



Content
Community
Connection

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Combined LV & HV Electrical Safety Training

Contact us Today for a FREE quotation to deliver this course at your company's location.

<https://www.electricityforum.com/onsite-training-rfq>

Our popular Combined Arc Flash Training course is designed for front-line workers who are responsible for electrical systems. This standard covers safe work practices related to electrical dangers in the workplace. Students will gain a solid understanding of hazards encountered while operating or maintaining electrical installations in the low voltage (below 750V) class including a full understanding of the arc hazard categorization, appropriate PPE selection and safe electrical work procedures AND the high voltage class.

This 12-Hour course is designed to assist organizations to identify shock and arc flash hazards and prevent injuries and incidents associated with those hazards.

Our Combined Arc Flash/Electrical Safety Awareness Workshop is instructed by our certified electrical expert, who has more than 25 years field electrical safety and maintenance experience. This electrical safety workshop examines the hazards found in the workplace and stresses the importance of the individual employee proactively recognizing hazards and applying safe work practices with the goal of zero accidents.

CSA Z462 sets a recommended standard for Electrical Safety in Canada. It states that

electrical workers "shall be trained in safety-related work practices and procedural requirements as necessary to provide protection from the electrical hazards associated with their respective jobs or task assignments. Workers shall be trained to identify and understand the relationship between electrical hazards and possible injury."

Our Electrical Safety Training Course offers:

- Electrical Safety Videos
- Physical Demonstrations Of PPE
- Group Discussion And Problem Solving Exercises
- Testing At The Conclusion Of The Course
- Job Briefing Requirements

- Hazardous Energy Control (Lockout/Tagout)
- Switching Procedures
- Clearance Procedures
- Personal Protective Equipment (PPE)
- Flame Resistant (FR) Clothing
- Rubber Protective Equipment
- Live-Line Tools & Testing Requirements
- Working On Or Near Exposed Lines
- De-Energizing Lines And Equipment
- Personal Protective Grounding
- Substation Safety
- Special Conditions
- Capacitors
- Current Transformers
- Potential Transformer Hazards
- Fuse/Relay Coordination

Students Will:

- Learn To Recognize All Medium Voltage/High Voltage Electrical Sources And

Hazards Created By Various High Voltage Electrical Equipment And Devices.

- Determine The Controls Used To Protect Workers From All Energy Sources Created In The Work Place.
 - Learn The Dangers Of How Induced Currents And Ground Gradients Are Produced
 - Learn How To Safely Select, Install And Maintain Temporary Grounds For Protection Of The High Voltage Electrical Worker.
 - Interpret and use a single line diagram to write a switching sequence to safely isolate a high voltage electrical device for work. Validate existing operating orders and switching procedures. Develop and maintain mandated documentation for all electrical equipment isolation and maintenance work.
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- Identify Electrical Safety Training Requirements For Qualified Workers
 - Identify Best Practice Regulations That Address Shock And Arc Flash Hazards
 - List The Steps To Perform A Shock Hazard Analysis And Describe Each Step
 - Define The Shock Protection Boundaries And Describe Their Use
 - List The Personal Protective Equipment Required For Shock Protection
 - List The Steps To Achieve An Electrically Safe Work Condition
 - Explain What An Arc Flash Is And The Injuries That Can Result
 - Identify When An Arc Flash Hazard Exists
 - List The Steps To Perform An Arc Flash Hazard Analysis And Describe Each Step
 - Define The Term “Incident Energy,” Identify The Key Electrical System Variables That Affect It
 - Define The Term “Arc Flash Protection Boundary” And Explain Its Application
 - Define The Term “Arc-Rated” And Explain The Difference Between “Flame-Resistant” Clothing And “Arc Rated” Clothing
 - Select Appropriate Personal Protective Equipment For Arc Flash Hazards
 - Describe Methods Of Selecting Arc Flash PPE Using The New Tables. New
 - List The Testing And Maintenance Requirements For Personal Protective Equipment
 - Identify The Key Objectives Of Job Safety Planning

WHO SHOULD ATTEND

- Utility Workers Who Work Around High-Voltage Power Lines, Overhead Or Underground Cabling Systems
- Substation Electricians
- Electrical Engineers
- Commercial And Industrial Electricians
- Instrumentation Mechanics
- Electrical Technicians
- Managers & Safety Professionals
- Electrical Engineers
- Plant Electricians
- Qualified Electrical Workers
- Instrumentation Mechanics
- Electrical Technicians
- Managers & Safety Professionals

STUDENTS RECEIVE

- 100-Page Electrical Safety Handbook - Value \$20 (Details Below)
- 1.4 Continuing Education Unit (CEU) Credits
- A **FREE** Magazine Subscription (Value \$25)
- **\$100** Coupon Toward Any Future 2016 Electricity Forum Event (Restrictions Apply)
- Course Presentations In Paper Format
- NOTE: This Course DOES NOT INCLUDE A CSA Z462-15* Standard. Copies Of The CSA Z462-15* Standard Must Be Purchased Separately From Canadian

Standards Association And Brought To The Course.

COURSE OUTLINE

DAY ONE

UNDERSTANDING ELECTRIC POWER SYSTEMS

- Time-Current Curves & Power System Studies
- Electrical Arc Characteristics

PREPARING TO WORK SAFELY

- Hazard Risk Analysis/ Task Assessment
- Assessment To Lockout Or Work Energized
- Overview Of Lockout Fundamentals
- Working Energized Defined
- Preparing A Job Briefing And Planning Checklist
- How To Plan For An Energized Electrical Work Permit
- Elements Of An Energized Electrical Work Permit

ELECTRICAL HAZARDS

- Electrical Shock
- Effects Of Current On Human Beings
- Shock Protection Boundaries
- Approach To Energized Electrical Conductors Or Circuit Parts Operating At 50 Volts

- Or More
- Arc Flash/ Arc Blast
- Elements And Characteristics Of An Arc Flash Event
- Arc Flash Hazard Analysis
- Arc Flash Protection Boundary For Voltages Between 50 And 600 Volts

ESTABLISHING AN ELECTRICALLY SAFE WORK CONDITION

The most effective way to prevent electrical injury is to completely remove the source of supply. This section will discuss the methods and process of achieving an electrically safe work condition. Including the following:

Working On or Near De-energized Electrical conductors or Circuit Parts That Have Lockout Devices Applied

- Principles Of Lockout Tagout Execution
- A. Employee Involvement
- B. Training
- C. Plan
- D. Control Of Energy
- E. Identification
- F. Voltage
- G. Coordination

Hazardous Electrical Energy Control Procedures

- A. Individual Qualified Employee Control Procedure
- B. Simple Lockout Tagout Procedure
- C. Complex Lockout Tagout Procedure
- D. Coordination
- E. Training And Retraining

Equipment

- A. Lock Application
- B. Lockout Tagout Device
- C. Lock Out Device
- D. Tagout Device
- E. Electrical Circuit Interlocks
- F. Control Devices
- G. Procedures
- H. Planning

DETERMINING SAFE APPROACH DISTANCE

- Determining Safe Approach Distance
- Definitions Of Boundaries And Spaces
- Limits Of Approach
- Shock Hazard Analysis
- Shock Protection Boundaries
- Limited Approach Boundary
- Restricted Approach Boundary
- Prohibited Approach Boundary
- Hazard Boundary

Shock Hazard Boundaries

- Limits Of Approach
- Preparation For Approach
- Qualified Persons, Safe Approach Distance
- Electrical Conductors Or Circuit Parts For Shock Protection
- Safe Working Distances From Energized Conductors

BASIC METHOD FOR DETERMINING ARC FLASH HAZARD ASSESSMENT

- Breakdown And Characteristics Of The 4 Hazard Risk Categories - NEW
- Selection Of Personal Protective Equipment For Various Tasks
- Hazard/ Risk Category Classification

- Protective Clothing And Personal Protective Equipment (PPE)
- Protective Clothing Characteristics
- Factors In Selection Of Protective Clothing And Equipment
- Two Category, Flame Resistant (HRC/ Hazard Risk Category) Clothing System - NEW
- Layering Protective Clothing And Total System Arc Rating
- Arc Rating, Arc Thermal Performance Value (ATPV) And Break-Open Threshold Energy (EBT)
- Brief Overview Of Applicable ASTM Standards For Protective Clothing And PPE

Safety-related Electrical Maintenance

- Introduction
- Frequency Of Maintenance Tests
- Maintaining Electrical Drawings
- Maintenance Standards

Electrical Hazard Labels, Arc Flash and Shock Labelling

- General
- Canadian Electrical Code Rule 2-306 Shock And Arc Flash Warning Label
- Arc Flash Label Example
- Detailed Arc Flash Hazard Analysis Label - NEW

NEW ANNEX: Prevention of Shock Injuries from Electrostatic Discharges

Prevention of Shock Injuries from Electrostatic Discharges, describes workplace scenarios, such as high-speed network operations, in which potential for shock injury from electrostatic discharge exists. This Annex identifies methods to prevent, control, and protect personnel from injury.

NEW: DC Safety-related Work Practices

The 3rd edition of Z462 has considerably more information on safety-related practices relating to work on and around DC systems. A new Shock Protection Boundary Table for DC systems and an arc flash energy calculation method for DC systems have been added. Extensive revisions have been made to deal with safety-related practices for batteries, battery rooms and battery enclosures. Both high value for anyone working on or around DC equipment. This new additional information is essential for working on DC systems.

ARC FLASH SOLUTIONS

- Arc Flash Study Analysis And Implementation
- Power System Upgrades
- Arc Resistant Switchgear
- Circuit Breaker Retrofitting
- Remote Breaker Racking
- Regular Maintenance And Testing
- Arc Rated Power Switchgear
- Light Sensing Trip Breakers
- GE Arc Vault Protection System

CSA Z462 PPE CLOTHING REQUIREMENTS, Arc Rated CLOTHING TESTING STANDARDS, HOW TO ESTABLISH A PPE PROGRAM IN YOUR COMPANY

- The Evolution Of Arc Resistant (AR Or HRC) Fabrics
- Changes In Clothing Requirements In Electrical Work - New
- The Various Types Of HRC Fabrics That Are Available In The Marketplace
- HRC Fabrics And The Effects Of Undergarments
- Review The Technology And Effectiveness Of Inherently Flame Resistant Fibers Vs Chemically Treated Fabrics
- Developing A PPE Program In Your Company

- Assessing The Correct Arc Flash Hazard And Choosing The Right Level Of Protective Clothing
- Company Training And Worker Compliance
- Documentation **QUIZ**
- A Quiz To Ensure Student Understanding Of The Days Information

DAY TWO

Recognizing Electrical Safety Hazards - Where Do They Exist?

A detailed review of critical electrical safety hazards created by energized electrical equipment:

- Insulation
- Power Cables
- Power Transformers
- Instrument Transformers
- Dealing With Fault Currents
- Disconnect Switches
- Switchgear
- Circuit Breakers
- Fuses
- Electrical Relays
- Motor Starters
- AC/DC Motors
- Capacitors
- Emergency UPS Systems

Resolving Electrical Safety Hazards

Objective: Determine the controls used to protect workers from all energy sources created in the workplace. Benefits of a safe workplace include fewer injuries, lower worker compensation costs, reduced service interruptions, greater protection of capital investment, and increased uptime. This section will provide you with a detailed blueprint that maximizes electrical safety and all the benefits it generates.

- Hierarchy Of Controls
- Management Control
- Legislation
- Electrical Code
- Purchasing Controls
- Engineering Controls
- Training
- Safety Documentation
- Rules
- Safe Work Practices
- Safe Work Procedures
- Codes Of Practice
- Operating Procedures
- Permits & Clearances
- Switching Procedures
- Physical Equipment
- Personal Protective Equipment
- Safety Equipment
- Signs And Barriers
- Equipment Protection
- Interlock
- Grounding
- Field Control
- Inspections
- Job Planning
- Pre-Job Meeting
- Hazard Identification
- Hazard Reporting
- Work Methods
- Limits Of Approach
- Switching Practices

GENERAL ELECTRICAL SAFETY REQUIREMENTS

- Review Of Standards And OH&S Regulations
- HV Electrical Qualifications
- Poles And Structures
- Obstructions On Poles
- Properly Informing Electrical Workers
- Working In Service Rooms
- Space Around Equipment
- Working With HV Test Equipment
- Insulated Aerial Devices

SWITCHING

This section of the course will instruct how to: interpret and use a single line diagram to write a switching sequence to safely isolate an electrical device for work; Validate existing operating orders and switching procedures; and Develop and maintain mandated documentation for all electrical equipment isolation and maintenance work.

- Single Line Diagrams
- Using Prints
- Electrical System Drawings
- Safety Documentation
- Isolation
- Lockout/Isolation
- Switching Workshop

WORKING ON HIGH VOLTAGE ELECTRICAL EQUIPMENT

- Isolation And Lockout
- Warning Signs

WORKING ON DE-ENERGIZED HIGH VOLTAGE POWER SYSTEMS

- Isolation And Lockout
- Person In Charge
- Switching Sequences
- Isolating Devices
- Grounding And Blocking
- Working With Multiple Authorities

WORKING CLOSE TO ENERGIZED HIGH VOLTAGE EQUIPMENT AND CONDUCTORS

- Minimum Clearances
- General Limits Of Approach
- Assurance In Writing
- Assurance Not Practicable
- When Is A Worker Specially Trained And Qualified
- Adjusted Limits Of Approach
- Emergency Work Procedures
- Authorization By Owner To Perform Work

COURSE TIMETABLE:

Both Days:

Start: 8:00 a.m.

Coffee Break: 10:00 a.m.

Lunch: 12:00 noon

Restart: 1:15 p.m.

Finish: 4:30 p.m.

Contact us Today for a FREE quotation to deliver this course at your company's location.

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