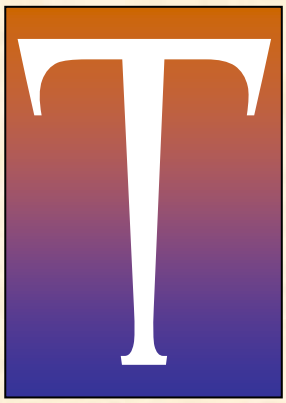
Eversource

Transmission



Administrative Procedure

Transmission Arc Flash Protection

M8-MT-2018, Rev. 5

Approval Signature: *Daniel S. Martin*

Process Owner:	Daniel S. Martin Manager-Safety (CL&P)	Effective Date: 04/25/2016

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1. Purpose

This procedure establishes the specifications for wearing flame resistant (FR), arc rated clothing and clothing systems for Eversource Transmission employees, with the exception of Eversource eastern MA, working near energized transmission system equipment where there is a potential for an arc flash event. This procedure is in addition to any requirements listed in TD-211, "When to Wear Arc Rated Flame Resistant Clothing", and other Eversource arc flash guidelines.

This document explains and reaffirms background, compliance, expectations and communications requirements for managing arc flash hazards. It can also be used as a supplement to arc flash training.

2. Background

In accordance with Occupational Safety and Health Administration (OSHA) 1910.269 and the National Electrical Safety Code (NESC), Section 410A3, employers shall protect employees from flames and electric arcs by:

- Performing an assessment of the workplace to determine the potential for exposure to an electric arc for employees who work on or near energized lines, parts or equipment.
- Estimating the available heat energy from electric arcs to which employees would be exposed.

If the assessment determines a potential employee exposure greater than 2 cal/cm^2 exists, the employer shall require employees to wear clothing or a clothing system that has an effective arc rating not less than the anticipated level of arc energy.

2.1. Assessment to Determine Potential for Exposure

An assessment of the Eversource Transmission system was performed to identify employees' potential exposure to electric arcs while performing work. Typical work tasks performed on or near energized equipment were assessed to determine if the probability of an electric arc event occurring in the employee's work area is higher during performance of the specified work task than under normal operating conditions.

Typical work tasks identified as arc flash hazards are documented in Attachment A, "Typical Work Tasks that May Cause Arc Flash Events". Work tasks or specific work methods on or near energized equipment that are not listed in Attachment A may still pose an increased risk of an arc flash event and shall be assessed in accordance with the criteria provided in the Process Steps section of this document.

2.2. Estimating Available Heat Energy of Arc Flash Events

The estimation of Transmission arc flash energy ratings was performed using the ARCPRO software program to calculate the thermal energy per unit area (cal/cm^2) from the arc that is incident on an employee's body.

The thermal energy available on employee's body due to an arc flash event is calculated based upon several variables, the most significant being:

- arc fault type (three phase or single phase)
- arc current magnitude
- duration of exposure to arc energy (fault clearing time)
- distance from the arc to the employee (working distance)

Arc Fault Type

Three phase arcs consume more power and, therefore, produce more thermal energy. While three phase arcs are much less probable, the possibility of a three phase arc occurring cannot be eliminated based upon working practices/methods. Therefore, the arc flash energy ratings for both three phase and single phase arc events were calculated for each arc fault scenario studied. Since ARCPRO software was designed based upon single phase arc model data, OSHA does not consider the use of unmodified ARCPRO results to be reasonable estimations of the energy for three phase arc events. However, if the employer adjusts the results using the conversion factors provided by ARCPRO, OSHA will consider this program an acceptable method for estimating incident energy three phase arc exposures. Therefore, the arc flash energy values for three phase arc events were calculated using the worst case ARCPRO provided multiplier of 2.2 in accordance with the OSHA directive.

Arc Fault Current Magnitude

Arc fault current magnitudes are based upon the results of ASPEN model fault simulations for various fault types and scenarios. For each substation, a three phase to ground and single phase to ground bus faults were simulated (3LG and 1LG). Additionally, three phase to ground and single phase to ground line end open faults (3LG-LEO and 1LG-LEO) were simulated on each transmission line connected to the substation bus. The worst case (highest) 3LG-LEO and SLG-LEO fault magnitudes were recorded for the given substation and used for calculation of the associated arc flash energy rating.

Arc Duration

Arc duration is defined as the length of time (in 60Hz cycles) an arc fault event lasts (from arc initiation to extinction). The arc duration of a given arc fault event is based upon fault type and location. To ensure conservative results, the arc flash energy calculations were based upon worst case protective relaying clearing times. Standard fault clearing times were developed based upon the relaying scheme type (high speed or traditional step distance) and fault scenario for each voltage class. Since all Eversource transmission lines are protected by two independent protective relaying packages (identified as the System 1 and System 2 protection packages), the protection scheme type (high speed or traditional step distance) must be known to properly calculate the worst case arc flash energy values associated with a given fault. Additionally, since the System 1 and System 2 protection scheme types for a given transmission element are not always the same (e.g., System 1: high speed, System 2: traditional step distance), it must be known what protection systems are in service while work is being performed to ensure the proper arc flash energy level is selected. Therefore, both the System 1 and System 2 clearing times for each substation were considered for each of the fault scenarios studied.

Working Distance

Working Distance is the distance from the arc flash to the employee's body. The "body" is defined as the chest region, not including the arms, legs, or head distance to the arc event. The working distance is assumed to be the applicable phase to ground minimum approach distance (MAD) for a qualified employee. OSHA permits the use of working distances greater than the applicable MAD as a method of moving the employee farther away from the arc and thus reducing the arc flash energy level. Therefore, in addition to the published MADS, arc flash energy values were calculated at larger working distances (including standard hot sticking lengths of 6', 8' and 10') to facilitate work at reduced arc flash energy exposure levels.

Calculation Results

Final arc flash energy results for transmission equipment are provided within Attachment B, "CT, WMA and NH substation Arc Flash Energy Ratings – System 1 Clearing Times" and Attachment C, "CT, WMA and NH substation Arc Flash Energy Ratings – System 2 Clearing Times" of this document. Attachment B provides the arc flash energy rating data calculated based upon arc fault magnitudes of three phase to ground and single phase to ground bus fault scenarios (3LG and 1LG) with arc durations equivalent to the applicable System 1 protective relaying clearing times. Attachment C provides the arc flash energy rating data calculated based upon three phase to ground and single phase to ground line-end-open fault scenarios (3LG-LEO and 1LG-LEO) with arc durations equivalent to the applicable System 2 protective relaying clearing times.

2.3. Requirements

Standard FR clothing systems have been developed to ensure proper protection is provided to employees for all potential arc exposures. Attachment F, "FR Clothing System Requirements", allows the employee to select the appropriate FR clothing system based upon the type of work performed and the applicable arc flash energy rating category.

In 2014, the Occupational Safety and Health Administration (OSHA) published its final Rule which included additional requirements to provide head to toe protection from arc heat energy. For much of the electric utility industry, this adds the requirement for employees to wear head and face protection when exposed to arc energy greater than 8 cal/cm^2 (single phase) or 4 cal/cm^2 (three phase).

In addition to head and face protection, the 2014 Final Rule also specified that hands and feet must be protected from arc flash energy. The current Employee Safety Manual and work procedures require employees to wear rubber gloves with protectors and sturdy work boots when working on energized electrical facilities. No additional hand or foot protection is required to protect Transmission/Contractor Employees at this time.

Equipment < 1000V

The 2012 NESC has also established arc flash ratings for secondary systems for voltage below 1000 volts. The NESC ratings are based on the equipment type and the nominal operating voltage. Testing has shown that arcs on nominal operating voltages less than 250V to not sustain for more than two cycles and arc energy is limited to less than 4.0 cal/cm^2.

Under certain conditions, voltages greater than 250V can sustain arcs for longer periods and will usually have higher exposure values. Moreover, equipment type will have a significant impact upon arc flash exposure at a given voltage level. This is due to the spacing of the energized parts, the proximity to grounded parts, and the size of the enclosure.

3. Scope

This procedure applies to all Eversource transmission employees and contractors, with the exception of Eversource eastern MA, working on or near energized transmission voltages 69kV or greater where there is a potential for an arc flash event. This applies to both Transmission and Distribution (T&D) maintained assets that are 69kV or greater, including new construction and maintenance of existing T&D facilities. This document also applies to employees and contractors working on or near energized equipment rated 1,000 volts or below (secondary voltages).

This document references TD-877, "Managing Arc Flash Hazards on CL&P Distribution Facilities" and TD-879, "Managing Arc Flash Hazards on WMECO Distribution Facilities" for Transmission personal working on or near energized Distribution voltages of >1,000 volts up to 34,500 volts. Transmission employees engaged in Distribution work shall adhere to TD-877 and TD-879.

4. Roles and Responsibilities

Roles and responsibilities are identified in the Process Steps section. The role is listed along the left margin and is followed by numbered instructions.

5. Process Steps

Transmission Manager

5.1.1. Work with Eversource Safety to identify arc flash mitigation practices.

5.1.2. Ensure that employees within your section understand and follow all Transmission and Eversource safety rules.

5.1.3. During the job pre-planning process, conduct a job assessment to evaluate actual or potential hazards which may be expected to occur during the project.

5.1.4. If the job is infrequently performed, complex, or is non-routine work, perform a Job Hazard Analysis (JHA). (Refer to M8-MT-2005, "Transmission Job Hazard Analysis Process".)

NOTE
Infrequent is defined as not performed in the last 12 months.

Transmission/Contractor Supervisor or Designee

5.1.5. During planning work on or near an energized transmission and/or distribution line and/or equipment, identify if the employees will be exposed to a known arc flash hazard.

a. Refer to Attachment A, "Typical Work Tasks That May Cause Arc Flash Events", for a list of typical work tasks which have been identified as known arc flash hazards.

NOTE
Attachment A lists ONLY typical work tasks that may cause an arc flash event.

b. If the planned work task is NOT listed in Attachment A, assess the specific work task/sequence to determine if the work will expose the employee(s) to an arc flash hazard. The assessment shall determine if there is an increased likelihood of an electric arc event occurring in the work area due to the work being performed. Some factors to consider include, but are not limited to, the following:

- Does the planned work result in an increased probability that conductive objects can come too close to or fall onto the energized parts?

- Does the planned work include the servicing or maintenance of energized electric equipment where there is evidence of impending failures, such as evidence of arcing or overheating?
- Does the planned work include operation of equipment that exhibits signs of damage or defects?

5.1.6. Once the Transmission/Contractor Employee's potential exposure to an electric arc has been established, determine the estimated/calculated arc flash incident (heat) energy rating associated with the work task being performed, as follows:

a. For work on energized transmission equipment (substation and overhead lines ≥ 69-kV), determine if the transmission line/equipment is protected by at least one high speed protective relaying scheme (reference the applicable substation Operating Instructions documents).

(1) If zero or two high speed protective relaying schemes exist, select the higher of the two arc flash energy ratings published in Attachment B, "CT, WMA and NH substation Arc Flash Energy Ratings – System 1 Clearing Times" and Attachment C, "CT, WMA and NH Substation Arc Flash Energy Ratings – System 2 Clearing Times" for the specified substation bus.

(2) If only one high speed clearing scheme exists, determine arc flash energy rating in accordance with one of the following methods:

(a) System 1 (High Speed) Protective Relaying In Service:

i. As part of the Clearance Request process, include a specific requirement for the System 1 (high speed) protective relaying schemes to remain in service.

ii. If the system operator (CONVEX or ESCC) approves the clearance request, thus confirming that high speed protective relaying will remain in service, refer to Attachment B, "CT, WMA and NH Substation Arc Flash Energy Ratings – System 1 Clearing Times".

(b) System 2 Protective Relaying Only:

i. If the specific work task must be performed with the System 1 (high speed) out of service, refer to Attachment C, "CT, WMA and NH Substation Arc Flash Energy Ratings – System 2 Clearing Times".

NOTE

Due to the longer clearing times associated with traditional step distance relaying schemes, the System 2 arc flash energy ratings within Attachment C will be higher and will, therefore, require additional personal protective equipment (PPE) and/or alternate work methods (e.g., larger working distances or hot sticking lengths) to achieve proper protection for arc flash hazards.

b. Select the arc flash energy rating (from the appropriate Attachment as determined in Process Step 5.1.6 above) for the work being performed in accordance with the following:

(1) Select the higher of the two published arc flash energy ratings in the applicable attachment (3LG or 1LG in Attachment B; 3LG-LEO or 1LG-LEO in Attachment C).

(2) Within Attachment B and Attachment C, select the arc flash rating based upon the assumption that the Transmission Employee/ Contractor will be performing work at a distance that is equal to the MAD.

(a) If the actual working distance for a specific work task is larger than the MAD, use the arc flash energy ratings for larger working distances provided in Attachment B and Attachment C as a method to reduce the employee's exposure and required PPE.

(3) If specific work practices are believed to limit the likelihood of a Transmission/Contractor Employee's exposure to a three phase arc, contact Transmission management for approval to use a lower 1LG or 1LG-LEO energy rating.

NOTE

Three phase arcs produce more energy than single phase arc events of the same magnitude. However, due to the longer (120 cycle) clearing times associated with System 2 1LG-LEO faults on the 115-kV system, in some cases, the 1LG arc flash energy may be the worst case scenario.

c. For overhead line work not being performed inside a substation, determine the appropriate arc flash energy rating for a transmission line in accordance with the following criteria:

(1) Obtain the appropriate arc flash energy ratings In accordance with Process Steps 5.1.6.a and 5.1.6.b above for ALL substations at which the transmission line being worked on terminates.

(2) Select the highest arc flash energy rating of ALL the connected substations to represent the arc flash energy rating for the transmission line. This will provide the work crew on the line the most conservative estimate of an arc flash event.

d. For work on energized equipment < 1000V, refer to Attachment D, "NESC Table 410-1".

e. Refer to TD-877, “Managing Arc Flash Hazards on CL&P Distribution Facilities“ and TD-879 “Managing Arc Flash Hazards on WMECO Distribution Facilities“ for selection of arc flash energy ratings for Distribution equipment (less than 69-kV).

NOTE

During decentralized storm operations, the District/Area Work Center (AWC) war room staff will provide Distribution arc flash energy information to the crews assigned to work from these locations.

5.1.7. Assign the work and communicate the arc flash hazard rating to the Transmission/Contractor Employee, along with the protection factor necessary for the Transmission Employee to protect himself/herself from arc flash. (Refer to TD-211, “When to Wear Arc Rated Flame Resistant Clothing”.)

5.1.8. Ensure thoroughly documented Job Briefings (i.e., Tailboard) are conducted, including the arc flash energy at the job site.

Transmission/Contractor Employee

5.1.9. Based upon the identified arc flash energy rating provided by the Transmission Supervisor or Designee:

a. Review Attachments A through Attachment E to determine the specific arc flash requirements for the type of work.

b. Determine the appropriate FR clothing system from Attachment F, “FR Clothing System Requirements” based upon the type of work performed and the applicable arc flash energy rating category as provided in accordance with Process Step 5.1.7 above.

5.1.10. Select the appropriate rated garment and/or clothing system for the work being performed.

a. Wear additional layer(s) of FR clothing, as applicable, so that the arc rating of the FR clothing meets or exceeds the arc flash energy at the work location or of the circuit.

NOTE

The head, face, neck and ears are areas of the body most frequently injured during arc flash events.

5.1.11. Ensure clothing worn underneath FR clothing system is made of 100% natural fibers (i.e., non-melting materials such as cotton, wool, silk, or blends of these materials).

a. If the clothing required has the potential to create additional or greater hazards than the possible exposure to the heat energy of the electric arc, obtain approval from Transmission management to wear clothing with an arc rating or arc thermal performance value (ATPV) less than that required by the rule.

b. If raingear is needed when exposed to an arc flash hazard, layer it over other FR clothing to achieve protection from arc flash energy that is greater than the FR rating of the raingear.

> **NOTE**
>
> NASCO ArcLite Raingear has an arc rating of 7 cal/cm^2.

5.1.12. Review the garment labels and inspect the appropriate rated FR garment and/or clothing system for defects.[1]

a. If a defect is found, notify Supervisor and/or replace garment immediately.

5.1.13. Conduct a thoroughly documented Job Briefing (i.e., Tailboard) to include a discussion and hazard analysis, including the arc flash energy at the job site.

5.1.14. Use proper insulate and isolate practices.

> **NOTE**
>
> Isolation is the primary protective measure employed when exposed to equipment energized at transmission voltages. This includes the remote operation of devices (e.g., capacitor, regulator, motorized disconnect, breakers, etc.) from a substation control house or at the bottom of a structure mounted device.

5.1.15. Maintain proper Minimum Approach Distances (MAD) for qualified employees to energized equipment. (Refer to Attachment E, “Minimum Approach Distances 69 kV and Above”.)

5.1.16. Use appropriate potential detectors if you are unsure of any difference in potential when working near or on energized equipment.

5.1.17. To limit injury from the thermal hazards of electric arcs, limit the duration of the arc and/or increase the distance from the arc.

5.1.18. Stop the job if you are unsure or if conditions on the job change.

[1] Defects include oil soaked material that cannot be removed by laundering, visible threadbare and/or areas of frayed material edges.

6. Administrative Information

6.1. Requirements

National Electrical Safety Code (NESC)

Occupational Safety and Health Administration (OSHA) Standard 1910.269 (l)(6)(iii)

General Revision Requirements

Transmission system modifications affect fault current levels and associated clearing times throughout the system. Therefore, updating the transmission arc flash energy data will require an analysis of the entire system to accurately capture all changes that will impact the available energy ratings.

Arc flash energy rating data will be updated annually in concurrence with the Transmission System Short Circuit Study process documented within M7-EN-3017, "Transmission Short-Circuit Study Database". Arc flash energy ratings associated with new substations will be calculated and available for use prior to the energization of the new equipment.

6.2. Definitions

Acronym or Word	Definition
Arc Flash	A voltage breakdown of the resistance of air resulting in an arc which can occur where there is sufficient voltage in an electrical system and a path to ground or lower voltage
ARCPRO	Arc flash computer software used to determine clothing levels
ATPV	Arc Thermal Performance Value
AWC	Area Work Center
CT	Connecticut
FR	Flame Resistant
FR Clothing	Company approved flame resistant clothing, rainwear or uniform. An FR clothing system consists of a combination of the following: coveralls, long sleeve shirt, sweatshirt, pants, bib overalls, jacket, etc. which adequately covers the arms, torso, waist and legs. Additional layers of FR clothing should be utilized so the combined arc rating of all the FR clothing system layers meets or exceeds the arc flash energy of the circuit.

Acronym or Word	Definition
GIS	Gas Insulated Substation
Job Briefing (Tailboard)	A documented conversation and meeting conducted with crew members and affected workers at the job site and lead by the employee in charge of the job. All recognized site-specific hazards associated with the work to be performed will be communicated, addressed, eliminated or mitigated.
Job Hazard Analysis (JHA)	A technique that focuses on job tasks as a way to identify hazards before they occur. It focuses on the relationship between the worker, the task, the tools, and the work environment.
MAD	Minimum Approach Distance
MOD	Motor Operated Disconnect
NESC	National Electrical Safety Code
NH	New Hampshire
OCB	Oil Circuit Breaker
OSHA	Occupational Safety & Health Administration
PPE	Personal Protective Equipment
Qualified Employee	Employee trained with competent skills and techniques necessary to distinguish exposed live parts from other parts of electric equipment; is able to determine the nominal voltage of exposed live parts; is knowledgeable of clearance distances required for corresponding voltages to which the qualified employee will be exposed and is able to select the appropriate PPE and tools required to perform work[2]
SF6	Sulfur Hexafluoride
T&D	Transmission and Distribution
WMA	western Massachusetts

6.3. References

TD-211, “When to Wear Arc Rated Flame Resistant Clothing”

Employee Safety Manual

TD-877, “Managing Arc Flash Hazards on CL&P Distribution Facilities”

M8-MT-2005, “Transmission Job Hazard Analysis Process”

FOS-09-2013, “When to Retire FR Clothing: Tips from Tyndale on Useful Wearlife”

[2] Employee Safety Manual, Section 6, General Rules for Electrical Employees

TD-879, “Managing Arc Flash Hazards on WMECO Distribution Facilities”

National Electrical Safety Code

M7-EN-3017, “Transmission Short-Circuit Study Database”

7. Summary of Changes

Revision 5

Replaces M8-MT-2018, Transmission Arc Flash Protection Program, Revision 4, Effective 4/1/2015

- Updated applicable sections of document to reflect current OSHA and NESC standards
- Rewrote Process Steps section to reflect new process required to determine applicable arc flash energy level ratings and select the appropriate FR clothing system
- Revised order of existing attachments to follow the need/use in accordance with the revised process steps
- Updated Attachment B and Attachment C tables

Revision 4

Replaces M8-MT-2018, Transmission Arc Flash Protection Program, Revision 3, Effective 3/18/2011

- Renamed document to remove the word “Program”, as this document is a procedure
- Rewrote entire document to reflect current NESC standards and updated attachments
- Changed applicable references to Northeast Utilities and operating companies, as needed
- Included 2015 OSHA arc flash requirements

Revision 3

Replaces M8-MT-2018, Transmission Arc Flash Protection Program, Revision 2, Effective 12/4/2009

- Clarified arc flash requirements for barehand and hot stick work, minor editorial changes.

Revision 2

Replaces M8-MT-2018, Transmission Arc Flash Protection Program, Revision 1, Effective 9/28/2009

- Created two separate arc flash requirements sections (Sections 5 & 6) based on the OSHA minimum approach distances for qualified employees and the CL&P and WMECO minimum approach distances for qualified employees.

Revision 1

Replaces Transmission Arc Flash Protection Program, Revision 0, Effective 8/18/2009

- Added Black Rock 11H Substation to Section 4.4 - Table T3 (Substations Requiring SCS Level 3 Clothing)

Revision 0

- None – This procedure is the original issue

Attachment A, Typical Work Tasks That May Cause Arc Flash Events

The items listed below have been identified as typical transmission work tasks/sequences that, while being performed, are considered to have the potential to expose the employee to an electric arc hazard. More specifically, the performance of these tasks presents an increased probability of an arc hazard occurring in the employee's work area when compared to normal operational conditions.

- Testing for potential of circuits or parts of an energized or de-energized transmission electrical system.
- Application of Transmission/Contractor Employee protective grounds to lines, bus structures, or taps to transmission lines.
- Switching where the configuration of the equipment is such that the operator must stand directly below or at the qualified minimum approach distance of the switch or breaker during the act of switching (manual crank or motor operated disconnect [MOD]).
- Switching that requires personnel to stand at the qualified minimum approach distance to a breaker that will be operated to break electrical load, including sulfur hexafluoride (SF6), gas insulated substation (GIS), and oil circuit breaker (OCB).
- Live line hot stick work.
- Work on energized electrical equipment 50-1000 volts.
- Climbing on energized structures for maintenance activities (poles, towers).

NOTE

The list above includes only typical work tasks performed on the Transmission system. Other specific and/or specialized work tasks should be evaluated for potential arc hazard exposure in accordance with the guidance provided in Step 5.1.5.b. of this procedure.

Attachment B, CT, WMA and NH Substation Arc Flash Energy Ratings – System 1 Clearing Times

Each of the tables provided within this attachment provides substation arc flash energy ratings specific to a single transmission voltage class.

For substations with multiple bus voltage levels, be sure to reference the proper table to determine the applicable arc flash energy rating for the work being performed.

Within each table, all substation bus names are listed twice. The first row of data for each substation provides the arc flash energy ratings associated with 3LG fault types. The second row of data for each substation provides the arc flash energy ratings associated with 1LG fault types.

The Transmission/Contractor Employee, Supervisor or Designee shall select the applicable arc flash energy values from the row (3LG or 1LG) which has the higher (worst case) energy ratings for the given substation.

Once the Transmission/Contractor Employee, Supervisor or Designee has determined the worst case fault type for the given substation, the arc flash energy level shall be selected based upon the applicable working distance for the work being performed. The Transmission/Contractor Employee, Supervisor or Designee shall assume the working distance to be the applicable phase to ground minimum approach distance (MAD) for a qualified employee (OSHA or CT/MA).

If alternate working practices allow for performance of work at larger working distances, arc flash data is provided at distances greater than published MADs (including standard hot sticking lengths) to facilitate work at reduced arc flash energy exposure levels.

115-kV Substations

State	SUBSTATION	Voltage Class	ASPEN Fault Type	Arc Flash Energy Ratings (cal/cm^2) at defined working distances				
				OSHA MAD 3'4" (40")	Alternate MAD 3'8" (44")	CT/WMA - MAD 6' (72")	Hot Sticking Distance - 8' (96")	Hot Sticking Distance - 10' (120")
CT	BALDWIN 13F	115	3LG	3	2	1	1	1
CT	BALDWIN 13F	115	1LG	1	1	1	1	1
CT	BARBOUR HILL23J	115	3LG	7	5	2	1	1
CT	BARBOUR HILL23J	115	1LG	3	2	1	1	1
CT	BATES ROCK 21K	115	3LG	2	2	1	1	1
CT	BATES ROCK 21K	115	1LG	1	1	1	1	1
CT	BEACON FALLS 11N	115	3LG	2	2	1	1	1
CT	BEACON FALLS 11N	115	1LG	1	1	1	1	1
CT	BERLIN 6A	115	3LG	7	5	2	1	1
CT	BERLIN 6A	115	1LG	2	2	1	1	1
CT	BLACKROCK 11H	115	3LG	4	3	1	1	1

State	SUBSTATION	Voltage Class	ASPEN Fault Type	Arc Flash Energy Ratings (cal/cm^2) at defined working distances				
				OSHA MAD 3'4" (40")	Alternate MAD 3'8" (44")	CT/WMA - MAD 6' (72")	Hot Sticking Distance - 8' (96")	Hot Sticking Distance - 10' (120")
CT	BLACKROCK 11H	115	1LG	1	1	1	1	1
CT	BLOOMFIELD 3B	115	3LG	6	4	2	1	1
CT	BLOOMFIELD 3B	115	1LG	2	2	1	1	1
CT	BOKUM 15L	115	3LG	3	2	1	1	1
CT	BOKUM 15L	115	1LG	1	1	1	1	1
CT	BRANFORD 11J	115	3LG	4	3	1	1	1
CT	BRANFORD 11J	115	1LG	1	1	1	1	1
CT	BRANFORD RR 48R	115	3LG	6	4	2	1	1
CT	BRANFORD RR 48R	115	1LG	2	2	1	1	1
CT	BRISTOL 11K	115	3LG	4	3	1	1	1
CT	BRISTOL 11K	115	1LG	1	1	1	1	1
CT	BROOKLYN 30Y	115	3LG	3	2	1	1	1
CT	BROOKLYN 30Y	115	1LG	1	1	1	1	1
CT	BULLS BRIDGE 11M	115	3LG	1	1	1	1	1
CT	BULLS BRIDGE 11M	115	1LG	1	1	1	1	1
CT	BUNKERHILL 12B	115	3LG	5	4	1	1	1
CT	BUNKERHILL 12B	115	1LG	2	1	1	1	1
CT	CAMPVILLE 14R	115	3LG	4	3	1	1	1
CT	CAMPVILLE 14R	115	1LG	1	1	1	1	1
CT	Canal 15Q	115	3LG	6	4	2	1	1
CT	Canal 15Q	115	1LG	2	2	1	1	1
CT	CANTON 5R	115	3LG	3	2	1	1	1
CT	CANTON 5R	115	1LG	1	1	1	1	1
CT	CARD 11F	115	3LG	6	4	2	1	1
CT	CARD 11F	115	1LG	3	2	1	1	1
CT	CARMEL HILL 11S	115	3LG	3	2	1	1	1
CT	CARMEL HILL 11S	115	1LG	1	1	1	1	1
CT	CEDAR HEIGHTS 4R	115	3LG	5	4	1	1	1
CT	CEDAR HEIGHTS 4R	115	1LG	2	2	1	1	1
CT	CHIPPEN HILL 15U	115	3LG	3	2	1	1	1
CT	CHIPPEN HILL 15U	115	1LG	1	1	1	1	1
CT	CLINTON 21S	115	3LG	8	6	2	1	1
CT	CLINTON 21S	115	1LG	3	2	1	1	1
CT	COS COB 11R	115	3LG	6	4	2	1	1
CT	COS COB 11R	115	1LG	2	2	1	1	1

State	SUBSTATION	Voltage Class	ASPEN Fault Type	Arc Flash Energy Ratings (cal/cm^2) at defined working distances				
				OSHA MAD 3'4" (40")	Alternate MAD 3'8" (44")	CT/WMA - MAD 6' (72")	Hot Sticking Distance - 8' (96")	Hot Sticking Distance - 10' (120")
CT	DARIEN 13S	115	3LG	6	4	2	1	1
CT	DARIEN 13S	115	1LG	3	2	1	1	1
CT	DEVON R1 7R	115	3LG	15	10	3	2	1
CT	DEVON R1 7R	115	1LG	6	5	2	1	1
CT	DEVON R2 7R	115	3LG	19	13	4	2	2
CT	DEVON R2 7R	115	1LG	8	6	2	1	1
CT	DEVON RR 26M	115	3LG	17	12	4	2	1
CT	DEVON RR 26M	115	1LG	7	5	2	1	1
CT	DOOLEY 30K	115	3LG	3	2	1	1	1
CT	DOOLEY 30K	115	1LG	1	1	1	1	1
CT	EAST DEVON 8G	115	3LG	18	13	4	2	2
CT	EAST DEVON 8G	115	1LG	9	6	2	1	1
CT	EAST HARTFORD 32G	115	3LG	8	6	2	1	1
CT	EAST HARTFORD 32G	115	1LG	3	2	1	1	1
CT	EAST MERIDEN 21P	115	3LG	3	2	1	1	1
CT	EAST MERIDEN 21P	115	1LG	1	1	1	1	1
CT	EAST NEWBRITAIN 7L	115	3LG	4	3	1	1	1
CT	EAST NEWBRITAIN 7L	115	1LG	2	1	1	1	1
CT	ENFIELD 12C	115	3LG	3	2	1	1	1
CT	ENFIELD 12C	115	1LG	1	1	1	1	1
CT	FARMINGTON 1C	115	3LG	3	2	1	1	1
CT	FARMINGTON 1C	115	1LG	1	1	1	1	1
CT	FLANDERS 11Y	115	3LG	4	3	1	1	1
CT	FLANDERS 11Y	115	1LG	1	1	1	1	1
CT	FLAXHILL 24A	115	3LG	8	6	2	1	1
CT	FLAXHILL 24A	115	1LG	3	2	1	1	1
CT	FORESTVILLE 12A	115	3LG	4	3	1	1	1
CT	FORESTVILLE 12A	115	1LG	1	1	1	1	1
CT	FRANKLIN DR 1B	115	3LG	3	2	1	1	1
CT	FRANKLIN DR 1B	115	1LG	1	1	1	1	1
CT	FREIGHT 11W	115	3LG	4	3	1	1	1
CT	FREIGHT 11W	115	1LG	1	1	1	1	1
CT	FROST BRIDGE 8R	115	3LG	9	7	2	1	1
CT	FROST BRIDGE 8R	115	1LG	3	2	1	1	1
CT	FRYBROOK 13B	115	3LG	2	2	1	1	1

State	SUBSTATION	Voltage Class	ASPEN Fault Type	Arc Flash Energy Ratings (cal/cm^2) at defined working distances				
				OSHA MAD 3'4" (40")	Alternate MAD 3'8" (44")	CT/WMA - MAD 6' (72")	Hot Sticking Distance - 8' (96")	Hot Sticking Distance - 10' (120")
CT	FRYBROOK 13B	115	1LG	1	1	1	1	1
CT	GLENBROOK 1K	115	3LG	11	8	3	2	1
CT	GLENBROOK 1K	115	1LG	6	4	2	1	1
CT	GREEN HILL 30R	115	3LG	2	2	1	1	1
CT	GREEN HILL 30R	115	1LG	1	1	1	1	1
CT	HADDAM 11C	115	3LG	6	5	2	1	1
CT	HADDAM 11C	115	1LG	3	2	1	2	1
CT	HANOVER 12F	115	3LG	4	3	1	1	1
CT	HANOVER 12F	115	1LG	2	1	1	1	1
CT	HOPEWELL 22R	115	3LG	4	3	1	1	1
CT	HOPEWELL 22R	115	1LG	2	1	1	1	1
CT	KILLINGLY 2G	115	3LG	4	3	1	1	1
CT	KILLINGLY 2G	115	1LG	2	2	1	1	1
CT	MANCHESTER 3A	115	3LG	16	11	4	2	1
CT	MANCHESTER 3A	115	1LG	6	5	2	1	1
CT	MIDDLE RIVER 28M	115	3LG	5	4	1	1	1
CT	MIDDLE RIVER 28M	115	1LG	2	1	1	1	1
CT	MIDDLETOWN 5A	115	3LG	7	5	2	1	1
CT	MIDDLETOWN 5A	115	1LG	4	3	1	1	1
CT	MONTVILLE 4J	115	3LG	15	10	3	2	1
CT	MONTVILLE 4J	115	1LG	8	6	2	1	1
CT	MYSTIC 13K	115	3LG	2	2	1	1	1
CT	MYSTIC 13K	115	1LG	1	1	1	1	1
CT	NEWNGTON 4A	115	3LG	4	3	1	1	1
CT	NEWNGTON 4A	115	1LG	2	1	1	1	1
CT	NEWTOWN 12M	115	3LG	4	3	1	1	1
CT	NEWTOWN 12M	115	1LG	2	1	1	1	1
CT	NOERA 13H	115	3LG	4	3	1	1	1
CT	NOERA 13H	115	1LG	1	1	1	1	1
CT	NORTH BLOOMFIELD 2A	115	3LG	10	7	3	1	1
CT	NORTH BLOOMFIELD 2A	115	1LG	4	3	1	1	1
CT	NORTHEAST SIMSBURY 43F	115	3LG	5	4	1	5	1
CT	NORTHEAST SIMSBURY 43F	115	1LG	2	1	1	1	1
CT	NORWALK 9S	115	3LG	14	10	3	2	1
CT	NORWALK 9S	115	1LG	6	5	2	1	1

State	SUBSTATION	Voltage Class	ASPEN Fault Type	Arc Flash Energy Ratings (cal/cm^2) at defined working distances				
				OSHA MAD 3'4" (40")	Alternate MAD 3'8" (44")	CT/WMA - MAD 6' (72")	Hot Sticking Distance - 8' (96")	Hot Sticking Distance - 10' (120")
CT	NORWALK HARBOUR 6J	115	3LG	11	8	3	2	1
CT	NORWALK HARBOUR 6J	138	3LG	8	5	2	1	1
CT	NORWALK HARBOUR 6J	115	1LG	5	3	1	1	1
CT	NORWALK HARBOUR 6J	138	1LG	4	3	1	1	1
CT	NW.HARTFORD 2N	115	3LG	8	6	2	1	1
CT	NW.HARTFORD 2N	115	1LG	3	2	1	1	1
CT	OXFORD 26N	115	3LG	2	2	1	1	1
CT	OXFORD 26N	115	1LG	1	1	1	1	1
CT	PEACEABLE 12N	115	3LG	4	3	1	1	1
CT	PEACEABLE 12N	115	1LG	1	1	1	1	1
CT	PLEASANT 16B	115	3LG	2	2	1	1	1
CT	PLEASANT 16B	115	1LG	1	1	1	1	1
CT	PLUMTREE 30G	115	3LG	8	6	2	1	1
CT	PLUMTREE 30G	115	1LG	4	3	1	1	1
CT	PORTLAND 21H	115	3LG	6	4	2	1	1
CT	PORTLAND 21H	115	1LG	3	2	1	1	1
CT	Pratt & Whitney 23B	115	3LG	3	2	1	1	1
CT	Pratt & Whitney 23B	115	1LG	1	1	1	1	1
CT	RIDGEFIELD 22N	115	3LG	2	2	1	1	1
CT	RIDGEFIELD 22N	115	1LG	1	1	1	1	1
CT	RIVERSIDE DR. 2R	115	3LG	8	5	2	1	1
CT	RIVERSIDE DR. 2R	115	1LG	3	2	1	1	1
CT	ROCKVILLE 14W	115	3LG	3	2	1	1	1
CT	ROCKVILLE 14W	115	1LG	1	1	1	1	1
CT	ROCKY HILL 3R	115	3LG	5	4	1	1	1
CT	ROCKY HILL 3R	115	1LG	2	1	1	1	1
CT	ROCKY RIVER 12Y	115	3LG	2	2	1	1	1
CT	ROCKY RIVER 12Y	115	1LG	1	1	1	1	1
CT	ROOD AVE 24J	115	3LG	5	4	1	1	1
CT	ROOD AVE 24J	115	1LG	2	2	1	1	1
CT	S.W.HARTFORD 47N	115	3LG	9	6	2	1	1
CT	S.W.HARTFORD 47N	115	1LG	4	3	1	1	1
CT	SANDYHOOK 37F	115	3LG	4	3	1	1	1
CT	SANDYHOOK 37F	115	1LG	2	1	1	1	1
CT	SASCOCREEK 51R	115	3LG	5	3	1	1	1

State	SUBSTATION	Voltage Class	ASPEN Fault Type	Arc Flash Energy Ratings (cal/cm^2) at defined working distances				
				OSHA MAD 3'4" (40")	Alternate MAD 3'8" (44")	CT/WMA - MAD 6' (72")	Hot Sticking Distance - 8' (96")	Hot Sticking Distance - 10' (120")
CT	SASCOCREEK 51R	115	1LG	2	1	1	1	1
CT	SCITICO 27H	115	3LG	2	2	1	1	1
CT	SCITICO 27H	115	1LG	1	1	1	1	1
CT	SHAWNIGAN 55E	115	3LG	7	5	2	1	1
CT	SHAWNIGAN 55E	115	1LG	3	3	1	1	1
CT	SHAWSHILL 24H	115	3LG	6	4	2	1	1
CT	SHAWSHILL 24H	115	1LG	2	2	1	1	1
CT	SHEPAUG 13A	115	3LG	2	2	1	1	1
CT	SHEPAUG 13A	115	1LG	1	1	1	1	1
CT	SHERWOOD 18P	115	3LG	5	3	1	1	1
CT	SHERWOOD 18P	115	1LG	2	1	1	1	1
CT	SHUNOCK 32F	115	3LG	2	1	1	1	1
CT	SHUNOCK 32F	115	1LG	1	1	1	1	1
CT	SONO 24P	115	3LG	8	6	2	1	1
CT	SONO 24P	115	1LG	3	2	1	1	1
CT	SOUTH END 1G	115	3LG	10	7	2	1	1
CT	SOUTH END 1G	115	1LG	5	3	1	1	1
CT	SOUTH MEADOW 1A	115	3LG	11	8	3	2	1
CT	SOUTH MEADOW 1A	115	1LG	5	3	1	1	1
CT	SOUTH NAUGATUCK 21L	115	3LG	2	2	1	1	1
CT	SOUTH NAUGATUCK 21L	115	1LG	1	1	1	1	1
CT	SOUTH WINDSOR 14L	115	3LG	4	3	1	1	1
CT	SOUTH WINDSOR 14L	115	1LG	2	1	1	1	1
CT	SOUTHINGTON 4C	115	3LG	13	9	3	2	1
CT	SOUTHINGTON 4C	115	1LG	5	4	2	1	1
CT	SOUTHWICK 29A	115	3LG	2	2	1	1	1
CT	SOUTHWICK 29A	115	1LG	1	1	1	1	1
CT	STEPSTONE 35L	115	3LG	2	2	1	1	1
CT	STEPSTONE 35L	115	1LG	1	1	1	1	1
CT	STEVENSON 14A	115	3LG	5	3	1	1	1
CT	STEVENSON 14A	115	1LG	2	1	1	1	1
CT	STONYHILL 48C	115	3LG	4	3	1	1	1
CT	STONYHILL 48C	115	1LG	2	1	1	1	1
CT	THOMASTON 2B	115	3LG	3	2	1	1	1
CT	THOMASTON 2B	115	1LG	1	1	1	1	1

State	SUBSTATION	Voltage Class	ASPEN Fault Type	Arc Flash Energy Ratings (cal/cm^2) at defined working distances				
				OSHA MAD 3'4" (40")	Alternate MAD 3'8" (44")	CT/WMA - MAD 6' (72")	Hot Sticking Distance - 8' (96")	Hot Sticking Distance - 10' (120")
CT	TODD 30L	115	3LG	5	3	1	1	1
CT	TODD 30L	115	1LG	2	1	1	1	1
CT	TOMAC 12H	115	3LG	6	5	2	1	1
CT	TOMAC 12H	115	1LG	3	2	1	1	1
CT	TORRINGTON TERMINAL 8A	115	3LG	3	2	1	1	1
CT	TORRINGTON TERMINAL 8A	115	1LG	1	1	1	1	1
CT	TRACY 14M	115	3LG	4	3	1	1	1
CT	TRACY 14M	115	1LG	2	2	1	1	1
CT	TRIANGLE 11A	115	3LG	6	4	2	1	1
CT	TRIANGLE 11A	115	1LG	2	2	1	1	1
CT	TUNNEL 12S	115	3LG	4	3	1	1	1
CT	TUNNEL 12S	115	1LG	1	1	1	1	1
CT	UNCASVILLE 1Q	115	3LG	12	8	3	2	1
CT	UNCASVILLE 1Q	115	1LG	5	4	2	1	1
CT	WALLINGFORD 13M	115	3LG	7	5	2	1	1
CT	WALLINGFORD 13M	115	1LG	3	2	1	1	1
CT	WATERFORD 36F	115	3LG	4	3	1	1	1
CT	WATERFORD 36F	115	1LG	1	1	1	1	1
CT	WATERSIDE 22M	115	3LG	6	4	2	1	1
CT	WATERSIDE 22M	115	1LG	3	2	1	1	1
CT	WEST BROOKFIELD 14H	115	3LG	3	2	1	1	1
CT	WEST BROOKFIELD 14H	115	1LG	1	1	1	1	1
CT	WEST SIDE 7A	115	3LG	3	2	1	1	1
CT	WEST SIDE 7A	115	1LG	1	1	1	1	1
CT	WESTON 21M	115	3LG	4	3	1	1	1
CT	WESTON 21M	115	1LG	2	1	1	1	1
CT	WILLIAMS 9L	115	3LG	3	2	1	1	1
CT	WILLIAMS 9L	115	1LG	1	1	1	1	1
CT	WILLIMANTIC 14S	115	3LG	5	3	1	1	1
CT	WILLIMANTIC 14S	115	1LG	2	2	1	1	1
CT	WILTON 35A	115	3LG	5	4	2	1	1
CT	WILTON 35A	115	1LG	2	1	1	1	1
CT	WINDSOR LOCKS 14K	115	3LG	3	2	1	1	1
CT	WINDSOR LOCKS 14K	115	1LG	1	1	1	1	1
MA	AGAWAM 16C	115	3LG	13	9	3	2	1

State	SUBSTATION	Voltage Class	ASPEN Fault Type	Arc Flash Energy Ratings (cal/cm^2) at defined working distances				
				OSHA MAD 3'4" (40")	Alternate MAD 3'8" (44")	CT/WMA - MAD 6' (72")	Hot Sticking Distance - 8' (96")	Hot Sticking Distance - 10' (120")
MA	AGAWAM 16C	115	1LG	6	4	2	1	1
MA	AMHERST 17K	115	3LG	1	1	1	1	1
MA	AMHERST 17K	115	1LG	1	1	1	1	1
MA	ASHFIELD 38A	115	3LG	2	1	1	1	1
MA	ASHFIELD 38A	115	1LG	1	1	1	1	1
MA	BERKSHIRE 18C	115	3LG	5	4	1	1	1
MA	BERKSHIRE 18C	115	1LG	3	2	1	1	1
MA	BLANDFORD 19J	115	3LG	2	1	1	1	1
MA	BLANDFORD 19J	115	1LG	1	1	1	1	1
MA	BRECKWOOD 20A	115	3LG	2	1	1	1	1
MA	BRECKWOOD 20A	115	1LG	1	1	1	1	1
MA	BUCKPOND 34B	115	3LG	4	3	1	1	1
MA	BUCKPOND 34B	115	1LG	2	1	1	1	1
MA	CADWELL 50F	115	3LG	6	5	2	1	1
MA	CADWELL 50F	115	1LG	2	2	1	1	1
MA	CHICOPEE 18L	115	3LG	6	4	2	1	1
MA	CHICOPEE 18L	115	1LG	2	2	1	1	1
MA	COMPO 23K	115	3LG	4	3	1	1	1
MA	COMPO 23K	115	1LG	2	1	1	1	1
MA	CUMBERLAND 22B	115	3LG	2	1	1	1	1
MA	CUMBERLAND 22B	115	1LG	1	1	1	1	1
MA	DEXTER 44R	115	3LG	3	2	1	1	1
MA	DEXTER 44R	115	1LG	1	1	1	1	1
MA	DOREEN 19A	115	3LG	5	3	1	1	1
MA	DOREEN 19A	115	1LG	2	2	1	1	1
MA	DUDLY 21A	115	3LG	3	2	1	1	1
MA	DUDLY 21A	115	1LG	1	1	1	1	1
MA	EAST SPRINGFIELD 5J	115	3LG	3	3	1	1	1
MA	EAST SPRINGFIELD 5J	115	1LG	2	1	1	1	1
MA	ELM 22G	115	3LG	3	2	1	1	1
MA	ELM 22G	115	1LG	1	1	1	1	1
MA	EXETER 54N	115	3LG	2	1	1	1	1
MA	EXETER 54N	115	1LG	1	1	1	1	1
MA	FAIRMONT 16H	115	3LG	9	7	2	1	1
MA	FAIRMONT 16H	115	1LG	4	3	1	1	1

State	SUBSTATION	Voltage Class	ASPEN Fault Type	Arc Flash Energy Ratings (cal/cm^2) at defined working distances				
				OSHA MAD 3'4" (40")	Alternate MAD 3'8" (44")	CT/WMA - MAD 6' (72")	Hot Sticking Distance - 8' (96")	Hot Sticking Distance - 10' (120")
MA	FRANCONIA 22H	115	3LG	2	2	1	1	1
MA	FRANCONIA 22H	115	1LG	1	1	1	1	1
MA	FRENCH KING 21B	115	3LG	2	1	1	1	1
MA	FRENCH KING 21B	115	1LG	1	1	1	1	1
MA	GUNN 15A	115	3LG	3	3	1	1	1
MA	GUNN 15A	115	1LG	1	1	1	1	1
MA	HOLYOKE 17L	115	3LG	6	5	2	1	1
MA	HOLYOKE 17L	115	1LG	2	2	1	1	1
MA	LISBON 46G	115	3LG	3	3	1	1	1
MA	LISBON 46G	115	1LG	1	1	1	1	1
MA	LUDLOW 19S	115	3LG	11	8	3	2	1
MA	LUDLOW 19S	115	1LG	5	3	1	1	1
MA	MIDWAY 19B	115	3LG	4	3	1	1	1
MA	MIDWAY 19B	115	1LG	2	2	1	1	1
MA	MONTAGUE 21C	115	3LG	2	2	1	1	1
MA	MONTAGUE 21C	115	1LG	1	1	1	1	1
MA	MT. TOM 22C	115	3LG	5	4	1	1	1
MA	MT. TOM 22C	115	1LG	2	2	1	1	1
MA	ORCHARD 27A	115	3LG	5	4	1	1	1
MA	ORCHARD 27A	115	1LG	2	2	1	1	1
MA	OSWALD 30B	115	3LG	3	2	1	1	1
MA	OSWALD 30B	115	1LG	1	1	1	1	1
MA	Partridge 15E	115	3LG	3	3	1	1	1
MA	Partridge 15E	115	1LG	1	1	1	1	1
MA	PINESHED 23F	115	3LG	5	3	1	1	1
MA	PINESHED 23F	115	1LG	2	2	1	1	1
MA	PIPER 21N	115	3LG	6	4	2	1	1
MA	PIPER 21N	115	1LG	2	2	1	1	1
MA	PLAINFIELD 18K	115	3LG	2	2	1	1	1
MA	PLAINFIELD 18K	115	1LG	1	1	1	1	1
MA	POCHASSIC 37R	115	3LG	4	3	1	1	1
MA	POCHASSIC 37R	115	1LG	2	1	1	1	1
MA	PODICK 18G	115	3LG	1	1	1	1	1
MA	PODICK 18G	115	1LG	1	1	1	1	1
MA	Shelburne 29R	115	3LG	2	1	1	1	1

State	SUBSTATION	Voltage Class	ASPEN Fault Type	Arc Flash Energy Ratings (cal/cm^2) at defined working distances				
				OSHA MAD 3'4" (40")	Alternate MAD 3'8" (44")	CT/WMA - MAD 6' (72")	Hot Sticking Distance - 8' (96")	Hot Sticking Distance - 10' (120")
MA	Shelburne 29R	115	1LG	1	1	1	1	1
MA	Silver 30A	115	3LG	8	6	2	1	1
MA	Silver 30A	115	1LG	3	2	1	1	1
MA	SOUTH AGAWAM 42E	115	3LG	9	6	2	1	1
MA	SOUTH AGAWAM 42E	115	1LG	4	3	1	1	1
MA	STONY BROOK 54B	115	3LG	7	5	2	1	1
MA	STONY BROOK 54B	115	1LG	4	3	1	1	1
MA	TILLSON 10P	115	3LG	1	1	1	1	1
MA	TILLSON 10P	115	1LG	1	1	1	1	1
MA	WEST SPRINGFIELD 8C	115	3LG	9	6	2	1	1
MA	WEST SPRINGFIELD 8C	115	1LG	4	3	1	1	1
MA	WOODLAND 17G	115	3LG	2	2	1	1	1
MA	WOODLAND 17G	115	1LG	1	1	1	1	1
NH	ASHLAND	115	3LG	2	1	1	1	1
NH	ASHLAND	115	1LG	1	1	1	1	1
NH	BEDFORD	115	3LG	4	3	1	1	1
NH	BEDFORD	115	1LG	2	1	1	1	1
NH	BEEBE RIVER	115	3LG	2	1	1	1	1
NH	BEEBE RIVER	115	1LG	1	1	1	1	1
NH	BERLIN	115	3LG	1	1	1	1	1
NH	BERLIN	115	1LG	1	1	1	1	1
NH	BRENTWOOD	115	3LG	2	2	1	1	1
NH	BRENTWOOD	115	1LG	1	1	1	1	1
NH	BRIDGE ST	115	3LG	4	3	1	1	1
NH	BRIDGE ST	115	1LG	1	1	1	1	1
NH	BUSCH	115	3LG	3	2	1	1	1
NH	BUSCH	115	1LG	1	1	1	1	1
NH	CHESTER B2	115	3LG	3	2	1	1	1
NH	CHESTER B2	115	1LG	1	1	1	1	1
NH	CHESTNT HILL	115	3LG	4	3	1	1	1
NH	CHESTNT HILL	115	1LG	2	1	1	1	1
NH	DEERFIELD B2	115	3LG	10	7	2	1	1
NH	DEERFIELD B2	115	1LG	4	3	1	1	1
NH	DOVER	115	3LG	3	3	1	1	1
NH	DOVER	115	1LG	1	1	1	1	1

State	SUBSTATION	Voltage Class	ASPEN Fault Type	Arc Flash Energy Ratings (cal/cm^2) at defined working distances				
				OSHA MAD 3'4" (40")	Alternate MAD 3'8" (44")	CT/WMA - MAD 6' (72")	Hot Sticking Distance - 8' (96")	Hot Sticking Distance - 10' (120")
NH	EAGLE S/S	115	3LG	3	2	1	1	1
NH	EAGLE S/S	115	1LG	1	1	1	1	1
NH	EASTPORT	115	3LG	2	1	1	1	1
NH	EASTPORT	115	1LG	1	1	1	1	1
NH	EDDY	115	3LG	3	3	1	1	1
NH	EDDY	115	1LG	1	1	1	1	1
NH	FARMWOOD	115	3LG	3	3	1	1	1
NH	FARMWOOD	115	1LG	1	1	1	1	1
NH	FITZWILLIAM	115	3LG	4	3	1	1	1
NH	FITZWILLIAM	115	1LG	2	1	1	1	1
NH	GARVINS	115	3LG	6	4	2	1	1
NH	GARVINS	115	1LG	2	2	1	1	1
NH	GREAT BAY	115	3LG	2	2	1	1	1
NH	GREAT BAY	115	1LG	1	1	1	1	1
NH	GREGGS BUS A	115	3LG	6	5	2	1	1
NH	GREGGS BUS A	115	1LG	2	2	1	1	1
NH	HUCKINS HILL	115	3LG	2	1	1	1	1
NH	HUCKINS HILL	115	1LG	1	1	1	1	1
NH	HUDSON B2	115	3LG	5	4	1	5	1
NH	HUDSON B2	115	1LG	2	1	1	1	1
NH	HUSE ROAD	115	3LG	5	3	1	1	1
NH	HUSE ROAD	115	1LG	2	1	1	1	1
NH	JACKMAN	115	3LG	2	1	1	1	1
NH	JACKMAN	115	1LG	1	1	1	1	1
NH	KEENE	115	3LG	2	2	1	1	1
NH	KEENE	115	1LG	1	1	1	1	1
NH	KINGSTON	115	3LG	2	1	1	1	1
NH	KINGSTON	115	1LG	1	1	1	1	1
NH	LACONIA A	115	3LG	1	1	1	1	1
NH	LACONIA A	115	1LG	1	1	1	1	1
NH	LITTLETON	115	3LG	3	2	1	1	1
NH	LITTLETON	115	1LG	2	1	1	1	1
NH	LONG HILL	115	3LG	3	2	1	1	1
NH	LONG HILL	115	1LG	1	1	1	1	1
NH	LOST NATION	115	3LG	1	1	1	1	1

State	SUBSTATION	Voltage Class	ASPEN Fault Type	Arc Flash Energy Ratings (cal/cm^2) at defined working distances				
				OSHA MAD 3'4" (40")	Alternate MAD 3'8" (44")	CT/WMA - MAD 6' (72")	Hot Sticking Distance - 8' (96")	Hot Sticking Distance - 10' (120")
NH	LOST NATION	115	1LG	1	1	1	1	1
NH	MADBURY B1	115	3LG	3	2	1	1	1
NH	MADBURY B1	115	1LG	1	1	1	1	1
NH	MAMMOTH RD 2	115	3LG	7	5	2	1	1
NH	MAMMOTH RD 2	115	1LG	3	2	1	1	1
NH	MERRIMACK B3	115	3LG	8	6	2	1	1
NH	MERRIMACK B3	115	1LG	4	3	1	1	1
NH	MILL POND	115	3LG	3	2	1	1	1
NH	MILL POND	115	1LG	1	1	1	1	1
NH	MONADNOCK	115	3LG	3	3	1	1	1
NH	MONADNOCK	115	1LG	1	1	1	1	1
NH	N MERRIMACK	115	3LG	6	4	2	1	1
NH	N MERRIMACK	115	1LG	2	2	1	1	1
NH	N ROAD	115	3LG	2	1	1	1	1
NH	N ROAD	115	1LG	1	1	1	1	1
NH	NT1 1ST1	115	3LG	4	3	1	1	1
NH	NT1 1ST1	115	1LG	2	1	1	1	1
NH	NT1 1ST2	115	3LG	4	3	1	1	1
NH	NT1 1ST2	115	1LG	2	1	1	1	1
NH	OAK HILL B1	115	3LG	3	2	1	1	1
NH	OAK HILL B1	115	1LG	1	1	1	1	1
NH	OAK HILL B2	115	3LG	3	2	1	1	1
NH	OAK HILL B2	115	1LG	1	1	1	1	1
NH	OCEAN ROAD A	115	3LG	2	2	1	1	1
NH	OCEAN ROAD A	115	1LG	1	1	1	1	1
NH	OCEAN ROAD B	115	3LG	2	2	1	1	1
NH	OCEAN ROAD B	115	1LG	1	1	1	1	1
NH	PARIS	115	3LG	1	1	1	1	1
NH	PARIS	115	1LG	1	1	1	1	1
NH	PEMIGEWASSET	115	3LG	2	1	1	1	1
NH	PEMIGEWASSET	115	1LG	1	1	1	1	1
NH	PINE HILL B	115	3LG	3	2	1	1	1
NH	PINE HILL B	115	1LG	1	1	1	1	1
NH	POWER ST	115	3LG	5	4	1	1	1
NH	POWER ST	115	1LG	2	1	1	1	1

State	SUBSTATION	Voltage Class	ASPEN Fault Type	Arc Flash Energy Ratings (cal/cm^2) at defined working distances				
				OSHA MAD 3'4" (40")	Alternate MAD 3'8" (44")	CT/WMA - MAD 6' (72")	Hot Sticking Distance - 8' (96")	Hot Sticking Distance - 10' (120")
NH	REEDS FERRY	115	3LG	3	2	1	1	1
NH	REEDS FERRY	115	1LG	1	1	1	1	1
NH	RESISTANCE	115	3LG	3	2	1	1	1
NH	RESISTANCE	115	1LG	2	1	1	1	1
NH	ROCHESTER 1	115	3LG	2	1	1	1	1
NH	ROCHESTER 1	115	1LG	1	1	1	1	1
NH	S MILFORD	115	3LG	1	1	1	1	1
NH	S MILFORD	115	1LG	1	1	1	1	1
NH	SACO VALLEY	115	3LG	1	1	1	1	1
NH	SACO VALLEY	115	1LG	1	1	1	1	1
NH	SCHILLER B1	115	3LG	4	3	1	1	1
NH	SCHILLER B1	115	1LG	2	1	1	1	1
NH	SCOBIE DIST	115	3LG	13	9	3	2	1
NH	SCOBIE DIST	115	1LG	5	4	2	1	1
NH	SCOBIE POND	115	3LG	15	10	3	2	1
NH	SCOBIE POND	115	1LG	6	4	2	1	1
NH	SMITH	115	3LG	1	1	1	1	1
NH	SMITH	115	1LG	1	1	1	1	1
NH	TASKER FARM	115	3LG	1	1	1	1	1
NH	TASKER FARM	115	1LG	1	1	1	1	1
NH	THORNTON	115	3LG	3	2	1	1	1
NH	THORNTON	115	1LG	1	1	1	1	1
NH	THREE RIVERS	115	3LG	4	3	1	1	1
NH	THREE RIVERS	115	1LG	2	1	1	1	1
NH	WATTS BROOK	115	3LG	6	4	2	1	1
NH	WATTS BROOK	115	1LG	3	2	1	1	1
NH	WEARE	115	3LG	3	2	1	1	1
NH	WEARE	115	1LG	1	1	1	1	1
NH	WEBSTER A	115	3LG	2	2	1	1	1
NH	WEBSTER A	115	1LG	1	1	1	1	1
NH	WHITE LAKE	115	3LG	1	1	1	1	1
NH	WHITE LAKE	115	1LG	1	1	1	1	1
NH	WHITEFIELD	115	3LG	2	2	1	1	1
NH	WHITEFIELD	115	1LG	1	1	1	1	1

345-kV Substations

State	SUBSTATION	Voltage Class	ASPEN Fault Type	Arc Flash Energy Ratings (cal/cm^2) at defined working distances				
				OSHA MAD 8'6"	Alternate MAD #1 9'2"	Alternate MAD #2 11' 3"	Hot Sticking Distance - 10' (120")	Hot Sticking Distance - 15' (180")
CT	ARCHERS LANE 35P	345	3LG	2	2	1	1	1
CT	ARCHERS LANE 35P	345	1LG	1	1	1	1	1
CT	BARBOUR HILL23J	345	3LG	2	2	1	2	1
CT	BARBOUR HILL23J	345	1LG	1	1	1	1	1
CT	BESECK 9F	345	3LG	3	3	2	2	1
CT	BESECK 9F	345	1LG	1	1	1	1	1
CT	CARD 11F	345	3LG	3	3	2	3	1
CT	CARD 11F	345	1LG	1	1	1	1	1
CT	EAST DEVON 345	345	3LG	2	2	1	2	1
CT	EAST DEVON 345	345	1LG	1	1	1	1	1
CT	FROST BRIDGE 8R	345	3LG	2	2	1	1	1
CT	FROST BRIDGE 8R	345	1LG	1	1	1	1	1
CT	HADDAM NECK 14B	345	3LG	3	3	2	2	1
CT	HADDAM NECK 14B	345	1LG	1	1	1	1	1
CT	Killingly 2G	345	3LG	3	3	2	2	1
CT	Killingly 2G	345	1LG	1	1	1	1	1
CT	KLEEN ENERGY	345	3LG	3	3	2	2	1
CT	KLEEN ENERGY	345	1LG	2	2	1	1	1
CT	LAKE ROAD 27E	345	3LG	3	3	2	2	1
CT	LAKE ROAD 27E	345	1LG	1	1	1	1	1
CT	LAUREL ENERGY 10F	345	3LG	3	3	2	3	1
CT	LAUREL ENERGY 10F	345	1LG	2	1	1	1	1
CT	LONG MOUNTAIN 13J	345	3LG	2	2	1	2	1
CT	LONG MOUNTAIN 13J	345	1LG	1	1	1	1	1
CT	MANCHESTER 3A	345	3LG	3	3	2	2	1
CT	MANCHESTER 3A	345	1LG	2	1	1	1	1
CT	MILLSTONE 15G	345	3LG	4	3	2	3	1
CT	MILLSTONE 15G	345	1LG	2	2	1	2	1
CT	MONTVILLE 4J	345	3LG	3	2	1	2	1
CT	MONTVILLE 4J	345	1LG	1	1	1	1	1
CT	NORTH BLOOMFIELD 2A	345	3LG	2	2	1	2	1
CT	NORTH BLOOMFIELD 2A	345	1LG	1	1	1	1	1
CT	NORWALK 9S	345	3LG	2	2	1	2	1
CT	NORWALK 9S	345	1LG	1	1	1	1	1
CT	Norwalk Jct 32M	345	3LG	2	2	1	2	1
CT	Norwalk Jct 32M	345	1LG	1	1	1	1	1

State	SUBSTATION	Voltage Class	ASPEN Fault Type	Arc Flash Energy Ratings (cal/cm^2) at defined working distances				
				OSHA MAD 8'6"	Alternate MAD #1 9'2"	Alternate MAD #2 11' 3"	Hot Sticking Distance - 10' (120")	Hot Sticking Distance - 15' (180")
CT	PLUMTREE 30G	345	3LG	2	2	1	1	1
CT	PLUMTREE 30G	345	1LG	1	1	1	1	1
CT	SCOVILL ROCK 22P	345	3LG	4	3	2	3	1
CT	SCOVILL ROCK 22P	345	1LG	2	2	1	1	1
CT	SOUTHINGTON 4C	345	3LG	3	3	2	2	1
CT	SOUTHINGTON 4C	345	1LG	1	1	1	1	1
MA	AGAWAM 16C	345	3LG	2	2	1	2	1
MA	AGAWAM 16C	345	1LG	1	1	1	1	1
MA	BERKSHIRE 18C	345	3LG	2	2	1	1	1
MA	BERKSHIRE 18C	345	1LG	1	1	1	1	1
MA	LUDLOW 19S	345	3LG	3	3	2	2	1
MA	LUDLOW 19S	345	1LG	1	1	1	1	1
MA	NORTHFIELD MOUTAIN 16R	345	3LG	2	2	1	2	1
MA	NORTHFIELD MOUTAIN 16R	345	1LG	1	1	1	1	1
NH	AMHERST	345	3LG	2	2	1	1	1
NH	AMHERST	345	1LG	1	1	1	1	1
NH	DEERFIELD	345	3LG	2	2	1	2	1
NH	DEERFIELD	345	1LG	1	1	1	1	1
NH	ELIOT	345	3LG	2	2	1	2	1
NH	ELIOT	345	1LG	1	1	1	1	1
NH	FITZWILLIAM	345	3LG	1	1	1	1	1
NH	FITZWILLIAM	345	1LG	1	1	1	1	1
NH	LAWRENCE ROAD	345	3LG	2	2	1	2	1
NH	LAWRENCE ROAD	345	1LG	1	1	1	1	1
NH	NEWINGTON	345	3LG	2	2	1	2	1
NH	NEWINGTON	345	1LG	1	1	1	1	1
NH	SCOBIE POND	345	3LG	3	2	2	2	1
NH	SCOBIE POND	345	1LG	1	1	1	1	1
NH	TIMBER SW RD	345	3LG	3	2	1	2	1
NH	TIMBER SW RD	345	1LG	1	1	1	1	1

69-kV Substations

State	SUBSTATION	Voltage Class	ASPEN Fault Type	Arc Flash Energy Ratings (cal/cm^2) at defined working distances			
				OSHA MAD 3'4"	CT/WMA MAD 5'	Hot Sticking Distance - 8'	Hot Sticking Distance - 10'
CT	BLACK ROCK 11H	69	3LG	2	1	1	1
CT	BLACK ROCK 11H	69	1LG	2	1	1	1
CT	CARD 11F	69	3LG	12	4	2	1
CT	CARD 11F	69	1LG	15	6	2	2
CT	FALLS VILLAGE 9A	69	3LG	2	1	1	1
CT	FALLS VILLAGE 9A	69	1LG	2	1	1	1
CT	GALES FERRY 11B	69	3LG	7	3	1	1
CT	GALES FERRY 11B	69	1LG	9	3	2	1
CT	MANSFIELD 12J	69	3LG	5	2	1	1
CT	MANSFIELD 12J	69	1LG	4	2	1	1
CT	MONTVILLE 4J	69	3LG	9	4	2	1
CT	MONTVILLE 4J	69	1LG	15	6	2	2
CT	N. CANAAN 5L	69	3LG	1	1	1	1
CT	N. CANAAN 5L	69	1LG	1	1	1	1
CT	SALISBURY 21J	69	3LG	2	1	1	1
CT	SALISBURY 21J	69	1LG	2	1	1	1
CT	SHEPAUG 13A	69	3LG	7	3	1	1
CT	SHEPAUG 13A	69	1LG	15	6	2	2
CT	SKUNGAMAUG 49S	69	3LG	3	1	1	1
CT	SKUNGAMAUG 49S	69	1LG	3	1	1	1
CT	TORRINGTON TERM 8A	69	3LG	5	2	1	1
CT	TORRINGTON TERM 8A	69	1LG	7	3	1	1
CT	TUNNEL 12S	69	3LG	9	4	2	1
CT	TUNNEL 12S	69	1LG	11	4	2	1
CT	UCONN 5P	69	3LG	5	2	1	1
CT	UCONN 5P	69	1LG	4	2	1	1
MA	COBBLE MT18F	69	3LG	3	1	1	1
MA	COBBLE MT18F	69	1LG	5	2	1	1
MA	POCHASSIC 37R	69	3LG	8	3	1	1
MA	POCHASSIC 37R	69	1LG	17	6	3	2

230-kV Substations

State	SUBSTATION	Voltage Class	ASPEN Fault Type	Arc Flash Energy Ratings (cal/cm^2) at defined working distances			
				OSHA (3.0 p.u.) 63"	New OSHA (3.5 p.u.) 79"	Hot Sticking Distance - 8'	Hot Sticking Distance - 10'
NH	Littleton	230	3LG	1	1	1	1
NH	Littleton	230	1LG	1	1	1	1
NH	Merrimack 230	230	3LG	1	1	1	1
NH	Merrimack 230	230	1LG	1	1	1	1

Color Key

Yellow = <9 CAL / CM^2

Gold = 9-16 CAL / CM^2

Pink = >16-24 CAL / CM^2

Red = > 24 CAL / CM^2

Attachment C, CT, WMA and NH Substation Arc Flash Energy Ratings – System 2 Clearing Times

Each of the tables provided within this attachment provides substation arc flash energy ratings specific to a single transmission voltage class.

For substations with multiple bus voltage levels, be sure to reference the proper table to determine the applicable arc flash energy rating for the work being performed.

Within each table, all substation bus names are listed twice. The first row of data for each substation provides the arc flash energy ratings associated with 3LG-LEO fault types. The second row of data for each substation provides the arc flash energy ratings associated with 1LG-LEO fault types.

The Transmission/Contractor Employee, Supervisor or Designee shall select the applicable arc flash energy values from the row (3LG-LEO or 1LG-LEO) which has the higher (worst case) energy ratings for the given substation.

Once the Transmission/Contractor Employee, Supervisor or Designee has determined the worst case fault type for the given substation, the arc flash energy level shall be selected based upon the applicable working distance for the work being performed. The Transmission/Contractor Employee, Supervisor or Designee shall assume the working distance to be the applicable phase to ground minimum approach distance (MAD) for a qualified employee (OSHA or CT/MA).

If alternate working practices allow for performance of work at larger working distances, arc flash data is provided at distances greater than published MADs (including standard hot sticking lengths) to facilitate work at reduced arc flash energy exposure levels.

115-kV Substations

State	SUBSTATION	Voltage Class	ASPEN Fault Type	Arc Flash Energy Ratings (cal/cm^2) at defined working distances				
				OSHA MAD 3'4" (40")	Alternate MAD 3'8" (44")	CT/WMA - MAD 6' (72")	Hot Sticking Distance - 8' (96")	Hot Sticking Distance - 10' (120")
CT	BALDWIN 13F	115	3LG_LEO	14	10	3	2	1
CT	BALDWIN 13F	115	1LG_LEO	13	9	3	2	1
CT	BARBOUR HILL23J	115	3LG_LEO	14	10	3	2	1
CT	BARBOUR HILL23J	115	1LG_LEO	15	10	3	2	1
CT	BATES ROCK 21K	115	3LG_LEO	7	5	2	1	1
CT	BATES ROCK 21K	115	1LG_LEO	9	6	2	1	1
CT	BEACON FALLS 11N	115	3LG_LEO	7	5	2	1	1
CT	BEACON FALLS 11N	115	1LG_LEO	8	5	2	1	1
CT	BERLIN 6A	115	3LG_LEO	10	7	3	1	1
CT	BERLIN 6A	115	1LG_LEO	11	8	3	2	1
CT	BLACKROCK 11H	115	3LG_LEO	14	10	3	2	1

State	SUBSTATION	Voltage Class	ASPEN Fault Type	Arc Flash Energy Ratings (cal/cm^2) at defined working distances				
				OSHA MAD 3'4" (40")	Alternate MAD 3'8" (44")	CT/WMA - MAD 6' (72")	Hot Sticking Distance - 8' (96")	Hot Sticking Distance - 10' (120")
CT	BLACKROCK 11H	115	1LG_LEO	16	11	4	2	1
CT	BLOOMFIELD 3B	115	3LG_LEO	19	13	4	2	2
CT	BLOOMFIELD 3B	115	1LG_LEO	21	15	5	3	2
CT	BOKUM 15L	115	3LG_LEO	8	6	2	1	1
CT	BOKUM 15L	115	1LG_LEO	8	5	2	1	1
CT	BRANFORD 11J	115	3LG_LEO	11	8	3	2	1
CT	BRANFORD 11J	115	1LG_LEO	11	8	3	2	1
CT	BRANFORD RR 48R	115	3LG_LEO	6	5	2	1	1
CT	BRANFORD RR 48R	115	1LG_LEO	7	5	2	1	1
CT	BRISTOL 11K	115	3LG_LEO	15	11	4	2	1
CT	BRISTOL 11K	115	1LG_LEO	15	10	3	2	1
CT	BROOKLYN 30Y	115	3LG_LEO	10	7	3	1	1
CT	BROOKLYN 30Y	115	1LG_LEO	13	9	3	2	1
CT	BULLS BRIDGE 11M	115	3LG_LEO	6	5	2	1	1
CT	BULLS BRIDGE 11M	115	1LG_LEO	7	5	2	1	1
CT	BUNKERHILL 12B	115	3LG_LEO	29	21	6	3	2
CT	BUNKERHILL 12B	115	1LG_LEO	29	21	7	3	2
CT	CAMPVILLE 14R	115	3LG_LEO	10	7	3	1	1
CT	CAMPVILLE 14R	115	1LG_LEO	11	8	3	2	1
CT	Canal 15Q	115	3LG_LEO	5	3	1	1	1
CT	Canal 15Q	115	1LG_LEO	2	2	1	1	1
CT	CANTON 5R	115	3LG_LEO	8	6	2	1	1
CT	CANTON 5R	115	1LG_LEO	8	5	2	1	1
CT	CARD 11F	115	3LG_LEO	6	4	2	1	1
CT	CARD 11F	115	1LG_LEO	7	5	2	1	1
CT	CARMEL HILL 11S	115	3LG_LEO	2	1	1	1	1
CT	CARMEL HILL 11S	115	1LG_LEO	1	1	1	1	1
CT	CEDAR HEIGHTS 4R	115	3LG_LEO	5	4	2	1	1
CT	CEDAR HEIGHTS 4R	115	1LG_LEO	2	2	1	1	1
CT	CHIPPEN HILL 15U	115	3LG_LEO	1	1	1	1	1
CT	CHIPPEN HILL 15U	115	1LG_LEO	1	1	1	1	1
CT	CLINTON 21S	115	3LG_LEO	7	5	2	1	1
CT	CLINTON 21S	115	1LG_LEO	3	2	1	1	1
CT	COS COB 11R	115	3LG_LEO	22	15	5	3	2
CT	COS COB 11R	115	1LG_LEO	26	19	6	3	2
CT	DARIEN 13S	115	3LG_LEO	6	5	2	1	1

State	SUBSTATION	Voltage Class	ASPEN Fault Type	Arc Flash Energy Ratings (cal/cm^2) at defined working distances				
				OSHA MAD 3'4" (40")	Alternate MAD 3'8" (44")	CT/WMA - MAD 6' (72")	Hot Sticking Distance - 8' (96")	Hot Sticking Distance - 10' (120")
CT	DARIEN 13S	115	1LG_LEO	7	5	2	1	1
CT	DEVON R1 7R	115	3LG_LEO	34	24	7	4	2
CT	DEVON R1 7R	115	1LG_LEO	47	33	10	5	3
CT	DEVON R2 7R	115	3LG_LEO	35	24	8	4	2
CT	DEVON R2 7R	115	1LG_LEO	42	29	9	5	3
CT	DEVON RR 26M	115	3LG_LEO	17	12	4	2	1
CT	DEVON RR 26M	115	1LG_LEO	7	5	2	1	1
CT	DOOLEY 30K	115	3LG_LEO	12	8	3	2	1
CT	DOOLEY 30K	115	1LG_LEO	13	9	3	2	1
CT	EAST DEVON 8G	115	3LG_LEO	3	2	1	1	1
CT	EAST DEVON 8G	115	1LG_LEO	2	1	1	1	1
CT	EAST HARTFORD 32G	115	3LG_LEO	29	21	6	3	2
CT	EAST HARTFORD 32G	115	1LG_LEO	34	24	7	4	2
CT	EAST MERIDEN 21P	115	3LG_LEO	10	7	2	1	1
CT	EAST MERIDEN 21P	115	1LG_LEO	10	7	2	1	1
CT	EAST NEWBRITAIN 7L	115	3LG_LEO	18	13	4	2	2
CT	EAST NEWBRITAIN 7L	115	1LG_LEO	20	14	4	2	2
CT	ENFIELD 12C	115	3LG_LEO	10	7	3	1	1
CT	ENFIELD 12C	115	1LG_LEO	12	9	3	2	1
CT	FARMINGTON 1C	115	3LG_LEO	10	7	3	1	1
CT	FARMINGTON 1C	115	1LG_LEO	12	9	3	2	1
CT	FLANDERS 11Y	115	3LG_LEO	2	2	1	1	1
CT	FLANDERS 11Y	115	1LG_LEO	1	1	1	1	1
CT	FLAXHILL 24A	115	3LG_LEO	33	23	7	4	2
CT	FLAXHILL 24A	115	1LG_LEO	42	29	9	5	3
CT	FORESTVILLE 12A	115	3LG_LEO	9	6	2	1	1
CT	FORESTVILLE 12A	115	1LG_LEO	10	7	2	1	1
CT	FRANKLIN DR 1B	115	3LG_LEO	10	7	3	1	1
CT	FRANKLIN DR 1B	115	1LG_LEO	12	9	3	2	1
CT	FREIGHT 11W	115	3LG_LEO	18	13	4	2	2
CT	FREIGHT 11W	115	1LG_LEO	18	13	4	2	2
CT	FROST BRIDGE 8R	115	3LG_LEO	16	11	4	2	1
CT	FROST BRIDGE 8R	115	1LG_LEO	22	16	5	3	2
CT	FRYBROOK 13B	115	3LG_LEO	1	1	1	1	1
CT	FRYBROOK 13B	115	1LG_LEO	2	1	1	1	1
CT	GLENBROOK 1K	115	3LG_LEO	7	5	2	1	1

State	SUBSTATION	Voltage Class	ASPEN Fault Type	Arc Flash Energy Ratings (cal/cm^2) at defined working distances				
				OSHA MAD 3'4" (40")	Alternate MAD 3'8" (44")	CT/WMA - MAD 6' (72")	Hot Sticking Distance - 8' (96")	Hot Sticking Distance - 10' (120")
CT	GLENBROOK 1K	115	1LG_LEO	3	2	1	1	1
CT	GREEN HILL 30R	115	3LG_LEO	6	5	2	1	1
CT	GREEN HILL 30R	115	1LG_LEO	6	4	2	1	1
CT	HADDAM 11C	115	3LG_LEO	6	5	2	1	1
CT	HADDAM 11C	115	1LG_LEO	8	5	2	1	1
CT	HANOVER 12F	115	3LG_LEO	24	17	5	3	2
CT	HANOVER 12F	115	1LG_LEO	25	18	6	3	2
CT	HOPEWELL 22R	115	3LG_LEO	14	10	3	2	1
CT	HOPEWELL 22R	115	1LG_LEO	16	11	4	2	1
CT	KILLINGLY 2G	115	3LG_LEO	25	18	6	3	2
CT	KILLINGLY 2G	115	1LG_LEO	34	24	7	4	2
CT	MANCHESTER 3A	115	3LG_LEO	15	11	4	2	1
CT	MANCHESTER 3A	115	1LG_LEO	20	14	4	2	2
CT	MIDDLE RIVER 28M	115	3LG_LEO	28	20	6	3	2
CT	MIDDLE RIVER 28M	115	1LG_LEO	28	20	6	3	2
CT	MIDDLETOWN 5A	115	3LG_LEO	7	5	2	1	1
CT	MIDDLETOWN 5A	115	1LG_LEO	8	5	2	1	1
CT	MONTVILLE 4J	115	3LG_LEO	18	12	4	2	1
CT	MONTVILLE 4J	115	1LG_LEO	1	1	1	1	1
CT	MYSTIC 13K	115	3LG_LEO	8	6	2	1	1
CT	MYSTIC 13K	115	1LG_LEO	8	5	2	1	1
CT	NEWNGTON 4A	115	3LG_LEO	11	8	3	2	1
CT	NEWNGTON 4A	115	1LG_LEO	13	9	3	2	1
CT	NEWTOWN 12M	115	3LG_LEO	14	10	3	2	1
CT	NEWTOWN 12M	115	1LG_LEO	13	9	3	2	1
CT	NOERA 13H	115	3LG_LEO	23	16	5	3	2
CT	NOERA 13H	115	1LG_LEO	21	15	5	3	2
CT	NORTH BLOOMFIELD 2A	115	3LG_LEO	12	8	3	2	1
CT	NORTH BLOOMFIELD 2A	115	1LG_LEO	13	9	3	2	1
CT	NORTHEAST SIMSBURY 43F	115	3LG_LEO	26	18	6	3	2
CT	NORTHEAST SIMSBURY 43F	115	1LG_LEO	28	20	6	3	2
CT	NORWALK 9S	115	3LG_LEO	21	15	5	3	2
CT	NORWALK 9S	115	1LG_LEO	25	18	6	3	2
CT	NORWALK HARBOUR 6J	115	3LG_LEO	4	3	1	1	1
CT	NORWALK HARBOUR 6J	138	3LG_LEO	4	3	1	1	1
CT	NORWALK HARBOUR 6J	115	1LG_LEO	2	1	1	1	1

State	SUBSTATION	Voltage Class	ASPEN Fault Type	Arc Flash Energy Ratings (cal/cm^2) at defined working distances				
				OSHA MAD 3'4" (40")	Alternate MAD 3'8" (44")	CT/WMA - MAD 6' (72")	Hot Sticking Distance - 8' (96")	Hot Sticking Distance - 10' (120")
CT	NORWALK HARBOUR 6J	138	1LG_LEO	2	2	1	1	1
CT	NW.HARTFORD 2N	115	3LG_LEO	35	24	8	4	2
CT	NW.HARTFORD 2N	115	1LG_LEO	42	29	9	5	3
CT	OXFORD 26N	115	3LG_LEO	5	4	1	1	1
CT	OXFORD 26N	115	1LG_LEO	6	4	2	1	1
CT	PEACEABLE 12N	115	3LG_LEO	12	8	3	2	1
CT	PEACEABLE 12N	115	1LG_LEO	11	8	3	2	1
CT	PLEASANT 16B	115	3LG_LEO	7	5	2	1	1
CT	PLEASANT 16B	115	1LG_LEO	8	5	2	1	1
CT	PLUMTREE 30G	115	3LG_LEO	22	15	5	3	2
CT	PLUMTREE 30G	115	1LG_LEO	31	22	7	3	2
CT	PORTLAND 21H	115	3LG_LEO	27	19	6	3	2
CT	PORTLAND 21H	115	1LG_LEO	44	31	9	5	3
CT	Pratt & Whitney 23B	115	3LG_LEO	10	7	3	1	1
CT	Pratt & Whitney 23B	115	1LG_LEO	13	9	3	2	1
CT	RIDGEFIELD 22N	115	3LG_LEO	13	9	3	2	1
CT	RIDGEFIELD 22N	115	1LG_LEO	12	9	3	2	1
CT	RIVERSIDE DR. 2R	115	3LG_LEO	50	35	11	5	3
CT	RIVERSIDE DR. 2R	115	1LG_LEO	58	40	12	6	4
CT	ROCKVILLE 14W	115	3LG_LEO	15	11	4	2	1
CT	ROCKVILLE 14W	115	1LG_LEO	15	10	3	2	1
CT	ROCKY HILL 3R	115	3LG_LEO	16	11	4	2	1
CT	ROCKY HILL 3R	115	1LG_LEO	16	11	4	2	1
CT	ROCKY RIVER 12Y	115	3LG_LEO	2	1	1	1	1
CT	ROCKY RIVER 12Y	115	1LG_LEO	1	1	1	1	1
CT	ROOD AVE 24J	115	3LG_LEO	14	10	3	2	1
CT	ROOD AVE 24J	115	1LG_LEO	13	9	3	2	1
CT	S.W.HARTFORD 47N	115	3LG_LEO	40	28	9	4	3
CT	S.W.HARTFORD 47N	115	1LG_LEO	45	32	10	5	3
CT	SANDYHOOK 37F	115	3LG_LEO	2	2	1	1	1
CT	SANDYHOOK 37F	115	1LG_LEO	1	1	1	1	1
CT	SASCOCREEK 51R	115	3LG_LEO	13	9	3	2	1
CT	SASCOCREEK 51R	115	1LG_LEO	13	9	3	2	1
CT	SCITICO 27H	115	3LG_LEO	7	5	2	1	1
CT	SCITICO 27H	115	1LG_LEO	8	5	2	1	1
CT	SHAWNIGAN 55E	115	3LG_LEO	3	2	1	1	1

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				OSHA MAD 3'4" (40")	Alternate MAD 3'8" (44")	CT/WMA - MAD 6' (72")	Hot Sticking Distance - 8' (96")	Hot Sticking Distance - 10' (120")
CT	SHAWNIGAN 55E	115	1LG_LEO	1	1	1	1	1
CT	SHAWSHILL 24H	115	3LG_LEO	34	24	7	4	2
CT	SHAWSHILL 24H	115	1LG_LEO	37	26	8	4	3
CT	SHEPAUG 13A	115	3LG_LEO	5	4	1	1	1
CT	SHEPAUG 13A	115	1LG_LEO	7	5	2	1	1
CT	SHERWOOD 18P	115	3LG_LEO	14	10	3	2	1
CT	SHERWOOD 18P	115	1LG_LEO	16	11	4	2	1
CT	SHUNOCK 32F	115	3LG_LEO	5	4	1	1	1
CT	SHUNOCK 32F	115	1LG_LEO	6	4	2	1	1
CT	SONO 24P	115	3LG_LEO	6	5	2	1	1
CT	SONO 24P	115	1LG_LEO	3	2	1	1	1
CT	SOUTH END 1G	115	3LG_LEO	52	37	11	6	3
CT	SOUTH END 1G	115	1LG_LEO	86	60	18	9	5
CT	SOUTH MEADOW 1A	115	3LG_LEO	20	14	5	2	2
CT	SOUTH MEADOW 1A	115	1LG_LEO	25	18	6	3	2
CT	SOUTH NAUGATUCK 21L	115	3LG_LEO	6	5	2	1	1
CT	SOUTH NAUGATUCK 21L	115	1LG_LEO	7	5	2	1	1
CT	SOUTH WINDSOR 14L	115	3LG_LEO	14	10	3	2	1
CT	SOUTH WINDSOR 14L	115	1LG_LEO	16	11	4	2	1
CT	SOUTHINGTON 4C	115	3LG_LEO	9	6	2	1	1
CT	SOUTHINGTON 4C	115	1LG_LEO	10	7	2	1	1
CT	SOUTHWICK 29A	115	3LG_LEO	6	4	2	1	1
CT	SOUTHWICK 29A	115	1LG_LEO	6	4	2	1	1
CT	STEPSTONE 35L	115	3LG_LEO	10	7	2	1	1
CT	STEPSTONE 35L	115	1LG_LEO	9	6	2	1	1
CT	STEVENSON 14A	115	3LG_LEO	10	7	3	1	1
CT	STEVENSON 14A	115	1LG_LEO	8	5	2	1	1
CT	STONYHILL 48C	115	3LG_LEO	8	6	2	1	1
CT	STONYHILL 48C	115	1LG_LEO	11	8	3	2	1
CT	THOMASTON 2B	115	3LG_LEO	10	7	2	1	1
CT	THOMASTON 2B	115	1LG_LEO	10	7	2	1	1
CT	TODD 30L	115	3LG_LEO	14	10	3	2	1
CT	TODD 30L	115	1LG_LEO	16	11	4	2	1
CT	TOMAC 12H	115	3LG_LEO	5	4	1	1	1
CT	TOMAC 12H	115	1LG_LEO	2	2	1	1	1
CT	TORRINGTON TERMINAL 8A	115	3LG_LEO	10	7	3	1	1

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				OSHA MAD 3'4" (40")	Alternate MAD 3'8" (44")	CT/WMA - MAD 6' (72")	Hot Sticking Distance - 8' (96")	Hot Sticking Distance - 10' (120")
CT	TORRINGTON TERMINAL 8A	115	1LG_LEO	12	9	3	2	1
CT	TRACY 14M	115	3LG_LEO	4	3	1	1	1
CT	TRACY 14M	115	1LG_LEO	2	1	1	1	1
CT	TRIANGLE 11A	115	3LG_LEO	32	22	7	4	2
CT	TRIANGLE 11A	115	1LG_LEO	37	26	8	4	3
CT	TUNNEL 12S	115	3LG_LEO	9	6	2	1	1
CT	TUNNEL 12S	115	1LG_LEO	9	6	2	1	1
CT	UNCASVILLE 1Q	115	3LG_LEO	12	8	3	2	1
CT	UNCASVILLE 1Q	115	1LG_LEO	5	4	2	1	1
CT	WALLINGFORD 13M	115	3LG_LEO	14	10	3	2	1
CT	WALLINGFORD 13M	115	1LG_LEO	13	9	3	2	1
CT	WATERFORD 36F	115	3LG_LEO	3	2	1	1	1
CT	WATERFORD 36F	115	1LG_LEO	1	1	1	1	1
CT	WATERSIDE 22M	115	3LG_LEO	29	21	6	3	2
CT	WATERSIDE 22M	115	1LG_LEO	39	27	8	4	3
CT	WEST BROOKFIELD 14H	115	3LG_LEO	11	8	3	2	1
CT	WEST BROOKFIELD 14H	115	1LG_LEO	12	9	3	2	1
CT	WEST SIDE 7A	115	3LG_LEO	10	7	3	1	1
CT	WEST SIDE 7A	115	1LG_LEO	10	7	2	1	1
CT	WESTON 21M	115	3LG_LEO	2	2	1	1	1
CT	WESTON 21M	115	1LG_LEO	1	1	1	1	1
CT	WILLIAMS 9L	115	3LG_LEO	17	12	4	2	1
CT	WILLIAMS 9L	115	1LG_LEO	16	11	4	2	1
CT	WILLIMANTIC 14S	115	3LG_LEO	30	21	7	3	2
CT	WILLIMANTIC 14S	115	1LG_LEO	44	31	9	5	3
CT	WILTON 35A	115	3LG_LEO	25	18	6	3	2
CT	WILTON 35A	115	1LG_LEO	24	17	5	3	2
CT	WINDSOR LOCKS 14K	115	3LG_LEO	11	8	3	2	1
CT	WINDSOR LOCKS 14K	115	1LG_LEO	13	9	3	2	1
MA	AGAWAM 16C	115	3LG_LEO	24	17	5	3	2
MA	AGAWAM 16C	115	1LG_LEO	32	23	7	4	2
MA	AMHERST 17K	115	3LG_LEO	6	5	2	1	1
MA	AMHERST 17K	115	1LG_LEO	8	5	2	1	1
MA	ASHFIELD 38A	115	3LG_LEO	1	1	1	1	1
MA	ASHFIELD 38A	115	1LG_LEO	1	1	1	1	1
MA	BERKSHIRE 18C	115	3LG_LEO	11	8	3	2	1

State	SUBSTATION	Voltage Class	ASPEN Fault Type	Arc Flash Energy Ratings (cal/cm^2) at defined working distances				
				OSHA MAD 3'4" (40")	Alternate MAD 3'8" (44")	CT/WMA - MAD 6' (72")	Hot Sticking Distance - 8' (96")	Hot Sticking Distance - 10' (120")
MA	BERKSHIRE 18C	115	1LG_LEO	16	11	4	2	1
MA	BLANDFORD 19J	115	3LG_LEO	6	4	2	1	1
MA	BLANDFORD 19J	115	1LG_LEO	7	5	2	1	1
MA	BRECKWOOD 20A	115	3LG_LEO	2	1	1	1	1
MA	BRECKWOOD 20A	115	1LG_LEO	1	1	1	1	1
MA	BUCKPOND 34B	115	3LG_LEO	10	7	2	1	1
MA	BUCKPOND 34B	115	1LG_LEO	12	9	3	2	1
MA	CADWELL 50F	115	3LG_LEO	3	2	1	1	1
MA	CADWELL 50F	115	1LG_LEO	1	1	1	1	1
MA	CHICOPEE 18L	115	3LG_LEO	25	18	6	3	2
MA	CHICOPEE 18L	115	1LG_LEO	32	23	7	4	2
MA	COMPO 23K	115	3LG_LEO	10	7	3	1	1
MA	COMPO 23K	115	1LG_LEO	12	9	3	2	1
MA	CUMBERLAND 22B	115	3LG_LEO	7	5	2	1	1
MA	CUMBERLAND 22B	115	1LG_LEO	10	7	2	1	1
MA	DEXTER 44R	115	3LG_LEO	15	11	4	2	1
MA	DEXTER 44R	115	1LG_LEO	18	13	4	2	2
MA	DOREEN 19A	115	3LG_LEO	18	13	4	2	2
MA	DOREEN 19A	115	1LG_LEO	25	18	6	3	2
MA	DUDLY 21A	115	3LG_LEO	15	11	4	2	1
MA	DUDLY 21A	115	1LG_LEO	16	11	4	2	1
MA	EAST SPRINGFIELD 5J	115	3LG_LEO	14	10	3	2	1
MA	EAST SPRINGFIELD 5J	115	1LG_LEO	18	13	4	2	2
MA	ELM 22G	115	3LG_LEO	14	10	3	2	1
MA	ELM 22G	115	1LG_LEO	16	11	4	2	1
MA	EXETER 54N	115	3LG_LEO	8	6	2	1	1
MA	EXETER 54N	115	1LG_LEO	9	6	2	1	1
MA	FAIRMONT 16H	115	3LG_LEO	15	11	4	2	1
MA	FAIRMONT 16H	115	1LG_LEO	20	14	4	2	2
MA	FRANCONIA 22H	115	3LG_LEO	10	7	3	1	1
MA	FRANCONIA 22H	115	1LG_LEO	10	7	2	1	1
MA	FRENCH KING 21B	115	3LG_LEO	7	5	2	1	1
MA	FRENCH KING 21B	115	1LG_LEO	8	5	2	1	1
MA	GUNN 15A	115	3LG_LEO	11	8	3	2	1
MA	GUNN 15A	115	1LG_LEO	10	7	2	1	1
MA	HOLYOKE 17L	115	3LG_LEO	36	25	8	4	3

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				OSHA MAD 3'4" (40")	Alternate MAD 3'8" (44")	CT/WMA - MAD 6' (72")	Hot Sticking Distance - 8' (96")	Hot Sticking Distance - 10' (120")
MA	HOLYOKE 17L	115	1LG_LEO	39	27	8	4	3
MA	LISBON 46G	115	3LG_LEO	21	15	5	3	2
MA	LISBON 46G	115	1LG_LEO	18	13	4	2	2
MA	LUDLOW 19S	115	3LG_LEO	14	10	3	2	1
MA	LUDLOW 19S	115	1LG_LEO	17	12	4	2	1
MA	MIDWAY 19B	115	3LG_LEO	23	16	5	3	2
MA	MIDWAY 19B	115	1LG_LEO	31	22	7	3	2
MA	MONTAGUE 21C	115	3LG_LEO	10	7	3	1	1
MA	MONTAGUE 21C	115	1LG_LEO	3	3	1	1	1
MA	MT. TOM 22C	115	3LG_LEO	14	10	3	2	1
MA	MT. TOM 22C	115	1LG_LEO	16	11	4	2	1
MA	ORCHARD 27A	115	3LG_LEO	18	13	4	2	2
MA	ORCHARD 27A	115	1LG_LEO	22	16	5	3	2
MA	OSWALD 30B	115	3LG_LEO	11	8	3	2	1
MA	OSWALD 30B	115	1LG_LEO	11	8	3	2	1
MA	Partridge 15E	115	3LG_LEO	14	10	3	2	1
MA	Partridge 15E	115	1LG_LEO	17	12	4	2	1
MA	PINESHED 23F	115	3LG_LEO	20	14	5	2	2
MA	PINESHED 23F	115	1LG_LEO	24	17	5	3	2
MA	PIPER 21N	115	3LG_LEO	25	18	6	3	2
MA	PIPER 21N	115	1LG_LEO	29	21	7	3	2
MA	PLAINFIELD 18K	115	3LG_LEO	1	1	1	1	1
MA	PLAINFIELD 18K	115	1LG_LEO	1	1	1	1	1
MA	POCHASSIC 37R	115	3LG_LEO	23	16	5	3	2
MA	POCHASSIC 37R	115	1LG_LEO	21	15	5	3	2
MA	PODICK 18G	115	3LG_LEO	5	4	1	1	1
MA	PODICK 18G	115	1LG_LEO	5	3	1	1	1
MA	Shelburne 29R	115	3LG_LEO	6	4	2	1	1
MA	Shelburne 29R	115	1LG_LEO	8	5	2	1	1
MA	Silver 30A	115	3LG_LEO	8	6	2	1	1
MA	Silver 30A	115	1LG_LEO	3	2	1	1	1
MA	SOUTH AGAWAM 42E	115	3LG_LEO	62	44	13	7	4
MA	SOUTH AGAWAM 42E	115	1LG_LEO	3	3	1	1	1
MA	TILLSON 10P	115	3LG_LEO	6	4	2	1	1
MA	TILLSON 10P	115	1LG_LEO	7	5	2	1	1
MA	WEST SPRINGFIELD 8C	115	3LG_LEO	7	5	2	1	1

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				OSHA MAD 3'4" (40")	Alternate MAD 3'8" (44")	CT/WMA - MAD 6' (72")	Hot Sticking Distance - 8' (96")	Hot Sticking Distance - 10' (120")
MA	WEST SPRINGFIELD 8C	115	1LG_LEO	2	2	1	1	1
MA	WOODLAND 17G	115	3LG_LEO	10	7	2	1	1
MA	WOODLAND 17G	115	1LG_LEO	10	7	2	1	1
NH	BEDFORD	115	3LG_LEO	3	2	1	1	1
NH	BEDFORD	115	1LG_LEO	1	1	1	1	1
NH	BEEBE RIVER	115	3LG_LEO	1	1	1	1	1
NH	BEEBE RIVER	115	1LG_LEO	1	1	1	1	1
NH	BERLIN	115	3LG_LEO	3	2	1	1	1
NH	BERLIN	115	1LG_LEO	3	3	1	1	1
NH	BRENTWOOD	115	3LG_LEO	1	1	1	1	1
NH	BRENTWOOD	115	1LG_LEO	1	1	1	1	1
NH	CHESTER B2	115	3LG_LEO	2	2	1	1	1
NH	CHESTER B2	115	1LG_LEO	1	1	1	1	1
NH	CHESTNT HILL	115	3LG_LEO	19	13	4	2	2
NH	CHESTNT HILL	115	1LG_LEO	28	20	6	3	2
NH	DEERFIELD B2	115	3LG_LEO	6	5	2	1	1
NH	DEERFIELD B2	115	1LG_LEO	8	5	2	1	1
NH	DOVER	115	3LG_LEO	13	9	3	2	1
NH	DOVER	115	1LG_LEO	13	9	3	2	1
NH	EAGLE S/S	115	3LG_LEO	11	8	3	2	1
NH	EAGLE S/S	115	1LG_LEO	11	8	3	2	1
NH	EASTPORT	115	3LG_LEO	5	4	1	1	1
NH	EASTPORT	115	1LG_LEO	6	4	2	1	1
NH	EDDY	115	3LG_LEO	14	10	3	2	1
NH	EDDY	115	1LG_LEO	13	9	3	2	1
NH	FARMWOOD	115	3LG_LEO	9	6	2	1	1
NH	FARMWOOD	115	1LG_LEO	10	7	2	1	1
NH	FITZWILLIAM	115	3LG_LEO	4	3	1	1	1
NH	FITZWILLIAM	115	1LG_LEO	3	3	1	1	1
NH	GARVINS	115	3LG_LEO	24	17	5	3	2
NH	GARVINS	115	1LG_LEO	29	21	7	3	2
NH	GREAT BAY	115	3LG_LEO	6	5	2	1	1
NH	GREAT BAY	115	1LG_LEO	9	6	2	1	1
NH	GREGGS BUS A	115	3LG_LEO	9	6	2	1	1
NH	GREGGS BUS A	115	1LG_LEO	10	7	2	1	1
NH	HUCKINS HILL	115	3LG_LEO	4	3	1	1	1

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				OSHA MAD 3'4" (40")	Alternate MAD 3'8" (44")	CT/WMA - MAD 6' (72")	Hot Sticking Distance - 8' (96")	Hot Sticking Distance - 10' (120")
NH	HUCKINS HILL	115	1LG_LEO	3	3	1	1	1
NH	HUDSON B2	115	3LG_LEO	5	4	1	5	1
NH	HUDSON B2	115	1LG_LEO	2	1	1	1	1
NH	HUSE ROAD	115	3LG_LEO	3	2	1	1	1
NH	HUSE ROAD	115	1LG_LEO	1	1	1	1	1
NH	JACKMAN	115	3LG_LEO	5	4	1	1	1
NH	JACKMAN	115	1LG_LEO	5	3	1	1	1
NH	KEENE	115	3LG_LEO	6	4	2	1	1
NH	KEENE	115	1LG_LEO	6	4	2	1	1
NH	LACONIA A	115	3LG_LEO	1	1	1	1	1
NH	LACONIA A	115	1LG_LEO	1	1	1	1	1
NH	LITTLETON	115	3LG_LEO	5	4	1	1	1
NH	LITTLETON	115	1LG_LEO	7	5	2	1	1
NH	LOST NATION	115	3LG_LEO	4	3	1	1	1
NH	LOST NATION	115	1LG_LEO	3	3	1	1	1
NH	MADBURY B1	115	3LG_LEO	9	6	2	1	1
NH	MADBURY B1	115	1LG_LEO	9	6	2	1	1
NH	MAMMOTH RD 2	115	3LG_LEO	5	4	1	5	1
NH	MAMMOTH RD 2	115	1LG_LEO	2	1	1	1	1
NH	MERRIMACK B3	115	3LG_LEO	11	8	3	2	1
NH	MERRIMACK B3	115	1LG_LEO	11	8	3	2	1
NH	MONADNOCK	115	3LG_LEO	16	11	4	2	1
NH	MONADNOCK	115	1LG_LEO	18	13	4	2	2
NH	N MERRIMACK	115	3LG_LEO	3	2	1	1	1
NH	N MERRIMACK	115	1LG_LEO	1	1	1	1	1
NH	N ROAD	115	3LG_LEO	4	3	1	1	1
NH	N ROAD	115	1LG_LEO	5	3	1	1	1
NH	NT1 1ST1	115	3LG_LEO	22	15	5	3	2
NH	NT1 1ST1	115	1LG_LEO	32	23	7	4	2
NH	NT1 1ST2	115	3LG_LEO	22	15	5	3	2
NH	NT1 1ST2	115	1LG_LEO	32	23	7	4	2
NH	OAK HILL B1	115	3LG_LEO	20	14	5	2	2
NH	OAK HILL B1	115	1LG_LEO	22	16	5	3	2
NH	OAK HILL B2	115	3LG_LEO	20	14	5	2	2
NH	OAK HILL B2	115	1LG_LEO	21	15	5	3	2
NH	OCEAN ROAD A	115	3LG_LEO	10	7	2	1	1

State	SUBSTATION	Voltage Class	ASPEN Fault Type	Arc Flash Energy Ratings (cal/cm^2) at defined working distances				
				OSHA MAD 3'4" (40")	Alternate MAD 3'8" (44")	CT/WMA - MAD 6' (72")	Hot Sticking Distance - 8' (96")	Hot Sticking Distance - 10' (120")
NH	OCEAN ROAD A	115	1LG_LEO	13	9	3	2	1
NH	OCEAN ROAD B	115	3LG_LEO	10	7	3	1	1
NH	OCEAN ROAD B	115	1LG_LEO	12	9	3	2	1
NH	PARIS	115	3LG_LEO	3	2	1	1	1
NH	PARIS	115	1LG_LEO	5	3	1	1	1
NH	PEMIGEWASSET	115	3LG_LEO	5	4	1	1	1
NH	PEMIGEWASSET	115	1LG_LEO	6	4	2	1	1
NH	PINE HILL B	115	3LG_LEO	11	8	3	2	1
NH	PINE HILL B	115	1LG_LEO	11	8	3	2	1
NH	POWER ST	115	3LG_LEO	2	1	1	1	1
NH	POWER ST	115	1LG_LEO	1	1	1	1	1
NH	REEDS FERRY	115	3LG_LEO	2	1	1	1	1
NH	REEDS FERRY	115	1LG_LEO	1	1	1	1	1
NH	SACO VALLEY	115	3LG_LEO	3	2	1	1	1
NH	SACO VALLEY	115	1LG_LEO	3	2	1	1	1
NH	SCHILLER B1	115	3LG_LEO	9	6	2	1	1
NH	SCHILLER B1	115	1LG_LEO	10	7	2	1	1
NH	SCOBIE POND	115	3LG_LEO	4	3	1	1	1
NH	SCOBIE POND	115	1LG_LEO	2	2	1	1	1
NH	SMITH	115	3LG_LEO	1	1	1	1	1
NH	SMITH	115	1LG_LEO	1	1	1	1	1
NH	THREE RIVERS	115	3LG_LEO	7	5	2	1	1
NH	THREE RIVERS	115	1LG_LEO	10	7	2	1	1
NH	WATTS BROOK	115	3LG_LEO	3	2	1	1	1
NH	WATTS BROOK	115	1LG_LEO	1	1	1	1	1
NH	WEARE	115	3LG_LEO	2	2	1	1	1
NH	WEARE	115	1LG_LEO	1	1	1	1	1
NH	WEBSTER A	115	3LG_LEO	6	4	2	1	1
NH	WEBSTER A	115	1LG_LEO	6	4	2	1	1
NH	WHITE LAKE	115	3LG_LEO	3	2	1	1	1
NH	WHITE LAKE	115	1LG_LEO	3	3	1	1	1
NH	WHITEFIELD	115	3LG_LEO	4	3	1	1	1
NH	WHITEFIELD	115	1LG_LEO	6	4	2	1	1

345-kV Substations

State	SUBSTATION	Voltage Class	ASPEN Fault Type	Arc Flash Energy Ratings (cal/cm^2) at defined working distances				
				OSHA MAD 8'6"	Alternate MAD #1 9'2"	Alternate MAD #2 11' 3"	Hot Sticking Distance - 10' (120")	Hot Sticking Distance - 15' (180")
CT	ARCHERS LANE 35P	345	3LG-LEO	1	1	1	1	1
CT	ARCHERS LANE 35P	345	1LG-LEO	1	1	1	1	1
CT	BARBOUR HILL23J	345	3LG-LEO	2	2	1	1	1
CT	BARBOUR HILL23J	345	1LG-LEO	1	1	1	1	1
CT	BESECK 9F	345	3LG-LEO	1	1	1	1	1
CT	BESECK 9F	345	1LG-LEO	1	1	1	1	1
CT	CARD 11F	345	3LG-LEO	1	1	1	1	1
CT	CARD 11F	345	1LG-LEO	1	1	1	1	1
CT	EAST DEVON 345	345	3LG-LEO	1	1	1	1	1
CT	EAST DEVON 345	345	1LG-LEO	1	1	1	1	1
CT	FROST BRIDGE 8R	345	3LG-LEO	1	1	1	1	1
CT	FROST BRIDGE 8R	345	1LG-LEO	1	1	1	1	1
CT	HADDAM NECK 14B	345	3LG-LEO	2	2	1	2	1
CT	HADDAM NECK 14B	345	1LG-LEO	1	1	1	1	1
CT	Killingly 2G	345	3LG-LEO	2	2	1	1	1
CT	Killingly 2G	345	1LG-LEO	1	1	1	1	1
CT	KLEEN ENERGY	345	3LG-LEO	4	3	2	3	1
CT	KLEEN ENERGY	345	1LG-LEO	1	1	1	1	1
CT	LAKE ROAD 27E	345	3LG-LEO	4	3	2	2	1
CT	LAKE ROAD 27E	345	1LG-LEO	1	1	1	1	1
CT	LAUREL ENERGY 10F	345	3LG-LEO	6	5	3	4	2
CT	LAUREL ENERGY 10F	345	1LG-LEO	1	1	1	1	1
CT	LONG MOUNTAIN 13J	345	3LG-LEO	5	4	2	3	1
CT	LONG MOUNTAIN 13J	345	1LG-LEO	1	1	1	1	1
CT	MANCHESTER 3A	345	3LG-LEO	1	1	1	1	1
CT	MANCHESTER 3A	345	1LG-LEO	1	1	1	1	1
CT	MILLSTONE 15G	345	1LG-LEO	1	1	1	1	1
CT	MONTVILLE 4J	345	3LG-LEO	2	1	1	1	1
CT	MONTVILLE 4J	345	1LG-LEO	1	1	1	1	1
CT	NORTH BLOOMFIELD 2A	345	3LG-LEO	1	1	1	1	1
CT	NORTH BLOOMFIELD 2A	345	1LG-LEO	1	1	1	1	1
CT	NORWALK 9S	345	3LG-LEO	2	1	1	1	1
CT	NORWALK 9S	345	1LG-LEO	1	1	1	1	1
CT	Norwalk Jct 32M	345	3LG-LEO	2	1	1	1	1
CT	Norwalk Jct 32M	345	1LG-LEO	1	1	1	1	1

State	SUBSTATION	Voltage Class	ASPEN Fault Type	Arc Flash Energy Ratings (cal/cm^2) at defined working distances				
				OSHA MAD 8'6"	Alternate MAD #1 9'2"	Alternate MAD #2 11' 3"	Hot Sticking Distance - 10' (120")	Hot Sticking Distance - 15' (180")
CT	PLUMTREE 30G	345	3LG-LEO	2	2	1	1	1
CT	PLUMTREE 30G	345	1LG-LEO	1	1	1	1	1
CT	SCOVILL ROCK 22P	345	3LG-LEO	2	1	1	1	1
CT	SCOVILL ROCK 22P	345	1LG-LEO	1	1	1	1	1
CT	SOUTHINGTON 4C	345	3LG-LEO	1	1	1	1	1
CT	SOUTHINGTON 4C	345	1LG-LEO	1	1	1	1	1
MA	AGAWAM 16C	345	3LG-LEO	1	1	1	1	1
MA	AGAWAM 16C	345	1LG-LEO	1	1	1	1	1
MA	BERKSHIRE 18C	345	3LG-LEO	1	1	1	1	1
MA	BERKSHIRE 18C	345	1LG-LEO	1	1	1	1	1
MA	LUDLOW 19S	345	3LG-LEO	1	1	1	1	1
MA	LUDLOW 19S	345	1LG-LEO	1	1	1	1	1
MA	NORTHFIELD MOUTAIN 16R	345	3LG-LEO	1	1	1	1	1
MA	NORTHFIELD MOUTAIN 16R	345	1LG-LEO	1	1	1	1	1
NH	AMHERST	345	3LG-LEO	1	1	1	1	1
NH	AMHERST	345	1LG-LEO	1	1	1	1	1
NH	DEERFIELD	345	3LG-LEO	1	1	1	1	1
NH	DEERFIELD	345	1LG-LEO	1	1	1	1	1
NH	ELIOT	345	3LG-LEO	1	1	1	1	1
NH	ELIOT	345	1LG-LEO	1	1	1	1	1
NH	FITZWILLIAM	345	3LG-LEO	1	1	1	1	1
NH	FITZWILLIAM	345	1LG-LEO	1	1	1	1	1
NH	NEWINGTON	345	3LG-LEO	1	1	1	1	1
NH	NEWINGTON	345	1LG-LEO	1	1	1	1	1
NH	SCOBIE POND	345	3LG-LEO	1	1	1	1	1
NH	SCOBIE POND	345	1LG-LEO	1	1	1	1	1
NH	TIMBER SW RD	345	3LG-LEO	2	2	1	1	1
NH	TIMBER SW RD	345	1LG-LEO	1	1	1	1	1

230-kV Substations

State	SUBSTATION	Voltage Class	ASPEN Fault Type	Arc Flash Energy Ratings (cal/cm^2) at defined working distances			
				OSHA MAD 5'3"	Alternate MAD 6'7"	Hot Sticking Distance 8'	Hot Sticking Distance 10'
NH	Littleton	230	3LG-LEO	4	2	2	1
NH	Littleton	230	1LG-LEO	12	6	4	2
NH	Merrimack 230	230	3LG-LEO	3	2	1	1
NH	Merrimack 230	230	1LG-LEO	7	4	2	1

69-kV Substations

State	SUBSTATION	Voltage Class	ASPEN Fault Type	Arc Flash Energy Ratings (cal/cm^2) at defined working distances			
				OSHA MAD 3'4"	CT/WMA MAD 5'	Hot Sticking Distance - 8'	Hot Sticking Distance - 10'
CT	CARD 11F	69	3LG-LEO	2	1	1	1
CT	CARD 11F	69	1LG-LEO	2	1	1	1
CT	FALLS VILLAGE 9A	69	3LG-LEO	1	1	1	1
CT	FALLS VILLAGE 9A	69	1LG-LEO	1	1	1	1
CT	GALES FERRY 11B	69	3LG-LEO	4	2	1	1
CT	GALES FERRY 11B	69	1LG-LEO	6	3	1	1
CT	MANSFIELD 12J	69	3LG-LEO	2	1	1	1
CT	MANSFIELD 12J	69	1LG-LEO	3	1	1	1
CT	MONTVILLE 4J	69	3LG-LEO	2	1	1	1
CT	MONTVILLE 4J	69	1LG-LEO	2	1	1	1
CT	N. CANAAN 5L	69	3LG-LEO	1	1	1	1
CT	N. CANAAN 5L	69	1LG-LEO	1	1	1	1
CT	SALISBURY 21J	69	3LG-LEO	1	1	1	1
CT	SALISBURY 21J	69	1LG-LEO	1	1	1	1
CT	SKUNGAMAUG 49S	69	3LG-LEO	3	1	1	1
CT	SKUNGAMAUG 49S	69	1LG-LEO	3	1	1	1
CT	TORRINGTON TERM 8A	69	3LG-LEO	1	1	1	1
CT	TORRINGTON TERM 8A	69	1LG-LEO	1	1	1	1
CT	TUNNEL 12S	69	3LG-LEO	2	1	1	1
CT	TUNNEL 12S	69	1LG-LEO	2	1	1	1
CT	UCONN 5P	69	3LG-LEO	3	2	1	1

State	SUBSTATION	Voltage Class	ASPEN Fault Type	Arc Flash Energy Ratings (cal/cm^2) at defined working distances			
				OSHA MAD 3'4"	CT/WMA MAD 5'	Hot Sticking Distance - 8'	Hot Sticking Distance - 10'
CT	UCONN 5P	69	1LG-LEO	2	1	1	1
MA	COBBLE MT18F	69	3LG-LEO	2	1	1	1
MA	COBBLE MT18F	69	1LG-LEO	3	1	1	1
MA	POCHASSIC 37R	69	3LG-LEO	1	1	1	1
MA	POCHASSIC 37R	69	1LG-LEO	1	1	1	1

Color Key

Yellow = <9 CAL / CM^2

Gold = 9-16 CAL / CM^2

Pink = >16-24 CAL / CM^2

Red = > 24 CAL / CM^2

Attachment D, NESC Table 410-1

Clothing and clothing systems (cal per cm^2) for voltages 50V to 1000V (ac) [1] (See Rule 410A3)

Equipment type	Nominal voltage range and cal/ cm^2		
	50V to 250V	251V to 600V [14]	601V to 1000V
Self-contained meters/cabinets	4 [2]	20 [4]	30 [8]
Pad-mounted transformers	4 [9]	4 [9]	6 [8]
CT meters and control wiring	4 [2]	4 [5]	6 [8]
Metal-clad switchgear/motor control centers	8 [3]	40 [6]	60 [8]
Pedestals/pull boxes/hand holes	4 [2]	8 [7]	12 [8]
Open air (includes lines)	4 [2]	4 [7]	6 [8]
Network protectors	4 [10]	[11]	[11]
Panel boards – single phase (all)/ three phase (≤100 A)	4 [2]	8 [12]	12 [8]
Panel boards – three phase (>100 A)	4 [2]	[13]	[13]

[1] This table is based on maximum fault current of 51kA. Calculations are based on an 18 inch separation distance from the arc to the employee. See IEEE 1584-2002. Other methods are available to estimate arc exposure values and may yield slightly different but equally acceptable results. The use of the table in the selection of clothing is intended to reduce the amount or degree of injury but may not prevent all burns.

[2] Industry testing by two separate major utilities has demonstrated that voltages 50 – 240V will not sustain arcs for more than 0.5 cycles, thereby limiting exposure to less than 4 calories/cm^2.

[3] Value based on industry test results and IEEE Std. 1584-2002 formula for Motor Control Centers. (Gap = 1 in.) (Xd = 1.641) (18 in. distance) 51kA (Based on a 208V, 1000kVA, 5.3% Z, served from a 500mVA system) Maximum duration (from tests) is 10 cycles: 46.5 cal/s/cm^2 * 0.167 sec = 7.8 cal/cm^2.

[4] Industry testing on 480V equipment indicates exposures for self-contained meters do not exceed 20 calories/cm^2.

[5] Industry testing on 480V equipment indicates exposures for CT meters and control wiring does not exceed 4 calories/cm^2.

[6] Value based on industry test results and IEEE Std. 1584-2002 formula for Motor Control Centers. (Gap = 1" and XD = 1.641, 18 inch distance) 12.7kA at 480 V (worst case energy value from testing). Maximum duration from tests is 85 cycles: 26.2 cal/s/cm2 * 1.42 sec = 37 cal/cm^2.

[7] Incident analysis on this equipment indicates exposures do not exceed 8 calories/cm^2.

[8] Incident analysis and industry testing indicates that applying a 150% multiplier to the 480V exposure values provides a conservative value for equipment and open air lines operating at 501 – 1000V

[9] Industry testing on 480V equipment indicates exposures on pad-mounted transformers do not exceed 4 cal/cm^2. (See Ref [2].)

[10] Industry testing on 208V network protectors indicates exposures do not exceed 4 cal/cm^2. (See Ref [1].)

[11] Industry testing on 480V network protectors indicates arcs will not self-extinguish and heat flux rates will exceed 60 cal/cm^2/s at 24 in working distance. Perform arc hazard analysis. (See Ref [2].)

[12] Industry testing on 480V panels with non-edge mounted bus bars indicates exposures do not exceed 8 cal/cm^2. (See Ref [2].)

[13] Industry testing on panelboards with edge-mounted, parallel bus bars indicate arcs will not self-extinguish and heat flux rates will exceed 60 cal/cm^2/s at 18 in working distance. Perform arc hazard analysis. (See Ref [2].)

[14] IEEE 1584 original test data indicates there is no significant difference between heat flux rates for 400V class equipment versus 600V class equipment.

Attachment E, Minimum Approach Distances 69-kV and Above

New Hampshire Transmission and Contractors

Voltage	Phase to Ground	Phase to Phase
69 kV	3 ft. 4 in.	4 ft.
115 kV	3 ft. 4 in.	4 ft. 3 in.
230 kV	5 ft. 3 in.	7 ft. 6 in.
345 kV	8 ft. 6 in.	12 ft. 6 in.

Connecticut and western Massachusetts Transmission

Voltage	Phase to Ground	Phase to Phase
69 kV	5 ft.	5 ft.
115 – 138 kV	6 ft.	6 ft.
345 kV	8 ft. 6 in.	12 ft. 6 in.

Attachment F, FR Clothing System Requirements

The table below provides the FR clothing system requirement for various work activities based upon defined arc flash energy rating categories (<9 cal/cm^2, 9-16 cal/cm^2, > 16-24 cal/cm^2, and > 24 cal/cm^2).

The Transmission/Contractor Employee shall determine the required FR clothing system requirements based upon the work activity (left most column) and the applicable arc flash energy rating established in accordance with the Process Steps section of this procedure.

Work Activity	FR Clothing System Requirements			
	<9 CAL / CM^2	**9-16 CAL / CM^2**	**>16-24 CAL / CM^2**	**> 24 CAL / CM^2**
Inspection & Casual Entry (Substations)	FR clothing with an arc rating that meets or exceeds 8 cal / cm^2 and current work methods	FR clothing with an arc rating that meets or exceeds 8 cal / cm^2 and current work methods	FR clothing with an arc rating that meets or exceeds 8 cal / cm^2 and current work methods	FR clothing with an arc rating that meets or exceeds 8 cal / cm^2 and current work methods
Switching Activities (Substations)	FR clothing with an arc rating that meets or exceeds 8 cal / cm^2 Minimum 12 cal / cm^2 balaclava hood with a 12 cal / cm^2 faceshield[1] Other PPE as required	FR clothing with an arc rating that meets or exceeds the arc energy at the work location **AND** Minimum 12 cal / cm^2 balaclava hood with a 12 cal / cm^2 faceshield[1] Other PPE as required	FR clothing with an arc rating that meets or exceeds the arc energy at the work location **AND** Minimum 20 cal / cm^2 balaclava hood with a 20 cal / cm^2 faceshield[1] Other PPE as required	FR clothing with an arc rating that meets or exceeds the arc energy at the work location **AND** Minimum 40 cal / cm^2 enclosed hood with faceshield Other PPE as required
Maintenance & Construction Activities (Substations)	FR clothing with an arc rating that meets or exceeds 8 cal / cm^2 Other PPE as required	FR clothing with an arc rating that meets or exceeds the arc energy at the work location **AND** Minimum 12 cal / cm^2 balaclava hood with a 12 cal / cm^2 faceshield[1] Other PPE as required	FR clothing with an arc rating that meets or exceeds the arc energy at the work location **AND** Minimum 20 cal / cm^2 balaclava hood with a 20 cal / cm^2 faceshield[1] Other PPE as required	FR clothing with an arc rating that meets or exceeds the arc energy at the work location **AND** Minimum 40 cal / cm^2 enclosed hood with faceshield Other PPE as required

Work Activity	FR Clothing System Requirements			
	<9 CAL / CM^2	**9-16 CAL / CM^2**	**>16-24 CAL / CM^2**	**> 24 CAL / CM^2**
Overhead/ Underground	FR clothing with an arc rating that meets or exceeds 8 cal / cm^2 10 or 12 cal / cm^2 balaclava hood is highly recommended Other PPE as required	FR clothing with an arc rating that meets or exceeds the arc energy at the work location **AND** Minimum 12 cal / cm^2 balaclava hood with a 12 cal / cm^2 faceshield[1] Other PPE as required	FR clothing with an arc rating that meets or exceeds the arc energy at the work location **AND** Minimum 20 cal / cm^2 balaclava hood with a 20 cal / cm^2 faceshield[1] Other PPE as required	FR clothing with an arc rating that meets or exceeds the arc energy at the work location **AND** Minimum 40 cal / cm^2 enclosed hood with faceshield Other PPE as required

NOTES

1. OSHA [1926.960(g)(5)(v)] permits head and face protection to have a minimum arc rating that is 4 cal / cm^2 less than the estimated arc energy.