

TE-4 LIGHTNING PROTECTION

BACKGROUND

This technical information report is intended as a guide for the design, construction, and installation of lightning protection systems on boats. Its primary objective is to decrease the risk to personnel and the risk of fire and sinking. Additional measures may be needed to harden electrical and electronics systems against lightning damage.

The probability of a lightning strike varies with geographic location and the time of the year. When the conditions that create an electrical charge between clouds and the earth exist, there is nothing that can be done to prevent the lightning discharge. A boat can be struck in open water or while tied to the dock.

INTENT

This technical information report applies to powerboats and sailboats if a lightning protection system is installed.

Complete protection from equipment damage or personal injury is not implied.

A lightning protection system offers no protection when the boat is out of water, and is not intended to afford protection if any part of the boat comes in contact with power lines while afloat or ashore.

Protection of persons and small craft from lightning is dependent on a combination of design and maintenance of equipment.. The basic guides contained in this technical information report should be considered and used in designing and installing a lightning protection system. However, in view of the wide variation in structural design of boats, and the unpredictable nature of lightning, specific recommendations cannot be made to cover all cases.

REFERENCED ORGANIZATIONS

ABYC - American Boat and Yacht Council, 613 Third Street, Suite 10, Annapolis, MD 21403 (410)990-4460, Fax: (410)9904466. Website: www.abycinc.org.

NFPA - National Fire Protection Association, 1 Batterymarch Park, PO Box 9101, Quincy, MA 02269-9101. (617) 770-3000. Website: www.nfpa.org.

DEFINITIONS – For the purpose of this technical information report, the following definitions apply.

Air Terminal - a device at the uppermost point of the lightning protection system that attaches a lightning stroke to the lightning ground system.

Lightning Bonding Conductor - a conductor used for potential equalization between metal bodies, and the lightning protection system.

Lightning Grounding Terminal - a device that conducts, the lightning current from the lightning protection system to the water.

Lightning Protective Mast - a conductive structure, or if non-conductive, equipped with a conductive means, and an air terminal.

Primary (Main) Lightning Conductor – a conductor intended to be used to carry lightning current between air terminals and lightning grounding terminals.

Secondary Lightning Conductor - a conductor used to connect conductive fittings, such as the rigging on a sailboat, to the primary lightning conductor, or to the lightning grounding terminal.

Side Flash - any discharge that occurs between the lightning system and any metallic object, or between any on-board conductor and the water.

Striking Distance – the final distance bridged by a lightning stroke when it makes its attachment to a grounded object.

Zone of Protection - an essentially cone shaped space below a grounded air terminal, mast, or overhead ground wire, wherein the risk of a direct lightning strike is substantially reduced. [See Figure 1.](#)