



Workplace Safety

Not Your Grandpa's Welding PPE and Gear

Vanessa Jo Roberts | Apr 02, 2020

From auto-darkening helmets for specific industries to modular welding curtains, the gear used to keep welders and those working around them safe has evolved dramatically. We talk with experts from SureWerx about this evolution and some of their latest products.

It's funny how different the reality of today's welders in manufacturing is from the picture many have of them, SureWerx's Bryan Fahey says.

"A lot of people have this image of the old-school welder: He's inhaling all these fumes, he doesn't care, he's a rugged tough kind of guy in a big helmet," says Fahey, senior product manager for the company's global welding program.

"When picking a helmet, there's personal preference, just like choosing a pair of shoes."

Bryan Fahey

Senior Product Manager, SureWerx

But the new crop of professional welders, he says, demand the latest and greatest technology in their helmets, along with PAPR systems to help clean the air that they're breathing. It is in fact such demands that drive continual innovations in welding personal protective equipment and shop floor safety gear, Fahey says.

How PPE Can Protect Workers From Welding Dangers

"If a product has metal involved, it can be welded," Fahey says. The *American Welding Society* suggests that welding directly accounts for as much as 12 percent of the nation's GDP. But some have suggested it touches possibly 50 percent, Fahey adds. "In reality, there is so much of it all around us."

Welding Helmet Comfort That the User Dials Up

For its Jackson welding helmets, SureWerx has developed the 370 Speed Dial headgear system.

Essentially, it's a dial on the back of the helmet that a user can turn right or left to adjust fit, which senior product manager Bryan Fahey says is much easier than helmet adjustment systems that require pushing in on mechanisms at the back of a helmet.

"Comfort is a huge factor," Fahey says. "If you're going to be doing this eight hours a day for your job, the last thing you want to worry about is that you get off work, your head hurts because you didn't have the right headgear on, and your neck hurts because the helmet weighed too much or was not positioned correctly."

SureWerx regularly talks with its users to learn and understand their needs and wants in helmets—as well as to find out what they don't like about the company's products. Because, Fahey notes, there is no one-size-fits-all. "Everyone's got a different head or a slightly different build. That's why we have options."

SureWerx has had such a positive response to its speed dial system that it's now integrating it into all of its product lines—even beyond welding—including *face shields* and *hard hats*.

The work of melting and forming molten hot metal, however, comes with obvious risks far beyond just the incredibly dangerous radiant heat.

"When you are up close and personal with the welding, you have ultraviolet radiation, you have blue-light radiation, and you have a large quantity of visible light, which is part of the radiation, and then you have infrared radiation," explains Dean Wilson, a SureWerx consultant whose family has produced welding protective products since the 1950s.

Up close, the sparks and spatter are a danger to the welder and anything nearby. But more of a concern is the radiation, which can cause short- and long-term damage to a welder's eyesight.

The welding helmets have to address each of those, Wilson says. "Really what you're trying to do is eliminate UV, blue light and IR, and allow only the amount of visible light necessary to adequately do the job."

In the far zone, the areas beyond the welding process area, UV and blue light remain major concerns. IR has dissipated so that it's no longer a factor.

And, for visible light, the goal now is to reduce it to levels comfortable to surrounding co-workers. That's the job of the welding curtains.

Blankets meanwhile prevent sparks and spatter from causing fires and harming nearby equipment.

"You really want to be careful, particularly if you are welding inside, of the potential for an errant bead of weld to spatter into the surrounding area," Wilson says. "That bead can sit there and smolder and

then, when everyone's left the building, boom, there's a fire. That's happened a lot."

Read about how a team of seven welders turns out custom band saw blades in a day at the largest Lenox Certified Welding Center in the country.

Welding Helmets: Passive vs. Auto-Darkening

Remember that "tough guy" image of a welder? For years, welders typically wore those large passive helmets, Fahey says. The shades, glass or polycarbonate, have a fixed lens and depending on the type of work at hand, a welder must stop and change out that shade.

What's the Future of Welding Curtain Technology?

Much of the recent evolution of welding curtains has involved making them modular and figuring out ways to allow easy access in and out of the welding process area.

"I spend a lot of time on the modularization processes," says Dean Wilson, a SureWerx consultant.

For instance, welding curtain manufacturers are borrowing technology from similar industries—like manufacturers of draperies, marine curtains and theater screens. These industries have contributed to the development of modular, automated curtains that allow for quick access to the welding process.

Curtains are available in heavy-duty strips that allow for large volumes of traffic and equipment such as forklifts to move in and out of the process area easily.

Leaning into Automation

Lean manufacturing and the advancement of robots have also affected welding protective gear.

"You cannot just have a welding curtain around a robot," Wilson points out. Robots are fenced off to avoid injury to workers from their swinging arms. Welding curtains have been modified to fit the robotic fencing specifications.

The Advent of Additive Manufacturing

Also of interest is how to provide radiation protection or perimeter barriers for new 3D printing applications that use lasers, Wilson says. "Lasers can cause more harm to the eye than welding."

He expects there will be a need for protective equipment as lasers increasingly are being integrated into welding processes, particularly in the automotive

industry.

“How will that influence PPE?” is one question for sure, Wilson says. Lasers work with the same wavelengths, but they’re concentrating those light wavelengths so their physical behaviors are different and will affect the eye differently too.

It will likely lead to changes in how people use curtains and how they use auto-darkening helmets and PPE eyewear in the future, he says.

Also, at the most common shade, Shade 10, once the helmet is on, the wearer is in complete darkness until they start the weld. That’s why you see welders set their tools and prepare for their welds before giving their heads a hard shake to snap the shades down on passive helmets, Fahey says.

While welders often still keep a passive helmet as a backup, most of today’s welders have transitioned to auto-darkening helmets, which have really taken off in just the last decade.

“With the auto-darkening helmets, the filter is already darkening automatically from your light state to your dark state,” he explains. “If I have to go do a weld and I already have my auto-darkening helmet on, I can clearly see what I’m doing beforehand, and I can quickly do my weld without having to take these extra steps” before each weld and when changing between projects.

For the welders, these helmets have a few advantages:

- They no longer have to stop and switch shades between jobs.
- They can also change the shade of the auto-darkening filters (ADFs) on the fly with manual or digital controls on the helmets.
- They have clear visibility when they’re not welding.
- They have less neck strain because they’re no longer flipping their heads to close the shades.

From the perspective of the business, Fahey says, there is a return on investment as well—despite the difference in cost between passive and auto-darkening helmets.

“What took you maybe an hour to do can take you a handful of minutes because you’re doing less motion to get to the weld,” he says.

Companies see that as a benefit. “Even though you might go out and see an auto-darkening helmet for \$200 and a passive helmet for \$45, you can justify the added cost pretty quickly based on the amount of time it saves,” Fahey says. “You can have less welders on a job, or you could have more welders taking on more work.”

This can be a critical factor given the skills gap for welders. The typical welder today is on average 50 years old, he says. “And for every two welders that leave the industry, only one is entering.”

A Wide Range of Welding Helmets for a Wide Range of Uses and Users

When selecting a helmet, you always start with what you are doing, what kind of products you are producing, and long term, how you think you will be using the helmet, Fahey explains.

"When picking a helmet, there's personal preference, just like choosing a pair of shoes too," he says.

There are decent helmets at the lower end for those companies that only do occasional welds but then on the opposite end of the spectrum, there are high-end products for companies with workers who weld all day long every day.

Helmets use an optical clarity scale across four categories—vision accuracy, diffusion of light, lens light and dark areas, and visual angle clarity—rated at a 1, 2 or 3. The best ranking would be a 1/1/1/1.

"If you're shopping for welding helmets and you see that 1/1/1/1, you know you have the highest-rated helmet in the marketplace," Fahey says. "At SureWerx, compared to our competitors, we have the most helmets that hit that top-tier, 1/1/1/1 quality."

The company also has the widest range of auto-darkening filter and auto-darkening helmet combinations, he says.

The focus for SureWerx—now home to **Jackson**, **Wilson** and **Sellstrom** products and nearly 100 years of experience in welding protective gear—is to create new helmets and add features that make users more comfortable, more productive and also safe, Fahey says.

Here's a look at a few of the company's auto-darkening helmets:

Jackson BH3

The **BH3 helmet** was one of the first welding helmets on the market to achieve top optical clarity because of its use of Balder Technology, which uses super-twisted pneumatics so that the auto-darkening filters can switch shades quickly and clearly.



The BH3 has a unique spherical design.

This helmet, which has a five-year warranty, is extremely lightweight because it uses solar power instead of batteries, Fahey points out. Most auto-darkening helmets use a mix of lithium batteries and solar. The lack of the batteries and battery electronics helps keep the BH3 lightweight at 18 ounces.

The helmet's spherical design "means sparks and spatter are more likely to fall off the sides of the helmet," he says. With the more traditional square helmets, sparks and spatter are more likely to stick to the front of the helmet area.

Jackson TrueSight II

This is another top-tier helmet with the Balder Technology. The *TrueSight II* helmet has a five-year warranty and also has a tinted "True Color" lens.



The TrueSight II has a “True Color” lens tint.

“The tint allows your eyes to better focus on the weld and see it,” Fahey explains. In some early auto-darkening helmets, there was a graininess to the visuals and a yellowish tint. “More helmets today have a blue tint, which makes it easier to focus in on the weld.”

Being able to discern color continues to be a key element of ensuring a proper weld.

Jackson WH40 Insight

This is SureWerx’s No. 1 seller. The *Insight helmet* is a professional-grade product that’s “designed for users that want good quality at a good price” but aren’t quite ready to invest in the more high-end helmets, Fahey says.

The viewing window is a little smaller, but the Insight has the most current feature set and comes with a two-year warranty.



The Insight has fewer auto-darkening shades than the higher-end helmet's ADFs.

For the shell, users have multiple possible graphic options to pick from or they can go with classic black—a “blank canvas,” Fahey says. Because the Insight uses an HLX (Halo X) shell like many of the SureWerx high-end helmets, welders can choose to keep their shells and upgrade their ADFs as they advance.



The Insight has many graphic design options.

“Even after a product is released, it’s always a continuous process of improving the helmets,” Fahey says. This year, even though the Insight has been around for a while, the company will relaunch it with a “True Color” lens and improved optical clarity at the 1/1/1/1 level.

Sellstrom 26100, 26200 and 26400

These are three auto-darkening helmets in the SureWerx value brand that Fahey describes as good (26100), better (26200) and best (26400). The **26100** works well for short bursts; the **26200** is meant for small projects; and the **26400** can be used by professional welders on a daily basis.

These helmets, which have shorter warranties, come with a digital feature set that lets users preset up to three separate auto-darkening functions. And the Sellstrom 26400 has 1/1/1/1 optical quality, Fahey adds.

“We want to make sure everyone has an option to have something that is really nice,” he says.



The Sellstrom 26400 has 1/1/1/1 optical clarity.

Welding Curtains: Protecting Workers Around the Welding Process

For workers in what Wilson describes as the surrounding work zone, a meter or more away from the weld processing areas, curtains are required both for comfort and for protection from welding radiation.

The original curtains designed by the company Wilson's father founded were mainly yellow. While those protected against the radiation, they did not filter and absorb the light enough for those working nearby, Wilson says.

Next came green, which he describes as “like putting sunglasses on the yellow curtains.”

Then, while working with engineers at the Jet Propulsion Laboratory and CalTech who were working on the Viking Mars program, the Wilson team began studying how to filter radiation in space.

The goal was to solve for eliminating the welding UV *and* the blue light and manipulating the visible light to provide comfort for the surrounding co-workers—while still allowing visibility into the welding process area, Wilson explains.

"This research led to the invention of the orange spectra curtain and created a change in how people think about welding curtains," he says. "To this day, the orange transparent curtain is the most popular welding curtain worldwide."

It makes sense because the orange can handle everything from low to high amperage and various types of welding processes.



Want advice on helmets or curtains? Ask one of our safety experts in the Better MRO Forum.

How to Choose the Right Welding Curtains

Wilson offers these pointers on how to determine the best **welding curtains** for your business:

Identify the total amperage for your welding process. The welding amperage has a lot to do with the visible light that's going to be transmitted through the curtain and how that creates an annoyance to surrounding co-workers.

- **Define what the operation is trying to accomplish.** The welding curtains provide protection to reduce and eliminate radiation hazards in the workplace. They also provide fire safety and achieve compliance with Occupational Safety and Health Administration requirements.
- **Detail what it is about the radiation and visible light that concerns you.** The UV radiation from welding can cause serious and long-term damage to the eye. The blue-light radiation causes nausea and eye discomfort. The visible light can be an annoyance to the surrounding workers.

How Do You Select the Right Welding Blankets?

When picking welding blankets, you need to decide what you want to do with the sparks and spatter. There are questions you need to ask to select the correct fabric for your use.

Do you want to capture molten metal sparks and spatter?

"There are fabrics that can capture spark and spatter and prevent fabric burn through," Wilson says. Welding blankets are for fire protection as well as providing protection for personnel, furniture and equipment.

You're not required to replace a blanket every time you use it. What ANSI FM4950 states is that welding blankets should be replaced if they have holes or have lost their integrity. It really depends on the work application, he adds.

That said, "you see people all the time use them once and then throw them away, particularly if it's a petrochemical company where a fire could be catastrophic," Wilson says. "They use the blanket once and throw it away."

Do you care if the spark and spatter fall to the asphalt?

If allowing the spark and spatter to fall to the ground is acceptable, a welding blanket that drapes (at an angle) off of the item you are protecting will cause the spark and spatter to bounce to the ground.

"That's a totally different fabric than the fabric that has to capture the 2,000-degree molten metal and not let it burn through," he says. This fabric usually has a special coating to shed the spatter and sparks.

Will the spatter's radiant heat cause harm?

When you capture spark and spatter, there's heat that is generated from the molten metal on the blanket. The radiant heat can transfer through the blanket and cause damage to whatever you're trying to protect.

There are numerous fabrics that have good radiant heat absorption in a single layer, or the use of a lesser expensive fabric in multiple layers is an option too.

"One of the key instructions to people when they are buying welding blankets is use multiple layers of welding fabric. This will stop the spark and spatter, and address the radiant heat issue," Wilson says.

What preferences do you or your welders have when it comes to helmets? What is the most critical factor when you buy protective welding gear?

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