

# PHYSICAL RESOURCES

# **Electrical Shop Safe Work Procedure**

# **5.1.4 Energized Testing and Troubleshooting**

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#### 1. Purpose

The purpose of this procedure is to provide safe work guidelines to be used during the testing and troubleshooting of all equipment.

#### 2. Scope

This type of work does not include the repair or modification of any type of apparatus while it is still in service. When such repairs or modifications are required the apparatus being worked on must be taken out of service by following the de-energizing procedures listed in this manual.

#### 3. Personal Protective Equipment Required

- See 5.1.3 Personal Protective Equipment
- PPE shall be worn while performing energized testing or troubleshooting if voltage exceeds 24VAC or 30VDC.

#### 4. Procedure

The following procedure shall be followed when testing or troubleshooting on energized electrical equipment. The potential electrical hazards include arc flash, arc blast, shock, electrocution, release of stored energy and entanglement with rotating machinery.

#### 5. Use of Test Equipment

#### 5.1. Multimeters

- 5.1.1. Only approved category three (III) or four (IV) devices shall be used to test for electrical potential.
- 5.1.2. Potential indicators shall be electrically tested at least every 12 months at a recognized testing laboratory.
- 5.1.3. All voltmeters, multimeters, and phase rotation indicators rated to 750 volts AC shall be equipped with fused leads.

- 5.1.4. A continuity check shall be conducted prior to using the meters or indicators to verify fuse integrity.
- 5.1.5. Equipment used for testing for electrical potential shall be tested on a known energized circuit prior to and after testing for the absence of voltage when performing a lockout procedure.
- 5.1.6. Proximity type voltage detectors are not to be used for the verification of potential. This type of device can be used for troubleshooting only. They shall not be used as the sole test means to establish an electrically safe condition.

# 5.2. High Voltage Potential Testing

- 5.2.1. A job planning meeting form (5.1.4) shall be completed by all workers involved prior to commencing high voltage testing or troubleshooting.
- 5.2.2. Only system rated voltage test devices shall be used to test for electrical potential.
- 5.2.3. Conduct a visual inspection of the potential indicator prior to using. Inspect for physical damage.
- 5.2.4. Prior to use, verify the operation of the potential indicator on a test source that is energized. After use, re-verify the operation of the potential indicator on the same test source.
- 5.2.5. A second competent worker trained in methods of release, first aid and CPR must observe the worker performing the tests.
- 5.2.6. Test conductors for potential in an orderly manner, testing the ones closest to you first and moving to the ones farther away second.
- 5.2.7. Do not bring the potential indicator close to grounded surfaces.
- 5.2.8. Do not place hands beyond safety indicating band on potential indicator.
- 5.2.9. A continuity check shall be conducted prior to using the meters or indicators to verify fuse integrity.

#### 6. Energized Work Guidelines

- 6.1. The worker shall always make another qualified worker or supervisor aware they will be performing an energized task before starting and the location where they will be performing the task.
- 6.2. Workers shall review their emergency procedures before performing energized tasks.
- 6.3. Whenever possible, two workers shall be present when energized tasks are performed.
- 6.4. No employee shall open or close any switch unless he/she is thoroughly familiar and has full knowledge concerning the circuits affected and giving ample warning to other workers who may be endangered.
- 6.5. Workers performing testing or troubleshooting activities on electrical equipment must hold a valid Certificate of Qualification as one of the following:
  - 6.5.1. 309A Construction & Maintenance Electrician or registered apprentice
  - 6.5.2. 442A Industrial Electrician or registered apprentice
  - 6.5.3. Other recognized trades performing duties limited to their scope of practice as defined by the Ontario Ministry of Labour and Skills Development (HVAC Tech, Industrial Millwright, Elevator Mechanics, etc.)
- 6.6. PPE selected in accordance with 5.1.3 shall be worn during all energized activities.
- 6.7. Conductive objects and shall not be brought close to or stored near energized equipment.
- 6.8. Fuse pullers shall be used to insert or extract fuses.
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- 6.9. When working on or near live circuits, always place yourself in a position so that a shock or slip will not bring you in contact with live parts, (3rd point of contact).
- 6.10. Portable electric tools must be effectively grounded and used with a Class A GFCI when in wet, damp or outdoor locations.
- 6.11. If work is to be done on or near energized parts, insulated tools rated for the highest voltage present must be used.
- 6.12. Care should be taken to never open a current metering circuit while equipment is energized.
- 6.13. The 3rd point of contact shall be covered with protective covers where practical.

# 7. Relevant Legislation

Occupational Health and Safety Act, 1990.

# 8. Related Policies, Procedures and Documents

CSA Z462-18

**Revision History** 

Revision No.	Revision Date (M,Y)	Summary of Change
00	May, 2015	N/A
01	October, 2019	Format
02	February, 2020	Changes to reflect requirements of the Z462