i>Subsection 17.1</i> .
.3	To provide remote control of fire pumps and water drenching system of superstructure outside walls from the navigating bridge.			.5	The atmosphere monitoring shall be performed all the time the ship is situated in an oil spill in the places specified in the <i>rule 2.11.19</i> .
2.11.13	The remote control of supply of an extinguishing medium into machinery spaces shall be provided from the navigating bridge; in this case, fire fighting station need not be provided with direct access to the open deck.				
2.11.14	The control of supply of an extinguishing medium need not be provided with time delay arrangement mentioned in 4.3.3.				
2.11.15	The high expansion foam system shall not be used for protection of machinery spaces.				
2.11.16	If carbon dioxide fire extinguishing system is used in ships of less than 2000 tons gross tonnage the amount of carbon dioxide for machinery spaces shall be calculated according to 3.8.1.1 where factor $\phi$ shall be equal to 0,35 and 0,4.			2.11.19	Sampling arrangements or detectors of the atmosphere monitoring system shall be located as follows:
2.11.17	The enclosed spaces for removable equipment used for oil products recovery shall be protected by means of fire extinguishing system according to <i>table 3.1.2.1, item 6</i> .	.1	.2	.3	Near the forced ventilation openings. At least at two locations at a height not more than 1 m above the open deck. In machinery space of Category A. In air locks.
2.11.18	Provision shall be made for a fixed automatic system to monitor the gas and vapor concentration in the atmosphere which	.4	.5		In cofferdams of cargo tanks.

# INTERMARITIME CERTIFICATION SERVICES (*ICS Class*)

## Chapter 6 Fire Protection

2.11.20 Fire fighting outfit, spares and tools (*tables 5.1.2 and 5.2.1*) shall be prescribed in the quantities provided for oil tankers; in this case, only a self-contained breathing apparatus may be included in the fireman's outfit.

2.11.21 For protection of working area of the deck two dry powder fire extinguishers shall be installed with the mass of dry powder being 45 kg each.

2.11.22 Fixed or portable instruments for determining the ignition temperature of oil products shall be provided in the ship.

2.11.23 The requirements of *Ch 8, Subsection 4.3, rule 6.1.9 and Subsection 7.13* as well as *Subsection 19.2 of Ch 11*, shall be taken into account.

Steel pipes shall have anti-corrosive coating both inside and outside.

Fire hydrants, sprinklers, sprayers and other equipment and fittings of fire extinguishing systems, ensuring efficient and trouble-free operation of these systems shall be made of materials resistant to marine environment.

### SECTION 3

#### Fire-fighting equipment and systems

##### 3.1.5 Remote starting of systems

3.1.5.1 A system shall be put into operation without any supplementary change-over at the station and shall operate quickly and efficiently under all service conditions, including those when the temperature is below zero and during a fire.

3.1.5.2 The possibility of spontaneous starting of a fire extinguishing system shall be excluded under any service conditions, including the effect of such factors as pitching and rolling, shaking and vibration.

3.1.5.3 Where necessary, the starting appliances shall be protected against mechanical damage.

3.1.5.4 Arrangements shall be provided for attachment of seals to the system starting control handles.

3.1.5.5 Irrespective of the provision of remote starting control, the system shall be capable of being started directly at the fire extinction station, and the pump from the place of its installation.

3.1.5.6 Remote control system (by air, nitrogen, carbon dioxide, etc.) shall be provided with two cylinders, each

being sufficient for one full operation of a fire extinguishing system.

3.1.5.7 The valves of the remote starting system shall be controlled with the help of hand wheel or levers to be positively connected to the valve stems or spindles.

##### 3.2 Water fire main system

###### 3.2.1 Number and capacity of fire pumps

3.2.1.1 In ships other than those referred to in *3.2.1.6* provision is to be made for pumps, fire mains, hydrants and hoses complying as applicable with the requirements of this *Subsection*.

The number of fixed fire pumps and the minimum pressure at any hydrant when discharging water through hydrant at the rate of discharge determined by *formula (3.2.1.5)*, shall be not less than those specified in *table 3.2.1.1*, the length of hoses complying with the requirements of *5.1.4* and the nozzle outlet diameters complying with *5.1.5*.

# INTERMARITIME CERTIFICATION SERVICES (ICS Class)

## Chapter 6 Fire Protection

**Table 3.2.1.1 Number of fixed fire pumps and minimum pressure at hydrants**

Gross tonnage of a ship, tons	Passenger ships	All other ships		
	Number of pumps	Minimum pressure at hydrants, MPa	Number of pumps (except an emergency pump, if any)	Minimum pressure at hydrants, MPa
< de 300	1	0,20	1	0,20
≥ 300 < 1000	2	0,28	2	0,26
≥ 1000 < 4000	2	0,28	2	0,26
≥ 4000	3	0,32	2	0,28

On floating cranes of less than 2000 tons gross tonnage, as well as on ships of restricted area of navigation II and III with gross tonnage between 300 and 1000 tons, not engaged on international voyages, only one fire pump may be installed.

The pressure developed by the fire pumps shall be sufficient to ensure the operation of other fire extinguishing systems using water (e. g., for pressure water spraying, froth extinguishing, etc.) and supplied from the same fire pumps.

3.2.1.2 Additionally, a fixed emergency fire pump complying with the requirements set out in 3.2.4 shall be fitted in passenger ships of less than 1000 tons gross tonnage and in all other self-propelled ships of 1000 tons gross tonnage and over.

3.2.1.3 In passenger ships of less than 300 tons gross tonnage and in all other self-propelled ships with a gross tonnage between 300 and 1000 tons, portable motor pumps complying with the requirements of 5.1.18 may be accepted as emergency pumps.

3.2.1.4 An emergency fire pump need not be fitted, if the fire pumps and the associated sources of power are located in different compartments having not more than one adjacent steel deck or bulkhead so that in the event of fire in one compartment the pumps located in another compartment (other compartments) will ensure the supply of water to the fire main.

3.2.1.5 The total capacity of fixed fire pumps, except for an emergency pump, if any, with the pressure at any hydrant not less than that specified in table 3.2.1.1, shall ensure discharge of water through hose nozzles in a quantity, in m<sup>3</sup>/h, not less than:

$$Q = k \cdot m^2 \quad (3.2.1.5)$$

where:

$$m = 1,68 \cdot \sqrt{L \cdot (B + D)} + 25$$

$L$  = length of the ship (see Ch 2, Subsection 1.2) in m, excluding the length of the spoil hopper, if no tanks and other storages for combustible materials are installed therein, in hopper dredgers and hopper barges;

$B$  = moulded breadth, m;

$D$  = depth to the bulkhead deck amidships, m;

$k$  = coefficient equal to:  
 0,016 for passenger ships having subdivision index  $R$  equal to, or more than, 0,5;  
 0,012 for passenger ships having subdivision index  $R$  less than 0,5;  
 0,008 for all other ships;

$R$  = subdivision index determined in accordance with Ch 5, Subsection 2.3.

# INTERMARITIME CERTIFICATION SERVICES (ICS Class)

## Chapter 6 Fire Protection

- 3.2.1.6 The fixed water fire main system need not be installed in ships with the crew of less than 3 members.
- 3.2.1.7 In all ships other than passenger ships the total capacity of fire pumps need not exceed 180 m<sup>3</sup>/h, unless a larger capacity is required in order to ensure the simultaneous operation of other systems using water.
- 3.2.1.8 The capacity, pressure head and number of fire pumps for floating docks shall be chosen in accordance with the quantity of water required by the largest cargo ship which the dock can carry, for the operation of the water fire main system.  
On non-self-contained floating docks receiving water for the water fire main system from the shore the emergency fire pump need not be installed.
- 3.2.1.9 When determining the total capacity of fire pumps, the capacity of fixed pumps fitted in the forward part of oil tankers, as well as the capacity of an emergency pump, shall not be taken into account.
- 3.2.1.10 Each fixed fire pump shall be capable of supplying at least two jets of water, with the largest nozzle size adopted in the given ship.
- 3.2.1.11 The capacity of each fixed pump, other than an emergency pump, shall not be less than 80 per cent of the total required capacity divided by the required number of fire pumps, but in any case, not less than 25 m<sup>3</sup>/h.
- 3.2.1.12 Capacity of these pumps shall be sufficient for the operation of the water fire main system having the capacity not less than 50 per cent determined by *formula (3.9.1.5)* and for parallel operation of one of the other systems requiring the largest quantity of water. In the case concerned the quantity of water for the water fire main shall be sufficient for delivering at least two jets of water through largest nozzles used in the ships, but more than six jets and more than 90 m<sup>3</sup>/h for cargo ships are not required. Possible increase of water discharge through each hydrant due to the pressure rise in the pipes required for the operation of the other fire extinguishing systems and also the requirements stated in 3.2.1.9 are to be taken into consideration.  
The quantity of water for fire-fighting systems, other than for the water fire main system, shall be determined in accordance with the requirements in 3.3.2.2, 3.4.2, 3.5.2 (within one main vertical zone), 3.6.5 and 3.7.  
In tugs fitted with special fire pumps for assisting other ships, provided their capacity is not less than that required for the needs of the ship, the fire pumps for tug's own needs may not be installed.
- 3.2.2 Location of fire pumps**
- 3.2.2.1 In passenger ships of 1000 tons gross tonnage and upwards, sea valves, fire pumps and associated sources of power shall be so located as to ensure that a fire in any watertight compartment will not render all pumps simultaneously inoperative.
- 3.2.2.2 In passenger ships of less than 300 tons gross tonnage, where, in compliance with *table 3.2.1.1* only one fire pump is required; this pump may be installed in the machinery space of category "A" and in this case, fire extinguishing systems prescribed by *table 3.1.2.1* for the machinery space of category "A" shall not depend on the operation of the fire pump.
- 3.2.2.3 In catamarans and similar ships, for which not less than two pumps are required in compliance with *table 3.2.1.1*, it is recommended that one pump be fitted in each hull.
- 3.2.3 Basic requirements for fire pumps**
- 3.2.3.1 In all self-propelled ships, fixed fire pumps shall be driven from an independent source of power, the use of belt drive to the pump being not permitted.  
In passenger ships with gross tonnage from 300 to 1000 tons one of the pumps shall be provided with means for to be independently driven.

# INTERMARITIME CERTIFICATION SERVICES (*ICS Class*)

## Chapter 6 Fire Protection

In cargo ships of less than 300 tons gross tonnage with the main propulsion machinery of power output less than 220 kW and in passenger ships of less than 150 tons gross tonnage with the main propulsion machinery of power output less than 220 kW, as well as in dynamically supported craft the pumps driven from the main engine may be used as independent fire pumps, provided that the propulsion unit (engine - shaft - propeller) is so designed as to permit of fire pump operation when the ship is not under way.

On agreement with *ICS Class*, a V-belt drive from the main engine to the pump may be permitted in above ships, provided that transmission of torque is ensured even when one of the belts is broken.

3.2.3.2 Fixed fire pumps including an emergency pump may be used for other shipboard services, if the ship is provided with at least two independently driven pumps, one of which is at all times kept readily available for its direct purpose.

Where in conformity with *table 3.2.1.1* only one fire pump is fitted, it may be used for other purposes requiring short-time consumption of water (flushing out of decks, hawse pipes, etc.).

No restrictions are placed on floating cranes. In ships of under 300 tons gross tonnage a fire pump may be used for emergency drainage of machinery spaces.

3.2.3.3 Sanitary, ballast, bilge and other sea water pumps may be used as fixed fire pumps, provided that they comply with the design requirements for capacity and pressure head and also meet the requirements of 3.2.3.2 and 3.2.3.4.

In cargo ships where the above pumps are fitted in a machinery space arrangement are to be made that at least one of these pumps is capable of providing water to the fire main.

3.2.3.4 Pumps and piping intended for firefighting purposes shall not be used for the pumping of oil and other flammable liquids, nor as ballast pumps for tanks used for alternate carriage of oil fuel and water ballast.

3.2.3.5 Fire pumps shall be fitted with a pressure gauge on the discharge side. Pumps capable

of developing in the fire main a pressure exceeding the permissible value shall be provided with relief valves set to operate at a pressure not more than 10 per cent in excess of the fire main working pressure and having the pipes to discharge water into the suction main.

3.2.3.6 Fixed fire pumps and their sea valves shall be located below the light-draught waterline of the ship.

A fixed emergency pump shall be installed in compliance with 3.2.4. Fire pumps installed outside machinery spaces of category "A" shall have an independent sea valve in each compartment in which they are located.

3.2.3.7 All pumps, including the emergency pump, shall be placed in spaces with positive temperature.

3.2.3.8 In passenger ships of 1000 tons gross tonnage and upwards and in all passenger ships with periodically unattended machinery spaces containing fire pumps the water fire main system is to be permanently kept under pressure to provide for immediate operation of one of the hydrants located inside the spaces and is to be equipped with a pump automatically starting in case of pressure drop.

3.2.3.9 In cargo ships with a periodically unattended machinery space containing fire pumps or when only one person is required on watch provision is to be made for remote starting of one of the fire pumps from the navigating bridge and from the position where a permanent watch is provided when in port and for immediate water supply in the fire main without additional opening of the valves in the pump room.

At the location of such arrangement a water pressure indicator shall be installed.

Where water fire main system is under pressure as required in 3.2.3.8, remote starting need not be provided.

### 3.2.4 Fixed emergency fire pump

3.2.4.1 The emergency pump shall be driven by a compression ignition engine (diesel engine

# INTERMARITIME CERTIFICATION SERVICES (ICS Class)

## Chapter 6 Fire Protection

type), gas turbine or an electric motor supplied with power from the emergency source of power.

3.2.4.2 The pump, its sources of power and sea valves shall be so located as not to be rendered inoperative by a fire within the spaces where the main fire pumps are located. If it is impossible to install sea valve outside the machinery spaces, the power drive shall be provided to operate it from the location or starting position of the pump.

3.2.4.3 Where the pump is located above the lowest possible waterline, efficient arrangements shall be made for self-priming. The total suction head shall be such that under all conditions of list and trim likely to be encountered in service the provisions of *rule 3.2.4.7* are met. Suction pipe is to be so constructed as to ensure a minimum of losses.

3.2.4.4 The space where the pump is arranged shall be of steel and located at a safe distance from the space containing the main fire pumps. Where this not possible, being those spaces adjacent, then the bulkheads and decks which separate them are to be "A-60" class.

The boundaries of the space containing the emergency fire pump are to be insulated to a standard of structural fire protection equivalent to the required for control stations according to tables of minimum fire integrity of bulkheads and decks.

No direct access is to be permitted between the machinery space containing main fire pumps and the space containing the emergency fire pump and its source of power. When this is impracticable, access is permitted by means of an air lock, each of the two doors being self-closing, or through a watertight door capable of being operated from a space remote from the machinery space containing main fire pump and the space containing the emergency fire pump and unlikely to be cut off in the event of fire in those spaces. These doors are not to have arrangements for holding them in the open position. In such cases, a second means of access to the space containing the

emergency fire pump and its source of power is to be provided.

3.2.4.5 It is recommended that in oil tankers the pump and its sea valve should be operated from the place where they are located and from the open deck. Pumps and sea valves controls are to be near each other.

3.2.4.6 Where a diesel engine or gas turbine is used to drive the pump, a service fuel tank containing sufficient fuel to enable the pump to run for at least three hours is to be provided in the emergency fire pump room. Sufficient reserves of fuel are to be available outside the machinery space containing main fire pumps to enable the pump to run for additional 15 hours.

The pump engine is to be started manually or from such starting device as to enable the engine to be started at least 6 times within a period of 30 min, and at least twice within the first 10 min. Where the power output of the engine exceeds 15 kW, an independent starting device is to be provided.

3.2.4.7 The capacity of the emergency fire pump shall be sufficient for the simultaneous operation of at least two fire hose nozzles of the largest size adopted in the ship, at a pressure in compliance with the provisions of *table 3.2.1.1*, and is to be not less than 40 per cent of the total capacity of the fire pumps and in any case not less than 25 m<sup>3</sup>/h.

3.2.4.8 Where the emergency pump is also intended to serve other water or froth fire extinguishing systems, its capacity shall be adequately increased to provide the simultaneous operation of any other systems requiring the greatest supply of water.

### 3.2.5 Piping

3.2.5.1 The diameters of the fire main and water service pipes are to be sufficient for the effective distribution of the maximum required discharge from two fire pumps operating simultaneously. In cargo ships the diameter need only be sufficient for the discharge of 140 m<sup>3</sup>/h.

In ships of 500 tons gross tonnage and upwards and floating cranes (see 3.2.5.6) the



# INTERMARITIME CERTIFICATION SERVICES (ICS Class)

## Chapter 6 Fire Protection

pipes of the water fire main shall be rated at a working pressure of at least 1 MPa.

3.2.5.2 The pipe portions of the water fire main system located in non-heated spaces and on open decks shall be provided with shut-off fittings so that they can be isolated from the pipes located in heated spaces.

3.2.5.3 Each fire pump shall be fitted with shutoff valves on the suction and discharge pipes. The use of slide valves on the suction pipe is permitted.  
In ships of 500 tons gross tonnage and upwards the valves on the discharge side of the pumps are to be of a non-return shut-off type.

3.2.5.4 In oil tankers, the water fire main shall comply with the following supplementary requirements:

.1 On the main pipe where it is led out of the poop and in easily accessible places on the cargo oil tank deck, cut-off valves shall be fitted approximately in each 30 m of the open deck length. Each of such valves shall be provided with an information plate to indicate that the valve must be kept permanently open under normal service conditions.

.2 Before each cut-off valve on the main there shall be fitted twin fire hydrants of 70 mm diameter so located that they are equally spaced, over the length of the ship and the fulfillment of the provisions of 3.2.6.2 is ensured.

.3 Before the cut-off valve fitted in the poop there shall be a branch pipe on either side, led out from the water fire main to the forward part of the poop deck; the diameter of each branch pipe is to be sufficient for supplying water through two fire hoses connected to two hydrants fitted at the end of each branch; in ships of 1000 tons gross tonnage and upwards the diameter of each hydrant shall be about 70 mm, and in ships of less gross tonnage this diameter is to be about 50 mm.  
Where fire pumps are fitted forward of the cargo tanks, two more similar pipes branching from the main of the same diameter as above shall be provided on the after part of the forecastle deck, a cutoff

valve being fitted on the main within the erection, after the branches.

3.2.5.5 Where vehicles carried in railway ferries are arranged in four or more rows, the water fire piping shall be so fitted that hydrants of 70 mm diameter may be provided both on the sides of the ship and between the rows.  
In catamarans and similar ships, in each hull shall be fitted a water fire main with hydrants, hoses and nozzles.

3.2.5.6 On all ships of 500 tons gross tonnage and upwards, and on floating cranes facilities shall be available on the open deck enabling an international shore connection to be used on either side of the ship (see 5.1.19).

3.2.5.7 Where two or more fire pumps are installed in passenger ships, the water fire main system shall be arranged in way of superstructures as a ring one and it shall be laid not below the bulkhead deck.

3.2.5.8 Isolating valves to separate the section of the fire main within the machinery space containing the fire pump or pumps from the rest of the fire main is to be fitted in an easily accessible position outside the machinery space.

The fire main is to be so arranged that when the isolating valves are shut all the hydrants on the ship, except those referred to above, can be supplied with water by a fire pump not located in this machinery space through pipes which do not enter this space.

Short lengths of the emergency fire pump suction and discharge piping may be permitted to penetrate the machinery space if it is impracticable to route it externally provided that the integrity of the fire main is maintained by the closure of the piping in a substantial steel casing.

### 3.2.6 Fire hydrants

3.2.6.1 Each fire hydrant shall have a shut-off valve and a standard quick-acting coupling. Hydrants fitted on open decks shall also have quick-acting plugs.

3.2.6.2 Fire hydrants shall be so placed that fire hoses might be easily and quickly coupled to

# INTERMARITIME CERTIFICATION SERVICES (*ICS Class*)

## Chapter 6 Fire Protection

them, and the number of hydrants shall be sufficient to provide the delivery of two jets of water to any part of each space, deck or empty hold. In this case, one of the jets shall be from a single length of hose as specified in 5.1.4.1, and the other jet may be from two interconnected hoses of the same length.

Hydrants are to be positioned near the accesses to the protected spaces.

On open decks for containers two jets of water shall be delivered onto each accessible vertical side of the container by standard length hoses.

Where spaces in ships are separated by watertight or main fire bulkheads, the above requirements shall be complied with, even if the doors in the bulkheads are closed.

In a ship having a helicopter deck and hangar, the number and location of hydrants shall be such as to provide three jets of water for any part of the hangar.

- 3.2.6.3 Within interior spaces fire hydrants shall be spaced not more than 20 m apart, while fire hydrants on open decks shall be spaced not more than 40 m apart.
- 3.2.6.4 Fire hydrants are not to be placed at the ends of dead-end corridors, in special electrical spaces or closed or rarely attended spaces.
- 3.2.6.5 In ships carrying deck cargo, fire hydrants shall be protected against damage from such cargo.
- 3.2.6.6 A fire hydrant shall be fitted on the discharge pipe, directly between each fire pump and shut-off valve.
- 3.2.6.7 In a machinery space of category "A" there shall be at least two fire hydrants located on both sides of the ship. In the case of ships of less than 500 tons gross tonnage, the hydrant fitted in immediate proximity to the fire pump may be used as one of the above hydrants.  
In the machinery spaces of category "A" of ships of less than 150 tons gross tonnage, when there is a hydrant fitted in immediate proximity to the fire pumps, other hydrants may be omitted.

3.2.6.8 In all ships there shall be fitted a fire hydrant located in the forward part of the propeller shaft tunnels.

3.2.6.9 All fire hydrants shall be painted red.

3.2.6.10 In passenger ships two fire hydrants shall be provided in the shaft tunnel, being one of the means of escape, in the proximity to the machinery space of category "A".  
Where some other space is used as a means of escape, two fire hydrants shall be provided therein at the entrance to the machinery space of category "A". Provision of 3.2.6.8 need not be met in this case.

### 3.2.7 Fire hoses

3.2.7.1 The water fire main system shall be capable to operate in compliance with the prescribed provisions, provided that the length and other characteristics of the fire hoses meet the provisions set out in 5.1.4.

### 3.2.8 Fire hose nozzles

3.2.8.1 The water fire main system shall be capable to operate in compliance with the provisions prescribed above provided that the standard sizes of fire hose nozzles meet the provisions set out in 5.1.5.

## 3.3 Sprinkler system

### 3.3.1 General provisions

3.3.1.1 The sprinkler system is to be of the wet pipe type but small exposed sections may be of the dry pipe type where in the opinion of *ICS Class* this is a necessary precaution. Any parts of the system which may be subjected to freezing temperature in service are to be suitably protected against freezing.

3.3.1.2 A sprinkler system shall be automatically set in operation at temperatures in the protected space rising to the values indicated in 3.3.4.2.

3.3.1.3 The water supply arrangements of every sprinkler system shall be fitted with a pressure tank, control valves, both automatically starting pump and air

# INTERMARITIME CERTIFICATION SERVICES (*ICS Class*)

## Chapter 6 Fire Protection

- compressor with an air cylinder in order to maintain the working pressure in the system and ensure instantaneous delivery of water to the opened sprinklers.
- 3.3.1.4 The air cylinder, compressor, pump and the pipes of the sprinkler system, except for the piping connecting the sprinkler system to the water fire main system, shall be independent of all other systems.
- 3.3.1.5 A sprinkler pump and a pressure tank shall be arranged outside the protected space, at an adequate distance from the machinery spaces of category "A". The main fire control station shall be provided with a pressure gauge.
- 3.3.1.6 In each individual case sprinkler systems whose rated parameters differ from those given in this Subsection are subject to special consideration by *ICS Class*.
- 3.3.2 Sprinkler pumps**
- 3.3.2.1 An automatic independent sprinkler pump shall be automatically brought into action by the pressure drop in the system and be capable of supplying water to the system before the standing fresh water charge in the pressure tank is completely exhausted. Means are to be provided for testing the automatic operation of the pump on reduction of pressure in the system.
- 3.3.2.2 The pump and piping system shall be capable of maintaining the necessary pressure at the level of the highest sprinkler to ensure a continuous flow rate of water sufficient for the simultaneous coverage of the minimum floor area of 280 m<sup>2</sup> at the application rate specified in 3.3.4.1.
- 3.3.2.3 The pump shall be fitted on the delivery side with a test valve with a short open-ended discharge pipe. The effective area through the valve and pipe shall be adequate to permit the release of the required pump output while maintaining the pressure in the system specified in 3.3.2.2.
- 3.3.2.4 The pump is to have a sea inlet which is wherever possible to be in the space containing the pump.
- 3.3.2.5 Provision is to be made for connection of the main supply piping with the ship's fire main. A lockable non-return stop valve shall be fitted at the connection concerned.
- 3.3.3 Pressure tank**
- 3.3.3.1 The pressure tank shall be fitted with:
- .1 An automatic pressure maintaining device.
  - .2 A water level control device and alarms warning of a drop of water level and pressure in the tank below the normal values and led to the permanent watch position in the machinery space of category "A".
  - .3 A relief valve.
  - .4 A pressure gauge.
- 3.3.3.2 The pressure tank shall contain a standing charge of fresh water equivalent to the volume of water which would be discharged in one minute by the sprinkler pump.
- The volume of the pressure tank shall be equal to at least twice that of the charge of water specified above. Arrangements shall be made for maintaining such air pressure in the tank as to ensure that where the standing charge of fresh water in the tank has been used the pressure in that tank is not less than a working pressure at the sprinkler plus a hydrostatic pressure from the tank bottom to the highest sprinkler. Suitable means of replenishing the air under pressure and of replenishing the fresh water charge in the tank are to be provided. Means are to be also provided to prevent the passage of sea water into the tank.
- 3.3.3.3 Pneumatic pressure tanks shall comply with the provisions for pressure vessels set out in *Ch 10*.
- 3.3.4 Sprinklers**
- 3.3.4.1 Sprinklers shall be placed in an overhead position and spaced in a suitable pattern to maintain an average application rate of not less than 5 l/min per 1 m<sup>2</sup> over the area of the protected space.

# INTERMARITIME CERTIFICATION SERVICES (ICS Class)

## Chapter 6 Fire Protection

*ICS Class* may permit the use of other application rate depending on structural features of the protected space.

- 3.3.4.2 In accommodation and service spaces the sprinklers are to come into operation within the temperature range from 68 °C to 79 °C, except that in locations such as drying rooms and galleys where high ambient temperatures might be expected, the operation temperature may be increased by not more than 30 °C above the maximum deck head temperature.

### 3.3.5 Control valves

- 3.3.5.1 Control valves shall be fitted on the supply pipe of each section of the sprinkler system and shall ensure:

- .1 Delivery of water from the sources of water supply when any of the sprinklers fitted in the section comes into operation.
- .2 Giving of visual and audible alarm signal whenever any sprinkler comes into operation.

The signal shall be simultaneously produced both directly at the control valve, at the main fire control station and in the machinery space of category "A" It shall indicate the section containing the sprinkler which has opened.

The alarm system is to be such as to indicate if any fault occurs in the system.

- .3 The possibility of checking the operation of the system through a special test valve with the cross-section equal to that of the sprinkler. The test valve for each section is to be situated near the stop valve for that section.

- 3.3.5.2 The control valves shall be fitted in special metallic enclosures or lockers outside the protected space.

Positions where control valves are fitted shall be easily accessible, illuminated and closed by a glazed door enabling the condition of all parts of the control valves and pressure gauge readings in particular to be watched.

A list or a plan shall be displayed at each control valve showing the spaces covered and location of the zone in respect of each section.

Suitable instructions for testing and maintenance are to be available.

- 3.3.5.3 One of the control valves is to have a switch to enable the operation of alarms and indicators of each section of sprinklers to be tested.

### 3.3.6 Pipes

- 3.3.6.1 Sprinkler system shall be subdivided into separate sections. Each section is permitted to contain no more than 200 sprinklers; a single section shall not be fitted in different main vertical zones. One section shall serve not more than two decks.

- 3.3.6.2 Provision shall be made in each section for purging the pipes with compressed air and flushing them with fresh water.

- 3.3.6.3 Each section of sprinklers shall be capable of being isolated by one stop valve only after which a gauge indicating the pressure in the system shall be provided.  
The stop valve shall be fitted before the control valve and located together with it in metallic enclosures specified in 3.3.5.2.

- 3.3.6.4 The suction pipes of the pumps feeding a sprinkler system shall be fitted with filters to prevent the clogging of the system and sprinklers.

- 3.3.6.5 The diameters of the pipes of a sprinkler system shall be such as to ensure the operation of sprinklers at the water pressure and the rate of discharge specified in 3.3.4.1.

- 3.3.6.6 The pipe lines of the sprinkler system shall be fitted with non-return stop valves preventing sea water from penetrating into the pressure tank and the leakage of water from the tanks and the system.

### 3.4 Pressure water - spraying system

- 3.4.1 In passenger ships, as well as in machinery spaces of category "A" of other ships; pressure water-spraying system shall be supplied from an independent pump which shall be automatically put into action by a pressure drop in the system and from the water fire main. A non-return stop valve

# INTERMARITIME CERTIFICATION SERVICES (*ICS Class*)

## Chapter 6 Fire Protection

- shall be fitted on the connection line with the water fire main.
- In other protected spaces the system may be supplied only from the water fire main.
- Where high-pressure water-spraying system is used, the necessity for the reserve supply for such system will be determined in each case on agreement with *ICS Class*.
- 3.4.2 The capacity of, and the pressure head developed by, the automatically starting pump shall be determined on the basis of characteristics and number of spray nozzles fitted in the largest protected space and the rate of discharge which shall be not less than:
- .1 5 l/min per 1 m<sup>2</sup> of the area over which oil fuel is likely to spread or cargo space area.
- .2 1,5 l/min per 1 m<sup>2</sup> of the largest horizontal cross-sectional area of the fish meal hold.
- In cargo, working, special and other similar spaces, where the system may be divided into sections, the above pump shall be capable of supplying two sections of the total length of at least 40 m.
- 3.4.3 In passenger ships, as well as in machinery spaces of category "A" of other ships, the pressure water-spraying system shall be kept charged under the required pressure up to the stop valves on the distribution pipes.
- 3.4.4 Filters preventing the system and spray nozzles from becoming clogged shall be fitted on the suction pipe of the pump supplying the system and on the connection pipe with the water fire main provided no filter is fitted in the latter.
- 3.4.5 Stop valves shall be placed in easily accessible positions outside the protected spaces.
- Provision shall be made in the protected spaces, where people are permanently present, for remote control of distribution valves from these spaces.
- 3.4.6 Spray nozzles shall be placed in the protected spaces as follows:
- .1 Underneath the ceiling of the space.
- .2 In casings of machinery spaces of category "A".
- .3 Above equipment and machinery using oil fuel or other flammable liquids.
- .4 Above surfaces over which oil fuel or flammable liquids are likely to spread.
- .5 Above stacks of fish meal bags.
- The spray nozzles shall be so disposed in the protected space that the area covered by one nozzle will overlap that covered by adjacent nozzles.
- 3.4.7 Water supply is to be provided at the required pressure to all sections of the system in any compartment to be protected. The pump and its controls are to be installed outside the spaces to be protected.
- It is not to be possible for a fire in the protected spaces to put the system out of action.
- The pump may be driven by independent internal combustion machinery which is to be so situated that a fire in the protected space will not affect the air supply to the machinery.
- If the pump is electrically driven from the emergency generator, the generator is to comply with the provisions of *Ch 11, Section 9*.
- 3.5 Water - screen system**
- 3.5.1 The present Rules provide for the use of the water-screen system in the following cases:
- .1 In special purpose ships where, subject to special agreement with *ICS Class*, water screens are permitted in lieu of "A" class divisions, in accordance with *2.1.2.8*.
- .2 For protecting doorways in compliance with *2.1.3.8*.
- 3.5.2 The water-screen system shall be fed from the water fire main. The design capacity of the pumps supplying the water-screen system shall be sufficient to provide at least 70 l/min per linear meter of the screen length.
- 3.5.3 Water screens for the protection of doorways shall be arranged and operated from the corridor.

# INTERMARITIME CERTIFICATION SERVICES (*ICS Class*)

## Chapter 6 Fire Protection

### 3.6 Drenching system

3.6.1 The present Rules provide for the use of the water drenching system in the following cases:

- .1 For drenching the racks of magazines (see 2.1.7.16 and *table 3.1.2.1*).
- .2 For drenching the trunks of exits from machinery spaces (see 2.1.4.5).
- .3 For drenching the external surfaces of spaces facing the tracks for railway carriages and motor cars in ferries, in lieu of insulation for "A" class divisions.

3.6.2 The drenching system shall be fed from the water fire main. The pumps and associated sources of power shall be placed outside the space protected.

It is recommended that provision should be made for additional water supply from sea water hydrophones to the drenching system of exits from machinery spaces.

3.6.3 The system shall be started from outside the space.

It is recommended that the system should be put into action at an inadmissible temperature rise in the space.

3.6.4 The drenching system of magazines and the pressure water-spraying system of the cargo spaces fitted for the carriage of explosives may be used for their flooding in emergency situations.

3.6.5 The capacity of the pumps supplying the system shall be sufficient to ensure the following rates of water discharge:

- .1 For drenching magazine racks 24 l/min per 1 m<sup>2</sup> of the total magazine floor area.
- .2 For drenching the exits from machinery spaces, 30 l/min per linear meter of the horizontal perimeter of the surface to be drenched, where the vertical extent of surface does not exceed 5 m. Where the surface extends vertically more than 5 m, a tier of spray nozzles shall be fitted for each successive 5 m to deliver the above amount of water in addition to the quantity discharged through the upper tiers of spray nozzles.

### 3.7 Foam fire extinguishing system

#### 3.7.1 General provisions

3.7.1.1.1 The foam fire extinguishing system provides for the use as an extinguishing medium of mechanical foam of the following types depending on the foam expansion ratio:

- |                        |                                |
|------------------------|--------------------------------|
| low expansion ratio    | - about 10 to 1                |
| medium expansion ratio | - between 50 to 1 and 150 to 1 |
| high expansion ratio   | - about 1000 to 1              |

Foam fire extinguishing systems may include units separately producing, but simultaneously supplying low expansion ratio foam and medium expansion ratio foam (combined foam).

3.7.1.2 Use is to be made of foam concentrate types approved by *ICS Class* (see 1.3.3.1).

A foam concentrate for generating low-expansion and medium-expansion foam is to be capable of being used both with fresh water and sea water.

3.7.1.3 The capacity of foam fire extinguishing systems and the quantity of a foam concentrate shall be calculated depending on the foam expansion ratio, the rate of application of solution and operation time of the system given in *table 3.7.1.3*.

3.7.1.4 Tanks for the storage of foam-generating liquid concentrate shall be fitted with arrangements for filling and draining, a device for watching the level of the liquid and a manhole for cleaning and inspecting. The tanks shall be of sufficient capacity to contain the full required amount of foam concentrate. If no excessive pressure is required to be created in tanks during the system operation, non-return valves shall be fitted between such tanks and the fire main.

Where a foam concentrate using fresh water is utilized in the high expansion foam system, the flooding of a space protected shall be stored in a tank installed in the station. The remainder of the water may be supplied from ship's storage tanks.

# INTERMARITIME CERTIFICATION SERVICES (ICS Class)

## Chapter 6 Fire Protection

Equipment (pumps, fittings, etc.) necessary for supplying fresh water to the tank shall be arranged outside the protected space, be fed from the emergency diesel-generator and have a capacity sufficient to ensure continuous operation of the system as required in *table 3.7.1.3*.

- 3.7.1.5 The mixers for making aqueous solution of a foam concentrate of the required concentration shall be of an approved type. The capacity of mixers shall be sufficient for ensuring operation of simultaneously used foam nozzles and/or foam generators.
- 3.7.1.6 Provision is to be made in the main at the foam extinction station at a maximum distance from mixers for a sampling device to determine percentage of foam concentrate in the solution.  
Besides, a pressure gauge is to be fitted on the pipe supplying water to the system at the foam extinction station.

### 3.7.2 Fixed deck systems

3.7.2.1 The expansion ratio of the foam generated by the system is not generally to be greater than 12:1. If the system generates actually low-expansion foam with expansion ratio slightly in excess of 12: 1, the quantity of the foam solution is to be calculated as for the system with foam expansion ratio 12: 1. Where the system generates the foam with expansion ratio somewhat below 12: 1, the quantity of the foam solution is to be proportionally increased.  
Where medium expansion ratio foam is used in oil tankers, the amount of the foam concentrate shall be not less than the rated quantity and sufficient for the operation of the rated number of the foam generators and one monitor during 10 min.

3.7.2.2 On oil tankers foam is to be supplied by means of monitors and foam applicators or portable foam generators (see 5.1.6 and 5.1.20) to the entire cargo deck area and to any cargo tank whose deck was ruptured.

**Table 3.7.1.3 Foam expansion ratio, rate of application of solution and operation time of the system**

N°	Spaces	Rate of solution supply, l/min.m <sup>2</sup> , with the foam expansion ratio			Rated time of continuous operation, min
		10:1	100:1	1000:1	
1	2	3	4	5	6
1	Cargo oil tanks and cargo tank deck	6 <sup>1</sup> 0,6 3	6 <sup>2</sup>	-	20 <sup>2/30</sup>
2	Tanks for oil products with a flash point 60 °C and above (oil fuel tanks)	6 <sup>2</sup>	4,5 <sup>2</sup>	-	20
3	Dry cargo holds	-	4 <sup>2</sup>	-	45
4	Machinery spaces and other spaces whose equipment is oil-fired	-	-	1 <sup>2</sup>	- 4
5	Lamp lockers, paint lockers, storerooms for flammable liquids, flammable liquefied and compressed gases	-	4,5 <sup>2</sup>	-	20
6	Hangars for helicopters, enclosed garages, as well as spaces listed in 1.5.4.3 and 1.5.8.1	-	-	- 5	45
7	Helicopter decks	8,2 <sup>6</sup>	8,2 <sup>6</sup>	-	

# INTERMARITIME CERTIFICATION SERVICES (ICS Class)

## Chapter 6 Fire Protection

### NOTES:

- 1 The rate of solution supply is not to be less than the greatest of the following:
  - .1 6 l/minute per square meter of the horizontal sectional area of the single tank having the largest such area.
  - .2 0,6 l/minute per square meter of the cargo area.
  - .3 3 l/minute per square meter of the area protected by the largest monitor, such area being entirely forward of the monitor but not less than 1250 l/minute.
- 2 For the area of the largest horizontal section of the largest protected space.
- 3 Sufficient foam concentrates are to be supplied to ensure at least 20 minutes of foam generation in oil tankers fitted with an inert gas system and 30 minutes in oil tankers not fitted with an inert gas system using largest rate of solution supply stipulated in note 1.
- 4 Sufficient foam concentrates are to be supplied to ensure foam generation in the volume equal of 5-fold volume of the largest protected space.
- 5 The rate of solution supply is to be sufficient for filling of the protected space volume during 15 minutes.
- 6 For the area of the circle the diameter of which equals to the helicopter length with screw outreach taken into account.

- |         |   |         |   |
|---------|---|---------|---|
| 3.7.2.3 | At least 50 per cent of the foam solution supply rate required in <i>table 3.7.1.3</i> , <i>footnotes 1.1</i> and <i>1.2</i> is to be delivered from each monitor. On ships of less than 4000 tons deadweight only portable foam generators or hand applicators may be employed. However, in such a case, the capacity of each generator or applicator according to 5.1.20 or applicator according to 5.1.6.1 is to be at least 25 per cent of the foam solution supply rate required in <i>table 3.7.1.3</i> , <i>footnotes 1.1</i> and <i>1.2</i> . |         | Before each cut-off valve fitted on the foam piping there shall be twin fire hydrants, 70 mm in inside diameter, for coupling thereto fire hoses with air-foam nozzles located at such distance that the provisions of 3.2.6.2 are met.   |
| 3.7.2.4 | The number and position of monitors are to be such as to comply with 3.7.2.2, 3.7.2.6 and, 3.7.2.8. The capacity of any monitor is to be at least 3 l/minute of foam solution per square meter of deck area protected by monitor, such area being entirely forward of the monitor, but not less than 1250 l/minute.   |         | Branches from the water fire main and foam piping to the monitors are also to be fitted before the cut-off valves.<br>Where medium-expansion foam is used, twin fire hydrants shall be substituted by valve chests with a number of fire hydrants equal to 50 per cent of the required number of foam generators.   |
| 3.7.2.5 | A monitor shall be provided with a changing-over device for alternate supply of water and foam. Pipes branching from the water fire main and foam solution supply piping shall be connected to the changing-over device. In lieu of the changing-over device suitably interlocked shut-off valves may be fitted.  |         | In oil tankers, each foam fire extinction station shall be provided with a shut-off sluice or disc valve located on the foam fire main before it extends beyond the boundaries of the station.<br>Before the shut-off sluice or valve there shall be a branch led out to the forward part of the poop deck, both starboard and port, to monitors and twin fire hydrant, about 70 mm in inside diameter, for coupling thereto fire hoses with air-foam nozzles.<br>Where medium-expansion foam is used, twin fire hydrants shall be substituted by valve chests with a number of fire hydrants equal to 50 per cent of the required number of foam generators. |
| 3.7.2.6 | The distance from the monitor to the farthest extremity of the protected area forward of that monitor is to be not more than 75 per cent of the monitor throws in still air conditions.   | 3.7.2.8 |   |
| 3.7.2.7 | The foam fire main in easily accessible places of the cargo deck shall be fitted with cut-off sluice or disc valves spaced 30 m apart. Next to each of such valves there shall be provided an information plate to indicate that the valve must be kept permanently open under normal service conditions.   | 3.7.2.9 | Foam smothering system for dry cargo spaces shall meet the following provisions: <ol style="list-style-type: none"> <li>.1 A shut-off valve shall be fitted where the foam fire main is led out to the open deck.</li> <li>.2 Provision shall be made for valve chests with fire hydrants to be fitted on the foam fire main on both sides. The distance between the valve chests of either side shall not exceed 40 m. The number of fire hydrants in each valve chest shall be equal to</li> </ol>  |



# INTERMARITIME CERTIFICATION SERVICES (ICS Class)

## Chapter 6 Fire Protection

- 50 per cent of the required number of foam generators.
- 3.7.2.10 If a ship is provided with a fixed low-and/or medium-expansion foam system, there shall be provided branches from solution pipe line to entrances from the upper deck to machinery spaces as also to the oil fuel filling positions. Each branch shall be fitted with two hydrants for coupling thereto fire hoses with air-foam nozzles or foam generators.
- 3.7.2.11 In ships where medium-expansion mechanical foam is used, it is recommended that solution piping should be connected to water fire main to provide for the possibility of application of such foam for extinction of fires in accommodation and service spaces through the water fire main. For this purpose, provision is to be made for an appropriate number of portable foam generators at hydrants in accommodation and service spaces.
- 3.7.2.12 The foam shall be supplied to the helicopter deck by monitors and hand applicators or by air-foam nozzles with the rate of supply specified in *table 3.7.1.3*.
- 3.7.2.13 In lieu of the monitors and foam generators may be used indistinctly combined foam generator sources fixed or portable.
- 3.7.3 High-expansion foam system**
- 3.7.3.1 In spaces protected by a high-expansion foam system provision is to be made in the upper part, opposite to foam delivery, for openings to discharge air during foam supply. Such openings are to be generally arranged beyond positions 1 and 2 as stipulated in *Ch 3, rule 7.1.4*. Where the outlets are otherwise arranged, they are to meet the provisions of *Ch 3, Subsection 7.7*.
- 3.7.3.2 The cross-sectional area of the foam ducts shall be not less than that of foam generator orifices. Foam pipes shall be so laid that the head loss therein is minimized and discharge orifices shall be so located that there are no obstructions for free foam discharge into the protected space.
- 3.7.3.3 A foam generator shall be of a design approved by *ICS Class*, ensuring the production of high-expansion mechanical foam from the aqueous solution of foam concentrate of an approved type.
- 3.7.3.4 A generator discharge orifice or foam duct at the place of its coming out beyond the station shall be provided with a closing device. This device shall open automatically concurrent with the foam discharge.  
A manual control and position indicators "closed", "open" shall be provided.
- 3.7.3.5 To test a foam generator in operation, a special changing-over device shall be provided to discharge the foam to the open deck instead of the protected space. This device shall always be in a position to direct the foam discharge to the protected space and shall have an appliance for sealing in such position.
- 3.7.3.6 Where the area of the protected space is more than 400 m<sup>2</sup>, at least two foam generators shall be provided to ensure foam discharge to the zones of the protected space, far distant from each other.
- 3.7.3.7 Equipment essential for the operation of the foam generators shall be supplied from the main and emergency sources of electrical power.
- 3.8 Carbon dioxide smothering system**
- 3.8.1 General provisions**
- 3.8.1.1 The amount of carbon dioxide, in kg, shall be calculated from the formula:
- $$G = 1,79 \cdot V \cdot \varphi \quad (3.8.1.1)$$
- where:
- $V$  = rated volume of the protected space, m<sup>3</sup>;  
 $\varphi$  = factor equal to:
- 0,3 for dry cargo holds and other spaces, except those indicated below;
  - 0,35 for machinery spaces, the rated volume of which is determined with regard to the full volume of casings;

# INTERMARITIME CERTIFICATION SERVICES (ICS Class)

## Chapter 6 Fire Protection

- 0,40 for machinery spaces, the rated volume of which is determined without any regard to the volume of casings from the level at which the horizontal area of the casings is equal to, or less than, 40 per cent of the machinery space area;
- 0,45 for spaces in which motor vehicles with fuel (other than diesel oil) in their tanks are carried and for closed ro/ro cargo spaces.
- For machinery spaces such value of the factor  $\phi$  is to be taken which results in a greater value  $G$ .
- In ships of less than 2000 tons gross tonnage, except for passenger ships, factors 0,35 and 0,4 may be reduced to 0,3 and 0,35, respectively.
- 3.8.1.2 Where a carbon dioxide smothering piping is used as a smoke detection one, the carbon dioxide distributing manifold may be placed together with the  $CO_2$  release controls for each space protected by the smoke detection system near its detecting units. However, it is recommended that the provision of such manifold should not preclude the possibility of discharging carbon dioxide into any of the protected spaces directly from the fire extinction station. Installation is to be in compliance with *rules 3.8.1.5.2 and 4.2.1.5.10*.
- 3.8.1.3 The total cross-sectional area of manifolds and the cross-section of the distributing manifold shall be not more than the sum of the cross-sections of the cylinder valves simultaneously opening for the largest by volume protected space (for high-pressure systems) and not more than the cross-section of the tank discharge valve (for low-pressure systems).
- 3.8.1.4 The cross-sections of distributing pipes for individual protected spaces shall be not more than the sum of the cross-sections of cylinder discharge valves simultaneously opening for the space concerned (for high-pressure system) or not more than the cross-section of the tank discharge valve (for low-pressure systems). The sum of the cross-sections of the discharge pipes shall not exceed the cross-section of the supply pipe
- Except in the cases where by means of calculation is proved that the pressure in any section of the pipe is not less than 1MPa.
- 3.8.1.5 The supply of 85 per cent of the rated amount of carbon dioxide shall be ensured within not more than:
- .1 2 minutes for machinery spaces, emergency diesel-generator and fire pump spaces and other spaces where oil fuel or other flammable liquids are used.
- .2 10 minutes for the spaces for the carriage of vehicles with fuel (other than diesel oil) in their tanks and for the spaces in which neither oil fuel nor any other flammable liquids are carried or used.
- 3.8.1.6 The thickness of pipe walls shall be calculated in accordance with *Ch 7, rule 1.3.4*, in this case, the design pressure  $p$  is assumed as equal to the design pressure of cylinders and tankers according to *3.8.2.1 and 3.8.3.1* and shall be not less than the values specified in *Ch 7, table 1.3.4.3*.
- 3.8.1.7 Carbon dioxide shall be supplied to the protected spaces through nozzles arranged in the upper part of these spaces. Where the floor plates of the machinery spaces of category A are placed higher than one meter above the tank top, a number of nozzles (about 15 per cent of the total number) shall be fitted in the upper portion of the space below the plates.
- 3.8.1.8 The total sectional area of the outlets of the nozzles of the space concerned shall not exceed 85 per cent of the total cross-section of the distributing piping.
- 3.8.1.9 Perforated pipes may be used instead of nozzles in silencers, exhaust-gas boilers and smoke stacks. The total area of pipe perforations shall be by 10 per cent less than the pipe cross-section.
- 3.8.1.10 In addition to the alarms required by *4.3.4*, signal whistles operated by the released carbon dioxide pressure shall be fitted on pipes laid in the spaces listed in *4.3.1*.
- 3.8.1.11 The materials used as joints of the equipments and flexible couplings, are to be capable of maintain its technical characteristics to temperatures of 60° C.

# INTERMARITIME CERTIFICATION SERVICES (ICS Class)

## Chapter 6 Fire Protection

<b>3.8.2</b>	<b>High pressure system</b>				cylinders or measuring the level of liquid therein.
3.8.2.1	The number of cylinders for storing liquid carbon dioxide shall be provided depending on the filling ratio (amount of carbon dioxide per 1 liter of cylinder capacity) which is not to be more than 0,675 kg/l at the design cylinder pressure 12,5 MP and over and not more than 0,75 kg/l at the cylinder design pressure 15 MPa and over.  When filling cylinders, deviation of not more than $\pm 0,5$ kg from the rated amount per cylinder is permitted. In case specified in 3.1.3.3 and 3.8.5 the filling ratio shall be reduced to 0,075 kg/l against the above values.	3.8.2.6	Cylinders valves:		
		.1		The valve shall have protective devices complying with the following requirements: Protective diaphragms shall break at a pressure rise in the cylinders up to $(1,3 \pm 0,1) p$ , MPa (where $p$ is the design pressure of the cylinder). For valves with slotted diaphragms which are additionally fitted with protective diaphragms the breaking pressure of slotted diaphragms shall be at least 1 MPa more than the highest value of the protective diaphragm breaking pressure.	
3.8.2.2	The cylinders shall be placed vertically in rows on the pads which may be made of wood and shall be accessible for inspection and checking of the amount of carbon dioxide contained therein. Each cylinder shall be marked with its ordinal number. Pilot cylinders shall be fitted in the fire extinction station and be coated with a distinguished paint.	.2		There shall be provided a checking device to indicate that the protective device has operated. The valve opening device shall be of the lever type and shall ensure the full opening of the valve by turning the lever to an angle not more than 90°. This device shall permit the valves to be opened individually or by groups.	
3.8.2.3	A pipe connecting a cylinder with a manifold shall be seamless and made of red copper. Use of special flexible hoses made of approved materials is permitted. A non-return valve shall be fitted on the pipe. The pipe is to be connected to the upper part of the manifold, the non-return valve is to be positioned either on the manifold inlet or so that accumulation of water above it is prevented. A drainage arrangement of the manifolds is to provide their complete draining.	.3		The cylinder valves shall be fitted with scared pipes cut short at 5-15 mm from the cylinder bottom; the inside diameter of the said valve pipes and of the pipes connecting the cylinder valves with a manifold shall be not less than 10 mm.	
		.4		If the design of the valves of pilot cylinders differs from that of the valves of all other cylinders, they shall be coated with a paint of another colour and have the inscription <b>pilot valve</b> .	
3.8.2.4	A manifold of the carbon dioxide extinction station shall be fitted with a pressure gauge graduated to a value at least 1 MPa in excess of the hydraulic test pressure of the carbon dioxide cylinders. The value of the pressure gauge scale division shall not exceed 0,5 MPa.	3.8.2.7	The gas from the protective devices shall be discharged:		
		.1		To the atmosphere beyond the boundaries of the station through a separate pipe provided with an audible alarm at the outlet or	
3.8.2.5	A carbon dioxide extinction station shall have arrangements for weighing the	.2		To the distribution manifold where provision is to be made for: Two pipes, one of which is open-ended and fitted with a shut-off valve, and the other is provided with a protective diaphragm.	

# INTERMARITIME CERTIFICATION SERVICES (ICS Class)

## Chapter 6 Fire Protection

A signaling device to indicate the presence of pressure in the manifold whose readings are to be transmitted to the space where watch keepers are present all the time.

In this case, a checking device to indicate that the protective device has operated is not required for the valves.

### 3.8.3 Low-pressure system

3.8.3.1 The rated amount of liquid carbon dioxide shall be stored in one tank at the working pressure of about 2 MPa which is ensured by maintaining a temperature of about -18 °C. A filling ratio of a tank shall be not more than 0,9 kg/l.

3.8.3.2 A tank shall be served by two self-contained refrigerating plants, each consisting of one compressor, a condenser and a cooling battery.

Each plant is to be capable of permanently maintaining prescribed temperature at its continuous operation during twenty-four hours under environmental conditions specified in *Ch 7, Subsection 1.6*.

When one of the plants is rendered inoperative, the other shall be automatically brought into operation.

One refrigerating plant may be used if it comprises two independently driven compressors and a condenser with 25 per cent heat transmission allowance.

Cooling batteries shall be separate for each plant or common, but they shall consist of not less than two isolated sections, each having a surface designed for full output.

In other respects, a refrigerating plant is to meet the provisions of *Ch 12* for unclassified plants, except for *3.3, 3.4, 3.5 and 6.2.6*, as well as those of *2.1.1, 2.3.12, 2.3.13 and 7.2.2* for classed plants.

3.8.3.3 A tank shall be fitted with:

- Branches with shut-off valves for filling the tank.
- A discharge pipe.
- A device for direct indication of carbon dioxide level and remote level indication device with indicators at control valves at the fire extinction station and remote control stations.
- Two relief valves discharging to the atmosphere fitted on the permanent pipe

connection of the tank with one of the relief valves.

A relief valve shall operate at a pressure equal to  $1,1—1,2p$  and its cross-section shall be such that the pressure in the tank with a relief valve fully open may not exceed  $1,35 p$ . Here  $p$  is a working pressure in the tank in MPa.

The value of the design pressure of the tank shall be assumed equal to the greatest lifting pressure of a relief valve.

3.8.3.4 The tank and pipes led there from and permanently filled with carbon dioxide are to be provided with heat insulation generally ensuring the operation of the relief valve in 24 hours only after the installation is de-energized with an atmosphere temperature of 45° C and the initial pressure equal to the starting pressure of the compressor.

3.8.3.5 Material for a tank shall meet the requirements of *Ch 13, Subsection 3.3*. Welds shall be radiographed as required for class II in *Ch 14, table 5.2.4*.

3.8.3.6 Pipe portions which may be isolated by means of shut - off valves, and where the pressure may be equal to the design pressure of any of the elements, shall be provided with a safety installation.

3.8.3.7 The damage signaling system is to be provided with audible and visual alarms in the following cases:

- With the maximum filling of the tank (not greater than the level of the relief valve) and to the minimum (not less than 16 bar) of the pressure.
- For the drop of the liquid level in the tank to the minimum permissible.
- In case of refrigerating plant failure.
- Carbon dioxide release.

The signal has to reach the main fire control station and the Chief Engineer cabin.

### 3.8.4 Release control

3.8.4.1 It is recommended that remote control of carbon dioxide discharge into the spaces specified in *3.8.1.5.1* should be provided from the main fire control station or from a position in the vicinity of the entrance to the space.

# INTERMARITIME CERTIFICATION SERVICES (*ICS Class*)

## Chapter 6 Fire Protection

Release controls of the high pressure system at the fire extinction station shall ensure simultaneous opening of cylinder valves for the above spaces.

3.8.4.2 Remote control station of the high-pressure system shall be fitted with means for giving audible warning of the carbon dioxide release into the protected space. Depending on the location of the station the need for provision of such alarm is subject to special consideration by *ICS Class* in each case.

3.8.4.3 The pipes supplying carbon dioxide from pilot cylinders to servomotors shall be fitted with shutt-off valves interlocked with a device opening pilot cylinders.

3.8.4.4 In low - pressure systems, release of carbon dioxide is to be manual. Where an automatic control system is provided to supply rated amount of carbon dioxide to protected spaces, manual regulation of gas supply shall also be provided.

Where the system serves more than one space, facilities shall be provided to control the amount of released carbon dioxide, such as an automatic flow meter or a precision level indicator located at the control station.

### 3.8.5 Local carbon dioxide fire extinction stations

3.8.5.1 In well-founded cases local stations with not more than five cylinders (not more than 125 kg of carbon dioxide) may be permitted for certain protected spaces.

3.8.5.2 In a machinery space carbon dioxide cylinders may be placed for fire protection of crankcases and silencers of internal combustion engines, of exhaust gas pipes and other enclosed compartments located within the machinery spaces.

## 3.9 Inert gas system

### 3.9.1 General provisions

3.9.1.1 The inert gas system may be used:  
.1 As a principal means of fire extinguishing in dry cargo holds, provided an independent inert gas generator is installed.  
.2 As a means of warning the outbreak of a fire by rendering and maintaining the

atmosphere of the cargo tanks non-flammable at all times, except when such tanks are required to be gas free.

3.9.1.2 The system is to be capable of:  
.1 Maintaining the atmosphere in any part of any cargo tank with an oxygen content not exceeding 8 per cent by volume and at a positive pressure at all times in port and at sea except when it is necessary for such tank to be gas free, maintaining the atmosphere in any part of any dry cargo hold with an oxygen content not exceeding 14 per cent by volume.  
.2 Eliminating the need for air to enter a tank during normal operations except when it is necessary for such a tank to be gas free.  
.3 Purging empty cargo tanks with inert gas and air.

3.9.1.3 Inert gas with an oxygen content of not more than 5 per cent by volume is to be delivered to the cargo tanks.

3.9.1.4 The temperature of the inert gas supplied to the protected space is to be not in excess of:  
.1 65 °C for cargo tanks and  
.2 50 °C for dry cargo holds.

3.9.1.5 The inert gas supply may be treated flue gas from main or auxiliary boilers or separate gas generators. *ICS Class* may accept systems using flue gases from other sources or any combination thereof provided an equivalent standard of safety is achieved. Each source of flue gas is to be provided with automatic combustion control to provide for the fulfillment of the requirements of 3.9.1.3.

In the systems using carbon dioxide, measures are to be taken that the risk of ignition from generation of static electricity by the system itself is minimized.

### 3.9.2 Capacity

3.9.2.1 The system is to be capable of delivering inert gas to the cargo tanks at a rate of at least 125 per cent of the maximum total capacity of the cargo pumps during discharging the ship.

# INTERMARITIME CERTIFICATION SERVICES (ICS Class)

## Chapter 6 Fire Protection

- 3.9.2.2 For dry cargo holds the capacity of the inert gas system is to be sufficient for filling at least 25 per cent of the volume of the largest protected space during 1 hour operation of an inert gas generator from the moment of its starting. The system is to be capable of operating with such capacity for at least 72 hours.
- 3.9.3 Equipment**
- 3.9.3.1 A flue gas scrubber is to be fitted which will effectively cool the volume of gas and removes solids and sulphur combustion products. The cooling water is to be delivered by an independent pump. Provision is to be made for an alternative supply of cooling water from a stand-by pump without interfering with any essential services on the ship.
- 3.9.3.2 The gas scrubber is to be designed so that the capacity of the system will not drop for more than 3 per cent and the gas temperature at the outlet will not rise more than 3 °C as against the design values under all normal conditions of heel and trim.
- 3.9.3.3 Provision is to be made in the gas scrubber housing for inspection holes and sight glasses made of impact- and heat-resisting material for inspections and maintenance.
- 3.9.3.4 At least two blowers are to be fitted which together be capable of delivering at least the volume of gas required by 3.9.2.
- 3.9.3.5 Provision is to be made in the blower casing for openings for maintenance.
- 3.9.3.6 Interior surfaces of the scrubber and blowers are to be made of corrosion-resistant materials or lined with a coating material.
- 3.9.3.7 Filters or equivalent devices are to be fitted to minimize the amount of water and solid particles carried over to the inert gas blowers.
- 3.9.4 Cargo tank protection against pressure (vacuum)**
- 3.9.4.1 The inert gas system is to be so designed that the maximum pressure which it can exert on any cargo tank will not exceed the test pressure of any cargo tank. In no case should this pressure exceed 24 kPa.
- 3.9.4.2 One or more pressure-vacuum breaking devices are to be provided on the inert gas supply main provided they are not fitted on the gas venting system or individually on each tank. Control, location and design of these arrangements are to comply with *Ch 8, Subsection 5.2*.
- 3.9.4.3 A positive pressure not exceeding 20 kPa is to be maintained in the cargo tanks when they are filled or being filled with inert gas under normal working conditions.
- 3.9.5 Non-return valves**
- 3.9.5.1 At least two non-return devices are to be fitted in the inert gas supply main in the cargo area on deck. One of them is to be a deck water seal, and the other a non-return valve or an equivalent device fitted forward of the deck water seal. They are to be located between the automatic valve required by 3.9.6.5 and the aftermost connection to any cargo tank or cargo pipeline.
- 3.9.5.2 The deck water seal is to be capable of being supplied by two separate pumps, each of which is to be capable of maintaining an adequate supply at all times and automatically starting each pump feeding the water seal and automatically filling the seal with water upon inert gas supply failure (for half-dry and dry water seals). A drain pipe of the deck water seal is not to pass through machinery spaces. Discharge pipes are to be led directly overboard.
- 3.9.5.3 Provision is to be made to ensure that the water seal is protected against freezing in such a way that the integrity of seal is not impaired by overheating.
- 3.9.5.4 The deck water seal and all loop arrangements are to be capable of preventing return of hydrocarbon vapors at a pressure equal to the test pressure of the cargo tanks.
- 3.9.5.5 The non-return valve (see 3.9.5.1) is to be of the isolating type or a stop valve is to be

# INTERMARITIME CERTIFICATION SERVICES (ICS Class)

## Chapter 6 Fire Protection

- fitted in the inert gas supply main forward of the non- return valve.
- 3.9.5.6 A water loop or other approved arrangement is to be fitted to each associated water supply and drain pipe and each venting or pressure-sensing pipe leading to gas safe spaces. Means are to be provided to prevent such loops from being emptied by vacuum.
- NOTE: **Gas safe space** is a space in which the entry of hydrocarbon gases would produce hazards with regard to flammability or toxicity.
- 3.9.5.7 Provision is to be made in the deck water seal for sight holes and glasses for monitoring the water level and carry out inspections.
- 3.9.5.8 Materials used in non-return devices are to be resistant to the effect of acids generated by gases.
- 3.9.6 Pipes**
- 3.9.6.1 The inert gas main may be divided into two or more branches forward of the non-return devices required by 3.9.5.1.
- 3.9.6.2 The inert gas supply mains are to be fitted with branch piping leading to each cargo tank. Branch piping for inert gas is to be fitted with either stop valves or equivalent means of control for isolating each tank. Where stop valves are fitted, they are to be provided with locking arrangements to prevent the control of the valves by unauthorized persons.
- 3.9.6.3 In combination carriers the arrangement to isolate the inert gas system from the slop tanks is to consist of blank flanges.
- 3.9.6.4 Outlets of the pipes discharging inert gas into dry cargo holds are to be located in the lower part of the protected space. Such spaces of 500 m<sup>3</sup> in volume and more are to be provided with two pipe outlets located in the opposite parts of the space. Pipe outlets discharging inert gas into the cargo tanks are to be located in the upper part.
- 3.9.6.5 A gas regulating valve is to be fitted in the inert gas supply main. It is to be capable of automatically regulating the flow of inert gas to the cargo tanks as referred to in 3.9.8.10 unless means are provided to automatically control the speed of the inert gas blowers.
- 3.9.6.6 If a connection is fitted between the inert gas supply main and the cargo piping system, arrangements are to be made to ensure an effective isolation having regard to the large pressure difference which may exist between the systems.  
This is to consist of two shut-off valves, the valve on the cargo main being of a non- return type, and an arrangement to vent the space between the valves in a safe manner or an arrangement consisting of a spool-piece with associated blanks.
- 3.9.6.7 The valve separating the inert gas supply main from the cargo main and which is on the cargo main side is to be a non-return shut-off valve.
- 3.9.6.8 Piping systems are to be so designed as to prevent the accumulation of cargo or water in the pipelines under all normal conditions.
- 3.9.6.9 Suitable arrangements are to be provided for the safe venting of the section of the line between the valves referred to in 3.9.5.5 and 3.9.6.5 in case when the first of these valves is closed.
- 3.9.6.10 The diameter of the pipes is to be such as to ensure the gas flow rate in any section of the piping to be not more than 40 m/s.
- 3.9.6.11 The piping from the gas scrubber to the blowers and recirculation lines as well as drain pipe of gas scrubbing and cooling system are to be lined with corrosion-resistant coating.
- 3.9.6.12 Suitable arrangements to be located after the valve referred to in 3.9.6.5 are to be provided to enable the inert gas main to be connected to an external supply of inert gas.
- 3.9.6.13 The inert gas supply main may be used for the venting of the cargo tanks.
- 3.9.7 Instruments and alarms**

# INTERMARITIME CERTIFICATION SERVICES (ICS Class)

## Chapter 6 Fire Protection

- 3.9.7.1 Means are to be provided for continuously indicating the temperature and the pressure of the inert gas on the discharge side of the gas blowers.
- 3.9.7.2 Instrumentation is to be fitted for continuously indicating and permanently recording, when the inert gas is being supplied:
- .1 The pressure of the inert gas supply main forward of the non-return devices required by 3.9.5.1.
- .2 The oxygen content of the inert gas in the inert gas supply main on the discharge side of the gas blowers.  
These devices are to be placed in the cargo control room; but where no cargo control room is provided, they are to be placed in a position easily accessible to the officer in charge of cargo operations.
- 3.9.7.3 In addition to the provisions of 3.9.7.2, the following meters are to be fitted:
- .1 In the navigating bridge to indicate at all times the pressure referred to in 3.9.7.2.1 and the pressure in the slop tanks of combination carriers, wherever those tanks are isolated from the inert gas supply main, and
- .2 In the main fire control station or in the machinery space to indicate the oxygen content (see 3.9.7.2.2).
- 3.9.7.4 Suitable arrangements are to be provided on each cargo tank for measuring oxygen and hydrocarbon vapor concentration using portable instruments.
- 3.9.7.5 Suitable means are to be provided for the zero and span calibration of both fixed and portable gas concentration measurement instruments referred to in 3.9.7.2 and table 5.1.2, item 16.
- 3.9.7.6 Audible and visual alarms are to be provided to indicate:
- .1 Low water pressure or low water flow rate to the flue gas scrubber.
- .2 High gas temperature, this alarm being operated when the temperatures referred to in 3.9.1.4 are reached.
- .3 Oxygen content in the gas in excess of 8 per cent by volume.
- .4 Failure of the power supply to the automatic control system for the gas regulating valve and to the indicating devices referred to in 3.9.7.2.
- .5 Low water level in the deck water seal referred to in 3.9.5.1.
- .6 Gas pressure less than 1 kPa in the inert gas main. The alarm arrangement is to be such as to ensure that the pressure in slop tanks in combination carriers can be monitored at all times.
- .7 High gas pressure (when the pressure reaches 10 kPa).
- 3.9.7.7 Indicating units of the alarms required in 3.9.7.6.3, 3.9.7.6.4 and 3.9.7.6.6 are to be placed in the machinery space and in the cargo control room, where provided, but in any case, they are to be placed in a position where the alarm may be immediately received by responsible members of the crew.
- 3.9.7.8 Audible and visual alarms indicating the low water level in the water seal of half-dry and dry type are to operate on failure of the inert gas supply.
- 3.9.7.9 Additional audible alarms independent of the alarms required in 3.9.7.6.6 or automatic shut-down of the cargo pumps is to be provided to operate when the pressure in the main drops to 0,5 kPa.
- 3.9.8 Systems using flue gas of boilers** (These requirements are additional to those stated in 3.9.1 to 3.9.7).
- 3.9.8.1 The flue gas scrubber and blowers are to be located aft of all cargo tanks, cargo pump rooms and cofferdams separating these spaces from machinery spaces of category A. The design and location of scrubber and blowers with relevant piping and fittings are to prevent the gas leakages into enclosed spaces.
- 3.9.8.2 Suitable shut-off arrangements are to be provided on the suction and discharge connections of each blower. Arrangements are to be provided to enable the functioning



# INTERMARITIME CERTIFICATION SERVICES (*ICS Class*)

## Chapter 6 Fire Protection

of the inert gas plant to be stabilized before commencing cargo discharge.

- 3.9.8.3 Flue gas isolating valves are to be fitted in the inert gas supply mains between the boiler uptake and the flue gas scrubber. The valves are to be provided with an indicator to show whether they are open or shut. Precautions are to be taken to maintain them gastight and keep the seatings clear of soot. Arrangements are to be provided to ensure that boiler soot blowers cannot be operated when the corresponding flue gas valve is open.
- 3.9.8.4 If the blowers are to be used for gas freeing, their air inlets are to be provided with blanking arrangements.
- 3.9.8.5 A flue gas isolating valve (see 3.9.8.3) is to be made of materials capable of withstanding the flue gas temperature and resistant to the corrosive action of the gas.
- 3.9.8.6 The piping between the flue gas isolating valve and the scrubber is to be made of corrosion resistant steel.
- 3.9.8.7 An additional water seal or other effective means of preventing flue gas leakage is to be fitted between the flue gas isolating valves (see 3.9.8.3) and scrubber.
- 3.9.8.8 The valve referred to in 3.9.6.5 is to be located at the forward bulkhead of the forward most gas safe space through which the inert gas supply main passes.
- 3.9.8.9 Automatic shutdown of the inert gas blowers and gas regulating valve are to be arranged on predetermined limits being reached in respect of 3.9.7.6.1, 3.9.7.6.2 and 3.9.7.6.8. Automatic shutdown of the gas regulating valve is also to be arranged in case of blower failure.
- 3.9.9 Inert gas generator system.** (The requirements for this system stated below are additional to those given in 3.9.1 to 3.9.7).
- 3.9.9.1 For inert gas generator (the machinery including blower, combustion chamber, scrubber, oil fuel pump, burner, automatic

combustion control and supervisory equipment) use is to be made of oil fuel meeting the provisions of *Ch 7, rule 1.1.2*.

- 3.9.9.2 Where oil fuel having a flash point not exceeding + 60 °C (but not lower than + 43 °C) is used, the generators are to be located in a special space meeting the provisions for control stations referred to in *1.5.1.2*.
- 3.9.9.3 In ships in whose tanks toxic substances may be carried the gas generators are not to be located in the machinery spaces and are to be located in a compartment reserved solely for their use according to the requirements of 3.9.8.1. Such a compartment is to be separated from the machinery spaces at least by a gastight steel bulkhead, having no doors or other openings, and from the accommodation spaces and cargo area by open decks, cofferdams or similar spaces. Adequate positive pressure type mechanical ventilation is to be provided for such a compartment. Access to such compartments is to be only from an open deck outside the cargo area. Access is to be provided on the end bulkhead of the superstructure or deckhouse, not facing the cargo area and/or on the outboard side of the superstructure or deckhouse at a distance of at least L/25, but not less than 3 m from the end of the superstructure or deckhouse facing the cargo area. The inert gas supply main is not to be located in or have any connection with systems located in machinery spaces, accommodation spaces and service spaces.
- 3.9.9.4 Two air blowers are to be fitted to the inert gas generator. *ICS Class* may permit only one blower if it is capable of delivering to the protected cargo spaces the total volume of gas required by 3.9.2 provided sufficient spares for the air blower and its prime mover are carried on board to enable any failure of the air blower and its prime mover to be repaired by the ship's crew.
- 3.9.9.5 Two oil fuel pumps are to be fitted to the inert gas generator. *ICS Class* may permit only one oil fuel pump, provided sufficient spares for the oil fuel pump and its prime mover are carried on board to enable any

# INTERMARITIME CERTIFICATION SERVICES (*ICS Class*)

## Chapter 6 Fire Protection

failure of the pump and its prime mover to be repaired by the ship's crew.

3.9.9.6 Where more than one inert gas generator is provided, suitable shut-off arrangements are to be fitted on the discharge outlet of each generator plant.

3.9.9.7 Arrangements are to be made to vent the inert gas to the atmosphere during starting- up or in case of equipment failure.

3.9.9.8 Where the inert gas generator is served by positive displacement blowers, a pressure relief device is to be provided to prevent excess pressure being developed on the discharge side of the blower.

3.9.9.9 Audible and visual alarms are to be provided to indicate:

.1 Insufficient fuel oil supply.

.2 Failure of power supply to the generator.

.3 Failure of power supply to the automatic control system for the generator.

3.9.9.10 The gas regulating valve is to be automatically controlled to close and to interrupt the oil fuel supply to the generator on predetermined limits being reached in respect of 3.9.7.6.1 and 3.9.7.6.2. Automatic shutdown of the gas regulating is also to be arranged in respect of 3.9.9.9.2.

### 3.10 Halogenated hydrocarbon system

#### 3.10.1 General provisions

3.10.1.1 Use of Halons 1301 and 2402, as fire extinguishing media is permitted.

The density of Halons in a liquid state under a temperature of 20 °C, shall be assumed as equal to 1,57 g/cm<sup>3</sup> for Halon 1301 and 2,18 g/cm<sup>3</sup> for Halon 2402.

Subject to special agreement with *ICS Class*, other Halons may be used upon submission to *ICS Class* of the documents confirming their fire extinguishing efficiency and safe application.

3.10.1.2 The amount *G* of fire extinguishing medium, in kg, shall be determined from the formula:

$$G = V \cdot q \quad (3.10.1.2)$$

where

*V* = design volume of the largest protected space, m<sup>3</sup>;

*q* = specific consumption of the agent, in kg/m<sup>3</sup>; this specific consumption will be equal to:

0,23 kg/m<sup>3</sup> for Halon 2402, for spaces where motor vehicles with fuel (other than diesel oil) in their tanks are carried;

0,20 kg/m<sup>3</sup> for Halon 2402, for machinery and other spaces;

0,31 kg/m<sup>3</sup> for Halon 1301, for spaces where motor vehicles with fuel (other than diesel oil) in their tanks are carried;

0,26 kg/m<sup>3</sup> for Halon 1301, for machinery and other spaces.

3.10.1.3 The capacity of a tank for the storage of extinguishing medium shall be based on the filling ratio which shall be equal to not more than 0,9 liters of the medium per liter of the tank capacity for Halon 2402 and not more than 1,1 kg of the liquefied halon per liter of the tank capacity for Halon 1301

3.10.1.4 Provision shall be made to discharge the required quantity of extinguishing medium in not more than 20 seconds.

3.10.1.5 The system shall not be automatically activated, except in the cases specified in 3.10.2.3.5 and 3.10.3.

3.10.1.6 Means shall be provided for the crew to safety check the quantity of extinguishing medium in the containers and pressure therein.

3.10.1.7 Nozzles shall be so positioned that a uniform distribution of fire extinguishing medium is obtained and that the discharge does not endanger personnel engaged in attending the equipment or using the normal access ladders and escapes serving the compartment.

#### 3.10.2 Use of Halon 1301 as fire extinguishing medium

3.10.2.1 The extinguishing system shall be provided with two independent manual control arrangements, one of them being positioned at the fire control station and the other in a

readily accessible position outside the protected space.

# INTERMARITIME CERTIFICATION SERVICES (*ICS Class*)

## Chapter 6 Fire Protection

- 3.10.2.2 If there is a need to provide overpressure in the container, nitrogen shall preferably be used for these purposes.  
On agreement with *ICS Class*, the use of another gas may be permitted. .7
- 3.10.2.3 Along with arrangement of Halon 1301 containers in accordance with 3.1.3.1, they may be stored inside the protected space and individually distributed throughout the space, the following requirements being complied with: .8
- .1 Provision is to be made for a release arrangement controlled from outside the protected space. Duplicate sources of power are to be provided for this release, one of the sources is to be located outside the protected space and be immediately available.
- .2 Electric power circuits connecting the containers shall be monitored for fault conditions and loss of power. Visible and audible alarms shall be provided to indicate this in the navigating bridge or main fire control station.
- .3 Hydraulic or pneumatic power circuits connecting the containers are to be duplicated. To monitor the sources of pneumatic or hydraulic pressure, visual and audible alarms are to be provided in the navigating bridge or main fire control station.
- .4 Within the protected space, any electrical power circuit of the control arrangement shall be of heat-resisting type.  
The piping system of a hydraulically or pneumatically operated control arrangement shall be of steel or other equivalent material approved by *ICS Class*.
- .5 Each container shall be fitted with an automatic overpressure release device which, in the event of the container being exposed to the effect of fire and the system being not operated, will vent the contents of the container into the protected space.
- .6 The arrangement of containers and control systems shall be such that in the event of damage to any power release line through fire or explosion in the protected space, i. e. a single fault concept, two-thirds of the fire extinguishing charge required by 3.10.1.2, can still be discharged at will.  
The arrangement of the containers and control systems in the space where the installation of one or more containers only is required is subject to special consideration by *ICS Class*.
- .7 Not more than two nozzles shall be fitted on each container.  
The maximum quantity of medium in each container shall be chosen with regard to a necessity of uniform distribution of the medium throughout the space.
- .8 Containers shall be readily available for inspection.  
To monitor the containers for decrease in pressure, visual and audible alarm are to be provided in the protected area and in the navigating bridge or main fire control station, except that for cargo spaces alarms in the protected area need not be provided.
- 3.10.3 Local automatically operated fire extinguishing units using Halon 1301**
- 3.10.3.1 Local automatically operated fire extinguishing units may be fitted in enclosed areas of high fire risk within machinery spaces of category A, in addition to any fixed fire extinguishing system required by *table 3.1.2.1* subject to compliance with the following:
- .1 The space in which such local units are provided shall preferably be on one working level and on the same level as the access.  
More than one working level may be permitted subject to an access being provided on each level.
- .2 The size of the space and arrangement of accesses thereto shall be such that escape from anywhere in the space can be affected in not more than 10 seconds.
- .3 The total quantity of extinguishing medium provided in the local automatically operated system shall be such that a concentration of 7 per cent at 20 °C based on the net volume of the enclosed space is not exceeded when either a fixed smothering system or local automatically operated units have operated.
- .4 The operation of any unit shall be signaled both visually and audibly outside each access to the space and at the control station.
- .5 A notice indicating that the space contains automatically operated fire extinguishing units shall be displaced outside each access.
- .6 The time of discharge of a unit shall be 10 seconds or less.

# INTERMARITIME CERTIFICATION SERVICES (ICS Class)

## Chapter 6 Fire Protection

- .7 The units shall be so arranged that their operation will not impair the maneuverability of the ship and not result in the power supply failure.
- .8 The requirements of 3.1.1.3, 3.10.1.6 and 3.10.1.7 shall also be met.
- 3.10.3.2 Local automatically operated units may be fitted in machinery spaces of category A over equipment having a high fire risk in addition to and independent of any fixed fire extinguishing system (as is required in table 3.1.2.1) subject to compliance with the following:
- .1 The quantity of medium provided in local automatically operated units shall be such that a vapor in air concentration not greater than 1,25 per cent at 20 °C based on the gross volume of the machinery space is obtained in the event of their simultaneous operation.
- .2 The operation of any unit shall be signaled both visually and audibly outside each access to the machinery space and at the control station.
- .3 A notice indicating that the space contains one or more local automatically operated fire extinguishing units, shall be displayed outside each access.
- .4 The requirements of 3.1.1.3; 3.10.1.6, 3.10.1.7, 3.10.3.1.6 and 3.10.3.1.7 shall be also met.
- 3.10.4 Use of Halon 2402 as fire extinguishing media**
- 3.10.4.1 At least two containers with extinguishing medium shall be provided at the fire extinction station. The capacity of each container shall be sufficient for the storage of the total rated amount of the medium calculated using *formule* (3.10.1.2). Both containers shall be so connected to the system that upon emptying one container the other can be immediately. The temperature at the station shall not be less than 20 °C.
- 3.10.4.2 Provision shall be made for not less than two air bottles. The capacity of each bottle shall provide one-shot discharge of the rated quantity of fire extinguishing medium. The final air pressure in the bottle shall ensure minimum adequate pressure at the farthest nozzle to provide effective spraying of the halon.
- In ships where air compressors are fitted, provision shall be made for compressed air supply from the compressor to the air bottles. Non-return cut-off valves are to be fitted on the piping connecting air bottles with the compressed air system and the containers.
- 3.10.4.3 In ships where air compressors are fitted, a system may be permitted, comprising one container in which 115 per cent of the rated quantity of extinguishing medium must be stored, and one air bottle to provide one-shot discharge of extinguishing medium subject to compliance with the following:
- .1 A container shall be fitted with a contents gauge having a time relay and giving an alarm to an attended space if the amount of liquid decreases by 10 per cent.
- .2 An air bottle shall be provided with a pressure indicator fitted in an attended space or a device for automatic air pumping.
- 3.10.4.4 In spaces with a deck head height more than 5 m the nozzles shall be arranged in several tiers.
- Where nozzles are fitted in cargo spaces or holds, the direction of spraying shall be horizontal as far as practicable.
- 3.10.4.5 A container shall be fitted with:
- .1 A contents gauge. If glass gauges are used for this purpose, they shall have plain glasses and stop fittings in places of their connection to the container. Glass gauges indicating a fluid level only within ± 5 per cent of the rated amount of extinguishing medium need not be provided with stop fittings.
- .2 A non-return shut-off valve and a siphon tube for release of extinguishing medium. Subject to special agreement with *ICS Class*, use of up to three siphon tubes may be permitted to provide proportionate discharge of extinguishing medium in the protected spaces different in volume.
- .3 A valve to discharge air in the atmosphere.
- 3.10.4.6 A safety valve and a pressure gauge of the container may be fitted on the compressed air supply pipe. A stop valve may be fitted

# INTERMARITIME CERTIFICATION SERVICES (*ICS Class*)

## Chapter 6 Fire Protection

between the above devices and the container subject to special agreement with *ICS Class*. Halon vapors are to be discharged from the safety valve fitted on the container through a special pipe outside the fire extinction room to the atmosphere.

3.10.4.7 All fittings on the containers shall have bellows seals or other seals approved by *ICS Class*.

### 3.11 Dry powder system

#### 3.11.1 General provisions

3.11.1.1 An extinguishing powder approved by *ICS Class* for this purpose shall be used in the dry powder system.

3.11.1.2 Nitrogen or other inert gas approved by *ICS Class* for this purpose shall be used as a propellant gas.

3.11.1.3 The system shall consist of:

- Powder installations that contain dry powder containers, propellant gas cylinders and a distribution manifold.
- Hose stations.
- Pipes and fittings for bringing the system into action and powder supply to the hose stations.

3.11.1.4 Provision shall be made for a remote release of the system from any hose station. The system shall be brought into action in not more than 30 s after the opening of the release cylinder at the remotest hose station operating from the powder installation concerned.

#### 3.11.2 Quantity of dry powder and propellant gas. Capacity and number of nozzles

3.11.2.1 A rated quantity of dry powder shall be stored in each container of the powder installation to provide a minimum 45 second continuous discharge time for all attached monitors and hand hose lines.

3.11.2.2 Each nozzle is to be capable of discharge at a rate not less than 3,5 kg/s, the powder throw range being not less than 8 m. In determining a maximum distance of

coverage of each hand hose line the length of its hose is to be taken into account.

The capacity of each fixed monitor is to be at least 10 kg/s, maximum distance of coverage for monitors having a capacity 10, 25 and 45 kg/s shall be 10, 30 and 40 m, respectively.

3.11.2.3 The number of hand hose lines and monitors shall provide the delivery of the dry chemical powder to any part of the cargo tank deck and cargo piping from two hand hose lines or a combination monitor/hand hose line.

At least one hand hose line or monitor shall be located aft of the cargo area.

3.11.2.4 In gas carriers one monitor shall be provided in the cargo area to protect cargo manifold and capable of discharge locally and remotely.

3.11.2.5 The quantity of dry powder for the protection of spaces indicated in 1.5.1.2 and 1.5.3.2.2 shall be determined on the basis of 10 second operation of the system with a dry powder discharge rate  $0,1 \text{ kg} \cdot \text{m}^{-3} \text{ s}^{-1}$ .

3.11.2.6 The quantity of the propellant gas shall provide for a single entire release of the dry powder from the powder container.

#### 3.11.3 Powder installations

3.11.3.1 The powder installations shall be positioned outside the cargo tank area. Where the length of the cargo tank deck exceeds 150 m, one powder installation may be located thereon.

3.11.3.2 The dry powder system shall consist of at least two self-contained installations and in gas carriers with a cargo capacity of less than 1000 m<sup>3</sup> only one such installation may be fitted.

3.11.3.3 Ships fitted with bow or stern cargo loading and discharge manifold shall be provided with an additional dry powder installation complete with at least one monitor and one hand hose line.

3.11.3.4 Where a fire extinguishing installation has two or more hose stations, an independent pipe with release valves is to ensure proper

# INTERMARITIME CERTIFICATION SERVICES (ICS Class)

## Chapter 6 Fire Protection

dry powder delivery from the manifold to each station.

The powder installation shall provide for independent and simultaneous operation of all those stations.

### 3.11.4 Hose stations

3.11.4.1 Each hose station shall consist of:

- A nozzle.
- A non-kinkable hand hose line of not more than 33 m in length.
- Remote release cylinders.

Otherwise it shall consist of:

- A monitor.
- Remote release cylinders.

3.11.4.2 All hose station equipment, other than a monitor, shall be stored in a watertight box or cabinet.

3.11.4.3 Each nozzle shall be fitted with an on/off operation and discharge device.

3.11.4.4 The cross-section of the nozzle shall be equal to that of the fire hose line or less than that by not more than 50 per cent.

3.11.4.5 Release cylinders shall be provided with pressure gauges.

3.11.4.6 Instructions on putting the system into action shall be available at the hose station.

### 3.11.5 Dry powder containers, pipes and fittings

3.11.5.1 Provision shall be made in the container for a dry powder discharge pipe cut short at about 100 mm from the bottom.

**Table 3.12.1 Hydraulic test pressure**

N°	Systems and assemblies to be tested	Hydraulic test pressure	
		In shop	On board ship
1	2	3	4
1	Foam and water fire extinguishing systems (see also <i>Ch 8, Section 15</i> ). .1 pipes.	-	In action
	.2 pipes of sprinkler system.	-	1p
2	Pipes of dry powder system	1,5p	1p (by air)
3	Pipes of steam smothering system	1,5p	In action
4	Carbon dioxide systems		
4.1	High-pressure systems: .1 <sup>(4)</sup> pipes from cylinders to release control valves; transit pipe lines passing through spaces (see <i>3.1.4.1.6</i> ); .2 pipes from release control valves to nozzles and pipes from safety devices.	-	1,5p
		-	5 MPa
4.2	Low-pressure systems: .1 <sup>(4)</sup> pipes from tank to release control valves. .2 pipes from release control valves to nozzles and pipes from safety devices.	-	1,5p
		-	1p
5	Pipes and scrubber of the inert gas system.	-	1p (by air)
6	Halogenated hydrocarbon systems.	-	1,5p
7	Pneumatic pipes	1,5p	1p (by air)
8	Cylinders, containers and tanks: .1 operating under pressure, including cylinders without valves. .2 operating without pressure. .3 cylinders with screwed-in valves.	1,5p	1p (by air) (containers acc. to <i>3.11.4</i> )
		By filling up to the top of the air pipe	In assembly with system
		1p (by air)	-
9	Fittings	1,5p but not less than 0,2 MPa	-

**NOTES:**

- .1 *p* is the maximum working pressure in the system and for carbon dioxide *p* is a design pressure of a cylinder or a tank, MPa.
- .2 Fittings in assembly shall be tested for the tightness of closing by a pressure of at least 1,25p, the valves of carbon dioxide cylinders by the highest breaking pressure of protective diaphragms according to *3.8.2.6.1*.
- .3 The systems shall be tested in assembly on board ship upon completion of all erection work.
- .4 Pipes specified in *4.1.1* and *4.2.1*, after being tested by a pressure of 1,5p in the shop, may be tested on board by an air pressure of 1p.
- .5 Pipes of the water fire main system in ships of 500 tons gross tonnage and upwards (see *3.2.5.1*) are to be tested by a pressure of at least 1,0 MPa.



# INTERMARITIME CERTIFICATION SERVICES (ICS Class)

## Chapter 6 Fire Protection

- 3.11.5.2 A device is to be provided in the lower part of the container for gas flow into the container preventing the powder from flowing back into the gas pipe.
- 3.11.5.3 The filling ratio of the containers shall be taken equal to not more than 0,95.
- 3.11.5.4 Pipes and fittings shall have no contractions and abrupt expansions of cross-section.
- 3.11.5.5 The cross-sectional area of the manifold in the powder installation shall be not less than the total area of the pipes connected thereto for simultaneous discharge of dry powder or shall be not more than twice that area.
- 3.11.5.6 Provision shall be made on the distribution manifold for an arrangement for purging the pipes after use.
- 3.11.5.7 A bending radius of the dry powder pipe shall be not less than 10 pipe diameters.
- 3.11.5.8 The dry powder shall be discharged into the spaces indicated in *1.5.1.2* and *1.5.3.2.2* through nozzles. Their construction, arrangement and number shall provide for uniform spraying of powder in the entire volume of the space. The pressure at the remotest nozzle shall be taken at least equal to a minimum pressure necessary for effective spraying of powder.
- 3.12 Testing of fire extinguishing systems**
- 3.12.1 Fire extinguishing systems shall be tested in compliance with *table 3.12.1*
- 
- SECTION 4**
- Fire detection and alarm systems**
- 4.1 General requirements**
- 4.1.1 All items of electrical equipment, devices, feeders and wiring of fire detection and alarm systems shall fully comply with *Ch 11, Subsection 7.4*.
- 4.1.2 The control desk of the system shall be installed on the navigating bridge or at the main fire control station.  
The indicating panels shall be installed in such a way that every fire detection signal is received by a responsible person. If there is no control desk in the wheelhouse, an indication panel shall be installed there.
- 4.1.3 Announcing an outbreak of fire to the crew, passengers, and special personnel shall be by means of the general alarm system, requirements for which are set out in *Ch 11, Subsection 7.3*.
- 4.1.4 In the fire detection system alarms giving indication of fire and its location as well as of fault conditions in the detector circuits shall permit of readily indicating an area or a space from which a signal has come and a circuit where a fault occurred.  
A signal received at the main fire control station shall be duplicated by an audible signal in the place where permanent watch, when in port, is provided.  
In passenger ships visual signals shall be arranged on the mimic diagram. Audible signals shall be capable of being cut off. The circuit shall be so designed as upon receiving a second signal an audible signal previously cut off operates again.
- 4.1.5 The location of fire detectors shall meet the following requirements:
- .1 A section of detectors shall not be situated in more than one vertical fire zone.
- .2 A section of detectors shall not serve spaces on both the port and starboard sides of the ship and not on more than one deck, except a section which covers an enclosed stairway.
- .3 A section of detectors shall not contain more than 100 detectors and shall not cover more than 50 rooms.
- .4 A section of fire detectors which covers machinery spaces of category A is not to include fire detectors of control stations, accommodation spaces or service spaces.
- 4.1.6 Suitable instructions for testing and maintenance of the system shall be displayed adjacent to a fire alarm station.



# INTERMARITIME CERTIFICATION SERVICES (ICS Class)

## Chapter 6 Fire Protection

- 4.1.7 Provision shall be made for automatically testing the correct operation of the automatic fire alarm and detection system. .12 Spaces listed in *Ch 7, rule 1.12.8*. For cargo ships *rules 4.2.1.2.1 - 4.2.1.2.3* are to be met only when Method IIC fire protection is used.
- 4.2 Fire detection system**
- 4.2.1 Automatic fire detection systems**
- 4.2.1.1 Automatic fire detection systems shall be provided in the following ships:
- .1 Passenger ships of 150 tons gross tonnage and upwards.
- .2 Cargo ships of 500 tons gross tonnage and upwards.
- .3 All ships with unattended machinery spaces of category A (see *4.2.3*).  
In the spaces protected by the sprinkler system an automatic fire alarm and fire detection system need not be provided.
- 4.2.1.2 In ships listed under *4.2.1.1.1* to *4.2.1.1.3*, except those not containing any combustible medium, automatic fire detection system shall be provided in the following spaces:
- .1 All accommodation and service spaces except for sanitary spaces, saunas and provision stores.
- .2 Storerooms for explosives, storerooms for readily flammable materials, storerooms for combustible materials, welding workshops.
- .3 Control stations (other than main fire control stations, accumulator battery rooms and generator rooms).
- .4 Inaccessible cargo spaces in passenger ships.
- .5 Cargo spaces fitted for the carriage of other than bulk dangerous goods, including ships under 500 t gross tonnage.
- .6 Special category spaces.
- .7 Closed ro/ro cargo spaces.
- .8 Closed cargo spaces (except those indicated in *items 6 and 7*) fitted for the carriage of vehicles with fuel in their tanks.
- .9 Corridors, stairways and means of escape in way of accommodation spaces in passenger ships where sprinkler system is fitted and in cargo ships where Methods IC and IIC of fire protection are used.
- .10 Incinerator room.
- .11 Zones presenting high fire risk (such as locations of oil purifiers, oil fuel pump units or their rooms, etc.) when said zones are so located that they are not under continuous sight from the centralized control position in attended machinery spaces of category A.
- 4.2.1.3 In the automatic fire detection and fire alarm system detectors are to be operated by heat, smoke or other factors approved by *ICS Class*. Flame detectors are only to be used in addition to smoke or heat detectors. Heat detectors are to be certified to operate within temperature limits of 54 to 78 °C in the spaces with normal temperatures, and within temperature limits of 80 to 100 °C in spaces with higher temperatures, such as certain areas in machinery spaces of category "A", drying rooms, galleys, etc. when the temperature is raised to those limits at a rate less than 1 °C per minute.  
Heat detectors fitted in boiler air supply casing and uptakes are to operate at a temperature exceeding a maximum working temperature of flue gases by 100 °C.  
In spaces referred to in *4.2.1.2.9* smoke detectors are to be fitted operating before the smoke density exceeds 12,5 per cent obscuration per meter, but not until the smoke density exceeds 2 per cent obscuration per meter.  
Smoke detectors fitted in machinery spaces of category A are to operate before smoke density reaches 50 per cent obscuration per meter.  
Use may be made in machinery spaces of category A of the detectors which reveal a seat of fire on appearing temperature pulsation (heat-pulse detectors). The detectors are to be set to a temperature pulse frequency of 1,9 - 2,3 Hz and above and to operate when an amplitude is exceeded by (2 ± 0,5) °C, whatever the room temperature may be.  
Automatic detectors are to be so arranged as to permit that they return to its initial state without changing any of its elements, when operation tests are carried out.
- 4.2.1.4 Detectors shall be so placed in the upper part of each protected space bounded by bulkheads, decks and enclosures that free flow of hot gases is ensured thereto. These detectors shall be protected against impacts and physical damage.

# INTERMARITIME CERTIFICATION SERVICES (ICS Class)

## Chapter 6 Fire Protection

Detectors which are located on the overhead are to be at a minimum distance of 0,5 m away from bulkheads. The maximum area and required spacing of detectors are to be in accordance with *table 4.2.1.4*.

**Table 4.2.1.4**  
**Maximum area and required spacing of detectors**

Type of detector	Maximum floor area per detector, m <sup>2</sup>	Maximum distance apart between centers, m	Maximum distance away from bulkheads, m
Heat	37	9	4,5
Smoke	74	11	5,5

*ICS Class* may permit departures from the requirements of *table 4.2.1.4* based upon test data agreed with *ICS Class*.

When heat-pulse detectors are used in machinery spaces, the deck area served by one detector is to be 50 m<sup>2</sup>, and the distance between centers is to be not more than 8 m.

4.2.1.5 The automatic smoke detection system operating on the principle of air sampling from spaces shall comply with the following additional requirements:

.1 The system shall be capable of continuous operation at all times. Systems operating on a sequential scanning principle may be permitted on agreement with *ICS Class*.

.2 The sampling pipe arrangements shall be such that the location of the fire can be readily identified.

.3 The system shall be constructed and installed so as to prevent the leakage of any toxic or flammable substances or fire extinguishing media into any accommodation and service space, control station or machinery space.

.4 At least one smoke accumulator shall be located in every enclosed space for which smoke detection is required. However, where a space is designed to carry oil or refrigerated cargo, or other cargoes for which a smoke sampling system is required, means may be provided to isolate the smoke accumulators in such compartments on agreement with *ICS Class*.

.5 Smoke accumulators shall be located for optimum performance and shall be spaced so that no part of the overhead deck area is more than 12 m measured horizontally from an accumulator. Where systems are used in spaces which may be mechanically ventilated, the position of the smoke accumulators shall be considered having regard to the effects of ventilation.

.6 Smoke accumulators shall be positioned where impact or physical damage is unlikely to occur.

.6 Not more than four accumulators shall be connected to each sampling point.

.7 Smoke accumulators from more than one enclosed space shall not be connected to the same sampling point.

.8 Sampling pipes shall be of self - draining type and shall be protected from impact or damage from cargo working.

.9 The sensing unit shall operate before the smoke density, within the sensing chamber, exceeds 6,65 % obscuration per meter.

.10 At least two sample extraction fans shall be provided.

.11 The fans shall be of sufficient capacity to operate with the normal conditions of ventilation in the protected area.

.11 The fire alarm station shall have means permitting observation of smoke in the individual sampling pipe.

.11 Means shall be provided to monitor the airflow through the sampling pipes so designed as to ensure that equal quantities are extracted from each interconnected accumulator.

.12 Sampling pipes shall be a minimum of 12 mm inside diameter. Where the pipes are used in conjunction with fixed gas fire - extinguishing systems, the minimum size of pipe shall be sufficient to permit the fire extinguishing medium to be discharged within the appropriate time.

.13 Sampling pipes shall be provided with arrangement for periodically purging with compressed air.

4.2.1.6 Provision shall be made for checking the operation of detectors by means of devices supplying hot air of particular temperature or by using smoke or aerosol having the relevant range of density or particle sizes, or by applying other conditions inherent in a

# INTERMARITIME CERTIFICATION SERVICES (ICS Class)

## Chapter 6 Fire Protection

fire to which the automatic detector shall respond.

in normal and emergency conditions. The button shall be protected with glass.

### 4.2.2 Manual alarms

### 4.2.3 Protection of unattended machinery spaces

4.2.2.1 Manual fire alarms shall be provided in the ships which in compliance with 4.2.1.1 are equipped with automatic fire detection system.

4.2.3.1 Unattended machinery spaces of category A, as well as heated air ducts and main boiler uptakes, essential auxiliary boilers with a steam capacity over 3 t/h and boilers with thermal liquids (including exhaust gas boilers) in such spaces are to be provided with an automatic fire alarm and fire detection system (see also *Ch 9, rule 2.2.5*).

4.2.2.2 In ships referred to in 4.2.2.1, the buttons of manual fire alarms shall be fitted in the following positions:

- .1 In the corridors of accommodation and service spaces.
- .2 In lobbies.
- .3 In public spaces having an area of more than 150 m<sup>2</sup>.
- .4 In machinery spaces of category A and in main control stations.
- .5 In working spaces referred to in 1.5.8.1.
- .6 In special category spaces.
- .7 At exits from accommodation and machinery spaces to cargo spaces for motor vehicles with fuel (other than diesel oil) in their tanks.

4.2.3.2 In addition to the requirements of 4.2.1, a fire alarm and fire detection system of machinery space of category A shall meet the following requirements:

4.2.2.3 The buttons shall be placed in easily accessible positions and shall be readily noticeable. Within each main vertical fire zone in passenger ships there shall be at least one button on both sides on each deck, so that within the same main vertical fire zone the distance between buttons does not exceed 20 m.

.1 An indicating unit shall be fitted at the main fire control station, on the navigating bridge or another accessible place protected from fire in machinery space of category A.

.2 A light signal shall indicate the location (zone) of fire.

.3 The audible alarm signals shall be different from the other audible signals in the space where is located the indicating unit and shall be easily heard in all the spaces, as well as in the accommodation spaces of the responsible operator of the propulsion installation. Besides, these spaces shall be provided with visual signals.

.4 In case of power supply failure or any fault in the system an audible alarm signal distinct from fire alarm shall be given in addition to a visual signal.

In all other ships, there shall be one button within accommodation and service spaces on each deck, and if the length of the corridor exceeds 20 m, there shall be on each deck 2 buttons fitted in corridors on both sides of the ship and, as far as possible, in the opposite parts of the spaces.

In the accommodation and service spaces are arranged in various locations on the length of the ship, for instance, amidships and aft, the buttons shall be fitted in each of such locations, and on each of the decks, their number being as specified above.

4.2.3.3 Type and location of detectors shall ensure rapid indication of fire and not permit of false operations under normal operating conditions of a machinery space. Provision shall be made for detectors of at least two types operating by different factors of fire detection. In spaces of less than 2,5 m in height use of heat detectors only may be permitted on agreement with *ICS Class*.

4.2.2.4 The sections of automatic fire alarms may also be used for manual fire alarms.

4.2.3.4 The arrangement of detector sections shall provide for the indication of fire location. Air movement due to machinery operation shall not affect the efficient operation of the fire alarm and fire detection system.

4.2.2.5 All buttons of manual fire alarms shall be painted red and adequately illuminated both

# INTERMARITIME CERTIFICATION SERVICES (ICS Class)

## Chapter 6 Fire Protection

4.2.3.5 Detectors with controlled sensitivity shall have holding devices and an indicator of the preset sensitivity.

4.2.3.6 Where provision is made for temporarily cutting off an individual detector or a section of detectors, this shall be clearly marked. When a preset period of time expires, a cut-off detector or a section of detectors shall automatically cut in.

4.2.3.7 Facilities shall be provided to release manually the fire alarm from the following places:

- Corridors having entrances to machinery spaces of category A.
- Wheelhouse.
- Control station in the engine room.

### 4.3 Fire warning alarms

4.3.1 Alarms intended to warn that fire extinguishing systems referred to in 3.8 and 3.10 are put into action shall be provided in the spaces permanently or periodically attended by people on their duties under normal service conditions, e. g. such as machinery spaces of category A and cargo spaces referred to in 1.5.4.3.1 except for small spaces where escape route to the door leading to the open deck does not exceed 10m walking distance, the height of the ladder being not more than 2,5 m.

4.3.2 The signal warning of putting a total flooding system into action shall be given only within the space into which the extinguishing medium is to be discharged.

4.3.3 Control of fire warning alarms shall be interlocked both with the manual and the remote control of the system, no matter from which control position the system is started for operation. The warning signal shall be transmitted to the protected space so that people can leave the space before the fire extinguishing medium is discharged therein. The time required for this purpose shall be about 1 - 2 min and shall be determined to correspond to the length of the way for escape from the remotest point in the space to the exit there from.

4.3.4 The signal shall be clear, distinct and readily audible in a noisy space, and shall be of a tone distinct from all other signals. In addition to the audible signal, there shall be a visible signal: "Gas! Go away!".

4.3.5 Audible alarm in the cargo pump room shall be:

- Pneumatic, operated by dry and clean air or
- Electrically-operated, intrinsically safe or
- Electrically-operated, the electric actuating mechanism being located outside the pump room.

---

## SECTION 5

### Fire fighting outfit, spares and tools

#### 5.1 Fire fighting outfit

5.1.1 All items of the outfit shall be of a type approved by a competent state body and shall be ready for use at any time. Easy access to these items shall be provided.

5.1.2 Depending on the purpose and size of the ship the standards for supplying portable fire fighting appliances, apparatus and consumable materials shall be in compliance with *table 5.1.2*.

5.1.3 The couplings of all portable items of outfit (fire hoses, fire hose nozzles, portable foam generators, etc.) shall be of the standard quick-acting type and size adopted for the given ship. All couplings and items of outfit shall be made of a material resistant to marine environment. In oil tankers and combination carriers couplings and items of outfit shall prevent spark formation.

5.1.4 Fire hoses shall comply with the following requirements:

.1 They shall have a length of 15 - 20 m for hydrants fitted on the open decks, and 10 - 15 m for hydrants fitted within the spaces, as well as on the open decks of ships under 500 tons gross.

# INTERMARITIME CERTIFICATION SERVICES (ICS Class)

## Chapter 6 Fire Protection

- .2 They shall be made of approved materials. Also, are to be resistant to the destructive action of microorganism.
- .3 Fire hoses in assembly with nozzles shall be stowed at hydrants on reels or in baskets. On open decks they shall be kept in spray- proof ventilated lockers or enclosures. The lockers and enclosures shall be marked with letters "FH" (fire hydrant) painted red.
- .4 In interior locations in passenger ships carrying more than 36 passengers fire hoses shall be connected to the hydrants at all times.
- 5.1.5 Standard nozzle sizes shall be 12, 16 and 19 mm or close thereto. Nozzles sizes greater than 12 mm need not be used in accommodation, service and working spaces. In ships under 150 tons gross tonnage nozzles having 10 mm in diameter are permitted to be used. For machinery spaces and exterior locations, the nozzle size shall be such as to obtain maximum discharge possible from two jets at the pressure at each hydrant mentioned in *table 3.2.1.1* from the smallest pump, but nozzle sizes greater than 19 mm need not be used. Nozzles are to be of an approved dual-purpose type with a shut-off device.
- 5.1.6 Air-foam nozzles for delivery of low-expansion foam (see 3.7) from fixed fire extinguishing system shall comply with the following requirements:
- .1 On cargo tank deck of oil tankers each nozzle shall be capable of delivering 4 m<sup>3</sup>/min of foam at a distance not less than 15 m (see also 3.7.2.3).
- .2 In ship's spaces each nozzle shall be capable of delivering at least 2 m<sup>3</sup>/min of foam.
- 5.1.7 Foam extension pipes with a hook-shaped bell - mouth at the end (for low-expansion foam) and extension pipes fitted with light supports at the middle (for medium-expansion foam) shall be of about 4 m in length.  
An extended air-foam nozzle having a hook - shaped bell-mouth may be used in addition to the usual air-foam nozzle instead of a foam extension pipe.
- 5.1.8 A portable foam set supplied from the water fire main system shall consist of:
- .1 An air-foam nozzle or foam generator delivering foam at a rate of at least 1,5m<sup>3</sup>/min.
- .2 Two portable vessels with foam concentrate of not less than 20 l capacity each.
- .3 Foam mixer (if air-foam nozzle or foam generator is not provided with an ejector).
- .4 A hose for connecting a vessel to the nozzle, foam generator or mixer.  
Complete sets shall be located near the hydrants.
- 5.1.9 Portable fire extinguishers shall be of an approved type and shall comply with the following requirements:
- .1 No fire extinguishing medium which either by itself or when in use gives off toxic gases shall be permitted.
- .2 Fire extinguishers shall have safety devices preventing the pressure therein to rise above permissible limits.
- .3 Every three fire extinguishers capable of being recharged on board ship shall be provided with two spare charges.
- .4 For every ten fire extinguishers not capable of being recharged on board the ship one spare fire extinguisher shall be provided.
- .5 Fire extinguishers in special brackets of quick - detachable type shall be located in positions protected against direct sunrays and precipitation at a height of not more than 1,5 m as measured from the space floor to their handle and at a distance of at least 1,5m from sources of heat.
- .6 Where several fire extinguishers are provided in the space in compliance with *table 5.1.2*, some of them shall be located near the entrances, and the remainder shall be placed where a fire is most likely to break out within the space.  
Where only one fire extinguisher is required for a particular space, it shall be located near the entrance to such space

# INTERMARITIME CERTIFICATION SERVICES (ICS Class)

## Chapter 6 Fire Protection

**Table 5.1.2 Number of items of outfit to be available in each ship**

N°	Description of items of outfit	Number of items
1	2	3
1	Fire hoses with couplings (see 5.1.4):	
	.1 for water	In accordance with the number of hydrants fitted on board ship.
	.2 For foam solution	In accordance with the number of fire hydrants to which foam solution is supplied from fixed foam fire extinguishing system. If the size of the water hoses required by 1.1 is suitable for handling foam solution, such hoses may be taken into account to complete the number of hoses to be coupled to the hydrants fitted on the upper decks.
2	Fire hose nozzles:	
	.1 Dual-purpose nozzles for producing a compact and a sprayed jet (see 5.1.5)	In accordance with the number of hydrants fitted on board ship.
	.2 Air-foam nozzles (see 5.1.6)	In accordance with the number of hydrants where to foam solution is supplied from the fixed foam fire extinguishing system.
	.3 Foam extension pipes (see 5.1.7)	In accordance with the number of air-foam nozzles for fire extinction in cargo tanks of oil tankers.
	.4 Portable foam generators (see 5.1.20)	Twice the rated number of foam generators.
	.5 Extension pipes (see 5.1.7)	50 per cent of the number of portable foam generators intended for fire extinction in the cargo tanks of oil tankers.

# INTERMARITIME CERTIFICATION SERVICES (ICS Class)

## Chapter 6 Fire Protection

3	Portable foam set (see 5.1.8)	<p>.1 In machinery spaces of category A and in the spaces with steam turbines, 1 set for each space.</p> <p>.2 For oil fuel storage tanks (except for double bottom tanks), 1 set for each space adjacent to the walls or decks of the tanks. Where the walls of the tanks are adjacent to machinery spaces of category A, the sets contained in the latter spaces may be regarded as sets required for protecting the oil fuel storage tanks.</p> <p>.3 In each fuel distributing station and each cargo hose room, 1 set.</p> <p>.4 In working spaces referred to in 1.5.8.1, in which are used oil fuel, flammable liquids or combustible materials or in which are processed combustible materials, 1 set per fire hydrant fitted, but not more than 3 sets are required for each space. A space of less than 150 m<sup>2</sup> need not have more than 1 set.</p> <p>.5 In hangars and on landing areas for helicopters, 2 sets.</p> <p>.6 In special category spaces, 2 sets.</p> <p>.7 On open deck of container ships, 2 sets.</p> <p>.8 In ro/ro cargo space for the carriage of motor vehicles with fuel in their tanks, 3 sets.</p> <p>Where spaces mentioned in 3.1 to 3.6 are protected by a fixed foam fire extinguishing system, portable foam sets need not be provided. In this case, cock-ended branches from the foam fire extinguishing system shall be led to these spaces.</p> <p>A set consisting of a hose and an air-foam nozzle is to be stored near the hydrants.</p> <p>The number of hydrants and sets shall be as specified above.</p>
---	-------------------------------	--

**INTERMARITIME CERTIFICATION SERVICES (ICS Class)**  
Chapter 6 Fire Protection

**Table 5.1.2 (Continued)**

N°	Description of items of outfit	Number of items
1	2	3
4	<p>Portable foam fire extinguishers, dry powder fire extinguishers and carbon dioxide fire extinguishers (see 5.1.9). The use of dry powder fire extinguishers is permitted in all spaces instead of foam and carbon dioxide fire extinguishers</p>	<p>The minimum number of fire extinguishers at control stations, accommodation and service spaces shall be determined on the basis of 2 fire extinguishers for every 30 m or part thereof, of the deck length on which such spaces are situated, but not less than the number required in accordance with the following provisions:</p> <p>.1 Control stations:</p> <ol style="list-style-type: none"> <li>1. 1 foam fire extinguisher for each space, 1 fire extinguisher being permitted to be fitted in the corridor for a group of small spaces with a total area of up to 50 m<sup>2</sup>, provided that the entrances to the spaces are adjacent and situated in the same corridor. Not required in unattended spaces of ships less than 300 tons gross tonnage.</li> <li>.2 1 carbon dioxide fire extinguisher for each space or group of spaces (as specified in 4.1.1 of this table) containing electrical or radio equipment, as also for chart houses and chart compartments.</li> <li>.3 1 foam fire extinguisher for each space containing an emergency diesel-generator or a fire diesel-driven pump.</li> </ol> <p>.2 Accommodation and service spaces:</p> <ol style="list-style-type: none"> <li>.1 for every 30 m, or part thereof, of the length of the corridors communicating with accommodation and service spaces, 1 foam fire extinguisher.</li> <li>.2 for every 100 m<sup>2</sup>, or part thereof, of area of public spaces, 1 foam fire extinguisher. For spaces less than 15 m<sup>2</sup> in area fire extinguishers fitted near them may be used.</li> <li>.3 in galleys and bakeries with oil-fired equipment, 1 foam fire extinguisher for each space.</li> <li>.4 in galleys and bakeries with electrical, steam, coal- or gas-fired equipment, having the area of more than 50 m<sup>2</sup>, 1 foam or carbon dioxide fire extinguisher.</li> <li>.5 in other domestic service spaces, 1 foam fire extinguisher (where fire extinguishers are available in the corridor, at the entrance to the space, provision of fire extinguishers within the space is not compulsory).</li> <li>.6 in each stairway enclosure and in each lobby, 1 foam fire extinguisher.</li> <li>.7 in storerooms for readily flammable and combustible materials, 1 foam fire extinguisher for each space. Where the storeroom area is less than 50 m<sup>2</sup>, the fire extinguishers may be kept in the corridor in close vicinity of the entrance to the space concerned or group of small spaces (with a total area not more than 50 m<sup>2</sup>). In addition to the above number of fire extinguishers, within the other ship's spaces the number of fire extinguishers shall be determined as follows:</li> </ol>



**INTERMARITIME CERTIFICATION SERVICES (ICS CLASS)**

**Chapter 6 Fire Protection**

**Table 5.1.2 Continued**

N°	Description of items of outfit	Number of items
1	2	3
4	Portable foam fire extinguishers, dry powder fire extinguishers and carbon dioxide fire extinguishers (see 5.1.9). The use of dry powder fire extinguishers is permitted in all spaces instead of foam and carbon dioxide fire extinguishers	<p>.3 In machinery spaces containing main or auxiliary machinery of the internal combustion type, 1 foam fire extinguisher for every 740 kW or part thereof, of the total power of the machinery installed in each space, but not less than 2 for each space. However, the number of fire extinguishers need not exceed 6 per space. In ships of less than 150 tons gross tonnage, it is sufficient to have 1 foam fire extinguisher.</p> <p>.4 In machinery spaces containing main or auxiliary steam-driven machinery, 2 foam fire extinguishers for each space.</p> <p>.5 In boiler rooms containing oil-fired main or auxiliary boilers, at least 2 foam fire extinguishers per firing space and per space containing oil fuel installation. Where an auxiliary boiler is installed in the machinery space, the necessity for additional fire extinguishers in excess of the number required by 4.3 of this table is subject to special consideration by <i>ICS Class</i>.</p> <p>.6 In spaces containing electric machinery or equipment:  1 carbon dioxide fire extinguisher, for spaces containing main internal combustion or steam machinery, if the total power of the main machinery is less than 740 kW.  2 carbon dioxide fire extinguishers, for spaces containing main internal combustion or steam machinery, if the total power of the main machinery is equal to, or more than, 740 kW.  1 carbon dioxide fire extinguisher for each electric generator or group of generators, the total power being 500 - 1000 kW.  1 carbon dioxide fire extinguisher for spaces containing auxiliary machinery with electrical drives and for special electrical spaces.  The carbon dioxide fire extinguishers required by this sub-item shall be provided in the above spaces whether or not provision is made for foam extinguishers required by other sub-items of this table.</p> <p>.7 In separate spaces containing switchboards, 2 carbon dioxide fire extinguishers per space.  In space having an area of 15 m<sup>2</sup>, 1 carbon dioxide fire extinguisher, near the entrance to the space.</p> <p>.8 In accumulator battery rooms, other than those for radio stations and emergency lighting, 1 carbon dioxide fire extinguisher per space.</p> <p>.9 In compartments for auxiliary machinery, 1 foam fire extinguisher, when the space area is 50 m<sup>2</sup> and more, otherwise the fire extinguisher placed near the entrance to such space may be sufficient.</p> <p>.10 For oil fuel tanks, other than those of double bottom, not less than 2 foam fire extinguishers in each space adjacent to the walls or decks of the tanks. If such adjacent spaces are already provided with fire extinguishers, no additional fire extinguishers are required.</p>

**INTERMARITIME CERTIFICATION SERVICES (ICS CLASS)**

Chapter 6 Fire Protection

**Table 5.1.2 Continued**

N°	Description of items of outfit	Number of items
1	2	3
4	Portable foam fire extinguishers, dry powder fire extinguishers and carbon dioxide fire extinguishers (see 5.1.9). The use of dry powder fire extinguishers is permitted in all spaces instead of foam and carbon dioxide fire extinguishers	.11 In pump rooms, fuel distributing stations, petrol pipe line trunks, cargo hose spaces: 1 foam fire extinguisher for every 30 m <sup>2</sup> of floor area. .12 In working spaces 2 foam fire extinguishers, if the space area is under 100 m <sup>2</sup> , plus 1 foam fire extinguisher for every 250 m <sup>2</sup> or part thereof, if the space area is more than 100 m <sup>2</sup> . .13 In welding shops and in storerooms for welding equipment, 1 foam fire extinguisher and one carbon dioxide fire extinguisher per space. .14 In special category spaces, cargo spaces for motor vehicles with fuel (other than diesel oil) in their tanks and in ro/ro cargo spaces on each deck, 1 fire extinguisher for each 20 m of deck length on both sides. At entrances to such spaces from accommodation and machinery spaces, 1 foam fire extinguisher. .15 For helicopter decks, two carbon dioxide fire extinguishers.
5	Foam fire extinguishers of at least 45 l capacity or at least 16 kg carbon dioxide or dry powder fire extinguishers (see 5.1.10 and 5.1.11)	.1 In machinery spaces containing engines used as main engines or for other purposes with total power output of not less than 370 kW at least 1 fire extinguisher. For spaces containing steam engines or turbines fitted with a fixed fire extinguishing system fire extinguisher need not be provided. .2 In boiler rooms of cargo ships with domestic boilers of less than 175 kW, 1 fire extinguisher when the area of these rooms is not less than 25 m <sup>2</sup> . .3 In the working spaces, referred to in 1.5.8.1 1 fire extinguisher mentioned in 5.1.11 for every 300 m <sup>2</sup> or part thereof, of each working space (bounded by watertight and gastight bulkheads) in which are used oil fuel or other flammable liquids or are processed greasy substances .4 In spaces containing electric generators or propulsion motors with the total power output being 1000 - 5000 kW, 1 fire extinguisher mentioned in 5.1.11 for each space. .5 In separate spaces containing electric switchboards if the switchboard length is more than 5 m and the space is not protected by means of a fire smothering system, 1 fire extinguisher mentioned in 5.1.11 for each space.
6	Foam fire extinguishers, at least 136 l capacity, or at least 45 kg carbon dioxide fire extinguishers or dry powder fire extinguishers (see 5.1.10 and 5.1.11)	.1 In boiler rooms, 1 fire extinguisher for a space. In this case, fire extinguishers specified in item 5.2 are not required. .2 In hangars and helicopter decks: 1 fire extinguisher for each hangar. .3 In spaces containing electric generators and propulsion motors with the total power output 5000 kW and over, 1 fire extinguisher mentioned in 5.1.11 for each space. Three fire extinguishers in accordance with this table, item 5 may be used instead of one fire extinguisher prescribed by this item.

# INTERMARITIME CERTIFICATION SERVICES (ICS CLASS)

## Chapter 6 Fire Protection

**Table 5.1.2 Continued**

N°	Description of items of outfit	Number of items
1	2	3
6	Foam fire extinguishers, at least 136 l capacity, or at least 45 kg carbon dioxide fire extinguishers or dry powder fire extinguishers (see 5.1.10 and 5.1.11)	.4 For helicopter deck, 1 carbon dioxide fire extinguisher. .5 For helicopter deck, dry powder fire extinguishers of a total capacity of not less than 100 kg.
7	Metal receptacles containing sand or sawdust (see 5.1.12)	1 receptacle in each firing space in each boiler room with oil-fired boilers, and each space containing a part of the oil fuel unit, as well as near lamp and paint lockers, fuel filling and distributing positions and in other fire hazardous areas where oil fuel or other flammable liquids are liable to spread (except for machinery spaces). 1 receptacle containing sand or dry sawdust impregnated with soda may be replaced by 1 portable foam fire extinguisher.
8	Blankets (see 5.1.13)	.1 1 blanket for every 40 m, or part thereof, of open deck length of oil tankers, and passenger ships. .2 In all other ships not referred to in this table, item 8.1, 1 blanket, if the ship is from 300 to 1000 tons gross tonnage, and 2 blankets, if the ship is of 1000 tons gross tonnage and upwards. .3 In machinery spaces of category A in ships of more than 300 tons gross, 1 blanket for each space. .4 In working spaces indicated in 1.5.8.1, 1 blanket for each space.
9	Sets of fire fighting tools (see 5.1.14)	For ships under 2000 tons gross, 1 set. For ships of 2000 to 4000 tons gross, 2 sets. For ships of 4000 to 10000 tons gross, 3 sets. For ships of 10000 tons gross and upwards, 4 sets.
10	Fireman's outfit (see 5.1.15)	.1 In passenger ships, 2 sets and additionally for every 80 m, or part thereof, of the length of the longest deck where accommodation and service spaces are situated, 2 sets in accordance with 5.1.15 and 2 sets of personal outfits in accordance with 5.1.15.1.1, 5.1.15.1.2 and 5.1.15.1.3. Not required in ships of restricted navigation of less than 300 tons gross tonnage. .2 In oil tankers (> 60 °C) and combination carriers of 500 tons gross tonnage and upwards, 4 sets. .3 In cargo ships of 500 tons gross tonnage and upwards, 2 sets.
11	Portable electric or pneumatic drills (see 5.1.16)	In all ships of 4000 tons gross tonnage and upwards, 1 drill per ship.
12	Portable electric exhaust fans complete with suction and delivery hoses (see 5.1.17)	In all ships of 500 tons gross tonnage and upwards, provided with a fixed fire extinguishing system according to 3.8, 3.9 and 3.10, 1 pc.
13	Portable fire motor-pumps (*) complete with suction and delivery hoses and fire hose nozzles (see 5.1.18)	.1 In ships where the fixed water fire main system is not fitted according to 3.2.1.6, 1 pc per ship. .2 Where no fixed emergency fire pump is fitted (see 3.2.1.3), 1 motor-pump per ship.

# INTERMARITIME CERTIFICATION SERVICES (ICS CLASS)

## Chapter 6 Fire Protection

**Table 5.1.2 Continued**

N°	Description of items of outfit	Number of items
1	2	3
14	International shore connection (see 5.1.19)	In all ships of 500 tons gross tonnage and upwards, and on the floating cranes, 1 set.
15	Foam concentrate	Full amount of foam concentrate required by 3.7.
16	Fire extinguishing media used in fire extinguishing systems	Full amount required under the provisions of the relevant sections of the present Rules.
17	.1 Gas analyzers for vapors of flammable liquids and gases	In ships carrying dangerous goods or motor vehicles with fuel (other than diesel oil) in their tanks, as well as in ro/ro ships (see 2.8.6), 1 pc.
	.2 Gas analyzers for oxygen content	In oil tankers and combination carriers, 2 pcs. In oil tankers and combination carriers equipped with an inert gas system, 2 pcs.
18	Fog applicator (see 5.1.21)	In passenger ships of unrestricted service carrying more than 36 passengers: .1 In each machinery space of category A, 2 pieces. .2 For each pair of breathing apparatus (see 5.1.15.2), 1 piece .3 In each special category space, 3 pieces. .4 In each ro/ro cargo space, 3 pcs.
19	Fire buckets (see 5.1.22)	In ships having no water fire main system, 3 buckets.

- |        |   |    |   |
|--------|---|----|---|
| .7     | The capacity of portable foam fire extinguishers shall be not less than 9 l and not more than 13,5 l.   | .1 | Fire extinguishers shall be located within the protected space, in regular fixed places near the exits.<br>Only fresh water shall be used for charging the fire extinguishers.  |
| .8     | Where fire extinguishers containing other extinguishing media are used, they shall not be less effective than 9 l foam fire extinguishers, whereas their overall dimensions and mass shall not exceed those of a 13,5-l foam fire extinguisher<br>In powder fire extinguishers the quantity of powder is to be not less than 4 kg, and carbon dioxide extinguishers are to contain at least 3 kg of carbon dioxide. | .2 | The air for an air-foam extinguisher shall be kept in a cylinder provided solely for that particular extinguisher. The quantity of air in the cylinder shall be at least 25 per cent in excess of the rated amount.<br>The air cylinder shall be fitted with a pressure gauge.  |
| .9     | In the machinery spaces fire extinguishers shall be so located that an extinguisher is not more than 10 m walking distance from any point in the space.   | .3 | The delivery of foam from the fire extinguishers shall be through rubber-textile hoses of 10 - 15 m long. In order to increase the range of action for 136 liter fire extinguishers, fixed piping for attachment of hoses thereto may be laid, the total length of pipes and hoses not exceeding 30 m. In all cases, the location of fire extinguishers and the length of pipes and hoses shall be such that the foam may reach any part of the space. For fire extinction under the floor plates of machinery spaces of category A |
| 5.1.10 | Foam fire extinguishers of at least 45 and 136 l shall meet the following requirements:   |    |   |

# INTERMARITIME CERTIFICATION SERVICES (ICS CLASS)

## Chapter 6 Fire Protection

- and under the engine bed plates, there shall be openings in the floor to lead a hose through, or an appropriate arrangement of branch pipes.
- 5.1.11 Carbon dioxide or dry powder fire extinguishers of at least 16 and 45 kg shall meet the following requirements:
- .1 Carbon dioxide fire extinguishers shall not be used in spaces of such volume that the complete discharge of the carbon dioxide contained in the cylinders is liable to cause concentration in excess of 5 per cent.
  - .2 An extinguishing medium shall be delivered to any part of the protected space through fire hoses of 10 - 15 m in length and through pipes if necessary.
  - .3 Fire extinguishers shall be placed near the exits in the spaces and shall be protected against mechanical damage.
- 5.1.12 Metal receptacles containing sand or dry sawdust impregnated with soda shall comply with the following requirements:
- .1 The capacity of receptacles shall be:
    - 50 l for ships of less than 150 tons gross tonnage;
    - 125 l for ships of 150 to 500 tons gross tonnage;
    - 250 l for ships of 500 tons gross tonnage and upwards.
  - .2 Each receptacle shall be provided with a readily opening watertight cover, a scoop and a device for holding the cover in the open position.
- 5.1.13 Fire smothering blankets shall comply with the following requirements:
- .1 They shall be sufficiently stout and durable.
  - .2 As a rule, they are to be made of non-combustible material.
  - .3 The area of the blankets is to be at least 3 m<sup>2</sup> and shall be round or square - shaped.
  - .4 The blanket dimensions shall be 1,5 x 2,0 m.
- 5.1.14 Complete sets of fire fighting tools shall comply with the following requirements:
- .1 One complete set shall include one fire axe and one light-weight fire crowbar.
  - .2 The sets of fire fighting tools shall be stowed on regular boards. The fastening of the tools shall permit of ready availability of the tools for use.
- .3 In ships for the carriage of motor vehicles with fuel (other than diesel oil) in their tanks one set of tools shall be placed near the exits from the accommodation and machinery spaces to cargo spaces.
- 5.1.15 The fireman's outfit shall include:
- .1 Personal outfit consisting of:
    - 1.1 Protective clothing made of a material capable of protecting the fireman's skin against the heat radiated by the fire, against burns and against scalding by steam; the outside surface shall be waterproof.
    - 1.2 Boots and mittens of rubber or of some other dielectric material.
    - 1.3 A rigid helmet ensuring effective protection against impacts.
    - 1.4 A portable safe lantern with a minimum burning period of 3 hours.
    - 1.5 A fire axe with a helve made of hard wood; if the helve is made of some other material, it shall be insulated with some suitable dielectric material.
  - .2 A breathing apparatus consisting of:

A smoke helmet or smoke mask which shall be provided with a suitable air pump and an air hose of a length sufficient to reach any part of the holds or machinery spaces through a hatch or doorway; the length of such air hose shall not exceed 36 m or a self-contained compressed air-operated breathing apparatus, the volume of air contained in the cylinders of which is to be at least 1200 l, or other self – contained breathing apparatus which is to be capable of functioning for at least 30 min.

Each breathing apparatus shall be provided with a flexible fireproof lifeline, about 30 m in length.

The lifeline shall be subjected to a test by statically load of 3.5 kN for 5 min. The lifeline shall be fastened directly to the apparatus or to a separate belt by means of a snap hook to preclude spontaneous separation of the line from the apparatus.

In ships where self-contained breathing apparatus are carried, provision shall be made for one complete spare charge or spare apparatus.

Fireman's outfits are to be stored in widely separated positions and to be easily accessible and ready for use.

# INTERMARITIME CERTIFICATION SERVICES (ICS CLASS)

## Chapter 6 Fire Protection

In passenger ships at least two fireman's outfits and one set of personal equipment are to be available at any one position.

- 5.1.16 Portable electric drills shall be provided with an electric cable of sufficient length. The use of pneumatic drills instead of electric ones is permitted. The electric or pneumatic drills specified in *table 5.1.2, item 11* may be reckoned in the number of the items prescribed for other types of ship's outfit.
- 5.1.17 Portable electric exhaust fans shall be provided with an electric cable of sufficient length to ensure the ventilation of any space protected, and with hoses for suction and exhaust of air.
- 5.1.18 Portable fire motor-pumps shall comply with the following requirements:
- .1 The pump shall ensure simultaneous operation of at least two fire hose nozzles with an outlet diameter of at least 12 mm at pressure 0,4 - 0,6 MPa and at vacuum in suction piping not less than 0,05 MPa; centrifugal pumps shall be fitted with a self-priming device.
  - .2 The pump motor shall be capable of being readily started either by hand or by special starters both at above-zero and below-zero ambient temperatures. The motor shall be provided with a quantity of fuel to ensure the operation of the pump for 1,5 hours without refueling; the ship shall carry an additional reserve of fuel for refueling.
  - .3 Each motor-pump shall be provided with suction hoses, to a total length of 8 m, fitted with a suction strainer and a non-return valve, two delivery hoses, each 20 m long, two dual-purpose fire hose nozzles with an outlet diameter of at least 12 mm and a branch coupling for connecting two hoses.
  - .4 The dimensions and type of coupling for the delivery hoses and nozzles shall correspond to those used in the fixed water fire extinction systems fitted in the ship.
  - .5 The motor-pumps shall be provided with tools and accessories in compliance with the manufacturer's specification.
  - .6 Motor-pumps for use in ships navigating under northern latitudes shall be placed in heated spaces, together with the suction and delivery hoses and nozzles.

5.1.19 The international shore connection (*fig 5.1.19*) for water supply from shore shall be in accordance with the following specification:

- Outside diameter of flange** - 178 millimeters (7 inches);
- Inside diameter of flange** - 64 millimeters (2½ inches);
- Bolt circle diameter** - 132 millimeters (5¼ inches);
- Holes** - 4 equispaced holes 19 millimeters (¾ inches) diameter equidistantly placed, slotted to the flange periphery;
- Flange thickness** - at least 14,5 millimeters (9/16 inches);
- Bolts** - 4 pcs each 16 millimeters (5/8 inches) in diameter and 50 millimeters (2 inches) in length;
- Bolt nuts** - 4 pcs 16 millimeters (5/8 inches) in diameter;
- Washers for bolts** - 8 pcs.

On one side the shore connection shall have a flat-faced flange with dimensions as above, and on the other a quick-acting coupling which shall correspond to the ship's hydrants and hoses both in dimensions and design.

The shore connection, gasket, bolts and nuts shall be made of materials suitable for 1,0 MPa (150 pounds per square inch).

The shore connection complete with gasket, four bolts, four nuts and eight washers shall be stowed together with other items of fire fighting outfit in an easily accessible position.

5.1.20 Portable medium expansion mechanical foam generators shall comply with the following requirements:

- .1 Concentrate solution discharge at a pressure of 0,6 MPa, not less than 360 l/min.
- .2 Foam jet range, at least 8 m.
- .3 Rated number of foam generators shall be determined from the formula:

$$n = Q/q \quad (5.1.20.3)$$

# INTERMARITIME CERTIFICATION SERVICES (ICS CLASS)

## Chapter 6 Fire Protection

where:

$Q$  = solution capacity of the system, l/min;

$q$  = solution capacity of a foam generator, l/min.

50 per cent of the foam generators and extension pipes required by *table 5.1.2, items 2.4 and 2.5* shall be placed in the poop, the remainder in the forecastle and midship superstructure, if any.

5.1.21 Fog applicator shall consist of L-shaped pipe with long side of about 2 m fitted for connection to fire hoses and short side of about 0,25 m equipped with fixed nozzle for producing water fog or fitted for connecting water-spraying nozzle.

These applicators shall be stored near the fire hydrants and those for breathing apparatus near the latter.

5.1.22 Fire buckets shall be provided with the hemp rope of sufficient length and shall be stowed on the open decks in easily accessible places. The buckets shall be painted red and bear inscription "fire".

### 5.2 Spares and tools

5.2.1 A ship shall carry spares and tools, the number of which shall be not less than that specified in *table 5.2.1*. The quantities prescribed in the table apply to fixed fire extinguishing systems only.

In ships of less than 150 tons gross tonnage, as well as in ships and floating cranes of restricted area of navigation III, provision shall be made for spare parts and tools specified in *table 5.2.1, items 1.1, 1.2, 1.5, 1.6, 1.7, 4.4, and 10.2*.

5.2.2 The spares and tools for the systems shall be kept in the fire extinction stations.

The spares and tools for pumps, compressors and motors shall be kept in the vicinity of the corresponding machinery.

Spares shall be suitably marked.

Fig 5.1.19 International shore connection (ship)

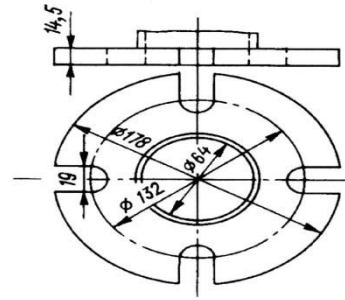


Fig. 5.1.18  
International shore connection (ship)

# INTERMARITIME CERTIFICATION SERVICES (ICS CLASS)

## Chapter 6 Fire Protection

**Table 5.2.1 Number of spares and tools**

N°	Description of spares and tools	Number per ship
1	2	3
1	<b>Water fire main system</b>	
	.1 a fire hose of each length and diameter fitted complete with couplings.	1 pc of each
	.2 connection couplings for each size fitted (if the ship is provided with hydrants of various diameters).	2 pcs
	.3 quick-acting couplings (hose couplings).	2 pcs (of each diameter)
	.4 quick-acting couplings (hose couplings) for ships of 4000 tons gross tonnage and upwards.	4 pcs (of each diameter)
	.5 rubber rings for packing of joints between couplings, hoses and apparatus.	5 per cent of total number, but not less than 10 pcs
	.6 hose clamps.	4 pcs (for ships of up to 300 tons gross tonnage, as many as the number of hoses, but not more than 4)
	.7 wrenches for engaging or disengaging couplings (where nozzles are fitted by means of a special wrench).	2 pcs
	.8 fire hydrant of each size fitted, assembly.	1 pc of each size
	.9 handwheel to fire hydrant of each size fitted.	1 pc of each size
	.10 valve disks with packing rings to fire hydrants of each size fitted.	1 pc of each size
2	<b>Sprinkler system</b>	
	.1 sprinkler heads, assembly.	5 pcs per section
	.2 wrenches for sprinkler heads (where heads are fitted by means of a special wrench).	1 pc per section
	.3 parts for control valve.	1 set, to delivery specification
3	<b>Pressure water-spraying, water-screen, drenching systems</b>	
	.1 spray nozzles of various types fitted in the system.	5 per cent of total number of spray nozzles fitted
	.2 wrench for spray nozzles (where nozzles are fitted by means of a special wrench)	1 pc
4	<b>Foam fire extinguishing system</b>	
	.1 hydrant of each size fitted, in assembly.	1 pc
	.2 fixed air-foam nozzle or foam generator.	1 pc
	.3 gauge glasses for tanks.	1 pc
	.4 rubber rings for joints.	10 pcs
5	<b>Carbon dioxide smothering system</b>	
	.1 cylinder valves, assembled; for the number of cylinders: below 50 from 50 to 100 100 and over	1 pc 2 pcs 3 pcs
	.2 wrenches for assembling and disassembling cylinder valves and other special valves.	1 set per station
	.3 plugs to be fitted on pipes leading from cylinder valves, when cylinders are removed.	25 per cent of the number of cylinders
	.4 protective diaphragms.	In accordance with the number of cylinders
	.5 thrust bushes and washers for protective devices.	10 per cent of the number of cylinders



**INTERMARITIME CERTIFICATION SERVICES (ICS CLASS)**

Chapter 6 Fire Protection

**Table 5.2.1 Continued**

N°	Description of spares and tools	Number per ship
1	2	3
	.6 protective caps for cylinder valves.	In accordance with the number of cylinders
	.7 non-return valves.	5 per cent of total number, but not less than 1 pc
	.8 discharge nozzles of each type and size fitted.	2 pcs
	.9 scales for weighing cylinders or carbon dioxide level gauge.	1 pc
	.10 parts of tank carbon dioxide contents gauges.	In accordance with delivery specification
6	<b>Inert gas smothering system</b>	
	.1 control valve (sluice valve) for admitting inert gas into protected spaces.	1 pc
	.2 parts for automatic control	In accordance with delivery specification
7	<b>Halogenated carbon system</b>	
	.1 spray nozzles of each type and size fitted.	1 or 2 pcs
	.2 special wrenches for replacement of nozzles.	1 pc
	.3 parts for safety and reducing valves (springs, disks, etc.).	1 set
	.4 gauge glass to measure level of fluid in tank.	1 set
	.5 containers with Halon 1301, in assembly, arranged in compliance with 3.11.2.3.	1 pc for each 10 containers, spare parts referred to in 8.1, 8.2, 8.3, and 8.4 being not required
8	<b>Dry powder system</b>	
	.1 parts of release arrangements for hand hose lines and monitors.	1 set of each
	.2 nozzles of each type and size.	1 or 2 pcs
	.3 wrenches for assembling and disassembling valves, hand hose lines, nozzles.	1 set
9	<b>Miscellaneous items, for all systems:</b>	
	.1 instruments and gauges: Pressure gauges, vacuum gauges, thermometers of each type fitted in systems.	1 pc of each
	.2 adequate quantity of packing material for onboard repairs.	1 set
	.3 fuses for automatic closing of fire doors and dampers.	In accordance with number of doors and dampers thus controlled
	.4 spare parts for pumps, fans, compressors and engines serving fire extinguishing systems.	In accordance with <i>Ch 7, Section 5</i>
	.5 spare parts and tools for remote control equipment of fire extinguishing systems.	In accordance with delivery specification approved by ICS
	.6 spare parts and tools for fire alarm systems.	In accordance with delivery specification
	.7 flame arresters (inserts) of each type and size fitted.	1 pc of each
	.8 spare parts for electrical equipment of fire extinguishing systems.	In accordance with <i>Ch 11, Section 4</i>