



MARINE SAFETY ALERT

Inspections and Compliance Directorate

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Washington, DC

Safety Alert 01-01

FLAMELESS RATION HEATERS

Situation: Flameless Ration Heaters (FRH) stowed onboard several Military Sealift Command (MSC) vessels have been identified as the source of elevated hydrogen gas (H₂) concentrations in containers and cargo hold spaces. In most instances H₂ gas elevations are barely detectable but in isolated cases the levels inside closed containers have entered the explosive range. One such container recently broke into flames on the pier after being opened and prepared for unloading.

Background: Subject units are water activated devices for warming military Meals, Ready-to Eat (MRE). FRHs contain magnesium-iron alloy (Mg-Fe) and other powdered ingredients in flat High Density Polyethylene (HDPE) pouch. The exothermic chemical reaction which warms the meals, produces hydrogen gas as a by-product. The addition of water is ordinarily required to cause the reaction to proceed. However, atmospheric moisture may be capable of penetrating the HDPE, causing a low grade reaction and the evolution of H₂ gas. The production of a flammable atmosphere is very slow but H₂ concentrations may occur inside containers and in upper reaches of holds where pockets of gas may be held.

FRH units are usually packed together with the MREs, inside the individual menu bags. On one ship, all FRHs were removed from the MREs and stowed in refrigerated containers on the open deck. While this method of stowage removed the H₂ gas generating problem from the holds, it concentrated the production of gas within the on-deck containers and resulted in concentration levels in the flammable range. MSC and the U.S. Army are investigating impermeable foil overwrapping methods and the use of non-hydrogen generating heaters but these solutions will not be fully implemented in the immediate future.

Recommendation: Ports loading or receiving shipments of MREs and FRHs should consider requiring the monitoring of containers and holds in which FRH are stowed prior to movement of the containers or any activities which could introduce an ignition source. COTPs should advise ship operators that have FRHs aboard their vessels of this potential condition and, recommend the operators have procedures and equipment necessary to monitor the temperature and atmospheric contents of containers holding FRHs. POC for additional information on FRHs is the Coast Guard Liaison to MSC, CDR Paul Gugg at (202) 685-5726. CDR.Gugg@msc.navy.mil Operational insights may also be obtained from MSO Guam which has been involved in the discovery and abatement of this problem on preposition vessels staged in its AOR.

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