

# MSC Guidelines for AEVADS and General Emergency Alarm System

Procedure Number: E2-2

Revision Date: 01/26/00

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## References:

- a. Title 46 CFR Parts 76, 111, 112, and 113
- b. Navigation and Inspection Circular (NVIC) 2-89, "Guide for Electrical Installations on Merchant Vessels and Mobile Offshore Drilling Units"
- c. Navigation and Inspection Circular (NVIC) 8-93, "Equivalent Alternatives to 46 CFR Subchapter H Requirements Related to Means of Escape, Safe Refuge Areas, and Main Vertical Zone Length"
- d. AEVADS Proposed Revision to NVIC 8-93
- e. American Bureau of Shipping (ABS), "Rules for Building and Classing Vessels under 90 Meters in Length", 1996
- f. E2-1, E2-3, and E2-9, MSC Work Instructions
- g. Electrical One-line Dwg (Main and Emergency Power Sources)

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## Disclaimer

These guidelines were developed by the Marine Safety Center staff as an aid in the preparation and review of vessel plans and submissions. They were developed to supplement existing guidance. They are not intended to substitute or replace laws, regulations, or other official Coast Guard policy documents. The responsibility to demonstrate compliance with all applicable laws and regulations still rests with the plan submitter. The Coast Guard and the U. S. Department of Transportation expressly disclaim liability resulting from the use of this document.

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## Contact Information

If you have any questions or comments concerning this document, please contact the Marine Safety Center by e-mail or phone. Please refer to the Procedure Number: E1-10.

E-mail: [customerservicemsc@uscg.mil](mailto:customerservicemsc@uscg.mil)

Phone: 202-366-6480.

## AEVADS and General Emergency Alarm System

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GENERAL EMERGENCY ALARM SYSTEM is required:

- For each manned vessel of over 100 gross tons, except barges, scows, and similar vessels. 46 CFR 113.25-25 and 113.25-30, do not apply.
- For each manned ocean and coastwise barge of over 100 gross tons if the crew is divided into watches for the purpose of steering. Use 46 CFR 113.25-25.
- For each barge of 300 or more gross tons that has sleeping accommodations for more than six persons. Use 46 CFR 113.25-30.

AEVADS.

- System is required for vessels certificated under Subchapters T, K and H, that do not operate on international voyages subject to SOLAS, have no overnight passenger accommodations, and predominantly comprised of large public spaces which generally encompass the entire length and breadth of each main vertical zone, that operate in protected (sheltered waters, such as most rivers, harbor or lakes), or partially protected waters (waters within 20 nautical miles of the mouth of a harbor of safe refuge, unless determined by the OCMI as exposed waters; or those waters determined by the OCMI as not sheltered.) Vessels targeted here are dinner excursion and gambling vessels with much higher passenger densities.
  - Pertinent plans and information sufficient to verify compliance with the Section 22 of enclosure (2) to NVIC 8-93, as modified in reference (d) above, shall be submitted.
  - Equipment and system's arrangement are reviewed by the Marine Safety Center. AEVADS equipment listed or certified by a U.S. Coast Guard recognized testing laboratory to an AEVADS standard facilitates acceptance of the equipment.
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## **AEVADS:**

- Check Coast Guard recognized testing laboratory approval of AEVADS. Otherwise, AEVADS construction, performance specifications, testing and a brief description of operation, should be provided for review.
- Check for a dedicated branch circuit, supplied from the emergency switchboard with a backup battery supply, or from the temporary and final emergency power sources that meet 46 CFR 112.05-5 and 112.15.
- When AEVADS is activated by a fire signal from the vessel's fire detection system, a time delay of reasonable duration (2 minutes), either at the fire detection panel or AEVADS to allow for direct phone checks and verification of fire by the ship's crew, must be provided.
- The sequence of emergency alarms, interspaced with the AEVADS message, is to be repeated continuously until either the system is manually overridden or intentionally terminated at the central control station.
- System must be capable of transmitting real time, prerecorded intelligible speech messages above the high noise levels encountered under emergency conditions throughout all public spaces and any other spaces, which are normally manned.
- A customized message for each large passenger space must be provided. The system should have the capability of simultaneously delivering one message to a fire-affected space(s) and another message to all other manned spaces. The text of the message should include the designation of the area affected, instructions to exit the space of fire origin, and directions to passengers to follow the instructions of the crew after exiting the space of fire origin.
- Upon activation of AEVADS, all announcing systems or entertainment systems on line must be automatically disconnected or temporarily interrupted.
- Fire detection trouble alarms such as, alarms due to fire detection systems monitoring of the sprinkler system, must not activate AEVADS.

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- A lockout key capability for the operator at the central control station to override the AEVADS in the event:
  - a. confirmation is received from the vessel's crew that the alarm is false,
  - b. it becomes necessary to switch to throughout the vessel announcement, or
  - c. manual emergency announcement for a situation other than fire is required.
- AEVADS installation, independent of the required emergency loudspeaker system, may be made in accordance with NFPA 72, with placement of loudspeakers in accordance with 46 CFR 113.50-20. Entertainment systems must not be used as part of AEVADS, unless the system meets the preceding requirements, or the installation meets 46 CFR Subpart 113.50. Loudspeaker systems used for AEVADS messaging must have the capability of selecting which zone(s) the manual voice message will be transmitted.

## **General Emergency Alarm System (46 CFR Subpart 113.25)**

- Verify the number and location of manually operated contact makers.
  1. Passenger vessels (H), and cargo and miscellaneous vessels (I). A manually operated contact in the following locations:
    - a. navigating bridge
    - b. general emergency alarm feeder distribution panel, if the general alarm power supply is not in or next to the navigating bridge.
  2. Tank vessels. A manually operated contact maker at the following locations:
    - a. navigating bridge.
    - b. deck officers' quarters farthest from the engine room.
    - c. Engine room.
    - d. location of the emergency means of stopping cargo transfer required under 33 CFR 155.780.
    - e. general emergency alarm feeder distribution panel, if the general alarm power supply is not in or next to the navigating bridge.

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3. Mobile Offshore Drilling Units. A manually operated contact maker in the following locations:
  - a. main control room.
  - b. drilling console.
  - c. feeder distribution panel.
  - d. navigating bridge, if there is one.
  - e. A routinely occupied space that is as far as practicable from all other contact makers.
- One extra contact maker is allowed, in addition to the specified locations above. The location of the contact maker is to the designer or owner's discretion.
- Special system. If a vessel has an emergency squad when operating, has a manual fire alarm system, or is an ocean-going passenger vessel, the following must be provided:
  - a. an independent manually operated contact maker in the navigating bridge that sounds the general emergency alarm system only in the crew's quarters and machinery spaces; or
  - b. a separate alarm system that sounds in the crew's quarters and machinery spaces.
- Check compliance with SOLAS 74, Regulations III/6.4.2, III/50, and the electrical power regulations referenced in III/50. 46 CFR 113.25-6.
- Check overcurrent protection of electrical power sources. Storage batteries, when used as power source, must have an enclosed fused switch or circuit breaker, located outside of, and next to, the battery room or battery locker. The enclosed switch or circuit breaker must have a means of locking. The fuses or circuit breaker must be set to at least 200 percent of the connected load. 46 CFR 113.25-7.
- Check system's distribution and zoning to the following requirements (46 CFR 113.25-8):
  - a. A feeder distribution panel must be provided to divide the system into the necessary number of zones, and feeders. If, because of the arrangement of

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- the vessel, only one zone feeder is necessary, a branch circuit distribution panel or feeder distribution panel must be used.
- b. In the feeder distribution panel, check overcurrent protection for each zone feeder. No disconnect switches are allowed. Ratings of the overcurrent protection must provide wide differential between the feeder and branch circuit overcurrent devices. 46 CFR 113.25-16(b).
  - c. The following ratings must meet (46 CFR 113.25-16(c):
    - (i) feeder overcurrent protection must be as near practicable to 200 percent of the load supplied.
    - (ii) branch circuit overcurrent protective device must not be higher than 50 percent of the capacity of the feeder overcurrent protective device.
  - d. At least one feeder must be provided for each vertical fire zone that has general emergency alarm signal.
  - e. One or more branch circuit distribution panel for each zone feeder is required. At least one fused branch circuit is required for each deck level.
  - f. A branch circuit must not supply emergency alarm signal on more than one deck level, except for a branch circuit supplying all levels of a single space containing more than one deck level.
- On a vessel not divided into fire zones by main vertical fire bulkheads, the general emergency alarm system must be arranged into vertical service zones not more than 40 meters (131 feet) long, and there must be a general alarm feeder for each of these zones that has general emergency alarm signal.
  - For integrated general emergency alarm, fire alarm, and public address system, equivalency to the intent of 46 CFR Subpart 113.25, and SOLAS Chapter II-2, Regulation 40.5 for public address system, must be determined. The system must meet the following requirements:
    - a. priority must be given to the general emergency alarm system over fire alarms or announcing.
    - b. speakers and electronic tone generators must produce a signal or tone distinct from any other audible signal on the vessel.
    - c. the location of speakers and sound levels must meet 46 CFR 113.50-15. Also, see Attachment (1).

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- d. distinct sound or intermittent operation of the general alarm bells (or speakers producing a bell-like sound) may be used to sound a fire alarm.
- e. a fire alarm switch (marked “fire alarm”), must be in a normally manned space which can receive alarms from the master fire alarm panel.
- f. loss of the fire alarm interfaced signal to the integrated system must not render the general emergency alarm system inoperative.

### **AEVADS:**

- System’s minimum sound level requirements:
  - a. Conform to 46 CFR 113.50-15(c).
  - b. Harmonic distortion not to exceed 5%, with a flat sound output response within  $\pm 6$  dB for frequencies from 500 – 5,000 Hz with less than 6% overall distortion.
- System shall be designed to withstand the following:
  - a. The corrosive, humid, and vibratory environment aboard ships.
  - b. The survivability standards in NFPA Section 72, 3-2.4 and 3-12.
  - c. Any occurrences of an open, ground or short circuit fault in any zone shall not impact the operation of the system for any other zone; and shall not reduce the output of any other loudspeaker by more than 3 dB.
- A visual and audible trouble alarm to indicate a fault in any zone shall be displayed at the central control station.

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- Using the system’s wiring deck plans, check distribution of general emergency alarm systems’ feeders and branch circuit cables to insure cable runs are not passing through staterooms, lockers, galleys, machinery spaces, or other enclosed spaces, unless it is necessary to supply the alarm signal in those spaces. 46 CFR 113.25-8(h).
- A feeder distribution panel must be in an enclosed space next to the general emergency alarm power supply. 46 CFR 113.25-8(c).

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- The distribution panel must be located above the uppermost continuous deck, in the zone served, and there must be no disconnect switches for the branch circuits. 46 CFR 113.25-8(e).
- General emergency alarm signal devices must:
  1. be located in passenger and crew quarter areas where they can alert persons in spaces where those persons may be maintaining, repairing, or operating equipment, stowing or drawing stores or equipment, or transiting, such as (46 CFR 113.25-9):
    - a. public spaces, work spaces, machinery spaces, workshops, galleys, emergency fire pump room, bow thruster rooms, storage areas for paint, rope, and other stores, underdeck passageways in cargo areas, steering gear rooms, windlass rooms, and holds of roll-on/roll-off vessels.
    - b. cabins without loudspeaker installations.
    - c. except spaces that are accessible only through bolted manhole covers, and duct keels with valve operators.
  2. be audible in the above spaces with all normally closed doors and accesses closed. See Attachment (1).
  3. be an electrically-operated bell, klaxon, or other warning device capable of producing a signal or tone distinct from any other audible signal on the vessel. (Other audible devices, such as electronic alarm devices, are permitted in cabins without loudspeaker installations).
  4. when the vessel is underway in moderate weather, the following sound pressure levels must be met:
    - a. in interior and exterior spaces not less than 80 db(A) measured at 10 feet on the axis; and 10 db(A), above the background noise level unless flashing red lights are also installed.
    - b. in sleeping accommodations, not less than 75 db(A) measured 3 feet (1m) on axis and 10 db(A) above background noise levels.

Manned Ocean and Coastwise Barges of more than 100 Gross Tons (46 CFR 113.25-25)

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- When operating with the crew divided into watches for steering the vessel, the emergency alarm signal installation must have the following:
  - a. automatically charged battery as the power source.
  - b. a manually operated contact maker at the steering station and in the crew accommodation area.
  - c. the storage battery must have an enclosed fused switch or circuit breaker, located outside of, and next to, the battery room or battery locker. The enclosed switch or circuit breaker must have a means of locking. The fuses or circuit breaker must be set to at least 200 percent of the connected load.
  - d. emergency alarm signal devices installed in the crew quarter areas where they can alert persons in spaces where persons may be maintaining, repairing, or operating equipment, stowing or drawing stores or equipment, or transiting., except spaces that are accessible only through bolted manhole covers.
  - e. the emergency alarm signal audible in the above spaces with all normally closed doors and accesses closed.
  - f. the requirements for each manned vessel of over 100 gross tons for the contact maker, alarm device minimum sound pressure levels, cable fittings, distribution panels, overcurrent protection, and marking, apply.

For Barges of 300 or more Gross Tons with Sleeping Accommodations for more than Six Persons. 46 CFR 113.25-30. The requirements for each manned vessel of over 100 gross tons apply, except:

- a. the number and location of contact makers are determined by the design, service and operation of the barge (primary work area, quarters area, galley and mess area, machinery spaces, and the navigating bridge or control area should be considered).
- b. distribution panel that cannot be above the uppermost continuous deck because of the design of the barge and installed below the deck, the panel must be as near the deck as practicable.

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### **AEVADS:**

- System shall be operable within 10 seconds after turning on power.

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- The system's branch circuit must be clearly marked "AEVADS" in red.
- Ground detection system capable of selectively monitoring individual zones.

### **General Emergency Alarm System:**

- Emergency red-flashing light or rotating beacon (46 CFR 113.25-10) must:
  - a. be provided, in addition to the general emergency alarm signal, when the general emergency alarm signal cannot be heard over the background noise.
  - b. have sufficient intensity above background lighting that would alert personnel in the space.
  - c. be activated whenever the general emergency alarm signal in the space is activated.
  - d. be supplied by the general emergency alarm system power supply or the vessel's emergency power source through a relay that is operated by the general emergency alarm system.
- General emergency contact makers must (46 CFR 113.25-11):
  - a. be a maintained switch with normally-open contacts.
  - b. have an enclosure protection that meets NEMA 250 Type 4 or 4X or IEC IP 56.
  - c. have the switch positions of the operating handle permanently marked "on" and "off".
  - d. have an inductive load rating not less than the connected load or, on large vessels, have auxiliary devices (relays or contactors) to interrupt the load current.
- Distribution panels must be watertight, and need a tool to be opened. 46 CFR 113.25-15.
- Cable entrances to the emergency alarm signal or distribution panels must be watertight. 46 CFR 113.25-14.
- General emergency alarm feeder and branch circuit fuses must be listed by a recognized independent laboratory. 46 CFR 113.25-16(a).

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- Marking of the general emergency alarm system to 46 CFR 113.25-20 is checked by the OCMI.
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