

MSC Guidelines for Electrical Plans – Barges

Procedure Number: E2-11

Revision Date: 06/14/2016

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Purpose: This document outlines basic considerations for submitting the proper electrical plans for tank barges to meet the requirements of 46 CFR Subchapters D, J, & O.

References:

- a) 46 CFR 32.55 – Ventilation and Venting
- b) 46 CFR 39.20 – Vapor Control System, Design & Equipment
- c) 46 CFR 111.105 – Hazardous Locations
- d) 46 CFR 151.15-10 – Cargo Gauging Devices
- e) 33 CFR 155.480 – Overfill Devices
- f) ANSI/ISA-RP12.06.01-2003, “Recommended Practice for Wiring Methods for Hazardous (Classified) Locations Instrumentation”
- g) NEC (2011) 500.2, 500.5, & 504.2
- h) Navigation and Vessel Inspection Circular (NVIC) 2-89, “Guide for Electrical Installations on Merchant Vessels and Mobile Offshore Drilling Units,” <http://www.uscg.mil/hq/cg5/nvic/pdf/1989/n2-89.pdf>
- i) CGMIX, <http://cgmix.uscg.mil/Default.aspx>

Contact Information: If you have any questions or comments concerning this document, please contact the Marine Safety Center (MSC) by email or phone. Please refer to the Procedure Number E2-11.

Email: MSC@uscg.mil

Phone: 202-795-6729

Website: <http://homeport.uscg.mil/msc>

Responsibilities: The submitter shall provide sufficient documentation and plans to indicate compliance with the applicable requirements outlined in references (a) through (i). The submission shall be made electronically to the above email address or, if paper, in triplicate to the MSC’s address found on the above website. To facilitate plan review, all plans and information specified in these guidelines should be submitted as one complete package through a single point of contact for the project.

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Applicability:

This document applies to all barges inspected under Subchapters D & O.

General Guidance:

- The following drawings shall be submitted, as applicable:
 - a) Hazardous Area Plan
 - b) Cargo Gauging Drawing
 - c) Electrical One-Line Diagram
 - d) Switchboard Diagram
 - e) Navigation Lights

 - The Coast Guard accepts UL standards as a sufficient method for determining if equipment is appropriate for installation in a hazardous location.
 - a) 46 CFR 111.105-9 incorporates UL 1203 (Third Edition) as the standard for explosion-proof equipment. The current UL 1203 (Fifth Edition) incorporates the requirements previously contained in:
 - 1. UL 698, Industrial control
 - 2. UL 877, Circuit breakers
 - 3. UL 886, Outlets
 - 4. UL 894, Switches
 - 5. UL 1002, Electrically operated valves
 - 6. UL 1010, Receptacle-plug combos
 - b) Other hazardous location UL standards include:
 - 1. UL 674, Electric Motors and Generators for Use in Division 1 Hazardous (Classified) Locations
 - 2. UL 823, Electric Heaters for Use in Hazardous (Classified) Locations
 - 3. UL 844, Luminaries for Use in Hazardous (Classified) Locations
 - 4. UL 913, Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II, and III, Division 1, Hazardous (Classified) Locations. Reference (f) or IEC 60079 series (with an IECEx certificate) can be used as an alternate standard.
 - 5. UL 2225, Cables and Cable-Fittings For Use in Hazardous (Classified) Locations
 - c) A list of additional Coast Guard-recognized third party laboratories can be found in reference (i). Note that the Coast Guard does not recognize the ATEX Certification Scheme.
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Tank Venting System (§32.55):

- On barges carrying Grade A, B, or C cargos, venting must be accomplished through the use of:
 - a) One pressure/vacuum (P/V) valve per tank, and/or
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- b) One P/V valve on the common vent header, if installed.
 - c) As per 46 CFR 153.355, barges carrying cargos that require P/V venting, as listed in Part 153 Table 1, must have a valve between each tank and the common header, if installed.
 - Barges carrying only Grade D or E cargos may:
 - a) Meet the venting requirements for Grade A and lower cargos, or
 - b) Be equipped with gooseneck vents and flame screens.
 - If the barge is carrying cargos listed under Subchapter O, the vents must be located so as to meet the requirements of 46 CFR 153.350-353.
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Cargo Gauging & Overfill Protection (§39.20):

- As per 33 CFR 155.480(b), all barges with a cargo capacity of 6,290 barrels or more of oil must have one overfill protection device per tank that meets one of the following requirements:
 - a) 46 CFR 39.20-9
 - 1. This is required if the vessel has a VCS. The vessel is then also subject to the requirements of 46 CFR 29.30-3(a):
 - i. The gauging system must be closed.
 - ii. The operator must be able to monitor all tank liquid levels at the location where cargo transfer is controlled.
 - 2. This is required if the vessel carries cargos that need closed gauging.
 - b) 46 CFR 39.20-3
 - 1. This is allowed if the vessel carries only Grade D or E cargos and does not have a VCS.
 - 2. It is possible for a barge to be authorized to carry Grade A, B, or C cargo with open gauging. However, the specific cargos that would be permitted with open gauging form a very small subset of all the cargos in these grades.
 - As per 46 CFR 39.20-9(a), the overfill protection system must meet the applicable requirements of 46 CFR 39.20-7 if it:
 - a) includes a self-contained power supply,
 - b) receives power from a barge generator power supply, or
 - c) receives shore power and is fitted with an explosion-proof 12V, 20A shore tie plug that meets ANSI/NEMA WD6 and NFPA 70 Articles 410-57 & 501-12.
 - If the overfill protection system is intrinsically safe, it must meet the requirements of 46 CFR 39.20-9(b). Barges using a 5-pin barge-to-shore
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connector at a Coast Guard-regulated facility use the alarm system provided by the facility.

- If the overfill protection system consists of a spill valve or rupture disc, the system drawing shall be reviewed by the Machinery Branch.
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Hazardous Areas (§111.105):

- The following areas are identified as hazardous, as per 46 CFR 111.105-31(l):
 - a) Within a 10-foot (3m) radius of:
 1. cargo tank vent outlets,
 2. cargo tank ullage openings,
 3. cargo pipe flanges,
 4. cargo valves,
 5. cargo handling room entrances, and
 6. cargo handling room ventilation openings.
 - b) Within a 16-foot (5m) radius of:
 1. P/V valves. Note that this zone has an unlimited height.
 - c) Within a 33-foot (10m) radius of:
 1. vent outlets for free flow of vapor mixtures, and
 2. high velocity P/V valves.
 - d) Note that these hazardous areas are not for Grade E cargoes, due to this section applying to liquids with a flashpoint below 140°F.
 - All electrical equipment installed in a hazardous area must be explosion-proof, as per 46 CFR 111.105-9, or part of an intrinsically safe system, as per 46 CFR 111.105-11.
 - For new construction, no electrical equipment is permitted to be installed within the hazardous area. This includes, but is not limited to, prime movers, generators, and thermal fluid heaters.
 - For existing vessels, if the Certificate of Inspection (COI) indicates that the thermal fluid heater can only be operated when carrying Grade E cargoes, then any revisions to the hazardous area submitted to the MSC for review that include an existing heater will be subject to approval contingent on satisfying the operational restrictions noted on the COI.
 - As per 46 CFR 111.05-19, systems under 1000V cannot be grounded; therefore, dual-voltage generators are not permitted. Systems over 1000V may be grounded, as long as no current flows through a hazardous area.
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- See Figure 1 of reference (h) for an example of acceptable ground detection for an ungrounded system. An ammeter is not an acceptable form of ground detection because it is always connected to ground.

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 the Marine Safety Center (MSC), the unit responsible for implementing this guidance.