



Safety

## How 3M Tackles Welder Safety and Productivity

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From harmful radiation to toxic fumes and molten metal, welding poses no shortage of risks to the people who choose it as a career.

An array of *U.S. Occupational Safety and Health Administration rules* recognize those dangers, setting guidelines meant to prevent fires, clear dangerous gases and ensure workers wear the personal protective equipment necessary to avoid physical harm.

That gear is something supplier 3M specializes in, with products including 3M™ *Speedglas™ welding helmets* and 3M™ Adflo™ Powered Air Purifying Respirators that help protect welders' lungs, eyes, heads and faces while boosting comfort and productivity.

"For every helmet we design, we have four key driving factors," says Brent Charlton, 3M's welding portfolio manager for the U.S. and Canada. "Reliability, comfort, view and protection. It is the combination of these four factors that drives overall productivity for the welder and the shop."

### Comfort: The Key to Productivity

Productivity, always a key measure of performance and competitiveness, is growing even more important to manufacturers as they try to make the most of workers' time amid a labor shortage expected to reach 2.1 million jobs by 2030.

One study that 3M conducted with a *military shipbuilder* showed that welders' productivity jumped 44 percent while wearing a 3M™ Adflo™ respirator and Speedglas™ 9100FX-Air welding helmet instead of the half-face respirators they had used previously.

"The participants reported that they found the powered air purifying respirator systems were more comfortable," 3M says in a white paper on the study, "which allowed the welders to stay under the weld hood longer, taking less break time."

The Speedglas™ helmet, which includes a headband that avoids scientifically determined pressure points around the head, also vents exhaled air and provides eye and face protection—all while staying

comfortable for a full shift.

## Long-Term Eye Damage

“When you plan to visit a welding facility, you need to be prepared for the radiation hazards associated with welding,” says Andrew Schrank, an advanced applications engineer for 3M. “The visible light given off by the weld is very intense and can quickly cause momentary spot blindness. On top of that, you have a spectrum of infrared and ultraviolet rays that can be harmful as well. If you are looking directly at a weld, a quick arc struck close enough can cause photokeratitis, a burn on the conjunctiva and cornea of your eye, in an instant.”

Such injuries can carry lifelong consequences, according to the *U.S. Centers for Disease Control and Prevention*, with many occurring because workers are wearing the wrong eye protection or none at all.

Since combining a welding helmet with a powered air purifying respirator like 3M’s Adflo™ makes workers comfortable enough to keep the helmet on for longer periods, however, they’re less exposed to eye injuries, including those from foreign particles.

That benefit was highlighted in a study 3M conducted with *FreightCar America*, a leading maker of railroad freight cars, that showed a 70 percent reduction in such injuries.

“When a welder’s helmet is not in the down position, there is always a risk,” Charlton says. “When welders are able to have their helmet in the down position longer, they are not only increasing their productivity but are safer overall. That is why comfort is such an important driver in every 3M™ Speedglas™ welding helmet.”

Several technologies are built into 3M™ Speedglas™ auto-darkening filters that provide the welder with a great view of their set-up and welding pool. Natural color technology provides the widest spectrum of visible light while also ensuring the welder is protected from ultraviolet (UV) and infrared (IR) light. Many traditional auto-darkening filters have a green tint.



3M™ Speedglas™ welding helmets help protect wearers' lungs, eyes, heads and faces while boosting comfort and productivity. | Photo courtesy of 3M

Variable color technology in the helmet's dark state allows the welder to view a weld in either, cool, warm or natural tones, depending on their set-up, materials and viewing preferences.

### Blocking Toxic Welding Fumes

Welders are trained to know exactly what to do to keep themselves safe from heat and sparks. But what about the microscopic and potentially toxic airborne elements that can affect their lungs over time?

"When welding, you create metal fumes that get released into the air around you," Schrank says. "The type of contaminants that make up those fumes depend on the type of metal you are welding on, the filler metal used and various other parameters. For example, galvanized steel has a zinc coating which can release zinc oxide, and if you breathe that in excess, it can cause welding fume fever, a short-term condition that resembles the flu."

Welding stainless steel is even riskier, releasing **hexavalent chromium**. Studies have found an important correlation between hexavalent chromium exposure and lung cancer, 3M explains in a **white paper**. When in prolonged contact with skin, it can also cause irritation, ulcers and allergic reactions.

Workers can help protect themselves from fumes by staying up-to-date on the latest news about health hazards and protective measures as well as talking with their supervisors about site-specific risks, 3M says.

It is not always possible for businesses to engineer out adequate levels of the different components of welding fumes. When they can't, companies must provide respiratory protection for their workforce.

The thing to remember is that both disposable and reusable respirators require fit-testing programs and necessitate that the welder is clean-shaven while wearing the equipment. (See ***CDC facial hairstyles for filtering facepiece respirators***).

Loose-fitting air helmets such as the 3M™ Speedglas™ G5-01 welding helmet, when connected to a PAPR or supplied air, negate the need for fit-testing and allow welders to keep their moustaches or beards.

"Personal protective equipment does not do any good if it is not being worn," 3M notes. "The time wearing the equipment, and wearing the equipment correctly, is imperative. PPE needs to be worn 100 percent of the time when exposed to hazards to be effective."

**What capabilities do you prioritize in welding helmets? Tell us in the comments below.**

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