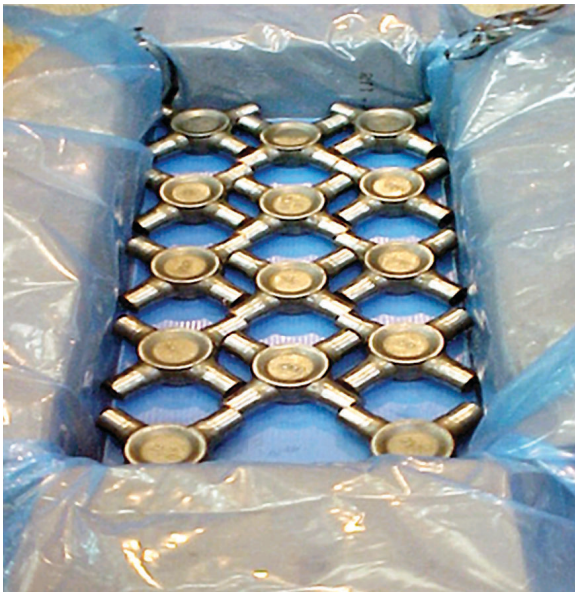
Cost-Saving Effects

Seen by Replacing Oils and Greases

The obvious advantage of corrosion-inhibiting products is the quality improvement they bring to finished parts. But, in addition to that, the developers of the Cortec system are emphasizing cost savings. "Clean" processing and "clean" protective packaging may contribute to significant overall manufacturing cost reductions, contends Cortec (www.CortecVCI.com), and creates a leaner manufacturing environment.



Protecting multi-metal components destined for overseas transit, storage and assembly.

An engine block arrives clean and dry thanks to protective packaging.

The system is based on the vapor-phase corrosion inhibitors (VpCI) formulas developed by Cortec researchers, and designed to produce clean, dry metal components. While manufacturing processes typically use oils and greases to inhibit corrosion, Cortec's high-tech chemicals mean those products can be replaced with water-based, bio-based, or synthetic fluids and powders activated with VpCI technology.

Some of the applications include Eco and MRO products for repair and maintenance applications, lubricants, surface-preparation products, water-treatment products, and high-performance coatings.

Removing oils and greases from manufacturing eliminates subsequent cleaning and/or degreasing processes, which then eliminates the costs of those oil-based products and chemical cleaners, and associated energy and labor costs. These savings projections should be extended to include maintenance costs and chemical disposal cost, according to Cortec.

The same research technology is applied to packaging products that keep cast-metal and other finished parts from being degraded by rust after production and during shipment. Metal parts enclosed in protective packaging that's treated with stay rust-free for three months to two years, the company indicates. As parts are shipped internationally for assembly this ensures delivery in premium condition, minimizing defect claims due to rust or corrosion. Metal parts arrive ready for use, with no need for cleaning or degreasing.

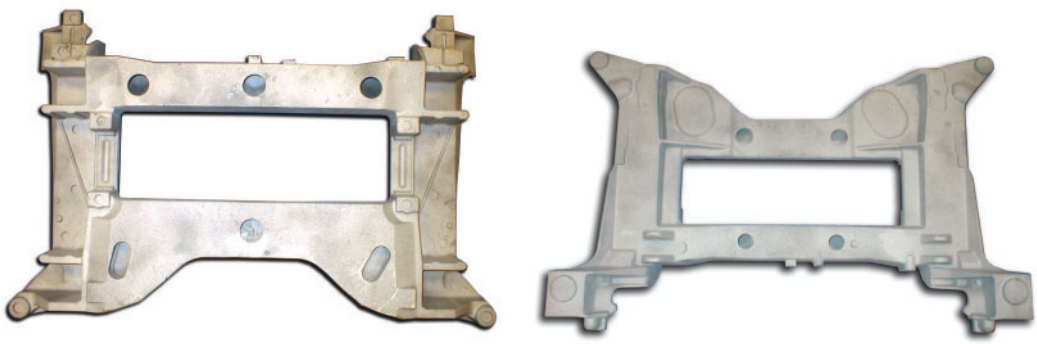
Cortec protective packaging is available in sheets and bags of various sizes, from small component parts to entire machine assemblies.

New Corrosion-Resistant Aluminum Alloy Offered

A new dieacasting alloy has been developed and patented by MDW Technologies L.L.C. (www/mdwtec.com/kalloy) and reportedly offers corrosion-resistance like other commercially available aluminum alloys, but better heat-transfer characteristics. Unlike comparable alloys A360, A380 and A413, Delphi K-Alloy is said to withstand corrosive conditions without coatings or special designs.

Comparing Delphi K-Alloy's physical properties, MDW says it presents a yield strength of 25,000 psi versus 23,000 psi for A380, while its elongation is at 5.1% versus 3.8% for A380. MDW indicates the alloy may be

Magnesium Advances Leading to Better Engine Blocks



The first magnesium low-pressure permanent mold cradles — designed for the Corvette GMX245 as part of the U.S. Automotive Materials Partnership program — demonstrated better mold filling characteristics than expected, and show the potential for low-pressure magnesium castings for high-integrity automotive applications.

Researchers in the U.S. and Australia have searching for a magnesium alloy that is suitable for mass production of complex engine blocks, either by sand casting or by permanent mold casting.

The Australian effort — organized as the Advanced Magnesium Corp. — started work in 1998 with VAW to develop a suitable alloy and sandcasting technology. They were joined later by Austrian engine design company AVL List in designing a demo magnesium engine. AMC licensed an alloy (MEZ from Magnesium Elektron Ltd.), and along with another research partner, CAST, began R&D that led to an alloy (AM-SC1) that met the AVL's requirements for sand casting an engine block.

AM-SC1 is a patented high-temperature, creep-resistant alloy used to cast automotive powertrain components. Sand castings have a higher integrity than high-pressure castings, and can be used for more complex parts, so the process it better suited for mass production. Composition and heat treating optimized the performance and cost, and the creep and bolt load retention were tailored to match typical aluminum alloys, A380 and A319. But, the mechanical properties of AM-SC1 made the alloy desirable for engineers. There is only a small decrease in tensile yield strength — 0.2% offset tensile proof stress — with increasing temperature from 20 to 177°C. and its compressive yield strength is unchanged.

The higher-temperature tensile creep strength in T6 condition is better than most magnesium alloys developed for automotive applications, according to reports. In certain temperatures for powertrain applications (150-170°C), the tensile creep strength is slightly better than sand cast A319, and high-pressure diecast A380. Bolt load retention is equally good.

AM-SC1 shows good resistance to general corrosion in saline conditions. Corrosion in engine-block internal cooling passages in is inhibited with the addition of a simple chemical inhibitor to a normal water/glycol coolant mixture. The fatigue strength depends on the casting quality too, for which AM-SC1 met the engine design requirements.

In addition, AM-SC1 has a fine microstructure in sand cast condition. It is strengthened by contiguous intermetallic phase at grain boundaries, which are strengthened further by T6 heat treatment and the distribution of fine precipitates.

After testing as part of a prototype three-cylinder turbo diesel engine by Genios LE, Am-SC1 was launched by AVL in October 2002 as part of a Volkswagon Lupo that was road tested for two years and 65,000 km. Inspection showed little damage.

Another magnesium R&D effort, the American Foundry Society's HI-MAC project, is developing high integrity magnesium castings, process techniques, and tools for manufacturing high-integrity automotive cast components.

This four-year, $6 million project is seeking a low-weight material to help improve automotive fuel efficiency and reduce exhaust emissions. A current project, SCMD (structural cast magnesium development), has shown that magnesium is ideal due to its strength and light weight. HI-MAC will continue the research begun in SCMD, focusing on developing processes for using magnesium in existing low pressure permanent mold and squeeze casting processes, both used in aluminum casting.

used in place of stainless steel in qualified applications, and that it exhibits good paint adhesion without extensive pretreatment.

Delphi K-Alloy's is already in use with one high-volume automotive application, according to MDW. "An outdoor lighting company has successfully completed 3000 hours of salt spray testing of Delphi K-Alloy without coatings," adds to Marty Newman, chief technology officer. MDW is offering K-Alloy in commercial quantities. They indicate castings can be produced without altering the current dies or diecasting equipment.

MDW Technologies LLC, which represents Delphi Corp., researches materials engineering and application of electronics and electronic sensors.