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 2010 AMENDMENT NO.1
Guidance for the Survey and Construction of Steel Ships
Part R 2010 AMENDMENT NO.1

Rule No.24 / Notice No.42 15th April 2010
Resolved by Technical Committee on 5th February 2010
Approved by Board of Directors on 23rd February 2010

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RULES FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS

RULES

Part R Fire Protection, Detection and Extinction

2010 AMENDMENT NO.1

Rule No.24 15th April 2010

Resolved by Technical Committee on 5th February 2010

Approved by Board of Directors on 23rd February 2010

Rule No.24 15th April 2010
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 1 GENERAL

1.2 Application of Requirements for Tankers

Paragraph 1.2.3 has been amended as follows.

1.2.3 Liquid Cargoes with a Flashpoint above 60℃

1 Liquid cargoes with a flashpoint above 60℃ other than oil products or liquid cargoes subject to the requirements of **Part S** may be considered to constitute a low fire risk, not requiring the protection of a foam extinguishing system.

2 Tankers carrying ~~petroleum products~~ liquid cargoes with a flashpoint above 60℃ (closed cup test), as determined by an approved flashpoint apparatus, are to comply with the requirements provided in **10.2.1-4(4)** and **10.10.2-2** and the requirements for cargo ships other than tankers, except that, in lieu of the fixed fire extinguishing system required in **10.7**, they are to be fitted with a fixed deck foam system which is to comply with the provisions of **Chapter 34**.

EFFECTIVE DATE AND APPLICATION (Amendment 1-1)

1. The effective date of the amendments is 15 April 2010.

Amendment 1-2

Chapter 9 CONTAINMENT OF FIRE

9.4 Protection of Openings in Fire Resisting Divisions

Paragraph 9.4.1 has been amended as follows.

9.4.1 Doors in Fire-resisting Divisions

The fire resistance of doors is to be equivalent to that of the division in which they are fitted, this being approved by the Society or organizations deemed appropriate by the Society in accordance with the Fire Test Procedures Code. Doors approved as "*A*" class without the sill being part of the frame are to be installed such that the gap under the door does not exceed 12*mm* and a non-combustible sill is to be installed under the door such that floor coverings do not extend beneath the closed door. Doors approved as "*B*" class without the sill being part of the frame are to be installed such that the gap under the door does not exceed 25*mm*. Doors and door frames in "*A*" class divisions are to be constructed of steel. Doors in "*B*" class divisions are to be non-combustible. Doors fitted in boundary bulkheads of machinery spaces of category *A* are to be reasonably gas tight and self-closing. In ships constructed according to method I*C*, the Society may permit the use of combustible materials in doors separating cabins from individual interior sanitary accommodation such as showers.

9.7 Ventilation Systems

Paragraph 9.7.1 has been amended as follows.

9.7.1 Duct and Dampers

1 Ventilation ducts are to be of ~~non-combustible~~ steel or equivalent material. However, short ducts, not generally exceeding 2*m* in length and with a free cross-sectional area not exceeding $0.02m^2$, need not be ~~non-combustible~~ steel or equivalent, subject to the following conditions:

(1) these ducts are to be of ~~a~~ any material which ~~has low flame spread characteristics~~ is fire resistant and non-combustible;

(2) the ducts may be faced internally and externally with membranes having low flame-spread characteristics and, in each case, a calorific value not exceeding $45MJ/m^2$ of their surface area for the thickness used;

(~~2~~3) they may only be used at the end of the ventilation device; and

(~~3~~4) the ducts are not to be situated less than 600*mm*, measured along the duct, from an opening in an "*A*" or "*B*" class division including continuous "*B*" class ceiling.

2 The following arrangements are to be tested and approved by the Society or organizations deemed appropriate by the Society in accordance with the Fire Test Procedures Code:

(1) fire dampers, including relevant means of operation; and

(2) 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.

Paragraph 9.7.4 has been amended as follows.

9.7.4 Exhaust Ducts from Galley Ranges

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 and, in addition, a fire damper in the upper 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.

Chapter 25 FIXED GAS FIRE-EXTINGUISHING SYSTEMS

25.2 Engineering Specifications

Paragraph 25.2.1 has been amended as follows.

25.2.1 General Requirements

1 Fire-extinguishing medium

(1) Where the quantity of the 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. The system is to be fitted with normally closed control valves arranged to direct agent into appropriate space.

(2) (Omitted)

(3) (Omitted)

(4) (Omitted)

2 Installation requirements

(1) The piping for the distribution of fire-extinguishing medium is to be arranged and discharge nozzles so positioned that a uniform distribution of medium is obtained. System flow calculations are to be performed using a calculation technique acceptable to Society.

(2) (Omitted)

(3) (Omitted)

(4) In piping sections where valve arrangements introduce sections of closed piping, such sections are to be fitted with pressure relief valve and the outlet of such valves are to be led to open decks.

(5) All discharge piping, fittings and nozzles in protected spaces are to be constructed of materials having a melting temperature which exceeds 925°C. Such piping and associated equipment are to be adequately supported.

(6) Fitting are to be installed in discharge piping to permit air testing that is required by the Society.

3 System control requirements

(1) 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 provisions are to be made to prevent inadvertent release of the medium into the space. The pipes may pass through accommodations 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.

(2) Means are to be provided for automatically giving audible and visual warnings 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 audible alarms is to be located so as to be audible throughout the protected space with all machinery operating, and such alarms are to be distinguished from other audible alarms by adjustment of sound pressure or sound patterns. 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 *seconds* 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.

(3) (Omitted)

(4) (Omitted)

Paragraph 25.2.2 has been amended as follows.

25.2.2 Carbon Dioxide Systems

1 Quantity of fire extinguishing medium

(1) (Omitted)

(2) (Omitted)

(3) (Omitted)

(4) (Omitted)

(5) (Omitted)

(6) For the purpose of this paragraph, in cases where two or more machinery spaces are not entirely separate, they are to be considered as forming one space.

2 Controls of carbon dioxide systems protecting ro-ro spaces or other spaces which are normally manned or where personnel can be expected to enter or access, 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 activities 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 a second control is to be used for opening the valve of the piping which conveys the gas into the protected space~~. Positive means are to be provided so they that they can only be operated in that order; and

(2) (Omitted)

3 In cases where a low pressure carbon dioxide system is fitted to comply with this regulation, the following **(1)** to **(13)** apply:

(1) System control devices and refrigerating plants are to be located within the same room as where pressure vessels are stored.

(2) The rated amount of liquid carbon dioxide is to be stored in vessel(s) under the working pressure in the range of 1.8N/mm^2 to 2.2N/mm^2. The normal liquid charge in the container is to be limited to provide sufficient vapour space to allow for expansion of the liquid under the maximum storage temperatures than can be obtained corresponding to the setting of the pressure relief valves, but is not to exceed 95% of the volumetric capacity of the container.

(3) Vessels are to be provided with the following equipment:

(a) Pressure gauge

(b) High pressure alarm (preset level is not to be more than setting of the relief valve)

(c) Low pressure alarm (preset level is not to be less than 1.8 *MPa*)

(d) Branch pipes with stop valves for filling the vessels

(e) Carbon dioxide gas discharge pipes

(f) Liquid CO_2 level indicator（fitted on the vessel(s)); and

(g) Two safety valves.

(4) The two safety relief valves are to be arranged so that either valve can be shut off while the other is connected to the vessel. The setting of the relief valves is not to be less than 1.1 times working pressure. The capacity of each valve is to be such that the vapours generated under fire condition can be discharged with a pressure rise not more than 20% above the setting pressure. The discharge from the safety valves is to be led to the open.

(5) Vessel(s) and outgoing pipes permanently filled with carbon dioxide are to have thermal insulation preventing the operation of the safety valve for a period of 24 h after de-energizing the plant, at an ambient temperature of 45°C and an initial pressure equal to the starting pressure of the refrigeration unit.

(6) Vessel(s) are to be serviced by two automated completely independent refrigerating units solely intended for this purpose, each comprising a compressor and the relevant prime mover, evaporator and condenser.

(7) The refrigerating capacity and automatic control of each unit are to be so as to maintain the required temperature under conditions of continuous operation during 24 h at sea temperatures up to 32°C and ambient air temperatures up to 45°C.

(8) Each electric refrigerating unit is to be supplied from the main switchboard busbars by a separate feeder.

(9) Cooling water supply to the refrigerating plant (in cases where required) are to be provided from at least two circulating pumps one of which is being used as a stand-by. The stand-by pump may be a pump used for other services so long as its use for cooling would not interfere with any other essential service of the ship. Cooling water is to be taken from not less than two sea connections, preferably one port and one starboard.

(10) Safety relief devices are to be provided in each section of pipe that may be isolated by block valves and in which there could be a build-up of pressure in excess of the design pressure of any of the components.

(11) Audible and visual alarms are to be given in a central control station or, in accordance with the requirements of **4.3.3, RULES FOR AUTOMATIC AND REMOTE CONTROL SYSTEMS**, where a central control station is not provided, when:

(a) The pressure in the vessel(s) reaches the low and high values according to **(3)(b)** or **(c)** above;

(b) Any one of the refrigerating units fails to operate; or

(c) The lowest permissible level of the liquid in the vessels is reached.

(12) If the system serves more than one space, means for control of discharge quantities of CO_2 are to be provided, e.g. automatic timer or accurate level indicators located at the control position(s).

(13) If a device is provided which automatically regulates the discharge of the rated quantity of carbon dioxide into the protected spaces, it is to be also possible to regulate the discharge manually.

EFFECTIVE DATE AND APPLICATION (Amendment 1-2)

1. The effective date of the amendments is 1 July 2010.

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

2010 AMENDMENT NO.1

Notice No.42 15th April 2010

Resolved by Technical Committee on 5th February 2010

Notice No.42 15th April 2010
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

R20 PROTECTION OF VEHICLE AND RO-RO SPACES

R20.5 Fire-extinction

Paragraph R20.5.1 has been amended as follows.

R20.5.1 Fixed Fire-extinguishing Systems

1 (Omitted)
2 (Omitted)
3 (Omitted)
4 (Omitted)
5 (Omitted)
6 (Omitted)
7 The "drainage systems" required by **20.5.1-4, Part R of the Rules** are to comply with the following **(1)** and **(2)**. However, in cases where the direct overboard discharge provisions or the bilge systems have a capacity sufficient for the additional flow from the fixed fire-extinguishing system and the required number of fire hoses, additional drainage facilities are not required.

(1) Arrangements above the bulkhead deck are to comply with the following **(a)** to **(d)**:

(a) an adequate number of properly-sized drains are to be provided on each deck to ensure that the combined water flow from the fixed fire-extinguishing system and required number of fire hoses can be rapidly discharged overboard or drain to a bilge system with a reservoir tank fitted with a high water level alarm. "Drains" as used in this Chapter, refers to either scupper wells and scuppers, freeing ports, or bilge wells and drain pipes. However, freeing ports are not to be installed in enclosed the superstructures specified in **2.1.20, Part A of the Rules**.

(b) At least four drains are to be located on each side of a protected space, uniformly distributed fore and aft.

(c) The drainage system on each side of a deck is to have an aggregate capacity of not less than 125% of the maximum flow rate of the fixed fire-extinguishing system water pumps plus the flow from two fire hoses (four if required by **19.3.1-2, Part R of the Rules**). In cases where an automatic deep well or submersible pumping system is installed, the bilge pump capacity can be subtracted from the required drainage capacity.

(d) The minimum capacity of scuppers, freeing ports or a combination thereof are to be determined in accordance with the following **(i)** or **(ii)** respectively.

(i) The minimum required area of scuppers and connected piping is to be determined by the following formula. The area of each individual drain is not to be less than $0.0078m^2$ or 125*mm* diameter piping:

$$A = \frac{Q}{0.5\sqrt{19.62(h - \sum h_l)}}$$

where

A: The total required sectional area of the drains on each side of the deck in (m^2);

Q: The combined waterflow from the fixed fire-extinguishing system and the required number of fire hoses in (m^3/s);

h: The elevation head difference between the bottom of the scupper well or suction level and the overboard discharge opening or highest approved load line in (*m*); and

$\sum h_l$: The summation of head losses corresponding to scupper piping, fittings and valves in (*m*).

(ii) The minimum required area of freeing ports is to be determined by the following formula. If the cross-sectional area of freeing ports required by **23.2.2, Part C of the Rules** is equal to or greater than determined above, additional freeing ports are not required:

$$A = \frac{Q}{0.5\sqrt{19.62(h_1 - h_2)}}$$

where

A: The total required sectional area of freeing ports on each side of the ship (m^2);

Q: The combined waterflow from the fixed fire-extinguishing system and the required number of fire hoses (m^3/s); and

$h_1 - h_2$: The depth of water on each deck .This value is to be calculated by multiplying the maximum flow rate of the installed fire-extinguishing system water pumps plus the flow from two fire hoses (four if required by **19.3.1-2, Part R of the Rules**) by an operating time of 30 *min*. This volume of water is to be divided by the area of the affected deck (*m*).

(2) Arrangements below the bulkhead deck are to be comply with the following **(a)** to **(f)**:

(a) An efficient bilge pumping system is to be provided to ensure that the combined water flow from the fixed fire-extinguishing system and the required number of fire hoses can be rapidly collected and led to suitable arrangements for discharge overboard. The bilge system capacity is to be not less than that required by following **(c)**.

(b) The bilge piping system is to be arranged in accordance with **13.5, Part D of the Rules**. At least four bilge wells are to be located on each side of a protected space, uniformly distributed fore and aft.

(c) The bilge pumping system on each side of the ship is to have an aggregate capacity of not less than 125% of the maximum flow rate of the fixed fire-extinguishing system water pumps plus the flow from two fire hoses (four, if required by **19.3.1-2, Part R of the Rules**).

(d) The required area of the main and branch bilge pipes for a protected space are to be adequate to ensure a waterflow of 2*m/s* in each section of piping in accordance with the following **(i)** to **(iii)**:

(i) If the drainage system is a bilge pumping system, the following three criteria are to be satisfied:

$$\sum Q_{bpump} \geq 1.25Q$$

$A_M \geq 0.625Q$

$\sum A_B \geq 0.625Q$

where

$\sum Q_{bpump}$: The combined capacity of all power bilge pumps except the emergency bilge pump (m^3/s);

Q: The combined waterflow from the fixed fire-extinguishing system and the required number of fire hoses (m^3/s);

A_M: The sectional area of the main bilge pipe of the protected space (m^2)

$\sum A_B$: The total sectional area of branched bilge pipes for each side (m^2).

(ii) If the drainage system is based on gravity drains leading to a reservoir tank, the minimum required area of drains and connected piping are to be determined by **(1)(d)** above.

(iii) If the drainage system is a combined system, the relevant dimensioning for each part of the system is to be determined using **(i)** and **(ii)**.

(e) The required capacity of each bilge well is to be at least 0.15m^3.

(f) If the system includes a reservoir tank, the tank is to have adequate capacity for at least 20 *min* of operation at the required drainage capacity for the affected space.

~~7~~8 The wording "suitable measures to limit the adverse effect upon stability of the added weight and free surface of water" required in **20.5.1-4, Part R of the Rules** means that the ship is to comply with the stability criteria specified in **2.2.1-1, Part U of the Rules** in any stage of accumulating water discharged from the fixed pressure water-spraying system in the cargo space. The initial condition of loading is to be in accordance with the provisions specified in **C31A.2**.

9 The wording "means to prevent the blockage of drainage arrangements" required in **20.5.1-5, Part R of the Rules** means that arrangements are to comply with the following **(1)** to **(3)**:

(1) An easily removable grating, screen or other means is to be installed over each drain opening in protected spaces to prevent debris from blocking the drain. The total open area ratio of the grating to the attached drain pipe is to be at least 6 to 1. The grating is to be raised above the deck or installed at an angle to prevent large objects from blocking the drain. No dimensions of individual openings in the grating are to be more than 25*mm*.

(2) No grating or screen is required in cases where a fixed mechanical system is provided to unblock the drainage system or in cases where the drainage system, excluding a gravity drain system, is provided with its own filter.

(3) A clearly visible sign or marking are to be provided not less than 1,500*mm* above each drain opening stating, "Drain opening – do not cover or obstruct". The marking are to be at least 50*mm* in height.

10 In lieu of the above, the Administration, after having given consideration to ship arrangement and equipment, may accept other fixed installations if they afford equivalent protection. Any equivalent protection is to demonstrate the capability to rapidly drain fire-fighting water from affected decks and prevent the build-up of free surfaces under expected conditions of trim and list, for as long as the fire-extinguishing system is in operation.

EFFECTIVE DATE AND APPLICATION (Amendment 1-1)

1. The effective date of the amendments is 1 January 2010.

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 1-2

R20 PROTECTION OF VEHICLE AND RO-RO SPACES

R20.3 Precaution against Ignition of Flammable Vapours in Closed Vehicle Spaces and Closed Ro-Ro Spaces

Paragraph R20.3.2 has been amended as follows.

R20.3.2 Electrical Equipment and Wiring

1 The wording "electrical equipment of a type suitable for use in explosive petrol and air mixture" in **20.3.2-1, Part R of the Rules** means those generally meeting the requirements in **2.16, Part H of the Rules**, having an intrinsically safe, flameproof ~~or~~, pressurized, increased safety, encapsulation, powder filling or oil immersion construction grouped into Apparatus Group II*A* and Temperature Class *T*3 as specified in *IEC* Publication 60079 or Explosion Class *d*3 and Ignition Group *G*3 as specified in Technical Recommendation issued by, National Institute of Industrial Safety, Independent Administrative Institution in Japan, or equivalent thereto. Further, the wording "wiring of a type suitable for use in explosive petrol and air mixture" means generally cables which comply with the requirements in **4.2.4-5, Part H of the Rules**.

2 The wording "electrical equipment of a type so enclosed and protected as to prevent the escape of sparks" in **20.3.2-2, Part R of the Rules** means the following **(1)** or **(2)**.

(1) The electrical equipment with a protection degree of at least IP55 as defined in **H2.1.3-4**.

(2) The electrical equipment suitable for use in the area of zone 2 as specified in *IEC* 60079 (*e.g.* type of protection "*n*") and with a Temperature class of at least *T*3 as defined in *IEC* 60079.

3 The wording "platforms with openings of sufficient size permitting penetration of petrol gases downwards" in **20.3.2-2, Part R of the Rules** means, for example, grating decks.

4 The wording "deck" in the provisions of **20.3.2-2, Part R of the Rules** excludes, for instance, grating decks with openings of sufficient size permitting penetration of petrol gases downwards.

EFFECTIVE DATE AND APPLICATION (Amendment 1-2)

1. The effective date of the amendments is 15 April 2010.

Amendment 1-3

R9 CONTAINMENT OF FIRE

R9.2 Thermal and Structural Boundaries

R9.2.3 Bulkheads within Accommodation Area

Sub-paragraph -15 has been added as follows.

15 With respect to the provisions of **9.2.3, Part R of the Rules**, the category of fan rooms serving machinery spaces of category *A* are to be as follows:

(1) A fan room solely serving machinery spaces of category *A* or multiple spaces containing machinery spaces of category *A*, may be treated as "other machinery spaces having little or no fire risk" referred to in footnote *i* of **Table R9.1** and **R9.2, Part R of the Rules**. In this case:
   (a) boundaries between the fan room and machinery spaces of category *A* are to be of "*A*-0" fire integrity;
   (b) duct penetrations between fan rooms and machinery spaces of category *A* are to comply with **9.7.3-1(2), Part R of the Rules** regardless of the ventilation duct free cross-sectional area;
   (c) ducts serving machinery spaces of category *A* are to be routed directly to the relevant fan(s) and from the fan to the louvers; and
   (d) closing of the ventilation duct to/from machinery spaces of category *A* is to be possible from outside machinery spaces of category *A*. In this case, the controls for the closing of the machinery spaces of category *A* ventilation duct (i.e., a fire damper installed in accordance with **(b)** above) can be located inside the fan room.

(2) A fan room solely serving machinery spaces of category *A* may be considered as part of the machinery spaces of category *A*. In this case:
   (a) requirements for fire integrity of the horizontal boundary between fan room and machinery spaces of category *A* need not apply; and
   (b) closing the ventilation duct to/from machinery spaces of category *A* is to be possible from outside machinery spaces of category *A*. In this case, the controls for closing of the ventilation trunk are to be located outside the fan room.

R9.2.4 Tankers

Sub-paragraph -1 has been amended as follows.

1 With respect to the requirements of **9.2.4-2, Part R of the Rules**, the provisions of **-1** to **-1~~4~~5** of **R9.2.3** are to be referred to.

R10 FIRE FIGHTING

R10.8 Cargo Tank Protection

R10.8.1 Fixed Deck Foam Systems

Sub-paragraph -3 has been added as follows.

3 With respect to the provisions of **10.8.1, Part R of the Rules**, in cases where pipe trunks that enclose cargo pipes, etc. are situated on top of tank decks, the following are to be complied with:

(1) The pipe trunk is to be protected by a fixed fire-extinguishing system in accordance with **10.9, Part R of the Rules**. This extinguishing system is to be operable from a readily accessible position outside the pipe trunk;

(2) The pipe trunk is not considered part of the cargo tanks deck area;

(3) The area of the pipe trunk does not need to be included in the cargo tank deck area specified in **34.2.2-1(1), Part R of the Rules**;

(4) Lighting in the pipe trunk is to be in accordance with **4.5.10(2), Part R of the Rules**;

(5) The pipe trunk is to be provided with a system for the continuous monitoring of the concentration of hydrocarbon gases in accordance with **4.5.10(3), Part R of the Rules**; and

(6) If the pipe trunk contains valves, pumps or any other instruments that possibly may become a source of flammable gas, this area is to satisfy the other provisions that are applied to cargo pomp-rooms in addition to **(1)** to **(5)**. However, pipes and flanges do not need to be considered as instruments that possibly may become a source of flammable gas.

EFFECTIVE DATE AND APPLICATION (Amendment 1-3)

1. The effective date of the amendments is 15 April 2010.

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.

Amendment 1-4

R32 FIXED EMERGENCY FIRE PUMPS

R32.2 Engineering Specifications

Paragraph R32.2.2 has been amended as follows.

R32.2.2 Component Requirements

1 ~~If the emergency fire pump is the main supply of water for any fixed fire extinguishing system provided to protect the space where the main fire pumps are located, the pump is to have the capacity for this system, in addition to, the capacity required in **32.2.2-1, Part R of the Rules**.~~ In cases where a fixed water-based fire-extinguishing system installed for the protection of the machinery space in accordance with **10.5, Part R of the Rules** is supplied by the emergency fire pump then the following **(1)** to **(3)** are to be complied with.

(1) The emergency fire pump capacity is to be adequate to supply the fixed fire-extinguishing system at the required pressure plus two jets of water.

(2) The required capacity of two jets of water is to be determined by **Table R32.2.2-1** based on the biggest nozzle size available on board (the nozzles located in the space where the main fire pumps are located are to be excluded).

(3) With respect to the provisions of **32.2.2-2, Part R of the Rules**, the pressure at any hydrants is to be not less than $0.27 N/mm^2$.

Table R32.2.2-1 Capacity of two jets of water

Nozzle size	12*mm*	16*mm*	19*mm*
Capacity of two jets of water	$25 m^3/h$	$32 m^3/h$	$47 m^3/h$

2 With respect to the requirements of **32.2.2-3, Part R of the Rules**, the emergency fire pump is to be of self-priming type or equivalent thereto and is to be so arranged that they are immediately operable when in use.

EFFECTIVE DATE AND APPLICATION (Amendment 1-4)

1. The effective date of the amendments is 15 April 2010.

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 1-5

R9 CONTAINMENT OF FIRE

R9.7 Ventilation Systems

Paragraph R9.7.1 has been amended as follows.

R9.7.1 Duct and Dampers

1 With respect to the provisions of **9.7.1, Part R of the Rules**, ~~irrespective of the sectional area, the ventilation ducts are, in principle, to be of non-combustible material. However,~~ flexible bellows of combustible material may be used for connecting fans to the ducting in air conditioning room, except the extent specified in **-2**.

2 With respect to the provisions of **9.7.1-1, Part R of the Rules**, combustible gaskets in flanged ventilation duct connections are not permitted within 600*mm* of an opening in an "*A*" class or "*B*" class division and in ducts required to be of "*A*" class construction.

3 The term "free cross-sectional area" specified in **9.7.1, Part R of the Rules** means, even if the case of a pre-insulated duct, the area calculated on the basis of the inner diameter of the duct.

4 "The calorific value" specified in **9.7.1(2), Part R of the Rules** is to be measured by the bomb method specified in *JIS M* 8814 or by *ISO* 1716 on "Determination of Calorific Potential".

~~**4**~~**5** Fire dampers required to be fitted in the requirements of **9.7.4(2), Part R of the Rules** need not comply with the requirements of **9.7.1-2, Part R of the Rules**, provided that they are to be capable of stopping the draught.

R9.7.4 Exhaust Ducts from Galley Ranges

Sub-Paragraph -1 has been amended as follows.

1 With respect to the requirements in **9.7.4, Part R of the Rules**, the exhaust ducts from galley ranges are to be in accordance with the following requirements **(1)** to **(5)**:

(1) The exhaust ducts from galley ranges are, in principle, to be independent from other ducts. In case where this is impracticable, i.e., where the ducts are connected to other ducts for other ventilation purposes, self-closing type fire dampers which can be remotely-operated are to be fitted to the other branch ducts in order to be capable of closing these dampers together with those for galley ranges simultaneously.

(2) Unless otherwise permitted by the Society, the term of "spaces containing combustible materials" will normally apply to all spaces in accommodation.

(3) The wording "exhaust ducts from galley ranges are to be constructed of "*A*" class divisions" means that ducts are to be of steel with a thickness of 4.5*mm* or more. "*A*" class applies only to the part of the duct outside the galley and the part where such duct piercing a bulkhead.

(4) The fire dampers located at the lower end of the ducts and the upper end of the ducts are to be such that they can be readily and safely closed in the galley in case of fire in way of range.

(5) In case where the carbon dioxide gas fire extinguishing system specified in **Chapter 25, Part R of the Rules** is provided as fixed means for extinguishing a fire within the exhaust duct, the quantity of fire extinguishing medium is to be 100% or more of the volume of the duct spaces to be protected.

R25 FIXED GAS FIRE-EXTINGUISHING SYSTEMS

R25.1 General

Paragraph R25.1.1 has been amended as follows.

R25.1.1 Application

1 (Omitted)

2 Except for those items specified in this Guidance, general items related to equipment and system are to comply with the requirements given in **Chapter 1**, vessels with **Chapter 10**, welding with **Chapter 11**, piping systems with **Chapters 12** and **13**, and refrigerating plants with **Chapter 17** of **Part D of the Rules** respectively.

R25.2 Engineering Specifications

Paragraph R25.2.1 has been amended as follows.

R25.2.1 General Requirements

1 (Omitted)

~~**2** The containers for the storage of fire-extinguishing medium and associated pressure components at a low pressure specified in **25.2.1-1(4), Part R of the Rules** are to comply with **Annex R25.2.1-1 "GUIDANCE FOR LOW PRESSURE CONTAINERS AND ASSOCIATED PRESSURE COMPONENTS FOR THE STORAGE OF FIRE-EXTINGUISHING CARBON DIOXIDE GAS".~~

~~**3**~~**2** The wording "spare parts to the satisfaction of the Society" specified in **25.2.1-2(3), Part R of the Rules** means the rupture seals (including those for starting and the packing) for all containers and rupture discs (including those for starting and the packing) for 1/3 thereof.

3 The wording "air testing that is required by the Society" specified in **25.2.1-2(6), Part R of the Rules** means the test specified in **B2.1.4-1(3)**.

4 (Omitted)

5 (Omitted)

6 (Omitted)

7 (Omitted)

8 (Omitted)

Paragraph R25.2.2 has been amended as follows.

R25.2.2 Carbon Dioxide Systems

1 (Omitted)

2 For the bulkheads or decks forming the boundaries of the storage room of fire-extinguishing medium for the system required in **25.2.2, Part R of the Rules**, consideration is to be given so as not to permit the internal temperature rises above the maximum design service temperature. The maximum design service temperature of a low pressure gas vessel is 45°C.

3 The means of gas control of the fixed gas fire-extinguishing system specified in **25.2.2, Part R of the Rules** is to comply with the following requirements:

(1) (Omitted)

(2) In case where discharge of carbon dioxide gas is remotely controlled, manual means of control is to be provided at the storage position of gas containers. ~~For the low pressure carbon~~

~~dioxide system, audible and visible alarms are to be provided so as to be clearly distinguished when liquid level in a gas container reaches the lowest permissible level or when carbon dioxide gas is being discharged at the fire control station and wheel house and by watch persons at machinery space.~~

(3) (Omitted)

(4) (Omitted)

(5) (Omitted)

(6) (Omitted)

(7) The wording "Positive means" specified in **25.2.2-2(1), Part R of the Rules** means documented operating procedures are to be posted at appropriate places.

4 The low pressure vessels of the carbon dioxide gas for fire-extinguishing and their associated equipment specified in **25.2.2-3, Part R of the Rules** are to comply with the following requirements:

(1) Vessels are to be classified into Pressure Vessels, Group I (*PV*-1). The design pressure of the vessels is not to be less than the set pressure of the pressure relief valves. The welding of manhole rings and pipe nozzles to the shell of the vessel is to be of the full penetration type.

(2) The capacity of each pressure relief valve may be calculated in accordance with the following formula:

$$W = \frac{9400\lambda(650 - t)A^{0.82}}{\sigma L} + \frac{H}{L}$$

W: Total relieving capacity per hour (*kg/h*)

A: External surface area of the vessel (m^2)

t: Temperature of CO_2 at relieving conditions, i.e. the pressure at which the pressure valve is set. (℃)

L: Latent heat of CO_2 being vapourized at relieving conditions (*J/kg*)

λ: Heat conductivity of insulation material under normal working temperature (*Watt/m·K*)

σ: Thickness of the heat insulating material (*m*)

H: Correction factor for other heat sources

H = Quantity of heat input ($J/m^2 \cdot h$) × *a*

a: exposed area for heat source (m^2)

(3) The high pressure alarm, the low pressure alarm and the low level alarm specified in **25.2.2-3, Part R of the Rules** are to be audible and visible at the navigation bridge and at the places where such alarms can be confirmed by the engineer on duty.

(4) The insulating materials and their lines are to be to the satisfaction of the Society, having in mind, in particular their self-extinguishing property and mechanical properties, as well as protection against penetration of water vapours.

(5) The design pressures of pipes, valves and fittings provided between the vessel and the distribution manifold are not to be less than the design pressure of the vessel. The design pressures of pipes and fittings provided in the downstream of the distribution manifold are not to be less than the maximum working pressure of the fluid in the pipe and be not less than 1.0*MPa*.

(6) In the event of failure of either one of the refrigerating units the other is to be actuated automatically. In this case, audible and visible alarms are to be annunciated at the navigating bridge and the places where the alarms can be confirmed by the engineer officer on duty.

(7) Provision is to be made for local manual control of the refrigerating plant.

(8) The supporting legs of the vessels are to be installed on the seating by way of suitable thermal insulation.

~~4~~**5** (Omitted)
~~5~~**6** (Omitted)

Annex R25.2.1-2 has been deleted.

~~**Annex R25.2.1-2 GUIDANCE FOR LOW PRESSURE VESSELS OF CARBON DIOXIDE GAS FOR FIRE-EXTINGUISHING AND THEIR ASSOCIATED EQUIPMENT**~~

(the rest is omitted)

EFFECTIVE DATE AND APPLICATION (Amendment 1-5)

1. The effective date of the amendments is 1 July 2010.

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

R29 FIXED FIRE DETECTION AND FIRE ALARM SYSTEMS

R29.2 Engineering Specifications

Paragraph R29.2.2 has been added as follows.

R29.2.2 Source of Power Supply

With respect to the requirements specified in **29.2.2, Part R of the Rules**, the following requirements are to be considered.

(1) Continuity of power supply

(a) Operation of the automatic changeover switch or a failure of one of the power supplies is not to result in any permanent or temporary degradation of the fixed fire detection and fire alarm systems.

(b) In cases where fixed fire detection and fire alarm systems would be degraded by a momentary loss of power, a source of stored energy having adequate capacity is to be provided to ensure continuous operation during the changeover between power supplies.

(c) Circuits of electrical power supplies to an automatic changeover switch are to be arranged so that a fault will not result in the loss of all power supplies to the automatic changeover switch.

(2) Emergency supply

(a) Fixed fire detection and fire alarm system emergency power may be supplied by accumulator batteries or from emergency switchboards. In cases where the systems are supplied from accumulator batteries, arrangements are to comply with the following requirements:

i) The accumulator batteries are to have the capacity to operate fire detection systems under normal and alarm conditions during the period specified in **3.3.2-2(4), Part H of the Rules**.

ii) The rating of the charge unit, on restoration of the input power, is to be sufficient to recharge the batteries while maintaining the output supply to the fire detection systems.

iii) The accumulator batteries are to be suitably located for use in an emergency.

(b) In cases where the emergency feeders for fixed fire detection and fire alarm systems are supplied from emergency switchboards, such feeders are to run from emergency switchboards to fixed fire detection and fire alarm systems without passing through any other switchboard.

EFFECTIVE DATE AND APPLICATION (Amendment 1-6)

1. The effective date of the amendments is 1 July 2010.

2. Notwithstanding the amendments to the Guidance, the current requirements may apply to fixed fire detection and fire alarm systems those are installed on 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

R1 GENERAL

R1.2 Application of Requirements for Tankers

Paragraph R1.2.2 has been amended as follows.

R1.2.2 Additional Requirements

With respect to the requirements of **1.2.2-2, Part R of the Rules**, the following standards are to be referred to for determining the foam concentrate.

(1) ~~*Guidelines for performance and testing criteria and surveys of expansion foam concentrates for fire-fighting systems for chemical tankers* (*MSC/Circ.*799)~~
Revised guidelines for the performance and testing criteria, and surveys of foam concentrates for fixed fire-extinguishing systems (*MSC.*1/*Circ.*1312)

(2) *Information on flashpoint and recommended fire-fighting media for chemicals to which neither the IBC nor BCH Codes apply* (*MSC/Circ.*553)

R24 FIRE EXTINGUISHERS

R24.2 Engineering Specifications

Paragraph R24.2.2 has been amended as follows.

R24.2.2 Portable Foam Applicators

"Approved foam concentrates" specified in **24.2.2-2(2), Part R of the Rules** means concentrates that have been approved by organizations authorized by the Administration or deemed appropriate by the Society with reference to the ~~"*Guidelines for the performance and testing criteria and surveys of low-expansion foam concentrates for fixed fire-extinguishing systems*" (*MSC/Circ.*582/*Corr.*1)~~ "*Revised guidelines for the performance and testing criteria, and surveys of foam concentrates for fixed fire-extinguishing systems*" (*MSC.*1/*Circ.*1312).

R26 FIXED FOAM FIRE-EXTINGUISHING SYSTEMS

R26.2 Engineering Specifications

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

Sub-paragraph -1 has been amended as follows.

1 The wording "approved foam concentrates" specified in **26.2.3-1(1), Part R of the Rules** means the ones approved by organizations authorized by the Administration or deemed appropriate by the Society with reference to the ~~*"Guidelines for performance and testing criteria and surveys of low-expansion foam concentrates for fire-extinguishing systems*" (*MSC/Circ.*582/*Corr.*1)~~ *"Revised guidelines for the performance and testing criteria, and surveys of foam concentrates for fixed fire-extinguishing systems*" (*MSC.*1/*Circ.*1312).

R34 FIXED DECK FOAM SYSTEMS

R34.2 Engineering Specifications

R34.2.2 Component Requirements

Sub-paragraph -2 has been amended as follows.

2 The application rate of the foam and the capacity of a monitor installation to the satisfaction of the Society specified in **34.2.2-2, Part R of the Rules** are to comply with the following guidelines:

(1) ~~*Guidelines for the performance and testing criteria, and surveys of low-expansion foam concentrates for fixed fire-extinguishing systems* (*MSC/Circ.*582)~~
Revised guidelines for the performance and testing criteria, and surveys of foam concentrates for fixed fire-extinguishing systems (*MSC.*1/*Circ.*1312)

(2) *Guidelines for the performance and testing criteria, and surveys of middle expansion foam concentrates for fixed fire-extinguishing systems* (*MSC/Circ.*798)

EFFECTIVE DATE AND APPLICATION (Amendment 1-7)

1. The effective date of the amendments is 1 July 2012.

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