Loveland Fire Rescue Authority
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# BORCO TORCH OPERATIONS 1.1

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## TASK SKILL DESCRIPTION AND DETAIL

This heading includes information about the following:

- This guide is intended to create a basic knowledge for set up and operation of the Broco cutting system we use at LFRA.
- The tasks role would be Rescue.
- The tasks role in the tactical and strategic elements of an incident.
- How to do the task.

**Step 1:** Determine what torch is needed.

**Broco (Exothermic cutting system)**
**Basic Assembly Procedure.**

- **Assembly:**
  - Connect the oxygen regulator to the oxygen source.
  - Purge the regulator to remove debris by slightly opening the oxygen cylinder valve and turning the regulator knob clockwise until a small stream of gas escapes. Close the oxygen cylinder valve. (For preset regulators that have no adjustment knob, slightly open, then immediately close the oxygen cylinder valve to purge the regulator.)
  - Connect the oxygen hose to the regulator.
  - Slowly open the oxygen cylinder valve.
  - Adjust the oxygen regulator to between **10** and **80 psig**, depending on the target material and the type of work being performed.
  - Check all connections for oxygen leaks.

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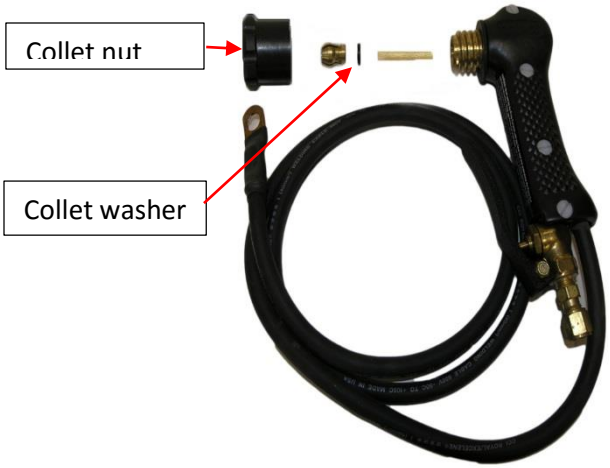
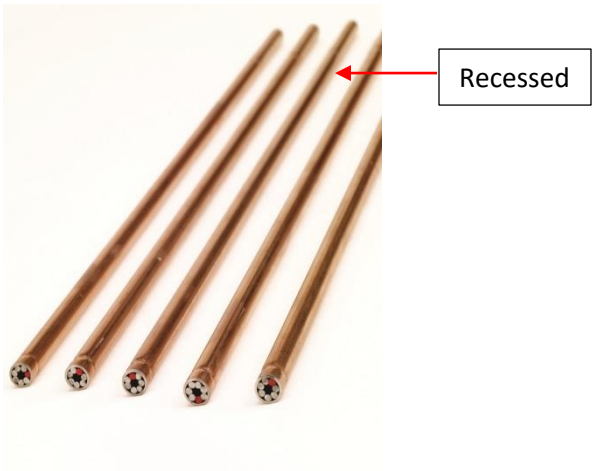
- **Battery:**
  - Charge a new battery before using.
  - Charge after each subsequent use.
  - The Broco battery will last up to 4 ignitions.
  - Batteries off vhieles may also be used with additional battery cables with this unit.

- **Cutting Rods:**
  - Check to see that the collet in the torch is the appropriate sized to properly fit the rod being used.
  - To replace collet:
    - Remove the collet nut and collet from the torch. Make sure the neoprene collet washer is in place. Insert the desired collet and replace the collet nut.
    - Loosen the collet nut 1/2 turn.
    - Insert the end of the rod that has the recessed internal rods into the collet until it is securely bottomed out on the collet washer. Tighten the collet nut to lock the rod in place.



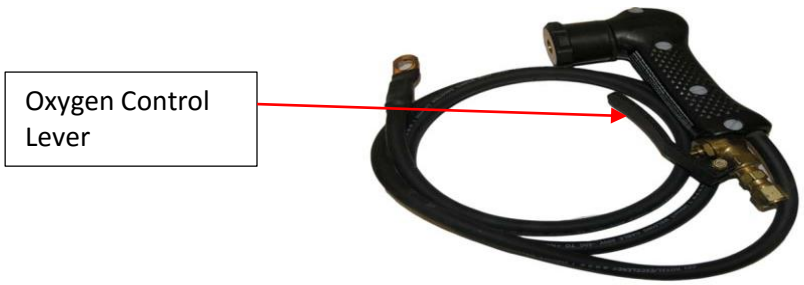




  - Check for oxygen leaks at the collet nut. If a leak exists:
    - Make sure the rod is firmly seared on the collet washer.
    - Inspect the rod for damage.
    - Inspect the collett washer for damage and replace if necessary.

- **Cutting Rod Ignition:**
  - Always hold the striker plate by the plastic handle to avoid electric shock. Never touch the copper plate.
  - Never touch or hold an ignited cutting rod.
  - Prolonged contact between the cutting rod and the striker plate can overheat the battery causing damage.

**Note: Vehicle battery cables**


  - Point the cutting rod away from your body. Never point the rod at bystanders.
  - Start the flow of oxygen by lightly squeezing the oxygen control lever on the torch.
  - Bring the striker plate into contact with the end of the rod.
  - While holding the rod at a 45°- 90° angle to the striker plate, slowly pull the rod across the striker plate surface.
  - Rod sparkling indicates ignition. Approximately 2-5 seconds of contact is required for ignition.
  - Maintain slight pressure on the oxygen lever to ensure complete ignition.
  - Lift the rod from the striker plate and bring it to the target material.
  - Place the striker plate in a safe location away from the work area.
  - Commence cutting, piercing or gouging according to the following directions.




- **Piercing:**

- With the oxygen lever slightly depressed (low oxygen flow), press the burning tip of the rod against the target material at a 90° angle, allowing it to melt a 1/4" deep hole.
- Insert the rod tip into the depression.
- Keeping the tip of the rod in the hole, increase the oxygen flow to increase penetration by slowly depressing the oxygen lever.
- As the target material melts and flows back out of the hole, move the rod in and out and around to enlarge the hole and allow the oxygen pressure to wash away molten material.
- Remove the rod from the hole before releasing the oxygen lever.
- When piercing is completed, release the oxygen control lever to extinguish the torch. The rod will continue to burn only as long as oxygen is supplied.
- Never touch a used rod, the target material or the work surface with a bare hand until it has cooled. Always wear welding gloves.
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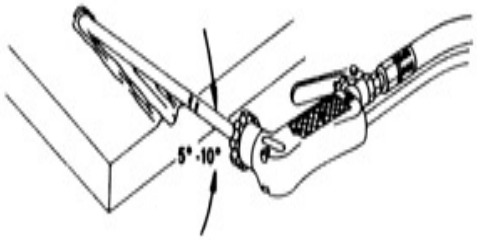
- **Suggestions:**
  - Set the oxygen regulator to 35 psig when starting piercing operations to avoid excessive blowback. When the penetration is approximately 2" deep, increase the oxygen pressure to 50 psig.

- **Cutting:**
  - Place the burning tip of the rod against the target material at a 45°-90° angle.
  - Increase the oxygen flow by slowly depressing the oxygen lever.
  - Keep the rod tip in the cut.
  - Pull the rod in the direction of the cut. Be sure that the molten material is blown forward through the cut and does not splash backwards towards the operator.
  - Complete the cut by making sure all the hangers are removed.
  - After completing the cut, release the oxygen control lever to extinguish the torch. The rod will continue to burn only as long as oxygen is supplied.
  - Never touch a used rod, the target material or the work surface with a bare hand until it has cooled. Always wear welding gloves.

- **Gouging:**
  - With the oxygen control lever slightly depressed (low oxygen flow), lay the rod flat on the work piece (5°-10° angle) with the burning tip of the rod against the target material.
  - Increase the oxygen flow by slowly depressing the oxygen lever.
  - The target material will puddle in approximately 1-2 seconds. Keep the rod at a very slight angle to the work piece and the tip of the rod in the puddle.
  - With the oxygen lever fully depressed, push the rod in the direction of the desired gouge.
  - When the gouge is complete, lift the rod tip from the target material.
  - Release the oxygen control lever to extinguish the torch. The rod will continue to burn only as long as oxygen is supplied.
  - Never touch a used rod, the target material or the work surface with a bare hand until it has cooled. Always wear welding gloves.




- **Shutdown:**
  - Close the oxygen cylinder valve.
  - Depress the oxygen control lever to relieve any pressure from the oxygen hose.
  - Turn the oxygen regulator adjustment knob counter-clockwise to take pressure off the diaphragm.
  - Disconnect the oxygen hose from the regulator and cap the open end of the hose.
  - Disconnect the torch and striker plate power cables from the battery.
  - Wipe down the torch assembly and striker plate assembly with a clean oil-free cloth.
  - Remove the collet nut, collet, collet washer, flash arrestor and flash arrestor screen and inspect for damage or wear. Clean and reassemble. Always replace any damaged or worn parts with factory replacement parts.
  - Always inspect the cables and hose for cuts, burns or any other signs of damage or wear.
  - Store the Prime-Cut torch in a clean dry place.
  - Charge the battery according to the manufacturer's instructions for the battery and battery charger being used.

- Counter-indications for completing the task if applicable?
    - Time it takes to perform the task.
    - Low battery.
    - Low O2.

## TASK SKILL INSTRUCTIONAL REQUIREMENTS AND IMPLEMENTATION

This heading includes information about the following:

- Associated PPE required for instructing the task?
    - Leather welders coat, SOT coveralls, Tech Gen, leather gloves, Cutting goggles.

- Evaluation criteria for observing knowledge, skills and abilities?
    - Basic knowledge of set up and operations.
    - Understand the different torch functions.
    - Understand fuel and oxygen supply.

- Safety criteria when preforming this task?
    - Site control.
    - Monitor the atmosphere before and during operations.
    - Situation/Hazard Evaluation.
    - Haz Mat concerns.
    - Proper PPE use, equipment in good working condition, and potential fire hazards.

## REFERENCE INFORMATION

This heading includes information about the following:

- NFPA 51B (Fire prevention during welding, cutting, and other hot work).
- National USAR Rescue FOG.
- OSHA 29 CFR 1910 Subpart Q (Welding, Cutting, and Brazing)