
SC170 Low pressure CO₂ systems

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(FSS Code Ch.5.2.2)

Where a low pressure CO₂ system is fitted to comply with this regulation, the following applies:

1. The system control devices and the refrigerating plants should be located within the same room where the pressure vessels are stored.
2. The rated amount of liquid carbon dioxide should be stored in vessel(s) under the working pressure in the range of 1.8 to 2.2 N/mm². The normal liquid charge in the container should be limited to provide sufficient vapour space to allow for expansion of the liquid under the maximum storage temperatures than can be obtained corresponding to the setting of the pressure relief valves but should not exceed 95% of the volumetric capacity of the container.
3. Provision should be made for:
 - pressure gauge;
 - high pressure alarm: not more than setting of the relief valve;
 - low pressure alarm: not less than 1.8 N/mm²;
 - branch pipes with stop valves for filling the vessel;
 - discharge pipes;
 - liquid CO₂ level indicator, fitted on the vessel(s);
 - two safety valves.
4. The two safety relief valves should be arranged so that either valve can be shut off while the other is connected to the vessel. The setting of the relief valves should not be less than 1,1 times working pressure. The capacity of each valve should be such that the vapours generated under fire condition can be discharged with a pressure rise not more than 20% above the setting pressure. The discharge from the safety valves should be led to the open.
5. The vessel(s) and outgoing pipes permanently filled with carbon dioxide should have thermal insulation preventing the operation of the safety valve in 24 hours after de-energizing the plant, at ambient temperature of 45°C and an initial pressure equal to the starting pressure of the refrigeration unit.
6. The vessel(s) should be serviced by two automated completely independent refrigerating units solely intended for this purpose, each comprising a compressor and the relevant prime mover, evaporator and condenser.
7. The refrigerating capacity and the automatic control of each unit should be so as to maintain the required temperature under conditions of continuous operation during 24 hours at sea temperatures up to 32°C and ambient air temperatures up to 45°C.

Note: This UI SC 170 is to be uniformly implemented by IACS Members and Associates from 1 January 2003.

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8. Each electric refrigerating unit should be supplied from the main switchboard busbars by a separate feeder.
9. Cooling water supply to the refrigerating plant (where required) should be provided from at least two circulating pumps one of which being used as a stand-by. The stand-by pump may be a pump used for other services so long as its use for cooling would not interfere with any other essential service of the ship. Cooling water should be taken from not less than two sea connections, preferably one port and one starboard.
10. Safety relief devices should be provided in each section of pipe that may be isolated by block valves and in which there could be a build-up of pressure in excess of the design pressure of any of the components.
11. The piping system should be designed in such a way that the CO₂ pressure at the nozzles should not be less than 1N/mm².
12. Audible and visual alarms should be given in a central control station when:
 - the pressure in the vessel(s) reaches the low and high values according to 2;
 - any one of the refrigerating units fails to operate;
 - the lowest permissible level of the liquid in the vessels is reached.
13. If the system serves more than one space, means for control of discharge quantities of CO₂ should be provided, e.g automatic timer or accurate level indicators located at the control position(s).
14. If a device is provided which automatically regulates the discharge of the rated quantity of carbon dioxide into the protected spaces, it should be also possible to regulate the discharge manually.

(MSC/Circ. 1120)