



Aligning military standards with REACH regulations in connectors

The essential role of connectors material selection

In an era where environmental sustainability and safety are paramount, the alignment of military standards with the European Union's REACH (Registration, Evaluation, Authorisation, and Restriction of Chemicals) regulations represents a significant stride toward a greener and more compliant future. This alignment is particularly crucial in the context of connectors, which are indispensable components in military and aerospace applications. Here, Dawn Rogers, senior product manager at [connector specialist](#) PEI-Genesis explains the importance of material selection for aligning military standards with REACH regulations.





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REACH is a comprehensive regulatory framework aimed at safeguarding human health and the environment from the risks posed by chemicals. Enacted in 2007, it places the onus on industries to manage the risks associated with the chemicals they produce and market within the EU. For military applications, the challenge lies in adhering to these stringent regulations while maintaining the rigorous performance and reliability standards that defence operations demand.

Military standards, such as MIL-DTL-38999 and MIL-DTL-5015 or VG (Verteidigungsgerät) dictate the performance, durability, and reliability of connectors used in critical defence systems. For example, VG95328 specifies design and material requirements for electrical connectors used in military applications, while VG95343 defines the requirements for the identification of electrical cables and wires.

These standards have traditionally focused on ensuring that connectors can withstand harsh environments, extreme temperatures, and mechanical stresses. However, integrating REACH compliance into these standards requires a nuanced approach to materials selection.

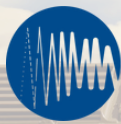
Material selection

Aligning military standards with REACH requires the substitution of hazardous substances with REACH-compliant alternatives. Olive drab cadmium has long been a favoured material in military connectors due to its exceptional properties. However, the Chrome VI substance used in the production process of cadmium is toxic and can have damaging effects on humans and the environment. This has prompted the military industry to adopt a transition to safer alternatives that comply with REACH.

Olive drab cadmium often used in electroplating connectors, provides several advantages that are crucial in military applications. The plating offers excellent resistance to corrosion, which is vital for connectors exposed to harsh environments, including salt spray, humidity, and extreme temperatures.

It also ensures high electrical conductivity, which is essential for reliable signal transmission in military communication systems. Similarly, olive drab cadmium plated connectors exhibit superior durability and wear resistance, contributing to the longevity and reliability of military equipment.

Despite these benefits, Chromate VI is classified as a carcinogen and poses significant environmental hazards. As a plated surface on a component, cadmium does not represent a risk to health, as it is not easily absorbed through the skin, so handling cadmium plated items is not directly harmful.



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The main risk to health is cadmium dust or vapour, which can be generated by machining or welding. The main route of entry into the body is via inhalation or ingestion. If it corrodes, cadmium forms a white crystalline cadmium salt deposit on the surface of the plating and it can represent a health risk if not handled properly. The deposit may enter the body through inhalation if it becomes airborne or through ingestion. Cadmium and the compounds it forms when it corrodes are toxic and may cause cancer or genetic defects.

Cadmium is also toxic for the environment as it accumulates in soils and it can be taken up by plants, then entering the food chain. High levels of cadmium in soil can also impair soil health and fertility, affecting agricultural productivity.

Producing cadmium plating needs to be a highly controlled process in order to ensure the hazardous substances used are controlled as much as possible.

REACH-compliant alternatives

The transition from cadmium to REACH-compliant alternatives involves exploring materials that can replicate or surpass the performance characteristics of cadmium without the associated health and environmental risks.

A suitable alternative is Tin-zinc J plating, which provides robust corrosion protection, making it suitable for connectors exposed to harsh environments. This plating offers good electrical conductivity and is 121 VG approved.

PEI-Genesis supplies compliant connectors from a range of manufacturers including Amphenol's Amphenol-AIR LB Tin Zinc J plating connectors, which fully comply with the values of a cadmium-plated design in terms of corrosion resistance, conductivity and shielding capability J-plating connectors. The Tin Zinc J plating is also compatible with cadmium connectors already in use so it is suitable for maintenance and repair orders.

Similarly, these connectors are compliant with VG military standards, including VG95234, VG95328, VG96912, VG95319-1016 and VG95319-1011.

Aligning military standards with REACH regulations through careful material selection is a multifaceted challenge, particularly when replacing cadmium. However, the defence industry is making strides in identifying and implementing alternatives that ensure connectors remain reliable, durable, and environmentally friendly. By replacing cadmium with REACH-compliant materials, such as Tin-Zinc J, the defence and other sectors can protect both their workforce and the planet, ensuring a healthier and more sustainable future.

To find out more about J-plating solutions from Amphenol-Air LB or to browse through the wide range of military connectors offered by PEI-Genesis, visit www.peigenesis.com.