

# Bauman Machine Inc.

## Welding, Cutting & Brazing

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### **Purpose**

The welding, cutting, and brazing processes expose workers to a variety of hazards including; burns, fire, eye damage, possible lung irritation and damage, electric shock, slips and falls. Bauman Machine Inc. recognizes these hazards, and has developed this program to help ensure the health, and well being of their employees. Numerous injuries and deaths occur each year from the hazards associated with welding, cutting, and brazing operations in the American workplace. Most of these injuries and deaths are preventable. By implementing this program, the company has intentions of eliminating problems associated with injuries, and death.

### **Responsibilities**

Bauman Machine Inc. will be responsible for all phases of the Welding, Cutting, and Brazing Plan. Through close supervision, and inspections, the company will monitor the provisions, and procedures described in the plan. Any changes in job descriptions, or any new regulations from OSHA may warrant this plan to be modified, and will be done so accordingly.

### **Fire Prevention and Protection**

Fire and explosion pose a serious risk to our employees during welding, cutting, and brazing operations. Sparks can travel as much as 35 feet and spatter can bounce on the floor or fall through openings creating hazards in other work areas of our facility.

### **Basic Safety Precautions**

The below listed basic safety precautions will be followed by company employee's performing welding, cutting, and brazing operations. The basic precautions for fire prevention in welding or cutting work are:

- Fire hazards. If the object to be welded or cut cannot readily be moved, all movable fire hazards in the vicinity shall be taken to a safe place.
- Guards. If the object to be welded or cut cannot be moved and if all the fire hazards cannot be removed, then guards shall be used to confine the heat, sparks, and slag, and to protect the immovable fire hazards.
- Restrictions. If the requirements stated in the above paragraphs cannot be followed then welding and cutting shall not be performed.

### **Fire Extinguishers**

Suitable fire extinguishing equipment shall be maintained in a state of readiness for instant use. Such equipment may consist of pails of water, buckets of sand, hose or portable extinguishers depending upon the nature and quantity of the combustible material exposed.

## **Fire Watch**

Fire watchers shall be required whenever welding or cutting is performed in locations where other than a minor fire might develop, or any of the following conditions exist:

- Appreciable combustible material, in building construction or contents, closer than 35 feet (10.7 m) to the point of operation.
- Appreciable combustibles are more than 35 feet (10.7 m) away but are easily ignited by sparks.
- Wall or floor openings within a 35 foot (10.7 m) radius expose combustible material in adjacent areas including concealed spaces in walls or floors.
- Combustible materials are adjacent to the opposite side of metal partitions, walls, ceilings, or roofs and are likely to be ignited by conduction or radiation.
- Fire watchers shall have fire extinguishing equipment readily available and be trained in its use. They shall be familiar with facilities for sounding an alarm in the event of a fire. They shall watch for fires in all exposed areas, try to extinguish them only when obviously within the capacity of the equipment available, or otherwise sound the alarm. A fire watch shall be maintained for at least a half hour after completion of welding or cutting operations to detect and extinguish possible smoldering fires.

## **Authorization System**

Authorization. Before cutting or welding is permitted, the area shall be inspected by the individual responsible for authorizing cutting and welding

## **Protection of Personnel**

Welding cables. Employees shall place welding cables and other equipment so that it is clear of passageways, ladders, and stairways.

Eye protection. Helmets or hand shields shall be used during all arc welding or arc cutting operations, excluding submerged arc welding. Helpers or attendants shall be provided with proper eye protection. Goggles or other suitable eye protection shall be used during all gas welding or oxygen cutting operations. Spectacles without side shields, with suitable filter lenses are permitted for use during gas welding operations on light work, for torch brazing or for inspection. All operators and attendants of resistance welding or resistance brazing equipment shall use transparent face shields or goggles, depending on the particular job, to protect their faces or eyes, as required. Eye protection in the form of suitable goggles shall be provided where needed for brazing operations.

Helmets and hand shields shall be made of a material which is an insulator for heat and electricity. Helmets, shields and goggles shall be not readily flammable and shall be capable of withstanding sterilization. Helmets and hand shields shall be arranged to protect the face, neck and ears from direct radiant energy from the arc. Helmets shall be provided with filter plates and cover plates designed for easy removal. All parts shall be constructed of a material which will not readily corrode or discolor the skin.

Goggles shall be ventilated to prevent fogging of the lenses as much as practicable.

All glass for lenses shall be tempered, substantially free from striae, air bubbles, waves and other flaws. Except when a lens is ground to provide proper optical correction for defective vision, the front and rear surfaces of lenses and windows shall be smooth and parallel. Lenses shall bear some permanent distinctive marking by which the source and shade may be readily identified.

The following is a guide for the selection of the proper shade numbers. These recommendations may be varied to suit the individual's needs.

<b>Welding Operation</b>	<b>Shade No.</b>
Shielded metal-arc welding: 1/16-, 3/32-, 1/8-, 5/32-inch electrodes	10
Gas-shielded arc welding (nonferrous): 1/16-, 3/32-, 1/8-, 5/32-inch electrodes	11
Gas-shielded arc welding (ferrous) 1/16-, 3/32-, 1/8-, 5/32-inch electrodes	12
Shielded metal-arc welding: 3/16-, 7/32-, 1/4-inch electrodes	12
5/16-, 3/8-inch 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, 6 inches and over:	5 or 6
Gas welding (light) up to 1/8 inch:	4 or 5
Gas welding (medium) 1/8 inch to 1/2 inch:	5 or 6
Gas welding (heavy) 1/2 inch and over:	6 or 8

Note: In gas welding or oxygen cutting where the torch produces a high yellow light, it is desirable to use a filter or lens that absorbs the yellow or sodium line in the visible light of the operation. All filter lenses and plates purchased by this company shall meet the test for transmission of radiant energy prescribed in ANSI Z87.1--1968--American National Standard Practice for Occupational and Educational Eye and Face Protection.

## **Training**

Types of training. Supervisors will determine whether training required for specific jobs will be conducted in a classroom or on-the-job. The degree of training provided shall be determined by the complexity of the welding, brazing, or cutting requirements of the individual job and the associated hazards.

Initial Training. Prior to job assignment, this employer shall provide training to ensure that the hazards associated with welding, brazing, and cutting operations are understood by employees and that the knowledge and skills required for the safe application, usage, of work place equipment, are acquired by employees. The training shall include the following:

- Each authorized employee shall receive training in the recognition of applicable hazards involved with particular job. The methods and means necessary for safe work.
- All other employees whose work operations are or may be in an area where welding, brazing, or cutting is to be performed, shall be instructed about the procedure, and about the prohibitions relating to working in that area.
- Retraining shall be provided for all authorized and affected employees whenever there is a change in their job assignments, a change in welding equipment, equipment or processes that present a new hazard, when their work takes them into hazardous areas, or when there is a change in the confined space entry procedures (when used).
- Additional retraining shall also be conducted whenever a periodic inspection reveals, or whenever this employer has reason to believe, that there are deviations from or inadequacies in the employee's knowledge of known hazards, or use of equipment or procedures.
- The retraining shall reestablish employee proficiency and introduce new equipment, or revised control methods and procedures, as necessary.
- This employer shall certify that employee training has been accomplished and is being kept up to date. The certification shall contain a synopsis of the training conducted, each employee's name, and dates of training.

### **Selection and Use of Work Practices**

Supervisors shall develop and ensure use of standardized safety-related work practices to prevent injuries resulting from hot-work accidents. The specific safety-related work practices shall be consistent with the nature and extent of the associated hot-work hazards.

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