

NFPA 70E COMPLIANCE GUIDE

This guide shall only be used in conjunction with performing the necessary calculations contained in a flash hazard analysis to determine the proper cal/cm². If the results of the calculations exceed the cal/cm² that correspond to the HRC found on this guide, you must use clothing that complies with the calculation.

| Panelboards or Other Equipment Rated 240V and Below -- Note 1 | | | | 600 V Class Switchgear (with power circuit breakers or fused switches) --Note 4 | | | | | | | | |
|--|----------------|---------------|-----|---|----------------|---------------|-----|--|---|---------------|-----|---|
| TASK (equipment is energized & work is done within the flash protection boundary) | V-Rated Gloves | V-Rated Tools | HRC | TASK (equipment is energized & work is done within the flash protection boundary) | V-Rated Gloves | V-Rated Tools | HRC | | | | | |
| Perform infrared thermography and other non-contact inspection outside the restricted approach boundary | | | 0 | Perform infrared thermography and other non-contact inspection outside the restricted approach boundary | | | 2 | Opening hinged covers (to expose bare, energized electrical conductors and circuit parts) | | 3 | | |
| Circuit Breaker (CB) or fused switch operation with covers on | | | 0 | CB or fused switch or starter operation with enclosure doors closed | | | 0 | Insertion or removal (racking) of starters from cubicles of arc-resistant construction, tested in accordance with IEEE C37.20.7, doors closed only | | 0 | | |
| CB or fused switch operation with covers off | | | 0 | Reading a panel meter while operation a meter switch | | | 0 | <i>Metal Clad Switchgear, 1 kV Through 38 kV</i> | | | | |
| Work on energized electrical conductors and circuit parts, including voltage testing | Y | Y | 1 | CB or fused switch operation with enclosure doors open | | | 1 | TASK (equipment is energized & work is done within the flash protection boundary) | V-Rated Gloves | V-Rated Tools | HRC | |
| Remove/install CBs or fused switches | Y | Y | 1 | Work on energized electrical conductors and circuit parts, including voltage testing | Y | Y | 2* | Perform infrared thermography and other non-contact inspection outside the restricted approach boundary | | | 3 | |
| Removal of bolted covers (to exposed bare, energized electrical conductors and circuit parts) | | | 1 | Work on control circuits with energized electrical conductors and circuit parts 120 V or below, exposed | Y | Y | 0 | CB operation with enclosure doors closed | | | 2 | |
| Open hinged covers (to exposed bare, energized electrical conductors and circuit parts) | | | 0 | Work on control circuits with energized electrical conductor and circuit parts >120 V, exposed | Y | Y | 2* | Reading a panel meter while operation a meter switch | | | 0 | |
| Work on energized electrical conductors and circuit parts of utilization equipment fed directly by a branch circuit of the panelboard | Y | Y | 1 | Insertion or removal (racking) of CBs from cubicles, doors open or closed | | | 4 | CB operation with enclosure doors open | | | 4 | |
| <i>Panelboards or Switchboards Rated >240V and up to 600 V (with molded or insulated case circuit breakers) - Note 1</i> | | | | Application of safety grounds, after voltage test | Y | | 2* | Work on energized electrical conductors and circuit parts, including voltage testing | Y | Y | 4 | |
| TASK (equipment is energized & work is done within the flash protection boundary) | V-Rated Gloves | V-Rated Tools | HRC | Removal of bolted covers (to exposed bare, energized electrical conductors and circuit parts) | | | 4 | Insertion or removal (racking) of CBs from cubicles, doors open or closed | | | 4 | |
| Perform infrared thermography and other non-contact inspection outside the restricted approach boundary | | | 1 | Open hinged covers (to exposed bare, energized electrical conductors and circuit parts) | | | 2 | Application of safety grounds, after voltage test | Y | | 4 | |
| Circuit Breaker (CB) or fused switch operation with covers on | | | 0 | <i>Other 600 V Class (277 V through 600 V, nominal Equipment -- Note 2 (except as indicated))</i> | | | | | Removal of bolted cover (to expose bare, energized electrical conductors and circuit parts) | | | 4 |
| CB or fused switch operation with covers off | Y | | 1 | TASK (equipment is energized & work is done within the flash protection boundary) | V-Rated Gloves | V-Rated Tools | HRC | Opening hinged covers (to expose bare, energized electrical conductors and circuit parts) | | | 3 | |
| Work on energized electrical conductors and circuit parts, including voltage testing | Y | Y | 2* | Lighting or small power transformer (600 V, Maximum) | | | | Opening voltage transformer or control power transformer compartments | | | 4 | |
| Work on energized electrical conductors and circuit parts of utilization equipment fed directly by a branch circuit of the panelboard or switchboard | Y | Y | 2* | Removal of bolted cover (to expose bare, energized electrical conductors and circuit parts) | | | 2* | <i>Arc-Resistant Switchgear Type 1 or 2 (for clearing times of <0.5 sec with a prospective fault current not exceed the arc resistant rating of equip.)</i> | | | | |
| <i>600 V Class Motor Control Center (MCCs)--Note 2 (except as indicated)</i> | | | | Opening hinged covers (to expose bare, energized electrical conductors and circuit parts) | | | 1 | TASK (equipment is energized & work is done within the flash protection boundary) | V-Rated Gloves | V-Rated Tools | HRC | |
| TASK (equipment is energized & work is done within the flash protection boundary) | V-Rated Gloves | V-Rated Tools | HRC | Work on energized electrical conductors and circuit parts, including voltage testing | Y | Y | 2* | CB operation with enclosure doors closed | | | 0 | |
| Perform infrared thermography and other non-contact inspection outside the restricted approach boundary | | | 1 | Application of safety grounds, after voltage test | Y | | 2* | Insertion or removal (racking) of CBs from cubicles, doors closed | | | 0 | |
| CB or fused switch or starter operation with enclosure doors closed | | | 0 | Revenue meters (kW-hour, at primary voltage and current) Insertion or removal | Y | | 2* | Insertion or removal of CBs from cubicles, doors open | | | 4 | |
| Reading a panel meter while operation a meter switch | | | 0 | Cable trough or tray cover removal or installation | | | 1 | Work on control circuits with energized electrical conductors and circuit parts 120 V or below, exposed | Y | Y | 2 | |
| CB or fused switch or starter operation with enclosure doors open | | | 1 | Miscellaneous Equipment cover removal or installation | | | 1 | Insertion or removal (racking) of ground and test device with doors closed | | | 0 | |
| Work on energized electrical conductors and circuit parts, including voltage testing | Y | Y | 2* | Work on energized electrical conductors and circuit parts, including voltage testing | Y | Y | 2* | Insertion or removal (racking) voltage transformer on or off the bus door closed | | | 0 | |
| Work on control circuits with energized electrical conductors and circuit parts 120 V or below, exposed | Y | Y | 0 | Application of safety grounds, after voltage test | Y | | 2* | <i>Other Equipment 1 kV Through 38 kV</i> | | | | |
| Work on control circuits with energized electrical conductor and circuit parts >120 V, exposed | Y | Y | 2* | Insertion or removal of plug-in devices into or from busways | Y | | 2* | TASK (equipment is energized & work is done within the flash protection boundary) | V-Rated Gloves | V-Rated Tools | HRC | |
| Insertion or removal of individual starter "buckets" from MCC--Note 3 | Y | | 4 | <i>Nema E2 (fused contactor) Motor Starters, 2.3 kV Through 7.2 kV</i> | | | | | Metal-enclosed interrupter switchgear, fused or unfused | | | 0 |
| Application of safety grounds, after voltage test | Y | | 2* | TASK (equipment is energized & work is done within the flash protection boundary) | V-Rated Gloves | V-Rated Tools | HRC | Switch operation of arc-resistant-type construction, tested in accordance with IEEE C37.20.7, doors closed only | | | 0 | |
| Removal of bolted covers (to exposed bare, energized electrical conductors and circuit parts)--Note 3 | | | 4 | Perform infrared thermography and other non-contact inspection outside the restricted approach boundary | | | 3 | Switch operation, doors closed | | | 2 | |
| Open hinged covers (to exposed bare, energized electrical conductors and circuit parts)--Note 3 | | | 1 | Contactor operation with enclosure doors closed | | | 0 | Work on energized electrical conductors and circuit parts, including voltage testing | Y | Y | 4 | |
| Work on energized electrical conductors and circuit parts of utilization equipment fed directly by a branch circuit of the motor control center | Y | Y | 2* | Reading a panel meter while operation a meter switch | | | 0 | Removal of bolted cover (to expose bare, energized electrical conductors and circuit parts) | | | 4 | |
| NFPA 70 E Compliance Guide | | | | Contactor operation with enclosure doors open | | | 2* | Opening hinged covers (to expose bare, energized electrical conductors and circuit parts) | | | 3 | |
| Revised 10-08 | | | | Work on energized electrical conductors and circuit parts, including voltage testing | Y | Y | 4 | Outdoor disconnect switch operation (hookstick operated) | Y | Y | 3 | |
| NFPA 70 E Compliance Guide | | | | Work on control circuits with energized electrical conductors and circuit parts 120 V or below, exposed | Y | Y | 0 | Outdoor disconnect switch operation (gang-operated, from grade) | Y | | 2 | |
| NFPA 70 E Compliance Guide | | | | Work on control circuits with energized electrical conductor and circuit parts >120 V, exposed | Y | Y | 3 | Insulated cable examination, in manhole or other confined space | Y | | 4 | |
| NFPA 70 E Compliance Guide | | | | Insertion or removal (racking) of CBs from cubicles, doors open or closed | | | 4 | Insulated cable examination, in open area | Y | | 2 | |
| NFPA 70 E Compliance Guide | | | | Application of safety grounds, after voltage test | Y | | 3 | | | | | |
| NFPA 70 E Compliance Guide | | | | Removal of bolted cover (to expose bare, energized electrical conductors and circuit parts) | | | 4 | | | | | |

| HRC | Protective Clothing | Minimum cal/cm ² | PPE (Safety glasses, hearing protection, leather safety shoes required for all) | Definitions: Y=Yes (Required) |
|-----|---|-----------------------------|--|--|
| 0 | Natural fiber long-sleeved shirt and pants (non melting) | N/A | Hard Hat | V-Rated Gloves : Rubber Insulating gloves rated and tested for the maximum line-to-line voltage upon which work will be done. Leather protectors must be worn externally if rubber insulating gloves could be damaged. |
| 1 | FR long-sleeved shirt and FR pants OR FR coveralls | 4 | Hard Hat, Arc-Rated Face Shield OR Flash suit hood | |
| 2 | FR long-sleeved shirt and FR pants OR FR coveralls | 8 | Hard Hat, Arc-Rated Face Shield with FR Balaclava (sock hood) OR Flash suit hood | |
| 2* | FR long-sleeved shirt and FR pants OR FR coveralls | 8 | Hard Hat, Arc-Rated Face Shield with FR Balaclava (sock hood) OR Flash suit hood | |
| 3 | Multi-Layer flash suit over FR long-sleeved shirt and pants over natural fiber short-sleeved T-shirt and pants OR Multi-Layer flash suit over FR coveralls over natural fiber short-sleeved T-shirt and pants | 25 | Hard Hat, Multi-Layer Switching Hood | V-Rated Tools : Insulated and Insulating Hand Tools rated and tested for the maximum line-to-line voltage upon which work will be done. |
| 4 | Multi-Layer flash suit over FR long-sleeved shirt and pants over natural fiber short-sleeved T-shirt and pants OR Multi-Layer flash suit over FR coveralls over natural fiber short-sleeved T-shirt and pants | 40 | Hard Hat, Multi-Layer Switching Hood | HRC : Hazard Risk Category FR : Flame Resistant |

* If the notes cannot be satisfied, work must be performed de-energized.

Note 1 Maximum of 25 kA short circuit current available, maximum of 0.03 second (2 cycle) fault clearing time.

Note 2 Maximum of 65 kA short circuit current available, maximum of 0.03 second (2 cycle) fault clearing time.

Note 3 Maximum of 42 kA short circuit current available, maximum of 0.33 second (20 cycle) fault clearing time.

Note 4 Maximum of 35 kA short circuit current available, maximum of 0.5 second (30 cycle) fault clearing time.

*Working on circuits over 40 cal/cm² should be avoided because of blast hazards.