

Today's Industrial Products & Solutions™

The Complete Purchasing Guide for Today's Industrial Market

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**Switching to Cast Polyurethane
Parts for High Impact, High
Wear Applications**

**Extending the Life of
Precision Components in
Demanding Applications**

**Guard-Safe Guarding
Five Easy Steps to Successful Machine Guarding!**

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TIPS CONTENTS

- PG 4 Switching to Cast Polyurethane Parts for High Impact, High Wear Applications
- PG 12 Guard-Safe Guarding is a Total Solutions Guarding Company
- PG 16 ASF Metrology to Acquire Nikon Metrology's Coordinate Measuring Machines Business
- PG 18 Guard-Safe Guarding- 5 Easy Steps to Successful Machine Guarding!
- PG 20 About Safety Through Engineering
- PG 22 Handle Four Drums at Once for High-Volume Drum Handling
- PG 24 Howden American Fan Company Announces AF Cast Aluminum Pressure Blowers
- PG 26 Company Profile: Regscan
- PG 28 Extending the Life of Precision Components in Demanding Applications
- PG 38 Company Profile: Jesco
- PG 40 Ad Index

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Switching to Cast Polyurethane Parts for High Impact, High Wear Applications





High-performance polyurethanes combine the advantages of plastics, metals and ceramics with resiliency of rubber parts

Although design engineers have traditionally specified parts made of rubber, plastic, or steel when durability is required, many are considering a new alternative for the most demanding, high-wear, abrasion and impact applications: cast polyurethanes.

Cast polyurethanes, also broadly referred to as urethanes, are tough, elastic materials that combine many of the performance advantages of high-tech plastics, metals and ceramics along with the resiliency and flexibility of rubber parts.

Unlike its closest counterpart, rubber, which is prepared as sheets or loaves before being molded in a high pressure press, urethanes can be poured as a liquid mixture into less expensive, low pressure molds. Using this technique, complex mold cavities can be filled without high-pressure molds and presses.

This provides a multitude of advantages, not the least of which are lower tooling and production costs than both rubber and plastic molding, and lower material cost than metals and ceramics.

In terms of performance, cast polyurethane parts are often lighter in weight than ceramics or metal alternatives and are not brittle and will not crack like plastics under stress or extreme temperatures.

To be sure, cast polyurethane parts are not new. Nonetheless, awareness of the potential for this type of material has largely remained under the radar. This can be attributed to several factors, not the least of which is a general lack of understanding of the options and formulations.

One does not simply specify a polyurethane part, for example. There are many formulations – some proprietary – that can be used to manipulate a range of variables such as hardness, resilience, spring rate, and chemical resistance.

For this reason, design engineers interested in a



possible switch to polyurethane from plastics, steel, ceramic or rubber parts are often best served by seeking out the assistance and guidance of experts in urethane formulation.

Customized Urethane Parts in Action

When a Dutch ship builder required a new slipway liner that could absorb the impact and abrasion of a speedboat exiting and entering its offshore patrol vessel through a rear bay, for instance, it selected a specially formulated polyurethane from Argonics, one of the U.S.'s largest producers of wear-resistant urethane products, over other materials.

The urethane liner replaced a nylon plastic liner, which tended to damage speedboats because it was too hard, according to Lars Muller, owner of Muller-Beltex, a Netherland-based parts distributor to various industries, who was involved with the project.

“The liner had to resist impact, abrasion, seawater, and UV exposure yet allow the speedboat to slide in and out of the bay without damaging the speedboat or the patrol vessel,” says Muller.

To maximize durability and cushion the impact of the speedboat entering and exiting the offshore patrol vessel’s rear bay, Argonics collaborated with the Dutch shipbuilder and Muller-Beltex to engineer a urethane slipway liner comprised of two layers of material each with a different durometer, a measure of hardness.

According to Muller, Argonics came up with the idea of creating a dual durometer liner to better withstand the inevitable wear and impact.

“The urethane’s harder top layer has more resistance against cutting and tearing, while the bottom layer is softer to better withstand the impact of the powerboats,” says Muller.

He adds that Argonics’ expertise in

urethane formulation helped to optimize the material for the necessary characteristics, while creating strongly bonded layers that would not separate.

“With their expertise, along with CAD, Solidworks, and prototyping capability, they can design a part in urethane to match any other substance or requirement,” says Muller.

Continued collaboration between the three companies has resulted in additional product refinements.

“We recently beveled the slipway liner’s edges to ensure that no seawater or sand can get behind it,” says Muller. “We also hardened the urethane at the bolt holes to better hold the screws and attachments where they fit the liner. To ease installation in the field, we added countersunk areas in the liner to match the exact positions of the part’s countersunk boreholes.”

“With urethane, you can combine strength, resilience, and lifetime durability in one product,” adds Muller. “The end user is very enthusiastic about the slipway liner. The application is now fully accepted by the shipyard and a standard product in their ship line.”

Proprietary Formulations

Although urethane producers can create customized formulations to accommodate varying characteristics such as hardness, resilience, and spring rate, some also have



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developed proprietary formulations.

Double L Global, an Idaho-based potato farming equipment manufacturer, for instance, relies on a proprietary performance-based polyurethane formulation from Argonics called Kryptane for components used to clean and sort potatoes. This includes gentle rollers, rotating cleaning stars, and rugged, load bearing parts.

“The urethane parts we use range from soft and pliable for gently handling potatoes to very hard load bearing components,” says Roy Withers, an engineer at Double L Global.

Kryptane is an extremely wear-resistant material for applications

where sliding, impact, abrasion, or corrosion occurs regularly. Examples include impact-and abrasion-resistant plates; blasting curtains and screens; chute, bin and hopper liners; pipe, fitting and valve liners, vibration pads, seals and gaskets; as well as truck bed liners, wheel chocks and crossover pads.

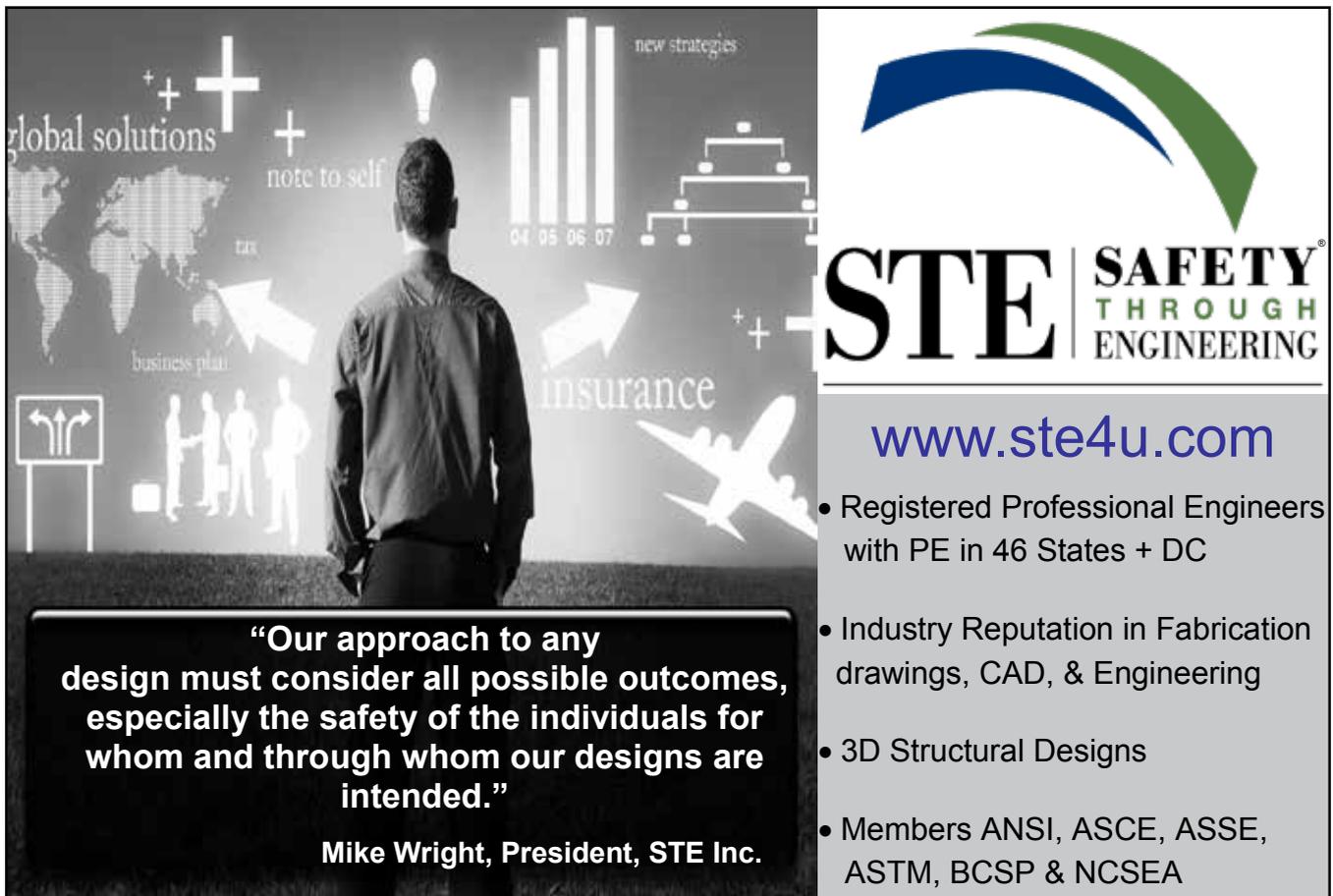
According to Withers, Double L Global utilizes the proprietary urethane for a recently developed, component designed to sweep product off a conveyor path.

Previously, the component consisted of an integrated polyurethane paddle and a torsion spring. However, often issues would arise with the integrated paddle spring because the springs were inconsistently wound,

causing the component to look aesthetically askew. The misalignment also often meant costly rework.

To create a more aesthetic and streamlined part, Withers asked the company if the performance requirements of the torsion spring could be achieved by making the entire part made from polyurethane.

In order to achieve the desired spring performance, Withers felt the two design variables he could use were the cross sectional area of the part and the durometer of the urethane. Initially, Withers measured the metal spring’s spring rate in an attempt to match performance requirements. He then developed a design with a specifically



The advertisement features a central image of a man in a dark shirt standing with his back to the camera, looking at a large, semi-transparent screen. The screen displays various business-related icons and text: a world map with 'global solutions', a lightbulb with 'note to self', a bar chart with 'new strategies' and years '04 05 06 07', a flowchart, 'tax', 'business plan', 'insurance', and an airplane. To the right of the man is the STE logo, which consists of a blue and green curved shape above the text 'STE | SAFETY THROUGH ENGINEERING'. Below the logo is the website 'www.ste4u.com' and a list of services and memberships.

“Our approach to any design must consider all possible outcomes, especially the safety of the individuals for whom and through whom our designs are intended.”

Mike Wright, President, STE Inc.

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calculated cross-section. The company delivered four different polyurethane prototypes, with the calculated cross section and with different material durometers.

Double L Global then physically tested the prototypes by seeing how much force it took to bend each and

how far it would deflect. After a few iterations, the correct durometer and cross section was identified and the urethane part went into production.

“Argonics helped to improve the reliability and consistency of the sweep’s design by integrating the spring into the urethane,” said Withers. “Now, there is no metal spring – it’s all one piece.”

Withers said that the sweep component is designed to be stiff enough to swipe potatoes off the conveyor, yet flexible enough to bend if it hits a hard object like a rock.

According to Withers, more economical tooling and the ability to fill even complex mold cavities can be particularly helpful to engineers

during iterations of design, prototyping and testing.

“Instead of choosing to make parts via injection molding, I will often choose the method of poured urethane parts from Argonics because I do not want to pay the high cost of injection molded tooling,” says Withers. “Urethane is usually much more cost effective for us, whether for one-off or higher volume parts.”

For more information contact Argonics, Inc., 520 9th St., Gwinn, MI 49841; visit www.argonics.com; call 800-991-2746; email information@argonics.com.

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Guard-Safe Guarding is a Total Solutions Guarding Company

Why did we start our company? With over 30 years in the material handling and conveyor industry I experienced a fatality on one of my projects where a worker got his arm caught in between the conveyor belt and a troughing idler. He died at the scene.

Devastated by this terrible and preventable situation I searched for a solution that could have prevented this from happening and more importantly how could this be prevented in the future. The old saying - "a guard is a guard" was not the answer I was looking for. After looking at hundreds of existing guards in this industry; I was amazed how many were not compliant with the OSHA and MSHA regulations. Most were painted yellow- which is good, but I could reach around, under, over and through a lot of them- basically they were not in compliance to the regulations and they did not protect me or my fellow workers. I could not find a good solution so I did the next best thing and started Guard-Safe Guarding.

We provide a COMPLETE LINE for ALL machine safeguarding. There isn't a machine we can't guard. We design, engineer, fabricate and install OSHA and MSHA compliant Safe Guarding in the mining, utilities and all process industries.

We are a small organization from the heartland of America located in Sibley, Iowa.

Through our professional associations we have the abilities and capabilities to provide the knowledge and solutions to establish regulatory compliance within your plant or facility.

What is the Machine Safeguarding Assessment Process?

1. Discovery

We will ask that you provide a list of the machines that you would like included in the machine safeguarding assessment report. We will then go over specific questions regarding your project initiatives, and questions relating to your site.

2. Evaluation

Once on-site, we will evaluate the machines and equipment that were specified in the machine list you provided. Each piece of equipment will be documented by make, model serial number, property number if available, and will include pictures and/or videos of your machines and their hazards. We will then provide you with the regulatory references and our recommendations for correcting the hazard or hazards.

3. Risk Assessment

Each machine will also have a risk ranking assigned to it determined by the frequency of use, probability of injury, and severity of harm. This ranking will help you determine your current level of safety and help you prioritize your remediation project planning.

All dialog, observations, notes, and media acquired will be kept in the strictest of confidence.

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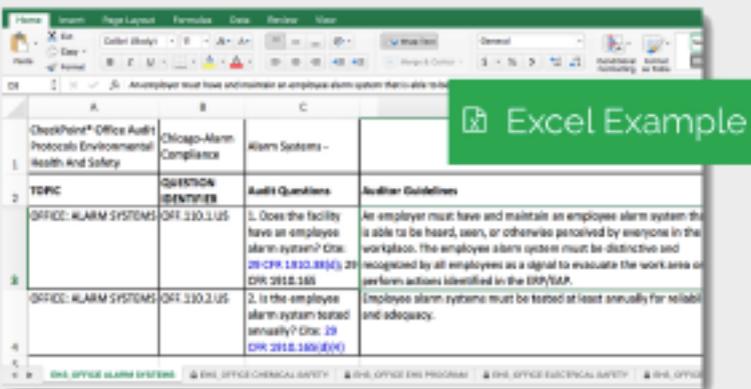
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Too **many** sites? Too **hard** to coordinate? Too **costly** to send auditors? Having **difficulty comparing results** across the locations you have inspected?

If you said **yes** to any of these questions, how can you be sure that those sites are in compliance with your Global EHS compliance and risk programs?



G. AUDIT QUESTIONS

Date: _____
Facility: _____
Auditor: _____

Question ID	Audit Questions	Auditor Guidance And Notes - Audit Questions	Y	N	N	Comments
			E	O	A	
ERGONOMICS						
OFF-140.1.US	1. Are workstations configured so that employees can achieve ergonomically correct working postures?	Workstations should be configured to prevent common ergonomic problems. The computer keyboard and mouse should be within easy reach and at a comfortable height (elbow high), the keyboard and monitor should be aligned, and the screen should be at or slightly below eye level. There have been no issues found.				
OFF-140.2.US	2. Are chairs used at workstations adjustable and in good condition?	Chairs so that employees can work in a comfortable seated position, with good body support. Chair height should allow feet to rest flat on the ground with thighs parallel to the				

HTML Example

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ASF Metrology to Acquire Nikon Metrology's Coordinate Measuring Machines Business

Nikon Metrology announced today that ASF Metrology intends to acquire Nikon Metrology's coordinate measuring machines (CMM) business. The closing of the transaction is expected to take place in about 2 months.

Nikon Metrology's CMM activities, with offices in Belgium, France, Germany, the UK and the USA, represent approx. 25 % of the total Nikon Metrology worldwide consolidated turnover. Coordinate measuring machines (CMM) are used in sectors where accurate dimensions and quality control are crucial, such as aerospace, automotive and medical implants.

Upon closing the transaction, all CMM production, development, sales and service activities, including the CAMIO software, will be transferred to ASF Metrology, under the ownership and management of Angelo Muscarella, who has a long and proven track record in metrology and especially the CMM business. Nikon Metrology will continue to serve a number of selected accounts as part of a strategic marketing partnership where both companies will promote each other's products and services. All employees mainly dedicated to the CMM business, a crucial asset to the knowhow of the company, are intended to transfer to ASF Metrology.

Hajime Kosawa, CEO of Nikon Metrology based in Leuven, Belgium, welcomed the plans: "This business transfer is in line with the 2017 Nikon Corporation strategic review for industrial metrology to focus on non-contact inspection, based on optical and X-ray technology and will allow both companies to focus on a more efficient growth strategy for each of their businesses."

Angelo Muscarella, CEO and owner of ASF Metrology, commented: "Thanks to our long-term experience in the CMM market and the close cooperation with Nikon Metrology, I believe that ASF Metrology's competitive position in the industry and its focus on CMM will enable us to expand the existing solid customer base. We will focus on growth in all regions by expanding our market coverage worldwide, leveraging on the former LK brand name of the CMM business and its track record."

Both companies will work closely together to ensure a smooth transition with suppliers, customers and resellers.

Further details of the agreement were not disclosed.

www.nikonmetrology.com •

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Five Easy Steps to Successful Machine Guarding!



Identify the Hazards

Not all hazards are created equal. Nor are the solutions for guarding them. Keep in mind the basic principle: Over, Under, Around or Through. If any body part is capable of reaching a moving component by those means, it must be guarded. The example to the left shows an exposed rotating shaft and a fan that present a hazard to employees.



Scanning & Measurements

Set up an appointment with Guard-Safe Guarding to visit your facility and review your goals and primary objectives regarding your hazards. GSG will perform their own safety assessment to assist you in this process. GSG will photograph and measure the application. Some applications may require Laser Scanning to capture interferences and assist us in the design stage. The shaft/fan hazard from above was scanned by GSG, as shown here.

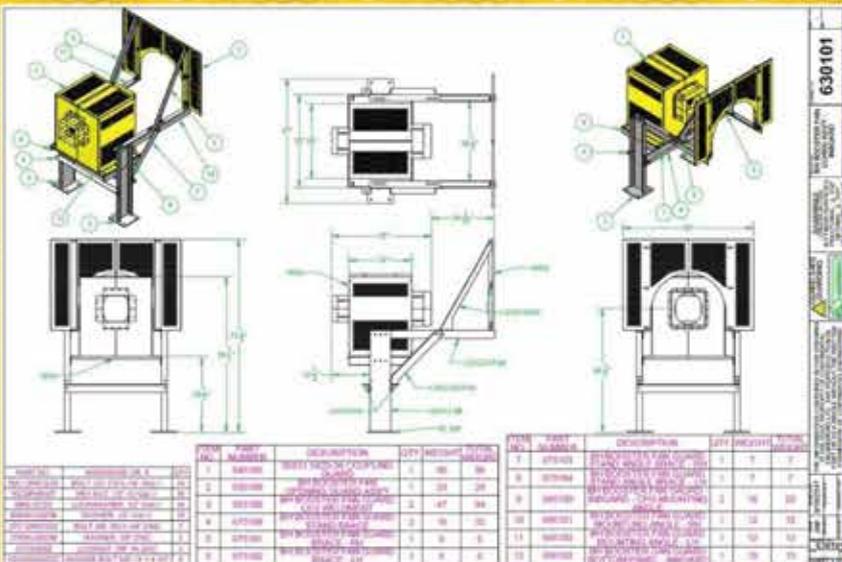


Designing your Guards

Upon processing the Laser Scan, GSG utilizes 3D CAD software to model the new guards and supporting structures. For simpler applications, the model is created based upon site measurements. A 3D CAD image is created and shared with our clients. The client is then able to visualize the final product, ask questions, and provide feedback regarding accessibility, or other concerns.

Engineering Drawings

Upon approval from the client of the initial concept model from above, GSG proceeds to create complete fabrication, arrangement and installation drawings. The drawings are once again submitted to the client for final approval prior to fabrication and shipment. O&M Manuals & drawings are provided for the client in electronic pdf format and paper format.



Installation

Guard-Safe Guarding powder coats all guards Safety Yellow. GSG preassembles the parts prior to shipping to ensure proper fit and delivers the guards assembled as much as possible to save time at installation. All guards are carefully packaged and shipped in a wooden box. It is recommended that a GSG technician be present during the installation process. All guards must be mounted rigid and secure.

At Guard-Safe Guarding we know that you care about your employees. We understand that guarding your equipment is not a simple or glamorous proposition. Guard-Safe Guarding is well prepared to answer your guarding questions. Typical concerns we hear are from Safety Managers looking for guidance, Maintenance personnel wanting easy access & removal of protective barriers, and from operators wanting to work safely, yet unencumbered. We have heard and addressed all of your concerns with our innovative and time saving products.

Please visit our website at www.guardsafeguarding.com call 712-754-4838 or email sales@guardsafeguarding.com to learn more about our custom engineered guarding process and our standard offerings including: Coupling Guards, Barrier Guarding, Idler Guards, V-Belt Guards and much more!



About Safety Through Engineering

Safety Through Engineering, Inc. is a Structural and Safety Engineering, Expert Witness, Safety Training and Consulting firm with the reputation as a pioneer of innovative design and safety solutions. For over 35 years we have provided cutting-edge design services by expanding traditional engineering approaches.

At STE, we incorporate new concepts and technology throughout our projects with 3D BIM, finite element analysis, fabrication drawings and a plethora of services. Fueled by a forward thinking team, STE serves a superior client base with innovative industry solutions.

Why Choose Us

Uniquely qualified engineers, construction specialists, fall protection experts and advanced safety trainers, STE's team of professionals advocate solutions based on practical experience, emerging technology, customized education and specialized training.



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Obtaining Sustainable Safety®
in Design

“Our approach to any design must consider all possible outcomes, especially the safety of the individuals for whom and through whom our designs are intended.”

*Mike Wright
President, STE Inc.*



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Handle Four Drums at Once for High-Volume Drum Handling

Liftomatic Material Handling, Inc., Buffalo Grove, IL, an industry leading material handling equipment manufacturer, now offers attachments to handle up to four drums at once.

Liftomatic offers two forklift-mounted attachments suited for high-volume drum handling. The attachments do not require hydraulic or electrical connections. Both units are capable of handling 1, 2, 3 or 4 rimmed steel, poly and fiber drums with a total load capacity of 8,000 pounds.

The LOM-4 units come in two configurations to handle up to 4 drums at once. The model L4F can handle 1, 2, 3 or 4 drums and is useful for mixed loads, single stacking in trucks and trailers and for fill-line movement. The model S4F handles 4 drums at a time only, for double stacking in trucks and trailers where overall height is limited.

Both models are available with spark-resistant and “EE” rated components. Each can handle a mixed group of 4 drums, steel, plastic or fiber at one time, as long as the drums heights are within 1.5 inches of each other. Crane and carriage-mount models are also available.

Liftomatic Material Handling, Inc. is an acknowledged leader in the design and manufacture of drum handling equipment. Headquartered in Buffalo Grove, Illinois, Liftomatic maintains manufacturing, engineering and

sales facilities around the globe. Liftomatic currently sells products in over 40 countries and sells to more than 400 of the Fortune 500 companies.

For more information, please contact: Liftomatic Material Handling, Inc., 700 Dartmouth Lane, Buffalo Grove, IL 60089, Sales Dept. 847-325-2930 Web: www.liftomatic.com Email: info@liftomatic.com. •



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Howden American Fan Company Announces AF Cast Aluminum Pressure Blowers

Wide range of accessories and construction options available with short lead times

Howden American Fan Company, the leading manufacturer of high-quality industrial fans and blowers, announces its AF Cast Aluminum Pressure Blowers, which can be supplied with extremely short (4-7 day) lead times, making them a good choice for urgent OEM equipment replacement applications.

Ideal for supplying fresh air in fume control systems, the versatile AF is also a good choice for fans used in dust collection systems, air purification units, and woodworking machinery, as well as combustion air for incinerators, ovens, furnaces, kilns and dryers.

The AF cast aluminum pressure blowers are available in radial bladed, backward curved, and forward curved models. The radial blade design enables some particulate in the airstream, opening up the AF's application range. The backward curved model is the most efficient option, with a smaller fan and motor.

The AF line includes a range of accessories, including flanges, slip connections, inlet/outlet screens, full cut off dampers, drains, and vibration isolators. A fabricated steel construction is available for high temperature applications up to 700°F. The AF fans are offered in a variety of arrangements, including direct drive units with the most compact design and shortest lead times, as well as belt-driven units for a wider range of performance levels.

To properly size the AF fan, Howden American Fan reviews the required performance and air conditions for the customer's application and process. Working closely with the customer, Howden selects the right size fan and wheel, the best arrangement, and all necessary accessories.

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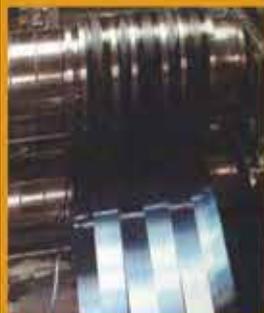
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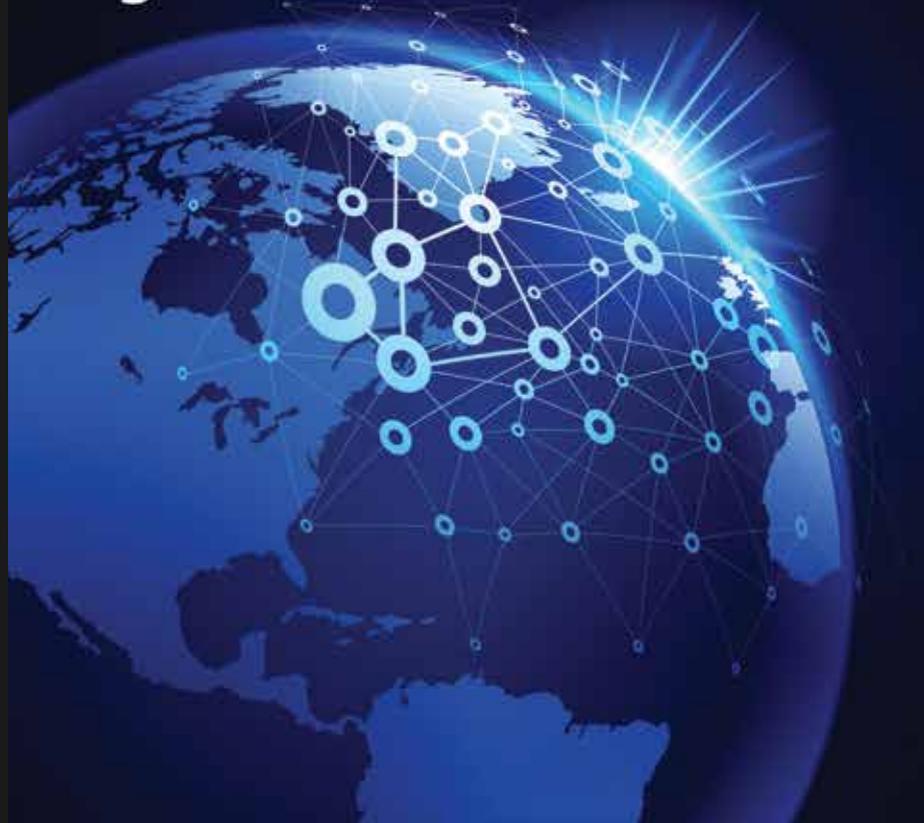
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Educational Resources

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RegScan understands that staying in compliance is critical. But it doesn't have to be complicated. That is why we host webinars several times throughout the year that help our clients tackle ever-evolving problems in the EHS industry. Prior topics covered included regulatory overviews, the Changing Role of the EHS Manager, and ISO 14001:2015. Such topics specifically address the newest industry standards while banishing compliance confusion, provide necessary tools to manage today's EHS challenges and reduce time and money spent on compliance activities.

Tutorials

RegScan also produces a number of helpful videos for our users. They answer most commonly asked questions on using the RegScan One interface. You may wish to visit our Informational & Tutorial Videos Page prior to submitting a ticket to see if your question can be answered with the assistance of one of these videos.

Quality Suite

RegScan has introduced audit protocols and checklists geared to quality management in healthcare. They cover the basic ISO 9001 and Quality Systems, Medical Devices (United States and the European Union), and Pharmaceuticals.

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Strikethrough allows you to effortlessly see the amendment history of a regulation by comparing the current regulation with an earlier or future version. Changes are easily identified by color-coding. Anything that has been added will appear in green, while anything that has been deleted will appear in red.

My WatchList

My WatchList is a custom regulatory change management tool that allows you to monitor change at various levels of detail. It gives you quick access to only the information you need, while providing a clear record of what you have and haven't reviewed. My WatchList is the easiest way for a Web Services user to build a custom regulatory register, which RegScan will automatically export to your online environmental management system.

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By defining specific keywords or phrases, LookOut allows you receive daily Email alerts on State or Federal regulatory changes.

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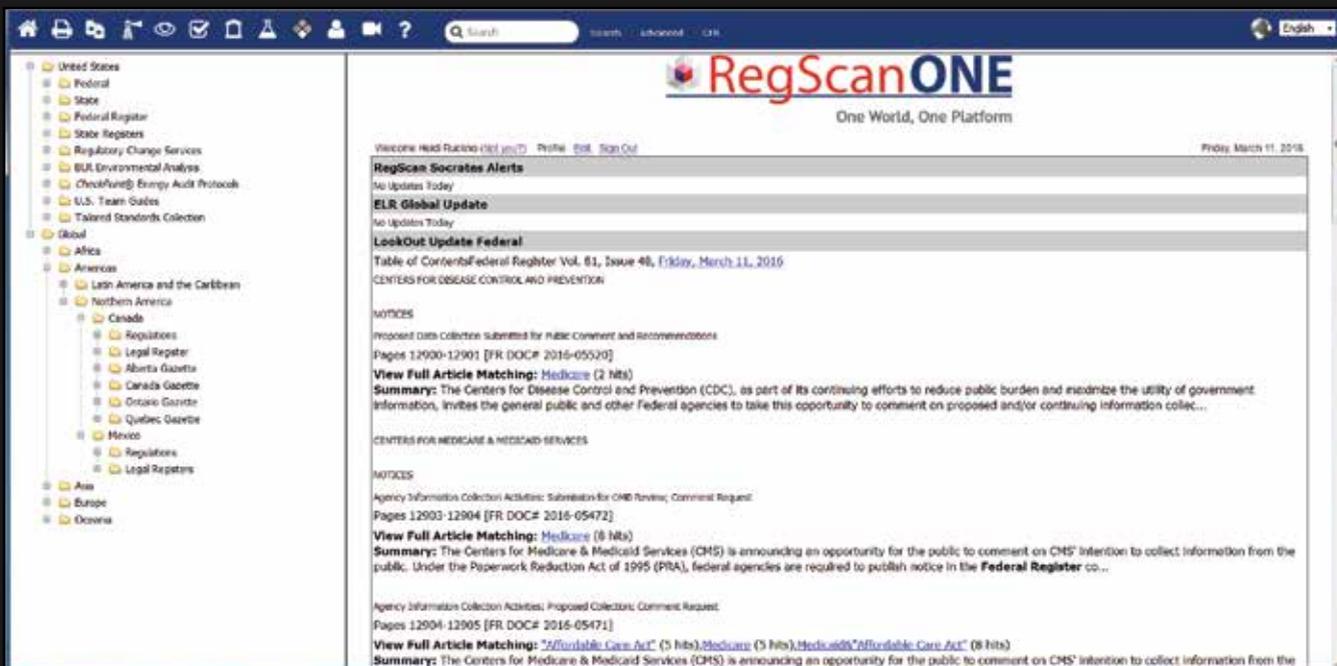
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This is exacerbated in applications with metal-to-metal interaction, repetitive friction at high speeds or where little to no lubrication is present. Other factors include the presence of contaminants, the prevailing service temperatures, the loads applied, and loading modes such as sliding, rolling, oscillating and pulsating.

To address this problem, product engineers and component manufacturers often turn to specialized PVD (physical vapor deposition) coatings that can be applied in thicknesses of 0.5 to 4 micrometers to further harden the surface of these parts.

By applying coatings optimized for these types of punishing environments, components benefit from increased surface hardness and a much lower coefficient of friction. As a result, these critical parts do not have to be replaced as frequently, if at all, reducing maintenance and unplanned downtime while improving machinery performance.

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Today, these coated components are utilized for a variety of applications from performance automotive and racing to wind turbine shaft bearings and planetary gears; stainless steel cutting blades and piston pumps for food processing; and sliding components in filling and bottling operations. The coatings are also a proven technique for upgrading critical rotating parts in hydraulic drives, pumps and valves.

Hardened Components

Many components are not coated at all. Instead, these parts are often made of heat-treated, nitrided or case-hardened steels, along with durable high performance materials such as titanium or nickel based alloys.

Even those used in high load, high wear applications are subject to wear and premature failure under poor lubrication. Some industries allow no lubrication at all, such as cryogenic and vacuum systems, clean rooms, food and pharmaceutical equipment.

When this is the case, engineers often turn to a variety of coating, plating or nitriding options to modify the surface to improve wear and corrosion resistance.

Examples include coating the parts with black oxide. Black oxide is a coating produced by a chemical reaction between the iron on the surface of a ferrous metal and oxidizing salts. After a post-treatment with oil, the surface provides protection against corrosion, improved lubricity and prevents galling during metal-to-metal interactions.

However, black oxide is not very durable and can be worn away quickly in repetitive, high load applications.

PTFE, another popular coating alternative, is known for its low coefficient of friction but is not recommended for high load applications where it, too, can wear away.

Hard chrome and chemical nickel plating are often specified, as well, to provide protection against wear and corrosion.

Although hard chrome is suitable for components that experience abrasive wear, microcracking inherent to the process limits its use against corrosion. Although this can be addressed with thin coatings that increase surface hardness, these solutions only offer limited wear resistance.

Chemical nickel can be applied over a range of hardnesses. However, the maximum is only 600 HV (Vickers Pyramid Number).

Concerns over polluting compounds, emissions or residues are also associated with these plating techniques.

Specialized PVD Coatings

Physical vapor deposition (PVD) describes a variety of vacuum deposition methods that can be used to produce thin coatings. PVD is typically used to coat components at relatively low coating temperatures of 200-500 °C. These temperatures are ideal because they are below the tempering temperature of steels so as to avoid altering the fundamental material properties.

Fortunately there are several carbon-based coatings available that provide a unique combination of extreme surface hardness, low friction coefficient and anti-corrosion properties like those provided by global coating provider Oerlikon Balzers.

According to Manfred Berger, Market Segment Manager General Engineering Components for Oerlikon Balzers, the company's BALINIT C coating is a WC/C ductile carbide carbon coating that is highly resistant to adhesive wear (scuffing) in particular. It has a high load-bearing capacity even under conditions of deficient lubrication or dry contact.

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Due to its low friction coefficient, it acts to reduce pitting and fretting corrosion.

Another example is the BALINIT DLC coating, a metal-free, carbon based coating that is even more durable. Applied through Plasma-Assisted Chemical Vapor Deposition (PACVD), this coating is designed for more severe wear conditions and high relative sliding speeds to protect against abrasion, scuffing and cold welding.

These and other coatings within the BALINIT family that are tailored to specific requirements can be applied to a variety of case-hardened or tempered steels, austenitic stainless steel as well as nickel, titanium, copper, magnesium and aluminum alloys.

“These materials provide an excellent combination of low coefficient of friction like PTFE, but with the hardness of a ceramic,” explains Berger.

The coatings also have the advantage of being thin, typically 0.5-4 μm . This feature, in conjunction with close tolerancing, means that the component retains its form, fit and dimensions after coating without the need for re-machining.

Potential Applications



Bearings

Bearings often suffer from severe and disproportionately distributed abrasive wear. A coating such as BALINIT C is particularly suitable for case-hardening as well as ball- and roller-bearing steels because it can be applied at temperatures under 200 °C.

The PVD coating can be applied not only to inner and outer races and cylinders but also to the balls in ball bearings in a highly uniform coating thickness of 0.5-1 μm . The slight increase in roughness is offset by the good burnishing qualities of the coating, which smoothes the raceway of the inner and outer rings, providing additional protection against scuffing and pitting.

Bearings in the soft calendar rolls of paper machines frequently experience smearing. Not only does PVD coating reduce the possibility of smearing, but by making the bearings harder with coating, it has been shown that the life of these parts can be increased by a factor of three or four. As a result, paper mills are able to hold off on bearing replacement until the calendar roll needs regrinding, significantly reducing costly production downtime.

Similarly, cylindrical roller bearings in compressors are often exposed to low loads and vibrations, causing potential smearing. Applying PVD coating to the bearings removes any such possibility.

Gears

Gears experience similar wear conditions. The PVD coating significantly reduces scuffing and pitting in gear as well. In fact, BALINIT C has been shown to quadruple the service life of high-speed gears.

The standard FZG C test shows that the fatigue strength is increased by 10-15% over case-hardened but uncoated



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gears. In the test, the failure criterion for gear service life was defined as single-tooth wear of 4% due to pitting.

The main factors in these improved figures were the lower local surface pressure (Hertzian pressure), which resulted from reduced friction in the rolling contact, and the superior running-in behavior of BALINIT C.

Coatings can also benefit worm gears, where lubrication is not always enough to protect helical-gear transmissions against friction and wear.

The sliding motion and the force between the worm and gear faces make it difficult for a lubricant film to form. For this reason, the gear is most often made of bronze in order to avoid scuffing.

In service, however, the teeth of the bronze gear wear away

quickly and the gear must be realigned or replaced. Coating the steel worm with a carbon-based coating can improve reliability and performance by reducing wear on both the worm and the bronze gear.

Pumps, compressors

Screw spindle-, vane-, gear-, lobe- and centrifugal pumps often function in abrasive and poorly lubricating media. This may be cooling media in grinding machines such as screw pumps and internal gear pumps. BALINIT coated screws provide the ideal combination of hardness and low friction for preventing wear in such poorly lubricated conditions.

Similarly, industrial compressor components, such as reciprocating pistons, screws or valve plates can undergo extensive wear when oil-free operation, dry gases, refrigerants, high or low temperature limit the use of lubricants.

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In addition to designing and manufacturing PVD coating equipment, Oerlikon Balzers offers coating services at more than 140 coating centers worldwide, including 16 locations throughout the United States.

According to Dr. Florian Rovere, Director of Sales for Precision Components in North America, companies like Oerlikon Balzers also have the R&D capabilities to tailor coating solutions to meet unique requirements. In addition to coating thickness and hardness, properties such as structure, chemical and temperature resistance, and adhesion can be precisely controlled.

In most cases, no alteration of the formula for the coatings is required, as it is already optimized for high load, high friction environments.

"I find engineers are most surprised about two factors when learning about these specialized PVD coatings," says Berger. First, that the coating can be applied in a thickness as low as .5 or 1 micrometers. The other is that these coatings can last the lifetime of the machine or systems it is in, despite the difficult operating conditions."

For more information about coating solutions for components with Oerlikon Balzers, call (408) 375-4408, e-mail: balzers.components@oerlikon.com; or visit www.oerlikon.com/balzers

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Eagle Bending / Carrell Corp	1	www.eaglebendingmachines.com / www.carrellcorp.com
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Gorbel	7, BC	www.gorbel.com
Guard Safe Guarding	13, 17, 24, IFC	www.guardsafeguarding.com
Hemco	11	www.emergencyshowerbooths.com
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Krenz Vent	10	www.krenzvent.com
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Community/Industrial Noise Monitor and Alarm



Standalone or w/PC

Text/Email Alerts

Rolling 3 weeks Logging

24/7 Alarm Scheduler

Ethernet, USB RS232

Secure Remote Access

SLARMsoft included

Indoors or Out



SLARMsuccesses

Construction

Johns Hopkins Hospital Floor Remodel
Apple's New Headquarters Construction
Airport Jet Run Up Monitoring

Industrial

Boatyards-Ferry and Tug construction
Hospital Medivac Helicopter Monitoring
Remote Alarm Monitoring-Dams

Entertainment

Red Rocks- Colorado
ATT Performing Arts-Dallas
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On YouTube Search: SLARMsolution

no false alarms

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BUILD



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DEPLOY



- Combustibles, LEL
- Hydrocarbons

- Refrigerants
- Toxics

- VOCs
- Oxygen



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WHY IS IT OKAY WHEN IT'S ONE OF YOUR WORKERS?

Don't fall victim to inadequate fall protection.

Not following industry standards? One fall can have disastrous consequences for your workers, their families and your business. You can't afford to wait to change the way you look at workplace fall protection.



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