

MANAGE SAFETY EFFECTIVELY WITH ISO 45001, see page 15

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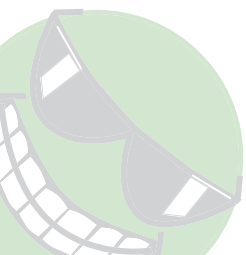
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7 Outlook for 2022: Information will Give us Power Over the Unknown

A look at new and updated standards as it relates to occupational psychological health and safety.

Material Handling/Logistics

RACKS & SHELVING

8 Keep Your Site Safe Before, During and After Rack Installation

Essential recommendations for rack installation projects to ensure the safety of all involved.

AUTOMATIC GUIDED VEHICLE

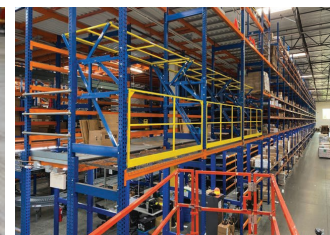
10 How Does an AGV Navigate Safely?

A look at how AGVs navigate in the workplace and why they are safer than traditional conveyance.

PROTECTIVE GUARDING

12 Assessing Safety at Your Facility

A checklist is key to ensure protective guarding is working as it should to protect workers from injury.



Environmental Health & Safety

THE COMPLIANCE ISSUE

14 SPECIAL SECTION: The Compliance Issue

A special section focusing on specific safety standards from such organizations as OSHA, ANSI and NFPA. From eyewash standards to foot protection, as well as HazCom and machine safety, WMHS highlights key compliance requirements, important facts and how to get compliance assistance when you need it.

In Every Issue

6 Editor's Column

A note from Maureen

Paraventi, Chief Editor

63 Ad Index

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Last year was, to put it mildly, challenging. Countries, states and cities struggled to contain the spread of and cope with the effects of a deadly virus, while companies pivoted again and again in order to accommodate restrictions, keep their workers healthy and continue to stay in business. New products sprang into being seemingly overnight that made it possible to physically separate employees in the workplace or reduce the number of workers needed to accomplish specific tasks.

Hygiene took on a heightened importance (which many EHS professionals point out that it should have had all along). The public health crisis forced companies to rise to new levels of ingenuity and resourcefulness, but it also showed them that they can, in fact, do that. There were costs associated with the changes, but costs would certainly have arisen from *not* making changes.

Workplace Material Handling & Safety (WMHS) is positioned to address the two industry concerns that were most prominent during 2021 and will continue to be critical during 2022: operational challenges of productivity and worker safety. The WMHS staff is dedicated to bringing you timely information from subject matter experts that help you solve problems, streamline operations, comply with regulations and maintain a safe and healthy workforce. Whether your responsibilities involve distribution centers, warehouses, a manufacturing center or some other type of business, you'll find tips, trends, recommendations and lots of new products in each issue of WMHS. Our broad focus allows us to cover a tremendous range of topics, including conveyors; combustible dust; mobile robots; hand, eye, foot and hearing protection; pallets; ladders; protective guarding; lifts; emergency showers and eyewashes; mezzanine safety; ASRS; order picking and fulfillment; LOTO; cubing and weighing; rugged printers; wearables; safety knives; carts and casters; racks and shelving...you get the idea.

As we roll into 2022, I invite you to embrace the slogan the British government printed on posters in 1939 – a sentiment intended to prepare the public for the devastating air attacks by the Germans that were up ahead. “Keep Calm and Carry On” is a much-needed reminder to remain calm in the face of adversity. It's going to be my motto for this year. (Maybe it should be my motto for every year!)

As always, your comments and questions are welcome. If you have comments about an article or would like to suggest one, feel free to email me. Oh, and: Happy New Year.

Maureen Paraventi

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Outlook for 2022: Information Will Give Us Power Over the Unknown

FUTURE
LOADING...



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Every new year begins with a mixture of uncertainty and determination, trepidation and optimism. The pandemic, which will be entering its second year, will likely heighten the negative and prevent us from fully embracing the positive. For industry, key questions that will affect profit and loss, as well as operational efficiencies, have yet to find answers. Will global supply chain bottlenecks be resolved? Will labor shortages ease? Will inflation increase and if it does, will it affect consumer spending? (*How much* will it affect consumer spending might be the better question.) What kind of economic growth can we expect in 2022 in the U.S., and elsewhere?

You don't need a crystal ball to foresee that material handling will continue to automate, a trend driven both by necessity (the explosive rise in ecommerce and difficulties in attracting and retaining workers) and by technology (i.e., increasingly sophisticated robots and vision-guided navigation technology). High installation costs will keep automation out of reach for some, at least for the time being, although it may be that – as is true for many kinds of technology – the costs will decrease going forward.

And speaking of those labor shortages, there *are* steps companies can take to retain employees and reduce turnover costs. The experts recommend creating a healthy workplace *culture* and using diversity initiatives and career advancement pathways to let workers know they're valued and that they have opportunities for upward mobility within the company. Signing bonuses, competitive wages and incentives for referrals can help fill those empty positions in the workforce.

The continuing importance of one of WMHS' favorite topics – workplace safety and health – is evident in the fact that one new voluntary standard on the subject has been published and existing ones have been revised. The new one is: *ANSI/ASSP/ISO 45003-2021, Occupational Health and Safety Management – Psychological Health and Safety at Work – Guidelines for Managing Psychosocial Risks*. It provides guidance for managing psychosocial risk and

promoting well-being at work as part of a safety and health management system based on ISO 45001. The revised standards are:

- *ANSI/ASSP A10.38-2021, Basic Elements of an Employer's Program to Provide a Safe and Healthful Work Environment*, which outlines minimum elements of a program for protecting employees in construction and demolition
- *ANSI/ASSP A10.47-2021, Work Zone Safety for Roadway Construction*, which sets minimum requirements for workers involved in construction, utility work or maintenance on roads and aims to prevent crashes in work zones.
- *ANSI/ASSP Z359.11-2021, Safety Requirements for Full Body Harnesses*, which creates minimum requirements for full-body harnesses commonly used for fall protection, travel restraint and rescue operations.
- *ANSI/ASSP Z359.14-2021, Safety Requirements for Self-Retracting Devices for Personal Fall Arrest and Rescue Systems*, which establishes minimum requirements for self-retracting devices, including self-retracting lanyards.
- *ANSI/ASSP Z590.3-2021, Prevention Through Design Guidelines for Addressing Occupational Hazards and Risks in Design and Redesign Processes*, which offers guidance on reducing or eliminating occupational safety and health hazards in the design process.

(For more information about those standards, visit the American Society of Safety Professionals website: <https://www.assp.org/>).

As we venture forth in 2022, it's impossible to predict what's up ahead (who could have anticipated a pandemic?). Information truly is power, and at *Workplace Material Handling & Safety*, we will continue to bring you timely and targeted information intended to improve your operations and keep your workers safe. **WMHS**



Keep Your Site Safe Before, During and After Rack Installation

Contributed by: **RMI- Rack Manufacturers Institute of MHI**

A rack installation project is a construction site. That's the message reputable rack manufacturers want to convey, first and foremost, with safety front and center in their minds. "These days, most facilities are doing their best to maximize their vertical space," says Ryan Pyle, National Sales Director at Hannibal Industries. "That means racking that often extends very high. If you have a fall from 30 feet in the air during installation, that's not a good outcome."

Everyone in a facility has to be aware and on board with the right protocols to successfully carry out a safe project. "The number one priority is safety," says Ryan Bartlett, President and CEO at United Material Handling. "This applies to the installers, the site employees, contractors and anyone on the floor."

With that in mind, it is essential that when you undertake a rack installation project, you follow specific recommendations to keep everyone involved safe. The best way to accomplish that is to break your project into specific segments: before, during and after installation.

BEFORE

While every stage of a rack installation is critical, it's the steps you take in advance of the project that lay the foundation for safety. Yet, says Pyle, "This is often the most overlooked stage of the project. You must have minimum standards in place before you even begin."

Your best starting point is selecting a reputable manufacturing company, a partner who can help you cross all the Ts and dot all the Is. "Make sure they are a member of the Rack Manufacturer's Institute (RMI)," says Bartlett.

"They will have guidelines and be committed to following those guidelines."

Always check references, too. Ask to see examples of projects on a scale similar to yours and check references. "Ask how the company handles hiccups when they arise, because they always do," recommends Pyle. "Also look into how much tonnage they produce in a month and whether or not they have more than one facility as a backup. Do your research—everyone thinks a rack is a rack, but there's a wide variety and you want to make sure what you're buying is safe and will stand the test of time."

A big part of the pre-installation stage involves applying for, and acquiring, the proper permits. This can involve a building inspection, as well as a fire inspection. Depending on where you are in the country, you want to ensure that the rack you are purchasing will meet not just static capacity, but seismic capacity as well.

Once you've made it through the permitting process and approvals, it's time to move on to a visual survey of your site. "Remember that if we're coming into your building, we're bringing in massive bundles of steel and setting up a construction site," says John Krummell, President and CEO of Advanced Storage Products. "Make sure there is safe access to bring all the materials and equipment in."

Have a walk through with the key players and look at the floor to ensure it is free of cracks, that it is strong enough for the weight of the incoming racking and that it's level. Look for any electrical or other lines that might be a tripping hazard, too.

DURING

Once the installation project is underway, there are plenty of safety boxes to check. “Make sure that everyone has proper PPE, including goggles, hard hats, steel-toe boots and vests,” says Pyle. “Also make sure anyone using equipment is certified to do so, and that the equipment is in good working order.”

Because much of the job might involve heights, installers need to be safely tethered inside and, on the racks, too. “OSHA is very specific about what’s allowable when it comes to fall protection,” says Krummell. “The key factor is that if someone is in an elevated position, they must be tied off. Sometimes this means a double lanyard, so make sure you are in compliance here.”

Krummell also emphasizes the importance of the work following a systematic timeline. “It’s easy to get into trouble by performing steps out of order,” he warns. “You need to finish what you start before moving onto the next step. Have an inspection that follows a checklist to ensure everything is carefully installed.”

And while it’s tempting to rush a project, that’s a big red flag. “People often want to throw more installers at a project and get the job finished faster, but that’s a mistake and a risk,” says Pyle.

AFTER

As the project reaches completion, there are still a few critical steps to ensure safety. Immediately post installation, you need a complete inspection, preferably by the design engineer or another qualified professional. Then schedule follow-up inspections at regular intervals, as recommended by your manufacturer or distributor partner.

“Also make sure all your employees are trained to operate in and around your new racking,” says Pyle. “This will not only make the environment safe, but help your rack last longer, too.”

If conditions change in your facility—you are storing different commodities, for instance—make sure your racking is up to code for handling that. This is a situation that can change quickly and regularly, and it’s an easy issue to fall through the cracks.

Much is riding on your new racking, including employee health. Afford your installation project the high priority it deserves. Says Bartlett: “Find a partner that covers safety before all else.”

To find out more about RMI visit <https://www.mhi.org/rmi>

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How Does an AGV Navigate Safely?

Contributed by: **RedViking**

Automated Guided Vehicles (AGVs) represent the next step in the evolution of the assembly line. AGVs are set to transform manufacturing in the near future. As the name suggests, the operations of AGVs are completely automated—no human guides the vehicle. It is natural to doubt whether AGVs can cause accidents like cars on the road. But the fact is, AGVs are actually safer than cars driven by human operators.

self-adhesive tape and are easy to install, are laid on the track. The AGV then moves only over the magnetic tape.

The advantage here is the low cost of implementation. It is also easy to shift the operations from one area to another. To add additional areas to be covered, the system just needs additional magnetic tape and the rest can be expanded at the software end, implemented with minimal disruption.



AGVs need to know their position in the manufacturing plant or assembly line to navigate effectively. *Photo courtesy of RedViking*

Once you have an understanding of how AGVs navigate, you will recognize how and why AGVs are a much safer option than traditional conveyance.

AGV NAVIGATION

AGVs need to know their position in the manufacturing plant or assembly line to navigate effectively. There are two ways to determine position: relative and absolute. Absolute position measurement uses the absolute position as it is mapped. Whereas, in the relative positioning method, the position is calculated relative to a reference point determined in the factory. With this basic information, we can take a look into the different navigation methods employed by AGVs and how safety is ensured while working along with people.

MAGNETIC NAVIGATION

Here is an example of how magnetic tapes are used to control the AGV. Magnetic tapes, which are available as

SAFETY WITH MAGNETIC NAVIGATION

Magnetic strips will be clearly visible on the factory floor. AGVs move only along the track laden with magnetic tapes. People can easily avoid the track to avoid collision with the vehicle. The vehicles will also be equipped with proximity sensors. Proximity sensors detect any object in its path by emitting magnetic radiation. There should not be any object in the path of the AGV as it has a dedicated track. The controls are coded in such a way that the AGV stops movement if any object is detected in its path.

OPTICAL NAVIGATION

Instead of magnetic tapes, paint or bright-colored normal tapes are used. The vision sensor system can detect the tapes that have clear contrast with the factory floor and centers the vehicle over the tape. Another way of implementation is to have barcoded tapes. It is particularly helpful to implement tracks that diverge and converge. The path

can be easily changed with this system.

SAFETY WITH OPTICAL NAVIGATION

AGVs with optical navigation can also implement proximity sensors. Once an object is detected in the path, it stops automatically. Another way is to detect people and obstacles using the optical sensors equipped with the AGV. Depending on the capability of the optical sensors and the software associated with them, optical sensors can be used to detect obstacles in the path. Proximity sensors are the easier and cheaper option as sensing obstacles with optical sensors require higher software and processing capabilities.

LIGHT DETECTION & RANGING

Light Detection and Ranging (LiDAR) is a relatively new technology that has seen wide adoption in autonomous vehicles. It functions similarly to Sonar or Sound Navigation and Ranging. Instead of sound waves, laser pulses are sent out in every direction of the AGV. The

LiDAR sensor detects the laser pulses that reflect off the objects and walls around it. This can be used to construct a useful 3-dimensional map of the environment. This map is updated in real-time. Since lasers are much faster than sound, the area can be mapped really fast and is also updated multiple times every second.

SAFETY WITH LIDAR NAVIGATION

As mentioned earlier, LiDAR uses laser technology to obtain a three-dimensional map of its environment. It clearly indicates the obstacles and other objects in the surroundings. This can be used to chart a path. Unlike the previous modes of navigation, LiDAR-enabled AGVs do not depend on a track to navigate. They can weave in and out of any path with great flexibility. When it detects an object in its path, it can reroute in such a way as to avoid the obstacle.

The fast lasers are used to update the environmental model multiple times in a second. It helps to detect moving objects, the direction and the speed of movement. Complex algorithms can work out the trajectory of the moving object and can chart a path to avoid the moving object. In that way, LiDAR provides a dynamic safety mechanism.

MISCELLANEOUS SAFETY FEATURES

AGVs can use a mix of the safety features mentioned above. In addition to that, it can also employ sound and light-based signals to alert of its presence.

- **Sound:** AGVs can be equipped with sound systems that will warn people around of their proximity. It can be implemented so it beeps continuously while it is in operation or beeps only when it detects an obstacle in its path. Proximity sensors or other object detection technology already available can be used to trigger the warning sounds. This will help to clear the path.
- **Light:** AGVs can be equipped with normal light or strobe lights to indicate its presence. Strobe lights catch the attention of the people around and they are bound to move out of the way. Lights can also be used to indicate various states of AGV or the manufacturing process.
- **Rerouting:** Here the AGV changes its course to accommodate the objects in its path. A combination of sensors and computer algorithms can be used to change the path to avoid obstacles. **WMHS**

AGVs not only provide operational efficiency compared to the traditional assembly line, but also superior protection to the



AGVs provide superior protection to the people around it. Photo courtesy of RedViking

people around its operation. AGVs can be used to eliminate the hazards of traditional assembly line conveyance. Get in touch with the team at RedViking to learn more about how AGVs can help your operations (www.redviking.com).

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Assessing Safety at Your Facility

By: **ProGMA**

Safety is a priority of most material handling and distribution facilities, so it's very likely there is already protective guarding installed within your operations. However, safety, particularly protective guarding, can have many definitions depending on the application; from columns guarding the building from being damaged, to netting that prevents objects from falling and striking workers. Because of this wide range, safety measures in certain areas of the facility can be overlooked. Or maybe the operations have changed in scope, which may cause some new safety hazards. Or the safety equipment from the prior application is being used, which doesn't fit the new system.

It's important for all safety managers to do a walk through and review the protective guarding at least once a year. The assessment must include both inside and outside the building, as well as reviewing each level on which employees work. Reviewing all of the ANSI codes and OSHA regulations is a good place to start. Then, use a checklist to help you review each area; a checklist created by the Protective Guarding Manufacturers Association (ProGMA) is a great tool to help assess each area within the facility for locations that may need protective guarding equipment to make the operations safer.

The Protective Guarding Checklist includes every area within the facility and offers a list of the protective guarding solutions that may be needed; it was developed to guide safety managers through the assessment process. The checklist includes a review of protective guarding throughout the facility, and links to resources like images and a list of the manufacturers that offer that type of guarding.

Regardless of the tools you use for your assessment, take time to review each application with a safety lens.

OUTSIDE THE FACILITY

About one quarter of all industrial accidents occur in the loading dock area; this can range from a forklift truck driving off the dock to a truck backing into a building, and many others in-between. Protective guarding can help to ensure employees are safe from falls, and that the building will be protected from the impact of a vehicle.

Checking around the major facility structures can ensure the building is protected. Look at the columns, curbs and traffic patterns to make sure the proper guarding is in place, noting if any buffers are needed. Guardrails and barriers like safety gates should be used along any ledges

of the actual loading dock if it's elevated, and installed on lift gates that are used by employees to transport material. Doors and stairways should also be safeguarded, and the use of access control cages can be very helpful if access to the building must be limited.

Make notes about any potential hazard or questions you have about safety outside of the building. A representative from a ProGMA member company or industry consultant can help you determine the best guarding for each area.



Protective guarding equipment like pallet drop safety gates are included on the checklist. Pictured are Rack Supported Pivot safety gates from ProGMA member company *Mezzanine Safeti-Gates, Inc.*

INSIDE THE FACILITY

Start at the ground level where employees enter to start their work day. Review the entry procedure, taking into account any access control cages and look at the aisles employees walk along. Make sure that employees have defined areas that separate them from traffic, especially automated vehicles, robots or machinery. Check the area around any automated equipment to ensure the presence of perimeter guarding, which prevents employees from coming into contact with this type of equipment.

Vehicles can also damage fixed structures like in-plant offices or work cells, electrical equipment and sprinkler system mainlines. Make sure that these areas are protected from all vehicle traffic.

Check around the pallet rack, or any other shelving system that is used for storage or pallet drop areas. Column

protectors and corner guards can protect rack systems in high traffic areas or at the end of rows. If items are being stored in the rack system, guarding like netting or wire mesh can prevent loose objects from falling into walkways and work areas.

On upper levels, all walkways must have a guardrail for fall protection. If the facility features pick modules, rack systems or other elevated pallet drop areas where employees work, those openings must have safety gates that secure the area and provide fall protection for both employees and products. Doors and openings on the upper levels must be guarded to prevent falls. Guarding under overhead conveyors also prevents product from falling into work areas. An annual safety audit can be the difference in preventing injuries to employees working in your facility. **WMHS**

A checklist can be downloaded free of charge from the Protective Guarding Manufacturers Association (<https://www.mhi.org/progma>). Visitors can also find a wide number of resources including a protective guarding search tool, videos and case studies. To access the free ProGMA facility safety checklist, go to: <https://www.mhi.org/downloads/industrygroups/progma/Protective-Guarding-Checklist.pdf>



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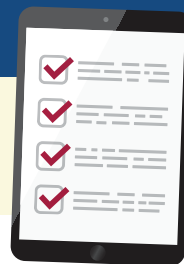
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Safety Requirements for Industrial Scissors Lifts: (ANSI MH29.1:2012) **18**



Crash Testing Industrial Guardrail Barriers and Barrier Posts: (ANSI MH31.2-2021)..... **20**



Safety Standard for Conveyors and Related Equipment: (ASME B20.1-2021)..... **22**



Combustible Dust Standard: (NFPA 652) **26**



Medical Services and First Aid: (1910.151) **28**



Dropped Object Prevention Solutions: (ANSI/ISEA 121-2018) **30**



Hand Protection: (OSHA 1910.138)..... **32**



Performance and Classification for Impact-Resistant Gloves: (ANSI/ISEA 138-2019)..... **36**



Hazard Communication Standard: (OSHA 1910.1200) **38**



Emergency Eyewash & Shower Standard: (ANSI Z358.1-2014)..... **40**



Safety Color Code for Marking Physical Hazards: (OSHA 1910.144)..... **44**



Respirator Fit-Testing Methods (ANSI/AIHA/ASSE Z88.10-2010) **46**



Crystalline Silica General Industry and Maritime Standard **48**



Fall Protection Systems and Falling Object Protection- Criteria and Practices: (1910.29) ... **50**



Focus on Portable Safety Equipment: (Eyewash/Shower) **54**



Duty to Have Fall Protection: (OSHA 1926.501)..... **56**



Foot Protection: (ASTM F2413-18)..... **58**



Foot Protection: (1910.136(a)) **60**



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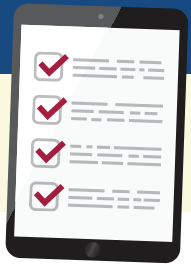


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Baling Equipment - Safety Requirements for Installation, Maintenance and Operation



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This standard revises safety requirements concerning the installation, operation, maintenance, service, repair, modification and reconstruction (where applicable) of baling equipment that were covered by ANSI Z245.5-2008, Baling Equipment - Safety Requirements. The companion standard, ANSI Z245.51-2013 establishes safety requirements for the design and construction of commercial baling equipment commonly used in recycling, solid waste disposal and raw materials handling. This standard was processed and approved for submittal to ANSI by the Accredited Standards Committee Z245 on Equipment, Technology and Operations for Wastes and Recyclable Materials.

Both these standards taken together revise and replace ANSI Z245.5 -2008.

Like all American National Standards Institute (ANSI) standards, this is a voluntary consensus standard. The requirements of this standard apply to balers rated at 600 volts or less, for outdoor or indoor use, and are employed in accordance with the manufacturer's written installation, operation and maintenance instructions and procedures.

Hazards of baler use

A baler is a powerful piece of machinery used to compress materials into compact bales that are easy to handle, transport and store. Employees who load, operate or maintain balers can be exposed to crushing and amputation hazards if the baler is inadequately safeguarded or if hazardous energy lockout procedures are not followed. Serious injuries and fatalities have occurred when part(s) of the worker's

body was caught by the baler ram inside loading and baling chambers.

Protecting workers from injury

The National Institute for Occupational Safety and Health (NIOSH) recommends three criteria to protect workers from injury during operation paper balers:

- The point-of-operation guarding, such as an interlock gate, must prevent workers from placing any part(s) of their body into the hazardous areas of the baler during operation.
- Periodic inspection and maintenance of the equipment and safeguarding devices must be conducted to ensure proper operation and safe performance.
- Workers must be trained in safe operation of the equipment, understand the hazards related to bypassing safety devices and recognize the limitations and effective operating ranges of safety devices.

For all balers:

- Access covers, access doors and protective shields shall be safely secured. If access doors are lockable, the key should be kept by an authorized person. By location or design, interlock components should not be easy to tamper with.
- Maintenance personnel are trained to follow manufacturer's recommended procedures for balers that the employer maintains. Sixteen and 17-year-olds are allowed *only* to load balers and shall not operate or perform maintenance, including clearing jams from the machine.
- The manufacturer's tag indicates that the baler was constructed in accordance with the standard. This indicates that the chamber door and latch have been designed to withstand the maximum ram forces on the material being baled.
- There should be a lockable power disconnect and an effective



Balers compress materials into compact bales that are easy to handle, transport and store.

- lockout procedure. A clear line of sight from the baler to the disconnect avoids unexpected start-ups.
- A lockout procedure is written specific to that baler. Lockout is required for cleaning, jam clearing and maintenance. Lockout procedures must meet OSHA requirements.

For vertical downstroke balers:

- The ram will not function unless the bale chamber door is closed and latched, except when operated with a control that must be kept engaged by the operator. Bale unloading is accomplished by upward ram motion, so a maintained-contact control (such as a push button) is appropriate.
- The loading chamber door or gate must completely cover the loading chamber before the ram can be activated and must remain closed during the compression stroke. The ram must stop or return to rest if the door or gate is opened more than 1/2 inch during the compression stroke. If the gate is opened more than 1/2 inch during the compression stroke, and ram movement continues, then the gate interlock is not functioning properly and needs to be repaired.

- The protective gate cannot be opened faster than the ram rises to keep the top of the ram protected during the upstroke. A safe procedure for clearing scrap from the top of the ram should include locking out power.
- The manufacturer's instructions must include provisions for manually installing a blocking device, which will restrain inadvertent downward motion of the ram whenever workers must enter the baling chamber. In addition to proper isolation and control of electrical energy during maintenance, the potential energy of the ram must be controlled by a blocking device of sufficient strength to resist downward ram motion. **WMHS**

For more information:

- » The standard is available from the ANSI webstore at <https://webstore.ansi.org/standards/eia/ansiz2452013-1506110>



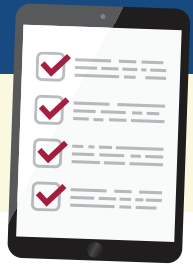
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Safety Requirements for Industrial Scissors Lifts



“Over 20 years ago, Advance Lifts and a number of other leading manufacturers of industrial scissors lifts formed a group that worked on developing the first version of Safety Requirements for Industrial Scissors Lifts. This became known as the ANSI MH29.1 standard. Advance Lifts has continued to be active in the development of the subsequent revisions to the standard and, in 2015, the International Code Council (ICC) incorporated ANSI MH29.1 as a reference standard in section 3001.2 in chapter 30 of the International Building Code (IBC). All of the Advance Lifts scissors lifts products are designed, tested and manufactured to comply with ANSI MH29.1. Consequently, when we ship a product to a customer, we are confident that we are providing them with reliable, durable and safe products. ANSI MH29.1 is a very important part of our company’s business philosophy.” *Advance Lifts, Inc., 800-843-3625, www.advancelifts.com*

About the Standard

This standard applies to industrial scissors lifts that are raised and lowered by means of hydraulic, pneumatic or mechanical actuation. These industrial scissors lifts are intended for commercial applications on firm and level surfaces and may be either stationary or mobile and used to position, feed, transfer, load or unload materials and/or personnel. Industrial scissors lifts are available in a range of capacities, sizes and travels and include dock lifts, work access lifts and lift tables. (ANSI: https://webstore.ansi.org/preview-pages/MHIA/preview_ANSI+MH29.1-2012.pdf)

This standard does not apply to: (1) Lift tables that do not incorporate scissors type mechanisms. (2) Aerial or work platforms as covered by ANSI/SIA A92. (3) Elevators and equipment covered in ANSI/ASME A17.1, safety code for elevator and escalators (The National Elevator Code). (4) Vertical reciprocating conveyors such as those covered in ANSI/ASME B20.1, Safety Standard for conveyors and related equipment. (4) Vertical lifts intended for transportation of a mobility impaired person only as covered in ANSI/ASME A18.1 – The Safety Standard for Platform Lifts and Stairway Chairlifts. (5) Automotive vehicle service lifts such as covered in ANSI/ALI ALIS, ANSI/

ALI ALOIM, and ANSI/ALI ALCTV. (6) Vehicle transport lifts as covered in ANSI/ASME PALD, Part 17. (7) Performing art lifts such as stage and orchestra lifts. (ANSI: https://webstore.ansi.org/preview-pages/MHIA/preview_ANSI+MH29.1-2012.pdf)

The standard includes responsibilities of manufacturers, owners/users and operators and covers basic principles, inspection and maintenance details, what training should include, workplace inspections and operator warnings and instructions, among other items.

History of the standard

ANSI MH29.1 was developed to provide a comprehensive safety standard and establish a minimum design and performance criteria to ensure the safe application and utilization of industrial scissors lifts. It is intended to serve as a guide for designers, manufacturers, sellers, installers, equipment

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specifiers, owners, users and governing bodies of industrial scissors lifts. The newest revision of the standard, MH29.1:2012 was released by Lift Manufacturers Product Section (LMPS) Industry Group of the MHI. It made changes and additions to definitions contained in the standard intended to address confusion and overlap in the earlier version and provide further delineation between industrial scissors lifts and aerial type lifts. The responsibilities of manufacturers, users, owners and operators have been reordered, consolidated and enhanced. Lastly, the requirements within the standard have been revised where needed to ensure they are stated using mandatory language. This revision contains a new section on operator responsibilities and modifies values related to the indicator bars in the section on platform protection. (ANSI: https://webstore.ansi.org/preview-pages/MHIA/preview_ANSI+MH29.1-2012.pdf)

Select the right equipment for the task

One of the most important ways to ensure safety is to choose the right lift



Photos courtesy of Advance Lifts, Inc.



for the application. To do this, it is necessary to take into account:

- **The capacity:** the total weight that will be placed on a unit. In order for a unit to be safe, it must be able to lift its maximum loaded capacity.
- **The nature of the load:** what the load consists of, the weights of the load components, the center of gravity of the load, if it is not centered on the load and the physical dimensions of the load.
- **Means of loading and unloading:** how loads are transitioned onto and off of the lift. These movements determine the “edge loading” and/or “impact” that the structure must sustain and they may contribute to off centered load conditions during the lifting cycle. The most common ways in which loads are transitioned on and off lifts are: rolled on/ rolled off – with a wheeled vehicle or cart; slid on/ slid off – as in sheet feeding operations or conveyor operations; placed on/ picked off – as in stacking operations or crane loading.
- **Travel and lowered height:** Travel refers to the vertical movement of the unit. Units with excess travel are chosen for some applications, so that longer platforms can be made available.
- **Platform size**
- **Speed requirements:** In most cases, the standard speed of a lift model is satisfactory for most applications.

Consulting with a manufacturer will help determine the right lift for an application. **WMHS**



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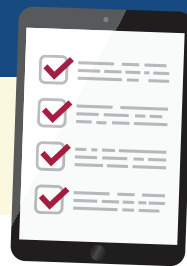


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Test Method for Crash Testing Industrial Guardrail Barriers and Barrier Posts



“Omega Industrial Safety applauds the rigorous testing and reporting by the Protective Guarding Manufacturers Association to develop universal criteria, especially in regard to the operation of forklifts. The new ANSI standard will help companies better understand what they need to do to protect their employees and safeguard their facilities.” *Eric Brewster, Omega Industrial Safety, www.omegaindl.com.*

Published just last year, ANSI MH31.2-2021 provides specifications for a crash testing method for evaluating the performance characteristics of industrial guardrail barriers and posts. These items are commonplace in industrial facilities and warehouses, and are used for protecting machinery, equipment, shelving, racks, doors, structures and pedestrians from being struck by forklifts, sweepers and other in-plant vehicles. They also safeguard walls, columns and other building features as well as finished products. Preventing injuries to people is of paramount importance. Preventing property damage helps companies avoid repair costs and the downtime needed to make repairs. Guardrails and barriers are typically mounted to the ground-level concrete floor slab at a safe distance away from pedestrian aisleways, vital equipment or critical infrastructure. The standard is designed to make it easier for end users to compare products and determine which ones are appropriate for their particular applications.

ANSI MH31.2-2021 was published by the Protective Guarding Manufacturers Association (ProGMA), whose members are the industry’s leading suppliers of fixed protective guarding products designed to protect personnel, equipment and inventory in industrial facilities. ProGMA worked on developing the standard with Texas A&M Transportation Institute (TTI), which addresses complex transportation challenges.

ANSI MH31.2 includes:

- A test method with various impact speeds (either three, five or seven miles per hour) and surrogate test vehicle weight (from 9,000

pounds to 20,000 pounds) that can be used to replicate the kind of powered industrial truck impacts that can occur in manufacturing, warehousing or distribution environments. Previously, there were no standardized parameters for manufacturers of guardrail barriers and posts to use when performing independent testing of their products.

- A requirement that testing to be performed at an ISO/IEC 17025 accredited testing facility.

The tests are designed to provide information about the degree of impact protection a barrier will provide as well as guidance about where to locate a guardrail in relation to the item or items that need to be protected.

In addition to the test results, a thorough assessment of a facility will help determine where and what type of industrial guardrails and barriers are needed. Heavy traffic areas, hazardous machinery and product storage areas are obvious choices, but guardrails and barriers can also be used to protect overhead door tracks on docks from being damaged and to visibly separate different areas of a facility. To be effective, protective guarding must be installed correctly.

Features to consider when choosing guardrails and related components:

- Customization capability in terms of rails height
- Easy installation
- The ability to absorb the impact of moving vehicles
- High-visibility finishes in OSHA-approved colors

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- The ability to expand or relocate guardrails as needed
- Mounting posts that can absorb impact and remain in place
- Removable guardrails are optimal where frequent access is required. They can swing out of the way or be taken off the hinges to allow quick accessibility
- Lift-out rails can be set aside until access is no longer required.

Features to consider when choosing safety barriers and related components:

- A strong rail-to-post connection, which can help distribute energy from an impact
- A selection of bracket styles and specialty brackets
- The ability to avoid damage to walls by mounting directly to precast concrete or masonry walls
- Mounting posts that are heavy duty
- Custom mounting posts that allow for multiple rail applications, heights, special angles and more specific connection requirements
- Portable pedestrian safety barrier used to control construction site zones and other hazardous zones should be lightweight, compact and highly visible.
- Bollards are short vertical posts that allow personnel to pass through an area but prevent vehicles from doing so.
- Dock door protection, dock lift gates, conveyor guarding and column protectors are other available protective solutions. **WMHS**

Resources

- » ProGMA has a protective guarding search tool at: <https://www.mhi.org/progma/technologies> that can help companies find products and technologies that fit their needs.

Safety Everywhere You Turn



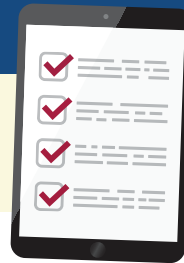
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Safety Standard for Conveyors and Related Equipment



“Until the ANSI/ASME B20.1 code for conveying devices was established, material conveying devices were held to the same ANSI/ASME A17 code requirements as passenger elevators. This made it nearly impossible for inclined and vertical reciprocating conveyor manufacturers to meet code standards and provide a competitively priced product. PFlow worked with state and local officials for nearly a decade to help author ANSI/ASME B20.1. This code standard was instituted in 1981 and explicitly excludes any conveyors designed or installed for the movement of human beings. Excluding the movement of people allows conveying devices to be installed in places where passenger or freight elevators are prohibited and applies. As the vertical reciprocating conveyor founder and industry leader, PFlow can engineer a solution for your specific vertical material movement needs.” *Chuck Cobb, VP-Sales, Marketing & Product Support, PFlow Industries, 414.352.9000, www.pflow.com.*

Conveyor belts are used in many industries, including mining, automotive, agricultural, food and beverage, bottling, commercial fishing, manufacturing, warehouse and logistics, and packaging. Their ability to load and unload items and to move materials between multiple levels or floors makes them indispensable in many settings. They save time and can convey objects too heavy for humans to lift and carry. Among conveyor types:

- Trolley conveyors carry loads beneath them.

About the standard

ASME B20.1-2021 was issued by The American Society of Mechanical Engineers (ASME), an engineering community association whose activities include developing codes and standards.

ASME B20.1-2021 applies to the design, construction, installation, maintenance, inspection and operation of conveyors and conveying systems in relation to hazards. The conveyors may be of the bulk material, package or unit-handling types, where the installation is designed for permanent, temporary or portable operation.

- Mechanical or hydraulic vertical reciprocating conveyors (VRC) that can accommodate heavy loads and can be structured as complex multi-level, multi-directional systems that provide horizontal and vertical movement and offer flexible loading / unloading patterns.
- Belt conveyors that feature a moving belt turned by pulleys.
- Chute conveyors have metal slides down which packages slide to a lower level.
- Gravity roller conveyors that use cylindrical rollers and gravity to slide objects downward.
- Bucket conveyors scoop material with buckets attached to a belt or cable and carry it to a different location before dumping it out.
- Ball transfer conveyors allow objects to be moved in different directions, with the help of rows of metal balls that can turn and rotate.

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With the exceptions noted below, this standard applies to all conveyor installations. It specifically excludes any conveyor designed, installed or used primarily for the movement of people. It does, however, apply to certain conveying devices that incorporate within their supporting structure workstations or operator's stations specifically designed for authorized operating personnel.

ASME B20.1-2021 does not apply to conveyors for which specific standards are already in effect, or to equipment such as industrial trucks, tractors, trailers, automatic guided vehicles, tiering machines (except pallet load tierers), cranes, hoists, power shovels, power scoops, bucket drag lines, trenchers, platform elevators designed to carry passengers or an operator, manlifts, moving walks, moving stairways (escalators), highway or railroad vehicles, cableways, tramways, dumbwaiters, material lifts, industrial scissors lifts, pneumatic



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conveyors, robots or integral machine transfer devices. Some of the foregoing have specific standards.

The provisions of the standard apply to equipment installed one year after the date of issuance (August 31, 2021).

History of the standard

B20.1 was first published in 1947. It is current practice to revise it every three years, to accommodate evolving technology and design developments. The 2021 version revises section 1-3.9, "Gates and Enclosures" to indicate that enclosure height requirements apply "unless guarded by location."

ASME B20.1-2018, the previous edition of this standard, contained the following changes from the previous edition:

- New provisions for tow conveyors:
- specifying warnings for when carts start automatically
- providing the means to allow the operator to disengage the tow pin from the conveyor pusher without being in front of the cart
- New definitions for mobile hopper railcar/hopper bottom truck unloader conveyor and hold-down wheels
- New guidelines for mobile hopper railcar/hopper bottom truck unloader conveyor
- New guidelines for electrified monorail conveyors used for assembly/inspection/testing processes

- Metric-equivalent values added throughout. An appendix includes specifications for design, installation, commissioning and periodic inspection of vertical reciprocating conveyors.

The next edition of this standard will be issued in 2024.

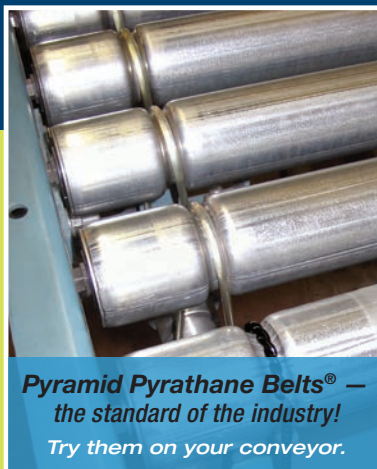
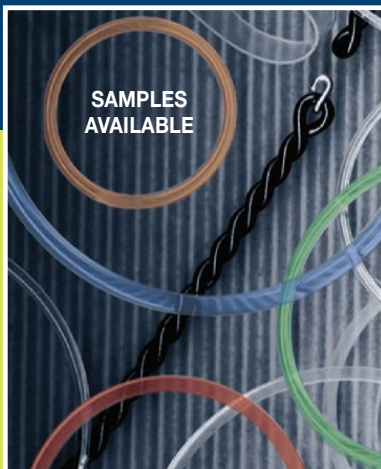
Conveyor hazards

Many injuries associated with conveyors may be caused by operator error. Loose clothing and jewelry can get trapped in conveyor belts, as can arms, hands and bodies, resulting in broken bones, lacerations, crushing injuries and amputations. Lack of guarding and lockout/tagout procedures; having belts overloaded or moving at excessive speeds; and failing to properly maintain a conveyor belt are also factors.

In addition to evaluating the space, operational needs and weight and size of the objects that will be moved by a conveyor, it is important that safety be factored into the decision-making process. Dealing with a manufacturer who complies with ASME B20.1; who has a rigorous testing program and whose research and development professionals keep safety at the forefront of their activities will help ensure safety for employees who work near and with conveyors. **WMHS**

» To purchase this standard, visit:
<https://tinyurl.com/2p8v7khy>

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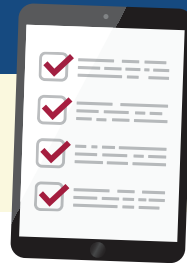
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Combustible Dust Standard: NFPA 652

“Proper housekeeping is a powerful and essential line of defense against many types of workplace hazards, and combustible dust is no exception. NFPA 652 recommends cleaning methods, such as vacuuming, but also outlines specific design requirements to ensure the equipment can meet the demands of collecting combustible dust. In the absence of a formal OSHA rule, NFPA 652 is vital to guiding our manufacturing customers on how to identify, measure and most importantly, choose the proper industrial vacuum to safely mitigate their combustible dust risk.” *Nilfisk*, 800-989-2235, www.nilfisk.us

History

Combustible dust is any fine material that can catch fire and explode when mixed with air. OSHA defines combustible dust as “...a solid material composed of distinct particles or pieces, regardless of size, shape or chemical composition, which presents a fire or deflagration hazard when suspended in air or some other oxidizing medium over a range of concentrations.”

This does not always mean the types of material normally considered either

combustible or dangerous. It can include metal dust, wood dust, plastic or rubber dust, coal dust, biosolids, dust from certain textiles—even organic dust, like flour, sugar, paper, soap and dried blood.

Why Standard is Important

If a company has processes that create dust or use powders, then it has a responsibility to determine if a combustible dust hazard exists. NFPA 652: Standard on the Fundamentals of Combustible Dust, 2016 edition,

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became effective Sept. 2015. This standard was created to promote and define hazard analysis, awareness, management and mitigation. The standard also issues a new term, Dust Hazard Analysis (DHA), to differentiate this analysis from the more complex forms of process hazard analysis methods currently found in industry. NFPA 652 is the starting point for this analysis. It will guide you, step by step, in identifying hazards and what to do next.

The NFPA standards have required a process hazard analysis since 2005. NFPA 652 takes this requirement further by making this requirement retroactive to existing installations, with a deadline. A DHA is now required for new installations and upgrades to existing installations. The standard allows three years to complete this DHA. To illustrate the importance of this hazard analysis, many OSHA citations regarding combustible dust hazards list the lack of a hazard analysis at the top of the citation.

Combustible dusts are created during the transportation, handling, processing, polishing and grinding of the materials. Abrasive blasting, crushing, cutting and screening dry materials can also create dust.

The types of workplaces most at risk of combustible dust include:

- Food production
- Woodworking facilities
- Metal processing
- Recycling facilities
- Chemical manufacturing (rubber, plastics, pharmaceuticals)
- Grain elevators
- Coal-fired power plants

ADDRESSING DUST CHALLENGES FOR FOOD PACKAGING

Dust can often be created during packaging, as finished products are moved by conveyor or during the box- or bag-filling process. The “puffs” of compressed air used during the bag-filling process can generate little puffs of dust while filling packages. This can cause an accumulation of dust over time, if not addressed properly, which can also create several challenges during the packaging process, including:

- **Cross-contamination:** Packaging lines for multiple products are often located in the same facility, creating a cross-contamination concern if fugitive dust is allowed to escape.
- **Nuisance dust/aesthetics:** Dust that settles on or in packaging is unappealing to consumers of packaged food products.
- **Microbial growth:** Dust that is allowed to settle on surfaces in the packaging facility or in between packaging layers provides a medium for microbial growth.
- **Combustion risk:** Food processing dusts—including flours, powdered milk, corn starch, wheat starch, sugar, tapioca, whey, cocoa powder and many spices—are highly combustible.

To address the challenges, food packaging operations must look at the whole process, including needs analysis, system design and engineering, collector and ductwork installation, filter selection, HVAC system integration, startup and commissioning, and aftercare and service. Calling the experts to help ensure your operations remains NFPA 652-compliant.

—Joan Mantini, Chief Editor, *Packaging Technology Today*

Any workplace that generates dust might be at risk, however. This is why it's essential to conduct a thorough risk assessment.

Key Compliance Requirements

The purpose of a dust-collection system is to remove and isolate dust away from people who can inhale it and process areas where it could accumulate and become a deflagration hazard. The DHA will identify the following conditions that may exist external or internal to the system that contribute to a fire or deflagration hazard:

- **Presence of oxygen:** Air is the oxidant
- **Presence of fuel:** Combustible dust wherever it is found, including floors, elevated surfaces, inside ducts, and inside process enclosures and machines
- **Dispersion of fuel:** includes pulse cleaning inside dust collector; use of compressed air for

cleaning; and events that can dislodge dust from elevated surfaces

- **Ignition sources:** Sparks, electrical shorts, hot work, electrostatic discharge, flames, rotating equipment, hot surfaces
- **Containment locations:** inside pipes; inside dust collectors; and inside any process enclosure or machine. *WMHS*

Resources:

Because so many different types of workplaces might contain potential combustible dust risks, it's essential to conduct a thorough risk assessment. Failing to comply with this standard can leave you open to serious fines and even more serious injuries, if an incident occurs.

- » OSHA offers a lengthy list of materials that could produce combustible dust: <https://bit.ly/1Lni5C7>
- » Become familiar with NFPA 652: Standard on the Fundamentals of Combustible Dust. <https://bit.ly/2KD03Po>

It provides basic principles and requirements for identifying and managing fire and explosion hazards from combustible dust.

- » OSHA looks to this standard for guidance when it comes to best practices for preventing combustible dust fires and explosions. Those who don't take the necessary steps to protect workers can be fined for violations under 18 different standards as part of OSHA's Combustible Dust National Emphasis Program. <https://bit.ly/2Rd1Eh8>. This includes the General Duty Clause and 29 CFR 1910.22, the main housekeeping standard.
- » For more an in-depth discussion of combustible dust, see the article titled "How to Prevent Combustible Dust Incidents in the Workplace" in *WMHS's* November 2018 issue: <https://bit.ly/2zsbRPM>

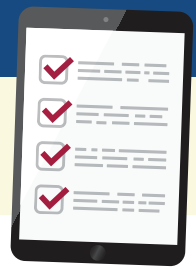


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a person who suffers a sudden cardiac arrest (SCA). SCA occurs when a heart's electrical system malfunctions and causes the heart to stop beating or to beat irregularly. Workplace events such as electrocution or exposure to low oxygen environments can lead to SCA. Overexertion at work can also trigger SCA in those with underlying heart disease. Scarring of the heart tissue from a previous heart attack, thickened heart muscle, blood vessel abnormalities and recreational drug use are among the causes of cardiac arrest. Whatever the underlying conditions, a cardiac arrest can happen quickly. Having AEDs and employees who are trained in the use of it and in administering CPR can mean the difference between survival and death when a person experiences a cardiac arrest.

An estimated 5% or less of victims of sudden cardiac deaths are successfully resuscitated and discharged alive from the hospital. According to OSHA, there are approximately 10,000 cardiac arrests in the workplace each year in the United States. However, only about 50% of people can locate an AED at work. A survey of 2,000 employees in corporate offices, hospitality, education and industry/labor found that:

- Half of all U.S. workers cannot locate an AED at work.
- In the hospitality industry, 66% of employees cannot locate an AED.
- 55% can't get first aid or CPR and AED training from their employer.

Having an AED on-site is not enough; workers must know its location and be trained in how to administer it. Using an AED as soon as possible after sudden cardiac arrest, within

This is one of OSHA's more succinct standards. It consists of three provisions:

- In the absence of an infirmary, clinic or hospital in near proximity to the workplace which is used for the treatment of all injured employees, a person or persons shall be adequately trained to render first aid. Adequate first aid supplies shall be readily available.
 - The employer shall ensure the ready availability of medical personnel for advice and consultation on matters of plant health.
 - Where the eyes or body of any person may be exposed to injurious corrosive materials, suitable facilities for quick drenching or flushing of the eyes and body shall be provided within the work area for immediate emergency use.
- Minimizes the outcome of accidents or exposures
 - Complies with OSHA requirements relating to first aid
 - Has sufficient quantities of appropriate and readily accessible first-aid supplies and first-aid equipment, such as bandages and automated external defibrillators.
 - Assigns and trains first-aid providers who:
 - ◆ receive first-aid training suitable to the specific workplace
 - ◆ receive periodic refresher courses on first-aid skills and knowledge
 - Instructing all workers about the first-aid program, including what workers should do if a coworker is injured or ill.
 - Putting the policies and program in writing is recommended to implement this and other program elements.
 - Providing for scheduled evaluation and changing of the first-aid program to keep the program current and applicable to emerging risks in the workplace, including regular assessment of the adequacy of the first-aid training course.

First aid is not intended to take the place of professional medical care, although it may suffice if the injury or sudden illness is not severe. In the event of a health emergency, the person who administers the first aid performs a primary assessment and intervention until emergency medical technicians (EMTs) arrive.

A workplace first-aid program is part of a comprehensive safety and health management system. It should include:

- Identifying and assessing the workplace risks that have potential to cause worker injury or illness.
- Designing and implementing a workplace first-aid program that:

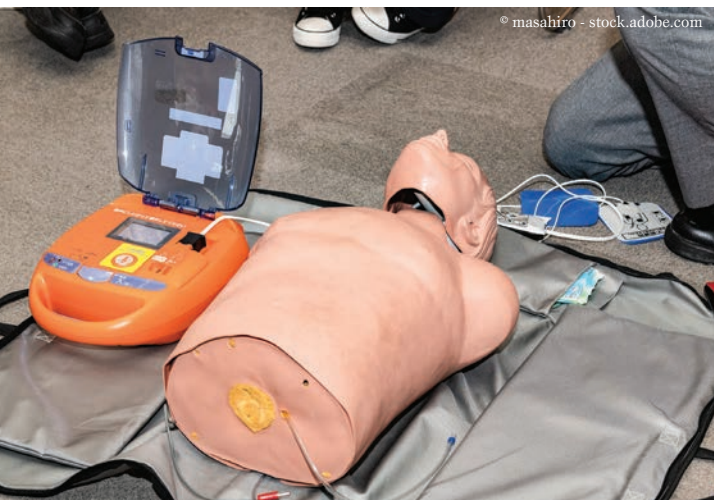
Medical equipment and supplies

Employers are required to evaluate the potential hazards in their workplace and have first aid supplies that could be used to treat injuries resulting from those hazards. Most workplaces are potential candidates for an automated external defibrillator (AED), which provides critical treatment for

3-4 minutes, improves the victim's chances of survival by 60%. CPR training is also important; using CPR with a SCA on someone who collapses suddenly and has no pulse supports the circulation and ventilation of the victim until an electric shock delivered by an AED can restore the fibrillating heart to normal.

Advancements in AED technology mean high-quality devices have more features while at the same time being

user-friendly. When choosing AEDs for the workplace, the focus should be on AEDs that are designed for lay rescuers to use. Available features include voice and text prompts; automatic shock delivery, dual-language functionality and self-tests that keep rescuers refreshed on use procedures. Check to see whether the AED aligns with American Heart Association and the National Institute for Occupational Safety and Health's Education and Research Center's (ERC) guidelines.



Issues to consider when setting up a worksite AED program include physician oversight; compliance with local, state and federal regulations; coordination with local EMS; a quality assurance program; and a periodic review, among others. **WMHS**

For more information

» Visit the American Heart Association at www.americanheart.org and the American Red Cross at www.redcross.org for more information. The National Center for Early Defibrillation at www.early-defib.org has additional information about AED program development. OSHA's Best Practices Guide: Fundamentals of a Workplace First-Aid Program is available at: <https://tinyurl.com/bdmuan2f>



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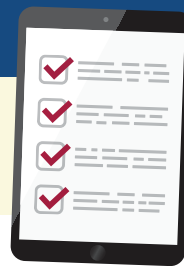
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American National Standard for Dropped Object Prevention Solutions



“This is big, because it establishes tethering systems as best practice when it comes to falling object safety,” said Nate Bohmbach, Product Director at Ergodyne and the Chairman of the ISEA committee that developed this standard. “To date, many have been content with PPE such as hard hats or administrative controls, such as barricade tape, but those do not prevent items from falling, nor do they eliminate potential injury. Tethering systems prevent the items from falling altogether, and without this standard, there would be nothing to differentiate duct tape and string from a properly rated tool lanyard and attachment point.” *Nate Bohmbach, Product Director, Ergodyne 800-225-8238, www.ergodyne.com*

Dropped objects including hand tools, instruments, small parts and structural components kill and injure many employees at U.S. worksites each year. In the construction industry alone, an estimated 50,000 “struck by falling object” incidents happen each year. According to OSHA, dropped objects constitute the third-leading cause of injuries on the jobsite. In addition to the human cost, dropped object incidents result in billions of dollars in workers’ compensation claims as well as damage to equipment, structures and the environment. Even small objects can pose a significant danger, if they fall from a high enough elevation. In a highly publicized incident in New York City, a worker died after being struck by a tape measure that fell 50 stories. Increasing numbers of employees are finding themselves ascending to heights to complete their work often directly over or adjacent to their colleagues, bystanders and other individuals at lower levels.

Protective equipment, such as hard hats, have long been available to minimize the effects of struck-by incidents only after an object has fallen. Preventative measures such as netting and toe boards are also a mitigating practice for this risk, however there are challenges to these solutions and they do not entirely prevent incidents. Active controls utilized to prevent falling objects by tying them off or containing them while at heights are a rapidly growing practice.

About the standard

ANSI/ISEA 121-2018 was developed by the ANSI and the Dropped Object Prevention Group of the International Safety Equipment Association, with the

goal of standardizing solutions for protecting workers from objects dropped from heights. This first-in-the-industry standard is intended to guide both employers and workers toward safer, more reliable solutions than tethering equipment and tools with duct tape or rope – an unreliable yet commonly used method. ANSI/ISEA 121-2018 requires dropped object prevention (DOP) solutions to be dynamically drop-tested in order to be considered fit for use. Dynamic drop-testing involves dropping an object of known weight multiple times. If the DOP device being tested prevents a drop, it passes; if the device breaks and the object drops, it fails.

This standard establishes minimum design, performance, testing and labeling requirements for solutions that reduce dropped objects incidents in industrial and occupational settings. Dropped objects include hand tools, instrumentation, small parts, structural components and other items that have to be transferred and used at heights. These objects have the opportunity of becoming dropped objects potentially resulting in struck-by injury or fatality or damage to equipment. This standard focuses on preventative solutions actively used by workers to mitigate these hazards.

This standard refers to these active dropped object prevention controls and outlines four categories of equipment; Anchor Attachments, Tool Attachments, Tool Tethers and Containers. Utilization and use of the equipment outlined in this standard may differ between manufacturers offering it and employers using it. Utilization and use of the equipment

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outlined in this standard may differ between manufacturers offering it and employers using it.

The standard does *not* include:

- Passive controls like netting and toeboards
- Longstanding falling object PPE, like hard hats, eye-wear and safety footwear

Best practices

- Train workers on how to safely tether tools when working at heights. Conduct periodic refresher courses. Make sure that employees who work at height understand the importance of securing objects at all times, even if they feel pressure to perform job tasks quickly and feel that the risk is minimal.
- Tool tethering is a primary means of preventing dropped objects incidents. Choosing effective tool tethering solutions requires assessing the tool to determine its weight, its shape, its size and body type (such as whether it has a handle or enclosed hole). Hand tools, power tools that require a power source to operate and instruments may need different tethering options. Details about the tool will help you decide whether a tool can be directly tethered to a lanyard or if a trapped connection point must be applied, and with a retrofit connector.
- Anchor and tool attachments; retractables; harnesses, holsters and holders; glove clips and tie hooks can all be helpful in preventing dropped objects incidents. **WMHS**

Compliance Assistance:

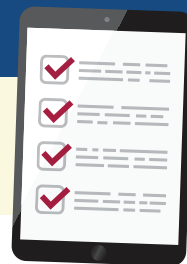
- » Copies of the standard can be purchased online from ISEA: <https://bit.ly/2LkwxQV>
- » Visit OSHA online at <https://bit.ly/2DrpxO8> for more information.



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Hand Protection

“The OSHA 1910.138 statute is instrumental in defining that the proper glove protection should be chosen when hazards are present. This selection process is a complex one when consumers realize the multiple hazards that a workforce can be exposed to, along with the vast amount of hand protection options in the market. At SHOWA, resources for consumer inquiries for hand protection selection is a top priority so consumers receive the proper recommendations for the hazards at hand. Regardless of the hazards, SHOWA is always there to make sure that our customers have the correct hand PPE option for their workforce to get any job done.” *Brian Moseley, R&D Technical Manager, SHOWA Group.* 1-800-241-0323, www.showagroup.com

A workers' hands might arguably be said to be the most important tool he or she uses on the job. Despite this, hands often go unprotected, with the result being that serious workforce hand injuries send more than a million employees to the emergency room each year, according to the U.S. Bureau of Labor Statistics. The average number of lost workdays for hand injuries is six days, but a significant percentage of hand injuries result in chronic problems or long-term disability. Despite these sobering statistics, hand protection is often lacking. Some workers say they find gloves uncomfortable or feel that gloves interfere with their ability to perform certain tasks. Some companies fail to implement and maintain effective safety programs that including providing appropriate personal protective equipment (PPE) and making sure it is worn. Both of these obstacles can be overcome. The variety of glove types, sizes and finishes available today makes it possible for workers to find hand protection that fits them comfortably and allows them to grasp, lift and manipulate objects and machinery. Companies and their safety managers can require that appropriate hand protection be worn whenever necessary. Aside from being mandatory, such an action will enhance profits and productivity and reduce the costs of workers' compensation claims by helping to prevent hand injuries.

Provisions of the standard

1910.138(a)

General requirements. Employers shall select and require employees to use appropriate hand protection when employees' hands are exposed to hazards such as those from skin absorption of harmful substances; severe cuts or lacerations; severe abrasions; punctures; chemical burns; thermal burns; and harmful temperature extremes.

1910.138(b)

Selection. Employers shall base the selection of the appropriate hand protection on an evaluation of the performance characteristics of the hand

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protection relative to the task(s) to be performed, conditions present, duration of use and the hazards/potential hazards identified.

Industries most cited for violations of 1910.138

From October 2020 through September 2021, the following industries received the most citations and penalties following OSHA inspections:

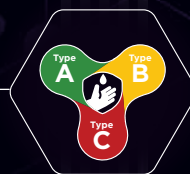
- Manufacturing
- Accommodation and Food Services
- Wholesale Trade
- Other Services (except Public Administration)
- Administrative & Support and Waste Management & Remediation Services
- Retail Trade
- Health Care and Social Assistance
- Utilities



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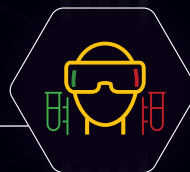
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- Construction
- Agriculture, Forestry, Fishing and Hunting

Hand protection usage and care

Like all PPE, safety gloves should be well designed and constructed, and should be maintained in a clean and reliable fashion. They should fit comfortably, encouraging worker use. If a glove does not fit properly, it can make the difference between being safely covered or dangerously exposed. When engineering, work practice and administrative controls are not feasible or do not provide sufficient protection, employers must provide gloves and other PPE to their workers and ensure its proper use. Employers are also required to train each worker required to use gloves to know:

- When they are necessary
- What kind of gloves are necessary

- How to properly put them on, adjust, wear them and take them off
- The limitations of the glove
- Proper care, maintenance, useful life and disposal of the gloves

Glove types

The wide range of glove types available today makes it possible for employers to find hand protection that is appropriate for the hazards involved in their operations. Manufacturers have continued to develop technologies and expand size ranges. There are washable, disposable, gauntlet style and vend ready gloves (for easy distribution among large workforces). Styles can be customized using various liners and coatings.

Payment for hand protection

Many OSHA standards require employers to provide personal protective equipment, when it is necessary to protect employees from job-related injuries, illnesses and fatalities. With few exceptions, the agency requires



employers to pay for personal protective equipment – including hand protection - when it is used to comply with OSHA standards.

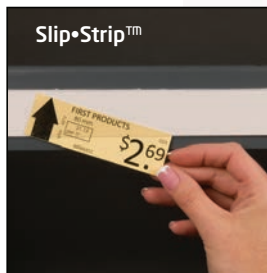
Compliance assistance

OSHA has put out a Guide for Personal Protective Equipment, which includes a section outlining their policies on hand protection. Supervisors and people in charge of worker safety wishing to seek out more information can consult this comprehensive guide to personal protective equipment. www.osha.gov/Publications/osh3151.pdf **WMHS**



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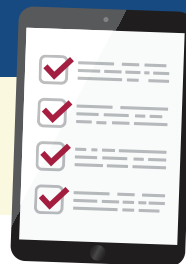
We surveyed the incoming workforce to better understand the how their views on workplace safety will impact the future.

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American National Standard for Performance and Classification for Impact-Resistant Gloves



“We have continuously seen a need for guidance on how to measure impact protection on the back of hand and the ANSI/ISEA 138 standard does that. Hearing our customers’ requests and needs lead us to increasing the number of gloves in our line that provide that protection. It is important that we have the right product for our customers to be at their safest.”
Pyramex, www.pyramex.com.

Because it is so instrumental in so many work tasks, the human hand is frequently exposed to the possibility of occupational injury. Injuries to the hand not only cause physical pain; they incur an average estimated cost of \$22,000. According to Bureau of Labor Statistics (BLS) data, of the 2.7 million nonfatal workplace injuries and illnesses in the U.S. in 2020, 120,350 were hand injuries. OSHA data indicates that 18% of recordable injuries that occur in the workplace involve crush and bone breakage. The bones and soft tissues in the back of the hand are all vulnerable to impact injuries, varying from bumps and bruises to contusions, lacerations and severe fractures. Hand injuries occur frequently in the automotive, construction, warehouse, heavy equipment, cargo handling, oil/gas, towing/transportation industries, manufacturing, mining and agriculture industries.

Causes of hand crush incidents

Machinery with moving parts, including the power shear equipment, punch presses and brake presses that are common in the manufacturing industry, account for many crush incidents. At construction sites, heavy construction materials constitute a danger to hands. Being stuck between two heavy moving objects, such as a power-driven vehicle, is another hazard. Crushing injuries can have both an immediate impact and long-term effects ranging from weakness, loss

of motion, numbness, tingling and cramping.

About the standard

Standards and guidance have been in place for certain types of hand injuries, such as those caused by cuts, punctures and chemical exposure; yet there has been no standardized approach to address dorsal or back-of-hand injuries such as bone breakage and fractures, bruising and finger pinching.



The predominant hand protection standard in Europe, EN 388, addresses impact performance in gloves for the knuckles. ANSI/ISEA 138, American National Standard for performance and classification for impact-resistant hand protection, covers knuckles and fingers.

ANSI/ISEA 138 provides a basis for evaluating and classifying gloves ‘for their capability to dissipate impact forces on the knuckles and fingers.’ The standard includes the following provisions regarding back-of-the-hand impact protection:

- A requirement that products be tested in a laboratory having a certificate of accreditation meeting the requirements in ISO/IEC 17025:2017, General Requirements for the competence of testing and calibration laboratories
- Specifications for required testing equipment and method

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- Classification and labeling requirements
- A performance level scale that provides employers with the information they need to compare products select gloves that are a fit for the application-specific hazards in their workplaces
- A required pictogram mark for each of the defined levels for compliant gloves

Manufacturers use various features and materials to give gloves dorsal impact protection, including foam, a shock-absorbing, cushioning pad on the back of the hand, and thermoplastic rubber (TPR) or thermoplastic elastomers (TPE). As with all forms of occupational hand protection, impact-resistant gloves must be comfortable and flexible enough to allow the wearer to complete necessary work tasks, or the worker will be tempted to remove the gloves – and lose, at least temporarily, their protective qualities. In environments where a number of hazards are present, gloves that combine impact resistance with other qualities - such as chemical-, heat- and cut-resistance, insulation from cold temperatures and waterproofing – should be chosen.

Treatment for hand crush injuries

While prevention is key, serious crush injuries should receive immediate treatment by a doctor. In the event of muscle, bone and tissue damage, surgery may be necessary. In the most severe cases, amputation may be performed. **WMHS**

» ANSI/ISEA 138-2019 can be purchased at: <https://tinyurl.com/2p899nx2>

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IMPACT

ABRASION

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ANSI/ISEA 138-2019

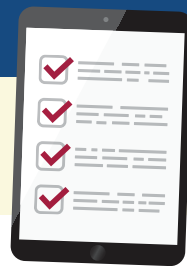
ANSI/ISEA 138 standard establishes a minimum performance for gloves designed to protect the back of hand from impact forces. The standard features three performance levels, with Level 3 providing the most impact protection. Level 1 (≤ 9 kN), Level 2 (≤ 6.5 kN), and Level 3 (≤ 4 kN). The less force transmitted to the wearer's hand earns a higher performance level indicating a greater degree of protection.

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Hazard Communication Standard

“OSHA’s Hazard Communication Standard was aligned with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS) in order to improve the safety and health of workers who handle or are exposed to hazardous chemicals. Ensuring that hazardous chemicals are labeled properly is an important component of creating a safe working environment and staying compliant with OSHA.” *Avery Products Corporation, industrial@avery.com, www.avery.com/industrial*

The Hazard Communication Standard (HCS) provides a common and coherent approach to classifying chemicals and communicating hazard information on labels and safety data sheets in order to ensure chemical safety in the workplace. It applies to companies who regularly handle, store and use hazardous chemicals.

Ten Most Cited Industries:

- Construction
- Manufacturing
- Other Services (except Public Administration)
- Retail Trade
- Wholesale Trade
- Administrative and Support and Waste Management and Remediation Services
- Accommodation and Food Services
- Health Care and Social Assistance
- Transportation and Warehousing
- Agriculture

Key Requirements of HCS

Hazard classification: A chemical must be evaluated using the full range of available scientific evidence to determine if a chemical is hazardous. The level of severity of the hazardous effect must also be identified, along with the hazard class(es) and associated hazard category of the chemical. The HCS defines hazard class as the nature of a physical or health hazard, e.g., flammable solid, carcinogen and acute toxicity. Hazard category means the division of criteria within each hazard class, e.g., acute toxicity and flammable liquids each include four hazard categories numbered from category 1 through category 4. These categories compare hazard severity within a hazard class and should not be taken as a comparison of hazard categories more generally. That is, a chemical identified as a category

2 in the acute toxicity hazard class is not necessarily less toxic than a chemical assigned a category 1 of another hazard class.

Safety Data Sheets (SDSs): The Hazard Communication Standard requires that the chemical manufacturer, distributor or importer provide Safety Data Sheets (SDSs) for each hazardous chemical to downstream users to communicate information on these hazards to the workers who will be handling them. The information must be presented in a consistent user-friendly, 16-section format and include the properties of each chemical; the physical, health and environmental health hazards; protective measures; and safety precautions for handling, storing and transporting the chemical. Sections 1 through 8 contain general information about the chemical, identification, hazards, composition, safe handling practices and emergency control measures (e.g., firefighting). This information should be helpful to those who need to get the information quickly. Sections 9 through 11 and 16 contain other technical and scientific information, such as physical and chemical properties, stability and reactivity information, toxicological information, exposure control information and other information including the date of preparation or last revision.

Labels: The standard requires that information about chemical hazards be conveyed on labels using quick visual notations to alert the user and provide immediate recognition of the hazards. Labels must also provide instructions on how to safely handle the chemical. They must contain:

- **Name, address and telephone number** of the chemical

manufacturer, importer or other responsible party.

- **Product Identifier:** This can be (but is not limited to) the chemical name, code number or batch number. The manufacturer, importer or distributor can decide the appropriate product identifier.
- **Signal Word:** These are used to indicate the relative level of severity of the hazard and alert the reader to a potential hazard on the label. There are only two words used as signal words, “Danger” and “Warning.” Within a specific hazard class, “Danger” is used for the more severe hazards and “Warning” is used for the less severe hazards. There will only be one signal word on the label no matter how many hazards a chemical may have. If one of the hazards warrants a “Danger” signal word and another warrants the signal word “Warning,” then only “Danger” should appear on the label.
- **Hazard Statements:** These describe the nature of the hazard(s) of a chemical, including, where appropriate, the degree of hazard. For example: “Causes damage to kidneys through prolonged or repeated exposure when absorbed through the skin.” All of the applicable hazard statements must appear on the label. Hazard statements may be combined where appropriate to reduce redundancies and improve readability.
- **Precautionary Statements:** These describe recommended measures that should be taken to minimize or prevent adverse effects resulting from exposure to the hazardous chemical or improper storage or handling. There are four types of precautionary statements:

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- prevention (to minimize exposure)
- response (in case of accidental spillage or exposure emergency response, and first-aid)
- storage
- disposal

A chemical presenting a specific target organ toxicity (repeated exposure) hazard would include the following on the label: “Do not breathe dust/fume/gas/mist/ vapors/spray. Get medical advice/attention if you feel unwell. Dispose of contents/ container in accordance with local/regional/ national and international regulations.” A forward slash (/) designates that the classifier can choose one of the precautionary statements. In most cases, the precautionary statements are independent. However, precautionary statements may be combined on the label to save on space and improve readability. For example, “Keep away from heat, spark and open flames,” “Store in a well-ventilated place,” and “Keep cool” may be combined to read: “Keep away from

heat, sparks and open flames and store in a cool, well-ventilated place.”

- **Pictogram(s):** OSHA enforces the use of eight pictograms; Health Hazard; Flame; Exclamation Mark; Gas Cylinder; Exploding Bomb; Flame Over Circle; and Skull and Crossbones. The environmental pictogram is not mandatory but may be used to provide additional information.

Information and training: Employers are required to train workers on the new labels’ elements and safety data sheets format to facilitate recognition and understanding. Training should include:

- How an employee might use the labels in the workplace (i.e., how information on the label can be used to ensure proper storage of hazardous chemicals; how it might be used to quickly locate information on first aid when needed by employees or emergency personnel.)

- A general understanding of how the elements work together on a label (i.e., explain that where a chemical has multiple hazards, different pictograms are used to identify the various hazards, or when there are similar precautionary statements, the one providing the most protective information will be included on the label.
- How the information on the label is related to the SDS (i.e., that the precautionary statements would be the same on the label and on the SDS). **WMHS**

For more information:

» Visit OSHA’s website for Frequently Asked Questions about HCS: <https://www.osha.gov/hazcom/faq>

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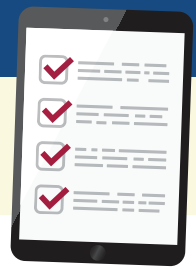
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“Haws Services is a warranty and services provider for all brands of emergency shower and eye/face wash products to ensure your emergency equipment is ANSI-compliant and functioning properly. From start-up and commissioning to annual inspections and preventative maintenance, Haws Services’ experts specialize in emergency equipment.” *Haws, 888-640-4297, www.hawesco.com*

History

Emergency eyewash stations, as well as shower equipment, are addressed by ANSI/ISEA Z358.1-2014: American National Standard for Emergency Eyewash and Shower Equipment. This standard, written and published by the International Safety Equipment Association (ISEA), an ANSI-accredited standards developing organization, establishes minimum performance and use guidelines for eyewash and shower equipment for the emergency treatment of the eyes or body of someone who has been exposed to hazardous materials.

Regarding personnel safety, there are multiple factors to take into account when handling hazardous materials in factories, laboratories or other workplaces. Emergency showers and eyewash stations need to remain visible, easily accessible and reliable. They are a final level of protection, in many cases, as they can sufficiently combat any chemicals or other hazardous materials that may make contact with one’s eyes or body.

OSHA regulations address emergency eyewash and shower equipment in 29 CFR 1910.151. Specifically, 1910.151(c) states: “Where the eyes or body of any person may be exposed to injurious corrosive materials, suitable facilities for quick drenching or flushing of the eyes and body shall be provided within the work area for immediate emergency use.” However, this is the only federal requirement for emergency eyewash and shower equipment. OSHA has often referred employers to ANSI Z358.1 as a recognized source of guidance for protecting employees who are exposed

to injurious corrosive materials. The standard has also been adopted by many governmental organizations and the International Plumbing Code.

Why Standard is Important

The first 10-15 seconds after exposure to a hazardous substance, especially a corrosive substance, are critical. Delaying treatment, even for a few seconds, may cause serious injury.

This ANSI standard establishes minimum performance and use requirements for eyewash and shower equipment for the emergency treatment of the eyes or body of a person who has been exposed to hazardous materials. It covers the following types of equipment: emergency showers, eyewashes, eye/face washes and combination units.

Key Compliance Requirements

The standard contains specific language for both showers and eyewashes, including performance, installation, maintenance and training components.

EMERGENCY SHOWERS

Performance: A means shall be provided to ensure that a controlled flow of flushing fluid is provided at a velocity low enough to be non-injurious to the user.

- Emergency showers shall be capable of delivering flushing fluid at a minimum of 75.7 liters/minute (20gpm) for a minimum of 15 minutes. If shut-off valves are installed in the supply line for maintenance purposes, provisions shall be made to prevent unauthorized shut off.
- Emergency showers shall provide a flushing fluid column

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that is at least 208.3cm (82in) and not more than 243.8cm (96in) in height from the surface on which the user stands.

- The spray pattern shall have a minimum diameter of 50.8cm (20in) at 152.4cm (60in) above the surface on which the user stands. The center of the spray pattern shall be located at least 40.6cm (16in) from any obstruction. The flushing fluid shall be substantially dispersed throughout the pattern.
- Emergency showers shall be designed, manufactured and installed in such a manner that, once activated, they can be used without requiring the use of the operator’s hands.
- Emergency showers shall be constructed of materials that will not corrode in the presence of the flushing fluid. Stored flushing fluid shall be protected against airborne contaminants.

Installation: When the self-contained emergency shower is installed, its installation shall be verified in accordance with manufacturer’s instructions. It is the installer’s responsibility to ensure that emergency showers shall:

- Be assembled and installed in accordance with the manufacturer’s instructions, including flushing fluid delivery requirements.
- Be in accessible locations that require no more than 10 seconds to reach. The emergency shower shall be located on the same level as the hazard; the path of travel shall be free of obstructions that may inhibit its immediate use.



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- Be located in an area identified with a highly visible sign, positioned so the sign shall be visible within the area served by the emergency shower. The area around the emergency shower shall be well-lit.
- Be positioned so that the shower pattern is dispersed such that the top of the flushing fluid column is at least 208.3cm (82in) and not more than 243.8cm (96in) from the surface on which the user stands. The center of the spray shall be at least 40.6cm (16in) from any obstruction.
- Be connected to a supply of flushing fluid per the manufacturer's installation instructions to produce the required spray pattern for a minimum period of 15 minutes. Where the possibility of freezing conditions exists, the emergency shower shall be protected from freezing or freeze-protected equipment shall be installed. If shut-off valves are installed in the shower line for maintenance purposes, provisions shall be made to prevent unauthorized shut off.
- Deliver tepid flushing fluid. In circumstances where chemical reaction is accelerated by flushing fluid temperature, a facilities safety/health advisor should be consulted for the optimum temperature for each application.
- When the plumbed emergency shower is installed, its performance shall be verified in accordance with the following procedures:
 1. With the unit correctly connected to the flushing fluid source and the valve(s) closed, visually check the piping connections for leaks.
 2. Open the valve to the full-open position. The valve shall remain open without requiring further use of the operator's hands.
 3. With the valve in the fully opened position, measure the diameter of the spray pattern. It shall be a minimum of 50.8cm (20in) at 152.4cm (60in) above the standing surface. The flushing fluid shall be substantially dispersed throughout the pattern.
 4. Using the flowmeter or other means, determine that the rate of flow is at least 75.7 liters/minute (20gpm).
 5. Using a temperature gauge or other means, determine that the flushing fluid is tepid.

Maintenance and Training: Manufacturers shall provide operation, inspection and maintenance instructions with emergency shower equipment. Instructions shall be readily accessible to maintenance and training personnel.

- Plumbed emergency showers shall be activated weekly for a period long enough to verify operation and ensure that flushing fluid is available.

- Self-contained emergency showers shall be visually checked weekly to determine if flushing fluid needs to be changed or supplemented. Such inspection shall be conducted in accordance with manufacturer's instructions.



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- Employees who may be exposed to hazardous materials shall be instructed in the location and proper use of emergency showers.
- All emergency showers shall be inspected annually to assure conformance with this standard.

EYEWASH EQUIPMENT

Performance: A means shall be provided to ensure that a controlled flow of flushing fluid is provided to both eyes simultaneously at a velocity low enough to be non-injurious to the user.

- The eyewash shall be designed and positioned in such a way as to pose no hazard to the user.
- Nozzles and flushing fluid units shall be protected from airborne contaminants. Whatever means is used to afford such protection, its removal shall not require a separate motion by the operator when activating the unit.
- Eyewashes shall be designed, manufactured and installed in such a manner that, once activated, they can be used without requiring the use of the operator's hands.
- Eyewashes shall be constructed of materials that will not corrode in the presence of the flushing fluid.
- Eyewashes shall be capable of delivering flushing fluid to the eyes not less than 1.5 liters/minute (0.4gpm) for 15 minutes. If shut-off valves are installed in the supply line for maintenance purposes, provisions shall be made to prevent unauthorized shut off.

- Eyewashes shall be designed to provide enough room to allow the eyelids to be held open with the hands while the eyes are in the flushing fluid stream.
- Eyewashes shall provide flushing fluid to both eyes simultaneously. A test gauge for making determination of a suitable eyewash pattern shall be a minimum 10.16cm (4in) in length with two sets of parallel lines equidistant from the center. The interior set of lines shall be 3.18cm (1.25in) apart and the exterior lines shall be 8.26cm (3.25in) apart. Place the gauge in the stream of the eyewash. The flushing fluid shall cover the areas between the interior and exterior lines of the gauge at some point less than 20.3cm (8in) above the eyewash nozzle(s).

Maintenance and Training: Manufacturers shall provide operation, inspection and maintenance instructions with eyewashes. Instructions shall be readily accessible to maintenance and inspection personnel.

- Plumbed eyewashes shall be activated weekly for a period long enough to verify operation and ensure that flushing fluid is available.

- Self-contained eyewashes shall be visually checked weekly to determine if flushing fluid needs to be changed or supplemented. Such inspection shall be conducted in accordance with manufacturer's instructions.
- Employees who may be exposed to hazardous materials shall be instructed in the location and proper use of emergency eyewashes.
- All eyewashes shall be inspected annually to assure conformance with this standard. **WMHS**

Resources:

- » The standard is available at the ANSI Webstore, along with information, specifications, performance guidelines and illustrations for emergency shower and eyewash stations: <https://bit.ly/2Rj5JjY>]
- » Read more at the ANSI Blog: Standard for Emergency Eyewash and Shower Stations: ANSI/ISEA Z358.1-2014: <https://bit.ly/2Rj17KP>

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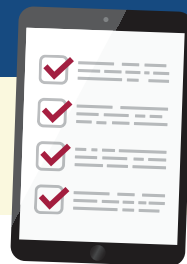
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Safety Color Code for Marking Physical Hazards



“Visual communication in the workplace is standardized by signs and color codes and has become an important method for communicating hazards. OSHA and ANSI have identified specific safety colors for consistency within the U.S. It is imperative that employers maintain their safety signage within the workspace to properly communicate potential hazards and keep their equipment compliant. To assist in this maintenance, Markal has created Paint-Riter® + Safety Colors liquid paint markers which are formulated to make durable marks that meet the OSHA and ANSI color standard for safety identification. Paint-Riter® + Safety Colors markers can be used for touch-up work of safety-colored equipment or signage and can be used for OSHA compliant general marking applications.” *Don Rice, Senior Product Manager, LA-CO Industries, Inc. 800-621-4025, www.markal.com*

Safety marking and safety signage in the workplace is an important component of an overall safety program – and color is key to making it instantly recognizable. It helps people identify the nature of a hazard at a glance. OSHA’s safety color code regulation makes use of primary colors which have general, commonly understood associations. Red in the workplace, for example, represents danger or the need to immediately stop an action or a movement, just as it does in traffic stop signs. Yellow denotes a warning. Red warns of a certain hazard, while yellow alerts people to potential threats. In short, colors are an effective way to raise awareness about hazards and help prevent incidents.

Provisions of the requirement

Red - Per OSHA 1910.144, red shall be the basic color for the identification of: *Fire protection equipment and apparatus*. It should also be used to indicate:

- **Danger.** On safety cans or other portable containers of flammable liquids having a flash point at or below 80° F, table containers of flammable liquids (open cup tester), excluding shipping containers, shall be painted red with some additional clearly visible identification either in the form of a yellow band around the can or the name of the contents conspicuously stenciled or painted on the can in yellow. Red lights shall be provided at barricades and at temporary obstructions. Danger signs shall be painted red.

- **Stop.** Emergency stop bars on hazardous machines such as rubber mills, wire blocks, flat work ironers, etc. shall be red. Stop buttons or electrical switches which letters or other markings appear, used for emergency stopping of machinery shall be red.

Yellow - Yellow shall be the basic color for designating caution and for marking physical hazards such as: Striking against, stumbling, falling, tripping and “caught in between.”

How color is perceived

Light is made up of wavelengths, which fall along various parts of the spectrum and thus, appear to be different colors. When we “see” a color, light travels into the eye and interacts with receptors in the retina. Those receptors send messages about perceived color to the brain, which activates familiar associations with the colors being seen. Yellow is the most visible color in the spectrum, and the first one the eye will notice. Red, which also has a long wavelength, is the second most visible. In color psychology, though, red is the most intense hue, which is why it is universally used to warn of impending danger.

In order to comply with the regulation, managers must conduct a thorough safety assessment of the facilities and applications for which they are responsible, and identify areas, equipment and tasks which should be marked with red or yellow. In addition to the uses specified in OSHA

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1910.144, red and yellow can be used to draw attention to:

- The need to use personal protective equipment
- The location of emergency equipment
- Communicate prohibited actions
- Communicate mandatory action
- Highlight health and safety warnings
- Mark specific dangers, such as wet floors
- Indicate emergency exits

Compliance

Industrial grade paint and ink markers may be used to comply with OSHA 1910.144. Choosing the right markers requires identifying the types of surfaces on which they’ll be used and determining whether the markings will need to be fast-drying, and permanent or semi-permanent. Paint markers, for instance, are optimal in situations that require wear- and extreme-temperature resistance. Ink markers are appropriate where the markings will need to be semi-permanent, as they can be removed with solvents. Paint markers can be used on smooth, rusty or clean surfaces and in operations that require quality control during manufacturing, and then a clean surface for painting, powder-coating or plating. There are low-corrosion markers that are appropriate for use on stainless steel and other alloy metals. **WMHS**

Increase your knowledge

OSHA 1910.145 recommends additional color coding:

- Orange for CAUTION
- Fluorescent orange or orange-red for BIOLOGICAL HAZARD

» To read OSHA 1910.144, visit: <https://tinyurl.com/2p8fzs6a>

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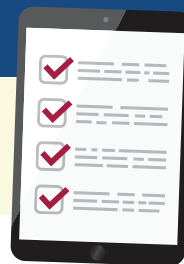
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Respirator Fit-Testing Methods (ANSI/AIHA/ASSE Z88.10-2010)



“A standard for carrying out the proper way to carry out fit testing was long overdue and has been immensely helpful in the field of respiratory protection. At OHD, we commend those who further our mission of protecting the world’s workforce.” *Dr. Stephanie Lynch, PhD (Product Manager), OHD, LLLP, 205.980.0180, www.ohdglobal.com.*

History

Developed by ANSI (now known as ASSP), with content provided by the American Society of Safety Engineers (ASSE), guideline Z88.10-2010 provides respiratory protection program managers (RPPM) with clear, consistent guidance on respirator fit-testing and the components required of an effective respiratory protection program. Included in the guide are instructions on how to avoid interference of PPE; it also provides detailed information on face pieces, including their selection, and other considerations for effective fit-testing. Z88.10 was last updated in 2010.

Qualitative fit-testing is a pass/fail test that uses the wearer’s sense of taste or smell, or his reaction to an irritant, in order to detect leakage into the respirator facepiece. Whether or not a worker needs a full-face respirator or a half-mask respirator depends on the Assigned Protection Factor (APF). The APF is a number that describes the level of protection that a respirator can be expected to provide—if used properly.

Yearly fit-testing is now required. According to OSHA, an employer that performed fit-testing every two years reported 7% of their employees

switched to different respirator sizes and/or models each time they were tested. OSHA considered this 7% measurement to be unacceptable and adopted the policy to require annual fit-testing and training.

Why Standard is Important

Fit-testing is a protocol used to evaluate sealing surface leakage of a specific, tight-fitting respirator while it is being worn. Individuals do not have to be issued the same respirator that they are fit-tested with, as long as they are issued a respirator that is the same make, model, style, size and material of respirator with which they are fit-tested. There are two categories of respirator fit-testing, which include qualitative and quantitative fit-testing methods.

Standard Z88.10 provides in-depth requirements for training fit-test operators; it also includes a large section entitled “General Considerations,” which covers in detail the important considerations for performing all respirator fit-testing protocols.

Clause 6 of the General Considerations section includes medical evaluation and pre-fit test training (such as how to don the respirator without assistance). Z88.10 recommends using a mirror to see how to position and

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adjust the respirator, for example. Also in this section are guidelines on how to inspect the respirator and how to accomplish user seal checks.

Key Compliance Requirements

There are numerous factors that could potentially diminish the effectiveness and fit of a respirator. These include:

- Weight gain or loss
- Dental work or facial surgery
- Significant scarring in areas where seal meets skin
- Wearer discomfort
- Facial hair or certain hair styles
- Cosmetics or facial jewelry
- Glasses or protective eyewear
- Do not perform fit testing if any foreign material, like gels or creams, are present between the sealing surfaces of the face and the respirator
- PPE must not interfere with respirator sealing surfaces and must be worn during fit testing

In addition, there are some other conditions that can adversely affect fit. These include possible facial feature interference, such as hollow temples, exceedingly protruding cheekbones, deep skin creases, absence of teeth or dentures, or facial injury including mouth or facial swelling.

If dentures are worn during respirator use, dentures should be worn during fit-testing. If dentures are not worn during respirator use, then dentures should not be worn during fit-testing. **WMHS**

Resources:

- » Copies of the standard can be purchased online, at the ANSI Webstore: <https://bit.ly/2PKVCqb>



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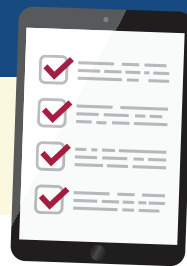


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History

Dust control efforts can include HEPA-filtered vacuuming; wet methods that apply water at the point where silica dust is made; local exhaust ventilation that removes silica dust at or near the point where it is made; and enclosures that isolate the work process or the worker.

Workers must not allow dry sweeping or dry brushing where they could contribute to employee exposure to respirable crystalline silica, unless methods like the ones mentioned above are not feasible. In addition, employers must not allow compressed air to be used to clean clothing or surfaces unless (1) the compressed air is used in conjunction with a ventilation system that effectively captures the dust cloud created by the compressed air; or (2) no alternative method is feasible.

Why Standard is Important

Crystalline silica is all around us: in sand, stone, concrete and mortar. This common mineral found in the earth’s crust is also used to make products such as glass, pottery, ceramics, bricks and artificial stone.

However, when it’s turned into tiny particles by workplace activities like cutting, sawing, grinding, drilling and crushing stone, rock, concrete, brick and mortar, crystalline silica becomes respirable—and dangerous to human health.

Approximately 2.3 million people in the U.S. are exposed to respirable crystalline silica at work. Exposure can occur during the manufacture of glass, pottery, ceramic, brick, concrete, asphalt roofing, jewelry, artificial stone, dental, porcelain or structural clay

products; the use of industrial sand in operations such as foundry work and hydraulic fracturing; and the use of sand for abrasive blasting (e.g., maritime operations).

Breathing in very small crystalline silica particles can cause a number of life-altering and life-threatening diseases. Silicosis, which results in scar tissue forming on the lungs, is incurable and can be fatal. It typically occurs after 15–20 years of occupational exposure to respirable crystalline silica. Because silicosis affects the immune system, it increases the risk of lung infections, such as tuberculosis. Exposure to respirable crystalline silica increases the risk of developing lung cancer, in which abnormal cells grow uncontrollably into tumors, interfering with lung function and often metastasizing to other parts of the body. Chronic obstructive pulmonary disease (COPD) causes shortness of breath due to difficulty breathing air into the lungs. It is usually irreversible. Exposure to respirable crystalline silica is also related to kidney failure, the development of autoimmune disorders and cardiovascular impairment.

Key Compliance Requirements

1910.1053 requires employers to:

- Determine the amount of silica that workers are exposed to if it is, or may reasonably be expected to be, at or above the action level of 25 µg/m³ (micrograms of silica per cubic meter of air), averaged over an 8-hour day.
- Protect workers from respirable crystalline silica exposures above the permissible exposure limit (PEL) of 50 µg/m³, averaged over an 8-hour day.

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- Limit access to areas where workers could be exposed above the PEL.
- Use dust controls and safer work methods to protect workers from silica exposures above the PEL.
- Provide respirators to workers when dust controls and safer work methods cannot limit exposures to the PEL.
- Establish and implement a written exposure control plan that identifies tasks that involve exposure and methods used to protect workers.
- Restrict housekeeping practices that expose workers to silica, such as use of compressed air without a ventilation system to capture the dust and dry sweeping, where effective, safe alternatives are available.
- Offer medical exams—including chest X-rays and lung function tests—every three years to workers exposed at or above the action level for 30 or more days per year.
- Train workers on the health effects of silica exposure, workplace tasks that can expose them to silica and ways to limit exposure.
- Keep records of workers’ silica exposure and medical exams. *WMHS*

Resources:

- » Details of the standard’s requirements can be found at: <https://tinyurl.com/yxu49g8l> and FAQs about it at: www.osha.gov/silica-crystalline/general-industry-info.
- » For specifics on the construction aspect of this standard, go to: <https://www.osha.gov/silica-crystalline/construction>



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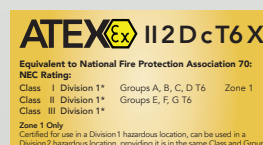
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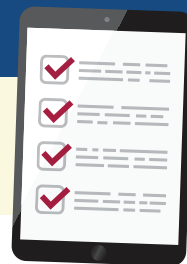


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Why is fall protection important?

Falls are among the most common causes of serious work-related injuries and deaths. Slips, trips and falls are the most frequent cause of fatalities in the construction industry, representing 37.9% of all construction fatalities (418 of 1,102) in 2019, according to the U.S. Bureau of Labor Statistics¹. However, falls that claim lives and result in injuries and lost time occur in a range of industries.

Most cited industries

From October 2020 through September 2021, the following industries were cited most often for violations of 1926.501:

- Construction
- Wholesale trade
- Manufacturing
- Administrative & Support and Waste Management & Remediation Services
- Utilities
- Retail trade
- Professional, Scientific, and Technical Services
- Information
- Arts, Entertainment and Recreation
- Real Estate and Rental & Leasing

Summary of the standard

Employers must set up the work place to prevent employees from falling off of overhead platforms, elevated work stations or into holes in the floor and walls. OSHA requires that fall protection be provided at elevations of four feet in general industry workplaces, five feet in shipyards, six feet in the

construction industry and eight feet in longshoring operations. In addition, OSHA requires that fall protection be provided when working over dangerous equipment and machinery, regardless of the fall distance.

To prevent employees from being injured from falls, employers must:

- Guard every floor hole into which a worker can accidentally walk (using a railing and toe-board or a floor hole cover).
- Provide a guard rail and toe-board around every elevated open sided platform, floor or runway.
- Regardless of height, if a worker can fall into or onto dangerous machines or equipment (such as a vat of acid or a conveyor belt) employers must provide guardrails and toe-boards to prevent workers from falling and getting injured.
- Other means of fall protection that may be required on certain jobs include safety harness and line, safety nets, stair railings and hand rails.

Major provisions of 1926.501

Employers are required to provide fall protection in a variety of work situations and conditions, including:

Unprotected sides and edges. Each employee on a walking/working surface (horizontal and vertical surface) with an unprotected side or edge which is 6 feet (1.8 m) or more above a lower level shall be protected from falling by the use of guardrail systems, safety net systems or personal fall arrest systems.

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Leading edges. Each employee who is constructing a leading edge 6 feet (1.8 m) or more above lower levels shall be protected from falling by guardrail systems, safety net systems or personal fall arrest systems.

Walking-working surfaces. Each employee on a walking-working surface 6 feet (1.8 m) or more above a lower level where leading edges are under construction, but who is not engaged in the leading-edge work, shall be protected from falling by a guardrail system, safety net system or personal fall arrest system. If a guardrail system is chosen to provide the fall protection, and a controlled access zone has already been established for leading edge work, the control line may be used in lieu of a guardrail along the edge that parallels the leading edge.

Hoist areas. Each employee in a hoist area shall be protected from falling 6 feet (1.8 m) or more to lower levels by guardrail systems or personal fall arrest systems. If guardrail systems, [or chain, gate or guardrail] or portions thereof, are removed to facilitate the hoisting operation (e.g., during landing of materials), and an employee must lean through the access opening or out over the edge



¹ <https://tinyurl.com/8dny8hn9>

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of the access opening (to receive or guide equipment and materials, for example), that employee shall be protected from fall hazards by a personal fall arrest system.

Holes. Each employee on walking/working surfaces shall be protected from falling through holes (including skylights) more than 6 feet (1.8 m) above lower levels, by personal fall arrest systems, covers or guardrail systems erected around such holes.

Formwork and reinforcing steel. Each employee on the face of formwork or reinforcing steel shall be protected from falling 6 feet (1.8 m) or more to lower levels by personal fall arrest systems, safety net systems or positioning device systems.

There are additional provisions for preventing falls through skylights; from ramps, runways and other walkways and off overhead platforms, elevated work stations or into holes in the floor and walls.

Fall Prevention Campaign for Construction Industry

OSHA, in partnership with the National Institute for Occupational Safety and Health (NIOSH) and National Occupational Research Agenda (NORA) - Construction Sector on the Fall Prevention Campaign have developed a plan to raise awareness among workers and employers about common fall hazards in construction, and how falls

from ladders, scaffolds and roofs can be prevented. It is a three-pronged approach:

1. PLAN ahead to get the job done safely

When working from heights, employers must plan projects to ensure that the job is done safely. Begin by deciding how the job will be done, what tasks will be involved and what safety equipment may be needed to complete each task.

2. PROVIDE the right equipment

Workers who are six feet or more above lower levels are at risk for serious injury or death if they should fall. To protect these workers, employers must provide fall protection and the right equipment for the job, including the right kinds of ladders, scaffolds and safety gear. Use the right ladder or scaffold to get the job done safely. For roof work, if workers use personal fall arrest systems (PFAS), provide a harness for each worker who needs to tie off to the anchor. Make sure the PFAS fits, and regularly inspect it for safe use.

3. TRAIN everyone to use the equipment safely

Every worker should be trained to recognize hazards and use safety equipment properly – in language they understand.

For more information

» For the complete standard, visit:
<https://tinyurl.com/464tvdr7>

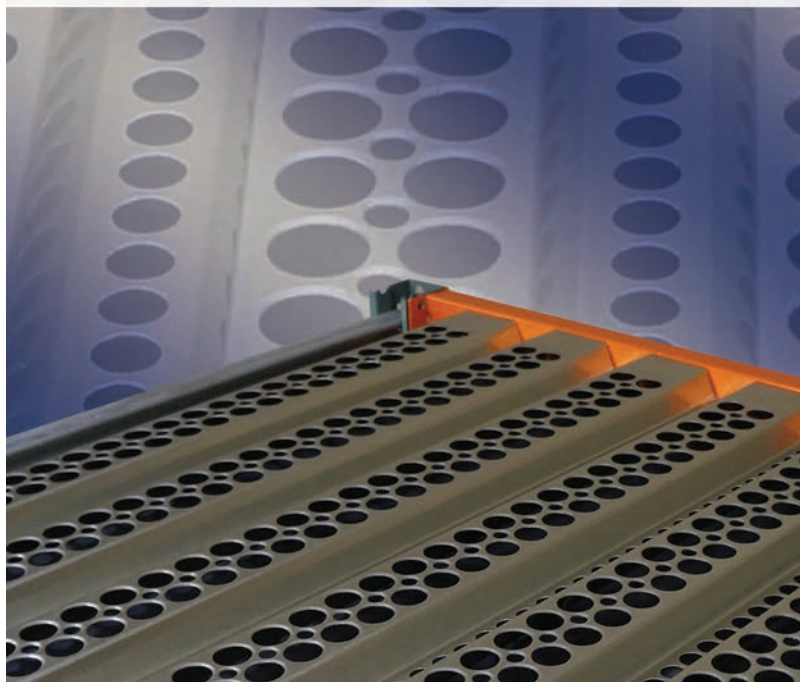


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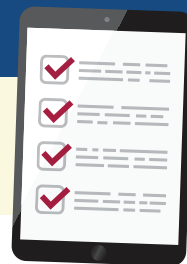
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Focus on Portable Safety Equipment

“Purchasing safety equipment, while meeting crucial standards such as ANSI Z358.1-2014, can be a daunting task. As a designer and manufacturer of safety showers, eye washes and decontamination equipment, Hughes Safety Showers can guide you through the recommendations to ensure you have the correct equipment, in the right location on site to achieve compliance and protect the safety of your workforce.” Hughes, www.hughes-safety.com.

Portable emergency safety showers and face/eyewash stations are among the equipment types covered the American National Standards Institute (ANSI) Eyewash and Drench Shower Standard (Z358.1-2014). Employees at temporary or remote worksites are entitled to speedy and effective first aid, the same as their counterparts at permanent facilities. Lack of access to a clean potable water supply or a power supply that can ensure the water remains at the required tempered level may present challenges, but not a basis for exemptions. Meeting the requirements of the standard with appropriate portable equipment can make a significant difference in the medical outcome if a worker's eyes, face or skin have come into contact with hazardous chemicals. Severe injuries, permanent disability and even fatalities may be avoided, if portable emergency safety showers and face/eyewash stations are readily available and functioning at the performance level specified in the standard.

Where is portable emergency safety equipment needed?

The construction; oil and gas and utilities industries are among those who have portions of their workforces spend time at temporary or out-of-the-way locations. In these circumstances, just as in conventional facilities, keeping workers safe depends both upon implementing measure to prevent incidents and on being ready to respond if an incident does happen. Assessing the specific layout, dimensions and workforce size at a temporary worksite is the first step in selecting the right and the right amount of portable equipment that can be used to provide first aid to an employee who has been exposed to hazmat.

What to look for in portable equipment

The eyewash/emergency shower industry has developed technologically advanced equipment designed to provide first aid despite challenging conditions. Major manufacturers offer portable shower units that provide

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proximity response within 10 seconds of exposure and can drench water at 20 gallons per minute when connected to a water main by a hose. On sites where that option is not available, large portable units can be filled with potable water by hose and transported to the required location using the standard towing hitch provided. Features that are available in high-quality equipment include:

- Tires that allow a portable shower cylinder to be easily moved around a site by an individual
- A towing hitch that enables the equipment to be towed by a vehicle
- Insulation and trace tape heating that cause the unit to deliver water heated at a safe level
- Frost protection
- An external, acid-resistant coating
- The ability to fit an eye/face wash station or handheld eye, face and body shower hose to a portable shower unit

Other considerations

According to the ANSI standard, flushing equipment must be located in areas that are accessible within 10 seconds (roughly 55 feet). However, when highly corrosive chemicals are present, locating the flushing equipment closer to the hazard is a good idea. Additionally, make sure that the equipment is identified by a highly visible safety sign, that it is not blocked by obstructions and that it is in a well-lit area. **WMHS**

» For more information, read the ANSI's blog post about emergency eyewash stations and showers: <https://tinyurl.com/499vk35t>



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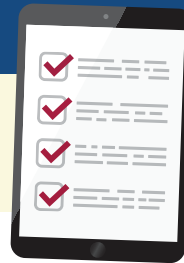
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Fall Protection Systems and Falling Object Protection- Criteria and Practices



Safety Rail Company manufactures the SRC360 Mobile Rail: a free-standing, non-penetrating railing system that complies with OSHA 1910.28 and 1910.29, qualifying as a passive barrier between the worker and the fall hazard. This engineered fall-protection system ranks high in OSHA's hierarchy of controls when addressing fall hazards, which prioritizes engineered solutions as the preferable preventative action over administrative or PPE protocol. Passive barrier systems also do not require significant training or compliance protocols like those associated with administrative or active fall-protection solutions. In low-slope commercial roofing applications, the SRC360 Mobile Rail is an ideal solution for fall-hazard areas and can be left in place permanently to protect all personnel that access the roof. *Safety Rail Company, 888-434-2720, www.safetyrailcompany.com*

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Fall protection regulations have been on OSHA's 10 most-cited-regulations list for the past decade. In the construction industry, falls are one of the "Fatal Four:" the top four causes of construction fatalities. (The others are struck-by, caught-in/between and electrocutions.) Falls from height or on the same level are among the leading causes of work-related injuries and deaths.

From October 2020 through September 2021, federal OSHA enforcement resulted in 58 inspections of workplaces/worksites in the U.S., and 71 citations, with a total of \$171,250 in penalties.

The industries most cited for violations of 1910.29 were:

- Manufacturing
- Wholesale Trade
- Retail Trade
- Mining, Quarrying
- Oil & Gas Extraction
- Construction
- Transportation & Warehousing

Major provisions of the standard

Employers are required to protect workers from along unprotected sides or edges that are at least four feet or above from a lower level. In circumstances where they are required, fall protection systems and falling object protection must be provided or installed before any employee begins work that necessitates fall or falling

object protection. In 1910.29, OSHA provides specifications for various forms of fall prevention.

Guardrail systems:

- The top edge height of top rails, or equivalent guardrail system members, must be 42 inches (107 cm), plus or minus 3 inches (8 cm), above the walking-working surface.
- Midrails, screens, mesh, intermediate vertical members, solid panels or equivalent intermediate members must be installed between the walking-working surface and the top edge of the guardrail system as follows when there is not a wall or parapet that is at least 21 inches (53 cm) high.
- Midrails must be installed at a height midway between the top edge of the guardrail system and the walking-working surface.
- Screens and mesh should extend from the walking-working

surface to the top rail and along the entire opening between top rail supports.

- Guardrail systems must be capable of withstanding, without failure, a force of at least 200 pounds (890 N) applied in a downward or outward direction within 2 inches (5 cm) of the top edge, at any point along the top rail.
- When the 200-pound (890-N) test load is applied in a downward direction, the top rail of the guardrail system must not deflect to a height of less than 39 inches (99 cm) above the walking-working surface.
- Midrails, screens, mesh, intermediate vertical members, solid panels and other equivalent



- intermediate members must be capable of withstanding, without failure, a force of at least 150 pounds (667 N) applied in any downward or outward direction at any point along the intermediate member.
- Guardrail systems are smooth surfaced to protect employees from injury, such as punctures or lacerations, and to prevent catching or snagging of clothing.
- The ends of top rails and midrails do not overhang the terminal posts, except where the overhang does not pose a projection hazard for employees.
- Top rails and midrails are at least 0.25-inches (0.6 cm) in diameter or in thickness.

Guardrail systems at hoist areas and holes

- When guardrail systems are used at hoist areas, a removable guardrail section, consisting of a top rail and midrail, is placed across the access opening between guardrail sections when employees are not performing hoisting operations. The employer may use chains or gates instead of a removable guardrail section at hoist areas if the employer demonstrates the chains or gates provide a level of safety equivalent to guardrails.
- When guardrail systems are used around holes, they are installed on all unprotected sides or edges of the hole.

- When guardrail systems are used around holes that serve as points of access (such as ladders), the guardrail system opening.
- Has a self-closing gate that slides or swings away from the hole and is equipped with a top rail and midrail or equivalent intermediate member that meets other requirements in this section.
- Is offset to prevent an employee from walking or falling into the hole.
- Guardrail systems on ramps and runways are installed along each unprotected side or edge.

Falling objects

- Employers must ensure that all openings in guardrail systems are small enough to prevent objects from falling through the opening.
- The employer must ensure canopies used for falling object protection are strong enough to prevent collapse and to prevent penetration by falling objects. **WMHS**

For more information:

- » 1910.29 is a robust regulation that addresses many different kinds of workplace environments that could present fall and falling object hazards. To read the complete regulation, visit: <https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.29>

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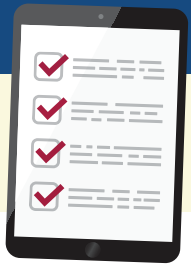
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Protective Footwear Standard

“Tingley is a leading manufacturer of protective apparel and footwear and steadfastly adheres to the American Society for Testing and Materials (ASTM) F2413-18 for the manufacture, assessment and labeling of safety footwear in terms of toe cap impact and compression, puncture resistance, electrical hazard resistance, and a range of other safety footwear protections. All Tingley footwear meets the specific section of the standard indicated on the ASTM F2413 label applied to the footwear.”
Tingley, www.tingleyrubber.com.

Standard Specification for Performance Requirements for Protective (Safety) Toe Cap Footwear

In the workplace, feet can have heavy objects fall on them, trapped between objects or caught in a crack. Vehicles can roll over them and heavy objects can fall on them. Bulldozers, lift trucks, pallets, chain saws, unguarded machinery, loose nails and sharp nails are just a few of the things that can pose a danger to feet and cause injuries ranging from punctures and severed toes, to broken bones and electric shocks. Hazards exist in a variety of industries, including warehousing, logging, manufacturing, transportation, waste management and construction. According to the Bureau of Labor Statistics, each year there are more than 53,000 foot injuries in U.S. workplaces that cause employees to miss work. Some result in permanent disability. Protective footwear - along with job design and/or workplace design - is an important means of preventing occupational foot injuries.

ASTM F2413-18 covers the minimum design, performance, testing and classification requirements, and prescribes fit, function and performance criteria for footwear designed to be worn to provide protection against a variety of workplace hazards that can potentially result in injury. It does not serve as a detailed manufacturing or purchasing specification, but it can provide a reference for purchasers that foot protection meets minimum performance requirements are met.

Major Provisions

Footwear conforming to ASTM F2413-18 must meet the following provisions of the standard:

- Impact resistance for the toe area of footwear - When subjected to a 75-pound force, the toe area must provide a minimum interior height clearance of 0.5 inches in men's footwear and 0.468 inches in women's footwear.
- Compression resistance for the toe area of footwear - When footwear is subjected to a 2,500-pound force, the toe area must provide a minimum interior height clearance of 0.5 inches in men's footwear and 0.468 inches in women's footwear.
- Metatarsal protection that reduces the chance of injury to the metatarsal bones at the top of the foot.
- Conductive properties which reduce hazards that may

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result from static electricity buildup and reduce the possibility of ignition of explosives and volatile chemicals.

- Electric shock resistance - the boot shall withstand 18,000 volts at 60 HZ for 1 minute with no current flow or leakage current in excess of 1.0 milliamperes under dry conditions.
- Static dissipative (SD) properties to reduce hazards due to excessively low footwear resistance that may exist where SD footwear is required.
- Puncture resistance of footwear bottoms.
- Chain saw cut resistance.
- Dielectric insulation

The standard specifies that controlled laboratory tests used to determine compliance with the performance requirements of this specification shall not be deemed as establishing performance levels for *all* situations to which individuals may be exposed.



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About the ASTM marking

Footwear that is manufactured to the ASTM specification must be marked with the specific portion of the standard with which it complies. The marking must be enclosed in a rectangular border. Each protective toe cap, metatarsal and puncture-resistant device must be marked with the manufacturer's name, trademark or logo. If any changes are made to the original components of safety toe footwear (such as replacing or adding after-market footbeds/inserts) that could cause failure, that could render the ASTM marking invalid.

NOTE: The standard does not apply to overshoes with safety toe caps or strap on devices with safety toes.

Tips for choosing protective footwear

- Buy shoes or boots late in the afternoon, when feet will be swollen to their largest size.
- Have both feet measured because feet may differ in size; buy shoes to fit the larger foot.
- Do not buy tight-fitting shoes and expect them to stretch with wear.
- Make sure the shoes grip the heels firmly.
- Select shoes and shoe materials based on the hazards to which you will potentially be exposed. Keeping flooring conditions in mind as well, in order to prevent slip and fall accidents.

- Footwear must be comfortable.

Combined Protection

Identifying potential hazards in the workplace or in specific applications will provide the information needed to choose effective foot protection. Many safety footwear styles have features and materials that protect the wearer from a number of different hazards. In addition to the provisions contained in the standard, footwear may also offer chemical resistance from oils, acids and chemicals; waterproofing; slip resistant outsoles; insoles designed to absorb moisture and shock and fire resistance. Some manufacturers have developed anti-fatigue product lines that are lighter in weight, and heels that are beveled to reduce back and leg strain. When shopping for safety footwear, make sure that the products meet the standards. **WMHS**

More information

ASTM F2413-18 was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.

» To purchase the standard: <https://www.astm.org/f2413-18.html>

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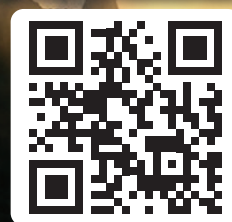
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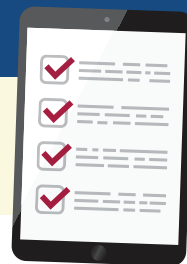
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Foot Protection

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General requirements. The employer shall ensure that each affected employee uses protective footwear when working in areas where there is a danger of foot injuries due to falling or rolling objects, or objects piercing the sole, or when the use of protective footwear will protect the affected employee from an electrical hazard, such as a static-discharge or electric-shock hazard, that remains after the employer takes other necessary protective measures.

The standard goes on to specify that protective footwear must comply with any of the following consensus standards:

- ASTM F-2412-2005, “Standard Test Methods for Foot Protection,” which requires footwear’s performance to be evaluated for impact and compression resistance in the toe area; metatarsal and puncture protection; conductive properties to reduce hazards from static electricity buildup; electrical hazards from stepping on a live wire; and static dissipative properties.
- ASTM F-2413-2005, “Standard Specification for Performance Requirements for Protective Footwear,” which are incorporated by reference in § 1910.6
- ANSI Z41-1999, “American National Standard for Personal Protection -- Protective Footwear,” which is incorporated by reference in § 1910.6
- ANSI Z41-1991, “American National Standard for Personal Protection -- Protective Footwear,” which is incorporated by reference in § 1910.6

Protective footwear that the employer demonstrates is at least as effective as protective footwear that is constructed in accordance with one of the above consensus standards will be deemed to be in compliance with the requirements.

Occupational foot protection is part of OSHA’s Personal Protective Equipment (PPE) standards.

The following industries were most cited by federal OSHA during the period October 2020 through September 2021:

- Manufacturing
- Retail Trade
- Transportation and Warehousing
- Construction
- Administrative and Support and Waste Management and Remediation Services
- Retail Trade

Who pays for safety footwear?

The answer to this question depends in part on whether or not the footwear in question is worn only at work. A rule issued by OSHA in 2007 said if non-specialty, safety-toe protective footwear can be worn off the workplace, employers aren’t required to pay for it. If the safety-toe protective footwear is a non-standard “specialty” item, such as nonskid shoes, the employer must pay for them. If employees are required by employers to keep non-specialty safety-toe protective footwear at the workplace, companies must pay for that footwear. If the safety-toe protective footwear is a non-standard “specialty” item, such as nonskid shoes, the employer must pay for them. OSHA also orders employers to pay for required footwear using metatarsal protection. In general, employers must provide PPE



It is important to identify potential existing hazards and choose footwear that will protect against them.



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at no cost to their employees *when the PPE is used to comply with OSHA standards.*

When should protective footwear be worn?

Foot protection should be worn where employees are potentially exposed to corrosive or poisonous materials; electrical hazards; static electricity that could cause an explosion; heavy objects that could roll onto feet; sharp objects that could puncture the foot; molten metal that could splash onto feet; and hot or slippery surfaces. Thus, it is important to have an in-house safety manager or an outside consultant conduct a thorough assessment of facility areas and operations, in order to identify all of the existing hazards and choose footwear that will protect against them. PPE, along with engineering solutions (including elimination or substitution), safe work practices and administrative controls, is an important part of helping prevent the more than two million nonfatal workplace injuries and illnesses that occur in private industry workplaces each year, according to the U.S. Bureau of Labor Statistics (BLS). Approximately 120,000 workers annually suffer from toe, foot and ankle injuries, which average six days to heal. The most common occupational foot injuries are:

- Broken foot
- Puncture wounds
- Amputation of toes or feet

- Foot sprain
- Burns
- Cuts and lacerations
- Hypothermia

Safety shoes and boots are available in a wide variety of styles and sizes, in order to select footwear that will protect against hazards, as well as keep feet warm in cold conditions with insulation or dry in wet conditions with waterproofing. Safety footwear may be puncture-resistant and/or heat-resistant. Other features include steel, composite or soft toes and metatarsal guards. Boots made from non-conductive materials will protect the wearer from electric shock. Static dissipative boots provide some protection against electric shock, but are primarily useful when coming in contact with static electricity. In addition to being appropriate for the hazards likely to be faced by the wearer, safety footwear should be comfortable. Many manufacturers strive to develop feature-laden footwear that is nonetheless lightweight, for comfort that lasts an entire shift. **WMHS**

» To read the standard, visit: <https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.136>

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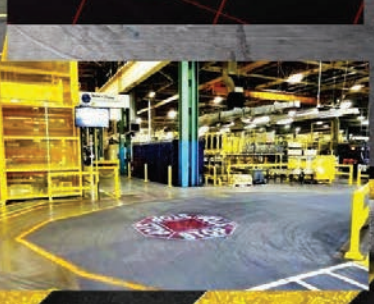
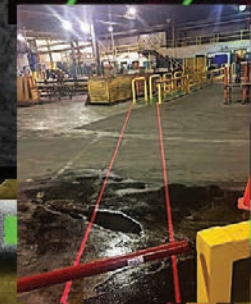
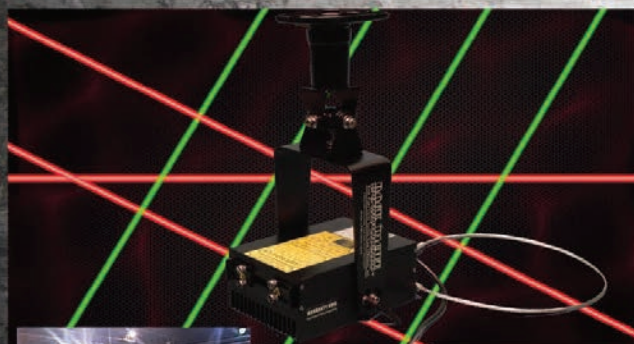
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