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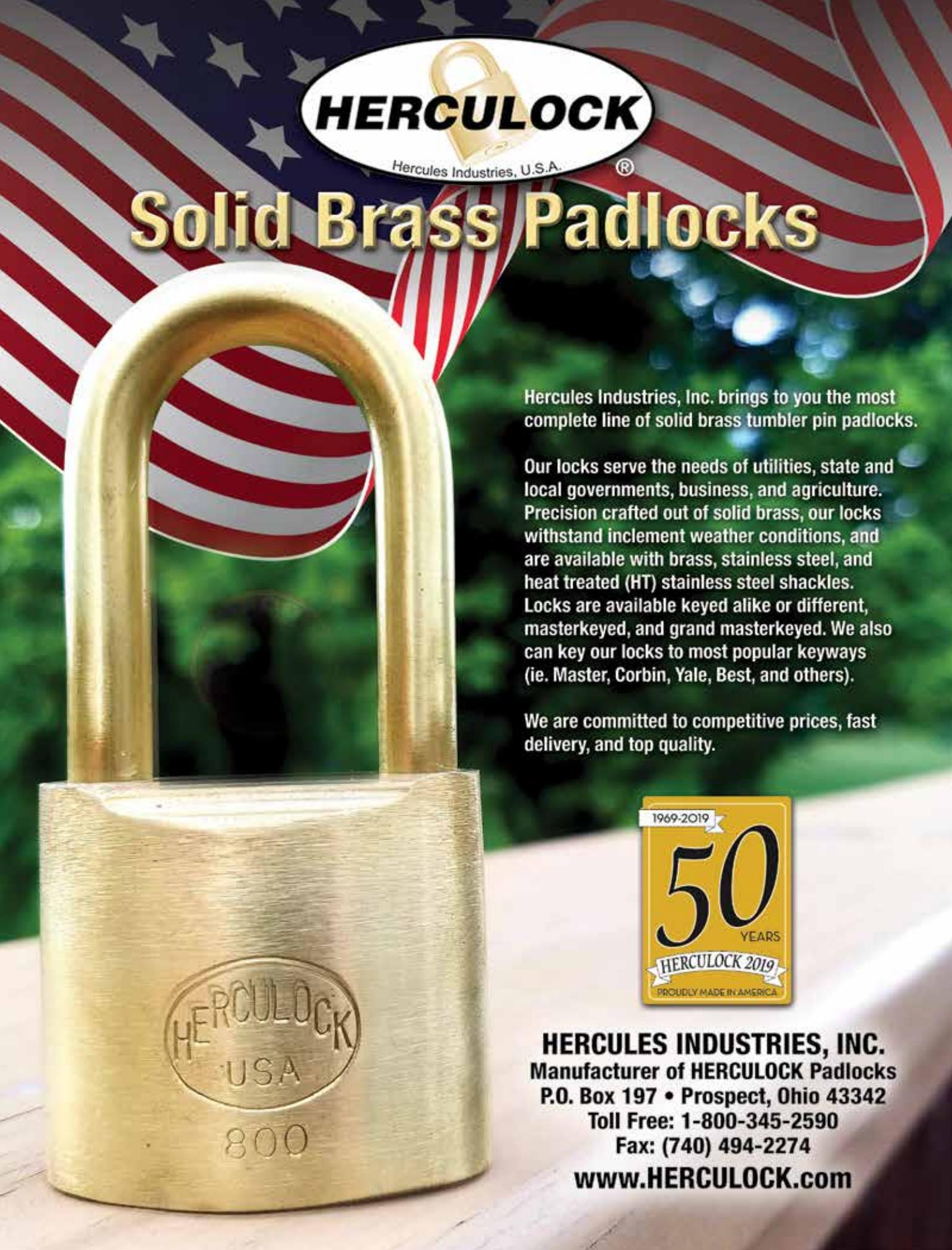
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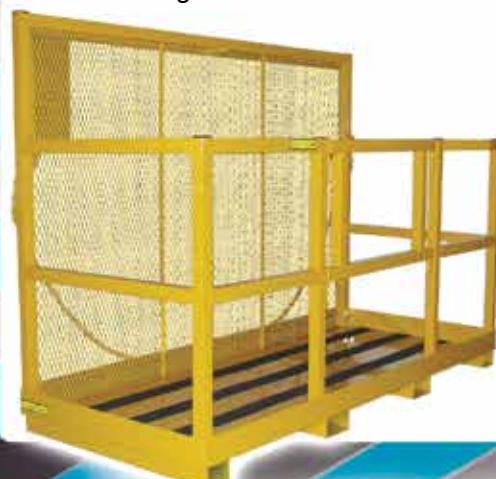
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# AMADA MIYACHI AMERICA Announces its Sigma Stent and Tube Cutting System won a 2018 GOOD DESIGN® Award



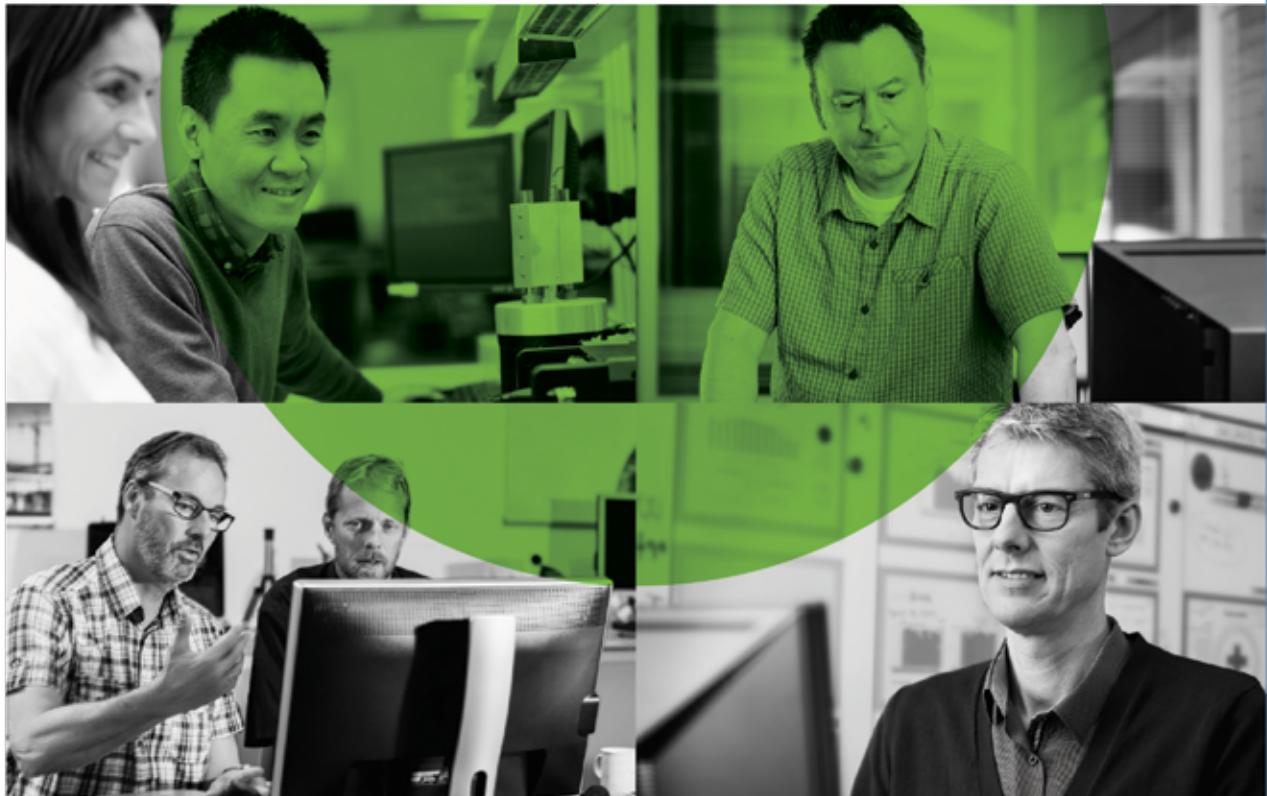
*Design recognized for offering best of class engineering performance, ease of use, and durability*

Amada Miyachi America, Inc., a leading manufacturer of welding, marking, cutting, sealing, bonding, and micro-machining technology, announces that its Sigma Stent and Tube Cutting System recently won a prestigious 2018 GOOD DESIGN® Award. The award-winning product features precision fiber and femtosecond laser cutting and microprocessing capabilities for stents and medical tubes.

The Sigma Stent and Tube Cutting System is recognized for its increased accuracy in laser cutting of micrometal tubing, allowing for greater precision and smaller features in the production of stents and other medical devices. "The team was challenged to fit a new class of laser cutter into a smaller footprint, while offering best-in-class engineering performance, ease of use, and durability," said David Fawcett, Amada Miyachi America's President & CEO. "The result is the new Amada Miyachi Sigma Stent and Tube Cutter, which provides an improved user experience and upgraded ergonomics by integrating industrial design and aesthetics into a holistic package."

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GOOD DESIGN® is the world's most prestigious, recognized, and oldest Design Awards program, organized annually by The Chicago Athenaeum Museum of Architecture and Design, in cooperation with the European Centre for Architecture, Art, Design and Urban Studies. The trademarked award program was founded in Chicago in 1950 by architects Eero Saarinen, Charles and Ray Eames, and Edgar Kaufmann, Jr. This

year, the Museum received a record number of submissions from the world's leading manufacturers and industrial and graphic design firms, representing the most important and critical mass of influential corporations in the design industry from over 47 countries.

The Sigma Stent and Tube Cutting System's high speed linear motors and its latest generation digital controller minimize tool path cycle time. Process-matched

ultrashort pulse lasers enable fast, stable, and high quality laser microcutting capabilities with minimized post-processing requirements, and optional single mode fiber lasers offer thick metal cutting versatility in the same system platform. An operator-oriented system design maximizes the ease of use, efficiency, and comfort. As part of the system delivery, Amada Miyachi America application engineers will develop and optimize the process that is supplied at no extra cost.

The Sigma Stent and Tube Cutting System can be configured to accommodate a wide variety of stent and tube cutting applications. For maximum production throughout, an automated tube loader is optionally available enabling a range of tube diameters and lengths to be fed continuously into the system. A large, all-in-one graphical user interface offers a full view of machine status and provides efficient, intuitive control over system functionality via touch panel operation.

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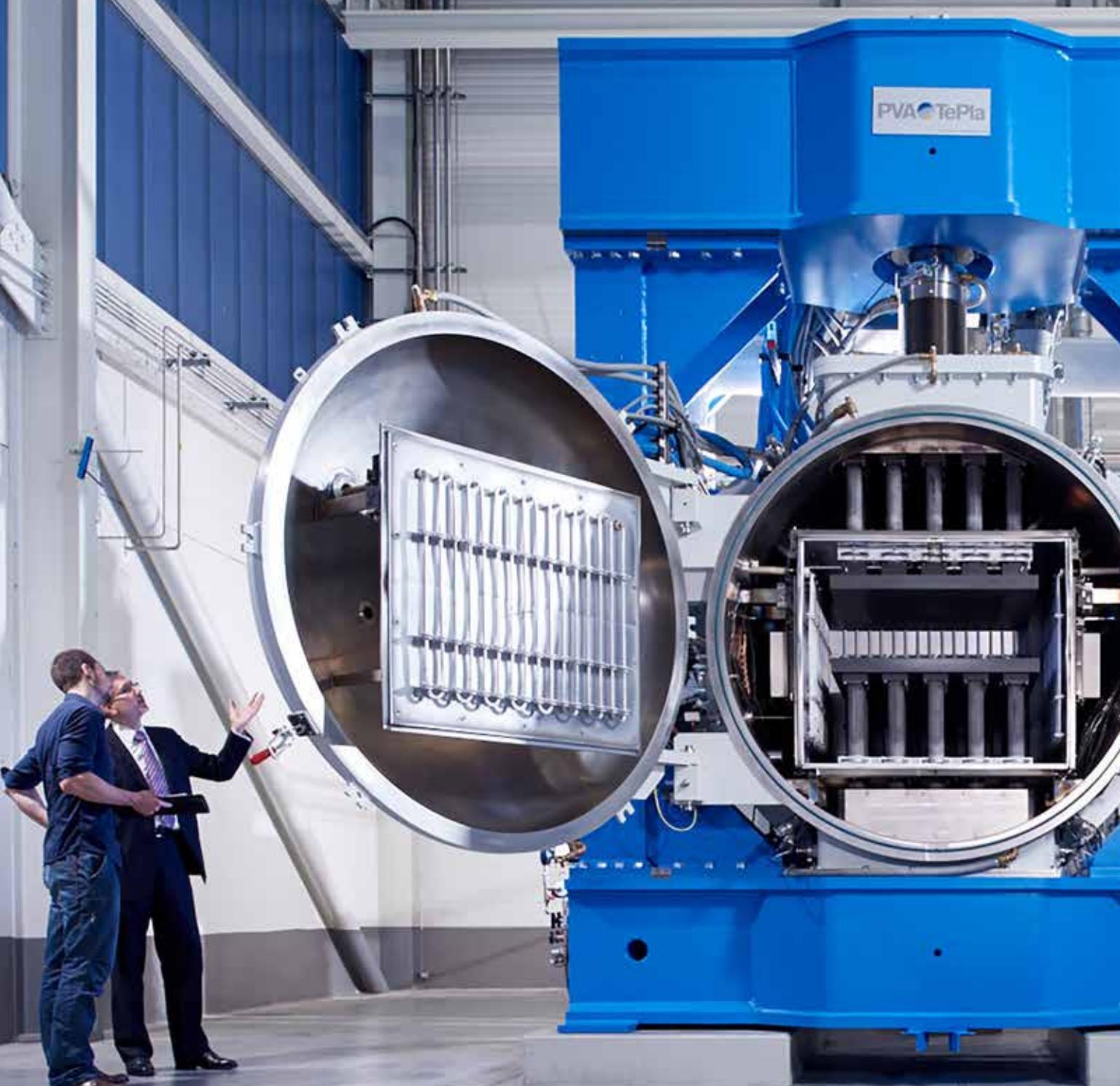
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# Perfecting Diffusion Bonding

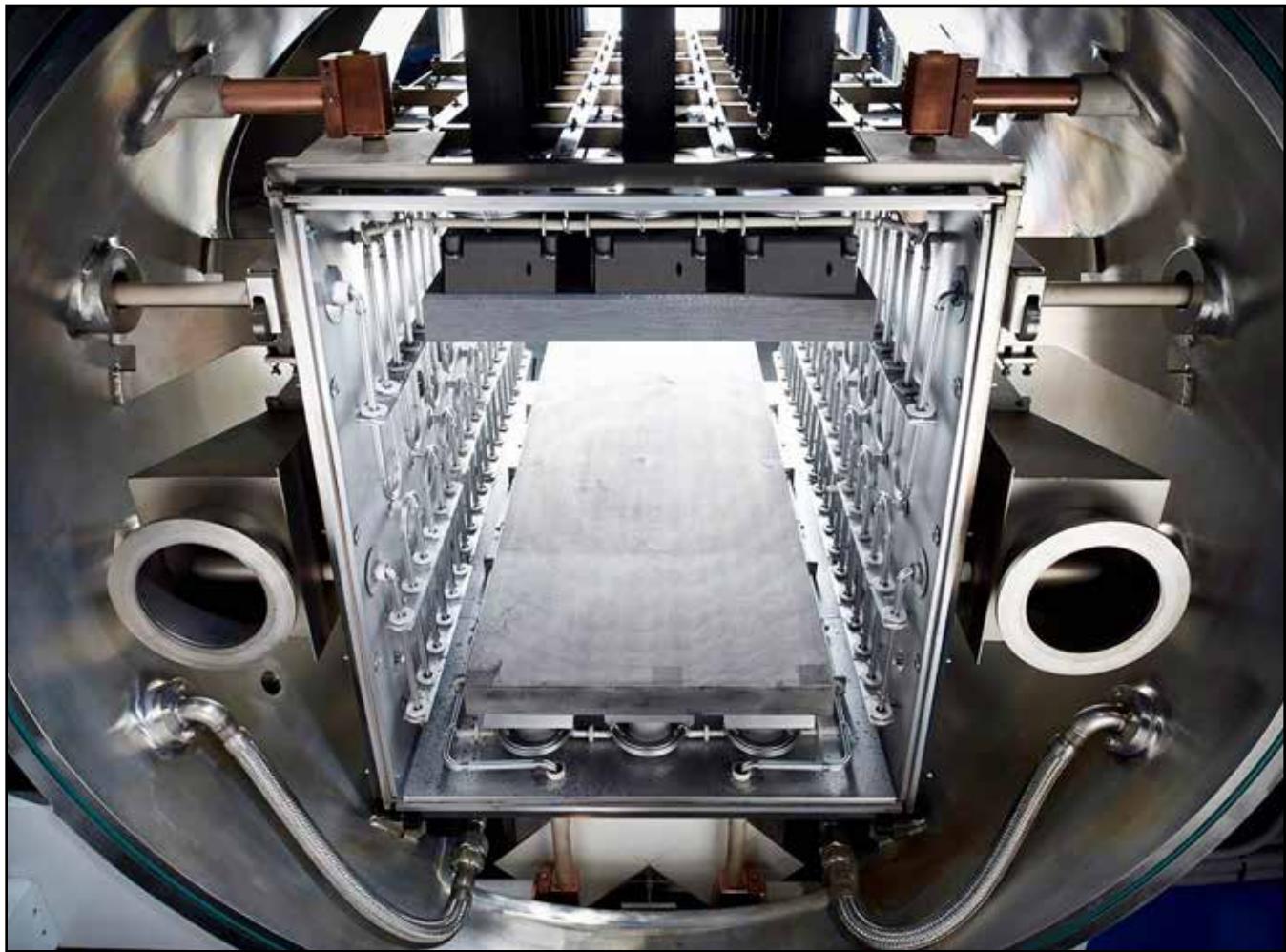
*Specialized furnaces with integrated presses provide superior control of pressure and temperature to create better diffusion bonds when joining similar or dissimilar metals*

For many years, diffusion bonding has been utilized to join high strength and refractory metals that are either difficult or impossible to weld by other means. The process, which involves applying high temperature and pressure to similar or dissimilar metals mated together in a hot press, causes the atoms on solid metallic surfaces to intersperse and bond.

Unlike traditional brazing techniques, the resulting bond exhibits the strength and temperature-resistance of the base metals. It also eliminates the need for filler material that affects the final weight and dimensions of the mated metals.

Despite its benefits, the use of diffusion bonding has been limited by more practical considerations. Specifically, the size limitation of the furnace chamber as well as limits to the amount, and uniformity, of the pressure applied across the entire surface area of the part. Run times are also long, often





lasting a full day.

Now, advances in high vacuum hot presses used for diffusion bonding are eliminating many of those constraints.

More advanced equipment now provides superior pressure control, feedback from embedded pressure transducers, physical ink tests that show variations in pressure across the surface and rapid cooling systems to improve the bond, increase yields and significantly increase cycle time.

This has ramifications for an increasing number of industries. Diffusion bonding is already used to create intricate forms for the electronics, aerospace, and nuclear industries for items such as fuselages, actuator fittings, landing gear trunnions,

nacelle frames and nuclear control rods.

Today, however, it is increasingly being utilized for new applications for products ranging from turbine blades to medical devices, heat exchangers and even lithium batteries.

Typical materials utilized in these products that are welded by diffusion bonding include stainless steel, titanium, zirconium, beryllium, high alloyed aluminum, Inconel and tungsten. The process is also used to weld dissimilar metals like copper to titanium, copper to aluminum, copper to tungsten and even Molybdenum to aluminum.

The process is now also being utilized for a revolutionary additive manufacturing process called Laminated Objection Manufacturing (LOM). In this

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approach, thin 1-2 mm sheets of metal are bonded in what is essentially an additive process.

The layered sheets can be laser cut so that when combined together create cooling channels, for example, used to dissipate heat. The final “sandwich” with all its layers can then be machined using traditional CNC turning and milling equipment, if needed.

### **Heat Treatment Furnaces with Integrated Presses**

Because diffusion bonding is a product of heat and pressure, the heating elements and integrated hydraulic press play a key role in the quality of the final join.

For the atoms of two solid, metallic surfaces to intersperse they typically must be at approximately 50-70% of the absolute melting temperature of the materials. To achieve these temperatures, the surfaces are heated either in a furnace or by electrical resistance to temperatures as high as 1400°C.

The pressure is applied by a hydraulic press or dead weights. Because the two mating pieces must be in intimate contact with each other, fixtures are often used. Once clamped, pressure and heat are applied to the components, usually for many hours.

Since oxidation can also affect bonding, most heat treatment furnaces operate under a high vacuum.

### **More Precise Controls**

While these are common elements of the process, the missing piece to date has been precise control of each.

In the case of the pressure applied, for example, integrated single cylinder hydraulic presses can apply a consistent, measurable amount of force,

but this provides very little control over large parts with more complex geometries.

To compensate, thick graphite pressing plates (10"-15" in height) must be used to mate the layers of metal together at a more consistent pressure. Unfortunately, this takes up furnace space while adding to the time to heat up the surfaces of the metals.

Today, however, leading manufacturers such as PVA TePla of Corona, California, offer multi-cylinder systems with large pressing plates that can accommodate a variety of parts. The largest, the company's MOV 853 HP can process parts as large as 900mm (35.43") x 1250mm (49.21"), which is quite large for diffusion bonding. The pressing force is 4,000 kN.

By controlling each cylinder independently, the integrated press provides extremely consistent pressure across the entire surface. The MOV also comes with built-in pressure transducers along the bottom of the pressing plate. Based on the readings, the individual hydraulic cylinders can be adjusted to achieve uniformity even over large areas.

PVA TePla has optimized a physical ink test method that can be performed to identify areas on the part where uneven pressure is being applied.

For greater temperature uniformity, the MOV system utilizes six heaters for temperature uniformity within the chamber, instead of the usual one or two, for a maximum operating temperature up to 1,400°C. Rapid cooling quickly brings temperatures down so parts can be removed in about half the time without risk of cracking or other damage.

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fixturing plates (less than 3") can be used, freeing up space in the furnace and allowing for increased cycle times due to faster heating of the surfaces to the desired temperatures.

### Laminated Object Manufacturing (LOM)

Today the diffusion bonding process is being used for a new additive technology called Laminated object manufacturing (LOM). This has tremendous potential applications for conformal cooling.

Parts are designed using traditional 3D- CAD modeling programs, then divided into 2 layer sections that equal the thickness of each sheet of metal.

The processing time is similar to 3D-printing with a similar investment cost. However, larger parts, with no restriction in regard to materials, can be produced.

One prime example of the additive process of diffusion bonding is for heat exchangers, which are usually made from aluminum. Blend circuit heat exchangers are typically made of stainless steel or even titanium and titanium alloys.

With LOM, the concept is to bond layers of sheet metal that contain machined micro-channel structures. When combined, the channels can provide for cooling or heat dissipation. The layers can be bonded up to a height of 600mm in the MOV diffusion bonding press retaining the strength as the parent materials.

Another application related to conformal cooling is for plastic injection molds made in 2-layer designs of tool steel and material such as stainless steel (STAVAX).

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With the multi-layer LOM design, more complex cooling channel designs can be incorporated into injection molds, allowing for higher pressures to be used. This significantly decreases cycle times as much as 40% while enhancing product quality.

#### Next Gen Applications

Whether applied in layers or simply to bond two parts, the diffusion bonding process is an ideal process for joining refractory and other high strength alloyed materials together without the need for brazing.

Although it has been around for decades, with more precise control of temperature and the uniformity of pressure across large parts, diffusion bonding opens up tremendous possibilities for a variety of next generation products.

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In a continuing effort to ensure optimal and sustainable screening equipment processes and productivity, Midwestern Industries, Inc. (Massillon, OH), a leading manufacturing mainstay of innovation for the screening industry since 1953, has recently expanded its advanced, full-scale screening test facility capabilities for customers—FREE of charge.

Comprised of over 10,000 Sq. Ft. of Midwestern's manufacturing headquarters (147,000 Sq. Ft.), the Midwestern Materials Testing Lab is an invaluable testing facility platform—considered one of the best tools for customers to make informed decisions about their screening processes. Ultimately, end-users can use the facility to gain vital quantitative data into their screening processes via running 'real-time', full-scale material tests for new applications, as well as improving on existing ones.

Midwestern is the industry's only screening company to provide testing to this scale with production size equipment—at no charge other than the cost of sending in a 55-gallon drum of material to be test screened or separated. Once the material is tested, fast, reliable, and accurate results are provided to tell them which machine performs best and how efficiently it can run their material (i.e., tons per hour, etc.). Conclusively, this data provides vital screen processing insight to maximize bottom-line productivity.

**SCREENING MATERIAL / TEST PARAMETERS:** The driving goal of the Testing Lab is to facilitate uniquely sustainable screening material testing for a myriad of processing industries including: Pharmaceutical, Food & Beverage, Chemicals, Waste Water, Shot Peening, Plastics, Roofing Granules, Ceramics, and Powdered Metals, amongst others.



# 'Real-Time' Screen Test: Midwestern Materials Testing Lab Creates 10,000 Sq. Ft. Facility To Optimize Screening Productivity.

A staff of Midwestern screening professionals work with clients to make sure the desired piece of equipment will do exactly what it is meant to do and accomplish their screening goals—thus taking the guess work out of it to ensure the quality of size and type of equipment before they buy it.

Feasibility tests are done on all types of major machines (round, rectangular, etc.) by running samples of aggregates and fine powders from 20 microns and up. Product batches and super sack tests are also run to see if screening will make sense to meet the optimal standards set forth by the end-user.

Midwestern professionals are available to go over the testing procedure and maintain constant contact with customers during the process—either on-site or via a GoPro video provided by Midwestern, along with a pa-

per copy of sample test results. Midwestern also keeps an archived library of 'blind/confidential' test result video samples to streamline end-user education.

**SCREENING TEST / SIMPLE PROCESS:** Midwestern's hands-on and experienced staff is geared to make their FREE Testing Lab experience as simple as possible by contacting a Midwestern Sales & Service Screening Consultant (877-4-SIZING), or by following a few simple steps including:

Fill out a Screening Questionnaire: A simple screening questionnaire provides valuable insight into what end-users are trying to accomplish. Complete the form and attach it to the material:

<https://www.midwesternind.com/pdf/Screening-Questionnaire.pdf>

**Send in Material:** Typically, a 55-gallon drum of material is recommended to be screened or separated. However, some tests can be run with a five-gallon bucket. Material must be sent prepaid.

**Run Test:** Tests are conducted on both rectangular screeners and round separators with the ability to change screen sizes quickly and efficiently. End-users can be in attendance while the tests are being run, which will provide the opportunity to best understand the screener's performance, as well as make adjustments quickly.

**Review the Test Data:** Once the tests are completed, several result sheets are generated from the findings. Sieve analysis, rate sheet, and percentages of throughput, etc. are calculated and immediately made known to the end-user. A Midwestern's sales professional will review the results in detail with them and then make equipment recommendations or other suggestions.

**MIDWESTERN MATERIALS TESTING LAB / CONCLUSION:** As technology advances, Midwestern Industries

continues to invest in the future—and the evolving advancements of the Midwestern Materials Testing Lab are a next-generation testament to this philosophy. In place since 1975, most clients take advantage of the lab's value-added benefits to help ensure their quality standards and realize productivity goals.

Set up a FREE materials screening test by calling: 877-4-SIZING (877-474-9464) or visit: [www.midwesternind.com](http://www.midwesternind.com)

A brief overview of the Midwestern Materials Testing Lab can also be viewed on YouTube at:

[https://www.youtube.com/watch?v=hou\\_CtU8x-c&feature=youtu.be](https://www.youtube.com/watch?v=hou_CtU8x-c&feature=youtu.be)

**CORPORATE PROFILE:** Since 1953, Midwestern Industries, Inc. has been a mainstay of innovation for the screening industry, delivering customized manufacturing and design solutions for a myriad of processing industries including: Pharmaceutical, Food & Beverage, Chemicals, Aggregates, Shot Peening, Plastics, Brick and Clay, Ceramics, and Powdered Metals, amongst others. Known throughout the industry as

"The Sizing People®", Midwestern's comprehensive product line offers advanced application solutions for handling coarse, fine, wet, and dry materials with the ability to screen and separate particles from 20 microns and up. We achieve these demanding standards by leveraging advanced precision manufacturing screening techniques and accessories that drive productivity.

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*Editorial & Photo Contact: Ray Farrar / Method Media LLC / 216.861.0862 / rayf@methmedia.net*

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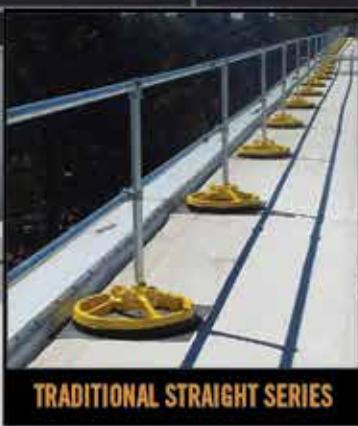
[www.midwesternind.com](http://www.midwesternind.com) •

The graphic features a blue header with "COMPANY SPOTLIGHT" and "HELPING CONSTRUCTION COMPANIES STAY DAVIS-BACON COMPLIANT". Below this is a portrait of Woody Chamberlain, President, wearing a suit and tie. To his right is the company logo, "eMARS INC", with a search icon above it. A profile text box states: "Profile: eMars / Compliant Client is an easy to use web based software that makes it easy for construction companies' payroll to be compliant with the Davis-Bacon Act of 1931." Another text box below says: "This unique paperless system encrypts all employee information, offering an 80% time and labor savings over hand preparation. Weekly payroll can be run in 7 minutes." At the bottom, there is contact information: "President: Woody Chamberlain Ph: 480-595-0466 Web Site: [emarsinc.com](http://emarsinc.com) Email: [Woody.Chamberlain@emarsinc.com](mailto:Woody.Chamberlain@emarsinc.com) Area Served: United States" and the "Compliant Client by eMars" logo.

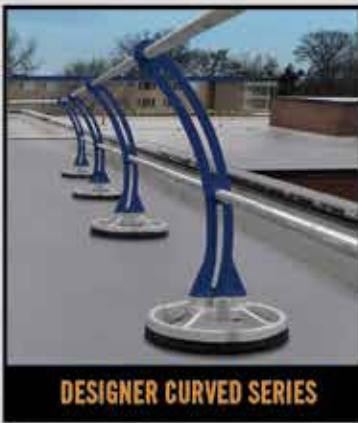
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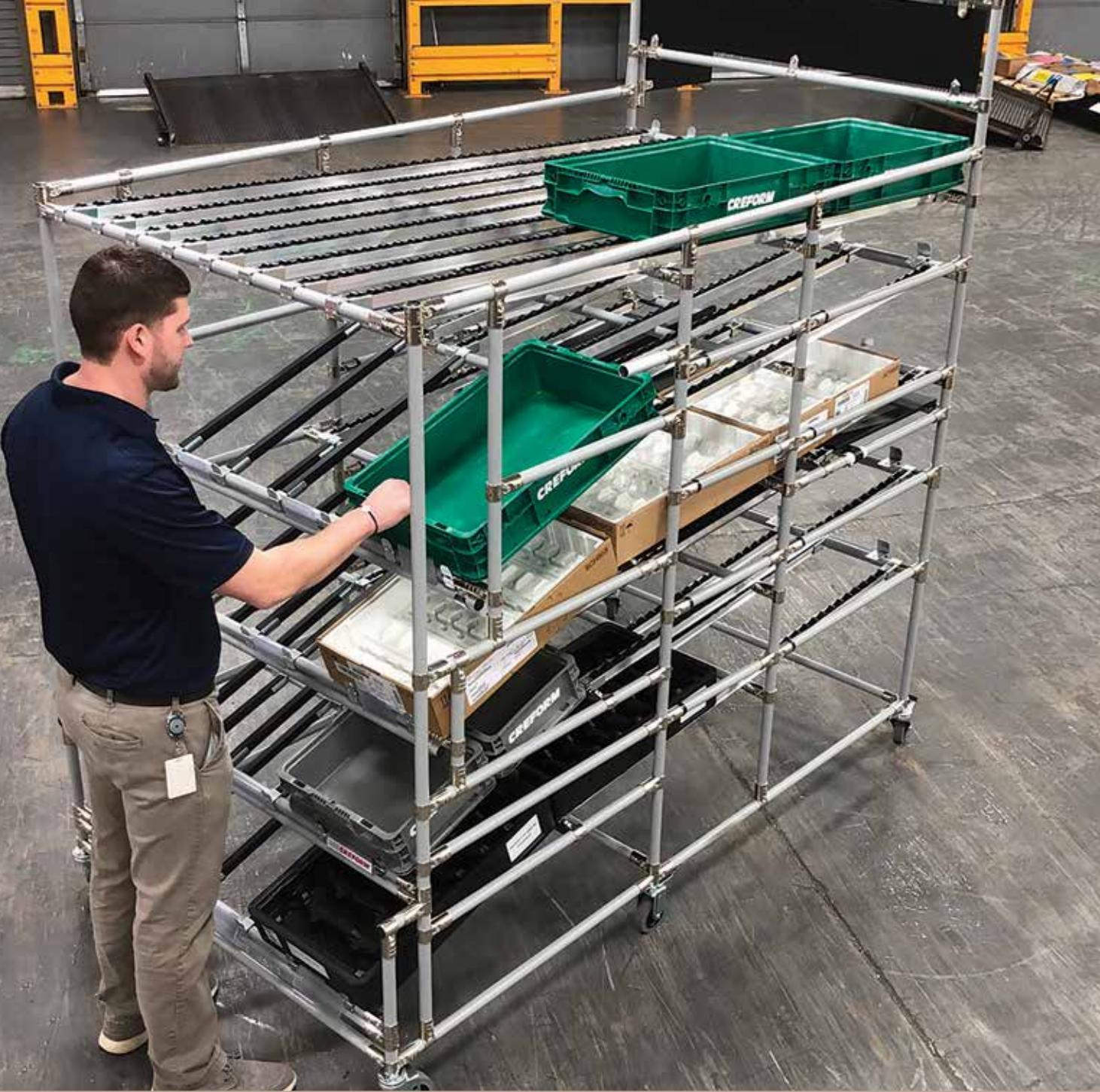
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tion. Each of the four levels feature three lanes, while the top level allows the empty container to be returned to the service aisle. The flow rack is built with ESD light gray pipe and nickel-plated metal joints per the assembler's anti-static requirement. Each of the flow rack's lanes feature Creform's ESD skatewheel conveyor rollers.

The rack's lanes feature physical separators on both sides so that the boxes are contained and separated as they flow smoothly. Each supply lane features an extra angle at the picking position for enhanced view and for easier component selection. Label holders for each lane are included for the front and back to ensure accurate loading and accurate picking.

With the stair-stepped design, each level can be raised or lowered without changing the length of the conveyor. This greatly simplifies adjustment when needed. The rack and its levels can be repositioned with simple tools.

The supply lanes feature an EF-2018 pivoting stop (an anti-back device). This simple gravity "stopper" allows material to be loaded in without impediment then automatically flips up to keep the container securely in the lane. The swing arm of the EF-2018 rests in the up position via gravity. The flow rack features six heavy duty stem casters, which allows for ease of movement and relocation. It features two fixed casters for directional control.

The dimensions of the flow rack pictured are 70" Tall x 77" Deep x 46" Wide and is designed to hold up to 800 lb.

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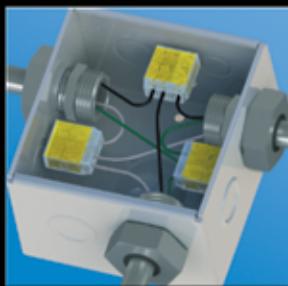
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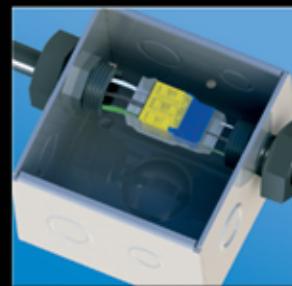
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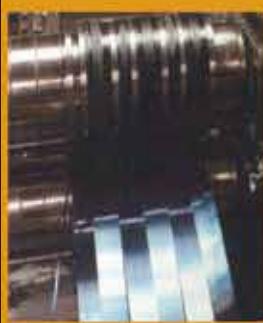
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