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MSC/Circ.314

CODE FOR THE CONSTRUCTION AND EQUIPMENT OF SHIPS CARRYING DANGEROUS CHEMICALS IN BULK

Calculation of the capacity of foam systems for chemical tankers

1 In section 3.14 of the Bulk Chemical Code concerning fire extinguishing arrangements for cargo tank areas (ninth set of amendments) the foam supply has to be determined in accordance with 3.14.5 to 3.14.7 of the Bulk Chemical Code. In order to provide for a correct interpretation of the requirements the Sub-Committee on Fire Protection agreed on the following example for a calculation of foam system for a chemical tanker of 10,000 tonnes deadweight.

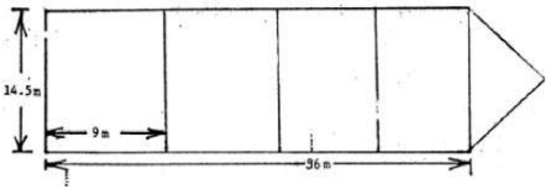
2 The Maritime Safety Committee at its forty-fourth session agreed that this example be followed when calculating the capacity of foam systems for chemical tankers. In addition this example will be included in the new edition of the Bulk Chemical Code.

Example of foam system calculation for chemical tanker of 10,000 dwt Ship particulars

- Beam = 14.5 m
- Length of cargo area = 56 m
- Length of largest cargo tank = 9 m
- Cargo deck area = 14.5m × 56m = 812 m²
- Horizontal sectional area of single largest tank = 14.5 m × 9m = 130.5m²

(Note: for the purposes of this illustration, a single tank encompasses the entire beam of the ship)

- Proposed monitor spacing = 9m
- Area protected by largest monitor = 9m x 14.5m = 130.5 m²



Calculations

1 Determination of foam supply rate:

3.14.5[1] - The largest of:

[1] Paragraphs refer to 1980 edition of the Bulk Chemical Code.

3.14.5(a) - the foam supply rate based upon the entire cargo deck area.

2 ℓ/m²/min × 812 m² = 1,624 ℓ/min

3.14.5(b) - the foam supply rate based upon the horizontal sectional area of the single largest tank

20 ℓ/m²/min × 130.5m² = 2,610 ℓ/min

3.14.5(c) - the foam supply rate based upon the area protected by the largest monitor

10 ℓ/m²/min × 130.5m² = *1,305 ℓ/min

(* shall not be less than 1,250 ℓ/min)

The foam supply rate is therefore 2,610 ℓ/min which is the largest of the three above calculated rates.

2 Determination of the required quantity of foam concentrate:

3.14.6 - 2,610 ℓ/min is the foam supply rate from Regulation 3.14.5. This flow rate for thirty minutes will require 30 min × 2,610 ℓ/min = 78,300 litres of foam-water solution. If a 5% foam concentrate is used, then 5% of the 78,300litres must be foam concentrate, or .05 × 78,300 = 3,915 litres.

3 Determination of the minimum monitor capacity:

3.14.7 - Each monitor must supply at least:

(a) 50% of the required foam rate; or

(b) 10 ℓ/m²/min for the area it protects; or

(c) 1,250 literes/min, whichever is greater

50% of the foam supply rate = 2,610 ℓ/min × .5 = 1,305 ℓ/min

10ℓ/m²/min times the area the monitor protects = 130.5m² × 10ℓ/m²/min = 1,305ℓ/min

The minimum monitor capacity is therefore 1,305 ℓ/min.

Designer wishes to increase monitor spacing to 15 metres between monitors.

1 Recalculate required foam supply:

3.14.5(a) - same as before - 1,624 ℓ/min

3.14.5(b) - same as before - 2,610 ℓ/min

3.14.5(c) - larger area covered by monitor is 15 m × 14.5 = 217.5 m²

10ℓ/m²/min × 217.5 m² = 2,175 ℓ/min

The required foam rate therefore remains 2,610 litres per minute

2 Recalculate required foam concentrate supply:

3.14.6 - The minimum foam supply rate has not changed therefore 3,915 litres of foam concentrate are still required.

3 Recalculate minimum monitor capacity:

3.14.7 - 50% of foam supply rate 2,610 ℓ/min × .50 = 1,305 ℓ/min 10 ℓ/m²/min of area protected by monitor = 10ℓ/m²/min × 217.5m² = 2,175 ℓ/min

The new minimum monitor capacity is therefore 2,175 ℓ/min.