

# Oxyacetylene Welding and Oxyfuel Cutting

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## Instructional/Task Analysis

**Related Information: What  
the Student Should Know**

**Application: What the  
Student Should Be Able to Do**

### Unit 1: Oxyacetylene Welding

1. Terms and definitions
2. Benefits of learning oxyacetylene welding and cutting
3. Equipment required for oxyacetylene welding
4. Safety rules for oxyacetylene workplace
5. Personal safety requirements
6. Eye protection required for oxyacetylene welding
7. Pressure regulating valves
8. Welding hoses and their characteristics
9. Parts of a welding torch
10. Types of mixers and their purposes
11. Welding tips and their uses
12. Basic safety rules for oxyacetylene cylinders and gases
13. Types of oxyacetylene flames
14. Guidelines for flame adjustment
15. Characteristics and causes of backfire and flashback
16. Ways to control backfire and backflash
17. Welding tip selection
18. Filler rod selection, handling, and safety
19. AWS designations for iron and steel gas welding rods
20. Flux selection, handling, and safety
21. Welding positions
22. Basic types of welds and their AWS symbols
23. Basic welding joints and positions
24. Elements of good fusion welding

# Instructional/Task Analysis

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## **Unit 1: Oxyacetylene Welding (continued)**

25. Rules of thumb for rod and torch angles
26. Guidelines for using the forehand technique in fusion welding
27. Guidelines for using the backhand technique in fusion welding
28. Techniques for controlling flame and rod motions
29. Guidelines for preheating, interpass, and postheating
30. Procedures for cleanup, inspection, and testing
31. Steps in setting up cylinders and regulators
32. Steps in purging oxygen and fuel gas regulators
33. Final steps in setting up oxyfuel equipment
34. Light, adjust, and shut down an oxyacetylene welding torch in compliance with safety standards
35. Lay beads on flat plate with no filler rod
36. Lay beads on flat plate with filler rod
37. Weld an outside corner joint in the flat position
38. Weld a square-groove butt joint in the flat position
39. Weld a lap joint in the flat position
40. Weld a T-joint in the flat position

## **Unit 2: Oxyfuel Cutting**

1. Match terms related to oxyacetylene and oxyfuel cutting with their definitions.
2. Complete statements about advantages of oxyacetylene and oxyfuel cutting.
3. Select true statements about alternate fuels.
4. Complete statements about alternate fuel gas data.

## Instructional/Task Analysis

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### Related Information: What the Student Should Know

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#### Unit 2: Oxyfuel Cutting (continued)

5. Select true statements about equipment requirements for alternate fuels.
6. Solve problems about liquid oxygen applications and safety.
7. Identify parts of an equal-pressure cutting torch.
8. Identify parts of an injector cutting torch.
9. Select true statements about cutting tip design.
10. Complete statements about high-volume heating tip design.
11. Select guidelines for acetylene cutting tip selection.
12. Select true statements about guidelines for cleaning acetylene cutting tips.
13. Match acetylene tip cleaning tools with their uses.
14. Select true statements about rules for tip use.
15. Select true statements about metal preparation for oxyfuel cutting.
16. Arrange in order the steps in properly starting a cut.
17. Complete statements about techniques for restarting a cut.
18. Select true statements about techniques for cutting straight lines.
19. Select techniques for controlling kerf and drag.
20. Complete statements about elements of a good cut.
21. Select causes for characteristics of poor cuts.
22. Complete statements about safety requirements for oxyacetylene and oxyfuel cutting.

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## Unit 2: Oxyfuel Cutting (continued)

23. Select true statements about characteristics of manifold systems.
  24. Select true statements about characteristics of track-type cutting machines.
  25. Select true statements about characteristics of shape cutting machines.
  26. Select true statements about characteristics of automated cutting machines.
  27. Select true statements about characteristics of pipe beveling machines.
  28. Complete statements about eye protection required for oxyacetylene and oxyfuel cutting.
29. Set up, adjust cutting flame, and shut down oxyacetylene cutting equipment.
  30. Set up, adjust cutting flame for star pattern, and shut down oxyfuel cutting equipment.
  31. Make 90° cuts and restart a cut on mild steel
  32. Make a flame-beveled cut on mild steel plate.
  33. Cut holes in mild steel.
  34. Lay out a pattern on mild steel plate and cut the pattern to specifications.
  35. Set up and cut a 30° bevel on a track-type torch.
  36. Cut a pipe bevel by hand.
  37. Set up and bevel a pipe with a pipe beveling machine.

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### **Unit 3: Oxyacetylene Braze Welding and Surfacing**

1. Match terms related to oxyacetylene braze welding and surfacing with their definitions.
2. Differentiate between the definitions of fusion welding and braze welding.
3. Differentiate between the definitions of brazing and braze welding.
4. Select true statements about the advantages of braze welding.
5. Select true statements about the limitations of braze welding.
6. Complete statements about precoating in braze welding.
7. Select true statements about the purposes of flux.
8. Complete statements about the characteristics of filler rods for braze welding.
9. Complete statements about important factors in successful braze welding.
10. Select true statements about techniques used in preparing joints for braze welding.
11. Complete statements about techniques used to remove oxides in preparing joints for braze welding.
12. Complete statements about techniques used for braze welding steel and cast iron.
13. Match braze welding problems with their causes.
14. Differentiate between the definitions surfacing and hardfacing.
15. Select true statements about the advantages of bronze surfacing.
16. Complete statements about limitations of bronze surfacing.
17. Differentiate between methods of preparing new and cast iron surfaces for bronze surfacing.

## Instructional/Task Analysis

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### Related Information: What the Student Should Know

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#### Unit 3: Oxyacetylene Braze Welding and Surfacing (continued)

18. Select true statements about guidelines for bronze surfacing.
19. Select true statements about guidelines for hardfacing applications.
20. Match types of hardfacing alloys with their definitions.
21. Complete statements about hardfacing powders.
22. Complete statements about the advantages of hardfacing with an oxyacetylene torch.
23. Complete statements about guidelines for preparing surfaces for hardfacing.
24. Identify requirements for machining surfaces to be hardfaced.
25. Select true statements about preheating and cooling requirements for hardfacing.
26. Complete statements about techniques used for oxyacetylene hardfacing.
27. Select true statements about techniques for making a second pass when oxyacetylene hardfacing.
28. Complete statements about safety precautions used for hardfacing.
29. Weld a stringer bead with a bronze rod on steel plate.
30. Braze weld a square-groove butt joint in the flat position.
31. Braze weld a lap joint in the horizontal position.
32. Repair a worn tool with hardfacing.