



Marvair air conditioners for use in petrochemical applications

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The use of Marvair air conditioners in and around petrochemical installations requires a number of modifications to make them suitable for use in these environments. The modifications can be categorized as being required for safety and for durability.

SAFETY

When electrical equipment, including air conditioners, are used in locations “where fire or explosion hazards may exist due to flammable gases or vapors, flammable liquids, combustible dust or ignitable fibers,” the National Electric Code (NEC, ANSI NFPA 70) requires special precautions be used for equipment and its installation to minimize the chance of a fire or explosion.

The NEC discusses the hazardous location, referred to as *Classes*, and the types of conditions under which these hazards are present as *Types*.

According to the NEC, there are three types of hazardous locations – Class I, Class II and Class III. A Class I location is created by the presence of flammable gases or vapors, e.g., natural gas or gasoline vapor, in the air thus creating a potential of explosion. These gases or vapors could be ignited or explode if an electrical or other source of ignition is present.

Examples of Class I locations include, petroleum refineries, gasoline storage and dispensing areas, utility gas plants and operations involving storage and handling of liquefied petroleum gas or natural gas.

Class II locations are defined as areas made hazardous by the presence of combustible dust, e.g. a grain elevator. Class III locations are areas where there are easily-ignitable fibers present. A textile mill is a Class III location.

In addition to defining the types of hazardous locations, The NEC also discusses the kinds of conditions under which these hazards exist. For simplicity, these conditions can be described as either *normal* (Division 1) or *abnormal* (Division 2). Class I, Class II and Class III hazardous locations can be Division 1 or Division 2.

In the *normal* (Division 1) condition, the hazard would be expected to be present in everyday production operations or during frequent repair and maintenance activity. Examples of Class I, Division 1 locations would be the areas near open dome loading facilities or adjacent to relief valves in a petroleum refinery because the hazardous material would be present during *normal* plant operations. An example of Class I, Div. 2 are closed storage

drums containing flammable liquids in an inside storage room would not normally allow the hazardous vapors to escape into the atmosphere.

For a complete discussion of hazardous locations and conditions, please see the OSHA web site at <http://www.osha.gov/doc/outreachtraining/htmlfiles/hazloc.html>

The most frequent use of Marvair air conditioners are in Class I, Division 2. For air conditioners to be installed in a Class I Division 2 area, various modifications must be made to our standard units to prevent sparking. These modifications include:

- The use of non-sparking motors,
- The sealing of all penetrations between the condenser and evaporator section, and
- Sealing the control box to make it air tight.

Durability

Many areas in and around petrochemical sites can have substances in the atmosphere that can be extremely corrosive to the cabinet or the coils of the air conditioner. To ensure for the maximum life, Marvair units can be built with a type 316 stainless steel or aluminum cabinet.

In addition, Marvair offers the Coastal Environmental Package on most wall mount air conditioners and heat pumps. This package extends the life of the unit by providing a corrosion protection coating or finish on the components located in the outdoor compartment, including the outdoor coil. The package includes the following:

- Dacromet® external fasteners
- A sealed or partially sealed condenser fan motor
- A two layer epoxy/urethane applied to all exposed components in the outdoor condenser compartment
- An impregnated polyurethane applied to the outdoor coil.

Marvair offers the aluminum-impregnated polyurethane (brand name Blygold® PoluAl XT) protective coil coating. Detailed information on the properties and advantages of the PoluAl XT can be found at www.blygoldamerica.com. The thin (1 mil) coating has a negligible effect on pressure drop and heat transfer of the coated coil. The coating is flexible and UV and impact resistant.

The exposed metallic components in the condenser section are first coated with a two part polyamide epoxy and finished with a two part acrylic urethane. This epoxy/urethane system is resistant to alkalis, salts, hydrogen sulfide and moisture, is UV resistant and is manufactured by ICI Devoe Coatings.

A coated outdoor (condenser) coil is included in the Coastal Environmental Package. However, if the complete corrosion protection is not required, the unit can be ordered with only a corrosion resistant condenser coil(s).