



## Marine Safety Center Technical Note

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MTN 05-95, CH-1  
16703/Wire Application  
November 14, 2022

### MARINE SAFETY CENTER TECHNICAL NOTE (MTN) 05-95, CH-1

Subj: ACCEPTABLE APPLICATIONS OF WIRE ON COAST GUARD CERTIFICATED VESSELS

- Ref:
- (a) Title 46 Code of Federal Regulations (CFR)
  - (b) Navigation and Vessel Inspection Circular (NVIC) 2-89, Guide for Electrical Installations on Merchant Vessels and Mobile Offshore Drilling Units
  - (c) Institute of Electrical and Electronics Engineers (IEEE) Standard 45, IEEE Recommended Practice for Electric Installations on Shipboard
  - (d) ANSI/NFPA 70, National Electrical Code (NEC)
  - (e) American Boat and Yacht Counsel (ABYC) E-11 AC and DC Electrical Systems on Boats

1. Purpose: This MTN identifies the acceptable applications for wire on Coast Guard certificated vessels.
2. Summary of Changes: Change 1 of this MTN clarifies the definitions of wire and cable conductors, updates guidance on application of wire aboard non-Subchapter J vessels, and introduces modern application for UL 1426 'wire' ampacity values.
3. Description: The acceptable use of wire instead of cable in a vessel's electrical distribution systems is an area of regular misunderstanding. NVIC 2-89 and the previous version of this MTN have caused further confusion on allowance of wire aboard certificated vessels. CH-1 of this MTN seeks to clarify and update the Marine Safety Center's (MSC) interpretation for vessel plan review.
4. Discussion: Wire can only be used for distribution systems considering the following limited definitions and applications:
  - a. The definitions and exceptions of wire and cable are as follows:
    - (1) Wire: A single insulated conductor without an outer protective jacket.
    - (2) Cable: A single or multiple insulated conductor(s) with an outer protective jacket.
    - (3) Exceptions: Single insulated conductors meeting the standards of Subchapter J (46 CFR 111.60-1 construction and testing of cable) may be considered equivalent to cable, however, this does not limit the Coast Guard's authority to require additional protection for the specific application.
  - b. Wire can be used on a vessel's distribution system not subject to Subchapter J requirements and less than 50 Volts.

- c. Wire cannot be used in the following applications outside an enclosure (e.g. motor controllers, electrical panels, instrument enclosures, etc...):
    - (1) Distribution systems of vessels subject to Subchapter J requirements.
    - (2) Distribution systems on vessels not subject to Subchapter J requirements over 50 Volts, unless inside conduit.
  - d. Wire used aboard certificated vessels must meet one of the following at a minimum:
    - (1) Thermoset or thermoplastic insulation listed and classified as moisture resistant and flame retardant by the NEC.
    - (2) Meet the standards by Underwriters Laboratories (UL) for UL Boat or UL Marine.
    - (3) Meet the requirements for wire in Subchapter J 111.60-11(b) - (e).
  - e. The conductor industry has changed since the inception of the current 46 CFR Subchapter T (1996) with regards to the manufacturing and materials used. The following is MSC's determination of the best standards for the ampacity of specific wire conductors:
    - (1) Wire meeting the standards for 46 CFR 111.60-1 must meet Table 25 of IEEE 45-2002.
    - (2) Wire meeting UL 1426 (Standard for Electrical Cables for Boats) must meet Table VI of ABYC E-11.
    - (3) All other wire must follow Section 310-15 of the NEC.
5. Action: The above describes the current position of the MSC on conductor requirements for wire installations. Along with these determinations, consideration must also be given to the following:
- a. Conduit where required must be installed in accordance with the NEC requirements for sizes and fill, bends and bending methods, couplings and connectors, and support methods and locations.
  - b. The installation must be suitable for a marine environment (corrosion, moisture, watertight bulkhead penetrations, and flexing must be addressed).
  - c. To clarify, wire is allowed inside an enclosure in all instances, but must meet 46 CFR 111.60-11. Conduit is not an enclosure.

  
R. C. COMPHER