

Safety Alert



SA 004

Fixed CO₂ Fire Fighting Systems

The United States Coast Guard (USCG) has recently published two [Marine Safety Alerts](#): “Wrong Directions: A Recipe for Failure” and “Simple Failures Render CO₂ System Inoperative” concerning fixed CO₂ fire fighting installations. They have been issued as a result of an ongoing USCG investigation into a machinery space fire involving a recently built vessel. Although the fire was quickly extinguished, it was decided approximately five hours later to inject CO₂ into the compartment. However, due to a number of failings with the CO₂ system this was not possible. The incident investigation discovered various problems with the vessel’s fixed CO₂ fire fighting installation and Firefighting Instruction Manual (FIM), as detailed below:

- The CO₂ release stations had instruction placards that referred to elements of a control panel not in use on the vessel.
- Shipyard piping drawings did not appear to match the actual installation.
- Numerous pipe and hose joints were found to be leaking, even when tightened.
- The ball valve from the CO₂ manifold to the aft machinery space failed when the gas powered actuator arm fell off. It had been fitted with a small screw and washer. Five of the six other zone ball valves with

similarly fitted actuator arms were found to be loose.

- Hemp type sealant had been used extensively on pipe threads and in some cases seemed to have entered the system.
- The distribution manifold contained low points where water could accumulate but not drain, leading to the possibility of corrosion over time.
- The pilot and co-pilot CO₂ bottles did not operate correctly and had to be activated manually.
- The procedures detailed in the FIM and the commissioning test procedures used in the shipyard differed.
- The FIM referred to a control panel that was not the same as the one fitted on board.
- The FIM stated that the control panel was on the starboard side of the vessel, when in reality it was located on the port side.
- The FIM used the word “pull” in relation to valves, when it should have read “turn”.
- A confusing statement was found in the FIM which read: “Once the fire has been extinguished make sure that the temperature has decreased before investigate the area same time is needed to wait hours”.
- The FIM referred, on numerous occasions, to an emergency shutdown graphic. However,

this was not found on board.

- The photographs of the internals of the CO₂ release stations in the FIM appeared to be different to those on the vessel.
- The system had recently been serviced and inspected by an authorised service agent, but none of the foregoing faults had been noted or rectified.

Given the number of deficiencies found, Members are advised to ensure that the manuals, piping schematics, instructions placards and labelling for the CO₂ systems on their vessels are relevant to the actual installation. Routine inspections, maintenance and testing of a vessel’s fixed CO₂ fire fighting installation should reflect manufacturers’ recommendations and be included in the planned maintenance system. Periodic servicing of the system should only be carried out by a service agent authorised by the manufacturer. In the event of any doubts regarding the service agent’s performance, the manufacturer should be informed.

Additional information on CO₂ fire extinguishing system safety can be found in USCG Navigation and Vessel Inspection Circular No. [09-00](#).

Members requiring further guidance should contact the Loss Prevention Department.