

Industrial Hygiene

March/April 2022

in the **Workplace**

VENTILATION TROUBLESHOOTING:

Before You Call the Engineer

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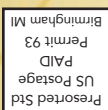
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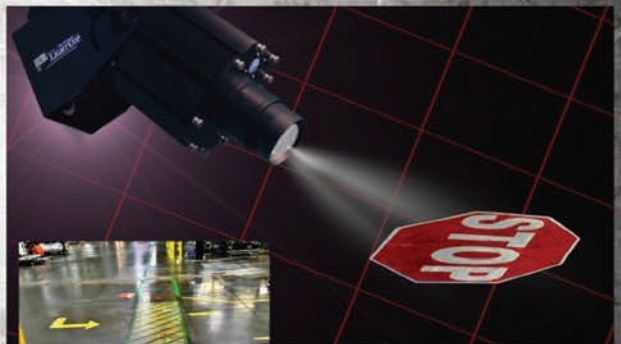
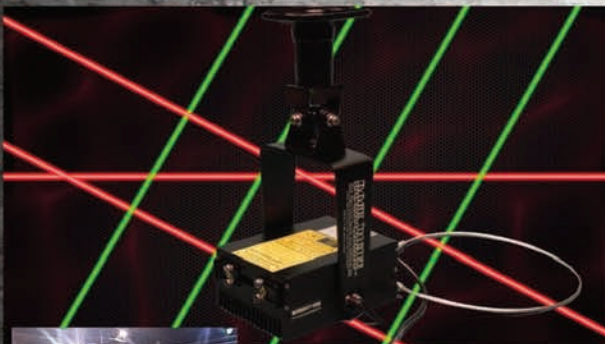


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"I've got to keep breathing. It'll be my worst business mistake if I don't."

—Steve Martin, Actor/Comedian/Producer

When I was looking for inspiring quotes about breathing fresh air and the importance of ventilation in industrial hygiene, I surprised myself by favoring the above quote from one of the kings of comedy. Steve Martin has long been a favorite of mine; I've even read some of his hilarious books. Within Martin's sarcastic and often caustic humor there is usually a grain or two of truth and, often, profound wisdom.

Breathing clean air is not to be taken for granted. For those of us who grew up in cities before the Clean Air Act of 1970, we remember smog alerts and the haze we'd often see over the downtown area. I grew up in Chicago, so the fact that city-dwellers are breathing cleaner air now is something I deeply appreciate.

Switching to indoor air quality, the March/April issue's cover story focuses on ventilation safety—with some practical, hands-on advice for troubleshooting a possibly wonky system. "Ventilation Troubleshooting: Before You Call the Engineer" can be used as a basic guide on how to possibly fix a problem yourself—and it's also a great primer in the types of ventilation systems and their various parts and functions.

Other features in the issue include gas detection in confined spaces and gas monitoring—other variations on the theme of making sure employees keep breathing safely. We also have an examination of heat stress (it is, after all, almost summer) and how to assess your facility, prep employees and monitor conditions to prevent heat-related illnesses.

Since COVID-19 is likely to be part of the daily life of EHS specialists for the foreseeable future, this issue provides a look at what the blockage of Emergency Temporary Standards means for companies trying to protect employees.

Moving to PPE, an always-important topic for anyone in the safety industry, we have a trifecta of articles: PPE in construction, a look at work gloves and an examination of the benefits of foam-lined protective eyewear.

I hope you enjoy this issue. As always, we strive to provide state-of-the-industry information to your doorstep. I hope it assists you in your respective positions within the industry and that you continue to keep your workers safe, healthy and injury-free. And, on the tough days, remember to just breathe.

Regards,

Barbara Nessinger, Editor-in-Chief
bnessinger@workplacemhs.com

P.S. If you are interested in contributing an article, Thought Leadership or Perspectives piece, feel free to contact me at bnessinger@workplacemhs.com.

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By: Phillip Rauscher, MPH, CIH, CSP

Ventilation Troubleshooting:

Before You Call the Engineer

Engineers with experience in industrial ventilation design and troubleshooting are few and far between. Pair this with the fact that increasing awareness of industrial hygiene principles, lower OELs and greater environmental awareness will further drive the need for high-functioning, efficient ventilation systems—and we can see engineers' time will be at a premium.

However, finding common problems and fixing them before calling an engineer isn't always as hard as one might think. With a few tips and tricks, you could come out looking like the hero when trying to figure out why your system doesn't quite work the way you expect.

The first tip is to find original engineering drawings for a system and, when you do, put them in a location you will remember, and guard them with your life! Many of the systems I have seen have been changed or have had parts replaced that were not a replacement "in kind." Now those changes are wreaking havoc on the system's overall performance. If you have the original drawings, you have a treasure trove of information that can help your maintenance team trouble-shoot. Any deviation from these plans should be looked at carefully and evaluated.

When doing a walkthrough of the ventilation system, having the drawings in hand can help inform as to what could be causing loss-of-function issues.

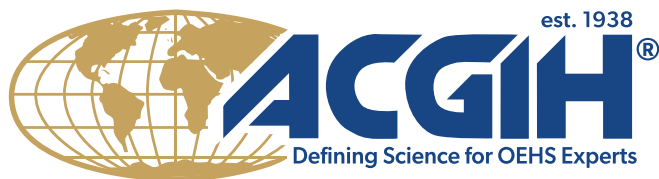
The Hood

First, go to the workstation and directly check the hood: Does anything seem like it might be a recent (or maybe not-so-recent) addition to the hood? A common story that is told by Jon Hale, in the ACGIH "Fundamentals of Industrial Ventilation" course, is a well-intentioned maintenance person adding expanded metal to a hood to stop material from being sucked into the duct. While this is very effective at stopping material from entering the hood, it is a problem when it prevents air from entering the hood. If you look at the profile of expanded metal, it is squared on the front and back. If you could shrink yourself down to "see" the air movement both in the front and back of the metal, you could see eddies on both sides. Essentially, this creates a wide net to stop air from entering the hood without friction. This loss of efficiency can reduce the reach and functionality of the hood drastically.

Next, see if there have been any modifications to the hood that might change its shape or location. Sometimes a well-intentioned operator will modify a hood so work is faster and easier. While they are to be commended for wanting to work as efficiently as possible, these modifications can also create less efficient hoods that can allow contaminant to escape.

The last, but possibly most obvious, question: Is the hood in the correct placement in relation to work? A walkthrough of most weld shops, in my experience, will have several operators that have ventilation systems running, but they are too far from the workspace to capture the contaminants of the work being done. When hoods are expected to be placed by the operator, constant attention must be paid to have the hood close to and in correct placement in relation to the work. In the case of weld fumes, common "elephant trunk"-type ventilation must be placed opposite the welder,





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above the weld and within about a foot of the work. I have frequently seen these hoods above the worker drawing the weld fume and *toward* the employee. Check with the manufacturer for specific placement if these hoods are utilized. If hoods are not out-of-the-box solutions, refer to the original drawings to see what assumptions were made in operations of a mobile hood.

The Duct

If hoods look in order, in place and unobstructed, the next step is to look at the duct work. Though, in theory, duct work seems like a place with minimal disruptions, there are some issues that arise from changes in duct work.

One of the most frequent changes that take place in a system again comes from employees doing what they think will be best for their own health protection. Common features in duct work are blast gates that are used to purposefully create an obstruction that will force air to be pulled from other branches of the system. When blast gates are all in the correct position, it creates balance in the system, and all hoods will receive the correct amount air flow. However, if these hoods are moved, it changes this balance and could potentially reduce flow to all other hoods when opened completely. By thinking they were increasing the flow, so that one hood has increased flow while in use, stops *all of them* from working as intended.



Many common issues with ventilation systems are not hard to diagnose. Being familiar with the system is the first step toward diagnosing a potential problem. (photo courtesy Adobe Stock)

Another possibility is duct damage. Sometimes, during an outage, ducts may become detached, dented or pinched at the hand of a hurried equipment operator. Although a totally detached duct creates an obvious issue, dents or pinches can start to accumulate settled dust in the duct—leading to a blockage.

A common issue with duct work is foreign objects getting caught in the duct; this can lead to material build-up. This might not be apparent by just looking from the outside of the duct, but

you can often see obstructions by looking into the duct from the end of a hood. Bottles, food wrappers or even cleaning rags often get caught in turns or blast gates. If these catch-points are close enough to the hood, a quick glance with a flashlight can help identify the reason for reduced airflow in a hood.

The last issue that I have seen while in the field are additions to systems that were included with no change to the initial design. Commonly, new process or work locations are added as business grows or process steps are added. This can require that additional ventilation hoods be utilized for new airborne hazards that are introduced into the workplace. Though the intent is to protect workers, this can lead to issues with the entire system.

The new duct work creates a point in which there are pressure losses and new air flow, which can lead to a reduced capacity elsewhere in the system. Any new duct added to an existing design will require a qualified individual to assess the needs of the system and a new process set-up.

Filter Equipment

Changes in filter or scrubber equipment may quickly go outside the realm of a simple inspection, but there are some common things that can quickly be remedied. A common energy loss that can be traced back to air-cleaning devices is related to the walls of the mechanism. With time and use, inspection door seals can start to wear out, or the locking mechanism that keeps them shut can begin to fail. An open door can lead to a major energy loss, but failed seals might lead to smaller, incremental changes. These can accumulate with other issues to create changes (before entering the fan) that might only be detected using direct measurement with a pitot tube.

If the system can be shut off during a break period, a look into filter equipment can give clues as to potential problems, as well. Broken, missing or burned filters will allow debris to pass through the bag house and deposit further into the system, where the fan may not function due to dust loading. Filters

that are overloaded may be a sign that the self-clean operation of the baghouse is not working properly and causing the filters to clog, stopping airflow through the baghouse.

The Fan

Seeing a new fan installed with the system can be an encouraging sight when doing a walkthrough evaluation of the ventilation system. However, this can also signal an issue with maintenance on a system. The typical “squirrel cage” design fan uses three-phase electric to operate. If this is not wired

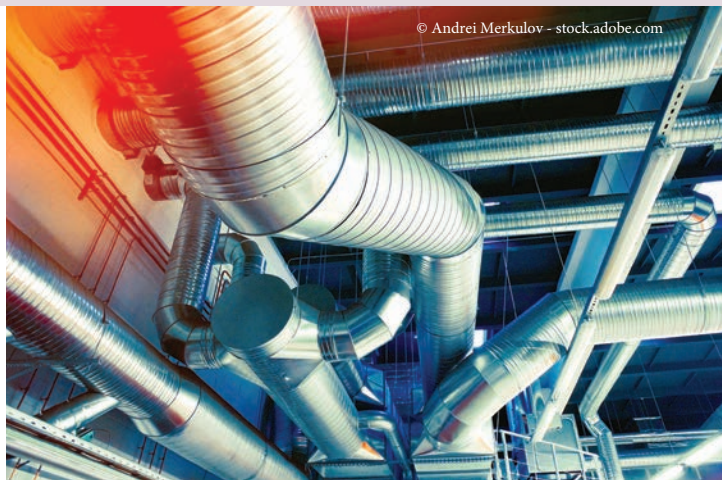
properly, the fan will spin backwards. A backwards rotating fan does not blow air as one might think; it will draw air into the fan housing at a greatly reduced capacity—about 30% of the designed capacity. This will create losses from throughout the system, and it can lead to deposition in the duct of materials drawn into the system.

A problem that may not be apparent during a walkthrough while the fan is operating, but is also simple to check, is the condition of drive belts for fans. Slippage of the belt may be causing an energy loss at the fan and a slower rotation speed than what is expected for proper function.

Exhaust

The last component of a system is the exhaust. Once air has traveled through the duct and fan, it must be ejected to allow for new air to be drawn into the system. A blockage here could create a choke point that holds air in the system and stops it from being picked up at that hood. Once again, this is a possible location for issues from well-intentioned employees—the addition of a weather cap, for instance, can create a blockage that was not designed to be part of the system.

Another possible blockage issue is birds or other wildlife building nests. Exhaust points are normally located outside and create a spot for birds to build nests when turned off during



weekends or nights. Ensuring that the exhaust is free from obstruction can be a quick and simple fix for low air-flow.

Many common issues with vent systems are not hard to diagnose, with some confidence and familiarity with the system. To help achieve this, I strongly recommend that individuals locate the initial drawings for ventilation systems in their facility. And, when on the floor, spend time to look at the system as it currently stands. This will make future troubleshooting easier. **IHW**

[Phillip Rauscher MPH, CIH, CSP, is Senior Director-Science, Education & Publications, for ACGIH®.]

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By: Dave Wagner, Contributor

Communication is Key to Safe Confined Space Entry

We have all heard the famous line from the 1967 movie *Cool Hand Luke*: “What we’ve got here is a failure to communicate.” Poor communication can lead to unexpected and unwanted outcomes in many situations, but lack of communication, or “failure to communicate” during a confined space entry operation, can lead to tragedy.

I don’t know of anyone who really enjoys entering a confined space. An area with a limited path to enter and exit; not designed to be occupied by a human; yet big enough for someone to do a needed job—doesn’t ever sound appealing to me. I have been in many, dating back well before my actual 35 years in the business, and I can’t think of anything much worse than crawling into a dark hole without knowing for certain someone on the outside had my back and was watching over me. Trust me, I’ve been there more than once.

Confined space communication begins well before anyone actually breaks the plane to enter the space itself. It starts with proper understanding of the hazards and risks that someone might encounter when working inside the space.

The National Fire Protection Agency’s *NFPA 350 Guide to Safe Confined Space Entry and Work* says that communication is a “vital, reiterative part of reducing hazards” in confined space entry operations. Hazards are identified and communicated during job hazard assessments and can also be communicated through other resources, such as Safety Data Sheets (SDS) that identify substances that might be found inside a space; blueprints and schematics that communicate information about the construction and equipment that may be in the space; and posted placards and markings that provide entrants with specific warnings about the space. You had better be paying

attention to these things before you go inside the space, so you know exactly what might be in store.

Meeting Hazard Communication Standards

Hazard communication is just the beginning of the communication requirements in confined spaces. The United States Federal Register final rule for Confined Spaces in Construction, 1926.1208(d)(3), which is for all intents and purposes identical



An attendant on a confined space entry must have all equipment necessary to communicate effectively with the entrants in the space. He must also have the ability to summon help in an emergency, if required. (photo courtesy Industrial Scientific)



to the final rule for confined space entry in general industry 1910.146(d)(4)(iii), says that an attendant on a confined space entry must have all of the equipment necessary to communicate effectively with the entrants in the space. That attendant must also have the ability to summon help in an emergency, if required, and inform the entrants if anything outside the space creates a threat to them working safely inside.

Communication with entrants in a confined space can come in a variety of forms. It may be direct, voice-to-voice communication between the attendant and the entrant(s). It may involve two-way radios. It could even be accomplished through other methods of non-verbal or visual communication.

But what happens if the configuration of the space is complex, and the attendant doesn't have sight of the entrants? What if the work in the space creates too much noise, making it difficult to hear the attendant or the radio while wearing hearing protection? What if wearing a respirator muffles the entrant's voice, making a call for help difficult to understand? What if the configuration of the space limits two-way radio reception? What if...?

Simplifying Communication with Portable Gas Detectors

Permit-required confined space entries require the use of a portable gas detector to test the atmosphere inside the space prior to anyone entering it. Many would suggest that the requirement should apply to all confined spaces. NFPA 350 Sec. 7.13.1 goes even a bit further, saying that the "atmosphere within and outside the confined space should be monitored continuously to ensure continued safe working conditions."



Confined space communication begins before anyone enters the space itself. It starts with proper understanding of the hazards and risks that might be encountered inside the space. (photo courtesy Adobe Stock)

The most effective way to accomplish this is for each entrant in the space to carry a portable, personal multi-gas detector. Personal gas monitors are available today with embedded radio systems that can provide communication from inside confined spaces to the world outside. These systems allow the detectors to easily form wireless mesh communication networks that repeat messages and allow for continuous transmission of radio signals from within even the most difficult confined spaces. The gas detectors transmit sensor readings continuously, allowing an attendant outside the space to see conditions inside on a detector monitoring the entry point or on a separate monitoring console.

Conditions can also be monitored remotely or from multiple spaces at the same time. Monitor-to-monitor communication

Gas Detection in Confined Spaces

lets an entrant in the space know if a co-entrant has encountered a gas hazard or is experiencing a physical or medical emergency—at the same time the attendant is alerted outside.

In the same manner, that attendant can use the gas detector to alert workers inside the space if conditions outside are going to compromise their safety. The radio messages from these devices will even allow the gas detector systems *themselves* to alert first responders and rescue personnel if necessary, providing them with more direct information about the nature of the emergency and the exact location of the space.

Good Communication is Ongoing

Good communication shouldn't stop when the entry operations are over. Information recorded and collected from gas monitors that continuously monitor confined spaces should be stored, reviewed and used to inform teams of the conditions encountered during and entry prior to the next entry into the same confined space. This provides ample opportunity to take steps to mitigate unexpected hazardous conditions before they are encountered again.

If confined space entry operations are going to be performed safely, a "failure to communicate" can never be tolerated. The next time you send your team out to enter a confined space, make sure they are equipped with all the right information and are carrying the right gas detection equipment that will

not only save their lives, but let them know someone always has their back. **IHW**

[Dave Wagner is Director Of Applications Engineering and Product Knowledge at Industrial Scientific. He has been extensively involved with the development and application of portable gas monitoring instruments and the development of innovative solutions to complex gas monitoring problems since joining the company in 1986. He can be reached at dwagner@indsci.com.]



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Option Slot / Plug-in I/O	starting at \$56.00 16 modules available w/ analog, discrete, relay, and combination options		starting at \$69.40 13 modules available w/ analog, discrete, temperature, high-speed, relay, and combination options
Expansion I/O	starting at \$44.50 27 modules available w/ analog, discrete, temperature, and relay options		starting at \$121.72 13 modules available w/ analog, discrete, temperature, and relay options
MQTT	✓		X
Wireless Communication	✓ Wi-Fi (802.11b,g,n), Bluetooth (used with Mobile app to provision network settings)		X
Programming Software	FREE C2-PGMSW		FREE Connected Components Workbench

All prices are U.S. published estimated retail prices. AutomationDirect prices as of 04/06/2022. Allen Bradley hardware prices taken from <https://report.scdirect.com/> on 11/30/2021.

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Emergency Temporary Standards: What They Mean for Businesses

COVID-19 continues to be a focal point for companies across the country. OSHA tried to step up its efforts to combat the spread of COVID-19 in the workplace, announcing an emergency temporary standard (ETS) requiring COVID-19 vaccination or a testing and mask policy for employers with 100+ employees.

But, on January 13, 2022, the U.S. Supreme Court blocked OSHA's COVID-19 ETS with one exception. The court allowed for the federal government to require vaccinations for healthcare employees at Medicare- and Medicaid-certified providers and suppliers.

While it's unlikely that OSHA's ETS will ever take effect, employers should now figure out if they want to implement their own vaccine mandates.

We talked to Jill Schaefer, Director of Content Management at KPA, a provider of Environment, Health & Safety (EHS) and Workforce Compliance software and services, to learn more about what the blocked ETS means and what companies should do about protecting their staff from COVID-19.



Q What should businesses know about the ETS?

An Emergency Temporary Standard (ETS) is a set of workplace safety rules that OSHA can implement at any time and for a predetermined length of time (usually six months) until a permanent standard is issued. OSHA issues an ETS when it determines that workers could be in grave danger—whether that's due to COVID-19 or another workplace hazard. An ETS can be challenged and turned down in courts, which we saw happen in January.

Even though the federal ETS was blocked, several states have their own COVID-19 ETS, which eligible companies



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operating in the state must abide by. Those states include California, Oregon, Colorado, Illinois, New York, New Jersey, Delaware, Massachusetts, Connecticut, Rhode Island and Maine. Businesses should ensure they're aware of and acting on any testing or vaccination requirements mandated by their state, county or city.

Q How are companies responding to the rejected ETS?

Across the country, some companies may be relieved that the ETS was blocked.

A recent Kaiser Family Foundation study found that 5% of the unvaccinated workforce population quit their jobs due to employer vaccination mandates. Considering the entire U.S. workforce is about 150 million strong, that could have equated to several million people leaving their jobs if the ETS was upheld—which would have had a big impact, especially on small or medium-sized companies. That would have been on top of an already existing labor shortage.

Businesses should know that, even though the ETS was struck down, OSHA recently issued a statement that it will continue to hold employers accountable for ensuring the safety of their workforces. This means that OSHA will continue to leverage the COVID-19 National Emphasis Program and General Duty Clause citations. In other words, employers can still be liable for any COVID-19 exposure in the workplace.

Q Some cities and states passed their own COVID-19 vaccination and testing requirements for private sector businesses already. How does the ruling affect those local or state mandates?

With the absence of a federal standard, we anticipate that state regulating agencies will continue to pursue their own COVID-19-related requirements around vaccines, testing, face masks, etc.

For example, New York City issued its own mandate on December 7 that required all private sector employees to be fully vaccinated by December 27. This was the first state to require vaccination in the private sector. Although as of this publication, this mandate was still temporarily blocked by a Manhattan court.

In terms of vaccine mandates, private companies in every state except Montana can require that employees are vaccinated against COVID-19. Although, many states (including Texas, Kansas, Iowa, Utah and more) have restrictions around those mandates, often related to religious or medical objections. Other states (including California, New York, Maine, Colorado, Illinois and more) require COVID-19 vaccination if you work in select industries.

Bottom line: Even though OSHA's ETS was blocked, companies must still abide by local and state requirements and do their best to keep workers safe from COVID-19 workplace outbreaks.

Take Your Safety Knowledge to the Next Level

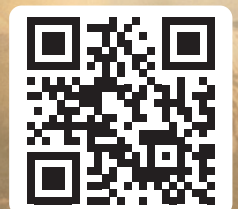


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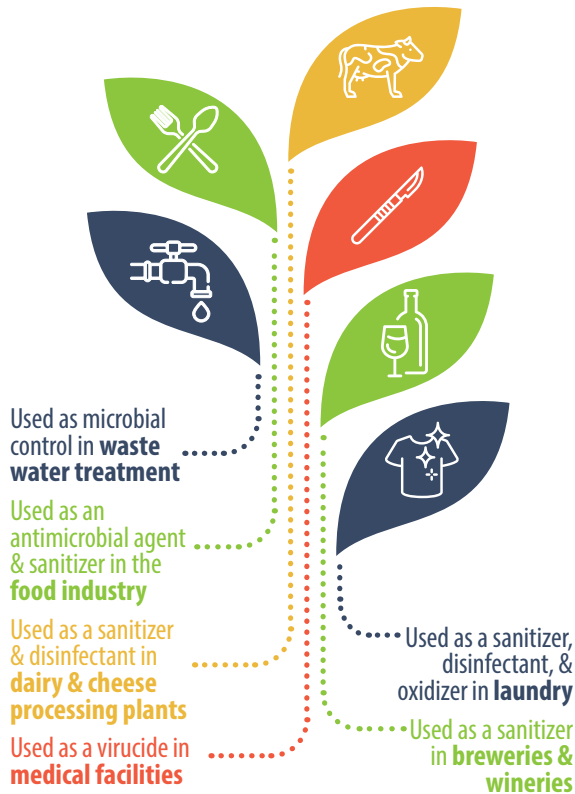


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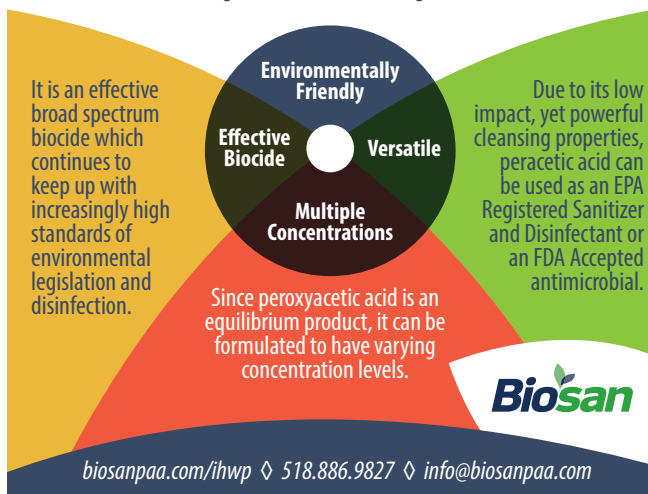
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Q What should companies do and know now about COVID-19 in the workplace?

Even though OSHA's ETS was blocked, at KPA we recommend that employers plan and communicate how to protect employees and others in the workplace from COVID-19. Businesses should know that they can still elect to require vaccinations. As such, we recommend the following:

- 1. Gather staff vaccination records:** This should be treated as a confidential medical record. Companies should communicate their vaccination policy and how employees should indicate that they received a vaccination, along with supporting documentation. Employers should not ask why an employee is or isn't vaccinated, as this may be considered unlawful conduct.
- 2. Research COVID-19 testing and vaccination requirement options:** If an employer intends to implement testing for unvaccinated or partially vaccinated workers, it's a good idea to start thinking about how this will look—whether that's at-home tests, tests at a COVID-19 testing site, etc. Employers should not be unreasonable or make it impossible for an employee to get tested. Best practice is for employers to pay for testing and related supplies when employers require staff to comply, as this can greatly reduce any long-term costs associated with litigation and/or wage and hour claims.
- 3. Establish and clearly communicate policies:** Employers should include vaccination, masking policy, testing and time-off to get vaccinated/recover from side effects/etc. Consider working with legal counsel to create these.
- 4. Understand state and local regulations:** Some states and localities have paid compensation laws around COVID-19. All businesses, depending on qualifying criteria, must comply with these.
- 5. Identify accommodations:** Employers should understand any religious and medical accommodations or exemptions and tell employees how to apply for one.
- 6. Communicate time-off policies:** Businesses should comply with payroll laws and provide paid time off and sick leave. State and local regulations may have specific COVID-19 requirements.
- 7. Establish OSHA reporting and recording processes:** Any COVID-19-related deaths that likely stemmed from the workplace must be reported within eight hours. Hospitalizations must be reported within 24 hours. Businesses should have a system setup to record and report these.

In any case, we recommend that companies always speak with competent local legal counsel before taking any action.

Q What does the blocked ETS mean for workplace safety programs?

Dr. Fauci recently said that the best-case scenario is that COVID-19 will become endemic in the U.S. and the workplace, meaning that it circulates but doesn't disrupt society. For now, COVID-19 is and will continue to be a significant threat to workplace safety across the country.

Continued on page 37

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Who Can Handle the Heat?

Heat Stress in General Industry



Is the risk of heat stress lurking in your facility? The signs of heat stress can be ambiguous, especially in manufacturing settings, which makes recognizing and mitigating the risk difficult. Employees are subjected to extreme temperatures when working around hot machinery, in direct sunlight or in poorly ventilated spaces. Their exposure may be reasonably anticipated, based on facility and weather conditions, or it might be totally unexpected due to an urgent repair or non-routine task.

Heat stress is on OSHA's radar. Cal/OSHA has had a standard in place for several years, and OSHA announced in 2021 that a federal heat stress standard was already in process. While the standard may take years to come to fruition, OSHA can cite employers for heat-related hazards using the General Duty Clause.

Causes and Symptoms

Before talking about heat within facilities, it's essential to understand how heat illnesses develop. When the body loses water faster than it's replaced, it loses its ability to cool itself efficiently. Working in the heat is physically exhausting, and it can also take a toll on an employee's mental health. Individuals may have a different response to dehydration, and that response can change day to day depending on:

- Physical condition and ability
- Personal medical conditions (heart disease, diabetes, pregnancy or medications)
- Substance use (caffeine, alcohol or drugs)
- Level of acclimatization to heat sources (new employee, job transfer)
- Strenuous or dehydrating activities in the days leading up to workday (yard work, exercise, long hours)

What conclusion do you draw from the following data? This is the percentage of heat incidents by day of the week, as reported by the BLS between 2011-2020.

Day of the Week	% of Reportable Heat Illnesses
Sunday	5.8%
Monday	16.9%
Tuesday	19.5%
Wednesday	23.8%
Thursday	17.9%
Friday	10.4%
Saturday	5.7%



How heat stress impacts someone is generally classified as one, or a combination of, the following heat illnesses:

Heat rash: "Prickly heat" is a rash that occurs when skin pores get blocked (typically due to restrictive clothing), and a red rash develops that is hot to the touch.

Heat cramps: Lactic acid builds up in muscles that are not adequately hydrated and causes sudden and excruciating muscle spasms. If left unattended, this build-up can lead to rhabdomyolysis, where muscles break down and cause long-term damage.

Heat exhaustion: When the body exhausts most of its resources, energy reserves are diverted to help the body cool down. This process is characterized by cool, clammy skin and is usually accompanied by a headache, nausea or even feeling "off."

Heatstroke: Once the body burns through its resource reserves, it can no longer produce sweat and begins to shut down. Sufferers will have hot, red and dry skin. They may have a severe headache, extreme nausea and might not be fully aware of their surroundings. This situation is a medical emergency; trained medical assistance is needed urgently. Heat syncope (fainting) is also associated with heatstroke.

A common misconception about the progression of heat illnesses is that they start at heat rash and work through cramps, exhaustion and finally heat stroke, in that order. Each individual is unique in their responses, so they might skip straight to heat exhaustion or heatstroke.

How can you determine the cause of an employee's symptoms? Heat illness symptoms are commonly dismissed due to their similarity to other illnesses and personal medical conditions, such as diabetes or high blood pressure. Are they ill, overtired or dehydrated?

To determine the possible cause, the employer should observe the employee for any symptoms listed above and ask questions about their activities to determine if heat could have played a role. This could include asking:

- What activities have you been doing today? Where? For how long?
- Is the task more strenuous than expected?

- What are the working conditions like?
- Were you able to take breaks and get a drink when needed?

Hidden Hazards

Where are these heat hazards hiding? The more obvious heat exposures are in facilities such as foundries, metalworking or molding processes where employees interact with the heat sources directly and regularly.



To avoid heat-related illnesses, a simple step is to ensure employees take breaks and drink plenty of water. (photo courtesy Adobe Stock)

The hazards can be difficult to determine in situations where heat exposure is less obvious. Sometimes a machine goes down, and employees must get the work done. This means they may be subject to unexpected, but strenuous, manual labor. The less obvious areas of risk are where employees are suddenly subjected to unexpected high heat indexes or when doing infrequent or non-routine tasks, such as working in:

- *Permit and non-permit required confined spaces*—servicing or cleaning railcars, tanks, pits, silos or manholes
- *Direct sunlight*—HVAC repair, servicing roof equipment, landscaping or sidewalk repair
- *Limited ventilation*—repairing equipment in boiler rooms, unloading truck trailers or work inside of equipment
- *Heavy personal protective equipment and clothing*—welding leathers, arc flash suits or HazMat suits.

Solutions

What can be done about heat stress? In an ideal world, all work could be completed in a safe and comfortable workplace without putting anyone at risk for heat illnesses (or any other risk for that matter). Since that is not feasible in the real world, the employer must take steps to reduce the risk.

Evaluate the facility where heat may be a problem. The first step in understanding what heat-related hazards exist in the facility is to evaluate them through job hazard analysis, OSHA logs and interviews. Find the heat sources and potential exposures and determine which non-routine tasks put employees at risk.

Eliminate any unnecessary heat hazards. Use engineering controls, when possible, to lower the radiant heat from machinery or to increase airflow.

Develop a heat illness prevention plan. Document, in your prevention plan, how and when to monitor the heat index and know what types of weather events are likely to impact the facility. Include the actions to take before the heat index reaches a dangerous level. Options can include working with a buddy; putting hydration stations closer to the work areas; increasing break time to cool down; and rotating employees through the workspace to shorten their exposures. When high index days are forecasted, encourage employees to stay hydrated in the days leading up to those days.

Acclimatize employees to their work environment. NIOSH recommends new or transferred employees have no more than 20% exposure on their first day and increase by no more than 20% exposure per day until they have adjusted. Employees who have experience working in the heat may start at 50% the first day and work up to an entire shift.

Train employees. The shop floor employees are the company's first line of defense in recognizing an employee or situation at risk. Conduct heat stress training as part of the onboarding and job transfer process. Teach employees to recognize the signs and symptoms of heat illness and act appropriately. Employees should also know who is trained in first aid and be able to contact them when help is needed.

Takeaways

Heat stress can be a concern in almost any industry. It can be glaringly obvious or leave more subtle clues as to its presence. The effects, should an employee's struggle go unnoticed, can have serious and even fatal consequences. By assessing the facility, providing training and preparing employees, and monitoring conditions, companies can keep their employees cool, calm and, most importantly, safe. **IHW**



About the Author:

Holly Pups is an EHS Editor specializing in workplace safety. Holly joined J.J. Keller in 2021 and is a former OSHA Compliance Officer with over a decade of industrial safety experience including warehousing, pharmaceuticals, public sector and plastics manufacturing.

Want to contribute to *Industrial Hygiene in the Workplace*? Let us know if you have an interest in writing an article for an upcoming issue.

Contact: Barbara Nessinger, Editor-in-Chief,
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Safe Industrial Plant Gas Monitoring

Detecting dangerous gases with versatile, advanced modular systems can speed compliance and construction project completion. Whether new or retrofit construction, monitoring hazardous gases in industrial plants that process pulp and paper, as well as at loading docks and receiving areas, is often crucial to safety, compliance and productivity. Exposure to potentially toxic gases can come from a wide variety of sources—particularly in partially or totally enclosed areas.

According to an OSHA Factsheet, carbon monoxide (CO) is a common industrial hazard resulting from the incomplete burning of material containing carbon, such as natural gas, gasoline, oil, propane or coal. “Carbon monoxide is harmful when breathed, because it displaces oxygen in the blood and deprives the heart, brain and other vital organs of oxygen. Large amounts of CO can overcome you in minutes without warning—causing you to lose consciousness and suffocate,” states the OSHA Factsheet.

“You may be exposed to harmful levels of CO in boiler rooms, warehouses, petroleum refineries, pulp and paper production, and steel production; [also] around docks, blast furnaces or coke ovens.” Occupations where exposure can occur include forklift operator, diesel engine operator and welder, the OSHA Factsheet adds.

Similarly, industrial workers in pulp and paper processing facilities can also be exposed to nitrogen dioxide (NO₂) from the burning of fuel for vehicles, equipment and power generation, which can cause respiratory irritation and aggravate respiratory diseases.

Within pulp- and paper-related warehousing and around loading docks/receiving areas, propane-burning forklifts and equipment can result in a build-up of carbon dioxide (CO₂) with complete combustion—or result in excess CO with incomplete combustion. Breathing too much CO₂ can cause headaches, dizziness, difficulty breathing, elevated blood pressure, and even coma, asphyxia and convulsions.

While loading docks and shipping/receiving areas are only partially enclosed when warehouse bay doors are opened, the prevalence of diesel trucks can make monitoring toxic gases essential. Even with ventilation systems installed, the systems can be insufficient; become overwhelmed; or break down and fail. So, any areas at risk in pulp and paper process-related industrial plants and warehousing should be continually assessed to avoid the inadvertent accumulation of dangerous gases.

To enhance safety, comply with regulations and minimize the risk of dangerous gases that can be inhaled—or even flammable or explosive—gas monitoring systems can be set to detect for specific thresholds. After detection, such systems will typically alarm workers in the vicinity and can also text or email supervisory personnel or managers to trigger an immediate response. A record is often kept to document compliance.

However, pulp and paper industrial processes and capacities can change over time. Design specifications written at the start of a project can evolve and so can the requirements. Also, local jurisdictions and code officials may have different demands that must be accommodated. Consequently, working with a vendor with expertise in pulp and paper gas monitoring systems and one that utilizes advanced, flexible modular systems can significantly speed project completion, while also facilitating design changes. It’s also helpful to install new and more reliable wireless detection systems that promise to speed installation and reduce wiring costs when retrofitting or expanding detection in existing structures.

“On almost every project, design changes occur, so we choose to work with expert vendors that help us quickly adapt,” said Adam Hitchen, President of Atlantis Comfort Systems, a Rhode Island-based HVAC contractor that provides commercial and residential service across the East Coast of the U.S.

According to Hitchen, in one project in Boston, there were changes in the design of a loading dock area that required accommodation. “They erected a wall, which required an extra ventilation system, a makeup air system, an independent CO/



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CO2 detection system and a change in the existing panel planned for the job,” Hitchen explained.

On the project, Atlantis Comfort Systems relied on a vendor that provided engineering expertise. “Our vendor helped us change midstream seamlessly. Acme provided the new system and the new panel, and they adjusted the existing panel,” said Hitchen, who notes that the wiring diagram, engineering drawing and necessary sequence of operations was also provided.

Acme Engineering is an ISO 9001:2015-certified manufacturer of environmental controls and systems with integrated mechanical, electrical and electronic capabilities. The company has expertise providing equipment for monitoring a variety of gases, such as carbon monoxide, nitrogen dioxide, carbon dioxide, hydrogen, ammonia and refrigerants. When designing a pulp and paper gas detection network, after receiving a floor plan, the company creates performance-based specifications; identifies the optimal sensor locations; designates the most energy-efficient activation sequence for the ventilation system; and prepares a job-specific wiring diagram—usually within a day or two.

According to Hitchen, when design changes occur, the gas monitoring company reacts quickly. “They start with the intent of the design engineer and, when project requirements change, they rapidly revise it and provide what is needed. This helps with code compliance.”

Expediting Construction Projects

For John Rainone, previously a Senior Project Manager with Automated Logic, a Carrier company, the main benefit of working with a vendor with gas monitoring expertise was expediting complex projects. The vendor provided certified engineering drawings up front and as needed.

“No one waited for us on a multi-million-dollar project, which was key, because it carried a significant per-day late penalty. Altogether, the design expertise probably saved us between two-four weeks,” said Rainone.

The Multi-Gas Monitoring System (MGMS), installed on the project to prevent excess carbon monoxide and nitrogen dioxide accumulation, is a gas detection network capable of communicating in real time with any smart device. The system utilizes industry-standard communication protocols, like Ethernet and BACnet, that allow remote supervision and reporting to building automation systems.

Such a system can also save pulp and paper industrial facilities energy from the intermittent operation of ventilation equipment. Without detectors to check air quality, ventilation would need to run continuously to change the air. Instead, the gas detection system can check the air quality and only run ventilation when it is necessary.



Wireless capability is extremely advantageous for reducing installation time and costs; all that's required is mounting the sensors and establishing the connection with the system. (photo courtesy Adobe Stock)

According to the *ASHRAE Applications Handbook*, this type of advanced, variable CO-based demand ventilation control strategy can decrease energy costs by over 60% compared to continuously operating ventilation. Additionally, wear and tear and maintenance on the mechanical and electrical equipment is reduced.

Next Generation Wireless

Although wired installations have long been utilized to install gas monitoring networks in industrial settings, new advanced wireless systems are ideal solutions for large open spaces, like pulp- and paper-related warehousing and loading docks, particularly for retrofits or expansions of existing systems.

Wireless capability is extremely advantageous, from an installation point of view, for reducing installation time and costs. Gas detection networks, generally speaking, are installed by licensed electricians, and labor costs are fairly high. With wireless gas detection networks, all that is required is mounting the sensors and establishing the connection with the system.

“In terms of installation, a warehouse can have 40-ft high ceilings, so it would be costly to run conduit and wires all over for



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Exposure to potentially toxic gases can come from a wide variety of sources—particularly in partially or totally enclosed areas. (photo courtesy Adobe Stock)

benefit there, too. By avoiding the cost and complexity of requiring an electrician for such areas, you could probably save about 20% on installation costs,” stated Rainone.

Acme, for its part, has developed a wireless version of its MGMTS system that incorporates a unique Wi-Fi capability, so it is not necessary to have a control panel as the sole point to receive feedback from the gas detection network. With the wireless MGMTS, users can observe current conditions via their computers, tablets and phones, with real-time alarms in case of emergency.

“When it comes to reducing installation cost and expediting the project, there is going to be a benefit with wireless. Because anytime you eliminate conduit and wire from one sensor to the next, to the next—and you eliminate all that material and labor—there are going to be savings with wireless,” concluded Rainone. **IHW**

gas monitoring, power and connectivity. Loading docks tend to be situated at the ends of a facility, so wireless could be a big

[Del Williams is a technical writer based in California. For more info, visit Acme Engineering Prod. Inc. at acmeprod.com.]



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PPE Plan For Construction

By: Allie Thunstrom, Contributor

How to Determine the Right PPE for Your Worksite

With ever-changing risks confronting workers daily, there is a constant challenge to keep them safe. New technology development is certainly crucial to the goal of zero injuries, but how does one take it all in; roll out a safety program; and adapt that program amidst constant change? The first step is a better understanding of Personal Protective Equipment (PPE) and how it fits into the larger risk-solution hierarchy.



Eye Protection

“Carol never wore her safety goggles. Now she doesn’t need them.” Conjure up any memories of 6th grade science class? Protective eyewear comes in a variety of styles to suit a range of job functions and wear preferences, from safety glasses with advanced lens technologies to more heavy-duty safety shields designed to shield workers from hazards such as welders’ flash.

Hand Protection

We’re all about the glove love—and for good reason. The right pair of work gloves can protect the front, back and sides of your hands from lifelong damage caused by cuts, frostbite, vibrations, impact and fire hazards. A good pair will also save you from the everyday nuisance of pesky blisters so, yeah, sign us up.

Face Protection & Body Protection

This one is essentially a catch-all for everything else. Face and body PPE runs the gamut with high-visibility apparel, fall protection harnesses, clothing and headwear for managing the elements (extreme heat, cold, wind, rain, dust, ice, etc.), sun-screen, knee pads, joint supports, respirators...the list goes on.



The right pair of work gloves can protect the front, back and sides of hands from lifelong damage caused by cuts, frostbite, vibrations, impact and fire hazards. Image courtesy Ergodyne

PPE = Personal. Protective. Equipment. But what does that really mean? PPE is safety work gear designed to protect you on and off the worksite. It’s bigger than hard hats, safety glasses and hi-vis clothing. It’s protective equipment specifically engineered for the heat and the cold, for working at heights and every stinkin’ place in between.

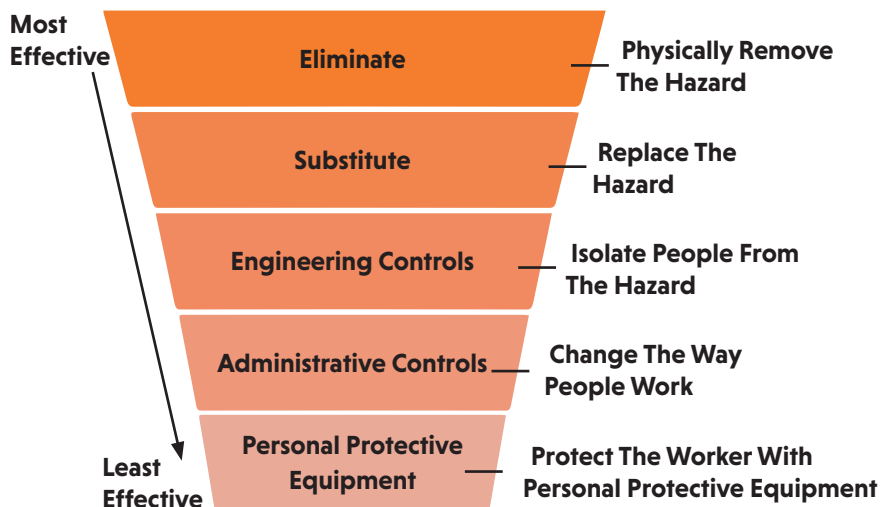
Types Of PPE

Head Protection

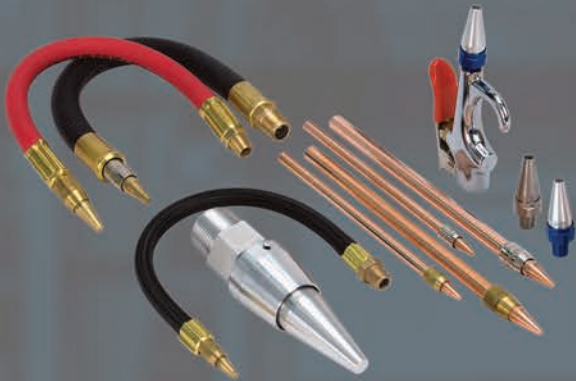
This is often the first thing that comes to mind (pun intended) when folks think of PPE on worksites. Hard hats, bump caps, safety helmets—all the good stuff that protects your noggin from life-altering damage due to falling objects, obstructive beams, etc.

Do I Need PPE?: Consulting the Risk-Solution Hierarchy

The short answer is yes. Every worksite is probably going to have some amount of PPE required. And, even if it’s not required, some of it might just make the job more comfortable. That said, PPE is the fifth and final safeguard within the risk-solution hierarchy—a sequence of controls safety professionals should



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PPE Plan For Construction

follow when implementing risk solutions. The sequence goes like this: eliminate, substitute, engineering, administrative and PPE. While there is a hierarchy, safety managers need to remember these controls are not mutually exclusive—the most effective plans are often a combination of all five.

“Proper PPE selection and deployment can be the difference between sending an employee home or to the hospital.”

Elimination & Substitution

The most effective control is eliminating the risk altogether and replacing it with a safer solution. Let's say a worker is at risk of falling when changing light bulbs at heights. Removing that particular light would be elimination, and replacing it with a skylight or a bulb lower to the ground would be substitution. Problem solved.

Engineering & Administrative Controls

If elimination or substitution aren't viable options, one must look at adjusting engineering and administrative controls.

The key to engineering controls is prevention—finding a way to isolate the workers from the hazard. In the light bulb example, a telescoping pole might be used to enable the worker to safely replace the bulb from the ground. This is an active control,



PPE is safety work gear designed to protect workers, both on and off the worksite. Image courtesy Ergodyne

meaning the worker must actively engage with the solution to complete the job. A passive engineering control, such as installing a perimeter net, would not require the worker to make any changes.

Administrative controls are educational measures and policies intended to improve jobsite safety by changing worker habits. Increased awareness on the importance of dropped object safety is one of the most crucial (and easy) preventative measures. These controls can be implemented in a variety of ways, such as safety signs, training, improved procedures and even barricading/directing certain areas of the worksite.

Continued on page 37



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By: Ted Madison, Contributor

Changing Workers' Attitudes About Hearing Protection

Some of the most effective actions employers can take to prevent noise-induced hearing loss involves training people who work in noise to protect their hearing; and conducting fit testing of hearing protectors¹. To change the attitudes of workers, focus on how valuable it is to hear well and how hearing damage will affect them.

Start with the question, "What's your favorite sound?" Is it music, laughter, conversation, movies or the sounds of nature? (See chart, "Favorite Sounds.")

This question immediately brings the value of hearing—and the consequences of losing it—into sharp focus. When you value something, you will do what is necessary to protect it. You don't need a rule or someone to tell you to do it.

Many years ago, a colleague of mine interviewed a retired industrial worker who was an avid hunter. When asked about his noise-induced hearing loss he said, "...I would give anything to be able to go in the fall, when the leaves are crisp...to be able to hear a deer or an elk walking in the leaves." He went on to say that he couldn't hear that anymore, even with his hearing aids. What a powerful statement,

"...I would give anything...!" It reveals how important his hearing is and how much he regrets not doing more to protect it.

Does your training program emphasize the value of hearing? If not, now might be the time to update your training, so employees walk away with an attitude that they would give anything to be able to continue to hear well. **IHW**

[Ted Madison is an Audiologist and National Hearing Conservation Association (NHCA) Expert. Visit NHCA at: <https://www.hearingconservation.org/>]

¹ Saylor SK, Rabinowitz PM, Cantley LF, Galusha D, Neitzel RL. Costs and effectiveness of hearing conservation programs at 14 US metal manufacturing facilities. *Int J Audiol*. 2018 Feb;57(sup1):S3-S11.



Asking employees about their favorite sounds can help to highlight the value of hearing—and the consequences of losing it. (photo courtesy <https://www.hearingconservation.org/educational-resources/>)

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Foamed Eyewear for Eye & Face Protection



Eye and face protection is one of the most commonly used personal protective products in industry. According to the CNIB, of an estimated 1,000 eye injuries in North American workplaces each day, about 5% of those injuries will be “debilitating enough to interfere with work on a short-or long-term basis.”

Legislation and the Health & Safety Act are clear in their instruction that it is the responsibility of the owner to ensure that a worker’s eyes and face are protected from any hazard that might be in the workplace. Having said this, eye and face hazards are one of the simplest hazards to identify and protect against. It’s simple: If a worker is in danger of a solid or liquid coming in contact with the eyes/face area, they need to protect accordingly.

With legislation like this in place, it’s no wonder that most workers are wearing some type of eye protection. However, foamed-lined eyewear is quickly becoming one of the fastest growing segments in eye and face protection. If you or your employees are currently not wearing foam-lined eyewear, here are the top four reasons why you should consider upgrading your eyewear protection.



Outdoor work in windswept conditions, or dusty and dirty environments, is ideal for upgrading to foam-lined eyewear, such as the Sand Viper™, DustDevil™, SentecDX™ and CeeTecDX™. (photo courtesy Dentec Safety)

1. Reduce Injury Risks

Even though most industries have implemented eye and face protection programs for employees, injuries are still occurring. This is because dust, dirt and debris can get behind the eyewear and cause injury to the individual. Upgrading to foam-lined eyewear can reduce these types of injuries, because the foam provides a better seal around the eye and mitigates risk. That can reduce lost time injuries and insurance claims—major reasons for companies to start adopting a foam-lined eye wear program.

Industries such as oil and gas, mining (above and below ground) and aggregates have recognized the value and benefits of foam-lined eye protection and have upgraded. In addition, any outdoor work in windswept conditions, or dusty and dirty environments (i.e., construction), are ideal candidates for upgrading eye and face protection to foam-lined eyewear.

There are several types that feature such design features as:

- Vented EVA foam-prevents eye injuries from wind, dust and debris; also hypo-allergenic
- Fog-free system-clear vision and durability with anti-fog, scratch-resistant lens coating
- Optional strap-for a secure goggle-like fit and no tools required
- Impact protection
- Replacement foam liners can help keep the eyewear working properly longer

2. Increased Visibility

Fogging of eye protection has become a major issue, with masks being mandatory in the workplace in some places. Fogging is not only an inconvenience to the worker; it can hinder vision, which creates another hazard in the workplace. Reduced visibility or vision impairment leads to an increased risk of accidents and can interfere with an employee’s job performance and quality of work. Foam does not prevent the fogging, but anti-fog coating on the lens does. Some company’s foam-lined eyewear has anti-fog coating that prevents moisture and fogging.

3. Increased Comfort

When it comes to comfort and fit, there is no comparison when you upgrade basic safety glasses to foam-lined eye protection. When you make the change, you also benefit from the features that provide a secure, comfortable fit, even in hot and humid conditions. There’s nothing more annoying than having to constantly re-adjust eyewear from slipping down your nose

or off your face while trying to maintain focus on the task at hand. Eyewear that stays put helps provide an optimal level of protection.

Some features to look for in comfortable eye protection include:

- Replaceable foam insert-prevents eye injuries caused by airborne dust and debris. Simple removal for easy cleaning
- Anti-fog system-combines high performance, scratch-resistant anti-fog coating with vented foam for proper airflow
- Non-slip comfort
- Blocks harmful UV-polycarbonate lenses block 99.9% of harmful UVA and UVB rays
- High-impact protection.
- CSA-certified and meets ANIS standards



photos courtesy Dentec Safety

According to Dentec Safety's President & Founder Claudio Dente, "Dentec's Sentec™ line now has a new replaceable foam insert that will add protection against dust and debris. This works well in construction for concrete cutting and dry-wall sanding, metal and woodworking, and other applications for trades, such as textile workers, cleaners and miners."

4. More Affordable

There was a time when foamed-lined eyewear came with a price tag. In the last 10 years, thanks to improvements in technology and materials, they have come down in price and are more affordable. According to Dentec Safety Specialist Craig Lafferty, "Even though you are spending a little more money to upgrade your eyewear protection, your risk and injury claims can decrease dramatically when you switch to foam-lined eyewear. These upgrades can result in huge cost-savings. In 2021,

being able to provide affordable foam-lined eye protection to your entire crew is a lot more reasonable. Any organization can increase safety compliance without increasing budget." **IHW**

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When is it Time to Replace Your Work Gloves?

[Editor's note: *The following main article is from Workplace Material Handling & Safety's February 2022 issue.*]

All gloves will eventually need to be replaced, especially if you're wearing them all the time. In general, they shouldn't be wearing out daily, but getting a few weeks out of a regularly used pair of gloves is considered a pretty good life.

The length of time a glove lasts depends on several factors, including the type of glove it is; the work you're doing while wearing it; how often and how long you're doing that work; and how well you take care of your gear. This also makes it very subjective—you might use your gloves faster than your coworkers because of differences in how you work. So, consider these factors when you suspect it might be time to replace your work gloves.

Know What Durability Means for You

When workers and manufacturers use the word "durability," they generally mean "longevity," which is just another way of saying how long a worker can wear the glove before it's considered "worn out" and no longer able to do its job. Unfortunately, this is a difficult quality to measure, because there aren't objective tests or standards. And often, the wear life is determined by the job for which the glove is used. When you're looking at gloves to wear, look at measurable performance qualities like cut protection or resistance to chemicals and abrasion.

Brush Up on Your Safety Skills

Workers should be trained on all aspects of their job; this includes equipment. There should be training for glove features, job applications, the impact of

proper gear, how to identify wear and damage, and recognizing when PPE is no longer able to do its job. This training will become even more crucial as the years go on and manufacturers develop new fabrics, technologies and methods that can help increase product durability and functionality.

Organized training through a workplace will make workers more likely to understand and therefore use work gloves, which lowers risk. Make training a continuous process for new and veteran employees alike to keep everyone's skills fresh.



The length of time a glove lasts depends on the type of glove; the work you're doing while wearing it; how often and how long you're doing that work; and how well you take care of your gear. (photo courtesy PK Safety)

Look for Signs of Wear and Tear

While you may get away with holey or over-used gloves when doing basic house chores or DIY projects, job sites may hold gear to higher standards to best protect its workers. Generally, there are visual signs of when gloves have reached the point of being worn out. Look for color variations in the coating and liner, for instance. Some workers will throw out

a pair of gloves when the coating wears through, and some when the glove itself is full of holes or the surface is completely abraded off—use your best judgment. It can only take a moment for a workplace accident to happen, so spend a few extra moments at the start of each shift to ensure that you're ready to go.

Proper Care and Keeping

While all gloves will eventually wear out and need to be removed from service, you can prolong the life of your gloves with proper care and maintenance. Make inspecting them for damage a regular part of your workday routine—especially if they've encountered a lot of abuse. Look specifically for breaks in the glove where skin is left vulnerable to temperatures, cuts, punctures, chemicals and other hazards.

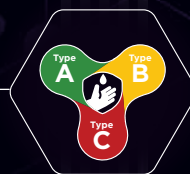
Make sure to follow the manufacturer's laundering directions as well. Launder the gloves as often as recommended and according to their directions, especially if they're flame-resistant and need to be clean to be safe. And really, you should be washing your gloves anyway—you wouldn't wear other clothes over and over without ever washing them, so why would gloves be any different?

Sometimes It's Necessary to Toss

Just like some gloves are designed to last for a long time, others are designed to be used once before being thrown out. If you're using disposable gloves, it's for a reason—specifically, that proper disposal of the glove and what it came in contact with is safer than reusing it. Medical, food service and janitorial work make use of disposable gloves. Sanitizing these gloves would be too intense of a process for the materials to handle, so they're disposed of after use, regardless of whether they're worn out or damaged.

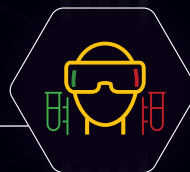
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About the Author:

Rick Pedley is CEO of PK Safety, a company that has been helping people stay safe in the workplace for more than 70 years. For information about PK Safety's safety gloves, gas detection devices, fall protection, respirators, confined space equipment and more, visit www.pksafety.com.



photo courtesy PK Safety

CHEMICAL RISKS IN HAND PROTECTION

By: Barbara Nessinger, Editor-in-Chief

Selecting the right chemical resistant glove for the job is complicated. Employees where chemicals are manufactured are obviously at risk for hand injuries due to chemical exposure. Other industries are also high-risk for such hazards (i.e., mining, painting, construction, welding, etc.).

How do workers unintentionally expose themselves to harmful solutions? The main issue is training: Making sure employees receive proper training and certifications is paramount to a safe work environment, especially where harmful chemicals are in use.

Permeation vs. Penetration

What is chemical permeation, and how can it be combatted in industries where chemical exposure is a risk? We recently asked Gil Leverne, Director, Marketing, at SHOWA International, this question.

"Individual molecules of the chemical enter the film and squirm through by passing between the molecules of the glove compound or film. This is combatted by wearing the proper hand protection within the regulated time of exposure to chemicals," Leverne stated.

Another factor to consider when seeking protection from chemicals is penetration. While permeation is described as something moving through a substance by diffusion or going through the pores of it by being spread onto it, penetration of something is when a chemical finds its way into the pores and imperfections of the material.

Marked for Protection

You can identify a glove's chemical protection performance by looking at the type at the top of the pictogram, [right], and the letters underneath it. The type will tell you how many of the 18

EN ISO 374-1/
Type A



UVWXYZ

Chemical protection with breakthrough times > 30 minutes for at least 6 of the 18 listed chemicals within the standard.

EN ISO 374-1/
Type B



XYZ

Chemical protection with breakthrough times > 30 minutes for at least 3 of the 18 listed chemicals within the standard.





















EN ISO 374-1/
Type C



Chemical protection with breakthrough times > 10 minutes for at least 1 of the 18 listed chemicals within the standard.

chemicals listed in the table were tested with the glove to check its performance, as well as the expected minimal length of the protection against these chemicals. The letter code denotes the tested chemicals within the EN 374 standard. **IHW**

[To watch an exclusive interview with SHOWA's Leverne, go to: <https://industrialhygienepub.com/tl-showa>.]

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Emergency Temporary Standards: What They Mean for Businesses

Continued from page 18

That's why a formal workplace safety and compliance program is paramount to keep staff safe. Regardless of a federal ETS, businesses should ensure their safety programs include any requirements around vaccination, testing, etc. But just updating your workplace safety programs isn't the end-all-be-all.

An effective safety program—one that mitigates workplace accidents and exposure to COVID-19—requires dedication to achieving the organization's safety goals. Management must ensure that everyone adheres to safety policies. If your company doesn't already have one, we recommend creating a dedicated EHS team, with specific roles assigned to each member to ensure the organization remains compliant. Everyone in the company should also receive regular safety training, especially training that is specific to their job duties. These training sessions should include proper ways to wear PPE and when and where it's required on the job.

If you need help getting started, talk to your EHS or workplace safety consultant. **IHW**

Jill Schaefer, Director of Content Management at KPA



How to Determine the Right PPE for Your Worksite

Continued from page 30

In our light bulb example, the control might be teaching the worker to use three points of contact when climbing up to change the light.

But again, it's not always an either-or fix when it comes to administrative or engineering controls. Ensuring the safest possible job execution often involves multiple controls for the same risk.

PPE: The Last Line Of Defense

When all else fails, there's PPE. In the lightbulb example, PPE would be secondary safety equipment that deflects falling objects or minimizes damage upon impact with the worker. A hard hat is the most important and obvious protective measure in this conversation; other examples include steel toe boots, safety glasses and work gloves with dorsal impact protection.

Determining the necessary safety gear for your worksite shouldn't be a game of guess and check. As the last line of defense, proper selection and deployment of PPE can be the difference between sending an employee home or to the hospital. Examining the task at hand through the lens of the risk-solution hierarchy is an integral step in deciphering the controls and PPE needed to operate your worksite as safely as possible. **IHW**

[Allie Thunstrom is a QSSP Certified Worksite Safety Specialist at Ergodyne.]

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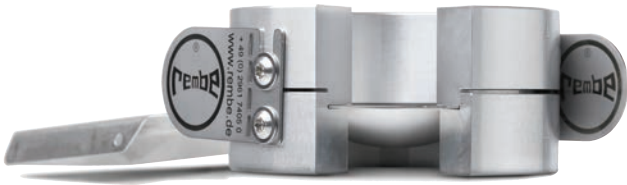
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Titanium Climbing-Style Helmet



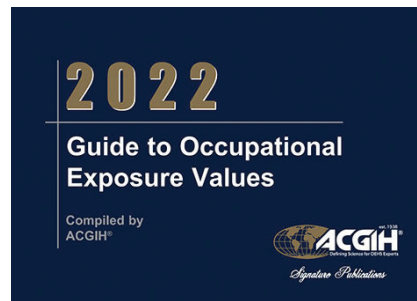
Radians'® new Titanium™ safety helmet features an ABS impact-resistant outer shell for strength and durability, and it is available vented and non-vented in a variety of colors. Traditional hard hats typically use a suspension system and forego the use of a chin strap. Without a chin strap, the hard hat may fall off a worker's head, especially if the worker falls, trips, slips, bends forward or looks up. Even strong wind can dislodge a hard hat. Also, typical hard hats are primarily designed to protect the top of the head, not the sides or back. This can lead to increased injuries, especially if a worker falls from a roof or scaffolding. Titanium helps protect workers from head injuries due to falls from heights or falling objects;

unlike a hard hat, it also provides protection from impacts to the side and back of the head, which is very important if a worker trips, slips or falls. Its integrated adjustable chin strap keeps the helmet where it belongs. Radians has also developed titanium accessories, including a visor bracket and a soft goods kit for when it's time to replace the inner brow guard, back pad and comfort liner.



Radians, www.radians.com

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Air Systems International Incorporated, www.airsystems.com

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