

Arc Flash Protection Checklist

UNDERSTANDING ARC FLASH HAZARDS IN WELDING

Welding arc produces intense visible, ultraviolet (UV), and infrared (IR) radiation that can cause immediate and permanent eye damage, severe skin burns, and other injuries. This checklist ensures comprehensive protection against arc flash radiation for welders and nearby personnel.

Arc Radiation Hazards Explained

Radiation Type	Wavelength	Immediate Effects	Long-Term Effects
Ultraviolet (UV)	200-400 nm	Arc eye (photokeratitis) Painful sensation 6-12 hours after Feels like sand in eyes	Cataracts Corneal damage Increased cancer risk
Visible Light	400-700 nm	Temporary blindness Spots in vision Headache	Retinal damage Permanent vision impairment
Infrared (IR)	700-1400 nm	Skin burns Heat sensation Dryness	Cataracts (glassblower's cataract) Premature skin aging

1. Welding Lens Shade Selection Chart

ANSI Z49.1 and OSHA 29 CFR 1910.133 specify minimum shade numbers. Always use the darkest shade that allows adequate visibility of the weld zone. NEVER use lighter shades than specified.

Process	Amperage/Conditions	Minimum Shade	Recommended Shade
Gas Welding (OFW)	Light: <1/8" tip	4	4-5
Gas Welding (OFW)	Medium: 1/8" - 1/2"	5	5-6
Gas Welding (OFW)	Heavy: >1/2" tip	6	6-8
SMAW (Stick)	<60 A	7	7-8
SMAW (Stick)	60-160 A	10	10-12
SMAW (Stick)	160-250 A	12	12-14
SMAW (Stick)	>250 A	14	14
GMAW/FCAW (MIG)	<60 A	7	7-8
GMAW/FCAW (MIG)	60-160 A	10	10-11

2025 Best Welding Helmet Reference Guide

GMAW/FCAW (MIG)	160-250 A	10	11-12
GMAW/FCAW (MIG)	>250 A	10	12-14
GTAW (TIG)	<50 A	8	8-10
GTAW (TIG)	50-150 A	10	10-12
GTAW (TIG)	150-500 A	12	12-14
Plasma Arc Cutting	<300 A	8	8-9
Plasma Arc Cutting	300-400 A	9	9-12
Plasma Arc Cutting	>400 A	10	10-14
Air Carbon Arc	Light	10	10-11
Air Carbon Arc	Heavy	12	13-14

2. Welder Eye and Face Protection Checklist

- Welding helmet meets ANSI Z87.1 standard:
 - Look for certification marking on helmet
 - Manufacturer label present and legible
- Filter lens shade appropriate for process (see chart above)
- Filter lens properly installed in helmet:
 - Secure in retainer ring
 - No gaps around edges
 - Correct orientation (some lenses are directional)
- Cover plates (clear plastic) installed both sides of filter:
 - Inside cover plate: Protects from spatter on lens
 - Outside cover plate: Protects from grinding sparks
 - Replace covers when scratched or pitted
- Filter lens condition verified:
 - No cracks, chips, or scratches
 - No discoloration or clouding
 - Replace immediately if damaged
- For auto-darkening helmets, additional checks:
 - Battery fully charged or fresh
 - Darkening response time <1/25,000 second
 - Test darkening function before use (strike arc on scrap)
 - Delay and sensitivity settings appropriate
 - Grind mode (if equipped) functions correctly
 - Backup shade permanently installed (required by standard)
- Safety glasses with side shields worn UNDER helmet:
 - ANSI Z87.1 rated
 - Clear or shade 2-3 for additional protection
 - Always worn even when helmet down
- Helmet fits comfortably and securely:
 - Headband adjusted for firm fit
 - No sliding or wobbling during head movement
 - Comfortable enough for extended use

3. Skin Protection from Arc Radiation

Arc radiation causes sunburn-like burns on exposed skin. UV exposure is cumulative and increases skin cancer risk. Complete coverage is mandatory:

- Welding jacket or leather cape:
 - Flame-resistant leather or cotton
 - No synthetics (melt and adhere to skin)
 - Sleeves long enough to cover wrists when arms extended
 - Cape for overhead work covers shoulders and chest
- Leather gloves:
 - Full coverage of hands and wrists
 - No tears, holes, or thin spots
 - Gauntlet style for overhead work
 - TIG-specific for TIG welding (softer, more dexterous)
- Pants:
 - Flame-resistant material
 - Cover boot tops completely
 - No cuffs (catch sparks)
 - Dark color preferred (reduces reflection)

■ Shirt:

- Long-sleeved, button-front
- Collar covers neck
- Pockets button closed or no pockets
- Tucked into pants (no gap at waist)

■ No exposed skin anywhere:

- Check wrists when arms extended
- Verify neck coverage
- Ensure no gaps between gloves and sleeves

4. Bystander and Co-Worker Protection

Welding arc can cause arc flash injury to anyone within direct line of sight up to 50 feet away. Reflections from shiny surfaces extend this hazard. Protect others in the area:

- Welding screens or curtains installed:
 - Non-reflective, flame-resistant material
 - Orange/bronze color recommended (blocks UV)
 - Height 6 feet minimum, 8 feet preferred
 - Positioned to block all direct sight lines to arc
 - Portable screens for temporary or field work
- Warning signs posted at all approaches:
 - 'WELDING IN PROGRESS'
 - 'EYE PROTECTION REQUIRED BEYOND THIS POINT'
 - Visible from all access points
- All personnel within 50 feet provided with:
 - Shade 2-3 safety glasses OR
 - Face shield with shade 2-3 lens OR
 - Instructions to look away when arc is active
- Reflective surfaces managed:
 - Cover or position to avoid reflections
 - Shiny metal, glass, or glossy paint can reflect arc
 - Even reflections can cause arc eye in bystanders
- Designated welding area established if possible:
 - Permanent screens or barriers
 - Controlled access
 - Reduced bystander exposure
- Communication with nearby workers:
 - Warn before striking arc
 - Especially critical in shared spaces

5. Special Situation Protections

Situation	Additional Protection Required
Overhead Welding	■ Leather cape covering shoulders and upper chest ■ Flame-resistant hood or cap ■ Gauntlet gloves covering forearms ■ No gaps between clothing layers
Confined Space Welding	■ All openings screened to prevent arc flash exposure outside space ■ Attendant positioned to avoid arc exposure ■ Warning posted at space entrance
Field/Construction Welding	■ Portable welding screens positioned around work area ■ Traffic cones or barriers preventing pedestrian approach ■ Extra vigilance for children or public nearby
Multiple Welders in Same Area	■ Each welder's area screened from others ■ Communication system to coordinate arc strikes ■ All welders wear appropriate shade even when not welding

2025 Best Welding Helmet Reference Guide

Welding Near Reflective Surfaces	■ Cover reflective surfaces with welding blankets ■ Reposition work if possible to eliminate reflections ■ Increase shade number if reflections cannot be eliminated
Arc Gouging or High-Amperage Work	■ Use darkest recommended shade ■ Extra attention to bystander screening ■ Consider additional PPE for nearby workers

6. Arc Eye (Photokeratitis) Recognition and Treatment

Symptoms (appear 6-12 hours after exposure):

- Gritty sensation in eyes (like sand or glass)
- Extreme sensitivity to light
- Watery, red eyes
- Severe pain
- Headache
- Blurred vision
- Seeing halos around lights

Immediate Treatment:

- Remove contact lenses immediately if worn
- Do NOT rub eyes—can cause corneal abrasion
- Apply cold compress over closed eyelids
- Take over-the-counter pain relievers as directed
- Stay in darkened room—light causes severe pain
- Use artificial tears frequently
- Seek medical attention:
 - Symptoms severe or not improving in 24 hours
 - Vision significantly impaired
 - Any foreign body sensation that doesn't resolve

Recovery typically takes 24-72 hours. Repeated exposure increases risk of permanent damage.

7. PPE Inspection and Maintenance Schedule

Item	Inspection Frequency	Replace When
Welding helmet shell	Monthly	Cracks, warping, or structural damage present
Filter lens	Before each use	Any cracks, scratches affecting vision, or discoloration
Cover plates	Before each use	Scratched, pitted, or obscuring vision
Auto-dark sensors	Before each use	Spatter buildup or damage present
Auto-dark battery	Monthly or per manufacturer	Darkening response slows or fails
Headband/suspension	Weekly	Cracked, torn, or doesn't hold adjustment
Safety glasses	Before each use	Scratches, cracks, or loose temples
Gloves	Before each use	Holes, tears, thin spots, or burns through
Jacket/sleeves	Before each use	Holes, tears, or areas burned through to skin

Quick Pre-Weld Arc Flash Protection Checklist

- Helmet: Correct shade, lens undamaged, cover plates clean
- Auto-dark helmet: Battery charged, tested on scrap
- Safety glasses: Worn under helmet, clean and undamaged
- Skin: All areas covered—no exposed skin anywhere
- Gloves: No holes, proper type for process
- Jacket/sleeves: Complete coverage, no tears
- Screens: Positioned to protect bystanders
- Warning signs: Posted if others in area
- Nearby personnel: Warned or provided protection
- Special situations: Additional protection for overhead, confined space, etc.

CRITICAL REMINDER

Arc flash injury is preventable. Using proper shade lens and complete skin coverage eliminates this hazard. Never compromise—arc eye is extremely painful and repeated exposure causes permanent vision damage. Protect yourself and everyone around you on every weld.