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Selecting the Right Enclosure

Tips From Experts to Help Protect Your Valuable Equipment

By Vicki Wheatley
AD Products Co.

Selecting an enclosure to house your valuable equipment is often an afterthought. Most of the design time is spent on the components inside but choosing the right enclosure can save you, and your customer, a great deal of time and money.

Now that you've spent all of that time and energy on your control panel or electrical device, be sure to choose an enclosure that will keep these things safe for years to come. Depending on what the application is and where the final product will be placed there are several key things to think about when selecting the proper electrical housing. Will the equipment be placed outdoors or in? Will it be in a cool, dry place or a damp, corrosive one? Is your project a wireless application that requires RF shielding or non-metal parts? Or is it processing equipment that must endure frequent chemical wash-downs?

Whichever the case the enclosure that you select could make or break the final product so choose carefully. Here are 5 important elements to consider when deciding on electrical enclosures.

1. Material Type

Enclosures come in a variety of material types, selecting the right one can be difficult but there are a few things to consider in selecting the material that's right for your application. Conditions such as temperature, budget and environment will all effect your final decision. Some information on the different material types might help you to determine which is the best for your application:

Stainless Steel - Higher in cost but also higher in relative physical strength than other materials. Stainless Steel is great for highly corrosive environments and can be used indoors and outdoors. It is available in types 304 and 316L with the latter offering a higher corrosion resistance for extremely harsh environments. This material is particularly good in food, beverage and pharmaceutical processing applications where frequent chemical wash-downs occur. It is also the best choice for other corrosive locations, like marine or waste-water, and most outdoor applications will fair better in stainless steel housing.

Aluminum - Slightly lower cost than stainless and also 1/3 the weight. Aluminum is also corrosion resistant but is perceived as less durable than stainless. Aluminum enclosures can be used indoors and out. There is no temperature limitation and this material is great for use in a variety of outdoor applications as well as petrochemical, marine and other corrosive environments.

This modified stainless steel enclosure is equipped with sun shields to protect equipment from direct sunlight, which causes added thermal loading.

Enclosures can be modified to fit users special needs. This enclosure features a thermal management system integrated into the side of the enclosure.

Mild Steel - Low in cost and high in physical strength. Mild Steel is good for indoor applications but susceptible to corrosion so not the best choice for caustic or extreme conditions. Most have a painted coating and will provide an acceptable protection in a mildly corrosive environment.

Fiberglass - Low to average cost and fairly strong. Fiberglass has a wide temperature limitation range of -40°F to 250°F and strong chemical resistance. Fiberglass is good for Indoor and Outdoor use; it can be exposed to continuous dampness and highly corrosive areas. It is a good material for industries such as petrochemical, water-treatment, marine, coating, salts and chemicals.

NEMA 4X Fiberglass enclosures are well suited for corrosive areas.

Polycarbonate - Low cost and average physical strength. Polycarbonate has a temperature limitation range of -31°F to 224°F This material is not the best for applications not exposed to direct sunlight and are best for indoor or enclosed locations. This material is also not recommended for exposure to organic solvents or concentrated alkalis.

2. Special Standards Required

Depending on where your application will find its final resting place there may be specific standards that your enclosure must maintain. Standards very from country to country and from industry to industry so it is very important to find out what requirements should be met before selecting your enclosure. For instance, the USDA and FDA

have placed some very strict guideline for products in food, pharmaceutical, dairy and beverage processing and packaging. In order to maintain safe and clean conditions most items in these industries should maintain special NSF certification. NSF is a leader in standards development, product certification and education for public health and safety. Not all enclosure manufacturers offer NSF certified enclosures but there are some that do. If you are designing products for these industries it's best to find out if you need equipment to be NSF certified. For all other industries and applications in the US the National Electrical Manufacturers Association (NEMA) created a list of standards that certain equipment should meet, enclosures included. All products NEMA certified are tested and rated to ensure that your enclosure will protect your electrical equipment in a specified area. These are the major NEMA Classifications:

Nema 1 - Indoor use to provide a degree of protection against falling dirt.

Nema 3R - Indoor or outdoor use to provide a degree of protection against falling dirt, rain, sleet and snow; and that will be undamaged by the external formation of ice on the enclosure.

Nema 4 - Indoor or outdoor use to provide a degree of protection against falling dirt, rain, sleet, snow, windblown dust, splashing water, hose-directed water; and that will be undamaged by the external formation of ice on the enclosure.

This NEMA 4 Steel Double Door Enclosures is well suited for large indoor or outdoor applications.

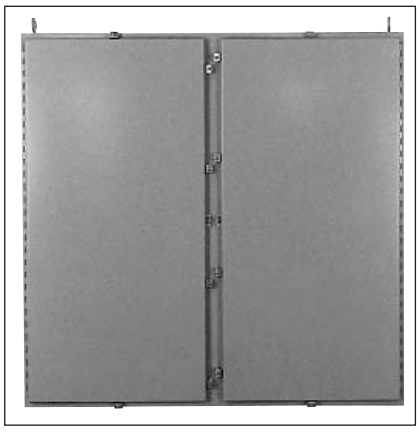
NEMA 4X - Indoor or outdoor use to provide a degree of protection against falling dirt, rain, sleet, snow, windblown dust, splashing water, hose-directed water and corrosion; and that will be undamaged by the external formation of ice on the enclosure

NEMA 6P - Indoor or outdoor use to provide a degree of protection against the entry of water during occasional temporary submersion at a limited depth.

NEMA 12 - Indoor use to provide a degree of protection against dust, falling dirt and dripping non- corrosive liquids. No knockouts.

NEMA 13 - Indoor use to provide a degree of protection against lint, dust, seepage, external condensation and spraying of water, oil and non corrosive coolant.

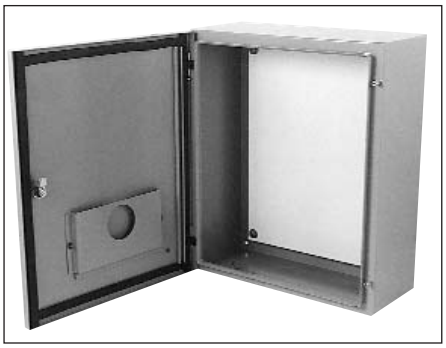
(NEMA Standards Publication 250, Enclosures for Electrical Equipment (1000 Volts Maximum) and NEMA standards Publication ICS6, Enclosures for Industrial Controls and Systems.)



A NEMA 12 Steel Single Door enclosure for indoor locales.

3. Weight and Size requirements

Now that the difficult part is over with the rest should be smooth sailing. Enclosures in all materials and all NEMA ratings come in a variety of sizes; nearly any size to fit your application. Keep in mind, however, that different materials have different weights and strengths. If you need a large enclosure to mount on a piece of equipment it's a good idea to find out the weight of the enclosure to ensure the equipment can support it. Most Enclosure manufactures will have a wide variety of standard sizes but not necessarily in all materials.



Carbon Painted NEMA enclosures are a cost effective solution for indoor or outdoor jobs.

4. Off-the-shelf or Modified

If a standard, off-the-shelf, enclosure won't work for your application. It should be easy, but sometimes expensive, to have an enclosure built just for you. It might, however, save you money to have an enclosure custom built. Some manufacturers can customize enclosures for you, for an additional charge, which can be very convenient. If you don't have tooling to drill the holes or cutouts or to install a window or lock, you should look into having the enclosure shipped to you ready-to-use. It may be more expensive than off-the-shelf but it will save a great deal of time, expense and frustration to have the enclosure delivered just as you need it.

5. Budget and Lead time

These two factors are often the driving force in selecting enclosures and one always affects the other. It's always best to plan ahead, even though enclosures are often the last step in you equipment design and manufacturing. You can save your self some agony by getting them on order early on in the project. Most standard enclosures will be in stock but certainly modified enclosures take longer. A modified enclosure could take months if you select the wrong manufacturer or distributor and it could cost a lot as well. Plan ahead and spend less.

AD Products offers enclosures in all materials and NEMA ratings for all of your electrical or electronic applications. AD Products offers great pricing on custom and on-the-shelf enclosures and short lead times on most out of stock or customized product. AD Products offers enclosures and accessories from several reputable manufacturers and will get you the best price fast. Many of those products are on-line for fast and convenient shopping 24 hours a day. www.adproductsco.com.

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