



MARINE SAFETY ALERT

Inspections and Compliance Directorate

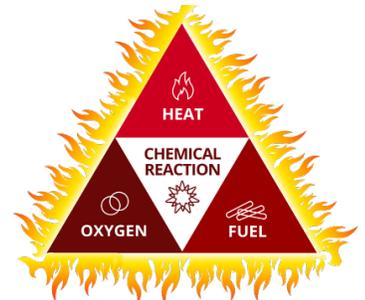
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Safety Alert 05-20

Electrical Issues Spark Major Concern – Addressing Hazardous Area Electrical Installations Knowledge Gaps

The purpose of this Safety Alert is to emphasize the importance of properly installed and maintained listed or certified safe electrical equipment in hazardous areas in order to reduce the risk of fire or explosion onboard vessels. The Coast Guard has seen a number of instances where there was a lack of knowledge in the marine industry as it relates to the installation, training, maintenance and inspection of these certified systems.

Since 2012, the Liquefied Gas Carrier National Center of Expertise (LGC NCOE) annually publishes the Top 5 deficiencies found on liquefied gas carriers during Certificate of Compliance (COC) exams. Since initially publishing this document, electrical equipment in hazardous areas continues to be a common deficiency. This past year 12% of all deficiencies written to gas carriers involved hazardous area electrical equipment. Port State Control Officers (PSCOs) have found certified safe equipment improperly installed or identified missing components, which compromises the certification of the system and nullifies this critical protection in a flammable environment. In other cases, PSCOs found degraded components and evidence of equipment not being maintained or inspected. Additionally, USCG personnel nationwide have discovered instances where individuals responsible for the installation, maintenance, and oversight of this equipment onboard foreign and domestic vessels were unfamiliar with the appropriate standards to follow.



The attribution of fires caused by electrical faults cannot be overstated. The National Fire Protection Agency published *Fires in Industrial and Manufacturing Properties* in March 2018 and reported that “electrical distribution and lighting equipment (24%) was the leading cause of structural fires in industrial properties from 2011-2015.” The International Union of Marine Insurance issued a press release *IUMI Voices Concerns over Growing Number of Roro Fires* reporting that, “marine accident reports in recent years have identified several sources of fires....a significant (leading) number of these incidents have occurred because of electrical fires.”



Properly Installed Certified Safe Junction Box



Improperly Modified & Maintained Certified Safe Junction Box



Improper Cable Gland Installation/Modification



Standing Water in a Certified Safe Flameproof Light Enclosure Indicating Failed Ingress Protection

Fire and explosion protection standards for electrical equipment in the oil and gas industry worldwide is a substantial part of the industry's safety barrier. Regulatory and certification authorities routinely use their own standards. The United States, for example, may use the National Electrical Code (NEC) or American Petroleum Institute (API) standards while other countries have separate requirements. However, for vessels subject to the *International Convention for the Safety of Life at Sea (SOLAS)*, electrical equipment installations in hazardous areas are required to meet a standard not inferior to those of the International Electrotechnical Commission (IEC), in particular IEC 60092-502:1999. This requirement is reiterated and further applies to **tank vessels (SOLAS II-1)**, **gas carriers (International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk, IGC Code)**, **chemical tankers (International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk, IBC Code)** and **vessels using gases or other low flashpoint fuel (International Code of Safety for Ships Using Gases or other Low-Flashpoint Fuels, IGF Code)**. For US vessels, hazardous area standards are laid out in *46 CFR Subchapter J*, specifically *46 CFR Subpart 111.105 - Hazardous Locations*. The Coast Guard's interpretation is that §111.105 does provide a set of design standards that are not inferior to the *IEC 60092-502:1999* standard specified in SOLAS.

While hazardous area design standards are included in *46 CFR Subchapter J*, the requirements for proper training, inspection and maintenance are not explicitly provided. Furthermore, requirements for these operational aspects of ensuring hazardous area electrical safety and system integrity are more robustly covered in the IEC standards than they are in some of the corresponding national standards.

The Coast Guard **strongly recommends** that owners, operators, shipboard personnel and service providers:

- Familiarize themselves with additional IEC standards that are called out by IEC 60092-502:1999 and in particular IEC 60079-14, 60079-17, and IEC 60079-19 as it relates to the proper training, inspection, maintenance, and documentation of electrical equipment installed in hazardous areas to ensure that no potential ignition source is present in hazardous areas aboard tank vessels, gas carriers and vessels using gases or other low flashpoint fuels.
- Ensure proper training for operators and persons with executive functions conducted to a standard not inferior to the IEC at all appropriate levels.
- Implement an appropriate periodic inspection and maintenance program by competent personnel.
- Any repairs should be made by a competent technician or repair facility. When in doubt, a representative of the equipment manufacturer should be consulted. Any modifications to existing systems **must** be discussed with and approved by the appropriate regulatory authority (i.e., USCG, flag administration, or vessel classification society).

This Safety Alert is provided for informational purposes only and does not relieve any domestic or international safety, operational or material requirement. Developed by the Liquefied Gas Carrier National Center of Expertise (LGC NCOE), Port Arthur, Texas. Address questions to lgcncoe@uscg.mil.