

Metal isn't the only way

Metal is the traditional choice for enclosures in industrial environments, where knocks and collisions are likely to occur. However, it is prone to corrosion in the event that a dent or scrape damages its protective coating; it requires greater insulation methods to render it safe; and it is heavy and therefore hard to install. Furthermore it is relatively valuable as scrap, and therefore a target for thieves, and it requires greater insulation methods to render it safe.

Chris Lloyd, Managing Director of Spelsberg UK, considers an alternative.

Small, modular enclosures constructed from polycarbonate allow engineers to safely install switchgear quickly in many industrial environments. With transparent lids it is easy to monitor internal equipment, while a Lego-like compatibility allows systems to grow organically as required with very little additional cost. Spelsberg GTi enclosures are an example of this type of enclosure.

For larger, panel mounted equipment it's possible to replace metal cabinets with GRP. This is almost as strong as most metal enclosures yet less than half the weight and impervious to rust, dents and scratches. It also lends itself to industries where insulation is important due to outdoor usage.

Typically the deciding factors for enclosure specification in most applications come down to ingress protection, ease of installation, cable retention, impact protection, UV protection and cost. In most environments, non-metallic enclosures can find a better balance than metal units. The options can be summarised as:

- PVC – a budget option: ideal for small simple installations
- Polystyrene – offers medium impact requirements and up to IP66/67 ingress protection in standard format
- Polycarbonate – withstand substantial knocks, offers UV protection for outdoor use and up to IP66/67 ingress protection in standard format
- GRP (glass reinforced polyester) – robust material suited to extremely harsh industrial environments and can be UV stabilised

PVC is typically used in smaller junction boxes and is low cost. However, it contains toxic dioxins which can bleed slowly into the atmosphere over time. Many manufacturers, including Spelsberg, do not include PVC in their product range for this reason.

The demands of the majority of enclosure applications are met by polystyrene or polycarbonate. Both materials are strong enough to withstand moderate knocks and neither contains halogens. They provide high cable retention when used in conjunction with suitable cable glands and IP68 protection when used in conjunction with a gelling compound.

Significantly, polystyrene can show signs of UV decay long before polycarbonate will. Thus polycarbonate is far more suitable for external applications; or where direct sunlight may be experienced. Polycarbonate is also thermally stable, a major consideration in inverter installations where heat generation is inevitable. Finally, polycarbonate's higher tensile strength makes it more suitable for applications where impacts are likely.

In industrial environments where extremely high levels of protection are required, GRP enclosures are rapidly becoming more popular. Its high level of rigidity at minimal thickness equates to increased protection from impact, in a lightweight, aesthetic design. GRP enclosures provide effective corrosion resistance for electrical and electronic controls in the harsh environments that are typical of many industries, such as marine, offshore, petrochemical, paper and water treatment.

An additional benefit is that GRP – like other plastics – is non-conductive. This reduces the risk of electrocution in the event of a fault, thus reducing installation time as additional measures for earthing aren't required. This has made GRP cabinets particularly popular within the rail industry since Network Rail introduced its new Class II specification.

In summary

There is an extremely wide range of possible applications and environments in which an electrical enclosure may be necessary; each presents different challenges and different environments from which to provide protection. This is why manufacturers, such as Spelsberg, have invested so heavily in developing different material technologies. The intention is to make sure that each customer can specify an enclosure that is cost effective and ideally suited to the environment in which it will be placed.

Of course the list of materials mentioned is by no means exhaustive; they have been selected as a representative group that demonstrates how, beneath a similar surface, there can be stark contrasts between performance capabilities. There are many highly specialised materials, that have not been mentioned, that are designed for extreme environments and offer protection levels beyond the capabilities of the materials listed above, but these are only necessary for a minority of specialty applications.

As with all electrical equipment, it is important that you consult an expert such as Spelsberg before specifying enclosures for your application. All reputable manufacturers and distributors should provide easy access to a sales force for technical support that can answer questions on halogens, resistance capabilities and material comparisons.

About Spelsberg

Spelsberg is one of the largest manufacturers of electrical enclosures in the world. With over 4,000 enclosures available as standard and further customisation possible, it offers solutions for almost any application.

With the largest supply of non-metallic enclosures, ex-stock in the UK, its products are often available for delivery within 24 hours; customisation is possible on any product, including bespoke entries, engraved corporate logos or fitted terminals, within 48 hours. Products can be ordered direct from Spelsberg or from most leading supply specialists including RS, Rapid, Farnell and CPC.

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