

## ANNEX

### REVISED FACTORS TO BE TAKEN INTO CONSIDERATION WHEN DESIGNING CARGO TANK VENTING AND GAS-FREEING ARRANGEMENTS

#### **Maximum loading/discharge rate**

The venting system should be designed to take into consideration the maximum permissible loading/discharge rate for each cargo tank and in the case of a combined venting system, for each group of tanks. These loading and discharge rates should also be used for the design of the inert gas system, regulation II-2/62.3.1.

#### **Gas evolution**

Regulation II-2/59.1.9.5 requires at least 25% to be added to the maximum loading rate to account for the increased volume due to gas evolution from the cargo. A higher gas evolution factor may be considered for highly volatile cargoes.

#### **Pressure loss across devices**

Data relating to pressure loss across devices to prevent the passage of flame, approved in accordance with MSC/Circ.677 and referred to in regulation II-2/59.1.5, is to be considered in the design of the venting system. Fouling of devices should be taken into account.

#### **Pressure loss in the venting system**

Pressure loss calculations of systems including pipes, valves, bends, fittings, etc., should be made to ensure that the pressure inside the cargo tanks does not exceed the pressure these tanks are designed to withstand taking into consideration .2 and .3 above. In the case where a combined venting system is used in association with loading of cargo tanks simultaneously, the combined effect of vapour pressure generated in the tanks and venting system should be considered.

#### **Pressure at which the vents open**

The initial opening pressure of the vent valves should be considered in selecting the appropriate valves for the venting system.

#### **Prevention of hammering**

In the case of high velocity vents, the possibility of inadvertent detrimental hammering leading to damage and/or failure should be considered, with a view to eliminating it.

#### **Density of the gaseous mixture**

The maximum density of the gaseous mixtures likely to be encountered in the cargo tanks having regard to the types of cargo intended to be carried and their temperature is to be considered.

#### **Design to prevent liquid overflow**

Where overflow control systems are fitted, consideration is to be given to the dynamic conditions during loading.,

### **Location of vent outlets**

Horizontal and vertical distances of the vent outlets are to be in accordance with regulation II-2/59.

### **Types of venting systems**

Due regard is to be given to cargo segregation when considering a venting system or inert gas system common to more than one tank. Where the inert gas main is designed for venting of cargo tanks, additional means for venting of these tanks are to be in accordance with regulation II-2/62.11.3.

### **Vent draining arrangements**

The draining arrangements for venting systems are to be designed in accordance with regulation II-2/59.1.4.

### **Gas-freeing**

In designing a gas-freeing system in conformity with paragraphs 2.2.2 and 2.2.3 of regulation II-2/59 in order to achieve the required exit velocities, the following should be considered:

- .1 the flow characteristics of the fans to be used;
- .2 the pressure losses created by the design of a particular tank's inlets and outlets;
- .3 the pressure achievable in the fan driving medium (e.g. water or compressed air); and
- .4 the densities of the cargo vapour air mixtures for the range of cargoes to be carried.

### **Others**

Repairs and renewal of the venting system should conform to the original design parameters. Factors in the above paragraphs are to be taken into consideration when modifications are carried out to the venting system.

The master is to be provided with a manual containing information relating to the maximum loading and unloading rates for each tank or group of tanks established during the design of the venting system, as per paragraph 1 of this circular.

Data referred to in paragraph 4.3 of MSC/Circ.677 should be taken into consideration when renewing devices referred to in the above circular.

---