# Based On Meeting NEC Criteria - QED Torpedo Pumps Are Suitable For Class 1, Division 1 & 2 Applications

**National Electric Code (NEC)**
**501.125 Motors and Generators**

**(A) Class 1, Division1**. In Class 1, Division1 locations, motors, Generators and other rotating electrical machinery shall be one of the following:

(1) Identified for Class 1. Division 1 locations.

(2) Of the totally enclosed type supplied with positive pressure ventilation from a source of clean air with discharge to a safe area, so arranged to prevent energizing of the machine until ventilation has been established and the enclosure has been purged with at least 10volumes of air, and also arranged to automatically de-energize the equipment when the air supply fails.

(3) Of the totally enclosed inert gas-filled type supplied with a suitable reliable source of inert gas for pressurizing the enclosure, with devices provided to ensure a positive pressure in the enclosure and arranged to automatically de-energize the equipment when the gas supply fails.

(4) Of a type designed to be submerged in a liquid that is flammable only when vaporized and mixed with air, or in a gas or vapor at a pressure greater then atmospheric and that is flammable only when mixed with air, and the machine is so arranged to prevent energizing it until it has been purged with the liquid or gas to exclude air, and also arranged to automatically de-energize the equipment when the supply of liquid or gas or vapor fails or the pressure is reduced to atmospheric.

**(B) Class 1, Division 2,** In Class 1 Division 2 locations, motors, generators and other rotating electrical machinery in which are employed sliding contacts, centrifugal or other types of switches mechanism (including motor overcurrent, overloading and over temperature devices), or integral resistance devices either while starting or while running, shall be identified for Class 1 Division 1 locations, unless such sliding contacts , switches mechanisms, and resistance devices are provided with enclosures identified for Class 1 Division 2 locations in accordance with 501.105 (B). The exposure surface of space heaters used to prevent condensation of moisture during shutdown periods shall not exceed 80 percent of the auto ignition temperature in degrees Celsius of the gas or vapor involved when operating at rated voltage and the maximum space heater surface [based on a 40 Degree C or higher marked ambient] shall be permanently marked on a visible nameplate mounted on the motor. Otherwise, space heaters shall be identified for Class 1, Division 2 locations.

In Class 1, Division 2 locations, the installation of open or non- explosion proof enclosed motors, such as squirrel-cage induction motors without brushes, switching mechanisms, or similar arc-producing devices that are not identified for in a Class 1, Division 2 location shall be permitted.

**QED Pumps meet the intent of NEC 501.125 Paragraph A. Class 1. Division 1 Motors and Generators in the following way: Under condition 4 outlined in red:**

The motors used in QED pumps are filled with a mixture of glycol and water. During normal operation, this fluid lubricates the internal sleeve bearing. If the motor temperature increases beyond normal operating temperature, the internal fluid boils out and the motor temperature starts to rise. At 225 degrees F, internal insulation of the motor fails causing a winding to winding internal short (Sealed between inner and outer stainless steel shells surrounded by non-hydroscopic insulation). When this phase to phase short occurs, the motor will be automatically de-energized. Without an ignition source there can be no explosion.

**QED Pumps meet the intent of NEC 501.125 Paragraph B. Class 1. Division 2 Motors and Generators in the following way: Outlined in Blue:**

QED Pumps meet the criteria because they contain no arc-producing devices. In fact, the same motor design is used in many underground gasoline storage tank applications throughout the US.

QED Pump motors have been tested under a dozen different failure modes and found to have a maximum surface temperature at failure of 225 degrees F. In addition, the power cables used are made from the same material used in off-shore drilling applications. This material was selected for its extreme chemical resistance, cut / abrasion resistance, and its inability to sustain combustion.

**QED Torpedo Pumps**

- Meet NEC Criteria for class 1 division 1 & 2 locations.
- Motors contain no arc-producing devices
- All internal parts are dissimilar and not a source of energy release
- Motor stator winding is hermetically sealed
- Maximum surface temperature of 225 F
- Cables are chemically resistant, waterproof and abrasion resistant