GC9 Guidance for sizing pressure relief systems for interbarrier spaces
(1988)

1 General

1.1 The formula for determining the relieving capacity given in section 2 is developed for interbarrier spaces surrounding independent type A cargo tanks, where the thermal insulation is fitted to the cargo tanks.

1.2 The relieving capacity of pressure relief devices of interbarrier spaces surrounding independent type B cargo tanks may be determined on the basis of the method given in section 2, however, the leakage rate is to be determined in accordance with 4.7.6.1 of the IGC-Code.

1.3 The relieving capacity of pressure relief devices for interbarrier spaces of membrane and semi-membrane tanks is to be evaluated on the basis of specific membrane/semi-membrane tank design.

1.4 The relieving capacity of pressure relief devices for interbarrier spaces adjacent to integral type cargo tanks may, if applicable, be determined as for type A independent cargo tanks.

1.5 Interbarrier space pressure relief devices in the scope of this interpretation are emergency devices for protecting the hull structure from being unduly overstressed in case of a pressure rise in the interbarrier space due to primary barrier failure. Therefore such devices need not comply with the requirements of 8.2.9 and 8.2.10 of the IGC-Code.

2 Size of pressure relief devices

The combined relieving capacity of the pressure relief devices for interbarrier spaces surrounding type A independent cargo tanks where the insulation is fitted to the cargo tanks may be determined by the following formula:

$$Q_{sa} = 3{,}4 \cdot A_c \frac{\rho}{\rho_v} \sqrt{h} \quad (m^3/s)$$

where:

Q_{sa} = minimum required discharge rate of air at standard conditions of 273 K and 1.013 bar

A_c = design crack opening area (m^2)

$$A_c = \frac{\pi}{4} \delta \cdot 1 \ (m^2)$$

δ = max, crack opening width (m)

δ = 0,2.t (m)

t = thickness of tank bottom plating (m)

l = design crack length (m) equal to the diagonal of the largest plate panel of the tank bottom, see sketch below.

h = max liquid height above tank bottom plus 10.MARVS (m)

ρ = density of product liquid phase (kg/m^3) at the set pressure of the interbarrier space relief device

ρ_v = density of product vapour phase (kg/m^3) at the set pressure of the interbarrier space relief device and a temperature of 273 K

MARVS = max allowable relief valve setting of the cargo tank (bar). ▶

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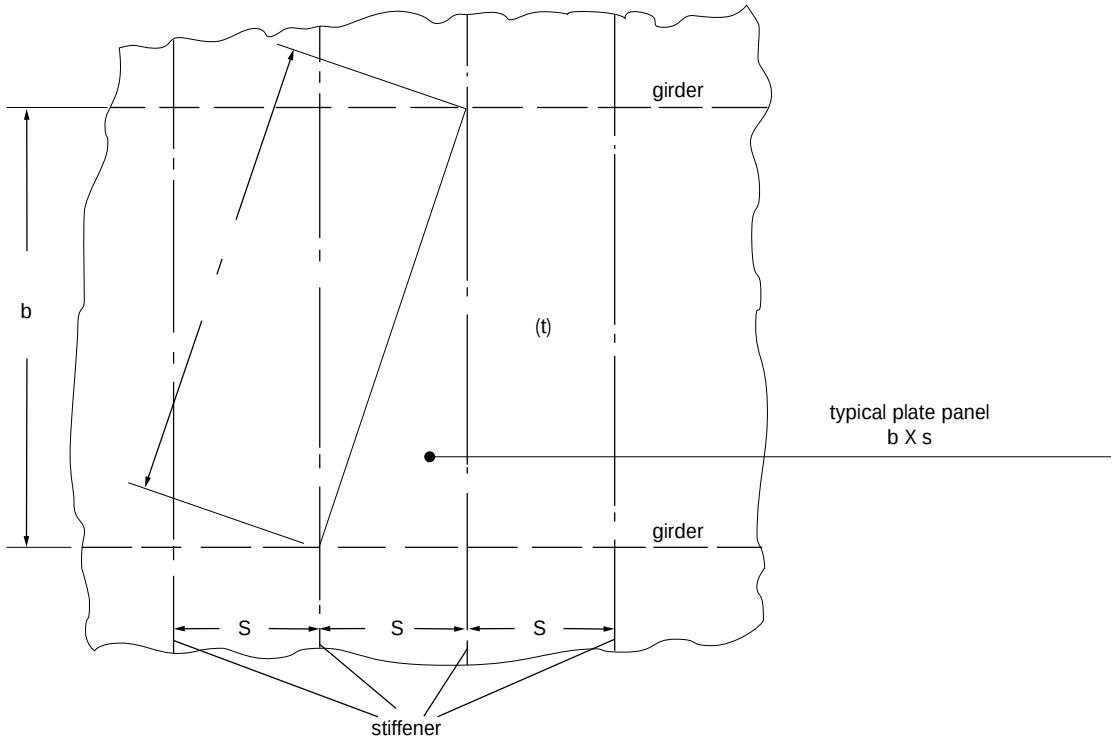

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GC10 Reliquefaction plant of moter-driven LNG-carriers
(1988)

1 Mechanical refrigeration fitted as the primary system for cargo pressure control

1.1 Section 7.2 is based on the assumption that paragraph 7.1.1 is being compiled with by using means defined in sub-paragraph 7.1.1.1. That is to say, a mechanical refrigeration system is fitted as the primary means of maintaining the cargo tank pressure below MARVS.

1.2 Section 7.2 should apply to refrigeration systems when fitted on LNG carriers, ie standby capacity will be required as detailed in 7.2.1. A stand-by LNG/refrigerant heat exchanger need not be provided and the fitted LNG/refrigerant heat exchanger will not be required to have 25% excess capacity over that for normal requirements[1]). Other heat exchangers utilizing water cooling should have a stand-by or have at least 25 per cent excess capacity.

1.3 Paragraph 7.2.1 states that unless an alternative means of controlling the cargo pressure/temperature is provided to the satisfaction of the Administration, a stand-by unit (or units) affording spare capacity at least equal to the largest required single unit should be fitted.
For the purpose of complying with the above, a suitable alternative means of pressure/temperature control would be:

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