

cargo tanks shall exceed design parameters and be such as to provide for:

(a) the flow of the small volumes of vapour, air or inert gas mixtures caused by thermal variations in a cargo tank in all cases through pressure/vacuum valves; and

(b) the passage of large volumes of vapour, air or inert gas mixtures during cargo loading and ballasting, or during discharging.

(3) The venting arrangements in each cargo tank may be independent or combined with other cargo tanks and may be incorporated into the inert gas piping.

(4) Where the arrangements are combined with other cargo tanks either stop valves or other acceptable means shall be provided to isolate each cargo tank. Where stop valves are fitted, they shall be provided with locking arrangements which shall be under the control of the responsible ship's officer. Any isolation must continue to permit the flow caused by thermal variations in a cargo tank in accordance with sub-clause (2)(a) of this clause.

(5) The venting arrangements shall be connected to the top of each cargo tank and shall be self-draining to the cargo tanks under all normal conditions of trim and list of the ship. Where it may not be possible to provide self-draining lines permanent arrangements shall be provided to drain the vent lines to a cargo tank.

(6) The venting system shall be provided with devices to prevent the passage of flame into the cargo tanks. The design, testing and locating of these devices shall be to the satisfaction of the Chief Surveyor.

(7) Provision shall be made to guard against liquid rising in the venting system to a height which would exceed the design head of cargo tanks. This shall be accomplished by high-level alarms or overflow control systems or other equivalent means, together with gauging devices and cargo tank filling procedures.

(8) Openings for pressure release required by sub-clause (2)(a) of this clause shall:

(a) have as great a height as is practicable above the cargo tank deck to obtain maximum dispersal of flammable vapours but in no case less than 2m above the cargo tank deck;

(b) be arranged at the furthest distance practicable but not less than 5m from the nearest air intakes and openings to enclosed spaces containing a source of ignition and from deck machinery and equipment which may constitute an ignition hazard.

(9) Pressure/vacuum valves required by sub-clause (2)(a) of this clause may be provided with a by-pass arrangement when they are located in a vent main or masthead riser. Where such an arrangement is provided there shall be suitable indicators to show whether the by-pass is open or closed.

(10) Vent outlets for cargo loading, discharging and ballasting required by sub-clause (2)(b) of this clause shall:

(a) permit the free flow of vapour mixtures; or

(b) permit the throttling of the discharge of the vapour mixtures to achieve a velocity of not less than 30m/sec;

(c) be so arranged that the vapour mixture is discharged vertically upwards;

(d) where the method is by free flow of vapour mixtures, be such that the outlet shall not be less than 6m above the cargo tank deck or fore and aft gangway if situated within 4m of the gangway and located not less than 10m measured horizontally from the nearest air intakes and openings to enclosed spaces containing a source of ignition and from deck machinery and equipment which may constitute an ignition hazard;

(e) where the method is by high velocity discharge, be located at a height not less than 2m above the cargo tank deck and not less than 10m measured horizontally from the nearest air intakes and openings to enclosed spaces containing a

source of ignition and from deck machinery and equipment which may constitute an ignition hazard. These outlets shall be provided with high velocity devices of an approved type;

(f) be designed on the basis of the maximum designed loading rate multiplied by a factor of at least 1.25 to take account of gas evolution, in order to prevent the pressure in any cargo tank from exceeding the design pressure. The master shall be provided with information regarding the maximum permissible loading rate for each cargo tank and in the case of combined venting systems, for each group of cargo tanks.

(11) In combination carriers, the arrangement to isolate slop tanks containing oil or oil residues from other cargo tanks shall consist of blank flanges which will remain in position at all times when cargoes other than liquid cargoes referred to in clause 96(1) of this Code are carried.

101. Cargo Tank Purging and/or Gas Freeing—(1) Arrangements for purging and/or gas-freeing shall be such as to minimise the hazards due to the dispersal of flammable vapours in the atmosphere and to flammable mixtures in a cargo tank. Accordingly:

(a) When the ship is provided with an inert gas system the cargo tanks shall first be purged in accordance with the provisions of the Shipping (Fire Appliances) Regulations 1989 until the concentration of hydrocarbon vapours in the cargo tanks has been reduced to less than 2 per cent by volume. Thereafter, venting may be at the cargo tank deck level.

(b) When the ship is not provided with an inert gas system, the operation shall be such that the flammable vapour is initially discharged:

(i) through the vent outlets as specified in clause 100(10) of this Code; or

(ii) with a vertical exit velocity of at least 20m/sec through outlets at least 2m above the cargo tank deck level and which are protected by suitable devices to prevent the passage of flame.

When the flammable vapour concentration in the outlet has been reduced to 30 per cent of the lower flammable limit the discharge of the vapour mixture may be at the cargo tank deck level.

102. Ventilation—(1) Cargo pump-rooms shall be mechanically ventilated and discharges from the exhaust fans shall be led to a safe place on the open deck. The ventilation of these rooms shall have sufficient capacity to minimise the possibility of accumulation of flammable vapours. The number of changes of air shall be at least 20 per hour, based upon the gross volume of the space. The air ducts shall be arranged so that all of the space is effectively ventilated. The ventilation shall be of the suction type using fans of the non-sparking type.

(2) The arrangement of ventilation inlets and outlets and other deckhouse and superstructure boundary space openings shall be such as to complement the provisions of clause 100 of this Code. Such vents especially for machinery spaces shall be situated as far aft as practicable. Due consideration in this regard should be given when the ship is equipped to load or discharge at the stern. Sources of ignition such as electrical equipment shall be so arranged as to avoid an explosion hazard.

(3) In combination carriers all cargo spaces and any enclosed spaces adjacent to cargo spaces shall be capable of being mechanically ventilated. The mechanical ventilation may be provided by portable fans.

Section E—General

103. Special Arrangements in Machinery Spaces—(1) The provisions of this regulation shall apply to machinery spaces of category A and, where the Chief Surveyor considers it desirable, to other machinery spaces.

(2) The number of skylights, doors, ventilators, openings in funnels to permit exhaust ventilation and other openings to