

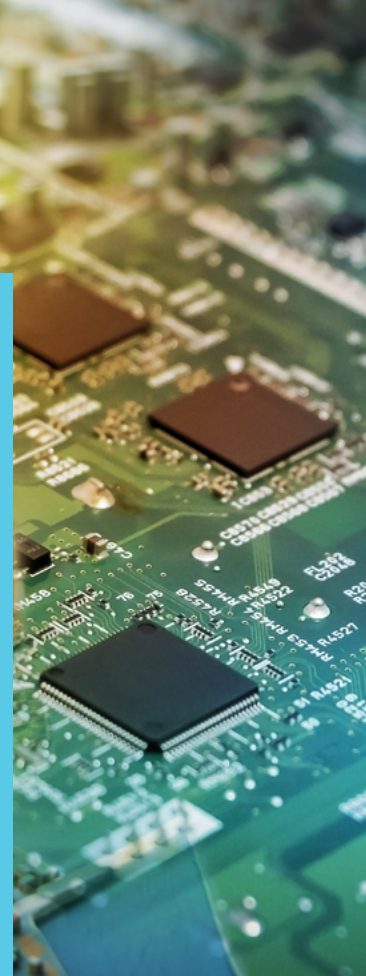
INDUSTRIAL FACT SHEET

Durable, Dependable Liquid & Corrosion Protection for the Harshest Environments

By 2025, there will be 11.4 billion industrial IoT (IIoT) devices.¹ Sensors, switches, transmitters, smart meters, smart grids, RFID tags, and components found in renewables are the electronic workhorses of the industrial market, adding formidable power to heavy-duty equipment that cases cannot fail.

The industrial marketplace has experienced an astounding technological evolution over the past 50 years. The advancements made are possible because of electronic devices, which, while varied in function, have one thing in common - the need to withstand challenging environmental conditions.

The industrial marketplace has also experienced a whirlwind of colossal growth. In 2018 alone, the utility sector contributed approximately 319 billion dollars to the United States' GDP.²



CHALLENGES

With great growth in industrial markets comes great growing pains. The components in industrial devices and equipment must be rugged, resistant, and resilient to facilitate maximum functionality. Yet printed circuit boards, semiconductors, and other electronic parts are susceptible to exposure to common elements like oil, gas, groundwater, rain, corrosive gasses, and salt fog, among others.

When an IIoT device fails due to component damage, manufacturers face costly product returns, warranty claims, and expensive repairs. When mission-critical devices fail, lives can be lost, causing catastrophic results and liabilities.

Finding a solution that can protect delicate circuitry inside industrial devices from liquid submersion, corrosive substances, and harmful gases is a need for every industrial market.

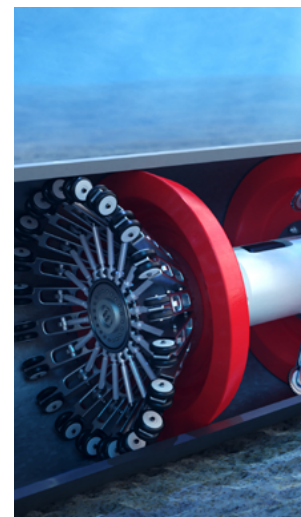
SOLUTION

To withstand these tremendous yet common challenges, industrial devices and the circuitry powering them must have extended protection. Mechanical seals and gaskets weaken and crack over time with temperature variations, and protective containers can be damaged during installation or use.

Consequently, manufacturers are investigating conformal coatings, made of polymeric materials, to safeguard electronic parts from environmental contamination. However, traditional conformal coatings such as acrylics, silicones, and epoxies do not provide adequate protection for critical electronic components due to limitations in their chemistry and application.

Nano coatings comprised of plasma-based derivatives and thin-film Parylene coatings offer a superior solution to problems associated with traditional coatings.

Our Parylene offers, at a competitive price point, the strongest protection available for its thickness (at micron levels), while our plasma-based coatings represent the next generation of protective thinness (at submicron levels) in conformal coatings. These solutions offer unparalleled protection for the industrial marketplace and can be tailored to any market, or specific operating environment.



BENEFITS

What OEMs Need to Know About Parylene and Plasma-Based Nano Coatings

FACT	BENEFIT
Traditional conformal coatings require a curing process to harden the protective films around components. Curing can produce environmentally harmful solvents, which is not an issue with most thin-film alternatives (e.g., Parylene).	Sustainability is integral to protecting our planet and can have the added benefit of increasing operational efficiency and reducing costs and waste for industrial manufacturers. ³ When OEMs use earth-friendly waterproof and corrosion protection, they can gain a competitive advantage with these savings and enjoy an improved brand reputation.
Parylene is an extremely ruggedized, durable coating, forming a permanent bond with any surface it adheres to.	Superior conformal coatings can positively influence MTBF in the manufacture of industrial electronics systems. ⁴ Parylene can have this long-lived, permanently bonded impact.
Parylene and plasma-based nano coatings are applied as ultra-thin conformal coatings (less than a fraction of a human hair) to protect IIoT electronic components, allowing manufacturers to avoid unnecessary weight and bulk.	In industrial equipment circuit boards, space is critical, and component size continues to shrink, making attachment more challenging with more and more circuitry being incorporated into an ever-shrinking footprint. ⁵ Industrial OEMs can still pack a lot of functionality into devices when they use ultra-thin protective coatings, meeting tight tolerance and space demands for the most pressing industrial needs.
Both Parylene and plasma-based nano coatings are applied using a process called “chemical vapor deposition” or CVD. CVD quickly delivers the consistency, quality, and repeatability required in industrial manufacturing.	Oil and gas service, equipment, and distribution providers drove 96.78 billion dollars in market value in 2018. High manufacturing demand calls for high throughput. CVD yields decreased cycle times and increased production capacity.
Many conformal coatings require a masking process to prevent electrical component connectors from being covered, increasing labor and time. With plasma-based nano coatings, masking is minimal, decreasing cost, increasing throughput, and improving yield.	With plasma-based coatings, faster production times are possible, as well as the capacity to cut down labor by as much as 80%, all at a minimal cost.

¹ Statista.com, ² BEA.gov, ³ EPA.gov, ⁴ mdpi.com, ⁵ n-digital.co.jp



**WE GUARANTEE RESULTS,
DELIVER THE INDUSTRY'S
HIGHEST YIELDS, AND
DRIVE DOWN COST AT
EVERY STAGE OF THE
PROTECTION PROCESS.**

WHY HZO

- We are the only industry vendor to offer a Spectrum of Protection™, a portfolio of unique thin-film and nano coatings composed of materials aligned to an OEM's specific needs. Drawing upon our wide selection of complex chemical compositions, we meet protection requirements, design parameters, sustainability requirements, cost consideration, and market consideration.
- Our deposition chambers are the largest in the industry, increasing efficiency, and throughput. Up to 50% more units per hour can typically be coated.
- We offer coating as a service, in your location, or ours, drawing from an intellectual property and patent portfolio of over 370 assets.
- Our engineers have practical industry expertise and are ready to offer insight, delivering you a prescriptive, customized plan for a reliable protection solution.
- We bring the right people, processes, material science, and equipment together to deliver an optimized turnkey solution.
- We ensure results, deliver the industry's highest yields, and drive down costs at every stage of the protection process.
- Fortune 100 brands work with and trust HZO to deliver reliable, repeatable results.



WHEN IT COMES TO COATINGS, WE'VE GOT YOU COVERED!

Let us know how we can help at [HZO.COM/CONTACT-US/](https://hzo.com/contact-us/) OR 1-877-757-4HZO (4496)