Content Community Connection

United States
The Electricity Forum Inc.
742 Pre Emption Road
Geneva, NY 14456
Tel 289-387-1025

Canada
The Electricity Forum
1885 Clements Rd, Unit 218
Pickering, ON L1W3V4
Tel 905-686-1040
Fax 905-686-1078
Toll Free 855-824-6131

UPS Battery Maintenance - Testing Inspection, Safety

View Course Details

COURSE DATES AND TIMES

March 9-10 , 2026

10:00 am - 4:30 pm ET

July 20-21 , 2026

10:00 am - 4:30 pm ET

November 16-17 , 2026

10:00 am - 4:30 pm ET

Why UPS Battery Maintenance Training Matters

Uninterruptible Power Supply systems are only as reliable as the batteries that support them. During a power outage, battery failure is one of the most common causes of UPS system breakdowns, leading to equipment damage, data loss, and safety risks. Proper battery maintenance, testing, and safety procedures are essential to ensure emergency power is available when it is needed most.

Uninterruptible power supply maintenance plays a critical role in protecting electronic devices from power interruptions and ensuring dependable operation during outages. Factors such as ambient temperature and battery chemistry directly impact battery life, performance, and longevity, making it essential to perform regular inspections and testing. Regular maintenance helps identify potential issues early, supports effective maintenance services, and reduces the risk of unexpected failures that can compromise critical systems.

Course Overview

This UPS Battery Maintenance Training course provides in-depth, practical instruction on battery safety, inspection methods, preventive maintenance, and testing procedures for UPS battery systems. Participants gain a strong understanding of battery technologies, battery room requirements, personal protective equipment, and manufacturer-recommended installation and maintenance practices. Emphasis is placed on real-world maintenance tasks that improve battery reliability, extend service life, and reduce unplanned downtime.

The course is designed for facilities that rely on backup power systems in industrial, commercial, institutional, and critical infrastructure environments. Whether you are responsible for maintaining UPS systems, managing emergency power equipment, or supervising electrical maintenance programs, this training equips you with the knowledge and skills to keep battery systems operating safely and effectively.

Through this 12-hour instructor-led program, participants learn how to properly inspect, test, and maintain UPS batteries so they perform reliably during emergency conditions. Industry standards such as NFPA 70E, IEEE 450, and recognized battery testing guides are used to reinforce best practices for battery maintenance, safety compliance, and risk mitigation.

Learning Outcomes

Upon completion of this UPS Battery Maintenance Training, participants will be able to:

• Identify common types of UPS batteries and explain their operating principles
• Understand battery charging, discharging, and temperature effects on battery performance
• Apply proper battery maintenance and testing procedures to improve reliability
• Safely use battery test equipment, meters, and hand tools
• Follow battery room safety practices, including PPE requirements and hazard awareness
• Use NFPA 70E, IEEE 450, manufacturer instructions, and recognized battery testing guidelines to develop effective battery inspection and maintenance programs
• Perform routine inspection, testing, and preventive maintenance of vented lead-acid batteries in stationary UPS applications
• Identify battery installation requirements and battery room design considerations based on IEEE recommendations

WHO SHOULD ATTEND

- Electrical Engineers
- Electrical Maintenance Trades people & Technicians
- Instrumentation and Control Engineers
- Power System Protection and Control Engineers
- Building Service Designers
- Data Systems Planners and Managers
- Other electrical personnel involved in the maintenance industrial, commericial and institutional power systems

STUDENTS RECEIVE

- UPS Battery Maintenance Training Course Certificate
- 1.2 Continuing Education Unit (CEU) Credits (12 Professional Development Hours)
- $100 Coupon toward any future Electricity Forum event (restrictions apply)
- 100-Page Digital Power Quality Handbook - Value $20 (details below)
- A FREE Magazine Subscription (Value $50)
- Course Materials in PDF Format

COURSE OUTLINE

UPS Battery Maintenance Training Course Outline

DAY ONE

BATTERY BASICS

- Introduction To Various Battery Technologies
- The Objective Of Battery Design
- Universal Law Of Conservation Of Energy

TYPES OF BATTERIES

- Primary, Secondary And Reserve Types
- Dry And Wet Cell Batteries
- Lead Calcium, Lead Antimony, Value Regulate Lead Acid, Absorbed Glass Mat Batteries
- Gel Cell, Automotive And Deep Cycle Batteries

BATTERY BASIC CONSTRUCTION

- Physical characteristics
- Terminals, + And – Plates, Electrolyte, Relief Valve, Separators And Container

FACTORS TO DETERMINE BATTERY ELECTRICAL CHARACTERISTICS

- Selection Of Active Materials And Weight Of The Active Materials
- Theoretical And Practical Parameters (Voltage And Amp Per Hour)

BATTERY OPERATIONAL THEORY

- Chemical Reactions Within The Battery
- Charging And Discharging Processes

MSDS (Material Safety Data Sheet)

- Sealed Lead Acid Battery And Wet Lead Acid Batteries
- Lithium Ion Battery

BATTERY SAFETY

Arc Flash Risks

- Arc flash assessment
- Arcing Current
- Incident Energy
- Arc Fault Boundary

PPE required due to Arc Flash Risks

- Human Body Surface And Internal Resistance
- Face shield, Coveralls, Gloves
- PPE Testing & Certification Documentation

Environmental safety

- Max & min temperatures for batteries
- Air exchanges, based on Bldg codes
- Hazardous Materials Management Plan

Tools and the risks of using them

- Tools' dielectric rating based on voltage
- Closes safe approach on live cone connections
- Short circuit Current carrying capacity of tools
- Clap meter ratings, AC versus DC
- FLIR camera use

OSHA AND NFPA REVIEW

- Occupational Safety And Health Standards
- National Fire Prevention Standards

BATTERY SIZING DETERMINATION

- KW And KVA Of Electrical Equipment
- Efficiency Of Electrical Equipment
- Battery Watt Per Cell Calculation
- Selection Of Battery, Number Of Cells, Number Of Battery Units And Number Of Cells Per Battery Block
- Single Or Shared Battery Configuration Considerations

DAY TWO

BATTERY SHIPMENT AND RECEIVING

- Visual Inspection (External And Internal)
- Concealed Damage, Housing Damage And Cracking
- Battery Storage Location, Tie Restriction And Handing

INSTALLATION COORDINATION AND BEST PRACTICES

Equipment movement & placement

- Weight loading, raised floor vs concrete floor
- Seismic provisioning
- Anchoring, Configuration

Bonding & Grounding

- Bonding with respect to raised floor systems
- Grounding requirements as per CEC and NEC

Cable management

- Best practices for Teck vs conduit
- Sizing and terminations

Contractor issues

- Recommended pre-commissioning checklists
- Coordination with GC for HVAC and structural provisions
- Environmental requirements for decommissioning old units during equipment swaps
- Eye Water Station

BATTERY CHARGING

- Charger Selection
- Switching Mode, Linear, Shunt, Chopper, Pulsed, USB And Inductive Types

CHARGING METHODS

- Constant Voltage, Constant Current, Pulsed Trickle, Slow And Fast

NATURE OF CHARGING

- Initial (Equalization) Normal Float, Termination Time & Temperature Relationship

CHARGER PERFORMANCE

- Voltage & Current Regulation, AC Ripple, Efficiency, Inrush Current, Power Factor, 2nd Current Limitation

WET CELL BATTERY INSTALLATION CERTIFICATION

- Third-Party Battery Inspection
- Initial And Final Open Battery Voltage And Battery Specific Gravity Measurement

FACTORS AFFECTING BATTERY PERFORMANCE

- Battery Voltage, Nature Of Discharging, Charger Voltage Regulation, AC Ripple,
- Impurity Of Battery Active Material, Internal Battery Temperature, Charging
- Methods, Number Of Deep And Normal Discharging And Battery Aging

VRLA BATTERY THERMAL RUNAWAY

- Battery Internal Impedance And Temperature Relationship
- Causes And Prevention

BATTERY MAINTENANCE

- Monthly, Quarterly And Annual Check Lists
- System Voltage, Charger AC Ripple, Internal Battery Temperature
- Electrolyte Level, Specific Gravity, Individual Cell Voltage, Internal Ohm
- Inter-Cell Resistance Housing, Terminal Corrosion, Pole Discolor And Leaking

BATTERY CLEANING

- Battery Individual Cell Posts And Connectors, Safety Precautions And Cleaning Materials

SIGNS OF BATTERY FAILURE

- Electrolyte Levels, Plates Deformation, Sediment, Sinking Poles And Abnormal Heat

IEEE 450-2010 STANDARD

- Review Key Points With The IEEE 450
- Protective Equipment, Duration Of BM, State Of Charging Determination
- Capacity Testing Method, Time Adjustment, Temperature Factor Method And Rated Battery Adjustment Method

BATTERY TESTING

- R And Z Relationship With Heat
- Internal Self-Discharging
- Battery Impedance And Resistor Type Testers, Ground Fault Condition And Detection
- Battery Replacement Guidelines

COURSE TIMETABLE

Start: 10 am ET
Finish: 4:30 pm ET