
STATUTORY INSTRUMENTS

1993 No. 3164

MERCHANT SHIPPING

SAFETY

The Merchant Shipping (Fire Protection) (Ships Built Before 25th May 1980) (Amendment) Regulations 1993

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| <i>Made</i> | - - - - | <i>14th December 1993</i> |
| <i>Laid before Parliament</i> | | <i>7th January 1994</i> |
| <i>Coming into force</i> | - - | <i>31st January 1994</i> |

The Secretary of State for Transport, after consulting the persons referred to in section 22(2) of the Merchant Shipping Act 1979(1), in exercise of the powers conferred on him by sections 21(1)(a) and (b) and (3) to (6) and 22(1) of that Act(2) and of all other powers enabling him in that behalf, hereby makes the following Regulations:—

Citation, commencement and interpretation

1.—(1) These Regulations may be cited as the Merchant Shipping (Fire Protection) (Ships Built Before 25th May 1980) (Amendment) Regulations 1993 and shall come into force on 31st January 1994.

(2) In these Regulations—

“the 1985 Regulations” means the Merchant Shipping (Fire Protection) (Ships Built Before 25th May 1980) Regulations 1985(3).

Amendments of the 1985 Regulations

2. The 1985 Regulations shall have effect subject to the amendments specified in the Schedule to these Regulations.

(1) 1979 c. 39.

(2) Subsection (6) was amended by the Criminal Justice Act 1986 (c. 48), section 49(3).

(3) S.I.1985/1218, amended by S.I. 1986/1070; and applied by S.I. 1986/1248.

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Signed by authority of the Secretary of State for Transport

14th December 1993

Caithness
Minister of State,
Department of Transport

SCHEDULE

Regulation 2

AMENDMENTS OF MERCHANT SHIPPING (FIRE PROTECTION) (SHIPS BUILT BEFORE 25TH MAY 1980) REGULATIONS 1985

Regulation 1

1.—(1) In paragraph (2) of regulation 1—

- (a) after the definition of “Administration” there shall be inserted the following definition—

““approved” means approved by the Secretary of State;”;
- (b) for the definition of “Certificate of Fitness for the Carriage of Dangerous Chemicals in Bulk” there shall be substituted the following definition—

““Chemical tanker” means a tanker constructed or adapted and used for the carriage in bulk of any liquid product of a flammable nature listed in Chapter VI of the Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk;”;
- (c) after the definition of “Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk” there shall be inserted the following definition—

““Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk” means the code so entitled adopted by the International Maritime Organization by Resolution A.328 (IX);”;
- (d) after the definition of “fishing vessel” there shall be inserted the following definitions—

““Gas carrier” means a tanker constructed or adapted and used for the carriage in bulk of any liquefied gas or other substance of a flammable nature listed in either—

 - (a) Chapter XIX of the Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk; or
 - (b) Chapter XIX of the Gas Carrier Code for Existing Ships;

whichever Code is applicable;

“Gas Carrier Code for Existing Ships” means the 1976 edition of the International Maritime Organization’s Code for Existing Ships Carrying Liquefied Gases in Bulk as amended by the four sets of amendments adopted by the Maritime Safety Committee of the Organization in, respectively, April 1978, May 1979, May 1980, and November 1984;”;
- (e) after the definition of “Reid vapour pressure” there shall be inserted the following definition—

““relevant standard of a member State other than the United Kingdom”, in relation to a reference to an International Standard or a British Standard, means—

 - (a) a relevant standard or code of practice of a national standards body or equivalent body of a member State other than the United Kingdom; or
 - (b) a relevant international standard recognised for use in a member State other than the United Kingdom; or
 - (c) a relevant specification acknowledged for use as a standard by a public authority of a member State other than the United Kingdom;

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being a standard, code of practice or specification which provides, in use, levels of safety, suitability and fitness for purpose equivalent to those provided by the International Standard or the British Standard;”.

2) In paragraph (3) of regulation 1, for the words following sub-paragraph (c) there shall be substituted the following words—

“(d) the Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk;

(e) the Gas Carrier Code for Existing Ships;

shall include—

(i) a reference to any document amending that publication which is considered by the Secretary of State to be relevant from time to time and is specified in a Merchant Shipping Notice; and

(ii) as respects a reference to a British Standard, a reference to a relevant standard of a member State other than the United Kingdom.”.

(3) After paragraph (6) of regulation 1 there shall be inserted the following paragraph—

“(7) An approval given in pursuance of these Regulations shall be given in writing and shall specify the date on which it takes effect and the conditions (if any) on which it is given.”.

Regulation 9A

2. After regulation 9 there shall be inserted the following regulation—

“Paint lockers etc

9A. In every ship of Class I and Class II, every paint locker and flammable liquid locker shall be protected by an approved fire-extinguishing system.”.

Regulation 27

3. In paragraph (1) of regulation 27—

(a) for “Regulation 23” there shall be substituted “Regulations 23 to 25 inclusive”; and

(b) for “it applies” there shall be substituted “they apply”.

Regulation 28

4.—(1) In paragraph (1) of regulation 28—

(a) at the end of sub-paragraph (c) the words “; and” shall be inserted; and

(b) at the beginning of sub-paragraph (d) the word “and” shall be omitted.

(2) In paragraph (2) of regulation 28—

(a) after the words “Every such ship which is not fully decked” there shall be inserted the words “but is decked”; and

(b) for “machinery space” there shall be substituted “machinery spaces”.

Regulation 29

5. In regulation 29(4)(b)(i), for “whichever is less” there shall be substituted “(whichever number is the greater)”.

Regulation 31

6. In regulation 31(2)(b), for “the carriage of ore, coal or grain” there shall be substituted “the carriage of ore, coal, grain, unseasoned timber or non-combustible cargoes, or of cargoes which, in the opinion of the Secretary of State, constitute a low fire risk”.

Regulation 34A

7. After regulation 34 there shall be inserted the following regulation—

“Paint lockers etc

34A. In every ship of Class VII of 500 tons or over, every paint locker and flammable liquid locker shall be protected by an approved fire-extinguishing system.”.

Regulation 41

8. At the end of regulation 41 there shall be added the following paragraph—

“(10) In every such ship, paint lockers and flammable liquid lockers shall be protected by an approved fire-extinguishing system.”.

Regulation 42

9. In paragraph (6) of regulation 42 there shall be inserted at the beginning of sub-paragraph (b) the words “two such fire extinguishers, together with either”.

Regulation 44

10. In paragraph (2) of regulation 44, after “Regulations 41(1) to (8)” there shall be inserted “and (10)”.

Regulation 47

11.—(1) In paragraph (1) of regulation 47 the words “having a valid Certificate of Fitness for the Carriage of Dangerous Chemicals in Bulk” shall be omitted.

(2) In paragraph (2) of regulation 47, after “Regulations 29, 30, 32, 33, 34,” there shall be inserted “34A,”.

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Regulation 48

12.—(1) In paragraph (1) of regulation 48, for “paragraph (3)” there shall be substituted “paragraphs (2A) and (3)”.

(2) After paragraph (2) of regulation 48 there shall be inserted the following paragraph—

“(2A) A tanker referred to in paragraph (1) need not be provided with an inert gas system complying with the requirements of Schedule 1 if—

- (a) being a chemical tanker carrying as cargo any substance mentioned in the said paragraph (1), it is provided with an inert gas system complying with the requirements of Schedule 1A;
- (b) being a chemical tanker carrying crude oil or petroleum products, it is provided with an inert gas system complying with the requirements of Schedule 1B;
- (c) being a gas carrier carrying as cargo a substance mentioned in the said paragraph (1), it is provided with cargo tank inerting arrangements equivalent to those specified in sub-paragraph (a) or (b) above;
- (d) being a chemical tanker or gas carrier, it is carrying a flammable cargo other than crude oil or petroleum products.

In sub-paragraph (d) above, the reference to a flammable cargo other than crude oil or petroleum products includes (without prejudice to the generality of that reference) a reference to any of the cargoes listed in Chapters VI and VII of the Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk.”.

Regulation 49

13. In paragraph (7) of regulation 49, after the words “Where any such tanker is constructed or adapted for the” there shall be inserted the words “carriage of”.

Regulation 54

14. In regulation 54, after “Regulations 29, 30, 32, 33, 34,” there shall be inserted “34A,”.

Regulation 60

15. In paragraph (1) of regulation 60, for the second sentence there shall be substituted the following sentence—

“Every such hose forming part of the ship’s equipment before 1st February 1992 shall be made of closely woven flax, canvas or other suitable material, and every other such hose shall be made of non-perishable material.”.

Regulation 62

16. In paragraph (4) of regulation 62, for “BS 5432” there shall be substituted “BS 5423”.

Regulation 74

17.—(1) In paragraph (1) of regulation 74, for the words “the Secretary of State may allow” there shall be substituted the words “the Secretary of State shall allow”.

(2) After paragraph (1) of regulation 74 there shall be inserted the following paragraph—

“(1A) For the purposes of these Regulations, the results of a verification or test shall be accepted if the verification or test is carried out—

- (a) in accordance with these Regulations or with a standard, code of practice, specification or technical description of a member State other than the United Kingdom offering equivalent levels of safety, suitability and fitness for purpose; and
- (b) by a body or laboratory of a member State other than the United Kingdom offering suitable and satisfactory guarantees of technical and professional competence and independence.”.

Schedule 1

18.—(1) For the heading to Schedule 1 there shall be substituted the following heading—

“INERT GAS SYSTEMS: STANDARD REQUIREMENTS”.

(2) In paragraph (1) of Schedule 1—

- (a) after “Every fixed inert gas system” there shall be inserted “provided in accordance with regulation 48(1) or (4) of these Regulations”; and
- (b) for “(m)(iii)(2)” there shall be substituted “(m)(iii)(B)”.

Schedules 1A and 1B

19. After Schedule 1 there shall be inserted the following Schedules—

“SCHEDULE 1A

Regulation 48(2A)(a)

INERT GAS SYSTEMS: ALTERNATIVE REQUIREMENTS FOR CHEMICAL TANKERS

- (a) (1) Every inert gas system provided in accordance with regulation 48(2A)(a) of these Regulations shall be designed, constructed and tested to the satisfaction of the Secretary of State and shall comply with the following requirements.
 - (b) In this Schedule a reference to a cargo tank includes a reference to a slop tank containing cargo residues.
- (2) The system shall be capable of:
 - (a) inerting empty cargo tanks by reducing the oxygen content of the atmosphere in each tank to a level at which combustion cannot be supported;
 - (b) maintaining the atmosphere, in all parts of each cargo tank designated to carry flammable products requiring protection by an inert gas system, with an oxygen content not exceeding 8 per cent by volume and at a positive pressure at all times in port and at sea except when it is necessary for such a tank to be gas-free;

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- (c) eliminating the need for air to enter a tank during normal operations except when it is necessary for such a tank to be gas-free;
- (d) purging empty cargo tanks of flammable vapour, so that subsequent gas-freeing operations will at no time create a flammable atmosphere within the tanks.
- (a) (3) The system shall be capable of delivering inert gas to the cargo tanks at a rate of at least 125 per cent of the maximum rate of discharge capacity of the ship expressed as a volume. The Secretary of State may accept an inert gas system having a lower delivery capacity provided that the maximum rate of discharge of cargoes from cargo tanks being protected by the system is restricted to 80 per cent of the inert gas capacity.
- (b) The system shall be capable of delivering inert gas with an oxygen content of not more than 5 per cent by volume in the inert gas supply main to the cargo tanks at any required rate of flow.
- (a) (4) Suitable fuel in sufficient quantity shall be provided for the inert gas generators.
- (b) The inert gas generators shall be located outside the cargo tank area as defined in the Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk. Spaces containing inert gas generators shall have no direct access to accommodation, service or control station spaces, but may be located in machinery spaces. If they are not located in machinery spaces, they shall be located in a compartment reserved solely for their use. Such a compartment shall be separated by a gastight steel bulkhead or deck from accommodation, service and control station spaces. Adequate positive-pressure-type mechanical ventilation shall be provided for such a compartment. Access to such compartments located aft shall be only from an open deck outside the cargo tank area. Access shall be located on the end bulkhead not facing the cargo area or on the outboard side of the superstructure or deckhouse at a distance of at least 25 per cent of the length of the ship but not less than 5 metres from the end of the superstructure or deckhouse facing the cargo area. In the case of such a compartment being located in the forecastle, access shall be through the deckhead forward of the cargo area.
- (c) Inert gas piping systems shall not pass through accommodation, service and control station spaces.
- (a) (5) Means shall be provided which will effectively cool the volume of gas specified by paragraph (3) of this Schedule and remove solids and sulphur combustion products. The cooling water arrangements shall be such that an adequate supply of water will always be available without interfering with any essential services on the ship. Provision shall also be made for an alternative supply of cooling water.
- (b) Filters or equivalent devices shall be fitted to minimise the amount of water carried over to the inert gas main.
- (a) (6) Two air blowers shall be fitted to each inert gas generator, which together shall be capable of delivering to the cargo tanks required to be protected by the system at least the volume of gas required by paragraph (3) of this Schedule. The Secretary of State may permit only one blower if it is capable of delivering to the protected cargo tanks the total volume of gas required by paragraph (3) of this Schedule, provided that sufficient spares for the air blower and its prime mover are carried on board to enable any failure of the air blower and its prime mover to be rectified.
- (b) The inert gas system shall be so designed that the maximum pressure which it can exert on any cargo tank will not exceed the test pressure of that tank.
- (c) Where more than one inert gas generator is provided, suitable shut-off arrangements shall be provided on the discharge outlet of each generator plant.

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- (d) Arrangements shall be made to vent the inert gas to the atmosphere in case the inert gas produced is sub-standard, eg during starting-up or in the case of equipment failure.
- (e) Where inert gas generators are served by positive displacement blowers, a pressure relief device shall be provided to prevent excess pressure being developed on the discharge side of the blower.

(7) Two fuel oil pumps shall be fitted to each inert gas generator. The Secretary of State may permit only one fuel oil pump on condition that sufficient spares for the fuel oil pump and its prime mover are carried on board to enable any failure of the fuel oil pump and its prime mover to be rectified by the ship's crew.

(8) A gas-regulating valve shall be fitted in the inert gas supply main. This valve shall be automatically controlled to close as required by paragraph (17)(b) and (c) of this Schedule. It shall also be capable of automatically regulating the flow of inert gas to the cargo tanks unless other means are provided to control automatically the inert gas flow rate.

- (a) (9) At least two non-return devices, one of which shall be a water seal, shall be fitted in the inert gas supply main in order to prevent the return of flammable vapour to the inert gas generator and to any gas-safe space under all normal conditions of trim, list and motion of the ship. They shall be located between the automatic valve required by paragraph (8) of this Schedule and the first connection to any cargo tank or cargo pipeline. The Secretary of State may permit an alternative arrangement or device providing a measure of safety equivalent to that of a water seal.
- (b) The devices referred to in sub-paragraph (a) of this paragraph shall be located in the cargo tank area on deck.
- (c) The water seal referred to in sub-paragraph (a) of this paragraph shall be capable of being supplied by two separate pumps, each of which shall be capable of maintaining an adequate supply at all times.
- (d) The arrangement of the water seal and its associated provisions shall be such that it will prevent backflow of flammable vapours and will ensure the proper functioning of the water seal under operating conditions.
- (e) Provision shall be made to ensure that any water seal is protected against freezing, in such a way that the integrity of the water seal is not impaired by overheating.
- (f) A water loop or other approved arrangement shall also be fitted to all associated water supply and drain piping and to all venting or pressure-sensing piping leading to gas-safe spaces. Means shall be provided to prevent such loops from being emptied by vacuum.
- (g) Any water seal or equivalent device and all loop arrangements shall be capable of preventing the return of flammable vapours to an inert gas generator at a pressure equal to the test pressure of the cargo tanks.
- (h) The second device shall be a non-return valve or equivalent capable of preventing the return of vapours or liquids or both and fitted between the water seal or the equivalent device required by sub-paragraph (a) of this paragraph and the first connection from the inert gas main to a cargo tank. It shall be provided with positive means of closure. As an alternative to positive means of closure, an additional valve having such means of closure may be provided between the non-return valve and the first connection to the cargo tanks to isolate the water seal or equivalent device.
- (i) As an additional safeguard against the possible leakage of flammable liquids or vapours back from the deck main, means shall be provided to permit the section of the line between the valve having positive means of closure referred to in sub-paragraph (h) of this paragraph and the valve referred to in paragraph (8) of this Schedule to be vented in a safe manner when the first of these valves is closed.

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- (a) (10) The inert gas main may be divided into two or more branches between the non-return devices required by paragraph (9) of this Schedule and the cargo tanks.
 - (b) Inert gas supply mains shall be fitted with branch piping leading to each cargo tank designated for the carriage of flammable products required to be inerted by this Schedule. Each cargo tank containing or loading products not required to be inerted shall be separated from the inert gas main by:
 - (i) removing spool pieces, valves or other pipe sections, and blanking the pipe ends; or
 - (ii) an arrangement of two spectacle flanges in series with provision for detecting leakage into the pipe between the two spectacle flanges.
 - (c) Means shall be provided to protect cargo tanks against the effect of overpressure or vacuum caused by thermal variations when the tanks are isolated from the inert gas mains.
 - (d) Piping systems shall be so designed as to prevent the accumulation of cargo or water in the pipelines under all normal conditions.
 - (e) Suitable arrangements shall be provided to enable the inert gas main to be connected to an external supply of inert gas.
- (11) Unless the arrangements for venting of all vapours displaced from the cargo tanks during loading and ballasting comply with the requirements of the Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk for controlled venting, such arrangements shall comply with regulation 12 of the Merchant Shipping (Cargo Ship Construction and Survey) Regulations 1984(4) and shall consist either of one or more mast risers or of a number of high velocity vents.
- (12) The arrangements for inerting, purging or gas-freeing of empty tanks as required by paragraph (2) of this Schedule shall be to the satisfaction of the Secretary of State and shall be such that the accumulation of hydrocarbon vapours in pockets formed by the internal structural members in a tank is minimised and that:
- (a) on individual cargo tanks the gas outlet pipe, if fitted, shall be positioned as far as practicable from the inert gas/air inlet and in accordance with regulation 12(5)(c) of the Merchant Shipping (Cargo Ship Construction and Survey) Regulations 1984. The inlet of such outlet pipes may be located either at deck level or at not more than 1 metre above the bottom of the tank;
 - (b) the cross-sectional area of such gas outlet pipe referred to in sub-paragraph (a) of this paragraph shall be such that an exit velocity of at least 20 metres per second can be maintained when any three tanks are being simultaneously supplied with inert gas. Their outlets shall extend not less than 2 metres above deck level. When in accordance with paragraph (3) of this Schedule the Secretary of State permits a system designed to supply only one tank or two tanks simultaneously, the outlet pipes shall be sized such that an exit velocity in the outlet pipes of 20 metres per second can be maintained;
 - (c) each gas outlet referred to in sub-paragraph (b) of this paragraph shall be fitted with suitable blanking arrangements.
- (13) Means shall be provided for continuously indicating the temperature and pressure of the inert gas at the discharge side of the system, whenever it is operating.
- (a) (14) Instrumentation shall be fitted for continuously indicating and permanently recording, when the inert gas is being supplied:

(4) S.I. 1984/1217; relevant applying or amending instruments are S.I. 1985/661, 1986/1067.

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- (i) the pressure of the inert gas supply mains between the non-return devices required by paragraph (9)(a) of this Schedule and the cargo tanks; and
 - (ii) the oxygen content of the inert gas in the inert gas supply main.
- (b) The devices referred to in sub-paragraph (a) of this paragraph shall be placed in the cargo control room where provided. Where no cargo control room is provided, they shall be placed in a position easily accessible to the officer in charge of cargo operations.
- (c) In addition, meters shall be fitted:
- (i) in the navigating bridge to indicate at all times the pressure referred to in sub-paragraph (a)(i) of this paragraph; and
 - (ii) in the machinery control room or in the machinery space to indicate the oxygen content referred to in sub-paragraph (a)(ii) of this paragraph.

(15) Portable instruments for measuring oxygen and flammable vapour concentration shall be provided. In addition, suitable arrangements shall be made on each cargo tank such that the condition of the tank atmosphere can be determined using these portable instruments.

(16) Suitable means shall be provided for the zero and span calibration of both fixed and portable gas concentration measurement instruments, referred to in paragraphs (14) and (15) of this Schedule.

- (a) (17) Audible and visual alarms shall be provided to indicate:
- (i) low water pressure or low water flow rate to the cooling and scrubbing arrangements referred to in paragraph (5)(a) of this Schedule;
 - (ii) low fuel supply;
 - (iii) high gas temperature referred to in paragraph (13) of this Schedule;
 - (iv) failure of the power supply to the inert gas generators;
 - (v) oxygen content in excess of 8 per cent by volume referred to in paragraph (14)(a)(ii) of this Schedule;
 - (vi) failure of the power supply to the indicating devices referred to in paragraph 14(a) of this Schedule and to the automatic control systems for the gas-regulating valve referred to in paragraph (8) of this Schedule and the inert gas generator;
 - (vii) low water level in the water seal referred to in paragraph (9) of this Schedule;
 - (viii) gas pressure less than 100 millimetres water gauge referred to in paragraph (14)(a) of this Schedule;
 - (ix) high gas pressure referred to in paragraph (14)(a)(i) of this Schedule.
- (b) Automatic shutdown of the gas-regulating valve and of the fuel oil supply to the inert gas generator shall be arranged on predetermined limits being reached in respect of sub-paragraph (a)(i) and (iii) of this paragraph.
- (c) Automatic shutdown of the gas-regulating valve shall be arranged in respect of sub-paragraph (a)(iv) of this paragraph.
- (d) In respect of sub-paragraph (a)(v) of this paragraph, when the oxygen content of the inert gas exceeds 8 per cent by volume, immediate action shall be taken to improve the gas quality. Unless the quality of the inert gas improves, all operations in those tanks to which inert gas is being supplied shall be suspended so as to avoid air being drawn into the tanks. The deck isolation valve referred to in paragraph (9)(h) of this Schedule shall be closed, and the sub-standard gas shall be vented to atmosphere.
- (e) The alarms required by sub-paragraph (a)(v), (vi) and (viii) of this paragraph shall be fitted in the machinery space and cargo control room, where provided, but in each

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case in such a position that they are immediately received by responsible members of the crew. All other alarms required by this paragraph shall be audible to responsible members of the crew either as individual alarms or as a group alarm.

- (f) In respect of sub-paragraph (a)(vii) of this paragraph, the Secretary of State shall be satisfied as to the maintenance of an adequate reserve of water at all times and the integrity of the arrangements to permit the automatic formation of the water seal when the gas flow ceases. The audible and visual alarm on the low level of water in the water seal shall operate when the inert gas is not being supplied.
- (g) An audible alarm system, independent of that required by sub-paragraph (a)(viii) of this paragraph, or automatic shutdown of cargo pumps shall be provided to operate on pre-determined limits of low pressure in the inert gas mains being reached.

(18) Detailed instruction manuals shall be provided on board, covering the operations, safety and maintenance requirements and occupational health hazards relevant to the inert gas system and its application to the cargo tank system. The manuals shall include guidance on procedures to be followed in the event of a fault or failure of the inert gas system.

SCHEDULE 1B

Regulation 48(2A)(b)

INERT GAS SYSTEMS: ALTERNATIVE REQUIREMENTS FOR CHEMICAL TANKERS CARRYING CRUDE OIL OR PETROLEUM PRODUCTS

- (a) (1) Every inert gas system provided in accordance with regulation 48(2A)(b) of these Regulations, shall be designed, constructed and tested to the satisfaction of the Secretary of State and shall comply with the following requirements.
 - (b) In this Schedule a reference to a cargo tank includes a reference to a slop tank containing oil residues.
- (2) The system shall be capable of:
 - (a) inerting empty cargo tanks by reducing the oxygen content of the atmosphere in each tank to a level at which combustion cannot be supported;
 - (b) maintaining the atmosphere, in all parts of each cargo tank designated to carry flammable products requiring protection by an inert gas system, with an oxygen content not exceeding 8 per cent by volume and at a positive pressure at all times in port and at sea except when it is necessary for such a tank to be gas-free;
 - (c) eliminating the need for air to enter a tank during normal operations except when it is necessary for such a tank to be gas-free;
 - (d) purging empty cargo tanks of flammable vapour, so that subsequent gas-freeing operations will at no time create a flammable atmosphere within the tanks.
- (a) (3) The system shall be capable of delivering inert gas to the cargo tanks at a rate of at least 125 per cent of the maximum rate of discharge capacity of the ship expressed as a volume. The Secretary of State may accept an inert gas system having a lower delivery capacity provided that the maximum rate of discharge of cargoes from cargo tanks being protected by the system is restricted to 80 per cent of the inert gas capacity.
 - (b) The system shall be capable of delivering inert gas with an oxygen content of not more than 5 per cent by volume in the inert gas supply main to the cargo tanks at any required rate of flow.
- (a) (4) Suitable fuel in sufficient quantity shall be provided for the inert gas generators.

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- (b) The inert gas generators shall be located outside the cargo tank area as defined in the Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk. Spaces containing inert gas generators shall have no direct access to accommodation, service or control station spaces, but may be located in machinery spaces. If they are not located in machinery spaces, they shall be located in a compartment reserved solely for their use. Such a compartment shall be separated by a gastight steel bulkhead or deck from accommodation, service and control station spaces. Adequate positive-pressure-type mechanical ventilation shall be provided for such a compartment. Access to such compartments located aft shall be only from an open deck outside the cargo tank area. Access shall be located on the end bulkhead not facing the cargo area or on the outboard side of the superstructure or deckhouse at a distance of at least 25 per cent of the length of the ship but not less than 5 metres from the end of the superstructure or deckhouse facing the cargo area. In the case of such a compartment being located in the forecastle, access shall be through the deckhead forward of the cargo area.
 - (c) Inert gas piping systems shall not pass through accommodation, service and control station spaces.
 - (a) (5) Means shall be provided which will effectively cool the volume of gas specified by paragraph (3) of this Schedule and remove solids and sulphur combustion products. The cooling water arrangements shall be such that an adequate supply of water will always be available without interfering with any essential services on the ship. Provision shall also be made for an alternative supply of cooling water.
 - (b) Filters or equivalent devices shall be fitted to minimise the amount of water carried over to the inert gas main.
 - (a) (6) Two air blowers shall be fitted to each inert gas generator, which together shall be capable of delivering to the cargo tanks required to be protected by the system at least the volume of gas required by paragraph (3) of this Schedule. The Secretary of State may permit only one blower if it is capable of delivering to the protected cargo tanks the total volume of gas required by paragraph (3) of this Schedule, provided that sufficient spares for the air blower and its prime mover are carried on board to enable any failure of the air blower and its prime mover to be rectified.
 - (b) The inert gas system shall be so designed that the maximum pressure which it can exert on any cargo tank will not exceed the test pressure of that tank.
 - (c) Where more than one inert gas generator is provided, suitable shut-off arrangements shall be provided on the discharge outlet of each generator plant.
 - (d) Arrangements shall be made to vent the inert gas to the atmosphere in case the inert gas produced is sub-standard, eg during starting-up or in case of equipment failure.
 - (e) Where inert gas generators are served by positive displacement blowers, a pressure relief device shall be provided to prevent excess pressure being developed on the discharge side of the blower.
- (7) Two fuel oil pumps shall be fitted to each inert gas generator. The Secretary of State may permit only one fuel oil pump on condition that sufficient spares for the fuel oil pump and its prime mover are carried on board to enable any failure of the fuel oil pump and its prime mover to be rectified by the ship's crew.
- (8) A gas-regulating valve shall be fitted in the inert gas supply main. This valve shall be automatically controlled to close as required by paragraph (17)(b) and (c) of this Schedule. It shall also be capable of automatically regulating the flow of inert gas to the cargo tanks unless other means are provided to control automatically the inert gas flow rate.

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- (a) (9) At least two non-return devices, one of which shall be a water seal, shall be fitted in the inert gas supply main in order to prevent the return of flammable vapour to the inert gas generator and to any gas-safe space under all normal conditions of trim, list and motion of the ship. They shall be located between the automatic valve required by paragraph (8) of this Schedule and the first connection to any cargo tank or cargo pipeline. The Secretary of State may permit an alternative arrangement or device providing a measure of safety equivalent to that of a water seal.
- (b) The devices referred to in sub-paragraph (a) of this paragraph shall be located in the cargo tank area on deck.
- (c) The water seal referred to in sub-paragraph (a) of this paragraph shall be capable of being supplied by two separate pumps, each of which shall be capable of maintaining an adequate supply at all times.
- (d) The arrangement of the water seal and its associated provisions shall be such that it will prevent backflow of flammable vapours and will ensure the proper functioning of the water seal under operating conditions.
- (e) Provision shall be made to ensure that any water seal is protected against freezing, in such a way that the integrity of the water seal is not impaired by overheating.
- (f) A water loop or other approved arrangement shall also be fitted to all associated water supply and drain piping and to all venting or pressure-sensing piping leading to gas-safe spaces. Means shall be provided to prevent such loops from being emptied by vacuum.
- (g) Any water seal or equivalent device and all loop arrangements shall be capable of preventing the return of flammable vapours to an inert gas generator at a pressure equal to the test pressure of the cargo tanks.
- (h) The second device shall be a non-return valve or equivalent capable of preventing the return of vapours or liquids or both and fitted between the water seal or the equivalent device required by sub-paragraph (a) of this paragraph and the first connection from the inert gas main to a cargo tank. It shall be provided with positive means of closure. As an alternative to positive means of closure, an additional valve having such means of closure may be provided between the non-return valve and the first connection to the cargo tanks to isolate the water seal or equivalent device.
- (i) As an additional safeguard against the possible leakage of flammable liquids or vapours back from the deck main, means shall be provided to permit the section of the line between the valve having positive means of closure referred to in sub-paragraph (h) of this paragraph and the valve referred to in paragraph (8) of this Schedule to be vented in a safe manner when the first of these valves is closed.
- (a) (10) The inert gas main may be divided into two or more branches between the non-return devices required by paragraph (9) of this Schedule and the cargo tanks.
- (b) Inert gas supply mains shall be fitted with branch piping leading to each cargo tank designated for the carriage of flammable products required to be inerted by this Schedule. Each cargo tank containing or loading products not required to be inerted shall be separated from the inert gas main by:
 - (i) removing spool pieces, valves or other pipe sections, and blanking the pipe ends;
or
 - (ii) an arrangement of two spectacle flanges in series with provision for detecting leakage into the pipe between the two spectacle flanges.
- (c) Means shall be provided to protect cargo tanks against the effect of overpressure or vacuum caused by thermal variations when the tanks are isolated from the inert gas mains.

- (d) Piping systems shall be so designed as to prevent the accumulation of cargo or water in the pipelines under all normal conditions.
- (e) Suitable arrangements shall be provided to enable the inert gas main to be connected to an external supply of inert gas.

(11) Unless the arrangements for venting of all vapours displaced from the cargo tanks during loading and ballasting comply with the requirements of the Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk for controlled venting, such arrangements shall comply with regulation 70(3) of the Merchant Shipping (Cargo Ship Construction and Survey) Regulations 1981⁽⁵⁾ and shall consist either of one or more mast risers or of a number of high velocity vents. The inert gas supply mains shall not be used for such venting.

- (a) (12) The arrangements for inerting, purging or gas-freeing of empty tanks as required by paragraph (2) of this Schedule shall be to the satisfaction of the Secretary of State and shall be such that the accumulation of flammable vapours in pockets formed by the internal structural members in a tank is minimised.
- (b) When in accordance with paragraph (3) of this Schedule the Secretary of State permits a system designed to supply only one tank or two tanks simultaneously, the outlet pipes shall be sized such that an exit velocity in the outlet pipes of 20 metres per second can be maintained.

(13) Means shall be provided for continuously indicating the temperature and pressure of the inert gas at the discharge side of the system, whenever it is operating.

- (a) (14) Instrumentation shall be fitted for continuously indicating and permanently recording, when the inert gas is being supplied:
 - (i) the pressure of the inert gas supply mains between the non-return devices required by paragraph (9)(a) of this Schedule and the cargo tanks; and
 - (ii) the oxygen content of the inert gas in the inert gas supply main.
- (b) The devices referred to in sub-paragraph (a) of this paragraph shall be placed in the cargo control room where provided. Where no cargo control room is provided, they shall be placed in a position easily accessible to the officer in charge of cargo operations.
- (c) In addition, meters shall be fitted:
 - (i) in the navigating bridge to indicate at all times the pressure referred to in sub-paragraph (a)(i) of this paragraph; and
 - (ii) in the machinery control room or in the machinery space to indicate the oxygen content referred to in sub-paragraph (a)(ii) of this paragraph.

(15) Portable instruments for measuring oxygen and flammable vapour concentration shall be provided. In addition, suitable arrangements shall be made on each cargo tank such that the condition of the tank atmosphere can be determined using these portable instruments.

(16) Suitable means shall be provided for the zero and span calibration of both fixed and portable gas concentration measurement instruments, referred to in paragraphs (14) and (15) of this Schedule.

- (a) (17) Audible and visual alarms shall be provided to indicate:
 - (i) low water pressure or low water flow rate to the cooling and scrubbing arrangements referred to in paragraph (5)(a) of this Schedule;
 - (ii) low fuel supply;
 - (iii) high gas temperature referred to in paragraph (13) of this Schedule;

(5) S.I. 1981/572, amended by S.I. 1984/1219, 1985/663.

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- (iv) failure of the power supply to the inert gas generators;
 - (v) oxygen content in excess of 8 per cent by volume referred to in paragraph (14)(a)(ii) of this Schedule;
 - (vi) failure of the power supply to the indicating devices referred to in paragraph (14)(a) of this Schedule and to the automatic control systems for the gas-regulating valve referred to in paragraph (8) of this Schedule and the inert gas generator;
 - (vii) low water level in the water seal referred to in paragraph (9)(a) of this Schedule;
 - (viii) gas pressure less than 100 millimetres water gauge referred to in paragraph (14)(a) of this Schedule;
 - (ix) high gas pressure referred to in paragraph (14)(a)(i) of this Schedule.
- (b) Automatic shutdown of the gas-regulating valve and of the fuel oil supply to the inert gas generator shall be arranged on predetermined limits being reached in respect of sub-paragraph (a)(i) and (iii) of this paragraph.
 - (c) Automatic shutdown of the gas-regulating valve shall be arranged in respect of sub-paragraph (a)(v) of this paragraph.
 - (d) In respect of sub-paragraph (a)(v) of this paragraph, when the oxygen content of the inert gas exceeds 8 per cent by volume, immediate action shall be taken to improve the gas quality. Unless the quality of the inert gas improves, all operations in those tanks to which inert gas is being supplied shall be suspended so as to avoid air being drawn into the tanks. The deck isolation valve referred to in paragraph (9)(h) of this Schedule shall be closed, and the sub-standard gas shall be vented to atmosphere.
 - (e) The alarms required by sub-paragraph (a)(v), (vi) and (viii) of this paragraph shall be fitted in the machinery space and cargo control room, where provided, but in each case in such a position that they are immediately received by responsible members of the crew. All other alarms required by this paragraph shall be audible to responsible members of the crew either as individual alarms or as a group alarm.
 - (f) In respect of sub-paragraph (a)(vii) of this paragraph, the Secretary of State shall be satisfied as to the maintenance of an adequate reserve of water at all times and the integrity of the arrangements to permit the automatic formation of the water seal when the gas flow ceases. The audible and visual alarm on the low level of water in the water seal shall operate when the inert gas is not being supplied.
 - (g) An audible alarm system, independent of that required by sub-paragraph (a)(viii) of this paragraph, or automatic shutdown of cargo pumps shall be provided to operate on predetermined limits of low pressure in the inert gas mains being reached.
- (18) Detailed instruction manuals shall be provided on board, covering the operations, safety and maintenance requirements and occupational health hazards relevant to the inert gas system and its application to the cargo tank system. The manuals shall include guidance on procedures to be followed in the event of a fault or failure of the inert gas system.”

EXPLANATORY NOTE

(This note is not part of the Regulations)

These Regulations further amend the Merchant Shipping (Fire Protection) (Ships Built Before 25th May 1980) Regulations 1985.

The Regulations give effect to amendments to Chapter II-2 of the Annex to the International Convention for the Safety of Life at Sea 1974 (as amended). The amendments, which were adopted by the Maritime Safety Committee (“MSC”) of the International Maritime Organization (“IMO”) at its 57th Session, are contained in the Annex to Resolution MSC 13(57) adopted on 11th April 1989. The Regulations also correct some minor errors in the 1985 Regulations.

The main effects of the Regulations are—

- (a) to make provision alternative to the existing requirements for inert gas systems on chemical tankers and gas carriers;
- (b) to require paint lockers to be protected by fire-extinguishing systems;
- (c) to require new fire hoses to be of non-perishable material.

A compliance cost assessment has been prepared, and copies may be obtained from the Department of Transport, Room 2/27B, Spring Place, 105 Commercial Road, Southampton, SO1 0ZD.

A copy has been placed in the library of each House of Parliament.

Copies of the IMO Resolution and Annex, and of the Codes mentioned in the Regulations, may be obtained from IMO, 4 Albert Embankment, London SE1 7SR.