Tasneef

هيئة الإمارات للتصنيف
Emirates Classification Society

Rules for Fire Protection, Detection and Extinction for the Issue and Maintenance of Statutory Certificates other than SOLAS Certificates

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Section 1: General

1 GENERAL

1.1 APPLICATION

1.1.1

These Rules contain requirements relevant to fire protection, detection and extinction which Tasneef applies to ships with steel hulls when it is requested to issue statutory certificates to:

a) cargo ships (including tankers) of less than 500 gross tonnage engaged in international voyages;
b) passenger ships and cargo ships (including tankers) not engaged in international voyages;
c) fishing vessels;
d) non-propelled units;

unless the application of specific rules is required by the flag Administration.

In addition to these Rules, the requirements of Part C, Chapter 4 of the Rules for the Classification of Ships, as applicable to the above-mentioned ships, are applied for the issue of statutory certificates, unless otherwise instructed by the flag Administration.

1.1.2

For the issue of the Seaworthiness Certificate or the Safety Certificate to ships flying the Italian flag, the specific Tasneef Rules apply.

1.1.3

In particular, Section 1 applies to all ships unless otherwise stated in these Rules, Section 2 applies to passenger ships, Section 3 applies to cargo ships including tankers, Section 4 applies to fishing vessels and Section 5 applies to non-propelled units.

1.1.4

Sections 1 to 5 contain the requirements for the issue of statutory certificates to the ships described in [1.1.1]. Section 6 contains the requirements for the maintenance of the same certificates, unless the flag Administration stipulates the application of specific survey requirements.

2 DOCUMENTATION TO BE SUBMITTED

2.1 GENERAL

The Interested Party is to submit to Tasneef the documents listed in Tab 1.

Table 1: Documentation to be submitted

No.	I/A **(1)**	Document **(2)**
1	A	Structural fire protection, showing the method of construction, purpose of the various spaces of the ships, the fire rating of bulkheads and decks, means of closing of openings in “A” and “B” class divisions, draught stops
2	A	Natural and mechanical ventilation systems showing the penetrations in “A” class divisions, location of dampers, means of closing, arrangements of air conditioning rooms
3	A	Means of escape and, where required, the relevant dimensioning
4	A	Automatic fire detection systems and manually operated call points
5	A	Fire pumps and fire main, including pump head and capacity, hydrant and hose locations
6	A	Arrangement of fixed fire-extinguishing systems **(2)** and inert gas systems
7	A	Arrangement of sprinkler or sprinkler equivalent systems, including the capacity and head of the pumps **(2)**
8	A	Fire-fighting equipment and firemen’s outfits (or fire control plans)
9	A	Fixed fire-extinguishing system in scavenge spaces of two-stroke crosshead type engines **(3)**
10	A	Electrical diagram of the fixed gas fire-extinguishing systems
11	A	Electrical diagram of the sprinkler systems
12	A	Electrical diagram of power control and position indication circuits for fire doors
13	I	General arrangement plan
14	A	Diagram of the remote stop system (ventilation, fuel pumps, etc.)

(1) A: to be submitted for approval, in four copies
I : to be submitted for information, in duplicate.

(2) Plans are to be schematic and functional and to contain all information necessary for their correct interpretation and verification such as:
- service pressures;
- capacity and head of pumps and compressors, if any;
- materials and dimensions of piping and associated fittings;
- volumes of protected spaces, for gas and foam fire-extinguishing systems;
- surface areas of protected zones for automatic sprinkler and pressure water-spraying, low expansion foam and powder fire-extinguishing systems;
- capacity, in volume and/or in mass, of vessels or bottles containing the extinguishing media or propelling gases, for gas, automatic sprinkler, foam and powder fire-extinguishing systems;
- type, number and location of nozzles of extinguishing media for gas, automatic sprinkler, pressure water-spraying, foam and powder fire-extinguishing systems.

All or part of the information may be provided, instead of on the above plans, in suitable operation manuals or in specifications of the systems.

(3) See Pt C, Ch 1, Sec 2, [2.4.1] of the Rules for the Classification of Ships

2.2 TYPE APPROVED PRODUCTS

The following materials, equipment, systems or products in general used for fire protection are to be type approved by Tasneef, except for special cases for which the acceptance may be given for individual ships on the basis of suitable documentation or ad hoc tests:

a) fire-resisting and fire-retarding divisions (bulkheads or decks) and associated doors;
b) upholstered furniture, excluding the frame (only requested for the application of Section 2);
c) materials for pipes penetrating “A” or “B” class divisions; (where they are not of steel or other equivalent material);
d) materials for oil or fuel oil pipes (where they are not of steel or copper and its alloys);
e) bulkhead or deck penetrations for electrical cables passing through “A” or “B” class divisions;
f) materials with low flame spread characteristics, including paints, varnishes and similar, when they are required to have such characteristic;
g) non-combustible materials;
h) textile and non-textile materials suspended vertically, for example curtains (only requested for the application of Section 2);
i) non-readily igniting materials for primary deck coverings;
j) fixed foam fire-extinguishing systems and associated foam-forming liquids;
k) fixed powder fire-extinguishing systems, including the powder;
l) flexible pipes and expansion bellows of both metallic and non-conventional material for any type of fluid;
m) sprinkler heads for automatic sprinkler systems;
n) nozzles for fixed pressure water-spraying fire-extinguishing systems for machinery spaces, boiler rooms and spaces intended for the carriage of vehicles;
o) sensing heads for automatic fire alarm and fire detection systems;
p) fixed fire detection and fire alarm systems;
q) explosive mixture detecting systems;
r) portable explosive mixture detecting apparatus;
s) fixed instruments for measuring the oxygen content for; inert gas systems serving cargo tanks;
t) portable instruments for measuring the oxygen content; for inert gas systems serving cargo tanks;
u) portable fire extinguishers;
v) large capacity fire extinguishers;
w) extinguishing media substitute for the foam in fire extinguishers;
x) fire protective overalls;
y) breathing apparatus;
z) smoke helmets and smoke masks;
a) electric safety lamps;
b) lifelines;
c) fire hoses;
d) water fog applicators and nozzles, including dual-purpose nozzles, for fire hoses;
e) fire dampers;
f) emergency escape breathing devices;
g) portable foam applicators;
h) glass reinforced plastic grid platforms.

Tasneef may request type approval for other materials, equipment, systems or products required by the applicable provisions for ships or installations of special types.

3 DEFINITIONS

3.1 ACCOMMODATION SPACES

Accommodation spaces are those spaces used for public spaces, corridors, stairs, lavatories, cabins, offices, hospitals, cinemas, games and hobby rooms, barber shops, pantries containing no cooking appliances and similar spaces.

3.2 “A” CLASS DIVISIONS

“A” class divisions are those divisions formed by bulkheads and decks which comply with the following criteria:

a) they are constructed of steel or other equivalent material;
b) they are suitably stiffened;
c) they are insulated with approved non-combustible materials such that the average temperature of the unexposed side will not rise more than 140°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, within the time listed below:
   - class "A-60" .....60 min;
   - class "A-30" .....30 min;
   - class "A-15".....15 min;
   - class "A-0".....0 min;
d) they are so constructed as to be capable of preventing the passage of smoke and flame to the end of the one-hour standard fire test; and
e) a test of a prototype bulkhead or deck in accordance with the “Fire Test Procedures

Code" (see [3.23]) is conducted to ensure that it meets the above requirements for integrity or temperature rise.

The products indicated in Tab 2 may be installed without testing or approval.

3.3 ADMINISTRATION

The Administration is the Administration of the State whose flag the ship is entitled to fly.

3.4 ATRIUMS

Atriums are public spaces within a single main vertical zone spanning three or more open decks.

3.5 "B" CLASS DIVISIONS

"B" class divisions are those divisions formed by bulkheads, decks, ceilings or linings which comply with the following criteria:

a) they are constructed of approved non-combustible materials and all materials entering into the construction and erection of "B" class divisions are non-combustible, with the exception that combustible veneers may be permitted provided they meet the other appropriate requirements of these Rules;

b) they have an insulation value such that the average temperature of the unexposed side will not rise more than 140° 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, within the time listed below:
   - class "B-15" .....15 min;
   - class "B-0" .....0 min;

c) they are so constructed as to be capable of preventing the passage of flame to the end of the first half hour of the standard fire test;

d) a test of a prototype division in accordance with the Fire Test Procedures Code (see [3.23]) is conducted to ensure that it meets the above requirements for integrity or temperature rise.

3.6 BULKHEAD DECK

Bulkhead deck is the uppermost deck up to which the transverse watertight bulkheads are carried.

3.7 CARGO AREA

3.7.1

The cargo area is that part of the ship that contains cargo holds, cargo tanks, slop tanks and cargo pump rooms including pump rooms, cofferdams, ballast and void spaces adjacent to cargo tanks and also deck areas throughout the entire length and breadth of the part of the ship over the above-mentioned spaces.

3.7.2

For the definition of the cargo area of chemical tankers (see [3.12]) and gas carriers (see [3.25]), refer to the International Code For the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (IBC Code) and the International Code For the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (IGC Code), respectively.

3.8 CARGO SHIP

A cargo ship is any ship which is not a passenger ship.

Table 2

Classification	Product description
class "A-0" bulkhead	A steel bulkhead with dimensions not less than the minimum dimensions given below: • thickness of plating: 4 mm • stiffeners 60 x 60 x 5 mm spaced at 600 mm or structural equivalent
class "A-0" deck	A steel deck with dimensions not less than the minimum dimensions given below: • thickness of plating: 4 mm • stiffeners 95 x 65 x 7 mm spaced at 600 mm or structural equivalent

3.9 CARGO SPACES

Cargo spaces are spaces used for cargo, cargo oil tanks, tanks for other liquid cargo and trunks to such spaces.

3.10 CENTRAL CONTROL STATION

A central control station is a control station in which the following control and indicator functions are centralised:

a) fixed fire detection and alarm systems;

b) automatic sprinklers, fire detection and alarm systems;

c) fire door indicator panels;

d) fire door closures;

e) watertight door indicator panels;

f) watertight door closures;

g) ventilation fans;

h) general/fire alarms;

i) communication systems including telephones, and

Note 1: The communication systems referred to are only those required by these Rules;

j) microphones to the public address system.

3.11 "C" CLASS DIVISIONS

"C" class divisions are constructed of approved non-combustible materials. They need meet neither requirements relative to the passage of smoke and flame nor limitations relative to the temperature rise. Combustible veneers are permitted provided they meet the requirements of these Rules.

3.12 CHEMICAL TANKER

A chemical tanker is a tanker constructed or adapted and used for the carriage in bulk of any liquid product of a flammable nature listed in Pt E, Ch 8, Sec 17 of the Rules for the Classification of Ships.

3.13 CLOSED RO-RO SPACES

Closed ro-ro spaces are those ro-ro spaces which are neither open ro-ro spaces nor weather decks.

3.14 CLOSED VEHICLE SPACES

Closed vehicle spaces are vehicle spaces which are neither open vehicle spaces nor weather decks.

3.15 COMBINATION CARRIERS

A combination carrier is a cargo ship designed to carry both oil and solid cargoes in bulk.

3.16 COMBUSTIBLE MATERIALS

Combustible material is any material other than a non-combustible material.

3.17 CONTINUOUS "B" CLASS CEILINGS AND LININGS

Continuous "B" class ceilings or linings are those "B" class ceilings or linings which terminate at an "A" or "B" class division.

3.18 CONTINUOUSLY MANNED CENTRAL CONTROL STATION

A continuously manned central control station is a central control station which is continuously manned by a responsible member of the crew.

3.19 CONTROL STATIONS

Control stations are those spaces in which the ship's radio or main navigating equipment or the emergency source of power is located or where the fire recording or fire control equipment is centralised.

3.20 CRUDE OIL

Crude oil is any oil occurring naturally in the earth, whether or not treated to render it suitable for transportation, and includes crude oil where certain distillate fractions may have been removed from, or added to.

3.21 DANGEROUS GOODS

Dangerous goods are those goods belonging to the following classes:

- class 1 - Explosives;
- class 2 - Gases: compressed, liquefied or dissolved under pressure;
- class 3 - Flammable liquids;
- class 4.1 - Flammable solids;
- class 4.1 - Flammable solids;
- class 4.2 - Substances liable to spontaneous combustion;
- class 4.3 - Substances which, in contact with water, emit flammable gases;
- class 5.1 - Oxidising substances;
- class 5.2 - Organic peroxides;
- class 6.1 - Poisonous (toxic) substances;
- class 6.2 - Infectious substances;
- class 7 - Radioactive materials;
- class 8 - Corrosives;
- class 9 - Miscellaneous dangerous substances (that is any other substance which experience has shown, or may show, to be of such a dangerous character that the provisions of Part A, Chapter VII of the SOLAS Convention are to be applied).

3.22 DEADWEIGHT

The deadweight is the difference in tonnes between the displacement of a ship in water of a specific gravity of 1,025 at the load waterline corresponding to the assigned summer freeboard and the lightweight of the ship.

3.23 FIRE TEST PROCEDURES CODE

The "Fire Test Procedures Code" means the "International Code for Application of Fire Test Procedures", as adopted by the Maritime Safety Committee of the IMO by Resolution MSC.61 (67), as may be amended by the IMO.

3.24 FLASH POINT

The flash point is the temperature in degrees Celsius (closed cup test) at which a product will give off enough flammable vapour to be ignited, as determined by an approved flashpoint apparatus.

3.25 GAS CARRIER

A gas carrier is a cargo ship constructed or adapted and used for the carriage in bulk of any liquefied gas or other products of a flammable nature listed in Pt E, Ch 9, Sec 19 of the Rules for the Classification of Ships.

3.26 HELIDECK

A helideck is a purpose-built helicopter landing area located on a ship, including all structure, fire-fighting appliances and other equipment necessary for the safe operation of helicopters.

3.27 HELICOPTER FACILITY

A helicopter facility is a helideck including any refuelling and hangar facilities.

3.28 LIGHTWEIGHT

The lightweight is the displacement of a ship in tonnes without cargo, fuel, lubricating oil, ballast water, fresh water and feed water in tanks, consumable stores, and passengers and crew and their effects.

3.29 LOW FLAME SPREAD

3.29.1

Low flame spread means that the surface thus described will adequately restrict the spread of flame, this being determined in accordance with the "Fire Test Procedures Code".

3.29.2

Non-combustible materials are considered as low flame spread. However, due consideration will be given by Tasneef to the method of application and fixing.

3.30 MACHINERY SPACES

Machinery spaces are machinery spaces of category A and other spaces containing propulsion machinery, boilers, fuel oil units, steam and internal combustion engines, generators and major electrical machinery, oil filling stations, refrigerating, stabilising, ventilation and air conditioning machinery, and similar spaces, and trunks to such spaces.

3.31 MACHINERY SPACES OF CATEGORY A

Machinery spaces of category A are those spaces and trunks to such spaces which contain either:

- internal combustion machinery used for main propulsion,
- internal combustion machinery used for purposes other than main propulsion where such machinery has in the aggregate a total power output of not less than 375 kW, or
- any oil fired boiler or oil fuel unit, or any oil fired equipment other than boilers, such as inert gas generators, incinerators, etc.

3.32 MAIN VERTICAL ZONES

Main vertical zones are those sections into which the hull, superstructure and deckhouses are divided by "A" class divisions, the mean length and width of which on any deck do not generally exceed 40 m.

3.33 NON-COMBUSTIBLE MATERIAL

3.33.1

Non-combustible material is a material which neither burns nor gives off flammable vapours in sufficient quantity for self-ignition when heated to approximately 750°C, this being determined in accordance with the "Fire Test Procedures Code".

3.33.2

In general, products made only of glass, concrete, ceramic products, natural stone, masonry units, common metals and metal alloys are considered as being non-combustible and may be installed without testing and approval.

3.34 OIL FUEL UNIT

3.34.1

The oil fuel unit is the equipment used for the preparation of oil fuel for delivery to an oil fired boiler or equipment used for the preparation for delivery of heated oil to an internal combustion engine and includes any oil pressure pumps, filters and heaters dealing with oil at a pressure of more than 0,18 MPa.

3.34.2

"Oil fuel unit" includes any equipment used for the preparation and delivery of oil fuel, whether or not heated, to boilers (including inert gas generators) and engines (including gas turbines) at a pressure of more than 0,18 MPa.

Note 1: For the purpose of these Rules "oil fuel" has the same meaning of "fuel oil".

3.35 OPEN RO-RO SPACES

Open ro-ro spaces are those ro-ro spaces that are either open at both ends or have an opening at one end, and are provided with adequate natural ventilation effective over their entire length through permanent openings distributed in the side plating or deckhead or from above, having a total area of at least 10% of the total area of the space sides.

3.36 OPEN VEHICLE SPACES

Open vehicle spaces are those vehicle spaces that are either open at both ends, or have an opening at one end, and are provided with adequate natural ventilation effective over their entire length through permanent openings distributed in the side plating or deckhead or from above, having a total area of at least 10% of the total area of the space sides.

3.37 PASSENGER SHIP

A passenger ship is a ship which carries more than twelve passengers.

3.38 PUBLIC SPACES

Public spaces are those portions of the accommodation which are used for halls, dining rooms, lounges and similar permanently enclosed spaces.

3.39 ROOMS CONTAINING FURNITURE AND FURNISHINGS OF RESTRICTED FIRE RISK (ONLY FOR THE PURPOSE OF APPLICATION OF SECTION 2)

Rooms containing furniture and furnishings of restricted fire risk are those rooms (whether cabins, public spaces, offices or other types of accommodation) in which:

aa) case furniture such as desks, wardrobes, dressing tables, bureaux and dressers are constructed entirely of approved non-combustible materials, except that a combustible veneer not exceeding 2 mm may be used on the working surface of such articles;

ab) free-standing furniture such as chairs, sofas and tables are constructed with frames of non-combustible materials;

ac) draperies, curtains and other suspended textile materials have qualities of resistance to the propagation of flame not inferior to those of wool of mass 0,8 kg/m^2 , this being determined in accordance with the Fire Test Procedures Code (see [3.23]);

ad) floor coverings have low flame spread characteristics;

ae) exposed surfaces of bulkheads, linings and ceilings have low flame spread characteristics;

af) upholstered furniture has qualities of resistance to the ignition and propagation of flame, this being determined in accordance with the Fire Test Procedures Code (see [3.23]), and

ag) bedding components have qualities of resistance to the ignition and propagation of flame, this being determined in accordance with the Fire Test Procedures Code (see [3.23]).

3.40 RO-RO SPACES

Ro-ro spaces are spaces not normally subdivided in any way and extending for either a substantial length or the entire length of the ship, in which motor vehicles with fuel in their tanks for their own propulsion and/or goods (packaged or in bulk, in or on rail or road cars, vehicles (including road or rail tankers), 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.

3.41 RO-RO PASSENGER SHIP

A ro-ro passenger ship means a passenger ship with ro-ro spaces or special category spaces as defined in [3.45].

3.42 STEEL OR OTHER EQUIVALENT MATERIAL

"Steel or other equivalent material" means any non-combustible material which, by itself or due to insulation provided, had structural and integrity properties equivalent to steel at the end of the applicable exposure to the standard fire test (e.g. aluminium alloy with appropriate insulation).

3.43 SAUNA

A sauna is a hot room with temperatures normally varying between 80°-120°C where the heat is provided by a hot surface (e.g. by an electrically-heated oven). The hot room may also include the space where the oven is located and adjacent bathrooms.

3.44 SERVICE SPACES

3.44.1

Service spaces are those spaces used for galleys, pantries containing cooking appliances, lockers, mail and specie rooms, storerooms, workshops other than those forming part of the machinery spaces, and similar spaces and trunks to such spaces.

3.44.2

Main pantries and pantries containing cooking appliances may contain:

- toasters, induction heaters, microwave ovens and similar appliances each of them with a maximum power of 5 kW;
- electrically heated cooking plates and hot plates for keeping food warm each of them with a maximum power of 2 kW and a surface temperature not above 150°C;
- water boilers, regardless of their electrical power;
- coffee automats, and non-cooking appliances such as dishwashers, water boilers, ice-cube machines and fridges without any restriction on their power. A dining room containing such appliances is not to be regarded as a pantry.

3.44.3

Spaces containing any electrically heated cooking plate or hot plate for keeping food warm, with a power of more than 2 kW, or toasters, induction heaters, microwave ovens and similar appliances each of them with power greater than 5 kW are to be regarded as galleys.

3.45 SPECIAL CATEGORY SPACES

Special category spaces are those enclosed vehicle spaces above and below the bulkhead deck, into and from which vehicles can be driven and to which passengers have access. Special category spaces may be accommodated on more than one deck provided that the total overall clear height for vehicles does not exceed 10 m.

3.46 STANDARD FIRE TEST

A standard fire test is a test in which the specimens of the relevant bulkheads or decks are exposed in a test furnace to temperatures corresponding approximately to the standard time-temperature curve in accordance with the Fire Test Procedures Code (see [3.23]).

3.47 TANKER

A tanker is a cargo ship constructed or adapted for the carriage in bulk of liquid cargoes of an flammable nature.

Note 1:For the purpose of these Rules, the term tanker includes the following service notations (see Pt A, Ch 1, Sec 2, Tab 1 of the Rules for the Classification of Ships):

- Chemical tanker;
- Combination carrier/OBO;
- Combination carrier/OOC;
- Flammable liquid substances tanker;
- Liquefied gas carrier;
- Oil recovery ship;
- Oil tanker.

3.48 VEHICLE SPACES

Vehicle spaces are cargo spaces intended for the carriage of motor vehicles with fuel in their tanks for their own propulsion.

3.49 WEATHER DECK

A weather deck is a deck which is completely exposed to the weather from above and from at least two sides.

4 REQUIREMENTS FOR FLEXIBLE HOSES AND EXPANSION JOINTS FITTED IN FIXED FIRE-FIGHTING SYSTEMS

Flexible hoses and expansion joints are to be made of materials resistant to the marine environment and to the fluid they are to convey. Metallic materials are to comply with Pt C, Ch 1, Sec 10, [2.1] of the Rules for the Classification of Ships, as applicable.

Flexible hoses are to be designed and constructed in accordance with recognised national or international standards acceptable to Tasneef.

Flexible hoses constructed of rubber or plastic materials are to incorporate a single or double closely woven integral wire braid or other suitable material reinforcement.

Flexible hoses are to be complete with approved end fittings in accordance with the Manufacturer's specification.

End connections that do not have a flange are to comply with Pt C, Ch 1, Sec 10, [2.4.5] of the Rules for the Classification of Ships, as applicable, and each type of hose/fitting combination is to be subject to prototype testing to the same standard as that required by the hose.

The use of hose clamps and similar types of end attachments is not acceptable for flexible hoses in piping systems for carbon dioxide. In other piping systems, the use of hose clamps may be accepted where the working pressure is less than 0,5 MPa and provided there are double clamps at each end connection.

Flexible hoses and expansion joints are to be so designed as to withstand the tests indicated in Table 2. Flexible hose assemblies are to be selected for the intended location and application taking into consideration ambient conditions, compatibility with fluids under working pressure and temperature conditions consistent with the Manufacturer's instructions.

Type approval tests are to be carried out on flexible hoses or expansion joints of each type and of sizes to be agreed with Tasneef, in accordance with Tab 2 (see also the "Rules for the type approval of flexible hoses and expansion joints").

The flexible hoses or expansion joints subjected to the tests are to be fitted with their connections.

Table 2: Type tests to be performed for flexible hoses and expansion joints

Test	Flexible hoses and expansion joints in non-metallic material	Flexible hoses and expansion joints in metallic material
Bursting test	X	X
Fire resistance test	X **(1)**	NR
Flexibility test	X **(2)**	NR
Elastic deformation test	NR	X
Resistance of the material **(3)**	X	X

1) Gas extinguishing systems: not requested for flexible hoses and expansion joints installed in the CO_2 room; fire endurance test according to item 2.3.1 of Appendix 3 to Pt C Ch 1 of the Rules for the Classification of Ships (L1 level) for flexible hoses and expansion joints installed within protected spaces and spaces with high fire hazard.
Water-based systems: fire endurance test according to item 2.3.1 of Appendix 3 to Pt C Ch 1 of the Rules for the Classification of Ships (L1 level) for flexible hoses and expansion joints installed within protected spaces and spaces with high fire hazard if normally operating in dry conditions; fire endurance test according to item 2.3.1 of Appendix 3 to Pt C Ch 1 of the Rules for the Classification of Ships (L3 level) for flexible hoses and expansion joints installed within protected spaces and spaces with high fire hazard if normally operating in wet conditions.
Only for flexible hoses conveying low temperature fluids.
Internal to the conveyed fluid to be demonstrated by suitable documentation and or tests.

Section 2: Passenger ships

1 GENERAL

The requirements of European Union Directive 2009/45/EC of 6 May 2009 as amended by the Commission Directive 2010/36/EU of 1 June 2010 apply.
The requirements for fixed fire-extinguishing systems given in Section 3 apply.

1 CARGO SHIPS OF 4000 GROSS TONNAGE AND UPWARDS

1.1 STRUCTURAL PROTECTION

1.1.1

The hull, superstructure, structural bulkheads, decks and deckhouses are to be constructed of steel, except where Tasneef may sanction the use of other suitable material (such as aluminium alloy) in special cases, bearing in mind the risk of fire, if this material is insulated in such a way that the structure cannot collapse in the event of fire.

1.1.2

As far as compatible with the size of the ship, boundaries separating spaces of the following categories are generally to be made of steel or

other equivalent material meeting the requirement of at least “A-0” class: accommodation spaces, machinery spaces, control stations, cargo spaces, service spaces with a high fire risk and any spaces intended for the carriage of motor vehicles.

1.1.3

In accommodation spaces, the corridor bulkheads are to be of steel or constructed of B class panels. If these bulkheads are of steel, the face exposed to the corridor is, as a rule, to be bare or lined with non-combustible material; it may, however, be lined with combustible material provided that the plate is insulated in such a way as to obtain a B-15 class bulkhead. In any case the ceilings in the corridors, including their supports, are to be of non-combustible material.

1.1.4

When A class divisions are penetrated for the passage of electrical cables, pipes, ducts, etc. or are pierced by the fitting of stringers, beams and other similar structures or vent outlets, lighting apparatus and other similar apparatus, such penetrations are to be tested in accordance with the Fire Test Procedures Code. In the case of ventilation ducts, [1.1.14] to [1.1.16] apply. However, where a pipe penetration is made of steel or equivalent material having a thickness of 3 mm or greater and a length of not less than 900 mm (preferably 450 mm on each side of the division), and no openings, testing is not required. Such penetrations are to be suitably insulated by extension of the insulation at the same level as the division.

1.1.5

When "B" class divisions are penetrated for the passage of electrical cables, pipes, trunks, ducts, etc., or for the fitting of ventilation terminals, lighting fixtures and similar devices, arrangements are to be made to ensure that the fire resistance is not impaired, subject to the provisions of paragraph [1.1.16] c). Pipes other than steel or copper that penetrate "B" class divisions are to be protected by either:

a) a fire tested penetration device, suitable for the fire resistance of the division pierced and the type of pipe used; or
b) a steel sleeve, having a thickness of not less than 1,8 mm and a length of not less than 900 mm for pipe diameters of 150 mm or more and not less than 600 mm for pipe diameters of less than 150 mm (preferably equally divided on each side of the division). The pipes are to be connected to the ends of the sleeve by flanges or couplings, or the clearance between the sleeve and the pipe is to not exceed 2,5 mm, or any clearance between pipe and sleeve is to be made tight by means of non-combustible or other suitable material.

1.1.6

Uninsulated metallic pipes penetrating "A" or "B" class divisions are to be of materials having a melting temperature which exceeds 950°C for “A-0” and 850°C for “B-0” class divisions.

1.1.7

Deck coverings within accommodation spaces on the decks forming the crown of machinery and cargo spaces are to be of a type which does not readily ignite.

1.1.8

Interior stairways and associated supports are to be of steel or other material deemed suitable by Tasneef. Crew lift trunks within accommodation spaces are to be of steel or equivalent material.

1.1.9

Bulkheads of galleys, paint stores, lamp rooms, boatswain’s stores when adjacent to accommodation spaces and emergency generator rooms, if any, are to be of steel or equivalent material. The face of these bulkheads external to such spaces (and also the internal face for spaces containing emergency generators or similar) is, as a rule, be to bare or lined with non-combustible material; it may, however, be lined with combustible material provided that the plate is insulated in such a way as to obtain an “A-60” class bulkhead.

For the boundaries of cargo spaces intended for the carriage of motor vehicles with fuel (gasoline, LPG or methane) in their tanks for their own propulsion, see [1.11.3] and [1.11.4].

1.1.10

In accommodation and machinery spaces, paints, varnishes and similar preparations having a nitro-cellulose or other highly flammable base are to not be used.

1.1.11

Pipes conveying oil or combustible liquids are to be of a material approved by Tasneef having regard to the fire risk. Materials readily rendered ineffective by heat are to not be used for overboard scuppers, sanitary discharges and other outlets which are close to the waterline and where the failure of the material in the event of fire would give rise to danger of flooding.

1.1.12

Power ventilation of machinery spaces is to be capable of being stopped from an easily accessible position outside the machinery spaces. Air inlets and outlets to the open are to be provided with draught stop devices; draught stops are to be made of non-combustible material.

1.1.13

The surfaces of the insulation on interior boundaries of spaces where penetration of oil products may occur are to be impervious to oil and oil vapours.

1.1.14

Ventilation ducts are to be of non-combustible material. However, short ducts, generally not exceeding 2 m in length and with a free cross-sectional area not exceeding 0,02 m^2, need not be non-combustible subject to the following conditions:

a) the ducts are made of a material which has low flame spread characteristics;
b) the ducts are only used at the end of the ventilation device;
c) the ducts are not situated less than 600 mm, measured along the duct, from an opening in an "A" or "B" class division including continuous "B" class ceiling;
d) fire dampers are made of steel of 3 mm thickness.

1.1.15

Ducts provided for ventilation of machinery spaces of category A and closed ro-ro spaces are generally not to pass through accommodation and service spaces or control stations; however, Tasneef may permit relaxation of this requirement provided that:

a) the ducts are constructed of steel and each is insulated to “A-60” class; or
b) the ducts are constructed of steel, are fitted with an automatic fire damper close to the boundary penetrated and are insulated to “A-60” class from the machinery space of category A or closed ro-ro space to a point at least 5 m beyond the fire damper;
c) ducts provided for ventilation of accommodation and service spaces or control stations are generally not to pass through machinery spaces of category A and closed ro-ro spaces; however, Tasneef may permit relaxation of this requirement provided that ducts are constructed of steel and an automatic fire damper is fitted close to the boundaries penetrated.

1.1.16

Where a thin plated duct with a free cross-sectional area equal to or less than 0,02 m^2 passes through "A" class bulkheads or decks, the openings are to be lined with a steel sheet sleeve having a thickness of at least 3 mm and a length of at least 200 mm, divided preferably into 100 mm on each side of the bulkhead or, in the case of the deck, wholly laid on the lower side of the decks pierced. Where ventilation ducts with a free cross-sectional area exceeding 0,02 m^2 pass through "A" class bulkheads or decks, the openings are to be lined with a steel sheet sleeve. However, where such ducts are of steel construction and pass through a deck or bulkhead, the ducts and sleeves are to comply with the following:

a) The sleeves are to have a thickness of at least 3 mm and a length of at least 900 mm. When passing through bulkheads, this length is to be divided preferably into 450 mm on each side of the bulkhead. These ducts, or sleeves lining such ducts, are to be provided with fire insulation. The insulation is to have at least the same fire integrity as the bulkhead or deck through which the duct passes;
b) Ducts with a free cross-sectional area exceeding 0,075 m^2 are to be fitted with fire dampers in addition to the requirements of item a). The fire dampers are to operate automatically, but are to also be capable of being closed manually from both sides of the bulkhead or deck. The dampers are to be provided with an indicator which shows whether they are open or closed. Fire dampers are not required, however, where ducts pass through spaces surrounded by "A" class divisions, without serving those spaces, provided those ducts have the same fire integrity as the divisions which they pierce. Fire dampers are to be easily accessible. Where they are placed behind ceilings or

linings, these ceilings or linings are to be provided with an inspection door on which a plate reporting the identification number of the fire damper is provided. The fire damper identification numbers are to also be placed on any remote controls required.

c) Ventilation ducts with a free cross-sectional area exceeding 0,02 m^2 passing through "B" class bulkheads are to be lined with steel sheet sleeves of 900 mm in length, divided preferably into 450 mm on each side of the bulkheads, unless the duct is of steel for this length.

1.1.17

Where they pass through accommodation spaces or spaces containing combustible materials, the exhaust ducts from galley ranges are to be constructed of "A" class divisions.
Each exhaust duct is to be fitted with:

1) a grease trap readily removable for cleaning;
2) a fire damper located in the lower end of the duct;
3) arrangements, operable from within the galley, for shutting off the exhaust fans; and
4) fixed means for extinguishing a fire within the duct.

1.2 MEANS OF ESCAPE

1.2.1

Stairways and ladders are to be arranged to provide ready means of escape to the lifeboat and liferaft embarkation deck from all passenger and crew spaces and from spaces in which the crew are normally employed, other than machinery spaces.

1.2.2

In machinery spaces, two means of escape, one of which may be a watertight door, are to be provided from each engine room, shaft tunnel and boiler room. In machinery spaces where no watertight door is available, the two means of escape are to be formed by two sets of steel ladders as widely separated as possible, leading to two doors in the casing similarly separated and from which access is provided to the embarkation deck.

1.3 SPECIAL ARRANGEMENTS IN MACHINERY SPACES

1.3.1

Means are to be provided for stopping ventilating fans serving machinery and cargo spaces and for closing all doorways, ventilators, annular spaces around funnels and other openings to such spaces. Such means are to be capable of being operated from outside such spaces in case of fire.

1.3.2

Machinery driving forced and induced draught fans, oil fuel transfer pumps, oil fuel unit pumps and other similar fuel pumps is to be fitted with remote controls situated outside the space concerned so that such machinery may be stopped in the event of a fire arising in the space in which it is located.

1.3.3

Every oil fuel suction pipe from a storage, settling or daily service tank situated above the double bottom is to be fitted with a cock or valve capable of being closed from outside the space concerned in the event of a fire arising in the space in which such tanks are situated. In the special case of deep tanks situated in any shaft or pipe tunnel, valves are to be fitted on the tank but control in the event of fire is to be possible by means of an additional valve on the pipeline or lines outside the tunnel or tunnels.

1.4 WATER FIRE-FIGHTING SYSTEM

1.4.1 Fire main and hydrants

a) General
Ships are to be provided with fire pumps, fire mains, hydrants and hoses complying with the applicable requirements of this item [1.4].
Materials readily rendered ineffective by heat are not to be used for fire mains and hydrants unless adequately protected. The pipes and hydrants are to be so placed that the fire hoses may be easily coupled to them. The arrangement of pipes and hydrants is to be such as to avoid the possibility of freezing. Suitable drainage provision is to be made for fire main piping. Isolation valves are to be installed for all open deck fire main branches used for purposes other than fire fighting. In ships where deck cargo may be carried, the positions of the hydrants are to be such that they are always readily accessible and the pipes are to be arranged as far as practicable to avoid risk of damage by such cargo.

b) Ready availability of water supply
The arrangements for the ready availability of water supply are to be:

- to the satisfaction of Tasneef ; and
- with a periodically unattended machinery space or when only one person is required on watch, there is to be immediate water delivery from the fire main system at a suitable pressure, either by remote starting

of one of the main fire pumps from the navigating bridge and fire control station, if any, or permanent pressurisation of the fire main system by one of the main fire pumps.

c) Diameter of fire mains

The diameter of the fire main and water service pipes is to be sufficient for the effective distribution of the maximum required discharge from two fire pumps operating simultaneously, except that in the case of cargo ships the diameter need only be sufficient for the discharge of 140 m^3/h.

d) Isolating valves and relief valves

1) Isolating valves to separate the section of the fire main within the machinery space containing the main fire pump or pumps from the rest of the fire main are to be fitted in an easily accessible and tenable 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 in the machinery space referred to above, can be supplied with water by another fire pump or an emergency fire pump. The emergency fire pump, its seawater inlet, and suction and delivery pipes and isolating valves are to be located outside the machinery space. If this arrangement cannot be made, the sea chest may be fitted in the machinery space if the valve is remotely controlled from a position in the same compartment as the emergency fire pump and the suction pipe is as short as practicable. Short lengths of suction or discharge piping may penetrate the machinery space, provided they are enclosed in a substantial steel casing or insulated to “A-60” class standards. The pipes are to have substantial wall thickness, but in no case less than 11 mm, and are to be welded except for the flanged connection to the sea inlet valve.

2) A valve is to be fitted to serve each fire hydrant so that any fire hose may be removed while the fire pumps are in operation.

3) Relief valves are to be provided in conjunction with fire pumps if the pumps are capable of developing a pressure exceeding the design pressure of the water service pipes, hydrants and hoses. These valves are to be so placed and adjusted as to prevent excessive pressure in any part of the fire main system.

4) In tankers, isolation valves are to be fitted in the fire main at poop front in a protected position and on the tank deck at intervals of not more than 40 m to preserve the integrity of the fire main system in case of fire or explosion.

e) Number and position of hydrants

The number and position of hydrants are to be such that at least two jets of water not emanating from the same hydrant, one of which is to be from a single length of hose, may reach any part of the ship normally accessible to the crew while the ship is being navigated and any part of any cargo space when empty, any ro-ro space or any vehicle space in which latter case the two jets are to reach any part of the space, each from a single length of hose. Furthermore, such hydrants are to be positioned near the means of access to the protected spaces.

f) Pressure at hydrants

With the two pumps simultaneously delivering water through the nozzles specified in paragraph [1.4.6], with the quantity of water as specified in paragraph [1.4.1] c), through any adjacent hydrants, the minimum pressure to be maintained at all hydrants is to be 0,25 N/mm^2 and the maximum pressure at any hydrant is not to exceed that at which the effective control of a fire hose can be demonstrated.

g) International shore connection

Ships are to be provided with at least one international shore connection complying with Tab 1.

Facilities are to be available enabling such a connection to be used on either side of the ship.

Figure 1 : International shore connection

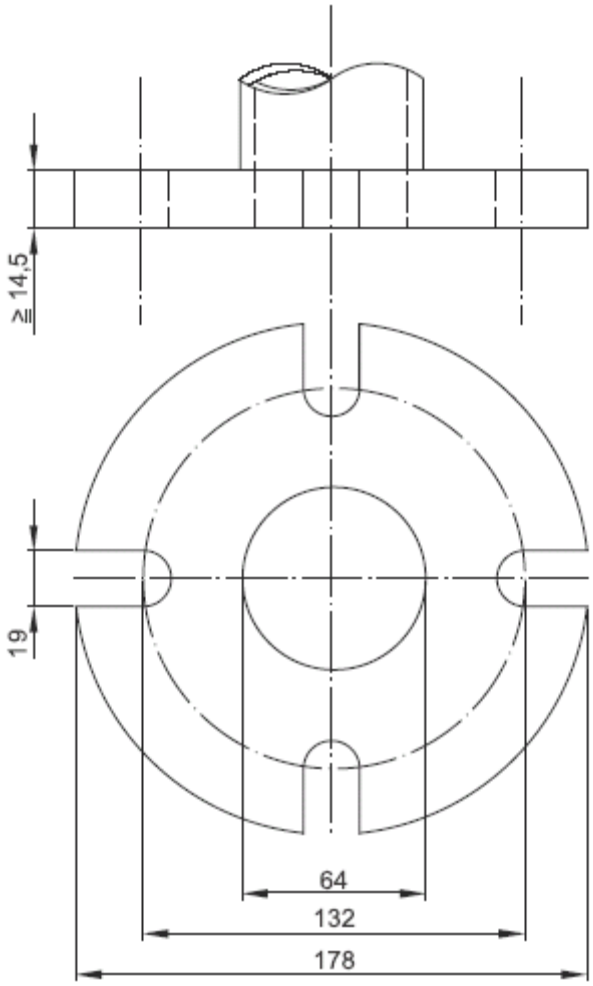

Table 1 - Standard dimensions for international shore connections

Description	Dimension
Outside diameter	178 mm
Inside diameter	64 mm
Bolt circle diameter	132 mm
Slots in flange	4 holes 19 mm in diameter spaced equidistantly on a bolt circle of the above diameter, slotted to the flange periphery
Flange thickness	14,5 mm minimum
Bolts and nuts	4, each of 16 mm diameter, 50 mm in length

1.4.2 Fire pumps

a) Pumps accepted as fire pumps

Sanitary, ballast, bilge or general service pumps may be accepted as fire pumps, provided that they are not normally used for pumping oil and that if they are subject to occasional duty for the transfer or pumping of oil fuel, suitable change-over arrangements are fitted.

b) Number of fire pumps

Ships are to be provided with at least two independently driven fire pumps.

c) Arrangement of fire pumps

The arrangement of sea connections, fire pumps and their sources of power are to be such as to ensure that, if a fire in any one compartment could put all the pumps out of action, there are alternative means consisting of an emergency fire pump complying with the provisions of paragraph [1.4.3] with its source of power and sea connection located outside the space where the main fire pumps or their sources of power are located.

d) Capacity of fire pumps

1) Total capacity of required fire pumps

The required fire pumps, other than any emergency pump, are to be capable of delivering for fire-fighting purposes a quantity of water, at the pressure specified in [1.4.1] f), not less than four thirds of the quantity required under Ch. 1, Sec. 10, [6] of the Rules for the Classification of Ships to be dealt with by each of the independent bilge pumps in a passenger ship of the same dimension when employed in bilge pumping, provided that in no cargo ship need the total required capacity of the fire pumps exceed 180 m3/h.

2) Capacity of each fire pump

Each of the required fire pumps (other than any emergency pump required in [1.4.3]) is to have a capacity not less than 80% of the total required capacity divided by the minimum number of required fire pumps, but in any case not less than 25 m3/h, and each such pump is in any event to be capable of delivering at least the two required jets of water. These fire pumps are to be capable of supplying the fire main system under the required conditions. Where more pumps than the minimum required are installed, such additional pumps are to have a capacity of at least 25 m3/h and to be capable of delivering at least the two jets of water required in paragraph [1.4.1] e).

1.4.3 Emergency fire pump

a) Capacity of the pump

The capacity of the pump is to not be less than 40% of the total capacity of the fire pumps required by [1.4.2] d)1) and in any case not less than 25 m^3h.

a) Pressure at hydrants

When the pump is delivering the quantity of water required by paragraph [1.4.3] a), the pressure at any hydrants is to be not less than the minimum pressure required by [1.4.1] f).

b) Diesel engines and fuel tank

1) Starting of diesel engine

Any diesel driven power source for the pump is to be capable of being readily started in its cold condition down to the temperature of 0°C by hand (manual) cranking. If this is impracticable, or if lower temperatures are likely to be encountered, consideration is to be given to the provision and maintenance of heating arrangements, acceptable to Tasneef so that ready starting will be assured. If hand (manual) starting is impracticable, Tasneef may permit other means of starting. These means are to be such as to enable the diesel driven power source to be started at least six times within a period of 30 min and at least twice within the first 10 min.

2) Fuel tank capacity

Any service fuel tank is to contain sufficient fuel to enable the pump to run on full load for at least three hours and sufficient reserves of fuel are to be available outside the machinery space of category A to enable the pump to be run on full load for an additional 15 h.

c) Requirements for the space containing the emergency fire pump

a. Location of the space

The space containing the fire pump is not to be contiguous to the boundaries of machinery spaces of category A or those spaces containing main fire pumps. Where this is not practicable, the common bulkhead between the two spaces is to be insulated to “A-60” class fire integrity.

b. Access to the emergency fire pump

No direct access is to be permitted between the machinery space and the space containing the emergency fire

pump and its source of power. When this is impracticable, Tasneef may accept an arrangement where the access is by means of an airlock with the door of the machinery space being of "A-60" class standard, and the other door being at least steel, both reasonably gas-tight, self-closing and without any hold back arrangements. Alternatively, the access may be through a watertight door capable of being operated from a space remote from the machinery space and the space containing the emergency fire pump and unlikely to be cut off in the event of fire in those spaces. 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.

c. Ventilation of the emergency fire pump space

Ventilation arrangements to the space containing the independent source of power for the emergency fire pump are to be such as to preclude, as far as practicable, the possibility of smoke from a machinery space fire entering or being drawn into that space.

1.4.4 Additional pumps for cargo ships

In addition, in ships where other pumps, such as general service, bilge and ballast pumps etc., are fitted in a machinery space, arrangements are to be made to ensure that at least one of these pumps, having the capacity and pressure required in [1.4.3] b), is capable of providing water to the fire main.

1.4.5 Fire hoses

a) Fire hoses are to be of non-perishable material approved by Tasneef and are to be sufficient in length to project a jet of water to any of the spaces in which they may be required to be used. Each hose is to be provided with a nozzle and the necessary couplings.
Hoses specified in these Rules as "fire hoses" are, together with any necessary fittings and tools, to be kept ready for use in conspicuous positions near the water service hydrants or connections. Fire hoses are to have a length of at least 10 m, but not more than:

b) 15 m in machinery spaces;

c) 20 m in other spaces and open decks; and

d) 25 m for open decks on ships with a maximum breadth in excess of 30 m.

b) Unless one hose and nozzle is provided for each hydrant in the ship, there is to be complete interchangeability of hose couplings and nozzles.

c) Ships are to be provided with fire hoses, the number and diameter of which are to be to the satisfaction of Tasneef.

The number of fire hoses to be provided is to be one for each 30 m length of the ship and one spare, but in no case less than five in all. This number does not include any hoses required in any engine or boiler room. Tasneef may increase the number of hoses required so as to ensure that hoses in sufficient number are available and accessible at all times, having regard to the type of ship and the nature of the trade in which it is employed.

1.4.6 Sizes and types of nozzles

a) For the purposes of these Rules, standard nozzle sizes are to be 12 mm, 16 mm and 19 mm or as near thereto as possible. Larger diameter nozzles may be permitted at the discretion of Tasneef;

b) for accommodation and service spaces, a nozzle size greater than 12 mm need not be used;

c) for machinery spaces and exterior locations, the nozzle size is to be such as to obtain the maximum discharge possible from two jets at the pressure mentioned in paragraph [1.4.1] f) from the smallest pump, provided that a nozzle size greater than 19 mm need not be used;

d) nozzles are to be of an approved dual-purpose type (i.e. spray/jet type) incorporating a shut-off.

1.5 PROTECTION OF MACHINERY SPACES

1.5.1

Where internal combustion type engines are used, either for main propulsion machinery, or for auxiliary purposes associated with a total power output of not less than 750 kW, the ship is to be provided with the following arrangements.

a) There is to be one of the following fixed fire-extinguishing systems:

- a gas system or equivalent;
- a high expansion foam system;
- a pressure water-spraying system.

In each case. if the engine and boiler rooms are not entirely separate, or if fuel oil can drain from the boiler room into the engine room bilges, the combined engine and boiler rooms are to be considered as one compartment.

b) There is to be in each engine space one approved foam type extinguisher of capacity

not less than 45 litres or equivalent and also one approved portable foam extinguisher for each 750 kW of engine power output or fraction thereof. The total number of portable extinguishers so supplied is to be not less than two and need not exceed six.

c) In proximity of the main switchboard and of any other electrical panel or subpanel of power not less than 20 kW, one carbon dioxide extinguisher is to be provided.

1.5.2

Spaces containing only internal combustion type engines for auxiliary purposes, having in the aggregate a total power output of less than 750 kW, are to be provided with two approved portable foam type extinguishers of 9 l capacity or equivalent, if the total power output is 75 kW or upwards, and at least with one such extinguisher if the total power output is 15 kW or upwards but does not exceed 75 kW.

1.5.3

Spaces containing steam turbines or enclosed steam engines used either for main propulsion or for auxiliary purposes, when such machinery has in the aggregate a total power output of 750 kW and upwards, if separated from the boiler room by a watertight bulkhead, are to be provided with the following arrangements:

- foam type fire extinguishers each of at least 45 l capacity or equivalent, sufficient in number to enable foam or its equivalent to be directed on to any part of the pressure lubrication system, on to any part of the casings enclosing pressure lubricated parts of the turbines, engines or associated gearing, and any other fire hazards. Such extinguishers are not required if protection at least equivalent to that indicated here is provided in such spaces by a fixed fire-extinguishing system fitted in compliance with [b];
- a sufficient number of portable foam type extinguishers or equivalent, which are to be so located that an extinguisher is not more than 10 metres walking distance from any point in the space; there are to be at least two such extinguishers in each such space; such extinguishers are not required in addition to those provided in compliance with [1.5.1] b);
- in proximity of the main switchboard and of any other electrical panel or subpanel having a power not less than 20 kW, one carbon dioxide extinguisher is to be provided.

1.6 PROTECTION OF BOILER ROOMS AND OTHER SIMILAR SPACES

Where main or auxiliary oil fired boilers are situated, or in spaces containing oil fuel units or settling tanks, the ship is to be provided with the following arrangements:

a) There is to be any one of the fixed fire-extinguishing systems required in [1.5.1] a);

b) There are to be at least two approved portable extinguishers suitable for extinguishing oil fires in each firing space in each boiler room and each space in which a part of the oil fuel installation is situated. In addition, there is to be at least one extinguisher of the same type with a capacity of 9 litres for each burner; the total capacity of the additional extinguishers need not exceed 45 l for any one boiler room. In the case of domestic boilers of less than 175 kW, Tasneef may consider relaxation of the requirements of this item;

c) in each firing space there is to be a receptacle containing sand, sawdust impregnated with soda, or other approved dry material, in such quantity as may be required by Tasneef. Alternatively, an approved portable extinguisher may be substituted;

d) in proximity of the main switchboard and of any other electrical panel or subpanel of power not less than 20 kW, one carbon dioxide extinguisher is to be provided.

Incinerator rooms and spaces containing inert gas generators are to comply with the requirements of this item [1.6].

1.7 FIXED GAS FIRE-EXTINGUISHING SYSTEMS

1.7.1 General

a) Where the quantity of the fire-extinguishing medium is required to protect more than one space, the quantity of medium available need not be more than the largest quantity required for any one space so protected;

b) the volume of starting air receivers, converted to free air volume, is to be added to the gross volume of the machinery space when calculating the necessary quantity of the fire-extinguishing medium. Alternatively, a discharge pipe from the safety valves may be fitted and led directly to the open air;

c) means are to be provided for the crew to safely check the quantity of the fire-extinguishing medium in the containers;

d) containers for the storage of fire-extinguishing medium and associated pressure components are to be designed to pressure codes of practice to the satisfaction of Tasneef having

regard to their locations and maximum ambient temperatures expected in service;

e) storage rooms of fire-extinguishing medium:

when the fire-extinguishing medium is stored outside a protected space, it is to be stored in a room which is located behind the forward collision bulkhead and is used for no other purposes. Any entrance to such a storage room is to preferably be from the open deck and is to be independent of the protected space. If the storage space is located below deck, it is to be located no more than one deck below the open deck and is to be directly accessible by a stairway or ladder from the open deck. Spaces which are located below deck or spaces where access from the open deck is not provided are to be fitted with a mechanical ventilation system designed to take exhaust air from the bottom of the space and sized to provide at least 6 air changes per hour. Access doors are to open outwards, and bulkheads and decks, including doors and other means of closing any opening therein, which form the boundaries between such rooms and adjacent enclosed spaces are to be gas-tight. For the purpose of structural fire protection, such storage rooms are to be treated as fire control stations.

1.7.2 Installation requirements

a) The piping for the distribution of fire-extinguishing medium is to be arranged and discharge nozzles so positioned that a uniform distribution of the medium is obtained;

b) except as otherwise permitted by Tasneef, pressure containers required for the storage of fire-extinguishing medium, other than steam, are to be located outside the protected spaces in accordance with [1.7.1] e);

c) spare parts for the system are to be stored on board and be to the satisfaction of Tasneef.

1.7.3 System control requirements

a) The necessary pipes for conveying fire-extinguishing medium into the protected spaces are to be provided with control valves so marked as to indicate clearly the spaces to which the pipes are led. Suitable provision is to be made to prevent inadvertent release of the medium into the space. Where a cargo space fitted with a gas fire-extinguishing system is used as a passenger space, the gas connection is to be blanked during such use. The pipes may pass through accommodation providing that they are of substantial thickness and that their tightness is verified with a pressure test, after their installation, at a pressure head not less than 5 N/mm^2. In addition, pipes passing through accommodation areas are to be joined only by welding and are not to be fitted with drains or other openings within such spaces. The pipes are not to pass through refrigerated spaces;

b) means are to be provided for automatically giving audible warning of the release of fire-extinguishing medium into any ro-ro spaces and other spaces in which personnel normally work or to which they have access. The pre-discharge alarm is to be automatically activated (e.g. by opening of the release cabinet door). The alarm is to operate for the length of time needed to evacuate the space, but in no case less than 20 s. before the medium is released. Conventional cargo spaces and small spaces (such as compressor rooms, paint lockers, etc.) with only a local release need not be provided with such an alarm;

c) the means of control of any fixed gas fire-extinguishing system are to be readily accessible, simple to operate and grouped together in as few locations as possible at positions not likely to be cut off by a fire in a protected space. At each location there are to be clear instructions relating to the operation of the system having regard to the safety of personnel;

d) automatic release of fire-extinguishing medium is not permitted, unless otherwise stated by Tasneef

1.7.4 Carbon dioxide systems

a) Quantity of fire-extinguishing medium

For cargo spaces, the quantity of carbon dioxide available is, unless otherwise provided, to be sufficient to give a minimum volume of free gas equal to 30% of the gross volume of the largest cargo space to be protected in the ship;

For machinery spaces, the quantity of carbon dioxide carried is to be sufficient to give a minimum volume of free gas equal to the larger of the following volumes, either:

a) 40% of the gross volume of the largest machinery space so protected, the volume to exclude that part of the casing above the level at which the horizontal area of the casing is 40% or less of the horizontal area of the space concerned taken midway between the tank top and the lowest part of the casing; or

b) 35% of the gross volume of the largest machinery space protected, including the casing;

For the purpose of this item [1.7.4] the volume of free carbon dioxide is to be calculated at 0,56 m^3/kg;

For machinery spaces, the fixed piping system is to be such that 85% of the gas can be discharged into the space within 2 min.

b) Controls

Carbon dioxide systems are to comply with the following requirements:

a. two separate controls are to be provided for releasing carbon dioxide into a protected space and to ensure the activation of the alarm. One control is to be used for opening the valve of the piping which conveys the gas into the protected space and a second control is to be used to discharge the gas from its storage containers; and
b. the two controls are to be located inside a release box clearly identified for the particular space. If the box containing the controls is to be locked, a key to the box is to be in a break-glass-type enclosure conspicuously located adjacent to the box.

c) Bottle arrangement

The bottles are to be arranged in a vertical position and so disposed in order to facilitate their weighing. Moreover, in order to avoid corrosion on the bottom of the bottles they are to be arranged in such a way that ventilation is facilitated and cleaning is possible.

d) Bottles and their fittings

The bottles are to be approved by Tasneef on the basis of the requirements of Pt C, Ch 1, Sec 3 of the Rules for Classification of Ships and are to have a capacity not greater than 67l. Bottles having capacity up to 80 l may be accepted by Tasneef on a case-by-case basis subject to satisfactory handling arrangements. However, the bottles of a system are to have the same capacity.

Each bottle is to be provided with a valve is to be fitted with a standard threaded connection, for bottle filling, and with a safety device (rupture disc) set to a pressure value between 17 and 20 MPa. The minimum cross-sectional area of the device is to be not less than 50 mm^2. Lastly, the valve is to be fitted with a manual opening control which can be easily and readily operated or with another opening device accepted by Tasneef. If the exhaust of the safety devices is led into the CO_2 collecting main, or into a proper exhaust pipe leading to the open, Tasneef may waive the requirement for mechanical ventilation of the room in SOLAS Convention, Regulation II-2/10.4.3 and furthermore, failing this, the discharge of such safety device is to be equipped with a jet breaker.

- The bottles are to be permanently connected to a common collecting main by means of a steel pipe complying with the requirements of l) or by a flexible pipe capable to withstanding a burst test at a pressure not less than four times the design pressure of the bottle. A non-return valve is to be fitted between each bottle and the collecting main.
- The filling ratio of the bottles is generally to be not greater than 0,67 kg/l. In exceptional cases, in which the ship's service is restricted to temperate zones, a filling ratio up to 0,75 kg/l may be accepted.
- Containers for the storage of fire-extinguishing medium and associated pressure components are to be designed to pressure codes of practice to the satisfaction of Tasneef having regard to their locations and maximum ambient temperatures expected in service.

e) Safety devices for the CO_2 collecting mains

The CO_2 manifold located in the bottle room is to be fitted with one or more safety valves or rupture disks set to a pressure value between 17 and 20 MPa with the exhaust pipe led to the open air. The outflow cross-sectional area of these valves or rupture disks is to be not less than 300 mm^2. When the exhaust pipe of the bottle safety devices mentioned in d) is led into the CO_2 collecting mains, the minimum total outflow cross-sectional area of the above-mentioned safety valves or rupture disks will be given special consideration by Tasneef on a case-by-case basis.

f) Carbon dioxide distribution arrangement

1) The CO_2 distribution system within protected spaces is to be so designed that, when the gas quantity appropriate to that space is discharged, it is uniformly distributed through all the discharge nozzles. In machinery and boiler spaces at least 20 per cent of the required quantity of carbon dioxide is to be discharged below the floor.
2) Tab 2 sets forth the minimum piping diameters for quick discharge in relation

to the quantity of carbon dioxide to be discharged; different values may be accepted by Tasneef on the basis of the results of detailed hydraulic calculations. For slow discharge, the piping is to have a nominal diameter, DN, not less than 20 mm. A connection for the compressed air piping is to be provided on the collecting main for the purpose of cleaning the system piping and associated nozzles. This connection is to be threaded and closed with a threaded plug.

3) Piping joints are to be made by means of flanges. However, threaded joints may be used within the CO_2 room and within the protected spaces, subject to the limitations in Pt C, Ch 1, Sec 10, [2.4.4] and [2.4.5] of the Rules for Classification of Ships. Pipes passing through accommodation spaces are to be joined only by welding.
4) The piping, valves and fittings are to be properly secured to the hull structures and, when necessary, they are to be protected against possible damage. Plugs, draining devices and filters, if any, are to be arranged, where necessary, in such a way as to prevent the accumulation of condensation water and residues. They are to be situated in easily accessible and controllable positions and, in any case, outside accommodation spaces. For the purpose of reducing friction loss in the piping, it is to be arranged as straight as possible and along the shortest path.
5) The carbon dioxide is to be discharged through nozzles in a nebulised state and for such purpose the utmost care is to be taken in shaping and sizing the nozzle cones to avoid the formation of dry snow or dry ice. When a smoke detection system using the CO_2 distribution piping is foreseen, the connection of the system to this piping is to be made close to the distribution valves by means of a device suitable for preventing the CO_2 from being conveyed to the smoke detection station during the discharge.
6) The applicator nozzles are not to be located near ventilation outlets and they are to be clear of machinery or devices which could hinder the outflow. The branch pipes on which the nozzles are fitted are to extend at least 50 mm beyond the last nozzle and are to be closed by a threaded plug in order to allow the removal of any residues left in sections of the piping by the gas flow. The total outflow cross-sectional area of the applicator nozzles in machinery and boiler spaces and in spaces, other than special category spaces, intended for the carriage of motor vehicles is to be not less than 50 per cent or greater than 85 per cent of the outflow cross-sectional area of the carbon dioxide collecting main. In general, the actual outflow cross-sectional area of each applicator is to be between 50 and 160 mm^2 and, in the case of multiple hole applicators, the diameter of each hole is to be not less than 4 mm; different values may be accepted by Tasneef on the basis of the results of detailed hydraulic calculations. Each cargo hold and each cargo 'tweendeck with a gross volume of less than 800 m^3 is to be fitted with at least 2 applicator nozzles; cargo holds and cargo 'tweendecks with a greater gross volume are to be fitted with at least 4 nozzles. Nozzles are to be located, in principle, in the upper part of the space to be protected and the distance between two nozzles is generally not to exceed 12 m. A different distance may be accepted on the basis of detailed hydraulic calculations to be submitted to Tasneef for approval.

g) Alarm devices

The alarm system is to be approved by Tasneef. The alarm sounding during the discharge may be of pneumatic type (e.g. CO_2, nitrogen) or of electrical type.

Audible alarms fitted to warn of the release of gas fire-extinguishing medium into pump rooms are to meet the requirements of 1) and 2):

1) Pneumatically operated alarms

In cases where the periodical testing of such alarms is required, CO_2 operated alarms are not to be used owing to the possibility of the generation of static electricity in the CO_2 cloud. Air operated alarms may be used provided the air supply is clean and dry.

2) Electrically operated alarms

When electrically operated alarms are used, the arrangements are to be such that the electrical actuating mechanism is located outside the pump room and the alarms are of certified safe type.

h) Electrical audible alarm

Where the audible alarm in g) is electrically operated, the following conditions are to be complied with:

1) The supply to the alarm system is to be continuously powered from the emergency source of electrical power or from a battery suitably located for use in an emergency. An alarm in case of power failure to the alarm system is to be given in a manned position.
2) Two or more audible alarm devices are to be installed in each protected space, as far away as possible from each other and such that, if one of them goes out of service, the remaining one(s) will be sufficient to give the alarm to the whole space.
3) The circuits supplying the audible alarm devices are to be protected only against short-circuits.
4) The arrangement of the circuits and their electrical protection are to be such that the failure of one of the audible alarm devices will not impair the operation of the others.
5) The fuses, if used for short-circuit protection, are to be of the type fitted with a device indicating the fuse condition.
6) The electrical cables are to be of the fire-resisting type.
7) The audible alarm devices and any other equipment located in the space are to be protected within cases ensuring a degree of protection adequate to the space of installation with a minimum of IP44. Where the audible alarm devices and any other equipment are arranged in a hazardous area, the requirements set forth in Chapter 2 are also to be complied with.

i) Pilot bottles

When the simultaneous operation of the bottles is actuated by means of carbon dioxide pressure from a driver bottle, at least two pilot bottles are to be provided, with valves capable of being locally manoeuvred at all times. The pipes connecting the pilot bottles to the valves of the other bottles are to be of steel complying with the requirements in k) below and their arrangement is to allow piping distortion due to thermal variations or, failing this, the connection is to be made by means of a flexible pipe capable to withstanding a burst test at a pressure not less than four times the design pressure of the bottle.

j) Shut-off valves

For systems in which bottle valve opening is actuated by using the pressure of carbon dioxide discharged from pilot bottles, a valve, normally to be kept shut, is to be placed between the main of the pilot bottles and the main of the other bottles. This valve is to be opened by means of the same actuating device as for the pilot bottles and is to be placed upstream of the device delaying the discharge of the non-pilot bottles.

k) Materials

The CO_2 system appliances are to be constructed of materials suitable for resisting corrosion by the marine environment; it is recommended that all important fittings of the system are to be of brass, special bronze or stainless steel. The carbon dioxide piping is to be of steel, hot galvanised inside and outside. The relevant wall thicknesses are to be not less than those specified in Tab 3. Cast iron connections and fittings are not allowed, except for fittings of ductile or globular cast iron which may be installed after the distribution valves.

The distribution valves or cocks are to be of such dimensions as to withstand a nominal pressure of not less than 16 MPa. The valves, flanges and other fittings of the piping between the bottles and the distribution valves are to have dimensions for a nominal pressure of not less than 16 MPa. The valves, flanges and other fittings of the piping between the distribution valves and the applicator nozzles are to have dimensions for a nominal pressure of not less than 4 MPa.

l) Inspections and tests

The bottles and associated fittings under pressure are to be subjected to a hydrostatic test pressure of 25 Mpa witnessed by Tasneef. The piping, valves and other fittings are to be

subjected to the following tests witnessed by Tasneef:

1) for those between the bottles and the distribution valves: hydrostatic test to 20 MPa pressure in the workshop before their installation on board and hydrostatic test to 0,7 MPa pressure after their installation on board
2) for those led through accommodation spaces: hydrostatic test to 5 MPa pressure after their installation on board
3) for those between the distribution valves and the applicator nozzles: pneumatic test, after their installation on board, to a pressure suitable to check gas tightness and absence of obstructions
4) for flexible pipes: hydrostatic test under a pressure at least equal to 1,5 times the maximum service pressure.

Table 2: Dimensions of the CO_2 piping for quick discharge

Nominal Diameter	External Diameter	CO_2 quantity, in kg	
DN (mm)	de (mm)	Machinery and boiler spaces	Spaces, other than special category spaces intended for the carriage of motor vehicles
15	21,3	45	225
20	26,9	100	500
25	33,7	135	675
32	42,4	275	1375
40	48,3	450	2250
50	60,3	1100	5500
65	76,1	1500	7500
80	88,9	2000	10000
90	101,6	3250	16250
100	114,3	4750	23750
110	127,0	6810	34050
125	139,7	9500	47500
150	168,3	15250	76250

Table 3: Minimum wall thickness for steel pipes for CO_2 fire-extinguishing systems

External diameter of pipes (mm)	Minimum wall thickness (mm)	
	From bottles to distribution station	From bottles to distribution station
21,3 - 26,9	3,2	2,6
30,0 - 48,3	4,0	3,2
51,0 - 60,3	4,5	3,6
63,5 - 76,1	5,0	3,6
82,5 - 88,9	5,6	4,0
101,6	6,3	4,0
108,0 - 114,3	7,1	4,5
127,0	8,0	4,5
133,0 - 139,7	8,0	5,0
152,4 - 168,3	8,8	5,6

Note 1:

a) Pipes are to be galvanised inside and outside. For pipes fitted in the engine room, galvanising may not be required, exclusively at the discretion of Tasneef.
b) For threaded pipes, where allowed, the minimum thickness is to be measured at the bottom of the thread.
c) For external diameters larger than those given in the Table, the minimum wall thickness will be subject to special consideration by Tasneef.
d) In general, the thicknesses indicated in the Table are the nominal wall thicknesses and no allowance need be made for negative tolerance and reduction in thickness due to building.
e) The external diameters and thicknesses listed in the Table have been selected from ISO Standards for welded and seamless steel pipes. For pipes covered by other standards, slightly lower thickness may be accepted, at Tasneef discretion.

1.7.5 Equivalent fixed gas fire-extinguishing systems for machinery spaces and cargo pump rooms

Fixed gas fire-extinguishing systems equivalent to those specified in paragraph [1.7.4] are to be type approved according to MSC/Circ.848 or another standard recognised by Tasneef.

1.8 FIXED FOAM FIRE-EXTINGUISHING SYSTEMS

1.8.1 General

Fixed foam fire-extinguishing systems are to be capable of generating foam suitable for extinguishing oil fires.

1.8.2 Fixed high expansion foam fire-extinguishing systems

a) Quantity and performance of foam concentrates:

b) the foam concentrates of high expansion foam fire-extinguishing systems are to be approved by Tasneef based on MSC/ Circ. 670;

c) any required fixed high expansion foam system in machinery spaces is to be capable of rapidly discharging through fixed discharge outlets a quantity of foam sufficient to fill the greatest space to be protected at a rate of at least 1 m in depth per minute. The quantity of foam-forming liquid available is to be sufficient to produce a volume of foam equal to five times the volume of the largest space to be protected. The expansion ratio of the foam is not to exceed 1000 to 1;

d) Tasneef may permit alternative arrangements and discharge rates provided that it is satisfied that equivalent protection is achieved.

1) Installation requirements:

i. supply ducts for delivering foam, air intakes to the foam generator and the number of foam-producing units are, in the opinion of Tasneef, to be such as will provide effective foam production and distribution;

ii. the arrangement of the foam generator delivery ducting is to be such that a fire in the protected space will not affect the foam generating equipment. If the foam

generators are located adjacent to the protected space, foam delivery ducts are to be installed to allow at least 450 mm of separation between the generators and the protected space. The foam delivery ducts are to be constructed of steel having a thickness of not less than 5 mm. In addition, stainless steel dampers (single or multi-bladed) with a thickness of not less than 3 mm are to be installed at the openings in the boundary bulkheads or decks between the foam generators and the protected space. The dampers are to be automatically operated (electrically, pneumatically or hydraulically) by means of remote control of the foam generator related to them;

iii. the foam generator, its sources of power supply, foam-forming liquid and means of controlling the system are to be readily accessible, simple to operate and grouped in as few locations as possible at positions not likely to be cut off by a fire in the protected space.

1.8.3 Fixed low expansion foam fire-extinguishing systems

a) Quantity and foam concentrates:
   1) the foam concentrates of low expansion foam fire-extinguishing systems are to be approved by Tasneef based on MSC/ Circ. 582 and Corr. 1;
   2) the system is to be capable of discharging through fixed discharge outlets in not more than 5 min a quantity of foam sufficient to cover to a depth of 150 mm the largest single area over which oil fuel is liable to spread. The expansion ratio of the foam is not to exceed 12 to 1.

b) Installation requirements:
   a. means are to be provided for the effective distribution of the foam through a permanent system of piping and control valves or cocks to suitable discharge outlets, and for the foam to be effectively directed by fixed sprayers on other main fire hazards in the protected space. The means for effective distribution of the foam are to be proven acceptable to Tasneef through calculation or by testing;
   b. the means of control of any such systems are to be readily accessible, simple to operate and grouped together in as few locations as possible at positions not likely to be cut off by a fire in the protected space.

1.9 FIXED WATER-SPRAYING FIRE-EXTINGUISHING SYSTEMS

1.9.1 Nozzles and pumps

a) The number and arrangement of the nozzles are to be to the satisfaction of Tasneef and are to be such as to ensure an effective average distribution of water of at least 5 l/m2 per minute in the spaces to be protected. Where increased application rates are considered necessary, these are to be to the satisfaction of Tasneef;

b) precautions are to be taken to prevent the nozzles from becoming clogged by impurities in the water or corrosion of piping, nozzles, valves and pump;

c) in machinery spaces, the pump is to be capable of simultaneously supplying at the necessary pressure all sections of the system in any one compartment to be protected.
In vehicle, ro-ro and special category spaces the pump or pumps are to be capable of providing simultaneously, at all times, a sufficient supply of water at the required pressure to nozzles or at least the two adjacent sections having the maximum extension;

1) the pump may be driven by independent internal combustion machinery but, if it is dependent upon power being supplied from the emergency generator fitted in compliance with the provisions of Part C, Ch 1, Sec 2 and Part C, Chapter 2 and Part E, Chapter 11 of the Rules for the Classification of Ships as appropriate, that generator are to be so arranged as to start automatically in case of main power failure so that power for the pump required by the previous item [c)] is immediately available. The independent internal combustion machinery for driving the pump is to be so situated that a fire in the protected space or spaces will not affect the air supply to the machinery.

1.9.2 Installation requirements for machinery spaces

a) Nozzles are to be fitted above the bilge, tank tops and other areas over which fuel oil is liable to spread and also above other specific fire hazards in the machinery spaces;

b) the system may be divided into sections, the distribution valves of which are to be operated from easily accessible positions outside the spaces to be protected and not readily cut off by a fire in the protected space;

c) the pump and its controls are to be installed outside the space or spaces to be protected. It is not to be possible for a fire in the space or

spaces protected by the water-spraying system to put the system out of action.

1.9.3 Installation requirements for vehicle, ro-ro and special category spaces

The system is to be capable of manual operation and is to protect all parts of any deck and vehicle platform in such spaces. Such water spray systems are to have:

a) a pressure gauge on the valve manifold;
b) clear marking on each manifold valve indicating the spaces served;
c) instructions for maintenance and operation located in the valve room; and
d) a sufficient number of drainage valves.

The system is to protect the whole space but may be subdivided into sections. Each section is to be not less than 20 m long. These sections are, as a rule, to have the same width as the space width except for those ships where the space is subdivided by “A” class longitudinal fire divisions forming the boundaries of stairways or other spaces, for which the section width may be reduced in proportion. An even water distribution to the whole space to be protected is to be ensured. The distribution valves for the system are to be located in an easily accessible position, adjacent to but outside the space to be protected, which will not readily be cut off by a fire within the space. Direct access to the distribution valves from the space and from outside the space is to be provided. Adequate ventilation means are to be fitted in the space containing the distribution valves. The water supply to the system is to be provided by one or more independent pumps which are not the required ship’s fire pumps or other pumps intended for services essential for safety and navigation. In any case, the required ship’s fire pumps are to be connected to the fire-extinguishing system of the space to be protected by manually lockable non-return valves which will prevent a backflow from the pressure water-spraying system to the fire main.

1.9.4 System control requirements

The system is to be kept charged at the necessary pressure and the pump supplying the water for the system is to be put automatically into action by a pressure drop in the system.
For vehicle and ro-ro spaces the pump or pumps are to be capable of being brought into operation by remote control from the same position at which the distribution valves are located.

1.10 EQUIVALENT WATER-MIST FIRE-EXTINGUISHING SYSTEMS FOR MACHINERY SPACES AND CARGO PUMP ROOMS

Water-mist fire-extinguishing systems for machinery spaces and cargo pump rooms are to be approved by Tasneef according to MSC/Cir.1165.

1.11 PROTECTION OF CARGO SPACES

1.11.1 Cargo spaces other than ro-ro spaces

a) The following requirements apply to cargo spaces other than ro-ro spaces, except for cargo spaces intended for the carriage of motor vehicles with fuel (gasoline, LPG or methane) in their tanks for their own propulsion, to which the requirements given in [1.11.3] apply, and cargo spaces intended for the carriage of dangerous goods, to which the requirements given in [1.15] apply in the terms specified therein;
b) cargo spaces are to be protected by a fixed carbon dioxide fire-extinguishing system complying with the provisions of [1.7] as applicable, or by another fire-extinguishing system which provides equivalent protection in the opinion of Tasneef . In general, Tasneef will not permit the use of steam as a fire-extinguishing medium in fixed fire-extinguishing systems;
c) Tasneef may exempt from the requirements of [b] the cargo spaces of any ship constructed and solely intended for the carriage of ore, coal, grain, unseasoned timber and non-combustible cargoes or cargoes which, in the opinion of Tasneef, offer a low fire risk. (This exemption does not apply to cargo spaces equipped for the carriage of containers or motor vehicles with diesel engines.) Such exemptions may be granted only if the ships are fitted with steel hatch covers and effective means of closing all ventilators and other openings leading to the cargo spaces.
Note 1: Tasneef includes a note on the Certificate of Classification for the exempted ships.

1.11.2 Protection of ro-ro spaces

a) Premise
The following requirements apply to ro-ro spaces, with the exception of those cargo spaces intended for the carriage of motor vehicles with fuel (gasoline, LPG or methane) in their tanks for their own propulsion, to which the requirements given in [1.11.3] apply. Ro-ro spaces intended only for the carriage of motor vehicles with diesel engines and with fuel in their tanks for their own

propulsion are to comply with the requirements given in item [c)].

b) Fire detection and fire alarm system
An approved automatic fire detection and fire alarm system is to be provided.

c) Fixed fire-extinguishing system

- Closed ro-ro spaces are to be fitted with a fixed carbon dioxide fire-extinguishing system, which is to comply with the same provisions as paragraph 1.7. The quantity of gas available is to be at least sufficient to give a minimum volume of free gas equal to 45 per cent of the gross volume of the largest such cargo space which is capable of being sealed, and the arrangements are to be such as to ensure that at least two thirds of the gas required for the relevant space will be introduced in 10 minutes. Any other fixed gas fire-extinguishing system or fixed high expansion foam fire-extinguishing system may be fitted provided Tasneef is satisfied that an equivalent protection is achieved.
- Ro-ro spaces not capable of being sealed are to be fitted with a fixed pressure water-spraying fire-extinguishing system meeting the requirements of Res. A.123(V) or alternatively approved according to MSC/Circ. 914. Such system may be fitted in closed ro-ro spaces instead of that described in the above item. If a fixed pressure water-spraying fire-extinguishing system is fitted, the drainage and pumping arrangements are to be such as to prevent the build-up of free surfaces. If this is not possible, the adverse effect on stability of the added weight and free surface of water is to be taken into account to the extent deemed necessary by Tasneef in its approval of the stability information. Such information is to be included in the stability information supplied to the Master.

  When fixed pressure water-spraying systems are provided, in view of the serious loss of stability which could arise due to large quantities of water accumulating on the deck or decks during the operation of the fixed pressure water-spraying system, the following arrangements are to be provided:

  in cargo ships, the drainage and pumping arrangements are to be such as to prevent the build-up of free surfaces. In such case, the drainage system is to be sized to remove no less than 125% of the combined capacity of both the water-spraying system pumps and the required number of fire hose nozzles. The drainage system valves are to be operable from outside the protected space at a position in the vicinity of the extinguishing system controls. Bilge wells are to be of sufficient holding capacity and are to be arranged at the side shell of the ship at a distance from each other of not more than 40 m in each watertight compartment. If this is not possible, the adverse effect upon stability of the added weight and free surface of water is to be taken into account to the extent deemed necessary by Tasneef in its approval of the stability information.

d) Fire extinguishers
All ro-ro spaces are to be provided with portable extinguishers in such number as Tasneef may deem sufficient. In general, portable extinguishers of type suitable for extinguishing oil fires are to be fitted at each deck level and at each ship side so located that the distance between two extinguishers does not exceed 20 m, with a minimum of two extinguishers located at each end. At least one portable extinguisher is to be located at each point of access.

e) Ventilation system:

1) closed ro-ro spaces are to be provided with an effective power ventilation system sufficient to provide at least six air changes per hour based on an empty hold. The system is to be entirely separate from other ventilating systems. Ventilation ducts serving ro-ro spaces capable of being effectively sealed are to be separated for each cargo space. Tasneef may require an increased number of air changes when vehicles are being loaded or unloaded. The system is to be capable of being controlled from a position outside such spaces;
2) the ventilation is to be such as to prevent air stratification and formation of air pockets;
3) means are to be provided to indicate on the navigating bridge any loss of the required ventilating capacity;
4) arrangements are to be provided to permit a rapid shutdown and effective closure of the ventilation system in the event of fire, taking into account the weather and sea conditions;

5) ventilation ducts, including dampers, are to be made of steel and are to be arranged to the satisfaction of Tasneef.

1.11.3 Protection of cargo spaces, including ro-ro spaces, intended for the carriage of motor vehicles with fuel (gasoline, LPG or methane) in their tanks for their own propulsion

a) Structural protection and means of escape: bulkheads and decks forming boundaries of cargo spaces are to be of steel or other equivalent material and means of escape, deemed suitable by Tasneef, are to be provided in every space. In the case of closed ro-ro spaces, bulkheads and decks forming their boundaries are to consist of fire divisions having the following characteristics in relation to the type of adjacent space:
   - control stations and machinery spaces of category A: A-60;
   - corridors, accommodation spaces, stairways, service spaces: A-30;
   - other spaces: A-0.

b) Fire detection and fire alarm system: a fixed automatic fire detection and fire alarm system, having sensing heads and detection system of an approved type, is to be provided.

c) Fire extinguishing appliances: a fixed fire-extinguishing system, in compliance with [1.11.2] c), is to be provided.

d) Portable extinguishers are to be provided at each deck level in each hold or compartment where vehicles are carried, spaced not more than 20 m apart on both sides of the space. At least one portable fire extinguisher is to be located at each point of access to such a cargo space. In addition, the following fire-extinguishing appliances are to be provided in vehicle, ro-ro and special category spaces intended for the carriage of motor vehicles with fuel in their tanks for their own propulsion:
   1) at least three water-fog applicators; and
   2) one portable foam applicator unit consisting of a foam nozzle of an inductor type capable of being connected to the fire main by a fire hose, together with a portable tank containing at least 20 l of foam-making liquid and one spare tank of foam-making liquid. The nozzle is to be capable of producing effective foam suitable for extinguishing an oil fire, at the rate of at least 1,5 m^3/min, provided that at least two such units are available in the ship for use in such ro-ro spaces.

e) Ventilation system: a ventilation system, complying with the requirements of [1.11.2] e), is to be provided. Impeller materials of exhaust fans are to have antistatic properties and be spark-proof, in the opinion of Tasneef, in respect of the material of the impeller housing, as required by Part C Ch 4 of the Rules for the Classification of Ships.

f) Precautions against ignition of flammable vapours:
   1) except as provided in [1.11.3] b), electrical equipment and wiring are to be of a type suitable for use in an explosive petrol and air mixture;
   2) in the case of other than special category spaces below the bulkhead deck, notwithstanding the provisions in [1.11.3] a), above a height of 450 mm from the deck and from each platform for vehicles, if fitted, except platforms with openings of sufficient size permitting penetration of petrol gases downwards, electrical equipment of a type so enclosed and protected as to prevent the escape of sparks is permitted as an alternative on condition that the ventilation system is so designed and operated as to provide continuous ventilation of the cargo spaces at the rate of at least ten air changes per hour whenever vehicles are on board;
   3) electrical equipment and wiring, if installed in an exhaust ventilation duct, are to be of a type approved for use in explosive petrol and air mixtures and the outlet from any exhaust duct is to be sited in a safe position, having regard to other possible sources of ignition;
   4) other equipment which may constitute a source of ignition of flammable vapours is not permitted;
   5) scuppers and discharges are not to be led to machinery or other spaces where sources of ignition may be present;
   6) exemptions for partially open spaces or for voyages not exceeding two hours: exemptions from the requirements relating to the insulation value of decks, to electrical installations and to the ventilation system may be granted by Tasneef in the case of partially open spaces or for voyages not exceeding two hours.

1.11.4 Protection of open deck spaces intended for the carriage of motor vehicles with fuel (gasoline, LPG or

methane) in their tanks for their own propulsion

The following requirements generally apply:

a) in the case of carriage of motor vehicles with fuel in their tanks on pen deck spaces, the deck may be counter-sheathed in wood and, in general, no communication stairways with enclosed spaces below or adjacent to the above zone are allowed;
b) in the event of fire in motor vehicle spaces, access to the ship manoeuvring spaces, to the places where safety appliances are located, to the lifeboats and liferafts and to the relevant embarkation areas is not to be precluded;
c) if main stairways, not for emergency, giving access to accommodation spaces below or adjacent to the open deck space intended for the carriage of motor vehicles lead to such space, sufficient room is to be left available around the door of the escape and in addition, an escape route connecting the above room with the means of escape leading to lifeboat and liferaft embarkation areas is to be provided;
d) the above-mentioned room and escape route are to be permanently marked on the deck.

1.12 FIRE PRECAUTIONS RELEVANT TO CONSTRUCTION AND INSTALLATION

1.12.1 Electric radiators

Electric radiators, if used, are to be fixed in position and so constructed as to reduce fire risks to a minimum. No such radiators are to be fitted with an element so exposed that clothing, curtains or other similar materials can be scorched or set on fire by heat from the element.

1.12.2 Waste receptacles

Waste receptacles are to be constructed of non-combustible materials with no openings in the sides or bottom.

1.13 PORTABLE FIRE EXTINGUISHERS

1.13.1

Accommodation spaces, service spaces and control stations are to be provided with portable fire extinguishers approved according to standards recognised by Tasneef .

1.13.2

Ships are to carry at least five portable fire extinguishers.

1.13.3

One of the portable fire extinguishers intended for use in any space is to be stowed near the entrance to that space.

1.13.4

Carbon dioxide fire extinguishers are to not be placed in accommodation spaces. In control stations and other spaces containing electrical or electronic equipment or appliances necessary for the safety of the ship, fire extinguishers are to be provided whose extinguishing media are neither electrically conductive nor harmful to the equipment and appliances.

1.13.5

Fire extinguishers are to be situated ready for use at easily visible places, which can be reached quickly and easily at any time in the event of a fire, and in such a way that their serviceability is not impaired by the weather, vibration or other external factors. Portable fire extinguishers are to be provided with devices which indicate whether they have been used.

1.13.6

Spare charges are to be provided for 100% of the first 10 extinguishers and 50% of the remaining fire extinguishers capable of being recharged on board. Not more than 60 total spare charges are required. Instructions for recharging are to be carried on board. For fire extinguishers which cannot be recharged on board, additional portable fire extinguishers of the same quantity, type, capacity and number as determined in [1.3.1] above are to be provided in lieu of spare charges.

1.14 FIREMAN'S OUTFIT

1.14.1 General

A fireman's outfit is to consist of a set of personal equipment and a breathing apparatus.

1.14.2 Personal equipment

Personal equipment is to consist of the following:

a) protective clothing of material to protect the skin from the heat radiating from the fire and from burns and scalding by steam. The outer surface is to be water-resistant;
b) boots of rubber or other electrically non-conducting material;
c) a rigid helmet providing effective protection against impact;
d) an electric safety lamp (hand lantern) of an approved type with a minimum burning period of 3 h. Electric safety lamps on tankers and those intended to be used in hazardous areas are to be of an explosion-proof type; and
e) an axe with a handle provided with high voltage insulation.

1.14.3 Breathing apparatus

Breathing apparatus is to be a self-contained compressed air-operated breathing apparatus for which the volume of air contained in the cylinders is to be at least 1,200 l, or other self-contained breathing apparatus which is to be capable of functioning for at least 30 min. All air cylinders for breathing apparatus are to be interchangeable.

1.14.4 Lifeline

For each breathing apparatus a fireproof lifeline of at least 30 m in length is to be provided. The lifeline is to successfully pass an approval test by static load of 3,5 kN for 5 min without failure. The lifeline is to be capable of being attached by means of a snap-hook to the harness of the apparatus or to a separate belt in order to prevent the breathing apparatus becoming detached when the lifeline is operated.

1.14.5 Number of firemen's outfits

Ships are to carry at least two firemen's outfits. In addition, in tankers, two firemen's outfits are to be provided. Tasneef may require additional sets of personal equipment and breathing apparatus, having due regard to the size and type of the ship.

1.14.6 Spare charges

Two spare charges are to be provided for each required breathing apparatus. Cargo ships that are equipped with suitably located means for fully recharging the air cylinders free from contamination need carry only one spare charge for each required apparatus.

1.14.7 Location

The firemen's outfits or sets of personal equipment are to be kept ready for use in an easily accessible location that is permanently and clearly marked and, where more than one fireman's outfit or more than one set of personal equipment is carried, they are to be stored in widely separated positions.

1.15 REQUIREMENTS FOR CARGO SHIPS INTENDED FOR THE CARRIAGE OF DANGEROUS GOODS

Cargo ships are to comply with Reg II-2/19 of the SOLAS convention as amended or, as an alternative, specific Rules of the flag Administration may be accepted.

2 REQUIREMENTS FOR CARGO SHIPS OF LESS THAN 4000 GROSS TONNAGE

2.1 STRUCTURAL PROTECTION

2.1.1

Cargo ships of less than 4000 gross tonnage are to generally comply with the requirements of [1.1] with the relaxation specified in [2.1.2] to [2.1.4].

2.1.2

For ships having a gross tonnage not less than 500, accommodation spaces (even partially) under the decks extending through the whole breadth of the ship are to comply with the requirements given in [1.1.3]. For other accommodation spaces, the requirements of [1.1.3] may be limited to dead corridors and to those which represent an escapeway from the above-mentioned spaces underneath. In accommodation spaces not complying with the requirements of [1.1.3], the stairway spaces are to be enclosed by suitable draught-cutting trunks.

2.1.3

For ships having gross tonnage less than 500 but in excess of 50, the requirements of [1.1.3] need be applied only to lengths of corridor which represent the only escapeway from spaces inside the ship towards open deck areas from which it is possible to reach the life-saving appliances. For accommodation spaces not complying with the requirements of [1.1.3], the stairway spaces are to be enclosed by suitable draught-cutting trunks.

2.1.4

For ships having a gross tonnage not exceeding 50, the requirements in [1.1.2] and [1.1.3] may be waived.

2.2 MEANS OF ESCAPE

The requirements of [1.2] generally apply. However, in the case of ships of less than 2000 gross tonnage, Tasneef may accept only one vertical means of escape, formed by a set of steel ladders, due regard being paid to the width and the disposition of machinery space casing.

2.3 SPECIAL ARRANGEMENTS IN MACHINERY SPACES

The requirements of [1.3] generally apply.

2.4 WATER FIRE-FIGHTING SYSTEM

The requirements of [1.4] generally apply with the following relaxation.

2.4.1 Fire main and hydrants

The requirements of [1.4.1] apply with the following relaxation:

a) Tasneef may waive the requirement in [1.4.1] b) for cargo ships of less than 1600 gross tonnage if the fire pump starting arrangement in the machinery space is located in an easily accessible position;

b) international shore connection:
ships of 500 gross tonnage and upwards are to be provided with at least one international shore connection complying with [1.4.1] g).

2.4.2 Fire pumps

The requirements of [1.4.2] generally apply with:

1. the following relaxation on the number of fire pumps to be provided:
   a) ships of 1000 gross tonnage and upwards having operating service limited to 6 nautical miles from the shore:
      - at least two fire pumps (one is to be an independently driven and the other may be driven by the main propulsion engine);
   b) ships of 200 gross tonnage and upwards but under 1000 gross tonnage engaged in national voyages or having operating service limited to 20 nautical miles from the shore, ships of 1000 gross tonnage and upwards having operating service limited to 3 nautical miles from the shore and ships of less than 500 gross tonnage but of 200 gross tonnage and upwards engaged in international voyages:
      - at least one independently driven fire pump;
   c) ships of less than 200 gross tonnage and sailing ships of any gross tonnage engaged in international or national voyages or classed for any other more restricted service:
      - at least one fire pump, which may be driven by the main propulsion engine or be a hand pump.
2. the following relaxation on the capacity of pump(s) to be provided:
   a) ships of less than 500 gross tonnage engaged in unrestricted navigation:
      - the total capacity of the main fire pump(s) needs not to exceed 25 m^3/h and is not to be less than:

      $$Q = [0{,}145 \cdot \sqrt{L\,(B + D)} + 2{,}170]^2$$

      where:

      Q : Total capacity (in m^3/h)

      L : Freeboard length (in m)

      B : Greatest moulded breadth of ship (in m)

      D : Moulded depth to bulkhead deck (in m).

2.4.3 Arrangement of fire pumps

The requirements of paragraph [1.4.2] c) are to be generally complied with taking into account the following.

a) Ships of 1000 gross tonnage and upwards engaged in national voyages or having operating service limited to 20 nautical miles from the shore:
   - the requirements of paragraph [1.4.3] regarding the emergency fire pump are to be complied with, except that the starting at a temperature of 0°C or lower, indicated therein, may not be complied with;

1) ships of 500 gross tonnage and upwards but not exceeding 1000 gross tonnage engaged in national voyages or having operating service limited to 20 nautical miles from the shore:
   - the ships are to be provided, in addition to the independently driven main fire pump required in item [2.4.2] a)2), with a fire pump, which may also be of a portable type, located in a compartment other than that containing the main fire pump;

2) ships of less than 500 gross tonnage engaged in international or national voyages or having operating service limited to 20 nautical miles from the shore and ships of any gross tonnage having operating service limited to 6 nautical miles from the shore:
   - no alternative means of providing water for fire-fighting purposes is required.

2.4.4 Pressure at hydrants

The requirements of [1.4.1] f) generally apply except that for ships under 1000 gross tonnage, with the two pumps simultaneously delivering, through nozzles specified in [1.4.6], the quantity of water specified in [1.4.2] d), through any adjacent hydrants, the minimum pressures at all hydrants to be maintained are to be such as to ensure that the above nozzles can project the required jets of water for the Rule distance (12 m or, for ships of less than 200 gross tonnage, 8 m). Where, on cargo ships of 500 gross tonnage and upwards but under 1000 gross tonnage, only one fire pump is provided, it is understood that the above minimum pressure values are to be maintained with the said pump delivering the maximum required quantity of water. Further to the provisions of this item a), machinery spaces of category A of ships of 200 gross tonnage and upwards are to be provided with two hydrants; for the same spaces of ships of less than 200 gross tonnage, only one hydrant is sufficient and is to

be fitted, if the spaces are unattended, near the access to such spaces.

2.4.5 Emergency fire pump

The requirements of [1.4.3] apply, except that the emergency fire pump capacity is to be 25 m^3/h for ships of 2000 gross tonnage and upwards, and 15 m^3/h for ships less than 2000 gross tonnage.

2.5 PROTECTION OF MACHINERY SPACES

2.5.1

Ships of 1000 gross tonnage and upwards are to comply in full with the requirements of [1.5].
Ships of less than 1000 gross tonnage are to comply with the requirements of [1.5] with the following relaxation:
The fixed fire-extinguishing system required in [1.5.1] a) need not be provided.

2.5.2

The foam type extinguisher of not less than 45 litres capacity, required in [1.5.1] b), is to be provided only for spaces containing internal combustion engines used for main propulsion having a total power output not less than 375 kW or used for auxiliary purposes associated with a total power output of not less than 750 kW. However, in ships of less than 200 gross tonnage, the 45-litre capacity foam type extinguisher may be replaced by 9-litre capacity portable foam type extinguishers or equivalent in such number as to have at least one such extinguisher for each 75 kW, or fraction thereof, of engine output exceeding 375 kW. In such case the total number of 9-litre capacity foam type extinguishers fitted in the machinery space need not exceed six.

2.6 PROTECTION OF BOILER ROOM AND OTHER SIMILAR SPACES

Ships of 1000 gross tonnage and upwards are to comply in full with the requirements of [1.6]. For ships of less than 1000 gross tonnage, the fixed fire-extinguishing system required in [1.6.1] a) and the additional foam extinguishers with a capacity of 9 l or equivalent required for each burner in [1.6.1] b) need not be provided.

2.7 FIXED GAS FIRE-EXTINGUISHING SYSTEMS

The requirements of paragraph [1.7] apply with the following relaxation.
The percentages specified in paragraph [1.7.4] a) may be reduced to 35% and 30%, respectively, for cargo ships of less than 2000 gross tonnage where two or more machinery spaces, which are not entirely separate, are considered as forming one space.

2.8 FIXED FOAM FIRE-EXTINGUISHING SYSTEMS

The requirements of paragraph [1.8] apply.

2.9 FIXED WATER-SPRAYING FIRE-EXTINGUISHING SYSTEMS

The requirements of paragraph [1.9] apply.

2.10 FIXED WATER-MIST FIRE-EXTINGUISHING SYSTEMS

The requirements of paragraph [1.10] apply.

2.11 PROTECTION OF CARGO SPACES

2.11.1 Cargo spaces other than ro-ro spaces

The requirements of [1.11.1] apply only to ships of 2000 gross tonnage and upwards.

2.11.2 Protection of ro-ro spaces

The requirements of [1.11.2] apply only to ships of 500 gross tonnage and upwards. However, the fixed fire-extinguishing system may not be required for ro-ro spaces of ships of less than 2000 gross tonnage intended solely for the carriage of motor vehicles with diesel engines, except when the latter carry dangerous goods.

2.11.3 Protection of cargo spaces, including ro-ro spaces, intended for the carriage of motor vehicles with fuel (gasoline, LPG or methane) in their tanks for their own propulsion

The requirements of [1.11.3] apply.

2.11.4 Protection of open deck spaces intended for the carriage of motor vehicles with fuel (gasoline, LPG or methane) in their tanks for their own propulsion

The requirements of [1.11.4] apply.

2.12 FIRE PRECAUTIONS RELEVANT TO CONSTRUCTION AND INSTALLATION

The requirements of [1.12] apply.

2.13 PORTABLE FIRE EXTINGUISHERS

Accommodation spaces, service spaces and control stations are to be provided with portable fire extinguishers of appropriate types and in sufficient number to the satisfaction of Tasneef

2.14 FIREMEN'S OUTFITS

The requirements of [1.14] apply; for cargo ships of 500 gross tonnage or less but more than 400 gross tonnage, only one firemen's outfits is required.
Firemen's outfits are not required for ships of less than 400 gross tonnage.

2.15 PROTECTION OF CARGO SPACES, INCLUDING RO-RO SPACES INTENDED FOR THE CARRIAGE OF DANGEROUS GOODS

The requirements of [1.15] apply.

3 REQUIREMENTS FOR OIL TANKERS, OTHER TANKERS CARRYING FLAMMABLE LIQUIDS, CHEMICAL TANKERS AND LIQUEFIED GAS CARRIERS

3.1 APPLICATION

3.1.1

Chemical tankers and liquefied gas carriers are to comply with the requirements of this item [3], except where alternative and supplementary arrangements are provided to the satisfaction of Tasneef, having due regard to the provisions of the Bulk Chemical Code and the Gas Carrier Code, as appropriate. Oil tankers of 500 gross tonnage and upwards carrying crude oil and petroleum products having a flashpoint not exceeding 60°C (closed cup test), as determined by an approved flashpoint apparatus, and a Reid vapour pressure which is below atmospheric pressure, and other liquid products having a similar fire hazard are to comply with the requirements of this item [3].

3.1.2

Tankers of less than 500 gross tonnage carrying products mentioned in [3.1.1] need only comply with the requirements of [2].
However, all oil tankers or chemical tankers having gross tonnage of 100 and above but less than 500, intended for the carriage of liquid cargoes of flammable nature (e.g. crude oil, petroleum products with flashpoint, determined by closed cup test, not exceeding 60°C and chemicals not listed in Chapter 18 of the International Bulk Chemical Code) are to be provided with at least one portable foam fire-extinguishing unit having the characteristics stated in [3.10.2].

3.1.3

For oil tankers, chemical tankers or liquefied gas carriers of less than 500 gross tonnage engaged on international voyages and for tankers of any gross tonnage, where liquid cargoes other than those referred to in [3.1.1] or liquefied gases which introduce additional fire hazards are intended to be carried, additional safety measures are required to the satisfaction of Tasneef, having due regard to the provisions of IGC and IBC Codes, as appropriate.

3.1.4

Oil tankers, FP>60°C and FLS tankers are to comply with the provisions of [1] or [2] as appropriate, except that in lieu of the fixed fire-extinguishing system required in [1.11.1] and [2.10.1] for cargo ships of 2000 gross tonnage and upwards, they are to be fitted with a fixed deck foam system or with a fire-extinguishing system discharging foam into cargo tanks, which is to comply with the requirements of [3.11.1] and [3.11.2], as appropriate.

3.1.5

Combination carriers are to comply with the requirements of this item [3] and, in addition, they are not to carry solid cargoes unless all cargo tanks are empty of oil and gas freed or unless the arrangements provided in each case are to the satisfaction of Tasneef and in accordance with the relevant operational requirements contained in paragraph [3.12].

3.1.6

The requirements for inert gas systems stated in [3.12] need not be applied to:

a) chemical tankers when carrying cargoes described in [3.1.1], provided that they comply with the requirements for inert gas systems on chemical tankers stated in [3.12]; or

b) liquefied gas carriers when carrying cargoes described in [3.1.1], provided that they are fitted with cargo tank inerting arrangements equivalent, in the opinion of Tasneef, to those specified in [3.12] or in the "Interim Regulation for Inert Gas Systems on Chemical Tankers Carrying Petroleum Products", adopted by Resolution A.473 (XII) on 19 November 1981; or

c) chemical tankers or liquefied gas carriers when carrying flammable cargoes other than crude oil or petroleum products such as the cargoes listed in Chapters 17 and 18 of the "International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk" ("IBC Code"), provided that:

- the capacity of the tanks used for their carriage does not exceed 3000 m^3
- the individual nozzle capacities of tank washing machines do not exceed 17,5 m^3/h
- the total combined throughput from the number of machines in use in a cargo tank at any one time does not exceed 110 m^3/h.

3.1.7

Tankers, other than those mentioned in the previous items, need only comply with the requirements of [1] or [2], as appropriate.

3.2 LOCATION AND SEPARATION OF SPACES

3.2.1

Machinery spaces of category A are to be positioned aft of cargo tanks and slop tanks and are to be isolated from them by a cofferdam, cargo pump room or oil fuel bunker tank; they are also to be situated aft of such cargo pump rooms and cofferdams, but not necessarily aft of the oil fuel bunker tanks.

However, the lower portion of the pump room may be recessed into such spaces to accommodate pumps, provided that the deck head of the recess is in general not more than one third of the moulded depth above the keel, except that, in the case of ships of not more than 25,000 tonnes deadweight, where it can be demonstrated that for reasons of access and satisfactory piping arrangements this is impracticable, Tasneef may permit a recess in excess of such height, but not exceeding one half of the moulded depth above the keel.

3.2.2

Accommodation spaces, main cargo control stations, control stations and service spaces are to be positioned aft of cargo tanks, slop tanks, cargo pump rooms and cofferdams which isolate cargo or slop tanks from machinery spaces of category A.

Any common bulkhead separating a cargo pump room, including the pump room entrance, from accommodation and service spaces and control stations is to be constructed to “A-60” class.

Where deemed necessary, accommodation spaces, control stations, machinery spaces other than those of category A and service spaces may be situated forward of all cargo tanks, slop tanks, cargo pump rooms and cofferdams subject to the provision of an equivalent standard of safety and ready availability of fire-extinguishing arrangements to the satisfaction of Tasneef.

3.2.3

Where the fitting of a navigation position above the cargo tank area is shown to be necessary, it is to be for navigation purposes only and is to be separated from the cargo tank deck by means of an open space with a height of at least 2 m. The fire protection of such navigation position is to be as required for control spaces as set forth in [3.3.1] and [3.3.2] and other applicable provisions of this item [3].

3.2.4

Means are to be provided to keep deck spills away from the accommodation and service areas.

This may be accomplished by provision of a permanent continuous coaming of a suitable height extending from side to side.

Special consideration is to be given to the arrangements associated with stern loading.

3.2.5

Exterior boundaries of superstructures and deckhouses enclosing accommodation and service spaces (and control stations, excluding the wheelhouse), and including any overhanging decks which support such accommodation, are to be insulated to “A-60” class for the whole of the portions which face cargo oil tanks and for 3 m aft of the boundary.

As regards the sides of these superstructures and deckhouses, such insulation is to be carried as high as is deemed necessary by Tasneef.

3.2.6

In boundaries facing cargo tanks of superstructures and deckhouses containing accommodation and service spaces, the following provisions apply:

a) No doors are permitted in such boundaries, except that doors to those spaces not having access to accommodation and service spaces, such as cargo control stations, provision rooms and storerooms, may be permitted by Tasneef. Where such doors are fitted, the boundaries of the space are to be insulated to “A-60” class. Bolted plates for removal of machinery may be fitted in such boundaries;

b) portlights in such boundaries are to be of a fixed (non-opening) type. Pilot house windows may be non-fixed (opening);

c) portlights in the first tier on the main deck are to be fitted with inside covers of steel or equivalent material. Except in the case of access to the navigating bridge spaces, the requirements of this paragraph, where relevant, are also to be applied to the boundaries of the superstructures and deckhouses for a distance of 5 m measured longitudinally from the forward end of such structures.

3.3 FIRE SAFETY MEASURES RELEVANT TO CONSTRUCTION AND INSTALLATION

3.3.1

a) The hull, superstructure, structural bulkheads, decks and deckhouses are to be constructed of steel or other equivalent material;

b) bulkheads between cargo pump rooms, including their tanks and machinery spaces of category A, are to be "A" class and are to have no penetrations which are less than "A-0" class or equivalent in all respects, other than the cargo pump shaft glands and similar glanded penetrations;

c) bulkheads and decks forming divisions separating machinery spaces of category A and cargo pump rooms, including their trunks, respectively, from accommodation and service spaces are to be of "A-60" class. Such bulkheads and decks and any boundaries of machinery spaces of category A and cargo pump rooms are not to be pierced for windows or portlights;

d) however, the requirements of the previous items (b) and (c) do not preclude the installation of permanent approved gas-tight lighting enclosures for illuminating the pump rooms, provided that they are of adequate strength and maintain the integrity and gas-tightness of the bulkhead as "A" class. Furthermore, the provisions do not preclude the use of windows in a control room located entirely within a machinery space;

e) control stations are to be separated from adjacent enclosed spaces by means of "A" class bulkheads and decks. The insulation of these control station boundaries is to be to the satisfaction of Tasneef bearing in mind the risk of fire in adjacent spaces;

f) casing doors in machinery spaces of category A are to be self-closing and comply with the provisions of [3.3.2] g);

g) the surface of the insulation on interior boundaries of machinery spaces of category A is to be impervious to oil and oil vapours;

h) primary deck coverings, if applied, are to be of approved materials which will not readily ignite;

i) interior stairways are to be of steel or other material suitable in the opinion of Tasneef;

j) when adjacent to accommodation spaces, bulkheads of galleys, paint stores, lamp rooms and boatswain's stores are to be of steel or equivalent material;

k) paints, varnishes and other finishes used on exposed interior surfaces are not to be of a nature to offer an undue fire hazard in the judgement of Tasneef and are not to be capable of producing excessive quantities of smoke or other toxic properties;

l) pipes conveying oil or combustible liquids are to be of a material approved by Tasneef having regard to the fire risk. Materials readily rendered ineffective by heat are not to be used for overboard scuppers, sanitary discharges and other outlets which are close to the waterline and where the failure of the material in the event of fire would give rise to danger of flooding;

m) power ventilation of machinery spaces is to be capable of being stopped from an easily accessible position outside the machinery spaces;

n) skylights of machinery spaces of category A and cargo pump rooms are to comply with the provisions of item [(c)] above in respect of windows and portlights and, in addition, are to be so arranged as to be capable of being readily closed from outside the spaces which they serve.

3.3.2

Within accommodation and service spaces and control stations the following conditions are to apply:

a) corridor bulkheads including doors are to be of "A" or "B" class divisions extending from deck to deck. Where continuous "B" class ceilings and/or linings are fitted on both sides of the bulkhead, the bulkhead may terminate at the continuous ceiling or lining. Doors of cabins and public spaces in such bulkheads may have a louvre in the lower half;

b) air spaces enclosed behind ceilings, panellings or linings are to be divided by close fitting draught stops spaced not more than 14 m apart;

c) ceilings, linings, bulkheads and insulation, except for insulation in refrigerated compartments, are to be of non-combustible material.

Vapour barriers and adhesives used in conjunction with insulation, as well as insulation of pipe fittings for cold service systems, need not be non-combustible, but they are to be kept to the minimum quantity practicable and their exposed surfaces are to have resistance to propagation of flame to the satisfaction of Tasneef

3) the framing, including grounds and the joint pieces of bulkheads, linings, ceilings and draught stops, if fitted, are to be of non-combustible material;

4) all exposed surfaces in corridors and stairway enclosures and surfaces in concealed or inaccessible spaces are to have low flame spread characteristics;
5) bulkheads, linings and ceilings may have combustible veneer, provided that such veneer does not exceed 2 mm within any such space except corridors, stairway enclosures and control stations, where it is not to exceed 1,5 mm;
6) stairways which penetrate only a single deck are to be protected at least at one level by "A" or "B" class divisions and self-closing doors so as to limit the rapid spread of fire from one deck to another. Crew lift trunks are to be of "A" class divisions. Stairways and lift trunks which penetrate more than a single deck are to be surrounded by "A" class divisions and protected by self-closing steel doors at all levels.

   Self-closing doors are not to be fitted with hold-back hooks. However, hold-back arrangements fitted with remote release fittings of the fail-safe type may be utilised.
7) electric radiators, if used, are to be fixed in position and so constructed as to reduce fire risks to a minimum. No such radiators are to be fitted with an element so exposed that curtains, clothing or other similar materials can be scorched or set on fire by heat from an element;
8) all waste receptacles are to be constructed of non-combustible materials with no openings in the sides or bottom.

3.3.3

Ducts provided for ventilation of machinery spaces of category A are generally not to pass through accommodation and service spaces or control stations, except that Tasneef may permit relaxation of this requirement provided that:

a) the ducts are constructed of steel and each is insulated to "A-60" class; or
b) the ducts are constructed of steel, are fitted with an automatic fire damper close to the boundary penetrated and are insulated to "A-60" class from the machinery space of category A to a point at least 5 m beyond the fire damper.

3.3.4

Ducts provided for ventilation of accommodation and service spaces or control stations are generally not to pass through machinery spaces of category A, except that Tasneef may permit relaxation of this requirement provided that ducts are constructed of steel and an automatic fire damper is fitted close to the boundaries penetrated.

3.3.5

a) Where "A" class divisions are penetrated for the passage of electrical cables, pipes, trunks, ducts, etc., or for girders, beams or other structural members, arrangements are to be made to ensure that the fire resistance is not impaired;
b) where "B" class divisions are penetrated for the passage of electrical cables, pipes, trunks, ducts, etc., or for the fitting of ventilation terminals, lighting fixtures and similar devices, arrangements are to be made to ensure that the fire resistance is not impaired.

3.4 VENTILATION

3.4.1

The arrangement and positioning of openings in the cargo tank deck from which gas emission can occur are to be such as to minimise the possibility of gas being admitted to enclosed spaces containing a source of ignition, or collecting in the vicinity of deck machinery and equipment which may constitute an ignition hazard.
In every case the height of the outlet above the deck and the discharge velocity of the gas are to be considered in conjunction with the distance of any outlet from any deckhouse opening or source of ignition.
For this purpose, the requirements of Part E, Ch 7, Sect 4, [4.2] of the Rules for the Classification of Ships apply.

3.4.2

Power ventilation of machinery spaces is to be capable of being stopped from an easily accessible position outside the machinery spaces.
Air inlets and outlets to the open are to be provided with draught stop devices.
The requirements given in [1.1.17] are also to be complied with.

3.4.3

The arrangement of ventilation inlets and outlets and other deckhouse and superstructure boundary space openings is to be such as to satisfy the provisions of [3.4.1].
Such vents, and in particular those for machinery spaces, are to be situated as far aft as practicable. Due consideration is to be given in this regard when the ship is equipped to load or discharge at the stern.

Sources of ignition such as electrical equipment are to be so arranged as to avoid an explosion hazard.

3.4.4

1) Ventilation systems in cargo pump rooms:
cargo pump rooms are to be mechanically ventilated and discharges from the exhaust fans are to be led to a safe place on the open deck.
The ventilation of these rooms is to have sufficient capacity to minimise the possibility of accumulation of flammable vapours.
There are to be at least 20 air changes per hour, based on the gross volume of the space. The air ducts are to be arranged so that all of the space is effectively ventilated.
The ventilation is to be of the suction type using fans of the non-sparking type in compliance with the requirements of Part C, Ch 4, [5.3] of the Rules for the Classification of Ships.

a) Ventilation systems in combination carriers:
in combination carriers, cargo spaces and any enclosed spaces adjacent to cargo spaces are to be capable of being mechanically ventilated. The mechanical ventilation may be provided by portable fans. An approved fixed gas warning system capable of monitoring flammable vapours is to be provided in cargo pump rooms, pipe ducts and cofferdams, as referred to in [3.1.4], adjacent to slop tanks. Suitable arrangements are to be made to facilitate measurement of flammable vapours in all other spaces within the cargo area. Such measurements are to be made possible from the open deck or easily accessible positions.

3.5 MEANS OF ESCAPE

3.5.1

The requirements of [1.1.2] or [1.2.2], as appropriate, are to be complied with.

3.6 SPECIAL ARRANGEMENTS IN MACHINERY SPACES

3.6.1

The requirements of [1.3] apply.

3.7 WATER FIRE-FIGHTING SYSTEM

The requirements of [1.4] or [2.4] apply, as appropriate according to the gross tonnage.
The requirements of item [1.4.6] b) apply to all nozzles provided on board.
For liquefied gas carriers or chemical tankers of any gross tonnage carrying liquefied gases or dangerous chemicals in bulk, the relevant requirements of IGC and IBC Codes apply, as appropriate.

3.8 PROTECTION OF MACHINERY SPACES

The requirements of [1.5] or [2.5] apply, as appropriate.
For liquefied gas carriers or chemical tankers of any gross tonnage carrying liquefied gases or dangerous chemicals in bulk, the relevant requirements of IGC and IBC Codes apply, as appropriate.

3.9 PROTECTION OF BOILER ROOMS AND OTHER SIMILAR SPACES

The requirements of [1.6] or [2.6] apply, as appropriate, except for liquefied gas carriers or chemical tankers carrying liquefied gases or dangerous chemicals in bulk for which, irrespective of their gross tonnage, the relevant requirements of IGC and IBC Codes apply, as appropriate.

3.10 CARGO TANK PROTECTION

3.10.1

For oil tankers, chemical tankers or liquefied gas carriers of 20,000 t deadweight and upwards, the protection of the cargo tank deck area and cargo tanks is to be achieved by a fixed deck foam system and a fixed inert gas system in accordance with the requirements of [3.11] and [3.12], except that in lieu of the above installation, after having given consideration to the ship's arrangements and equipment, Tasneef may accept other combinations of fixed installations if they afford protection equivalent to the above:

a) in order to be considered equivalent, the system proposed in lieu of the deck foam system is to:
b) be capable of extinguishing spill fires and also preclude ignition of spilled oil not yet ignited; and
c) be capable of combating fire in ruptured tanks;

a. to be considered equivalent, the system proposed in lieu of the fixed inert gas system is to:
1) 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
2) be so designed as to minimise the risk of ignition from the generation of static electricity by the system itself.

3.10.2

Every oil tanker, chemical tanker or gas carrier of less than 20,000 t deadweight but having gross tonnage of 2000 and upwards is to be provided with a fixed deck foam system or with a fixed fire-

extinguishing system discharging foam into cargo tanks.

Such systems are to comply with the requirements of [3.11.1] or [3.11.2]. Where the tanker is fitted with a fixed fire-extinguishing system discharging foam into cargo tanks, the tanker is to be fitted, in addition, with a portable foam fire-extinguishing unit provided with a portable tank of foam-forming liquid having a minimum capacity of 100 l and with a spare tank having at least the same capacity or with two such portable units, each provided both with a portable tank of foam-forming liquid having a minimum capacity of 50 l and with a spare tank having at least the same capacity. Whenever connected to the fire hoses on deck, these units are to be capable of delivering foam to the area of cargo main on deck during loading and unloading operations, if necessary.

Oil tankers, chemical tankers or liquefied gas carriers of less than 2000 gross tonnage are to be fitted with at least one portable foam fire-extinguishing unit provided with a portable tank of foam-forming liquid having a minimum capacity of 50 l and with a spare tank having at least the same capacity.

3.10.3

Any oil tanker, chemical tanker or gas carrier irrespective of gross tonnage, operating with a cargo tank cleaning procedure using crude oil washing, is to be fitted with an inert gas system complying with the requirements of paragraph [3.12] and with fixed tank washing machines.

3.10.4

All oil tankers, chemical tankers or liquefied gas carriers fitted with a fixed inert gas system are to be provided with a closed ullage system.

3.11 CHARACTERISTICS OF THE FIXED FOAM SYSTEMS

3.11.1 Fixed deck foam fire-extinguishing system

a) The arrangements for providing foam are to be capable of delivering foam to the entire cargo tank deck area as well as into any cargo tank, the deck of which has been ruptured;

b) the system is to be capable of simple and rapid operation. The main control station for the system is to be suitably located outside the cargo tank deck area, adjacent to the accommodation spaces and readily accessible and operable in the event of fire in the areas protected.

A common line for fire main and deck foam line can only be accepted if it can be demonstrated that the hose nozzles can be effectively controlled by one person when supplied from the common line at a pressure needed for operation of the monitors. Additional foam concentrate is to be provided for operation of 2 nozzles for the same period of time required for the foam system. The simultaneous use of the minimum required jets of water is to be possible on deck over the full length of the ship, in the accommodation spaces, service spaces, control stations and machinery spaces;

b. the rate of supply of foam solution is not to be less than the greater of the following:

i. 0,6 litres per minute per square metre of the cargo deck area, where cargo deck area means the maximum breadth of the ship times the total longitudinal extent of the cargo tank spaces, or

ii. 6 litres per minute per square metre of the horizontal sectional area of the single tank having the largest such area.

Sufficient foam concentrate is to be supplied to ensure at least 20 minutes of foam generation when using the greater of the solution rates stipulated in item a) above. The foam expansion ratio (i.e. the ratio of the volume of foam produced to the volume of the mixture of water and foam-making concentrate supplied) is generally not to exceed 12 to 1.

Where systems essentially produce low expansion foam but at an expansion ratio slightly in excess of 12 to 1, the quantity of foam solution available is to be calculated as for 12 to 1 expansion ratio systems.

When medium expansion ratio foam (between 50 to 1 and 150 to 1 expansion ratio) is employed, the application rate of the foam and the capacity of the monitor installation are to be to the satisfaction of Tasneef .

For type approval of foam concentrate, periodical checks and renewal, the relevant Tasneef requirements are applicable;

c. foam from the fixed foam system is to be supplied by means of monitors and foam applicators.

At least 50 per cent of the required foam rate is to be delivered from each monitor.

On oil tankers, chemical tankers or liquefied gas carriers of less than 4000 t deadweight, Tasneef may not require the installation of monitors but only that of applicators.

However, in such case the capacity of each applicator is to be at least 25 per cent of the required foam solution supply;

d. the number and position of monitors are to be such as to comply with item a) of paragraph [3 .11.1]. The capacity of any monitor in litres per minute of foam solution is to be at least three times the deck area in square metres protected by that monitor, such area being entirely forward of the monitor.
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 throw in still air conditions;

e. a monitor and hose connection for a foam applicator is to be situated both port and starboard at the poop front of accommodation spaces facing the cargo deck.
Applicators are to be provided for flexibility of action during fire-fighting operations and to cover areas screened from the monitors;

1) valves are to be provided in both the foam main and the fire main immediately forward of every monitor position to isolate damaged sections of these mains;

2) operation of a deck foam system at its required output is to permit the simultaneous use of the minimum required number of jets of water at the required pressure from the fire main.

3.11.2 Characteristics of the fixed fire-extinguishing system discharging foam into cargo tanks

a) The rate of supply of foam solution which is to be provided, in litres per minute, is not to be less than 3,8 times the surface of the horizontal area, in square metres, of the tank having the largest such area;

b) sufficient foam concentrate is to be provided to ensure that the system operates for at least 5 minutes at the rate mentioned in [3.11.1] b) above;

c) the requirements of [3.11.1] b), [3.11.1] c) and [3.11.1] h) are also to be complied with, as far as applicable.

3.11.3 Supply of fixed foam fire-extinguishing systems

For the supply of the fixed foam fire-extinguishing systems mentioned in [3.11.1] and [3.11.2], the following pumps are to be provided, fitted aft of and at a safe distance from the cargo tank deck area:

a) one or more sea water pumps, having in the aggregate a capacity not less than that necessary to comply with the requirements of [3.11.1] b) and [3.11.2] a) and having sufficient head as to obtain, in way of monitors and foam applicators, the necessary pressure for correct operation, to be checked during type tests. For this purpose, fire pumps, the emergency fire pump, tank washing pumps or other pumps acceptable to Tasneef can be used, provided the capacity and head correspond to the above-mentioned requirements and the requirement in subparagraph [3.11.1] h) is met;

b) one or more pumps for foam concentrate, having sufficient delivery and head to generate the required quantity of foam. Such pumps are to be built of material resistant to the corrosive action of the foam concentrate used. Suitable metering devices or premixers of foam concentrate and water, approved by Tasneef are to be provided.

3.12 PROTECTION OF CARGO PUMP ROOMS

a) Fixed fire-extinguishing systems

Each cargo pump room is to be provided with one of the following fixed fire-extinguishing systems operated from a readily accessible position outside the pump room. Cargo pump rooms are to be provided with a system suitable for machinery spaces of category A;

b) a carbon dioxide system complying with the provisions of [1.7] and with the following:

a. the alarms giving audible warning of the release of fire-extinguishing medium are to be safe for use in a flammable cargo vapour/air mixture; and

b. a notice is to be exhibited at the controls stating that due to the electrostatic ignition hazard, the system is to be used only for fire extinguishing and not for inerting purposes;

c) a high expansion foam system complying with the provisions of [1.8], provided that the foam concentrate supply is suitable for extinguishing fires involving the cargoes carried;

d) a fixed pressure water-spraying system complying with the provisions of [1.9];

e) quantity of fire-extinguishing medium.

Where the extinguishing medium used in the cargo pump room system is also used in systems serving other spaces, the quantity of medium provided or its delivery rate need not be more than the maximum required for the largest compartment.

3.13 ARRANGEMENTS FOR FUEL OIL, LUBRICATING OIL AND OTHER FLAMMABLE OILS

3.13.1 Limitation in the use of oils as fuel

See Pt C, Ch 1, Sec 1, [2.9] of the Rules for the Classification of Ships.

3.13.2 Arrangements for fuel oil

See Pt C, Ch 1, Sec 10 and Pt F, Ch 3, Sec 1, [4.7] of the Rules for the Classification of Ships.

3.13.3 Arrangements for lubricating oil

See Pt C, Ch 1, Sec 10 of the Rules for the Classification of Ships.

3.13.4 Arrangements for other flammable oils

See Pt C, Ch 1, Sec 10 of the Rules for the Classification of Ships.

3.13.5 Arrangements for fuel oil in periodically unattended machinery spaces

See Pt F, Ch 3, Sec 1 of the Rules for the Classification of Ships.

3.14 ARRANGEMENTS FOR GASEOUS FUEL FOR DOMESTIC PURPOSES

Gaseous fuel systems used for domestic purposes are to be approved by Tasneef
Storage of gas bottles is to be located on the open deck or in a well-ventilated space which opens only to the open deck. The requirements of Sec 2, [2.1] generally apply.

3.15 FIRE EXTINGUISHERS

The requirements of [1.13] generally apply.

3.16 FIREMEN'S OUTFITS

The requirements of [1.14] or [2.14] generally apply, as applicable.
However, for liquefied gas carriers or chemical tankers of any gross tonnage carrying liquefied gases or dangerous chemicals in bulk, the relevant requirements of IGC and IBC Codes apply, as appropriate

3.17 GAS MEASUREMENTS SYSTEMS

3.17.1 Gas measurements

a) Portable instruments

b) Tankers (except oil tankers, for which Part C, Ch 4, Sec 1, [5.2.4] a) of the Rules for the Classification of Ships applies) are to be equipped with at least one portable instrument for measuring flammable vapour concentrations, together with a sufficient set of spares;

c) suitable means are to be provided for the calibration of such instruments;

1) arrangement for gas measurement in double hull and double bottom spaces:

b) where the atmosphere in double hull spaces cannot be reliably measured using flexible gas sampling hoses, such spaces are to be fitted with permanent gas sampling lines. The configuration of gas sampling lines is to be adapted to the design of such spaces;

c) the materials of construction and the dimensions of gas sampling lines are to be such as to prevent restriction. Where plastic materials are used, they are to be electrically conductive.

Notes:

1) For ships having the service notations oil tanker or FLS tanker the provisions pf Pt C, Ch 4, Sec 1, [5.2.4] of the Rules apply;

2) For ships having service notations oil tanker, flashpoint > 60°C are subject to:

- Pt C, Ch 4, Sec 1, [5.2.4] of the Rules, in the case of carriage of bulk cargoes with flashpoint of 100°C or below;
- no requirements in the case of carriage of bulk cargoes with flashpoint above 100°C.

3.17.2 Protection of cargo area

Drip pans for collecting cargo residues in cargo lines and hoses are to be provided in the area of pipe and hose connections under the manifold area. Cargo hoses and tank washing hoses are to have electrical continuity over their entire lengths, including couplings and flanges (except shore connections), and are to be earthed for removal of electrostatic charges.

3.17.3 Protection of cargo pump rooms

In tankers:

a) cargo pumps, ballast pumps and stripping pumps, installed in cargo pump rooms and driven by shafts passing through pump room bulkheads, are to be fitted with temperature sensing devices for bulkhead shaft glands, bearings and pump casings. A continuous audible and visual alarm signal is to be automatically effected in the cargo control room or the pump control station;

b) lighting in cargo pump rooms, except emergency lighting, is to be interlocked with ventilation such that the ventilation is in operation when switching on the lighting. Failure of the ventilation system is not to cause the lighting to go out;

c) a system for continuous monitoring of the concentration of hydrocarbon gases is to be fitted. Sampling points or detector heads are to be located in suitable positions in order that

potentially dangerous leakages are readily detected. When the hydrocarbon gas concentration reaches a pre-set level, which is not to be higher than 10% of the lower flammable limit, a continuous audible and visual alarm signal is to be automatically effected in the pump room, engine control room, cargo control room and navigation bridge to alert personnel to the potential hazard; and

d) all pump rooms are to be provided with bilge level monitoring devices together with appropriately located alarms.

Section 4: Fishing vessels

1 GENERAL

1.1 APPLICATION

This Section provides requirements for fishing vessels having a length of 60 m or less.
Fire protection, detection and extinction of fishing vessels having a length of more than 60 m are to comply with the provisions of the Torremolinos International Convention for the Safety of Fishing Vessels in force.

1.2 DOCUMENTS TO BE SUBMITTED

In lieu of the documentation required in Section 1, the documents listed in Tab 1 are to be submitted for approval.

1.3 TYPE APPROVED PRODUCTS

In lieu of what the provisions in [2.2] of Section 1, the following materials, equipment, systems or products in general used for fire protection are be type approved by Tasneef except for special cases for which the acceptance may be given for individual ships on the basis of suitable documentation and/or tests:

a) fire-resisting and fire-retarding divisions (bulkheads or decks) and associated doors;
b) automatic closing devices of fire doors;
c) materials for pipes penetrating “A” or “B” class divisions (where they are not of steel or other equivalent material);
d) materials for oil or fuel oil pipes (where they are not of steel or copper and its alloys);
e) bulkhead or deck penetrations for electrical cables passing through “A” or “B” class divisions;
f) materials with low flame spread characteristics, including paints, varnishes and similar, when they are required to have such characteristics;
g) non-combustible materials;
h) non-readily igniting materials for primary deck coverings;
i) fixed foam fire-extinguishing systems and portable foam fire-extinguishing units;
j) sensing heads for automatic fire alarm and fire detection systems;
k) portable fire extinguishers;
l) extinguishing media substitute for the foam in fire extinguishers;
m) fire protective overalls;
n) breathing apparatus;
o) smoke helmets and smoke masks;
p) electric safety lamps;
q) lifelines;
r) fire hoses;
s) fire hydrants and nozzles, including dual-purpose nozzles, for fire hoses.

As regards the type approval, the requirements of Part A of the Rules for the Classification of Ships apply.

1.4 DEFINITIONS

1.4.1 Foreword

For the purpose of this Section, in lieu of the provisions in item 3 of Section 1, the definitions given in [1.4.2] to [1.4.11] below apply.

Table 1: Documents to be submitted

No.	Document
1	Longitudinal section of the ship and deck plans giving the following particulars: • use of the various spaces; • characteristics of the materials used for the coverings of deck, bulkheads and other surfaces; • location of the doors, stairways, lifts, etc; • arrangement of the natural and mechanical ventilation with location of the dampers.
2	Drawing of the water fire-extinguishing system**(1)**
3	Drawings of other fixed fire detection and extinguishing systems **(1)**
4	Drawings of other fixed or movable fire safety equipment (fire extinguishers, movable systems and portable equipment for fire extinguishing, sand boxes, buckets, etc.)
5	Schematic diagram of the fixed self-protection water-spraying system
(1)	This drawing is to be diagrammatic and functional and is to contain the necessary information for correct interpretation and checking. In particular, it is to include the technical and dimensional characteristics of the main components of the system.

1.4.2 Non-combustible material

Non-combustible material is a material which neither burns nor gives off flammable vapours in sufficient quantity for self-ignition when heated to approximately 750°C. Such property is to be demonstrated by means of a test performed in accordance with a procedure accepted by Tasneef Any other material is to be considered as a combustible material.

1.4.3 Standard fire test - "A" class divisions – "B" class divisions

Refer to the definitions given in Sec 1, [3.2.1] and [3.5.1].

Tasneef may require a test of a prototype bulkhead of "A" or "B" class to ensure that it meets the requirements for integrity or temperature rise.

1.4.4 Steel or other equivalent material

Where the words "steel or other equivalent material" are used, "equivalent material" 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 exposure to the standard fire test (e.g. aluminium alloy with appropriate insulation).

1.4.5 Low flame spread

"Low flame spread" means that the surface thus described offers an adequate resistance to the spread of flame. Such property is to be demonstrated by a test procedure deemed acceptable by Tasneef

Surfaces having low flame spread characteristics are said to be "self-extinguishing" in the case where, after being ignited by a flame, the combustion stops after a short time when the igniting flame is moved away or no ignition occurs under the same conditions.

1.4.6 Materials which do not readily ignite

"Materials which do not readily ignite" are materials having approved characteristics of ignitability. These characteristics are to be obtained from a test procedure deemed acceptable by Tasneef

Such materials may also have low flame spread characteristics and/or be self-extinguishing; see [1.4.5].

1.4.7 Accommodation spaces

"Accommodation spaces" are those spaces normally used by the crew, such as corridors, lavatories, cabins, offices, lounges, dining rooms and other similar spaces.

1.4.8 Service spaces

"Service spaces" are those spaces used for galleys, pantries containing cooking appliances, lockers, storerooms, workshops other than those forming part of machinery spaces, and similar spaces and trunks to such spaces. They also include the spaces used for the storage of fishing nets.

1.4.9 Cargo spaces

"Cargo spaces" are all spaces used for the storage of fish and the trunks to such spaces.

1.4.10 Machinery spaces

"Machinery spaces" are all spaces containing the propulsion machinery, boilers, fuel oil units, steam and internal combustion engines, generators and major electric motors, steering gear, oil filling stations, ventilation and air conditioning machinery, refrigerating machinery, stabilisers and similar spaces or trunks to such spaces.

1.4.11 Control stations

Control stations are those spaces containing the main navigating equipment, the ship's radio and the emergency source of power.

2 PREVENTION OF FIRE

2.1 REDUCTION OF THE RISK OF IGNITION

2.1.1

In accommodation and machinery spaces, the use of paints, varnishes or other products containing cellulose nitrate or other highly flammable substances is not permitted.

2.1.2

Primary deck coverings, if applied within accommodation and service spaces and control stations, are to be of a material which does not readily ignite.

2.1.3

Electric heating appliances are to be so designed and installed as to reduce fire risks to a minimum. The decks and bulkheads on which they are installed are to be adequately protected with non-combustible material. Heating appliances having exposed electrical parts or naked flame and stoves burning solid fuels are not permitted.

2.1.4

Piping systems conveying flammable oils are to be so designed and installed as to reduce the risk of ignition in the event of oil spillage or leakage; see Pt C, Ch 1, Sec 10 of the Rules for the Classification of Ships.

2.2 LIMITATION OF FIRE GROWTH POTENTIAL

2.2.1

Devices are to be provided for:

- and stopping the fans serving machinery spaces cargo spaces;
- closing the openings and ducts for ventilation, annular spaces around funnels and other possible openings to such spaces.

In case of fire, these devices are to be capable of being operated from a position located outside the space concerned. Means are also to be provided for operating the closing devices of the skylights of machinery spaces from outside the spaces.

2.2.2

Means of control are to be provided for:

- stopping fuel oil transfer pumps and fuel oil unit pumps

closing the valves fitted to fuel oil tanks or bunkers; see Pt C, Ch 1, Sec 10, [11.6.4]) of the Rules for the Classification of Ships.
Such controls are to be located outside the space concerned.

2.3 LIMITATION OF SMOKE GENERATION

Paints, varnishes and other finishes used on exposed interior surfaces are not to be capable of producing excessive quantities of smoke and toxic products.

3 STRUCTURAL FIRE PROTECTION

3.1 SPECIFIC REQUIREMENTS FOR "A" CLASS AND "B" CLASS DIVISIONS

3.1.1 "A" class division

When required to be of "A" class, a metallic division is to have a plating thickness of at least:

- 4 mm, where made of steel;
- 5 mm, where made of light alloy;

and is to be adequately stiffened.

In addition, "A" class divisions made of light alloy are to be adequately insulated on the side exposed to fire so that, for the fire test duration (60 min), the average temperature of the light alloy structure does not rise more than 200°C above the original temperature of the structure. For structures not subjected to load, a temperature rise of 250°C may be accepted.

3.1.2 "B" class division

When required to be of "B" class, a metallic division is to have a plating thickness of at least:

- 3 mm, where made of steel;
- 4 mm, where made of light alloy,

and is to be adequately stiffened.

Where made of light alloy, such a division may be considered of "B-0" class provided that it is adequately insulated on the side exposed to fire so that, for the fire test duration (30 min), the average temperature of the light alloy structure does not rise more than 200°C above the original temperature of the structure. For structures not subjected to load, a temperature rise of 250°C may be accepted.

3.2 CHARACTERISTICS OF THE INSULATION MATERIALS

3.2.1

The insulation of accommodation spaces, service spaces, control stations and machinery spaces is to consist of non-combustible material.
The insulation of refrigerated spaces and fish holds is to consist of non-combustible material unless the exposed surfaces are protected with appropriate linings.

3.2.2

Impervious linings and adhesives used for the insulation of refrigeration plants, as well as for the insulation of the related piping, may be of combustible materials, but their quantity is to be as limited as possible and their exposed surfaces are to have a resistance to the flame spread deemed satisfactory by Tasneef

3.2.3

The exposed interior surface of the insulation limiting the spaces where the penetration of oil products is possible is to be impervious to oil and oil vapours.

3.2.4

All exposed surfaces in accommodation spaces, service spaces, control stations, corridors, stairways trunks and associated hidden and inaccessible spaces behind bulkheads, ceilings, panels and linings are to have low flame spread characteristics.

3.3 FIRE RESISTANCE OF BULKHEADS AND DECKS

3.3.1

Hull, superstructures, structural bulkheads, decks and deckhouses are to be of steel.
However, in special cases, Tasneef may accept the use of other equivalent materials (such as aluminium alloys) when the fire risk has been taken into account and provided that such material is so insulated that, in the event of fire, the structure cannot collapse.

3.3.2

In general, the bulkheads and decks that separate accommodation spaces, machinery spaces, control stations and cargo spaces from service spaces with high fire risk are to be of steel or other equivalent material.

3.3.3

The bulkheads of galleys and stores containing paints, lamps or flammable materials, when adjacent to accommodation spaces, service spaces, control stations and spaces containing emergency generators, are to be of steel or other equivalent material.

The side of such bulkheads external to these spaces and, for spaces containing emergency generators or equivalent, also the internal side are generally to be bare or covered with a non-combustible material. They may, however, be covered with a combustible material provided that the plating is so insulated as to form an "A-60" class bulkhead.

3.3.4

Accommodation spaces located (even partly) below decks, and extending over all the ship width, are generally to have corridor bulkheads in steel, or composed of "B-15" class panels, and extending from deck to deck. Where such bulkheads are of steel, the side exposed to the corridor is generally to be bare or covered with a non-combustible material. It may, however, be covered with a combustible material provided that the plating is so insulated as to form a "B-15" class bulkhead.

In any case, where provided, the ceiling in the corridors including its supports is to be of a non-combustible material.

Note 1: For ships having a length of less than 45 m and greater than 15 m, the above provisions may be applied only to the parts of corridors which constitute the sole escape route from the inside ship spaces to the positions on the open deck where the access to the collective life-saving appliances is provided.

Note 2: For ships having a length of 15 m or less, the above provisions may be disregarded.

3.3.5

For accommodation spaces other than those referred to in [3.3.4], the requirements of [3] may be applied only to the dead-end corridors and to those that constitute an escape route from the spaces located below decks. In such case, the stairways are to be enclosed by appropriate trunks so designed as to avoid draught.

3.3.6

Where "A" class divisions, "B" class divisions or steel divisions referred to in the above requirements are penetrated for the passage of electrical cables, pipes, ducts, etc., or girders, beams or other structural members or for the fitting of ventilation terminals, lighting fixtures and similar devices, arrangements are to be made to ensure that the fire resistance is not impaired.

3.3.7

The coverings of decks within accommodation spaces, service spaces and control stations, and on decks forming the ceiling of machinery spaces, are to be of a material which does not readily ignite; see [1.4.6].

3.4 ARRANGEMENT OF STAIRWAYS AND RELATED TRUNKS

Internal stairways and related supports are to be of steel or other material deemed appropriate by Tasneef Stairways serving accommodation spaces, service spaces, control stations and machinery spaces are to be enclosed in trunks. However, in the case of stairways serving only two 'tweendeck spaces, the trunk may enclose one 'tweendeck space only.

In the case of low fire risk or of specific arrangement, the trunk may be omitted, subject to special examination by Tasneef

Note 1: In ships having a length of 15 m or less, internal stairways and related supports may be of a material other than steel. The stairways are not required to be enclosed in a trunk.

4 VENTILATION SYSTEM

4.1 APPLICATION

The requirements of this Article apply to ships having a length of 12 m or greater. For ships having a length of less than 12 m, Tasneef may accept arrangements not in compliance with this Article.

4.2 VENTILATION DUCTS

4.2.1

Ventilation ducts are to be of adequate material and thickness in connection with the divisions passed through and the spaces served. In general, steel ducts are to have a thickness, in mm, not less than b/600, b being the width of the duct, in mm. Higher thicknesses may be required by Tasneef depending on the spaces served and on the degree of protection of the duct.

4.2.2

Main inlets and outlets of all ventilation systems are to be provided with means of closing; see also [2.2.1].

4.2.3

Ventilation ducts serving propulsion machinery spaces are generally not to pass through accommodation spaces, service spaces or

control stations unless they are constructed of steel and so arranged as not to impair the fire resistance of the division.

4.2.4

Ventilation ducts serving accommodation spaces, service spaces or control stations are generally not to pass through propulsion machinery spaces unless they are constructed of steel and so arranged as not to impair the fire resistance of the division.

4.2.5

Where they pass through accommodation spaces or spaces containing combustible materials, the exhaust ducts from galley ranges are to be constructed of "A" class divisions.
Each exhaust duct is to be fitted with:

b) a grease trap readily removable for cleaning;
c) a fire damper located at the lower end of the duct;
d) arrangements, operable from within the galley, for shutting off the exhaust fans;
e) fixed means for extinguishing a fire within the duct.

The outlet ducts are to be easily accessible for cleaning.

5 MEANS OF ESCAPE

5.1 GENERAL

Stairways and ladders are to be so arranged as to provide, from all accommodation spaces and from spaces normally accessible to the crew, ready means of escape to the survival craft embarkation position.

5.2 ARRANGEMENT OF THE MEANS OF ESCAPE

5.2.1

Each group of accommodation spaces or service spaces is normally to have two means of escape, as widely separated as practicable.
The main means of escape from accommodation and service spaces located below the open deck is not to pass through machinery spaces or through other spaces containing a possible source of fire. It may be the normal means of access to the space concerned.
The second means of escape may be through a porthole or hatch leading to the open deck.
Note 1: The second means of escape may be dispensed with by Tasneef due regard being paid to the nature and location of spaces and to the number of persons who normally might be accommodated or employed there.

5.2.2

Each machinery space is normally to be fitted with two means of escape, as widely separated as possible. One may be the normal access to the space and the other may be a set of steel ladders leading to the open deck.
Note 1: The second means of escape may be dispensed with by Tasneef in the case of small machinery spaces.

6 WATER FIRE-FIGHTING SYSTEM

6.1 GENERAL

Every ship is to be provided with a water fire-fighting system consisting of fire pumps, fire main, hydrants and hoses complying as applicable with the provisions of this Article, depending on the length of the ship.
The water fire-fighting system is to be independent of any other system of the ship. A connection with the washing system is permitted, however.

6.2 NUMBER AND TYPE OF FIRE PUMPS

6.2.1 Ships with L ≥ 45 m

All ships having a length of 45 m or greater are to be provided with:

a) at least two main fire pumps; one is to be independently driven and power operated and the other may be driven by the propulsion engine
b) one emergency fire pump complying with [6.3.2].

Note 1: In the case of ships having a restricted navigation notation, the emergency fire pump may be omitted.

6.2.2 Ships with 24 m ≤ L < 45 m

Ships having a length of 24 m and above, but less than 45 m, are to be provided with:

a) at least one main fire pump, independently driven and power operated;
b) one emergency fire pump, except when the main fire pump, its source of power and its sea connection are located outside the spaces containing the propulsion machinery or oil fired boilers.

Note 1: In the case of ships having a restricted navigation notation, the emergency fire pump may be omitted.

6.2.3 Ships with 15 m ≤ L < 24 m

Ships having a length of 15 m and above, but less than 24 m, are to be provided with:

a) at least one power-operated pump for the fire-fighting service
b) one hand pump complying with [6.3.3], except when the power-operated pump is independently driven.

6.2.4 Ships with L < 15 m

Ships having a length less than 15 m are to be provided with at least one hand pump complying with [6.3.3].

6.3 CHARACTERISTICS AND ARRANGEMENT OF FIRE PUMPS

6.3.1 Main fire pumps

a) When delivering together for fire-fighting purposes at the pressure specified in [6.4.1] b), the required fire pumps, other than hand pumps and the emergency fire pump, are to have a total capacity Q, in m^3/h, not less than that determined from the following formula: where: d : internal diameter, in mm, of the bilge main as determined in Part E, Ch 20, Sec 4, [2.4.1] of the Rules for the Classification of Ships.

The total capacity of the main fire pumps need not exceed 180 m^3/h;

when several power-operated fire pumps other than the fire emergency pump are required, each pump is to have a capacity not less than 80% of the total required capacity divided by the minimum number of required fire pumps. Each such pump is, in any event, to be capable of delivering at least the two jets of water required in [6.4.3] a). These fire pumps are to be capable of supplying the fire main system under the required conditions. Where more than the minimum number of required pumps are installed, the capacity of such additional pumps may be less than that required above, provided it is deemed satisfactory by Tasneef

sanitary, ballast, bilge or general service pumps may be accepted as fire pumps, provided they are not normally used for pumping oil and that, if they are subject to occasional duty for the transfer or pumping of fuel oil, suitable change-over arrangements are fitted.

6.3.2 Emergency fire pumps

The emergency fire pump and its location are to comply with the following requirements:

a) the capacity of the pump is to be not less than 40% of the total capacity of the main fire pumps and in any case not less than:
   - 25 m^3/h for ships having a length of 45 m or greater;
   - 15 m^3/h for ships having a length less than 45 m;

b) when the pump is delivering the quantity of water required by clause a) above, the pressure at any hydrant is to be not less than the minimum pressures required in [6.4.1], clause b);

c) any diesel driven power source for the emergency fire pump is to be capable of being readily started in all the temperature conditions likely to be encountered, taking into account the navigation assigned to the ship;

d) any service fuel tank is to contain a sufficient quantity of fuel to enable the emergency fire pump to run on full load for at least 3 h and sufficient reserves of fuel are to be available outside machinery spaces to enable the pump to run on full load for an additional 15 h;

e) the emergency fire pump is to be of the self-priming type and capable of operating under all conditions of immersion, list, trim, roll and pitch likely to be encountered in service. The sea suction valve is to be capable of being operated from a position close to the pump;

f) the emergency fire pump and its source of power are to be installed in a safe and readily accessible position located in a separate compartment as far as possible from the compartment containing the main fire pumps and their source of power.

g) When this is not practicable, the emergency fire pump may be located in a compartment adjacent to the one containing the main fire pumps, provided that the bulkheads and decks forming the boundaries of both compartments are insulated to “A-60” standard.

Note 1: For ships having a length less than 45 m and a restricted navigation notation, the emergency fire pump may also be portable and located in a space other than the one containing the main fire pump.

6.3.3 Hand pumps

Hand pumps are to have a capacity of at least two thirds of that required for the bilge pump and a total suction head sufficient to project through a 12 mm nozzle a jet of water for the distances specified in [6.4.1].

6.4 FIRE MAIN, HYDRANTS AND HOSES

6.4.1 Diameter of, and pressure in, the fire main

a) The diameter of the fire main and water service pipes is to be sufficient for the effective distribution of the maximum required discharge from all the main fire pumps operating simultaneously. However, this diameter need only be sufficient for the discharge of 140 m^3/h;

b) with two main fire pumps simultaneously delivering through the nozzles specified in [6.4.5] the quantity of water stipulated in [6.3.1], through any adjacent hydrants, the

following minimum pressures are to be maintained at all hydrants:

- for ships having a length of 45 m or greater: 0,25 MPa
- for ships having a length of 24 m or greater, but less than 45 m: to the satisfaction of Tasneef but in any case sufficient to project through the nozzles a jet of water for a distance of 12 m
- for ships having a length less than 24 m: to the satisfaction of Tasneef but in any case sufficient to project through the nozzles a jet of water for a distance of 8 m.

Note 1: When only one main fire pump is permitted, the above values are to be achieved with that pump operating at the required capacity.

6.4.2 Pipes and hydrants

a) Materials readily rendered ineffective by heat are not to be used for the fire main and hydrants unless adequately protected. The pipes and hydrants are to be so placed that the fire hoses may be easily coupled to them. The arrangement of pipes and hydrants is to be such as to avoid the possibility of freezing;

1) a valve is to be fitted to serve each fire hose so that any hose may be removed while the fire pumps are at work.

2) isolating valves to separate the section of the fire main within the machinery space containing the main fire pump or pumps from the rest of the fire main are to be fitted in easily accessible and safe positions outside the machinery space. The fire main is to be so arranged that, when the isolating valves are shut, all the hydrants of the ship except those in the machinery space 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. Exceptionally, Tasneef may permit short lengths of the emergency fire pump suction and discharge piping 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 enclosure of the piping in a substantial steel casing.

6.4.3 Number and position of hydrants

a) The number and position of hydrants are to be such that at least two jets of water not emanating from the same hydrant, one of which is to be from a single length of hose, may reach any part of the ship normally accessible to the crew while the ship is being navigated and any part of any cargo space when empty;

b) notwithstanding the provisions of clause a) above, the propulsion machinery space is generally to be fitted:

- in the case of ship length of 24 m or greater, with at least two hydrants
- in the case of ship length less than 24 m, with one hydrant. Where the propulsion machinery space is unmanned, this hydrant is to be installed near the entrance to the space.

6.4.4 Fire hoses

a) Each hose is to be provided with a nozzle and the necessary couplings. Hoses specified in this Section as “fire hoses” are, together with any necessary fittings and tools, to be kept ready for use in conspicuous positions near the water service hydrants or connections;

b) fire hoses are to be of a material approved by Tasneef and sufficient in length to project a jet of water to any of the spaces where they may be required to be used. Their maximum length is to be to the satisfaction of Tasneef The normal length of a fire hose is to be about 20 m, but in the case of small ships (L < 12 m) a length from 10 to 15 m is sufficient;

b) the number of fire hoses to be provided is to be as follows:

1) in ships having a length of 45 m or greater:
   - in each machinery space, at least two;
   - in addition, at least one for each 30 m length of the ship and one spare but in no case less than five in all;

2) in ships having a length of 24 m or greater, but less than 45 m:
   - in each machinery space, at least two;
   - in addition, at least three;

3) in ships having a length less than 24 m:
   - in manned machinery spaces, at least one;
   - in addition, at least two.

Note 1: For ships having a length less than 45 m, Tasneef may require additional fire hoses where deemed necessary.

c) in all ships, hydrants located in machinery spaces are to be provided with fire hoses.

6.4.5 Nozzles

For the purposes of this Section, standard nozzle sizes are to be 12 mm, 16 mm and 19 mm or as near thereto as possible. Larger diameter nozzles may be permitted at the discretion of Tasneef

6.5 Water-spraying fire-fighting system

In ships having a length of 24 m or greater, the spaces where fishing nets are stored are to be provided with a water-spraying fire-fighting system independent of the one possibly installed in machinery spaces. This system is to be connected to the fire main and operable from outside the space served.

7 FIRE EXTINGUISHERS

7.1 DESIGN AND INSTALLATION OF FIRE EXTINGUISHERS

7.1.1 General

All fire extinguishers are to be of a type and characteristics approved by Tasneef

7.1.2 Equivalences

a) Tasneef reserves the right to establish equivalences between the various types of extinguishers;

b) foam extinguishers may be replaced by equivalent extinguishers deemed appropriate by Tasneef

7.1.3 Spare charges

A sufficient number of spare charges is to be provided. In general, spare charges are to be provided for 10% of the portable water or foam extinguishers on the ship, with a minimum of 5 spare charges of each type.
However, the number of spare charges need not exceed the number of water or foam extinguishers on board.

7.1.4 Capacity of portable fire extinguishers

The capacity of required portable fluid extinguishers is to be not greater than 13,5 l and not less than 9 l. Other extinguishers are to be at least as portable as the 13,5 l fluid extinguishers and are to have a fire-extinguishing capability at least equivalent to a 9 l fluid extinguisher.

7.1.5 Extinguishing medium

Fire extinguishers containing an extinguishing medium which, in the opinion of Tasneef either by itself or under expected conditions of use gives off toxic gases in such quantities as to endanger persons are not permitted.

7.1.6 Installation

One of the portable fire extinguishers intended for use in any space is to be stowed near the entrance to that space.

7.2 ARRANGEMENT OF FIRE EXTINGUISHERS IN MACHINERY SPACES

7.2.1 Spaces containing propulsion engines with a total power of at least 375 kW or auxiliary engines with a total power of at least 750 kW

Spaces containing diesel engines having an aggregate power output of 375 kW or above used for the main propulsion, or an aggregate power output of 750 kW or above used for auxiliary services, are to be provided with:

- one foam fire extinguisher of at least 45 l capacity of an approved type or equivalent and, in addition, one portable foam extinguisher of 9 l capacity of an approved type for each 750 kW of engine power, or part thereof. The total number of such portable extinguishers is to be not less than two but is not required to exceed six.

  Note 1: On ships having a length less than 24 m, the above-mentioned foam fire extinguisher of 45 l capacity may be replaced by portable foam extinguishers of 9 l capacity, or equivalent, on the basis of one such extinguisher for each 75 kW of engine power, or part thereof, in excess of 375 kW. However, the total number of portable fire extinguishers need not exceed six;
- one carbon dioxide close to the main electrical switchboard and one close to each switchboard or section board of 20 kW power or more.

7.2.2 Spaces containing propulsion engines with a total power of less than 375 kW or auxiliary engines with a total power of less than 750 kW

Spaces containing diesel engines having an aggregate power output less than 375 kW used for the main propulsion, or an aggregate power output less than 750 kW used for auxiliary services, are to be provided with portable foam extinguishers of 9 l capacity of an approved type as follows:

- where the aggregate power is 75 kW or more, at least two;
- where the aggregate power is less than 75 kW, at least one.

7.3 ARRANGEMENT OF EXTINGUISHERS IN ACCOMMODATION AND SERVICE SPACES

7.3.1 General

All ships are to be provided with a sufficient number of portable fire extinguishers such that, in any accommodation or service spaces, a fire extinguisher is readily available in case of need.

The type of the extinguisher is to be suitable for the type of fire which is likely to break out in the space concerned.

7.3.2 Number and type of extinguishers in the various spaces

a) Accommodation spaces are to be provided with at least:
   - 5 water or foam extinguishers, with a minimum of one such extinguisher for each 'tweendecks, for ships having a length of 45 m or greater;
   - 2 water or foam extinguishers, with a minimum of one such extinguisher for each 'tweendecks, for ships having a length of 24 m or greater, but less than 45 m;
   - 1 water or foam extinguisher for each 'tweendecks, for ships having a length less than 24 m;

b) in the vicinity of switchboards or section boards having a power of 20 kW or more, at least one carbon dioxide or powder extinguisher is to be provided;

c) spaces containing a galley are to be provided with at least one foam or powder extinguisher;

d) stores containing paint or other easily flammable products used on board are to be provided with at least one foam or carbon dioxide or powder extinguisher;

e) the navigation bridge is to be provided with at least one foam or carbon dioxide extinguisher;

f) the spaces containing the ship's radio equipment are to be provided with at least two carbon dioxide extinguishers.

Note 1: In small ships where the sole electrical switchboard and/or the sole radio station is/are located on the navigation bridge or in the same position as the wheelhouse, only two extinguishers need be provided, one of the water type, the other of the carbon dioxide type or equivalent.

8 FIREMEN'S OUTFITS AND OTHER EQUIPMENT

8.1 FIREMEN'S OUTFITS

8.1.1 Number of firemen's outfits

Ships having a length of 35 m or greater are to carry at least one fireman's outfit.

Note 1: In ships having a restricted navigation notation and small internal spaces which are normally manned, the fireman's outfit may be omitted.

8.1.2 Composition of the fireman's outfit

The fireman's outfit is to consist of:

a) personal equipment comprising:

c) protective clothing of material to protect the skin from the heat radiating from the fire and from burns and scalding by steam. The outer surface is to be water-resistant;

d) boots and gloves of rubber or other electrically non-conducting material;

e) a rigid helmet providing effective protection against impact;

f) an electric safety lamp (hand lantern) of an approved type, with a minimum burning period of 3 h;

g) an axe;

1) a breathing apparatus of a type deemed suitable by Tasneef which may be either:

b) a smoke helmet or smoke mask which is to be provided with a suitable air pump and a length of air hose sufficient to reach, from the open deck, well clear of the hatch or doorway, to any part of the holds or machinery spaces. If, in order to comply with this clause b)1, an air hose exceeding 36 m in length would be necessary, a self-contained breathing apparatus is to be substituted or provided in addition as determined by Tasneef or

c) a self-contained compressed air-operated breathing apparatus, for which the volume of air contained in the cylinders 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. A number of spare charges, suitable for use with the apparatus provided, are to be available on board to the satisfaction of Tasneef This is normally to include:
   - two cylinders for each one-cylinder breathing apparatus, and four cylinders for each two-cylinder breathing apparatus, or
   - one cylinder for each one-cylinder breathing apparatus, and two cylinders for each two-cylinder breathing apparatus, and, in addition, an air compressor with the necessary accessories, deemed appropriate by Tasneef and capable of providing clean air at the required pressure.

8.1.3 Lifeline

a) For each breathing apparatus a fireproof lifeline of sufficient length and strength is to be provided capable of being attached by means of a snap-hook to the harness of the apparatus or to a separate belt in order to prevent the breathing apparatus becoming detached when the lifeline is operated;

b) the lifeline is to have a breaking load not less than 10 kN and a length greater than the maximum distance between the open deck and any holds, machinery spaces or accommodation spaces.

8.2 MISCELLANEOUS EQUIPMENT

All ships are to be provided with the equipment listed in Tab 2. Such equipment is to be ready for use by the crew and located in a suitable position.

Table 2: List and quantity of equipment

Equipment	L< 24 m	24 m ≤ L ≤45 m	45 m < L ≤60 m	L > 60 m
pick	1	2	2	3
wrecking bar	0	0	1	1
fire-resistant blanket	0	0	0	1
fireman's belt with a toolkit**(1)**	0	0	0	1
electrical toolkit**(2)**	0	0	0	1
electric portable lamp	1	1	1	1
spare batteries and bulbs	**(3)**	**(3)**	**(3)**	**(3)**

(1) The toolkit is to include: a burin, a hammer, an adjustable wrench, a lever, a screwdriver, etc.
(2) The toolkit is to include gloves of non-conducting material.
(3) The number of spare batteries and bulbs is to be at least 50% of those that are parts of the electric portable lamps on board.

Section 5: Non-propelled units without persons on board

1 GENERAL

1.1

For non-propelled units without persons on board, structural arrangements, systems and appliances for fire protection, detection and extinction purposes will be specially considered by Tasneef on a case-by-case basis in relation to the characteristics of the non-propelled unit concerned.

Section 6: Non-propelled units with persons on board

1 APPLICATION

1.2 General

1.1.1 This Section 6 provides requirements for fire protection, detection and extinction of non-propelled units with persons on board.

1.1.2 The requirements for non–propelled units with persons on board, not assigned with the service notation **barge- accommodation** are contained in paragraph 2.

1.1.3 The requirements for non–propelled units with persons on board, assigned with the service notation **barge- accommodation** (see Pt A, Ch 1, Sec 2, [4.9.1] of the Rules for the classification of ships) are contained in paragraphs 3 to 22 .

1.1.4 For the purpose of this Section 6 “passenger” means every person other than crew.

2 NON-PROPELLED UNITS WITH PERSONS ON BOARD OTHER THAN BARGE ACCOMMODATION UNITS

The systems, arrangements, means and outfits required for fire protection of non-propelled units with persons on board are the same as those required for mechanically propelled ships. In particular, as far as the containment of fire and means of escape are concerned, the following requirements are generally to be complied with:

a) if the number of persons on board does not exceed 12, the requirements of Section 3, [2] are to be complied with, as appropriate;
b) if the number of persons on board exceeds 12 but does not exceed 50, the requirements for cargo ships in Section 3, [1] apply, as appropriate;
c) if the number of persons on board exceeds 50 but does not exceed 200, the requirements of European Union 2009/45/EC of 6 May 2009 as amended by the Commission Directive 2010/36/EU of 1 June 2010 apply as they would to a passenger ship carrying not more than 36 passengers, with adjustments determined by Tasneef on a case-by-case basis in relation to the characteristics of the non-propelled unit concerned;
d) if the number of persons on board exceeds 200, the requirements of European Union 2009/45/EC of 6 May 2009 as amended by the Commission Directive 2010/36/EU of 1 June 2010 apply as they would to a passenger ship carrying more than 36 passengers, with adjustments determined by Tasneef on a case by-case basis in relation to the characteristics of the non-propelled unit concerned.

3 BARGE ACCOMMODATION UNITS

Items 4 to 22 apply to non–propelled units with persons on board, assigned with the service notation **barge-accommodation** and operating at any distance from a port or a place where persons and crew could be placed in safety.

In case of an existing passenger ship converted in **barge-accommodation unit**, the application of the requirements of this Section will be considered by Tasneef on a case by case basis taking into account the standards on the basis of which the ship was constructed.

4 STRUCTURAL FIRE PROTECTION

4.1 Main vertical zones

4.1.1 In barge-accommodation units carrying more than 36 passengers, the hull, superstructure and deckhouses are to be subdivided into main vertical zones by "A-60" class divisions. Steps and recesses are to be kept to a minimum, but where they are necessary they are to be "A-60" class divisions. Where a category (5), (9) or (10) space defined in [4.3] is on one side or where fuel oil tanks are on both sides of the division the standard may be reduced to "A-0".

4.1.2 In barge-accommodation units carrying not more than 36 passengers, the hull, superstructure and deckhouses in way of accommodation and service spaces are to be subdivided into main vertical zones by "A" class divisions. These divisions are to have insulation values in accordance with Tables 3 and 4.

4.1.3 As far as practicable, the bulkheads forming the boundaries of the main vertical zones above the bulkhead deck are to be in line with watertight subdivision bulkheads situated immediately below the bulkhead deck. The length and width of main vertical zones may be extended to a maximum of 48 m in order to bring the ends of main vertical zones to coincide with watertight subdivision bulkheads or in order to accommodate a large public space extending for the whole length of the main vertical zone provided that the total area of the main vertical zone is not greater than 1,600 m^2 on any deck. The length or width of a main vertical zone is the maximum distance between the furthermost points of the bulkheads bounding it. Such bulkheads are to extend from deck to deck and to the shell or other boundaries.

4.2 Bulkheads within a main vertical zone

4.2.1 For barge-accommodation units carrying more than 36 passengers, bulkheads which are

not required to be "A" class divisions are to be at least "B" class or "C" class divisions as prescribed in Tables 1 and 2.

4.2.2 For barge-accommodation units carrying not more than 36 passengers, bulkheads within accommodation and service spaces which are not required to be "A" class divisions are to be at least "B" class or "C" class divisions as prescribed in the Tables 3 and 4. In addition, corridor bulkheads, where not required to be "A" class, are to be "B" class divisions which are to extend from deck to deck except:

a) when continuous "B" class ceilings or linings are fitted on both sides of the bulkhead, the portion of the bulkhead behind the continuous ceiling or lining is to be of material which, in thickness and composition, is acceptable in the construction of "B" class divisions, but which is to be required to meet "B" class integrity standards only in so far as is reasonable and practicable in the opinion of Tasneef and

b) in the case of a barge-accommodation unit protected by an automatic sprinkler system complying with the provisions of [15] the corridor bulkheads may terminate at a ceiling in the corridor provided such bulkheads and ceilings are of “B” class standard in compliance with [4.4]. All doors and frames in such bulkheads are to be of non-combustible materials and are to have the same fire integrity as the bulkhead in which they are fitted.

4.2.3 Bulkheads required to be "B" class divisions, except corridor bulkheads as prescribed in [4.2.2], are to extend from deck to deck and to the shell or other boundaries. However, where a continuous "B" class ceiling or lining is fitted on both sides of a bulkhead which is at least of the same fire resistance as the adjoining bulkhead, the bulkhead may terminate at the continuous ceiling or lining.

4.3 Fire integrity of bulkheads and decks in barge-accommodation units carrying more than 36 passengers

4.3.1 The minimum fire integrity of all bulkheads and decks is to be as prescribed in Tables 1 and 2. Where, due to any particular structural arrangements in the barge-accommodation unit, difficulty is experienced in determining from the tables the minimum fire integrity value of any divisions, such values are to be determined to the satisfaction of Tasneef

4.3.2 To determine the appropriate fire integrity standards to be applied to boundaries between adjacent spaces, such spaces are classified according to their fire risk as shown in categories (1) to (14) below. Where the contents and use of a space are such that there is a doubt as to its classification for the purpose of this regulation, or where it is possible to assign two or more classifications to a space, it is to be treated as a space within the relevant category having the most stringent boundary requirements. Smaller, enclosed rooms within a space that have less than 30% communicating openings to that space are considered separate spaces. The fire integrity of the boundary bulkheads and decks of such smaller rooms is to be as prescribed in Tables 1 and 2. The title of each category is intended to be typical rather than restrictive. The number in parentheses preceding each category refers to the applicable column or row in the tables.

(1) Control stations

Spaces containing emergency sources of power and lighting.

Spaces containing the barge-accommodation unit’s radio equipment.

Fire control stations.

Control room for machinery spaces when located outside the machinery space itself.

Spaces containing centralized fire alarm equipment.

Spaces containing centralized emergency public address system stations and equipment.

(2) Stairways

Interior stairways, lifts, totally enclosed emergency escape trunks, and escalators (other than those wholly contained within the machinery spaces) for passengers and crew and enclosures thereto.

In this connection a stairway which is enclosed at only one level is to be regarded as part of the space from which it is not separated by a fire door.

(3) Corridors

Passenger and crew corridors and lobbies.

(4) Evacuation stations and external escape routes

Survival craft stowage area.

Open deck spaces and enclosed promenades forming lifeboat and liferaft embarkation and lowering stations.

Assembly stations, internal and external.

External stairs and open decks used for escape routes.

The unit's side to the waterline in the lightest floating condition, superstructure and deckhouse sides situated below and adjacent to the liferaft and evacuation slide embarkation areas.

(5) Open deck spaces

Open deck spaces and enclosed promenades clear of lifeboat and liferaft embarkation and lowering stations. To be considered in this category, enclosed promenades are to have no significant fire risk, meaning that furnishings are to be restricted to deck furniture. In addition, such spaces are to be naturally ventilated by permanent openings.

Air spaces (the space outside superstructures and deckhouses).

6) Accommodation spaces of minor fire risk

Cabins containing furniture and furnishings of restricted fire risk.

Offices and dispensaries containing furniture and furnishings of restricted fire risk.

Public spaces containing furniture and furnishings of restricted fire risk and having a deck area of less than 50 m^2.

(7) Accommodation spaces of moderate fire risk

Spaces as in category (6) above but containing furniture and furnishings of other than restricted fire risk.

Public spaces containing furniture and furnishings of restricted fire risk and having a deck area of 50 m^2 or more.

Isolated lockers and small store-rooms in accommodation spaces having areas less than 4 m^2 (in which flammable liquids are not stowed).

Sale shops. Motion picture projection and film stowage rooms. Diet kitchens (containing no open flame).

Cleaning gear lockers (in which flammable liquids are not stowed).

Laboratories (in which flammable liquids are not stowed).

Pharmacies.

Small drying rooms (having a deck area of 4 m^2 or less).

Specie rooms.

Operating rooms.

(8) Accommodation spaces of greater fire risk

Public spaces containing furniture and furnishings of other than restricted fire risk and having a deck area of 50 m^2 or more.

Barber shops and beauty parlours.

Saunas.

(9) Sanitary and similar spaces

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

Small laundry rooms.

Indoor swimming pool area.

Isolated pantries containing no cooking appliances in accommodation spaces.

Private sanitary facilities are to be considered a portion of the space in which they are located.

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

Water tanks forming part of the barge-accommodation unit'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;

electrical motor room;

rooms containing section switchboards and purely electrical equipment other than oil-filled electrical transformers (above 10 kVA);

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, oil tanks and other similar spaces of moderate fire risk

Trunkways 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.

Auxiliary machinery spaces as in category (10) which contain machinery having a pressure lubrication system or where storage of combustibles is permitted.

Oil fuel filling stations.

Spaces containing oil-filled electrical transformers (above 10 kVA).

Spaces containing turbine and reciprocating steam engine driven auxiliary generators and small internal combustion engines of power output up to 110 kW driving generators, sprinkler, drencher or fire pumps, bilge pumps, etc.

Closed trunks serving the spaces listed above.

(12) Machinery spaces and main galleys

Auxiliary machinery spaces other than those in categories (10) and (11) which contain internal combustion machinery or other oil-burning, heating or pumping units.

Main galleys and annexes.

Trunks and casings to the spaces listed above.

(13) Store-rooms, workshops, pantries, etc.

Main pantries not annexed to galleys.

Main laundry.

Large drying rooms (having a deck area of more than 4 m^2)

Miscellaneous stores.

Mail and baggage rooms.

Garbage rooms.

Workshops (not part of machinery spaces, galleys, etc.).

Lockers and store-rooms having areas greater than 4 m^2, other than those spaces that have provisions for the storage of flammable liquids.

(14) Other spaces in which flammable liquids are stowed

Paint lockers.

Store-rooms containing flammable liquids (including dyes, medicines, etc.).

Laboratories (in which flammable liquids are stowed).

4.3.3 Where a single value is shown for the fire integrity of a boundary between two spaces, that value is to apply in all cases.

4.3.4 Notwithstanding the provisions of [4.2] there are no special requirements for material or integrity of boundaries where only a dash appears in the tables.

4.3.5 Tasneef is to determine in respect of category (5) spaces whether the insulation values in Table 1 are to apply to ends of deckhouses and superstructures, and whether the insulation values in Table 2 are to apply to weather decks. In no case are the requirements of category (5) of Tables 1 or 2 to necessitate enclosure of spaces which in the opinion of Tasneef need not be enclosed.

Section 6: Non-propelled units with persons on board

Table 1 - Bulkheads not bounding either main vertical zones or horizontal zones in barge-accommodation units carrying more than 36 passengers

SPACES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Control stations (1)	B-0 [a]	A-0	A-0	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]	A-0	A-0	A-0	A-0	A-15	A-15	A-0 [c]	A-0	A-15	A-30	A-15	A-30
Corridors (3)			B-15	A-60	A-0	B-15	B-15	B-15	B-15	A-0	A-15	A-30	A-0	A-30
Evacuation stations and external escape routes (4)				-	A-0	A-60 [b][d]	A-60 [b][d]	A-60 [b][d]	A-60 [d]	A-0	A-60 [b]	A-60 [b]	A-60 [b]	A-60 [b]
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 minor fire risk (6)						B-0	B-0	B-0	C	A-0	A-0	A-30	A-0	A-30
Accommodation spaces of moderate fire risk (7)							B-0	B-0	C	A-0	A-15	A-60	A-15	A-60
Accommodation spaces of greater fire risk (8)								B-0	C	A-0	A-30	A-60	A-15	A-60
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 [a]	A-0	A-0	A-0	A-0
Auxiliary machinery spaces, cargo spaces, cargo and other oil tanks and other similar spaces of moderate fire risk (11)											A-0 [a]	A-0	A-0	A-15
Machinery spaces and main galleys (12)												A-0 [a]	A-0	A-60
Storerooms, workshops, pantries etc. (13)													A-0 [a]	A-0
Other spaces in which flammable liquids are stowed (14)														A-30

[a] Where adjacent spaces are in the same numerical category and letter "a" appears, a bulkhead or deck between such spaces need not be fitted if deemed unnecessary by Tasneef For example, in category (12) a bulkhead need not be required between a galley and its annexed pantries provided the pantry bulkheads and decks maintain the integrity of the galley boundaries. A bulkhead is, however, required between a galley and a machinery space even though both spaces are in category (12).

Section 6: Non-propelled units with persons on board

[b] [The unit's side, to the waterline in the lightest floating condition, superstructure and deckhouse sides situated below and adjacent to the liferaft and evacuation slide embarkation areas may be reduced to A-30.
[c] Where public toilets are installed completely within the stairway enclosure, the public toilet bulkhead within the stairway enclosure can be of B class integrity.
[d] Where spaces of category (6), (7), (8) and (9) are located completely within the outer perimeter of the assembly station, the bulkheads of these spaces are allowed to be of B-0 class integrity. Control positions for audio, video and light installations may be considered as part of the assembly station.

Table 2 - Decks not forming steps in main vertical zones nor bounding horizontal zones in barge-accommodation units carrying more than 36 passengers

SPACE below	SPACE above													
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Control stations (1)	A-30	A-30	A-15	A-0	A-0	A-0	A-15	A-30	A-0	A-0	A-0	A-60	A-0	A-60
Stairways (2)	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-30	A-0	A-30
Corridors (3)	A-15	A-0	A-0 [a]	A-60	A-0	A-0	A-15	A-15	A-0	A-0	A-0	A-30	A-0	A-30
Evacuation stations and external escape routes (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
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
Accommodation spaces of minor fire risk (6)	A-60	A-15	A-0	A-60	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0
Accommodation spaces of moderate fire risk (7)	A-60	A-15	A-15	A-60	A-0	A-0	A-15	A-15	A-0	A-0	A-0	A-0	A-0	A-0
Accommodation spaces of greater fire risk (8)	A-60	A-15	A-15	A-60	A-0	A-15	A-15	A-30	A-0	A-0	A-0	A-0	A-0	A-0
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]	A-0	A-0	A-0	A-0
Auxiliary machinery spaces, cargo 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-0	A-15	A-30	A-0	A-0	A-0 [a]	A-0	A-0	A-30

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 [a]	A-0	A-60
Storerooms, workshops, pantries, etc. (13)	A-60	A-30	A-15	A-60	A-0	A-15	A-30	A-30	A-0	A-0	A-0	A-0	A-0	A-0
Other spaces in which flammable liquids are stowed (14)	A-60	A-60	A-60	A-60	A-0	A-30	A-60	A-60	A-0	A-0	A-0	A-0	A-0	A-0

4.3.6 Continuous "B" class ceilings or 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 division.

4.3.7 Construction and arrangement of saunas

The perimeter of the sauna is to be of "A" class boundaries and may include changing rooms, showers and toilets. The sauna is to be insulated to A-60 standard against other spaces except those inside of the perimeter and spaces of categories (5), (9) and (10). Bathrooms with direct access to saunas may be considered as part of them. In such cases, the door between sauna and the bathroom need not comply with fire safety requirements.

The traditional wooden lining on the bulkheads and ceiling is permitted in the sauna. The ceiling above the oven is to be lined with a non-combustible plate with an air gap of at least 30 mm.

The distance from the hot surfaces to combustible materials is to be at least 500 mm or the combustible materials are to be protected (e.g. non-combustible plate with an air gap of at least 30 mm).

The traditional wooden benches are permitted to be used in the sauna.

The sauna door is to open outwards by pushing.

Electrically heated ovens are to be provided with a timer.

4.4 Fire integrity of bulkheads and decks in barge-accommodation units carrying not more than 36 passengers

4.4.1 The minimum fire integrity of bulkheads and decks is to be as prescribed in Tables 3 and 4. The following requirements govern application of the tables:

a) Tables 3 and 4 are to apply respectively to the bulkheads and decks separating adjacent spaces;

b) To determine 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 (9) below.

Where the contents and use of a space are such that there is a doubt as to its classification for the purpose of this regulation, or where it is possible to assign two or more classifications to a space, it is to be treated as a space within the relevant category having the most stringent boundary requirements. Smaller, enclosed rooms within a space that have less than 30 % communicating openings to that space are considered separate spaces. The fire integrity of the boundary bulkheads and decks of such smaller rooms is to be as prescribed in tables 3 and 4. The title of each category is intended to be typical rather than restrictive. The number in parentheses preceding each category refers to the applicable column or row in the tables.

(1) Control stations

Spaces containing emergency sources of power and lighting.

Spaces containing the barge-accommodation unit’s radio equipment.

Fire control stations.

Control room for propulsion machinery when located outside the machinery space.

Spaces containing centralized fire alarm equipment.

(2) Corridors

Passenger and crew corridors and lobbies.

(3) Accommodation spaces

Spaces as defined in Section 1, [3.1] excluding corridors.

(4) Stairways

Interior stairways, lifts, totally enclosed emergency escape trunks, and escalators (other than those wholly contained within the machinery spaces) and enclosures thereto.

In this connection, 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 risk)

Lockers and store-rooms not having provisions for the storage of flammable liquids and having areas less than 4 m^2 and drying rooms and laundries.

(6) Machinery spaces of category A

Spaces as defined in Section 1, [3.31].

(7) Other machinery spaces

Electrical equipment rooms (auto-telephone exchange, air-conditioning duct spaces).

Spaces as defined in Section 1, [3.30] excluding machinery spaces of category A.

(8) Service spaces (high risk)

Galleys, pantries containing cooking appliances, paint and lamp rooms, lockers and store-rooms having areas of 4 m^2 or more, spaces for the storage of flammable liquids, saunas and workshops other than those forming part of the machinery spaces.

(9) Open decks

Open deck spaces and enclosed promenades having little or no fire risk. Enclosed promenades should have no significant fire risk, meaning that furnishings should be restricted to deck furniture. In addition, such spaces should be naturally ventilated by permanent openings. Air spaces (the space outside superstructures and deckhouses).

4.4.2 In determining the applicable fire integrity standard of a boundary between two spaces within a main vertical zone which is not protected by an automatic sprinkler system approved according to standards recognized by Tasneef or between such zones neither of which is so protected, the higher of the two values given in the tables is to apply.

4.4.3 In determining the applicable fire integrity standard of a boundary between two spaces within a main vertical zone which is protected by an automatic sprinkler system approved according to standards recognized by Tasneef or between such zones both of which are so protected, the lesser of the two values given in the tables shall apply. Where a zone with sprinklers and a zone without sprinklers meet within accommodation and service spaces, the higher of the two values given in the tables is to apply to the division between the zones.

4.4.4 Continuous "B" class ceilings or 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 division.

Table 3 - Fire integrity of bulkheads separating adjacent spaces in barge-accommodation units carrying not more than 36 passengers

SPACES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Control stations (1)	A-0 [c]	A-0	A-60	A-0	A-15	A-60	A-15	A-60	*	A-60
Corridors (2)		C [e]	B-0 [e]	A-0 [a] B-0 [e]	B-0 [e]	A-60	A-0	A-15 A-0 [d]	*	A-15
Accommodation spaces (3)			C [e]	A-0 [a] B-0 [e]	B-0 [e]	A-60	A-0	A-15 A-0 [d]	*	A-30 A-0 [d]
Stairways (4)				A-0 [a] B-0 [e]	A-0 [a] B-0 [e]	A-60	A-0	A-15 A-0 [d]	*	A-15
Service spaces (low risk) (5)					C [e]	A-60	A-0	A-0	*	A-0

Section 6: Non-propelled units with persons on board

Machinery spaces of category A (6)						*	A-0	A-60	*	A-60
Other machinery spaces (7)							A-0 [b]	A-0	*	A-0
Service spaces (high risk) (8)								A-0 [b]	*	A-30
Open decks (9)									-	A-0
Special category spaces (10)										A-0

Table 4 - Fire integrity of decks separating adjacent spaces in barge-accommodation units carrying not more than 36 passengers

SPACE below	**(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	*	A-30
Corridors (2)	A-0	*	*	A-0	*	A-60	A-0	A-0	*	A-0
Accommodation spaces (3)	A-60	A-0	*	A-0	*	A-60	A-0	A-0	*	A-30 A-0 [d]
Stairways (4)	A-0	A-0	A-0	*	A-0	A-60	A-0	A-0	*	A-0
Service spaces (low risk) (5)	A-15	A-0	A-0	A-0	*	A-60	A-0	A-0	*	A-0
Machinery spaces of category A (6)	A-60	A-60	A-60	A-60	A-60	*	A-60 [f]	A-60	*	A-60
Other machinery spaces (7)	A-15	A-0	A-0	A-0	A-0	A-0	*	A-0	*	A-0
Service spaces (high risk) (8)	A-60	A-30 A-0 [d]	A-30 A-0 [d]	A-30 A-0 [d]	A-0	A-60	A-0	A-0	*	A-30
Open decks (9)	*	*	*	*	*	*	*	*	-	A-0
Special category spaces (10)	A-60	A-15	A-30 A-0 [d]	A-15	A-0	A-30	A-0	A-30	A-0	A-0

Notes: To be applied to both tables 3 and 4 as appropriate.
[a] For clarification as to which applies, see [4.2] and [4.5].
[b] Where spaces are of the same numerical category and superscript b appears, a bulkhead or deck of the rating shown in the tables is only required when the adjacent spaces are for a different purpose, (e.g. in category (8)). A galley next to a galley does not require a bulkhead but a galley next to a paint room requires an "A-0" bulkhead.
[c] Bulkhead separating the wheelhouse and chartroom from each other may have a "B-0" rating.
[d] See [4.4.2] and [4.4.3].
[e] For the application of [4.1.3], "B-0" and "C", where appearing in table 3, are to be read as "A-0".
[f] Fire insulation need not be fitted if the machinery space in category (7), in the opinion of Tasneef has little or no fire risk.
* 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. However, where a deck, except in a category (9) space, is penetrated for the passage of electric cables, pipes and vent ducts, such penetrations should be made tight to prevent the passage of flame and smoke. Divisions between control stations (emergency generators) and open decks may have air intake openings without means for closure, unless a fixed gas fire-fighting system is fitted.
For the application of [4.1.3], an asterisk, where appearing in Table 4, except for categories (9), are to be read as “A-0”.

4.4.5 External boundaries which are required in [22] to be of steel or other equivalent material may be pierced for the fitting of windows and sidescuttles provided that there is no requirement for such boundaries of barge-accommodation units to have "A" class integrity. Similarly, in such boundaries which are not required to have "A" class integrity, doors may be constructed of materials which are to the satisfaction of Tasneef

4.4.6 Saunas are to comply with [4.3.7].

4.5 Protection of stairways and lifts in accommodation area

4.5.1 Stairways are to be within enclosures formed of "A" class divisions, with positive means of closure at all openings, except that:

a) a stairway connecting only two decks need not be enclosed, provided the integrity of the deck is maintained by proper bulkheads or self-closing doors in one 'tween-deck space.

   When a stairway is closed in one 'tween-deck space, the stairway enclosure is to be protected in accordance with the tables for decks in [4.3] or [4.4]; and

b) stairways may be fitted in the open in a public space, provided they lie wholly within the public space.

4.5.2 Lift trunks are to be so fitted as to prevent the passage of smoke and flame from one 'tween-deck to another and are to be provided with means of closing so as to permit the control of draught and smoke. Machinery for lifts located within stairway enclosures is to be arranged in a separate room, surrounded by steel boundaries, except that small passages for lift cables are permitted. Lifts which open into spaces other than corridors, public spaces, stairways and external areas are not to open into stairways included in the means of escape.

4.6 Arrangement of cabin balconies

4.6.1 Non-load bearing partial bulkheads which separate adjacent cabin balconies are to be capable of being opened by the crew from each side for the purpose of fighting fires.

4.7 Penetration in fire -resisting divisions and prevention of heat transmission

4.7.1 Where "A" class divisions are penetrated, such penetrations are to be tested in accordance with the IMO Fire Test Procedures Code, subject to the provisions of [4.8.3] In the case of ventilation ducts, items [3.1.2] and [3.3.1] apply. However, where a pipe penetration is made of steel or equivalent material having a thickness of 3mm or greater and a length of not less than 900 mm (preferably 450 mm on each side of the division), and no openings, testing is not required. Such penetrations are to be suitably insulated by extension of the insulation to the same level as the division.

4.7.2 Where "B" class divisions are penetrated for the passage of electric cables, pipes, trunks, ducts, etc., or for the fitting of ventilation terminals, lighting fixtures and similar devices, arrangements are to be made to ensure that the fire resistance is not impaired, subject to the provisions of [3.3.2].

4.7.3 Pipes other than steel or copper that penetrate “B” class divisions are to be protected by either:

a) a fire tested penetration device, suitable for the fire resistance of the division pierced and the type of pipe used; or

b) a steel sleeve, having a thickness of not less than 1.8 mm and a length of not less than 900 mm for pipe diameters of 150 mm or more and not less than 600 mm for pipe diameters of less than 150 mm (preferably equally divided on each side of the division). The pipe is to be connected to the ends of the sleeve by flanges or couplings; or the clearance between the sleeve and the pipe is not to exceed 4.5 mm; or any clearance between pipe and sleeve is to be made tight by means of non-combustible or other suitable material.

4.7.4 Uninsulated metallic pipes penetrating “A” or “B” class divisions are to be of materials having a melting temperature which exceeds 950º C for “A-0” and 850º C for “B-0” class divisions.

4.7.5 In approving structural fire protection details, Tasneef will assess to the risk of heat transmission at intersections and terminal points of required thermal barriers. The insulation of a deck or bulkhead is to be carried past the penetration, intersection or terminal point for a distance of at least 450 mm in the case of steel and aluminium structures. If a space is divided with a deck or a bulkhead of "A" class standard having insulation of different values, the insulation with the higher value is to continue on the deck or bulkhead with the insulation of the lesser value for a distance of at least 450 mm.

4.8 Openings in "A" class divisions

4.8.1 Except for hatches between store, and baggage spaces, and between such spaces and the weather decks, openings are to be provided with permanently attached means of closing which are to be at least as effective for resisting fires as the divisions in which they are fitted.

4.8.2 The construction of doors and door frames in "A" class divisions, with the means of securing them when closed, is to provide resistance to fire as well as to the passage of smoke and flame equivalent to that of the bulkheads in which the doors are situated, this being determined in accordance with the Fire Test Procedures Code. Such doors and door frames are to be constructed of steel or other equivalent material. Watertight doors need not be insulated.

It is to be possible for each door to be opened and closed from each side of the bulkhead by one person only.

4.8.3 Fire doors in main vertical zone bulkheads, galley boundaries and stairway enclosures other than power-operated watertight doors and those which are normally locked, are to satisfy the following requirements:

a) the doors is to be self-closing and be capable of closing with an angle of inclination of up to 3.5º opposing closure;

b) the approximate time of closure for hinged fire doors are to be no more than 40 s and no less than 10 s from the beginning of their movement with the barge-accommodation unit in upright position. The approximate uniform rate of closure for sliding doors is to be of no more than 0.2 m/s and no less than 0.1 m/s with the barge-accommodation unit in upright position;

c) the doors, except those for emergency escape trunks, are to be capable of remote release from the continuously manned central control station, either simultaneously or in groups and are to be capable of release also individually from a position on both sides of the door. Release switches are to have an on-off function to prevent automatic resetting of the system;

d) hold-back hooks not subject to central control station release are prohibited;

e) a door closed remotely from the central control station is to be capable of being reopened from both sides of the door by local control. After such local opening, the door is to automatically close again;

f) indication must be provided at the fire door indicator panel in the continuously manned central control station as to whether each door is closed;

g) the release mechanism is to be so designed that the door will automatically close in the event of disruption of the control system or central power supply;

h) local power accumulators for power-operated doors are to be provided in the immediate vicinity of the doors to enable the doors to be operated at least ten times (fully opened and closed) after disruption of the control system or central power supply using the local controls;

i) disruption of the control system or central power supply at one door is not to impair the safe functioning of the other doors;

j) remote-released sliding or power-operated doors are to be equipped with an alarm that sounds at least 5 s but no more than 10 s after the door has been released by the central control station and before the door begins to move and continues sounding until the door is completely closed;

k) a door designed to re-open upon contacting an object in its path is to re-open not more than 1 m from the point of contact;

l) double-leaf doors equipped with a latch necessary for their fire integrity are to have a latch that is automatically activated by the operation of the doors when released by the system;

m) the components of the local control system are to be accessible for maintenance and adjusting;

n) power-operated doors are to be provided with a control system of an approved type which is to be able to operate in the case of fire and be in accordance with the Fire Test Procedures Code. This system is to satisfy the following requirements:

1 the control system is to be able to operate the door at a temperature of at least 200°C for at least 60 min, served by the power supply;

2 the power supply for all other doors not subject to fire is not to be impaired; and

3 at temperatures exceeding 200°C the control system is to be automatically isolated from the power supply and is to be capable of keeping the door closed up to at least 945°C.

4.8.4 In barge-accommodation units carrying not more than 36 passengers, where a space is protected by an automatic sprinkler fire detection and alarm system approved according to

standards recognized by Tasneef or fitted with a continuous "B" class ceiling, openings in decks not forming steps in main vertical zones are to be closed reasonably tight and such decks are to meet the "A" class integrity requirements in so far as is reasonable and practicable in the opinion of Tasneef

4.8.5 The requirements for "A" class integrity of the outer boundaries of a barge-accommodation unit are not to apply to glass partitions, windows and sidescuttles, provided that there is no requirement for such boundaries to have "A" class integrity in [4.10.2]. The requirements for "A" class integrity of the outer boundaries of the barge-accommodation unit are not to apply to exterior doors, except for those in superstructures and deckhouses facing lifesaving appliances, embarkation and external assembly station areas, external stairs and open decks used for escape routes. Stairway enclosure doors need not meet this requirement.

4.8.6 Except for watertight doors, weathertight doors (semi-watertight doors), doors leading to the open deck and doors which need to be reasonably gastight, all "A" class doors located in stairways, public spaces and main vertical zone bulkheads in escape routes are to be equipped with a self-closing hose port of material, construction and fire resistance which is equivalent to the door into which it is fitted, there is to be a 150 mm square clear opening with the door closed and it is to be inset into the lower edge of the door, opposite the door hinges or, in the case of sliding doors, nearest the opening.

4.8.7 Where it is necessary that a ventilation duct passes through a main vertical zone division, a fail-safe automatic closing fire damper is to be fitted adjacent to the division. The damper is also to be capable of being manually closed from each side of the division. The operating position is to be readily accessible and be marked in red light-reflecting colour. The duct between the division and the damper is to be of steel or other equivalent material and, if necessary, insulated to comply with the requirements of [4.7.1]. The damper is to be fitted on at least one side of the division with a visible indicator showing whether the damper is in the open position.

4.9 Openings in "B" class divisions

4.9.1 Doors and door frames in "B" class divisions and means of securing them are to provide a method of closure which is to have resistance to fire equivalent to that of the divisions, this being determined in accordance with the Fire Test Procedures Code except that ventilation openings may be permitted in the lower portion of such doors. Where such an opening is in or under a door the total net area of any such opening or openings is not to exceed 0,05 m^2. Alternatively, a non-combustible air balance duct routed between the cabin and the corridor, and located below the sanitary unit is permitted where the cross-sectional area of the duct does not exceed 0,05 m^2. All ventilation openings are to be fitted with a grill made of non-combustible material. Doors are to be non-combustible.

Cabin doors in "B" class divisions are to be of a self-closing type. Hold-back hooks are not permitted.

4.9.2 The requirements for "B" class integrity of the outer boundaries of a barge-accommodation unit are not to apply to glass partitions, windows and sidescuttles. Similarly, the requirements for "B" class integrity are not to apply to exterior doors in superstructures and deckhouses. For barge-accommodation units carrying not more than 36 passengers, Tasneef may permit the use of combustible materials in doors separating cabins from the individual interior sanitary spaces such as showers.

4.9.3 In barge-accommodation units carrying not more than 36 passengers, where an automatic sprinkler system complying with standards recognized by Tasneef is fitted:

a) openings in decks not forming steps in main vertical zones are to be closed reasonably tight and such decks are to meet the "B" class integrity requirements in so far as is reasonable and practicable in the opinion of Tasneef

and

b) openings in corridor bulkheads of "B" class materials are to be protected in accordance with the provisions of [4.2.2].

4.10 Windows and sidescuttles

4.10.1 Windows and sidescuttles in bulkheads within accommodation and service spaces and control stations other than those to which the provisions of [4.8.4] and [4.9.2] apply, are to be so constructed as to preserve the integrity requirements of the type of bulkheads in which they are fitted, this being determined in accordance with the Fire Test Procedures Code.

Notwithstanding the requirements of Tables 1 to 4, windows and sidescuttles in bulkheads separating accommodation and service spaces and control stations from the weather are to be constructed with frames of steel or other suitable material. The glass is to be retained by a metal glazing bead or angle.

4.10.2 Windows facing life-saving appliances, embarkation and assembly stations, external stairs and open decks used for escape routes, and windows situated below liferaft and escape slide embarkation areas are to have fire integrity as required in table 1. Where automatic dedicated sprinkler heads are provided for windows, "A-0" windows may be accepted as equivalent. To be considered under this item [4.10.2], the sprinkler heads must either be:

a) dedicated heads located above the windows, and installed in addition to the conventional ceiling sprinklers; or

b) conventional ceiling sprinkler heads arranged such that the window is protected by an average application rate of at least 5 l/m^2 and the additional window area is included in the calculation of the area of coverage. Windows located in the unit's side below the lifeboat embarkation area are to have fire integrity at least equal to "A-0" class.

4.11 Protection of openings in machinery space boundaries

4.11.1 The provisions of this item [4.11] are to apply to machinery spaces of category A and, where Tasneef considers it desirable, to other machinery spaces.

4.11.2 The number of skylights, doors, ventilators, openings in funnels to permit exhaust ventilation and other openings to machinery spaces are to be reduced to a minimum consistent with the needs of ventilation and the proper and safe working of the barge-accommodation unit.

4.11.3 Skylights are to be of steel and are not to contain glass panels.

4.11.4 Means of control are to be provided for closing power-operated doors or actuating release mechanisms on doors other than power-operated watertight doors. The control is to be located outside the space concerned, where it will not be cut off in the event of fire in the space it serves.

4.11.5 In barge-accommodation units, the means of control required in item [4.11.4] are to be situated at one control position or grouped in as few positions as possible to the satisfaction of Tasneef

Such positions are to have safe access from the open deck.

4.11.6 In barge-accommodation units, doors, other than power-operated watertight doors are to be so arranged that positive closure is assured in case of fire in the space by power-operated closing arrangements or by the provision of self-closing doors capable of closing against an inclination of 3,5° opposing closure, and having a fail-safe hold-back arrangement, provided with a remotely operated release device. Doors for emergency escape trunks need not be fitted with a fail-safe hold-back facility and a remotely operated release device.

Windows are not to be fitted in machinery space boundaries. However, this does not preclude the use of glass in control rooms within the machinery spaces.

5 VENTILATION SYSTEMS

5.1 Ducts and dampers

5.1.1 Ventilation ducts are to be of non-combustible material. However, short ducts, not generally exceeding 2 m in length and with a free cross-sectional area* not exceeding 0,02 m^2, need not be non-combustible subject to the following conditions:

a) the ducts are made of a material which has low flame spread characteristics;

b) the ducts are only used at the end of the ventilation device; and

c) the ducts are not situated less than 600 mm, measured along the duct, from an opening in an "A" or "B" class division including continuous "B" class ceiling.

5.1.2 The following arrangements are to be tested in accordance with the Fire Test Procedures Code:

a) fire dampers, including their relevant means of operation; and

b) duct penetrations through "A" class divisions. However, the test is not required where steel sleeves are directly joined to ventilation ducts by means of riveted or screwed flanges or by welding.

5.2 Arrangements of ducts

5.2.1 The ventilation systems for machinery spaces of category A, and galleys, are, in general, to be separated from each other and from the ventilation systems serving other spaces. Except that the galley ventilation systems in barge-accommodation units carrying not more than 36 passengers, need not be completely separated, but may be served by separate ducts from a ventilation unit serving other spaces. In any case, an automatic fire damper is to be fitted in the galley ventilation duct near the ventilation unit.

Ducts provided for the ventilation of machinery spaces of category A and galleys, are not to pass through accommodation spaces, service spaces or control stations unless they comply with the conditions specified in items a) to d) or e) and f) below:

a) the ducts are constructed of steel having a thickness of at least 3 mm and 5 mm for ducts the widths or diameters of which are up to and including 300 mm and 760 mm and over respectively and, in the case of such ducts, the widths or diameters of which are between 300 mm and 760 mm having a thickness obtained by interpolation;

b) the ducts are suitably supported and stiffened;

c) the ducts are fitted with automatic fire dampers close to the boundaries penetrated;

and

d) the ducts are insulated to "A-60" class standard from the machinery spaces and galleys, to a point at least 5 m beyond each fire damper;

or

e) the ducts are constructed of steel in accordance with items [a)] and [b)]; and

f) the ducts are insulated to "A-60" class standard throughout the accommodation spaces, service spaces or control stations;

except that penetrations of main zone divisions are to also comply with the requirements of [4.8.7].

5.2.2 Ducts provided for ventilation to accommodation spaces, service spaces or control stations are not to pass through machinery spaces of category A and galleys, unless they comply with the conditions specified in items a) to c) or d) and e) below:

a) the ducts where they pass through a machinery space of category A and galley, are constructed of steel in accordance with [3.2.1] a) and b);

b) automatic fire dampers are fitted close to the boundaries penetrated; and

c) the integrity of the machinery space, galley boundaries is maintained at the penetrations;

or

d) the ducts where they pass through a machinery space of category A and galley are constructed of steel in accordance with [3.2.1 e] and f)] ; and

e) the ducts are insulated to "A-60" standard within the machinery space and galley;

except that penetrations of main zone divisions are also to comply with the requirements of [4.8.7].

5.3 Details of duct penetrations

5.3.1 Where a thin plated duct with a free cross-sectional area equal to, or less than, 0.02 m^2 passes through "A" class bulkheads or decks, the opening is to be lined with a steel sheet sleeve having a thickness of at least 3 mm and a length of at least 200 mm, divided preferably into 100 mm on each side of the bulkhead or, in the case of the deck, wholly laid on the lower side of the decks pierced.

Where ventilation ducts with a free cross-sectional area exceeding 0,02 m^2 pass through "A" class bulkheads or decks, the opening is to be lined with a steel sheet sleeve. However, where such ducts are of steel construction and pass through a deck or bulkhead, the ducts and sleeves are to comply with the following:

a) The sleeves are to have a thickness of at least 3 mm and a length of at least 900 mm. When passing through bulkheads, this length is to be divided preferably into 450 mm on each side of the bulkhead. These ducts, or sleeves lining such ducts, are to be provided with fire insulation. The insulation is to have at least the same fire integrity as the bulkhead or deck through which the duct passes; and

b) Ducts with a free cross-sectional area exceeding 0,075 m^2 are to be fitted with fire dampers in addition to the requirements of item a) above. The fire damper is to operate automatically, but is also to be capable of being closed manually from both sides of the bulkhead or deck. The damper is to be provided with an indicator which shows whether the damper is open or closed. Fire dampers are not required, however, where ducts pass through spaces surrounded by "A" class divisions, without serving those spaces, provided those ducts have the same fire integrity as the divisions which they pierce. Fire dampers are to be easily accessible. Where they are placed behind ceilings or linings, these ceilings or linings are to be provided with an inspection door on which a plate reporting the identification number of the fire damper is provided. The fire damper identification number is also to be placed on any remote controls required.

5.3.2 Ventilation ducts with a free cross-sectional area exceeding 0,02 m^2 passing through "B" class bulkheads are to be lined with steel sheet

sleeves of 900 mm in length divided preferably into 450 mm on each side of the bulkheads unless the duct is of steel for this length.

5.4 Barge-accommodation units carrying more than 36 passengers

5.4.1 The ventilation systems of barge-accommodation units carrying more than 36 passengers are to be in compliance with the additional requirements of [5.4.2] to [5.4.5].

5.4.2 In general, the ventilation fans are to be so disposed that the ducts reaching the various spaces remain within the main vertical zone.

Where ventilation systems penetrate decks, precautions are to be taken, in addition to those relating to the fire integrity of the deck required by [4.7.1] and [4.8.3] to reduce the likelihood of smoke and hot gases passing from one 'tween-deck space to another through the system. In addition to insulation requirements contained in [5.4], vertical ducts are, if necessary, to be insulated as required by the appropriate Tables 1 and 2.

5.4.3 Ventilation ducts are to be constructed of the following materials:

a) ducts not less than 0,075 m^2 in free cross-sectional area and all vertical ducts serving more than a single 'tween-deck space are to be constructed of steel or other equivalent material;

b) ducts less than 0,075 m^2 in free cross-sectional area other than the vertical ducts referred to in item [5.4.3] a), are to be constructed of non-combustible materials. Where such ducts penetrate "A" or "B" class divisions due regard is to be given to ensuring the fire integrity of the division; and

c) short length of duct, not in general exceeding 0,02m^2 in free cross-sectional area nor 2 m in length, need not be non-combustible provided that all of the following conditions are met:

4 the duct is constructed of a material which has low flame spread characteristics;

5 the duct is used only at the terminal end of the ventilation system; and

6 the duct is not located closer than 600mm measured along its length to a penetration of an "A" or "B" class division, including continuous "B" class ceilings.

5.4.4 Stairway enclosures are to be ventilated and served by an independent fan and duct system which is not to serve any other spaces in the ventilation systems.

5.4.5 Exhaust ducts are to be provided with hatches for inspection and cleaning. The hatches are to be located near the fire dampers.

5.5 Exhaust ducts from galley ranges

5.5.1 Exhaust ducts from galley ranges of barge-accommodation units carrying more than 36 passengers, are to meet the requirements of [5.2.1] a) and b) and are to be fitted with:

a) a grease trap readily removable for cleaning unless an alternative approved grease removal system is fitted;

b) a fire damper located in the lower end of the duct which is automatically and remotely operated, and in addition a remotely operated fire damper located in the upper end of the duct;

c) a fixed means for extinguishing a fire within the duct;

d) remote-control arrangements for shutting off the exhaust fans and supply fans, for operating the fire dampers mentioned in b) above and for operating the fire-extinguishing system, which are to be placed in a position close to the entrance to the galley.

Where a multi-branch system is installed, a remote means located with the above controls is to be provided to close all branches exhausting through the same main duct before an extinguishing medium is released into the system; and

e) suitably located hatches for inspection and cleaning.

5.5.2 Exhaust ducts from galley ranges of barge-accommodation units carrying not more than 36 passengers, where they pass through accommodation spaces or spaces containing combustible materials, are to be constructed of "A" class divisions. Each exhaust duct is to be fitted with:

a) a grease trap readily removable for cleaning;

b) a fire damper located in the lower end of the duct;

c) arrangements, operable from within the galley, for shutting off the exhaust fans; and

d) fixed means for extinguishing a fire within the duct.

6 FIRE PROTECTION MATERIALS

6.1 GENERAL

6.1.1 Insulating materials are to be non-combustible, except in mail rooms, baggage

rooms and refrigerated compartments of service spaces. Vapour barriers and adhesives used in conjunction with insulation, as well as the insulation of pipe fittings for cold service systems, need not be of non-combustible materials, but they are to be kept to the minimum quantity practicable and their exposed surfaces are to have low flame-spread characteristics.

6.1.2 All linings, grounds, draught stops and ceilings are to be of non-combustible material except in mail rooms, baggage rooms, saunas or refrigerated compartments of service spaces.

6.1.3 Partial bulkheads or decks used to subdivide a space for utility or artistic treatment are to be of non-combustible materials.

6.1.4 Linings, ceilings and partial bulkheads or decks used to screen or to separate adjacent cabin balconies are to be of non-combustible materials.

6.1.5 “A”, "B" or "C" class divisions in accommodation and service spaces and cabin balconies which are faced with combustible materials, facings, mouldings, decorations and veneers are to comply with the provisions of [6.1.6], [6.1.7] and [6.2]. However, traditional wooden benches and wooden linings on bulkheads and ceilings are permitted in saunas and such materials need not be subject to the calculations prescribed in [6.1.6] and [6.1.7].

However, the provisions of [6.1.7] need not be applied to cabin balconies.

6.1.6 Combustible materials used on the surfaces and linings specified in [6.1.5] are to have a calorific value* not exceeding 45 MJ/m^2 of the area for the thickness used. The requirements of this item [6.1.6] are not applicable to the surfaces of furniture fixed to linings or bulkheads.

6.1.7 Where combustible materials are used in accordance with [6.1.5], they are to comply with the following requirements:

a) The total volume of combustible facings, mouldings, decorations and veneers in accommodation and service spaces is not to exceed a volume equivalent to 2.5 mm veneer on the combined area of the walls and ceiling linings. Furniture fixed to linings, bulkheads or decks need not be included in the calculation of the total volume of combustible materials;

and

b) In the case of barge-accommodation units fitted with an automatic sprinkler system complying with [18], the above volume may include some combustible material used for the erection of "C" class divisions.

6.1.8 The following surfaces are to have low flame-spread characteristics in accordance with the Fire Test ProceduresCode:

6.1.9 In barge-accommodation units:

a) exposed surfaces in corridors and stairway enclosures and of bulkhead and ceiling linings

in accommodation and service spaces (except saunas) and control stations; and

b) surfaces and grounds in concealed or inaccessible spaces in accommodation and service spaces and control stations.

c) exposed surfaces of cabin balconies, except for natural hard wood decking systems.

6.1.10 Furniture in stairway enclosures is to be limited to seating. It is to be fixed, limited to six seats on each deck in each stairway enclosure, be of restricted fire risk determined in accordance with the Fire Test Procedures Code, and is not to restrict the passenger escape route. Tasneef may permit additional seating in the main reception area within a stairway enclosure if it is fixed, non-combustible and does not restrict the passenger escape route. Furniture is not to be permitted in passenger and crew corridors forming escape routes in cabin areas. In addition to the above, lockers of non-combustible material, providing storage for non-hazardous safety equipment required by these regulations, may be permitted. Drinking water dispensers and ice cube machines may be permitted in corridors provided they are fixed and do not restrict the width of the escape routes. This applies as well to decorative flower or plant arrangements, statues or other objects of art such as paintings and tapestries in corridors and stairways.

6.1.11 Furniture and furnishings on cabin balconies are to comply with Section 1, [3.39] unless such balconies are protected by a fixed pressure waterspraying and fixed fire detection and fire alarm systems complying with [19] and [15].

6.2 Smoke generation potential and toxicity

6.2.1 Paints, varnishes and other finishes used on exposed interior surfaces are not to be capable of producing excessive quantities of smoke and toxic products, this being determined in accordance with the Fire Test Procedures Code. Paints, varnishes and other finishes used on exposed surfaces of cabin balconies, excluding natural hard wood decking systems, are not to be capable of producing excessive

quantities of smoke and toxic products, this being determined in accordance with the Fire Test Procedures Code.

6.2.2 Primary deck coverings, if applied within accommodation and service spaces and control stations, are to be of approved material which will not give rise to smoke or toxic or explosive hazards at elevated temperatures, this being determined in accordance with the Fire Test Procedures Code.

6.2.3 primary deck coverings on cabin balconies are not to give rise to smoke, toxic or explosive hazards at elevated temperatures, this being determined in accordance with the Fire Test Procedures Code.

7 DETECTION AND ALARM

7.1 General

7.1.1 The purpose of this regulation is to detect a fire in the space of origin and to provide for an alarm for safe escape and fire-fighting activity. For this purpose, the following functional requirements are to be met:

a) fixed fire detection and fire alarm system installations are to be suitable for the nature of the space, fire growth potential and potential generation of smoke and gases;

b) manually operated call points are to be placed effectively to ensure a readily accessible means of notification; and

c) fire patrols are to provide an effective means of detecting and locating fires and alerting the navigation bridge and fire teams.

7.1.2 A fixed fire detection and fire alarm system is to be provided in accordance with the provisions of this regulation. A fixed fire detection and fire alarm system and a sample extraction smoke detection system required in this regulation and other regulations in this section are to be of an approved type according to standards recognized by Tasneef

Where a fixed fire detection and fire alarm system is required for the protection of spaces other than those specified in [7.1.6], at least one detector complying with standards recognized by Tasneef is to be installed in each such space.

7.1.3 The functions of fixed fire detection and fire alarm systems required by the relevant regulations of this chapter are to be tested under varying conditions of ventilation after installation.

The functions of fixed fire detection and fire alarm systems are to be periodically tested to the satisfaction of Tasneef by means of equipment producing hot air at the appropriate temperature, or smoke or aerosol particles having the appropriate range of density or particle size, or other phenomena associated with incipient fires to which the detector is designed to respond.

7.1.4 A fixed fire detection and fire alarm system is to be installed in:

a) periodically unattended machinery spaces; and

b) machinery spaces where:

1) the installation of automatic and remote control systems and equipment has been approved in lieu of continuous manning of the space; and

2) the main propulsion and associated machinery including sources of the main electrical power are provided with various degrees of automatic or remote control and are under continuous manned supervision from a control room.

7.1.5 The fixed fire detection and fire alarm system required in item [7.1.4] is to be so designed and the detectors so positioned as to detect rapidly the onset of fire in any part of those spaces and under any normal conditions of operation of the machinery and variations of ventilation as required by the possible range of ambient temperatures. Except in spaces of restricted height and where their use is especially appropriate, detection systems using only thermal detectors are not to be permitted. The detection systems are to initiate audible and visual alarms distinct in both respects from the alarms of any other system not indicating fire, in sufficient places to ensure that the alarms are heard and observed in the main control station and by a responsible engineer officer. When the navigating bridge is unmanned the alarm is to sound in a place where a responsible member of the crew is on duty.

7.1.6 Smoke detectors are to be installed in all stairways, corridors and escape routes within accommodation spaces as provided in items [7.1.7] to [7.1.9]. Considerations are to be given to the installation of special purpose smoke detectors within ventilation ducting.

7.1.7 In barge-accommodation units carrying more than 36 passengers a fixed fire detection and fire alarm system is to be installed and arranged so as to provide smoke detection in service spaces, control stations and accommodation spaces, including corridors, stairways and escape routes within

accommodation spaces. Smoke detectors need not be fitted in private bathrooms and galleys. Spaces having little or no fire risk such as voids, public toilets, carbon dioxide rooms and similar spaces need not be fitted with a fixed fire detection and alarm system.

7.1.8 In barge-accommodation units carrying not more than 36 passengers, either a) or b) below is to be installed throughout each separate zone, whether vertical or horizontal, in all accommodation and service spaces and, where it is considered necessary by Tasneef in control stations, except spaces which afford no substantial fire risk such as void spaces, sanitary spaces, etc.:

a) a fixed fire detection and fire alarm system so installed and arranged as to detect the presence of fire in such spaces and providing smoke detection in corridors , stairways and escape routes within accommodation spaces;

b) an automatic sprinkler, fire detection and fire alarm system of an approved type complying with the relevant requirements of the standards recognized by Tasneef and so installed and arranged as to protect such spaces and, in addition, a fixed fire detection and fire alarm system so installed and arranged as to provide smoke detection in corridors, stairways and escape routes within accommodation spaces.

7.1.9 The entire main vertical zone containing the atrium is to be protected throughout with a smoke detection system.

7.1.10 Manually operated call points are to be installed throughout the accommodation spaces, service spaces and control stations. One manually operated call point is to be located at each exit. Manually operated call points are to be readily accessible in the corridors of each deck such that no part of the corridor is more than 20 m from a manually operated call point.

7.1.11 Any required fixed fire detection and fire alarm system with manually operated call points are to be capable of immediate operation at all times.

The fixed fire detection and fire alarm system is not to be used for any other purpose, except that closing of fire doors and similar functions may be permitted at the control panel.

The system and equipment are to be suitably designed to withstand supply voltage variation and transients, ambient temperature changes, vibration, humidity, shock, impact and corrosion normally encountered in barge-accommodation units.

Fixed fire detection and fire alarm systems with a zone address identification capability are to be so arranged that:

a) means are provided to ensure that any fault (e.g. power break, short circuit, earth, etc.) occurring in the loop will not render the whole loop ineffective;

b) all arrangements are made to enable the initial configuration of the system to be restored in the event of failure (e.g. electrical, electronic, informatic, etc.);

c) the first initiated fire alarm will not prevent any other detector from initiating further fire alarms; and

d) no loop will pass through a space twice. When this is not practical (e.g. for large public spaces), the part of the loop which by necessity passes through the space for a second time is to be installed at the maximum possible distance from the other parts of the loop.

7.2 Sources of power supply

7.2.1 There are to be not less than two sources of power supply for the electrical equipment used in the operation of the fixed fire detection and fire alarm system, one of which is to be an emergency source. The supply is to be provided by separate feeders reserved solely for that purpose. Such feeders are to run to an automatic change-over switch situated in or adjacent to the control panel for the fire detection system.

7.3 Component requirements (detectors)

7.3.1 Detectors are to be operated by heat, smoke or other products of combustion, flame, or any combination of these factors. Detectors operated by other factors indicative of incipient fires may be considered by Tasneef provided that they are no less sensitive than such detectors. Flame detectors are only to be used in addition to smoke or heat detectors.

7.3.2 Smoke detectors required in all stairways, corridors and escape routes within accommodation spaces are to be certified to operate before the smoke density exceeds 12.5% obscuration per metre, but not until the smoke density exceeds 2% obscuration per metre. Smoke detectors to be installed in other spaces are to operate within sensitivity limits to the satisfaction of Tasneef having regard to the avoidance of detector insensitivity or oversensitivity.

7.3.3 Heat detectors are to be certified to operate before the temperature exceeds 78°C but not until

the temperature exceeds 54°C, when the temperature is raised to those limits at a rate less than 1°C per minute. At higher rates of temperature rise, the heat detector is to operate within temperature limits to the satisfaction of Tasneef having regard to the avoidance of detector insensitivity or oversensitivity.

7.3.4 The operational temperature of heat detectors in drying rooms and similar spaces of a normal high ambient temperature may be up to 130°C, and up to 140°C in saunas.

7.3.5 All detectors are to be of a type such that they can be tested for correct operation and restored to normal surveillance without the renewal of any component.

7.4 Installation requirements

7.4.1 Sections

a) Detectors and manually operated call points are to be grouped into sections.

b) A section of fire detectors which covers a control station, a service space or an accommodation space is not to include a machinery space of category A. For fixed fire detection and fire alarm systems with remotely and individually identifiable fire detectors, a loop covering sections of fire detectors in accommodation, service spaces and control station is not to include sections of fire detectors in machinery spaces of category A.

c) Where the fixed fire detection and fire alarm system does not include means of remotely identifying each detector individually, no section covering more than one deck within accommodation spaces, service spaces and control stations is normally to be permitted except a section which covers an enclosed stairway. In order to avoid delay in identifying the source of fire, the number of enclosed spaces included in each section shall be limited as determined by Tasneef In no case are more than 50 enclosed spaces to be permitted in any section. If the system is fitted with remotely and individually identifiable fire detectors, the sections may cover several decks and serve any number of enclosed spaces.

d) In barge-accommodation units, if there is no fixed fire detection and fire alarm system capable of remotely and individually identifying each detector, a section of detectors is not to serve spaces on both sides of the barge-accommodation unit nor on more than one deck and neither is it to be situated in more than one main vertical zone except that the same section of detectors may serve spaces on more than one deck if those spaces are located in the fore or aft end of the barge-accommodation unit or if they protect common spaces on different decks (e.g. fan rooms, galleys, public spaces, etc.). In barge-accommodation units of less than 20 m in breadth, the same section of detectors may serve spaces on both sides of the barge-accommodation unit. In barge-accommodation units fitted with individually identifiable fire detectors, a section may serve spaces on both sides of the barge-accommodation unit and on several decks but shall not be situated in more than one main vertical zone.

7.4.2 Positioning of detectors

a) Detectors are to be located for optimum performance. Positions near beams and ventilation ducts or other positions where patterns of air flow could adversely affect performance and positions where impact or physical damage is likely are to be avoided. Detectors which are located on the overhead are to be a minimum distance of 0.5 m away from bulkheads, except in corridors, lockers and stairways.

b) The maximum spacing of detectors is to be in accordance with Table 5.

Table 5 – Spacing of detectors

Type of detector	Maximum floor area per detector	Maximum distance apart between centres	Maximum distance away from bulkheads
Heat	37 m^2	9 m	4,5 m
Smoke	74m^2	11 m	5,5 m

Tasneef may require or permit different spacing to that specified in the above table if based upon test data which demonstrate the characteristics of the detectors.

7.4.3 Arrangement of electric wiring

a) Electrical wiring which forms part of the system is to be so arranged as to avoid galleys, machinery spaces of category A, and other enclosed spaces of high fire risk except where it is necessary to provide for fire detection or fire alarm in such spaces or to connect to the appropriate power supply.

b) A loop of fire detection systems with a zone address identification capability is not to be damaged at more than one point by a fire.

7.5 System control requirements

7.5.1 Visual and audible fire signals*

a) The activation of any detector or manually operated call point is to initiate a visual and audible fire signal at the control panel and indicating units. If the signals have not received attention within 2 min an audible alarm is to be automatically sounded throughout the crew accommodation and service spaces, control stations and machinery spaces of category A. This alarm sounder system need not be an integral part of the detection system.

b) The control panel is to be located in the continuously manned central control station.

c) Indicating units are to denote, as a minimum, the section in which a detector has been activated or a manually operated call point has been operated. At least one unit is to be so located that it is easily accessible to responsible members of the crew at all times. One indicating unit is to be located on the navigation bridge if the control panel is located in the main fire control station.

d) Clear information is to be displayed on or adjacent to each indicating unit about the spaces covered and the location of the sections.

e) Power supplies and electric circuits necessary for the operation of the system are to be monitored for loss of power or fault conditions as appropriate. Occurrence of a fault condition is to initiate a visual and audible fault signal at the control panel which shall be distinct from a fire signal.

7.5.2 Testing

Suitable instructions and component spares for testing and maintenance shall be provided.

8 FIRE ALARM SIGNALLING SYSTEMS

8.1

8.1.1 Barge-accommodation units are, at all times when at sea or in port (except when out of service), to be so manned or equipped as to ensure that any initial fire alarm is immediately received by a responsible member of the crew.

The control panel of fixed fire detection and fire alarm systems is to be designed on the failsafe principle (e.g. an open detector circuit is to cause an alarm condition).

8.1.2 Barge-accommodation units carrying more than 36 passengers are to have the fire detection alarms for the systems required by [7.1.7] centralized in a continuously manned central control station. In addition, controls for remote closing of the fire doors and shutting down the ventilation fans are to be centralized in the same location. The ventilation fans are to be capable of reactivation by the crew at the continuously manned control station. The control panels in the central control station are to be capable of indicating open or closed positions of fire doors and closed or off status of the detectors, alarms and fans. The control panel are to be continuously powered and are to have an automatic change-over to standby power supply in case of loss of normal power supply.

The control panel is to be powered from the main source of electrical power and the emergency source of electrical power unless other arrangements are permitted by the rules, as applicable.

8.1.3 A special alarm, operated from the navigation bridge or fire control station, is to be fitted to summon the crew. This alarm may be part of the unit's general alarm system and is to be capable of being sounded independently of the alarm to the passenger spaces.

8.1.4 A fixed fire detection and fire alarm system approved according to standards recognized by Tasneef are to be installed on cabin balconies of barge-accommodation units to which [8.1.11]

applies, when furniture and furnishings on such balconies are not as defined in Sec 1 [3.39].

9 CONTROL OF SMOKE SPREAD

9.1 GENERAL

9.1.1 The purpose of this regulation is to control the spread of smoke in order to minimize the hazards from smoke. For this purpose, means for controlling smoke in atriums, control stations, machinery spaces and concealed spaces are to be provided.

9.1.2 Practicable measures are to be taken for control stations outside machinery spaces in order to ensure that ventilation, visibility and freedom from smoke are maintained so that, in the event of fire, the machinery and equipment contained therein may be supervised and continue to function effectively.

Alternative and separate means of air supply are to be provided and air inlets of the two sources of supply are to be so disposed that the risk of both inlets drawing in smoke simultaneously is minimized. At the discretion of Tasneef such requirements need not apply to control stations situated on, and opening on to, an open deck or where local closing arrangements would be equally effective.

9.1.3 The provisions of this item [9.1.3] are to apply to machinery spaces of category A and, where Tasneef considers desirable, to other machinery spaces.

a) Suitable arrangements are to be made to permit the release of smoke, in the event of fire, from the space to be protected, subject to the provisions of item [4.11.2].

b) The normal ventilation systems may be acceptable for this purpose.

c) Means of control are to be provided to permit the release of smoke and such controls are to be located outside the space concerned so that, in the event of fire, they will not be cut off from the space they serve.

d) In barge-accommodation units, the controls required by c) are to be situated at one control position or grouped in as few positions as possible to the satisfaction of Tasneef Such positions are to have a safe access from the open deck.

9.1.4 Air spaces enclosed behind ceilings, panelling or linings are to be divided by close-fitting draught stops spaced not more than 14 m apart. In the vertical direction, such enclosed air spaces, including those behind linings of stairways, trunks, etc., are to be closed at each deck.

9.1.5 Atriums are to be equipped with a smoke extraction system. The smoke extraction system is to be activated by the required smoke detection system and be capable of manual control. The fans are to be sized such that the entire volume within the space can be exhausted in 10 min or less.

10 MEANS OF ESCAPE

10.1 MEANS OF ESCAPE FROM CONTROL STATIONS, ACCOMMODATION AND SERVICE SPACES

10.1.1 General requirements

1) Stairways and ladders are to be so arranged as to provide ready means of escape to the lifeboat and liferaft embarkation deck from passenger and crew accommodation spaces and from spaces in which the crew is normally employed, other than machinery spaces.

2) Unless expressly provided otherwise in this regulation, a corridor, lobby, or part of a corridor from which there is only one route of escape are to be prohibited. Dead-end corridors used in service areas which are necessary for the practical utility of the barge-accommodation unit, such as fuel oil stations and athwartship supply corridors, are to be permitted, provided such dead-end corridors are separated from crew accommodation areas and are inaccessible from passenger accommodation areas. Also, a part of a corridor that has a depth not exceeding its width is considered a recess or local extension and is permitted.

3) All stairways in accommodation and service spaces and control stations are to be of steel frame construction except where Tasneef sanctions the use of other equivalent material.

4) If a radiotelegraph station has no direct access to the open deck, two means of escape from or access to, the station are to be provided, one of which may be a porthole or window of sufficient size or other means to the satisfaction of Tasneef

5) Doors in escape routes are, in general, to open in-way of the direction of escape, except that:

1. individual cabin doors may open into the cabins in order to avoid injury to persons in the corridor when the door is opened; and
2. doors in vertical emergency escape trunks may open out of the trunk in order to permit the trunk to be used both for escape and for access.

10.1.2 Escape from spaces below the bulkhead deck

Below the bulkhead deck two means of escape, at least one of which is to be independent of watertight doors, are to be provided from each watertight compartment or similarly restricted space or group of spaces. Exceptionally, Tasneef may dispense with one of the means of escape for crew spaces that are entered only occasionally, if the required escape route is independent of watertight doors.

Where Tasneef has granted dispensation under the provisions of this item [10.1.2] this sole means of escape is to provide safe escape. However, stairways are not to be less than 800 mm in clear width with handrails on both sides.

10.1.3 Escape from spaces above the bulkhead deck

Above the bulkhead deck there are to be at least two means of escape from each main vertical zone or similarly restricted space or group of spaces at least one of which is to give access to a stairway forming a vertical escape.

10.1.4 Direct access to stairway enclosures

Stairway enclosures in accommodation and service spaces are to have direct access from the corridors and be of a sufficient area to prevent congestion, having in view the number of persons likely to use them in an emergency. Within the perimeter of such stairway enclosures, only public toilets, lockers of non-combustible material providing storage for nonhazardous safety equipment and open information counters are permitted. Only public spaces, corridors, lifts, public toilets, to which any passengers carried can have access, other escape stairways required by [10.1.5] a) and external areas are permitted to have direct access to these stairway enclosures.

Small corridors or "lobbies" used to separate an enclosed stairway from galleys or main laundries may have direct access to the stairway provided they have a minimum deck area of 4.5 m^2, a width of no less than 900 mm and contain a fire hose station.

10.1.5 Details of means of escape

a) At least one of the means of escape required by [10.1.2] and [10.1.3] is to consist of a readily accessible enclosed stairway, which is to provide continuous fire shelter from the level of its origin to the appropriate lifeboat and liferaft embarkation decks, or to the uppermost weather deck if the embarkation deck does not extend to the main vertical zone being considered. In the latter case, direct access to the embarkation deck by way of external open stairways and passageways is to be provided and these are to have emergency lighting arrangements to the satisfaction of Tasneef and slip-free surfaces underfoot.

Boundaries facing external open stairways and passageways forming part of an escape route and boundaries in such a position that their failure during a fire would impede escape to the embarkation deck are to have fire integrity, including insulation values, in accordance with Tables 1 to 4, as appropriate.

b) Protection of access from the stairway enclosures to the lifeboat and liferaft embarkation areas is to be provided either directly or through protected internal routes which have fire integrity and insulation values for stairway enclosures as determined by Tables 1 to 4, as appropriate.

c) Stairways serving only a space and a balcony in that space are not to be considered as forming one of the required means of escape.

d) Each level within an atrium is to have two means of escape, one of which is to give direct access to an enclosed vertical means of escape meeting the requirements of [10.1.5] a).

e) The widths, number and continuity of escapes are to be in accordance with the requirements in IMO Res. 757(18).

10.1.6 Marking of escape routes

In addition to the emergency lighting required by Part E, Chapter 19, Sec 5 of the Rules for the classification of ships, the means of escape, including stairways and exits, are to be marked by lighting or photoluminescent strip indicators placed not more than 300 mm above the deck at all points of the escape route including angles and intersections. The marking must enable passengers to identify the routes of escape and readily identify the escape exits. If electric illumination is used, it is to be supplied by the emergency source of power and is to be so arranged that the failure of any single light or cut in a lighting strip will not result in the marking being ineffective. Additionally, escape route signs and fire equipment location markings are to be of photoluminescent material or marked by lighting. Tasneef is to ensure that such lighting or photoluminescent equipment has been evaluated, tested and applied in accordance with IMO Res. 752(18).

In barge-accommodation units carrying more than 36 passengers, the requirements of this item

[10.1.6] are to apply also to the crew accommodation areas.

10.1.7 Normally locked doors that form part of an escape route

Cabin and stateroom doors are not to require keys to unlock them from inside the room. Neither are there to be any doors along any designated escape route which require keys to unlock them when moving in the direction of escape.

Escape doors from public spaces that are normally latched are to be fitted with a means of quick release. Such means are to consist of a door-latching mechanism incorporating a device that releases the latch upon the application of a force in the direction of escape flow. Quick release mechanisms are to be designed and installed to the satisfaction of Tasneef and, in particular:

a) consist of bars or panels, the actuating portion of which extends across at least one half of the width of the door leaf, at least 760 mm and not more than 1120 mm above the deck;

b) cause the latch to release when a force not exceeding 67 N is applied; and

c) not be equipped with any locking device, set screw or other arrangement that prevents the release of the latch when pressure is applied to the releasing device.

10.2 Means of escape from machinery spaces

10.2.1 General

Means of escape from each machinery space in barge-accommodation units are to comply with the following provisions.

10.2.2 Escape from spaces below the bulkhead deck

Where the space is below the bulkhead deck the two means of escape are to consist of either:

a) two sets of steel ladders as widely separated as possible, leading to doors in the upper part of the space similarly separated and from which access is provided to the appropriate lifeboat and liferaft embarkation decks. One of these ladders is to be located within a protected enclosure that satisfies the requirements for category (2) as per item [4.3], or category (4) as per item [4.4], as appropriate, from the lower part of the space it serves to a safe position outside the space. Self-closing fire doors of the same fire integrity standards are to be fitted in the enclosure. The ladders are to be fixed in such a way that heat is not transferred into the enclosure through non-insulated fixing points. The protected enclosures are to have minimum internal dimensions of at least 800 mm x 800 mm, and are to have emergency lighting provisions; or

b) one steel ladder leading to a door in the upper part of the space from which access is provided to the embarkation deck and additionally, in the lower part of the space and in a position well separated from the ladder referred to, a steel door capable of being operated from each side and which provides access to a safe escape route from the lower part of the space to the embarkation deck.

10.2.3 Escape from spaces above the bulkhead deck

Where the space is above the bulkhead deck, the two means of escape are to be as widely separated as possible and the doors leading from such means of escape are to be in a position from which access is provided to the appropriate lifeboat and liferaft embarkation decks. Where such means of escape require the use of ladders, these are to be of steel.

10.2.4 Dispensation from two means of escape

In a barge-accommodation unit of less than 1,000 gross tonnage, Tasneef may dispense with one of the means of escape, due regard being paid to the width and disposition of the upper part of the space. In a barge-accommodation unit of 1,000 gross tonnage and above, Tasneef may dispense with one means of escape from any such space, including a normally unattended auxiliary machinery space, so long as either a door or a steel ladder provides a safe escape route to the embarkation deck, due regard being paid to the nature and location of the space and whether persons are normally employed in that space.

10.3 EMERGENCY ESCAPE BREATHING DEVICES

10.3.1 On all barge-accommodation units, within the machinery spaces, emergency escape breathing devices is to be situated ready for use at easily visible places, which can be reached quickly and easily at any time in the event of fire. The location of emergency escape breathing devices are to take into account the layout of the machinery space and the number of persons normally working in the spaces (see Note 1).

The number and location of these devices are to be indicated in the fire control plan.

Emergency escape breathing devices are to be approved according to standards recognized by Tasneef

Note 1: Refer to the Guidelines for the performance, location, use and care of emergency escape breathing devices issued by IMO (MSC/Circ.849).

11 SPECIAL ARRANGEMENTS IN MACHINERY SPACES

11.1 GENERAL

11.1.1 Means are to be provided for stopping ventilating fans serving machinery spaces and for closing all doorways, ventilators, annular spaces around funnels and other openings to such spaces. Such means are to be capable of being operated from outside such spaces in case of fire.

11.1.2 Machinery driving forced and induced draught fans, oil fuel transfer pumps, oil fuel unit pumps and other similar fuel pumps is to be fitted with remote controls situated outside the space concerned so that such machinery may be stopped in the event of a fire arising in the space in which it is located.

11.1.3 Every oil fuel suction pipe from a storage, settling or daily service tank situated above the double bottom is to be fitted with a cock or valve capable of being closed from outside the space concerned in the event of a fire arising in the space in which such tanks are situated. In the special case of deep tanks situated in any shaft or pipe tunnel, valves are to be fitted on the tank but control in the event of fire is to be possible by means of an additional valve on the pipeline or lines outside the tunnel or tunnels.

12 WATER FIRE-FIGHTING SYSTEM

12.1 Purpose

12.1.1 The purpose of this item [10] is to suppress and swiftly extinguish a fire in the space of origin. For this purpose, the following functional requirements are to be met:

a) fixed fire extinguishing systems are to be installed having due regard to the fire growth potential of the protected spaces; and

b) fire extinguishing appliances are to be readily available.

12.2 Water supply systems

12.2.1 General

Units are to be provided with fire pumps, fire mains, hydrants and hoses complying with the applicable requirements of this regulation.

12.2.2 Fire mains and hydrants

Materials readily rendered ineffective by heat are not to be used for fire mains and hydrants unless adequately protected. The pipes and hydrants are to be so placed that the fire hoses may be easily coupled to them. The arrangement of pipes and hydrants are to be such as to avoid the possibility of freezing.

Suitable drainage provisions are to be provided for fire main piping. Isolation valves are to be installed for all open deck fire main branches used for purposes other than fire fighting.

12.2.3 Ready availability of water supply

The arrangements for the ready availability of water supply are to be:

a) in barge-accommodation units of 1,000 gross tonnage and upwards such that at least one effective jet of water is immediately available from any hydrant in an interior location and so as to ensure the continuation of the output of water by the automatic starting of one required fire pump;

b) in barge-accommodation units of less than 1,000 gross tonnage by automatic start of at least one fire pump or by remote starting from the central control station of at least one fire pump. If the pump starts automatically or if the bottom valve cannot be opened from where the pump is remotely started, the bottom valve is always to be kept open; and

c) if fitted with periodically unattended machinery spaces, fixed water fire-extinguishing arrangement for such spaces are to be in accordance with Part F, Ch 3 of the Rules for the classification of ships.

12.2.4 Diameter of fire mains

The diameter of the fire main and water service pipes is to be sufficient for the effective distribution of the maximum required discharge from two fire pumps operating simultaneously.

12.2.5 Isolating valves and relief valves

Isolating valves to separate the section of the fire main within the machinery space containing the main fire pump or pumps from the rest of the fire main are to be fitted in an easily accessible and tenable position outside the machinery spaces. The fire main is to be so arranged that when the isolating valves are shut all the hydrants on the barge-accommodation unit, except those in the machinery space referred to above can be supplied with water from another fire pump or an emergency fire pump. The emergency fire pump, its seawater inlet, and suction and delivery pipes

and isolating valves are to be located outside the machinery space. If this arrangement cannot be made, the sea-chest may be fitted in the machinery space if the valve is remotely controlled from a position in the same compartment as the emergency fire pump and the suction pipe is as short as practicable. Short lengths of suction or discharge piping may penetrate the machinery space, provided they are enclosed in a substantial steel casing, or are insulated to A-60 class standards. The pipes are to have substantial wall thickness, but in no case less than 11 mm, and are to be welded except for the flanged connection to the sea inlet valve.

A valve is to be fitted to serve each fire hydrant so that any fire hose may be removed while the fire pumps are in operation. Relief valves shall be provided in conjunction with fire pumps if the pumps are capable of developing a pressure exceeding the design pressure of the water service pipes, hydrants and hoses.

These valves are to be so placed and adjusted as to prevent excessive pressure in any part of the fire main system.

12.2.6 Number and position of hydrants

The number and position of hydrants are to be such that at least two jets of water not emanating from the same hydrant, one of which is to be from a single length of hose, may reach any part of the unit normally accessible to the passengers or crew while the barge-accommodation unit is in service, each from a single length of hose. Furthermore, such hydrants are to be positioned near the accesses to the protected spaces.

In the accommodation, service and machinery spaces the number and position of hydrants are to be such that the requirements of this item [12.2.6] are to be complied with when all watertight doors and all doors in main vertical zone bulkheads are closed

12.2.7 Pressure at hydrants

With the two pumps simultaneously delivering water through the nozzles specified in [12.2.14], with the quantity of water as specified in [12.2.11], through any adjacent hydrants, the following minimum pressures are to be maintained at all hydrants:

1 4,000 gross tonnage and upwards 0.40 N/mm^2

2 less than 4,000 gross tonnage 0.30 N/mm^2;

and the maximum pressure at any hydrant is not to exceed that at which the effective control of a fire hose can be demonstrated.

12.2.8 International shore connection

Units of 500 gross tonnage and upwards are to be provided with at least one international shore connection complying with Figure 1 and Table 5.

Figure 1 : International shore connection

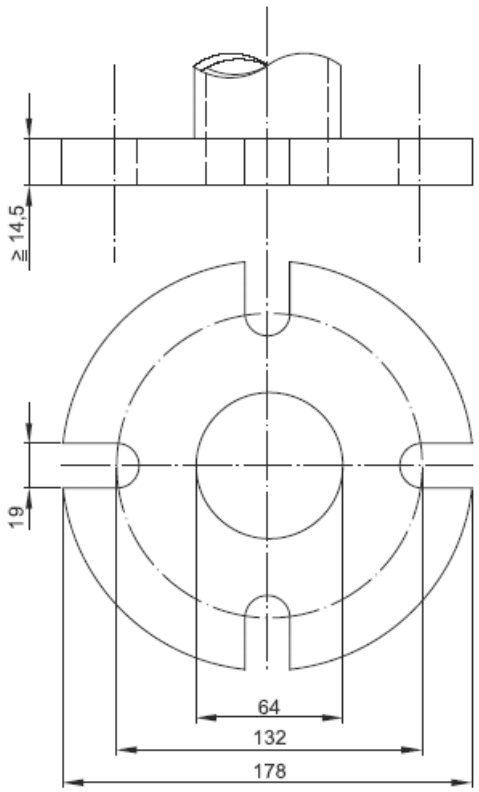

Table 6 - Standard dimensions for international shore connections

Description	Dimension
Outside diameter	178 mm
Inside diameter	64 mm
Bolt circle diameter	132 mm
Slots in flange	4 holes 19 mm in diameter spaced equidistantly on a bolt circle of the above diameter, slotted to the flange periphery
Flange thickness	14,5 mm minimum
Bolts and nuts	4, each of 16 mm diameter, 50 mm in length

Facilities are to be available enabling such a connection to be used on either side of the barge-accommodation unit. International shore connections are to be of steel or other equivalent material and are to be designed for 1.0 N/mm^2 services. The flange is to have a flat face on one side and, on the other side, it is to be permanently attached to a coupling that will fit the barge-accommodation unit's hydrant and hose. The connection is to be kept aboard the barge-accommodation unit together with a gasket of any material suitable for 1.0 N/mm^2 services, together with four bolts of 16 mm diameter and 50 mm in length, four 16 mm nuts, and eight washers.

12.2.9 Fire pumps

a) Pumps accepted as fire pumps

Sanitary, ballast, bilge or general service pumps may be accepted as fire pumps, provided that they are not normally used for pumping oil and that if they are subject to occasional duty for the

transfer or pumping of oil fuel, suitable change-over arrangements are fitted.

b) Number of fire pumps

Units are to be provided with independently driven fire pumps as follows:

1 in barge-accommodation units of 4,000 gross tonnage and upwards at least three;

2 In barge-accommodation units of less than 4,000 gross tonnage at least two.

c) Arrangement of fire pumps and fire main

The arrangement of sea connections, fire pumps and their sources of power are to be such as to ensure that:

1) in barge-accommodation units of 1,000 gross tonnage and upwards, in the event of a fire in any one compartment all the fire pumps will not be put out of action; and

2) in barge-accommodation units of less than 1,000 gross tonnage, if a fire in any one compartment could put all the pumps out of action, there is to be an alternative means consisting of an emergency fire pump complying with the provisions of [12.2.15] with its source of power and sea connection located outside the space where the main fire pumps or their sources of power are located.

12.2.10 Requirements for the space containing the emergency fire pump

a) Location of the space

The space containing the fire pump is not to be contiguous to the boundaries of machinery spaces of category A or those spaces containing main fire pumps. Where this is not practicable, the common bulkhead between the two spaces is to be insulated to a standard of structural fire protection equivalent to that required for a control station.

b) Access to the emergency fire pump

No direct access is to be permitted between the machinery space and the space containing the emergency fire pump and its source of power. When this is impracticable, Tasneef may accept an arrangement where the access is by means of an airlock with the door of the machinery space being of A-60 class standard, and the other door being at least steel, both reasonably gastight, self-closing and without any hold back arrangements. Alternatively, the access may be through a watertight door capable of being operated from a space remote from the machinery space and the space containing the emergency fire pump and unlikely to be cut off in the event of fire in those spaces. 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.

c) Ventilation of the emergency fire pump space

Ventilation arrangements to the space containing the independent source of power for the emergency fire pump are to be such as to preclude, as far as practicable, the possibility of smoke from a machinery space fire entering or being drawn into that space.

12.2.11 Capacity of fire pumps

a) Total capacity of required fire pumps

The required fire pumps are to be capable of delivering for fire-fighting purposes a quantity of water, at the pressure specified in [12.2.7], as follows: the quantity of water is not less than two thirds of the quantity required to be dealt with by the bilge pumps when employed for bilge pumping.

b) Capacity of each fire pump

Each of the required fire pumps is to have a capacity not less than 80% of the total required capacity divided by the minimum number of required fire pumps but in any case not less than 25 m^3/h and each such pump is to in any event be capable of delivering at least the two required jets of water. These fire pumps are to be capable of supplying the fire main system under the required conditions. Where more pumps than the minimum required pumps are installed such additional pumps are to have a capacity of at least 25 m^3/h and are to be capable of delivering at least the two jets of water required in [12.2.6].

12.2.12 Fire hoses and nozzles

Fire hoses are to be of non-perishable material approved by Tasneef and are to be sufficient in length to project a jet of water to any of the spaces in which they may be required to be used.

Each hose is to be provided with a nozzle and the necessary couplings. Hoses specified in this chapter as "fire hoses" are, together with any necessary fittings and tools, to be kept ready for use in conspicuous positions near the water service hydrants or connections. Additionally, in interior locations in barge-accommodation units carrying more than 36 passengers fire hoses are to be connected to the hydrants at all times. Fire hoses are to have a length of at least 10 m, but not more than:

1 15 m in machinery spaces;

2 20 m in other spaces and open decks; and

3 25 m for open decks on barge-accommodation units with a maximum breadth in excess of 30 m.

Unless one hose and nozzle are provided for each hydrant in the Barge-accommodation unit, there is to be complete interchangeability of hose couplings and nozzles.

12.2.13 Number and diameter of fire hoses

Units are to be provided with fire hoses the number and diameter of which are to be to the satisfaction of Tasneef

There is to be at least one fire hose for each of the hydrants required by [12.2.6] and these hoses are to be used only for the purposes of extinguishing fires or testing the fire-extinguishing apparatus at fire drills and surveys.

12.2.14 Size and types of nozzles

For the purposes of this item [12.2.14], standard nozzle sizes are to be 12 mm, 16 mm and 19 mm or as near thereto as possible. Larger diameter nozzles may be permitted at the discretion of Tasneef For accommodation and service spaces, a nozzle size greater than 12 mm need not be used.

For machinery spaces and exterior locations, the nozzle size is to be such as to obtain the maximum discharge possible from two jets at the pressure mentioned in [12.2.7] from the smallest pump, provided that a nozzle size greater than 19 mm need not be used.

Nozzles are to be of an approved dual-purpose type (i.e., spray/jet type) incorporating a shutoff.

12.2.15 Emergency fire pump characteristics

a) General

The emergency fire pump is to be a fixed independently driven power-operated pump.

b) Capacity

The capacity of the pump is not to be less than 40% of the total capacity of the fire pumps required by [12.2.11] and in any case not less than 25 m^3/h.

c) Pressure at hydrants

When the pump is delivering the quantity of water required by [12.2.15] b) the pressure at any hydrants is not to be less than the minimum pressure required [12.2.7]

d) Suction heads

The total suction head and the net positive suction head of the pump is to be determined having due regard to the requirements of this item [12] on pump capacity and on hydrant pressure under all conditions of list, trim, roll and pitch likely to be encountered in service.

e) Diesel engines and fuel tank

Any diesel driven power source for the pump is to be capable of being readily started in its cold condition down to the temperature of 0°C by hand (manual) cranking. If this is impracticable, or if lower temperatures are likely to be encountered, consideration is to be given to the provision and maintenance of heating arrangements, acceptable to Tasneef so that ready starting will be ensured. If hand (manual) starting is impracticable, Tasneef may permit other means of starting. These means are to be such as to enable the diesel driven power source to be started at least six times within a period of 30 min and at least twice within the first 10 min.

f) Fuel tank capacity

Any service fuel tank is to contain sufficient fuel to enable the pump to run on full load for at least three hours and sufficient reserves of fuel are to be available outside the machinery space of category A to enable the pump to be run on full load for an additional 15 h.

13 PROTECTION OF MACHINERY SPACES

13.1

13.1.1 Fixed fire-extinguishing systems

Machinery spaces of category A containing internal combustion machinery are to be provided with one of the fixed fire-extinguishing systems in [16].

13.1.2 Additional fire-extinguishing arrangements

There is to be at least one portable foam applicator unit approved according to standards recognized by Tasneef

Each such space is to contain approved foam-type fire extinguishers, each of at least 45 l capacity or equivalent, sufficient in number to enable foam or its equivalent to be directed on to any part of the fuel and lubricating oil pressure systems, gearing and other fire hazards. In addition, a sufficient number of portable foam extinguishers or equivalent are to be provided which are to be so located that no point in the space is more than 10 m walking distance from an extinguisher and that there are at least two such extinguishers in each such space In Barge-accommodation units carrying more than 36 passengers, each machinery space of category A

shall be provided with at least two suitable water fog applicators.

14 MACHINERY SPACES CONTAINING OIL-FIRED BOILERS OR OIL FUEL UNITS

14.1 FIXED FIRE-EXTINGUISHING SYSTEMS

14.1.1 Machinery spaces of category A containing oil-fired boilers or oil fuel units are to be provided with anyone of the fixed fire-extinguishing systems in [18]. In each case, if the engine and boiler rooms are not entirely separate, or if fuel oil can drain from the boiler room into the engine-room, the combined engine and boiler rooms shall be considered as one compartment.

14.1.1 ADDITIONAL FIRE-EXTINGUISHING ARRANGEMENTS

There is to be in each boiler room or at an entrance outside of the boiler room at least one portable foam applicator unit complying with standards recognized by Tasneef

There shall be at least two portable foam extinguishers or equivalent in each firing space in each boiler room and in each space in which a part of the oil fuel installation is situated. There shall be not less than one approved foam-type extinguisher of at least 135 *l* capacity or equivalent in each boiler room. These extinguishers shall be provided with hoses on reels suitable for reaching any part of the boiler room. In the case of domestic boilers of less than 175 kW an approved foam-type extinguisher of at least 135 *l* capacity is not required.

In each firing space there shall be a receptacle containing at least 0,1 m^3 of sand, sawdust impregnated with soda, or other approved dry material, along with a suitable shovel for spreading the material. An approved portable extinguisher may be substituted as an alternative. In barge-accommodation units carrying more than 36 passengers, each machinery space of category A shall be provided with at least two suitable water fog applicators.

15 OTHER MACHINERY SPACES

15.1 GENERAL

15.1.1 Where, in the opinion of Tasneef a fire hazard exists in any machinery space for which no specific provisions for fire-extinguishing appliances are prescribed in [13] and [14], such a number of approved portable fire extinguishers or other means of fire extinction as Tasneef may deem sufficient are to be provided in, or adjacent to, that space. Refer to IMO MSC.1/Circ 1275.

16 FIXED LOCAL APPLICATION FIRE-FIGHTING SYSTEMS

16.1 GENERAL

16.1.1 Machinery spaces of category A above 500 m^3 in volume, in barge-accommodation units of 500 gross tonnage and above, in addition to the fixed fire-extinguishing system required in [13] and [14], are to be protected by an approved type of fixed water based or equivalent local application fire-fighting system, approved according to standards recognized by Tasneef In the case of periodically unattended machinery spaces, the fire-fighting system is to have both automatic and manual release capabilities. In the case of continuously manned machinery spaces, the fire-fighting system is only required to have a manual release capability.

16.1.2 Fixed local application fire-fighting systems are to protect areas such as the following without the necessity of engine shutdown, personnel evacuation, or sealing of the spaces:

a) the fire hazard portions of internal combustion machinery used for power generation;

b) boiler fronts;

c) the fire hazard portions of incinerators; and

d) purifiers for heated fuel oil.

16.1.3 Activation of any local application system shall give a visual and distinct audible alarm in the protected space and at continuously manned stations. The alarm shall indicate the specific system activated.

The system alarm requirements described in this item [16.1.3] are in addition to, and not a substitute for, the detection and fire alarm system required elsewhere in this section 6.

17 PROTECTION OF CONTROL STATIONS,ACCOMMODATION AND SERVICE SPACES

17.1 BARGE-ACCOMMODATION UNITS CARRYING MORE THAN 36 PASSENGERS

17.1.1 Barge-accommodation units are to be equipped with an automatic sprinkler, fire detection and fire alarm system of an approved type complying with standards recognized by Tasneef in all control stations, accommodation and service spaces, including corridors and stairways. Alternatively, control stations, where water may

cause damage to essential equipment, may be fitted with an approved fixed fire-extinguishing system of another type. Spaces having little or no fire risk such as voids, public toilets, carbon dioxide rooms and similar spaces need not be fitted with an automatic sprinkler system.

17.2 BARGE-ACCOMMODATION UNITS CARRYING NOT MORE THAN 36 PASSENGERS

17.2.1 In barge-accommodation units carrying not more than 36 passengers, when a fixed smoke detection and fire alarm system complying with standards recognized by Tasneef is provided only in corridors, stairways and escape routes within accommodation spaces, an automatic sprinkler system is to be installed in accordance with [17.1.1].

17.3 CABIN BALCONIES

17.3.1 A fixed pressure water-spraying fire-extinguishing system complying with the provisions of the standards recognized by Tasneef is to be installed on cabin balconies of barge-accommodation units to which [6.1.4] applies, where furniture and furnishings on such balconies are not as defined in Sec 1 [3.39].

17.4 SPACES CONTAINING FLAMMABLE LIQUID

17.4.1 Paint lockers are to be protected by:

a) a carbon dioxide system, designed to give a minimum volume of free gas equal to 40% of the gross volume of the protected space;

b) a dry powder system, designed for at least 0,5 kg powder/m^3;

c) a water spraying or sprinkler system, designed for 5 l/m^2 min. Water spraying systems may be connected to the fire main of the barge-accommodation unit; or

d) a system providing equivalent protection, as determined by Tasneef

In all cases, the system is to be operable from outside the protected space.

17.4.2 Flammable liquid lockers are to be protected by an appropriate fire-extinguishing arrangement approved by Tasneef

17.4.3 For lockers of a deck area of less than 4 m^2, which do not give access to accommodation spaces, a carbon dioxide portable fire extinguisher sized to provide a minimum volume of free gas equal to 40% of the gross volume of the space may be accepted in lieu of a fixed system. A discharge port is to be arranged in the locker to allow the discharge of the extinguisher without having to enter the protected space. The required portable fire extinguishers are to be stowed adjacent to the port.

Alternatively, a port or hose connection may be provided to facilitate the use of fire main water.

17.5 DEEP-FAT COOKING EQUIPMENT

17.5.1 Deep-fat cooking equipment is to be fitted with the following:

a) an automatic or manual extinguishing system tested to a standard recognized by Tasneef

b) a primary and backup thermostat with an alarm to alert the operator in the event of failure of either thermostat;

c) arrangements for automatically shutting off the electrical power upon activation of the extinguishing system;

d) an alarm to indicate operation of the extinguishing system in the galley where the equipment is installed; and

e) controls for manual operation of the extinguishing system which are clearly labelled for ready use by the crew.

17.6 PORTABLE FIRE EXTINGUISHERS

17.6.1 Type and design

Portable fire extinguishers are to be approved according to standards recognized by Tasneef

17.6.2 Arrangement of fire extinguishers

Accommodation spaces, service spaces and control stations are to be provided with portable fire extinguishers of appropriate types and in sufficient number according to IMO MSC.1/Circ.1275.

Barge-accommodation units of 1000 gross tonnage and upwards are to carry at least five portable fire extinguishers.

One of the portable fire extinguishers intended for use in any space is to be stowed near the entrance to that space.

Carbon dioxide fire extinguishers are not to be placed in accommodation spaces. In control stations and other spaces containing electrical or electronic equipment or appliances necessary for the safety of the barge-accommodation unit, fire extinguishers should be provided whose extinguishing media are neither electrically conductive nor harmful to the equipment and appliances.

Fire extinguishers are to be situated ready for use at easily visible places, which can be reached quickly and easily at any time in the event of a fire, and in such a way that their serviceability is not impaired by the weather, vibration or other external factors. Portable fire extinguishers are to be provided with devices which indicate whether they have been used.

17.6.3 Spare charges

a) Spare charges are to be provided for 100% of the first 10 extinguishers and 50% of the remaining fire extinguishers capable of being recharged on board. Not more than 60 total spare charges are required. Instructions for recharging are to be carried on board.

b) For fire-extinguishers which cannot be recharged on board, additional portable fire-extinguishers of the same quantity, type, capacity and number as determined in a) above are to be provided in lieu of spare charges.

18 FIXED FIRE-EXTINGUISHING SYSTEMS

18.1 GENERAL

18.1.1 A fixed fire extinguishing system required by [13] and [14] may be any of the following systems:

a) a fixed gas fire-extinguishing system complying with the provisions of the standards recognized by Tasneef

b) a fixed high-expansion foam fire-extinguishing system complying with the provisions of standards recognized by Tasneef

or

c) a fixed pressure water-spraying fire-extinguishing system complying with the provisions standards recognized by Tasneef

18.2 FIXED GAS FIRE-EXTINGUISHING SYSTEMS

18.2.1 General

b) Where the quantity of fire-extinguishing medium is required to protect more than one space, the quantity of medium available need not be more than the largest quantity required for any one space so protected;

c) the volume of starting air receivers, converted to free air volume, is to be added to the gross volume of the machinery space when calculating the necessary quantity of the fire-extinguishing medium. Alternatively, a discharge pipe from the safety valves may be fitted and led directly to the open air;

d) means are to be provided for the crew to safely check the quantity of the fire-extinguishing medium in the containers;

e) containers for the storage of fire-extinguishing medium and associated pressure components are to be designed to pressure codes of practice to the satisfaction of Tasneef having regard to their locations and maximum ambient temperatures expected in service;

f) storage rooms of fire-extinguishing medium: when the fire-extinguishing medium is stored outside a protected space, it is to be stored in a room which is located behind the forward collision bulkhead and is used for no other purposes. Any entrance to such a storage room is preferably to be from the open deck and is to be independent of the protected space. If the storage space is located below deck, it is to be located no more than one deck below the open deck and is to be directly accessible by a stairway or ladder from the open deck. Spaces which are located below deck or spaces where access from the open deck is not provided are to be fitted with a system designed to take exhaust air from the bottom of the space and sized to provide at least 6 air changes per hour. Access doors are to open outwards, and bulkheads and decks, including doors and other means of closing any opening therein, which form the boundaries between such rooms and adjacent enclosed spaces are to be gas-tight. For the purpose of structural fire protection, such storage rooms are to be treated as fire control stations.

18.2.2 Installation requirements

a) The piping for the distribution of fire-extinguishing medium is to be arranged and discharge nozzles so positioned that a uniform distribution of the medium is obtained;

b) except as otherwise permitted by Tasneef pressure containers required for the storage of fire-extinguishing medium, other than steam, are to be located outside the protected spaces in accordance with [18.2.1] e);

c) spare parts for the system are to be stored on board and be to the satisfaction of Tasneef

18.2.3 System control requirements

a) The necessary pipes for conveying fire-extinguishing medium into the protected spaces are to be provided with control valves so marked as to indicate clearly the spaces to which the pipes are led. Suitable provision is to be made to prevent inadvertent release of the medium into the space. The pipes may pass through

accommodation providing that they are of substantial thickness and that their tightness is verified with a pressure test, after their installation, at a pressure head not less than 5 N/mm^2. In addition, pipes passing through accommodation areas are to be joined only by welding and are not to be fitted with drains or other openings within such spaces. The pipes are not to pass through refrigerated spaces;

b) means are to be provided for automatically giving audible warning of the release of fire-extinguishing medium into any ro-ro spaces and other spaces in which personnel normally work or to which they have access. The pre-discharge alarm is to be automatically activated (e.g. by opening of the release cabinet door). The alarm is to operate for the length of time needed to evacuate the space, but in no case less than 20 s. before the medium is released. Small spaces (such as compressor rooms, paint lockers, etc.) with only a local release need not be provided with such an alarm;

c) the means of control of any fixed gas fire-extinguishing system are to be readily accessible, simple to operate and grouped together in as few locations as possible at positions not likely to be cut off by a fire in a protected space. At each location there are to be clear instructions relating to the operation of the system having regard to the safety of personnel;

d) automatic release of fire-extinguishing medium is not permitted, unless otherwise stated by Tasneef

18.2.4 Carbon dioxide systems

a) Quantity of fire-extinguishing medium

For machinery spaces, the quantity of carbon dioxide carried is to be sufficient to give a minimum volume of free gas equal to the larger of the following volumes, either:

1) 40% of the gross volume of the largest machinery space so protected, the volume to exclude that part of the casing above the level at which the horizontal area of the casing is 40% or less of the horizontal area of the space concerned taken midway between the tank top and the lowest part of the casing; or

2) 35% of the gross volume of the largest machinery space protected, including the casing;

For the purpose of this item [18.2.4] the volume of free carbon dioxide is to be calculated at 0,56 m^3/kg;

For machinery spaces, the fixed piping system is to be such that 85% of the gas can be discharged into the space within 2 min.

b) Controls

Carbon dioxide systems are to comply with the following requirements:

1) two separate controls are to be provided for releasing carbon dioxide into a protected space and to ensure the activation of the alarm. One control is to be used for opening the valve of the piping which conveys the gas into the protected space and a second control is to be used to discharge the gas from its storage containers; and

2) the two controls are to be located inside a release box clearly identified for the particular space. If the box containing the controls is to be locked, a key to the box is to be in a break-glass-type enclosure conspicuously located adjacent to the box.

c) Bottle arrangement

The bottles are to be arranged in a vertical position and so disposed in order to facilitate their weighing. Moreover, in order to avoid corrosion on the bottom of the bottles they are to be arranged in such a way that ventilation is facilitated and cleaning is possible.

d) Bottles and their fittings

The bottles are to be approved by Tasneef on the basis of the requirements of Pt C, Ch 1, Sec 3 of the Rules for Classification of Ships and are to have a capacity not greater than 67l. Bottles having capacity up to 80 l may be accepted by Tasneef on a case-by-case basis subject to satisfactory handling arrangements. However, the bottles of a system are to have the same capacity.

Each bottle is to be provided with a valve fitted with a standard threaded connection, for bottle filling, and with a safety device (rupture disc) set to a pressure value between 17 and 20 MPa. The minimum cross-sectional area of the device is to be not less than 50 mm^2. Lastly, the valve is to be fitted with a manual opening control which can be easily and readily operated or with another opening device accepted by Tasneef If the exhaust of the safety devices is led into the CO_2 collecting main, or into a proper exhaust pipe leading to the open, Tasneef may waive the requirement for mechanical ventilation of the room in [18.2.1] e) and furthermore, failing this, the discharge

of such safety device is to be equipped with a jet breaker.

1) The bottles are to be permanently connected to a common collecting main by means of a steel pipe complying with the requirements of l) or by a flexible pipe capable of withstanding a burst test at a pressure not less than four times the design pressure of the bottle. A non-return valve is to be fitted between each bottle and the collecting main.

2) The filling ratio of the bottles is generally to be not greater than 0,67 kg/l. In exceptional cases, in which the barge-accommodation unit's service is restricted to temperate zones, a filling ratio up to 0,75 kg/l may be accepted.

3) Containers for the storage of fire-extinguishing medium and associated pressure components are to be designed to pressure codes of practice to the satisfaction of Tasneef having regard to their locations and maximum ambient temperatures expected in service.

e) Safety devices for the CO_2 collecting mains

The CO_2 manifold located in the bottle room is to be fitted with one or more safety valves or rupture disks set to a pressure value between 17 and 20 MPa with the exhaust pipe led to the open air. The outflow cross-sectional area of these valves or rupture disks is to be not less than 300 mm^2. When the exhaust pipe of the bottle safety devices mentioned in d) is led into the CO_2 collecting mains, the minimum total outflow cross-sectional area of the above-mentioned safety valves or rupture disks will be given special consideration by Tasneef on a case-by-case basis.

f) Carbon dioxide distribution arrangement

1) The CO_2 distribution system within protected spaces is to be so designed that, when the gas quantity appropriate to that space is discharged, it is uniformly distributed through all the discharge nozzles. In machinery and boiler spaces at least 20 per cent of the required quantity of carbon dioxide is to be discharged below the floor.

2) Tab 2 sets forth the minimum piping diameters for quick discharge in relation to the quantity of carbon dioxide to be discharged; different values may be accepted by Tasneef on the basis of the results of detailed hydraulic calculations. For slow discharge, the piping is to have a nominal diameter, DN, not less than 20 mm. A connection for the compressed air piping is to be provided on the collecting main for the purpose of cleaning the system piping and associated nozzles. This connection is to be threaded and closed with a threaded plug.

3) Piping joints are to be made by means of flanges. However, threaded joints may be used within the CO_2 room and within the protected spaces, subject to the limitations in Pt C, Ch 1, Sec 10, [4.4.4] and [4.4.5] of the Rules for Classification of Ships. Pipes passing through accommodation spaces are to be joined only by welding.

4) The piping, valves and fittings are to be properly secured to the hull structures and, when necessary, they are to be protected against possible damage. Plugs, draining devices and filters, if any, are to be arranged, where necessary, in such a way as to prevent the accumulation of condensation water and residues. They are to be situated in easily accessible and controllable positions and, in any case, outside accommodation spaces. For the purpose of reducing friction loss in the piping, it is to be arranged as straight as possible and along the shortest path.

5) The carbon dioxide is to be discharged through nozzles in a nebulised state and for such purpose the utmost care is to be taken in shaping and sizing the nozzle cones to avoid the formation of dry snow or dry ice. When a smoke detection system using the CO_2 distribution piping is foreseen, the connection of the system to this piping is to be made close to the distribution valves by means of a device suitable for preventing the CO_2 from being conveyed to the smoke detection station during the discharge.

6) The applicator nozzles are not to be located near ventilation outlets and they are to be clear of machinery or devices which could hinder the outflow. The branch pipes on which the nozzles are fitted are to extend at least 50 mm beyond the last nozzle and are to be closed by a threaded plug in order to allow the removal of any residues left in sections of the piping by the gas flow. The total outflow cross-sectional area of

the applicator nozzles in machinery and boiler spaces is to be not less than 50 per cent or greater than 85 per cent of the outflow cross-sectional area of the carbon dioxide collecting main. In general, the actual outflow cross-sectional area of each applicator is to be between 50 and 160 mm^2 and, in the case of multiple hole applicators, the diameter of each hole is to be not less than 4 mm; different values may be accepted by Tasneef on the basis of the results of detailed hydraulic calculations.

g) Alarm devices

The alarm system is to be approved by Tasneef The alarm sounding during the discharge may be of pneumatic type (e.g. CO_2, nitrogen) or of electrical type.

Audible alarms fitted to warn of the release of gas fire-extinguishing medium into pump rooms are to meet the requirements of 1) and 2):

1) Pneumatically operated alarms

In cases where the periodical testing of such alarms is required, CO_2 operated alarms are not to be used owing to the possibility of the generation of static electricity in the CO_2 cloud. Air operated alarms may be used provided the air supply is clean and dry.

2) Electrically operated alarms

When electrically operated alarms are used, the arrangements are to be such that the electrical actuating mechanism is located outside the pump room and the alarms are of certified safe type.

h) Electrical audible alarm

Where the audible alarm in g) is electrically operated, the following conditions are to be complied with:

1) The supply to the alarm system is to be continuously powered from the emergency source of electrical power or from a battery suitably located for use in an emergency. An alarm in case of power failure to the alarm system is to be given in a manned position.

2) Two or more audible alarm devices are to be installed in each protected space, as far away as possible from each other and such that, if one of them goes out of service, the remaining one(s) will be sufficient to give the alarm to the whole space.

3) The circuits supplying the audible alarm devices are to be protected only against short-circuits.

4) The arrangement of the circuits and their electrical protection are to be such that the failure of one of the audible alarm devices will not impair the operation of the others.

5) The fuses, if used for short-circuit protection, are to be of the type fitted with a device indicating the fuse condition.

6) The electrical cables are to be of the fire-resisting type.

7) The audible alarm devices and any other equipment located in the space are to be protected within cases ensuring a degree of protection adequate to the space of installation with a minimum of IP44. Where the audible alarm devices and any other equipment are arranged in a hazardous area, the requirements set forth in Chapter 2 are also to be complied with.

i) Pilot bottles

When the simultaneous operation of the bottles is actuated by means of carbon dioxide pressure from a driver bottle, at least two pilot bottles are to be provided, with valves capable of being locally manoeuvred at all times. The pipes connecting the pilot bottles to the valves of the other bottles are to be of steel complying with the requirements in k) below and their arrangement is to allow piping distortion due to thermal variations or, failing this, the connection is to be made by means of a flexible pipe capable of withstanding a burst test at a pressure not less than four times the design pressure of the bottle.

j) Shut-off valves

For systems in which bottle valve opening is actuated by using the pressure of carbon dioxide discharged from pilot bottles, a valve, normally to be kept shut, is to be placed between the main of the pilot bottles and the main of the other bottles. This valve is to be opened by means of the same actuating device as for the pilot bottles and is to be placed upstream of the device delaying the discharge of the non-pilot bottles.

k) Materials

The CO_2 system appliances are to be constructed of materials suitable for resisting corrosion by the marine environment; it is recommended that all important fittings of the system be of brass, special bronze or stainless steel. The carbon dioxide piping is to be of steel, hot galvanised inside and outside. The relevant wall thicknesses are to be not less than those specified in Tab 3. Cast iron connections and fittings are not allowed, except for fittings of ductile or globular cast iron which may be installed after the distribution valves.

The distribution valves or cocks are to be of such dimensions as to withstand a nominal pressure of not less than 16 MPa. The valves, flanges and other fittings of the piping between the bottles and the distribution valves are to have dimensions for a nominal pressure of not less than 16 MPa. The valves, flanges and other fittings of the piping between the distribution valves and the applicator nozzles are to have dimensions for a nominal pressure of not less than 4 MPa.

l) Inspections and tests

The bottles and associated fittings under pressure are to be subjected to a hydrostatic test pressure of 25 MPa witnessed by Tasneef The piping, valves and other fittings are to be subjected to the following tests witnessed by Tasneef

1) for those between the bottles and the distribution valves: hydrostatic test to 20 MPa pressure in the workshop before their installation on board and hydrostatic test to 0,7 MPa pressure after their installation on board
2) for those led through accommodation spaces: hydrostatic test to 5 MPa pressure after their installation on board
3) for those between the distribution valves and the applicator nozzles: pneumatic test, after their installation on board, to a pressure suitable to check gas tightness and absence of obstructions
4) for flexible pipes: hydrostatic test under a pressure at least equal to 1,5 times the maximum service pressure.

Table 7: Dimensions of the CO_2 piping for quick discharge

Nominal Diameter	External Diameter	CO_2 quantity, in kg
DN (mm)	De (mm)	Machinery and boiler spaces
15	21,3	45
20	26,9	100
25	33,7	135
32	42,4	275
40	48,3	450
50	60,3	1100
65	76,1	1500
80	88,9	2000
90	101,6	3250
100	114,3	4750
110	127,0	6810
125	139,7	9500
150	168,3	15250

Table 8: Minimum wall thickness for steel pipes for CO_2 fire-extinguishing systems

External diameter of pipes (mm)	Minimum wall thickness (mm)	
	From bottles to distribution station	From bottles to distribution station
21,3 - 26,9	3,2	2,6
30,0 - 48,3	4,0	3,2
51,0 - 60,3	4,5	3,6
63,5 - 76,1	5,0	3,6
82,5 - 88,9	5,6	4,0
101,6	6,3	4,0
108,0 - 114,3	7,1	4,5
127,0	8,0	4,5
133,0 - 139,7	8,0	5,0
152,4 - 168,3	8,8	5,6

Note 1:

f) Pipes are to be galvanized inside and outside. For pipes fitted in the engine room, galvanizing may not be required, exclusively at the discretion of Tasneef

g) For threaded pipes, where allowed, the minimum thickness is to be measured at the bottom of the thread.

h) For external diameters larger than those given in the Table, the minimum wall thickness will be subject to special consideration by Tasneef

i) In general, the thicknesses indicated in the Table are the nominal wall thicknesses and no allowance need be made for negative tolerance and reduction in thickness due to building.

j) The external diameters and thicknesses listed in the Table have been selected from ISO Standards for welded and seamless steel pipes. For pipes covered by other standards, slightly lower thickness may be accepted, at Tasneef discretion.

18.2.5 Equivalent fixed gas fire-extinguishing systems for machinery spaces

Fixed gas fire-extinguishing systems equivalent to those specified in [18.2.4] are to be type approved according to MSC/Circ.848 as amended or another standard recognised by Tasneef

19 FIXED FOAM FIRE-EXTINGUISHING SYSTEMS

19.1 GENERAL

19.1.1 Fixed foam fire-extinguishing systems are to be capable of generating foam suitable for extinguishing oil fires.

19.2 FIXED HIGH EXPANSION FOAM FIRE-EXTINGUISHING SYSTEMS

19.2.1 Quantity and performance of foam concentrates:

a) the foam concentrates of high expansion foam fire-extinguishing systems are to be approved by Tasneef based on MSC/Circ. 670;

b) any required fixed high expansion foam system in machinery spaces is to be capable of rapidly discharging through fixed discharge outlets a quantity of foam sufficient to fill the greatest space to be protected at a rate of at least 1 m in depth per minute. The quantity of foam-forming liquid available is to be sufficient to produce a volume of foam equal to five times the volume of the largest space to be protected. The expansion ratio of the foam is not to exceed 1000 to 1;

c) Tasneef may permit alternative arrangements and discharge rates provided that it is satisfied that equivalent protection is achieved.

19.2.2 Installation requirements:

a) supply ducts for delivering foam, air intakes to the foam generator and the number of foam-producing units are, in the opinion of Tasneef to be such as will provide effective foam production and distribution;

b) the arrangement of the foam generator delivery ducting is to be such that a fire in the protected space will not affect the foam generating equipment. If the foam generators are located adjacent to the protected space, foam delivery ducts are to be installed to allow at least 450 mm of separation between the generators and the protected space. The foam delivery ducts are to be constructed of steel having a thickness of not less than 5 mm. In addition, stainless steel dampers (single or multi-bladed) with a thickness of not less than 3 mm are to be installed at the openings in the boundary bulkheads or decks between the foam generators and the protected space. The dampers are to be automatically operated (electrically, pneumatically or hydraulically) by means of remote control of the foam generator related to them;

c) the foam generator, its sources of power supply, foam-forming liquid and means of controlling the system are to be readily accessible, simple to operate and grouped in as few locations as possible at positions not likely to be cut off by a fire in the protected space.

19.3 FIXED LOW EXPANSION FOAM FIRE-EXTINGUISHING SYSTEMS

19.3.1 Quantity and foam concentrates

a) The foam concentrates of low expansion foam fire-extinguishing systems are to be approved by Tasneef based on MSC.1/Circ. 1312.

b) The system is to be capable of discharging through fixed discharge outlets in not more than 5 min a quantity of foam sufficient to cover to a depth of 150 mm the largest single area over which oil fuel is liable to spread. The expansion ratio of the foam is not to exceed 12 to 1.

19.3.2 Installation requirements

a) means are to be provided for the effective distribution of the foam through a permanent system of piping and control valves or cocks to suitable discharge outlets, and for the foam to be effectively directed by fixed sprayers on other main fire hazards in the protected space. The means for effective distribution of the foam are to be proven acceptable to Tasneef through calculation or by testing;

b) the means of control of any such systems are to be readily accessible, simple to operate and grouped together in as few locations as possible at positions not likely to be cut off by a fire in the protected space.

20 FIXED WATER-SPRAYING FIRE-EXTINGUISHING SYSTEMS

20.1 Nozzles and pumps

20.1.1 The number and arrangement of the nozzles are to be to the satisfaction of Tasneef and are to be such as to ensure an effective average distribution of water of at least 5 l/m^2 per minute in the spaces to be protected. Where increased application rates are considered necessary, these are to be to the satisfaction of Tasneef

20.1.2 Precautions are to be taken to prevent the nozzles from becoming clogged by impurities in the water or corrosion of piping, nozzles, valves and pump.

20.1.3 In machinery spaces, the pump is to be capable of simultaneously supplying at the necessary pressure all sections of the system in any one compartment to be protected.

20.1.4 The pump may be driven by independent internal combustion machinery but, if it is dependent upon power being supplied from the emergency generator fitted in compliance with the provisions of Part C, Ch 1, Sec 2 and Part C, Chapter 2 and Part E, Chapter 11 of the Rules for the Classification of Ships as appropriate, that generator is to be so arranged as to start automatically in case of main power failure so that power for the pump required by the previous item [20.1.3] is immediately available. The independent internal combustion machinery to drive the pump is to be so situated that a fire in the protected space or spaces will not affect the air supply to the machinery.

20.2 INSTALLATION REQUIREMENTS FOR MACHINERY SPACES

20.2.1 Nozzles are to be fitted above the bilge, tank tops and other areas over which fuel oil is liable to spread and also above other specific fire hazards in the machinery spaces.

20.2.2 The system may be divided into sections, the distribution valves of which are to be operated from easily accessible positions outside the spaces to be protected and not readily cut off by a fire in the protected space.

20.2.3 The pump and its controls are to be installed outside the space or spaces to be protected. It is not to be possible for a fire in the space or spaces protected by the water-spraying system to put the system out of action.

20.3 INSTALLATION REQUIREMENTS IN ACCOMMODATION AND SERVICE SPACES

20.3.1 Type of sprinkler systems

The automatic sprinkler systems are to be of the wet pipe type, but small exposed sections may be of the dry pipe type where in the opinion of Tasneef this is a necessary precaution.

Saunas are to be fitted with a dry pipe system, with sprinkler heads having an operating temperature up to 140°C.

20.3.2 Sprinkler systems equivalent to those specified in items [20.3.3] to [20.3.8]

Automatic sprinkler systems equivalent to those specified in items [20.3.3] to [20.3.8] are to be in compliance with item [21].

20.3.3 Sources of power supply

There are to be not less than two sources of power supply for the sea water pump and automatic alarm and detection system. Where the sources of power for the pump are electrical, these are to be a main generator and an emergency source of power. One supply for the pump is to be taken from the main switchboard, and one from the emergency switchboard by separate feeders reserved solely for that purpose. The feeders are to be so arranged as to avoid galleys, machinery spaces and other enclosed spaces of high fire risk except in so far as it is necessary to reach the appropriate switchboards, and are to be run to an automatic changeover switch situated near the sprinkler pump. This switch is to permit the supply of power from the main switchboard so long as a supply is available therefrom, and be so designed that upon failure of that supply it will automatically change over to the supply from the emergency switchboard. The switches on the main switchboard and the emergency switchboard are to be clearly labelled and normally kept closed. No other switches are to be permitted in the feeders concerned. One of the sources of power supply for the alarm and detection system is to be an emergency source. Where one of the sources of power for the pump is an internal combustion engine, in addition to complying with the provisions of paragraph h), it is to be so situated that a fire in any protected space will not affect the air supply to the machinery.

20.3.4 Component requirements

The sprinklers are to be resistant to corrosion by marine atmosphere. 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, where high ambient temperatures might be expected, the operating temperature may be increased by not more than 30°C above the maximum deckhead temperature.

A quantity of spare sprinkler heads is to be provided for all types and ratings installed on the barge-accommodation unit as follows:

Total number of heads	Required number of spares

<300	6
300 to 1000	12
>1000	24

The number of spare sprinkler heads of any type need not exceed the total number of heads installed of that type.

20.3.5 Pressure tanks

A pressure tank having a volume equal to at least twice that of the charge of water specified in this item [20.3.6] b) is to be provided. The tank is to contain a standing charge of fresh water, equivalent to the amount of water which would be discharged in one minute by the pump referred to in [20.3.6] b), and the arrangements are to ensure that an air pressure is maintained in the tank such as to guarantee that where the standing charge of fresh water in the tank has been used the pressure will be not less than the working pressure of the sprinkler, plus the pressure exerted by a head of water measured from the bottom of the tank to the highest sprinkler in the system. Suitable means of replenishing the air under pressure and of replenishing the fresh water charge in the tank are to be provided. A glass gauge is to be provided to indicate the correct level of the water in the tank.

Means are to be provided to prevent the passage of sea water into the tank.

20.3.6 Sprinkler pumps

a) An independent power pump is to be provided solely for the purpose of continuing automatically the discharge of water from the sprinklers. The pump is to be brought into action automatically by the pressure drop in the system before the standing fresh water charge in the pressure tank is completely exhausted.

b) The pump and the piping system are to be capable of maintaining the necessary pressure at the level of the highest sprinkler to ensure a continuous output of water sufficient for the simultaneous coverage of a minimum area of 280 m^2 at the application rate specified in [20.3.9] c). The hydraulic capability of the system is to be confirmed by reviewing the hydraulic calculations, followed by a test of the system, if deemed necessary by Tasneef

c) The pump is to have a test valve with a short open-ended discharge pipe fitted on the delivery side. The effective area through the valve and pipe is to be adequate to permit the release of the required pump output while maintaining the pressure in the system specified in [20.3.5].

20.3.7 Installation requirements

a) Any parts of the system which may be subjected to freezing temperatures in service are to be suitably protected against freezing.

b) Piping arrangements: sprinklers are to be grouped into separate sections, each of which is to contain not more than 200 sprinklers. In barge-accommodation units any section of sprinklers is not to serve more than two decks and is not to be situated in more than one main vertical zone. However, Tasneef may permit such a section of sprinklers to serve more than two decks or be situated in more than one main vertical zone, if it is satisfied that the protection of the barge-accommodation unit against fire will not thereby be reduced.

c) Each section of sprinklers is to be capable of being isolated by one stop valve only. The stop valve in each section is to be readily accessible in a location outside the associated section or in cabinets within stairway enclosures. The valve's location is to be clearly and permanently indicated. Means are to be provided to prevent the operation of the stop valves by any unauthorized person.

d) A test valve is to be provided to test the automatic alarm for each section of sprinklers by a discharge of water equivalent to the operation of one sprinkler. The test valve for each section is to be situated near the stop valve for that section.

e) The sprinkler system is to have a connection from the barge-accommodation unit's fire main by way of a lockable screw-down non-return valve at the connection which will prevent a backflow from the sprinkler system to the fire main.

f) A gauge indicating the pressure in the system is to be provided at each section stop valve and at a central station.

g) The sea inlet to the pump, wherever possible, is to be in the space containing the pump and so arranged that when the barge-accommodation unit is afloat it will not be necessary to shut off the supply of sea water to the pump for any purpose other than inspection or repair of the pump.

20.3.8 Location of systems

The sprinkler pump and tank are to be situated in a position reasonably remote from any machinery space of category A and are not to be situated in any space required to be protected by the sprinkler system.

20.3.9 System control requirements

a) Ready availability

Any required automatic sprinkler, fire detection and fire alarm system is to be capable of immediate operation at all times and no action by the crew is to be necessary to set it in operation.

The automatic sprinkler system is to be kept charged at the necessary pressure and to have provision for a continuous supply of water as required in this chapter.

b) Alarm and indication

Each section of sprinklers is to include means for giving a visual and audible alarm signal automatically at one or more indicating units whenever any sprinkler comes into operation. These alarm systems are to be such as to indicate if any fault occurs in the system. Such units are to indicate in which section served by the system a fire has occurred and to be centralised on the navigating bridge or in the continuously manned central control station and, in addition, visible and audible alarms from the unit also to be placed in a position other than in the aforementioned spaces to ensure that the indication of fire is immediately received by the crew.

Switches are to be provided on the navigating bridge or in the continuously manned central control station which will enable the alarm and the indicators for each section of sprinklers to be tested.

c) Nozzle arrangements

Sprinklers are to be placed in an overhead position and spaced in a suitable pattern to maintain an average application rate of not less than 5 l/m^2/min over the nominal area covered by the sprinklers. However, Tasneef may permit the use of sprinklers providing an alternative amount of water suitably distributed, as shown to the satisfaction of Tasneef to be not less effective.

A list or plan is to be displayed at each indicating unit showing the spaces covered and the location of the zone in respect of each section. Suitable instructions for testing and maintenance are to be available.

d) Testing

Means are to be provided for testing the automatic operation of the pump on reduction of pressure in the system.

21 EQUIVALENT WATER-MIST FIRE-EXTINGUISHING SYSTEMS FOR CONTROL STATIONS ACCOMMODATION AND SERVICE SPACES

21.1 GENERAL

21.1.1 Water-mist fire-extinguishing systems for accommodation service spaces are to be approved by Tasneef and are to be in compliance with the requirements contained in IMO Res. A.800(19) as amended.

22 EQUIVALENT WATER-MIST FIRE-EXTINGUISHING SYSTEMS FOR MACHINERY SPACES

22.1 GENERAL

22.1.1 Water-mist fire-extinguishing systems for machinery spaces are to be approved by Tasneef and are to be in compliance with the requirements contained in MSC/Cir.1165 as amended.

23 FIRE -FIGHTER'S OUTFITS

23.1 GENERAL

23.1.1 A fireman's outfit is to consist of a set of personal equipment and a breathing apparatus.

23.2 PERSONAL EQUIPMENT

23.2.1 Personal equipment is to consist of the following:

a) protective clothing of material to protect the skin from the heat radiating from the fire and from burns and scalding by steam. The outer surface is to be water-resistant;

b) boots of rubber or other electrically non-conducting material;

c) a rigid helmet providing effective protection against impact;

d) an electric safety lamp (hand lantern) of an approved type with a minimum burning period of 3 h. Electric safety lamps on tankers and those intended to be used in hazardous areas are to be of an explosion-proof type; and

e) an axe with a handle provided with high voltage insulation.

23.3 BREATHING APPARATUS

Breathing apparatus is to be a self-contained compressed air-operated breathing apparatus for which the volume of air contained in the cylinders is to be at least 1,200 l, or other self-contained breathing apparatus which is to be capable of functioning for at least 30 min. All air cylinders for breathing apparatus are to be interchangeable.

23.4 LIFELINE

23.4.1 For each breathing apparatus a fireproof lifeline of at least 30 m in length is to be provided. The lifeline is to successfully pass an approval test by static load of 3,5 kN for 5 min without failure. The lifeline is to be capable of being attached by means of a snap-hook to the harness of the apparatus or to a separate belt in order to prevent the breathing apparatus becoming detached when the lifeline is operated.

23.5 NUMBER OF FIRE-FIGHTER'S OUTFITS

23.5.1 Barge-accommodation units are to carry at least two fire-fighter's outfits.

23.5.2 In addition, in barge-accommodation units, the following are to be provided:

a) for every 80 m, or part thereof, of the aggregate of the lengths of all passenger spaces and service spaces on the deck which carries such spaces or, if there is more than one such deck, on the deck which has the largest aggregate of such lengths, two fire-fighter's outfits and, in addition, two sets of personal equipment, each set comprising the items stipulated in [23.2].

In barge-accommodation units carrying more than 36 passengers, two additional fire-fighter's outfits are to be provided for each main vertical zone. However, for stairway enclosures which constitute individual main vertical zones and for the main vertical zones in the fore or aft end of a barge-accommodation unit which do not contain spaces of categories (6), (7), (8) or (12) defined in [4.3], no additional fire-fighter's outfits are required; and

b) in barge-accommodation units carrying more than 36 passengers, for each pair of breathing apparatus, one water fog applicator is to be provided which is to be stored adjacent to such apparatus. Having due regard to the size and type of the barge-accommodation unit.

23.5.3 Spare charges

Two spare charges are to be provided for each required breathing apparatus. barge-accommodation units carrying not more than 36 passengers that are equipped with suitably located means for fully recharging the air cylinders free from contamination, need carry only one spare charge for each required apparatus. In barge-accommodation units carrying more than 36 passengers, at least two spare charges for each breathing apparatus are to be provided.

23.5.4 Location

The firefighter's outfits or sets of personal equipment are to be kept ready for use in an easily accessible location that is permanently and clearly marked and, where more than one fireman's outfit or more than one set of personal equipment is carried, they are to be stored in widely separated positions.

23.5.5 Storage of fire-fighter's outfits

The fire-fighter's outfits or sets of personal equipment are to be kept ready for use in an easily accessible location that is permanently and clearly marked and, where more than one fire-fighter's outfit or more than one set of personal equipment is carried, they are to be stored in widely separated positions.

At least two fire-fighter's outfits and, in addition, one set of personal equipment are to be available at any one position. At least two fire-fighter's outfits are to be stored in each main vertical zone.

24 MATERIAL OF HULL, SUPERSTRUCTURES, STRUCTURAL BULKHEADS, DECKS AND DECKHOUSES

24.1 GENERAL

24.1.1 The hull, superstructures, structural bulkheads, decks and deckhouses are to be constructed of steel or other equivalent material. For the purpose of applying the definition of steel or other equivalent material as given in Sec 1, [3.42] the "applicable fire exposure" is to be according to the integrity and insulation standards given in Tables 1 to 4. For example, where divisions such as decks or sides and ends of deckhouses are permitted to have "B-0" fire integrity, the "applicable fire exposure" is to be half an hour.

24.2 Structure of aluminium alloy

24.2.1 Unless otherwise specified in [24.1], in cases where any part of the structure is of aluminium alloy, the following are to apply:

a) the insulation of aluminium alloy components of "A" or "B" class divisions, except structure which, in the opinion of Tasneef is non-load-bearing, is to be such that the temperature of the structural core does not rise more than 200°C above the ambient temperature at any time during the applicable fire exposure to the standard fire test; and

b) special attention is to be given to the insulation of aluminium alloy components of columns,

stanchions and other structural members required to support lifeboat and liferaft stowage, launching and embarkation areas, and "A" and "B" class divisions to ensure:

- that for such members supporting lifeboat and liferaft areas and "A" class divisions, the temperature rise limitation specified in item [a] above is to apply at the end of one hour; and
- that for such members required to support "B" class divisions, the temperature rise limitation specified in a) is to apply at the end of half an hour.

24.3 Floor plating

24.3.1 The floor plating of normal passageways in machinery spaces of category A is to be made of steel.

24.4 Materials of overboard fittings

24.4.1 Materials readily rendered ineffective by heat are not to be used for overboard scuppers, sanitary discharges, and other outlets which are close to the waterline and where the failure of the material in the event of fire would give rise to danger of flooding.

1 GENERAL

1.1 APPLICATION

This Section contains the survey requirements for the maintenance of statutory certificates other than SOLAS certificates.

Additional surveys will be required where the flag Administration stipulates the application of specific survey requirements.

2 ANNUAL SURVEY OF ALL SHIPS – HULL

2.1 HULL AND EQUIPMENT

The survey is to include a general external examination and testing, where appropriate, verifying the efficient condition of the following items, as applicable:

- fire divisions and fire doors, dampers in ventilation ducts, means of closure of skylights and other openings
- confirmation that emergency escape routes from accommodation and service spaces are practicable and not blocked.

3 ANNUAL SURVEY OF ALL SHIPS – MACHINERY AND SYSTEMS

3.1

3.1.1

The survey of fire prevention and other general arrangements is to cover the following items:

- checking that fire control plans are properly posted;
- examination and testing, as feasible, of the operation of manual and/or automatic fire doors, where fitted;
- checking, as far as practicable, that the remote controls for stopping fans and machinery and shutting off fuel supplies in machinery spaces and, where fitted, the remote controls for stopping fans in accommodation spaces and the means of cutting off power to the galley are in working order;
- examination of the closing arrangements of ventilators, funnel annular spaces, skylights, doorways and tunnel, where applicable;
- •examination, as far as practicable, and testing, as feasible and at random, of the fire and/or smoke detection systems;
- •examination of arrangements for gaseous fuel for domestic purposes, such as movable cooking appliances, the so-called "flambé carte".

3.1.2

The survey requirements for all types of fire-fighting systems that are usually found on board ships related either to machinery spaces or to cargo areas and/or spaces or to accommodation spaces, irrespective of the ship type, are the following:

a) water fire system:

- examination of the fire main system and confirmation that each fire pump including the emergency fire pump can be operated separately so that the two required powerful jets of water can be produced simultaneously from different hydrants, at any part of the ship whilst the required pressure is maintained in the fire main;
- checking that fire hoses, nozzles, applicators, spanners and international shore connection (where fitted) are in satisfactory working condition and situated at their respective locations;

b) fixed gas fire-extinguishing system:

- external examination of receivers of CO_2 (or other gas) fixed fire-extinguishing systems and their accessories, including the removal of insulation for insulated low pressure CO_2 containers;
- examination of fixed fire-fighting system controls, piping, instructions and marking; checking that the maintenance and servicing, including the filling ratio of gas bottles, have been carried out not more than two years beforehand and that the dates of the last tests of the system are in order;
- test of the alarm triggered before the CO_2 is released;

c) sprinkler system:

- examination of the system, including piping, valves, sprinklers and header tank;
- test of the automatic starting of the pump activated by a pressure drop;
- check of the alarm system while the above test is carried out;
- water-spraying system;

- examination of the system, including piping, nozzles, distribution valves and header tank;
- test of the starting of the pump activated by a pressure drop (applicable only for machinery spaces);

d) fixed foam systems (low or high expansion):

- examination of the foam system;
- test to confirm that the minimum number of jets of water at the required pressure in the fire main is obtained when the system is in operation;
- checking the supplies of foam concentrate and receiving confirmation that it is periodically tested (not later than three years after manufacture and annually thereafter) by the Manufacturer or an agent;

d) dry powder system:

- examination of the dry powder system, including the powder release control devices;
- checking the supplies of powder contained in the receivers and that it has maintained its original smoothness;
- checking that the pressure of propelling inert gas contained in the relevant bottles is satisfactory;

3.1.3

As far as other fire-fighting equipment is concerned, it is to be checked that:

- semi-portable and portable fire extinguishers and foam applicators are in their stowed positions, with evidence of proper maintenance and servicing, and detection of any discharged containers; the periodical servicing of the vessels containing the extinguishing agents is to be in accordance with the guidelines contained in the “Improved Guidelines for Marine Portable Fire Extinguishers” adopted by IMO by Resolution A.951(23) on 5 December 2003. For ready reference they are indicated in Appendix 1;
- firemen's outfits are complete and in satisfactory condition.

3.1.4

Where a helideck is fitted, the following is to be checked, as far as appropriate:

- drainage arrangements around the landing area;
- fire-fighting appliances and arrangements (to be surveyed as per [3.1.2], according to the equipment installed);
- overall examination of refuelling systems and hangar facilities for cleanliness and absence of leaks, condition of gutters and drainage arrangement.

4 RENEWAL SURVEY OF ALL SHIPS – MACHINERY AND SYSTEMS

4.1

4.1.1

The Owner or his representative is to declare to the attending Surveyor that no significant changes have been made to the arrangement of structural fire protection.

4.1.2

The renewal survey of fire prevention arrangements is to cover the following items.

a) Visible parts of items forming part of structural fire protection arrangements in accommodation spaces and in machinery spaces such as bulkheads, decks, doors, stairways, crew and service lift trunks, and light and air trunks are to be examined, due attention being given to their integrity and that of the insulating material.

b) The operation of manual/automatic fire doors, where fitted, is to be checked.

c) Remote controls for stopping fans and machinery and shutting off fuel supplies in machinery spaces and, where fitted, remote controls for stopping fans in accommodation spaces and means of cutting off power to the galley are to be tested.

d) Closing arrangements of ventilators, funnel annular spaces, skylights, doorways and tunnels, where applicable, are to be tested.

e) Fire and/or smoke detection and alarm systems are to be tested.

4.1.3

The survey requirements for all types of fire-fighting systems that are usually found on board ships related either to machinery spaces or to cargo areas and/or spaces or to accommodation spaces, irrespective of the ship type, are the following:

a) water fire system:

- the associated pumps are to be opened up and examined at the Surveyor’s discretion;

- the fire main is to be hydrostatically tested to the working pressure at the Surveyor's discretion;

b) fixed gas fire-extinguishing system:

Receivers of CO_2 (or other gas) fixed fire-extinguishing systems are to be externally examined together with all stationary fittings and devices. In addition, the following applies:

- the total loss of CO_2 is not to exceed 10% of the installed quantity (5% for Halon);
- after being repaired or discharged, containers are to be subjected to a hydrostatic test;
- hydrostatic testing of high pressure CO_2 containers is to be carried out at alternate class renewal surveys (starting from the 2nd, i.e. : at the 2nd, 4th, etc.); the number of the tested containers is to be not less than 10% of the total number;
- low pressure CO_2 containers are to be internally inspected if the content has been released and the container is more than five years old; depending upon the result of the internal examination, the Surveyor may require the container to be hydrostatically tested.

It is to be checked that the distribution pipework is proved clear;

c) sprinkler system:

- the associated pumps are to be opened up and examined at the Surveyor's discretion;

d) water-spraying system:

- the associated pumps are to be opened up and examined at the Surveyor's discretion;
- a working test is to be carried out as far as reasonable and appropriate;

e) fixed foam systems (low or high expansion:

- the associated pumps are to be opened up and examined at the Surveyor's discretion;

f) dry powder system:

- it is to be verified that the propelling inert gas bottles have been hydrostatically tested. The same applies to bottles disembarked for refilling or embarked for replacement.

4.1.4

As far as other fire-fighting equipment is concerned, the following items are to be hydrostatically tested :

- shells of water and foam extinguishers;
- shells of powder extinguishers;
- air or gas bottles associated with fire extinguishers whose shells are not kept under pressure (if internally examined, the test need not be performed).

As far as concerns the bottles of extinguishers containing either CO_2 or Halon or powder with shell kept under pressure, they are to be hydrostatically tested whenever they are found empty or low charged (less than 90% for CO_2, 95% for Halon and with low pressure for powder extinguishers).

4.1.5

Where a helideck is fitted, the following is to be checked, as far as appropriate:

- drainage arrangements around the landing area;
- fire fighting appliances and arrangements (to be surveyed as per [4.1.3] and [4.1.4], according to the equipment installed);
- other arrangements for helicopter refuelling and hangar facilities (fuel system, ventilation, fire protection and detection).

5 ANNUAL SURVEY OF OIL TANKERS, FLS TANKERS, SUPPLY VESSELS-OIL PRODUCT AND SUPPLY VESSELS-CHEMICAL PRODUCT – CARGO MACHINERY ITEMS

5.1 VENTILATION SYSTEM

The Owner or his representative is to declare to the attending Surveyor that no modifications or alterations which might impair safety have been made to the various installations in dangerous zones without prior approval from Tasneef

The survey is to include confirmation that the dampers of the ventilation system are operational.

5.2 FIRE-FIGHTING SYSTEMS

The survey is to include:

- external examination of piping and cut-out valves of fixed fire-fighting systems related to cargo tanks and cargo pump rooms

- confirmation, as far as practicable and when appropriate, that the remote means for closing the various openings are operable
- examination of the appropriate portable fire-extinguishing equipment for the cargoes to be carried in accordance with the relevant requirements given in [3.1.3]
- examination of fire-fighting systems of any type fitted on board such as deck foam, water-spraying, etc., as applicable in accordance with the relevant requirements given in [3.1.2].

6 RENEWAL SURVEY OF OIL TANKERS, FLS TANKERS, SUPPLY VESSELS-OIL PRODUCT AND SUPPLY VESSELS-CHEMICAL PRODUCT – CARGO MACHINERY ITEMS

6.1 FIRE-FIGHTING SYSTEMS

The survey is to include the examination of fire-fighting systems of any type fitted on board for the protection of the cargo area, cargo pump room and other dangerous spaces, such as deck foam, water-spraying systems, etc., as applicable in accordance with the relevant requirements given in [4].

7 ANNUAL SURVEY OF CHEMICAL TANKERS – CARGO MACHINERY ITEMS

7.1 VENTILATION SYSTEM

The Owner or his representative is to declare to the attending Surveyor that no modifications or alterations which might impair safety have been made to the various installations in dangerous zones without prior approval from Tasneef

The survey is to include:

- confirmation that the dampers of the ventilation system are operational
- confirmation that the spare parts for cargo area mechanical ventilation fans are available on board.

7.2 FIRE-FIGHTING SYSTEMS

The survey is to include:

- external examination of piping and cut-out valves of fixed fire-fighting systems related to cargo tanks and cargo pump rooms
- confirmation, as far as practicable and when appropriate, that the remote means for closing the various openings are operable
- examination of the appropriate portable fire-extinguishing equipment for the chemical cargoes to be carried in accordance with the relevant requirements given in [3.1.3]
- examination of fire-fighting systems of any type fitted on board such as deck foam, water-spraying, etc. as applicable in accordance with the relevant requirements given in [3.1.2].

7.3 PERSONNEL PROTECTION

The survey is to include:

- confirmation that suitable protective clothing for crew engaged in loading and discharging operations is available on board and is properly stowed
- examination of the required safety equipment and associated breathing apparatus with required air supplies and, when appropriate, the satisfactory condition and suitable stowage of emergency escape respiratory and eye protection
- confirmation that medical first-aid equipment, including stretchers and oxygen resuscitation equipment, is in satisfactory condition and that antidotes specific for the cargoes actually carried are available on board
- examination of the decontamination showers and eyewash in relation to their actual operation in all ambient conditions.

8 RENEWAL SURVEY OF CHEMICAL TANKERS – CARGO MACHINERY ITEMS

8.1 FIRE-FIGHTING SYSTEMS

The survey is to include the examination of fire-fighting systems of any type fitted on board for the protection of the cargo area, cargo pump room and other dangerous spaces, such as deck foam, water-spraying and dry powder systems, as applicable in accordance with the relevant requirements given in [4].

9 ANNUAL SURVEY OF LIQUEFIED GAS CARRIERS – CARGO MACHINERY ITEMS

9.1 VENTILATION SYSTEM

The Owner or his representative is to declare to the attending Surveyor that no modifications or alterations which might impair safety have been made to the various installations in dangerous zones without prior approval from Tasneef

The survey is to include:

- confirmation that the dampers of the ventilation system are operational;

- confirmation that the spare parts for cargo area mechanical ventilation fans are available on board.

9.2 FIRE-FIGHTING SYSTEMS

The survey is to include the examination of fire-fighting systems of any type fitted on board for the protection of the cargo area, cargo pump room, cargo compressor room and other dangerous spaces, such as deck foam, water-spraying and dry powder systems, as applicable in accordance with the relevant requirements given in [3.1.2].

9.3 PERSONNEL PROTECTION

The survey is to include:

- confirmation that two complete sets of safety equipment, each permitting personnel to enter and work in a gas-filled space, are provided and properly stowed
- confirmation that the requisite supply of compressed air is provided and examination, when applicable, of arrangements for any special air compressor and low pressure air line system
- confirmation that medical first-aid equipment, including stretchers and oxygen resuscitation equipment, is in satisfactory condition and that antidotes specific for the cargoes actually carried are available on board
- confirmation that respiratory and eye protection for emergency escape purposes is provided
- confirmation that decontamination arrangements and eyewashes are operational
- examination, when applicable, of the arrangements to protect personnel against the effects of a major cargo release by a special suitably designed and equipped space within the accommodation area.

10 RENEWAL SURVEY OF LIQUEFIED GAS CARRIERS – CARGO MACHINERY ITEMS

10.1 Fire-fighting systems

The survey is to include the examination of fire-fighting systems of any type fitted on board for the protection of the cargo area, cargo pump room, cargo compressor room and other dangerous spaces, such as deck foam, water-spraying, dry powder systems etc., as applicable in accordance with the relevant requirements given in [4].

11 ANNUAL SURVEY OF RO-RO CARGO SHIPS

11.1

Within the scope of survey of fire protection, detection and extinction arrangements as required for the annual survey of all ships in [7.2], attention is to be given to the particular arrangements related to ro-ro cargo spaces, such as:

- fire detection systems and alarms
- fixed fire-extinguishing arrangements (gas, water-spraying or foam systems)
- portable fire extinguishers in spaces and at entrances
- ventilation and related safety devices (including remote control on the bridge), and
- electrical equipment of a safe type.

12 RENEWAL SURVEY OF RO-RO CARGO SHIPS

12.1

Within the scope of survey of fire protection, detection and extinction arrangements as required for the class renewal survey of all ships in [4], attention is to be given to the particular arrangements related to ro-ro cargo spaces, such as those indicated in [11.1].

13 ANNUAL SURVEY OF PASSENGER SHIPS

13.1

It is to be verified that the emergency escape routes from passenger and crew spaces, including related stairways and ladders, are kept clear.

14 RENEWAL SURVEY OF PASSENGER SHIPS

14.1

The condition of the Low Location Lighting (LLL) system, where fitted, is to be verified.

If the LLL system is of the electric illumination type, its power source(s) is (are) also to be verified. Where the LLL system consists of photoluminescent strip indicators, the continued acceptable performance of the photoluminescent material is to be checked in accordance with the applicable provisions contained in the “Guidelines for the evaluation, testing and application of low location lighting on passenger ships” adopted by

IMO by Resolution A.752(18) or in the International Standard ISO 15370 - 2001.

15 ANNUAL AND RENEWAL SURVEY OF RO-RO PASSENGER SHIPS

15.1

15.1.1

The scope of the annual survey and renewal survey of ro-ro passenger ships is to include the scope of surveys required for ro-ro cargo ships and passenger ships, as detailed in [11.1] and [13.1] for annual survey and [12.1] and [14.1] for renewal survey.

15.1.2

In addition to [15.1.1] above, for both annual survey and renewal survey, the condition of means of escape as well as of fire protection, detection and extinction in special category spaces is to be checked.

16 ANNUAL SURVEY OF OIL RECOVERY SHIPS

16.1

The survey is to include:

- general examination of the cargo pump room, as regards fire protection, detection and fire-fighting systems;
- general examination of the dry powder fire extinguishers, as well as, if fitted, of the fixed or semi-fixed foam extinguishing systems; the Owner is to show evidence that the foam concentrates have been periodically tested, either by the Manufacturer or by an organisation agreed by him.

17 RENEWAL SURVEY OF OIL RECOVERY SHIPS

17.1

A partial test of fixed foam fire-extinguishing systems, if fitted, is to be carried out at the Surveyor's discretion.

17.2 APPLICATION

This Section contains the survey requirements for the maintenance of statutory certificates other than SOLAS certificates.

Additional surveys will be required where the flag Administration stipulates the application of specific survey requirements.

18 ANNUAL SURVEY OF ALL SHIPS – HULL

18.1 HULL AND EQUIPMENT

The survey is to include a general external examination and testing, where appropriate, verifying the efficient condition of the following items, as applicable:

- fire divisions and fire doors, dampers in ventilation ducts, means of closure of skylights and other openings
- confirmation that emergency escape routes from accommodation and service spaces are practicable and not blocked.

19 ANNUAL SURVEY OF ALL SHIPS – MACHINERY AND SYSTEMS

19.1

19.1.1

The survey of fire prevention and other general arrangements is to cover the following items:

- checking that fire control plans are properly posted;
- examination and testing, as feasible, of the operation of manual and/or automatic fire doors, where fitted;
- checking, as far as practicable, that the remote controls for stopping fans and machinery and shutting off fuel supplies in machinery spaces and, where fitted, the remote controls for stopping fans in accommodation spaces and the means of cutting off power to the galley are in working order;
- examination of the closing arrangements of ventilators, funnel annular spaces, skylights, doorways and tunnel, where applicable;
- •examination, as far as practicable, and testing, as feasible and at random, of the fire and/or smoke detection systems;
- •examination of arrangements for gaseous fuel for domestic purposes, such as movable cooking appliances, the so-called "flambé carte".

19.1.2

The survey requirements for all types of fire-fighting systems that are usually found on board ships related either to machinery spaces or to cargo areas and/or spaces or to accommodation spaces, irrespective of the ship type, are the following:

a) water fire system:

- examination of the fire main system and confirmation that each fire pump including the emergency fire pump can be operated separately so that the two required powerful jets of water can be produced simultaneously from different hydrants, at any part of the ship whilst the required pressure is maintained in the fire main;
- checking that fire hoses, nozzles, applicators, spanners and international shore connection (where fitted) are in satisfactory working condition and situated at their respective locations;

b) fixed gas fire-extinguishing system:

- external examination of receivers of CO_2 (or other gas) fixed fire-extinguishing systems and their accessories, including the removal of insulation for insulated low pressure CO_2 containers;
- examination of fixed fire-fighting system controls, piping, instructions and marking; checking that the maintenance and servicing, including the filling ratio of gas bottles, have been carried out not more than two years beforehand and that the dates of the last tests of the system are in order;
- test of the alarm triggered before the CO_2 is released;

c) sprinkler system:

- examination of the system, including piping, valves, sprinklers and header tank;
- test of the automatic starting of the pump activated by a pressure drop;
- check of the alarm system while the above test is carried out;
- water-spraying system;
- examination of the system, including piping, nozzles, distribution valves and header tank;
- test of the starting of the pump activated by a pressure drop (applicable only for machinery spaces);

d) fixed foam systems (low or high expansion):

- examination of the foam system;
- test to confirm that the minimum number of jets of water at the required pressure in the fire main is obtained when the system is in operation;
- checking the supplies of foam concentrate and receiving confirmation that it is periodically tested (not later than three years after manufacture and annually thereafter) by the Manufacturer or an agent;

e) dry powder system:

- examination of the dry powder system, including the powder release control devices;
- checking the supplies of powder contained in the receivers and that it has maintained its original smoothness;
- checking that the pressure of propelling inert gas contained in the relevant bottles is satisfactory;

19.1.3

As far as other fire-fighting equipment is concerned, it is to be checked that:

- semi-portable and portable fire extinguishers and foam applicators are in their stowed positions, with evidence of proper maintenance and servicing, and detection of any discharged containers; the periodical servicing of the vessels containing the extinguishing agents is to be in accordance with the guidelines contained in the “Improved Guidelines for Marine Portable Fire Extinguishers” adopted by IMO by Resolution A.951(23) on 5 December 2003. For ready reference they are indicated in Appendix 1;
- firemen's outfits are complete and in satisfactory condition.

3.1.4

Where a helideck is fitted, the following is to be checked, as far as appropriate:

- drainage arrangements around the landing area;
- fire-fighting appliances and arrangements (to be surveyed as per [3.1.2], according to the equipment installed);
- overall examination of refuelling systems and hangar facilities for cleanliness and absence of leaks, condition of gutters and drainage arrangement.

20 RENEWAL SURVEY OF ALL SHIPS – MACHINERY AND SYSTEMS

20.1

20.1.1

The Owner or his representative is to declare to the attending Surveyor that no significant changes have been made to the arrangement of structural fire protection.

20.1.2

The renewal survey of fire prevention arrangements is to cover the following items.

f) Visible parts of items forming part of structural fire protection arrangements in accommodation spaces and in machinery spaces such as bulkheads, decks, doors, stairways, crew and service lift trunks, and light and air trunks are to be examined, due attention being given to their integrity and that of the insulating material.

g) The operation of manual/automatic fire doors, where fitted, is to be checked.

h) Remote controls for stopping fans and machinery and shutting off fuel supplies in machinery spaces and, where fitted, remote controls for stopping fans in accommodation spaces and means of cutting off power to the galley are to be tested.

i) Closing arrangements of ventilators, funnel annular spaces, skylights, doorways and tunnels, where applicable, are to be tested.

j) Fire and/or smoke detection and alarm systems are to be tested.

20.1.3

The survey requirements for all types of fire-fighting systems that are usually found on board ships related either to machinery spaces or to cargo areas and/or spaces or to accommodation spaces, irrespective of the ship type, are the following:

a) water fire system:

- the associated pumps are to be opened up and examined at the Surveyor's discretion;
- the fire main is to be hydrostatically tested to the working pressure at the Surveyor's discretion;

b) fixed gas fire-extinguishing system:

Receivers of CO_2 (or other gas) fixed fire-extinguishing systems are to be externally examined together with all stationary fittings and devices. In addition, the following applies:

- the total loss of CO_2 is not to exceed 10% of the installed quantity (5% for Halon);
- after being repaired or discharged, containers are to be subjected to a hydrostatic test;
- hydrostatic testing of high pressure CO_2 containers is to be carried out at alternate class renewal surveys (starting from the 2nd, i.e. : at the 2nd, 4th, etc.); the number of the tested containers is to be not less than 10% of the total number;
- low pressure CO_2 containers are to be internally inspected if the content has been released and the container is more than five years old; depending upon the result of the internal examination, the Surveyor may require the container to be hydrostatically tested.

It is to be checked that the distribution pipework is proved clear;

c) sprinkler system:

- the associated pumps are to be opened up and examined at the Surveyor's discretion;

d) water-spraying system:

- the associated pumps are to be opened up and examined at the Surveyor's discretion;
- a working test is to be carried out as far as reasonable and appropriate;

e) fixed foam systems (low or high expansion:

- the associated pumps are to be opened up and examined at the Surveyor's discretion;

f) dry powder system:

- it is to be verified that the propelling inert gas bottles have been hydrostatically tested. The same applies to bottles disembarked for refilling or embarked for replacement.

20.1.4

As far as other fire-fighting equipment is concerned, the following items are to be hydrostatically tested :

- shells of water and foam extinguishers;
- shells of powder extinguishers;
- air or gas bottles associated with fire extinguishers whose shells are not kept under pressure (if internally examined, the test need not be performed).

As far as concerns the bottles of extinguishers containing either CO_2 or Halon or powder with shell kept under pressure, they are to be hydrostatically tested whenever they are found empty or low charged (less than 90% for CO_2, 95% for Halon and with low pressure for powder extinguishers).

20.1.5

Where a helideck is fitted, the following is to be checked, as far as appropriate:

- drainage arrangements around the landing area;
- fire fighting appliances and arrangements (to be surveyed as per [4.1.3] and [4.1.4], according to the equipment installed);
- other arrangements for helicopter refuelling and hangar facilities (fuel system, ventilation, fire protection and detection).

21 ANNUAL SURVEY OF OIL TANKERS, FLS TANKERS, SUPPLY VESSELS-OIL PRODUCT AND SUPPLY VESSELS-CHEMICAL PRODUCT – CARGO MACHINERY ITEMS

21.1 VENTILATION SYSTEM

The Owner or his representative is to declare to the attending Surveyor that no modifications or alterations which might impair safety have been made to the various installations in dangerous zones without prior approval from Tasneef

The survey is to include confirmation that the dampers of the ventilation system are operational.

21.2 FIRE-FIGHTING SYSTEMS

The survey is to include:

- external examination of piping and cut-out valves of fixed fire-fighting systems related to cargo tanks and cargo pump rooms
- confirmation, as far as practicable and when appropriate, that the remote means for closing the various openings are operable
- examination of the appropriate portable fire-extinguishing equipment for the cargoes to be carried in accordance with the relevant requirements given in [3.1.3]
- examination of fire-fighting systems of any type fitted on board such as deck foam, water-spraying, etc., as applicable in accordance with the relevant requirements given in [3.1.2].

22 RENEWAL SURVEY OF OIL TANKERS, FLS TANKERS, SUPPLY VESSELS-OIL PRODUCT AND SUPPLY VESSELS-CHEMICAL PRODUCT – CARGO MACHINERY ITEMS

22.1 FIRE-FIGHTING SYSTEMS

The survey is to include the examination of fire-fighting systems of any type fitted on board for the protection of the cargo area, cargo pump room and other dangerous spaces, such as deck foam, water-spraying systems, etc., as applicable in accordance with the relevant requirements given in [4].

23 ANNUAL SURVEY OF CHEMICAL TANKERS – CARGO MACHINERY ITEMS

23.1 VENTILATION SYSTEM

The Owner or his representative is to declare to the attending Surveyor that no modifications or alterations which might impair safety have been made to the various installations in dangerous zones without prior approval from Tasneef

The survey is to include:

- confirmation that the dampers of the ventilation system are operational
- confirmation that the spare parts for cargo area mechanical ventilation fans are available on board.

23.2 FIRE-FIGHTING SYSTEMS

The survey is to include:

- external examination of piping and cut-out valves of fixed fire-fighting systems related to cargo tanks and cargo pump rooms
- confirmation, as far as practicable and when appropriate, that the remote means for closing the various openings are operable
- examination of the appropriate portable fire-extinguishing equipment for the chemical cargoes to be carried in accordance with the relevant requirements given in [3.1.3]
- examination of fire-fighting systems of any type fitted on board such as deck foam, water-spraying, etc. as applicable in accordance with the relevant requirements given in [3.1.2].

23.3 PERSONNEL PROTECTION

The survey is to include:

- confirmation that suitable protective clothing for crew engaged in loading and discharging

operations is available on board and is properly stowed

- examination of the required safety equipment and associated breathing apparatus with required air supplies and, when appropriate, the satisfactory condition and suitable stowage of emergency escape respiratory and eye protection
- confirmation that medical first-aid equipment, including stretchers and oxygen resuscitation equipment, is in satisfactory condition and that antidotes specific for the cargoes actually carried are available on board
- examination of the decontamination showers and eyewash in relation to their actual operation in all ambient conditions.

24 RENEWAL SURVEY OF CHEMICAL TANKERS – CARGO MACHINERY ITEMS

24.1 FIRE-FIGHTING SYSTEMS

The survey is to include the examination of fire-fighting systems of any type fitted on board for the protection of the cargo area, cargo pump room and other dangerous spaces, such as deck foam, water-spraying and dry powder systems, as applicable in accordance with the relevant requirements given in [4].

25 ANNUAL SURVEY OF LIQUEFIED GAS CARRIERS – CARGO MACHINERY ITEMS

25.1 VENTILATION SYSTEM

The Owner or his representative is to declare to the attending Surveyor that no modifications or alterations which might impair safety have been made to the various installations in dangerous zones without prior approval from Tasneef

The survey is to include:

- confirmation that the dampers of the ventilation system are operational;
- confirmation that the spare parts for cargo area mechanical ventilation fans are available on board.

25.2 FIRE-FIGHTING SYSTEMS

The survey is to include the examination of fire-fighting systems of any type fitted on board for the protection of the cargo area, cargo pump room, cargo compressor room and other dangerous spaces, such as deck foam, water-spraying and dry powder systems, as applicable in accordance with the relevant requirements given in [3.1.2].

25.3 PERSONNEL PROTECTION

The survey is to include:

- confirmation that two complete sets of safety equipment, each permitting personnel to enter and work in a gas-filled space, are provided and properly stowed
- confirmation that the requisite supply of compressed air is provided and examination, when applicable, of arrangements for any special air compressor and low pressure air line system
- confirmation that medical first-aid equipment, including stretchers and oxygen resuscitation equipment, is in satisfactory condition and that antidotes specific for the cargoes actually carried are available on board
- confirmation that respiratory and eye protection for emergency escape purposes is provided
- confirmation that decontamination arrangements and eyewashes are operational
- examination, when applicable, of the arrangements to protect personnel against the effects of a major cargo release by a special suitably designed and equipped space within the accommodation area.

26 RENEWAL SURVEY OF LIQUEFIED GAS CARRIERS – CARGO MACHINERY ITEMS

26.1 Fire-fighting systems

The survey is to include the examination of fire-fighting systems of any type fitted on board for the protection of the cargo area, cargo pump room, cargo compressor room and other dangerous spaces, such as deck foam, water-spraying, dry powder systems etc., as applicable in accordance with the relevant requirements given in [4].

27 ANNUAL SURVEY OF RO-RO CARGO SHIPS

27.1

Within the scope of survey of fire protection, detection and extinction arrangements as required for the annual survey of all ships in [7.2], attention is to be given to the particular arrangements related to ro-ro cargo spaces, such as:

- fire detection systems and alarms
- fixed fire-extinguishing arrangements (gas, water-spraying or foam systems)

- portable fire extinguishers in spaces and at entrances
- ventilation and related safety devices (including remote control on the bridge), and
- electrical equipment of a safe type.

28 RENEWAL SURVEY OF RO-RO CARGO SHIPS

28.1

Within the scope of survey of fire protection, detection and extinction arrangements as required for the class renewal survey of all ships in [4], attention is to be given to the particular arrangements related to ro-ro cargo spaces, such as those indicated in [11.1].

29 ANNUAL SURVEY OF PASSENGER SHIPS

29.1

It is to be verified that the emergency escape routes from passenger and crew spaces, including related stairways and ladders, are kept clear.

30 RENEWAL SURVEY OF PASSENGER SHIPS

30.1

The condition of the Low Location Lighting (LLL) system, where fitted, is to be verified.

If the LLL system is of the electric illumination type, its power source(s) is (are) also to be verified. Where the LLL system consists of photoluminescent strip indicators, the continued acceptable performance of the photoluminescent material is to be checked in accordance with the applicable provisions contained in the “Guidelines for the evaluation, testing and application of low location lighting on passenger ships” adopted by IMO by Resolution A.752(18) or in the International Standard ISO 15370 - 2001.

31 ANNUAL AND RENEWAL SURVEY OF RO-RO PASSENGER SHIPS

31.1

31.1.1

The scope of the annual survey and renewal survey of ro-ro passenger ships is to include the scope of surveys required for ro-ro cargo ships and passenger ships, as detailed in [11.1] and [13.1] for annual survey and [12.1] and [14.1] for renewal survey.

31.1.2

In addition to [15.1.1] above, for both annual survey and renewal survey, the condition of means of escape as well as of fire protection, detection and extinction in special category spaces is to be checked.

32 ANNUAL SURVEY OF OIL RECOVERY SHIPS

32.1

The survey is to include:

- general examination of the cargo pump room, as regards fire protection, detection and fire-fighting systems;
- general examination of the dry powder fire extinguishers, as well as, if fitted, of the fixed or semi-fixed foam extinguishing systems; the Owner is to show evidence that the foam concentrates have been periodically tested, either by the Manufacturer or by an organisation agreed by him.

33 RENEWAL SURVEY OF OIL RECOVERY SHIPS

33.1

A partial test of fixed foam fire-extinguishing systems, if fitted, is to be carried out at the Surveyor's discretion.

Appendix 1: Periodical inspections and maintenance of fire extinguishers

1

Extinguishers are to be subjected to periodical inspections in accordance with the Manufacturer's instructions and serviced at intervals not exceeding one year.

a) At least one extinguisher of each type manufactured in the same year and kept on board a ship is to be test discharged at five-yearly intervals (as part of a fire drill).

b) All extinguishers together with propellant cartridges are to be hydraulically tested in accordance with a recognised standard or the Manufacturer's instructions at intervals not exceeding ten years.

c) Service and inspection are only to be undertaken by, or under the supervision of, a person with demonstrable competence, based on the inspection guide in Tab 1.

2

Records of inspections are to be maintained. The records are to show the date of inspection, the type of maintenance carried out and whether or not a pressure test was performed.

3

Extinguishers are to be provided with a visual indication of discharge.

4

Instructions for recharging extinguishers are to be supplied by the Manufacturer and be available for use on board.

Appendix 1: Periodical inspections and maintenance of fire extinguishers

Table 1: Inspection guide

ANNUAL INSPECTION	
Safety clip and indicating devices	Check to see if the extinguisher may have been operated
Pressure indicating device	Where fitted, check to see that the pressure is within limits. Check that dust covers on pressure indicating devices and relief valves are in place.
External examination	Inspect for corrosion, dents or damage which may affect the safe operation of the extinguisher.
Weight	Weigh the extinguisher and check the mass compared to the fully charged extinguisher.
Hose and nozzle	Check that hoses and nozzles are clear and undamaged.
Operating instructions	Check that they are in place and legible.
INSPECTION AT RECHARGE	
Water and foam charges	Remove the charge to a clean container if to be reused and check if it is still suitable for further use. Check any charge container.
Powder charges	Examine the powder for reuse. Ensure that it is free flowing and that there is no evidence of caking lumps or foreign bodies.
Gas cartridge	Examine for damage and corrosion.
INSPECTION AT FIVE - AND TEN - YEAR INTERVALS	
INSPECTION AFTER DISCHARGE TEST	
Air passages and operating mechanism	Prove clear passage by blowing through vent holes and vent devices in the cap. Check hose, nozzle strainer, discharge tube and breather valve, as applicable. Check the operating and discharge control. Clean and lubricate as required.
Operating mechanism	Check that the safety pin is removable and that the lever is undamaged.
Gas cartridge	Examine for damage and corrosion. Weigh the cartridge to ascertain that it is within prescribed limits.
O-rings, washers and hose diaphragms	Check O-rings and replace hose diaphragms if fitted.
Water and foam bodies	Inspect the interior. Check for corrosion and lining deterioration. Check separate containers for leakage or damage.
Powder body	Examine the body and check internally for corrosion and lining deterioration.
INSPECTION AFTER RECHARGE	
Water and foam	Replace the charge in accordance with the Manufacturer’s instructions.
Reassemble	Reassemble the extinguisher in accordance with the Manufacturer’s instructions.
Maintenance label	Fill in entry on maintenance label, including full weight.
Mounting of extinguishers	Check the mounting bracket or stand.
Report	Complete a report on the state of maintenance of the extinguisher.