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**Multi-Purpose
Abrasive
Nylon Brush
Becomes
Staple in
Machine
Shops**

**Strategies
to Strengthen
Subassembly Sourcing**

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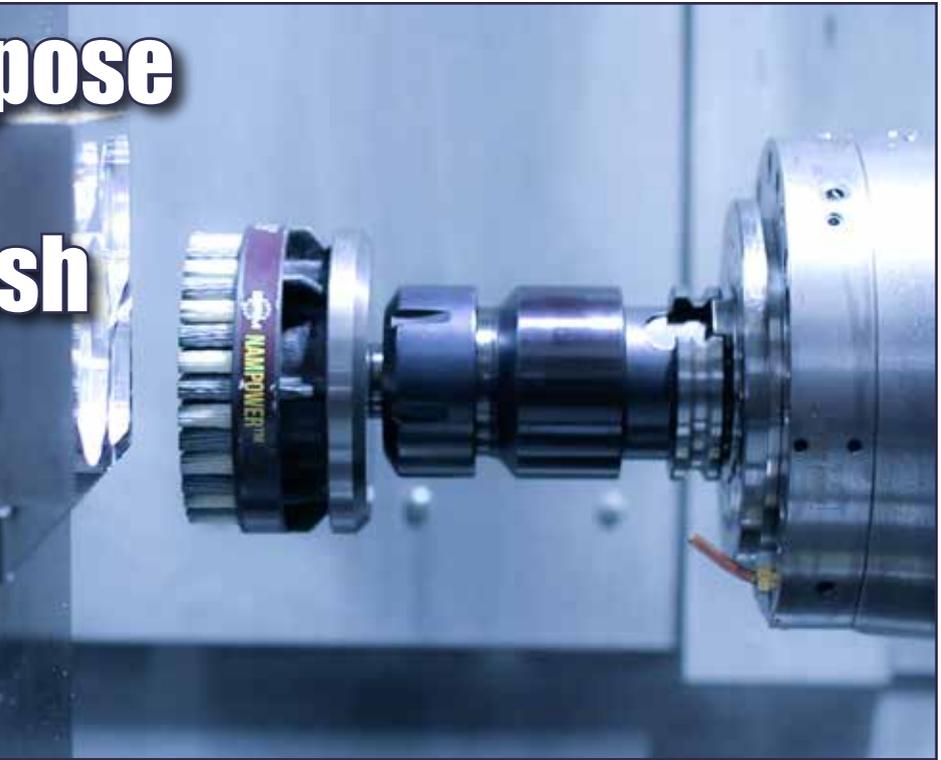


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Multi-Purpose Abrasive Nylon Brush Becomes Staple in Machine Shops



Abrasive nylon brushes prove to be flexible and useful finishing tools for deburring, edge breaking, surface finishing and corrosion removal on metal and alloy workpieces

In contract manufacturing, removing excess material that remains on a metal part after fabrication is an important finishing step. Despite utilizing increasingly sophisticated machining centers, however, much of the secondary finishing work is still performed by hand using oscillating tools, grinders, files, abrasive hand pads and wire brushes.

This labor-intensive approach only serves to drive up costs – for both the shop and, ultimately, the customer – while yielding inconsistent results. For those parts that do not meet the specifications, reworking may also be required.

As a result, contract manufacturers are turning to new finishing tools that can be easily integrated into automated machinery, CNC machines, transfer lines or robotic cells in an effort to reign in

costs and achieve more consistent results.

These new options include abrasive nylon brushes that can be used for a variety of finishing operations including deburring, edge breaking, surface finishing and even light corrosion removal. In some cases, these multi-purpose tools can also eliminate machining operations traditionally performed by chamfer tools and face mills.

“We have implemented abrasive brushes on every CNC machine we have, which includes our live tool lathes,” says Eric Sun, Founder of Orange Vise Company.

In addition to manufacturing CNC machine vises and quick change fixturing components, Orange Vise also performs a significant amount of

contract manufacturing. The disc brushes he utilizes are from the NamPower line developed by Brush Research Manufacturing.

Composed of flexible abrasive nylon filaments bonded to a fiber reinforced thermoplastic base, the abrasive disc brushes contain a unique combination of both ceramic and silicon carbide abrasive.

The abrasive filaments work like flexible files, conforming to part contours, wiping and filing across part edges and surfaces of non-ferrous, cast iron, mild steel and ductile iron, stainless and alloy steels, titanium and high nickel alloys.

“For us, there really isn’t another solution, because the alternative is to have a worker use a file or a handheld abrasive pad, and the part is not going to

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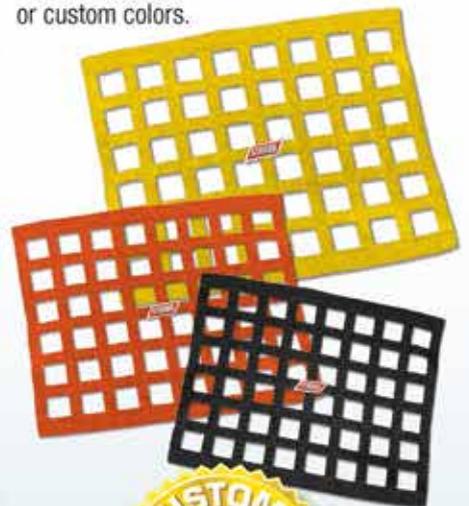
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have the finish you get with the abrasive nylon brushes," says Sun.

Edge Finishing, Often Without Chamfer Tools

Finishing sharp edges between two faces of a part, as well as deburring bits of metal or imperfections caused by the cutting action of the tools, can be accomplished with a variety of techniques.

Hand finishing is an option, as are options such as tumbling. Chamfering tools are also frequently used to provide a transitional edge at 90 degree angles, as well as for deburring. For some contract manufacturers, however, eliminating the chamfering step can prove valuable.

"I run the abrasive nylon brushes over any fairly flat part I have going in the

mill," says Ken Spaulding of Zodiac Engineering, a contract manufacturer in California with a background in aerospace parts as well as mold making. "I don't want to use a chamfer tool for edge breaking or deburring if it's not necessary."

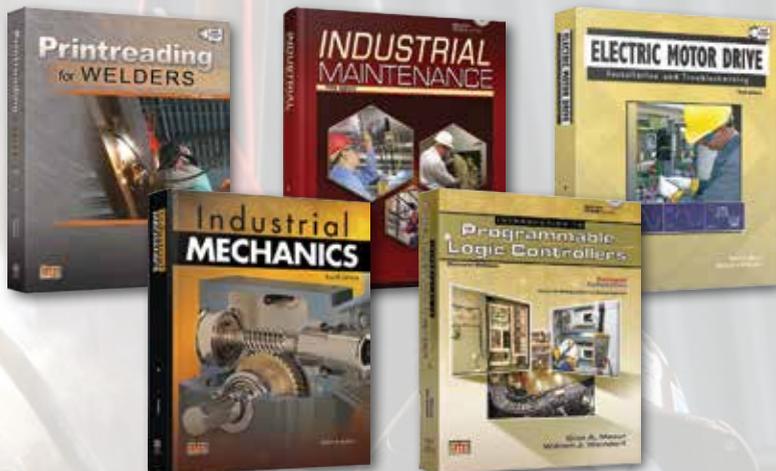
The majority of the machining work Spaulding currently focuses on includes pocket knives as well as cycling components for BMX, road and mountain bikes. Spaulding sells products of his own design, along with contract manufacturing.

Spaulding uses the NamPower abrasive discs on his CNC and manual milling equipment for light deburring as well as surface finishing of various types of metals and alloys. For the pocketknives, this includes stainless steel for the blades and titanium and zirconium for the frames and handles; and 6061 aluminum for the bike stems and 7000 series aluminum for the sprockets.

"With the brushes, I get a very predictable and consistent edge break and surface finish," says Spaulding. "I can do it inline and it is a lot more predictable and reliable than breaking edges by hand."



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For the cycle sprockets he produces, for example, Spaulding runs the brushes over the teeth in a single pass on each side of the part.

“The brushes deburr pretty much every side of the tooth, so I don’t have to run a chamfer tool around the edges. Also, tumbling doesn’t really get inside the teeth, like the brush does,” explains Spaulding.

Even when chamfer tools are specified, the edges may still require deburring.

“Chamfering tools are just half of the puzzle,” says Sun of Orange Vise. “The other half is some sort of abrasive method, such as tumbling. However, tumbling can be impractical for larger parts or anything that needs to remain dimensionally unaffected.”

Instead, Sun finds abrasive nylon brushes “complementary” to 45 degree chamfering tools. This extends to chamfered holes.

“Often chamfers leave burrs on the top and the inside edges of drilled holes, so we use the NamPower brushes because they are flexible enough to remove any burrs from the top edge, while going into the hole enough to deburr the lower edge,” says Sun.



Minor edge breaking is another potential use for the abrasive nylon brush.

Although most manufacturers specify the degree of edge finishing, there can be gray areas where a customer may not want a sharp 90 degree edge but does not specify chamfering.

In cases like this, Orange Vise may slightly round off the edges and corners with an abrasive nylon brush. The

rounding can be minimal, if necessary, so it is not visible to the naked eye.

Surface Finishing Without Face Milling

In addition to edge finishing, the abrasive nylon brush has application for surface finishing. In some cases, this can replace the use more aggressive face mills, flycutters or grinders.

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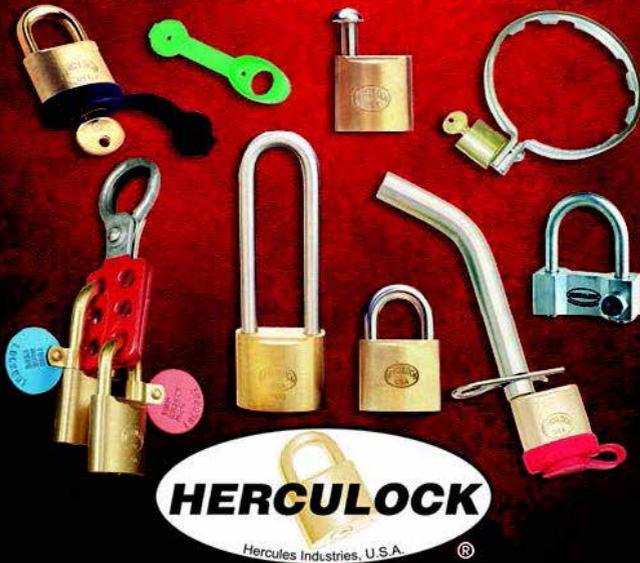
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Sun describes the finish as “almost like a milled finish, with a consistent swirl pattern in one direction.”

“The surface finish was good enough that we were actually blending it with our ground finishes on our vices,” says Sun. “With large surfaces that required multiple passes, there were no visible blends. The whole thing looked like it was done in one pass.”

He adds that there are times when a workpiece or even a machine does not lend itself well to using a large face mill, creating the need for multiples passes to accomplish the task.

“You can use a brush to create a cosmetic 6” pattern even if the machine can’t handle a similarly sized face mill,” says Sun.

Corrosion Removal

Another potential use for the tools is light corrosion removal, often without affecting specified tolerances.

“With only a few passes a 120 or 180-grit brush, you can remove a significant amount of rust without affecting the dimensions of the workpiece,” says Sun. “On steel, for example, it is unlikely to create a measurable difference.”

“The pattern will be nice and even as opposed to if you use a handheld abrasive hand pad where the patterns may run in random directions,” says Sun.

Sun cautions that aluminum is more susceptible to dimensional changes when using abrasives, so a finer grit brush may be required. However, the removal of material is minimal – measured in ten thousandths of an inch – so if the tolerances are within a fairly typical 2-3 thousandths of an inch, it would not be an issue.

Tool Configurations

According to Spaulding of Zodiac Engineering, the brushes are available in a variety of options including two fill configurations: the Dot Style, for general purpose deburring and surface finishing and the Turbine Style, which has a higher density fill for more aggressively deburring.

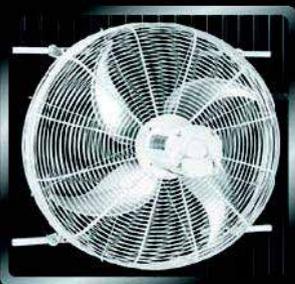
Sizes include 100mm, 125mm and 150mm diameters at trim lengths 18mm or 38mm. Available grits include 80, 120, 180 and 320.

“With the different grits, diameters, and trim lengths, the abrasive nylon brushes are extremely versatile as long as you have a few different sizes and styles,” says Spaulding.

For more information, contact Brush Research Manufacturing, Brush Research Mfg. Co., Inc., 4642 Floral Drive, Los Angeles, CA 90022; Phone: (323) 261-2193; Fax: (323) 268-6587; email: info@brushresearch.com.

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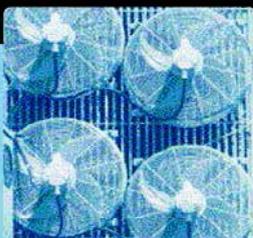
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Missouri University of Science & Technology Wins WARDJet Waterjet at IMTS Tradeshow

On Tuesday, November 1st, representatives from Missouri S&T, WARDJet and Hypertherm gathered at the Rock Mechanics and Explosives Research Center (RMERC) on S&T campus to inaugurate the new WARDKit 5x5 waterjet cutting system. Unlike the other machinery in the RMERC lab, the WARDKit 5x5 waterjet was won by a student team in mid-September at the International Manufacturing and Technology Show in Chicago, Illinois. The S&T group traveled to McCormick Place in Chicago to participate in WARDJet's Build It! Challenge, organized in association with the Smartforce Student Summit. The Student Summit was established to provide a forum for students, parents and educators to discover and use technologies utilized in advanced manufacturing.

This year, Ohio-based waterjet manufacturer WARDJet teamed up with the Smartforce Student Summit at IMTS to create the Build It! Challenge. During this event, over 200 individuals registered for one hour time slots to build components of a waterjet cutting system. The Build It! Challenge engaged teams of mechatronics students in a hands-on experience requiring them to assemble a high-end waterjet system. A waterjet is a CNC cutting tool that uses high pressure water, combined with a sand-like abrasive, to make detailed, highly precise cuts in a variety of materials including 10-12" steel, stone, plastics and foam using a jeweled orifice and 60,000psi. Students who participated in the build-off competition were then entered in a drawing to win the very waterjet they worked to assemble for their school's machining lab, valued at approximately \$89,000.

The Missouri University of Science & Technology team consisted of Jay Schafler (Graduate Student, Explosives, Mining and Nuclear Engineering), Marty Langenderfer (Senior, Mining and Nuclear Engineering) and John Rueschmann (Senior, Mechanical Engineering) led by Research Engineering Technician Jeff Heniff. The new WARDKit waterjet equipped with a 30 horsepower 60,000 psi pump will replace a decades-old waterjet table with the latest in waterjet technology. This new technology was demonstrated during the November 1st machine inauguration ceremony by cutting official S&T gear medallions. WARDJet owner Richard Ward was in attendance to award S&T the grand prize waterjet, as well as Jay Kobzik whose company Hypertherm generously donated the pump for the system. Missouri S&T Chancellor Dr. Cheryl Schrader and other administrators were also in attendance to help cut the ceremonial ribbon with owner Ward. Dr. Schrader, Ward, and RMERC staff each offered a few words of congratulation to the student team for securing the prize for the waterjet lab.

WARDJet was excited to see the impact this event had on educating students and pleased to provide this piece of high-quality, American made technology for the next generation of engineers. WARDJet is looking forward to seeing how Missouri S&T is able to use their new waterjet in valuable research over the coming years.

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Strategies to Strengthen Subassembly Sourcing

Selecting subassembly manufacturers with specific capabilities can speed turnaround, improve product performance and functionality, and increase an OEM's bottom line.

With electrical and electronic components and features like touch screens, flex circuits, keypads and membrane switches becoming more technologically advanced, OEMs are becoming increasingly dependent on sourcing subassemblies to expert third-party suppliers.

At the same time, subassemblies are critical to the OEM's finished product and must be sourced carefully to achieve consistent quality, timely turnaround and competitive pricing. In many cases, contracting with suppliers that offer access to global manufacturing facilities and in-house engineering support can be instrumental to the success of an OEM.

One of the most significant challenges is locating reliable suppliers that can meet these qualifications with pricing that can improve profitability. Some of the more successful OEMs point to a few uncomplicated strategies that help strengthen subassembly sourcing, achieving faster turnaround, ensuring product quality and functionality, and increasing added profitability.

1. Access to Global Resources

Selecting a domestic subassembly supplier with global manufacturing resources can provide OEMs with significant economic advantages – provided the manufacturing processes are well managed by the supplier.

For example, many OEMs that contract directly with offshore suppliers experience communication difficulties that can lead to errors with subassembly materials or dimensions, avoidable logistical difficulties, or even cost miscalculations.

However, some OEM suppliers have no problem in providing high quality products through relationships with offshore fabricators that work seamlessly with the domestic supplier's engineering and management team.

"We have found that offshore fabricators can be effective partners in manufacturing for North American subassembly suppliers, provided the proper communications and management controls are in place," says Hector Macias, director of Northpoint Technologies, El Paso, Texas. Macias adds that such fabrication partnerships can also be financially beneficial to OEM customers by providing saving on costs and eliminating the need for capital investments.

Northpoint Technologies is a manufacturer of components and subassemblies used in electronic and electric devices used in the medical, automotive, defense, telecommunications, industrial and consumer markets. The company's expertise includes silicon and membrane switches, flexible PCBs and assemblies, touchscreens and wire harnesses.



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When Justin Blush was in search of a silicon membrane for a microscope control switch, he found Northpoint Technology. Blush, lead technician at Prescott's Inc., a remanufacturer of surgical microscope, says his company's own molding and machine shop was unable to fabricate the membrane, which was incorporated into a switch that enabled a model of microscope to zoom in and out on a subject.

Northpoint advised Blush that the membrane would be designed at its headquarters in El Paso, but would be fabricated at a plant in Asia.

"I was happy just to have a supplier and expected the fabrication and shipping process to take at least six-to-eight weeks, as with our traditional suppliers," Blush explains. "I was amazed to learn that the membrane required only a two-week turnaround, and at a fraction of the price I expected."

2. *Faster, Functional Prototypes*

The timely delivery of prototypes and quick turnaround of revisions are vital to expediting the manufacturing process. When subassembly suppliers with offshore manufacturing facilities can produce prototypes in-house with quick turnaround times, the process is much more efficient.

Due to those factors, prototyping is one of the functions that successful suppliers seldom outsource. Macias considers prototyping a critical step in product development. These are produced via aluminum or "soft" molds, and are of such quality that they are usually considered to be product samples or the equivalent of first article production pieces.

"The prototypes we require are real, functional samples that we send to customers to inspect and test," says Terry Swick, president and co-founder, Swick-White Inc. (Davisburg, MI), a manufacturer of electric enclosures, control panels, membrane switches and graphic overlays. "Assuming they meet specifications, they can install them as finished subassemblies in products and ship them out to customers - with confidence."

At other times OEMs will have requirements that are outside of the usual request. Suppliers who have the in-house capabilities produce complex items domestically can satisfy the extra demand by producing additional functional prototypes that have been approved for production.

For example, Stoehr says that on occasion, he made such a request. "I said, 'We're doing a prototype run of 10 control panels, so can you provide 10 sample keypads?' And they were able to do that with no delays."

3. *Look for Volume Flexibility*

Whether subassemblies or piece parts are fabricated domestically or overseas, minimum volume requirements can force OEMs to purchase more parts than they require. However, a few subassembly suppliers are moving away from volume requirements to better serve the OEM.

When Steve Stoehr, Engineering Manager at GS Global Resources (GSGR) was sourcing a keypad as part of switch and control panels installed on some heavy-duty equipment such as agricultural machinery or fire trucks, he expected to make a sizable volume commitment to the keypad manufacturer.

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Based in Mukwonago, WI, GSGR develops and implements a broad range of electronic and hydraulic control systems for various OEMs.

“Most of our suppliers want high-volume orders, just like other industries,” explains Stoehr. “Five or six years ago we found Northpoint Technologies, which has been very good about taking on even low volume projects. That’s a real plus for us and our customers.”

4. Adding Significant Value

Finally, many OEMs are finding suppliers that provide significant value-added services, with offerings ranging from engineering assistance to recommendations for streamlining the manufacturing process.

In some cases, graphic design assistance, such as special icons or other symbols on keypads and other controls, can provide important safety or security features.

In another example, GSGR’s Stoehr found that subassembly suppliers could bring important value added through the kitting of loose piece parts. He arranged with Northpoint to have special kits, containing 20 loose keypad buttons, to be packaged in order to expedite assembly on the production line.

“Getting great value-added services through a single source is important to GSGR,” Stoehr says. “It is not only more convenient, but when you couple that with consistent quality, quick turnaround and competitive prices, it helps us provide better service to our customers, as well.”

For information contact: Northpoint Technologies, Inc.; 13321 Tobacco Rd., El Paso, TX 79938; Phone: (915) 591-6300; Sales Office: (800) 553-5087; Email: sales@northpoint.com.

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It's Daylight Savings Time: Save Big on Natural Lighting with Smart LED System

Commercial daylighting systems with LED option for nightlighting reduces energy costs

Commercial property owners of hotels, resorts, condominiums and apartment buildings hammered by the rising cost of electricity, have turned to solar in growing numbers to protect their pocketbooks. Beyond rooftop solar, one of the most popular strategies to cut electrical bills as well as functionally beautify living space is residential daylighting, which directs natural daylight far into the home via inconspicuous rooftop domes and highly reflective tubing in place of costly electrical lighting.

Now commercial daylighting has become even more attractive with the addition of a LED-powered nightlighting capability. This revolutionary commercial LED lighting system unites advanced LED technology with a proven daylighting design to deliver an unbeatable sustainable lighting option and energy-efficient commercial lighting solution.

Starting at the roof level, patented dome technology captures daylight and transmits it indoors through the reflective tubing to spaces once thought impossible to reach, like interior hallways, with natural lighting. At the same time, proprietary SunSense Technology monitors daylight levels in the system and automatically triggers the LEDs when daylight levels get too low.

As far as design goes, the Smart LED System was designed to operate individually to illuminate small areas or in dual configurations to attain predictable lighting results for medium-

sized spaces. It also can be used to create specific architectural effects using wall washes and soffit lighting, making the Smart LED System an intelligent solution for achieving ambient light levels in spaces with ceiling heights up to 10 ft. Functioning as a whole, the daylighting system allows natural light into living spaces during the day, while making it safer and easier to navigate hallways, bathrooms and stairwells at night.

During the day, the Smart LED System lights interiors using no-cost, natural light. As the sun starts to set and light levels fall, energy-efficient LEDs activate automatically to provide illumination for early morning and evening use. The result is a commercial daylighting solution that significantly cuts electricity use and delivers up to 94% in light energy savings.

Better Health and Aesthetics

Recent studies have shown that getting enough natural daylight can enhance energy, concentration, and mood – and commercial daylighting is making this more accessible to hotels, resorts, condominiums and apartments.

Compared to the often yellow or bluish hues of artificial lighting, bringing natural daylight also allows true colors to be seen



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.



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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/ttnam61/files/ambient/pm25/Summary_of_Appendix_A_Changes_1020125_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

more vividly. In bathrooms, this means makeup is applied more accurately. In bedrooms and walk-in closets, this means that clothes are matched more appropriately.

While traditional skylights have long been used to allow more sunlight in, they have a number of drawbacks. Because skylights must be near the roof and often require wall construction through attic space to the ceiling, this substantially raises cost and can take several days.

From a functional point of view, skylights are prone to leaks, and sunlight directly entering the skylight can leave some areas in the home too sunny and others in shade as the sun crosses the sky. The direct sunlight also allows in a lot of heat, which increases cooling costs, as well as UV light which fades carpets, fabrics, and even hardwoods.

Unlike skylights that allow sunlight to enter only from upper levels of the home, commercial daylighting systems, also known as Tubular Daylighting Devices (TDDs), can direct natural light through up to 30' of highly reflective tubing that can accommodate 45 and even 90-degree angles. The natural light exits decorative fixtures to evenly brighten interior rooms, closets, hallways, bathrooms and more.

While skylights can be several feet across or more and require reframing or the cutting of joists or support beams, tubular skylights can be more effective at 10" or 14" in diameter and fit between rafters.

"By efficiently capturing daylight at the roof, transporting it through reflective tubing, and delivering it inside the home through optically engineered diffusers, a first-rate TDD can be several times more effective than a skylight or window in terms of daylight delivered with minimal heat transfer," explains Dana Carlson, a product manager at Solatube, a global leader in residential and commercial daylighting systems.

The company has developed better ways to capture, transfer and deliver sunlight without the heat, UV light, or maintenance of skylights through advanced domes, ultra-reflective tubing, customizable diffusers, and other means in the past 25 years. Solatube's Raybender and LightTracker technologies, for example, capture and redirect maximum amounts of daylight into the tube, including low-angled light, such as early morning, late afternoon, and winter sunlight.

Unlike traditional light sources, LEDs expend significantly less energy to produce light. For this reason, they can last up to three times longer than compact fluorescent lamps, eight times longer than halogen lamps, and a whopping 25 times longer than incandescent lamps. The LED bulbs in the Smart LED System are designed to last up to 20 years, making maintenance easier since re-lamping will be unnecessary for decades.

The Smart LED System constantly monitors daylight levels using proprietary SunSense Technology. When exterior daylight

conditions are too dim, the LEDs automatically activate to maintain acceptable light levels, day or night. When daylight levels are sufficient, the LEDs turn off automatically. This hands-free approach eliminates the need for light level adjustments, providing added convenience for building occupants. Units can be connected to a wall switch or an optional occupancy sensor to ensure the LED lights only come on when there is a person present in the space.

While skylights can take days to install, Solatube Daylighting Systems take about two hours due to a unique fastening and tube telescoping system. Typical obstructions and structural changes are avoided too, as angle adapters and extension tubing make it easy to go around rafters and joists for fast installation.

Engineered to work with all roof types – including shingle, slate, tile and metal – its powder-coated seamless flashing with one-piece metal construction also eliminates the possibility of leaks. Plus, the circular design allows rain and debris to bypass the rooftop dome, making them virtually maintenance-free.

For more info, call 1-888-SOLATUBE; email info@solatube.com; visit www.solatube.com/residential; or write to Solatube International, Inc., 2210 Oak Ridge Way, Vista, California 92081.

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GORE® FR Apparel is a new line of FR foul weather outerwear products designed to meet the demanding needs of oil and gas workers. A jacket, bib, and detachable hood combination offers protection from incidental flame exposure and weather protection across a wide range of environmental conditions, while offering moisture management to improve comfort and safety. The durable, lightweight 2-layer ePTFE membrane construction also helps protect workers from exposure to hot liquids, steam common oilfield contaminants, and allows for easy care and cleaning.

Leveraging the same platform as GORE-TEX® Fabric and utilizing Gore's proprietary PYRAD® Fabric Technology, GORE® FR Apparel complies to ASTM F2733-09 and ASTM F1891-12 and adds retro-reflective properties that meet or exceed ANSI/ISEA 107-15 Class O, Type 1 and CSA Z96-15, Class 1, Level 2 offering HSE managers the confidence they need when selecting FR outerwear for their employees.

“Simply put, GORE® FR Apparel is a best-in-class line of foul-weather outerwear products that will deliver an unprecedented performance-to-value solution for our customers in the oil and gas markets,” said Sean McDearmon, Market Development Champion for Gore. “A new performance benchmark has been established.” For more information visit our website at www.goreprotectivefabrics.com/utilities or call 800.431.GORE (4673).

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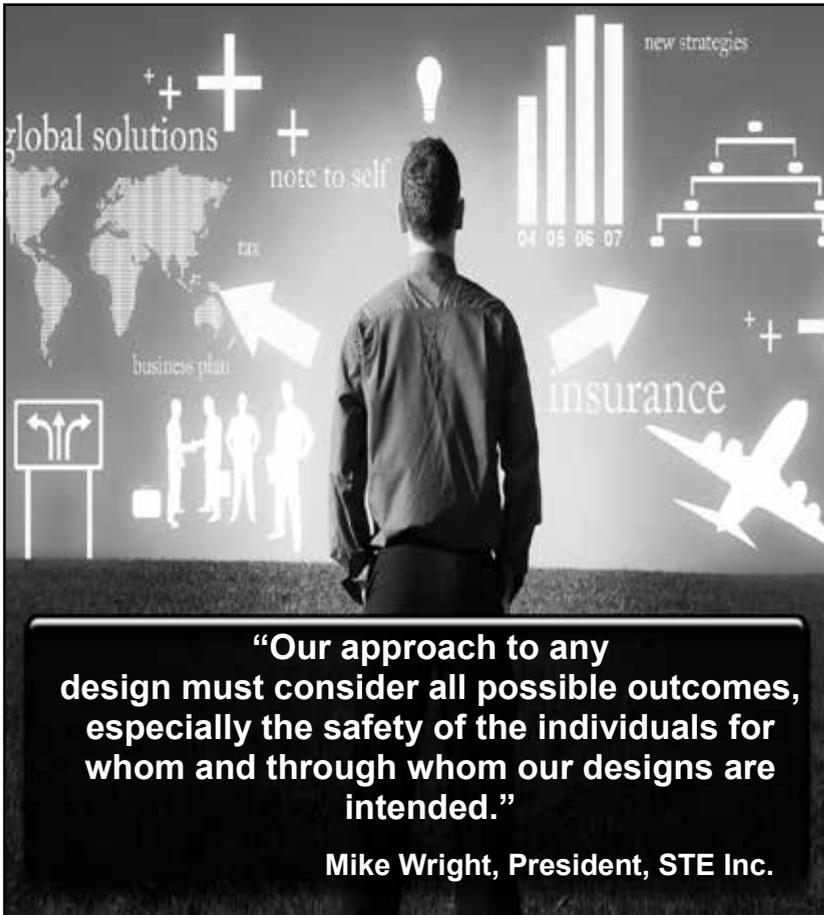


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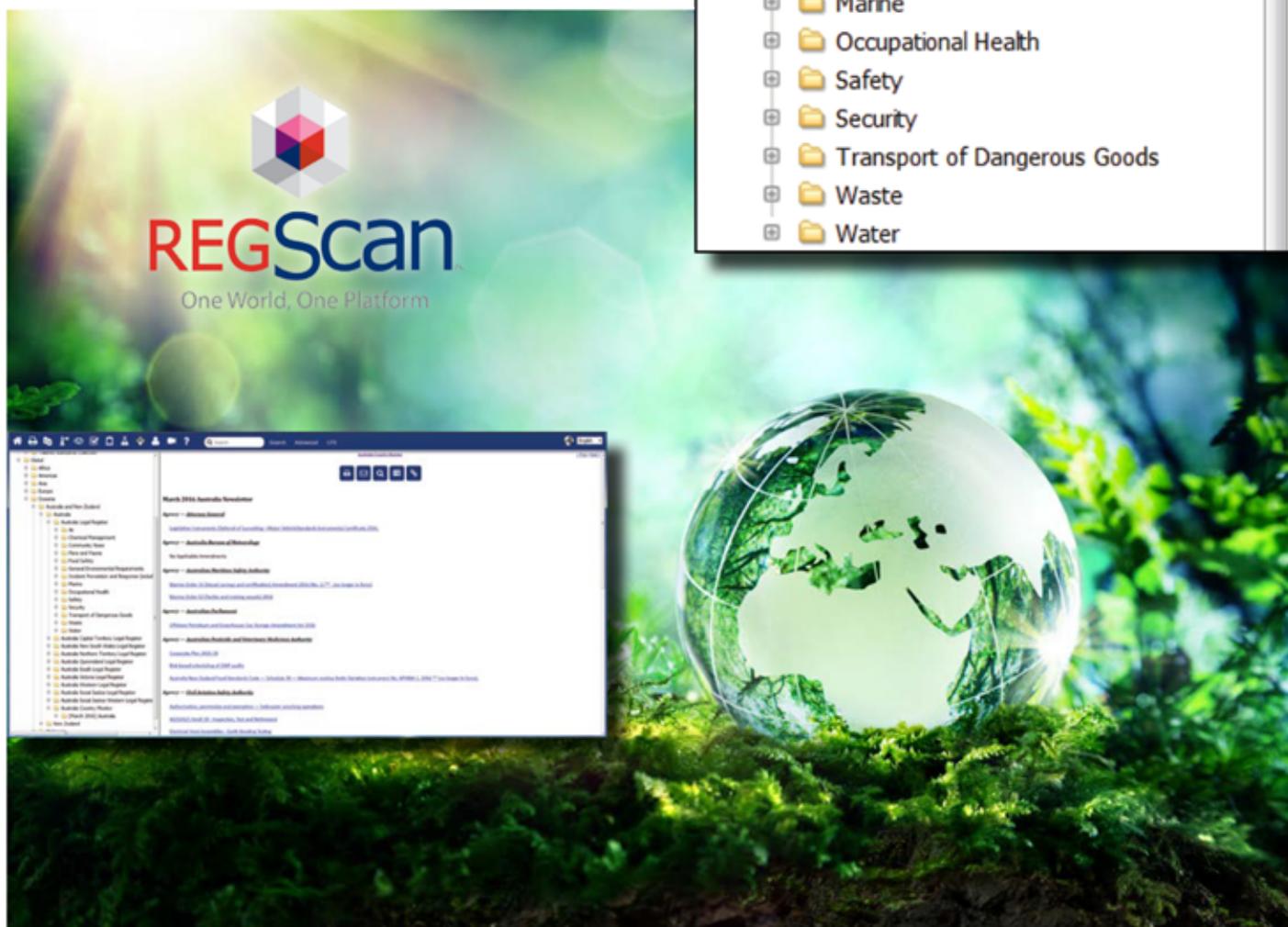
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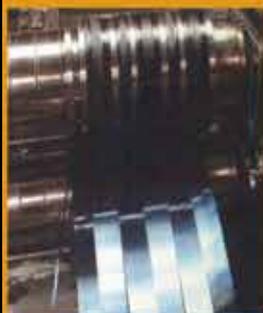
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