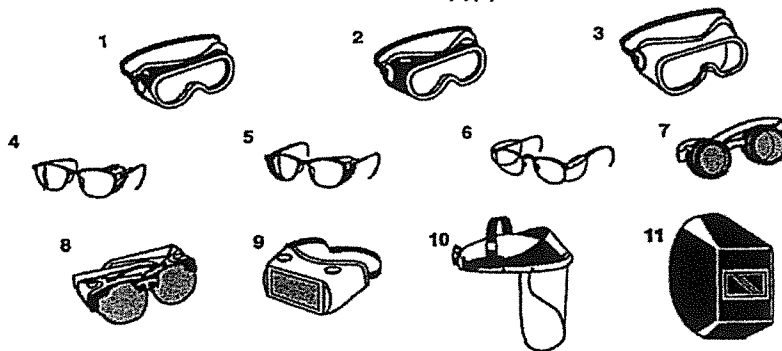


Eye and Face Protection; Filter Lens Shade Numbers for Protection Against Radiant Energy

Welding Operation	Shade Number
Shielded metal-arc welding $\frac{1}{16}$ -, $\frac{3}{32}$ -, $\frac{1}{8}$ -, $\frac{5}{32}$ -inch diameter electrodes	10
Gas-shielded arc welding (nonferrous) $\frac{1}{16}$ -, $\frac{3}{32}$ -, $\frac{1}{8}$ -, $\frac{5}{32}$ -inch diameter electrodes	11
Gas-shielded arc welding (ferrous) $\frac{1}{16}$ -, $\frac{3}{32}$ -, $\frac{1}{8}$ -, $\frac{5}{32}$ -inch diameter electrodes	12
Shielded metal-arc welding $\frac{3}{16}$ -, $\frac{7}{32}$ -, $\frac{1}{4}$ -inch diameter electrodes	12
$\frac{5}{16}$ -, $\frac{3}{8}$ -inch diameter electrodes	14
Atomic hydrogen welding	10-14
Carbon-arc welding	14
Soldering	2
Torch brazing	3 or 4
Light cutting, up to 1 inch	3 or 4
Medium cutting, 1 inch to 6 inches	4 or 5
Heavy cutting, over 6 inches	5 or 6
Gas welding (light), up to $\frac{1}{8}$ -inch	4 or 5
Gas welding (medium), $\frac{1}{8}$ - to $\frac{1}{2}$ -inch	5 or 6
Gas welding (heavy), over $\frac{1}{2}$ -inch	6 or 8

Figure 1. Recommended Eye and Face Protectors

Source: 29 CFR 1926.102 (a)(5) Table E-1



Eye and face protectors are identified below by number and type. Refer to Table 1 for recommended usage applications.

- 1. GOGGLES, Flexible Fitting, Regular Ventilation
- 2. GOGGLES, Flexible Fitting, Hooded Ventilation
- 3. GOGGLES, Cushioned Fitting, Rigid Body
- 4. SPECTACLES, Metal Frame, With Sideshields*
- 5. SPECTACLES, Plastic Frame, With Sideshields*
- 6. SPECTACLES, Metal-Plastic Frame, With Flat-Fold Side shields*
- 7. WELDING GOGGLES, Eyecup type, Tinted Lenses**
- 7A. CHIPPING GOGGLES, Eyecup Type, Clear Safety Lenses (not illustrated)
- 8. WELDING GOGGLES, Eyecup type, Tinted Plate Lenses**
- 8A. CHIPPING GOGGLES, Coverspec Type, Clear Safety Lenses (not illustrated)
- 9. WELDING GOGGLES, Coverspec Type, Tinted Plate Lenses**
- 10. FACE SHIELD (Available With Plastic or Mesh Window, Tinted/Transparent)
- 11. WELDING HELMETS**

*These are also available without side shields for limited use requiring only frontal protection.

** See Table 2, Filter Lens Shade Numbers for Protection Against Radiant Energy.

Table 1. Eye and Face Protector Selection Guide

Source: 29 CFR 1926.102(a)(5)

Operation	Hazards	Recommended protectors: (see Figure 1)
Acetylene-burning, Acetylene-cutting, Acetylenewelding	Sparks, harmful rays, molten metal, flying particles	7,8,9
Chemical handling	Splash, acid burns, fumes	2,10 (for severe exposure add 10 over 2)
Chipping	Flying particles	1,3,4,5,6,7A,8A
Electric (arc) welding	Sparks, intense rays, molten metal	9,11 (11 in combination with 4,5,6 in tinted lenses advisable)
Furnace operations	Glare, heat, molten metal	7,8,9 (for severe exposure add 10)
Grinding - light	Flying particles	1,3,4,5,6,10
Grinding - heavy	Flying particles	1,3,7A,8A (for sever exposure add 10)
Laboratory	Chemical splash, glass	2 (10 when in breakage combination with 4,5,6)
Machining	Flying particles	1,3,4,5,6,10
Molten metals	Heat, glare, sparks, splash	7,8 (10 in combination with 4,5,6 in tinted lenses)
Spot welding	Flying particles, sparks	1,3,4,5,6,10

How dark do lenses on welding helmets and goggles need to be?

The intensity of light or radiant energy produced by welding, cutting, or brazing operations varies according to a number of factors including the task producing the light, the electrode size, and the arc current. Table 2, Filter Lens Shade Numbers for Protection Against Radiant Energy, shows the minimum protective shade for a variety of welding, cutting, and brazing operations. To protect employees who are exposed to intense radiant energy, begin by selecting a shade too dark to see the welding zone. Then try lighter shades until you find one that allows a sufficient view of the welding zone without going below the minimum protective shade.

Table 2. Filter Lens Shade Numbers For Protection Against Radiant Energy

Source: 29 CFR 1926.102(b)(1)