

Arc Welder

I. Competencies

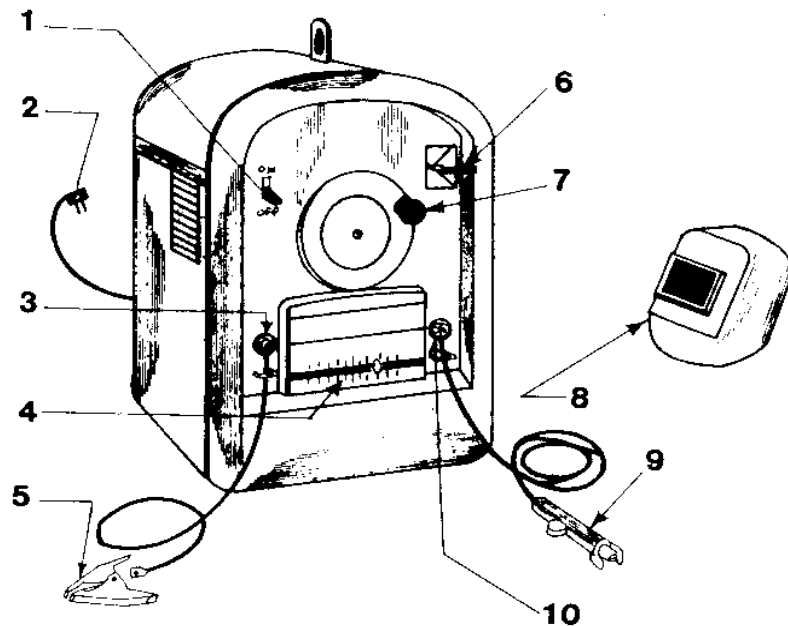
Given a functional welder, instruction and demonstration of use, each student will be able to:

- A. Identify the major parts of the arc welder.
- B. Pass a written test of safety and operating procedures of the arc welder with a minimum of 100 percent accuracy.
- C. Demonstrate, to the satisfaction of the instructor, ability to safely use an arc welder while performing assigned tasks.

II. Instructional Materials and Procedures

A. Identification of Basic Arc Welder Parts

- | | |
|------------------------------|----------------------------------|
| 1. Switch | 7. Amperage adjustment handwheel |
| 2. Power cord | 8. Helmet |
| 3. Ground cable terminal | 9. Electrode holder |
| 4. Amperage output indicator | 10. Electrode cable terminal |
| 5. Ground clamp | |
| 6. Polarity switch | |



B. Arc Welder Safety

1. Always wear protective clothing suitable for welding. Wool or cotton clothing, high top leather shoes, gauntlet gloves, welding apron or leathers, and leggings are recommended. DO NOT wear clothing made of synthetic fibers when welding. Some synthetic fibers are highly flammable.
2. Always wear industrial quality eye protection when welding and cleaning welds. A number 10 filter lens is minimum for most arc welding processes.
3. Keep the welding area clean and free of tools, scrap metal, and water.
4. Make sure the work area is free of flammable, volatile, or explosive materials. (Ex. propane, gasoline, grease, and coal dust).
5. Do not carry matches, butane or propane lighters or other flammables in you pockets while welding.
6. Shield others from the light rays produced by arc welding. Keep the welding curtain in place at all times.
7. Never weld while standing in water or on damp ground.
8. Guard against the use of damp or wet clothing when welding. The use of such clothing increases the possibility of electrical shock.
9. Never breath fumes when welding lead, cadmium, chromium, steel, manganese, brass, bronze, beryllium, zinc, or galvanized steel. These fumes are toxic and may cause sickness or death. A good exhaust system is essential when welding within a confined laboratory.
10. Protect welding cables from sparks, hot metal, open flames, sharp edges, oil, and grease.
11. Never lay the electrode holder on the welding table or a grounded metal surface. Place it on an insulated hanger. An electrode holder should never touch a compressed gas cylinder.
12. Place electrode stubs in a suitable container. Do not allow stubs to get on the floor in the welding area.
13. Use tongs or pliers to handle hot metal after it has been welded. Completely submerge metal in water when cooling, this prevents steam from burning you.
14. Never weld with the cables coiled over the shoulders.

15. Disconnect the power to a welding machine before making any repairs.
16. Treat all cuts or burns promptly. Report accidents to the instructor immediately; treat any cuts or burns promptly.
17. Cool and store any hot metal before leaving the work area.
18. Do not use cables with frayed, cracked or bare spots in the insulation.
19. Use a fire blanket to smother clothing fires. Use a dry chemical type “C” extinguisher to put out an electrical fire.

C. Arc Welder Operating Procedures

1. Check to make sure the welding machine is properly grounded. The welding equipment should be installed according to provision of the National Electric Code and the manufacturers recommendations.
2. A power disconnect switch should be conveniently located near each welding machine.
3. Turn the welder off and store cables before leaving the welding area.
4. The operator should keep all cable connections tight.
5. Inspect electrode holders for defective jaws and poor insulation.
6. Make adjustments in polarity and amperage only when the machine is not under load. Switching the current while the machine is under load will cause an arc to form between the contact surfaces.
7. Wear a welding helmet with a correct shade filter lens. A number 10 to 12 filter lens is usually satisfactory for general purpose welding. Most welding helmets provide a flip-up device to allow chipping or grinding to be done without removing the helmet.
8. Keep welding screens in place to protect on-lookers from arc flash.
9. Turn on the fumes removal system before starting to weld.
10. Do not weld in damp areas; keep hands and clothing dry at all times. Dampness on the body increases the chance of electrical shock when welding.
11. Do not weld in areas that store compressed gas cylinders.

12. Be sure that all gas cylinders are chained in an upright position before starting to weld.
13. Clear all combustible materials from the welding area before welding.
14. Handle all compressed gas cylinders used in Mig and Tig welding with extreme care. Keep the cylinder caps in place when the cylinders are not in use.
15. When gas cylinders are empty, close the valve and mark cylinders “empty”.
16. When using water cooled equipment, check for water leakage often.
17. Use an audible signal such as “cover” to indicate to others that you plan to strike an arc.
18. If an electrode sticks, try to twist it free. If twisting fails to free the electrode, release the electrode from the electrode holder. Turn off the switch on the welder and use pliers to break the electrode free.
19. Avoid welding directly on concrete floors. Residual moisture in the concrete may be turned to steam resulting in the concrete exploding.

III. Written Test

Arc-Welding Safety and Operation Test

Name_____ Date_____ Class_____

Multiple Choice – Place the letter of the most correct answer on the answer sheet.

1. When arc welding one should wear _____.
 - a. wool clothing
 - b. cotton gloves
 - c. a heavy coat
 - d. tinted glasses
2. For proper eye protection when arc welding the minimum shade number of the filter lens should be _____.
 - a. 4
 - b. 6
 - c. 10
 - d. 12
3. The welding area should be kept free of _____.
 - a. grease, fuels and solvents
 - b. ultraviolet rays
 - c. infrared rays
 - d. electrodes
4. Arc welding produces harmful _____.
 - a. noise
 - b. light rays
 - c. heat
 - d. gas
5. When arc welding do not use cables that are _____.
 - a. welded
 - b. soldered
 - c. cracked, cut or frayed
 - d. spliced

6. Careful handling of compressed gas cylinders includes _____.
a. keeping caps in place
b. fastening in an upright position
c. labeling when empty
d. all of these
e. a and b above
7. Gloves used for arc welding should be _____.
a. gauntlet gloves
b. cotton gloves
c. synthetic material gloves
d. work gloves
8. When welding, the operator should not carry _____.
a. paper in his/her pockets
b. cigarette lighters
c. rags
d. tools
9. When welding the operator should never lay or stand _____.
a. on concrete floors
b. on damp ground
c. on metal
d. on wood structures
10. Saturation of clothing by moisture or perspiration increases the risk of _____.
a. weld burns
b. electrical shock
c. getting a flash
d. welder fatigue
11. When starting to arc weld, the operator should _____.
a. turn on the exhaust fan
b. clean area of scraps and tools
c. shield others from arc rays
d. all of these

12. Welding cables should be protected from _____.
- a. sparks and flames
 - b. excessive voltage
 - c. excessive amperage
 - d. all of these
13. The amperage setting should be made while the welding machine is _____.
- a. running a bead
 - b. not under load
 - c. warmed up
 - d. turned off
14. Electrode stubs should be placed _____.
- a. in a container
 - b. on the floor
 - c. on the welding table
 - d. in the cooling barrel
15. Hot metal should be handled with _____.
- a. gloves
 - b. aprons
 - c. tongs or pliers
 - d. rags
16. Any cuts or burns should be _____.
- a. treated at the end of class
 - b. treated promptly by an authorized person
 - c. coated with salve
 - d. packed in ice
17. If a fellow student's clothes catches on fire, the first thing one should do is _____.
- a. throw water on the person
 - b. use a fire extinguisher
 - c. wrap the person with a fire blanket
 - d. call the school nurse

18. Welding directly on a concrete floor may cause _____.

- a. damage
- b. smoke
- c. poisonous gas fumes
- d. explosion of the concrete

19. When working in an area with other people, what should be done before an arc is struck?

- a. Check the electrode holder
- b. Tell others you plan to strike an arc
- c. Check the cables for cuts and burned insulation
- d. All of these

20. If the electrode holder is placed on a grounded welding table with the welding machine on, what will happen?

- a. Nothing
- b. The welding machine will automatically shut off
- c. A deadly electrical circuit is established
- d. An arc will be struck

Student _____

IV. Performance Test for the Arc-Welder

The student performs the following while operating the arc welder.

	Yes	No	N/A
1. The operator wears approved eye protection while welding and grinding welds.	___	___	___
2. Suitable protective clothing is worn by the operator when welding.	___	___	___
3. The work area is kept clean and free of hot metal, scrap and tools.	___	___	___
4. Flammable materials are kept out of the welding areas.	___	___	___
5. The operator signals others when he or she is about to strike an arc.	___	___	___
6. The operator keeps all cable connections tight and insulated while welding.	___	___	___
7. The fumes removal system is operating while welding is being performed.	___	___	___
8. Compressed gas cylinders are securely fastened in an upright position.	___	___	___
9. Cables are protected from sparks, hot metal, open flames, oil, and grease.	___	___	___
10. A special container is used for depositing spent electrode stubs.	___	___	___
11. The electrode holder is placed in an insulated hanger when it is not in use.	___	___	___
12. Tongs or pliers are used for handling hot metal.	___	___	___
13. Work procedures used are safe and acceptable.	___	___	___
14. Correct work procedures are used when arc welding.	___	___	___

Comments _____

I hereby certify that the student had satisfactorily demonstrated ability to operate the arc welder by passing the above performance test.

Signed (Student)

Date

Signed (Teacher)

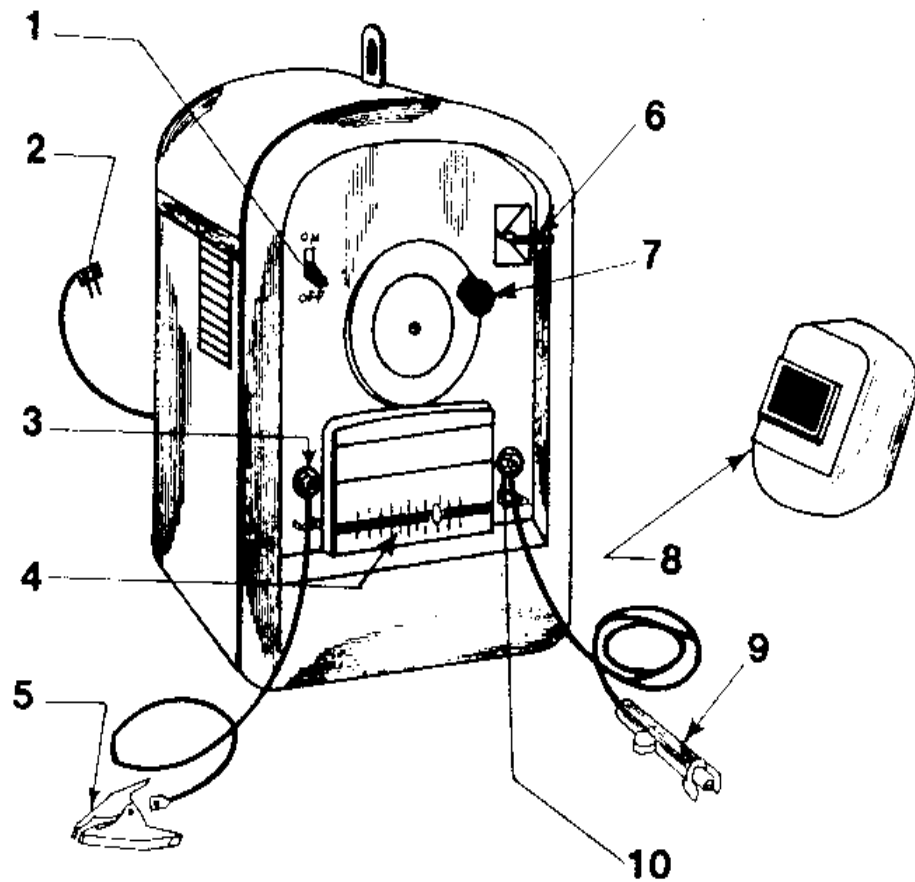
Date

Arc Welder Parts Identification Test

Name _____

Match the number of each arc welder part with the correct part name.

- | | |
|---------------------------------|--------------------------------------|
| ___ A. Polarity switch | ___ F. Switch |
| ___ B. Ground clamp | ___ G. Ground cable terminal |
| ___ C. Power cord | ___ H. Electrode holder |
| ___ D. Helmet | ___ I. Amperage output scale |
| ___ E. Electrode cable terminal | ___ J. Amperage adjustment handwheel |



BASIC ARC WELDER PARTS

