

Lesson 1.4: Fact Worksheet - Welding Safety – Electricity and the Arc

IMPORTANT:

- Electricity is present and must be respected in all arc welding and cutting processes
- Electrical shock from welding and cutting equipment can cause extreme burns or death
- Read warning labels on welding and cutting equipment regarding electric shock

When the welder is turned ON, what parts can electrocute?

- Welding circuit
- Input power circuit
- Machine internal circuits
- Cables
- The welding wire and the reel of wire
- Drive rolls
- Electrode holder
- All metal parts touching the energized electrode

Electrical hazards in welding:

- Water
- Exposed wires
- Contact with energized leads
- Faulty equipment

Water

- Wet gloves, clothing, or skin (even from perspiration) can come in contact with energized leads or electrodes, causing electrical shock
- Wet welding equipment will also cause shock
- Never stand in water while welding
- Never try to cool your welding equipment by immersing in water

Exposed wires

- Live parts of welders are insulated to help prevent electrical shock
- The insulation can wear and become damaged with use, exposing wires or live metal parts and leaving you susceptible to electrical shock
- Let your teacher know if you see any damaged insulation or exposed wires in the shop

Contact with energized leads

- Never touch an energized electrode and the work clamp at the same time
- Keep live electrodes, electrode holders, and live metal parts of welders away from skin or wet clothing on the body
- Never change electrodes with bare hands, wet gloves, when standing on wet floors or grounded surfaces

Faulty equipment

- Welding equipment that is old or has been abused may incur internal damage that affects its electrical system
- Faulty equipment may produce unexplained shocks
- Let your teacher know if there are any maintenance issues with a welder

Prevent Electrical Shock:

Inspect welding equipment before you weld

- Check for bare wires and insulation damage in the cords, leads, electrode holders, and the welder
- Check all connections and make sure they are secure
- Make sure equipment is dry
- Check the area for water or other hazards
- Never try to fix a welder yourself. Let your teacher know of any defects, safety hazards, or maintenance issues
- Wear welding gloves that are insulated, dry, and in good condition
- Wear dry clothing personal protective equipment
- Wear proper work shoes or boots with rubber soles
- Turn off the welder when changing wire or contact tips or doing maintenance
- Never put the electrode holder on any conductive surfaces or the work surface
- Do not loop or coil electrode cables around the body
- Never work alone in a shop

The welding arc:

- Produces ultraviolet radiation (UV)
- Ultraviolet rays are very dangerous to welders
- Welders need to protect their skin and eyes from exposure
- Everyone around the arc is susceptible to exposure

What does exposure to the arc (UV) do?

- Exposure to the arc can cause your skin to burn and peel like a sunburn; excessive exposure may cause skin cancer
- Exposure can also cause your eyes to burn and damage the lens
- The burns from the arc are commonly called “arc flash”, “flash burn” or “arc-eye”
- It can take several hours for arc flash to take effect after exposure

What does exposure to the arc do to the eyes?

- “Arc-eye” is typically noticed late at night or early morning hours with the sensation of hot sand in the eyes
- Eye drops or salve may be prescribed by a doctor to help relieve the pain of arc-eye, but only time will heal the effects
- Excessive exposure or exposure in the wrong area of the eye can damage the lens, cause cataracts, and even cause blindness

How does a person get arc flash in the shop?

- By welding with exposed skin
- By welding or tacking without a welding helmet
- By using the wrong filter lens in the welding helmet
- By others welding without a screen or barrier designed to block the arc
- If there is a welding arc in your peripheral vision, it can burn your eyes

How does a person get arc flash in the shop?

- If someone is welding near a shiny surface
- UV can reflect off of mirrors, glass, bare metal, light colored painted surfaces and shiny paint or finishes on walls and ceilings
- UV will also reflect off of white and light colored shirts and burn the face under the welding helmet

How is arc exposure prevented?

- Wear proper Personal Protective Equipment
- Wear dark colored shirts while welding
- Any time while welding or watching others weld, wear a welding helmet with the proper shade filter lens (#10-11 for most arc welding processes)
- Use a welding screen when welding in the open
- Use flat green or blue paint in the welding area; avoid welding around shiny surfaces