



006: Arc Fault Hazards

Arc fault prevention

You can prevent some arc faults by following two simple rules:

Use the one-handed measuring method. Use one only one hand for attaching or removing test leads. This reduces the likelihood of your being shocked across the heart, and it eliminates causing an ionization trail between the leads.

Don't assume lockout/tagout rules have been followed, and don't assume a given circuit is de-energized just because they have. Always measure. A "wiggy" may indicate a safe situation when conditions are actually dangerous. The standard rule is "Check your meter, check the object, check your meter." This means you measure a known source, such as a 120V receptacle, to ensure the meter is measuring. Next, measure the object, and then re-check the meter.

Arc fault injury prevention

You can't prevent every arc fault. Thus, you must take the appropriate safety precautions:

Report unsafe conditions immediately. Most electrical fatalities and disabling injuries result from a string of safety violations and/or a combination of unsafe conditions and unsafe acts. The presence of one indicates more are lurking.

Wear your safety glasses and hardhat any time you are around energized switchgear or other energized electrical equipment. Many people remove their safety glasses and hardhat when they enter a small building or room dedicated to switchgear. After all, the room is clean and nobody is operating rotating equipment. This practice, however, is dangerous because an arc fault can happen at any time without warning.

Don't create an ionization trail across your hard hat. The hat is made from an insulating material. OSHA has limits on the amount of hardhat space you can cover with stickers. A rule of thumb is one on each side, one on the front, and one in the back. Dry transfer lettering, magic marker, and paint can create a conductive path across your hat.

Use insulated gloves when working on energized equipment at 480V or above. Be sure you test the gloves before each use, using the roll-up method described in the product literature that comes with the gloves. Do not blow into the gloves.

Never work alone on energized circuits. Ensure you and your partner are familiar with the circuits being worked on, know the location of emergency shut-offs, know the fire escape routes, and have a way to immediately call for help. It's also good if you both have training in first aid and CPR. If one of you can't satisfy all of these requirements, discuss the problem with your foreman and resolve the deficiencies.

Verify that your test equipment is suitable to the task. For example, your multimeter and test leads should have adequate voltage and safety category ratings for the environment in which you'll be working. If you are taking voltage readings at load side distribution transformers—such as one that supplies a 277V lighting panel—your meter needs to be rated for 600V, Category II. If you are working on a 480V service entrance panel, your meter needs to be rated for 600V, Category III.

Discussion leader duties for this session:

Obtain a set of insulated gloves.

What this Safety Talk covers:

Avoiding injury from arc faults.

Discussion notes :

Review and Discussion

What is the one-handed measuring method?

When should you report unsafe conditions and acts, and why?

Why should you keep your safety glasses and hardhat on when you are around energized electrical equipment?

What should you and your partner know before working in a given location?

What are some things to look for prior to taking a measurement?

Take special care with special-purpose equipment such as motor rotation testers, ensuring you match them to only the voltages they are rated.

Check meter settings and lead configurations before connecting to a circuit, whether you think the circuit is energized or not. In a DMM, for example, the typical 2A fuse will not protect you or the meter if you inadvertently measure current between Phase C and ground on an 800A breaker. Ensure the test leads are in the right jacks.

Have your partner verify the meter is set up correctly. Many electricians fail to do this, out of misplaced sense of pride. It's better for you or your partner to spot the error, than for one of you to walk into a dangerous situation you could have prevented.

Check the physical condition of your test leads, including the insulating boots. Test leads are inexpensive to replace—if in doubt, throw them out.

Pay attention to your environment. Before measuring, look, listen, smell, and feel. Look for proper safeguards (rubber mats, insulated gloves, metal covers securely in place, etc.), look for potential hazards (puddles, corrosion, exposed circuits), listen for unusual sounds that may indicate arcing or burning, and pay attention to unusual odors that may indicate recent arcing or burning.

Ask yourself if you are in the most protected position from which to take an action. For example, never stand in front of a disconnect to operate it. Those with pulldown handles have those handles on the right side. Stand to the right of the disconnect, and pull down with your left hand. If you need to measure the voltage in a panel, look for a breaker with the lowest current rating and measure there. If you are using an alligator clip, look for a bare conductor rather than a screw head.

If you are measuring to ground, make the ground connection first.

When you are preparing to make a measurement, taking a measurement, and closing up after taking a measurement, remember that job quality, housekeeping, and safety take priority over speed. If your partner or another party is in a rush, that is not your problem. You can work safe and you can work fast, but you can't always do both. If you get too much pressure from another person to compromise on this, stop work and contact your foreman.

Demonstration:

Have 2 or 3 crew members demonstrate the correct method for testing insulated gloves.

Participant's Signature and Date
