

P. C. Campana, Inc.
Caldo, Lance Pipe & Burning Bar

EXOTHERMIC CUTTING RODS (individually and collectively , the “System”)

READ ALL SAFETY INFORMATION BEFORE USING

ALL CUTTING OPERATIONS SHALL BE PERFORMED PURSUANT TO O.S.H.A .29 CFR, STANDARDS 1910.251, 1919.252 AND 1910. 253 AND ANSI Z49.1:1999. SEE PAGE 2 FOR ANSI Z 49 SAFETY CLOTHING REQUIREMENTS. All company safety policies and the safety policies of the company where cutting is being performed, and all local regulations shall, at all times, be strictly observed.

SAFETY: ALL SAFETY INFORMATION MUST BE READ BEFORE USING THE SYSTEM

1. **DO NOT OPERATE THE SYSTEM WITHOUT WEARING APPROVED FIRE RESISTANT CLOTHING. SEE PAGE 2.**
2. **USE ONLY PURE OXYGEN WITH THE SYSTEM. NO OTHER GAS IS PERMITTED OR REQUIRED.**
3. Inspect all System rods, holders, and oxygen hose for contamination from oil, grease, or any other substances that could cause a reaction with pure oxygen. **DO NOT USE CONTAMINATED EQUIPMENT.**
4. Check all parts of the System for leaks. **DO NOT USE THE SYSTEM IF ANY LEAKS ARE PRESENT.**
5. Remove all combustible materials from work area or move work to an area free of combustibles. If the work cannot be moved or the fire hazard cannot be removed, use a guard or shield to confine heat, sparks, and hot slag from causing a fire. Provide a fire watch and insure that adequate and approved fire extinguishers are available.
6. Insure that material to be cut contains no flammable or explosive material.
7. Insure that material to be cut contains no substances that will create harmful fumes and/or explosive vapors.
8. Provide fresh air breathing equipment and ventilation where dangerous smoke and fumes may be created.
9. **NEVER USE OXYGEN FOR A BREATHING SUPPLY – USE ONLY APPROVED COMPRESSED AIR**

SINGLE LIQUID OXYGEN CONTAINERS MAY NOT SUPPLY THE REQUIRED VOLUME OF OXYGEN. IT MAY BE NECESSARY TO ADD AN EXTERNAL VAPORIZER OR MANIFOLD TWO (2) LIQUID OXYGEN CONTAINERS TOGETHER. A SINGLE LIQUID OXYGEN TANK WILL SUPPLY 350 TO 400 CFH. CONTINUOUS CUTTING WITH THE SYSTEM CAN USE IN EXCESS OF 500 CFH.

STORAGE AND HANDLING:

WARNING: EXPLOSIONS OR FIRE MAY OCCUR WHEN OXYGEN CONTACTS CERTAIN SUBSTANCES.

The System is always cleaned for Oxygen Service. and the System related equipment must be handled and stored so that they are protected from **contamination from oil, grease, or any other substance that may have a reaction with Oxygen.** NEVER use the System or any cutting System rods, holders, or oxygen hoses that have been contaminated.

EQUIPMENT REQUIRED

1. **FIRE RESISTANT PROTECTIVE CLOTHING, APPROVED FOR FLAME CUTTING OPERATIONS, (SEE PAGE 2).**
 2. **Eye protection shall be a full-face shield and safety goggles (See Page 2 for ANSI Z49 requirements)**
 3. System Holder and System Cutting Rods
 4. High Flow Oxygen Regulator (One regulator per holder).
 5. Oxygen system capable of supplying required **VOLUME** and **PRESSURE** for the size rods being used.
 6. Oxygen lance hose. Hose I.D. is dependent on length of hose and diameter of the System rod being used. The minimum recommended hose diameter is 5/16” I.D. Use 3/8” I.D. for lengths over 100 feet long.
 7. Ignition source for igniting System Rods. (12/24 volt battery, welding machine or Pug Tube Igniter).
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EQUIPMENT SETUP

1. Place Oxygen Cylinders in a location protected from heat, sparks, and hot slag. Insure that oxygen cylinders are secured so they cannot be turned over or damaged by other equipment operating in the area.
2. Route oxygen hose and welding leads to protect them from heat, sparks, and hot slag from the burning operation. Insure oxygen hose and welding leads do not create a trip hazard. Insure hose and leads are protected from damage by other equipment operating in the area. Use an oxygen hose long enough to keep the cutting operation at a safe distance from oxygen cylinders.

3. Attach Regulator and Oxygen hose. Turn on oxygen and check system and control valve for leaks. **DO NOT OPERATE IF THERE ARE ANY OXYGEN LEAKS.** Attach welding leads to power source.

WARNING: DO NOT PERFORM ANY CUTTING OPERATIONS WITHOUT FIRST READING ALL SAFETY MATERIAL ENCLOSED AND REVIEWING ALL RELEVANT OSHA AND ANSI REQUIREMENTS

Note that the following information on Safety Clothing and Safety in Welding, Cutting and Allied Processes is based on ANSI Z49.1:1999 and OSHA Standard 29 CFR. Portions of this information are reprinted with permission from ANSI/AWS. The complete ANSI Z49 standard is available from Global Engineering at (800)854-7179, or the American Welding Society, 550 N.W. Lejeune Rd., Miami, Florida 33126. For complete copies of OSHA 29 CFR 1910.251, 1910.252, and 1910.253 and all OSHA safety requirements can be downloaded from the World Wide Web at www.osha-slc.gov

EYE PROTECTION (ANSI Z49.1:1999 Page 6 PARAGRAPH 4.2.1.2)

OXY-FUEL GAS CUTTING: Approved goggles or other approved eye protection shall be worn during all oxygen-fuel gas cutting operations.

PROTECTIVE CLOTHING (Based on ANSI Z49.1:1999 PAGE 9 PARAGRAPH 4.3 TO PAGE 10 PARAGRAPH 4.6) TO REDUCE THE POTENTIAL OF PERSONAL INJURY, ALL UNDER GARMENTS SUCH AS WORK SHIRTS AND PANTS SHALL BE COVERED BY FLAME RESISTANT GARMENTS AND SHALL BE FREE OF GREASE AND OIL.

1. Clothing shall be selected to minimize the potential for ignition, burning, or trapping of hot sparks or slag.
2. Clothing shall provide sufficient coverage, and shall be made of suitable material to minimize skin burns caused by sparks, spatter or radiation.
3. **Gloves:** All System operators shall wear approved protective flame-resistant gloves. **DO NOT USE CLOTH OR THIN LEATHER GLOVES SUCH AS TIG WELDING OR GARDENING TYPE OF GLOVES.**
4. **Jackets:** Approved durable **flame-resistant** jackets shall be worn to protect the front of the body.
5. **Leggings:** Approved flame-resistant leggings or other equivalent means shall be used to give added protection to the legs.
6. **Capes and Sleeves:** Cape sleeves or shoulder covers with bibs made of leather or other flame-resistant material shall be worn during cutting operations.
7. **Other Protective Clothing:** Approved properly fitted flame-resistant plugs in the ear canals, or equivalent protection, shall be used where hazards to the ear canals exist. Caps made from flame resistant material shall be worn under helmets, when necessary, to prevent head burns.
8. **Noise Control:** Noise shall be controlled at the source when feasible. When control methods fail to bring noise exposure within allowable limits, approved personal protective devices such as earmuffs or earplugs shall be used.

Respiratory Protective Equipment: When controls such as ventilation fail to reduce contaminants to permissible levels or when, implementation of such controls are not feasible, approved respiratory protective equipment shall be used to protect personnel from hazardous concentrations of airborne contaminants.

1. Only approved respiratory protective equipment shall be used.
2. Whenever the use of respirators is required, a program to establish the proper selection and use of respirators shall be implemented.
3. Compressed air for air supplied respirators or other breathing equipment shall at least meet the Grade D requirements of the Compressed Gas Association ANSI/CGA-G-7.1, Commodity Specification for Air. **DO NOT USE OXYGEN FOR BREATHING AIR IN CUTTING AND WELDING APPLICATIONS.**

TRAINING: PERSONS PERFORMING CUTTING OPERATIONS SHALL BE TRAINED IN THE PROPER USE OF, AND UNDERSTAND THE REASONS FOR, PROTECTIVE CLOTHING, PROPER EQUIPMENT SET UP AND MAINTENANCE.

OPERATING INSTRUCTIONS

1. Purge hose and holder prior to putting System rod in holder. With holder pointed in a safe direction, slowly crack open oxygen valve and purge hose and holder. Insure full flow with no restrictions.
2. Adjust Oxygen pressure according to thickness of material to be cut and diameter of System rod being used.
3. System rods have a pressed crimp near the holder end. **CRIMPED** end of the System rod goes in the holder. **DO NOT OPERATE WITH WRONG END OF SYSTEM ROD IN HOLDER.**
4. Holders incorporate a brass collet and rubber grommet to seal the rods in the holder. Insert the **CRIMPED** end of System rod in the holder. **THE SYSTEM ROD MUST BE INSERTED THROUGH THE BRASS COLLET AND FULLY SEATED AGAINST THE RUBBER GROMMET.**
5. Tighten collet nut until brass collet is fully compressed and System rod is secured in holder.

6. Slowly depress oxygen valve to purge System rod and check for Oxygen leaks (**DO NOT IGNITE SYSTEM ROD WITH OXYGEN LEAKS**). Insure oxygen flows freely through System rod. **DO NOT ATTEMPT TO IGNITE THE SYSTEM ROD WITH RESTRICTED OXYGEN FLOW**. Release oxygen control valve completely prior to heating end of System rod.
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IGNITING SYSTEM RODS

Igniting System rods can be accomplished with one of the following three methods.

Igniting with a battery pack (12 or 24 volt) or welding machine (set at 125 amps). Polarity does not matter.

1. Secure System rod properly in holder
2. Point System rod in safe direction
3. Depress the oxygen control valve to purge the System rod. Release oxygen control valve.
4. Strike the tip of the System rod on the striker plate slowly depress Oxygen control valve.
5. As the System rod begins to burn remove from striker plate and move to material to be cut.

Igniting System Rods with an Oxy Acetylene or Propane torch

1. This method will require a helper to light and hold the Oxy Acetylene/ propane torch.
2. Light the Oxy Acetylene or Propane torch.
3. Hold the tip of the System rod in the torch flame until the tip is red hot and slightly molten.
4. Slowly depress the Oxygen control valve until System rod begins to burn on its own.
5. Remove the tip of the System rod from the flame and begin cutting operation.

IF SYSTEM ROD DOES NOT IGNITE

1. Check Oxygen flow to end of System rod, insure that the end of System rod is open.
2. Check Oxygen system for proper pressure and volume and that there are no leaks.
3. Correct problem and repeat ignition process, making sure the end of the System rod is properly heated.

Cutting can begin as soon as System rod is fully ignited. System rod can be extinguished at any time during cutting operation and can be re-ignited. Check oxygen flow prior to applying heat to the tip of partially burned System rod.

OXYGEN PRESSURE

Oxygen pressure will vary according to the material to be cut. Pressure range is from 30 psi to 150 psi. Preset the regulator to the proper pressure and ignite the System Rod. Adjust pressure with System rod burning and oxygen control valve full open. If adequate volume of oxygen is not available, pressure will drop and System rod will not burn properly. **DO NOT OPERATE THE SYSTEM RODS WITH LOW OXYGEN PRESSURE OR VOLUME.**

CUTTING WITH SYSTEM RODS

System Rods will rapidly cut most ferrous and non-ferrous metals, as well as concrete and refractory. The cutting speed will depend on the material type and its oxidation rate, or its melting temperature. Materials that do not oxidize have to be melted and blown away. Melting and blowing material away will require an increase in oxygen pressure.

CUTTING TECHNIQUES

For most applications, using the drag method of cutting with the tip of the System rod pointed back towards the cut will produce the fastest travel speed. Cutting techniques will vary according to the material, thickness, position and direction of cut i.e. flat, vertical, and horizontal. For cutting thick material, operator will need to hold the System rod nearly perpendicular to the cut and move the System rod in and out of the cut in a sawing motion.

For thin material, the System rod can be held at a steep angle to the cut and travel much faster. Operator will have to adjust the System Rod angle for optimum cutting speed.

For material such as concrete, refractory, and cast iron, the cutting method is to melt the material and then allow the oxygen pressure to blow the molten material away from the cut. Cutting this type of material will be slower than cutting carbon steel, stainless steel or aluminum and requires higher Oxygen pressure. **DO NOT EXCEED MAXIMUM PRESSURE OF 150 psi.**

SAFETY SUMMARY

1. **ALWAYS WEAR PROPER FIRE PROOF PROTECTIVE CLOTHING**
2. **ALWAYS WEAR PROPER EYE AND FACE PROTECTION**
3. **NEVER USE OXYGEN FOR BREATHING – USE ONLY APPROVED COMPRESSED AIR**
4. **ONLY USE PURE OXYGEN WITH SYSTEM RODS. DO NOT ATTEMPT TO USE AIR OR ANY OTHER GAS**
5. **NEVER OPERATE SYSTEM RODS WITH OXYGEN LEAKS ANYWHERE IN THE SYSTEM**
6. **NEVER OPERATE MORE THAN ONE HOLDER PER REGULATOR**
7. **NEVER OPERATE SYSTEM RODS IF REGULATOR AND HOSE ARE FREEZING UP**

8. **NEVER** OPERATE SYSTEM RODS ALONE. ALWAYS HAVE A FIRE WATCH OR SAFETY PERSON STANDING BY TO ASSIST OPERATOR
 9. **NEVER** STORE SYSTEM RODS OR RELATED EQUIPMENT WHERE IT CAN BECOME CONTAMINATED WITH OIL, GREASE OR OTHER SUBSTANCES THAT WILL REACT WITH OXYGEN
 10. **DO NOT** USE SYSTEM RODS OR EQUIPMENT THAT ARE CONTAMINATED
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