

LEADING THE WAY IN ELECTRICAL SAFETY

*The following is sample only, intended as a Guideline for the Safe Use of Multi-Meters.
A more comprehensive document may be required to be considered adequate.
Consult the Authority Having Jurisdiction.*

COMPANY: _____

Contact: _____

SECTION: Safe Work Procedures

Date Issued: 00/00

SUBJECT: **Multimeters and Fused Leads**
Safe Work Procedure Guidelines

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INTRODUCTION: The following provides a guideline intended to assist in defining safety steps and procedures suitable for companies to follow to keep employees and contract staff safe from potential hazards associated with using multimeters for testing or troubleshooting electrical systems. This constitutes only suggestions that should be included in a Safe Work Document and may require additional inclusions to be considered adequate.

PURPOSE: To assist in the development of site-specific safety guidelines for companies to protect workers and contract staff from potential hazards associated with user error and other failures associated with the application of multimeters used for testing or trouble shooting electrical systems.

POLICY: The Company requires the use of minimum CAT III Multimeters (or higher where required) with appropriately rated, fused leads:

- As a troubleshooting tool for electrical systems; and
- As a testing tool to verify electrical systems have been de-energized.

The Company believes that electrical work should be carried out with the electrical system de-energized, whenever possible. In keeping with this mandate, a policy of Live Work under only those limited conditions permitted under the Occupational Health & Safety Act will be permitted, when it is not practicable, to disconnect electrical equipment or conductors from the power supply before working on, or near, live exposed parts of the equipment or conductors. "Not practicable" does not mean "not convenient". It would include meaning where life, limb or property damage may occur if the power is turned off.

"Not practicable" also includes the need to troubleshoot live electrical systems where the troubleshooting can not be done de-energized. In these circumstances it is critical to take safety precautions, including:

1. Use a multimeter that is properly rated for the job.
2. Use properly rated fused leads with the multimeter.
3. Use personal protective equipment.

**LEGAL
REQUIREMENTS:**

The Ontario Electrical Safety Code (Ontario Regulation 164/99) states 2-304 Disconnection

(1) No repairs or alterations shall be carried out on any live equipment except where complete disconnection of the equipment is not practicable.

As well, Occupational Health and Safety Act (OHSA) and Regulations for Construction Projects requires systems to be de-energized prior to conducting any electrical maintenance work (Section 188(1)) to protect electrical trades and maintenance workers.

If it is not practical to disconnect an electrical system, workers should follow the rules outlined to protect them. This includes the use of personal protective equipment (approved rubber gloves, mats, shields and V-rated tools), and spotters when working on live electrical systems greater than 300 volts (OHSA Reg 213/91, Section 189 (4)). OHSA requirements for construction projects further require employers to:

- a) *establish and implement written measures and procedures for complying with this section to ensure that workers are adequately protected from electrical shock and burn (Section 190 (2)); and*
- b) *make a copy of the written measures and procedures available to every worker on the project (Section 191(5)).*

(3) Section 190 (2) requires that "The worker shall follow the written measures and procedures".

Non-compliance with these requirements could lead to charges being laid to the contractor and the facility owner under the Occupational Health and Safety legislation or the Criminal Code.

COMPANY SAFETY REQUIREMENTS:

This Company is committed to the preventing injuries by providing a safe and healthy environment for its employees.

Whenever possible, electrical systems will be de-energized prior to electrical work being initiated.

Trouble shooting of electrical systems requiring that work be conducted on live electrical systems will require workers:

- 1. Use a minimum CAT III Multimeters (or higher as required) combined with fused leads that have an adequate rating.**
- 2. Use appropriate personal protective equipment**

These steps will be followed to ensure that potential electrical hazards associated with multimeter are eliminated. (mark those which apply to your facility with an "✓")

☐ **Do a site analysis**

Identify voltage ratings and any unusual electrical circumstances. Exits, first aid equipment, etc.

☐ **Have an emergency plan**

Work with a partner trained in first aid and discuss procedures if something goes wrong, where required by OHSA.

☐ **Wear proper Personal Protective Equipment (PPE)**

(See OSHA Requirements or NFPA Section 70E as required)

☐ **Understand the "CAT" ratings**

Select the highest rated multi-meter available, Never use less than CAT III rating on Construction and Industrial sites. Know what the CAT ratings limitations are.

❑ **Use approved products**

Ensure multimeters and fused leads are approved, in accordance with the Ontario Electrical Safety Code

❑ **Check multimeter rating**

Ensure the multimeter rating is as high as or higher than the equipment you are going to work on.

❑ **Check fused lead rating**

Ensure fused leads and internal probe fuse, are rated as high as or higher than the equipment you are going to work on.

❑ **Confirm the multimeter is set to the highest voltage possible.**

Never exceed the voltage limits of the multimeter.

❑ **Cover up in-line “Amp” measurement feature.**

If the in-line Amp feature is infrequently used, cover or block these slots to eliminate a common user error of the probe being inserted into the wrong slot.

❑ **Do an “Inventory” of personal “Point of Entry, Point of Exit” hazards.**

Do not allow yourself to become a conductor.

❑ **Ensure your multimeter is in good operating condition**

Ensure batteries in the multi-meter are working. Weak batteries have been known to give inaccurate readings. Contamination of water, dirt or moisture from temperature changes could cause failure.

❑ **Ensure your fused leads are in good operating condition. (properly rated, working fuses, fresh batteries, no damage)**

1. Careful examination of the insulation, probe handles and connectors, for signs of damage is an important process.
2. Any compromise of the dielectric integrity can result in shock or short circuit.
3. Check the probe fuse to ensure that it is in place and is not less than 600v (Note: Even though a 250v rated fuse will fit many probes, they will offer absolutely no protection to the user while testing 600v)

❑ **Apply the “3-point test”**

1. Test a circuit know to be live
2. Measure the target circuit
3. Re-test the live circuit, to ensure all of the multimeter components are functioning, including fuses

❑ **Don’t switch multimeter functions while the meter is energized**

Ensure the test probes are removed from any source of energy when changing settings.

Avoid wherever possible, having a partner operate the multi-meter.

When switching from different meter functions or test points, take an extra moment to check that the settings on the meter match the application.

SAFETY

RESPONSIBILITIES:

Supervisors are responsible for instructing workers and contract staff in following safe multimeter guidelines prior to initiating electrical work and/or maintenance.

Any decision to attempt live testing/work, will be made by the Supervisor in conjunction with the Company’s Safety Director. In the field, the supervisor is to assess the level of risk of the work being done, and must carry out a risk analysis or job safety plan.

Supervisors are responsible for ensuring employees are provided with, and trained on, the use of properly rated multimeters and fused leads as well as personal protective equipment. Supervisors are responsible for establishing timelines for inspection and maintenance of meters, fused leads and personal protective equipment have been established and communicated. Supervisors are responsible for ensuring that these guidelines are communicated to, and understood, by any staff likely to work on electrical equipment.

Employees are responsible to notify supervisors of the need for meters, fused leads and Personal Protective Equipment, and to ensure that systems are de-energized whenever possible and that safety procedures are followed during troubleshooting of electrical systems and informing their supervisors before any deviation to this plan is attempted.