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CONTENTS

JANUARY FEBRUARY 2024 | ISSUE 295

INDUSTRY INSIGHTS

- 03** UVITRON International
- 11** The Essential Role of Fixture Design in Laser-Based Welding Applications

INDUSTRY NEWS

- 22** Regional Press

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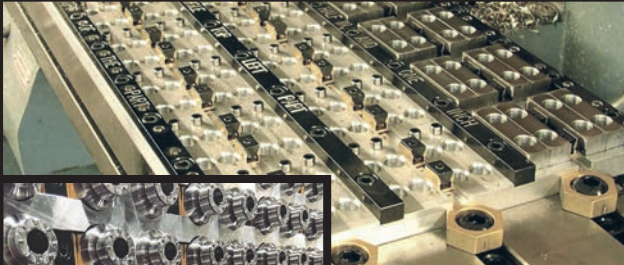
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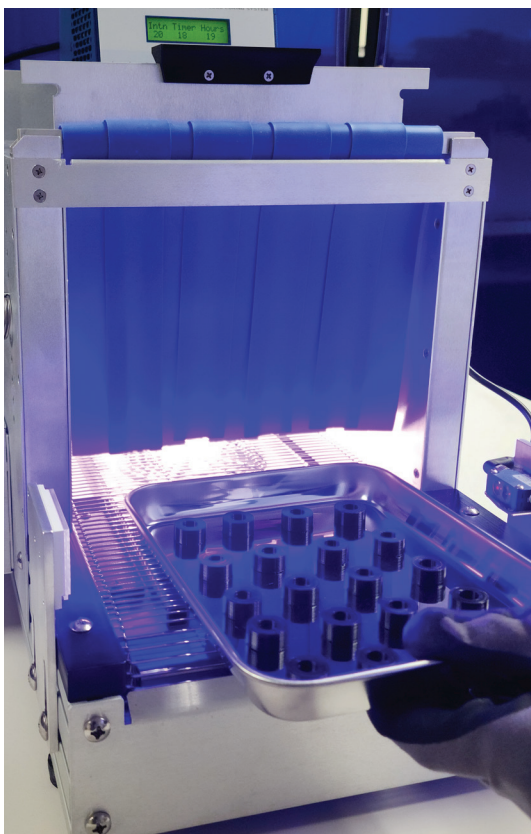
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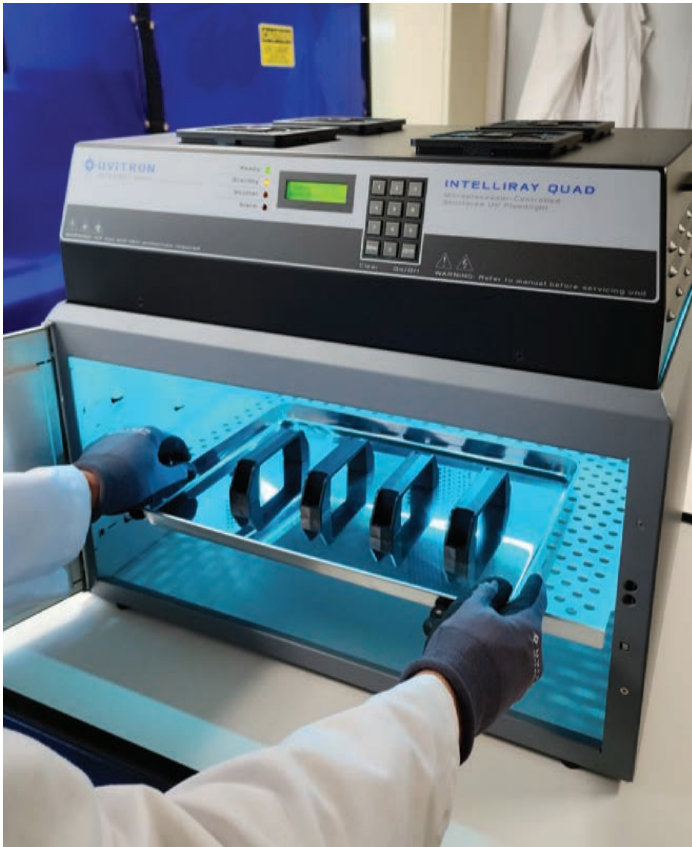
In today's tech-driven world, there's a neat trick that ultraviolet (UV) light can do, and it's called UV curing. Put simply, this is where products, like certain inks or glues, are zapped with UV light and they dry or harden super quickly. For those unfamiliar with this concept, imagine the quick efficiency of a microwave heating your food; similarly, UV curing uses UV light to expedite the hardening process of materials. Beyond the speed of drying paints or inks, the scope of UV curing is vast.



UV curing's influence permeates across various sectors. In the automotive world, it's instrumental in giving vehicles their sleek finishes and durable coatings. On the home front, it's responsible for that polished wooden finish on furniture and shiny hardwood floors. Beyond these, in the realm of print media, UV curing ensures vibrant and sharp prints, whether on packaging materials or large-scale billboards. Within the electronics sector, this technology is indispensable, ensuring that tiny components are securely affixed and maintain optimum functionality. The depth and breadth of UV curing's applications are extensive, impacting several industries and continually evolving with technological advancements.

Now, let's talk about a company that's been at the forefront of this tech: Uvitron International. Back in 1993, as our industry was starting to blossom, we stepped onto the scene. We didn't just want to be another company in the UV curing world; we wanted to lead and innovate. And that's exactly what we did. We made the industry's very first electronic UV lamp ballast for this kind of work. While our initial step into the UV field was supplying ballasts for light curing systems, we didn't stop there. Over time, we broadened our scope to manufacture complete UV light curing systems that serve various industries.

As we celebrate our 31st anniversary this year, it's evident that our legacy goes beyond just products. For us at Uvitron, it's not just about making and selling systems. Every piece of tech we create



is a showcase of our dedication to making things that really work and work well. The heart of our story isn't just about the journey of a company; it's about constantly finding new and better ways to use UV light. And even today, there's a whole world out there just starting to see how awesome UV curing can be.

Unlocking Efficiency: The Game-Changing Power of UV Curing in Modern Manufacturing

In the fiercely competitive world of manufacturing, finding avenues to gain an edge can be a game-changer, and UV curing has proven to be a vital player in this realm. Imagine slashing drying and setting times to mere moments. That's the power UV curing brings to the table. By accelerating these processes, industries are witnessing a tangible uptick in their production rates.

Take metal and glass manufacturing as prime examples. By incorporating UV curing, these sectors are not just churning out products faster, but also freeing up significant resources and space that would otherwise be reserved for lengthy curing or drying processes. This shift doesn't just translate to more products rolling off the line but equates to tangible cost savings.

WHY UV CURING?

- Quick Setup
- Easy Use
- Dries Fast
- Strong Bond
- Less Waste
- Saves Power







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Cost-effectiveness isn't merely about quicker processes. When adhesives or coatings, be it for electronics or automotive parts, are UV-cured to perfection, the longevity and durability increase. This diminishes the need for frequent replacements or maintenance, which over time, saves businesses a substantial amount in after-sales services or warranty claims.

Moreover, with faster curing times, businesses find themselves better positioned to respond to bulk orders or sudden spikes in demand. The ability to quickly ramp up production without compromising on quality can be pivotal in securing lucrative contracts or establishing a reputation as a reliable supplier in the market.

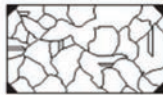
In essence, for manufacturers eyeing a future where efficiency, cost-saving, and production speed are paramount, UV curing isn't just an option—it's an imperative. It's the key to overhauling traditional production processes, cutting down on overhead costs, and unlocking a new era of manufacturing prowess.

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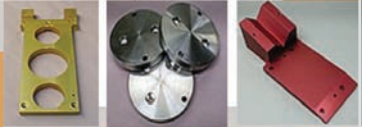
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Crafting Excellence: Uvitron's UV Innovation Fuels New England Manufacturing

Our commitment to research, development, and technological advancement has resulted in a product line that caters to the unique demands of various industries. Each system we offer is crafted to perfection, ensuring our clients get the best tools tailored to their specific needs. From ensuring precision in electronics to accommodating large-scale manufacturing processes, our products stand testament to our dedication and expertise.

Uvitron's UV Flood Systems: These are the workhorses of the UV world, built for tasks that require extensive coverage. If you're dealing with large components or assemblies that need a uniform layer of protection or adhesive, our flood systems ensure that every inch gets the right amount of UV exposure. It's especially beneficial for manufacturers who produce sizeable parts or panels and need to ensure consistent treatment across the whole surface, such as protective coatings on automotive components or large moldings. Our UV Flood Systems: IntelliRay Quad, IntelliRay, SkyRay, SunRay, PortaRay.

Uvitron's UV Spot Systems: Precision is the hallmark of the UV Spot Systems. These systems cater to intricate tasks that require targeted UV exposure. Think about the minute components in an electronic assembly or the delicate soldered joints on a circuit

board. The UV Spot Systems are engineered to deliver UV light with pinpoint accuracy, ensuring that only the designated area is treated, without risk to neighboring components. In industries like electronics, where tiny connections can determine the functionality of a product, this level of precision is critical. Our UV Spot Systems: SunSpot2, SkyBeam, SkyWand.

Uvitron's UV Conveyors: These are specifically tailored for continuous production environments. For instance, when manufacturing long sheets of metal or glass, you need a system that can keep pace with the production line and treat materials uniformly. UV Conveyors ensure every part of that sheet, as it moves, gets the UV treatment it needs. This is crucial in industries like wood, glass, or large circuit board manufacturing, where a uniformly cured protective layer can determine the product's durability and quality. Our UV Conveyors: UV Conveyor 40 Plus, SunBelt25, SunBelt BT9.

Uvitron's UV LED Systems: UV-LED curing technology presents a multitude of benefits, including superior energy efficiency, eco-friendly operation, decreased heat output, longer lifespan, instant on/off capability, and greater process control. These advantages stem from the technology's lower energy consumption, especially with its instant on-off feature, and precise wavelength emission, leading to reduced utility costs. The technology's lower heat output expands the range of materials that can be cured, including heat-sensitive ones, and enhances workplace safety. In electronics manufacturing, it's used to cure adhesives and coatings, ensuring durable and reliable electronic components. The technology also finds use in medical equipment production, where precise and safe curing is essential for producing high-quality medical devices. Additionally, it's beneficial in the automotive sector for coating and painting processes, improving finish quality, and reducing production time. UV-LED curing is revolutionizing various industries by offering a cleaner, safer, and more efficient alternative to traditional curing methods. *Our UV LED Systems:* SkyRay, SkyBeam, SkyWand.

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achieve unmatched quality, and significantly curtail costs. By streamlining processes and minimizing curing and setting durations, we enable businesses to amplify their output and, in turn, their profits. Leveraging Uvitron's bespoke solutions, manufacturers don't just meet but surpass their production objectives, securing a leading spot in their industries.

Stay Ahead with UV Curing: The Future of Manufacturing

In the rapidly evolving world of manufacturing, staying static is akin to moving backward. As pioneers in the industry, we at Uvitron International have always championed forward momentum. And right now, that direction is clearly pointing towards UV curing.

- 1. Cost-effectiveness:** The initial investment in UV curing technology is rapidly offset by the manifold benefits it brings to the table. Lower operational costs, reduced material wastage, and speedier production cycles mean a healthier bottom line for businesses.
- 2. Efficiency at Its Best:** Time is of the essence in the manufacturing world. With UV curing, drying, and setting times are slashed dramatically, boosting productivity, and allowing businesses to meet tight deadlines without breaking a sweat.
- 3. Eco-Conscious Production:** In an age where environmental responsibility is paramount, UV curing offers a solution. With significantly lower emissions compared to traditional methods, manufacturers can take pride in adopting greener processes.
- 4. Impressive ROI:** With tangible benefits in efficiency, cost savings, and product quality, the return on investment for UV curing technology is not just assured; it's impressive. Businesses can expect to recoup their initial investment in a shorter span, all while enjoying the advantages UV curing offers.

Manufacturing giants, innovative startups, and every enterprise in between are taking notice of the myriad advantages UV curing presents. The question isn't whether to adopt this technology; it's about when. And with every tick of the clock, the gap widens between businesses that are harnessing the power of UV curing and those yet to embrace its potential. In a dynamic

industry landscape, getting left behind isn't an option. Uvitron International invites you to be part of the future, to seize the competitive edge, and to shape the next chapter in manufacturing excellence.

We warmly encourage all readers of The Gateway to get in touch. If you have queries about our products, services, or any other aspect of our operations, Eugene Mikhaylichenko, our Director of Sales & Marketing, together with our dedicated team of sales experts, technical specialists, and engineers, are readily available to assist and address your concerns. As a locally owned and operated entity, we take immense pride in our heritage. It's noteworthy that several Fortune 500 companies rely on us repeatedly for their needs. We are proud to be ISO 9001:2015 Certified by NQA, underscoring our commitment to quality and excellence. We ship our systems globally, showcasing our reach and trustworthiness. While we are rooted in New England, our connections and clientele span the world, and we are always eager to expand our community and partnerships.



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THE ESSENTIAL ROLE OF FIXTURE DESIGN IN LASER-BASED WELDING APPLICATIONS

By Todd E. Lizotte, Orest Ohar, and Joseph Dagher of Bold Laser Automation, Inc. Bedford, NH

Laser-based welding has revolutionized the manufacturing landscape, enabling the precise and efficient joining of intricate assemblies across diverse sectors, including medical devices, automotive, aerospace, and the growing battery and electric vehicle (EV) industries. While lasers are undeniably crucial for achieving top-tier welds, the significance of fixture design cannot be over-emphasized. A well-crafted fixture is the backbone of the welding process, ensuring stability, repeatability, and, ultimately, the operation's success.

Five essential functions must be meticulously addressed in fixture design to unlock the full potential of laser-based welding in these industries: ease of loading/unloading, ensuring intimate contact between parts being welded, maintaining consistent component tolerances and fixture registration, and providing a clear line of sight for laser welding and alignment verification through cameras. Neglecting these functions can lead to subpar weld quality, early failures, and significant production setbacks. Figure 1 shows how gaps can impede proper and satisfactory welds.

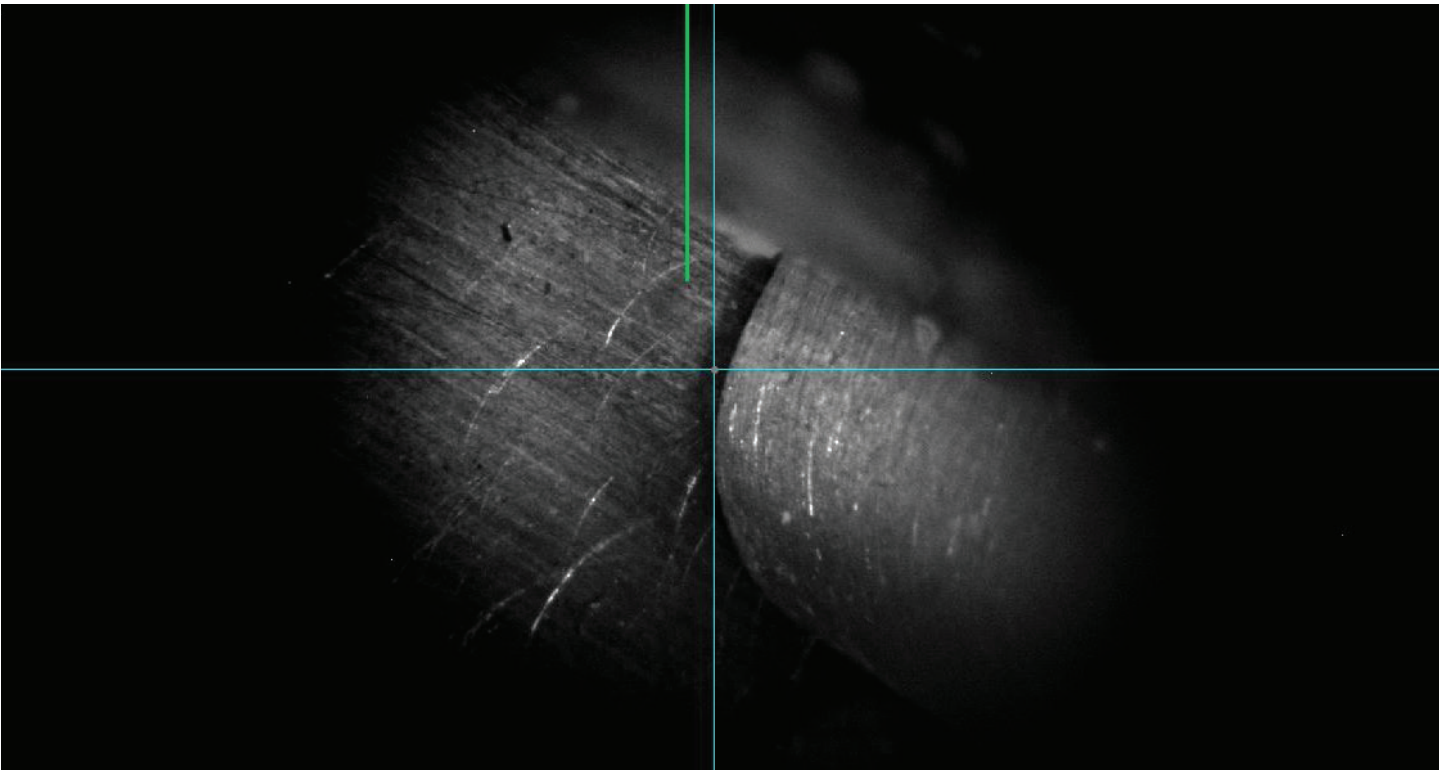


Figure 1 – Shows inadequate clamping, leaving a gap under the part to be welded.

Streamlined Loading/ Unloading

Efficiency is paramount in the fast-paced world of manufacturing. A well-designed fixture must facilitate the smooth loading and unloading of components to be welded. This is especially crucial in industries like medical devices, automotive, aerospace, and EVs, where precision and speed are imperative. A fixture that hampers the easy placement and removal of parts can impede production throughput. This is further highlighted in cases where fixtures act as pallets, preloading components within the fixture before transferring them to the laser system, as shown in Figure 2.

Consider a medical device manufacturing scenario where tiny, intricate components must be laser welded. An inadequately designed fixture can make it difficult for operators to position these delicate parts accurately. In many cases, fixture selection might involve robotic handling to bring the components together one assembly at a time. In another case, this prolongs the assembly process and increases the risk of damaging the components. In contrast, a fixture that enables quick and precise loading/unloading (manually or automatically) ensures that the welding process remains efficient, minimizes operator errors, and maximizes productivity.



Figure 2 shows a palletized fixture being placed into the laser welding tool.

Ensuring Optimal Part Contact

Achieving high-quality welds demands optimal contact between the parts to be joined. Gaps or misalignment between components can result in subpar weld quality, compromising the structural integrity and reliability of the final product. This requirement is particularly vital in aerospace and EVs, where safety and performance are paramount.

Imagine an aerospace component with a slight gap between two critical parts due to inadequate fixture design; Figure 1 shows such a case. These gaps can lead to stress concentrations when exposed to rigorous flight conditions, causing premature component failure. In the EV sector, where battery packs are assembled using laser welding, any gaps or misalignment in the components can affect the overall performance and longevity of the battery, potentially leading to costly recalls. These gaps

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also lead to a failure mode where the weld acts as a hinge flexure, subjecting it to stress and ultimately causing weld failure over time. Furthermore, such gaps can serve as collectors of oxides and contaminants, leading to further oxidation of the weld from its backside.

Consistent Registration and Tolerances

Maintaining consistent registration and tight tolerances between components is another crucial function of a well-designed fixture. In precision-critical industries such as medical devices and automotive, even minor variations in alignment can result in unacceptable product deviations and increased reject rates. Fixtures must ensure that parts are securely held in their intended positions throughout welding. Tolerance plays a vital role in both the fixture and the components.

Unacceptable component tolerance stack-ups can lead to mispositioned components, part gaps, over- or under-clamping of the element within the fixture, and overall yield issues in the laser welding process. It should be noted that various clamps may be needed, and the setup of these clamps becomes critical; you don't want heavy clamping, just a slight preload to keep the parts in a fixed position and the overall fixture in place. Figure 3 shows the typical clamping of a palletized fixture.



Figure 3 shows a typical lever clamp to fix the pallet fixture in place, where the pallet fixture was pre-loaded with components and assembled externally.

Unobstructed Line of Sight and Camera Alignment Verification

In laser-based welding applications, maintaining an unobstructed path for the laser beam is evident and crucial for achieving precision. With a variety of off-the-shelf welding optical heads, manufacturing engineers need to be aware of the characteristics of the laser beam output of the lens within that focusing head. The collimated beam diameter received at the focus lens, the cone angle output, the working distance of the focusing lens, and the spot size on the target all play a vital role in the laser material interaction during welding.

Once the welding parameters are established, initial testing parameters can be brought to the laser machine tool. The design of the fixture must take into consideration several factors for proper laser welding, including nozzle gas pressure, nozzle end size, the reflectivity of the material being processed, the angle at which the laser focus head is angled to eliminate back reflections, and the observed visual alignment verification to ensure the accuracy of the welding process.

Fixtures must provide clear access for the laser beam to reach the welding zone and enable operators to verify component alignment through cameras or other machine vision optical systems. These openings must also ensure that the welding spatter can eject and that those openings can be cleaned easily. Figure 4 shows an image of a typical window and how it might get contaminated over time, requiring maintenance and cleaning.

In the automotive industry, for example, welding intricate components within the confined spaces of a vehicle chassis requires fixtures that allow the laser beam to reach every weld joint without obstruction. Additionally, using cameras or vision systems is essential to verify the alignment of components and ensure that the welding process is on track. Narrow weld zones or obstructions caused by weld angles and positioning could result in partial laser beam blockage, leading to poor welding performance and potentially no weld due to such shadowing.

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Figure 4 shows an image of a window and the resulting ejected materials. This view is from the laser side.

Consequences of Neglected Laser Welding Fixture Design

Neglecting any of these crucial functions in fixture design can have significant consequences. Mismatched part tolerances, gaps between parts due to poor clamping, loose component registration, inadequate vision illumination, or laser beam obstruction can all lead to subpar welding quality and product failures. These failures not only necessitate costly rework and potential recalls, but they also have safety and financial implications for the manufacturer.

Conclusion

Fixture design is integral in laser-based welding applications across industries such as medical devices, automotive, aerospace, and EVs. To achieve the stability and repeatability required for precision welding, fixtures must excel in essential functions: ease of loading/unloading, ensuring optimal part contact, maintaining consistent fixture registration and component tolerances, and providing an unobstructed path for laser welding and alignment verification. Neglecting these functions can lead to subpar weld quality and costly production setbacks.

As these industries continue to push the boundaries of innovation, the role of fixture design in laser-based welding will remain indispensable. Manufacturers must recognize the importance of well-designed fixtures and invest in their development to ensure the success, quality, and reliability of their products in an increasingly competitive marketplace.



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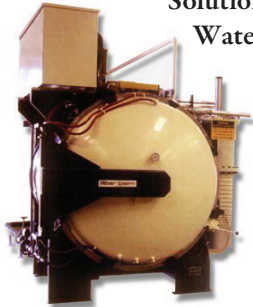
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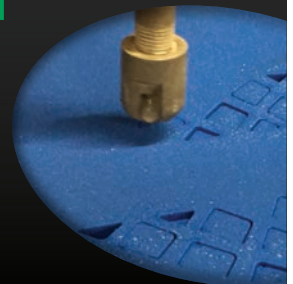
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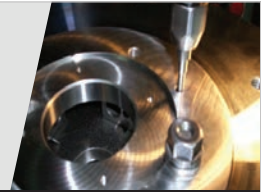
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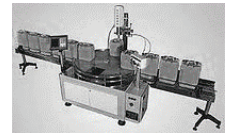
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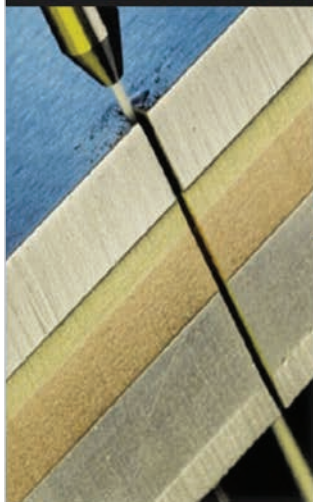
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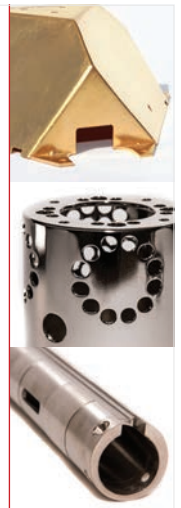


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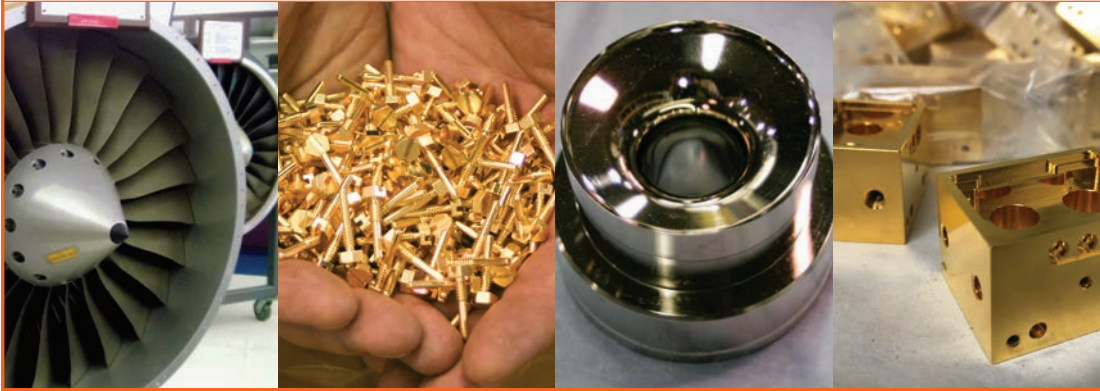
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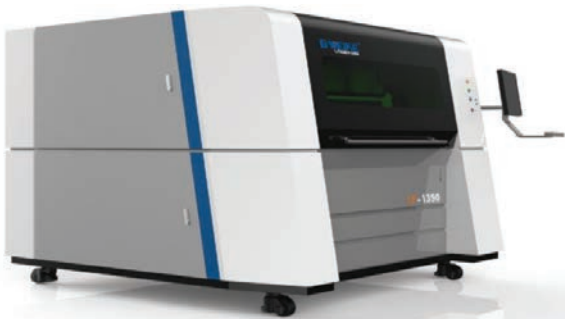
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What's Good for the Environment is Good for Business

Hutchinson's energy conservation program reduces its carbon footprint and boosts employee engagement at Ithaca plant

Hopkinton, MA — Committed to pledges made in Paris in 2015, Hutchinson Aerospace & Industry, Inc., a world leader in the development of unique and custom mounting solutions, is working to reduce emissions and act sustainably for the planet and future generations. With a goal for all its plants to receive an ISO 50001 International Energy Management Certificate by the end of 2025 and be carbon neutral by 2050, the company is making great strides, especially at its Ithaca, Michigan plant.

“Our Ithaca team has embraced every facet of our environmental sustainability roadmap,” said Bob Anderson, EVP of Hutchinson Aerospace and Industry, Inc. “Not only did we achieve a 17 percent reduction in carbon emissions in 2022 with an additional 15 percent reduction in 2023, but we reduced our electricity usage by an average one million megawatt hours per year, year on year. These results were driven by the replacement of inefficient equipment and a supportive team of employees energized by the positive outcomes we want to achieve.”

To improve efficiency, Hutchinson's Ithaca plant has made the following changes:

- **Removed inefficient presses:** Six inefficient presses were removed from the plant since mid-2020 and replaced with three new, energy-efficient presses.
- **Streamlined the phosphate line:** Manufacturing orders are now scheduled based on optimal lot size, requiring fewer hours of operation. The schedule for aluminum was reduced to one day per week to allow the heat to be turned off for two stages for the remainder of the work week.
- **Adjusted its weekend schedule:** The production schedule was changed from the plant operating every Saturday with a partial crew to every other Saturday with a full crew.
- **Staggered start-up:** Equipment is now started based upon the schedule, and there is strict adherence to policies to shut down equipment when the schedule is complete.

- **Upgraded HVAC Units:** In November 2021, office HVAC units were upgraded to high efficiency units.

The press replacement alone delivered nearly \$35,000 in savings, between a reduction in electricity costs and utility rebates.

“Before starting on our sustainability roadmap, no one really considered energy something that was being wasted,” said Brandy Dufrene, Hutchinson’s Ithaca plant manager. “Now everyone understands our company goals and has become aware of all the different things we can do to conserve energy, not just here at the plant, but also in their daily lives. We’ve been able to achieve results beyond our goals by not just replacing inefficient equipment but also looking at continuous improvement opportunities within our existing processes and equipment.”

In October, Hutchinson’s Ithaca plant participated in Sustainab’ALL Day. The company-wide observance provided an opportunity to communicate with employees about the conservation initiatives and served as a springboard to get the team thinking about what else they could do to reduce energy consumption to achieve Hutchinson’s corporate goal of becoming a sustainable company.

“We stopped all plant activities to provide all employees an opportunity to participate in small round table discussions,” added Dufrene. “We presented what we had done for sustainability over the past few years. Then we asked employees what else they thought we could do to reduce our carbon footprint. The teams generated 78 continuous improvement ideas that are now part of what we work on every single day.”

Dufrene applauded the Ithaca plant team, crediting the employees’ enthusiastic dedication to the conservation program for its success to date. “Their hard work is what helped us achieve ISO 50001 certification,” she concluded.

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Todd E. Lizotte, President & CEO of Bold Laser Automation, stated, “As a CEO, I firmly believe that innovation and safety should always go hand in hand. Our new business unit offering Class 1 Division 1 electrical controls cabinets and sensor arrays, compliant with NEFA 496 codes for Electrical equipment in hazardous areas, represents our commitment to providing cutting-edge solutions that prioritize the well-being of our customers and their environments. We understand the critical importance of ensuring the highest standards of safety in these hazardous settings, and our products are designed to not only meet but exceed these standards, offering peace of mind and reliability to industries operating in challenging conditions.”

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the ignition of flammable atmospheres.

Meeting NFPA 496 Standards

Our electrical control cabinets and distribution cabinets are meticulously designed and constructed to meet the rigorous criteria laid out by NFPA 496. This standard outlines the specific requirements for purging and pressurization systems used in hazardous locations. Bold Laser Automation takes pride in exceeding these standards, ensuring that our solutions comply with regulations and deliver a superior level of safety and reliability.

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At the core of our offerings lies our expertise in purging and pressurization. We understand that any spark or heat source can be catastrophic in Class 1 Division 1 and Division 2 environments. Bold Laser Automation, electrical control cabinets, are equipped with state-of-the-art purging systems that eliminate any flammable gases or vapors within the enclosure before energizing the equipment. This proactive approach significantly reduces the risk of ignition.

Enhancing Manufacturing Tools and SCADA Control

Our electrical control cabinets are not just about safety but also integral to optimizing manufacturing processes and SCADA control. With seamless integration into manufacturing tools and SCADA systems, our cabinets empower industries to operate efficiently and with complete control, even in hazardous environments. This allows for real-time monitoring, data acquisition, and automation, increasing productivity and reducing downtime.

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Bold Laser Automation incorporates advanced sensor systems within our cabinets to enhance safety and precision. These sensors continuously monitor various parameters, including temperature, pressure, and gas concentration, providing instant feedback to operators and control systems. In case of any deviations from safe conditions, our systems can automatically initiate purging or shutdown procedures, ensuring a rapid response to potential hazards.

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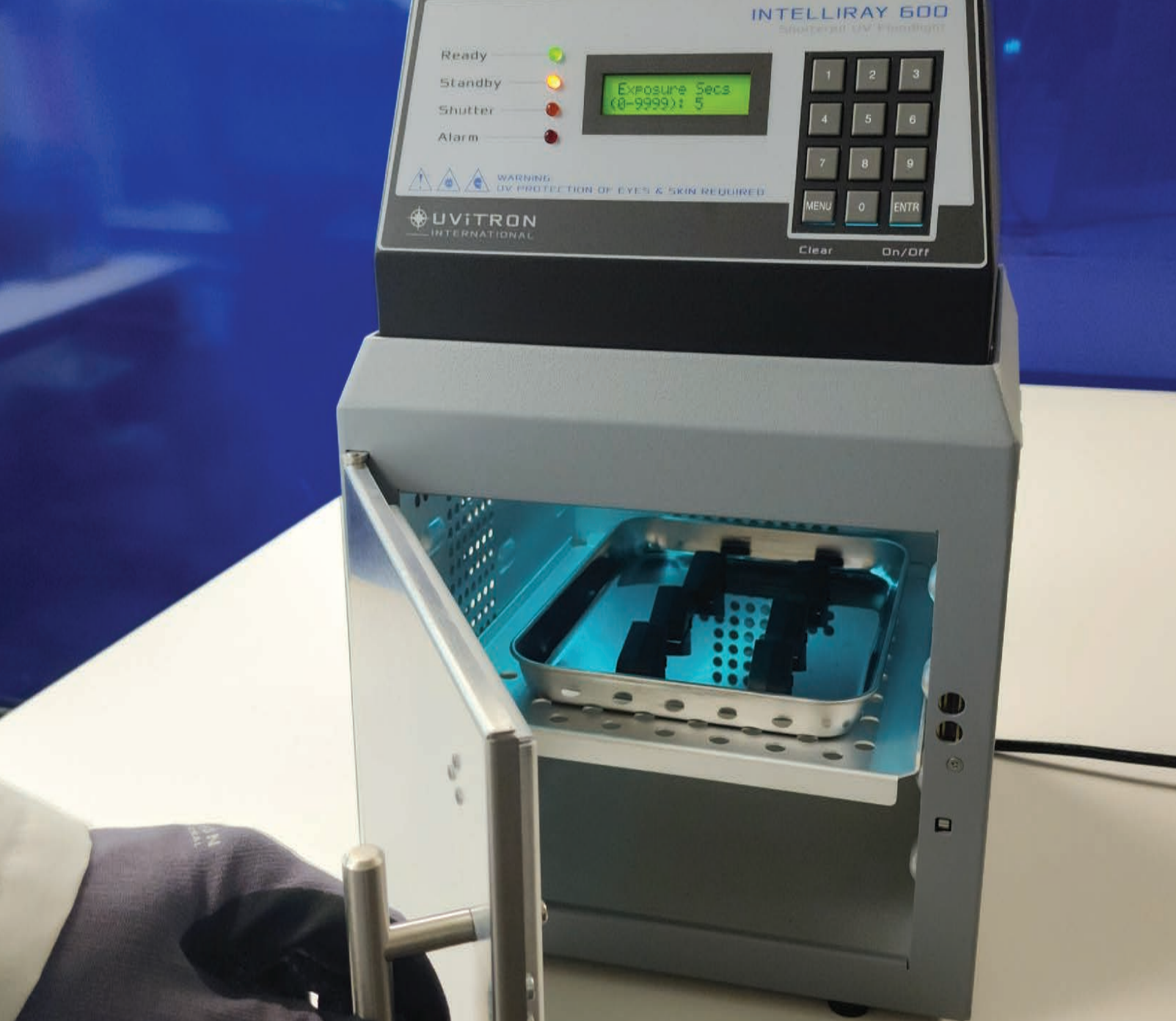
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