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**A MORE EFFECTIVE
WEAPON
TO ELIMINATE CORROSION**



LASER CLEANING



A MORE EFFECTIVE WEAPON TO ELIMINATE CORROSION

Clean technology lasers offer superior industrial corrosion removal in myriad applications, helps solve some of metalworking's most costly corrosion problems

Metalworking industries have been fighting a **war against corrosion in metal infrastructure, equipment, and products at great expense** for generations. However, **traditional methods of removing corrosion can be messy, laborious, time consuming, and can even pose serious health hazards.**

Today, one of the easiest to use and most effective alternatives is the category of industrial-grade, clean technology lasers. With this approach, **precision laser-based systems are used to remove corrosion, contaminants, paint, and residues with a high-energy laser beam** that leaves the substrate unaffected. **Preparation and cleanup time are minimal**, and the low-maintenance equipment can last decades. The technology minimizes operator exposure to potential environmental health hazards. In addition, no consumables are necessary.

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Other laser applications

The CleanTech lasers are also used to refurbish industrial infrastructure, such as when removing a previous coating along with any corrosion to facilitate the new coating's adhesion to the surface.

Another common laser application involves pre-weld treatment to remove corrosion, mill scale,

APPEARANCE OF THE MATERIALS. THE DIRECT COST OF CORROSION INCLUDES A LOSS OF MATERIALS, EQUIPMENT, AND PRODUCTION, PLUS THE COST OF REPAIR, MAINTENANCE, AND REPLACEMENT

residue and any impurities on the surface of the base material that would compromise the weld's effectiveness. It's essential to avoid any such contamination on a weld's surface, which could otherwise lead to a weakening of the weld's mechanical properties, requiring rework. Laser treatment is also used for post-weld cleaning to increase the life expectancy and corrosion resistance of a welded joint. Post-weld cleaning is important for stainless steel as well. Welding can cause a "heat tint," a discolored, thickened top layer on the stainless steel around the weld bead within the heat affected zone that compromises corrosion resistance. Removing the heat tinted top layer is necessary to restore stainless steel's full corrosion resistance and aesthetic value.

Corrosion and the limits of conventional control

Industries with metal infrastructure, processing equipment, or products exposed to water, fluids, moisture, or atmospheric humidity continually fights **corrosion**, which **causes the deterioration and loss of a material** and its critical properties due to chemical, electrochemical reactions of the exposed surface with the surrounding environment. Corrosion affects the microstructure, mechanical properties, and physical appearance of the materials. The direct cost of corrosion includes a **loss of materials, equipment and production, plus the cost of repair, maintenance, and replacement**. Additional losses can result from **accidents, injuries, and even loss of life**, as well as payments to repair environmental damage.

Within the continual struggle against industrial corrosion, one important niche area of corrosion control involves the **pretreating of metal surfaces to remove corrosion and contaminants before coating or welding**, which is crucial to ensure the safety, performance, and longevity of products and structures.

Insufficient coating pretreatment can lead to inadequate protection from the environment, leading to potential coating failure, moisture entry, and accelerated corrosion, as well as increased maintenance, early replacement, and warranty issues. Similarly, insufficient weld pretreatment to remove corrosion and contaminants can lead to **weakened or failed welds and necessary rework**, as well as substantial safety, liability, and litigation risk.

A cleaning method full of advantages

In many industries, it's necessary to remove corrosion, residue, oil, grease, or paint before coating a product or infrastructure to improve coating adhesion. Toward this end, laser-based systems have significant advantages over traditional methods, starting with ease of use.

“With laser-based systems, an operator simply points and clicks a high-energy laser beam at the surface.

The substrate is not affected by the laser, and the systems do not create any mess or byproducts. The approach is **eco-friendly, energy-efficient, and completes the job in approximately half the time of traditional methods** when preparation and cleanup are considered. Also, no consumables are required”, says **Wayne Tupuola, CEO, Orlando, Florida-based Laser Photonics**, a leading provider of patented industrial grade **CleanTech lasers** for cleaning and surface conditioning.

The laser systems made by Laser Photonics are available in portable and stationary models, ranging from 50 to 3,000 W (a 4,000 W version is in development), with chamber sizes from 3’ x 3’ in size to 6’ x 12’. The systems can also be installed in manufacturing lines in cabinets or operated by a robotic arm.

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In industry, the laser pre-treatment of metal surfaces can be used to streamline various manufacturing processes. For instance, it has been used to remove rust from hundreds of automotive transmissions per day. It has also been utilized to eliminate corrosion from conveying system components. A further benefit of the laser systems is that some of the most advanced units are designed to last for decades. For example, **CleanTech laser systems can last for 50,000 to 100,000 hours**. In addition, **virtually no maintenance is needed** after purchase and no consumables are required. Given the devastating cost of corrosion and the inherent limitations of typical control methods, lasers are becoming a best practice technique to combat it in facilities and in the field. Laser treatment effectively removes corrosion for many industrial applications, minimizes cleanup time and operator exposure to potential environmental health hazards, lasts for decades, and requires no consumables.

by Del Williams

