RULES FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS

GUIDANCE FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS

Part R Fire Protection, Detection and Extinction

Rules for the Survey and Construction of Steel Ships
Part R 2013 AMENDMENT NO.1
Guidance for the Survey and Construction of Steel Ships
Part R 2013 AMENDMENT NO.1

Rule No.38 / Notice No.28 30th May 2013
Resolved by Technical Committee on 4th February 2013
Approved by Board of Directors on 4th March 2013

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RULES FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS

RULES

Part R Fire Protection, Detection and Extinction

2013 AMENDMENT NO.1

Rule No.38 30th May 2013
Resolved by Technical Committee on 4th February 2013
Approved by Board of Directors on 4th March 2013

Rule No.38 30th May 2013
AMENDMENT TO THE RULES FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS

"Rules for the survey and construction of steel ships" has been partly amended as follows:

Part R FIRE PROTECTION, DETECTION AND EXTINCTION

Amendment 1-1

Chapter 9 CONTAINMENT OF FIRE

Title of paragraph 9.2.2 has been amended as follows.

9.2.2 Methods of Protection ~~in Accommodation Area~~

Title of paragraph 9.2.3 has been amended as follows.

9.2.3 Bulkheads and Decks~~within Accommodation Area~~

EFFECTIVE DATE AND APPLICATION (Amendment 1-1)

1. The effective date of the amendments is 30 May 2013.

Amendment 1-2

Chapter 14 OPERATIONAL READINESS AND MAINTENANCE

14.2 Operational Readiness and Maintenance

14.2.2 Maintenance, Testing and Inspections

Sub-paragraph -1 has been amended as follows.

1 Maintenance, testing and inspections are to be carried out based on the ~~Guidelines on Maintenance and Inspection of Fire Protection Systems and Appliances (*MSC/Circ*.850)~~ Revised Guidelines for the Maintenance and Inspection of Fire Protection Systems and Appliances (*MSC*.1/*Circ*.1432) developed by the *IMO* and in a manner having due regard to ensuring the reliability of fire-fighting systems and appliances.

EFFECTIVE DATE AND APPLICATION (Amendment 1-2)

1. The effective date of the amendments is 31 May 2013.

Amendment 1-3

Chapter 26 has been amended as follows.

Chapter 26 FIXED FOAM FIRE-EXTINGUISHING SYSTEMS

26.1 General

26.1.1 Application

This chapter details the specifications for fixed foam-extinguishing systems for the protection of machinery spaces in accordance with **10.4**, cargo pump-rooms in accordance with **10.9.1(2)** and vehicle and ro-ro spaces in accordance with regulation **20.5.1**~~as required by this Part~~. This chapter does not apply to cargo pump-rooms of chemical tankers carrying liquid cargoes referred to in **1.2.2-2**, unless the Society specifically accepts the use of these systems based on additional tests with alcohol-based fuel and alcohol resistant foam.

26.2 Definitions~~Engineering Specifications~~

~~**26.2.1 General Requirements**~~

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

26.2.1 Design Filling Rate

Design filling rate is at least the minimum nominal filling rate used during the approval tests specified in **26.3.1-3**.

26.2.2 Foam

Foam is the extinguishing medium produced when foam solution passes through a foam generator and is mixed with air.

26.2.3 Foam Solution

Foam solution is a solution of foam concentrate and water.

26.2.4 Foam Concentrate

Foam concentrate is a liquid which, when mixed with water in the appropriate concentration forms a foam solution.

26.2.5 Foam Delivery Ducts

Foam delivery ducts are supply ducts for introducing high-expansion foam into the protected space from foam generators located outside the protected space.

26.2.6 Foam Mixing Ratio

Foam mixing ratio is the percentage of foam concentrate mixed with water forming the foam solution.

26.2.7 Foam Generators

Foam generators are discharge devices or assemblies through which high-expansion foam

solution is aerated to form foam that is discharged into the protected space. Foam generators using inside air typically consist of a nozzle or set of nozzles and a casing. The casing is typically made of perforated steel/stainless steel plates shaped into a box that enclose the nozzle(s). Foam generators using outside air typically consist of nozzles enclosed within a casing that spray onto a screen. An electric, hydraulic or pneumatically driven fan is provided to aerate the solution.

26.2.8 High-Expansion Foam Fire-extinguishing Systems

High-expansion foam fire-extinguishing systems are fixed total flooding extinguishing systems that use either inside air or outside air for aeration of the foam solution. A high-expansion foam system consists of both the foam generators and the dedicated foam concentrate approved during the test specified in **26.3.1-3**.

26.2.9 Inside Air Foam System

Inside air foam system is a fixed high-expansion foam fire-extinguishing system with foam generators located inside the protected space and drawing air from that space.

26.2.10 Nominal Flow Rate

Nominal flow rate is the foam solution flow rate expressed in *l/minute*.

26.2.11 Nominal Application Rate

Nominal application rate is the nominal flow rate per area expressed in *l/minute/*m^2.

26.2.12 Nominal Foam Expansion Ratio

Nominal foam expansion ratio is the ratio of the volume of foam to the volume of foam solution from which it was made, under non-fire conditions, and at an ambient temperature of e.g. around 20°C.

26.2.13 Nominal Foam Production

Nominal foam production is the volume of foam produced per time unit, i.e. nominal flow rate times nominal foam expansion ratio, expressed in *m^3/minute*.

26.2.14 Nominal Filling Rate

Nominal filling rate is the ratio of nominal foam production to the area, i.e. expressed in *m/minute*.

26.2.15 Nominal Filling Time

Nominal filling time is the ratio of the height of the protected space to the nominal filling rate, i.e. expressed in *minutes*.

26.2.16 Outside Air Foam System

Outside air foam system is a fixed high-expansion foam system with foam generators installed outside the protected space that are directly supplied with fresh air.

26.3~~2.2~~ Fixed High-expansion Foam Fire-extinguishing Systems

~~**1** Fixed high-expansion foam fire-extinguishing systems provided with foam generators installed outside protected spaces are to comply with the following (1) and (2):~~

~~(1) Quantity and performance of foam concentrates~~

~~(a) The foam concentrates of high-expansion foam fire-extinguishing systems is to be approved by the Society.~~

~~(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 1,000 to 1.~~

~~(c) The Society may permit alternative arrangements and discharge rates provided that it is satisfied that equivalent protection is achieved.~~

~~(2) Installation requirements~~

~~(a) Supply ducts for delivering foam, air intakes to the foam generator and the number of foam-producing units are to in the opinion of the Society 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 is to be readily accessible and simple to operate and is to be grouped in as few locations as possible at positions not likely to be cut off by a fire in the protected space.~~

~~**2** Fixed high expansion foam fire extinguishing systems provided with foam generators installed inside protected spaces are to be to the satisfaction of the Society.~~

26.3.1 Principal Performance

1 The system is to be capable of manual release, and is to be designed to produce foam at the required application rate within 1 *minute* of release. Automatic release of the system is not to be permitted unless appropriate operational measures or interlocks are provided to prevent any local application systems required by **10.5.5** from interfering with the effectiveness of the system.

2 The foam concentrates are to be approved by the Society. Different foam concentrate types are not to be mixed in a high-expansion foam system.

3 The system is to be capable of fire extinction and manufactured and tested based on the standards to the satisfaction of the Society.

4 The system and its components are to be suitably designed to withstand ambient temperature changes, vibration, humidity, shock, clogging and corrosion normally encountered on ships. Piping, fittings and related components inside the protected spaces (except gaskets) are to be designed to withstand 925℃.

5 System piping, foam concentrate storage tanks, components and pipe fittings in contact with the foam concentrate are to be compatible with the foam concentrate and be constructed of corrosion resistant materials such as stainless steel, or equivalent. Other system piping and foam generators are to be full galvanized steel or equivalent. Distribution pipework is to have self-draining capability.

6 Means for testing the operation of the system and assuring the required pressure and flow are to be provided by pressure gauges at both inlets (water and foam concentrate supply) and at the

outlet of the foam proportioner. A test valve is to be installed on the distribution piping downstream of the foam proportioner, along with orifices which reflect the calculated pressure drop of the system. All sections of piping are to be provided with connections for flushing, draining and purging with air. All nozzles are to be able to be removed for inspection in order to prove clear of debris.

7 Means are to be provided for the crew to safely check the quantity of foam concentrate and take periodic control samples for foam quality.

8 Operating instructions for the system is to be displayed at each operating position.

9 Spare parts are to be provided based on the manufacturer's instruction.

10 If an internal combustion engine is used as a prime mover for the seawater pump for the system, the fuel oil tank to the prime mover is to contain sufficient fuel to enable the pump to run on full load for at least 3 *h* 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*. If the fuel tank serves other internal combustion engines simultaneously, the total fuel tank capacity is to be adequate for all connected engines.

11 The arrangement of foam generators and piping in the protected space are not to interfere with access to the installed machinery for routine maintenance activities.

12 The system source of power supply, foam concentrate supply and means of controlling the system are to be readily accessible and simple to operate, and are to be arranged at positions outside the protected space not likely to be cut off by a fire in the protected space. All electrical components directly connected to the foam generators are to have at least an IP 54 rating.

13 The piping system is to be sized in accordance with a hydraulic calculation technique to ensure availability of flows and pressures required for correct performance of the system.

14 The arrangement of the protected spaces is to be such that they may be ventilated as the space is being filled with foam. Procedures are to be provided to ensure that upper level dampers, doors and other suitable openings are kept open in case of a fire. For inside air foam systems, spaces below 500 m^3 need not comply with this requirement.

15 Onboard procedures are to be established to require personnel re-entering the protected space after a system discharge to wear breathing apparatus to protect them from oxygen deficient air and products of combustion entrained in the foam blanket.

16 Installation plans and operating manuals are to be supplied to the ship and be readily available on board. A list or plan is to be displayed showing spaces covered and the location of the zone in respect of each section. Instructions for testing and maintenance are to be available on board.

17 All installation, operation and maintenance instructions/plans for the system are to be in the working language of the ship. If the working language of the ship is not English, French, nor Spanish, a translation into one of these languages is to be included.

18 The foam generator room is to be ventilated to protect against overpressure, and is to be heated to avoid the possibility of freezing.

19 The quantity of foam concentrate available is to be the following **(1)** or **(2)**, whichever is greater:

(1) sufficient to produce a volume of foam equal to at least five times the volume of the largest protected space enclosed by steel bulkheads, at the nominal expansion ratio; or

(2) enough for 30 *minutes* of full operation for the largest protected space, whichever is greater.

20 Machinery spaces, cargo pump-rooms, vehicle spaces and ro-ro spaces are to be provided with audible and visual alarms within the protected space warning of the release of the system. The alarms are to operate for the length of time needed to evacuate the space, but in no case less than 20 *seconds*.

26.3.2 Inside Air Foam Systems

1 Systems for the protection of machinery spaces and cargo pump-rooms

(1) The system is to be supplied by both main and emergency sources of power. The emergency power supply is to be provided from outside the protected space.

(2) Sufficient foam-generating capacity is to be provided to ensure the minimum design filling rate for the system is met and in addition is to be adequate to completely fill the largest protected space within 10 *minutes*.

(3) The arrangement of foam generators are, in general, to be designed based on the results of the test specified in **26.3.1-3**. A minimum of two generators is to be installed in every space containing combustion engines, boilers, purifiers, and similar equipment. Small workshops and similar spaces may be covered with only one foam generator.

(4) Foam generators are to be uniformly distributed under the uppermost ceiling in the protected spaces including the engine casing. The number and location of foam generators are to be adequate to ensure all high risk areas are protected in all parts and at all levels of the spaces. Extra foam generators may be required in obstructed locations. The foam generators are to be arranged with at least 1 *m* free space in front of the foam outlets, unless tested with less clearance. The generators are to be located behind main structures, and above and away from engines and boilers in positions where damage from an explosion is unlikely.

2 Systems for the protection of vehicle and ro-ro spaces

(1) The system is to be supplied by the ship's main power source. An emergency power supply is not required.

(2) Sufficient foam-generating capacity is to be provided to ensure the minimum design filling rate for the system is met and in addition is to be adequate to completely fill the largest protected space within 10 *minutes*. However, for systems protecting vehicle and ro-ro spaces, with decks that are reasonably gas-tight and that have a deck height of 3 *m* or less, the filling rate is to be not less than two thirds of the design filling rate and in addition sufficient to fill the largest protected space within 10 *minutes*.

(3) The system may be divided into sections, however, the capacity and design of the system are to be based on the protected space demanding the greatest volume of foam. Adjacent protected spaces need not be served simultaneously if the boundaries between the spaces are "*A*" class divisions.

(4) The arrangement of foam generators are, in general, to be designed based on the results of the test specified in **26.3.1-3**. The number of generators may be different, but the minimum design filling rate determined during the test specified in **26.3.1-3** is to be provided by the system. A minimum of two generators is to be installed in every space. The foam generators are to be arranged to uniformly distribute foam in the protected spaces, and the layout is to take into consideration obstructions that can be expected when cargo is loaded on board. As a minimum, generators are to be located on every second deck, including movable decks. The horizontal spacing of the generators is to ensure rapid supply of foam to all parts of the protected space. This is to be established on the basis of full scale tests.

(5) The foam generators are to be arranged with at least 1 *m* free space in front of the foam outlets, unless tested with less clearance.

26.3.3 Outside Air Foam Systems

1 Systems for the protection of machinery spaces and cargo pump-rooms

(1) The system is to be supplied by both main and emergency sources of power. The emergency power supply is to be provided from outside the protected machinery space.

(2) Sufficient foam-generating capacity is to be provided to ensure the minimum design filling rate for the system is met and in addition is to be adequate to completely fill the largest protected

space within 10 *minutes*.

(3) The arrangement of foam delivery ducts are, in general, to be designed based on the results of the test specified in **26.3.1-3**. The number of ducts may be different, but the minimum design filling rate determined during the test specified in **26.3.1-3** is to be provided by the system. A minimum of two ducts is to be installed in every space containing combustion engines, boilers, purifiers, and similar equipment. Small workshops and similar spaces may be covered with only one duct.

(4) Foam delivery ducts are to be uniformly distributed under the uppermost ceiling in the protected spaces including the engine casing. The number and location of ducts are to be adequate to ensure all high risk areas are protected in all parts and at all levels of the spaces. Extra ducts may be required in obstructed locations. The ducts are to be arranged with at least 1 *m* free space in front of the foam delivery ducts, unless tested with less clearance. The ducts are to be located behind main structures, and above and away from engines and boilers in positions where damage from an explosion is unlikely.

(5) The arrangement of the foam delivery ducts are 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, and the separating divisions are to be class "*A*-60" rated. 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, and arranged to remain closed until the foam generators begin operating.

(6) The foam generators are to be located where an adequate fresh air supply can be arranged.

2 Systems for the protection of vehicle and ro-ro spaces

(1) The system is to be supplied by the ship's main power source. An emergency power supply is not required.

(2) Sufficient foam-generating capacity is to be provided to ensure the minimum design filling rate for the system is met and in addition is to be adequate to completely fill the largest protected space within 10 *minutes*. However, for systems protecting vehicle and ro-ro spaces, with decks that are reasonably gas-tight and that have a deck height of 3 *m* or less, the filling rate is to be not less than two thirds of the design filling rate and in addition sufficient to fill the largest protected space within 10 *minutes*.

(3) The system may be divided into sections, however, the capacity and design of the system are to be based on the protected space demanding the greatest volume of foam. Adjacent protected spaces need not be served simultaneously if the boundaries between the spaces are "*A*" class divisions.

(4) The arrangement of foam delivery ducts are, in general, to be designed based on the results of the test specified in **26.3.1-3**. The number of ducts may be different, but the minimum design filling rate determined during the test specified in **26.3.1-3** is to be provided by the system. A minimum of two ducts is to be installed in every space. The foam generators are to be arranged to uniformly distribute foam in the protected spaces, and the layout is to take into consideration obstructions that can be expected when cargo is loaded on board. As a minimum, ducts are to be led to every second deck, including movable decks. The horizontal spacing of the ducts is to ensure rapid supply of foam to all parts of the protected space. This is to be established on the basis of full scale tests.

(5) The system is to be arranged with at least 1 *m* free space in front of the foam outlets, unless tested with less clearance.

(6) The arrangement of the foam delivery ducts 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, and the separating divisions are to be class "*A*-60" rated. 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, and arranged to remain closed until the foam generators begin operating.

(7) The foam generators are to be located where an adequate fresh air supply can be arranged.

26.3.4 Systems Using Outside Air with Generators Installed inside the Protected Space

Systems using outside air but with generators located inside the protected space and supplied by fresh air ducts may be accepted by the Soceity provided that these systems have been shown to have performance and reliability equivalent to systems defined in **26.3.3**. Consideration is to be given to the following minimum design features of the system:

(1) lower and upper acceptable air pressure and flow rate in supply ducts;

(2) function and reliability of damper arrangements;

(3) arrangements and distribution of air delivery ducts including foam outlets; and

(4) separation of air delivery ducts from the protected space.

26.3.5 Installation Testing Requirements

1 After installation, the pipes, valves, fittings and assembled systems are to be tested to the satisfaction of the Society, including functional testing of the power and control systems, water pumps, foam pumps, valves, remote and local release stations and alarms. Flow at the required pressure is to be verified for the system using orifices fitted to the test line. In addition, all distribution piping is to be flushed with freshwater and blown through with air to ensure that the piping is free of obstructions.

2 Functional tests of all foam proportioners or other foam mixing devices are to be carried out to confirm that the mixing ratio tolerance is within +30 to -0 % of the nominal mixing ratio defined by the system approval. For foam proportioners using foam concentrates of Newtonian type with kinematic viscosity equal to or less than 100 *cSt* at 0℃ and density equal to or less than 1,100 kg/m^3, this test can be performed with water instead of foam concentrate. Other arrangements are to be tested with the actual foam concentrate.

26.4~~2.3~~ Fixed Low-expansion Foam Fire-extinguishing Systems

26.4.1~~1~~ Quantity and ~~f~~Foam ~~c~~Concentrates

1~~(1)~~ The foam concentrates of low-expansion foam fire-extinguishing systems are~~is~~ to be approved by the Society. Different foam concentrate types are not to be mixed in a low-expansion foam system. Foam concentrates of the same type from different manufacturers are not to be mixed unless they are approved for compatibility.

2~~(2)~~ The system is to be capable of discharging through fixed discharge outlets in no~~t~~ more than 5 *minutes*, a quantity of foam sufficient to produce an effective foam blanket over the largest single area over which oil fuel is liable to spread.

26.4.2~~2~~ Installation ~~r~~Requirements

1~~(1)~~ Means are to be provided for 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 onto other main fire hazards in the protected space. The means for effective distribution of the foam are to be proven acceptable to the Society through calculation or by testing.

2~~(2)~~ The means of control of any such systems are to be readily accessible and simple to operate and are to be grouped together in as few locations as possible at positions not likely to be cut off by a fire in the protected space.

Chapter 28 AUTOMATIC SPRINKLER, FIRE DETECTION AND FIRE ALARM SYSTEMS

28.2 Engineering Specifications

28.2.1 General Requirements

Sub-paragraph -1 has been amended as follows.

1 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 the Society there is a necessary precaution. Control stations, where water may cause damage to essential equipment, may be fitted with a dry pipe system or a pre-action system. Saunas are to be fitted with a dry pipe system, with sprinkler heads having an operating temperature up to 140℃.

EFFECTIVE DATE AND APPLICATION (Amendment 1-3)

1. The effective date of the amendments is 1 January 2014.

2. Notwithstanding the amendments to the Rules, the current requirements may apply to ships the keels of which were laid or which were at *a similar stage of construction* before the effective date.
(Note) The term "*a similar stage of construction*" means the stage at which the construction identifiable with a specific ship begins and the assembly of that ship has commenced comprising at least 50 *tonnes* or 1% of the estimated mass of all structural material, whichever is the less.

GUIDANCE FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS

GUIDANCE

Part R Fire Protection, Detection and Extinction

2013 AMENDMENT NO.1

Notice No.28 30th May 2013

Resolved by Technical Committee on 4th February 2013

Notice No.28 30th May 2013
AMENDMENT TO THE GUIDANCE FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS

"Guidance for the survey and construction of steel ships" has been partly amended as follows:

Part R FIRE PROTECTION, DETECTION AND EXTINCTION

Amendment 1-1

R3 DEFINITIONS

R3.2 Definitions

Paragraph R3.2.1 has been amended as follows.

R3.2.1 Accommodation Spaces

~~Coffee automates, toasters, dish washers, microwave ovens, water boilers and similar appliances with a maximum power of 5 *kW*~~ The Following devices **(1)** and **(2)** may be provided in "pantries containing no cooking appliances" specified in **3.2.1, Part R of the Rules**~~, provided that, the power for electrically heated cooking plates or hot plates is not to be more than 2 *kW* and those surface temperatures are not to exceed 150℃.~~

(1) Toasters, microwave ovens, induction heaters and similar appliances each of them with a maximum power of 5 *kW*. However, coffee machines, dish washers and water boilers with no exposed hot surfaces may be provided in these pantries regardless of their power; and
(2) 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.

Paragraph R3.2.45 has been added as follows.

R3.2.45 Service Spaces

The Following devices **(1)** and **(2)** may be provided in "pantries containing cooking appliances" specified in **3.2.45, Part R of the Rules**. However, spaces containing any electrically heated cooking plate or hot plate for keeping food warm with a power of more than 5 *kW* are to be regarded as galleys.

(1) Toasters, microwave ovens, induction heaters and similar appliances each of them with a power of more than 5 *kW*. However, coffee machines, dish washers and water boilers may be provided in these pantries regardless of their power; and
(2) electrically heated cooking plates and hot plates for keeping food warm each of them with a maximum power of 5 *kW*.

R9 CONTAINMENT OF FIRE

R9.2 Thermal and Structural Boundaries

Title of paragraph R9.2.2 has been amended as follows.

R9.2.2 Methods of Protection ~~in Accommodation Area~~

Title of paragraph R9.2.3 has been amended as follows.

R9.2.3 Bulkheads and Decks~~within Accommodation Area~~

Sub-paragraph -4 has been deleted and Sub-paragraphs -5 to -15 have been renumbered to -4 to -14.

~~**4** The wording "cooking appliances" specified in **9.2.3-2(9), Part R of the Rules** are to be understood that they do not include electric appliances of small capacities, such as coffee urns, hot plates for keeping food warm, water boilers, etc.~~

R10 FIRE FIGHTING

R10.2 Water Supply Systems

R10.2.1 Fire Mains and Hydrants

Sub-paragraph -4 has been amended as follows.

4 With respect to the provisions of **10.2.1-4(1), Part R of the Rules**, where the sea-chest is fitted in the machinery space, the sea-chest valve is not to be a fail-close type in cases where the remotely controlled system of the valve can be disabled by fire. Devices, pipings and cables, etc. for the operation of the sea-chest valve are to be enclosed in a substantial steel casing or are to be insulated to "*A*-60" class standards. In addition, such cables are to be in accordance with the provisions of **2.9.11-~~3~~2, Part H of the Rules**. However, devices, pipings and cables, etc. for the operation of the sea-chest valve are not necessary to be enclosed in a substantial steel casing or to be insulated to "*A*-60" class standards provided that the sea-chest valve is a fail-open type even in cases where the remotely controlled system of the valve can be disabled by fire.

EFFECTIVE DATE AND APPLICATION (Amendment 1-1)

1. The effective date of the amendments is 30 May 2013.

Amendment 1-2

R18 HELICOPTER FACILITIES

R18.5 Fire-fighting

R18.5.1 Fire-fighting Appliances

Sub-paragraph -3 has been added as follows and sub-paragraphs -3 and -4 have been renumbered to sub-paragraphs -4 and -5 respectively.

3 With respect to foam fire-fighting appliances specified in **18.5.1(3), Part R of the Rules**, reference is to be made to the "*Guidelines for the Approval of Helicopter Facility Foam Fire-fighting Appliances*" (*MSC*.1/*Circ*.1431) in addition to the requirements specified in **18.5.1(3), Part R of the Rules**.

EFFECTIVE DATE AND APPLICATION (Amendment 1-2)

1. The effective date of the amendments is 30 May 2013.

2. Notwithstanding the amendments to the Guidance, the current requirements may apply to ships the keels of which were laid or which were at *a similar stage of construction* before the effective date.
(Note) The term "*a similar stage of construction*" means the stage at which the construction identifiable with a specific ship begins and the assembly of that ship has commenced comprising at least 50 *tonnes* or 1% of the estimated mass of all structural material, whichever is the less.

Amendment 1-3

R20 PROTECTION OF VEHICLE AND RO-RO SPACES

R20.5 Fire-extinction

R20.5.1 Fixed Fire-extinguishing Systems

Sub-paragraph -4 has been amended as follows.

4 The wording "an approved fixed pressure water~~-~~spraying system" specified in **20.5.1-2, Part R of the Rules** means the one complying with the ~~following~~ requirements ~~as the standard:~~ of sections 1, 2, 3 and 4 of "*Revised guidelines for the design and approval of fixed water-based fire-fighting systems for ro-ro spaces and special category spaces*" (*MSC*.1/*Circ*.1430).

~~(1) Ro-ro and vehicle spaces (hereinafter referred to as the "ro-ro spaces, etc.") where their deck height is not more than 2.5 *m* are to be served by the fixed pressure water-spraying system capable of continuously spraying water at an average distribution of 3.5 *l/m*^{2} *per minute* or more, and ro-ro spaces, etc. with a deck height of not less than 2.5 *m*, 5.0 *l/m*^{2} *per minute* or more.~~

~~(2) The system is to be so arranged that a fire in the space protected by the system would not put the system out of action.~~

~~(3) The fixed pressure water-spraying system divided into sections by distribution valves is to have a longitudinal length of protection not less than 20 *m* and a minimum transverse length of protection equivalent to the total breadth of the ro-ro spaces, etc. excluding the case where the ro-ro spaces, etc. are divided by the longitudinal "*A*" class divisions forming the boundaries of stairways, etc.~~

~~(4) The water supply pumps are to comply with the following requirements:~~

~~(a) The pumps are to be other than the fire pumps required for the ship.~~

~~(b) The pumps are to have a sufficient water supplying capacity at the specified pressure to all the water spraying nozzles provided in one division where the ro-ro spaces, etc. are divided into a plural number of water spray sections in conformance with the requirements of the preceding **(3)**, the greatest of at least two adjoining sections).~~

~~(c) In a system provided with the distribution valves, the system is to be capable of being operated by the remote control arrangement (manual operation may be accepted) from the position of the distribution valves.~~

~~(5) Between the water spray nozzles and the pumps specified in **(4)**, a pressure tank is to be provided to the satisfaction to the Society. In this case, the wording "the pressure tank to the satisfaction to the Society" means those which have passed the inspection of organizations authorized by the Administration or deemed appropriate by the Society.~~

~~(6) The water spraying nozzles are to be to the satisfaction of the Society which have passed the inspection of organizations authorized by the Administration or deemed appropriate by the Society.~~

~~(7) The piping systems are to comply with the following requirements:~~

~~(a) To be made of fire-resisting materials.~~

~~(b) To have sufficient strength for the working pressure.~~

~~(c) The piping is to be adequately protected against freezing where appropriate.~~

~~(d) Means are to be provided to prevent the water spraying nozzles from becoming clogged by~~

~~impurities in the water or corrosion of piping, valves and pumps.~~

~~(e) The piping is to be connected to the fire main pipe by means of a pipe fitted with a non-return valve capable of blocking the reverse flow into the fire main pipe.~~

~~(8) The piping from the pressure tank to distribution valves or release valves (valves for spraying the water in a system not provided with the distribution valves) is to be always filled with water.~~

~~(9) The installed location of distribution valves is to comply with the following requirements:~~

~~(a) The position is to be an easily accessible position outside the spaces to be protected from which the distribution valves are operable and will not be readily cut off by a fire in the protected space.~~

~~(b) The position is to have direct access to the ro-ro spaces, etc. and from the outside of such ro-ro spaces, etc.~~

~~(c) The position is to have adequate means of ventilation.~~

~~(10) The following items are to be posted:~~

~~(a) A notice stating that this is the starter of the system and the starting procedure at a conspicuous place of the starting position of the system.~~

~~(b) An indication of the manufacturer's name, type and date of manufacture at conspicuous places of the pump and water spraying heads.~~

~~(11) The installation procedures of water spray nozzles are to comply with the following requirements.~~

~~(a) The nozzles are to be so arranged that any part of the space to be protected by the system is covered within the effective water spraying range of the nozzles.~~

~~(b) The nozzles are to be installed at an elevated position as far as practicable so that combustible substances are properly covered. In this case, the water spraying effect is not to be impaired by beams and other structures.~~

~~(c) As a standard, the nozzle is to be capable of spraying the specified quantity of water uniformly within a circular area with a radius of 2.1 *m* at a water pressure of 0.34 *MPa*.~~

Sub-paragraph -6 has been amended as follows.

6 The wording “other fixed fire-extinguishing system” specified in **20.5.1-3, Part R of the Rules** means ~~a system which is approved by organizations authorized by the Administration or deemed appropriate by the Society in accordance with the “*Guidelines for the approving of fixed water-based fire-fighting systems for ro-ro spaces and special category spaces equivalent to those referred to in resolution A.*123 (V)” (*MSC*.1/*Circ*.1272)~~ the one complying with the requirements of sections 1, 2, 3 and 5 of “*Revised guidelines for the design and approval of fixed water-based fire-fighting systems for ro-ro spaces and special category spaces*” (*MSC*.1/*Circ*.1430).

EFFECTIVE DATE AND APPLICATION (Amendment 1-3)

1. The effective date of the amendments is 30 May 2013.

2. Notwithstanding the amendments to the Guidance, the current requirements may apply to systems for which the date of approval is before the effective date.

Amendment 1-4

R29 FIXED FIRE DETECTION AND FIRE ALARM SYSTEMS

R29.2 Engineering Specifications

R29.2.3 Component Requirements

Sub-paragraphs -2 and -3 have been deleted and Sub-paragraph -4 has been renumbered to -2.

~~**2** The wording "sensitivity limits to the satisfaction of the Society" specified in **29.2.3-1(2), Part R of the Rules** means the following conditions as the standard for the ionizing type (that comes to operate on sensing the change in the ion current due to smoke) and the photo voltaic type (that comes to operate on sensing the change in the received amount of photoelectron due to smoke) respectively:~~

~~(1) Ionization type~~

~~(a) When the detector is placed in an air flow at a flow rate of 20 *cm/s* containing smoke with a density in terms of the change rate of 0.324 of ionization current, the detector of non-accumulation type is to come into action within 30 *seconds*, or the detector of accumulation type is to come into action within 30 *seconds* and transmits fire alarm signals within 5 *seconds* of the nominal accumulation period (*i.e.*, the period of continuous detection from the time when the ambient air becomes containing smoke of a density exceeding the preset density value to transmitting fire alarm signals (10 *seconds* and under 60 *seconds*)).~~

~~(b) When the detector is placed in an air flow at a flow rate of 40 *cm/s* containing smoke with a density in terms of the change rate of 0.156 of ionization current, the detector is not to come into action for a period of 5 *minutes*.~~

~~(c) When the detector is placed in an air flow at a flow rate of 5 *m/s*, the detector is not to come into action for a period of 5 *minutes*.~~

~~Note~~

~~1 Smoke density means the extinction coefficient (%/*m*) measured by utilizing the phenomenon that the luminous intensity decreases in accordance with Lambert-Beer's Law when the light passes through the light emitting face and the light receiving face which are spaced at a certain distance by the effect of smoke existing between the two. In this case, the light source is to be of an incandescent bulb with a colour temperature of 2,800℃ and the light receiving face is to be nearly equal to visual sensitivity. The same is referred to in **(2)**.~~

~~2 Change ratio of ionization current means the ratio of change in ionization current due to existence of smoke when a *DC* voltage of 20 *V* is applied between the two parallel plate poles (two plate poles spaced 2 *cm* apart and one of which is formed by a 5 *cm* diameter circular metal plate fitted with Americium 241 of 8.2 *micro curie*.~~

~~(2) Photo voltaic type~~

~~(a) When the detector comes in contact with smoke with a density of 10%/*m* or less, it is to come into action within 30 *seconds*.~~

~~(b) When the detector comes in contact with smoke with a density of 5%/*m* or less, it is not to come into action within 5 *minutes*.~~

~~(c) When the detector is placed on a face receiving a light with a luminous intensity of from an~~

~~arbitrary direction, it is not to come into action with 5 *minutes*.~~

~~**3** The wording "temperature limits to the satisfaction of the Society" specified in **29.2.3-1(3), Part R of the Rules** means the following conditions respectively for the constant temperature type spot detectors (those come into action when the ambient temperature of one place exceeds a preset value) and the compensation type spot detectors (those come into action when the rate of temperature rise in the ambient temperature exceeds a preset value) as the standard:~~

~~(1) Constant temperature type spot detectors~~

~~(a) When the detector is placed in a vertical air flow with a flow rate of 1 *m/s* at a temperature of 125% of the nominal operating temperature, it is to come into action within the period obtained from the following formula:~~

$$t = 120\frac{\log_{10}(1+(\theta-\theta_r)/\delta}{\log_{10}(1+\theta/\delta)}$$

~~where:~~

~~t : initiating time (*s*)~~

~~θ : nominal initiating temperature (℃)~~

~~θ_r : room temperature (℃)~~

~~δ : difference between nominal initiating temperature and test initiating temperature (℃)~~

~~(b) When the detector is placed in a vertical air flow with a flow rate of 1 *m/s* at a temperature 10℃ lower than the nominal initiating temperature, it is not to come into action for a period of 10 *minutes*.~~

~~(c) When a horizontal air flow of which temperature is linearly increasing at a rate of 1℃ */minute* from at temperature 15℃ lower than the nominal initiating temperature is added, the operating temperature is to be within a range exceeding 54℃ and 78℃ or below and that it is to come into action within a range 10℃ of the nominal initiating temperature.~~

~~(2) Compensation type spot detectors~~

~~(a) When the detector is placed in a vertical air flow with a flow rate of 85 *m/s* at a temperature 30℃ higher than the room temperature, it is to come into action within 30 *seconds*, and when a horizontal air flow of which temperature is linearly increasing at a rate of 15℃*/minute* from the room temperature is added, it is to come into action within 4.5 *minutes*.~~

~~(b) When the detector is placed in a vertical air flow with a flow rate of 60 *m/s* at a temperature 15℃ higher than the room temperature, it is not to come into action for a period of 1 *minute*, and when a horizontal air flow of which temperature is linearly increasing at a rate of 3℃*/minute* from the room temperature is added, it is not to come into action for a period of 10 *minutes*.~~

~~(c) The criteria specified in the preceding **(1)(c)** are to apply. In this case, the "nominal initiating temperature" in **(1)(c)** is to be read as "nominal settle point of temperature."~~

4<u>2</u> In applying **29.2.3-1(7), Part R of the Rules**, reference is made to the "*Guidelines for Approval of Fixed Fire Detection and Fire Alarm Systems for Cabin Balconies*" (*MSC*.1/*Circ*.1242).

Paragraph R29.2.4 has been amended as follows.

R29.2.4 Installation Requirements

With respect to the requirements of **29.2.4-2(1), Part R of the Rules**, precautions are to be taken on the following items:

(1) Constant temperature type spot detectors or compensation type spot detectors are not to be provided at the following spaces:
   (a) Spaces exposed to outside air flow where generation of fire at such spaces can not be detected efficiently.
   (b) Spaces where the temperature tends to rise significantly high (except for spaces where vapour or smoke is generated at all times such as saunas, galleys, etc.).
   (c) Spaces where the detectors are installed by 8 *m* or more apart from the floor surface of detection.
   (c) Spaces where the difference between the nominal initiating temperature or nominal settle point of temperature and the maximum ambient temperature of such spaces in normal condition is less than 20℃.

((2) and (3) are omitted.)

EFFECTIVE DATE AND APPLICATION (Amendment 1-4)

1. The effective date of the amendments is 30 May 2013.

2. Notwithstanding the amendments to the Guidance, the current requirements may apply to ships the keels of which were laid or which were at *a similar stage of construction* before the effective date.

(Note) The term "*a similar stage of construction*" means the stage at which the construction identifiable with a specific ship begins and the assembly of that ship has commenced comprising at least 50 *tonnes* or 1%* of the estimated mass of all structural material, whichever is the less.

* For high speed craft, "1%" is to be read as "3%".

Amendment 1-5

R10 FIRE FIGHTING

R10.6 Fire-extinguishing Arrangements in Control Stations, Accommodation and Service Spaces

R10.6.3 Deep-fat Cooking Equipment

Sub-paragraph -2 has been amended as follows.

2 The wording "extinguishing system tested to an international standard acceptable to the Society" required in **10.6.3(1), Part R of the Rules** means a fire extinguishing system which have passed a test of organizations authorized by the Administration or deemed appropriate by the Society in accordance with *ISO* 15371:200~~0~~9 on "Ships and marine technology - Fire-extinguishing systems for protection of galley ~~deep-fat~~ cooking equipment".

EFFECTIVE DATE AND APPLICATION (Amendment 1-5)

1. The effective date of the amendments is 1 July 2013.

2. Notwithstanding the amendments to the Guidance, the current requirements may apply to ships the keels of which were laid or which were at *a similar stage of construction* before the effective date.
(Note) The term "*a similar stage of construction*" means the stage at which the construction identifiable with a specific ship begins and the assembly of that ship has commenced comprising at least 50 *tonnes* or 1% of the estimated mass of all structural material, whichever is the less.

Amendment 1-6

R11 STRUCTURAL INTEGRITY

R11.6 Protection of Cargo Tank Structure against Pressure or Vacuum

Paragraph R11.6.3 has been amended as follows.

R11.6.3 Safety Measures in Cargo Tanks

1 (omitted)

2 The following **(1)** and **(2)**~~failure of stop valves or other acceptable means to isolate each cargo tank specified in **4.5.3-2(2), Part R of the Rules**~~ need~~may~~ not be considered as "the event of failure of the arrangements in **11.6.1(2)**" specified in **11.6.3-2, Part R of the Rules**.

(1) venting arrangement piping damage; and

(2) mechanical failure or inadvertent closure of either isolation valves or other acceptable means to isolate each cargo tank specified in **4.5.3-2(2), Part R of the Rules** in cases where the cargo is homogenous or for multiple cargoes where the vapours are compatible and do not require isolation.

3 "A secondary means of allowing full flow relief of vapour, air or inert gas mixtures" specified in **11.6.3-2, Part R of the Rules** is to comply with the following requirements:

(1) The venting arrangements specified in **11.6.1(2), Part R of the Rules**, the rupture disks or the pressure-vacuum breaking devices may be used as a secondary means. The rupture disk is to be of a type approved by the Society in accordance with the provisions of **Chapter 7, Part 6 of "Guidance for the Approval and Type Approval of Materials and Equipment for Marine Use"**.

(2) The height requirements specified in **4.5.3-4(1)** and **11.6.2, Part R of the Rules** and the requirements for devices to prevent the passage of flame specified in **4.5.3-3, Part R of the Rules** are not applicable to the openings of a secondary means provided that their settings are above the pressure relief setting of and below the vacuum relief setting of the venting arrangements required by **(1)** and **(2)** of **11.6.1, Part R of the Rules**, namely, that a secondary means does~~se~~ not work during the venting arrangements required by **(1)** and **(2)** of **11.6.1, Part R of the Rules** are at normal operation.

(3) For tankers equipped with inert gas systems complying with the requirements specified in **4.5**, **11.6** and **Chapter 35**, **Part R of the Rules**, the pressure vacuum breaking devices specified in **11.6.3-4, Part R of the Rules** fitted on inert gas main may be utilised as the required secondary means of venting provided that the subject pressure-vacuum breaking devices are arranged in accordance with the requirements specified in **4.5.3-2(3), Part R of the Rules** where the cargo is homogenous or for multiple cargoes where the vapours are compatible and do not require isolation.

(4) For tankers which are equipped with inert gas systems complying with the requirements specified in **4.5**, **11.6** and **Chapter 35**, **Part R of the Rules**, which carry out unloading operation under the conditions that the mast head isolation valve is closed and inert gas is supplied into cargo tanks, the secondary means may be arranged taking into account that the operation supplying inert gas serves as the primary under-pressure protection as specified in **11.6.1(2), Part R of the Rules**.

4 The pressure monitoring system specified in **11.6.3-2, Part R of the Rules** is to comply with the following requirements in addition to the requirements specified in **11.6.3-2, Part R of the**

Rules:

(1) The pressure monitoring system is to be of an approved type by the Society in accordance with the provisions of **Chapter 7, Part 6 of "Guidance for the Approval and Type Approval of Materials and Equipment for Marine Use"**.

(2) The set pressure of an alarm facility on the pressure side is to be above the pressure setting of the arrangements required by **11.6.1(2), Part R of the Rules** but is not to exceed the test pressure of the cargo oil tank unless specially approved by the Society.

(3) The set pressure of an alarm facility on the vacuum side is to be below the vacuum setting of the arrangements required by **11.6.1(2), Part R of the Rules** but is not to be less than -0.007 *MPa* unless specially approved by the Society.

(4) Any stop valves or other shut-off devices are, in general, not to be fitted between a cargo oil tank and the pressure sensor. Where stop valves are fitted, they are to be provided with locking arrangements, and there is to be a clear visual indication of the operational status of the valves.

(5) The pressure sensor is to be designed and fitted with to avoid clogging by particle contaminants and to be easily calibrated and maintained.

(6) The alarm settings are to be fixed and not arranged for blocking or adjustment in operation specified in **11.6.1(2), Part R of the Rules**.

(7) Notwithstanding the requirement in the preceding **(6)**, for ships that carry different types of cargo and use P/V valves with different settings, one setting for each type of cargo, the settings may be adjusted to account for the different types of cargo.~~In case that the set pressure of an alarm facility is necessary to change due to characteristic of cargoes or cargo loading/unloading operations,~~ However, the procedure of changing of the set pressure is to be clearly specified in the operation manual of the pressure monitoring system.

(-5 and -6 are omitted.)

Annex R35.2.2-2 GUIDANCE FOR INERT GAS SYSTEMS USING NITROGEN GENERATORS

1.2 Construction of Inert Gas Systems

1.2.3 Nitrogen Receivers/Buffer Tanks

Sub-paragraph -2 has been amended as follows.

2 The oxygen-enriched air from the nitrogen generator and the nitrogen-product enriched gas from the protective devices of the nitrogen receiver are to be discharged to a safe location on the open deck. The expression "safe location" refers to the following **(1)** and **(2)**:

(1) Oxygen-enriched air is to be discharged at the following **(a)** to **(c)**:
   (a) Locations outside of the hazardous areas specified in **1.1.5(1), Part H of the Rules**;
   (b) Locations which are not within 3 *m* of areas traversed by personnel; and
   (c) Locations which are not within 6 *m* of air intakes for machinery (engines and boilers) and all ventilation inlets

(2) Nitrogen-product enriched gas is to be discharged at the following **(a)** and **(b)**:
   (a) Locations which are not within 3 *m* of areas traversed by personnel; and

(b) Locations which are not within 6 *m* of air intakes for machinery (engines and boilers) and all ventilation inlets and outlets.

EFFECTIVE DATE AND APPLICATION (Amendment 1-6)

1. The effective date of the amendments is 1 July 2013.

2. Notwithstanding the amendments to the Guidance, the current requirements may apply to ships for which the date of contract for construction* is before the effective date.

* "contract for construction" is defined in the latest version of IACS Procedural Requirement (PR) No.29.

IACS PR No.29 (Rev.0, July 2009)

1. The date of "contract for construction" of a vessel is the date on which the contract to build the vessel is signed between the prospective owner and the shipbuilder. This date and the construction numbers (i.e. hull numbers) of all the vessels included in the contract are to be declared to the classification society by the party applying for the assignment of class to a newbuilding.

2. The date of "contract for construction" of a series of vessels, including specified optional vessels for which the option is ultimately exercised, is the date on which the contract to build the series is signed between the prospective owner and the shipbuilder.

For the purpose of this Procedural Requirement, vessels built under a single contract for construction are considered a "series of vessels" if they are built to the same approved plans for classification purposes. However, vessels within a series may have design alterations from the original design provided:

(1) such alterations do not affect matters related to classification, or

(2) If the alterations are subject to classification requirements, these alterations are to comply with the classification requirements in effect on the date on which the alterations are contracted between the prospective owner and the shipbuilder or, in the absence of the alteration contract, comply with the classification requirements in effect on the date on which the alterations are submitted to the Society for approval.

The optional vessels will be considered part of the same series of vessels if the option is exercised not later than 1 year after the contract to build the series was signed.

3. If a contract for construction is later amended to include additional vessels or additional options, the date of "contract for construction" for such vessels is the date on which the amendment to the contract, is signed between the prospective owner and the shipbuilder. The amendment to the contract is to be considered as a "new contract" to which **1.** and **2.** above apply.

4. If a contract for construction is amended to change the ship type, the date of "contract for construction" of this modified vessel, or vessels, is the date on which revised contract or new contract is signed between the Owner, or Owners, and the shipbuilder.

Note:
This Procedural Requirement applies from 1 July 2009.

Amendment 1-7

R19 CARRIAGE OF DANGEROUS GOODS

R19.3 Special Requirements

R19.3.1 Water Supplies

Sub-paragraph -6 has been amended as follows.

6 For the~~As~~ "provision to flood a designated under-deck cargo space with suitable specified media" specified in **19.3.1-4, Part R of the Rules**, the fixed high-expansion foam fire extinguishing systems specified in **26.3~~2.2~~, Part R of the Rules** may be used.

Chapter R26 has been amended as follows.

R26 FIXED FOAM FIRE-EXTINGUISHING SYSTEMS

~~**R26.2 Engineering Specifications**~~

R26.3~~2.2~~ Fixed High-expansion Foam Fire-extinguishing Systems

R26.3.1 Principal Performance

1 The wording "approved foam concentrates" specified in **26.3.1-2~~2.2-1(1)(a)~~, Part R of the Rules** means those~~the one~~ approved by organizations authorized by the Administration or deemed appropriate by the Society with reference to the "*Guidance for ~~p~~Performance and ~~t~~Testing ~~c~~Criteria and ~~s~~Surveys of ~~h~~High ~~e~~Expansion ~~f~~Foam ~~c~~Concentrates for ~~f~~Fire-extinguishing ~~s~~Systems*" (*MSC/Circ.*670).

2 The foam generators required in **26.3.1-5~~2.2-1(2)~~, Part R of the Rules** are, in principle, to be driven by an independent power source. In cases where this source of power is internal combustion machinery, it is to be of a compression ignition type.~~comply with the following requirements:~~

~~(1) To be of corrosion-resistant materials.~~

~~(2) To be driven by an independent power. In case where the source of power is an internal combustion machinery, it is to be of a compression ignition type.~~

~~(3) To be capable of generating foam within two minutes after starting.~~

~~**3** Two or more foam-producing units specified in **-2** above which are distant from each other are, in principle, to be provided in case where the area of the protected space is not less than 400 m^2.~~

3~~4~~ The means of remote control specified in **26.3.3-1(5)** and **26.3.3-2(6)~~2.2-1(2)(b)~~, Part R of the Rules** are also to be manually operated.

4~~5~~ ~~For the purpose of~~ The wording "standards to the satisfaction of the Society" specified in

26.3.1-3~~2.2-2~~, Part R of the Rules~~,~~ means the "*Guidelines for the Testing and Approval of Fixed High-expansion Foam Systems*" (*MSC.*1/*Circ.*1384).~~fixed high-expansion foam fire-extinguishing systems using the air inside protected spaces are to comply with the "*GUIDELINES FOR HIGH EXPANSION FORM USING INSIDE AIR FOR THE PROTECTION OF MACHINERY SPACES AND CARGO PUMP- ROOMS*" (*MSC.1/Circ.*1271).~~

5 Where the Hazen-Williams method is used as the "hydraulic calculation technique" specified in **26.3.1-13, Part R of the Rules**, the friction factors used are to be the values specified in **Table R26.3.1-1**.

Table R26.3.1-1

Pipe type	friction factor *C*
Black or galvanized mild steel	100
Copper or copper alloys	150
Stainless steel	150

R26.4~~2.3~~ Fixed Low-expansion Foam Fire-extinguishing Systems

R26.4.1 Quantity and Foam Concentrates

1 The wording "approved foam concentrates" specified in **26.4.1-1~~2.3-1(1)~~, Part R of the Rules** means those~~the one~~ approved by organizations authorized by the Administration or deemed appropriate by the Society with reference to the "*Revised ~~g~~Guidelines for the ~~p~~Performance and ~~t~~Testing ~~c~~Criteria, and ~~s~~Surveys of ~~f~~Foam ~~c~~Concentrates for ~~f~~Fixed ~~f~~Fire-extinguishing ~~s~~Systems"* (*MSC.*1/*Circ.*1312).

2 The wording "largest single area over which oil fuel is liable to spread" specified in **26.4.1-2~~2.3-1(2)~~, Part R of the Rules** means as follows:

(1) The aggregate total floor area of the tank top or floor top in machinery spaces and pump rooms in oil tankers.

(2) In spaces containing oil-fired boilers and oil fuel units where a suitable coaming capable of preventing undue spread of fuel oil is provided, the area of the space enveloped by such coaming. In this case, the coaming height is to be sufficient against a list of 15 *degrees* and a trim of 10 *degrees* of the ship. However, in no case it is necessary to exceed 750 *mm*.

EFFECTIVE DATE AND APPLICATION (Amendment 1-7)

1. The effective date of the amendments is 1 January 2014.

2. Notwithstanding the amendments to the Guidance, the current requirements may apply to ships the keels of which were laid or which were at *a similar stage of construction* before the effective date.

(Note) The term "*a similar stage of construction*" means the stage at which the construction identifiable with a specific ship begins and the assembly of that ship has commenced comprising at least 50 *tonnes* or 1%* of the estimated mass of all structural material, whichever is the less.

* For high speed craft, "1%" is to be read as "3%".