# Marine Safety Information Bulletin

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Contact: P. Murphy (D11 CFVS)
Phone: 510-437-5931
E-Mail: peggy.a.murphy@uscg.mil

## Power Strips and Surge Protective Devices on commercial fishing vessels

Electrical devices that are not properly constructed, insulated or grounded for specific use in a marine environment can result in shipboard fires. Several recent catastrophic fires onboard commercial fishing vessels have been sourced to power strips or surge protective devices (SPDs) that were being used to recharge multiple electronic devices powered by lithium-ion batteries.

A power strip plugs into a single outlet to give you multiple outlets. A surge protective device (SPD) is a power strip that also defends against voltage spikes. All the power in a power strip or SPD comes from the single outlet it is plugged into, which means it doesn't have infinite energy, as every shipboard electrical circuit is designed to carry a certain maximum load. Plugging in a power strip or SPD and adding too many devices can result in overheating and electrical failure, which can lead to fire.

Mariners need to be aware there is no official Underwriters Laboratory standard for marine-use power strips or SPD's, despite numerous retailers advertising, "UL Marine 1449".

Lithium-ion batteries are rechargeable and used in many modern portable electronic devices. The batteries store and release electrical energy through electro-chemical reactions. Despite their technological promise, lithium-ion batteries still have a number of shortcomings, particularly with regards to safety. The batteries have a tendency to overheat and can be damaged at high voltages. In some cases this can lead to thermal runaway and combustion. The lithium salt, organic solvents and oxygen involved in the electrochemical process are sensitive to stressors such as excessive heat, vibration, and exposure to saltwater.

***Safety take-away: Power strips or SPDs plugged into a shipboard circuit with lithium-ion battery powered devices can be a serious fire hazard onboard your vessel.***

The USCG recommends vessel owners and operators have defined procedures for checking the condition and grounding capabilities of any personal portable electrical equipment brought onboard. The Master should check and approve any power strip or SPD for compatibility with the vessel's electrical system prior to use. If there's excessive use of power strips or SPD's, installation of additional permanent components like distribution panels, breakers, cabling and/or receptacles should be considered. ***Avoid jury-rigging of electrical equipment at all costs***.

Any power strip or SPD should be removed from service if it is hot to the touch. Keep power strips and SPD's unplugged when not in use. Limit one power strip or SPD per single duplex outlet and never daisy-chain. Prevent use in excessively humid or moist areas, and ensure good air circulation around the device. Check with a certified marine electrician for any questions or more information.♦

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