

FEBRUARY 2018

SAFETYZONE MAGAZINE

Extending the
Life of Precision
Components in
Demanding
Applications

Ladder
Safety 101



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TO CONVENTIONAL



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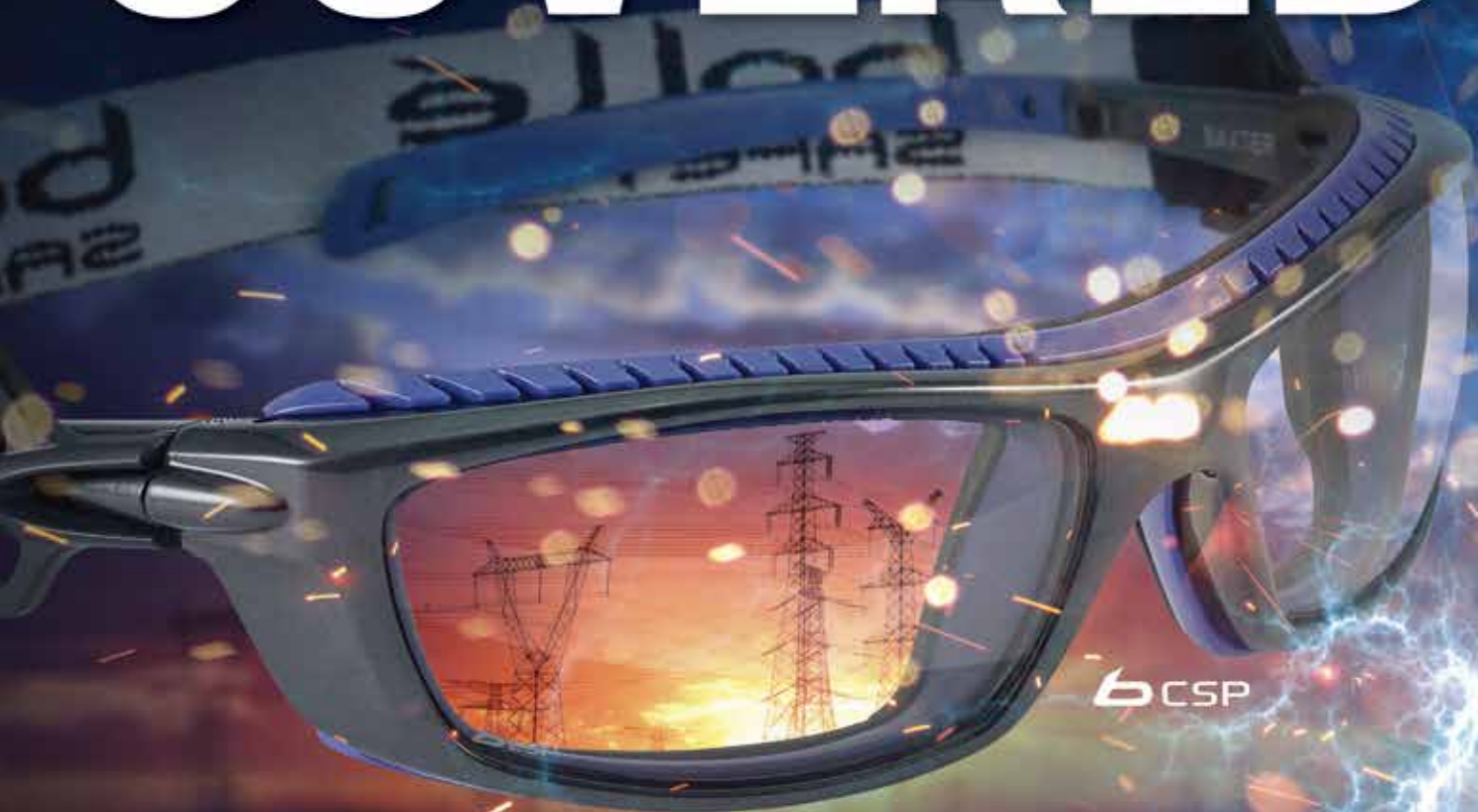
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Regulations can be complicated, but they don't have to be. RegScan's WIKI feature provides clear analysis on the newest and most important environmental regulations in easy-to-follow articles authored by subject matter experts. The article-based system explains key provisions and requirements so users can proactively stay transparent while preventing and mitigating risks.



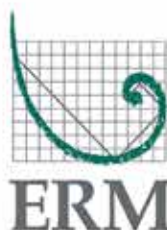
- Icon displayed next to reviewed regulations in the RegScanOne database

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- Includes contact information and bios for all authors

- Displays the date when the article was last updated

- Full-text regulations located next to abstracts and articles



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Revised Ambient Air Monitoring Quality Assurance Requirements

ABSTRACT

The revised air monitoring quality assurance requirements are EPA's first comprehensive changes to the air monitoring rules since 2006. These changes formalize many changes that had been informally adopted by Agency memorandum and guidance documents. Many of the changes were driven by improved monitoring technology—such as continuous particulate matter analyzers—that were not commonly available at the time of the previous update.

The revised rules also revert to the pre-2006 structure whereby state and federal monitoring program requirements are set out in Appendix A, with industrial PSD monitoring requirements specified in Appendix B. EPA provides a summary of the changes at the following URL:

https://www3.epa.gov/ttnamti1/files/ambient/pm25/Summary_of_Appendix_A_Changes_10201_25_2016.pdf

ARTICLE

Key Changes

The revised regulation once again separates the quality assurance requirements applicable to state and federal monitoring programs from those for industrial PSD monitoring. This change recognizes the many differences in the objectives and implementation approach between the state and industrial monitoring programs. Other significant items include:

- Increased emphasis on the role and responsibilities of the Primary Quality Assurance Organization (PQAO)
- Requirement that EPA be provided a courtesy copy of an organization's Quality Assurance Project Plan (QAPP), even if that PQAO has been delegated QAPP review authority by EPA
- Clarification of the applicable system and performance audits and required frequency for each type of monitoring program
- Updated calibration and audit ranges for gaseous analyzers

Impacts On Existing Monitoring Monitoring Programs

Extending the Life of Precision Components in Demanding Applications

Specialized PVD coatings increase surface hardness and durability of precision components such as bearings, gears and rollers to significantly increase lifespan under high load conditions



Although bearings, gears, rollers and other precision components are generally made of hardened steel or metal alloys, those utilized in high load applications still can fail due to excessive wear, surface fatigue, pitting, galling and corrosion.

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.

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.

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Topic	Question ID	Question	Auditor Guidance
CheckPoint® Office Audit Protocols Environmental Health And Safety	CHC-130.1.1.5	1. Does the facility have an employee alarm system? Cite: 29 CFR 1910.135(c), 29 CFR 1910.135	As an employer must have and maintain an employee alarm system that is able to be heard, seen, or otherwise perceived by everyone in the workplace. The employee alarm system must be distinctive and recognized by all employees as a signal to evacuate the work area or perform actions identified in the ERP/SAP.
OFFICE: ALARM SYSTEMS	CHC-130.1.1.5	2. Is the employee alarm system tested annually? Cite: 29 CFR 1910.135(d)(4)	Employee alarm systems must be tested at least annually for reliability and adequacy.

G. AUDIT QUESTIONS						
Date: _____						
Facility: _____						
Auditor: _____						
Question ID	Audit Questions	Auditor Guidance And Notes-Audit Questions	Y E S	N O	N A	Comments
ERGONOMICS						
OFF-140.1.1.5	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 should be no under the desk storage.				
OFF-140.1.1.5	2. Are chairs used at workstations adjustable and in good condition?	Chairs should be 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 ground.				

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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. 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 dura-

ble. 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 Application

Bearing

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 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

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.

Customized Solutions

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

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- German
- Italian
- Japanese
- Malay
- Portuguese
- Spanish

Educational Resources

Webinars

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.

I-Comply Checklists have been added to provide Environmental, Health, Safety, Security for Data Centers and Offices. When you still have EH&S issues, but not the intensity of a manufacturing opera-

tion.

Tracking Regulatory Change

Strikethrough

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.

LookOut Email Alert

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

RegScan Customer Support

As part of our ongoing commitment to improve the RegScan user experience, we use a ticketing system for customer support inquiries. This allows us to streamline requests and better serve you. Available 24/7, the ticketing system

allows you to immediately report an issue and track the support team's response to it. Every support request is assigned a unique ticket number. For your reference, we provide complete archives and history of all your support requests. A valid email address is required to submit a ticket.

Schedule a Demonstration

The RegScan team will gladly demonstrate any of our products or services for free. Our online demonstration sessions can accommodate up to 25 people, and we will schedule a meeting whenever it's convenient for you. During these interactive demonstrations, our experienced staff will go through whatever products or services interest you. You'll also have the opportunity to ask questions, and discuss licensing options that are tailored to your needs. If you decide to purchase, we can take of your training and support needs too. We frequently update our library of training videos, and we'll be happy to arrange online or in-person training sessions. Furthermore, our in-house technical support team is always available on weekdays (except for holidays) between 8 a.m. and 8 p.m. Eastern time, and online 24/7.

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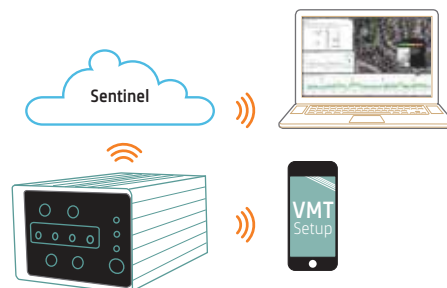
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An aerial photograph of a construction site. Several workers in high-visibility vests and hard hats are working on a concrete deck with a grid of rebar. Blue plastic sheeting covers parts of the ground. Scaffolding and other construction materials are visible in the background.

Ladder Safety 101

Falls from portable ladders (step, straight, combination and extension) are one of the leading causes of occupational fatalities and injuries. Read and follow all labels/markings on the ladder.

Avoid electrical hazards! – Look for overhead power lines before handling a ladder. Avoid using a metal ladder near power lines or exposed energized electrical equipment.

Always inspect the ladder prior to using it. If the ladder is damaged, it must be removed from service and tagged until repaired or discarded.

Always maintain a 3-point (two hands and a foot, or two feet and a hand) contact on the ladder when climbing. Keep your body near the middle of the step and always face the ladder while climbing (see diagram).

Only use ladders and appropriate accessories (ladder levelers, jacks or hooks) for their designed purposes.

Ladders must be free of any slippery material on the rungs, steps or feet.

Do not use a self-supporting ladder (e.g., step ladder) as a single ladder or in a partially closed position.



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Do not use the top step/rung of a ladder as a step/rung unless it was designed for that purpose.

Use a ladder only on a stable and level surface, unless it has been secured (top or bottom) to prevent displacement.

Do not place a ladder on boxes, barrels or other unstable bases to obtain additional height.

Do not move or shift a ladder while a person or equipment is on the ladder.

An extension or straight ladder used to access an elevated surface must extend at least 3 feet above the point of support (see diagram). Do not stand on the three top rungs of a straight, single or extension ladder.

The proper angle for setting up a ladder is to place its base a quarter of the working length of the ladder from the wall or other vertical surface (see diagram).

A ladder placed in any location where it can be displaced by other work activities must be secured to prevent displacement or a barricade must be erected to keep traffic away from the ladder.

Be sure that all locks on an extension ladder are properly engaged.

Do not exceed the maximum load rating of a ladder. Be aware of the ladder's load rating and of the weight it is supporting, including the weight of any tools or equipment.

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Milwaukee® Announces New Dipped Gloves, Improving Safety & Dexterity on the Jobsite

New Gloves are ANSI/ISEA-rated Cut Level 1, 3 and 5

Milwaukee Tool enhances safety on the jobsite with the introduction of new Dipped Gloves. The new gloves are ANSI/ISEA-rated for Cut Levels 1, 3, and 5 and are EN 388 rated. Designed to provide users with all-day comfort and ultimate durability, all of the new gloves have been thoughtfully developed with proprietary knitting that provide the protection necessary at these key ANSI/ISEA cut levels and EN ratings. Each also features *SMARTSWIPE™* technology so users can access phones or tablets without removing the gloves.

“As jobsite safety is emphasized across the nation, users increasingly need hand protection that is comfortable, durable and provides the dexterity needed to work with small fasteners and fittings,” said Matt Vargo, Product Manager for Milwaukee Tool. “Through a proprietary knitting pro-

cess and a nitrile dip, these new gloves provide outstanding durability, perform well in a wide range of temperatures and are resistant to most common chemicals and solvents found on the jobsite; all while maintaining an excellent grip and all-day comfort.”

Cut Level 1 Dipped Gloves

The textured nitrile palm of the Cut Level 1 Dipped Gloves offer a better grip on materials, as well as increased dexterity, and their nylon/lycra blend construction provides increased comfort and wicks away moisture to keep hands dry. *SMARTSWIPE™* touch screen functionality has been incorporated into the index finger tip to permit the use of touchscreen devices without removing the gloves.

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puncture resistance while *SMART-SWIPE™* fingertips and palms provide full access to touchscreen devices.

Cut Level 5 Dipped Gloves

These gloves feature ANSI/ISEA cut level 5 protection to help prevent injuries from demanding jobsite applications, such as work with sheet metal/glass, wire stripping, and ducting. The gloves utilize a double-dipped nitrile grip for best-in-class puncture resistance, and added durability. Similar to the Cut Level 3 Dipped Gloves, the Cut Level 5 Dipped Gloves also include *SMART-SWIPE™* fingertips and palms.

Cut Level 3 Dipped Gloves

These gloves feature ANSI/ISEA cut level 3 protection to help prevent injuries from sharp objects on the jobsite. They also provide a more comfortable grip, maximum dexterity when handling small objects, and feature a Comfort Web Grip for outstanding grip performance. The nitrile dip material provides ultimate durability and best-in-class

Milwaukee Tool's new Dipped Gloves are designed to provide users with ANSI-rated protection, all-day comfort, ultimate durability and the best dexterity for handling small objects and using touch-screen devices – without sacrificing jobsite productivity.

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“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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Nixalite® the Company

Nixalite of America Inc is the leading manufacturer of effective and humane bird and animal control exclusion and dispersal products. Established in 1950, Nixalite is a third generation, family owned firm with over 150 years of combined experience in bird and animal control.

Nixalite® History

In the late 1940's, Charles B. Kaufmann patented and manufactured the first Nixalite bird control models and founded the Nixalite Company. Known as "porcupine wire" because of its prickly appearance, Nixalite spikes set the industry standards for product quality, reliability and superior design. Nixalite quality and reliability have captured the attention and loyalty of customers worldwide.

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Nixalite's executive and manufacturing facilities, located in East Moline, Illinois, are where high grade stainless steel wire and strip are turned into the world's finest bird and animal barriers. Call (888-624-1189) or E-mail (birdcontrol@nixalite.com) Nixalite for a free review of your pest bird or nuisance animal control problem. We are at your service.

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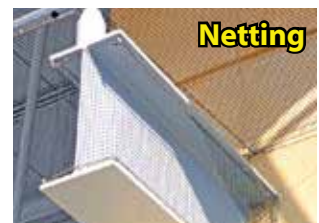
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Who We Are

Since 1979, S.E. International, Inc., has been a leading manufacturer of ionizing radiation detection instruments under the Radiation Alert® product line. We design, develop, and manufacture instruments for the environmental, laboratory, health physics, industrial hygiene, security, emergency response, and educational industries. SEI sells direct and has a strong network of domestic and international distributors. Together we are dedicated to our customers and promise to help you find the appropriate instrument for your needs.

How We Started

In the early years of the company, we were known as Solar Electronics because the first products were solar powered two-way radios that could be used in remote locations. We then developed a team of people to work with TVA on demonstration projects all over the southeastern US designing and installing photovoltaic arrays and wind energy. During that period, we also produced a small fetal heart monitor and from that instrument the idea of a small radiation detector was born.

In the mid-1980's, SEI decided to focus on radiation detection instruments. We have worked hard to establish a company and products that are known for quality and reliability. We have a reputation for being honest, innovative, and good to work with. We've partnered with numerous companies over the years and received recognition in the state of Tennessee for our international sales efforts.

Much of our success started with one product, the Monitor 4, a simple but reliable general-purpose survey meter. At the height of the Chernobyl disaster, we sold thousands of the Monitor 4 meters establishing us as one of the leading radiation detection instrument manufacturers. We now offer many products including our two most recent developments; the Radiation Alert® Ranger and the Radiation Alert® Monitor 200. Our product line features both analog and digital instruments with detection ranges from 1 microR to 1R.

Our Improvements

The Ranger offers maximum performance for surveying at the facility or out in the field. It is designed for industrial environments, but still has all of the features you've come to love in the lab. This small, handheld, smart instrument offers excellent sensitivity to low levels of alpha, beta, gamma, and x-rays and has built in efficiencies for common isotopes to calculate activity in Bq and DPM. Each instrument includes a backlit digital display, internal memory, selectable alert levels,

adjustable timer, a red count light and a beeper that sounds with each count detected. With the free Observer USB Software, you can set alarms and download your collected data from the internal memory for easy reporting! An optional wipe test plate is available for detecting small amounts of contamination. We also offer the Ranger EXP with all of the same features of the Ranger but with the added flexibility of an external probe.

The Monitor 200 also measures alpha, beta, gamma, and x-rays. Its digital display shows readings in your choice of CPM, CPS, $\mu\text{Sv/hr}$, mR/hr, or in accumulated counts. Includes a red count light, and a beeper that sounds with each count detected, adjustable timer, and selectable alert and free Observer USB Software.

The Ranger, Ranger EXP, and the Monitor 200 also come with a case, protective rubber boot, stand, lanyard, and batteries.

Our diverse product line includes handheld instruments for surface and air contamination, including general purpose survey meters, friskers, and dosimeters. We offer area monitors, multi-channel analyzers, and a portable laboratory, for the detection and identification of radiation in a variety of sources, i.e. soil, food, liquid, etc. All of our software along with all updates is included for free with the purchase of a Radiation Alert® instrument.

Our Involvement

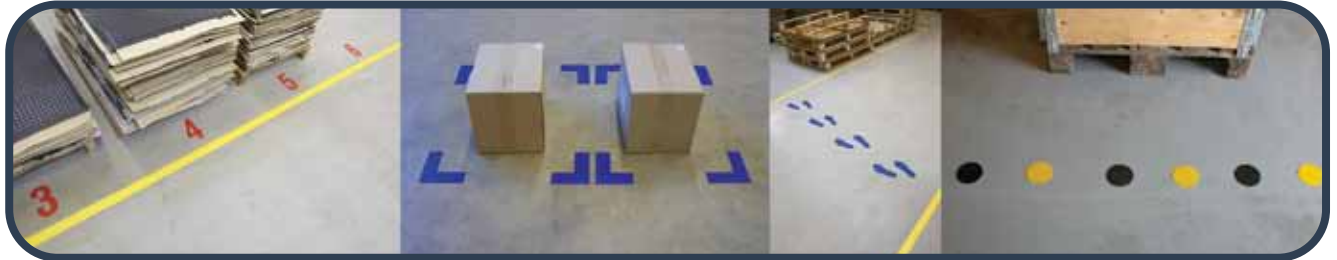
S.E. International, Inc. has a strong sense of community and has provided development grants, as well as donations to local groups and non-profits to help strengthen community-based initiatives. By supporting all of these projects, S.E. International, Inc. hopes to inspire other companies to look for creative ways to improve, support, and cooperate with their local communities.



How to Find Us

SEI can be found in a wide variety of industry magazines, trade shows, and web based buyers' guides. We strive to provide great instrumentation at a cost that will fit most budgets. To find out more about S.E. International, Inc. and the Radiation Alert® product line, please visit our website at www.seintl.com or call 800-293-5759. •

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