

Personal Protective Equipment

## 10 Features to Examine When Selecting Face Shields

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Face shields are transparent screens designed to protect a worker's entire face and neck from flying objects, chemical splashes, and other eye and face hazards. They are usually worn in conjunction with masks and respirators and they come in a variety of materials, shapes, shades, and tints, to suit different applications. This article aims to ease your decision of selecting the right face shield, by examining 10 key product features.

But first, when is a face shield required?

OSHA recommends conducting a worksite hazard assessment before selecting a face shield or any other PPE. Eye and face PPE is recommended when engineering solutions are not practical and workers are exposed to hazards such as flying objects, molten metal, liquid chemicals, acids or caustic liquids, chemical gases, vapors, or UV radiation.



Woodworking, welding, drilling, and environments with fluid exposure – all these jobs pose chemical, respiratory, and impact risks that require face protection.

### 1. Visor lens material

Typically, face shield visors are built of durable materials such as polycarbonate, propionate, acetate, polyethylene terephthalate glycol (PETG), steel or nylon mesh. It's important to choose the most suitable material for your application. While steel or nylon mesh provides good airflow and protects

from impact with larger objects such as wood debris, they don't protect from dust and vapors, for instance.

Of all the materials, polycarbonate provides the best impact and heat resistance. It protects against chemical splash and holds up well in extremely cold temperatures.

Visual strain can impact worker productivity, so the lens should provide excellent visibility, too. Acetate is a material known to provide superior clarity and scratch resistance. It also offers chemical splash protection and impact protection. If you are looking for superior impact protection, however, propionate is stronger than acetate.

A face shield made of polyethylene terephthalate glycol (PETG) tends to be the most economical option.

There are also specialty lenses:

- Arc lenses that protect workers against arc flash
- UV filter lenses to protect from UV radiation. Shaded welding face shields provide protection from UV and IR radiation generated when working with molten metal. The shades usually range from Shade 2 to 14, with Shade 14 being the darkest shade.

## 2. Comfort & fit

Lightweight construction ensures workers don't experience fatigue during long working hours.

A face shield should also fit snugly and the headgear plays a key role in achieving a proper fit. It is usually adjustable via a flexible headband for the circumference and a top band for depth. Depth plays an important role in the overall stability of the facepiece.

Honeywell's Uvex Bionic Face Shield offers 2,784 possible adjustment positions and has a ratcheting mechanism to lock the headgear into place.

"I like the inclusion of the tough and strong clear polycarbonate visor, too", this *online review* reads. "It is because I instantly discovered how it offers the best protection from chemical splashes and flying debris in your work area. I am also pleased with the anti-fog hard coating used in this shield because this promotes clarity of vision."

## 3. Anti-fogging coating

Fogging is more than annoying, it's dangerous. When lenses fog up, they significantly reduce the visibility of the wearer, increasing the risk of accidents.

Did you know fogging technology was initially developed by **NASA**, for astronaut helmet visors?

Thin film coatings made of polymers and hydrogels are used to prevent fogging at very low and high temperatures. This happens by absorbing moisture (hydrophilic action) and diverting excess moisture to the sides of the lenses (hydrophobic action).

Lens anti-fogging ability is tested under the European EN166/168 standard.

Under this test, a lens is soaked in water for two hours to simulate the cumulative moisture lenses are subjected to over time from sweat, washing, and extreme work environments. After drying, the lens is exposed to steam and the duration of its fog-free time is recorded.

In this test, **Uvex HydroShield** proved to be one of the market's longest lasting anti-fog coatings, providing fog-free performance even after extended wear and repeated cleanings.

## 4. Anti-scratch coating

The outside of the lens should be protected with scratch-resistant coatings, for extra durability and abrasion resistance. It also makes the product easier to clean.

## 5. Anti-reflective coating

Anti-glare or AR coatings are mirrored coatings that dissipate heat and remove the glare being reflected.

## 6. Ultra-violet protection

It's strongly recommended that all personnel operating with high-intensity UV sources wear an ultraviolet protective face shield, in addition to protective gloves and clothing. These face shields have a special construction that blocks ultraviolet transmission overall UV wavelengths.

## 7. Adaptability to other PPE

The visor attaches to hard hats, so it's important to make sure it works with your head protection, too. It also needs to be worn comfortably with most goggles and respirators, including an N95 mask.

## 8. Care and maintenance

One of the advantages of face shields is their durability, allowing them to be re-worn multiple times. Another benefit is that they are easy to clean after use and they prevent the wearer from touching his/her face. Reusable face shields are resistant to disinfectants, serializable, and washable.

Polycarbonate face shields will scratch, so only use a clean, soft cloth and up and down strokes to clean them. Since some solvents damage polycarbonate, it's recommended to wash the product with a mix of water and mild soap.

## 9. Certifications

Face shields should pass all the required standards.

### Impact resistance

The American National Standards Institute requires each face shield to be marked with the manufacturer's identity. All components should consequently be marked – Z87 or Z87+ANSI Z87+. Both standards are listed in the ANSI Z87.1 section.

- Mark Z87 is a basic impact face shield. This means it should be capable of resisting impact from a 1 in. (25.4mm) diameter steel ball dropped from a height of 50 inches.
- Mark Z87+ is a high-impact face shield that can resist impact from a .25 inch (6.35mm) diameter steel ball traveling at a velocity of 300 feet per second (91.4 m/s).

The "+" symbol stamped on the face shield means it will provide impact protection regardless of price. Safety markings for ANSI Z87.1-2015 must be clearly marked on the safety glasses, goggles, and face shields.

The European standard (EN 166) requires face shields to withstand impact from a 6mm diameter steel ball at various speeds. There are three different classifications:

- Mark A: 190 m/s.
- Mark B: 120 m/s.
- Mark F: 45 m/s.

Lens quality is mentioned in the Z87.1-2010 standard. Lenses should be free of visible defects, have a luminous transmittance level >85 percent (if the lens is clear), and not exhibit >3 percent haze. Lens

quality should also be within acceptable tolerance levels for refractive power, astigmatism, resolving power, prism, and prism imbalance.

#### **10. Price**

Price is, of course, something to consider. Beware of too-good-to-be-true offers, as counterfeit products are easily available, too, and can jeopardize worker health and safety.

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