

Protecting vital plant equipment

Molybdenum-bearing stainless steel enclosures for electrical, electro-mechanical and electronic equipment generally go unnoticed, but are very important. These enclosures are used in chemical plants and at other industrial sites with corrosive environments. They protect vital systems and instruments from chemicals, fumes, moisture and even fires or explosions.

More than half of all molybdenum-containing stainless steel is used in chemical, petrochemical and other processing plants. It is used in a variety of applications such as piping systems, tanks, vessels, columns and heat exchangers that hold corrosive liquids and gases. Molybdenum-bearing stainless steels in particular resist a broad range of chemicals in these applications. A less-known but equally common use of stainless steel, in these plants, is for enclosures. They protect the electrical components and electronic equipment from chemical fumes and leaks, steam and other corrosive atmospheres as well as fires or explosions.

Such enclosures are found in virtually every plant throughout all process industries, but not only there. Many other applications with humid or corrosive atmospheres need corrosion-resistant enclosures. Examples include mines and tunnels, and uses where chlorine or chloride ions exist, such as water treatment plants, ships, and coastal structures.

Electrical junction boxes, switch boxes, electro-mechanical devices, and electronic systems and instruments are just a few of the electrical and electronic components that require protection. These are very important components used to power and control plant processes. When selecting the appropriate enclosure, plant designers must consider the kind of environment in which electrical components will operate. If it is non-corrosive, painted carbon steel or aluminum can often suffice. If it is corrosive, the designers can specify either Type 304 stainless steel for mildly corrosive environments or Type 316 stainless steel with two

percent molybdenum for more corrosive environments or if maximum integrity is crucial. Manufacturers and users have established a large base of standards and specifications over the years, which prescribe the design and use of enclosures in various environments. Examples include ratings for flameproof, explosion-proof and waterproof enclosures. Alternatively, standards can define the kind of application, for example hazardous areas or exterior use. Various national and international rating and specification organizations are active in producing these standards, including NEMA, UL, ULC, ATEX, IECEx, and many government bodies.

Manufacturers can provide enclosures that meet virtually any requirement. Many enclosures are stock items, available in a variety of materials and sizes. However, as enclosure size increases or performance requirements become more sophisticated, manufacturers produce special enclosures to specific designs that meet the specifications. Such enclosures can be very large, even large enough to walk into. The market is competitive, so new designs with improved sealing, venting, or other features are often introduced. One example is a new investment-cast oblong enclosure made from the cast version of Type 316 stainless steel, CF8M. It has a flat cover plate, which allows for the installation of viewing windows, push buttons, selector switches, and pilot lights.

Type 316 stainless steel electrical conduit is also available to protect wiring running to and from enclosures in harsh environments. The conduit and couplings have standard pipe threads for easy

installation. They are essential where wash-down and sanitation operations are carried out, as in food and beverage plants.



Stainless steel enclosures protect equipment from the plant environment. © ADALET

Molybdenum-bearing stainless steels like Type 316 and its cast counterpart CF8M play a vital role not only in major process plant equipment in many industries, but also in less noticeable electrical enclosures and related components. These applications are just as essential to successful plant operation as the process equipment itself. (Frank Smith)