
Oxy-Acetylene Torch Setup, Leak Testing, and Shutdown

1.0 Objective & Intent

This SOP defines the mandatory safety protocols for the setup, leak testing, and shutdown of oxy-acetylene torch systems used in cabinet and millwork manufacturing. The primary objective is to prevent catastrophic gas explosions, flashback fires, and asphyxiation hazards by ensuring all connections are leak-free and the system is properly shut down after use. This procedure aligns with WorkSafeBC OHS Regulation Part 12 (Tools, Machinery and Equipment) and CSA W117.2 (Safety in Welding, Cutting, and Allied Processes).

2.0 Operational Scope

This procedure applies to all maintenance personnel, welders, and authorized operators who handle, connect, or operate oxy-acetylene torch equipment within the cabinet and millwork facility. It covers the initial setup of cylinders, regulator attachment, hose connection, torch assembly, leak testing using an approved leak detection solution, and the complete shutdown sequence. This SOP does not cover cutting or welding operations themselves, which are governed by a separate hot work permit procedure.

3.0 Hazard Identification & Mandatory PPE

- Explosion Hazard: Acetylene is highly unstable above 15 psi. Oxygen accelerates combustion. Leaks can create explosive atmospheres.
- Flashback Hazard: Improper setup or leaky connections can cause flame to travel back into hoses or regulators, leading to catastrophic failure.
- Asphyxiation Hazard: Acetylene and oxygen can displace air in confined spaces. Never use in unventilated areas.
- Burn Hazard: Torch tips and hot metal surfaces can cause severe burns. Contact with high-pressure gas streams can cause frostbite.
- CSA-Approved Welding Helmet with Shade 5 or darker filter lens
- CSA-Approved Safety Glasses with side shields (worn under helmet)
- Flame-Resistant (FR) Coveralls or welding jacket (100% cotton or treated fabric)
- Heavy-Duty Welding Gloves (gauntlet style, leather)
- CSA-Approved Steel Toed Boots with oil-resistant soles
- Hearing Protection (earplugs or earmuffs) if operating near other machinery

4.0 Required Safety Equipment & Tools

- Approved leak detection solution (e.g., Snoop or soapy water in a squeeze bottle) – never use a flame or match to test for leaks
- Oxygen and acetylene cylinder cart with chain restraints (secured upright at all times)
- Oxygen regulator (CGA 540 connection) and acetylene regulator (CGA 510 connection) – both with pressure gauges in good condition
- Dual-grade oxygen and acetylene hoses (red for acetylene, green for oxygen) with flashback arrestors installed at both regulator and torch ends

- Welding torch handle with separate oxygen and acetylene valves and mixing chamber
- Approved cutting or welding tip (clean and free of obstructions)
- T-handle wrench for cylinder valves (never use pliers or adjustable wrenches)
- Fire extinguisher (Class ABC, minimum 10 lb) within 30 feet of work area
- Hot work permit (if applicable per facility policy)

5.0 Step-by-Step Safety Procedure

1. Inspect the work area: Remove all combustible materials (wood dust, sawdust, solvents, rags) within a 35-foot radius. Ensure a fire extinguisher is accessible and a hot work permit is posted if required. Verify ventilation is adequate to prevent gas accumulation.
2. Inspect all equipment: Visually examine oxygen and acetylene cylinders for damage, dents, or leaks. Check regulator gauges for zero position (needle should rest at zero when no pressure is applied). Inspect hoses for cuts, abrasions, or bulges. Ensure flashback arrestors are installed and within their service date. Replace any defective components before proceeding.
3. Position and secure cylinders: Place cylinders upright on a dedicated cart and secure them with chains to prevent tipping. Ensure the acetylene cylinder valve is closed (turn clockwise to close) and the oxygen cylinder valve is closed. Remove protective caps only when cylinders are secured and ready for connection.
4. Attach regulators: Connect the oxygen regulator to the oxygen cylinder using the CGA 540 nut and tighten with the T-handle wrench. Connect the acetylene regulator to the acetylene cylinder using the CGA 510 nut and tighten. Do not overtighten. Ensure regulator pressure-adjusting screws are fully backed out (turned counterclockwise) before opening cylinder valves.
5. Connect hoses and torch: Attach the green oxygen hose from the regulator outlet to the oxygen inlet on the torch handle. Attach the red acetylene hose from the regulator outlet to the acetylene inlet on the torch handle. Ensure all connections are hand-tight plus a quarter turn with a wrench. Install the appropriate tip on the torch handle and tighten securely.
6. Perform leak test: Open the acetylene cylinder valve slowly (no more than one full turn) to pressurize the system. Immediately apply leak detection solution to all connections: cylinder valve outlet, regulator inlet and outlet, hose connections, torch handle inlets, and tip connection. Watch for bubbles indicating a leak. If a leak is found, close the cylinder valve, depressurize the system by opening the torch valve briefly, then tighten the connection and retest. Repeat for the oxygen side by opening the oxygen cylinder valve fully (until the valve stops turning). Do not use a flame to test for leaks.
7. Set working pressures: With both cylinder valves open and torch valves closed, turn the oxygen regulator adjusting screw clockwise until the working pressure gauge reads the required pressure for the tip size (typically 20-40 psi for cutting). Turn the acetylene regulator adjusting screw clockwise until the working pressure gauge reads no more than 15 psi (acetylene is unstable above 15 psi). Never exceed 15 psi for acetylene.
8. Light the torch (if required for operation): Open the acetylene torch valve slightly (1/4 turn) and ignite the gas immediately with a friction striker (never a lighter or match). Adjust the acetylene flow until the flame stops smoking. Then slowly open the oxygen torch valve and adjust to a neutral flame. If the torch pops or goes out, close both torch valves immediately and inspect the tip for blockages.
9. Shutdown sequence: When work is complete, close the acetylene torch valve first, then close the oxygen torch valve. This ensures any remaining gas in the hoses is consumed. Then close the acetylene cylinder valve tightly. Open the acetylene torch valve briefly to vent residual pressure from the hose, then close it. Repeat for the oxygen side: close the oxygen cylinder valve, open the oxygen torch valve to vent, then close it. Back out both regulator adjusting screws (turn counterclockwise) until they are loose.
10. Final inspection and storage: Verify all cylinder valves are closed and pressure gauges read zero. Disconnect hoses from regulators if the system will not be used again within 24 hours. Coil hoses loosely and store them away from oil, grease, and sharp edges. Replace protective caps on cylinders. Return cylinders to the designated storage area (upright, secured, away from combustibles). Complete the hot work permit sign-off and report any equipment defects to the safety supervisor.

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