Document Revision Change Table

Revision Number	Revision Description	Revised By	Revision Date
New			
Review	Procedure Reviewed. No Changes	G. Dawson	4/13/17
Review	Procedure Reviewed. No Changes	G. Dawson	11/12/20

1. PURPOSE

The purpose of this procedure is to ensure that all work activities associated with metal welding, thermal cutting, and grinding meet the respiratory protection and ventilation requirements of all applicable OSHA Standards.

2. DEFINITIONS

2.1. APR

Air-purifying respirator.

2.2. ASR

Air-supplied respirator

2.3. Assigned Protection Factor

Assigned protection factors (APFs) are numbers that indicate the level of workplace respiratory protection that a respirator or class of respirators is expected to provide to employees when used as part of an effective respiratory protection program.

Typical APFs for common types of respirators are shown below. Check with the respirator manufacturer to verify the APF for a specific respirator.

Type of Respirator	½ Facepiece	Full Facepiece	Helmet or Hood
Air-Purifying Respirator (APR)	10	50	N/A
Powered Air-Purifying Respirator (PAPR)	50	1,000	25 to 1,000
Air-Supplied Respirator (ASR) – Continuous Flow Mode	50	1,000	25 to 1,000
ASR – Pressure-Demand Mode	50	1,000	N/A
Self-Contained Breathing Apparatus (SCBA) – Pressure-Demand Mode	N/A	10,000	10,000

2.4. Authorized Person

Any person specifically authorized by the employer whose duties require the person to enter a regulated area.

2.5. Employee Exposure

Employee exposure to airborne metal fumes, which would occur if the employee were not wearing respiratory protective equipment.

2.6. GMAW

Gas metal arc welding. Also known as metal inert gas (MIG) welding or metal active gas (MAG) welding.

2.7. GTAW

Gas tungsten arc welding. Also known as tungsten inert gas (TIG) welding or heliarc welding

2.8. Grinding – Incidental vs. Non-Incidental

Non-incidental grinding is grinding that is performed by one worker during one work shift and is performed for 4 hours or more. "Incidental" grinding is the periodic grinding that is performed as part of a welding or thermal cutting task.

2.9. Historical Monitoring Data

Industrial hygiene monitoring data obtained during work operations conducted under workplace conditions closely resembling the processes, types of material, control methods, work practices, and environmental conditions that are in the current operations. (OSHA definition)

2.10. Objective Data

Industrial hygiene monitoring data from industry-wide surveys or calculations based on the composition or chemical and physical properties of a substance demonstrating the employee exposure to metal fumes associated with a particular product or material or a specific process, operation, or activity. The data must reflect workplace conditions closely resembling the processes, types of material, control methods, work practices, and environmental conditions that are in the current operations.

2.11. Permissible Exposure Limit (PEL)

The airborne concentration of a metal fume, usually expressed in milligrams per cubic meter of air, established and enforced by the Occupational Safety and Health Administration.

2.12. PAC

Plasma arc cutting.

2.13. Poorly Ventilated Area

Includes, but is not limited to, (1) a space of less than 10,000 cubic feet per welder, (2) a room having a ceiling height of less than 16 feet, (3) a space where partitions, balconies, or other structural barriers significantly obstruct cross ventilation.

2.14. Regulated Area

Any area, demarcated by the employer, where airborne concentrations of metal fumes exceed or can reasonably be expected to exceed, the permissible exposure limit(s).

2.15. SMAW

Shielded metal arc welding. Also known as manual metal arc (MMA) welding or stick welding.

3. SCOPE

This procedure applies to work performed by Maintenance, Instrument, Electrical, Operations, or Contract personnel in plant areas where the potential for metal fume exposure exists. This includes, but is not limited to, metal welding, thermal cutting, and grinding.

This procedure applies to the respiratory protection and ventilation controls that may be needed to control employee exposure to below the permissible exposure limits for metal fumes.

There are other safety and health issues associated with metal welding, thermal cutting, and grinding operations that are not addressed by this procedure and which may require additional control measures. These other issues include, but are not limited to, hot work, confined space entry, hearing conservation, non-ionizing radiation (UV light), and lifting.

4. REQUIREMENTS

4.1. General

4.1.1. When work permits are issued for metal welding, thermal cutting, and/or grinding operations, the Permit Acceptor (contractor or BASF employee) is responsible for knowing and using the correct respiratory protection and ventilation required by this procedure. The Permit Issuer is responsible for advising the Permit Acceptor of area and process-related hazards, if any, associated with the task.

4.1.2. Attachment A contains the detailed requirements for respiratory protection and for ventilation for metal welding, thermal cutting, and grinding operations for various base metals, welding/cutting methods, and environmental conditions.

4.1.3. Attachment B is a form to request variances from the requirements found in Attachment A.

NOTE: Compressed oxygen shall never be used to provide ventilation for any metal welding, thermal cutting, or grinding operations.

4.2. Additional Requirements for Operations Using Fluorine Compounds

4.2.1. Manufacturers of brazing and gas welding fluxes that contain fluorine compounds must label their products with warnings and cautions. Employees and contractors shall read and comply with all manufacturers' instructions and warnings.

4.2.2. Air-supplied respirators and Procedure A (as shown in Attachment A) are required for all tasks that involve welding or cutting in confined spaces with fluxes, coverings, or other materials that contain fluorine compounds. Respiratory protection is required for all confined space entrants. The hole watch (attendant) and other workers outside of the confined space may or may not need the same level of protection depending on their location relative to the location where fumes or particles are being generated, relative to the ventilation system exhaust air, and/or other factors.

4.2.3. For tasks that involve welding or cutting outside of confined spaces with fluxes, coverings, or other materials that contain fluorine compounds, notify the site EHS team member for additional respirator requirements.

4.3. Additional Requirements for Operations Using Zinc-Bearing Materials

4.3.1. Air-supplied respirators and Procedure A (as shown in Attachment A) are required for all tasks that involve welding or cutting in confined spaces with zinc-bearing base or filler metals or metals coated with zinc-bearing materials (e.g., galvanizing). Respiratory protection is required for all confined space entrants. The hole watch (attendant) and other workers outside of the confined space may or may not need the same level of protection depending on their location relative to the location where fumes or particles are being generated, relative to the ventilation system exhaust air, and/or other factors.

4.3.2. For tasks that involve welding or cutting indoors with zinc-bearing base or filler metals or metals coated with zinc-bearing materials (e.g., galvanizing), local exhaust hoods or booths shall be used. The required flow velocity is 100 linear feet per minute in the zone of welding and in a direction away from the welder. If local exhaust hoods or booths are not available, then respiratory protection shall be required. (Ref: OSHA 1910.252(c)(6)(ii))

4.4. Additional Requirements for Operations Using Lead-Based Materials

4.4.1. Air-supplied respirators and Procedure A (as shown in Attachment A) are required for all tasks that involve welding or cutting in confined spaces with lead-base metals. Respiratory protection is required for all confined space entrants. The hole watch (attendant) and other workers outside of the confined space may or may not need the same level of protection depending on their location relative to the location where fumes or particles are being generated, relative to the ventilation system exhaust air, and/or other factors.

4.4.2. For tasks that involve welding or cutting indoors with lead-base metals, local exhaust hoods or booths shall be used. The required flow velocity is 100 linear feet per minute in the zone of welding and in a direction away from the welder.

4.4.3. Additional requirements for working with lead are found in 29 CFR 1910.1025 and 1926.62.

4.5. Additional Requirements for Operations Using Beryllium-Containing Materials

4.5.1. Welding or cutting indoors, outdoors, or in confined spaces involving beryllium-containing base or filler metals shall be done using local exhaust ventilation and airline respirators unless atmospheric tests under the most adverse conditions have established that the workers' exposure is within the acceptable occupational exposure limits.

4.5.2. In all cases, workers in the immediate vicinity of the welding or cutting operations shall be protected as necessary by local exhaust ventilation or airline respirators.

4.6. Additional Requirements for Operations Using Cadmium-Bearing Materials

4.6.1. In confined spaces or indoors, welding or cutting operations involving cadmium-bearing or cadmium-coated base metals must be done using local exhaust ventilation or airline respirators unless atmospheric tests under the most adverse conditions show that employee exposure is within the acceptable occupational exposure limits.

4.6.2. Such operations, when done outdoors, must be done using respiratory protection. Contact the site EHS team member for respirator recommendations.

4.6.3. Additional requirements for working with cadmium are found in 29 CFR 1926.1127.

4.7. Additional Requirements for Operations Using Mercury-Bearing Materials

4.7.1. In confined spaces or indoors, welding or cutting operations involving metals coated with mercury-bearing materials, including paint, must be done using local exhaust ventilation or airline respirators unless atmospheric tests under the most adverse conditions show that employee exposure is within the acceptable occupational exposure limits.

4.7.2. Such operations, when done outdoors, must be done using respiratory protection. Contact the site EHS team member for respirator recommendations.

4.8. Additional Requirements for Operations Using Cleaning Compounds

4.8.1. Degreasing and other cleaning operations involving chlorinated hydrocarbons shall be so located that no vapors from these operations will reach or be drawn into the atmosphere surrounding any welding operation.

4.8.2. Trichloroethylene and perchlorethylene should be kept out of atmospheres penetrated by the ultraviolet radiation of gas-shielded welding operations.

4.9. Additional Requirements for Operations Using Stainless Steel Materials

See Beaumont Site Procedure BMEHS-002.030 - Hexavalent Chromium Operations

5. RESPONSIBILITIES

5.1. Site Leadership Team

Has primary responsibility for implementation of this procedure.

5.2. Health and Safety Team Leader

Has primary responsibility for the initiation, re-issuance, administration, and/or interpretation of this procedure.

5.3. Employees and Contractors

Have primary responsibility for adherence to procedure including identifying deficiencies in the procedure, and identifying, reporting and correcting activities not in compliance with the procedure.

Employees and contractors who perform metal cutting, welding, and grinding operations are responsible for knowing and using the correct respiratory protection and ventilation required by this procedure.

6. RELATED DOCUMENTS

OSHA 29 CFR 1910.1026 and 1926.1126 – Chromium (VI)
OSHA 29 CFR 1910.141 – Sanitation
OSHA 29 CFR 1910.252 – Welding, Cutting, and Brazing-General Requirements
OSHA 29 CFR 1926.353 – Ventilation and Protection in Welding, Cutting, and Heating
OSHA 29 CFR 1926.1127 – Cadmium
OSHA 29 CFR 1910.1025 and 1926.62 – Lead
Beaumont Site Procedure BMEHS-002.030 - Hexavalent Chromium Compliance
Beaumont Site Procedure BMEHS-002.032 - Respiratory Protection

CONTROLLED DOCUMENT- 24 HRS FROM 9/13/2021 10:41 AM
-- UNCONTROLLED THEREAFTER –
Internal

Attachment A

Minimum Respiratory Protection Requirements for Metal Cutting, Welding, Grinding Operations

Attachment B

Variance Request Form