

MSC Guidelines for Electrical Load Analysis

Procedure Number: E2-06

Revision Date: 06/20/2016

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Purpose:

This document outlines a basic method for submitting electrical system load analyses.

References:

- a) 46 CFR 111.10
 - b) 46 CFR 112
 - c) SOLAS (Consolidated Edition 2014)
 - d) Navigation and Vessel Inspection Circular (NVIC) 2-89, "Guide for Electrical Installations on Merchant Vessels and Mobile Offshore Drilling Units"
 - e) D8(m) Policy Ltr 01-03, "Use of Dynamic Positioning (DP) by Offshore Supply Vessels (OSVs) for Oil and Hazmat Transfers," dated January 22, 2003
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**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 E2-06.

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 (e). 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.

Applicability:

This document applies to all vessels inspected under Subchapter J.

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Background:

Adequate power must be provided to ship's service, emergency, and drilling loads. *Ship's service loads* are defined as all auxiliary services necessary for maintaining the vessel in a normal operational and habitable condition; these include, but are not limited to, safety, lighting, ventilation, navigational, communication, habitability, and propulsion auxiliary loads. *Emergency loads* are vital loads necessary for the safety of passengers and crew. *Drilling loads* are those associated exclusively with drilling operations, to include the drill table, mud system, and positioning equipment.

General Guidance:

- Vessels may have various operating conditions, such as “Normal Sea Load,” “At Anchor,” or “Maneuvering.” The largest computed load should be used to determine the required generation capacity. For OSVs operating in DP mode during oil and hazmat transfers, see reference (e).
- The load analysis should clearly show that the generators can supply enough power to the ship's service loads. The individual load factors should be reasonable; see Appendix 2 Table 1 of reference (d) for examples of “typical” load factors.
 - a) The load analysis should not include electrical propulsion, drilling, or cargo refrigeration or transfer loads.
 - b) The efficiency of power converters (rectifiers, transformers, etc.) should be taken into account: the total kW on the load side should be divided by the converter's efficiency to obtain the computed load.
 - c) For redundant equipment where one unit will be the primary and the other will be a standby (e.g. Steering Pump #1 & #2), the standby unit may have a load factor of 0.
 - d) With the largest power source off, the remaining power sources must be able to supply the loads associated with normal operating conditions for propulsion, safety, and habitability, as per 46 CFR 111.10-4(b) and SOLAS II-1/41-1.2. This includes cooking, heating, air conditioning, refrigeration, ventilation, sanitation, and fresh water.
- The load analysis should also demonstrate that the emergency load requirements of 46 CFR 112 are satisfied.
 - a) All emergency loads must be able to be supplied simultaneously, as per 46 CFR 112.05-5(a); reference (d) Appendix 2, Paragraph (2)(n); and SOLAS II-1/42-2 or 43-2. If there is a temporary/transitional source of emergency power, it must have adequate capacity to meet the requirements of 46 CFR 112.05-5(a) and SOLAS II-1/42-4 or 43-4. A unity (1.0) load factor shall be used for all emergency switchboard connected loads. Refer to 46 CFR Table 112.05-5(a) or SOLAS II-

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1/42-2 or 43-2 for guidance on how long the emergency loads must be powered.

- b) Only loads identified in 46 CFR 112.15-1 & 112.15-5 are authorized for connection to the emergency power source. The emergency power source may be authorized by the MSC for use, if necessary, to maintain or restore the propulsion plant, such as control systems, controllable pitch propellers, hydraulic pumps, control air compressors, and machinery necessary for dead-ship start-up, as per 46 CFR 112.05-1(b) and SOLAS II-1/41-1.4. Other loads that enhance safety must be specifically authorized by the MSC, as per 46 CFR 112.05-1(c).

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.