

## Water Damaged Electrical Distribution and Control Equipment Class 0110

### Background

Flooding and other disasters prompt many questions about water damaged electrical equipment. Can the equipment be dried out? Is the circuit breaker still okay to use? Can the switchboard be re-energized?

Considering these and other questions, it is most important to remember that, in many cases, the water that has been in contact with the equipment has been contaminated with sewage, chemicals, or other substances that can negatively affect the electrical equipment's integrity.

The answers are not always simple, but this data bulletin is intended to provide some guidelines to help answer these and other questions related to water damaged electrical equipment.

### Wet Electrical Equipment

Consider the following when assessing wet electrical equipment.

- Electrical equipment that has been submerged or has come in contact with water must be replaced. There are exceptions to this rule for larger equipment (see page 2).
- Attempting to dry out the equipment (in many cases) leaves portions of the current-carrying parts with damp or wet surfaces. These surfaces may be in contact with insulators or other materials that prevent them from being properly dried out and cleaned of debris.
- Residual debris or wet surfaces may result in a loss of dielectric spacing within the equipment, and could present a hazard upon re-energization.
- Molded case circuit breakers should never be re-energized if they have been subjected to or immersed in water. It is likely that wet or damp surfaces and foreign debris remain inside the circuit breaker housing.
- New equipment is built at the factory by trained personnel and is built based on strict design guidelines. Non-trained personnel should not attempt to disassemble and reassemble equipment. This may result in improper assembly and could create a hazard upon re-energizing.
- Equipment that must be replaced in its entirety is listed below:
  - Miniature and molded case circuit breakers (including Masterpact™ NT/NW circuit breakers)
  - Molded case switches (including Masterpact NT/NW switches)
  - Multi-metering equipment
  - Safety switches (AC and DC switches)
  - Load centers or panelboard interiors and other components (see exceptions under the section "Equipment with Field Replaceable Interior Components" on page 2)
  - Dry-type transformers
  - Busway: mylar wrapped bars (indoor)
  - Solid state components
  - Programmable logic controllers
  - Fuses
  - Electromechanical relays, contactors, starters, push buttons, limit switches, and other input logic and output controls
  - Solid state motor starters
  - Adjustable speed drives
  - Motor control center components

## Reconditioning of Larger Equipment

For certain types of equipment, disassembly may be performed by trained factory service personnel who are familiar with the equipment design and function. Schneider Electric Services can help in evaluating this equipment, making recommendations, and discussing the next appropriate phase of recovery with customers. To contact Schneider Electric Services, call 1-888-778-2733.

Equipment that may be reconditioned includes:

- Switchboard enclosures and bus structure (depends on bus structure arrangement and types of insulating materials used)
- Switchgear
- Low-voltage power circuit breakers (excluding Masterpact™ NT/NW circuit breakers) <sup>1</sup>
- Medium voltage circuit breakers
- Low voltage bolted-pressure switches <sup>1</sup>
- Medium voltage switches
- Motor control center enclosures and bus structure (depends on bus structure arrangement and type of insulating materials used)
- Panelboard and load center enclosures
- Liquid-filled power transformers
- Cast-resin transformers
- Busway: epoxy coated bars (outdoor)

Reconditioning of this equipment may include repair or replacement of internal components. This service should only be performed by qualified personnel familiar with the operation and construction of such equipment. The ability to recondition this equipment will vary depending on equipment age, contamination level of the water, and the length of time in contact with water.

## Equipment with Field Replaceable Interior Components

Generally, this type of replacement is limited to a load center or panelboard type of product where the entire assembly can be removed and replaced as a unit. In this case, there is a possibility that enclosures can be reused if they have not been subjected to physical damage and if they have been properly cleaned of all debris and foreign materials.

Contact your local Schneider Electric representative for possible replacement interior assemblies.

Equipment with mechanical components that cannot be field replaced, such as a safety switch, must be removed and replaced in its entirety. These mechanical components are critical to proper operation of the equipment and may have sustained damage.

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<sup>1</sup> Low voltage power circuit breakers and bolted-pressure switches cannot be dried out and cleaned. They must be repaired with new parts including mechanisms, trip units/fuses, and other electrical components.

## Cleaning Agents and Abrasives

Do not apply cleaning agents, particularly petroleum-based cleaners such as WD-40® and CRC®, to the current-carrying portions of electrical equipment to remove foreign debris, residues, and other substances. This practice can be hazardous and should be avoided.

Some cleaning and lubricating compounds can cause deterioration of the non-metallic insulating or structural portions of the equipment (see National Electrical Code® 110.11 FPN No. 2).

Do not use abrasives such as sandpaper or steel wool to clean current-carrying parts of the equipment. These materials may remove plating or other conductive surfaces from the parts, which could result in a hazard when the equipment is re-energized.

## Non-Submerged Equipment in Flooded Areas

Equipment in this situation should be inspected carefully by a qualified person to determine whether moisture has entered the enclosure. If any signs of moisture or damage exist, the equipment should be replaced or repaired, as previously described.

## Other References

- NEMA Standard AB 4-2003, *Guidelines for Inspection and Preventive Maintenance of Molded Case Circuit Breakers Used in Commercial and Industrial Applications*
- NEMA Standard BU 1.1-2000, *General Instructions for Proper Handling, Installation, Operation, and Maintenance of Busway Rated 600 Volts or Less*
- NEMA Standard PB 1.1-2002, *General Instructions for Proper Installation, Operation, and Maintenance of Panelboards Rated 600 Volts or Less*
- NEMA Standard PB 2.1-2002, *General Instructions for Proper Handling, Installation, Operation, and Maintenance of Deadfront Distribution Switchboards Rated 600 Volts or Less*
- NEMA Standard ICS 1.1-2003, *Industrial Control and Systems: Safety Guidelines for the Application, Installation, and Maintenance of Solid State Controls*

## Other Considerations

Consideration must be given to other components in the electrical system such as conductors, connected utilization equipment, connections in junction boxes, etc.

## Summary

In general, water damaged equipment must be replaced. It is important to the entire electrical system that distribution and control equipment function properly. Equipment or components that have been replaced due to water damage should be destroyed; they should not be reused in another application.

The CCC can answer any questions you have about water damaged equipment. Schneider Electric Services offers a variety of services, including inspecting, testing, and reconditioning of electrical equipment. To contact the CCC or Schneider Electric Services, please call 1-888-778-2733.

**Schneider Electric USA, Inc.**  
1601 Mercer Road  
Lexington, KY 40511 USA  
1-888-778-2733  
www.schneider-electric.us

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