

Lesson 2: Welding With Oxyacetylene

Running a Continuous Weld Pool With and Without Welding Rod

Objective: Students will observe how to run a continuous weld pool with and without welding rod using the oxyacetylene outfit.

Directions: Use an oxyacetylene outfit to run a continuous weld pool. If needed, demonstrate how to set up the oxyfuel outfit, adjust the flame, and shut down the outfit as a review or as new material if this has not already been covered in class.

Materials and Equipment:

Oxyacetylene outfit and accessories	Soapstone or chalk
Welding goggles with appropriate shaded lens*	Straightedge
Safety glasses or goggles	Wire brush
Leather gloves and any other protective clothing recommended by instructor	Pliers
Spark lighter	Steel plate(s), selected by instructor
	Welding rod(s), selected by instructor

* Everyone participating in or observing the demonstration should wear appropriate protective eyewear.

Procedure:

Demonstrate the proper procedure for running a continuous weld pool without welding rod.

1. Wear appropriate face protection and protective clothing.
2. Inspect equipment, materials, and work area to ensure safe and correct operation.
3. Demonstrate the correct procedure for preparing the metal using a wire brush.
4. Position the plate on the worktable and mark a line using the soapstone and straightedge. More lines can be laid out for additional demonstrations, if desired.
5. Demonstrate or review proper setup procedures for the oxyacetylene outfit, including the following steps and others as needed. (In the student activity, these steps will be indicated by the instruction to "Set up the oxyacetylene outfit following assigned procedure.")
 - a. Crack the valves.
 - b. Attach the regulators.
 - c. Inspect and install the torch tip.

- d. Purge the lines.
 - e. Check for leaks.
6. Demonstrate the correct method for lighting the torch using the spark lighter. If desired, set the torch to demonstrate a carburizing flame and oxidizing flame. Point out how the students can recognize them and remind them that these flames are not preferred for most cutting and welding work.
 7. Demonstrate how to adjust the flame to a neutral flame.
 8. Position the torch so that the flame is just inside the edge of the metal and turned toward the plate. If desired, explain that this is the forehand welding method, which means that the metal in front of the welding pool will be preheated by the flame.
 9. Hold the torch at a 45-degree angle, with the inner cone approximately 1/8 in. from the work.
 10. Move the torch in a small circular pattern to form a weld pool that is about 1/4 in. in diameter.
 11. Continue moving the torch in the circular pattern and also move it forward at a speed that will keep the weld pool a uniform size and shape. Be sure to keep the tip of the inner flame cone inside the boundary of the weld pool but not touching the surface.
 12. At the end of the weld, lift the tip slowly so that the weld pool solidifies before the flame is removed. Explain that this technique helps keep the weld pool from cracking.
 13. If desired, other beads could be run to demonstrate the effects of varying factors such as speed of travel, position of torch, and type of flame.
 14. Demonstrate the correct procedure for shutting off the outfit. Explain to students that the flame must be shut off before they set the torch down.
 15. If desired, turn the metal over when it is safe to do so and have the students inspect the underside of the weld or welds. Explain that a properly run weld pool has the appearance of a continuous, uniform deformation on the underside of the metal with no holes burned through the piece.
 16. Demonstrate the proper procedure for running a continuous weld pool using welding rod. If this portion of the activity is not demonstrated or assigned, skip to step 30 to demonstrate the proper procedure for shutting down the outfit. If the activity is performed at a different time, perform and review setup procedures as needed.

Demonstrate the proper procedure for running a continuous weld pool using welding rod.

17. Use pliers to bend one end of the welding rod into a hook. Explain that this is to distinguish the cool back end of the rod from the end that may be hot and also to avoid injuring anyone nearby with the end of the wire. Also explain that it is standard procedure to leave rods full-length rather than cut them down.

18. Demonstrate the correct way to hold, feed, and change hand position with the rod.
Explain that to change hand positions the students should set the rod down with the hot end pointed away from the body and pick it up in the new position. Do not place the rod against the body and move the hand to a new position. The hot end of the rod can burn through clothes and burn the skin.
19. Prepare the metal to be welded.
20. Position the plate on the worktable and mark a line using the soapstone and straightedge. More lines can be laid out for additional demonstrations, if desired.
21. Set up the outfit, if needed, and light and adjust the torch.
22. Position the torch so that the flame is just inside the edge of the metal and turned toward the plate.
23. Hold the torch at a 45-degree angle, with the inner cone approximately 1/8 in. from the work.
24. Move the torch in a small circular pattern to form a weld pool that is about 1/4 in. in diameter.
25. At the same time, use the other hand to bring the welding rod close to the flame for preheating. The end of the rod should be approximately 3/8 in. from the flame and 1/16 to 1/8 in. from the pool surface. The rod is held at an angle to the work, usually about 45 degrees.
26. When the weld pool needs additional material, dip the end of the rod in the front edge of the weld pool. This melts the rod and fills the pool. When enough filler is added to make the desired bead, move forward.
27. Carry the bead forward by moving the torch and adding filler with a smooth, uniform motion.
 - a. Keep the end of the welding rod inside the flame so that it stays preheated and does not become oxidized by contact with the air.
 - b. If the welding rod becomes too cool, it can freeze the weld pool. If it is too hot, drops of filler can be blown around by the flame, resulting in an uneven bead and poor fusion.
28. Continue moving forward until the weld is complete.
29. Demonstrate the correct procedure for shutting off the outfit. Explain to students that the flame must be shut off before they set the torch down.
30. Demonstrate the correct procedure for shutting down the outfit, including the following steps and others as needed. (In the student activity, these steps will be indicated by the instruction to "Shut down the outfit following assigned procedure.")
 - a. Turn off gas at the cylinders.
 - b. Bleed the lines.
 - c. Close the regulators.
 - d. Hang up the hoses. Do not hang them over the regulators.
 - e. If the outfit is portable, return it to its assigned place.
31. Assign the student version of AS 1 to be performed by students.