Hazardous Locations and Intrinsically Safe (IS) Radios

FACT SHEET

Hazardous Location Regulations

In North America, a variety of codes, standards and regulatory bodies exist to address safety issues of hazardous locations. Regulations on hazardous location by means of a Class/Division system have been formulated by the National Electrical Code (NEC); Canadian Electrical Code (CEC) and the National Fire Protection Association (NFPA). Adherence to these regulations is required by equipment manufacturers and monitored by accredited test agencies. These standards enable manufacturers to design safe, explosion-protected electrical equipment that is tested with uniform and binding tests at test agencies such as SGS, Underwriters Laboratory (UL) and Factory Mutual (FM). On successful completion of the tests, these agencies issue conformity certificates which state that the required uniform safety standards for explosion protected electrical equipment have been met.

The classification system that is most widely used in North America is defined by NEC, CEC and NFPA Publication 70. They define the type of hazardous substance that is, or may be, present in the air in quantities sufficient to produce explosions or ignitable mixtures. Actually determining the classification of a specific location requires a thorough understanding of the particular site. This Fact Sheet does not serve as a source to determine how a location is actually classified; this is for general information purposes only to understand the equipment certifications of Vertex Standard intrinsically safe land mobile radios.

Hazardous Location Classifications

Class – The type of explosive or ignitable substances which are present in the atmosphere.
Group – Materials grouped based on their ignition temperatures and explosion pressures.
Division – Evaluation of location, independent of the Class.
Temperature – Designates the maximum operating temperatures on the surface of the equipment which should not exceed the ignition temperatures of the surrounding atmosphere.

LOCATION TYPE	GROUP	DIVISION (NEC Article 500)	
		Division 1	Division 2
CLASS I Flammable Gas, Vapors and Liquid (NEC Article 501)	A. Acetylene B. Hydrogen, Butadiene, etc. C. Ethylene, Ethyl Ether, etc. D. Propane, Acetone, Ammonia, etc.	In which ignitable concentration of hazards exists under normal operation conditions and/or where hazard is caused by frequent maintenance or repair work or frequent equipment failure.	In which ignitable concentrations of hazards are handled, processed or used, but which are normally in closed containers or closed systems from which they can only escape through accidental rupture or breakdown of such containers or systems
CLASS II Combustible Dusts (NEC Article 502)	E. Metal dusts F. Carbon dusts G. Other dusts: flour, grain, wood, plastic, chemicals		
CLASS III Ignitable Fibers and Flyings (NEC Article 503)	No specified groups. Types of materials: rayon, cotton, hemp, cocoa fiber, jute, istle, oakum, Spanish moss, etc.		

Temperature Class

The temperature marking specified shall not exceed the ignition temperature of the specific gas or vapor to be encountered. Ignition temperature is the minimum temperature required, at normal atmospheric pressure in the absence of a spark or flame, to set afire or cause self-sustained combustion independently of the heating or heated element.

Temp Class	T1	T2	T2A	T2B	T2C	T2D	T3	T3A	T3B	T3C	T4	T4A	T5	T6
Degree F	842	572	536	500	446	419	392	356	329	320	275	248	212	185
Degree C	450	300	280	260	230	215	200	180	165	160	135	120	100	85

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Intrinsically Safe Defined

Intrinsic safety is a designed/engineered explosion protection method that is integral to the electrical circuit. Intrinsically safe equipment shall not be capable of releasing sufficient electrical or thermal energy under normal or abnormal conditions to cause ignition of a specific hazardous atmospheric mixture. Intrinsically safe certified electrical equipment must be distinctively marked in accordance to the classified area in which it can be installed. The minimum marking must indicate:

- Class
- Division
- Group
- Maximum safe operating temperature or temperature range
- Any special conditions that have to be observed

Vertex Standard Intrinsically Safe Certified Radios

All Vertex Standard intrinsically safe certified land mobile radios are tested in accordance with the ANSI/UL 913-1997 Fifth Edition Standard for Safety for Intrinsically Safe Apparatus and Associated Apparatus for use in Class I, II, and III, Division 1 Hazardous Locations. Certifications have been obtained from the SGS-U.S. Testing Center for the following radios:

US

VX-450 Series	EVX-530 Series	VX-820 Series	VX-920 Series
			
Intrinsically Safe Certification **Class I, II, III** **Division 1 – Group C, D, E, F, G** **Temp Class T3C**			
• VHF: 134 – 174 MHz • UHF: 400 – 470 MHz, 450 – 512 MHz • Analog • 700 mW Audio Output • 32 Channels/2 Groups (VX-451) • 512 Channels/32 Groups (VX-454/459) • IP 57 Submersible • Auto-Range Transpond System II (ARTS II) • Voice Channel Announce	• VHF: 136 – 174 MHz • UHF: 400 – 470 MHz, 450 – 512 MHz • Digital and Analog • 700 mW Audio Output (EVX-534/539) • 500 mW Audio Output (EVX-531) • 32 Channels/2 Groups (EVX-531) • 512 Channels/32 Groups (EVX-534/539) • IP 57 Submersible • Auto-Range Transpond System II (ARTS II) • Voice Channel Announce	• VHF: 134 – 174 MHz • UHF: 400 – 470 MHz, 450 – 512 MHz • Analog • 700 mW Audio Output • 16 Channels (VX-821) • 512 Channels/32 Groups (VX-824/829) • IP 57 Submersible • Auto-Range Transpond System (ARTS)	• VHF: 134 – 174 MHz • UHF: 400 – 470 MHz, 450 – 512 MHz • Analog • 700 mW Audio Output • 48 Channels/3 Groups (VX-921) • 512 Channels/32 Groups (VX-924) • IP 57 Submersible • Auto-Range Transpond System (ARTS)

Accessories Used with Intrinsically Safe Radios

Only manufacturer-designated, IS-approved accessories can be used with IS-certified radios. Batteries and accessories do not feature the IS certification markings. Additional IS-approved batteries and accessories may be used after the initial radio package is purchased. Replacement batteries and accessories can be sold indefinitely as long as model numbers do not change. Radios in the field will still be approved as long as the battery/accessory has not changed (model number and suffix remain the same).

Repairing Intrinsically Safe Radios

Only Vertex Standard's repair center is authorized to repair IS-certified Vertex Standard radios. If a radio is repaired anywhere else, the IS certification becomes void.