Composite Enclosures Prove To Be The Best ChoiceFor Protecting Wireless Controls

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Since the early 1960's, Stahlin Non-Metallic Enclosures has been manufacturing fiberglass enclosure housings to protect electrical connections as well as sensitive controls, instrumentation and measurement systems. Applications of our enclosures are useful in a diverse range of industries including water and wastewater, solar, wind, food, marine, oil and gas, and many more. One of our primary applications in many industries is providing the housing for wireless (WiFi) controls because of the advantages our non-metallic enclosures provide over the standard metallic enclosures.

Wireless Signals

Wireless transmission is useful in cases where interconnecting wires are inconvenient,
hazardous, or impossible. Many industries have a need for reliable enclosures for sensitive controls and monitoring systems in the field, and effective transmission is a must. With wireless data transmission, such as radio, the proportion of energy received becomes critical if it is too low for the signal to be distinguished from the background noise.

Radio receivers receive all signals on the frequency at which the receiver is set; in the case of WiFi: 2.4Ghz. For data transmission to occur, the WiFi signal must be at least 20dbm greater than the signal level of the noise or spurious transmissions. If a signal is shielded, the signal- to-noise ratio (SNR) diminishes and the signal level drops below the 20dbm threshold. As a result data transmission errors then occur. The consequence in the case of using a laptop is that the computer will browse slowly or not at all.

For most applications, the choice of a metallic enclosure for WiFi components has proven to be an ineffective one unless there is an external antenna. Metal is the enemy of WiFi radio wave transmission because a metallic enclosure blocks radio waves and thus reduces the signal quality.

Enclosures Choices
Metallic Enclosures with External Antennas

To overcome the fact that metal enclosures will block RF signals, users sometimes will install an internal cable assembly linking the wireless module to a bulkhead connector. This is intended to bridge the gap allowing an external antenna such as the Delta 1 series to screw directly onto the bulkhead connector. In practice, a metallic enclosure with this configuration of an external antenna generally performs better than one featuring an internal antenna.

The downside, however, is that the external antenna becomes vulnerable to environmental elements (corrosion, ferrous oxide deterioration, natural ambient interference such as that from livestock, or consumption of the external antenna).

Composite Materials (Fiberglass)
Ultimately, the choice of enclosure material is dependent on the concentration of various corrosives present in the application environment and other physical properties necessary to meet design specifications. Although many non-metallic enclosure materials offer a degree of corrosion resistance in less harsh environments, one user of non-metallic enclosures, AMCi, has discovered that fiberglass NEMA 4X enclosures are specifically fabricated and rated for resistance to the harshest corrosive agents. Additionally, in comparisons of materials, they have determined that metal enclosures and radio frequency signals specific to wireless controls were not adequately compatible. Those two factors resulted in the selection of Stahlin J Series and Stahlin Pushbutton fiberglass composite enclosures for use in housing and protecting wireless controls.

In addition to AMCi, Enviro Tech Instruments and security companies such as Boundless Security Systems and RACO Cellularm Systems have discovered that non-metallic enclosures are optimal for their wireless needs. Enviro Tech, for example, uses Stahlin non-metallic enclosures for protecting wireless monitoring equipment when measuring toxicity in natural water and other liquids. Boundless Security uses

non-metallic enclosures for wireless camera monitoring equipment on home and office security systems. All of these companies cited wireless compatibility together with rugged durability and resistant to harsh environments to be key factors in their product specifications.

Results
After reviewing the many available options, an increasing number of companies requiring protection for wireless control systems chose non-metallic enclosures. The reasons why include:

? Metal is not as accommodating as non-metallic materials in terms of enabling electronic signals to transmit as freely as their information systems require.

? Control systems are often placed in extreme and remote environments. Users did not want to risk exposing an antenna as would be necessary with a metallic enclosure. That would have made remote solutions more vulnerable to failure.

? Non-metallic enclosures ultimately provide proven durability essential for protecting applications.

? Non-metallic enclosures do not present the problem of rust or corrosion in harsh elements.

? Fiberglass enclosures are suitable for its dual latching/lockable lid to prevent unauthorized access.

? Fiberglass enclosures are also more resilient to impact in that they "give" rather than dent. The negative consequence to metal enclosures can be the compromise of the all-important gasketed seal that prevents moisture, dust and other environmental factors from damaging internal controls.

Based on the experience of companies such as AMCi, Enviro Tech Instruments, Boundless Security Systems, RACO Cellularm Systems and others, hands-on consideration of the detrimental factors of choosing metallic enclosures in protecting wireless controls while still ensuring maximum transmission qualities, has led to the specification of non-metallic enclosures as the most reliable choice for housing in WiFI-related applications.

For more information: www.stahlin.com [1]

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