Industrial Safety & Hygiene News

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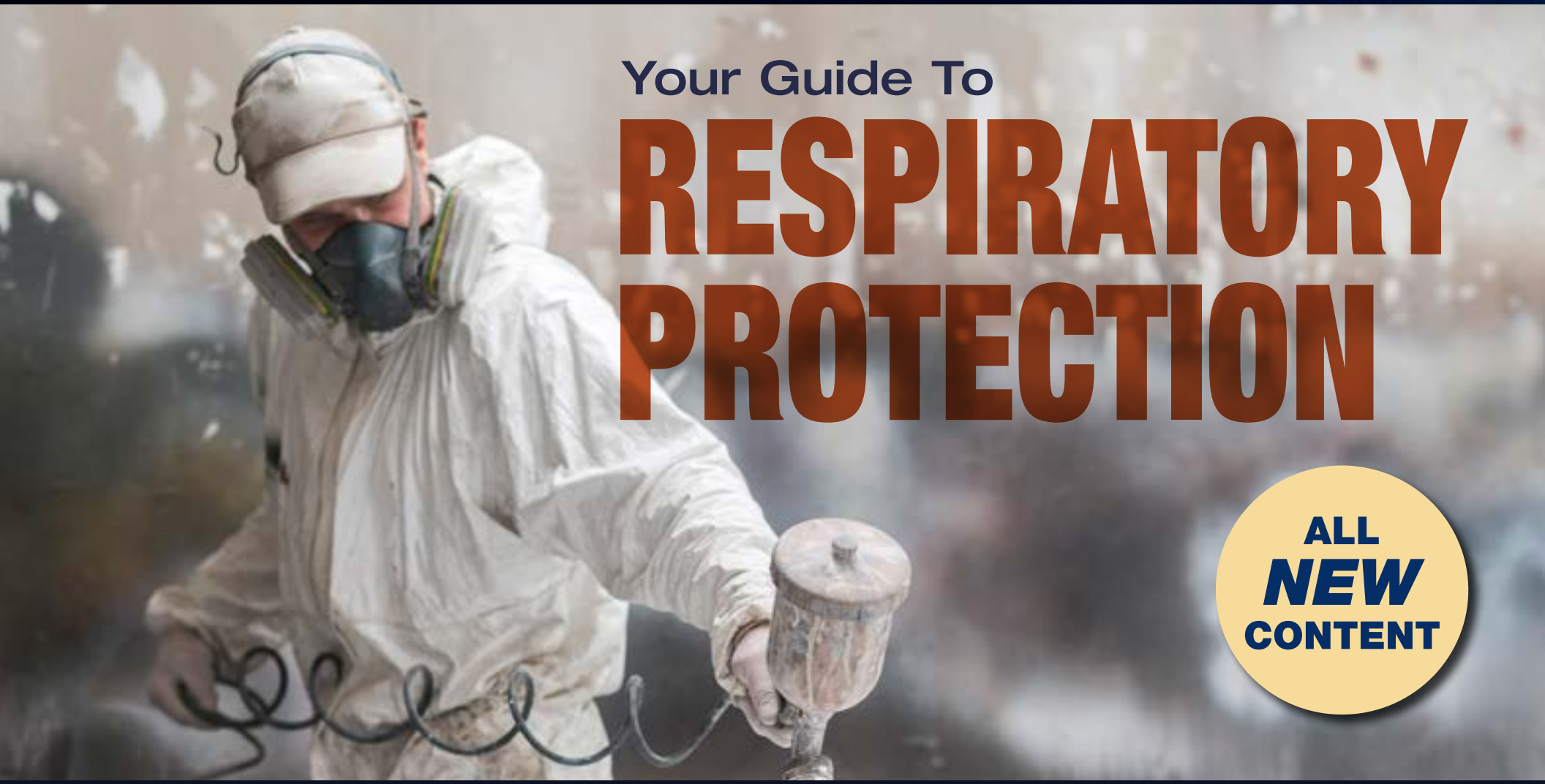
- Trends in respiratory protection
- Solving welding fume exposures
- Silica dust's invisible risks
- OSHA's fit testing requirements
- Exclusive purchasing & usage research



Your Guide To

RESPIRATORY PROTECTION

ALL *NEW* CONTENT

introduction

Respiratory protection is arguably the most vital, potentially life-saving personal protective equipment (PPE), along with fall protection gear. And protecting your employees against respiratory hazards is challenging. Administering an OSHA-compliant respiratory protection program is a multi-faceted endeavor. The revised standards issued in 1998 – CFR 1910.134 and 29 CFR 1926.103 -- are now 20 years old, and many safety and health practitioners still have issues with it and questions about it.

A respiratory protection program involves writing out a plan with required worksite-specific procedures; the plan must be supervised by a trained program administrator. Gas, fume, mist particulate and other exposures that cannot be controlled by means other than respiratory PPE must be identified; typical applications include confined spaces, welding, and silica, the subject of one of OSHA's most recent standards. Articles and sponsors cover all these hazards in this ebook.

Your respiratory protection program also includes matching the right respirator for the exposure; using only NIOSH-approved respirators; calculating respirator protection factors; medically evaluating employees who will wear respirators; fit-testing masks to individuals; employee training; setting schedules for cleaning, maintenance, repairs and discarding respirators; and regularly evaluating the effectiveness of your program.

No wonder violations of OSHA's respiratory protection standard constituted the fourth most-frequently cited agency standard in 2017. Last year there were 3,381 violations. The most common was hazard evaluation, followed by establishing a respiratory protection program, respirator fit testing, having a written plan and qualified administrator, and medical evaluations. This ebook will be a handy compliance guide to navigate the many aspects of respiratory protection, and understanding some of the most common respiratory hazards.

OSHA estimates more than five million workers need respiratory protection in 1.3 million workplaces. Of the 12.7 million people diagnosed with cancer each year, anywhere from 381,000 to 762,000 diagnoses stem from prolonged exposure to workplace carcinogens, according to NIOSH. *ISHN* is pleased to produce for you this ebook on one of safety and health's most important topics.

Dave Johnson
ISHN Editor

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Current trends in respiratory protection

Silica & opioid exposures; technology advances

By RICK MARQUEZ

What are the big headlines in the respiratory protection world this year? Here are three areas safety and health professionals are watching closely:

1. Silica
2. Opioid Epidemic Hazards
3. New Technology in Safety

Let's examine each of these in more detail.

Silica

The new OSHA Silica Standard came into effect last fall and it's estimated that over two million workers are impacted by the silica standard. Employers must be aware/knowledgeable of their site dust levels and have appropriate measures in place for the level and for the likely exposure times. Measures include: dust controls and safer work methods and use of respirators when dust controls and safer work methods cannot limit exposures to the permissible Exposure Limit (PEL).

How's it going so far?

Companies see the value of compliance and genuinely want to protect their staff. It has been reported that there have been 116 citations in the first six months, with the most common citation relating to failure to do air/exposure monitoring. That's not surprising — monitoring being the first step in the OSHA regulation and not a routine check for small to mid-sized companies.

Many companies that had no respiratory program are now working to get hundreds of workers medically tested, trained and fitted for respirators. As a manufacturer of low profile, light weight Powered Air Purifying Respirators (PAPRs) we're seeing an upsurge of people in the construction and related fields looking at upgrading from negative pressure cartridge respirators and N95s to lightweight and easily deployable PAPRs that provide a higher Applied Protection Factor and save

Current trends in respiratory protection *continued*

costs in the long run.

The opioid crisis

The number of Americans dying from opioid overdoses continues to rise. The CDC published a recent study that said that in 2016 there were more than 42,000 deaths from opioid overdoes. The most common synthetic opioid responsible for the epidemic is Fentanyl, estimated to be 50-100 times more powerful than heroin. The sheer numbers of overdoses have created a major risk to law enforcement, first responders, hazmat workers and hospital staff who can be frequently exposed to life-threatening doses of opioids.

NIOSH/CDC in a recent publication warned employers and workers to understand their risk for fentanyl exposure and maximize their protection through proper PPE including appropriate respiratory protection. Absorption via inhalation or via mucous membranes of the mouth and nose are believed to be the most likely modes of exposure – wearing gloves, avoiding touching the face and wearing a respirator are recommended by NIOSH/CDC.

Due to the low exposure levels and dangerous/sudden effects (collapse, coma, death), it is critical to wear respiratory protection that fully protects and stops exposure – as even the smallest amount can be life-threatening. Of course, training in the correct use of respiratory protection is imperative. Earlier this year the CDC published a document related to the Fentanyl risks and PPE. The report provides an outline of safety procedures, training, PPE and a detailed chart about respiratory protection.

In low risk situations staff is advised to use disposable N100, R100, or P100 products. For high risk scenarios - longer exposure, higher concentrations or situations where the exposure is unknown, guidelines call for high protection solutions such as PAPRs or even SCBA. Concerns with the daily risk to Fentanyl exposure for emergency staff, hospitals and law enforcement agencies are moving to adopt strong PPE practices including PAPRs.

First line responders are far more educated and experienced in opioid overdoses than they were ten years ago. With a number of high profile deaths in their ranks due to accidental exposure, there is a growing awareness of the risk to their own lives while carrying out their jobs in the line of duty. Basic PPE with training and compliance ensures first responders to opioid overdoses are protected.

New technology in workplace safety

Workplace safety has been an industry to experience rapid change in the past 20 years – from training/education, site monitoring, remote and real-time data collection to global-wide adoption of safer work techniques driven by regulation, societal expectations and importantly, improvements in equipment.

What technology should HSE specialists be watching for?

- **Air monitoring** – improvements in manufacturing has driven down the cost of detectors and personal gas monitors.

Current trends in respiratory protection *continued*

Connected devices have allowed companies to remotely monitor equipment performance and in some cases the worker himself.

- **Clothing** – Improvements in fabrics have enabled breathability and improved durability.
- **Eyewear** – welders shields with improved color differentiation and protection
- **Powered respirators** – Game-changing designs that dramatically reduce weight and parts and make high protection deployable site wide.

One area in development is the "connected worker" – where sensors enabling data collection are embedded in site equipment and on personnel or PPE and have the potential to create real time monitoring for early warning systems and changes in workplace activities/processes that lead to improved safety and business operations.

Our workers deserve and expect a safe work place. For employers or HSE teams this is not always easy and there can be considerable challenges for compliance and making suitable equipment available. Fortunately, the knowledge base of workplace safety and PPE is growing driven by OSHA, CDC/NIOSH, ISEA, industry and PPE manufacturers. Workplace safety is globalized, driven by large multinationals and an international community of specialists.

Watching the trends is an easy and valuable way for HSE and employers to remain aware and deliver business improvements while keeping their staff safe.

Rick Marquez is vice president of sales - The Americas, for Sydney, Australia-based CleanSpace Technology. CleanSpace manufactures innovative PAPR systems newly launched in the U.S. and the Americas. Rick has more than 25 years of experience in the safety and respiratory marketplace managing sales and business development throughout the U.S., Canada and Latin America. Contact Rick at rick.marquez@cleanspacetechnology.com; (310) 463-6428.

CleanSpace Respirators, disrupting the norm…

CleanSpace Respirators are an innovative range of powered respirators that have been NIOSH-approved since 2017 and have built up a loyal following amongst general industry and welding specialists across North America.

CleanSpace is revolutionary in respiratory protection - lightweight (1.1 – 2lb), comfortable and offers higher protection than any other filtering respirator. The compact (2 parts) system is easy to train on, effective to deploy and simple to maintain by an individual or large company. The fresh positive airflow ensures workers are well protected, cool with no fogging and not constrained in their tasks – increasing productivity and compliance. The patented Air-Sensit™ technology adjusts to wearer's breath 100 times per second and adjusts for temporary break down in seal or poor mask fit. With a smart operating system and few parts, CleanSpace is a low inventory, easily trainable and re-useable powered respirator that makes good economic sense for any business looking to improve respiratory safety and compliance.

For too long, employees and their teams have had to endure the expense, discomfort and limited protection of the N95 disposable mask. The CleanSpace vision is to make personal devices with high levels of protection, that are comfortable to wear and easily deployable even over the largest operations. Modern technology and smart design, like that in mobile phones, has enabled significant miniaturization and a significant increase in performance. In an industry that has not seen innovation in 25 years, NIOSH-approved CleanSpace respirators are a revolution in respiratory protection.

With standard and high capacity NIOSH-approved High Efficiency Particulate (HEPA) filters, CleanSpace offers a range of models including an intrinsically safe model plus half and full-face mask options and accessories. Suitable industrial applications including protection from:

- Respirable silica in construction;
- Metallurgy and welding fumes;
- Manufacturing and woodworking processes
- Large scale maintenance and cleaning operations.

CleanSpace respirators are also used by healthcare teams and first responders. Driven by the emergence of bioterrorism, infectious disease pandemics and ever-present illicit fentanyl used in illegal drug manufacturing, healthcare and law enforcement personnel are faced with life threatening risks from inhalation of unknown toxins and biohazards. First Responders and Healthcare workers health and protection is paramount in responding, containing and protecting the wider American community.

CleanSpace Technology specializes in respirator design and is a manufacturer of advanced personal respiratory protection in the healthcare, emergency and industrial applications. CleanSpace is focused on innovation, safety business efficiency, comfort and quality. CleanSpace respiratory protection technology is truly a game changer. The AirSensit™ technology behind the CleanSpace respirators was developed by leading biomedical engineers from the medical device industry who are specialists in positive pressure airflow control and mask design, and work to the highest standards in safety, quality and reliability. The CleanSpace team built their skills and expertise with the design and development of FDA-approved medical respirators currently in use by millions of patients around the world. CleanSpace global headquarters and manufacturing are in Sydney, Australia with a regional presence in over 30 countries including product specialists, sales representatives and a network of trained professional distributors throughout North America.

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4 warnings of **welding fume problems**

Check health concerns, air quality standards, fume build-up and equipment

By JON LADWIG

Many manufacturers use one of two options to clear the air of welding fumes – filter the dirty air and recirculate clean air inside the facility, or exhaust the dirty air outside and provide clean replacement air from outside.

If you are recirculating cleaned air, you'll need to keep below OSHA permissible exposure limit (PEL) thresholds for metal contaminants generated by welding processes.

If you are exhausting the air outdoors, you are subject to EPA emission requirements.

When you are using a collection system to capture weld fumes, you have to make sure your equipment is doing its job.

Recognizing warning signs that you may have problems with your fume extraction equipment and addressing them promptly is key to protecting workers' health and your facility and keeping your operation in compliance. Here are a few important indicators that you may have a welding fume problem:

1 Employee health concerns

If your employees experience health problems consistent with overexposure to fumes, pay attention. In general, watch out for eye, nose and throat irritation, dizziness and nausea.

Manganese, the primary metal in welding wire, can cause

headaches, exhaustion, listlessness and weakness. Prolonged exposure to manganese fume can cause neurological symptoms.

Exposure to **hexavalent chromium,** a carcinogenic substance produced during welding on metals that contain chromium, can result in short-term upper respiratory symptoms, eye or skin irritations. The most serious long-term danger associated with hex chrome exposure is lung cancer.

Zinc oxide, generated by hot work on galvanized steel, can result in "metal fume fever," a short-term illness in which severe

4 warnings of welding fume problems *continued*

flu-like symptoms occur after a break from work, such as after a weekend or during a vacation.

Signs and symptoms of beryllium exposure can include shortness of breath, an unexplained cough, fatigue, weight loss, fever and night sweats.

2 Exceeding air quality standards

If air quality testing shows your facility no longer meets OSHA exposure limits for the materials you are welding, you are exposing your workers to dangerous welding fumes. OSHA has established PELs based on an eight-hour time-weighted average (TWA) for hundreds of dusts, including metals contained in welding fumes. They are listed in OHSA's annotated PEL tables.[1] OSHA's Fact Sheet, "Controlling Hazardous Fume and Gases during Welding"[2] includes links to OSHA standards applicable to welding.

The OSHA PEL requirements will determine the minimum level of filtration efficiency that your fume collector must be able to achieve. Note, though, even if your facility is in compliance with PELs set for your metals, some of your workers might still experience fume-related health symptoms. When this happens, you may need to set even lower exposure limits to ensure air quality safety for all of your employees.

If visible fumes are exhausted outdoors, the air is subject to monitoring under EPA National Emission Standard for Hazardous Air Pollutants (NESHAP) Rule 6x.[3] Within this standard are materials that contain 1.0% by weight manganese or 0.1% by weight cadmium, chromium, lead or nickel. If you opt to exhaust the air straight outdoors, you must perform an EPA Method 22 Fugitive Emission test per NESHAP Rule 6x.

3 Excessive build-up of fumes

If you still have welding fumes building up in your facility, pay attention to your equipment. If you have a source capture system, it may need adjustments to get back to the original performance level. Or your process may have changed, and your source points are no longer effective.

If you are using an ambient ventilation system, you might see a light cloud during working hours. These light fumes should dissipate when the work stops and the filter system stays running. Watch out for a fume cloud that thickens throughout the day and hangs in the air long after welding activity ends. If you can see heavy fume accumulation, it doesn't necessarily mean that your fume extraction system isn't working. Many successful companies increase production and outgrow the fume extraction system and need to re-evaluate to accommodate the uptick in activity.

4 Equipment issues

Whether you choose to exhaust air outdoors or recirculate air indoors, one strategy that offers multiple benefits is the use of a dust and fume collector with high-efficiency cartridge filtration. If your system isn't working sufficiently to handle the welding fumes created from your facility's workload, you'll notice the effects in

4 warnings of **welding fume problems** *continued*

the performance of your equipment.

If the filters in your fume extraction system are failing prematurely and requiring frequent change-out, the culprit may be excessive airflow for the filter media area. This could indicate that the collector may be too small for the job.

Another area to watch is the compressed air system. If the compressed air pressure is too low, the pulse-cleaning system will not clean the filters properly. If the compressed air moisture content is too high or there is oil present, the filters may plug or it could cause problems with the solenoid and diaphragm valves. Moisture problems in compressed air systems are especially prevalent in cold winter months.

Proactive weld fume control

A well-designed cartridge system will properly filter welding fumes and other hazardous contaminants, and the filtered air can either be exhausted outside or recirculated back into the facility. These systems use self-cleaning mechanisms that pulse dirt off the filters, allowing units to run for extended periods between filter change-outs.

Regular inspections & periodic service

Verify that dampers are in position, valves are working and pulse-cleaning systems are functioning properly. Check pressure drop on filters to make sure it has not exceeded the manufacturer's recommended limit. Check compressed air pressure and purge the compressed air header, looking for signs of moisture. If you are located in a cold climate, make sure that your compressed air has a dew point that is below the lowest temperatures your equipment will be exposed to.

Test your dust

If you're experiencing any of the warning signs for welding fume problems, bring in an environmental engineer to perform air sample testing. This will allow you to pinpoint what pollutants are occurring and to determine whether you are below OSHA PEL thresholds. Also, if you haven't tested your dust for flammability and explosion potential, NFPA guidelines call for you to do so. An environmental engineer or your fume collection equipment supplier can connect you with a lab that specializes in explosion testing.

Jon Ladwig is the systems market manager for Camfil Air Pollution Control (APC). For further information, contact 1-800-479-6801 or 1-870-933-8048; email filterman@camfil.com; website www.camfilapc.com.

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Selecting the right breathing air system

Hazard Evaluation

First, conduct and review the results of a hazard assessment to identify what hazards exist. This phase of the decision process determines the proper selection of airline respirator and type of Grade-D or Grade-E breathing air system to use.

Respirator Selection Choices

Once the safety department determines the concentration or oxygen level of the hazard, it is time to select the appropriate airline respirator.

All airline respirators are positive pressure and either 1) Constant Flow or 2) Pressure Demand. Constant flow (CF) respirators are available with a tight-fitting mask or a hood design used for painters and sandblasters. Pressure demand (PD) airline respirators are available with a tight-fitting mask; a special version PD comes with a five minute escape cylinder used in IDLH (Immediate Dangerous to Life or Health) locations.

Calculating the Air (CFM) Requirements for the Work Site

The total number of airline workers plus air tools to be used at the work location will determine the size of the compressor to provide all air requirements. The number of workers multiplied by the required minimum flow rate per respirator, 4-6 cfm, plus the tool requirements will determine the size of the air compressor.

An additional 15-25% output capacity (CFM) should be added to the overall compressor system for any unforeseen air consumption needs. Always calculate the average air flow requirements for each worker at approximately 10-12 CFM per worker and add any air for tools required.

Selecting Supplied Air Method – Grade-D or Grade-E

After identifying any hazards, selecting respirators, determining the number of workers, and calculated the total CFM air source needed, select the air source:

1. Can the plant compressor provide adequate air (CFM) and pressure (PSI) for the job?
2. If the plant compressor is undersized, secure a portable compressor with adequate capacity.

Note: If the work location is determined as Hazardous, this choice must be eliminated.

3. If Choices 1 or 2 are not available, compressed Grade-E breathing air cylinders must be provided.

Supplying Grade-D Breathable Air

Options 1 and 2 above require the use of a Grade-D air filtration system. The components of a Grade-D Breathing Air System include:

1. Air Source: Air can be supplied from electric, gas, or diesel compressors.
2. Filtration (with CO Monitor): Grade-D filtration units provide breathable air to the workers through a 3-stage filtration system

Selecting the right breathing air system *continued*

with proper flow (CFM) capacity. Select a filtration system based on the listed CFM capacity of the Grade-D unit and not by the number of outlets supplied. The most toxic and hazardous portion of Grade-D air is Carbon Monoxide (CO). A CO monitor device will alarm workers at 10 ppm if there is high CO (5 ppm in Canada). If the work location is considered explosive, always select a Grade-D Filtration System supplied with a certified CO monitor approved for use in explosive locations.

3. Air Distribution: The air pressure (psi) must be set according to the manufacturer's respirator data sheet for the respirator in use; the corresponding respirator quick connect coupling specified must be used.

4. Respirator: The final part of a Grade-D Breathing Air System is the airline respirator; it is attached to the air distribution with the manufacturer's required fittings and the manufacturer's hose with a maximum of 300 ft. from the point-of-attachment (POA).

Summary

Understanding the basics of a Supplied Air System will allow you to design a safe breathing air system for one person or over 100 workers.

By David F. Angelico, President, Air Systems International, Inc.

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No guarantees

Keep workers safe before, during & after confined space entry

By RUSSELL WARN

Working in confined spaces often presents unique challenges. These sites—characterized by their limited entry or exit paths and a size that makes them too small for continuous occupancy but large enough for worker activity—are vulnerable to a series of hazards, ranging from toxic gases to faulty structures.

Luckily, these dangers can be mitigated. With over one million workers entering confined spaces each year, it's essential that safety managers invest in developing a confined space entry (CSE) plan of action, which can help identify and alleviate present risks. By detailing what workers can do before, during and after CSE, such plans give workers the agency necessary to protect themselves—and each other.

Step one: Assess potential hazards

As with all potentially dangerous situations on the worksite, it is crucial for workers to identify job and site-specific health and safety threats. For confined space scenarios, this comes by way of atmospheric testing prior to entering. This assessment has two distinct parts: evaluation testing and verification testing.

Evaluation testing can help identify dangerous airborne chemicals such as hydrogen sulfide (H2S), xylene and hexane, among others. For instance, H2S is particularly prevalent for those who work in confined spaces, since it weighs more than air, and is thus predisposed to accumulate in enclosed areas. In areas where H2S may be present—most commonly around crude petroleum and natural gas deposits or stagnant bodies of water, but also near manmade sites—workers must adhere to the proper protocol from a process and equipment perspective.

While the health hazards of the gas depend on its concentration and the duration of its presence, affects can

No guarantees *continued*

include headaches (around 10-100 ppm), loss of smell after 2-15 minutes (around 100 ppm), a rapid loss of consciousness (around 700-1000 ppm) and almost instantaneous death (around 1000-2000 ppm). To establish H2S's presence prior to CSE, workers can use portable gas detectors in conjunction with external pumps and hoses. Detectors with integrated rubber housing, shock-proof sensors and insensitivity to electromagnetic interference can provide superior test information, as they are largely impermeable to harsh environmental conditions.

In scenarios where confined spaces have either (1) potentially hazardous atmospheres (determined via evaluation testing); (2) designs that that can engulf workers; or (3) interiors that can cause asphyxiation, a permit and verification testing may be required.

Performed to ensure that any present chemicals exist at safe levels, verification testing assesses several different atmospheric qualities. Oxygen levels are tested first, since most gas meters fail to provide accurate readings in oxygen-deprived atmospheres. Next, the presence of combustible gases is established, followed by the presence of toxic gases, as the risks presented by the former are often more pressing than those presented by the latter.

Step two: Protect workers accordingly

Once a worksite's hazards have been identified, it is important to arm workers with the proper safety gear. Respiratory protection, for instance, can help mitigate the effects of airborne threats. To return to the hydrogen sulfide scenario, for exposure levels below 100 ppm, full-face respirators with threefold sealing edges and wide straps can offer sufficient protection and comfort. If H2S levels are equal to or above 100 ppm, however, workers might require a self-contained breathing apparatus (SCBA) with a minimum lifespan of 30 minutes.

Like respiratory protection, portable gas detectors can help safeguard the air workers breathe. In addition to helping with initial atmospheric evaluations, personal detectors can help alert workers to fluctuations in gas concentrations while inside a confined space. Detectors that have sensors placed in multiple locations—at the top and front, for example—are particularly useful, as they can function well regardless of their placement on the workers' person.

To ensure maximum worker safety, full-fledged monitoring systems can be used. These programs combine various protective measures that defend workers from an array of potential hazards. For example, programs that combine gas detection with video surveillance, access control and a two-way intercom can help defend workers from toxic gases and faulty structures, along with other threats.

Video systems that can monitor several points simultaneously and use infrared technology can be especially beneficial, as the former increases the breadth of surveillance and the latter allows for better vision in dark or dusty environments.

Simple access control systems—designated by a green light

No guarantees *continued*

that signifies "access granted" and a red light that signifies "access denied," for instance—can help make CSE processes easily comprehended and unaffected by language barriers.

A two-way intercom is yet another useful monitoring system feature, as it aids communication between interior workers and outside supervisors.

Step three: Exit and repeat

When finished using protective devices, workers should employ the appropriate cleaning and storage techniques. For example, workers might consider disinfecting used respirators, and then placing them in containers that are impervious to harm, contamination and extreme temperatures. By doing so, workers can help maintain device functionality and lifespan and ensure that the devices are ready for their next use.

Notably, workers should not remain in a permit space for longer than the maximum time allotted on the permit. Even if work is left unfinished, employees nearing the end of their allocated stay should exit the confined space and report back to the appropriate person. Upon re-entry, atmospheric testing should be repeated, unless continuous monitoring systems have been employed and are showing it is safe for the re-entry.

A confined space's safety is never guaranteed, and environmental and structural changes can alter an atmosphere's composition dramatically. As the saying goes, time is precious—especially when it comes to confined spaces. With the proper knowledge and protection, workers can stay safe on the job and come home uninjured, time and time again.

Information presented herein is for informational purposes only. Follow any applicable internal and external policies, procedures, rules, and regulations as it applies to your workplace environment.

Russell Warn is the Product Support Manager for gas detection products at Dräger, Inc. With over 30 years in the safety industry, he is an expert on gas detection product and application support. He can be reached at Russell.Warn@draeger.com

Sources:

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2. https://www.osha.gov/SLTC/hydrogensulfide/exposure.html

Existing Technology Meets Innovation in Respiratory Protection

Particulate respirators use similar technology to capture contaminants today as they did many years ago. The five basic mechanisms that help to capture particles are **Impaction, Interception, Sedimentation, Diffusion and Electrostatic Charge**. All these mechanisms are used by the filter, but depend upon other factors as to which mechanism is more predominant in capturing a particular particle. These factors include particle size, breathing rates (which relates to the velocity of the particle) and humidity.

- **Impaction** is where a particle has a certain amount of inertia while traveling in an air steam and tends to continue on a straight path when the direction of the air stream changes and therefore runs into the filter surface rather than passing through the porous fibers.

- **Interception** is where the edge of a particle comes close to a filter surface, touches it and then adheres to it.

- **Sedimentation** is where the air velocities are small and a particle simply tends to drop out of the air stream due to gravity.

- **Diffusion** is where a particle is so small in size that its movement is affected by being moved around by the natural and random movement of gases.

- **Electrostatic Charge** is where the filter has been charged and particle of opposite charge is naturally attracted to the filter, like opposite poles of a magnet.

These above stated factors although variable, are what makes a filter work and generally cannot be easily altered, though manufacturers can make adjustments making some of these factors more or less predominant. What is more subject to change are some of the other features that a manufacturer can build into the respirator to make it more effective and user friendly.

Innovation in respiratory protection is a very important concept. Any feature that will make the respirator more comfortable, fit better and ultimately more wearable will enhance the respirators efficacy because there will be a greater tendency to wear it. A manufacturer can have the “best” respirator in the world, or an employer the “best” written program, yet without proper and continuous use of the respirator by the employee the program is rendered ineffective. Here is where the innovation comes in.

It is not often that you find innovative respiratory protection products, yet every so often a manufacturer comes out with a good idea. Some of the more recent innovations that have been developed in the last several years are:

Existing Technology Meets Innovation in Respiratory Protection *continued*

Ability to more easily hang the respirator around the neck: This is a very important innovation and can be found in disposables as well as reusables. The advantage is that the user can hang the respirator around their neck when they are not in the contaminated area. Previously, the user would remove the respirator and either have to carry it around, store it (sometimes in inappropriate places such as a contaminated bench top), or wear it uncomfortably around the neck. This feature solves many of these problems.

Increased filter area using pleats: This is a new technology where the filter media of a disposable respirator is pleated to add surface area to the respirator. Typically this technology has been used for reusable cartridge respirators, especially the high efficiency particulate air (HEPA) cartridge filters. By adding this feature to disposable masks it generally adds more breathability, lower resistance, and greater longevity of the filter.

Of course, all respirators whether disposable or reusable must be fit tested, training must be conducted, and all elements of a respiratory protection program complied with. But the easier, more pleasant, and comfortable you make it for the employee, the more compliance that will be achieved.

Jeffrey Birkner, Ph.D., CIH is VP - Technical Services for Moldex-Metric, Inc. a leading manufacturer of hearing and respiratory protection equipment. For more info visit www.moldex.com.

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Deceptive spaces

Assess job sites for unexpected confined spaces

By CHRIS IRWIN

A work environment may not seem like a confined space at first glance, but the surprising truth is that confined spaces exist in many forms. They are found in nearly every industry, including food, chemical and petroleum processing, utility and communications installations, construction sites, and many others. Without a doubt, confined spaces expose workers to very real dangers.

So the question becomes, are you or your employees at risk? Should you take special precautions even if you are unsure whether or not your location could be considered a confined space? The obvious answer is yes — it's best to treat an unknown area and its interior environment as if confined space exists and take all necessary safety measures.

Hazard alert

What are the specific hazards of confined space entry? Confined space entry ports and shafts are often small and narrow, accessed via ladder or rope. Without the proper PPE and preparation, workers can be trapped inside and become subject to toxic gases, explosions, oxygen deficiency, particulates, and other hazards.

Below is the technical definition of a confined space.

A confined space:

- is an area large enough for an employee to bodily enter and perform work
- has limited or restricted means of entry or exit
- is not designed for continuous human occupancy.

A permit-required confined space has one or more of the following characteristics:

- it contains, or has a known potential to contain, a hazardous atmosphere

Deceptive spaces *continued*

- it contains material with engulfment potential
- it is configured such that entrants could be trapped or asphyxiated by inwardly converging walls or floors which slope and taper to a smaller cross section
- it contains any other recognized serious safety or health hazard.

Bearing these definitions in mind, conscientious employers carefully assess their job sites, develop written safety procedures, and provide training for their workforce. They also cooperate with OSHA regarding confined space atmospheric testing and use of respiratory, fall protection, head, eye, and face, hazmat, and gas detection gear. Conversely, failing to prepare may result in tragedy — injuries and fatalities do occur where no confined space procedures are in place or when workers ignore documented hazards, procedures, and company-provided PPE.

Deceptive spaces

It's important to remember that confined spaces are sometimes deceptive in appearance. For example, the interior of an open-topped water tower is defined as a confined space, even though the top is open to the outdoor environment. The following are just a few examples of confined spaces, many of which are on record as sources of injuries and fatalities.

Open-topped water tanks such as those used to supply municipalities with fresh water require maintenance involving priming, painting, refinishing, and sandblasting. Work is sometimes performed via catwalks located above or risers placed within tanks. As these processes require use of potentially hazardous materials, unprotected workers within such tanks may be subject to concentrated hazardous vapors plus lack of oxygen despite the tank's open top.

Control valve pits for water fountain displays pose potential asphyxiation hazards, as workers must crawl inside these pits to perform valve adjustments and maintenance. Workers can be subject to carbon monoxide buildup due to sewer trap gases found within, or oxygen deficiency/displacement due to mechanical corrosion or vegetation decomposition.

Grain silos present several confined space entry challenges. One such scenario involves bridging, a condition where grain that is stored wet crusts at the silo's surface, slowing grain flow. Workers sometimes walk on this surface to break up crust. Workers attempting to break up crusted grain in this fashion have fallen through and died from engulfment.

Flowing grain emptying through a silo's bottom creates a surprising degree of force and presents another hazard. A worker who has slipped into the grain flow just waist deep is at considerable risk of suffocation even when clutching a safety rope.

Grain spoilage presents yet another worker confined space hazard, as decomposition produces carbon dioxide, displacing oxygen within the silo. Workers within have been known to suffocate from lack of oxygen at the grain surface.

Deceptive spaces *continued*

Cleaning, repair, and refurbishment of railroad tank cars can put workers at risk of asphyxiation or engulfment, as this line of work often involves interior sweeping, welding, cutting, scraping, buffing, and abrasive blasting. Workers may be subjected to hazardous tank residue of transported toxic chemicals, airborne insulation, and dust. Cover gas such as nitrogen may be used to inert interiors, preventing spoilage of food-related shipments but displacing the remaining oxygen within. Polyisocyanate foam used to insulate chlorine-carrying tank cars is a source of potential ignition, the smoke from which may expose workers to toxic substances.

Workers generally enter empty tank car confined spaces via top hatches. It is essential that railroad tank cars and other transport tanks are properly marked using warning signage and tags. Tank car interior confined spaces should be adequately ventilated as well as sampled and monitored for toxic gases, particulates, and oxygen deficiency.

Conclusion

As the examples above demonstrate, confined spaces can be found in expected—and unexpected—environments, but each and every occurrence represents potentially major health and safety risks for many workers. The ability to recognize and plan appropriately for confined space work can mean the difference between a job well done and disaster.

In light of all this, how can you respond?

As an employer, make sure you take advantage of the many resources available to help protect your employees from the hazards inherent in confined spaces. In particular, full compliance with the OSHA standard governing confined spaces, 29 CFR 1910.146, requires the expertise of safety and health professionals such as industrial hygienists. With their assistance, you can evaluate your work site with its unique challenges, create a written safety plan, and make sure your workers understand everything they need to know to minimize their risk of injury or death.

As an employee, know your environment, master your safety procedures, and be intimately familiar with your equipment. In this way, you'll be better prepared to face the unexpected when you enter and work in confined spaces.

Chris Irwin, ASHM, is a global training instructor and safety program developer with MSA, having worked in the development of both fall protection and confined space entry training programs for the company and within the field of health and safety since 2008

Sources:

1. https://www.osha.gov/Publications/osha3138.pdf
2. NIOSH Fatality Assessment and Control Evaluation (FACE) Program: www.cdc.gov/niosh/face/
3. OSHA Safety and Health Topics; Confined Space: www.osha.gov/SLTC/confinedspaces/index.html

How to Buy an Industrial SCBA

The SCBA provides the highest level of protection available for the industrial worker in an immediately dangerous to life and health (IDLH) atmosphere. In today's world, an IDLH atmosphere can range from a confined space entry to a chemical, biological, radiological or nuclear (CBRN) event.

An SCBA purchase represents a significant financial investment for an organization. It must be a unit that users like well enough to use when working in an IDLH atmosphere, and it must be a cost-effective purchase for the organization, in the initial purchase price as well as service.

The SCBA should be dependable and durable so that users can rely on their equipment in the harshest environments and get the job done without worrying whether their SCBA will perform when needed.

7 things to consider when making an SCBA purchase

Consider these seven features while evaluating SCBA for purchase:

1. Rugged and durable design: Even with the best inspection, maintenance and testing program, SCBA must withstand tough conditions, so look for an SCBA platform that's been around for a while and has a reputation for durability.

2. Total cost of owning SCBA: Total cost of ownership (TCO) is an indication of how much the SCBA will cost over the lifetime ownership of the product and is as important as – if not more than – upfront cost.

3. System redundancy for extra levels of security: Your workers need and deserve an SCBA with system backups, such as an automatic dual-path redundant pressure reducer.

4. SCBA warranty: Does the manufacturer have a long history of warranty support? The length of warranty period may sound great, but only if you fully understand the limitations and exclusions.

5. Service and training: A robust service network and comprehensive training program should be key factors before purchasing. Does the manufacturer offer an extensive service network to ensure quick and efficient turnaround of repairs? Do they offer training free of charge, including user level up to technician repairs?

6. Maintenance: Understanding maintenance requirements before a purchase will help you avoid hidden costs. For example, does the SCBA manufacturer have a mandatory overhaul period? Required overhauls will add significant cost to the lifetime ownership of the product. Find out upfront. Look for a cost-effective, after-the-purchase package that includes required maintenance and technical support, as today's SCBA is much more than just an air cylinder with a hose and a mask. Ensure that the purchase agreement includes a complete listing of what components are not included in the product warranty.

7. Multi-platform respiratory solution: The number of facepieces required to outfit your team varies based on personnel. Having a versatile facepiece that allows a worker to use their facepiece for multiple purposes, including using supplied air and air-purifying respirators should be considered.

Silica dust's **invisible risks**

Here are 3 actions to plan for exposure protection

By DONNY BEAVER

Silica, often referred to as quartz, is a common mineral. It is found in many materials common on construction sites, including soil, sand, concrete, masonry, rock, granite, and landscaping materials.[1]

If you're in construction, maritime, hydraulic fracturing, or other general industries using silica, the new silica standard and silica dust should matter to you. Chances are, you could be getting exposed to dangerous respirable silica dust that you can't even see. And, what you can't see, can hurt you.

In fact, OSHA estimates that roughly 2.3 million people in the U.S. are exposed to silica at work. Health effects range from incurable lung disease to death, and therefore warrant significant attention from workers and employers alike.

Exposure scenarios

Dust created by cutting, grinding, drilling, blasting or otherwise disturbing silica materials can contain crystalline silica particles. These particles are small and invisible to the human eye. When these tiny silica dust shards are inhaled, they often become imbedded deep into the alveolar sacs of the lungs (where oxygen and carbon dioxide are exchanged).

Unfortunately, respirable silica dust can be hazardous and can cause silicosis, the oldest industrial disease. As silicosis progresses, shortness of breath begins to occur and clinical tests will reveal a poor exchange of oxygen and carbon dioxide. In later stages patients may experience persistent coughing, fatigue, extreme shortness of breath and even complete respiratory failure.

Okay, enough of the bad news. What's being done about it?

Here's some good news: While silicosis is progressive, irreversible and incurable, NIOSH and OSHA have taken the position that silicosis is completely preventable.

With more than a million individuals affected, it's no wonder

Silica dust's **invisible risks** *continued*

that OSHA rolled out new respirable crystalline silica standards focused on limiting worker exposure to respirable crystalline silica.

Put briefly, OSHA's new silica dust standard limits exposure to the tune of 50 micrograms of respirable crystalline silica per cubic meter of air, averaged over an eight-hour day. Still have no idea what that means? Here's a tangible comparison, "50 micrograms has roughly the same mass as a fly's wing."[2]

So, here's the deal: 50 micrograms is not much. You want to stay in compliance and keep exposure at safe levels. To help keep you and your workers safe and happy, we reviewed tips and best practices for reducing silica dust exposure. Here are three steps that you can take to get the ball rolling on a Silica Dust Plan.

Step one

Conduct a risk assessment to determine whether or not your workers could reasonably be exposed to the action level of 25 µg/m3 (micrograms of silica per cubic meter of air), averaged over an eight-hour day.

Ask yourself: Is there silica on site that could potentially be released into the air? Don't limit this question to the use of raw material. Keep in mind any activities on a silica substrate, like crushing, chipping, and blasting to name a few.

Don't just guess. Utilize air monitoring technology to confirm exposure rates. When air monitoring occurs, be sure to include measurement of tasks that create the highest potential exposure.

Step two

Establish and implement a written plan to protect workers from exposures over the PEL of 50 µg/m3, averaged across an 8-hour day.

To be compliant, this requires:

- Identifying tasks from your exposure assessment that could expose workers to silica dust.
- Outlining the engineering controls, work practices and respiratory protections methods used to limit exposure.
- Outlining the housekeeping measures and restricted work area procedures used to limit exposure.
- Designating a competent person to implement this plan.
- Using the data from your assessment, establish control methods, such as those laid out for the construction industry in OSHA's Table 1[3]. Or, independently decide upon alternative dust controls methods that will best limit exposure.

While engineering control methods vary greatly in efficacy depending on the task and the scenario, some potential methods to consider are:

- Containment - Create a dust containment system for the ongoing removal and filtration of contaminated air.
- Housekeeping - Restrict practices like dry brushing, dry sweeping, using compressed air without ventilation, etc., that expose workers to silica dust.
- Personal Protective Equipment (PPE) - Due to protective and practical limitations, the new OSHA Rule specifies that respiratory protection should only be used in cases where

Silica dust's **invisible risks** *continued*

engineering controls are inadequate.[4]

- Restricted Areas - Wherever possible, prohibit workers from entering high risk dust exposure zones.
- Substitution - Avoid silica altogether by using alternate materials.
- Ventilation - Affix a local exhaust ventilation (LEV) unit directly to equipment to contain dust at the source of origin.
- Wet Methods - Use water or other liquid agents where appropriate to reduce the generation of dust.

Step three

Training is always an integral part of a successful health and safety plan. Prepare to train workers on:

- The health effects of silica exposure,
- Workplace tasks that can expose them to silica,
- Ways to limit exposure.

Ask yourself:

- Have workers received hazard training?
- If using LEVs, did specific control training include proper disposal techniques, control limitations, and proper maintenance of tools?
- If using wet methods do they know the amount of water to be used, how to apply the water, and length of time water should be applied?
- In sum, can employees demonstrate adequate knowledge of chosen controls or alternative protective measures?

Follow up is also required. Make sure that:

- Exposure levels are verified through air monitoring to confirm that controls are effective.
- Medical exams are offered every three years to workers who are required to wear a respirator 30+ days per year.
- Records are kept of all silica exposure and medical exams.

While these tips are by no means all encompassing, we do hope that this article serves to re-introduce the revised silica standard and give you the basic oversight to consider whether you are OSHA compliant and protect the long-term health of your fellow workers.

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Refernces

1 Visit OSHA's Silica Overview here: https://www.osha.gov/dsg/topics/silicacrystalline/

2 Engineering Controls and Housekeeping Practices to Reduce Silica Dust Levels. Nilfisk. September 26, 2016. <http://news.nilfiskcfm.com/2016/09/engineering-controls-housekeeping-practices-reduce-silica-dust-levels/>. January 31, 2018.

3 OSHA's Table #1 of Specified Exposure Control Methods helps provide effective dust control methods to 18 common construction tasks. https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=1270

4 For more information about OSHA's stance on respiratory protection, see 29 CFR 1910.134: Respiratory Protection: https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=standards&p_id=12716

Comfort is safety

Climate control, air flow, padding & weight distribution improve respirator use

By JOSIE LARSEN

If there is any one thing that creates a win-win with respiratory protection, especially in terms of return on investment, it is comfort. We will discuss how comfort improves safety and productivity, and explore some of the best ways to ensure comfort.

Comfort is viewed by many PPE developers and manufacturers, employers and employees as secondary to safety, but we believe that comfort is safety. The more comfortable your employees are, the more likely they can make good and safe decisions. Or to look at it from the negative perspective, uncomfortable employees are a lot more likely to lose focus and not pay enough attention to their often-dangerous job and surroundings, make bad and unsafe decisions, or sub-consciously violate safety measures and risk harming themselves.

Comfort also has a positive effect on employee morale and productivity because it allows them to operate at their maximum level. Improved productivity allows your company to complete more jobs and ultimately, generate more income.

Here are some key factors to look for in PPE to ensure maximum comfort:

Climate control

Climate control in PPE refers to those PPE items that allow your employees to improve their body temperature and work comfortably. There are many forms of climate control in PPE; with some, their very purpose is climate control (for example air-

Comfort is safety *continued*

conditioning devices), while others are general items that can be used to aid with climate control (like coveralls that allow air to flow over the body).

Sufficient climate control is paramount, not only to maximize comfort, but also for safety. When the combined temperature of your body and the environment you are in reaches levels where your body can't regulate its heat gain though sweating, you can develop heat cramps, which is a mild form of heat-related illness. This is usually accompanied by fatigue, heavy sweating, muscle cramps and thirst. If promptly treated by drinking water and resting in a cool place, further illness can be prevented. If ignored, however, this can develop into heat exhaustion where symptoms can include that of heat cramps plus confusion, nausea or vomiting, headache, dizziness and fainting.

The worst form of heat stress is heat stroke (a type of hyperthermia) where your body may stop sweating, collapse and experience seizure. This is life-threatening and requires immediate medical attention. Effective climate control will assist your body in maintaining a safe and comfortable temperature so that even the mildest forms of heat stress don't occur.

Also important but not so commonly required is protection from the cold and the associated dangers. Prolonged exposure to cold temperatures can develop into hypothermia, which is also life-threatening, as it can cause your essential organs to fail.

Air-supplied respirators

Air-supplied respirators are more comfortable because they supply air to your breathe zone, as opposed to negative pressure respirators that require you to draw air through the filters as you breathe.

Loose-fitting respirators

Loose-fitting respirators are more comfortable than tight-fitting respirators for a number of reasons:

1. You don't have tight straps against your face.
2. Air flow can be distributed to a larger area around your face and head, not just directly to your breathe zone.
3. They provide superior protection. For example, a full-hood style respirator in a painting environment would cover the neck opening of your paint suit, and paint would not come in contact with your skin.
4. A greater range of options are available. For example, in-helmet communication, chemical protection, in-helmet hearing, head and eye protection.

Additional benefits include the ability to wear these respirators with facial hair, and no fit testing is required.

Helmet padding

Helmet padding makes respirators comfortable to wear, as opposed to head suspensions. The foam used in helmet padding eliminates pressure points on your head. It also provides stability, which means the respirator moves with your head.

Comfort is safety *continued*

Weight distribution

A respirator with even weight distribution makes it very comfortable. The rule of thumb: the more contact the respirator has with your head, the less pressure there is on any one point. But note that the placement of these contact points also play a part. A fully padded helmet spreads the weight evenly across your head, minimizing pressure points and neck strain. While these are sometimes heavier than respirators with head suspension, many operators claim that they feel lighter.

Airflow distribution

The distribution of air inside your respirator plays a major role in your overall comfort. Typically, the most comfortable respirators direct the majority of the air over your head to your breathe zone, with channels that distribute a small amount of air over you head to aid with cooling. This type of airflow system stops the air drying out your eyes or nasal passages.

In conclusion, comfort is key to maintaining safety and maximizing productivity. Comfortable respirators are air-supplied and loose-fitting. Climate control, helmet padding, weight distribution and airflow distribution are all factors you should consider to maximize comfort. Some of these are dependent on user preference, so it is a good idea to research your options and try various respirators before choosing your respirator. A great respirator will advance your safety, increase your productivity and protect you for life's best moments.

Josie Larsen is market analyst at RPB Safety LLC. Established in the 1970s, RPB safety specializes in supplied air respirators, airline filters, monitoring equipment and safety essentials that advance your safety and increase your productivity. Contact RPB at 866-494-4599, sales@rpbsafety.com or www.rpbsafety.com.

OSHA personal protective equipment 1910.134

Appendix A: fit testing procedures (mandatory)

A respirator can't protect you if it doesn't fit your face. Certain respirators, known as tight-fitting respirators, must form a tight seal with your face or neck to work properly, according to OSHA. If your respirator doesn't fit your face properly, contaminated air can leak into your respirator facepiece, and you could breathe in hazardous substances.

Before you wear a tight-fitting respirator, your employer must ensure that your respirator fits you. This is done by performing a fit test on you while you wear the same make, model, and size of respirator that you will be using on the job.

In addition, before you use a respirator or are fit-tested, your employer must ensure that you are medically able to wear it.

So what is a fit test? A "fit test" tests the seal between the respirator's facepiece and your face. It takes about 15 to 20 minutes to complete and is performed at least annually, per OSHA requirements. After passing a fit test with a respirator, you must use the exact same make, model, style, and size respirator on the job.

OSHA notes that a fit test should not be confused with a user seal check. A user seal check is a quick check performed by the wearer each time the respirator is put on. It determines if the respirator is properly seated to the face or needs to be readjusted.

There are two types of fit tests: qualitative and quantitative.

Qualitative fit testing

Qualitative fit testing is a pass/fail test method that uses your sense of taste or smell, or your reaction to an irritant in order to detect leakage into the respirator facepiece. Qualitative fit testing does not measure the actual amount of leakage. Whether the respirator passes or fails the test is based on you detecting leakage of the test substance into your facepiece. There are four qualitative fit test methods accepted by OSHA:

- Isoamyl acetate, which smells like bananas;

OSHA personal protective equipment 1910.134 *continued*

- Saccharin, which leaves a sweet taste in your mouth;
- Bitrex, which leaves a bitter taste in your mouth; and
- Irritant smoke, which can cause coughing.

Qualitative fit testing is normally used for half-mask respirators - masks that just cover your mouth and nose. Half-mask respirators can be filtering facepiece respirators - often called "N95s" — as well as elastomeric respirators.

Quantitative fit testing

Quantitative fit testing uses a machine to measure the actual amount of leakage into the facepiece and does not rely upon your sense of taste, smell, or irritation in order to detect leakage. The respirators used during this type of fit testing will have a probe attached to the facepiece that will be connected to the machine by a hose. There are three quantitative fit test methods accepted by OSHA:

- Generated aerosol;
- Ambient aerosol; and
- Controlled Negative Pressure.

Quantitative fit testing can be used for any type of tight-fitting respirator.

Fit test caveats

Many workers need to wear prescription glasses or personal protective equipment, such as safety goggles or earmuffs, while performing a job. If you fall into this category, then you must wear these items during the fit test to be sure they don't interfere with the respirator's fit.

You must be fit tested before you use a respirator in the workplace, and you must be retested at least every 12 months to make sure that the respirator you use still fits you. You must be fit tested with the specific make, model, style, and size of respirator that you will be using.

Not everyone can get a good fit with one specific respirator. If the respirator fails the fit test, then another make, model, style, or size must be tried until one is found that fits you properly. Your employer needs to provide you with a reasonable selection of sizes and models to choose from. When you've completed the fit testing process, it's very important that you know which make, model, style, and size respirator fits your face properly, and when and where you'll need to wear it for protection.

Also, the fit of your respirator must be retested whenever you have a change in your physical condition that could affect the fit of you respirator. Such changes could include:

- large weight gain or loss;
- major dental work (such as new dentures);
- facial surgery that may have changed the shape of your face; or
- significant scarring in the area of the seal.

Any of these changes could affect the ability of your respirator to properly seal to your face, which could allow contaminated air to leak into your respirator facepiece, according to OSHA.

OSHA personal protective equipment 1910.134 *continued*

If you find that the fit of your respirator becomes unacceptable, you must be allowed to select a different type of respirator and be retested. The selection may include a new make, model, style, or size of respirator.

Facial hair, like a beard or mustache, can affect your respirator's ability to protect you, according to OSHA. Anything that comes between your face and the respirator's seal or gets into the respirator's valves can allow contaminated air to leak into the respirator facepiece and you will not be protected. For example, if you have long hair, make sure it doesn't get between the respirator seal and your face because this can allow contaminated air to leak into the respirator, states OSHA.

New fit test protocols

Any person may submit to OSHA an application for approval of a new fit test protocol. If the application meets the following criteria, OSHA will initiate a rulemaking proceeding under section 6(b)(7) of the OSH Act to determine whether to list the new protocol as an approved protocol in this Appendix A.

The application must include a detailed description of the proposed new fit test protocol. This application must be supported by either:

- A test report prepared by an independent government research laboratory (e.g., Lawrence Livermore National Laboratory, Los Alamos National Laboratory, the National Institute for Standards and Technology) stating that the laboratory has tested the protocol and had found it to be accurate and reliable; or
- An article that has been published in a peer-reviewed industrial hygiene journal describing the protocol and explaining how test data support the protocol's accuracy and reliability.

If OSHA determines that additional information is required before the agency commences a rulemaking proceeding under this section, OSHA will notify the applicant and afford the applicant the opportunity to submit the supplemental information. Initiation of a rulemaking proceeding will be deferred until OSHA has received and evaluated the supplemental information.

Respiratory protection **purchasing & usage**

Exclusive CLEAReport of safety & health professionals by Clear Seas Research

By DAVE JOHNSON, *ISHN* Editor

Disposable air-purifying respirators are the most popular respirators used in industry, according to a 2017 study of Industrial Safety & Hygiene News readers by Clear Seas Research, Troy, MI.

Almost three-quarters of respondents (72%) use disposable APRs. Another 65% use reusable APRs. That's not surprising given 94% of respondents said particular contamination is top respiratory hazards workers are exposed to. Gas and vapor hazards are faced by 51% of workers, and oxygen-deficient atmospheres are a risk to 20% of workers.

To safeguard workers against these hazards, self-contained breathing apparatus (SCBA) is used by 38% of workers, supplied air respirators (SAR) are used by 38%. And powered air-purifying respirators (PAPR) are used by 38%.

Why not wear respirators?

For employees facing respiratory hazards, some form of protection is used 75% of the time they are on the job. Why are respirators not used? The number one reason (cited by 67%) is that protection is not required. Certain respirator use is voluntary. Other reasons for not wearing respirators: convenience (13%); forget to (11%); comfort/fit (11%); design/appeal/style (5%); PPE is not provided by the employer (3%); the belief the wearer will not have an accident (3%); and respirators are too expensive (1%).

Selection criteria

What features/benefits do respirator purchasers look for when selecting products? There are numerous variables: level of protection (94%); comfort/fit/style (93%); quality (93%); durability (91%); ease of use (91%); availability (87%); mobility/weight (78%); price (74%); compatibility (72%); design/style

Respiratory protection purchasing & usage *continued*

(59%); customer service (58%); breadth of product line (58%); technical support (52%); training support (51%); and trackability (RFID) (36%).

Assistance with OSHA compliance is the most important factor in choosing a respirator supplier, cited by 73% of study respondents. Other buying considerations: one-stop shopping (70%); customer service (67%); just-in-time delivery (67%); knowledge of hazards and user needs (67%); maintenance or repair of products (65%); technical support (62%); and tracking availability (56%).

More purchasing done online

Interestingly, respiratory protection is purchased slightly more often online (83%) than in bricks and mortar stores (79%). The most popular online purchasing sources: general industrial supplier websites (38%); safety distributor websites (30%); Amazon (23%); manufacturers' websites (21%); other industry-specific distributor sites (16%); and retailer online sites (15%).

When it comes to in-store purchasing of respirators, retail outlets are most popular, used by 37% of buyers. Other buying channels: general industrial distributors (34%); safety distributors (20%); direct mail (17%); other industry-specific distributors (16%); and vending machines (2%).

Knowledge of the regs

OSHA compliance with respirator use is of course essential for safety and health pros. More than nine in ten (91%) are aware of OSHA's respiratory protection requirements, and 53% of pros said they have a strong understanding of respiratory program standards.

Roughly half of the respondents report fit-testing their respirators, of those, 71% fit test annually, as required by OSHA. More frequent fit testing is down bi-annually by 5%; quarterly (9%); monthly (13%); weekly (6%); and as needed (26%).

Sources of product information

What are the most frequently used sources of information to learn about respirators? Trade magazines lead the way (51%); followed by manufacturers' websites (50%); manufacturers' literature (44%); peer recommendations (43%); trade magazine websites (30%); distributor sales reps (29%); and trade shows (28%).

Modern technology information channels popular with consumers are not very popular at all with purchasers of respirators. Only 7% get respirator information from YouTube, and only 5% learn about product via social media.

For more information on Clear Seas Research designed for actionable results, recommendations, and superior decision-making, contact Tracy Bristow at 919.519.7161; bristowt@clearseasresearch.com; or Beth Surowiec at 248.786.1519; suroweicb@clearseasresearch.com

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