OVERVIEW

Oxyacetylene welding, also known as oxy-fuel welding or gas welding, is a welding process that utilizes a mixture of oxygen and acetylene gases to create a high-temperature flame. The flame is used to melt and join metal pieces together.

Oxyacetylene welding is commonly used for welding thin sheets of steel and can be employed for various repair and maintenance applications. In this module, you will learn how to effectively use oxyacetylene for welding and cutting purposes.

The module covers the essential equipment required, including oxygen and acetylene cylinders, regulators, torch handles, welding/cutting torch nozzles, hoses, spark igniters, welding rods/filler materials, and personal protective equipment (PPE). You will understand the setup process, adjusting regulator pressures, lighting the torch, controlling the flame characteristics, preparing the workpiece, striking the arc, and performing the welding process. The module also covers moving along the joint, finishing the weld, and conducting inspections for quality assurance. Following safety guidelines and manufacturer's instructions is essential to ensure proper usage of the oxyacetylene equipment.

EQUIPMENT

1. **Oxygen Cylinder:** A high-pressure cylinder filled with compressed oxygen. It is usually color-coded green for easy identification.

2. **Acetylene Cylinder:** Another high-pressure cylinder containing dissolved acetylene gas. Acetylene cylinders are commonly painted in maroon or brown.

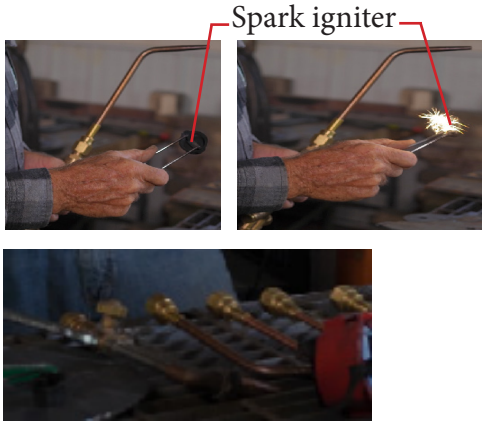
3. **Regulators:** These devices are attached to the oxygen and acetylene cylinders to reduce the high cylinder pressure to a manageable and controlled level for use in the torch. The regulators also provide pressure gauges to monitor the gas pressure.

4. **Torch Handle:** The torch handle is connected to the regulators and holds the mixing chamber, where oxygen and acetylene combine. It also includes valves to control the flow of both gases.

5. **Welding/Cutting Torch Nozzles:** Various nozzles or tips can be attached to the torch handle to control the shape and intensity of the oxyacetylene flame. Different nozzles are used for welding, cutting, or heating applications.

6. **Hose:** Flexible hoses connect the regulators to the torch handle, allowing the flow of gases. These hoses are designed to withstand high-pressure and are often color-coded (red for acetylene and green for oxygen) for easy identification.

7. Spark Igniter: A device used to ignite the oxyacetylene flame safely. It provides a spark to ignite the mixed gases as they exit the torch nozzle.



8. Welding Rods/Filler Material: For welding purposes, a suitable welding rod or filler material compatible with the base metal being welded is required.

9. Personal Protective Equipment (PPE): Safety gear such as welding goggles, welding gloves, aprons, and flame-resistant clothing should be worn to protect against the intense heat, sparks, and UV radiation produced during oxyacetylene processes.

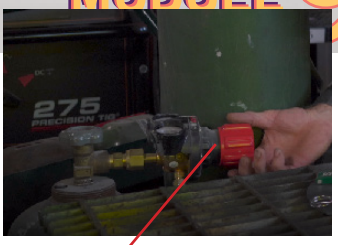
PROCEDURES

1. Set up the Equipment: Ensure that the oxygen and acetylene cylinders are securely in place and properly connected to the regulators. Check the hoses for any damage or leaks. Attach the appropriate welding nozzle to the torch handle.

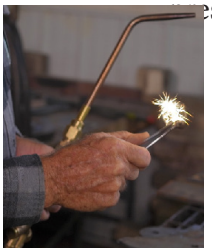
2. Preparing the Workpiece: Clean the surfaces to be welded using a wire brush or suitable cleaning method. Secure the workpieces in the desired welding position using clamps or fixtures.

3. Open Cylinder Valves: Slowly open the oxygen and acetylene cylinder valves aa the way to full open (1 to 2 turns). Stand to the side and open them gradually to avoid sudden pressure surges.

1d OXYACETYLENE WELDING



Oxygen regulator Acetylene regulator



Torch oxygen valve Torch Acetylene valve

4. Adjust Regulator Pressures: Adjust the oxygen and acetylene regulator pressures according to the welding requirements. The smaller your welding tip, the less pressure you need.

5. Lighting the Torch: Slightly open the acetylene valve on the torch handle and use a spark igniter to ignite the acetylene gas. Adjust the acetylene valve to soothe free flame.

6. Adjusting the Oxygen Flow: Gradually open the oxygen valve on the torch handle to introduce oxygen into the flame. Adjust the oxygen flow until you achieve the desired flame characteristics for welding.

7. Striking the Arc: Hold the torch nozzle at an appropriate angle and distance from the joint. Position the flame slightly ahead of the desired weld pool, and bring the torch tip close to the workpiece and move it smoothly and steadily along the joint.

8. Welding: Control the torch movement, maintaining a consistent distance between the torch tip and the workpiece. Direct the heat onto the joint to melt the base metal and the filler material (if used), forming the weld pool. Add filler material into the pool as needed to create the desired weld bead.

9. Moving along the Joint: Continue moving the torch along the joint, keeping a consistent speed and maintaining the appropriate torch angle and distance. Ensure sufficient heat penetration and fusion of the metal.

10. Finishing the Weld: Once the joint is completely welded, slowly reduce the torch heat and move away from the workpiece. Allow the weld to cool gradually. Clean the weld area and inspect the quality of the weld for any defects.