THE NATION'S URANIUM PROCESSING FACILITY

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This document has been reviewed by a Y-12 DC/ RO and has been determined to be UNCLASSIFIED, not UCNI, and contains no CUI based upon current classification guidance. This review does not constitute a review for CUI outside of classification guidance and does not constitute clearance for Public Release.
Name: Steve Buffalo Date: 07/15/24

REVISION LOG

Revision 14

☒ Intent ☐ Non-Intent Implements PRMS Requirements: ☒ Yes ☒ No

- This change is / These changes are in response to Action Condition Report 25774-000-GCA-GAM-04502, *Y-12 APMO M&O Finding (F-1) - Procedural Requirements for Traffic Flagging Less Than Adequate (ASM-5.30.2023-6408)*
- This revision incorporates the changes identified in and supersedes PRCN-UPF-CP-205-R13-03
- No forms have been edited as part of this revision
- Updated Section 3.1.4.3 to add clarification regarding the PPE requirements for personnel working in close proximity to hot work operators
- Other changes include:
  - Updated to current CMGD template
  - Updated references and acronyms
  - Editorial changes

Revision 13

☒ Intent ☐ Non-Intent Implements PRMS Requirements: ☐ Yes ☒ No

- Revised Section 3.0, *Requirements*, in response to Condition Report 25774-000-GCA-GAM-03184, Arc Between Welder Safety Toe Boot/Welding Whip (ORPS Reportable NA-UPO-CNS-UPRPROJ-2021-0007)
  - Added Section 3.1.11, *Body Protection*; and Section 3.1.11.1, *Welding and Associated Hot Work Activities*, to specify PPE requirements for personnel performing welding and hot work as requested by the Authority Having Jurisdiction
- An evaluation determination has been performed confirming that this Procedure does not implement requirements tracked in the Programmatic Requirements Management System (PRMS)
- No forms have been revised as a part of this revision
- Other changes include:
  - Revised Section 3.1.1, *Safe Work Apparel*, to clarify appropriate clothing/Apparel at UPF sites including a NOTE regarding the use of arm sleeves
  - Revised Section 3.1.3, *Head Protection*, to clarify use and upkeep of head protection
  - Revised Section 3.1.4, *Eye and Face Protection*, to include use and maintenance requirements
  - Revised Section 3.1.6, *Hand Protection (Gloves)*, to require the use of hand protection in all active Construction and Warehousing areas and to include new minimum requirements for the selection of hand protection
  - Added new Sections 3.1.3.1, *Alternate Forms of Head Protection*; 3.1.4.1, *Goggles and Sealed Eyewear*; 3.1.4.2, *Face Shields*; and 3.1.4.3, *Welding Helmets (Hoods)*
  - Added Appendix B, *Guide for Shade Numbers in Welding*
  - Updated references
  - Updated acronyms and definitions
  - Editorial changes

- This revision is a total rewrite; because of the extent of changes, revision bars are not shown

Previous revisions on record

CONTENTS

1.0 INTRODUCTION

1.1 Purpose

This Procedure describes how Personal Protective Equipment (PPE) is selected, inspected, and maintained at the Uranium Processing Facility (UPF).

1.2 Scope

This Procedure is applicable to UPF construction site personnel, subcontractors, vendors, and visitors throughout the duration of the Project.

This Procedure does not address attire worn in Project office facilities (i.e., 1060 and 1099 Commerce Park). Refer to E-POL-0050, *Standards of Conduct and Appearance*, for further guidance.

2.0 RESPONSIBILITIES

2.1 Site Manager

The Site Manager is responsible for:

- Overall responsibility for implementing this Procedure
- Ensuring all Project personnel actively participate in the PPE program
- Providing worker support, facilities, and other resources necessary to effectively carry out the PPE program

2.2 Environmental, Safety, and Health Manager, BNI

The Environmental, Safety, and Health (ES&H) Manager, Bechtel National, Inc. (BNI) has the overall authority to interpret the regulations associated with this Procedure and provide guidance as to its intent and application.

2.3 Environmental, Safety, and Health Representative, BNI

The Environmental, Safety, and Health (ES&H) Representative, BNI is responsible for:

- Overseeing compliance of this Procedure via review of field work activities
- Supplying technical advice and interpreting the ES&H codes in this Procedure

2.4 Responsible Superintendent

The Responsible Superintendent is responsible for:

- Being thoroughly familiar with this Procedure and having a full understanding of individual roles and responsibilities regarding compliance with and implementation of this Procedure
- Pre planning work activities to identify the appropriate PPE to use
- Ensuring workers understand the requirements of this Procedure

2.5 Supervisor

The Supervisor is responsible for ensuring the applicable safety controls and processes are incorporated into the planning and execution of the work, and workers are using the correct PPE for the assigned task.

2.6 PPE User/Worker

The PPE user/worker is responsible for:

- Using (wearing) PPE as required or specified by this Procedure, jobsite rules, and/or CFN-1158, *Job Hazard Analysis*, in accordance with Y17-95-64-823, *UPF Field Level Hazard Assessment/Job Hazard Analysis Program (FLHA/JHA)* Process
- Reporting situations where assigned PPE does not provide appropriate protection against the hazards that are present
- Inspecting PPE for defects, damage, and/or wear and tear that would make the PPE unsafe to use
- Wearing work Apparel as required by this Procedure, company-specific dress standard requirements, and/or the JHAs/permits
- Maintaining work Apparel or PPE in accordance with the requirements of this Procedure and the manufacturer's recommendations

3.0 REQUIREMENTS

The proper selection and use of PPE and safe Apparel are important elements in the prevention of work-related injuries; however, PPE can only provide a level of protection against injuries and illnesses when it is maintained and used correctly.

This Procedure does not address every type of PPE that could be used at the UPF construction site. For each potentially hazardous task performed at the construction site, appropriate controls, including PPE, are identified and documented in the JHA. Only through appropriate planning can site hazards be determined and proper PPE identified and utilized.

The hazards present in any particular work activity or area and the risks they pose shall be evaluated, and adequate PPE shall be selected based on these evaluations. Key factors to be considered in the selection of PPE include the following:

- PPE shall be capable of providing protection against risk(s) without compromising individual safety
- PPE shall properly fit the user/worker
- PPE shall be compatible with the work to be performed
- PPE shall be of safe design and construction and in compliance with a nationally recognized standard for the work to be performed. Nationally recognized PPE standards include those from the following organizations:
    - American National Standards Institute (ANSI)
    - American Society for Testing and Materials (ASTM)
    - National Fire Protection Association (NFPA)
    - National Institute for Occupational Safety and Health (NIOSH)

- UL Research Laboratories (UL)

- PPE shall be used and maintained in a sanitary and reliable condition. PPE that has been altered beyond the manufacturer's recommendations is prohibited at the UPF construction site. Any such PPE shall be removed from the site and then either repaired or destroyed
- Specialized PPE, such as respirators or fall protection, requires additional training and/or medical qualifications before use. These items are outlined in their respective procedures

3.1 Criteria for PPE and Safe Work Apparel

The following subsections identify the various types of PPE utilized on the UPF Project:

3.1.1 Safe Work Apparel—Construction/Warehousing Areas

- Minimum safe work Apparel requirements include:
  - Durable shirts with full-length sleeves (continuous) that cover the entire upper torso and arms. Shirts constructed of mesh and/or netting material are prohibited

NOTE: *Arm sleeves (synthetic/compression material) combined with short-sleeved shirts do not meet this requirement.*

  - Full length durable pants in good condition that extend to the ankles
  - Clothing made of natural fibers (e.g., cotton) is recommended
  - Avoid wearing loose clothing, rings, and/or necklaces that may contact or get caught or tangled in moving parts, equipment, or energized systems

3.1.2 Footwear—Construction/Warehousing Areas

- Personnel assigned to or visiting Construction/Warehousing areas shall wear safety-toed, sturdy work boots that cover the ankle and meet or exceed the requirements of ASTM F2413-18, *Standard Specification for Performance Requirements for Protective (Safety) Toe Cap Footwear*. Footwear (i.e., tennis/athletic shoes, open-toed shoes, sandals, moccasins, high heels, boat shoes, mules) are not acceptable footwear at construction and warehousing locations
- Footwear must be in good condition, free from holes, tears, and other damage that impacts their protective qualities
- Use metatarsal guards in conjunction with the protective footwear as identified in the JHA for the task

3.1.2.1 Footwear—Construction/Warehousing Support Facilities

- Personnel assigned to or visiting Construction/Warehousing Support Facilities (e.g., office trailers or buildings) shall wear sturdy, closed-toed shoes in good condition with a maximum one-inch heel. Footwear (i.e., open-toed shoes, sandals, moccasins, high heels, boat shoes, flats, mules) are not acceptable footwear

3.1.3 Head Protection

- Hardhats must comply with ANSI/International Safety Equipment Association (ISEA) Z89.1-2014 (R2019), *American National Standard for Industrial Head Protection*. Hardhats must be worn in accordance with the manufacturer's requirements and with the brim facing forward, unless the ES&H Manager or designee provides a written exception. Hardhats, other than those issued by the UPF, or current employer (subcontractor), are prohibited
- Do not wear a ball cap or any unapproved headgear under the hardhat. Hardhats fit best when worn directly on the head; however, some garments (e.g., bandanas, welding skullcaps, fabric winter liners, and tight knit stocking caps) may be worn under the hardhat as long as these items do not diminish the protective properties of the hardhat
- Hardhats must be worn at all times while on the UPF construction site, with the following exceptions:
  - Inside an enclosed vehicle/equipment cab
  - In an office
  - Taking a break in a designated PPE-free area
  - Walking on a designated PPE-free pathway between the office/trailer building and the parking lot
- A hardhat must be worn in conjunction with a welding hood when performing welding or similar hot work operations
- The use of a welding hood alone without a hardhat is allowed if approved/authorized by the Responsible Superintendent and an ES&H Representative. This exemption may occur when welding needs to take place in a location that is physically restrictive and impedes the safe use of a hardhat. The use of alternative head/face protection must be evaluated and implemented as determined by the evaluation
- Store hardhats in a clean and dry location. Never use paint, solvents, hydrocarbon type cleaners, glue, or other similar chemicals on hardhats. These substances can cause serious damage that may not be visible upon inspection
- Visually inspect the shell and suspension system of the hardhat daily for breakage, cracks, scratches, gouges, hairline cracks, discoloration, chalky appearance, or other unusual condition. Inspect the shell for brittleness by flexing the brim. Any of these conditions indicates a loss of protection from impact and electrical conductivity

3.1.3.1 Alternate Forms of Head Protection

- Alternate forms of head protection, such as bump caps or climbing helmets, may be suitable for select work tasks that require maneuvering in tight spaces with low overhead clearance or overhead hazards from falling/flying objects are not present
- Use of an alternate form of head protection may be allowed when:
  - Hardhats have been demonstrated to be impractical or create an additional hazard
  - There is no exposure to falling/flying objects that a hard hat would protect the user from

- The task is evaluated by the Responsible Superintendent and an ES&H Representative and documented on the Field Level Hazard Assessment (FLHA) card for the task in accordance with Y17-95-64-823

3.1.4 Eye and Face Protection

Eye protection (safety glasses) must meet the specifications of ANSI/ISEA Z87.1-2020, *American National Standard for Occupation and Educational Personal Eye and Face Protection Devices*.

- Do not wear non-photochromic glasses with tinted lenses inside a building or other structure with limited (temporary) illumination, regardless of whether they are prescription or non-prescription glasses
- Refer to ML-SH-801768-A002, *Eye and Face Protection List*, for task-specific eye and face protection directives
- Wear eye protection at all times while on the UPF construction site or warehouse area, except when:
  - In an office or a trailer
  - Operating a vehicle or equipment inside an enclosed cab
  - Wearing goggles or respiratory protection that provides equal or greater levels of protection
- Personal prescription eyewear must have impact-rated (ANSI/ISEA Z87.1) lens, frames, and permanently affixed side shields. If assistance is needed in determining whether specific glasses meet the ANSI standard, then contact a supervisor or an ES&H Representative
- Inspect eye and face protection for damage and wear and tear before each use. Before wearing safety glasses, inspect the frames for cracks and deformation and inspect the lenses for extensive scratches that limit visibility. Inspect goggles for pliability to ensure a good fit to the face. Check the headband and vents, if applicable, for signs of degradation and deterioration. Inspect face shields and suspension systems for breakage, cracks, scratches, and other detrimental conditions
- Safety glasses, goggles, and face shields may be cleaned with an eyeglass cleaner. Do not use ammonia, alkaline cleaners, abrasive cleaning compounds, or solvents

3.1.4.1 Goggles and Sealed Eyewear

Goggles and sealed eyewear (e.g., spoggles) may be required to provide protection from impact, dust, mists, and splashes that are generated by work activities.

Refer to ML-SH-801768-A002 and the activity JHA for task-specific eye and face protection directives.

3.1.4.2 Face Shields

Face shields are required when workers are exposed to flying objects, molten metal, liquid chemicals, or potentially hazardous light radiation. Face shields shall be worn in conjunction with primary eye protection (safety glasses or goggles).

Refer to ML-SH-801768-A002 and the activity JHA for task-specific eye and face protection directives.

3.1.4.3 Welding Helmets (Hoods)

- Personnel performing welding activities shall wear a welding helmet (hood) that meets the requirements of ANSI/ISEA Z87.1 to protect themselves from welding arc, sparks, and spatter
- Filter lenses shall be selected for the specific welding operation in accordance with ANSI Z49.1-2021, *Safety in Welding, Cutting, and Allied Processes*, Table 1 – "Guide for Shade Numbers." Refer to **Appendix B, *Guide for Shade Numbers in Welding***

NOTE: *Minimum shade requirements for welding operations are identified in the JHA for the activity.*

- Safety glasses or goggles must be worn in addition to the welding helmet
- Support personnel in the immediate welding area and subject to the same hazards as the welder (or hot work operator) must wear a similar level of eye, face and body protection or may move away to an area of lesser hazard where additional eye, face and body protection is not required

3.1.5 Hearing Protection

Refer to UPF-CP-312, *Hearing Conservation Program*, for the selection and use of hearing protection equipment.

Care includes discarding disposable earplugs when they possess visible signs of uncleanliness. Reusable earplugs and earmuffs must be cleaned and sanitized. Cleaned and sanitized reusable hearing protection must be kept in a clean, dry area.

Inspect reusable earplugs and earmuffs for wear and tear. Return damaged earmuffs for repair or disposal.

3.1.6 Hand Protection (Gloves)

- Hand protection shall be worn in all active Construction and Warehousing areas with the exception of designated PPE-free areas or for tasks that have been evaluated and require gloves to be removed (e.g., touchscreen use)
- Utilize hand protection appropriate for the hazards and the tasks to be performed. The following are for hand protection:
  - Impacts, cuts, abrasions, and infections
  - Extreme temperatures
  - Chemicals and other hazardous substances
  - Inspect hand protection before each use. Discard damaged and/or worn gloves with holes, tears, and/or other signs of deterioration

3.1.6.1 Selection of Hand Protection

The following are for Hand Protection selection:

- Use only hand protection that is approved and provided by the Project. Refer to ML-SH-801768-A003, *UPF Glove Matrix*, for a sample of Project approved hand protection
- Selected hand protection must meet or exceed the following minimum requirements
  - Gloves must meet cut resistance equal to or greater than Level A5 as defined in ANSI/ISEA 105-2016, *American National Standard for Hand Protection Classification*, or equivalent
  - Gloves must meet puncture resistance equal to or greater than Level 2 as defined in European Standard EN 388:2003, *Protective Gloves Against Mechanical Risk*, or equivalent
  - Where impact hazards are identified (e.g., present risks to hands or fingers such as being caught in/between or struck by/against hazards), gloves with impact protection are required

NOTE 1: *Subcontractors shall provide gloves meeting these minimum requirements for standard use on the Project.*

NOTE 2: *Wearing gloves or loose clothing around rotating equipment can pose a risk of entanglement. An ES&H Representative and Responsible Superintendent will evaluate the task, equipment function, and manufacturer's instructions and provide recommendations for the task.*

3.1.7 Respiratory Protection Equipment

Refer to UPF-CP-318, *Respirator Use and Issuance*, for the selection, use, and care of respiratory protective equipment.

3.1.8 Fall Protection Equipment

Refer to UPF-MANUAL-SH-A001, *UPF Elevated Work Manual*, for the selection, use, and care of fall protection equipment.

3.1.9 Electrical Protection Equipment

Refer to UPF-MANUAL-CM-001, *Uranium Processing Facility Construction Electrical Safety Manual*, for the selection, use, and care of electrical protective equipment.

3.1.10 High Visibility Apparel

Project personnel working in active construction areas must wear appropriate, high-visibility vests (or equivalent clothing), in accordance with ANSI 107-2004, *American National Standard for High-Visibility Apparel and Headwear,* as follows:

- ANSI/ISEA 107 Type "R" Class 2 – General construction areas
- ANSI/ISEA 107 Type "R" Class 3 – When exposed to traffic from public access Highway/Street right-of-way or Highway/Street Temporary Traffic Control Zones during nighttime activities

- High visibility vests must be rated for flame resistance where hot work processes may negatively impact the vest or the wearer's safety

Additionally, the selection of Apparel color shall be in accordance with **Table 1** for the specific activity performed.

Table 1. Appropriate Apparel

Personnel	Apparel Color
Safety Watches: • Fire Watch • Confined Space Attendant	Orange
Personnel Directing Crane Equipment: • Signalman (crane), Bellman	Red
Excavation and Backfill Personnel (Personnel working within an excavation area where heavy equipment is operating)	Yellow/Lime Green
Personnel as directed by the Site Manager and ES&H Manager (e.g., K-31, Laydown 2, Alpha/Bravo/Charlie Area)	Yellow/Lime Green

3.1.11 Body Protection

Specific body protection/clothing may be required for specialized work tasks. The JHA will identify the specific body protection/clothing required.

3.1.11.1 Welding and Associated Hot Work Activities

Clothing shall be selected to minimize the potential for ignition, burning, entrapment of hot sparks, or electric shock. Personnel performing welding and associated hot work activities shall:

- Wear a shirt, jacket, or equivalent that meets the requirements of hazard risk Category 2 (in accordance with NFPA 2112, *Standard on Flame-Resistant Clothing for Protection of Industrial Personnel Against Short-Duration Thermal Exposures from Fire*)
- Wear pants/trousers made from heavier materials (e.g., heavy cotton, denim) that overlap footwear to prevent spatter from entering
- Keep sleeves and collars buttoned
- Wear clothing that is free from pockets, hoods, or cuffs that can trap sparks or slag

NOTE: *Pockets that are covered or equipped with closeable flaps are acceptable.*

For heavy work (e.g., Carbon Arc Cutting over 500Amps, Oxyfuel Gas Weld over 1/2" plate), flame-resistant leggings or other equivalent means shall be used to give added protection to the legs, when necessary.

Cape sleeves or shoulder covers with bibs made of leather or other flame-resistant material shall be worn during overhead welding, cutting, or other operations, when necessary.

Additional evaluation of hot work PPE will be performed during the hot work permit process and pre-job/FLHA card briefing.

4.0 RECORDS

None

5.0 REFERENCES

5.1 Source References

10 Code of Federal Regulations (CFR) 851, *Worker Safety and Health Program*

29 CFR 1926, *Safety and Health Regulations for Construction,* Subpart E*, Personal Protective and Life Saving Equipment*

Bechtel Corporation, ES&H Core Process 2HI H030 00205, *Personal Protective Equipment*

Bechtel Corporation, ES&H Procedure 2HO E0S0 00001, *Hand Protection*

U.S. Department of Transportation, *Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD) 2009*

NFPA 70E, *Standard for Electrical Safety in the Workplace®*

UPF-CP-200, *UPF General Safe Work Practices*

UPF-CP-227, *UPF Safety Watches*

Y73-95-802, *Confined Space Entry Program*

5.2 Interfacing References

ANSI Z49.1-2021, *Safety in Welding, Cutting, and Allied Processes*

ANSI/ISEA 105-2016, *American National Standard for Hand Protection Classification*

ANSI/ISEA 107-2004, *American National Standard for High-Visibility Apparel and Headwear*

ANSI/ISEA Z87.1-2020, *American National Standard for Occupation and Educational Personal Eye and Face Protection Devices*

ANSI/ISEA Z89.1-2014 (R2019), *American National Standard for Industrial Head Protection*

ASTM F2413-18, *Standard Specification for Performance Requirements for Protective (Safety) Toe Cap Footwear*

E-POL-0050, *Standards of Conduct and Appearance*

European Standard EN 388:2003, *Protective Gloves Against Mechanical Risks*

ML-SH-801768-A002, *Eye and Face Protection List*

ML-SH-801768-A003, *UPF Glove Matrix*

NFPA 2112, *Standard on Flame-Resistant Clothing for Protection of Industrial Personnel Against Short-Duration Thermal Exposures from Fire*

UPF-CP-312, *Hearing Conservation Program*

UPF-CP-318, *Respirator Use and Issuance*

UPF-MANUAL-CM-001, *Uranium Processing Facility Construction Electrical Safety Manual*

UPF-MANUAL-SH-A001, *UPF Elevated Work Manual*

Y17-95-64-823, *UPF Field Level Hazard Assessment/Job Hazard Analysis Program (FLHA/JHA) Process*

5.3 Forms

CFN-1158, *Job Hazard Analysis*

6.0 SUPPLEMENTAL INFORMATION

Appendix A, *Acronyms and Definitions*

Appendix B, *Guide for Shade Numbers in Welding*

APPENDIX A
Acronyms and Definitions

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Acronyms

ANSI - American National Standards Institute 5
ASTM - American Society for Testing and Materials 5
BNI - Bechtel National, Inc. 4
ES&H - Environmental, Safety, and Health 4
FLHA - Field Level Hazard Assessment 8
ISEA - International Safety Equipment Association 7
NFPA - National Fire Protection Association 5
NIOSH - National Institute for Occupational Safety and Health 5
PPE - Personal Protective Equipment 4
UL - UL Research Laboratories 6
UPF - Uranium Processing Facility 4

Definitions

Apparel	Clothing worn to cover the body and extremities, including shirts, pants, jackets, raincoats, etc.
Construction/Warehousing Support Facilities	Offices and break areas directly supporting construction or warehousing activities, but where physical work is not being performed (e.g., Construction Support Building, On-boarding Center, craft break trailers, warehouse support trailers).
Flagger	A person who actively controls the flow of vehicular traffic in to and/or through public access Highways, Street right-of-way or Highway/Street Temporary Traffic Control Zones using hand-signaling devices.
Highway	A general term for denoting a public way for purposes of vehicular travel, including the entire area within the right-of-way.
Job Hazard Analysis (JHA)	A tool used to document workplace activities and related hazards and controls.
Personal Protective Equipment	Safety devices or garments used to protect workers from injury or exposure resulting from contact with chemical, biological, physical, or workplace hazards.
Photochromic Glasses	Eyeglass lenses that darken automatically when exposed to sunlight and then fade back when returning indoors.

APPENDIX A
Acronyms and Definitions

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Street	Refer to definition for Highway
Temporary Traffic Control Zone	An area of a Highway where road user conditions are changed, because of a work zone or incident, by the use of temporary traffic control devices, flaggers, uniformed law enforcement officers, or other authorized personnel.

APPENDIX B
Guide for Shade Numbers in Welding

ANSI Z49.1:2012

Table 1
Guide for Shade Numbers
(from AWS F2.2:2001(R2010), *Lens Shade Selector*)
Shade numbers are given as a guide only and may be varied to suit individual needs.

Process	Electrode Size in (mm)	Arc Current (Amperes)	Minimum Protective Shade	Suggested[a] Shade No. (Comfort)
Shielded Metal Arc Welding (SMAW)	Less than 3/32 (2.4)	Less than 60	7	—
	3/32–5/32 (2.4–4.0)	60–160	8	10
	5/32–1/4 (4.0–6.4)	160–250	10	12
	More than 1/4 (6.4)	250–550	11	14
Gas Metal Arc Welding (GMAW) and Flux Cored Arc Welding (FCAW)		Less than 60	7	—
		60–160	10	11
		160–250	10	12
		250–500	10	14
Gas Tungsten Arc Welding (GTAW)		Less than 50	8	10
		50–150	8	12
		150–500	10	14
Air Carbon Arc (Light) Cutting (CAC-A) (Heavy)		Less than 500	10	12
		500–1000	11	14
Plasma Arc Welding (PAW)		Less than 20	6	6 to 8
		20–100	8	10
		100–400	10	12
		400–800	11	14
Plasma Arc Cutting (PAC)		Less than 20	4	4
		20–40	5	5
		40–60	6	6
		60–80	8	8
		80–300	8	9
		300–400	9	12
		400–800	10	14
Torch Brazing (TB)		—	—	3 or 4
Torch Soldering (TS)		—	—	2
Carbon Arc Welding (CAW)		—	—	14

	Plate Thickness		Suggested[a] Shade No. (Comfort)
	in	mm	
Oxyfuel Gas Welding (OFW)			
Light	Under 1/8	Under 3	4 or 5
Medium	1/8 to 1/2	3 to 13	5 or 6
Heavy	Over 1/2	Over 13	6 or 8
Oxygen Cutting (OC)			
Light	Under 1	Under 25	3 or 4
Medium	1 to 6	25 to 150	4 or 5
Heavy	Over 6	Over 150	5 or 6

[a] As a rule of thumb, start with a shade that is too dark to see the weld zone. Then go to a lighter shade which gives sufficient view of the weld zone without going below the minimum. In oxyfuel gas welding, cutting, or brazing where the torch and/or the flux produces a high yellow light, it is desirable to use a filter lens that absorbs the yellow or sodium line of the visible light spectrum.