



REVIEW OF HAZARDOUS LOCATIONS

Procedure Number: E2-12

Revision Date: September 30, 2021

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Purpose

This Plan Review Guideline (PRG) covers hazardous locations for compliance with requirements of 46 CFR Subchapter J, ABS Class Rules, and IMO Rules. Other vessel classifications (e.g. 46 CFR Subchapter D and O) requirements may differ from those listed below.

Contact Information

If you have any questions or comments concerning this document, please contact the Marine Safety Center (MSC) by e-mail or phone. Please refer to Plan Review Guide Number E2-12.

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1. Applicability

This Plan Review Guideline (PRG) is applicable to vessels other than tank barges carrying hazardous cargos and subject to the requirements of 46 CFR Subchapter J and/or SOLAS, including vessels carrying methanol in bulk, vessels carrying liquefied natural gas (LNG) in bulk, and vessels using LNG as fuel. For tank barges (not carrying LNG) inspected under 46 CFR Subchapters D & O, refer to WI E2-11 Electrical Plans – Barges

2. Background

Using applicable portions of references (a) through (p), the submitter shall provide sufficient documentation and plans to indicate compliance. A typical hazardous location submittal includes a detailed drawing showing the hazardous areas, details for electrical equipment located inside the hazardous location and/or electrical equipment list.

3. References

- (a) Title 46 CFR 111.105 "Hazardous Locations"
- (b) [Navigation and Vessel Inspection Circular \(NVIC\) 2-89, "Guide for Electrical Installations on Merchant Vessels and Mobile Offshore Drilling Units"](#)
- (c) ABS "Rules for Building and Classing Steel Vessels for Service on Rivers and Intracoastal Waterways, 2007"
- (d) IMO IGC Code "International Code for the Construction and Equipment of Ships Carrying Liquefied Gas in Bulk, 2003 Edition, Chapter 10"
- (e) IMO Resolution A.673(16), "Guidelines for the Transport and Handling of Limited Amounts of Hazardous and Noxious Liquid Substances in Bulk on Offshore Supply Vessels"
- (f) [CG-ENG Policy Letter 03-12, "Policy on the Implementation of IMO Resolution A.673 \(16\), Guidelines for the Transport and Handling of Limited Amounts of Hazardous and Noxious Liquid Substances in Bulk on Offshore Support Vessels, for New and Existing Offshore Supply Vessels"](#)
- (g) IMO IGF Code "International Code of Safety for Ships Using Gases or other Low-Flashpoint Fuels, Resolution MSC.391(95)"
- (h) [CG-ENG Policy Letter 01-12, CH-1, "Equivalency Determination – Design Criteria for Natural Gas Fuel System"](#)
- (i) [CG-ENG Policy Letter 02-15, "Design Standards for U.S. Barges Intending to Carry Liquefied Natural Gas in Bulk"](#)
- (j) IEC 60092-502, "Electrical Installations in Ships–Tankers–Special Features"
- (k) U.S. Coast Guard Interpretation of IEC 60092-502: 1999 Supplement
- (l) IEC 60079, Parts 0, 1, 2, 5, 6, 7, 11, 15, & 18 (2001) – "Electrical Apparatus for Explosive Gas Atmospheres"
- (m) NEC (2011), Articles 500 through 506, and 510
- (n) ANSI/ISA – RP 12.06.01 – 2003, "Recommended Practice for Wiring Methods for Hazardous (Classified) Locations Instrumentation"
- (o) [Marine Inspection Notice \(MIN\) 01-12, "ATEX certified Electrical Equipment in Hazardous Area on U.S. Ships"](#)
- (p) CGMIX, <https://cgmix.uscg.mil/Default.aspx>

4. Definitions

- a. *Independent Laboratory*: An organization that meets the standards of acceptance in 46 CFR 159.010-3, and which is accepted by the Coast Guard to perform certain tests and inspections. A listing of accepted laboratories can be found in reference (p).
- b. *Flashpoint*: Near the surface of a liquid, the minimum temperature at which the liquid gives off a vapor in sufficient concentration to ignite when mixed with air. Grade refers to the flashpoint.
- c. *Class*: The classification of a material or material location based on experimentally determined properties of flammable vapors, gases, liquids, combustible dusts or fibers that may be present, and the likelihood that a quantity or concentration of such flammable or combustible material is present. Class I material includes flammable gases and vapors, while Class II materials include combustible dusts.
- d. *Group*: The classification of gases, vapors and dust that are based on experimentally determined explosion pressure and/or ignition temperature, and the maximum safe clearance between parts of an enclosure that contains the hazardous material.
- e. *Division*: A classification of the probability that material may be present in flammable or combustible quantities. In Division 1 areas the hazardous material can exist under normal conditions (1 fault) whereas in Division 2 areas, the hazardous material can exist under abnormal conditions (2 faults).
- f. *Zone*: An alternative to the division classification system, for electrical and electronic equipment and wiring for all voltages in Zone 0, Zone 1, and Zone 2 hazardous (classified) location where fire or explosion hazards may exist due to flammable gases, vapors, or liquids.

5. Content

The submittal should include the following in accordance with the applicable sections of references (a) through (n).

- a. Applicable electrical equipment certified by CG approved or recognized independent laboratories for use in hazardous areas along with copies of certificates.
- b. Wiring methods for hazardous locations per 46 CFR 111.105-17.
- c. Purged and pressurized equipment per references (a) and/or (l).
- d. Intrinsically safe system requirements per 46 CFR 111.105-11 and/or (l).
- e. As applicable, specific requirements for vessel cargo/material per 46 CFR 111.105-31
- f. General considerations of reference (b).

Note: A list of additional Coast Guard-recognized third party laboratories can be found in reference (p). Note that the Coast Guard does not recognize the ATEX Certification Scheme, in accordance with reference (o).

- g. If reference (j) was the applicable standard used to develop a hazardous area plan and installation of electrical equipment in the hazardous area, then compliance with

reference (k) must also be verified. These plans may be submitted for the following vessels types:

- (1) Vessels for which an equivalency to reference (a) has been requested and granted by Marine Safety Center per 46 CFR 110.20-1.
 - (2) Offshore supply vessels to which references (d) and (e) apply.
 - (3) Vessels carrying methanol in bulk to which reference IMO IBC Code “International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk, 2007 Edition, Chapter 10” applies.
 - (4) Vessels carrying liquefied natural gas (LNG) in bulk to which references (d) or (i) applies. For more information on Liquefied Gas Carriers or LNG as Fuel, see [LGCNCOE](#).
 - (5) Vessels using LNG as fuel to which references (g) and (h).
 - (6) Oversight of plans for vessels enrolled in the Alternative Compliance Program (ACP) under NVIC 2-95 where the rules of the Authorized Classification Society and the applicable US Supplement is applicable, or are based on compliance with references (d), (g), (h) and (i).
- h. For MODU’s or offshore installations, reference (n) may be applicable and applicable MODU material substitute requirements are contained in 46 CFR 108.105. For classified (hazardous) locations, material substitute requirements are found in 46 CFR 108.170 to 108.187.
- i. On tank and cargo vessels, a hazardous area plan on weather deck locations per 46 CFR 111.105-31(l), along with cargo and/or Tankerman houses (if installed). If the houses are placed within the hazardous areas, they must be elevated (cofferdams). Refer to 5C-2-1/5.3 and 5C-3-7/3.5 of reference (g) and 46 CFR 110.30-1(b). The plan should indicate if the interior of a deck house is or is not a hazardous area. The hazardous area plan should identify machinery spaces/structures on weather deck locations as required by 46 CFR 111.105-31(l), such as cargo and/or Tankerman houses (if installed). If any openings such as doors or ventilation for machinery spaces/houses are within the hazardous areas, then the interior of the structure will also be considered to be in the hazardous area.
- j. Per 46 CFR 110.25-1(i), a hazardous area submittal should include:
- (1) A plan identifying hazardous and non-hazardous areas and cargo engines and generators (if installed).
 - (2) Complete and detailed Bill of Materials, including independent laboratory testing label or listing for explosion-proof and intrinsically safe equipment and systems, and purged and pressurized equipment per references (a) and/or (l). The corresponding certificates should also be submitted to match the equipment listed in the Bill of Materials.
 - (3) Elementary one-line wiring diagram showing all electrical installation details, location and type of equipment, and wiring methods of 46 CFR 111.105-17.
 - (4) Maximum temperature rating of electrical equipment in hazardous locations.
 - (5) General criteria for hazardous areas in reference (c).

Additional Considerations

- a. [TANKSHIPS] As per 46 CFR 32.55-20(b), cargo tanks in which Grade A liquids are to be transported must be fitted with a vent line that connects to a common header which must terminate at least 13.1 feet above the weather deck and away from any working or living space, ventilator inlet, or source of ignition. The vent header must be fitted with either a flame arrester or a pressure-vacuum relief valve (P/V valve). When special considerations prohibit this vent from being permanently installed, it must be adjustable to reach an appropriate location.
- b. [TANKSHIPS] As per 46 CFR 32.55-20(c), cargo tanks in which Grades B or C liquids are to be transported must either be fitted with individual P/V valves or connect to a common header with flame arrester or P/V valve. In either case, the vent must terminate a “reasonable height” above the weather deck.
- c. The exhaust system location of cargo pump and/or other engines on tank barges must exceed 10ft from the nearest source of flammable vapor or gas per 4-1-1/15.3 of reference (f) and 46 CFR 110.20-1.
- d. Engines with electrical and electronic starting, control and monitoring systems must be approved for installation in a hazardous area. Approval is normally by engine series and done by the Marine Safety Center.

6. Disclaimer

This guidance is not a substitute for applicable legal requirements, nor is it itself a rule. It is not intended to nor does it impose legally-binding requirements on any party. It represents the Coast Guard’s current thinking on this topic and may assist industry, mariners, the general public, and the Coast Guard, as well as other federal and state regulators, in applying statutory and regulatory requirements. You can use an alternative approach for complying with these requirements if the approach satisfies the requirements of the applicable statutes and regulations. If you want to discuss an alternative, you may contact MSC, the unit responsible for implementing this guidance.