



**Welding Helmet Technologies**  
Offer Benefits for Productivity and Operator Safety

By: Eric Sommers, Product Manager, Weld Safety - Head and Face Protection, Miller Electric Mfg. Co.

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Helmets are a critical part of operator safety and protection in welding and grinding applications, but not all welding helmets are created equal.

There are a number of options to consider when selecting a helmet for a specific application or environment. Many types of helmets offer varying technologies and solutions that not only play a role in welding operator safety, but also impact productivity and comfort.

To select the right level of protection and product for the job, welding operators should consider the following: the amount and type of welding that is done; the need to perform alternate applications such as plasma cutting or grinding; whether out-of-position applications are required; and if welding will be done indoors or outdoors.

### Helmet Technology Advancements

Welding helmets are available in two main categories: passive and auto-darkening. Passive helmets have a dark lens that does not change or adjust, and welding operators nod the helmet down as they start the arc when using this type of helmet.

Auto-darkening helmets offer greater ease of use and convenience, especially for operators who raise and lower their helmet frequently, since sensors will automatically darken the lens once they detect the arc.

In the category of auto-darkening helmets, there are fixed shade or variable shade options. A fixed shade helmet will darken to one pre-set shade — often a good option in applications where the welding operator repeats the same weld. With a variable shade helmet, the lens has different shades that the operator can select, which is beneficial when welding processes and applications vary. Adjustments to the lens shade — often via a digital keypad — are based upon the brightness of the arc.

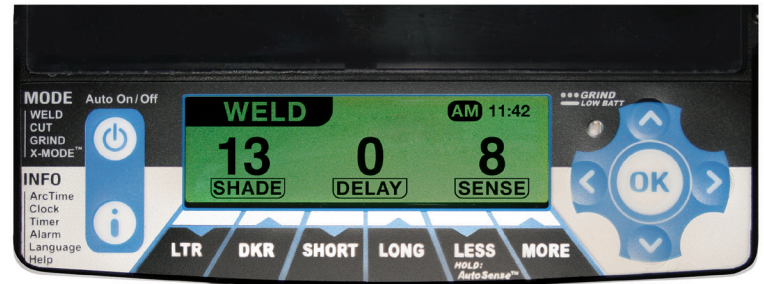
Auto-darkening helmets also offer different operational modes, which adjust the lens shade for grinding or plasma cutting, for example. These modes increase flexibility, allowing a single helmet to be used for numerous jobs and applications.

Welding helmets on the market today offer technology and conveniences that can help improve productivity and welding operator comfort and safety — these include features like tracking functions, improved headgear and more. Following are some of the recent advancements in welding helmet technology.

### Arc Tracking

New technology is available on the market that allows the helmet lens to track arc-on time while the operator is welding. By gathering this information, the weld operator and company can determine how much time is spent welding over a given period of time. This information can be used to calculate efficiency and productivity, and to identify training opportunities if necessary.

Typically, this helmet technology also includes a digital clock display and offers the operator the ability to set an alarm or timer to keep track of daily activities, or to receive alerts about breaks, meetings or shift end times.



### Arc Tracking

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### Electromagnetic Arc Sensing

One available helmet technology that can help improve productivity is electromagnetic arc sensing. This option can be especially beneficial for outdoor welding or in applications where the welding operator has an obstructed view.

On helmets without this technology, the position of the welding operator's head or an obstruction can block the sensors on the lens, preventing the lens from darkening. Bright sunlight during outdoor welding applications can also cause the lens to darken before the operator is ready.

With electromagnetic arc sensing, the sensor picks up the magnetic frequency of the welding arc to eliminate any interference issues. The lens will darken only during welding and stays dark throughout the process — even in bright sunlight or when there are obstacles between the sensor and the arc. This reduces operator downtime for helmet adjustments or repositioning of the work piece.

## Enhanced Grinding Options

For many welding operators, grinding is a large and time-consuming — but necessary — part of the welding process. Some newer helmets offer a grind mode, which is a good option when the grinding is mostly post-weld cleanup work. With an external grind control option, the push of a button or flip of a switch puts the helmet into grind mode and adjusts the lens, which helps improve productivity and safety since there is no need for the operator to remove the helmet to make adjustments.

Some helmets provide the ability to flip up the auto-darkening lens while keeping the rest of the shield down. This opens up a clear grinding shield beneath the auto-darkening lens to provide the operator a clear view of the work surface for critical grinding applications and setup work. It should be noted that safety glasses are still required underneath helmets with clear grind shields. If using a welding helmet for grinding, be sure to look for the ANSI Z87.1+ marking, as the “+” indicates that the helmet is certified to protect against high impact.



### Clear Grinding Shield

Some helmets offer a clear grinding shield beneath the auto-darkening lens. The lens simply flips up, providing the operator a larger, clear view.

## Headgear Comfort

There is a push across the industry to improve welding operator comfort and productivity while still maintaining safety. Many welding operators wear a helmet five or six hours a day — or more — making helmet weight and design important considerations.

Some helmet options on the market offer pivoting headgear with dual top straps to help spread the weight across the operator's head and cushioned headband pads. The main goal of many of these solutions is to reduce and better distribute the helmet weight to help alleviate strain and discomfort for the weld operator. Keep in mind that most of the weight of a helmet comes from glass in the auto-darkening lens, so typically the larger the lens, the heavier the helmet will be.

## Elevating Productivity and Safety

There are many welding helmet options on the market, so consider the application and welding, grinding or cutting requirements when making the selection. Available sensors, modes and features on many welding helmets can offer greater ease of use, flexibility and easy adjustment — factors that can help improve productivity and operator comfort.

## Misconceptions About Helmet Technology

1. A common misconception about auto-darkening welding helmets is that if the auto-darkening feature does not trigger, it will cause flash burn for the welding operator. However, any helmet certified through the American National Standards Institute (ANSI) will provide the minimum protection required to prevent UV and IR burns, even if the lens does not darken. This protects the user from arc burn even if the lens doesn't engage.
2. Another misconception is that a faster lens switching speed equals a safer welding helmet. This goes back to the previous point: As long as the helmet is lowered, the lens will protect the welding operator from arc burn. ANSI has a minimum switching speed required of all certified helmets, and manufacturers test helmets at different temperature ranges. While all ANSI certified helmets have acceptable switching speeds, faster speeds can help reduce eye fatigue in situations where a higher number of arc starts are initiated, such as during tack welding.
3. The size of the lens on a welding helmet is another consideration that often comes down to user preference. Some welding operators like a large lens, so they can see more of what's around them. Others prefer a smaller lens, which can reduce the helmet weight. It's important to understand that a larger lens equals increased helmet weight and that lens size does not determine the quality of the helmet. Rather, helmet quality is based on the quality of the glass and other features, including electronics and components.
4. Welding helmets are rated based on optical clarity and other factors, so keep that in mind when making the selection. The EN379 rating refers to the optical class of a helmet with a range from 1-3 in four categories. The optimal rating would be 1/1/1/1, with the first three digits defining clarity and consistency characteristics of the lens, while the fourth digit defines the “angle of view” shading consistency for viewing arcs at angles through the lens. When considering helmet quality, look for a manufacturer with helmet certification based on post-production inspection.