

## **Advising OEMs on enclosure specification for outdoor locations**

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**Against the most arduous conditions, sensitive equipment installed in outdoor locations has to be protected against weather extremes, as well as the potential of physical impact. To provide complete protection, a holistic approach to enclosure design is required. For OEM design integration, a flexible enclosure range, combined with the ability to quickly customise a housing, speeds up this process and ensures the required protection for the toughest conditions.**

**Chris Lloyd, Managing Director at Spelsberg UK, explains the considerations for OEM enclosure specification for outdoor locations.**

When electrical equipment has to be installed outside, the first consideration must be weather conditions. Within the British Isles, protection against heavy rain and the possibility of settled snow is vital. As a result, enclosure-protected equipment should be mounted in a sheltered environment, if possible, to reduce the potential of ingress. Ideally, this means an undercover location, or the installation of a canopy, if conditions and cost allow. At minimum, locating the device on the leeward side of a building will provide some protection against the heaviest precipitation.

On many occasions though, securing an ideal weatherproof location isn't possible. Equipment installed on a ship's deck may not have any opportunity for cover, or the

operational requirement of the protected device may not allow it. Security cameras, for example, have to be placed to enable coverage of the required field of vision, and a cover might impede its view. In some cases, even if the protection of a shelter is achievable from an operational perspective, the added size, as well as extra cost, might not make this a viable option.

### **Protection against the elements**

Ingress protection (IP) rating is therefore a key enclosure requirement when sensitive equipment is installed in an outdoor location, and industrial enclosures can extend as high as IP68. This confirms prevention of ingress from the equivalent of high-pressure water jets, as well as protection when immersed for a specified time period. Some enclosures, such as the Spelsberg XT, are even designed for long-term installation in flooded ground. Meanwhile, IP68 rating confirms prevention of dust particles that could contaminate a sensitive device.

Enclosure designs that reduce the potential of ingress in the first place will also enhance long-term protection. Features such as the Drain Protect seal system, included on Spelsberg's GEOS enclosure, channels rainwater or liquids away from more vulnerable entry points, reducing the potential of liquid accumulation and ingress.

It's not just moisture from outside that presents a problem. For outdoor installations that face fluctuating temperatures, from heat and sunshine during the day down to cold temperatures at night, combined with heat-generating electrical circuits, this commonly causes condensation within a housing. Condensation can attack terminals and damage protected components, so for applications susceptible to these conditions, an anti-condensation system should be used. As featured on the AK Air enclosure, this system creates a through-flow of air, maintaining temperature

levels inside the box while allowing hot air and condensation to escape – all while preventing the ingress of heavy rain.

The ability for an industrial housing to protect against temperature extremes might also be a requirement. Within Britain the Highlands might see as low as  $-20^{\circ}\text{C}$ , but for OEMs designing equipment for use in locations from the Falklands to Siberia, temperature protection to as low as  $-50^{\circ}\text{C}$  might be necessary. Spelsberg tests enclosures to suit these needs accordingly.

### **Durability against impact**

Unprotected outdoor installation also means that an enclosure has to be resistant to impact. Metal enclosures might be the first consideration for outdoor durability, and in some cases, they can be ideal for very large applications. The main drawback of a metal enclosure for most applications, however, is their size and weight.

Alternatively, polycarbonate thermoplastic is generally preferred as it's six times lighter than stainless steel yet retains a very high impact resistance – it's the material commonly used in the construction of fighter jet canopies. Spelsberg designs polycarbonate enclosures up to IK09 impact resistance, one of the highest industrial ratings, providing protection to the equivalent of 5kg dropped from 200mm.

Another advantage of polycarbonate over most metal-based designs is that whatever atmosphere it's exposed to, the enclosure won't corrode. This is vital for use in marine-based outdoor environments, through to locations where aggressive chemicals are used. This includes installation on farms and agricultural sites where chemicals such as ammonia from fertilisers are prevalent, for example with enclosures that protect control units for silos. Spelsberg's enclosures achieve the

DLG and DNV-GL certificates, confirming high-level protection for use within these potentially corrosive areas.

### **Flexibility for easier installation**

Light weight not only makes a thermoplastic enclosure easier to install, but the designs achieved are more flexible, enabling a more compact footprint. With knock-out sidewalls, it's quickly possible for the installer to combine polycarbonate enclosures on-site as required. Enclosures such as Spelsberg's GTi have a modular approach with open housings and removable walls, enabling the houses to be interconnected. This provides on-site installation flexibility and means that enclosure systems can be expanded at a later date if required.

Frequently, a dedicated approach is required to fit the footprint, and polycarbonate lends itself to rapid customisation. Spelsberg UK's in-house design and machining capability means that a customised prototype can be developed within 24 hours. The ability to customise flexible cable entry points, for example, makes installation much faster and easier. For an exposed outdoor environment in particular, simplifying installation is a significant advantage for the installer.

This flexible approach, together with the ability to advise on the most effective specification for the outdoor environment, will provide an OEM with the right specification. Combined with a highly durable design, this ensures an enclosure system for any outdoor location.

**Image captions:**



**Image 1:** Ingress protection (IP) rating is a key enclosure requirement when sensitive equipment is installed in an outdoor location.

**Image 2:** GEOS enclosure, channels rainwater or liquids away from more vulnerable entry points, reducing the potential of liquid accumulation and ingress.

**Image 3:** A range of Enclosures with the ability to quickly customize a shell speeding up processes and ensuring the protection needed for the toughest conditions

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## 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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