

What Is Ignition Protection?

More than half the boat fires and explosions in 2014 involved some kind of vessel fuel, with gasoline vapors making up the vast majority. A small fuel spill can result in fuel collecting in the bilge which is an enclosed space also housing powerful switching electronics. Vapors can also accumulate in many unintended ways such as sloppy fuel handling or fuel leaks. Fire ranked number five among the causes of loss, from data obtained by Boat US Marine Insurance.

As gasoline vapor is heavier than air, it fills the bilge and lower machinery areas first. As the fuel evaporates, the vapors mix with air creating a perfect storm; all that is required for an ignition is a spark. Keeping those vapors separated from sparks and heat is critical to avoid unintended explosions.

An electrical component that is “Ignition Protected” is capable of operating in an explosive environment without igniting that environment. “Ignition Protection” of electrical devices is accomplished by the use of seals, flame arrestors and potting or a combination of such means. An electrical device that has been **Certified Ignition Protected** can safely be used in marine engine compartments and fuel tank spaces.

Use of certified “Ignition Protected” electrical parts such as relays, switches, fuses, and motors marked with **SAE J1171, ISO 8846 or UL 1500 is not only a good safety practice, but required by the United States Coast Guard regulation 33CFR 183.410**. Unless the electrical parts are labeled “Ignition Protection”, assume that small sparks and extreme heat are possible during operation which can cause an explosion. When in doubt about your electrical device, either replace the electrical part(s) in question or check with a qualified trained marine professional.



The Agencies Generating The Standards

Ignition Protection Performance Requirements Have Been Established By:

- The Society of Automotive Engineers in SAE J1171
- Underwriters Laboratories in UL 1500
- The International Organization for Standardization in ISO 8846:2017
- The National Marine Manufacturers Association (NMMA)
- The United States Coast Guard (USCG)



What Is SAE J1171 And Its Testing Requirements?

These various standards with respect to Ignition Protection Performance of relays are very similar. To determine compliance of a relay, samples are tested to the Ignition Protection requirements for electrical components as stated in ISO 8846:2017 as well as the Electrical System Standard, Title 33 CFR, Part 183, Subpart I, Section 183.410, SAE J1171 and the NMMA. These procedures are acceptable to the European Community and the United States Coast Guard.

Specific Picker relays were subjected to a rigorous Water Submergence Test and a High Temperature Operating Test per the ISO 8846 and SAE J1171 requirements. The SAE J1171 standard is a set of rigorous tests that place a component under maritime conditions that might result in ignition. For relays, the test process involves:

- Submerging the relay under 15 inches of water at 50°C.
- Next, the relay is operated at 120% of its max nominal voltage while sitting in a 60°C chamber of 4.8% propane for 7 hours.

According to the 2003 Boat Builder Hand book “each electrical component must not ignite a propane gas and air mixture that is 4.25 to 5.25 percent propane gas by volume surrounding the electrical component when it is operated at each of its manufacturer rated voltages and current loadings”

All Relays Are Not Created Equal

Relays can look very similar on the outside, but design, materials and construction make a significant difference in reliability and safety. Picker’s sealed automotive relays listed below meet or exceed the SAE J1171 standard and have been certified by an independent testing lab.

Following is a list of Picker sealed relays that are SAE J1171, UL 1500 & ISO 8846* certified;

Mini ISO

- PC792A
- PC792B
- PC792E

Maxi ISO

- PC795
- PC796

Micro ISO

- PC780
- PC782
- PC784



For the data sheet go to:
www.pickercomponents.com/Get-A-Data-Sheet.PHP

If you have any questions whether a Picker relay is ignition protected or any other relay specific questions, please feel to reach out to us directly.

**All testing was performed by Imanna Laboratory Inc. in 2018. Laboratory tests available upon request*