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 2011 AMENDMENT NO.2
Guidance for the Survey and Construction of Steel Ships
Part R 2011 AMENDMENT NO.2

Rule No.82 / Notice No.90 1st November 2011
Resolved by Technical Committee on 7th July 2011
Approved by Board of Directors on 27th September 2011

ClassNK
NIPPON KAIJI KYOKAI

RULES FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS

RULES

Part R Fire Protection, Detection and Extinction

2011 AMENDMENT NO.2

Rule No.82 1st November 2011

Resolved by Technical Committee on 7th July 2011

Approved by Board of Directors on 27th September 2011

Rule No.82 1st November 2011
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 2-1

Chapter 4 PROBABILITY OF IGNITION

4.5 Cargo Areas of Tankers

4.5.7 Gas Measurement

Sub-paragraph (1) has been amended as follows.

(1) Tankers are to be equipped with~~at least~~ two portable instruments ~~deemed appropriate by the Society~~ for measuring flammable vapour concentrations and two portable instruments for measuring oxygen concentrations, together with~~a sufficient set of spares. S~~suitable means ~~are to be provided~~for the calibration of such instruments. These instruments for measuring flammable vapour concentrations are to be deemed appropriate by the Society.

EFFECTIVE DATE AND APPLICATION (Amendment 2-1)

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

Amendment 2-2

Chapter 4 PROBABILITY OF IGNITION

4.5 Cargo Areas of Tankers

4.5.7 Gas Measurement

Sub-paragraph (3) has been added as follows.

(3) Arrangements for fixed hydrocarbon gas detection systems in double-hull and double-bottom spaces of oil tankers

(a) Oil tankers of 20,000 *tonnes deadweight* and above are to be provided with a fixed hydrocarbon gas detection system complying with the **Chapter 36, Part R of the Rules** for measuring hydrocarbon gas concentrations in all ballast tanks and void spaces of double-hull and double-bottom spaces adjacent to the cargo tanks, including the forepeak tank and any other tanks and spaces under the bulkhead deck adjacent to cargo tanks.

(b) Oil tankers provided with constant operative inerting systems for such spaces need not be equipped with fixed hydrocarbon gas detection equipment.

(c) Notwithstanding the above, cargo pump-rooms subject to the provisions of **4.5.10, Part R of the Rules** need not comply with the requirements of this paragraph.

Chapter 30 SAMPLE EXTRACTION SMOKE DETECTION SYSTEMS

30.2 Engineering Specifications

Paragraph 30.2.1 has been amended as follow.

30.2.1 General Requirements

1 Wherever in the text of this chapter the word “system” appears, it means “sample extraction smoke detection system”. A sample extraction smoke detection system consists of the following main components: smoke accumulators, sampling pipes, three-way valves and control panels.

(1) Smoke accumulators: air collection devices installed at the open ends of the sampling pipes in each cargo hold that perform the physical function of collecting air samples for transmission to the control panel through the sampling pipes, and may also act as discharge nozzles for the fixed-gas fire-extinguishing system, if installed;

(2) Sampling pipes: a piping network that connects the smoke accumulators to the control panel, arranged in sections to allow the location of the fire to be readily identified;

(3) three-way valves: if the system is interconnected to a fixed-gas fire-extinguishing system, three-way valves are used to normally align the sampling pipes to the control panel and, if a fire is detected, the three-way valves are re-aligned to connect the sampling pipes to the fire-extinguishing system discharge manifold and isolate the control panel; and

(4) Control panel: the main element of the system which provides continuous monitoring of the protected spaces for indication of smoke. It typically may include a viewing chamber or smoke sensing units. Extracted air from the protected spaces is drawn through the smoke

accumulators and sampling pipes to the viewing chamber, and then to the smoke sensing chamber where the airstream is monitored by electrical smoke detectors. If smoke is sensed, the repeater panel (normally on the bridge) automatically sounds an alarm (not localized). The crew can then determine at the smoke sensing unit which cargo hold is on fire and operate the pertinent three-way valve for discharge of the extinguishing agent.

2 Any required system is to be capable of continuous operation at all times except that systems operating on a sequential scanning principle may be accepted, provided that the interval between scanning the same position twice gives a maximum allowable interval determined as follows:

(1) The interval (*I*) is to depend on the number of scanning points (*N*) and the response time of the fans (*T*), with a 20% allowance:

$I = 1.2 \times T \times N$

However, the maximum allowable interval is not to exceed 120 *seconds* (I_{max} = 120 *seconds*).

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

4 The system and equipment are to be suitably designed to withstand supply voltage variations and transients, ambient temperature changes, vibration, humidity, shock, impact and corrosion normally encountered in ships and to avoid the possibility of ignition of flammable gas air mixture.

5 The system is to be of a type that can be tested for correct operation and restored to normal surveillance without the renewal of any component.

6 An alternative power supply for the electrical equipment used in the operation of the system is to be provided.

Paragraph 30.2.2 has been amended as follow.

30.2.2 Component Requirements

1 The sensing unit is to be certified to operate before the smoke density within the sensing chamber exceeds 6.65% obscuration per metre.

2 Duplicate sample extraction fans are to be provided. The fans are to be of sufficient capacity to operate with the normal conditions or ventilation in the protected area and the connected pipe size is to be determined with consideration of fan suction capacity and piping arrangement to satisfy the conditions specified in **30.2.4-2(2).** ~~are to give an overall response time to the satisfaction of the Society.~~ Sampling pipes are to be a minimum of 12 *mm* internal diameter. The fan suction capacity is to be adequate to ensure the response of the most remote area within the required time criteria specified in **30.2.4-2(2)**. Means to monitor airflow are to be provided in each sampling line.

3 The control panel is to permit observation of smoke in the individual sampling pipe.

4 ~~Means are to be provided to monitor the airflow through to~~The sampling pipes are to be so designed as to ensure that, as far as practicable, equal quantities of airflow are extracted from each interconnected accumulator.

~~**5** Sampling pipes are to be a minimum of 12 *mm* internal diameter except when used in conjunction with fixed gas fire-extinguishing systems when the minimum size of pipe is to be sufficient to permit the fire-extinguishing gas to be discharged within the appropriate time.~~

~~**6**~~**5** Sampling pipes are to be provided with an arrangement for periodically purging with compressed air.

6 The control panel for the smoke detection system is to be tested according to standards *EN* 54-2:1997, *EN* 54-4:1997 and *IEC* 60092-504:2001. Alternative standards may be used as determined by the Administration.

Paragraph 30.2.3 has been amended as follow.

30.2.3 Installation Requirements

1 Smoke accumulators

(1) At least one smoke accumulator is to be located in every enclosed space for which smoke detection is required. However, where a space is designed to carry oil or refrigerated cargo alternatively with cargoes for which a smoke sampling system is required, means may be provided to isolate the smoke accumulators in such compartments for the system. Such means are to be to the satisfaction of the Society.

(2) Smoke accumulators are to be located on the overhead or as high as possible in the protected space, ~~for optimum performance~~ and are to be spaced so that no part of the overhead deck area is more than 12 *m* measured horizontally from an accumulator. Where systems are used in spaces which may be mechanically ventilated, the position of the smoke accumulators is to be considered having regard to the effects of ventilation. At least one additional smoke accumulator is to be provided in the upper part of each exhaust ventilation duct. An adequate filtering system is to be fitted at the additional accumulator to avoid dust contamination.

(3) Smoke accumulators are to be positioned where impact or physical damage is unlikely to occur.

~~(4) Not more than four accumulators are to be connected to each sampling point.~~

(4) Sampling pipe networks are to be balanced to ensure compliance with the requirements of **30.2.2-4**. The number of accumulators connected to each sampling pipe is to ensure compliance with the requirements of **30.2.4-2(2)**.

(5) Smoke accumulators from more than one enclosed space are not to be connected to the same sampling point.

(6) In cargo holds where non-gastight "'tween deck panels" (movable stowage platforms) are provided, smoke accumulators are to be located in both the upper and lower parts of the holds.

2 Sampling pipes

(1) The sampling pipe arrangements are to be such that the location of the fire can be readily identified.

(2) Sampling pipes are to be self-draining and suitably protected from impact or damage from cargo working.

Paragraph 30.2.4 has been amended as follow.

30.2.4 System Control Requirements

1 Visual and audible fire signals

(~~3~~1) The detection of smoke or other products of combustion is to initiate a visual and audible signal at the control panel and indicating units ~~the navigating bridge or continuously manned central control station~~.

(~~1~~2) The control panel is to be located on the navigating bridge or in the fire control station ~~the continuously manned central control station~~. An indicating unit is to be located on the navigation bridge if the control panel is located in the fire control station.

(~~2~~3) Clear information is to be displayed on or adjacent to the control panel and indicating units designating the spaces covered.

(4) Power supplies necessary for the operation of the system are to be monitored for loss of power. Any loss of power is to initiate a visual and audible signal at the control panel and the navigating bridge which is to be distinct from a signal indicating smoke detection.

(5) Means to manually acknowledge all alarm and fault signals are to be provided at the control panel. The audible alarm sounders on the control panel and indicating units may be manually

silenced. The control panel is to clearly distinguish between normal, alarm, acknowledged alarm, fault and silenced conditions.

(6) The system is to be arranged to automatically reset to the normal operating condition after alarm and fault conditions are cleared.

~~**2** The fire detection indicating panel is to be provided with facilities for functional testing.~~

~~**3**~~**2** Testing

(1) Suitable instructions and component spares are to be provided for the testing and maintenance of the system.

(2) After installation, the system is to be functionally tested using smoke generating machines or equivalent as a smoke source. An alarm is to be received at the control unit in not more than 180 *seconds* for vehicle decks, and not more than 300 *seconds* for container and general cargo holds, after smoke is introduced at the most remote accumulator."

Chapter 36 has been added as follows.

Chapter 36 Fixed Hydrocarbon Gas Detection Systems

36.1 General

36.1.1 Application

This chapter details the specifications for fixed hydrocarbon gas detection systems which are required to be provided by **4.5.7, Part R of the Rules**.

36.2 ENGINEERING SPECIFICATIONS

36.2.1 General Requirements

1 The fixed hydrocarbon gas detection systems required to be provided by this chapter are to be approved by the Society.

2 The system is to be comprised of a central unit for gas measurement and analysis and gas sampling pipes in all ballast tanks and void spaces of double-hull and double-bottom spaces adjacent to the cargo tanks, including the forepeak tank and any other tanks and spaces under the bulkhead deck adjacent to cargo tanks.

3 The system may be integrated with the cargo pump-room gas detection system, provided that the spaces referred to in paragraph **(2)** above are sampled at the rate required in **36.2.2-3(1)**. Continuous sampling from other locations may also be considered provided the sampling rate is complied with.

36.2.2 Component Requirements

1 Gas Sampling Lines

(1) Common sampling lines to the detection equipment are not to be fitted, except the lines serving each pair of sampling points as required in under **(3)**.

(2) The materials of construction and the dimensions of gas sampling lines are to be such as to prevent restriction. Where non-metallic materials are used, they are to be electrically conductive. The gas sampling lines are not to be made of aluminium.

(3) The configuration of gas sampling lines is to be adapted to the design and size of each space.

Except as provided in under **(4)** and **(5)**, the sampling system is to allow for a minimum of two hydrocarbon gas sampling points, one located on the lower and one on the upper part where sampling is required. When required, the upper gas sampling point is not to be located lower than 1*m* from the tank top. The position of the lower located gas sampling point is to be above the height of the girder of bottom shell plating but at least 0.5*m* from the bottom of the tank and it is to be provided with means to be closed when clogged. In positioning the fixed sampling points, due regard is also to be given to the density of vapours of the oil products intended to be transported and the dilution from space purging of ventilation.

(4) For ships with deadweight of less than 50,000 *tonnes*, the Society may allow the installation of one sampling location for each tank for practical and/or operational reasons.

(5) For ballast tanks in the double-bottom, ballast tanks not intended to be partially filled and void spaces, the upper gas sampling point is not required.

(6) Means are to be provided to prevent gas sampling lines from clogging when tanks are ballasted by using compressed air flushing to clean the line after switching from ballast to cargo loaded mode. The system is to have an alarm to indicate if the gas sampling lines are clogged.

2 Gas Analysis Unit

(1) The gas analysis unit is to be located in a safe space and may be located in areas outside the ship's cargo area; for example, in the cargo control room and/or navigation bridge in addition to the hydraulic room when mounted on the forward bulkhead, provided the following requirements are observed:

(a) sampling lines are not to run through gas safe spaces, except where permitted under **(e)**;

(b) the hydrocarbon gas sampling pipes are be to equipped with flame arresters. Sample hydrocarbon gas is to be led to the atmosphere with outlets arranged in a safe location, not close to a source of ignitions and not close to the accommodation area air intakes;

(c) a manual isolating valve, which is to be easily accessible for operation and maintenance, is to be fitted in each of the sampling lines at the bulkhead on the gas safe side;

(d) the hydrocarbon gas detection equipment including sample piping, sample pumps, solenoids, analysing units etc., is to be located in a reasonably gas-tight cabinet (e.g., fully enclosed steel cabinet with a door with gaskets) which is to be monitored by its own sampling point. At a gas concentration above 30% of the lower flammable limit inside the steel enclosure the entire gas analysing unit is to be automatically shut down; and

(e) where the enclosure cannot be arranged directly on the bulkhead, sample pipes are to be of steel or other equivalent material and without detachable connections, except for the connection points for isolating valves at the bulkhead and analysing unit, and are to be routed on their shortest ways.

3 Gas Detection Equipment

(1) The gas detection equipment is to be designed to sample and analyze from each sampling line of each protected space, sequentially at intervals not exceeding 30 *min*.

(2) Means are to be provided to enable measurements with portable instruments, in case the fixed system is out of order or for system calibration. In case the system is out of order, procedures are to be in place to continue to monitor the atmosphere with portable instruments and to record the measurement results.

(3) Audible and visual alarms are to be initiated in the cargo control room, navigation bridge and at the analysing unit when the vapour concentration in a given space reaches a pre-set value, which is not to be higher than the equivalent of 30% of the lower flammable limit.

(4) The gas detection equipment is to be so designed that it may readily be tested and calibrated.

EFFECTIVE DATE AND APPLICATION (Amendment 2-2)

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

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

2011 AMENDMENT NO.2

Notice No.90 1st November 2011
Resolved by Technical Committee on 7th July 2011

Notice No.90 1st November 2011
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 2-1

R4 PROBABILITY OF IGNITION

R4.5 Cargo Areas of Tankers

R4.5.7 Gas Measurement

Sub-paragraph -1 has been amended as follows.

1 The portable instruments for measuring flammable vapour and oxygen concentrations required by **4.5.7(1), Part R of the Rules** may be utilized as the portable instruments required by **4.5.7(2)(a)** and **35.2.9-4, Part R of the Rules**.

EFFECTIVE DATE AND APPLICATION (Amendment 2-1)

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

Amendment 2-2

R4 PROBABILITY OF IGNITION

R4.5 Cargo Areas of Tankers

Paragraph R4.5.3 has been amended as follows.

R4.5.3 Cargo Tank Venting

(Sub-paragraphs -1 to -4 are omitted)

5 ~~For the application of~~ The area around the vent outlets specified in **4.5.3-4(1)(c)** and **(d)**, **Part R of the Rules**~~,~~ is defined as a hazardous area in accordance with **4.3.1(2)(h)** and **4.3.1(3)(b), Part H of the Rules**. In addition, electrical equipment fitted in compliance with the applicable provisions of **4.2.4** ~~and **4.3**~~**, Part R of the Rules** is not considered as a source of ignition or ignition hazard.

R11 STRUCTURAL INTEGRITY

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

Paragraph R11.6.2 has been added as follows.

R11.6.2 Openings for Small Flow by Thermal Variations

The area around the air intakes and openings specified in **11.6.2(2)**, **Part R of the Rules** is defined as a hazardous area in accordance with **4.3.1(2)(g)** and **4.3.1(3)(a), Part H of the Rules**. In this case, the "1.5 *m*" in **4.3.1(3)(a), Part H of the Rules** is to be read as "2 *m*". Furthermore, electrical equipment fitted in compliance with the applicable provisions of **4.2.4, Part R of the Rules** is not considered as a source of ignition or ignition hazard.

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

R20.3.1 Ventilation Systems

Sub-paragraph -5 has been added as follows.

5 With respect to the requirements of **20.3.1-4(1), Part R of the Rules**, at least one access route to the controls for closure of the ventilation system complying with the following **(1)** to **(3)** is to be provided. However, in cases where remote closing and position indicator arrangements from the bridge or a fire control station for those ventilator closures are provided, the following **(1)** to **(3)** are not required.

(1) The access routes are at least 600 *mm* clear width;

(2) The access routes are provided with a single handrail or wire rope lifeline not less than 10 *mm* in diameter, supported by stanchions not more than 10 *m* apart in way of any route which involves traversing a deck exposed to weather; and
(3) The access routes are fitted with appropriate means of access (such as ladders or steps) to the closing devices of ventilators located in high positions.

R32 FIXED EMERGENCY FIRE PUMPS

R32.2 Engineering Specifications

R32.2.2 Component Requirements

Sub-paragraph -3 has been added as follows.

3 With respect to the requirements of **32.2.2-3, Part R of the Rules**, the net positive suction head (NPSH) available for the fixed emergency fire pumps is to be greater than the net positive suction head (NPSH) required under all conditions given in the following **(1)** to **(4)**:
(1) Condition taking into account heave combined pitch in head seas under the lightest seagoing condition (including the ballast exchange condition if necessary). The amount of the drop in the waterline associated with heave combined pitch is to be subject to **Table R32.2.2-2** and **Fig. R32.2.2-1**;
(2) Condition taking into account heave combined roll in beam seas under the lightest seagoing condition (including the ballast exchange condition if necessary). The inclined angle associated with heave combined roll is to be 11 *deg*. for ships with bilge keels or 13 *deg*. for ships without bilge keels;
(3) A static condition with a level of 2/3 immersion of the propeller at even keel; and
(4) An arrival ballast condition without cargo and with 10% of stores and fuel remaining.

Table R32.2.2-2 has been added as follows.

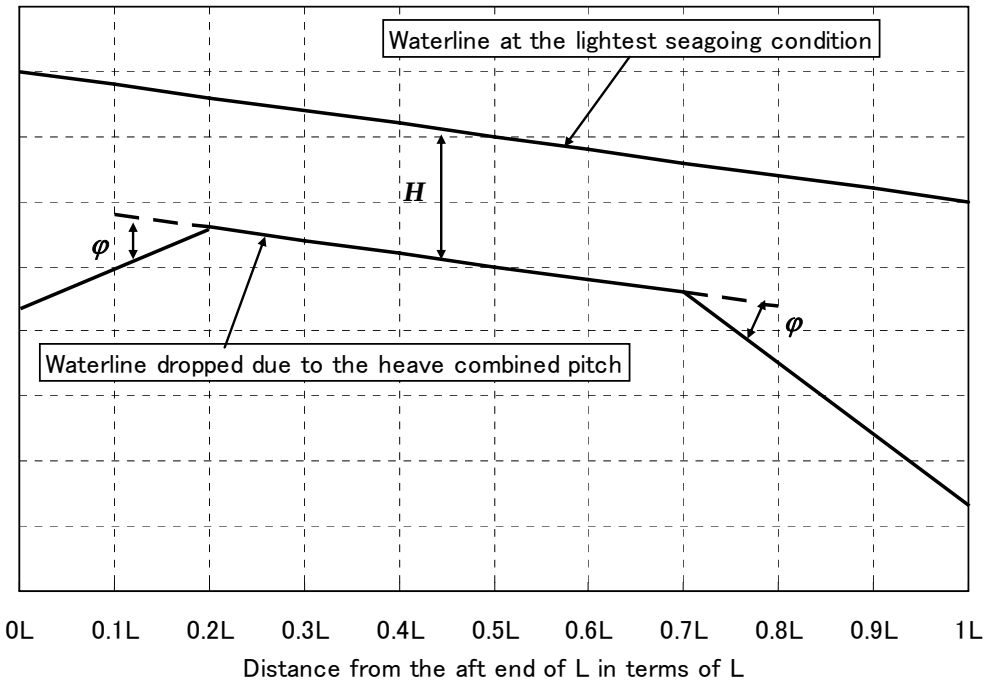
Table R32.2.2-2 Amount of drop in waterline

L (*m*)	75 and below	100	125	150	175	200	225	250	300	350 and above
φ (*deg.*)	4.5	4.0	3.2	2.7	2.3	2.1	1.8	1.7	1.6	1.5
H (*m*)	0.73	0.8	0.87	0.93	0.98	1.03	1.07	1.11	1.19	1.25

Notes:
Values at the intermediate length of ships are to be obtained by linear interpolation.
L : Length of the ship as defined in **2.1.3, Part A of the Rules** or length between perpendiculars at the ballast draught, whichever is greater
φ : Pitch angle as defined in **Fig. R32.2.2-1**
H : Heave amplitude as defined in **Fig. R32.2.2-1**

Fig. R32.2.2-1 has been added as follows.

Fig. R32.2.2-1 Amount of drop in waterline



EFFECTIVE DATE AND APPLICATION (Amendment 2-2)

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

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 2-3

R20 PROTECTION OF VEHICLE AND RO-RO SPACES

R20.4 Detection and Alarm

Paragraph R20.4.2 has been deleted.

~~**R20.4.2 Sample Extraction Smoke Detection Systems**~~

~~The wording "an overall response time" specified in **20.4.2, Part R of the Rules** means an operating time which is specified in **R29.2.3-2** in case of the fixed fire detection and alarm system, and which is specified in **R30.2.1-1** in case of the sample extraction smoke system.~~

R30 SAMPLE EXTRACTION SMOKE DETECTION SYSTEMS

R30.2 Engineering Specifications

Paragraph R30.2.1 has been deleted.

~~**R30.2.1 General Requirements**~~

~~"An over all response time to the satisfaction of the Society" specified in **30.2.1-2, Part R of the Rules** is to comply with the following requirements:~~

~~(1) for the continuous detection system, time from the extraction of smoke to the activation of a fire alarm is not to be more than 3 *minutes*;~~

~~(2) for the intermittent detection system, time from the extraction of smoke to the activation of a fire alarm is not to be more than 3 *minutes* and one cycle time for detecting all protected areas by the system is not to be more than the value calculated by the following formula.~~

~~$I = 18 \times n$~~

~~I : one cycle time for detecting all protected areas~~

~~n : number of s canning points~~

~~Where, I is not to exceed 120 *seconds*~~

Chapter 36 has been added as follows.

R36 Fixed Hydrocarbon Gas Detection Systems

R36.2 ENGINEERING SPECIFICATIONS

R36.2.1 General Requirements

The approved fixed hydrocarbon gas detection systems specified in **36.2.1-1, Part R of the Rules** means the one approved by organizations authorized by the Administration or deemed appropriate by the Society with reference to the "*Guidelines for the design, construction and testing of fixed hydrocarbon gas detection system*" (*MSC.1/Circ.1370*).

R36.2.2 Component Requirements

1 The flame arresters specified in **36.2.2-2(1)(b), Part R of the Rules** can use flame screens. Both flame arresters and flame screens are to comply with the requirements of **R4.5.3-3**. In addition, sample gas is to be led to the atmosphere with outlets provided with such devices.

2 The "safe location" for the arrangement of discharge outlets specified in **36.2.2-2(1)(d), Part R of the Rules** is to be at a horizontal distance not less than 3*m* from the nearest air intake, discharge outlet or opening to accommodation spaces, service spaces and control stations, or other non-hazardous locations.

3 A visual and audible alarm is to be provided to notify the shutting down of the gas analysing unit specified in **36.2.2-2(1)(d), Part R of the Rules**. The alarm signal is to be provided in the cargo control room and navigation bridge.

4 Copper pipes may be used for sample pipes as the equivalent material specified in **36.2.2-2(1)(e), Part R of the Rules**.

5 Bulkhead penetrations of sample pipes between safe and dangerous areas are to have the same fire integrity as the division penetrated by an equivalent construction or fittings to those specified in **R9.3**.

EFFECTIVE DATE AND APPLICATION (Amendment 2-3)

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

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.