



WELDING

Project Guide



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Alberta
Government



Uses for Arc Welders

- On the farm: repairing cracked machinery, broken parts, etc.
- In industry: manufacturing farm machinery, automobiles, furniture, etc.
- Local businesses: installing exhaust systems in cars, auto bodies, etc.
- Other uses: modern art, etc.

Welding Safety

1. Never look at welding arc with the naked eye.
2. Always use a helmet or face shield that is in good condition. Wear safety glasses.
3. Replace any cracked or poor-fitting lenses in the helmet or shield.
4. Wear suitable clothing to protect all parts of your body from spatter and arc burns. Don't wear fortrel, corduroy, or frayed jeans (they can catch fire)! Instead, wear jeans which are old, but in good shape, or thick overalls. Professional welders wear leather aprons and jackets to protect themselves. Leather gloves are a necessity.
5. Any part of your body left exposed to the arc can be burned by the ultraviolet radiation (just like a sunburn)! Cover up!
6. Do not strike an arc or weld until you are sure those in the vicinity have protective equipment, or will look in the other direction.
7. Do not weld around combustible materials.
8. Do not pick up hot metal. Even if it's black, it can still be quite hot. Use pliers.
9. Do not weld in confined spaces without adequate ventilation.
10. Change the welding current adjustment only when the welding circuit is open.
11. Do not work on live circuits. Always turn the welder off when checking over the machine.
12. Do not leave the electrode holder on
the welding table, or in contact with
a grounded metal surface.
13. Do not use worn or frayed cables.
14. Make sure the ground clamp has a
strong spring, and that it is
fastened securely to the welding
table or part being welded.
15. Keep your welding area clean!

Arc Welder's Language

Most trades and professions have a language of their own when communicating about their jobs. Persons working with arc welders have a language of their own. To understand instructions on welders, electrodes, and welding material, or to just talk about welding, you will need to learn the meaning of welding terms that are a part of the welders' language. An experienced welder, welding supply person, or welding instructor can usually tell after a few minutes of talking with someone (whether or not the person knows and understands much about welding. This is basically true of most trades and professions.

Open Circuit Voltage

Voltage produced by the welder before the arc is struck. It can be measured by connecting a voltage measuring device between the electrode holder and the ground clamp with the switch on, but not welding.

Arc Volts

Voltage measured between the electrode holder and ground clamp while welding.

Primary Current

The current (amperes) from the power line or generator going into the welder.

Primary Voltage

The voltage of the power line or generator from which the welder is operated. It is the input voltage.

Secondary Voltage

The figures listed under the heading Secondary on the nameplate of a welder refer to the output of the welder. An AC welder reduces the primary voltage and increases the amperage to produce heat.

Duty Cycle

The number of minutes during a 10-minute cycle period that the welder can be operated at maximum output is usually given in percentage. A 20% duty cycle means that the unit has the capability of operating a maximum output for two minutes of each 10-minute period.

$$\text{eg: } \frac{20}{100} = \frac{x}{10} ; \quad \frac{20 \times 10}{100} = 2$$

Ultra-Violet and Infra-Red Rays

Intense rays given off by the arc that can cause skin burn and eye burn and even permanent eye damage.

Eye Burn

Eye irritation caused by exposure to the arc rays is very much like a sunburn. The ultra-violet rays given off by the arc are the same as those given off by the sun.

Bead

A continuous deposit of weld metal.

Crater

A depression at the end of an arc weld bead caused by the force of the arc as it is withdrawn.

Types of Arc Welding Machines

There are many different kinds of arc welding machines used in industry, on farms, and in repair shops. All of the many different models of welders can be classified under three classifications:

- 1) Alternating Current Machines
- 2) Direct Current Machines
- 3) D.C. Rectifier Welders

AC Welder

A machine that produces an alternating current for striking the arc and running a welding bead.

DC Welder

A machine that produces a direct current for striking an arc and running a bead.