Loveland Fire Rescue Authority
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www.cityofloveland.org

PLASMA 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 three cutting systems we use at LFRA.
- Plasma Torch.
- 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.

Plasma Cutting system.
Basic Procedure.

- **Specifications (Cutting Capability):**
  - Rated: 3/8 in (10 mm).
  - Quality: 1/2 in (13 mm).
  - Sever: 5/8 in (16 mm).
- **Specifications Cont:**
  - Input Power 115 - 230 V 1 Phase.
  - Input Amperage Circuit Requirement, 120 volt, 20 amp (min.)
  - Compressor Requirement, 4.5 CFM (128 L/min.) at 90 PSI (621 kPa)

- **Setting-up**
  - To set-up a plasma arc cutter, simply hook-up the compressed air to the plasma cutting unit.
  - Choices of air available: backpack SCBA cylinder, confined space air manifold or a small air compressor, and the compressor on the Rescue 6.
  - To set the amperage, or heat, of the cutting unit to the proper level, make a few practice cuts with the amperage set high. You can then adjust the amperage down according to your travel speed. If the amperage is too high or your travel speed is too slow, the material you are cutting may become hot and accumulate dross (slag). Traveling at the right speed and using the right amount of heat will produce a very clean cut with less dross on the bottom of the cut, as well as little or no distortion to the metal.

  - Backpack SCBA cylinder set-up at **120 psi.**

  - Confined Space Air Manifold set-up at **120 psi.**

- **Plasma Cutting Tips:**
  - Connect work clamp to a clean, paint and rust free location on the metal work piece, as close to the cutting area as possible.
  - Set the air pressure to the factory recommended pressure for cutting (**90-120 psi**) **120 psi** works best.
  - For standard (shielded) cutting, place the drag shield on the edge of the metal. For non-shielded cutting, use 1/8 in (3.2mm) standoff distance (dragging a non shielded tip on the metal will reduce tip life).

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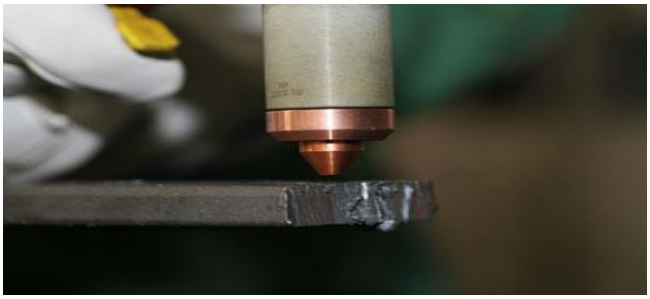
- **Plasma Cutting Tips cont:**
  - Raise trigger lock and press the trigger. The pilot arc will start. The pilot arc starts immediately when trigger is pressed.
  - Move the pilot arc into the metal being cut.
  - After the cutting arc starts, slowly start moving the torch across the metal.
  - Adjust the torch speed so sparks go thru the metal and out the bottom of the cut.
  - If sparks are being blown upward and back at the torch head, your speed is too excessive.
  - At the end of the cut, pause briefly before releasing the trigger to sever the work piece.
  - Post flow air continues for approximately 15 to 20 seconds after releasing the trigger. The cutting arc can be instantly restarted during post flow by raising the trigger lock and pressing the trigger.

Note: **120 psi.**

Tip. **Trigger, and Lock.** **Gun.**

- **Cutting:**
  - When non-shieled cutting use 1/8” standoff.



- **Cutting cont:**
  - When shielded cutting drag the tip.

- **Maximum Cutting Speeds:**
  - 20 Amps Output (110 v).
    - 16 ga (1.5 mm) 162 IPM (4115 mm/min).
    - 3/16 in (4.8 mm) 26 IPM (660 mm/min).
    - 1/4 in (6.4 mm) 18 IPM (457 mm/min).
    - 5/16 in (8 mm) 10 IPM (254 mm/min).
    - 3/8 in (9.5 mm) 7 IPM (178 mm/min).

- **Maximum Cutting Speeds cont:**
  - 27 Amps Output (220 v).
    - 16 ga (1.5 mm) 188 IPM (4775 mm/min).
    - 3/16 in (4.8 mm) 40 IPM (1016 mm/min).
    - 1/4 in (6.4 mm) 24 IPM (610 mm/min).
    - 3/8 in (9.5 mm) 14 IPM (256 mm/min).
    - 1/2 in (12.7 mm) 6 IPM (152 mm/min).

Note: This plasma cutter uses a lot of amps when in operation, you must use the generator off the apparatus. The portable generators we have will not run this cutter.

- Counter-indications for completing the task if applicable?
  - Time it takes to perform the task.
  - Inadequate power source

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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.
  - 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)