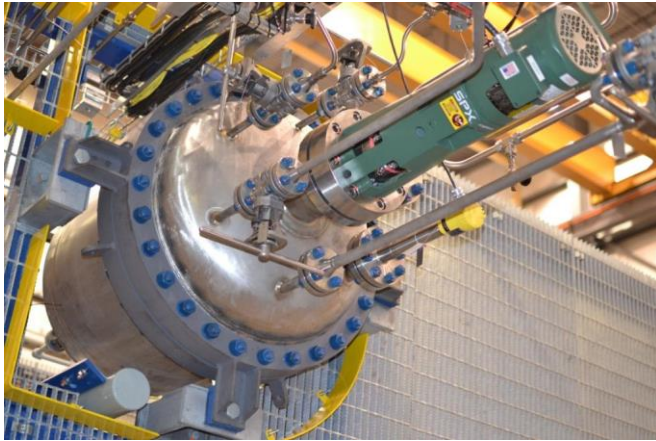


How to Choose the Right Electric Motor for the Chemical Process Industry – Part 2 of 5

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Operating an electric motor in a hazardous location poses risks that range from production downtime to injury and death. In this series of articles, learn how to select the appropriate motor for your operating environment in the chemical process industry.

Classify the Operating Area: IEC Method

In this article, we will look at the international IEC classifications and contrast them to the NEC and CEC classifications.

Both the NEC and the CEC have adopted an alternative method of hazardous location designation based on the standards of the International Electrotechnical Commission (IEC). The IEC method, which applies only to Class I locations (the most common classification in industrial chemical environments), uses class, zone, and group to describe hazardous areas, somewhat similar to the North American method of class, division, and group designations.

Divisions and Zones

The definition of Class I is the same under both systems. However, the divisions differ. Whereas the NEC/CEC method categorizes the conditions under which the material is present into two divisions (Divisions 1 and 2), the IEC method uses three zones (Zones 0, 1, and 2) (Table 1).

Table 1. Comparison of NEC/CEC and IEC Methods Categorizing Presence of Hazards

NEC/CEC Method	Presence of Hazard	IEC Method
Division 1	Continuous	Zone 0
	Intermittent	Zone 1
Division 2	Under Abnormal Conditions	Zone 2

Zone 0 refers to continuous hazards and Zone 1 to intermittent hazards. They correspond to NEC/CEC Division 1 (normal operation). Zone 2 corresponds to NEC/CEC Division 2 and refers to hazards that are present only under abnormal circumstances.

Groups

The IEC also uses groups to classify how materials react after they have been ignited. However, their groupings are somewhat different. The IEC classifies as Group IIC those materials that react most violently when ignited; this encompasses both Group A and B of the NEC/CEC classifications. In the IEC system, Group IIA and Group IIB are classifications for materials that react with less severity when ignited. Table 2 provides a simple cross-reference of the groups for the IEC and North American methods.

Table 2. Comparison of NEC/CEC and IEC Methods Categorizing Reactions after Ignition

NEC/CEC Method	Example Hazards	IEC Method
A	Acetylene	IIC
B	Hydrogen, Butadiene, Ethylene	
C	Carbon Monoxide, Hydrogen Sulfide	IIB
D	Gasoline, Ammonia, Ethanol, Propane	IIA

Applying either the NEC/CEC or IEC methods of designating hazardous locations and specifying motors suitable for use within them is acceptable. However, one method should be used throughout an entire facility. There are exceptions to this rule, as it is up to the authority having jurisdiction whether they deem a motor classified and labeled based on the IEC method as acceptable for use in an equivalent area that is classified based on the NEC/CEC method.

However, in some cases it is permissible to use equipment approved by one method in an area bearing the equivalent classification of the other system.

Overall, these systems have proven to be excellent guides in the purchasing and operating of equipment in hazardous industrial environments.

In the next article in this series, we will look specifically at Class I, Division 1 motors, at what these motors are built for and best practices for their operation.