

Guideline - in the event of flooding or water damage

Background:

Electrical equipment and wiring that has been exposed to water through flooding, fire fighting activities, etc. may be dangerous if re-energized without proper evaluation and reconditioning or replacement by qualified persons. In many cases the water has been contaminated with soil, debris, chemicals, sewage, oil, or other substances. Reductions in the performance of electrical equipment and wiring and the integrity of electrical insulation due to contamination by moisture and pollutants may lead to fire and shock hazards.

Getting your power reconnected.

When electrical power has been disconnected from the premises, the utility may require written authorization from the Electrical Safety Authority prior to reconnecting power. Any necessary repairs or replacement of wiring and equipment shall be completed and a notification of work shall be submitted to ESA to have it inspected and authorized for reconnection of service. Further information regarding this process may be obtained from the Electrical Safety Authority. 1-877-ESA-SAFE (1 (877) 372-7233) or at www.esasafe.com.

Reconditioning flood or water damaged equipment.

Do not plug in or attempt to use electrical appliances that have been submerged or sprayed with significant jets of water until they have been serviced by a manufacturer approved service agency. Certain electrical equipment that has been submerged may have to be replaced, while other equipment may be salvageable when serviced by qualified personnel.

Working knowledge of electrical systems including the equipment and wiring in question is required to properly assess damage from contact with water and pollutants and to take proper corrective actions. In many cases replacement of the affected wiring and equipment is the only safe alternative, even if no visible damage is apparent. Simply allowing equipment and wiring to “dry out” and then reenergizing it is not recommended practice. Attempts to recondition equipment by unqualified persons may result in additional hazards from the use of improper cleaning agents and techniques. Electrical equipment or components, which have been replaced due to water damage should be destroyed and **must not** be re-used in another application. All repair or replacement of electrical wiring and equipment is subject to the inspection requirements contained in the Ontario Electrical Safety Code. While restoring power after a disaster is a priority, doing it safely is a necessity; one disaster is enough.

The Following table provides a summary of the most common equipment involved with Electrical installations. For equipment not identified in the table and more details, please reference the NEMA GD 1-2019 document for Evaluating Water Damaged Electrical

Equipment and its related documents. Your local area electrical inspector is also an excellent resource to help with repairs and questions.

<https://www.nema.org/standards/view/evaluating-water-damaged-electrical-equipment>

Points to remember:

- Electrical Equipment exposed to water may be dangerous if re-energized without proper evaluation by qualified persons.
- All electrical equipment with electronic components such as breakers, smoke and CO2 detectors, GFCI's, AFCI's, VFD's and surge protective devices that have been sprayed or submerged must be replaced. There are no methods of insuring these life safety devices will operate as intended after they are exposed to water.
- All electrical equipment, panelboards, switchgear, motor control centers, boilers and boiler controls, electric motors, transformers, receptacles, switches, light fixtures, electric heaters and appliances such as water heaters, ovens, ranges, and dishwashers that have been submerged need to be replaced or repaired by the original manufacturer or an approved representative
- When returning home to a flood damaged area take extreme precautions, avoid any electrical power wires, report any downed wires to the LDC – Local Distribution Company or utility.
- Do not plug in or attempt to use electrical appliances that have been wet until they have been serviced by an electrician or service agency.
- To help reduce the risks associated with using electrical appliances in wet and damp locations, use a GFCI (ground fault circuit interrupter) to help prevent shocks.

| Equipment | Replace when Submerged | Replace when Sprayed | Requires additional testing | Notes |
|--|------------------------|----------------------|-----------------------------|--|
| ELECTRICAL DISTRIBUTION EQUIPMENT | | | | |
| Molded-Case circuit breakers | ✓ | ✓ | | |
| Fuses | ✓ | ✓ | | |
| Switches | ✓ | ✓ | | |
| Busway (Mylar wrapped bars) | ✓ | ✓ | | |
| Busway (powder-coated bars) | | | ✓ | |
| Residential Panelboards | ✓ | ✓ | | |
| Commercial Panelboards | | | ✓ | Replacement of interior components. |
| Switchboards | | | ✓ | Testing to confirm suitability based on construction |
| TRANSFORMERS | | | | |
| All dry-type transformers; All kVA | ✓ | ✓ | | If sprayed indirectly, testing to determine suitability as per manufacturer |
| All dry-type control power Xfmrs | ✓ | ✓ | | If sprayed indirectly, testing to determine suitability as per manufacturer |
| Liquid-filled transformers | | | ✓ | Analysis of the insulating medium is required for the evaluation |
| Cast-resin transformers | ✓ | | | |
| WIRE, CABLE AND FLEXIBLE CORDS | | | | |
| Cable with paper wrapped conductors | ✓ | ✓ | | |
| Wire or cable listed for dry locations | | | ✓ | Test cables insulation integrity, when the ends of the conductors have not been submerged See Table below |
| Armoured cable listed for dry locations | ✓ | | ✓ | If sprayed, testing to determine suitability when the ends of the |

| Equipment | Replace when Submerged | Replace when Sprayed | Requires additional testing | Notes |
|---|------------------------|----------------------|-----------------------------|--|
| | | | | conductors have not been submerged |
| Wire or cable listed for wet locations | | | ✓ | Provided that the ends of the wire or cable have not been exposed to water and the wire is not damaged |
| EQUIPMENT | | | | |
| Wiring Devices (Switches, receptacles, dimmers, etc.) | ✓ | ✓ | | |
| GFCI and AFCI Devices | ✓ | ✓ | | |
| Motors | | | ✓ | If not of the sealed type need to be tested by accredited manufacture repair facility |
| Batteries | ✓ | | | |

Insulation Resistance Test Values From ANSI/NETA ATS-2009

| Nominal Rating of Equipment in Volts | Minimum Test Voltage, DC | Recommended Minimum Insulation Resistance in Megohms |
|--------------------------------------|--------------------------|--|
| 250 | 500 | 25 |
| 600 | 1,000 | 100 |
| 1,000 | 1,000 | 100 |
| 2500 | 1,000 | 500 |