



Technical Bulletin

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No Special Handling Required: The Ease of ARMOR VCI Nanotechnology

ARMOR VCI Nanotechnology

ARMOR Protective Packaging® products utilize proprietary ARMOR Volatile/Vapor Corrosion Inhibitor (VCI) nanotechnology. VCI are a class of corrosion inhibiting compounds which have sufficient vapor pressure to release molecules from a carrier into the air. The presence of humidity or moisture greatly aids in the release of ARMOR VCI. Once released, the molecules are disseminated throughout an enclosed air space to the metal surface by diffusion. ARMOR VCI molecules attach themselves to the metal surface to form an invisible thin film, only a few molecules thick. The VCI film passivates the surface and inhibits the electrochemical reaction that causes corrosion.

The principle cost saving feature of ARMOR VCI nanotechnology is that it allows metals to be protected in a clean, dry condition over extended periods. There is no need to have physical coatings or the labor costs of application and removal of them. Other metal protection methods actually form physical layers that often times have to be removed. This is not the case with ARMOR VCI nanotechnology. ARMOR VCI chemicals do not alter any important metal properties, even in precise electronic applications. Once the ARMOR VCI packaging is removed, the metal part is ready for immediate use.

VCI Nano-Layer

The thickness of the VCI layer depends on the type of metal, VCI concentration in the air and temperature. In general, in a closed container with a sufficient source of VCI, the VCI layer will be between 4 and 8 nanometers thick (approximately 2 to 4 molecules thick). It will not interfere with any surface treatments or further metal processing and is a non-factor in regard to part handling and processing.

For reference:

- ARMOR proprietary VCI nanotechnology = 4 to 8 nanometers thick
- Average human hair = 50,000 nanometers (10,000 times thicker)
- Primer paint coating = 25,000 nanometers (5,000 times thicker)

Decorative or functional coatings can be applied and metal forming operations such as stamping, grinding, cutting, welding, or burnishing can be performed without removal of ARMOR VCI nanotechnology.

Applications may include many variations of metal substrate and processing. Therefore, ARMOR Protective Packaging® recommends testing product and process compatibility with ARMOR VCI nanotechnology prior to implementation. The sales and technical service staff at ARMOR Protective Packaging® are happy to assist with any questions and recommended testing plans.

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