NATIONAL FIRE PROTECTION ASSOCIATION
The leading information and knowledge resource on fire, electrical and related hazards

M E M O R A N D U M

TO: Technical Committee on Electrical Safety in the Workplace

FROM: Sarah Caldwell, *Senior Committee Administrator*

DATE: November 24, 2025

SUBJECT: NFPA 70E Second Draft FINAL Ballot Results (A2026)

According to the final ballot results, all ballot items received the necessary affirmative votes to pass ballot.

Second Draft Ballot Results:

29 **Members Eligible to Vote**
4 **Members Not Returned** *(Conkwright, Dyson, Katekar, Stallcup)*

Second Draft Supplemental Ballot Results, Second Revision No. 105:

29 **Members Eligible to Vote**
3 **Members Not Returned** *(Dyson, Katekar, Stallcup)*

The attached report shows the number of affirmative, negative, and abstaining votes as well as the explanation of the vote for **each** revision**.**

To pass ballot, **each** revision requires: (1) a simple majority of those eligible to vote and (2) an affirmative vote of $^{2}/_{3}$ of ballots returned. See Sections 3.3.4.3.(c) and 4.3.10.1 of the ***Regulations Governing the Development of NFPA Standards***.

Second Revision No. 169-NFPA 70E-2025 [Global Comment]

[re-title and reorganize Chapter 3 articles as follows]

300 Introduction

310 ~~Safety-Related Work Practices: dc~~ DC Electrical Hazards ~~(Reserved)~~

320 ~~Safety-Related Work Requirements for~~ Capacitor~~s~~ Electrical Hazards

330 Electrical Hazards 1 Hz to 110 MHz ~~(Not Including~~ excluding dc and 50/60 Hz~~)~~

340 ~~Safety-Related Work Practices:~~ Electrical Hazards for Mixed Frequencies (Reserved)

350 Safety-Related Work Practices for Electrolytic Cells

360 Safety-Related Requirements ~~Related to~~ for Batteries~~and Battery Rooms~~

~~370~~ 390 Safety-Related Work Requirements~~for :~~ Research and Development (R&D) Laboratories

~~380~~ 370 Safety-Related Work Practices~~for :~~ Electrical Double Layer Capacitors (EDLCs)

~~390~~ 380 Safety-Related Work ~~Requirements~~ Practices for ~~:~~ Photovoltaic Systems

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Thu Aug 28 10:16:38 EDT 2025

Committee Statement

Committee Statement: R&D laboratories are moved to the end because it applies to more than single equipment hazards, including requirements for enforcement. Titles are aligned to be consistent.

Title to Article 330 is edited to better reflect the information in the article.

Response Message: SR-169-NFPA 70E-2025 Restructuring of the remaining articles is not accepted because grouping topics by ac and dc alone is not technically accurate.

Public Comment No. 177-NFPA 70E-2025 [Chapter 3]

Public Comment No. 104-NFPA 70E-2025 [Chapter 3]

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
24 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul

Dyson, Thomas B.

Katekar, Chaitanya

Stallcup, James G.

Affirmative All

Barnhart, Paul D.

Crow, Daryld Ray

Dollard, Jr., James T.

Gallo, Ernest J.

Gray, Bobby J.

Guier, Jarod

Hacke, Donald Charles

Harris, William R.

Hickman, Palmer L.

Hilbert, Mark R.

Lubaczewski, Scott

McKinch, Terrance L.

McNellis, Mark

Miller, Charles R.

Mohla, Daleep C.

Niemira, James K.

Norwood, Thomas D.

Pace, David A.

Schamel, Duke W.

Steinman, Gregory J.

Tobias, John M.

West, Rodney J.

Widup, Ron

Wolf, Jason

Affirmative with Comment

Barrios, Louis A.

Despite the excellent efforts by the Chapter 3 task group and 70E technical committee to restructure the content of Chapter 3 and to align article titles, there are still inconsistencies in those titles. The following is suggested for consideration during the next edition for further alignment: 300 Introduction, 310 Electrical Hazards: DC, 320 Electrical Hazards: Capacitors 330 Electrical Hazards: 1 Hz to 110 MHz excluding 50/60 Hz, 340 Electrical Hazards: Mixed Frequencies (Reserved), 350 Safety-Related Work Practices for Electrolytic Cells, 360 Safety-Related Work Practices for Batteries, 370 Safety-Related Work Practices for Electrical Double Layer Capacitors (EDLCs), 380 Safety-Related Work Practices for Photovoltaic Systems, 390 Safety-Related Requirements for Research and Development (R&D) Laboratories

Second Revision No. 189-NFPA 70E-2025 [Global Comment]

[Correct the NEC extract reference in all extracted definitions as follows:]

Change [**70:**100] to [**70,** 2026]

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Fri Aug 29 10:30:28 EDT 2025

Committee Statement

Committee Statement: Defined terms that are extracted from the NEC but did not change are updated to reflect the 2026 edition for clarity and for compliance with Section 7.3.1.2 of the NFPA Manual of Style.

Response Message: SR-189-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

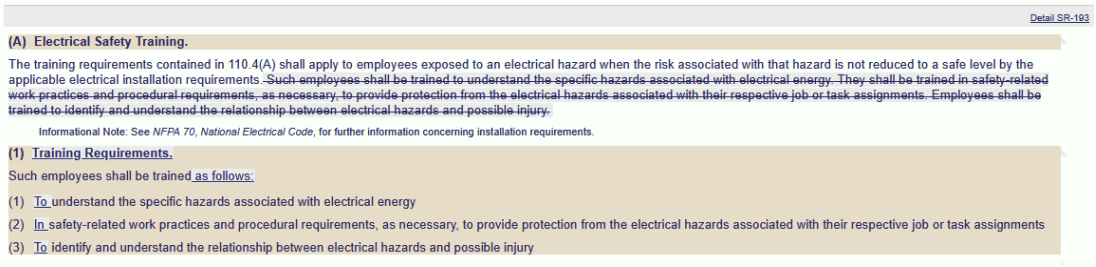
Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.

Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 193-NFPA 70E-2025 [Detail]

[110.4]



Detail SR-193

(A) Electrical Safety Training.

The training requirements contained in 110.4(A) shall apply to employees exposed to an electrical hazard when the risk associated with that hazard is not reduced to a safe level by the applicable electrical installation requirements. ~~Such employees shall be trained to understand the specific hazards associated with electrical energy. They shall be trained in safety-related work practices and procedural requirements, as necessary, to provide protection from the electrical hazards associated with their respective job or task assignments. Employees shall be trained to identify and understand the relationship between electrical hazards and possible injury.~~

Informational Note: See *NFPA 70, National Electrical Code*, for further information concerning installation requirements.

(1) Training Requirements.

Such employees shall be trained as follows:

(1) To understand the specific hazards associated with electrical energy

(2) In safety-related work practices and procedural requirements, as necessary, to provide protection from the electrical hazards associated with their respective job or task assignments

(3) To identify and understand the relationship between electrical hazards and possible injury

Supplemental Information

File Name	Description	Approved
70E_Detail_SR-193_110.4_A_.docx		

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Thu Sep 04 14:26:47 EDT 2025

Committee Statement

Committee Statement: The multiple requirements contained in 110.4(A) were moved into a second level sub-division and separated into list items to comply with NEC Style Manual Section 3.5.1.2.

Response Message: SR-193-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

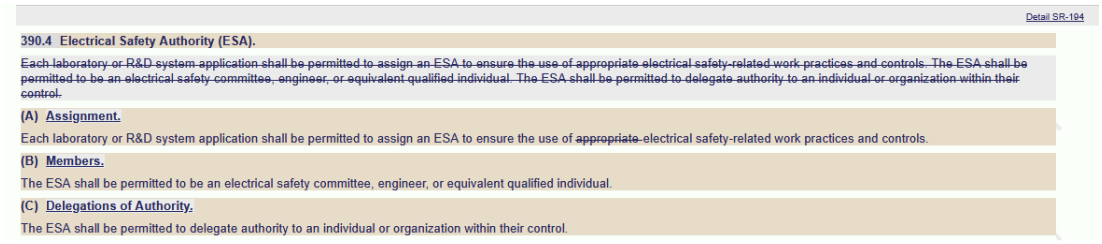
Affirmative All

Barnhart, Paul D.

Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 194-NFPA 70E-2025 [Detail]

370.4 [390.4 after reorg]



Detail SR-194

390.4 Electrical Safety Authority (ESA).

~~Each laboratory or R&D system application shall be permitted to assign an ESA to ensure the use of appropriate electrical safety-related work practices and controls. The ESA shall be permitted to be an electrical safety committee, engineer, or equivalent qualified individual. The ESA shall be permitted to delegate authority to an individual or organization within their control.~~

(A) Assignment.

Each laboratory or R&D system application shall be permitted to assign an ESA to ensure the use of ~~appropriate~~ electrical safety-related work practices and controls.

(B) Members.

The ESA shall be permitted to be an electrical safety committee, engineer, or equivalent qualified individual.

(C) Delegations of Authority.

The ESA shall be permitted to delegate authority to an individual or organization within their control.

Supplemental Information

File Name	Description	Approved
70E_Detail_SR-194_370.4.docx		

Submitter Information Verification

Committee: EEW-AAA

Submittal Date: Fri Sep 05 11:00:16 EDT 2025

Committee Statement

Committee Statement: A vague and unenforceable term “appropriate” is removed to comply with NEC Style Manual Section 3.2.1.

Added subdivisions and titles to comply with the NEC Style Manual Section 3.5.1.2, which states that multiple requirements within a single subdivision shall be avoided. Additional subdivisions are used to express independent requirements.

Response Message: SR-194-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul

Dyson, Thomas B.

Katekar, Chaitanya

Stallcup, James G.

Affirmative All

Barnhart, Paul D.

Barrios, Louis A.

Crow, Daryld Ray

Dollard, Jr., James T.

Gallo, Ernest J.

Gray, Bobby J.

Guier, Jarod

Hacke, Donald Charles

Harris, William R.

Hickman, Palmer L.

Hilbert, Mark R.

Lubaczewski, Scott

McKinch, Terrance L.

McNellis, Mark

Miller, Charles R.

Mohla, Daleep C.

Niemira, James K.

Norwood, Thomas D.

Pace, David A.

Schamel, Duke W.

Steinman, Gregory J.

Tobias, John M.

West, Rodney J.

Widup, Ron

Wolf, Jason

Second Revision No. 170-NFPA 70E-2025 [Definition: Accessible (as applied to equipment).]

Accessible (as applied to equipment).

~~Admitting close approach; not guarded by locked doors, elevation, or other effective means.~~
[~~**70:** 100~~] Capable of being reached for operation, renewal, and inspection. [**70**, 2026]

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Fri Aug 29 09:46:41 EDT 2025

Committee Statement

Committee Statement: The Technical Committee has reviewed the definitions that were modified in the 2026 National Electrical Code and are extracted for use in NFPA 70E. The term identified in this second revision is updated to match the 2026 National Electrical Code.

Response Message: SR-170-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.

Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 1-NFPA 70E-2025 [Definition: Arc Rating.]

Arc Rating.

The value attributed to materials that describes their performance to exposure to an electrical arc discharge. ~~The arc rating is expressed in cal/cm 2 and is derived from the determined value of the arc thermal performance value (ATPV) or energy of breakopen threshold (E BT) (should a material system exhibit a breakopen response below the ATPV value). Arc rating is reported as either ATPV or E BT , whichever is the lower value.~~

Informational Note No. 1: The arc rating is expressed in cal/cm^2 and is derived from the determined value of the arc thermal performance value (ATPV) or energy of breakopen threshold (E_{BT})~~(~~, should a material system exhibit a breakopen response below the ATPV value~~)~~. Arc rating is reported as either ATPV or E_{BT}, whichever is the lower value.

Informational Note No. 2: Arc-rated clothing or equipment indicates that it has been tested for exposure to an electric arc. Flame-resistant clothing without an arc rating has not been tested for exposure to an electric arc. All arc-rated clothing is also flame resistant.

Informational Note No. 3: See ASTM F1959/F1959M, *Standard Test Method for Determining the Arc Rating of Materials for Clothing*, which defines ATPV as the incident energy (cal/cm^2) on a material or a multilayer system of materials that results in a 50 percent probability that sufficient heat transfer through the tested specimen is predicted to cause the onset of a second degree skin burn injury based on the Stoll curve.

Informational Note No. 4: See ASTM F1959/F1959M, *Standard Test Method for Determining the Arc Rating of Materials for Clothing*, which defines E_{BT} as the incident energy (cal/cm^2) on a material or a material system that results in a 50 percent probability of breakopen. Breakopen is a material response evidenced by the formation of one or more holes of a defined size [an area of 1.6 cm^2 (0.5 in.^{2}) or an opening of 2.5 cm (1.0 in.) in any dimension] in the innermost layer of arc-rated material that would allow thermal energy to pass through the material.

Supplemental Information

File Name	Description	Approved
70E_SR-1_Arc_Rating.docx		

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Tue Aug 19 12:54:17 EDT 2025

Committee Statement

Committee Statement: The definition is restructured to comply with Section 7.2 of the Manual of Style for NFPA Technical Committee Documents October 2023 Edition. The informative material is relocated as a new Informational Note No. 1 and subsequent informational notes are retained and renumbered. The parenthesis are removed per Section 3.5.1.1 of the National Electrical Code Style Manual.

Response Message: SR-1-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters

4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 171-NFPA 70E-2025 [Definition: Bonding Conductor or Jumper.]

Bonding Conductor ~~or~~ (Bonding Jumper) .

A ~~reliable~~ conductor ~~to ensure~~ that ensures the required electrical conductivity between metal parts that are required to be electrically connected. [~~**70:** 100~~] [**70,** 2026]

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Fri Aug 29 09:48:47 EDT 2025

Committee Statement

Committee Statement: The Technical Committee has reviewed the definitions that were modified in the 2026 National Electrical Code and are extracted for use in NFPA 70E. The term identified in this second revision is updated to match the 2026 National Electrical Code.

Response Message: SR-171-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.

Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 172-NFPA 70E-2025 [Definition: Building.]

Building.

A structure that stands alone or that is ~~cut off~~ separated from adjoining structures by fire walls ~~with all openings therein protected by approved fire doors~~ . [~~**70:** 100~~] [**70**, 2026]

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Fri Aug 29 09:50:03 EDT 2025

Committee Statement

Committee Statement: The Technical Committee has reviewed the definitions that were modified in the 2026 National Electrical Code and are extracted for use in NFPA 70E. The term identified in this second revision is updated to match the 2026 National Electrical Code.

Response Message: SR-172-NFPA 70E-2025

Ballot Results

This item has passed ballot

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.

Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 3-NFPA 70E-2025 [Definition: Cutout.]

Cutout.

An assembly of a fuse support with either a fuseholder, fuse carrier, or disconnecting blade.

Informational Note: The fuseholder or fuse carrier ~~may~~ might include a conducting element ~~(~~ , such as a fuse link~~)~~ , or ~~may~~ might act as the disconnecting blade by the inclusion of a nonfusible member.

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Thu Aug 21 09:05:04 EDT 2025

Committee Statement

Committee Statement: The definition is restructured to comply with Section 7.2 of the Manual of Style for NFPA Technical Committee Documents October 2023 Edition. The informative material is relocated as a new informational note. The word “may” is replaced with “might” for clarity. The parenthesis are removed per Section 3.5.1.1 of the National Electrical Code Style Manual.

Response Message: SR-3-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod

Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 4-NFPA 70E-2025 [Definition: Exposed (as applied to energized electrical con...]

Exposed (as applied to energized electrical conductors or circuit parts).

~~Capable of~~ Not suitably guarded, isolated, or insulated to prevent being inadvertently touched or approached nearer than a safe distance by a person. ~~It is applied to electrical conductors or circuit parts that are not suitably guarded, isolated, or insulated.~~

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Thu Aug 21 09:08:54 EDT 2025

Committee Statement

Committee Statement: The definition is restructured to comply with Section 7.2 of the Manual of Style for NFPA Technical Committee Documents October 2023 Edition

Response Message: SR-4-NFPA 70E-2025

Ballot Results

This item has passed ballot

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.

Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

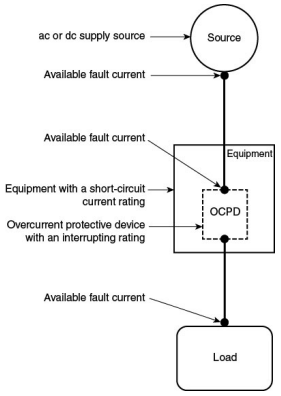
Second Revision No. 2-NFPA 70E-2025 [Definition: Fault Current, Available. (Available Fault Curr...]

Fault Current, Available. (Available Fault Current)

The largest amount of current capable of being delivered at a point on the system during a short-circuit condition.

Informational Note No. 1: See ~~Figure~~ Figure Informational Note 100.0 A short circuit can occur during abnormal conditions such as a fault between circuit conductors or a ground fault.

Figure Informational Note 100.0 Available Fault Current.



Informational Note No. 2: If the dc supply is a battery system, the term *available fault current* refers to the prospective short-circuit current.

Informational Note No. 3: The available fault current varies at different locations within the system due to the location of sources and system impedances.

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Tue Aug 19 12:56:11 EDT 2025

Committee Statement

Committee Statement: The title and references to Informational Note Figure 100.0 are updated for clarity and to remove redundant language.

Response Message: SR-2-NFPA 70E-2025While the fault current also varies, the figure depicts that the available fault current varies at different locations in the system as indicated in Informational Note No. 3 to the definition of “available fault current”. The figure is not associated with the defined term “fault current”.

Public Comment No. 121-NFPA 70E-2025 [Definition: Fault Current, Available. (Available Fault Curr...]

Public Comment No. 40-NFPA 70E-2025 [Definition: Fault Current, Available. (Available Fault Curr...]

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments

0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 183-NFPA 70E-2025 [Definition: Ground Fault.]

Ground Fault.

An unintentional, electrically conductive connection between an ungrounded conductor of an electrical circuit and the normally non–current-carrying conductors, ~~metallic~~ metal enclosures, ~~metallic~~ metal raceways, ~~metallic~~ metal equipment, or earth. [~~**70:** 100~~] [**70**, 2026]

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Fri Aug 29 10:07:18 EDT 2025

Committee Statement

Committee Statement: The Technical Committee has reviewed the definitions that were modified in the 2026 National Electrical Code and are extracted for use in NFPA 70E. The term identified in this second revision is updated to match the 2026 National Electrical Code.

Response Message: SR-183-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
24 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.

Hickman, Palmer L.

Hilbert, Mark R.

Lubaczewski, Scott

McKinch, Terrance L.

McNellis, Mark

Miller, Charles R.

Mohla, Daleep C.

Norwood, Thomas D.

Pace, David A.

Schamel, Duke W.

Steinman, Gregory J.

Tobias, John M.

West, Rodney J.

Widup, Ron

Wolf, Jason

Affirmative with Comment

Niemira, James K.

The definition is overly restrictive and should be revised. A ground fault can occur between the grounded circuit conductor (system neutral conductor) and ground as well as between an ungrounded circuit conductor and ground. A fault from the grounded circuit conductor to ground can allow a hazardous amount of leakage current to flow in the parallel ground path. A better definition would be: Ground Fault. An unintentional, electrically conductive connection between a circuit conductor of an electrical circuit or equipment and the normally non–current-carrying conductors, metal enclosures, metal raceways, metal equipment, or earth.

Second Revision No. 174-NFPA 70E-2025 [Definition: Ground-Fault Circuit Interrupter (GFCI).]

Ground-Fault Circuit Interrupter (GFCI) (Class A GFCI) .

A device intended for the protection of personnel that functions to de-energize a circuit or portion thereof within an established period of time when a current to ground exceeds the values established for a Class A device. [~~70:~~ ~~100~~] [**70**, 2026]

Informational Note: See UL 943, *Ground-Fault Circuit Interrupters*, for further information. Class A ground-fault circuit interrupters trip when the ground-fault current is 6 mA or higher and does not trip when the ground-fault current is less than 4 mA.

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Fri Aug 29 09:51:57 EDT 2025

Committee Statement

Committee Statement: The Technical Committee has reviewed the definitions that were modified in the 2026 National Electrical Code and are extracted for use in NFPA 70E. The term identified in this second revision is updated to match the 2026 National Electrical Code.

Response Message: SR-174-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.

Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 173-NFPA 70E-2025 [Definition: Ground.]

Ground.

The ~~earth~~ Earth . [~~**70:** 100~~] [**70**, 2026]

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Fri Aug 29 09:51:12 EDT 2025

Committee Statement

Committee Statement: The Technical Committee has reviewed the definitions that were modified in the 2026 National Electrical Code and are extracted for use in NFPA 70E. The term identified in this second revision is updated to match the 2026 National Electrical Code.

Response Message: SR-173-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.

Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 184-NFPA 70E-2025 [Definition: Grounded Conductor.]

Grounded Conductor.

A system or circuit conductor that is intentionally grounded. [~~**70:** 100~~] [**70**, 2026]

Informational Note: Although an equipment grounding conductor is grounded, it is not considered a grounded conductor.

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Fri Aug 29 10:09:54 EDT 2025

Committee Statement

Committee Statement: The Technical Committee has reviewed the definitions that were modified in the 2026 National Electrical Code and are extracted for use in NFPA 70E. The term identified in this second revision is updated to match the 2026 National Electrical Code.

Response Message: SR-184-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles

Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 175-NFPA 70E-2025 [Definition: Grounding Conductor, Equipment (EGC). (Equipmen...]

Grounding Conductor, Equipment (EGC). (Equipment Grounding Conductor)

~~The~~ A conductive path(s) that ~~provides a~~ is part of an effective ground-fault current path and connects normally non-current-carrying metal parts of equipment together and to the system grounded conductor or to the grounding electrode conductor, or both. [~~70:~~ ~~100~~] [**70,** 2026]

Informational Note No. 1: It is recognized that the equipment grounding conductor also performs bonding.

Informational Note No. 2: See 250.118 of *NFPA 70*, *National Electrical Code*, for a list of acceptable equipment grounding conductors.

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Fri Aug 29 09:53:35 EDT 2025

Committee Statement

Committee Statement: The Technical Committee has reviewed the definitions that were modified in the 2026 National Electrical Code and are extracted for use in NFPA 70E. The term identified in this second revision is updated to match the 2026 National Electrical Code.

Response Message: SR-175-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.

Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 176-NFPA 70E-2025 [Definition: Grounding Electrode Conductor.]

Grounding Electrode Conductor (GEC) .

A conductor used to connect the system grounded conductor or the equipment to a grounding electrode or to a point on the grounding electrode system. [~~**70:** 100~~] [**70,** 2026]

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Fri Aug 29 09:54:22 EDT 2025

Committee Statement

Committee Statement: The Technical Committee has reviewed the definitions that were modified in the 2026 National Electrical Code and are extracted for use in NFPA 70E. The term identified in this second revision is updated to match the 2026 National Electrical Code.

Response Message: SR-176-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.

Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 5-NFPA 70E-2025 [Definition: Hazard, Electrical. (Electrical Hazard)]

Hazard, Electrical. (Electrical Hazard)

A source of possible injury or damage to health that can result in electric shock, arc flash burn, contact thermal burn, or arc blast injury.

Informational Note No. 1: See Informative Annex K for further information on the associated hazards.

Informational Note No. 2: Class 2 power supplies, listed low-voltage lighting systems, and similar sources are examples of circuits or systems that are not considered an electrical hazard.

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Thu Aug 21 09:10:11 EDT 2025

Committee Statement

Committee Statement: The new informational note references Informative Annex K to direct users to where electrical hazards are discussed.

Response Message: SR-5-NFPA 70E-2025 The term “arc-blast injury” is not deleted as it remains a type of injury that needs to be identified in this definition.

Public Comment No. 227-NFPA 70E-2025 [Definition: Hazard, Electrical. (Electrical Hazard)]

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
23 Affirmative All
2 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.

Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Affirmative with Comment

Barrios, Louis A.
Editorial: There needs to be a comma following "electric shock" in the definition.
Niemira, James K.
add a comma after "electric shock"

Second Revision No. 177-NFPA 70E-2025 [Definition: Luminaire.]

Luminaire.

~~A complete lighting unit consisting of a light source, such as a lamp or lamps, together with the parts designed to position the light source and connect it to the power supply. It may also include parts to protect the light source or the ballast or to distribute the light. A lampholder itself is not a luminaire.~~

[~~**70:** 100~~] Utilization equipment intended to illuminate a space or object(s), to facilitate visual tasks, activities, aesthetics, or security, or a similar purpose. Light-emitting devices such as lamps or LED modules could be removable or replaceable. The equipment can connect directly to the branch circuit (ac or dc) or be used with a separate power source that regulates the voltage, current, or both from the branch circuit. [**70**, 2026]

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Fri Aug 29 09:56:12 EDT 2025

Committee Statement

Committee Statement: The Technical Committee has reviewed the definitions that were modified in the 2026 National Electrical Code and are extracted for use in NFPA 70E. The term identified in this second revision is updated to match the 2026 National Electrical Code.

Response Message: SR-177-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.

Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 178-NFPA 70E-2025 [Definition: Panelboard.]

Panelboard.

A single panel or group of panel units designed for assembly in the form of a single panel, including buses and automatic overcurrent protective devices (OCPDs), and equipped with or without switches for the control of light, heat, or power circuits; designed to be placed in a cabinet or cutout box placed in or against a wall, partition, or other support; and accessible only from the front. [~~70:~~ ~~100~~] [**70,** 2026]

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Fri Aug 29 09:57:06 EDT 2025

Committee Statement

Committee Statement: The Technical Committee has reviewed the definitions that were modified in the 2026 National Electrical Code and are extracted for use in NFPA 70E. The term identified in this second revision is updated to match the 2026 National Electrical Code.

Response Message: SR-178-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles

Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 6-NFPA 70E-2025 [Definition: Pilot Cell.]

~~**Pilot Cell.**~~

~~One or more cells chosen to represent the operating parameters of the entire battery (sometimes called "temperature reference" cell). (320)~~

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Thu Aug 21 12:04:04 EDT 2025

Committee Statement

Committee Statement: The definition of "pilot cell" is removed because the term is not used in the requirements of NFPA 70E.
Response Message: SR-6-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.

Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 179-NFPA 70E-2025 [Definition: Raceway.]

Raceway.

An enclosed channel ~~of metal or nonmetallic materials~~ designed expressly for holding wires, cables, or busbars, with additional functions as permitted in ~~this standard~~ *NFPA 70 , National Electrical Code* .
[~~**70:** 100~~] [**70,** 2026]

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Fri Aug 29 09:59:00 EDT 2025

Committee Statement

Committee Statement: The Technical Committee has reviewed the definitions that were modified in the 2026 National Electrical Code and are extracted for use in NFPA 70E. The term identified in this second revision is updated to match the 2026 National Electrical Code.

Response Message: SR-179-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.

Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 191-NFPA 70E-2025 [Definition: Receptacle.]

Receptacle.

A contact device installed at the outlet for the connection of an attachment plug, or for the direct connection of electrical utilization equipment designed to mate with the corresponding contact device. A single receptacle is a single contact device with no other contact device on the same yoke. A multiple receptacle is two or more contact devices on the same yoke or strap . [~~**70:** 100~~] [**70**, 2026]

Informational Note: A duplex receptacle is an example of a multiple receptacle that has two receptacles on the same yoke or strap.

Supplemental Information

File Name	Description	Approved
70E_SR-191_Receptacle.docx		

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Fri Aug 29 14:32:54 EDT 2025

Committee Statement

Committee Statement: The definition is restructured to comply with Section 7.2 of the Manual of Style for NFPA Technical Committee Documents October 2023 Edition. The informative material is relocated as a new informational note.

Response Message: SR-191-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray

Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 180-NFPA 70E-2025 [Definition: Service Drop.]

Service Drop.

The overhead conductors between the serving utility ~~electric supply system~~ and the service point.
[~~**70:** 100~~] [**70**, 2026]

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Fri Aug 29 10:01:12 EDT 2025

Committee Statement

Committee Statement: The Technical Committee has reviewed the definitions that were modified in the 2026 National Electrical Code and are extracted for use in NFPA 70E. The term identified in this second revision is updated to match the 2026 National Electrical Code.

Response Message: SR-180-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.

Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 181-NFPA 70E-2025 [Definition: Short-Circuit Current Rating.]

Short-Circuit Current Rating.

The prospective symmetrical fault current at a nominal voltage to which ~~an apparatus or system~~ equipment is able to be connected without sustaining damage exceeding defined acceptance criteria. [~~**70:** 100~~] [**70**, 2026]

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Fri Aug 29 10:02:21 EDT 2025

Committee Statement

Committee Statement: The Technical Committee has reviewed the definitions that were modified in the 2026 National Electrical Code and are extracted for use in NFPA 70E. The term identified in this second revision is updated to match the 2026 National Electrical Code.

Response Message: SR-181-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.

Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 7-NFPA 70E-2025 [Definition: Short-Circuit Current, Prospective. (Prospectiv...]

Short-Circuit Current, Prospective. (Prospective Short-Circuit Current)

The highest level of fault current that could theoretically occur at a point on a circuit~~. This is the fault current that can flow~~ in the event of a zero impedance short circuit and if no protection devices operate. (~~320~~ 360)

Informational Note: Some batteries have built-in management devices to limit maximum short-circuit current. The determination of the prospective short-circuit current for these batteries assumes that the internal battery management system protection devices are operable.

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Thu Aug 21 12:04:51 EDT 2025

Committee Statement

Committee Statement: The definition is restructured to comply with Section 7.2 of the Manual of Style for NFPA Technical Committee Documents. The article reference is updated to Article 360 to reflect changes made in the first draft.

Response Message: SR-7-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
24 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod

Hacke, Donald Charles

Harris, William R.

Hickman, Palmer L.

Hilbert, Mark R.

Lubaczewski, Scott

McKinch, Terrance L.

McNellis, Mark

Miller, Charles R.

Mohla, Daleep C.

Niemira, James K.

Norwood, Thomas D.

Pace, David A.

Schamel, Duke W.

Steinman, Gregory J.

Tobias, John M.

West, Rodney J.

Widup, Ron

Wolf, Jason

Affirmative with Comment

Barrios, Louis A.

Note to NFPA editorial staff to verify article references at the end of definitions applicable to Chapter 3 are updated per the order of articles in SR 169. This definition is correctly updated from "320" to "360".

Second Revision No. 187-NFPA 70E-2025 [Definition: Structure.]

Structure.

That which is built or constructed, other than equipment . [~~**70:** 100~~] [**70,** 2026]

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Fri Aug 29 10:19:27 EDT 2025

Committee Statement

Committee Statement: The Technical Committee has reviewed the definitions that were modified in the 2026 National Electrical Code and are extracted for use in NFPA 70E. The term identified in this second revision is updated to match the 2026 National Electrical Code.

Response Message: SR-187-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.

Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 182-NFPA 70E-2025 [Definition: Switchboard.]

Switchboard.

A large single panel, frame, or assembly of panels on which are mounted on the face, back, or both, switches, overcurrent protective devices (OCPDs) and other protective devices, buses, and usually instruments. ~~These assemblies are generally accessible from the rear as well as from the front and are not intended to be installed in cabinets.~~ [~~**70:** 100~~] [**70**, 2026]

Informational Note: These assemblies ~~are generally~~ can be accessible from the rear or side as well as from the front and are not intended to be installed in cabinets.

Supplemental Information

File Name	Description	Approved
70E_SR-182_Switchboard.docx		

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Fri Aug 29 10:03:33 EDT 2025

Committee Statement

Committee Statement: The Technical Committee has reviewed the definitions that were modified in the 2026 National Electrical Code and are extracted for use in NFPA 70E. The term identified in this second revision is updated to match the 2026 National Electrical Code.

Response Message: SR-182-NFPA 70E-2025

Public Comment No. 74-NFPA 70E-2025 [Global Input]

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.

Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 8-NFPA 70E-2025 [Definition: Switchgear, Metal-Enclosed. (Metal-Enclosed Swi...]

Switchgear, Metal-Enclosed. (Metal-Enclosed Switchgear)

A switchgear assembly completely enclosed on all sides and top with sheet metal ~~(~~ except for ventilating openings and inspection windows~~)~~, containing primary power circuit switching, interrupting devices, or both, with buses and connections. ~~This assembly may include control and auxiliary devices. Access to the interior of the enclosure is provided by doors, removable covers, or both. Metal-enclosed switchgear is available in non-arc-resistant or arc-resistant constructions.~~

Informational Note: This assembly ~~may~~ might include control and auxiliary devices. Access to the interior of the enclosure is provided by doors, removable covers, or both. Metal-enclosed switchgear is available in non-arc-resistant or arc-resistant constructions.

Supplemental Information

File Name	Description	Approved
70E_SR-8_Switchgear.docx		

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Thu Aug 21 12:06:51 EDT 2025

Committee Statement

Committee Statement: The definition is restructured to comply with Section 7.2 of the Manual of Style for NFPA Technical Committee Documents The informative material is relocated as a new informational note. The word “may” is replaced with “might” for clarity. The parentheses are removed per Section 3.5.1.1 of the National Electrical Code Style Manual.

Response Message: SR-8-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
23 Affirmative All
2 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.

Crow, Daryld Ray

Dollard, Jr., James T.

Gallo, Ernest J.

Gray, Bobby J.

Guier, Jarod

Hacke, Donald Charles

Harris, William R.

Hickman, Palmer L.

Hilbert, Mark R.

Lubaczewski, Scott

McKinch, Terrance L.

McNellis, Mark

Miller, Charles R.

Mohla, Daleep C.

Norwood, Thomas D.

Pace, David A.

Schamel, Duke W.

Steinman, Gregory J.

Tobias, John M.

West, Rodney J.

Widup, Ron

Wolf, Jason

Affirmative with Comment

Barrios, Louis A.

The parentheses in the definition around "(except for ventilating openings and inspection windows)" should be deleted according to the committee statement and the NEC Style Manual.

Niemira, James K.

TC should consider deleting definitions of "Metal-Enclosed Switchgear" and "Metal-Clad Switchgear" and just adopting the NEC definition of "Switchgear". If it is necessary to distinguish Metal-Enclosed from Metal-Clad, then the NEC definition of "Switchgear" can be adopted and additional simplified definitions can be developed such as "Metal-Clad Switchgear: switchgear with draw-out switching and interrupting devices" and "Metal-Enclosed Switchgear: switchgear without draw-out interrupting devices"

Second Revision No. 9-NFPA 70E-2025 [Section No. 105.5]

~~105.5 Organization.~~

~~Chapter 1 of this standard is divided into five articles. Article 100 provides definitions for terms used in one or more of the chapters of this standard. Article 105 covers employer and employee responsibilities for the application of safety-related work practices and procedures. Article 110 covers general requirements for electrical safety-related work practices and procedures. Article 120 covers requirements for establishing an electrically safe work condition. Article 130 covers requirements for work involving electrical hazards.~~

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Thu Aug 21 12:35:01 EDT 2025

Committee Statement

Committee Statement: Section 105.5 is deleted to correlate with actions taken in first revisions where both the title of Article 105 and the scope of Article 105 were revised to include only employer and employee responsibilities. Further, the content of 105.5 is no longer necessary as it is redundant to 90.4 and Figure 90.4.

Response Message: SR-9-NFPA 70E-2025

Public Comment No. 134-NFPA 70E-2025 [Section No. 105.5]

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.

Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 10-NFPA 70E-2025 [Section No. 110.2(B)]

(B) When Required.

Energized electrical conductors and circuit parts operating at voltages equal to or greater than 50 volts or where an electrical hazard exists shall be put into an electrically safe work condition before an employee performs work if any of the following conditions exist:

(1) The employee is within the limited approach boundary.

(2) The employee interacts with equipment where conductors or circuit parts are not exposed but an increased likelihood of injury from an exposure to an arc flash hazard exists.

Informational Note: See 120.2 through 120.6 for requirements to establish and verify an electrically safe work condition for the period of time for which the state is maintained.

Exception No. 1: Normal operation of electric equipment shall be permitted where a normal operating condition exists. A normal operating condition exists when all of the following conditions are satisfied:

(1) The equipment is properly installed.

(2) The equipment is properly maintained.

(3) The equipment is rated for the available fault current.

(4) The equipment is used in accordance with instructions included in the listing and labeling and in accordance with manufacturer's instructions.

(5) The equipment doors are closed and secured.

(6) All equipment covers are in place and secured.

(7) There is no evidence of impending failure.

Informational Note No. 1: The phrase *properly installed* means that the equipment is installed in accordance with applicable industry codes and standards and the manufacturer's recommendations. The phrase *properly maintained* means that the equipment has been maintained in accordance with the manufacturer's recommendations and applicable industry codes and standards. The phrase *evidence of impending failure* means that there is evidence such as arcing, overheating, loose or bound equipment parts, visible damage, deterioration, or water damage.

Informational Note No. 2: See NEMA GD 1-2019, *Evaluating Water-Damaged Electrical Equipment*, as an example of a document that provides further information on evaluating electrical equipment that may have been exposed to water.

Exception No. 2: An energized disconnecting means or isolating element shall be permitted to be operated to achieve an electrically safe work condition or to return equipment to service that has been placed in an electrically safe work condition. The equipment supplying the disconnecting means or isolating element shall not be required to be placed in an electrically safe work condition provided a risk assessment is performed and there is no unacceptable risk identified.

Exception No. 3: Energized work shall be permitted where the employer can demonstrate that the task to be performed is infeasible in a de-energized state due to equipment design or operational limitations.

Informational Note: Examples of work that might be performed within the limited approach boundary of exposed energized electrical conductors or circuit parts because of infeasibility due to equipment design or operational limitations include performing diagnostics and ~~testing (e.g.,~~ testing, such as start-up or troubleshooting~~)~~ , of electric circuits that can only be performed with the circuit energized and work on circuits that form an integral part of a continuous process that would otherwise need to be completely shut down in order to permit work on one circuit or piece of equipment.

Exception No. 4: Energized work shall be permitted where the employer can demonstrate that de-energizing introduces additional hazards or increased risk.

Informational Note: Examples of additional hazards or increased risk include, but are not limited to, interruption of life-support equipment, deactivation of emergency alarm systems, and shutdown of hazardous location ventilation equipment.

Exception No. 5: Energized electrical conductors and circuit parts that operate at less than 50 volts shall not be required to be de-energized where the capacity of the source and any overcurrent protection between the energy source and the worker are considered and it is determined that there will be no increased exposure to electrical burns or to explosion due to electric arcs.

Submitter Information Verification

Committee: EEW-AAA

Submittal Date: Thu Aug 21 12:35:48 EDT 2025

Committee Statement

Committee Statement: The revision modifies the parenthetical expression “e.g., start up testing or troubleshooting” within the Exception No. 3 Informational Note to comply with the NEC Style Manual Section 3.5.1.1.

Response Message: SR-10-NFPA 70E-2025

Public Comment No. 41-NFPA 70E-2025 [Section No. 110.2(B)]

Ballot Results

This item has passed ballot

29 Eligible Voters
4 Not Returned
24 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.

Widup, Ron

Wolf, Jason

Affirmative with Comment

Hickman, Palmer L.

The Correlating Committee should review the use of the term "infeasible" in Exception Nn. 3 and replacing it with "not possible" to both correlate with the action taken on SR-50 where "feasible" was replaced with "possible" and to comply with section and Table 3.2.1 Possibly Unenforceable and Vague Terms.

Second Revision No. 11-NFPA 70E-2025 [Section No. 110.2(C)]

(C) Requirements ~~Until~~ to Establish~~ed~~ .

Electrical conductors and circuit parts shall not be considered to be in an electrically safe work condition until all of the applicable requirements of 120.2 through 120.6 have been met.

~~**(1)** When Established.~~

~~Electrical conductors and circuit parts shall not be considered to be in an electrically safe work condition until all of the applicable requirements of 120.2 through 120.6 have been met.~~

(D) Work Practices Until Established.~~:~~

Safe work practices applicable to the circuit voltage and energy level shall be used until such time that electrical conductors and circuit parts are in an electrically safe work condition.

Supplemental Information

File Name	Description	Approved
70E_SR-11_110.2_C_.docx		

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Thu Aug 21 12:38:48 EDT 2025

Committee Statement

Committee Statement: Revisions were made to 110.2(C) to comply with the NEC Style Manual Section 3.5.1.2 Multiple Requirements and to ensure that the sub-division titles accurately reflected the content.

Response Message: SR-11-NFPA 70E-2025

Public Comment No. 42-NFPA 70E-2025 [Section No. 110.2(C)]

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 12-NFPA 70E-2025 [Section No. 110.3(A)]

(A) General.

The employer shall implement and document an overall electrical safety program that directs activity ~~appropriate~~ applicable to the risk associated with electrical hazards.

Informational Note No. 1: Safety-related work practices such as verification of proper maintenance and installation, alerting techniques, auditing requirements, and training requirements provided in this standard are administrative controls and part of an overall electrical safety program.

Informational Note No. 2: See Informative Annex P for information on implementing an electrical safety program within an employer's occupational health and safety management system.

Informational Note No. 3: See IEEE 3007.1, *Recommended Practice for the Operation and Management of Industrial and Commercial Power Systems*, which provides additional guidance for the implementation of the electrical safety program.

Informational Note No. 4: See IEEE 3007.3, *Recommended Practice for Electrical Safety in Industrial and Commercial Power Systems*, which provides additional guidance for electrical safety in the workplace.

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Thu Aug 21 12:40:19 EDT 2025

Committee Statement

Committee Statement: The phrase "appropriate to" is potentially vague and unenforceable and is replaced with the phrase "applicable to."

Response Message: SR-12-NFPA 70E-2025

Ballot Results

This item has passed ballot

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.

Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 13-NFPA 70E-2025 [Section No. 110.3(D)]

(D) Awareness and Self-Discipline.

The electrical safety program shall be designed ~~to provide an awareness of the potential electrical hazards to employees who work in an environment with the presence of electrical hazards. The program shall be developed to provide the required self-discipline for all employees who must perform work that may involve electrical hazards. The program shall instill safety principles and controls.~~ and developed to accomplish the following:

(1) Provide an awareness of the potential electrical hazards to employees who work in an environment with the presence of electrical hazards.

(2) Provide the required self-discipline for all employees who must perform work that ~~may~~ might involve electrical hazards.

(3) Instill safety principles and controls.

Supplemental Information

File Name	Description	Approved
70E_SR-13_110.3_D_.docx		

Submitter Information Verification

Committee: EEW-AAA

Submittal Date: Thu Aug 21 12:41:27 EDT 2025

Committee Statement

Committee Statement: Section 110.3(D) has been edited to eliminate multiple requirements within a single subdivision to comply with NEC Style Manual Section 3.5.1.2

Response Message: SR-13-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
23 Affirmative All
2 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul

Dyson, Thomas B.

Katekar, Chaitanya

Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Affirmative with Comment

Barrios, Louis A.
The "may" in new list item (2) should be changed to "might".
Niemira, James K.
change "may" to "might" in list item 2.

Second Revision No. 14-NFPA 70E-2025 [Section No. 110.3(L)(1)]

(1) Electrical Safety Program Audit.

~~The electrical safety program shall be audited to verify that the principles and procedures of the electrical safety program are in compliance with this standard. Audits shall be performed at intervals not to exceed 3 years.~~

(a) The electrical safety program shall be audited to verify that the principles and procedures of the electrical safety program are in compliance with this standard.

(b) Audits shall be performed at intervals not to exceed 3 years.

Supplemental Information

File Name	Description	Approved
70E_SR-14_110.3_L_1_.docx		

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Thu Aug 21 12:43:58 EDT 2025

Committee Statement

Committee Statement: Section 110.3(L)1 has been edited to eliminate multiple requirements within a single subdivision to comply with NEC Style Manual Section 3.5.1.2.

Response Message: SR-14-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.

Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 15-NFPA 70E-2025 [Section No. 110.3(L)(2)]

(2) Work Practices Audit.

(a) Employee work practices shall be audited to verify that the requirements contained in the procedures of the employer's electrical safety program are being followed.

(b) When the auditing determines that the principles and procedures of the electrical safety program are not being followed, the ~~appropriate revisions to the~~ training program or ~~revisions to~~ the procedures shall be ~~made~~ revised to address the deficiencies .

(c) Audits shall be performed at intervals not to exceed 1 year.

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Thu Aug 21 12:45:52 EDT 2025

Committee Statement

Committee Statement: Section 110.3(L)2 was edited to avoid the use of unenforceable or vague terminology per NEC Style Manual Section 3.2.1.

Response Message: SR-15-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.

Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 16-NFPA 70E-2025 [Section No. 110.3(L)(4)]

(4) Lockout/Tagout Procedure Audit.

(a) The lockout/tagout procedures required by 120.2 through 120.6 shall be audited by a qualified person at intervals not to exceed 1 year.

(b) The audit shall cover at least one lockout/tagout in progress.

(c) The audit shall ~~cover at least one lockout/tagout in progress. The audit shall~~ be designed to identify and correct deficiencies in the following:

(1) The lockout/tagout procedures

(2) The lockout/tagout training

(3) Worker execution of the lockout/tagout procedure

Submitter Information Verification

Committee: EEW-AAA

Submittal Date: Thu Aug 21 12:58:50 EDT 2025

Committee Statement

Committee Statement: The sentence “The audit shall cover at least one lockout/tagout in progress” in 110.3(L)(4)(c) is deleted as it is already stated in 110.3(L)(4)(b).

Response Message: SR-16-NFPA 70E-2025

Public Comment No. 145-NFPA 70E-2025 [Section No. 110.3(L)(4)]

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul

Dyson, Thomas B.

Katekar, Chaitanya

Stallcup, James G.

Affirmative All

Barnhart, Paul D.

Barrios, Louis A.

Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 18-NFPA 70E-2025 [Section No. 110.4(A)(1)]

(2) Qualified Person.

A qualified person shall be trained and knowledgeable in the construction and operation of equipment or a specific work method and be trained to identify and avoid the electrical hazards that might be present with respect to that equipment or work method.

(a) Such persons shall also be familiar with the proper use of applicable precautionary techniques, electrical policies, procedures, PPE, insulating materials, shielding materials, and insulated tools and test equipment.

(b) A person shall be permitted to be considered qualified with respect to certain equipment and tasks, but unqualified for others.

(c) Such persons permitted to work within the limited approach boundary shall, at a minimum, be additionally trained in all of the following:

(1) Skills and techniques necessary to distinguish exposed energized electrical conductors and circuit parts from other parts of electrical equipment

(2) Skills and techniques necessary to determine the nominal voltage of exposed energized electrical conductors and circuit parts

(3) Approach distances specified in Table 130.4(E)(a) and Table 130.4(E)(b) and the corresponding voltages to which the qualified person will be exposed

(4) Decision-making process necessary to be able to do the following:

a. Perform the job safety planning

b. Identify electrical hazards

c. Assess the associated risk

d. Select ~~the appropriate~~ risk control methods from the hierarchy of control~~s~~ identified in 110.3(H)(3), including PPE

(d) An employee who is undergoing on-the-job training for the purpose of obtaining the skills and knowledge necessary to be considered a qualified person, and who in the course of such training demonstrates an ability to perform specific duties safely at his or her level of training, and who is under the direct supervision of a qualified person shall be considered to be a qualified person for the performance of those specific duties.

(e) ~~Employees~~ Where employees use each test instrument, they shall be trained ~~to select an appropriate test instrument and shall demonstrate how to use a device to test for the absence of voltage, including interpreting indications provided by the device. The training shall include information that enables the employee to understand all limitations of each test instrument that might be used.~~ on the following:

(1) How to select a test instrument that is rated for the application

(2) The correct use of the test instrument

(3) The limitations of the test instrument

(f) The training required by 110.4(A)(2)(e) shall include a demonstration by the employee on how to use the test instrument to test for the absence of voltage, including interpreting indications provided by the device.

(g) The employer shall determine through regular supervision or through inspections conducted on at least an annual basis that each employee is complying with the safety-related work practices required by this standard.

Supplemental Information

File Name	Description	Approved

attachment_for_SR_18_110.4_A_1_d_.docx attachment for SR 18 110.4(A)(1)(d)

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Tue Aug 26 12:57:55 EDT 2025

Committee Statement

Committee Statement: In 110.4(A)(1)(c)(4)d the word “appropriate” is deleted as it is unnecessary."Controls" was changed to "control" in (d) to align with how controls are applied elsewhere in the standard.

In 110.4(A)(1)(e) the phrase “an appropriate test instrument” is revised to “a test instrument rated for the application” to comply with NEC Style Manual Section 3.2.1. Section (e) is restructured from paragraph to list items to comply with NEC Style Manual Section 3.5.1.2 multiple requirements in a subdivision, and to improve readability.

Response Message: SR-18-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
24 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark

Miller, Charles R.

Mohla, Daleep C.

Niemira, James K.

Norwood, Thomas D.

Pace, David A.

Schamel, Duke W.

Steinman, Gregory J.

Tobias, John M.

West, Rodney J.

Widup, Ron

Wolf, Jason

Affirmative with Comment

Gray, Bobby J.

I am concerned that restructuring (e) has changed the application of the language. Existing language required all qualified persons to demonstrate how to use test instruments to determine absence of voltage. This has been a common theme throughout the standard, for example see 110.6(A). This language now allows a person to be considered a qualified person and be within the restricted approach boundary, without demonstrating how to use a test instrument to verify an electrically safe work condition. I hope we understand that an employer can now designate a person qualified without demonstrating this critical fundamental skill.

Second Revision No. 19-NFPA 70E-2025 [Section No. 110.4(A)(3)]

(4) Additional Training and Retraining.

~~Additional training and retraining in safety-related work practices and applicable changes in this standard shall be performed at intervals not to exceed 3 years. An employee shall receive additional training or retraining if any of the following conditions exists:~~

(0) ~~The supervision or annual inspections indicate the employee is not complying with the safety-related work practices.~~

(0) ~~New technology, new types of equipment, or changes in procedures necessitate the use of safety-related work practices different from those that the employee would normally use.~~

(0) ~~The employee needs to review tasks that are performed less often than once per year.~~

(0) ~~The employee needs to review safety-related work practices not normally used by the employee during regular job duties.~~

(0) ~~The employee's job duties change.~~

(a) Additional training and retraining in safety-related work practices and applicable changes in this standard shall be performed at intervals not to exceed 3 years.

(b) An employee shall receive additional training or retraining if any of the following conditions exists:

(1) The supervision or annual inspections indicate the employee is not complying with the safety-related work practices.

(2) New technology, new types of equipment, or changes in procedures necessitate the use of safety-related work practices different from those that the employee would normally use.

(3) The employee needs to review tasks that are performed less often than once per year.

(4) The employee needs to review safety-related work practices not normally used by the employee during regular job duties.

(5) The employee's job duties change.

Supplemental Information

File Name	Description	Approved
70E_SR-19_110.4_A_3_.docx		

Submitter Information Verification

Committee: EEW-AAA

Submittal Date: Tue Aug 26 13:00:47 EDT 2025

Committee Statement

Committee Statement: Section 110.4(A)3 has been edited to eliminate multiple requirements within a single subdivision to comply with NEC Style Manual Section 3.5.1.2.

Response Message: SR-19-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters

4 Not Returned
23 Affirmative All
2 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul

Dyson, Thomas B.

Katekar, Chaitanya

Stallcup, James G.

Affirmative All

Barnhart, Paul D.

Crow, Daryld Ray

Dollard, Jr., James T.

Gallo, Ernest J.

Gray, Bobby J.

Guier, Jarod

Hacke, Donald Charles

Hickman, Palmer L.

Hilbert, Mark R.

Lubaczewski, Scott

McKinch, Terrance L.

McNellis, Mark

Miller, Charles R.

Mohla, Daleep C.

Niemira, James K.

Norwood, Thomas D.

Pace, David A.

Schamel, Duke W.

Steinman, Gregory J.

Tobias, John M.

West, Rodney J.

Widup, Ron

Wolf, Jason

Affirmative with Comment

Barrios, Louis A.

The committee statement does not align with the changes made. The changes were purely editorial in nature in order to comply with the NEC Style Manual. The committee statement shown likely applies to the rejection of PC-13 and PC-28. This committee statement needs to be corrected to reflect the actual changes. I suggest the following: "Section 110.4(A)(3) has been edited to eliminate multiple requirements within a single subdivision to comply with NEC Style Manual Section 3.5.1.2."

Harris, William R.

The Committee Statement does not apply to this SR and appears to be a copy from somewhere else.

Second Revision No. 20-NFPA 70E-2025 [Section No. 110.4(A)(4)]

(5) Type of Training.

~~The training required by 110.4(A) shall be classroom, on-the-job, or a combination of the two. The type and extent of the training provided shall be determined by the risk to the employee.~~

(a) The training required by 110.4(A) shall be classroom, on-the-job, or a combination of the two.

(b) The type and extent of the training provided shall be determined by the risk to the employee.

Informational Note: Classroom training can include interactive electronic or interactive web-based training components.

Supplemental Information

File Name	Description	Approved
70E_SR-20_110.4_A_4_.docx		

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Tue Aug 26 13:01:58 EDT 2025

Committee Statement

Committee Statement: Section 110.4(A)4 has been edited to eliminate multiple requirements within a single subdivision to comply with NEC Style Manual Section 3.5.1.2.

Response Message: SR-20-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.

Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 21-NFPA 70E-2025 [Section No. 110.4(A)(5)]

(6) Electrical Safety Training Documentation.

~~The employer shall document that each employee has received the training required by 110.4(A) . This documentation shall be in accordance with the following:~~

(0) ~~Be made when the employee demonstrates proficiency in the work practices involved~~

(0) ~~Be retained for the duration of the employee's employment~~

(0) ~~Contain the content of the training, each employee's name, and dates of training~~

(a) The employer shall document that each employee has received the training required by 110.4(A).

(b) ~~This~~ Training documentation shall be in accordance with the following:

(1) Be made when the employee demonstrates proficiency in the work practices involved

(2) Be retained for the duration of the employee's employment

(3) Contain the content of the training, each employee's name, and dates of training

Informational Note No. 1: Content of the training could include one or more of the following: course syllabus, course curriculum, outline, table of contents, or training objectives.

Informational Note No. 2: Employment records that indicate that an employee has received the required training are an acceptable means of meeting this requirement.

Supplemental Information

File Name	Description	Approved
70E_SR-21_110.4_A_5_.docx		

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Tue Aug 26 13:03:08 EDT 2025

Committee Statement

Committee Statement: Section 110.4(A)5 has been edited to eliminate multiple requirements within a single subdivision to comply with NEC Style Manual Section 3.5.1.2.

Response Message: SR-21-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 22-NFPA 70E-2025 [Section No. 110.4(C)(1)]

(1) Contact Release.

~~Employees exposed to electric shock hazards and those responsible for the safe release of victims from contact with energized electrical conductors or circuit parts shall be trained in methods of safe release. Refresher training shall occur annually.~~

(a) Employees exposed to electric shock hazards and those responsible for the safe release of victims from contact with energized electrical conductors or circuit parts shall be trained in methods of safe release.

(b) Refresher training shall occur annually.

Supplemental Information

File Name	Description	Approved
70E_SR-22_110.4_C_1_.docx		

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Tue Aug 26 13:05:59 EDT 2025

Committee Statement

Committee Statement: Section 110.4(C)1 has been edited to eliminate multiple requirements within a single subdivision to comply with NEC Style Manual Section 3.5.1.2.

Response Message: SR-22-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.

Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 23-NFPA 70E-2025 [Sections 110.5(A), 110.5(B)]

(A) Host Employer Responsibilities.

The host employer shall inform contract employers of the following:

(1) Known hazards that are covered by this standard, that are related to the contract employer's work, and that might not be recognized by the contract employer or its employees

(2) Information about the employer's installation that the contract employer needs to make the assessments required by Chapter 1

(3) Observed contract employer–related violations of this standard

Informational Note: Examples of a host employer can include an owner or their designee, construction manager, general contractor, or employer.

~~**(1)** Provide Hazard Information to Contract Employer.~~

~~The host employer shall inform contract employers of the following:~~

(0) ~~Known hazards that are covered by this standard, that are related to the contract employer's work, and that might not be recognized by the contract employer or its employees~~

(0) ~~Information about the employer's installation that the contract employer needs to make the assessments required by Chapter 1~~

~~**(2)** Report Violations to Contract Employer.~~

~~The host employer shall report observed contract employer–related violations of this standard to the contract employer.~~

(B) Contract Employer Responsibilities.

The contract employer shall ensure the following:

(1) ~~each~~ Each of his or her employees is instructed in the hazards communicated to the contract employer by the host employer, in addition to the basic training required by this standard .

(2) ~~each~~ Each of his or her employees follows the work practices required by this standard and safety-related work rules required by the host employer.

(3) The ~~contract employer shall advise the~~ host employer is advised of the following:

a. Any unique hazards presented by the contract employer's work

b. Hazards identified during the course of work by the contract employer that were not communicated by the host employer

c. The measures the contractor took to correct any violations reported by the host employer under 110.5(A)(2) and to prevent such violation from recurring in the future

~~**(1)** Communicate Hazard Information to Employees.~~

(0) ~~The contract employer shall ensure that each of his or her employees is instructed in the hazards communicated to the contract employer by the host employer.~~

(0) ~~This instruction shall be in addition to the basic training required by this standard.~~

~~**(2)** Ensure Employee Compliance.~~

~~The contract employer shall ensure that each of his or her employees follows the work practices required by this standard and safety-related work rules required by the host employer.~~

~~(3) Provide Hazard Information and Report Corrective Actions to the Host Employer.~~

~~The contract employer shall advise the host employer of the following:~~

(0) ~~Any unique hazards presented by the contract employer's work~~

(0) ~~Hazards identified during the course of work by the contract employer that were not communicated by the host employer~~

(0) ~~The measures the contractor took to correct any violations reported by the host employer under 110.5(A)(2) and to prevent such violation from recurring in the future~~

Supplemental Information

File Name	Description	Approved
attachment_for_SR_23_110.5_A_B_.docx	attachment for SR 23 110.5(A) & (B)	
70E_SR-23_110.5_A_.docx	For prod use	

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Tue Aug 26 13:08:46 EDT 2025

Committee Statement

Committee Statement: The second level sub-division titles are removed in 110.5(A) and 110.5(B) as they are unnecessary. The requirements are editorially revised and formatted as list items to comply with the NEC Style Manual.

Response Message: SR-23-NFPA 70E-2025

Public Comment No. 43-NFPA 70E-2025 [Section No. 110.5(A)]

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.

Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 24-NFPA 70E-2025 [Section No. 110.6(D)]

(D) Visual Inspection and Repair.

Portable test instruments and portable test equipment shall be inspected and repaired as follows:

(1) Portable test instruments and portable equipment and all associated test leads, cables, power cords, probes, and connectors shall be visually inspected for external defects and damage before each use.

(2) If there is a defect or evidence of damage that might expose an employee to injury, the defective or damaged item shall be removed from service until a person(s) qualified to perform the repairs and tests that are necessary to render the equipment safe has done so.

~~**(1)** Inspection.~~

~~Portable test instruments and equipment and all associated test leads, cables, power cords, probes, and connectors shall be visually inspected for external defects and damage before each use.~~

~~**(2)** Repair.~~

~~If there is a defect or evidence of damage that might expose an employee to injury, the defective or damaged item shall be removed from service until a person(s) qualified to perform the repairs and tests that are necessary to render the equipment safe has done so.~~

Supplemental Information

File Name	Description	Approved
70E_SR-24_110.6_D_.docx		

Submitter Information Verification

Committee: EEW-AAA

Submittal Date: Tue Aug 26 13:10:45 EDT 2025

Committee Statement

Committee Statement: The second level sub-division restructuring and the associated titles were removed in 110.6(D) and the requirements turned into a list to comply with the NEC Style Manual.

110.5(D)(1) is revised to clarify that the equipment being referred to within this requirement is “portable test equipment.”

Response Message: SR-24-NFPA 70E-2025

Public Comment No. 245-NFPA 70E-2025 [Section No. 110.6(D)(1)]

Public Comment No. 44-NFPA 70E-2025 [Section No. 110.6(D)]

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul

Dyson, Thomas B.

Katekar, Chaitanya

Stallcup, James G.

Affirmative All

Barnhart, Paul D.

Barrios, Louis A.

Crow, Daryld Ray

Dollard, Jr., James T.

Gallo, Ernest J.

Gray, Bobby J.

Guier, Jarod

Hacke, Donald Charles

Harris, William R.

Hickman, Palmer L.

Hilbert, Mark R.

Lubaczewski, Scott

McKinch, Terrance L.

McNellis, Mark

Miller, Charles R.

Mohla, Daleep C.

Niemira, James K.

Norwood, Thomas D.

Pace, David A.

Schamel, Duke W.

Steinman, Gregory J.

Tobias, John M.

West, Rodney J.

Widup, Ron

Wolf, Jason

Second Revision No. 26-NFPA 70E-2025 [Section No. 110.7(A)]

(A) Handling and Storage.

~~Portable equipment shall be handled and stored in a manner that will not cause damage. Flexible electric cords connected to equipment shall not be used for raising or lowering the equipment. Flexible cords shall not be fastened with staples or hung in such a fashion as could damage the outer jacket or insulation.~~

(1) Portable Equipment.

Portable equipment shall be handled and stored in a manner that will not cause damage.

(2) Flexible Cords.

(a) Flexible electric cords connected to equipment shall not be used for raising or lowering the equipment.

(b) Flexible cords shall not be fastened with staples or hung in such a fashion as could damage the outer jacket or insulation.

Supplemental Information

File Name	Description	Approved
70E_SR-26_110.7_A_.docx		

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Tue Aug 26 13:16:27 EDT 2025

Committee Statement

Committee Statement: Second level subdivisions and titles are added and some requirements are placed in a list format to comply with the NEC Style Manual Section 3.5.1.2.

Response Message: SR-26-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.

Barrios, Louis A.

Crow, Daryld Ray

Dollard, Jr., James T.

Gallo, Ernest J.

Gray, Bobby J.

Guier, Jarod

Hacke, Donald Charles

Harris, William R.

Hickman, Palmer L.

Hilbert, Mark R.

Lubaczewski, Scott

McKinch, Terrance L.

McNellis, Mark

Miller, Charles R.

Mohla, Daleep C.

Niemira, James K.

Norwood, Thomas D.

Pace, David A.

Schamel, Duke W.

Steinman, Gregory J.

Tobias, John M.

West, Rodney J.

Widup, Ron

Wolf, Jason

Second Revision No. 27-NFPA 70E-2025 [Section No. 110.7(B)]

(B) Grounding-Type Equipment.

The following shall apply to flexible cords and attachment plugs for grounding type equipment:

(1) A flexible cord used with grounding-type utilization equipment shall contain an equipment grounding conductor.

(2) Attachment plugs and receptacles shall not be connected or altered in a manner that would interrupt the continuity of the equipment grounding conductor.

(3) ~~Additionally, these devices~~ Attachment plugs and receptacles shall not be altered in order to allow use in a manner that was not intended by the manufacturer.

(4) Adapters that interrupt the continuity of the equipment grounding conductor shall not be used.

(0) ~~A flexible cord used with grounding-type utilization equipment shall contain an equipment grounding conductor.~~

(0) ~~Attachment plugs and receptacles shall not be connected or altered in a manner that would interrupt continuity of the equipment grounding conductor. Additionally, these devices shall not be altered in order to allow use in a manner that was not intended by the manufacturer.~~

(0) ~~Adapters that interrupt the continuity of the equipment grounding conductor shall not be used.~~

Supplemental Information

File Name	Description	Approved
70E_SR-27_110.7_B_.docx		

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Tue Aug 26 13:21:24 EDT 2025

Committee Statement

Committee Statement: Section 110.7(B) second level subdivisions are turned into a list and parent text added to eliminate multiple requirements within a single subdivision to comply with NEC Style Manual Section 3.5.1.2.

The second sentence in list item (2) is turned into a separate list item (3) to avoid multiple requirements in one subdivision.

Response Message: SR-27-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul

Dyson, Thomas B.

Katekar, Chaitanya

Stallcup, James G.

Affirmative All

Barnhart, Paul D.

Barrios, Louis A.

Crow, Daryld Ray

Dollard, Jr., James T.

Gallo, Ernest J.

Gray, Bobby J.

Guier, Jarod

Hacke, Donald Charles

Harris, William R.

Hickman, Palmer L.

Hilbert, Mark R.

Lubaczewski, Scott

McKinch, Terrance L.

McNellis, Mark

Miller, Charles R.

Mohla, Daleep C.

Niemira, James K.

Norwood, Thomas D.

Pace, David A.

Schamel, Duke W.

Steinman, Gregory J.

Tobias, John M.

West, Rodney J.

Widup, Ron

Wolf, Jason

Second Revision No. 28-NFPA 70E-2025 [Section No. 110.7(C)]

(C) Visual Inspection and Repair of Portable Cord- and Plug-Connected Equipment and Flexible Cord Sets.

(1) Frequency of Inspection.

Before each use, portable cord- and plug-connected equipment shall be visually inspected for external defects ~~(such as loose parts or deformed and missing pins)~~ and for evidence of possible internal damage ~~(such as a pinched or crushed outer jacket)~~ .

Informational Note: Evidence of external defects could include loose parts or deformed or missing attachment plug pins. Evidence of possible internal damage could include a pinched or crushed cord set outer jacket.

Exception: Stationary cord- and plug-connected equipment that remain connected once they are put in place and are installed such that the cord and plug are not subject to physical damage during normal use shall not be required to be visually inspected until they are relocated or repaired.

(2) Defective Equipment.

~~If there is a defect or evidence of damage that might expose an employee to injury, the defective or damaged item shall be removed from service. No employee shall use it until a person(s) qualified to perform the repairs and tests necessary to render the equipment safe has done so.~~

(a) If there is a defect or evidence of damage that might expose an employee to injury, the defective or damaged item shall be removed from service.

(b) No employee shall use ~~it~~ the defective equipment until a person~~(s)~~ qualified to perform the repairs and tests necessary to render the equipment safe has done so.

(3) Proper Mating.

When an attachment plug is to be connected to a receptacle, the relationship of the plug and receptacle contacts shall first be checked to ensure that they are of mating configurations.

Supplemental Information

File Name	Description	Approved
attachment_for_SR_28_110.7_C_.docx	attachment for SR 28 110.7(C)	
70E_SR-28_110.7_C_.docx	For prod use	

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Tue Aug 26 13:27:56 EDT 2025

Committee Statement

Committee Statement: Section 110.7(A) has been edited organizationally and renumbered to comply with Style Manual Section 3.5.1.2 and an informational note has been added to delete parentheticals to comply with Section 3.5.1.1.

Response Message: SR-28-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters

4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 29-NFPA 70E-2025 [Section No. 110.7(D)]

(D) Conductive or Wet Work Locations.

Cord sets ~~(extension cords)~~ and portable cord-and-plug-connected electric equipment used in conductive or wet work locations shall be approved for use in those locations.

Informational Note: The risk assessment procedure can also include identifying when the use of portable tools and equipment powered by sources other than 120 volts ac, such as batteries, air, and hydraulics, should be used to minimize the potential for injury from electrical hazards for tasks performed in conductive or wet locations.

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Tue Aug 26 13:29:10 EDT 2025

Committee Statement

Committee Statement: Section 110.7(D) is edited to remove parenthetical expressions to comply with NEC Style Manual Section 3.5.1.1.

Response Message: SR-29-NFPA 70E-2025

Public Comment No. 45-NFPA 70E-2025 [Section No. 110.7(D)]

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.

Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 30-NFPA 70E-2025 [Section No. 110.7(E)]

(E) Connecting Attachment Plugs.

(1) Wet Hands.

Employees' hands shall not be wet when plugging and unplugging flexible cords and cord- and plug-connected equipment if energized equipment is involved.

(2) Wet Plug and Receptacle Connections.

Energized plug and receptacle connections shall be handled only with insulating protective equipment if the condition of the connection could provide a conductive path to the employee's hand ~~(e.g, if a cord connector is wet from being immersed in water)~~ .

(3) Locking-Type Connectors.

Locking-type connectors shall be secured after connection.

Supplemental Information

File Name	Description	Approved
70E_SR-30_110.7_E_.docx		

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Tue Aug 26 13:30:30 EDT 2025

Committee Statement

Committee Statement: The parenthetical example in 110.7(E) is is restated as a requirement to comply with NEC Style Manual Section 3.5.1.1.

Response Message: SR-30-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 25-NFPA 70E-2025 [Section No. 110.7 [Excluding any Sub-Sections]]

This section applies to the use of cord- and plug-connected equipment, including cord- and plug-connected test instruments and cord sets ~~(extension cords)~~ .

Informational Note: Cord sets are sometimes referred to as “extension cords.”

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Tue Aug 26 13:13:47 EDT 2025

Committee Statement

Committee Statement: The parenthetical expression “extension cords” is deleted in 110.7 to comply with NEC Style Manual Section 3.5.1.1 and moved into an informational note to ensure that the user of the document understand what is intended by the term “cord sets.”

Response Message: SR-25-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.

Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 31-NFPA 70E-2025 [Sections 110.8(A), 110.8(B), 110.8(C)]

(A) General.

~~Employees shall be provided with listed ground-fault circuit-interrupter (GFCI) protective devices where required by applicable state, federal, or local codes and standards. Listed cord sets or devices incorporating listed GFCI protection for personnel identified for portable use shall be permitted.~~ The following shall apply to ground-fault circuit-interrupters:

(1) Employees shall be provided with listed ground-fault circuit-interrupter (GFCI) protective devices where required by applicable state, federal, or local codes and standards.

(2) Listed cord sets or devices incorporating listed GFCI protection for personnel identified for portable use shall be permitted.

(3) GFCI protection devices shall be tested in accordance with the manufacturer's instructions

(B) Additional Circumstances Requiring GFCI Protection.

(1) 120-Volt Cord Circuits.

Cord sets ~~(extension cords)~~ and cord- and plug-connected tools used for maintenance or construction activity, or outdoors, or in conductive or wet work locations and that are supplied by 120-volt, 15-, 20-, or 30-ampere circuits shall be provided with GFCI protection.

(2) Greater ~~then~~ than 120-Volt Cord Circuits.

Cord sets ~~(extension cords)~~ and cord- and plug-connected tools used for maintenance or construction ~~or maintenance~~ activity, or outdoors, or in conductive or wet work locations and that are supplied by greater than 120-volt, 15-, 20-, or 30-ampere circuits~~,~~ shall be provided with GFCI protection or operated under an assured equipment grounding conductor program ~~shall be implemented~~ .

Informational Note No. 1: See Informative Annex O. Where an assured equipment grounding conductor program is used, a special purpose ground-fault circuit interrupter may provide additional protection.

Informational Note No. 2: See applicable state, federal, or local codes and standards such as *NFPA 70*, *National Electrical Code*, Section 590.6(B)(2) for more information regarding implementation of an assured equipment grounding conductor program.

~~**(C)** Testing Ground-Fault Circuit-Interrupter Protection Devices.~~

~~GFCI protection devices shall be tested in accordance with the manufacturer's instructions.~~

Supplemental Information

File Name	Description	Approved
70E_SR-31_110.8_A_.docx		

Submitter Information Verification

Committee: EEW-AAA

Submittal Date: Tue Aug 26 13:35:03 EDT 2025

Committee Statement

Committee Statement: Section 110.8(A) has been edited to eliminate multiple requirements within a single subdivision to comply with NEC Style Manual Section 3.5.1.2.

Second level subdivision 110.8(C) has been moved into 110.8(A) as a list item as the requirement is general in nature.

110.8(B)(1)&(2) are edited to improve readability and provide paralell structure in accordance with NEC Style Manual.

Parenthetical expressions are removed to comply with NEC Style Manual Section 3.5.1.1

Response Message: SR-31-NFPA 70E-2025

Public Comment No. 46-NFPA 70E-2025 [Sections 110.8(B), 110.8(C)]

Public Comment No. 84-NFPA 70E-2025 [Section No. 110.8(B)(2)]

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.

Widup, Ron

Wolf, Jason

Second Revision No. 32-NFPA 70E-2025 [Section No. 120.2(A)]

(A) General.

Each employer shall establish, document, and implement a lockout/tagout program~~. The lockout/tagout program shall specify lockout/tagout procedures to safeguard workers from exposure to electrical hazards. The lockout/tagout program and procedures shall also incorporate~~ that complies with the following:

(1) The lockout/tagout program shall specify lockout/tagout procedures to safeguard workers from exposure to electrical hazards.

(2) The lockout/tagout program and procedures shall ~~also~~ incorporate the following:

a. Be applicable to the experience and training of the workers and conditions in the workplace

b. Meet the requirements of 120.2 through 120.6

c. Apply to fixed, permanently installed equipment, temporarily installed equipment, and portable equipment

Supplemental Information

File Name	Description	Approved
70E_SR-32_120.2_A_.docx		

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Tue Aug 26 13:43:48 EDT 2025

Committee Statement

Committee Statement: Subdivisions were added to comply with NEC Style Manual Section 3.5.1.2 Multiple Requirements. Additional subdivisions or lists are used to express independent requirements.

Response Message: SR-32-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul

Dyson, Thomas B.

Katekar, Chaitanya

Stallcup, James G.

Affirmative All

Barnhart, Paul D.

Barrios, Louis A.

Crow, Daryld Ray

Dollard, Jr., James T.

Gallo, Ernest J.

Gray, Bobby J.

Guier, Jarod

Hacke, Donald Charles

Harris, William R.

Hickman, Palmer L.

Hilbert, Mark R.

Lubaczewski, Scott

McKinch, Terrance L.

McNellis, Mark

Miller, Charles R.

Mohla, Daleep C.

Niemira, James K.

Norwood, Thomas D.

Pace, David A.

Schamel, Duke W.

Steinman, Gregory J.

Tobias, John M.

West, Rodney J.

Widup, Ron

Wolf, Jason

Second Revision No. 33-NFPA 70E-2025 [Section No. 120.3(B)]

(B) Lockout/Tagout Procedure.

A lockout/tagout procedure complying with the following shall be developed on the basis of the existing electrical equipment and system ~~and shall use suitable documentation including up-to-date drawings and diagrams. The procedure shall meet the requirements of applicable codes, standards, and regulations for lockout and tagging of electrical sources.~~ :

(1) The procedure shall use suitable documentation including up-to-date drawings and diagrams.

(2) The procedure shall meet the requirements of applicable codes, standards, and regulations for lockout and tagging of electrical sources.

Supplemental Information

File Name	Description	Approved
70E_SR-33_120.3_B_.docx		

Submitter Information Verification

Committee: EEW-AAA

Submittal Date: Tue Aug 26 13:45:52 EDT 2025

Committee Statement

Committee Statement: Subdivisions were added to comply with NEC Style Manual Section 3.5.1.2 Multiple Requirements. Additional subdivisions or lists are used to express independent requirements.

Response Message: SR-33-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul

Dyson, Thomas B.

Katekar, Chaitanya

Stallcup, James G.

Affirmative All

Barnhart, Paul D.

Barrios, Louis A.

Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 34-NFPA 70E-2025 [Section No. 120.3(E)]

(E) Circuit Disconnecting Means.

Locks/tags shall be installed only on circuit disconnecting means.

(F) Control Devices.

~~Locks/tags shall be installed only on circuit disconnecting means.~~ Control devices, such as push-buttons or selector switches, shall not be used as the primary isolating device.

Supplemental Information

File Name	Description	Approved
70E_SR-34_120.3_E_.docx		

Submitter Information Verification

Committee: EEW-AAA

Submittal Date: Tue Aug 26 13:47:29 EDT 2025

Committee Statement

Committee Statement: Subdivisions are used to express independent requirements to comply with NEC Style Manual Section 3.5.1.2 Multiple Requirements. Title was revised and a title added to reflect the contents of the requirements.

Response Message: SR-34-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.

Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 35-NFPA 70E-2025 [Section No. 120.3(H)]

(I) Forms of Control of Hazardous Electrical Energy.

Two forms of hazardous electrical energy control shall be permitted with the following responsibilities : ~~simple lockout/tagout and complex lockout/tagout *[see 120.5]* . For the simple lockout/tagout, the qualified person shall be in charge. For the complex lockout/tagout, the person in charge shall have overall responsibility.~~

(1) For the simple lockout/tagout, the qualified person shall be in charge.

(2) For the complex lockout/tagout, the person in charge shall have overall responsibility.

Supplemental Information

File Name	Description	Approved
70E_SR-35_120.3_H_.docx		

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Tue Aug 26 13:48:48 EDT 2025

Committee Statement

Committee Statement: Lists are used to express independent requirements to comply with NEC Style Manual Section 3.5.1.2 Multiple Requirements. Simple lockout/tagout and complex lockout tagout are removed from paragraph to avoid redundancy.

Response Message: SR-35-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.

Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 36-NFPA 70E-2025 [Section No. 120.4(B)]

(B) Lockout/Tagout Device.

Each employer shall supply, and employees shall use, lockout/tagout devices used for control of exposure to electrical hazards and equipment necessary to execute the requirements of 120.4~~. Locks and tags used for control of exposure to electrical hazards shall be unique, shall be readily identifiable as lockout/tagout devices, and shall be used for no other purpose.~~ that comply with the following:

(1) Locks and tags used for control of exposure to electrical hazards shall be unique.

(2) Locks and tags shall be readily identifiable as lockout/tagout devices.

(3) Locks and tags shall be used for no other purpose.

Supplemental Information

File Name	Description	Approved
70E_SR-36_120.4_B_.docx		

Submitter Information Verification

Committee: EEW-AAA

Submittal Date: Tue Aug 26 13:50:39 EDT 2025

Committee Statement

Committee Statement: Lists are used to express independent requirements to comply with NEC Style Manual Section 3.5.1.2 Multiple Requirements.

Response Message: SR-36-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
23 Affirmative All
2 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Crow, Daryld Ray

Dollard, Jr., James T.

Gallo, Ernest J.

Gray, Bobby J.

Guier, Jarod

Hacke, Donald Charles

Harris, William R.

Hickman, Palmer L.

Hilbert, Mark R.

Lubaczewski, Scott

McKinch, Terrance L.

McNellis, Mark

Miller, Charles R.

Mohla, Daleep C.

Norwood, Thomas D.

Pace, David A.

Schamel, Duke W.

Steinman, Gregory J.

Tobias, John M.

West, Rodney J.

Widup, Ron

Wolf, Jason

Affirmative with Comment

Barrios, Louis A.

While combining both sentences in 120.4(B) satisfied NEC Style Manual requirements, the resulting parent text to a listing has become overly complex and difficult to read. I suggest splitting this into two separate requirements during the next edition.

Niemira, James K.

There are multiple requirements listed in one subdivision. It should be split into 3 separate requirements: "(B) Lockout/Tagout Device. 1. Each employer shall supply lockout/tagout devices used for control of exposure to electrical hazards and equipment necessary to execute the requirements of 120.4. 2. Employees shall use the lockout/tagout devices of 120.4(B)1. 3. The lockout/tagout devices of 120.4(B)1 shall comply with the following: a. Locks and tags used for control of exposure to electrical hazards shall be unique. b. Locks and tags shall be readily identifiable as lockout/tagout devices. c. Locks and tags used for lockout/tagout shall be used for no other purpose."

Second Revision No. 37-NFPA 70E-2025 [Section No. 120.4(D)]

(D) Tagout Device.

The tagout device shall meet the following requirements:

(1) A tagout device shall include a tag together with an attachment means.

(2) The tagout device shall be readily identifiable as a tagout device and suitable for the environment and duration of the tagout.

(3) A tagout device attachment means shall comply with the following:

a. Be capable of withstanding at least 222.4 N (50 lb) of force exerted at a right angle to the disconnecting means surface

b. Be nonreusable, attachable by hand, self-locking, and nonreleasable cable tie

c. Be suitable for the environment where used

(4) Tags shall contain a statement prohibiting unauthorized operation of the disconnecting means or removal of the tag.

(5) A hold card ~~tagging tool on an overhead conductor in conjunction with a hotline tool to install the tagout device safely on a disconnect that is isolated from the work(s) shall be permitted. Where a hold card is used, the tagout procedure shall include the method of accounting for personnel who are working under the protection of the hold card.~~ shall comply with the following:

a. A hold card tagging tool on an overhead conductor in conjunction with a hotline tool to install the tagout device safely on a disconnect that is isolated from the work~~(s)~~ shall be permitted.

b. Where a hold card is used, the tagout procedure shall include the method of accounting for personnel who are working under the protection of the hold card.

Supplemental Information

File Name	Description	Approved
70E_SR-37_120.4_D_.docx		

Submitter Information Verification

Committee: EEW-AAA

Submittal Date: Tue Aug 26 13:53:46 EDT 2025

Committee Statement

Committee Statement: Lists are used to express independent requirements to comply with NEC Style Manual Section 3.5.1.2 Multiple Requirements.

Response Message: SR-37-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments

0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 38-NFPA 70E-2025 [Section No. 120.5(A)(1)]

(1) Locating Sources.

~~Up-to-date single-line drawings shall be considered a primary reference source for such information. When up-to-date drawings are not available, the employer shall be responsible for ensuring that an equally effective means of locating all sources of energy is employed.~~

(a) Up-to-date single-line drawings shall be considered a primary reference source for such information.

(b) When up-to-date drawings are not available, the employer shall be responsible for ensuring that an equally effective means of locating all sources of energy is employed.

Informational Note: Locating sources of supply could include identifying situations where a neutral conductor continues to carry current after phase conductors have been de-energized.

Supplemental Information

File Name	Description	Approved
70E_SR-38_120.5_A_1_.docx		

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Tue Aug 26 13:56:11 EDT 2025

Committee Statement

Committee Statement: Lists are used to express independent requirements to comply with NEC Style Manual Section 3.5.1.2 Multiple Requirements.

Response Message: SR-38-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 39-NFPA 70E-2025 [Section No. 120.5(A)(4)]

(4) Simple Lockout/Tagout Procedure.

~~All lockout/tagout procedures that involve only a qualified person(s) de-energizing one set of conductors or circuit part source for the sole purpose of safeguarding employees from exposure to electrical hazards shall be considered to be a simple lockout/tagout. Simple lockout/tagout procedures shall not be required to be written for each application. Each worker shall be responsible for his or her own lockout/tagout.~~

(a) All lockout/tagout procedures that involve only a qualified person(s) de-energizing one set of conductors or circuit part source for the sole purpose of safeguarding employees from exposure to electrical hazards shall be considered to be a simple lockout/tagout.

(b) Simple lockout/tagout procedures shall not be required to be written for each application.

(c) Each worker shall be responsible for his or her own lockout/tagout.

Exception: Lockout/tagout is not required for work on cord- and plug-connected equipment for which exposure to the hazards of unexpected energization of the equipment is controlled by the unplugging of the equipment from the energy source, provided that the plug is under the exclusive control of the employee performing the servicing and maintenance for the duration of the work.

Supplemental Information

File Name	Description	Approved
70E_SR-39_120.5_A_4_.docx		

Submitter Information Verification

Committee: EEW-AAA

Submittal Date: Tue Aug 26 13:57:14 EDT 2025

Committee Statement

Committee Statement: Subdivisions are used to express independent requirements to comply with NEC Style Manual Section 3.5.1.2 Multiple Requirements.

Response Message: SR-39-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul

Dyson, Thomas B.

Katekar, Chaitanya

Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 40-NFPA 70E-2025 [Section No. 120.5(A)(5)]

(5) Complex Lockout/Tagout.

(a) A complex lockout/tagout procedure shall be permitted where one or more of the following exists:

(1) Multiple energy source
(2) Multiple crews
(3) Multiple crafts
(4) Multiple locations
(5) Multiple employers
(6) Multiple disconnecting means
(7) Particular sequences
(8) Job or task that continues for more than one work period

(b) All complex lockout/tagout procedures shall require a written plan of execution that identifies the person in charge.

(c) The complex lockout/tagout procedure shall vest primary responsibility in an authorized employee for employees working under the protection of a group lockout or tagout device, such as an operation lock or lockbox. ~~The person in charge shall be held accountable for safe execution of the complex lockout/tagout.~~

(d) The person in charge shall be held accountable for safe execution of the complex lockout/tagout.

(e) Each authorized employee shall affix a personal lockout or tagout device to the group lockout device, group lockbox, or comparable mechanism when he or she begins work and shall remove those devices when he or she stops working on the machine or equipment being serviced or maintained.

(f) All complex lockout/tagout plans shall identify the method to account for all persons who might be exposed to electrical hazards in the course of the lockout/tagout.

Supplemental Information

File Name	Description	Approved
70E_SR-40_120.5_A_5_.docx		

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Tue Aug 26 13:58:56 EDT 2025

Committee Statement

Committee Statement: Subdivisions are used to express independent requirements to comply with NEC Style Manual Section 3.5.1.2 Multiple Requirements.
Response Message: SR-40-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters

4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 41-NFPA 70E-2025 [Section No. 120.5(B)(2)]

(2) Stored Energy.

~~The procedure shall include requirements for releasing stored electric or mechanical energy that might endanger personnel. All capacitors shall be discharged, and high-capacitance elements shall also be short-circuited and grounded before the associated equipment is touched or worked on. Springs shall be released or physical restraint shall be applied when necessary to immobilize mechanical equipment and pneumatic and hydraulic pressure reservoirs. Other sources of stored energy shall be blocked or otherwise relieved to the extent that the circuit cannot be unintentionally energized.~~

(a) The procedure shall include requirements for releasing stored electric or mechanical energy that might endanger personnel.

(b) All capacitors shall be discharged, and high-capacitance elements shall also be short-circuited and grounded before the associated equipment is touched or worked on.

(c) Springs shall be released or physical restraint shall be applied when necessary to immobilize mechanical equipment and pneumatic and hydraulic pressure reservoirs.

(d) Other sources of stored energy shall be blocked or otherwise relieved to the extent that the circuit cannot be unintentionally energized.

Informational Note: See 320.3, 320.5, and Informative Annex R for more information on methods and procedures to place capacitors in an electrically safe work condition.

Supplemental Information

File Name	Description	Approved
70E_SR-41_120.5_B_2_.docx		

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Tue Aug 26 14:04:19 EDT 2025

Committee Statement

Committee Statement: Subdivisions are used to express independent requirements to comply with NEC Style Manual Section 3.5.1.2 Multiple Requirements.

Response Message: SR-41-NFPA 70E-2025

Ballot Results

This item has passed ballot

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All
Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 42-NFPA 70E-2025 [Section No. 120.5(B)(4)]

(4) Responsibility.

~~The procedure shall identify the person who is responsible for verifying that the lockout/tagout procedure is implemented and who is responsible for ensuring that the task is completed prior to removing locks/tags. A mechanism to accomplish lockout/tagout for multiple (complex) jobs/tasks where required, including the person responsible for coordination, shall be included.~~

(a) The procedure shall identify the person who is responsible for verifying that the lockout/tagout procedure is implemented and who is responsible for ensuring that the task is completed prior to removing locks/tags.

(b) A mechanism to accomplish lockout/tagout for multiple ~~(~~ or complex~~)~~ jobs/tasks where required, including the person responsible for coordination, shall be included.

Supplemental Information

File Name	Description	Approved
70E_SR-42_120.5_B_4_.docx		

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Tue Aug 26 14:06:30 EDT 2025

Committee Statement

Committee Statement: Subdivisions are used to express independent requirements to comply with NEC Style Manual Section 3.5.1.2 Multiple Requirements.

The parentheses were deleted to comply with NEC Style Manual Section 3.5.1.1.

Response Message: SR-42-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.

Barrios, Louis A.

Crow, Daryld Ray

Dollard, Jr., James T.

Gallo, Ernest J.

Gray, Bobby J.

Guier, Jarod

Hacke, Donald Charles

Harris, William R.

Hickman, Palmer L.

Hilbert, Mark R.

Lubaczewski, Scott

McKinch, Terrance L.

McNellis, Mark

Miller, Charles R.

Mohla, Daleep C.

Niemira, James K.

Norwood, Thomas D.

Pace, David A.

Schamel, Duke W.

Steinman, Gregory J.

Tobias, John M.

West, Rodney J.

Widup, Ron

Wolf, Jason

Second Revision No. 43-NFPA 70E-2025 [Section No. 120.5(B)(5)]

(5) Verification.

~~The procedure shall verify that equipment cannot be restarted. The equipment operating controls, such as push-buttons, selector switches, and electrical interlocks, shall be operated or otherwise it shall be verified that the equipment cannot be restarted.~~

(a) The procedure shall verify that equipment cannot be restarted.

(b) The equipment operating controls, such as push-buttons, selector switches, and electrical interlocks, shall be operated or otherwise it shall be verified that the equipment cannot be restarted.

Supplemental Information

File Name	Description	Approved
70E_SR-43_120.5_B_5_.docx		

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Tue Aug 26 14:08:29 EDT 2025

Committee Statement

Committee Statement: Subdivisions are used to express independent requirements to comply with NEC Style Manual Section 3.5.1.2 Multiple Requirements.

Response Message: SR-43-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
24 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Crow, Daryld Ray

Dollard, Jr., James T.

Gallo, Ernest J.

Gray, Bobby J.

Guier, Jarod

Hacke, Donald Charles

Harris, William R.

Hickman, Palmer L.

Hilbert, Mark R.

Lubaczewski, Scott

McKinch, Terrance L.

McNellis, Mark

Miller, Charles R.

Mohla, Daleep C.

Niemira, James K.

Norwood, Thomas D.

Pace, David A.

Schamel, Duke W.

Steinman, Gregory J.

Tobias, John M.

West, Rodney J.

Widup, Ron

Wolf, Jason

Affirmative with Comment

Barrios, Louis A.

New subdivision (b) can be further simplified by deleting the second "shall" as follows: "(b) The equipment operating controls, such as push-buttons, selector switches, and electrical interlocks, shall be operated or otherwise verified that the equipment cannot be restarted."

Second Revision No. 44-NFPA 70E-2025 [Section No. 120.5(B)(6)]

(6) Testing.

The procedure shall establish the following:

(1) Test instrument to be used, the required PPE, and the person who will use it to verify proper operation of the test instrument on a known voltage source before and after use

(2) Requirement to define the boundary of the electrically safe work condition

(3) Requirement to test before touching every exposed conductor or circuit parts within the defined boundary of the work area

(4) Requirement to retest for absence of voltage when circuit conditions change or when the job location has been left unattended

(5) Planning considerations that include methods of verification where there is no accessible exposed point to take voltage measurements

(6) Additional methods of testing if the testing for the absence of voltage alone does not indicate that electrical conductors and equipment are de-energized

Informational Note to (6): An example of an additional method includes testing for the absence of current in current-driven circuits.

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Tue Aug 26 14:10:13 EDT 2025

Committee Statement

Committee Statement: List Item #6 and an informational note are added to recognize additional testing methods may be required other than voltage measurement to indicate electrical conductors and equipment are deenergized.

Response Message: SR-44-NFPA 70E-2025 The application of testing for the absence of current requires a more holistic approach to the requirements that might involve more than simply replacing 'voltage" with "energy" throughout the standard.

Public Comment No. 15-NFPA 70E-2025 [Section No. 120.5(B)(6)]

Public Comment No. 30-NFPA 70E-2025 [Section No. 120.5(B)(6)]

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
19 Affirmative All
4 Affirmative with Comments
2 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul

Dyson, Thomas B.

Katekar, Chaitanya

Stallcup, James G.

Affirmative All

Barnhart, Paul D.

Crow, Daryld Ray

Dollard, Jr., James T.

Gallo, Ernest J.

Gray, Bobby J.

Guier, Jarod

Hacke, Donald Charles

Hickman, Palmer L.

Hilbert, Mark R.

Lubaczewski, Scott

McKinch, Terrance L.

McNellis, Mark

Mohla, Daleep C.

Norwood, Thomas D.

Pace, David A.

Steinman, Gregory J.

Tobias, John M.

West, Rodney J.

Widup, Ron

Affirmative with Comment

Barrios, Louis A.

There have been some good ballot comments submitted related to the term "indicate", and how "confirm" might be a less ambiguous term. I recommend changing new list item (6) as follows: "Additional methods of testing if the testing for the absence of voltage alone does not confirm that electrical conductors and equipment are de-energized"

Niemira, James K.

The new list item (6) is confusing as written. It was intended to address a situation where absence of voltage testing provides a false positive result and is insufficient to confirm that the circuit has been de-energized. Instead of "does not indicate", it would be clearer to say "is not sufficient to confirm". Re-write as follows: "(6) Additional methods of testing if the testing for the absence of voltage alone is not sufficient to confirm that electrical conductors and equipment are de-energized"

Schamel, Duke W.

This is a valuable addition to help technicians identify and address additional hazards when creating an electrically safe work condition. Grounded neutral conductors downstream of the neutral point, incorrect wiring between different systems, and generators installed as non-separately derived systems create electrical hazards that cannot be detected solely with a voltage test instrument.

Wolf, Jason

This allows qualified workers to plan for proper testing methods to achieve an electrical safe work condition where testing for voltage alone does not confirm an electrical safe work condition.

Negative with Comment

Harris, William R.

The revised text is ambiguous and misleading. If a voltage test shows absence of voltage, additional tests are not needed for verification as stated in other parts of 70E. The test for list item 6 must state the special system type for application. Consider restating: "If the system design does not allow for an absence of voltage test at the test

location to verify the electrical hazard has been removed, then additional methods of testing shall be performed to establish an electrically safe work condition."

Miller, Charles R.

Adding this provision will present confusion to the majority of qualified persons who put electrical equipment into an electrically safe work condition. They will be confused wondering if their electrical equipment is not electrically safe unless they add the step of testing for the absence of current. For qualified persons who work on current-driven circuits, they already know they need to include absence of current testing as one of their steps of putting electrical equipment into an electrically safe work condition.

Second Revision No. 45-NFPA 70E-2025 [Section No. 120.5(B)(7)]

(7) Temporary Protective Grounding Requirements .

(a) Temporary protective grounding requirements for the circuit shall be established, including whether the temporary protective grounding equipment ~~shall be~~ is installed for the duration of the task or is temporarily established by the procedure.

(b) Temporary protective grounding needs or requirements shall be permitted to be covered in other work rules and might not be part of the lockout/tagout procedure.

Submitter Information Verification

Committee: EEW-AAA

Submittal Date: Tue Aug 26 14:11:50 EDT 2025

Committee Statement

Committee Statement: The title is changed to better reflect the content of the section according to NEC Style Manual Section 2.1.6.2

"Shall be" is replaced by "is" to improve clarity for temporary protective grounding requirements.

Response Message: SR-45-NFPA 70E-2025

Public Comment No. 47-NFPA 70E-2025 [Section No. 120.5(B)(7)]

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul

Dyson, Thomas B.

Katekar, Chaitanya

Stallcup, James G.

Affirmative All

Barnhart, Paul D.

Barrios, Louis A.

Crow, Daryld Ray

Dollard, Jr., James T.

Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 46-NFPA 70E-2025 [Section No. 120.5(B)(11)]

(11) Lockout/Tagout Application.

The procedure shall clearly identify when and where lockout applies, ~~in addition to~~ when and where tagout applies, and ~~shall~~ address the following:

(1) ~~Lockout shall be defined as installing~~ The application of a lockout device on all sources of hazardous energy shall be such that operation of the disconnecting means is prohibited, and forcible removal of the lock is required to operate the disconnecting means.

(2) ~~Tagout shall be defined as installing~~ The application of a tagout device on all sources of hazardous energy~~,~~ shall be such that the operation of the disconnecting means is prohibited.

(3) The tagout device shall be installed in the same position available for the lockout device.

(4) Where it is not possible to attach a lock to existing disconnecting means, the disconnecting means shall not be used as the only means to put the circuit in an electrically safe work condition.

(5) The use of tagout procedures without a lock shall be permitted only in cases where equipment design precludes the installation of a lock on an energy isolation device(s). ~~When tagout is employed, at least one additional safety measure shall be employed. In such cases, the procedure shall clearly establish responsibilities and accountability for each person who might be exposed to electrical hazards.~~

(6) When tagout is employed, at least one additional safety measure shall be employed.

(7) ~~In such cases~~ When tagout is employed , the procedure shall clearly establish responsibilities and accountability for each person who might be exposed to electrical hazards.

Informational Note: Examples of additional safety measures include the removal of an isolating circuit element such as fuses, blocking of the controlling switch, or opening an extra disconnecting device to reduce the likelihood of inadvertent energization.

Supplemental Information

File Name	Description	Approved
70E_SR-46_120.5_B_11_.docx		

Submitter Information Verification

Committee: EEW-AAA

Submittal Date: Tue Aug 26 14:13:24 EDT 2025

Committee Statement

Committee Statement: Added “application of” and removed the reference to definitions of lockout and tagout in List Items #1 and #2 to meet NEC Style Manual Section 2.1.2.2 that definitions are in Article 100.

Lists are used to express independent requirements to comply with NEC Style Manual Section 3.5.1.2 Multiple Requirements.

Response Message: SR-46-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters

4 Not Returned

25 Affirmative All

0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 47-NFPA 70E-2025 [Section No. 120.5(B)(12)]

(12) Removal of Lockout/Tagout Devices.

~~The procedure shall identify the details for removing locks or tags when the installing individual is unavailable. When locks or tags are removed by someone other than the installer, the employer shall attempt to locate that person prior to removing the lock or tag. When the lock or tag is removed because the installer is unavailable, the installer shall be informed prior to returning to work.~~

(a) The procedure shall identify the details for removing locks or tags when the installing individual is unavailable.

(b) When locks or tags are removed by someone other than the installer, the employer shall attempt to locate that person prior to removing the lock or tag.

(c) When the lock or tag is removed because the installer is unavailable, the installer shall be informed prior to returning to work.

Supplemental Information

File Name	Description	Approved
70E_SR-47_120.5_B_12_.docx		

Submitter Information Verification

Committee: EEW-AAA

Submittal Date: Tue Aug 26 14:17:16 EDT 2025

Committee Statement

Committee Statement: Subdivisions are used to express independent requirements to comply with NEC Style Manual Section 3.5.1.2 Multiple Requirements.

Response Message: SR-47-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul

Dyson, Thomas B.

Katekar, Chaitanya

Stallcup, James G.

Affirmative All

Barnhart, Paul D.

Barrios, Louis A.

Crow, Daryld Ray

Dollard, Jr., James T.

Gallo, Ernest J.

Gray, Bobby J.

Guier, Jarod

Hacke, Donald Charles

Harris, William R.

Hickman, Palmer L.

Hilbert, Mark R.

Lubaczewski, Scott

McKinch, Terrance L.

McNellis, Mark

Miller, Charles R.

Mohla, Daleep C.

Niemira, James K.

Norwood, Thomas D.

Pace, David A.

Schamel, Duke W.

Steinman, Gregory J.

Tobias, John M.

West, Rodney J.

Widup, Ron

Wolf, Jason

Second Revision No. 48-NFPA 70E-2025 [Section No. 120.5(B)(13)]

(13) Release for Return to Service.

~~The procedure shall identify steps to be taken when the job or task requiring lockout/tagout is completed. Before electric circuits or equipment are re-energized, tests and visual inspections shall be conducted to verify that all tools, mechanical restraints and electrical jumpers, short circuits, and temporary protective grounding equipment have been removed, so that the circuits and equipment are in a condition to be safely energized. When applicable, the employees responsible for operating the machines or process shall be notified when circuits and equipment are ready to be energized, and such employees shall provide assistance as necessary to safely energize the circuits and equipment. The procedure shall contain a statement requiring the area to be inspected to ensure that nonessential items have been removed. One such step shall ensure that all personnel are clear of exposure to dangerous conditions resulting from re-energizing the service and that blocked mechanical equipment or grounded equipment is cleared and prepared for return to service.~~

(a) The procedure shall identify steps to be taken when the job or task requiring lockout/tagout is completed.

(b) Before electric circuits or equipment are re-energized, tests and visual inspections shall be conducted to verify that all tools, mechanical restraints and electrical jumpers, short circuits, and temporary protective grounding equipment have been removed, so that the circuits and equipment are in a condition to be safely energized.

(c) When applicable, the employees responsible for operating the machines or process shall be notified when circuits and equipment are ready to be energized, and such employees shall provide assistance as necessary to safely energize the circuits and equipment.

(d) The procedure shall contain a statement requiring the area to be inspected to ensure that nonessential items have been removed.

(e) One such step shall ensure that all personnel are clear of exposure to dangerous conditions resulting from re-energizing the service and that blocked mechanical equipment or grounded equipment is cleared and prepared for return to service.

Supplemental Information

File Name	Description	Approved
70E_SR-48_120.5_B_13_.docx		

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Tue Aug 26 14:18:33 EDT 2025

Committee Statement

Committee Statement: Subdivisions are used to express independent requirements to comply with NEC Style Manual Section 3.5.1.2 Multiple Requirements.
Response Message: SR-48-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned

25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 49-NFPA 70E-2025 [Section No. 120.5(B)(14)]

(14) Temporary Release for Testing/Positioning.

The procedure shall ~~clearly~~ identify the ~~steps and qualified persons' responsibilities when the job or task requiring lockout/tagout is to be interrupted temporarily for~~ following for the temporary release of lockout/tagout for the purpose of testing or positioning of equipment~~; then the steps shall be identical to the steps for return to service.~~ :

(1) The steps in accordance with 120.5(B)(13)

(2) The qualified persons' responsibility for those steps

Informational Note: See 110.6 for requirements when using test instruments and equipment.

Supplemental Information

File Name	Description	Approved
70E_SR-49_120_B_14_.docx		

Submitter Information Verification

Committee: EEW-AAA

Submittal Date: Tue Aug 26 14:20:25 EDT 2025

Committee Statement

Committee Statement: Section 120.5(B)(14) is revised for clarity in accordance with NEC Style Manual Section 2.1.6.3.4, to direct user to the steps required in 120.5(B)(13). Multiple requirements have been separated into list items to comply with NEC Style Manual 3.5.1.2.

Response Message: SR-49-NFPA 70E-2025

Ballot Results

This item has passed ballot

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul

Dyson, Thomas B.

Katekar, Chaitanya

Stallcup, James G.

Affirmative All

Barnhart, Paul D.

Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 50-NFPA 70E-2025 [Section No. 120.6]

120.6 Process for Establishing and Verifying an Electrically Safe Work Condition.

Establishing and verifying an electrically safe work condition shall include all of the following steps~~. The steps shall be~~ , performed in the order presented to the extent ~~feasible~~ possible :

(1) Determine all possible sources of electrical supply to the specific equipment~~. Check~~ including, but not limited to, checking applicable up-to-date drawings, diagrams, and identification tags.

(2) After properly interrupting the load current, open the disconnecting device(s) for each source.

(3) Wherever possible, visually verify that all blades of the disconnecting devices are fully open or that drawout-type circuit breakers are withdrawn to the test or fully disconnected position.

(4) Release stored electrical energy.

(5) Block or relieve stored nonelectrical energy in devices to the extent the circuit parts cannot be unintentionally energized by such devices.

(6) Apply lockout/tagout devices in accordance with a documented and established procedure.

(7) Test for the absence of voltage as follows:

a. Use ~~an adequately rated~~ a portable test instrument that is rated for the application to test for the absence of voltage of each phase conductor or circuit part at each point of work, phase to phase and phase to ground.

b. Before and after testing, determine that the test instrument is operating ~~satisfactorily~~ correctly through verification on any known voltage source.

Informational Note No. 1: See UL 61010-1, *Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use, Part 1: General Requirements*, for rating, overvoltage category, and design requirements for voltage measurement and test instruments intended for use on electrical systems 1000 volts and below.

Exception No. 1 to 7: ~~An adequately rated~~ A permanently mounted absence of voltage tester rated for the application shall be permitted to be used to test for the absence of voltage of the conductors or circuit parts at the work location, provided it meets all of the following requirements:

(1) It is permanently mounted and installed in accordance with the manufacturer's instructions and tests the conductors and circuit parts at the point of work.

(2) It is listed and labeled for the purpose of testing for the absence of voltage.

(3) It tests each phase conductor or circuit part both phase-to-phase and phase-to-ground.

(4) The test device is verified as operating ~~satisfactorily on~~ correctly, using any known voltage source before and after testing for the absence of voltage.

Informational Note 2: See UL 1436, *Outlet Circuit Testers and Other Similar Indicating Devices*, for additional information on rating and design requirements for permanently mounted absence of voltage testers.

Exception No. 2 to 7: On electrical systems over 1000 volts, ~~adequately rated~~ noncontact capacitive test instruments rated for the application shall be permitted to be used to test for the absence of detectable voltage at each phase conductor in lieu of using a contact test instrument for testing for absence of voltage both phase to phase and phase to ground.

Informational Note No. 3: Noncontact capacitive test instruments require a minimum voltage to operate and are therefore not suitable to test for the absence of voltage.

Informational Note No. 4: See IEC 61243-1, *Live Working — Voltage Detectors — Part 1: Capacitive type to be used for voltages exceeding 1kV a.c.*, or IEC 61243-2, *Live Working — Voltage Detectors — Part 2: Resistive type to be used for voltages of 1kV to 36 kV a.c.*, or IEC 61243-3, *Live Working — Voltage Detectors — Part 3: Two-pole low voltage type*, for additional information on rating and design requirements for voltage detectors.

Exception No. 3 to 7: If the testing for absence of voltage alone does not indicate that electrical conductors and equipment are deenergized, then additional methods of testing shall be required.

Informational Note to Exception No. 3: An example of additional methods include testing for the absence of current in current-driven circuits.

(8) Temporary protective grounding equipment shall be applied to electrical conductors and circuit parts before touching them where the following conditions exist:

a. Where there is the possibility of induced voltages or stored electrical energy exists, all circuit conductors and circuit parts shall be grounded before touching them in those conductors or circuit parts.

b. Where it could be reasonably anticipated that the conductors or circuit parts being de-energized could contact other exposed energized conductors or circuit parts, temporary protective grounding

equipment shall be applied.

(9) If required by 120.6(8), temporary protective grounding equipment shall be installed in accordance with the following:

a. *Placement.* Placement of temporary grounding equipment shall meet the following requirements:

i. Temporary protective grounding equipment shall be placed at such locations and arranged in such a manner as to prevent each employee from being exposed to an electric shock hazard ~~(i.e., hazardous differences in electrical potential)~~ .

ii. The location, sizing, and application of temporary protective grounding equipment shall be identified as part of the employer's job planning.

b. *Capacity.* Temporary protective grounding equipment shall be capable of conducting the maximum fault current that could flow at the point of grounding for the time necessary to clear the fault.

Informational Note No. 5: See ASTM F855, *Standard Specification for Temporary Protective Grounds to be Used on De-energized Electric Power Lines and Equipment*, which is an example of a standard that contains information on capacity of temporary protective grounding equipment.

c. *Impedance.* Temporary protective grounding equipment and connections shall have an impedance low enough to cause immediate operation of protective devices in case of unintentional energizing of the electric conductors or circuit parts.

Supplemental Information

File Name	Description	Approved
attachment_for_SR_50_120.6.docx	attachment for SR 50 120.6	

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Tue Aug 26 14:25:58 EDT 2025

Committee Statement

Committee Statement: The terms infeasible, adequately and satisfactorily have been removed per NEC Style Manual Section 3.2.1, as vague and unenforceable terms.

Lead Paragraph: The two sentences were combined to comply with NEC Style Manual Section 3.5.1.2 Multiple Requirements.

120.6 List item #1. Subdivisions were added The two sentences were combined to comply with NEC Style Manual Section 3.5.1.2 Multiple Requirements. Multiple requirements within a single subdivision shall be avoided.

List Item 7: A list is used to express independent requirements to comply with NEC Style Manual Section 3.5.1.2 Multiple Requirements.

Exception No. 3 to 7 and a new informational note are added to recognize additional testing methods may be required other than voltage measurement to indicate electrical conductors and equipment are deenergized.

120.6 List item #9. Deleted parenthetical phrase to meet NEC Style Manual Section 3.5.1.1 Sentence Structure.

Response Message: SR-50-NFPA 70E-2025 Response to PC 11, 31, 9, 189, 251: The application of testing for the absence of current requires a more holistic approach to the requirements that might involve more than simply replacing 'voltage" with "energy" throughout the standard. Response to PC 31, 11: Exception No. 2 to 7, and Information Note No. 5 are addressed in the standard for test instruments. Test instruments shall be rated for the application and environment including instruments used for current driven circuits. Response to PC 251: The term "voltage-regulated" is undefined and potentially limits the scope of testing for the absence of voltage. Response to PC 251: Testing the function of the meter is a requirement in accordance with manufacturer's instruction. Response to PC 144: The sequence of steps to establish and verify an electrically safe work condition is retained as the steps are presented in a logical order. The requirement to test for the absence of voltage at each point of work is not added

to the existing requirement to visually verify that all blades of the disconnecting devices are fully open as this is already adequately addressed in 120.6(7).

Public Comment No. 35-NFPA 70E-2025 [Section No. 120.6]

Public Comment No. 11-NFPA 70E-2025 [Section No. 120.6]

Public Comment No. 251-NFPA 70E-2025 [Section No. 120.6]

Public Comment No. 48-NFPA 70E-2025 [Section No. 120.6]

Public Comment No. 189-NFPA 70E-2025 [Section No. 120.6]

Public Comment No. 9-NFPA 70E-2025 [Section No. 120.6]

Public Comment No. 144-NFPA 70E-2025 [Section No. 120.6]

Public Comment No. 31-NFPA 70E-2025 [Section No. 120.6]

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
19 Affirmative All
4 Affirmative with Comments
2 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul

Dyson, Thomas B.

Katekar, Chaitanya

Stallcup, James G.

Affirmative All

Barnhart, Paul D.

Crow, Daryld Ray

Dollard, Jr., James T.

Gallo, Ernest J.

Gray, Bobby J.

Guier, Jarod

Hacke, Donald Charles

Hickman, Palmer L.

Hilbert, Mark R.

Lubaczewski, Scott

McKinch, Terrance L.

McNellis, Mark

Mohla, Daleep C.

Norwood, Thomas D.

Pace, David A.

Steinman, Gregory J.

Tobias, John M.

West, Rodney J.

Widup, Ron

Affirmative with Comment

Barrios, Louis A.

In the first sentence of the committee statement, "infeasible" should be "feasible". The term "feasible" was replaced with "possible". In list item (3), "Wherever possible," can be deleted because the parent text to the list includes the phrase "... to the extent possible:". In new Informational Note to Exception No. 3, "current driven circuits" should be "current-driven circuits" to match new Informational Note to (6) in 120.5(B)(6). There have been some good ballot comments submitted related to the term "indicate", and how "confirm" might be a less ambiguous term. I recommend changing new Exception No. 3 to 7 as follows: "Exception No. 3 to 7: If the testing for absence of voltage alone does not confirm that electrical conductors and equipment are deenergized, then additional methods of testing shall be required."

Niemira, James K.

In Exception No. 3 to 7, change "does not indicate" to "is not sufficient to confirm". It should read: "Exception No. 3 to 7: If the testing for absence of voltage alone is not sufficient to confirm that electrical conductors and equipment are deenergized, then additional methods of testing shall be required."

Schamel, Duke W.

The step order in 120.6 should align with section 320.5(B), where the step for applying the lock occurs right after verifying the disconnection and before releasing any stored electrical energy.

Wolf, Jason

In regards to exception 3 to 7, this allows qualified workers to plan for proper testing methods to achieve an electrical safe work condition where testing for voltage alone does not confirm an electrical safe work condition.

Negative with Comment

Harris, William R.

Exception No. 3 to 7 provides guidance that is unsafe. My interpretation of the exception is if the test for absence of voltage shows zero, then no additional testing is necessary. This is not addressing the concern raised. System type information must be added for context.

Miller, Charles R.

I am voting negative on Exception No. 3 to 7 and the Informational Note to Exception No. 3. Adding this provision will present confusion to the majority of qualified persons who put electrical equipment into an electrically safe work condition. They will be confused wondering if their electrical equipment is not electrically safe unless they add the step of testing for the absence of current. For qualified persons who work on current-driven circuits, they already know they need to include absence of current testing as one of their steps of putting electrical equipment into an electrically safe work condition.

Second Revision No. 51-NFPA 70E-2025 [Section No. 130.2(A)(2)]

(2) Additional Person.

If an energized electrical work permit is required in accordance with ~~130.3(A)~~ 130.3 , and the energized electrical work permit specifies the use of electric shock or arc flash PPE, or both, in accordance with 130.3(B)(5) d. and 130.3(B)(6) b. , at least one additional person meeting the emergency response training requirements of 110.4(C)(1) shall be present ~~in the vicinity of~~ at , but outside of, either the limited approach boundary or arc flash boundary, whichever is greater.

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Tue Aug 26 14:42:44 EDT 2025

Committee Statement

Committee Statement: The (A) was removed to include all 130.3 so that both the requirements and exemptions of the energized work permit are included.

The second revision is created based on using the hierarchy of controls. The additional person is necessary based on the need for an energized electrical work permit and the risk assessment resulting in the need for PPE. The additional criteria are needed because the need for the energized electrical work permit alone was not sufficient to determine whether an additional person is needed.

The phrase “in the vicinity of” was replaced because it is vague and unenforceable.

Response Message: SR-51-NFPA 70E-2025

Public Comment No. 85-NFPA 70E-2025 [Section No. 130.2(A)(2)]

Public Comment No. 86-NFPA 70E-2025 [Section No. 130.2(A)(2)]

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
22 Affirmative All
3 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul

Dyson, Thomas B.

Katekar, Chaitanya

Stallcup, James G.

Affirmative All

Barnhart, Paul D.

Crow, Daryld Ray

Gallo, Ernest J.

Gray, Bobby J.

Guier, Jarod

Hacke, Donald Charles

Hickman, Palmer L.

Hilbert, Mark R.

Lubaczewski, Scott

McKinch, Terrance L.

McNellis, Mark

Miller, Charles R.

Mohla, Daleep C.

Niemira, James K.

Norwood, Thomas D.

Pace, David A.

Schamel, Duke W.

Steinman, Gregory J.

Tobias, John M.

West, Rodney J.

Widup, Ron

Wolf, Jason

Affirmative with Comment

Barrios, Louis A.

As noted in the Committee Statement, the new 130.2(A)(2) is modified to implicitly require the shock and arc flash risk assessments to determine the need for additional persons by requiring an additional person when electric shock or arc flash PPE is required by the energized electrical work permit. This implicit requirement without changing the shock and arc flash risk assessment requirements could lead to confusion or lack of understanding of the requirement for additional persons. As an improvement opportunity for next edition, the electric shock and arc flash risk assessment requirements in 130.4(A) and 130.5(A) should be modified so that they explicitly state that electric shock and arc flash risk assessments also determine the need for additional persons. For example, 130.4 list item (3) could be modified to "To determine if additional protective measures are required, such as the need for additional persons".

Dollard, Jr., James T.

This is a long overdue safety-driven revision. However, more work on the part of the technical committee, and the public is required. The revised text infers that the only time an additional (second) person is required, is: (1) when an energized electrical work permit (EEWP) is required and, (2) the EEWP specifies the use of PPE for electric shock or arc flash hazards, or both. There are many workplaces that see very limited tasks that require an EEWP as most exposures fall under the exemptions to the EEWP including but not limited to testing, troubleshooting or voltage measuring. While the committee statement clarifies that "The (A) was removed to include all 130.3 so that both the requirements and exemptions of the energized work permit are included" the requirement, as written, does not apply to the exemptions to the EEWP. An additional person is only required when an EEWP and PPE are required. The first sentence of this new requirement clearly states, “If an energized electrical work permit is required…..” Testing, troubleshooting and voltage measuring are exempted from the EEWP, see 130.5(C).

Harris, William R.

The driver for the additional person should be the Risk Assessment, not the type of permit being used for the task.

Second Revision No. 52-NFPA 70E-2025 [Section No. 130.3(B)]

(B) Elements of Work Permit.

The work permit shall include, but not be limited to, the following items:

(1) Description of the circuit and equipment to be worked on and their location

(2) Description of the work to be performed

(3) Justification for why the work must be performed in an energized condition *[see 110.2(B)]*

(4) Description of the safe work practices to be employed *(see 130.1)*

(5) Results of the electric shock risk assessment *[see 130.4(A)]*

a. Voltage to which personnel will be exposed

b. Limited approach boundary *[see 130.4(F), Table 130.4(E)(a), and Table 130.4(E)(b)]*

c. Restricted approach boundary *[see 130.4(G), Table 130.4(E)(a), and Table 130.4(E)(b)]*

d. Personal and other protective equipment required by this standard to safely perform the assigned task and to protect against the electric shock hazard *[see 130.4(F), 130.5(G), 130.7(C)(1) through 130.7(C)(15), and 130.7(D)]*

(6) Results of the arc flash risk assessment *[see 130.5(A)]*

a. Incident energy at the working distance or arc flash PPE category *[see 130.5(F)]*

b. Personal and other protective equipment required by this standard to protect against the arc flash hazard *[see 130.5(F), 130.7(C)(1) through 130.7(C)(15), Table 130.7(C)(15)(c), and 130.7(D)]*

c. Arc flash boundary *[see 130.5(E)]*

(7) Means employed to restrict the access of unqualified persons from the work area *[see 130.8(O)]*

(8) Evidence of completion of a job briefing, including a discussion of any job-specific hazards *[see 110.3(I)]*

(9) Energized work approval ~~(~~ signature or signatures such as by authorizing or responsible management, safety officer, or owner~~, etc.) signature(s)~~

Informational Note: See Figure J.1 for an example of an acceptable energized work permit.

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Tue Aug 26 14:48:46 EDT 2025

Committee Statement

Committee Statement: The wording was changed because of the NEC Correlating Committee request to comply with the NEC Style Manual Section 3.5.1.1 and avoid using parenthetical notes. Bracketed references in 130.3(B) are retained for useability. Parentheses were changed to brackets in Item 4 for consistency

Response Message: SR-52-NFPA 70E-2025

Public Comment No. 49-NFPA 70E-2025 [Section No. 130.3(B)]

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters

4 Not Returned
24 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul

Dyson, Thomas B.

Katekar, Chaitanya

Stallcup, James G.

Affirmative All

Barnhart, Paul D.

Crow, Daryld Ray

Dollard, Jr., James T.

Gallo, Ernest J.

Gray, Bobby J.

Guier, Jarod

Hacke, Donald Charles

Harris, William R.

Hickman, Palmer L.

Hilbert, Mark R.

Lubaczewski, Scott

McKinch, Terrance L.

McNellis, Mark

Miller, Charles R.

Mohla, Daleep C.

Niemira, James K.

Norwood, Thomas D.

Pace, David A.

Schamel, Duke W.

Steinman, Gregory J.

Tobias, John M.

West, Rodney J.

Widup, Ron

Wolf, Jason

Affirmative with Comment

Barrios, Louis A.

Per the intended action and committee statement, "(see 130.1)" should be changed to "[see 130.1]" in list item (4) for consistency with the other bracketed items.

Second Revision No. 53-NFPA 70E-2025 [Section No. 130.3(C)]

(C) Exemptions to Work Permit.

Electrical work shall be permitted without an energized electrical work permit if a qualified person is provided with and uses ~~appropriate~~ safe work practices and PPE in accordance with Chapter 1 under any of the following conditions:

(1) Testing, troubleshooting, or voltage measuring

(2) Thermography, ultrasound, or visual inspections if the restricted approach boundary is not crossed

(3) Access to and egress from an area with energized electrical equipment if no electrical work is performed and the restricted approach boundary is not crossed

(4) General housekeeping and miscellaneous non-electrical tasks if the restricted approach boundary is not crossed

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Tue Aug 26 14:50:58 EDT 2025

Committee Statement

Committee Statement: The word "appropriate" was deleted because of the NEC Correlating Committee request to comply with the NEC Style Manual Section 3.2.1 and avoid using unenforceable or vague terms.

Response Message: SR-53-NFPA 70E-2025

Ballot Results

This item has passed ballot

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.

Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 54-NFPA 70E-2025 [Section No. 130.4(E)]

(E) Electric Shock Protection Boundaries.

The electric shock protection boundaries identified as limited approach boundary and restricted approach boundary shall be applicable where personnel are approaching exposed energized electrical conductors or circuit parts. Table 130.4(E)(a) shall be used for the distances associated with various ac system voltages. Table 130.4(E)(b) shall be used for the distances associated with various dc system voltages.

Informational Note: In certain instances, the arc flash boundary might be a greater distance from the energized electrical conductors or circuit parts than the limited approach boundary. The electric shock protection boundaries and the arc flash boundary are independent of each other.

Table 130.4(E)(a) Electric Shock Protection Approach Boundaries to Exposed Energized Electrical Conductors or Circuit Parts for Alternating-Current Systems

(1)	(2)	(3)	(4)
-	Limited Approach Boundary [b]		
Nominal System Voltage Range, Phase to Phase [a]	Exposed Movable Conductor [c]	Exposed Fixed Circuit Part	Restricted Approach Boundary [b,d]; Includes Inadvertent Movement Adder
Less than 50 V	Not specified	Not specified	Not specified
50 V–150 V [e]	3.1 m (10 ft 0 in.)	1.0 m (3 ft 6 in.)	Avoid contact
151 V–750 V	3.1 m (10 ft 0 in.)	1.0 m (3 ft 6 in.)	0.31 m (1 ft 0 in.)
751 V–5 kV	3.1 m (10 ft 0 in.)	1.0 m (3 ft 6 in.)	0.63 m (2 ft 1 in.)
5.1 kV–15 kV	3.1 m (10 ft 0 in.)	1.5 m (5 ft 0 in.)	0.65 m (2 ft 2 in.)
15.1 kV–36 kV	3.1 m (10 ft 0 in.)	1.8 m (6 ft 0 in.)	0.77 m (2 ft 7 in.)
36.1 kV–46 kV	3.1 m (10 ft 0 in.)	2.5 m (8 ft 0 in.)	0.84 m (2 ft 10 in.)
46.1 kV–72.5 kV	3.1 m (10 ft 0 in.)	2.5 m (8 ft 0 in.)	1.0 m (3 ft 4 in.)
72.6 kV–121 kV	3.3 m (10 ft 8 in.)	2.5 m (8 ft 0 in.)	1.2 m (3 ft 9 in.)
121.1 kV–145 kV	3.4 m (11 ft 0 in.)	3.1 m (10 ft 0 in.)	1.3 m (4 ft 4 in.)
145.1 kV–169 kV	3.6 m (11 ft 8 in.)	3.6 m (11 ft 8 in.)	1.5 m (4 ft 10 in.)
169.1 kV–242 kV	4.0 m (13 ft 0 in.)	4.0 m (13 ft 0 in.)	2.1 m (6 ft 8 in.)
242.1 kV–362 kV	4.7 m (15 ft 4 in.)	4.7 m (15 ft 4 in.)	3.5 m (11 ft 2 in.)
362.1 kV–420 kV	5.8 m (19 ft 0 in.)	5.8 m (19 ft 0 in.)	4.3 m (14 ft 0 in.)
420.1 kV–550 kV	5.8 m (19 ft 0 in.)	5.8 m (19 ft 0 in.)	5.1 m (16 ft 8 in.)
550.1 kV–800 kV	7.2 m (23 ft 9 in.)	7.2 m (23 ft 9 in.)	6.9 m (22 ft 7 in.)

Notes:

(1) For arc flash boundary, see 130.5(E).

(2) All dimensions are distance from exposed energized electrical conductors or circuit part to personnel.

[a] For single-phase systems above 250 volts, select the range that is equal to the system's maximum phase-to-ground voltage multiplied by 1.732.

[b] See definition in Article 100 and text in 130.4(F)(3) and Informative Annex C for elaboration.

[c] *Exposed movable conductors* describes a condition in which the distance between the conductor and a person is not under the control of the person. The term is normally applied to overhead line conductors supported by poles.

[d] The restricted approach boundary in Column 4 is based on an elevation not exceeding 900 m (3000 ft). For higher elevations, adjustment of the restricted approach boundary shall be considered.

Informational Note: See 29 CFR 1910.269, Table R-5, Altitude Correction Factor; ANSI/IEEE C2-2023, *National Electrical Safety Code*; and IEEE 516-2021, *Guide for Maintenance Methods on Energized Power Lines*, Section 4.7.6 for information on adjusting the restricted approach boundary for elevations exceeding 900 m (3000 ft).

[e] This voltage range applies to line to ground voltages up to 240 volts.

Table 130.4(E)(b) Electric Shock Protection Approach Boundaries to Exposed Energized Electrical Conductors or Circuit Parts for Direct-Current Voltage Systems

(1)	(2)	(3)	(4) [b]
Nominal Potential Difference	Limited Approach Boundary		Restricted Approach Boundary; Includes Inadvertent Movement Adder
	Exposed Movable Conductor* [a]	Exposed Fixed Circuit Part	
Less than 50 V	Not specified	Not specified	Not specified
50 V–300 V	3.1 m (10 ft 0 in.)	1.0 m (3 ft 6 in.)	Avoid contact
301 V–1 kV	3.1 m (10 ft 0 in.)	1.0 m (3 ft 6 in.)	0.3 m (1 ft 0 in.)
1.1 kV–5 kV	3.1 m (10 ft 0 in.)	1.5 m (5 ft 0 in.)	0.5 m (1 ft 5 in.)
5.1 kV–15 kV	3.1 m (10 ft 0 in.)	1.5 m (5 ft 0 in.)	0.7 m (2 ft 2 in.)
15.1 kV–45 kV	3.1 m (10 ft 0 in.)	2.5 m (8 ft 0 in.)	0.8 m (2 ft 9 in.)
45.1 kV– 75 kV	3.1 m (10 ft 0 in.)	2.5 m (8 ft 0 in.)	1.0 m (3 ft 6 in.)
75.1 kV–150 kV	3.3 m (10 ft 8 in.)	3.1 m (10 ft 0 in.)	1.2 m (3 ft 10 in.)
150.1 kV–250 kV	3.6 m (11 ft 8 in.)	3.6 m (11 ft 8 in.)	1.6 m (5 ft 3 in.)
250.1 kV–500 kV	6.0 m (20 ft 0 in.)	6.0 m (20 ft 0 in.)	3.5 m (11 ft 6 in.)
500.1 kV–800 kV	8.0 m (26 ft 0 in.)	8.0 m (26 ft 0 in.)	5.0 m (16 ft 5 in.)

Note: All dimensions are distance from exposed energized electrical conductors or circuit parts to worker.

* [a] *Exposed movable conductor* describes a condition in which the distance between the conductor and a person is not under the control of the person. The term is normally applied to overhead line conductors supported by poles.

[b] The restricted approach boundary in Column 4 is based on an elevation not exceeding 900 m (3000 ft). For higher elevations, adjustment of the restricted approach boundary shall be considered.

Informational Note: See 29 CFR 1910.269, Table R-5, Altitude Correction Factor; ANSI/IEEE C2-2023, *National Electrical Safety Code* ; and IEEE 516-2021, *Guide for Maintenance Methods on Energized Power Lines* , Section 4.7.6 for information on adjusting the restricted approach boundary for elevations exceeding 900 m (3000 ft).

(1) Application.

The electric shock protection boundaries identified as limited approach boundary and restricted approach boundary shall be applicable where personnel are approaching exposed energized electrical conductors or circuit parts.

Informational Note: In certain instances, the arc flash boundary might be a greater distance from the energized electrical conductors or circuit parts than the limited approach boundary. The electric shock protection boundaries and the arc flash boundary are independent of each other.

(2) AC Table.

Table 130.4(E)(a) shall be used for the distances associated with various ac system voltages.

Table 130.4(E)(a) Electric Shock Protection Approach Boundaries to Exposed Energized Electrical Conductors or Circuit Parts for Alternating-Current Systems

(1)	(2)	(3)	(4)
	Limited Approach Boundary[b]		
Nominal System Voltage Range, Phase to Phase[a]	Exposed Movable Conductor[c]	Exposed Fixed Circuit Part	Restricted Approach Boundary[b,d]; Includes Inadvertent Movement Adder
Less than 50 V	Not specified	Not specified	Not specified
50 V–150 V[e]	3.1 m (10 ft 0 in.)	1.0 m (3 ft 6 in.)	Avoid contact
151 V–750 V	3.1 m (10 ft 0 in.)	1.0 m (3 ft 6 in.)	0.31 m (1 ft 0 in.)
751 V–5 kV	3.1 m (10 ft 0 in.)	1.0 m (3 ft 6 in.)	0.63 m (2 ft 1 in.)
5.1 kV–15 kV	3.1 m (10 ft 0 in.)	1.5 m (5 ft 0 in.)	0.65 m (2 ft 2 in.)
15.1 kV–36 kV	3.1 m (10 ft 0 in.)	1.8 m (6 ft 0 in.)	0.77 m (2 ft 7 in.)
36.1 kV–46 kV	3.1 m (10 ft 0 in.)	2.5 m (8 ft 0 in.)	0.84 m (2 ft 10 in.)
46.1 kV–72.5 kV	3.1 m (10 ft 0 in.)	2.5 m (8 ft 0 in.)	1.0 m (3 ft 4 in.)
72.6 kV–121 kV	3.3 m (10 ft 8 in.)	2.5 m (8 ft 0 in.)	1.2 m (3 ft 9 in.)
121.1 kV–145 kV	3.4 m (11 ft 0 in.)	3.1 m (10 ft 0 in.)	1.3 m (4 ft 4 in.)
145.1 kV–169 kV	3.6 m (11 ft 8 in.)	3.6 m (11 ft 8 in.)	1.5 m (4 ft 10 in.)
169.1 kV–242 kV	4.0 m (13 ft 0 in.)	4.0 m (13 ft 0 in.)	2.1 m (6 ft 8 in.)
242.1 kV–362 kV	4.7 m (15 ft 4 in.)	4.7 m (15 ft 4 in.)	3.5 m (11 ft 2 in.)
362.1 kV–420 kV	5.8 m (19 ft 0 in.)	5.8 m (19 ft 0 in.)	4.3 m (14 ft 0 in.)
420.1 kV–550 kV	5.8 m (19 ft 0 in.)	5.8 m (19 ft 0 in.)	5.1 m (16 ft 8 in.)
550.1 kV–800 kV	7.2 m (23 ft 9 in.)	7.2 m (23 ft 9 in.)	6.9 m (22 ft 7 in.)

Notes:

(1) For arc flash boundary, see 130.5(E).

(2) All dimensions are distance from exposed energized electrical conductors or circuit part to personnel.

[a]For single-phase systems above 250 volts, select the range that is equal to the system's maximum phase-to-ground voltage multiplied by 1.732.

[b]See definition in Article 100 and text in 130.4(F)(3) and Informative Annex C for elaboration.

[c]*Exposed movable conductors* describes a condition in which the distance between the conductor and a person is not under the control of the person. The term is normally applied to overhead line conductors supported by poles.

[d]The restricted approach boundary in Column 4 is based on an elevation not exceeding 900 m (3000 ft). For higher elevations, adjustment of the restricted approach boundary shall be considered.

> Informational Note: See 29 CFR 1910.269, Table R-5, Altitude Correction Factor; ANSI/IEEE C2-~~2023~~ , *National Electrical Safety Code*; and IEEE 516-~~2021~~ , *Guide for Maintenance Methods on Energized Power Lines*, Section 4.7.6 for information on adjusting the restricted approach boundary for elevations exceeding 900 m (3000 ft).

[e]This voltage range applies to line to ground voltages up to 240 volts.

(3) DC Table.

Table 130.4(E)(b) shall be used for the distances associated with various dc system voltages.

Table 130.4(E)(b) Electric Shock Protection Approach Boundaries to Exposed Energized Electrical Conductors or Circuit Parts for Direct-Current Voltage Systems

(1)	(2)	(3)	(4)[b]
Nominal Potential Difference	Limited Approach Boundary		Restricted Approach Boundary; Includes Inadvertent Movement Adder
	Exposed Movable Conductor*[a]	Exposed Fixed Circuit Part	
Less than 50 V	Not specified	Not specified	Not specified
50 V–300 V	3.1 m (10 ft 0 in.)	1.0 m (3 ft 6 in.)	Avoid contact
301 V–1 kV	3.1 m (10 ft 0 in.)	1.0 m (3 ft 6 in.)	0.3 m (1 ft 0 in.)
1.1 kV–5 kV	3.1 m (10 ft 0 in.)	1.5 m (5 ft 0 in.)	0.5 m (1 ft 5 in.)
5.1 kV–15 kV	3.1 m (10 ft 0 in.)	1.5 m (5 ft 0 in.)	0.7 m (2 ft 2 in.)
15.1 kV–45 kV	3.1 m (10 ft 0 in.)	2.5 m (8 ft 0 in.)	0.8 m (2 ft 9 in.)
45.1 kV– 75 kV	3.1 m (10 ft 0 in.)	2.5 m (8 ft 0 in.)	1.0 m (3 ft 6 in.)
75.1 kV–150 kV	3.3 m (10 ft 8 in.)	3.1 m (10 ft 0 in.)	1.2 m (3 ft 10 in.)
150.1 kV–250 kV	3.6 m (11 ft 8 in.)	3.6 m (11 ft 8 in.)	1.6 m (5 ft 3 in.)
250.1 kV–500 kV	6.0 m (20 ft 0 in.)	6.0 m (20 ft 0 in.)	3.5 m (11 ft 6 in.)
500.1 kV–800 kV	8.0 m (26 ft 0 in.)	8.0 m (26 ft 0 in.)	5.0 m (16 ft 5 in.)

Note: All dimensions are distance from exposed energized electrical conductors or circuit parts to worker.

*[a] *Exposed movable conductor* describes a condition in which the distance between the conductor and a person is not under the control of the person. The term is normally applied to overhead line conductors supported by poles.

[b] The restricted approach boundary in Column 4 is based on an elevation not exceeding 900 m (3000 ft). For higher elevations, adjustment of the restricted approach boundary shall be considered.

Informational Note: See 29 CFR 1910.269, Table R-5, Altitude Correction Factor; ANSI/IEEE C2~~-2023~~ , *National Electrical Safety Code*; and IEEE 516~~-2021~~ , *Guide for Maintenance Methods on Energized Power Lines*, Section 4.7.6 for information on adjusting the restricted approach boundary for elevations exceeding 900 m (3000 ft).

Supplemental Information

File Name	Description	Approved
70E_SR-54_130.4_E_.docx		

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Tue Aug 26 14:54:48 EDT 2025

Committee Statement

Committee Statement: Second level subdivisions with titles were added to comply with the NEC Style Manual Section 3.5.1.2.

Edition dates for documents referenced in informational notes are provided in Annex A.

Response Message: SR-54-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 55-NFPA 70E-2025 [Section No. 130.4(G)]

(G) Restricted Approach Boundary.

No qualified person shall approach or take any conductive object closer to exposed energized electrical conductors or circuit parts than the restricted approach boundary set forth in Table 130.4(E)(a) and Table 130.4(E)(b), unless one of the following conditions applies:

(1) The qualified person is insulated or guarded from energized electrical conductors or circuit parts operating at 50 volts or more. ~~Insulating gloves and sleeves are considered insulation only with regard to the energized parts upon which work is performed.~~

(2) The energized electrical conductors or circuit parts are insulated from the qualified person and from any other conductive object at a different potential.

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Tue Aug 26 14:58:23 EDT 2025

Committee Statement

Committee Statement: "Insulating gloves and sleeves are considered insulation only with regard to the energized parts upon which work is performed" is better located to 130.7(C)(7)(a).

Response Message: SR-55-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.

Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 73-NFPA 70E-2025 [Section No. 130.5(B)]

(B) Estimate of Likelihood and Severity.

The estimate of the likelihood of occurrence of injury or damage to health and the potential severity of injury or damage to health shall take into consideration the following:

(1) The design of the electrical equipment

(2) The overcurrent protective device for the electrical equipment and its operating time and ~~operation~~ operating condition

(3) The electrical equipment operating condition and condition of maintenance

Informational Note: In most cases, closed doors do not provide enough protection to eliminate the need for PPE in situations in which the state of the equipment is known to readily change (e.g., doors open or closed, rack in or rack out).

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Wed Aug 27 08:43:13 EDT 2025

Committee Statement

Committee Statement: The phrase “operation condition” in list Item (2) was editorially revised to “operating condition” to correlate with existing 130.5(B) list item (3).

Response Message: SR-73-NFPA 70E-2025

Public Comment No. 51-NFPA 70E-2025 [Section No. 130.5(B)]

Public Comment No. 96-NFPA 70E-2025 [Section No. 130.5(B)]

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul

Dyson, Thomas B.

Katekar, Chaitanya

Stallcup, James G.

Affirmative All

Barnhart, Paul D.

Barrios, Louis A.

Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 74-NFPA 70E-2025 [Section No. 130.5(C)(2)]

(2) When PPE is Used.

When the additional protective measures include the use of PPE, the following shall be determined:

(1) ~~Appropriate safety~~ Safety -related work practices

(2) The arc flash boundary

(3) The PPE to be used within the arc flash boundary

Submitter Information Verification

Committee: EEW-AAA

Submittal Date: Wed Aug 27 08:44:40 EDT 2025

Committee Statement

Committee Statement: The revision brings this text into compliance with the NEC Style Manual. The term “appropriate” is vague.

Response Message: SR-74-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul

Dyson, Thomas B.

Katekar, Chaitanya

Stallcup, James G.

Affirmative All

Barnhart, Paul D.

Barrios, Louis A.

Crow, Daryld Ray

Dollard, Jr., James T.

Gallo, Ernest J.

Gray, Bobby J.

Guier, Jarod

Hacke, Donald Charles

Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 75-NFPA 70E-2025 [Section No. 130.5(C)(3)]

(3) Use of Table 130.5(C)(3).

Table 130.5(C)(3) shall be permitted to be used to estimate the likelihood of occurrence of an arc flash event to determine if additional protective measures are required.

Table 130.5(C)(3) Estimate of the Likelihood of Occurrence of an Arc Flash Incident for ac and dc Systems

Task	Operating Condition[a]	Likelihood of Occurrence[b]
Reading a panel meter while operating a meter switch.	Any	No
Performing infrared thermography and other noncontact inspections outside the restricted approach boundary. This activity does not include opening of doors or covers.		
Working on control circuits with exposed energized electrical conductors and circuit parts, nominal 125 volts ac or dc, or below without any other exposed energized equipment over nominal 125 volts ac or dc, including opening of hinged covers to gain access.		
Examination of insulated cable with no manipulation of cable.		
For dc systems, maintenance on a single cell of a battery system or multi-cell units in an open rack.		
Working on battery equipment ~~below~~ less than 600 volts where the ~~exposed electrical conductors are separated by more than~~ separation between exposed electrical conductors exceeds 1 mm (0.039 in.) per volt.		
For ac systems, work on energized electrical conductors and circuit parts, including electrical testing.	Any	Yes
Operation of a CB or switch the first time after installation or completion of maintenance in the equipment.		
For dc systems, working on energized electrical conductors and circuit parts of series-connected battery cells, including electrical testing.		
Removal or installation of CBs or switches.		
Opening hinged door(s) or cover(s) or removal of bolted covers (to expose bare, energized electrical conductors and circuit parts). For dc systems, this includes bolted covers, such as battery terminal covers.		
Application of temporary protective grounding equipment, after voltage test.		
Working on control circuits with exposed energized electrical conductors and circuit parts, greater than 120 volts.		
Insertion or removal of individual starter buckets from motor control center (MCC).		
Insertion or removal (racking) of circuit breakers (CBs) or starters from cubicles, doors open or closed.		
Insertion or removal of plug-in devices into or from busways.		
Examination of insulated cable with manipulation of cable.		
Working on exposed energized electrical conductors and circuit parts of equipment directly supplied by a panelboard or motor control center.		
Insertion or removal of revenue meters (kW-hour, at primary voltage and current).		
Insertion or removal of covers for battery intercell connector(s).		
For dc systems, working on exposed energized electrical conductors and circuit parts of utilization equipment directly supplied by a dc source.		
Opening voltage transformer or control power transformer compartments.		
Operation of outdoor disconnect switch (hookstick operated) at 1 kV through 15 kV.		
Operation of outdoor disconnect switch (gang-operated, from grade) at 1 kV through 15 kV.		
Operation of a CB, switch, contactor, or starter.	Normal	No
	Abnormal	Yes
Voltage testing on individual battery cells or individual multi-cell units.		

Task	Operating Condition[a]	Likelihood of Occurrence[b]
Removal or installation of covers for equipment such as wireways, junction boxes, and cable trays that does not expose bare, energized electrical conductors and circuit parts.		
Opening a panelboard hinged door or cover to access dead front overcurrent devices.		
Removal of battery nonconductive intercell connector covers.		
Maintenance and testing on individual battery cells or individual multi-cell units in an open rack		
Insertion or removal of individual cells or multi-cell units of a battery system in an open rack.		
Arc-resistant equipment with the DOORS CLOSED and SECURED, and where the available fault current and fault clearing time does not exceed that of the arc-resistant rating of the equipment in one of the following conditions:		
(1) Insertion or removal of individual starter buckets		
(2) Insertion or removal (racking) of CBs from cubicles		
(3) Insertion or removal (racking) of ground and test device		
(4) Insertion or removal (racking) of voltage transformers on or off the bus		

[a] Equipment is considered to be in a “normal operating condition” if all of the conditions in 110.2(B), Exception No. 1 are satisfied.

~~[b] As defined in this standard, the two components of risk are the likelihood of occurrence of injury or damage to health and the severity of injury or damage to health that results from a hazard. Risk assessment is an overall process that involves estimating both the likelihood of occurrence and severity to determine if additional protective measures are required.~~

Informational Note No. 1: The estimate of the likelihood of occurrence contained in this table does not cover every possible condition or situation, nor does it address severity of injury or damage to health. Where this table identifies “No” as an estimate of likelihood of occurrence, it means that an arc flash incident is not likely to occur. Where this table identifies “Yes” as an estimate of likelihood of occurrence, it means an arc flash incident should be considered likely to occur. The likelihood of occurrence must be combined with the potential severity of the arcing incident to determine if additional protective measures are required to be selected and implemented according to the hierarchy of risk control identified in 110.3(H).

Informational Note No. 2: See IEEE C37.20.7, ~~*Guide*~~ *Recommended Practice for Testing Switchgear Rated Up to 52 kV for Internal Arcing Faults*, as an example of a standard that provides information for arc-resistant equipment referred to in Table 130.5(C)(3).

Informational Note No. 3: Improper or inadequate maintenance can result in increased fault clearing time of the overcurrent protective device, thus increasing the incident energy. Where equipment is not properly installed or maintained, PPE selection based on incident energy analysis or the PPE category method might not provide adequate protection from arc flash hazards.

Informational Note No. 4: Both larger and smaller fault currents could result in higher incident energy. If the fault current increases without a decrease in the fault clearing time of the overcurrent protective device, the incident energy will increase. If the fault current decreases, resulting in a longer fault clearing time for the overcurrent protective device, incident energy could also increase.

Informational Note No. 5: See Informative Annex O for safety-related design requirements. The occurrence of an arcing fault inside an enclosure produces a variety of physical phenomena very different from a bolted fault. For example, the arc energy resulting from an arc developed in the air will cause a sudden pressure increase and localized overheating. Equipment and design practices are available to minimize the energy levels and the number of procedures that could expose an employee to high levels of incident energy. Proven designs such as arc-resistant switchgear, remote racking (insertion or removal), remote opening and closing of switching devices, high-resistance grounding of low-voltage and 5000-volt (nominal) systems, current limitation, and specification of covered bus or covered conductors within equipment are available to reduce the risk associated with an arc flash incident.

Informational Note No. 6: See 205.4, 225.1, 225.2, and 225.3 for additional direction for performing maintenance on overcurrent protective devices.

Informational Note No. 7: See IEEE 1584, *Guide for Performing Arc Flash Hazard Calculations*, for more information regarding incident energy and the arc flash boundary for three-phase systems.

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Wed Aug 27 08:45:53 EDT 2025

Committee Statement

Committee Statement: Revisions were made in the first column of Table 130.5(C) to express maximum and minimum limits in a manner that complies with NEC Style Manual Section 3.2.2.

Table note b (referred to in Column 3) was revised to be Informational Note No. 1 as it does not contain any requirements. The first two sentences of this note are deleted as they repeat what is stated in the definitions of risk and risk assessment.

Response Message: SR-75-NFPA 70E-2025

Public Comment No. 36-NFPA 70E-2025 [Section No. 130.5(C)]

Public Comment No. 52-NFPA 70E-2025 [Section No. 130.5(C)]

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.

Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 76-NFPA 70E-2025 [Section No. 130.5(F)]

(F) Arc Flash PPE Selection Methods.

(1) Selection Methods.

One of the following methods shall be used for the selection of arc flash PPE:

(1) The incident energy analysis method in accordance with 130.5(G)

(2) The arc flash PPE category method in accordance with 130.7(C)(15)

Informational Note No. 1: Some equipment has been tested by a qualified electrical testing laboratory and is marked with third-party verified incident energy information for specified conditions to aid in the selection of arc flash PPE.

Informational Note No. 2: See UL RP 2986, *Recommended Practice for Measuring Incident Energy Exposure*, for further information.

(2) One Method Per Equipment.

Either, but not both, methods shall be permitted to be used on the same piece of equipment.

(3) Incident Energy and PPE Categories.

The results of an incident energy analysis to specify an arc flash PPE category in Table 130.7(C)(15)(c) shall not be permitted.

~~*Exception: A task specific incident energy value shall be permitted to be used for the selection of arc flash PPE if the equipment complies with all of the following:*~~

~~*(0) The equipment is listed.*~~

~~*(0) The equipment is installed in accordance with the manufacturer's instructions.*~~

~~*(0) The equipment is installed in accordance with its ratings.*~~

~~*(0) The equipment has been tested by a third party qualified electrical testing laboratory to verify the task specific incident energy information.*~~

~~*(0) The task specific incident energy information is marked on the equipment.*~~

~~Informational Note: See UL RP 2986, *Recommended Practice for Measuring Incident Energy Exposure* , for further information.~~

Submitter Information Verification

Committee: EEW-AAA

Submittal Date: Wed Aug 27 08:51:23 EDT 2025

Committee Statement

Committee Statement: A new Informational Note Number 1 is added to clarify that some electrical equipment is marked with third party incident energy information to assist with the selection of arc flash PPE.

The exception following 130.5(F)(3) is deleted as it is not necessary. The informational note following the exception is retained and relocated to 130.5(F)(1).

Response Message: SR-76-NFPA 70E-2025 RESPONSE TO PC 53: The second level subdivision titles were reviewed and are considered to accurately reflect the content.

Public Comment No. 138-NFPA 70E-2025 [Section No. 130.5(F)(3)]

Public Comment No. 1-NFPA 70E-2025 [Section No. 130.5(F)(3)]

Public Comment No. 53-NFPA 70E-2025 [Section No. 130.5(F)]

Public Comment No. 139-NFPA 70E-2025 [Section No. 130.5(B)]

Ballot Results

This item has passed ballot

29 Eligible Voters
4 Not Returned
24 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Affirmative with Comment

Barrios, Louis A.

While new Informational Note No. 1 (that replaced the Exception introduced during First Draft Meeting) provides information related to equipment testing, it is left up to the user of the Standard to decide if and how to use this

information to determine PPE levels.

Second Revision No. 77-NFPA 70E-2025 [Section No. 130.5(G)]

(G) Incident Energy Analysis Method.

The incident energy exposure level shall be based on the working distance of the employee's face and chest areas from a prospective arc source for the specific task to be performed. Arc-rated clothing and other PPE shall be used by the employee based on the incident energy exposure associated with the specific task. Recognizing that incident energy increases as the distance from the arc flash decreases, additional PPE shall be used for any parts of the body that are closer than the working distance at which the incident energy was determined.

The incident energy analysis shall take into consideration the characteristics of the overcurrent protective device and its fault clearing time, including its condition of maintenance.

The incident energy analysis shall be updated when changes occur in the electrical distribution system that could affect the results of the analysis. The incident energy analysis shall also be reviewed for accuracy at intervals not to exceed 5 years.

> Informational Note: Changes that could affect the results of the incident energy analysis include changes made by utilities or other entities, such as transformer sizing, as well as modifications to protective devices or changes to protective settings.

Table 130.5(G) identifies arc-rated clothing and other PPE requirements and shall be permitted to be used with the incident energy analysis method of selecting arc flash PPE.

> Informational Note No. 1: See Informative Annex D for information on estimating the incident energy.
>
> Informational Note No. 2: See Informative Annex H for information on selection of arc-rated clothing and other PPE.

Table 130.5(G) Selection of Arc-Rated Clothing and Other PPE When the Incident Energy Analysis Method Is Used

Incident energy exposures equal to 1.2 cal/cm^2 up to and including 12 cal/cm^2
Arc-rated clothing with an arc rating equal to or greater than the estimated incident energy [a]
Arc-rated long-sleeve shirt and pants or arc-rated coverall or arc flash suit (SR)
Arc-rated face shield and arc-rated balaclava or arc flash suit hood (SR) [b]
Arc-rated outerwear (e.g., jacket, parka, rainwear, hard hat liner, high-visibility apparel) (AN) [c]
Heavy-duty leather gloves, arc-rated gloves, or rubber insulating gloves with protectors (SR) [c]
Hard hat
Safety glasses or safety goggles (SR)
Hearing protection
Leather footwear [d]
Incident energy exposures greater than 12 cal/cm^2
Arc-rated clothing with an arc rating equal to or greater than the estimated incident energy [a]
Arc-rated long-sleeve shirt and pants or arc-rated coverall or arc flash suit (SR)
Arc-rated arc flash suit hood
Arc-rated outerwear (e.g., jacket, parka, rainwear, hard hat liner, high-visibility apparel) (AN) [c]
Arc-rated gloves or rubber insulating gloves with protectors (SR) [c]
Hard hat
Safety glasses or safety goggles (SR)
Hearing protection
Leather footwear [d]

SR: Selection of one in group is required.

AN: As needed.

[a] Arc ratings can be for a single layer, such as an arc-rated shirt and pants or a coverall, or for an arc flash suit or a multi-layer system if tested as a combination consisting of an arc-rated shirt and pants, coverall, and arc flash suit.

[b] Face shields with a wrap-around guarding to protect the face, chin, forehead, ears, and neck area are required by 130.7(C)(10)(c). Where the back of the head is inside the arc flash boundary, a balaclava or an arc flash hood shall be required for full head and neck protection.

~~e Rubber insulating gloves with protectors provide arc flash protection in addition to electric shock protection. Higher class rubber insulating gloves with protectors, due to their increased material thickness, provide increased arc flash protection.~~

~~d Footwear other than leather or dielectric shall be permitted to be used provided it has been tested to demonstrate no ignition, melting, or dripping at the estimated incident energy exposure.~~

~~e The arc rating of outer layers worn over arc-rated clothing as protection from the elements or for other safety purposes, and that are not used as part of a layered system, shall not be required to be equal to or greater than the estimated incident energy exposure.~~

(1) Incident Energy Analysis.

(a) The incident energy exposure level shall be based on the working distance of the employee's face and chest areas from a prospective arc source for the specific task to be performed. ~~Arc-rated clothing and other PPE shall be used by the employee based on the incident energy exposure associated with the specific task. Recognizing that incident energy increases as the distance from the arc flash decreases, additional PPE shall be used for any parts of the body that are closer than the working distance at which the incident energy was determined.~~

(b) The incident energy analysis shall take into consideration the characteristics of the overcurrent protective device and its fault clearing time, including its condition of maintenance.

(c) The incident energy analysis shall be updated when changes occur in the electrical distribution system that could affect the results of the analysis.

(d) The incident energy analysis shall also be reviewed for accuracy at intervals not to exceed 5 years.

Informational Note No. 1: Changes that could affect the results of the incident energy analysis include changes made by utilities or other entities, such as transformer sizing, as well as modifications to protective devices or changes to protective settings.

Informational Note No. 2: See Informative Annex D for information on estimating the incident energy.

(2) PPE.

(a) Arc-rated clothing and other PPE shall be used by the employee based on the incident energy exposure associated with the specific task.

(b) Recognizing that incident energy increases as the distance from the arc flash decreases, additional PPE shall be used for any parts of the body that are closer than the working distance at which the incident energy was determined.

(c) Table 130.5(G) identifies arc-rated clothing and other PPE requirements and shall be permitted to be used with the incident energy analysis method of selecting arc flash PPE.

~~Informational Note No. 1: See Informative Annex D for information on estimating the incident energy.~~

Informational Note: See Informative Annex H for information on selection of arc-rated clothing and other PPE.

Table 130.5(G) Selection of Arc-Rated Clothing and Other PPE When the Incident Energy Analysis Method Is Used

Incident energy exposures equal to 1.2 cal/cm^2 up to and including 12 cal/cm^2
Arc-rated clothing with an arc rating equal to or greater than the estimated incident energy[a]
Arc-rated long-sleeve shirt and pants or arc-rated coverall or arc flash suit (SR)
Arc-rated face shield and arc-rated balaclava or arc flash suit hood (SR)[b]
Arc-rated outerwear (e.g., jacket, parka, rainwear, hard hat liner, high-visibility apparel) (AN)[e]
Heavy-duty leather gloves, arc-rated gloves, or rubber insulating gloves with protectors (SR)[c]
Hard hat
Safety glasses or safety goggles (SR)
Hearing protection
Leather footwear[d]
Incident energy exposures greater than 12 cal/cm^2
Arc-rated clothing with an arc rating equal to or greater than the estimated incident energy[a]
Arc-rated long-sleeve shirt and pants or arc-rated coverall or arc flash suit (SR)
Arc-rated arc flash suit hood
Arc-rated outerwear (e.g., jacket, parka, rainwear, hard hat liner, high-visibility apparel) (AN)[e]
Arc-rated gloves or rubber insulating gloves with protectors (SR)[c]
Hard hat
Safety glasses or safety goggles (SR)
Hearing protection
Leather footwear[d]

SR: Selection of one in group is required.

AN: As needed.

[a]Arc ratings can be for a single layer, such as an arc-rated shirt and pants or a coverall, or for an arc flash suit or a multi-layer system if tested as a combination consisting of an arc-rated shirt and pants, coverall, and arc flash suit.

[b]Face shields with a wrap-around guarding to protect the face, chin, forehead, ears, and neck area are required by 130.7(C)(10)(c). Where the back of the head is inside the arc flash boundary, a balaclava or an arc flash hood shall be required for full head and neck protection.

[c]Rubber insulating gloves with protectors provide arc flash protection in addition to electric shock protection. Higher class rubber insulating gloves with protectors, due to their increased material thickness, provide increased arc flash protection.

[d]Footwear other than leather or dielectric shall be permitted to be used provided it has been tested to demonstrate no ignition, melting, or dripping at the estimated incident energy exposure.

[e]The arc rating of outer layers worn over arc-rated clothing as protection from the elements or for other safety purposes, and that are not used as part of a layered system, shall not be required to be equal to or greater than the estimated incident energy exposure.

Supplemental Information

File Name	Description	Approved
70E_SR-77_130.5_G_.docx		

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Wed Aug 27 08:56:11 EDT 2025

Committee Statement

Committee Statement: Multiple requirements within a single subdivision have been separated into additional subdivisions and list items in order to comply with NEC Style Manual Section 3.5.1.2.

PPE requirements were editorially reordered and consolidated within one subdivision.

Response Message: SR-77-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.

Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 78-NFPA 70E-2025 [Section No. 130.5(H)]

(H) Equipment Labeling.

~~Electrical equipment such as switchboards, panelboards, industrial control panels, meter socket enclosures, and motor control centers that are in other than dwelling units and that are likely to require examination, adjustment, servicing, or maintenance while energized shall be marked with a label containing all the following information:~~

(0) ~~Nominal system voltage~~

(0) ~~Arc flash boundary~~

(0) ~~At least one of the following:~~

0. ~~Available incident energy and the corresponding working distance, or the arc flash PPE category in Table 130.7(C)(15)(a) or Table 130.7(C)(15)(b) for the equipment, but not both~~
0. ~~Minimum arc rating of clothing~~
0. ~~Site-specific level of PPE~~

~~*Exception No. 1: Unless changes in electrical distribution system(s) render the label inaccurate, labels applied prior to the effective date of this edition of the standard shall be acceptable if they complied with the requirements for equipment labeling in the standard in effect at the time the labels were applied.*~~

~~*Exception No. 2: In supervised industrial installations where conditions of maintenance and engineering supervision ensure that only qualified persons monitor and service the system, the information required in 130.5(H)(1) through 130.5(H)(3) shall be permitted to be documented in a manner that is readily available to persons likely to perform examination, servicing, maintenance, and operation of the equipment while energized.*~~

~~The method of calculating and the data to support the information for the label shall be documented. The data shall be reviewed for accuracy at intervals not to exceed 5 years. Where the review of the data identifies a change that renders the label inaccurate, the label shall be updated.~~

~~The label shall be of sufficient durability to withstand the environment involved.~~

~~The owner of the electrical equipment shall be responsible for the documentation, installation, and maintenance of the marked label.~~

(1) General.

Electrical equipment such as switchboards, panelboards, industrial control panels, meter socket enclosures, and motor control centers that are in other than dwelling units and that are likely to require examination, adjustment, servicing, or maintenance while energized shall be marked with a label containing all the following information:

(1) Nominal system voltage

(2) Arc flash boundary

(3) At least one of the following:

a. Available incident energy and the corresponding working distance, or the arc flash PPE category in Table 130.7(C)(15)(a) or Table 130.7(C)(15)(b) for the equipment, but not both

b. Minimum arc rating of clothing

c. Site-specific level of PPE

Exception No. 1: Unless changes in electrical distribution system(s) render the label inaccurate, labels applied prior to the effective date of this edition of the standard shall be acceptable if they complied with the requirements for equipment labeling in the standard in effect at the time the labels were applied.

Exception No. 2: In supervised industrial installations where conditions of maintenance and engineering supervision ensure that only qualified persons monitor and service the system, the information required in 130.5(H)(1)(1) through 130.5(H)(1)(3) shall be permitted to be documented in a manner that is readily available to persons likely to perform examination, servicing, maintenance, and operation of the equipment while energized.

(2) Calculation Method and Data Documentation.

The method of calculating and the data to support the information for the label shall be documented.

(3) Data Review.

The data shall be reviewed for accuracy at intervals not to exceed 5 years.

(4) Label Updated.

Where the review of the data identifies a change that renders the label inaccurate, the label shall be updated.

(5) Label Durability.

The label shall be of sufficient durability to withstand the environment involved.

(6) Equipment Owner Responsibility.

The owner of the electrical equipment shall be responsible for the documentation, installation, and maintenance of the marked label.

Supplemental Information

File Name	Description	Approved
70E_SR-78_130.5_H_.docx		

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Wed Aug 27 09:01:31 EDT 2025

Committee Statement

Committee Statement: Multiple requirements within a single subdivision have been separated into additional subdivisions in order to comply with NEC Style Manual Section 3.5.1.2.

Response Message: SR-78-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 79-NFPA 70E-2025 [Section No. 130.7(A)]

(A) General.

Employees exposed to an electrical ~~hazards~~ hazard when the risk associated with that hazard is not ~~adequately~~ reduced by the applicable electrical installation requirements shall be provided with, and shall use, ~~personal protective equipment~~ PPE that is designed and constructed for the specific part of the body to be protected and for the work to be performed.

Informational Note: The PPE requirements of 130.7 are intended to protect a person from arc flash and electric shock hazards. While some situations could result in burns to the skin, even with the protection selected, burn injury should be reduced and survivable. Due to the explosive effect of some arc events, physical trauma injuries could occur. The PPE requirements of 130.7 do not address protection against physical trauma other than exposure to the thermal effects of an arc flash.

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Wed Aug 27 09:04:28 EDT 2025

Committee Statement

Committee Statement: The term “adequately” is deleted in accordance with the NEC Style Manual Section 3.2.1 on the use of unenforceable terms.

Response Message: SR-79-NFPA 70E-2025

Public Comment No. 54-NFPA 70E-2025 [Section No. 130.7(A)]

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.

Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 80-NFPA 70E-2025 [Section No. 130.7(C)(1)]

(1) General.

~~When an employee is working within the restricted approach boundary, the worker shall wear PPE in accordance with 130.4 . When an employee is working within the arc flash boundary, he or she shall wear protective clothing and other PPE in accordance with 130.5 . All parts of the body inside the arc flash boundary shall be protected.~~

~~Informational Note: Where the estimated incident energy exposure is greater than the arc rating of commercially available arc-rated PPE, then for the purpose of testing for the absence of voltage, the following examples of risk reduction methods could be used to reduce the likelihood of occurrence of an arcing event or the severity of exposure:~~

(0) ~~Use of noncontact capacitive test instrument(s) or a permanently installed metering device(s) in the equipment for indication, before using a contact-type test instrument to test for the absence of voltage.~~

(0) ~~If equipment design allows, observe visible gaps between the equipment conductors and circuit parts and the electrical source(s) of supply.~~

(0) ~~Increase the working distance.~~

(0) ~~Consider system design options to reduce the incident energy level.~~

(a) When an employee is working within the restricted approach boundary, the worker shall wear PPE in accordance with 130.4.

(b) When an employee is working within the arc flash boundary, he or she shall wear protective clothing and other PPE in accordance with 130.5.

(c) All parts of the body inside the arc flash boundary shall be protected.

Informational Note: Where the estimated incident energy exposure is greater than the arc rating of commercially available arc-rated PPE, then for the purpose of testing for the absence of voltage, the following examples of risk reduction methods could be used to reduce the likelihood of occurrence of an arcing event or the severity of exposure:

(1) Use of noncontact capacitive test instrument(s) or a permanently installed metering device(s) in the equipment for indication, before using a contact-type test instrument to test for the absence of voltage.

(2) If equipment design allows, observe visible gaps between the equipment conductors and circuit parts and the electrical source(s) of supply.

(3) Increase the working distance.

(4) Consider system design options to reduce the incident energy level.

Supplemental Information

File Name	Description	Approved
70E_SR-80_130.7_C_1_.docx		

Submitter Information Verification

Committee: EEW-AAA

Submittal Date: Wed Aug 27 09:05:29 EDT 2025

Committee Statement

Committee Statement: Multiple requirements within a single subdivision have been separated into subdivisions in order to comply with NEC Style Manual Section 3.5.1.2.

Response Message: SR-80-NFPA 70E-2025

Ballot Results

This item has passed ballot

29 Eligible Voters
4 Not Returned
24 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Affirmative with Comment

Barrios, Louis A.

The phrase "he or she" should be changed to "the worker" in order to make new subdivision (b) parallel to new subdivision (a).

Second Revision No. 81-NFPA 70E-2025 [Section No. 130.7(C)(3)]

(3) Head, Face, Neck, and Chin (Head Area) Protection.

~~Employees shall wear nonconductive head protection wherever there is a danger of head injury from electric shock or burns due to contact with energized electrical conductors or circuit parts or from flying objects resulting from electrical explosion. Employees shall wear nonconductive protective equipment for the face, neck, and chin whenever there is a danger of injury from exposure to electric arcs or flashes or from flying objects resulting from electrical explosion. If employees use hairnets or beard nets, or both, these items shall be arc rated.~~

(a) Employees shall wear nonconductive head protection wherever there is a danger of head injury from electric shock or burns due to contact with energized electrical conductors or circuit parts or from flying objects resulting from electrical explosion.

(b) Employees shall wear nonconductive protective equipment for the face, neck, and chin whenever there is a danger of injury from exposure to electric arcs or flashes or from flying objects resulting from electrical explosion.

(c) If employees use hairnets or beard nets, or both, these items shall be arc rated.

Informational Note: See 130.7(C)(10)(b) and 130.7(C)(10)(c) for arc flash protective requirements.

Supplemental Information

File Name	Description	Approved
70E_SR-81_130.7_C_3_.docx		

Submitter Information Verification

Committee: EEW-AAA

Submittal Date: Wed Aug 27 09:06:42 EDT 2025

Committee Statement

Committee Statement: Multiple requirements within a single subdivision have been separated into subdivisions in order to comply with NEC Style Manual Section 3.5.1.2.

Response Message: SR-81-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul

Dyson, Thomas B.

Katekar, Chaitanya
Stallcup, James G.

Affirmative All
Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 82-NFPA 70E-2025 [Section No. 130.7(C)(6)]

(6) Body Protection.

Employees shall wear arc-rated clothing wherever there is possible exposure to incident energy ~~of~~ equal to or greater than 1.2 cal/cm^2 (5 J/cm^2).

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Wed Aug 27 09:07:58 EDT 2025

Committee Statement

Committee Statement: Stating the requirement in terms of incident energy correlates with the definition of arc flash boundary, which is “an approach limit from an arc source at which incident energy equals 1.2 cal/cm2 (5 J/cm2).” This revision also correlates with Table 130.5(G), which requires arc flash protection when the incident energy exposure is equal to or greater than 1.2 cal/cm2. The wording aligns with how the phrase is already used in Table H.3.

Response Message: SR-82-NFPA 70E-2025

Public Comment No. 55-NFPA 70E-2025 [Section No. 130.7(C)(6)]

Public Comment No. 99-NFPA 70E-2025 [Section No. 130.7(C)(6)]

Public Comment No. 136-NFPA 70E-2025 [Section No. 130.7(C)(6)]

Public Comment No. 230-NFPA 70E-2025 [Section No. 130.7(C)(6)]

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.

Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 83-NFPA 70E-2025 [Section No. 130.7(C)(7)]

(7) Hand and Arm Protection.

Hand and arm protection shall be provided in accordance with 130.7(C)(7)(a), 130.7(C)(7)(b), ~~and~~ 130.7(C)(7)(c), and 130.7(C)(7)(e) .

(a) *Electric Shock Protection.* ~~Employees shall wear rubber insulating gloves with protectors where there is a danger of hand injury from electric shock due to contact with exposed energized electrical conductors or circuit parts. Employees shall wear rubber insulating gloves with protectors and rubber insulating sleeves where there is a danger of hand and arm injury from electric shock due to contact with exposed energized electrical conductors or circuit parts. Rubber insulating gloves shall be rated for the voltage for which the gloves will be exposed. Rubber insulating gloves shall be permitted to be used without protectors, under the following conditions:~~ The following shall apply where employees wear electric shock protection:

(1) Employees shall wear rubber insulating gloves with protectors where there is a danger of hand injury from electric shock due to contact with exposed energized electrical conductors or circuit parts.

(2) Employees shall wear rubber insulating gloves with protectors and rubber insulating sleeves where there is a danger of hand and arm injury from electric shock due to contact with exposed energized electrical conductors or circuit parts.

(3) Rubber insulating gloves and sleeves shall be considered insulation only with regard to the energized parts upon which work is performed.

(4) Rubber insulating gloves shall be rated for the voltage for which the gloves will be exposed.

(5) Rubber insulating gloves shall be permitted to be used without protectors, under the following conditions:

   a. There shall be no activity performed that risks cutting or damaging the glove.

   b. The rubber insulating gloves shall be electrically retested before reuse.

   c. The voltage rating of the rubber insulating gloves shall be reduced by 50 percent for class 00 and by one whole class for classes 0 through 4.

(b) *Arc Flash Protection.* ~~Hand and arm protection shall be worn where there is possible exposure to arc flash burn. The apparel described in 130.7(C)(10)(d) shall be required for protection of hands from burns. Arm protection shall be accomplished by the apparel described in 130.7(C)(6) .~~ The following shall apply for arc flash protection:

(1) Hand and arm protection shall be worn where there is possible exposure to arc flash burn.

(2) The apparel described in 130.7(C)(10)(d) shall be required for protection of hands from burns.

(3) Arm protection shall be accomplished by the apparel described in 130.7(C)(6).

(c) *Maintenance and Use.* ~~Electrical protective equipment shall be maintained in a safe, reliable condition. Insulating equipment shall be inspected for damage before each day's use and immediately following any incident that can reasonably be suspected of having caused damage. Insulating gloves shall be given an air test, along with the inspection. Maximum use voltages for rubber insulating gloves shall not exceed that specified in Table 130.7(C)(7)(a) . The top of the cuff of the protector glove shall be shorter than the rolled top of the cuff of the insulating glove by at least the distance specified in Table 130.7(C)(7)(a) .~~ The following shall apply for maintenance and use:

(1) Electrical protective equipment shall be maintained in a safe, reliable condition.

(2) Insulating equipment shall be inspected for damage before each day's use and immediately following any incident that can reasonably be suspected of having caused damage.

(3) ~~Insulating~~ Rubber insulating gloves shall be given an air test, along with the inspection.

(4) Maximum use voltages for rubber insulating gloves shall not exceed that specified in Table 130.7(C)(7)(a).

(5) The top of the cuff of the protector glove shall be shorter than the rolled top of the cuff of the insulating glove by at least the distance specified in Table 130.7(C)(7)(a).

(d) *Periodic Electrical Tests*. ~~Rubber insulating equipment shall be subjected to periodic electrical tests. Test voltages shall be in accordance with applicable state, federal, or local codes and standards. The maximum intervals between tests shall not exceed that specified in Table 130.7(C)(7)(b).~~ The following shall apply for periodic electrical tests:

(1) Rubber insulating equipment shall be subjected to periodic electrical tests.

(2) Test voltages shall be in accordance with applicable state, federal, or local codes and standards.

(3) The maximum intervals between tests shall not exceed that specified in Table 130.7(C)(7)(b).

(e) *Thermal Hand Protection*. ~~Hand~~ Thermal hand protection shall be worn where there is possible exposure to a contact thermal hazard.

Informational Note: See OSHA 29 CFR 1910.137; ASTM F478, *Standard Specification for In-Service Care of Insulating Line Hose and Covers*; ASTM F479, *Standard Specification for In-Service Care of Insulating Blankets*; and ASTM F496, *Standard Specification for In-Service Care of Insulating Gloves and Sleeves*, which contain information related to in-service and testing requirements for rubber insulating equipment.

Table 130.7(C)(7)(a) Maximum Use Voltage for Rubber Insulating Gloves

Class Designation of Glove or Sleeve	Maximum ac Use Voltage rms, volts	Maximum dc Use Voltage avg, volts	Distances Between Protector Cuff and Rubber Insulating Glove Cuff, minimum
00	500	750	13 mm (0.5 in.)
0	1,000	1,500	13 mm (0.5 in.)
1	7,500	11,250	25 mm (1 in.)
2	17,000	25,500	51 mm (2 in.)
3	26,500	39,750	76 mm (3 in.)
4	36,000	54,000	102 mm (4 in.)

Table 130.7(C)(7)(b) Rubber Insulating Equipment, Maximum Test Intervals

Rubber Insulating Equipment	When to Test
Blankets	Before first issue; every 12 months thereafter*
Covers	If insulating value is suspect
Gloves	Before first issue; every 6 months thereafter*
Line hose	If insulating value is suspect
Sleeves	Before first issue; every 12 months thereafter*

*New insulating equipment is not permitted to be placed into service unless it has been electrically tested within the previous 12 months. Insulating equipment that has been issued for service is not new and is required to be retested in accordance with the intervals in this table.

Supplemental Information

File Name	Description	Approved
70E_SR-83_130.7_C_7_.docx		
70E_SR-83_130.7_C_7_.docx	For editorial use only	

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Wed Aug 27 09:09:46 EDT 2025

Committee Statement

Committee Statement: The requirement in 130.7(C)(7)(e) has been revised to more accurately reflect the subdivision title, and to correlate with the titles for (a) and (b) in this section.

The parent text was updated to include new requirement (e) added by First Revision No. 103.

Multiple requirements within a single subdivision have been separated into additional subdivisions and lists in order to comply with NEC Style Manual Section 3.5.1.2.

The second sentence of 130.4(G) list item (1) regarding rubber insulating gloves and sleeves being considered insulation only with regard to the energized parts upon which work is performed is relocated to new Subdivision 130.7(C)(a)(3) as this is a more logical location for the requirement.

Response Message: SR-83-NFPA 70E-2025

Public Comment No. 56-NFPA 70E-2025 [Section No. 130.7(C)(7)]

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
24 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.

Tobias, John M.

West, Rodney J.

Widup, Ron

Wolf, Jason

Affirmative with Comment

Barrios, Louis A.

For the next edition of the Standard, the organization of 130.7(C)(7) should be addressed. This is made even more evident by the creation of new subdivisions in order to comply with the NEC Style Manual. The parent text requires hand and arm protection to be provided in accordance with subdivisions (a), (b), (c) and (e), while subdivision (d) related to periodic electrical tests is excluded. Subdivision (c) contains both maintenance and use requirements primarily related to electric shock protection and appears to be out of order coming after arc flash protection. The basic requirements for electric shock protection, arc flash protection and the new section on thermal hand protection should be identified in (a), (b) and (c), respectively, with the maintenance and use, along with the periodic electrical testing being moved to (d) and (e) as a more logical order.

Second Revision No. 84-NFPA 70E-2025 [Section No. 130.7(C)(8)]

(8) Foot Protection.

~~Where insulated footwear is used as protection against step and touch potential, dielectric footwear shall be required. Insulated soles shall not be used as primary electrical protection.~~

(a) Where insulated footwear is used as protection against step and touch potential, dielectric footwear shall be required.

(b) Insulated soles shall not be used as primary electrical protection.

Informational Note: Electrical hazard (EH) footwear can provide a secondary source of electric shock protection under dry conditions.

Supplemental Information

File Name	Description	Approved
70E_SR-84_130.7_C_8_.docx		

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Wed Aug 27 09:19:39 EDT 2025

Committee Statement

Committee Statement: This revision separates multiple requirements within a single subdivision as required by the NEC Style Manual. Subsections are added to express independent requirements.

Response Message: SR-84-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.

Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 85-NFPA 70E-2025 [Section No. 130.7(C)(9)]

(9) Factors in Selection of Protective Clothing.

~~Clothing and equipment that provide worker protection from electric shock and arc flash hazards shall be used. If arc-rated clothing is required, it shall cover associated parts of the body as well as all flammable apparel while allowing movement and visibility.~~

~~Clothing and equipment required for the degree of exposure shall be permitted to be worn alone or integrated with flammable, nonmelting apparel. Garments that are not arc rated shall not be permitted to be used to increase the arc rating of a garment or of a clothing system.~~

~~Informational Note: Protective clothing includes shirts, pants, coveralls, jackets, and parkas worn routinely by workers who, under normal working conditions, are exposed to momentary electric arc and related thermal hazards. Arc-rated rainwear worn in inclement weather is included in this category of clothing.~~

(a) *General.* The following general factors shall apply to the selection of protective clothing:

(1) Clothing and equipment that provide worker protection from electric shock and arc flash hazards shall be used.

(2) If arc-rated clothing is required, it shall cover associated parts of the body as well as all flammable apparel while allowing movement and visibility.

(3) Clothing and equipment required for the degree of exposure shall be permitted to be worn alone or integrated with flammable, nonmelting apparel.

Informational Note: Protective clothing includes shirts, pants, coveralls, jackets, and parkas worn routinely by workers who, under normal working conditions, are exposed to momentary electric arc and related thermal hazards. Arc-rated rainwear worn in inclement weather is included in this category of clothing.

(b) *Layering.*~~Nonmelting, flammable fiber garments shall be permitted to be used as underlayers in conjunction with arc-rated garments in a layered system. If nonmelting, flammable fiber garments are used as underlayers, the system arc rating shall be sufficient to prevent breakopen of the innermost arc-rated layer at the expected arc exposure incident energy level to prevent ignition of flammable underlayers. Garments that are not arc rated shall not be permitted to be used to increase the arc rating of a garment or of a clothing system.~~ The following shall apply to the layering of protective clothing:

(1) Nonmelting, flammable fiber garments shall be permitted to be used as underlayers in conjunction with arc-rated garments in a layered system.

(2) If nonmelting, flammable fiber garments are used as underlayers, the system arc rating shall be sufficient to prevent breakopen of the innermost arc-rated layer at the expected arc exposure incident energy level to prevent ignition of flammable underlayers.

(3) Garments that are not arc rated shall not be permitted to be used to increase the arc rating of a garment or of a clothing system.

Informational Note: A typical layering system might include cotton underwear, a cotton shirt and trouser, and an arc-rated coverall. Specific tasks might call for additional arc-rated layers to achieve the required protection level.

(c) *Outer Layers.*~~Garments worn as outer layers over arc-rated clothing, such as jackets, high-visibility apparel, or rainwear, shall also be made from arc-rated material. The arc rating of outer layers worn over arc-rated clothing as protection from the elements or for other safety purposes, and that are not used as part of a layered system, shall not be required to be equal to or greater than the estimated incident energy exposure.~~ The following shall apply to garments worn as outer layers over arc-rated clothing:

(1) Garments worn as outer layers over arc-rated clothing, such as jackets, high-visibility apparel, or rainwear, shall also be made from arc-rated material.

(2) The arc rating of outer layers worn over arc-rated clothing as protection from the elements or for other safety purposes, and that are not used as part of a layered system, shall not be required to be equal to or greater than the estimated incident energy exposure.

(d) *Underlayers.* Meltable fibers such as acetate, nylon, polyester, polypropylene, and spandex shall not be permitted in fabric underlayers.

Exception: An incidental amount of elastic used on nonmelting fabric underwear or socks shall be permitted.

Informational Note No. 1: Arc-rated garments ~~(e.g.~~ , such as ~~,~~ shirts, trousers, and coveralls~~)~~ , worn as underlayers that neither ignite nor melt and drip in the course of an exposure to electric arc and related thermal hazards generally provide a higher system arc rating than nonmelting, flammable fiber underlayers.

Informational Note No. 2: Arc-rated underwear or undergarments used as underlayers generally provide a higher system arc rating than nonmelting, flammable fiber underwear or undergarments used as underlayers.

(e) *Coverage.* ~~Clothing shall cover potentially exposed areas as completely as possible. Shirt and coverall sleeves shall be fastened at the wrists, shirts shall be tucked into pants, and shirts, coveralls, and jackets shall be closed at the neck.~~ The following shall apply to coverage provided by protective clothing:

(1) Clothing shall cover potentially exposed areas as completely as possible.

(2) Shirt and coverall sleeves shall be fastened at the wrists, shirts shall be tucked into pants, and shirts, coveralls, and jackets shall be closed at the neck.

(f) *Fit.* Tight-fitting clothing shall be avoided. ~~Loose-fitting clothing provides additional thermal insulation because of air spaces. Arc-rated apparel shall fit properly such that it does not interfere with the work task.~~

Informational Note: Loose-fitting clothing provides additional thermal insulation because of air spaces.

(g) *Interference.* ~~The garment~~ Arc-rated apparel shall be selected ~~shall~~ so that the fit results in the least amount of interference with the work tasks but still provides the necessary protection. ~~The work method, location, and task could influence the protective equipment selected.~~

Informational Note: The work method, location, and task could influence the protective equipment selected.

Supplemental Information

File Name	Description	Approved
attachment_for_SR_85_130.7_C_9_.docx	attachment for SR 85 130.7(C)(9)	
70E_SR-85_130.7_C_9_.docx	For prod use	

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Wed Aug 27 09:27:13 EDT 2025

Committee Statement

Committee Statement: Multiple requirements within a single subdivision have been separated into additional subdivisions in order to comply with NEC Style Manual Section 3.5.1.2.

Additionally, editorial revisions have been made for the following reasons:

The last sentence in 130.7(C)(9) has been deleted as this requirement is duplicated in 130.7(C)(9)(a).

The second sentence in 130.7(C)(9)(e) has been moved into an informational note as it does not contain any requirements.

The third sentence in 130.7(C)(9)(e) has been merged with the requirement in the first sentence of 130.7(C)(9)(f).

The last sentence in 130.7(C)(9)(f) has been moved into an informational note as it does not

contain any requirements.

Parenthetical expressions are removed in the informational note.

Response Message: SR-85-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.

Widup, Ron

Wolf, Jason

Second Revision No. 86-NFPA 70E-2025 [Section No. 130.7(C)(10)]

(10) Arc Flash Protective Equipment.

(a) *Arc Flash Suits.* Arc flash suits shall meet the following requirements:

(1) Arc flash suit design shall permit easy and rapid removal by the wearer.

(2) The entire arc flash suit, including the hood's face shield, shall have an arc rating that is suitable for the arc flash exposure.

(3) When exterior air is supplied into the hood, the air hoses and pump housing shall be either covered by arc-rated materials or constructed of nonmelting and nonflammable materials.

(b) *Head Protection.* Head protection shall meet the following requirements:

(1) An arc-rated hood or an arc-rated balaclava with an arc-rated face shield shall be used when the back of the head is within the arc flash boundary.

(2) An arc-rated hood shall be used when the anticipated incident energy exposure exceeds 12 cal/cm^2 (50.2 J/cm^2).

(c) *Face Protection.* Face protection shall meet the following requirements:

(1) Face shields shall have an arc rating suitable for the arc flash exposure.

(2) Face shields with a wrap-around guarding to protect the face, chin, forehead, ears, and neck area shall be used.

(3) Face shields without an arc rating shall not be used.

(4) Eye protection ~~(~~ , in the form of either safety glasses or goggles ~~)~~ , shall always be worn under face shields or hoods.

Informational Note: Face shields made with energy-absorbing formulations that can provide higher levels of protection from the radiant energy of an arc flash are available, but these shields are tinted and can reduce visual acuity and color perception. Additional illumination of the task area might be necessary when these types of arc-protective face shields are used.

(d) *Hand Protection.* Hand protection shall meet the following requirements:

(1) Heavy-duty leather gloves or arc-rated gloves shall be worn where required for arc flash protection.

Informational Note: Heavy-duty leather gloves are made entirely of leather with minimum thickness of 0.03 in. (0.7 mm) and are unlined or lined with nonflammable, nonmelting fabrics. Heavy-duty leather gloves meeting this requirement have been shown to have ATPV values in excess of 10 cal/cm^2 (41.9 J/cm^2).

(2) Where insulating rubber gloves are used for electric shock protection, protectors shall be worn over the rubber gloves.

Informational Note: The protectors worn over rubber insulating gloves provide additional arc flash protection for the hands for arc flash protection exposure.

(e) *Foot Protection.* Foot protection shall meet the following requirements:

(1) Leather footwear or dielectric footwear or both provide some arc flash protection to the feet and shall be used in all exposures greater than 4 cal/cm^2 (16.75 J/cm^2).

(2) Footwear other than leather or dielectric shall be permitted to be used provided it has been tested to demonstrate no ignition, melting, or dripping at the estimated incident energy exposure or the minimum arc rating for the respective arc flash PPE category.

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Wed Aug 27 09:28:33 EDT 2025

Committee Statement

Committee Statement: This revision editorially corrects a violation of the NEC Style Manual Section 3.5.1.1. The parenthetical expression is modified to comply with the NEC Style Manual.

Response Message: SR-86-NFPA 70E-2025

Public Comment No. 57-NFPA 70E-2025 [Section No. 130.7(C)(10)]

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.

Schamel, Duke W.

Steinman, Gregory J.

Tobias, John M.

West, Rodney J.

Widup, Ron

Wolf, Jason

Second Revision No. 87-NFPA 70E-2025 [Section No. 130.7(C)(11)]

(11) Clothing Material Characteristics.

~~Arc-rated clothing shall meet the requirements described in 130.7(C)(12) and 130.7(C)(14) .~~

~~Informational Note No. 1: Arc-rated materials, such as flame-retardant-treated cotton, meta-aramid, para-aramid, and poly-benzimidazole (PBI) fibers, provide thermal protection. These materials can ignite but will not continue to burn after the ignition source is removed. Arc-rated fabrics can reduce burn injuries during an arc flash exposure by providing a thermal barrier between the arc flash and the wearer.~~

~~Informational Note No. 2: Non-arc-rated cotton, polyester-cotton blends, nylon, nylon-cotton blends, silk, rayon, and wool fabrics are flammable. Fabrics, zipper tapes, and findings made of these materials can ignite and continue to burn on the body, resulting in serious burn injuries.~~

~~Informational Note No. 3: Rayon is a cellulose-based (wood pulp) synthetic fiber that is a flammable but nonmelting material.~~

~~Clothing consisting of fabrics, zipper tapes, and findings made from flammable synthetic materials that melt at temperatures below 315°C (600°F), such as acetate, acrylic, nylon, polyester, polyethylene, polypropylene, and spandex, either alone or in blends, shall not be used.~~

~~Informational Note: These materials melt as a result of arc flash exposure conditions, form intimate contact with the skin, and aggravate the burn injury.~~

~~*Exception: Fiber blends that contain materials that melt, such as acetate, acrylic, nylon, polyester, polyethylene, polypropylene, and spandex, shall be permitted if such blends in fabrics are arc rated and do not exhibit evidence of melting and dripping during arc testing.*~~

~~Informational Note: See ASTM F1959/F1959M, *Standard Test Method for Determining the Arc Rating of Materials for Clothing* , and ASTM F1506, *Standard Performance Specification for Flame Resistant and Electric Arc Rated Protective Clothing Worn by Workers Exposed to Flames and Electric Arcs* , for information on test methods used to determine the arc rating of fabrics.~~

(a) Arc-rated clothing shall meet the requirements described in 130.7(C)(12) and 130.7(C)(14).

Informational Note No. 1: Arc-rated materials, such as flame-retardant-treated cotton, meta-aramid, para-aramid, and poly-benzimidazole (PBI) fibers, provide thermal protection. These materials can ignite but will not continue to burn after the ignition source is removed. Arc-rated fabrics can reduce burn injuries during an arc flash exposure by providing a thermal barrier between the arc flash and the wearer.

Informational Note No. 2: Non-arc-rated cotton, polyester-cotton blends, nylon, nylon-cotton blends, silk, rayon, and wool fabrics are flammable. Fabrics, zipper tapes, and findings made of these materials can ignite and continue to burn on the body, resulting in serious burn injuries.

Informational Note No. 3: Rayon is a cellulose-based (wood pulp) synthetic fiber that is a flammable but nonmelting material.

(b) Clothing consisting of fabrics, zipper tapes, and findings made from flammable synthetic materials that melt at temperatures below 315°C (600°F), such as acetate, acrylic, nylon, polyester, polyethylene, polypropylene, and spandex, either alone or in blends, shall not be used.

Informational Note: These materials melt as a result of arc flash exposure conditions, form intimate contact with the skin, and aggravate the burn injury.

Exception: Fiber blends that contain materials that melt, such as acetate, acrylic, nylon, polyester, polyethylene, polypropylene, and spandex, shall be permitted if such blends in fabrics are arc rated and do not exhibit evidence of melting and dripping during arc testing.

Informational Note: See ASTM F1959/F1959M, *Standard Test Method for Determining the Arc Rating of Materials for Clothing*, and ASTM F1506, *Standard Performance Specification for Flame Resistant and Electric Arc Rated Protective Clothing Worn by Workers Exposed to Flames and Electric Arcs*, for information on test methods used to determine the arc rating of fabrics.

Supplemental Information

File Name	Description	Approved
70E_SR-87_130.7_C_11_.docx		

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Wed Aug 27 09:31:06 EDT 2025

Committee Statement

Committee Statement: Multiple requirements within a single subdivision have been separated into additional subdivisions in order to comply with NEC Style Manual Section 3.5.1.2.

Response Message: SR-87-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.

Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 88-NFPA 70E-2025 [Section No. 130.7(C)(13)]

(13) Care and Maintenance of Arc-Rated Clothing and Arc-Rated Arc Flash Suits.

(a) *Inspection.* Arc-rated apparel shall be inspected before each use~~. Work clothing or arc flash suits that are contaminated or damaged to the extent that their protective qualities are impaired shall not be used. Protective items that become contaminated with grease, oil, or flammable liquids or combustible materials shall not be used.~~ as follows:

(1) Work clothing or arc flash suits that are contaminated or damaged to the extent that their protective qualities are impaired shall not be used.

(2) Protective items that become contaminated with grease, oil, or flammable liquids or combustible materials shall not be used.

(b) *Manufacturer's Instructions.* The garment manufacturer's instructions for care and maintenance of arc-rated apparel shall be followed.

(c) *Storage.* Arc-rated apparel shall be stored in a manner that prevents physical damage; damage from moisture, dust, or other deteriorating agents; or contamination from flammable or combustible materials.

(d) *Cleaning, Repairing, and Affixing Items.*~~When arc-rated clothing is cleaned, manufacturer's instructions shall be followed. When arc-rated clothing is repaired, the same arc-rated materials used to manufacture the arc-rated clothing shall be used to provide repairs.~~ The following shall apply to the cleaning, repairing, and the affixing of items to arc-related clothing:

(1) When arc-rated clothing is cleaned, the manufacturer's instructions shall be followed.

(2) When arc-rated clothing is repaired, the same arc-rated materials used to manufacture the arc-rated clothing shall be used to provide repairs.

Informational Note No. 1: The purpose of following manufacturer's instructions is to avoid the loss of protection and to remove contaminants such as hydrocarbons and metallic and disease-causing contaminants that could compromise safety.

Informational Note No. 2: See ASTM F1506, *Standard Performance Specification for Flame Resistant and Electric Arc Rated Protective Clothing Worn by Workers Exposed to Flames and Electric Arcs*, for additional guidance when trim, name tags, logos, or any combination thereof are affixed to arc-rated clothing.

Informational Note No. 3: See ASTM F1449, *Standard Guide for Industrial Laundering of Flame, Thermal, and Arc Resistant Clothing*, and ASTM F2757, *Standard Guide for Home Laundering Care and Maintenance of Flame~~, Thermal, and Arc~~ Resistant Clothing*, for additional guidance.

Supplemental Information

File Name	Description	Approved
attachment_for_SR_88_130.7_C_13_.docx	attachment for SR 88 130.7(C)(13)	
70E_SR-88_130.7_C_13_.docx	For prod use	

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Wed Aug 27 09:32:08 EDT 2025

Committee Statement

Committee Statement: This revision editorially provides compliance with the NEC Style Manual by adding parent text and list item numbering.

Response Message: SR-88-NFPA 70E-2025

Ballot Results

This item has passed ballot

29 Eligible Voters
4 Not Returned
24 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Affirmative with Comment

Barrios, Louis A.

The parent text in 130.7(C)(13)(a) should be modified as follows: "(a) Inspection. Arc-rated apparel shall be inspected before each use with corrective actions taken as follows:". What follows in list items (1) and (2) are corrective actions to be taken and not directly related to how the inspection is conducted.

Second Revision No. 89-NFPA 70E-2025 [Section No. 130.7(C)(14)]

(14) Standards for PPE.

(a) *General.* PPE shall conform to applicable state, federal, or local codes and standards.

Informational Note No. 1: See Table Informational Note 130.7(C)(14)for a list of examples of standards that contain information on the care, inspection, testing, and manufacturing of PPE.

Informational Note No. 2: See 130.7(C)(11) and 130.7(C)(12) for requirements on non-arc-rated or flammable fabrics not covered by any of the standards in Table Informational Note 130.7(C)(14).

(b) *Conformity Assessment.* ~~All arc-rated PPE shall be listed.~~ All suppliers or manufacturers of PPE shall demonstrate conformity with an applicable product standard by using one of the following methods:

(1) Self-declaration under a registered quality management system and product testing by an accredited laboratory and a Supplier's Declaration of Conformity

(2) Certification by an accredited independent third-party certification organization

Exception: PPE that has been marked with a supplier or manufacturer's self-declared level of conformity prior to the effective date of this edition of the standard shall be permitted.

Informational Note No. 1: See H.4 and ANSI/ISEA 125, *American National Standard for Conformity Assessment of Safety and Personal Protective Equipment*, for examples of a process for conformity assessment to an ~~appropriate~~ applicable product standard.

Informational Note No. 2: See ISO 17065, *Conformity assessment — Requirements for bodies certifying products, processes, and services*, for an example of a process to accredit independent third-party certification organizations.

(c) *Marking.* All suppliers or manufacturers of PPE shall provide the following information on the PPE, on the smallest unit container, or contained within the manufacturer's instructions:

(1) Name of manufacturer

(2) Conformity assessment method used

(3) Product performance standards to which the product conforms

(4) Arc rating ~~where appropriate for~~ if the equipment is arc rated

(5) One or more identifiers such as model, serial number, lot number, or traceability code

(6) Care instructions

Table Informational Note 130.7(C)(14) Standards for PPE

Subject	Document Title	Document Number
Clothing — Arc Rated	Standard Performance Specification for Flame Resistant and Electric Arc Rated Protective Clothing Worn by Workers Exposed to Flames and Electric Arcs	ASTM F1506
	Standard Guide for Industrial Laundering of Flame, Thermal, and Arc Resistant Clothing	ASTM F1449
	Standard Guide for Home Laundering Care and Maintenance of Flame~~, Thermal, and Arc~~ Resistant Clothing	ASTM F2757
	Live working — Protective clothing against the thermal hazards of an electric arc — Part 1-1: Test methods — Method 1: Determination of the arc rating (ELIM, ATPV, and/or EBT) of clothing materials and of protective clothing using an open arc	IEC 61482–1–1
	Live working — Protective clothing against the thermal hazards of an electric arc — Part 2: Requirements	IEC 61482–2
Aprons — Insulating	Standard Specification for Electrically Insulating Aprons	ASTM F2677
Eye and Face Protection — General	American National Standard for Occupational and Educational Professional Eye and Face Protection	ANSI/ISEA Z87.1
Face — Arc Rated	Standard Test Method for Determining the Arc Rating and Standard Specification for Personal Eye or Face Protective Products	ASTM F2178 /F2178M
Fall Protection	Standard Specification for Personal Climbing Equipment	ASTM F887
Footwear — Dielectric	Standard Specification for Dielectric Footwear	ASTM F1117

Subject	Document Title	Document Number
Specification		
Footwear — Dielectric Test Method	Standard Test Method for Determining Dielectric Strength of Dielectric Footwear	ASTM F1116
Footwear — Standard Performance Specification	Standard Specification for Performance Requirements for Protective (Safety) Toe Cap Footwear	ASTM F2413
Footwear — Standard Test Method	Standard Test Methods for Foot Protections	ASTM F2412
Gloves — Arc Rated	Standard Test Method for Determining Arc Ratings of Hand Protective Products Developed and Used for Electrical Arc Flash Protection	ASTM F2675/F2675M
Gloves — Leather Protectors	Standard Specification for Leather Protectors for Rubber Insulating Gloves and Mittens	ASTM F696
Gloves — Non-Leather Protectors	Standard Specification for Protectors for Rubber Insulating Gloves Meeting Specific Performance Requirements	ASTM F3258
Gloves — Rubber Insulating	Standard Specification for Rubber Insulating Gloves	ASTM D120
Gloves and Sleeves — In-Service Care	Standard Specification for In-Service Care of Insulating Gloves and Sleeves	ASTM F496
Head Protection — Hard Hats	American National Standard for Head Protection	ANSI/ISEA Z89.1
Rainwear — Arc Rated	Standard Specification for Arc and Flame Resistant Rainwear	ASTM F1891
Rubber Protective Products — Visual Inspection	Standard Guide for Visual Inspection of Electrical Protective Rubber Products	ASTM F1236
Sleeves — Insulating	Standard Specification for Rubber Insulating Sleeves	ASTM D1051

Supplemental Information

File Name	Description	Approved
attachment_for_SR_89_130.7_C_14_.docx	attachment for SR 89 130.7(C)(14)	
70E_SR_89_130.7_C_14.docx	For prod use	

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Wed Aug 27 09:33:58 EDT 2025

Committee Statement

Committee Statement: This revision reverses the First Revision action to require arc rated PPE to be listed. The requirements of the 2024 edition of NFPA 70E were restored with the exception of “self-declaration with a suppliers declaration of conformity” which was a driving factor of the revision to require arc rated PPE to be listed. Editorial modifications were made in accordance with the NEC Style Manual.

An exception has been added to allow the continued use of PPE that was acceptable prior to this revision.

Response Message: SR-89-NFPA 70E-2025

Public Comment No. 95-NFPA 70E-2025 [Section No. 130.7(C)(14)]

Public Comment No. 94-NFPA 70E-2025 [Section No. 130.7(C)(14)]
Public Comment No. 206-NFPA 70E-2025 [Section No. 130.7(C)(14)]
Public Comment No. 114-NFPA 70E-2025 [Section No. 130.7(C)(14)]
Public Comment No. 222-NFPA 70E-2025 [Section No. 130.7(C)(14)]
Public Comment No. 107-NFPA 70E-2025 [Section No. 130.7(C)(14)]
Public Comment No. 184-NFPA 70E-2025 [Section No. 130.7(C)(14)]
Public Comment No. 120-NFPA 70E-2025 [Section No. 130.7(C)(14)]

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
23 Affirmative All
0 Affirmative with Comments
2 Negative with Comments
0 Abstention

Not Returned
Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All
Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.

Widup, Ron

Wolf, Jason

Negative with Comment

Harris, William R.

The requirement is too broad in scope. 70E requirements for PPE should be limited to electrical PPE. As stated, the change will apply to all PPE including Safety Glasses, Work Boots, Hearing Protection, etc.

Mohla, Daleep C.

ANSI/ISEA 125, the American National Standard for Conformity Assessment of Safety and Personal Protective Equipment is a globally accepted standard. This standard provides a process for conformity assessment system to an appropriate product standard for suppliers, specifiers, users, and regulators. It provides three levels of conformance. Level 1 (self-declaration by the manufacturer of conformance, Level 2 (additional documented conformance of quality management by the manufacturers) and Level 3 (certification by an accredited listing agency). As proposed, this requirement deletes Level 1 Conformity Assessment method. The new requirement mandates that conformance of all PPE, not just all arc flash protective equipment, but all personal protective equipment such as footwear, hearing protection, leather gloves, and safety glasses or goggles — be based on level 2 or level 3. However, there is no evidence or documentation that the current, previously permitted method (level 1) is inadequate or unsafe—only that an issue could occur. Employers who wish to obtain Level 2 (quality management certification) or Level 3 (certification through an accredited third-party organization), already have that option under the 2024 edition. There are many reputable PPE suppliers that consistently provide high-quality, nationally recognized product standards compliant equipment consistent with Level 1 requirements. Eliminating the self-declaration option, and imposing this additional requirement, would increase costs across the board without offering any measurable improvement in safety. For many employers, who already face financial challenges in providing PPE for the workers, this added expenses could become a significant hardship and make it more difficult for them to provide PPE for their employees. The wording needs to be reverted to the 2024 requirement.

Second Revision No. 90-NFPA 70E-2025 [Section No. 130.7(C)(15)]

(15) Arc Flash PPE Category Method.

The requirements of 130.7(C)(15) shall apply when the arc flash PPE category method is used for the selection of arc flash PPE.

Informational Note: For both ac and dc systems, the arc flash PPE category of the protective clothing and equipment is generally based on determination of the estimated exposure level.

(a) *Alternating-Current (ac) Equipment.* Alternating-current (ac) equipment shall meet the following requirements:

(1) When the arc flash risk assessment performed in accordance with 130.5 indicates that arc flash PPE is required and the arc flash PPE category method is used for the selection of PPE for ac systems in lieu of the incident energy analysis of 130.5(G), Table 130.7(C)(15)(a) shall be used to determine the arc flash PPE category.

Informational Note: The estimated ~~maximum~~ available fault current, maximum fault-clearing times, and minimum working distances for various ac equipment types or classifications are listed in Table 130.7(C)(15)(a).

(2) An incident energy analysis shall be required in accordance with 130.5(G) for the following:

a. Power systems with greater than the estimated ~~maximum~~ available fault current

b. Power systems with longer than the maximum fault clearing times

c. Less than the minimum working distance

(b) *Direct-Current (dc) Equipment.* Direct-current (dc) equipment shall meet the following requirements:

(1) When the arc flash risk assessment performed in accordance with 130.5(G) indicates that arc flash PPE is required and the arc flash PPE category method is used for the selection of PPE for dc systems in lieu of the incident energy analysis of 130.5(G), Table 130.7(C)(15)(b) shall be used to determine the arc flash PPE category.

Informational Note: The estimated ~~maximum~~ available fault current, maximum arc duration, and working distances for dc equipment are listed in 130.7(C)(15)(b).~~The estimated maximum available fault current, maximum arc duration, and working distances for dc equipment are listed in 130.7(C)(15)(b) .~~

(2) An incident energy analysis shall be required in accordance with 130.5(G) for the following:

a. Power systems with greater than the estimated ~~maximum~~ available fault current

b. Power systems with longer than the maximum arc duration

c. Less than the minimum working distance

(c) *Protective Clothing and Personal Protective Equipment (PPE).* Protective clothing and PPE shall meet the following requirements:

(1) Once the arc flash PPE category has been identified from Table 130.7(C)(15)(a) or Table 130.7(C)(15)(b), Table 130.7(C)(15)(c) shall be used to determine the required PPE.

Note: Table 130.7(C)(15)(c) lists the requirements for PPE based on arc flash PPE categories 1 through 4.

(2) This clothing and equipment shall be used when working within the arc flash boundary.

(3) The use of PPE other than or in addition to that listed shall be permitted provided it meets 130.7(C)(7).

Informational Note No. 1: See Informative Annex H for a suggested simplified approach to ensure adequate PPE for electrical workers within facilities with large and diverse electrical systems.

Informational Note No. 2: The PPE requirements of this section are intended to protect a person from arc flash hazards. While some situations could result in burns to the skin even with the protection described in Table 130.7(C)(15)(c), burn injury should be reduced and survivable. Due to the explosive effect of some arc events, physical trauma injuries could occur. The PPE requirements of this section do not address protection against physical trauma other than exposure to the thermal effects of an arc flash.

Informational Note No. 3: The arc rating for a particular clothing system can be obtained from the arc-rated clothing manufacturer.

Table 130.7(C)(15)(a) Arc Flash PPE Categories for ac Systems

Equipment	Arc Flash PPE Category	Arc Flash Boundary
Panelboards or other equipment rated 240 volts and below Parameters: Available fault current not exceeding 25 kA; fault clearing time not exceeding 0.03 sec (2 cycles); minimum working distance 455 mm (18 in.)	1	485 mm (19 in.)
Panelboards or other equipment rated greater than 240 volts and up to 600 volts Parameters: Available fault current not exceeding 25 kA; fault clearing time not exceeding 0.03 sec (2 cycles); minimum working distance 455 mm (18 in.)	2	900 mm (3 ft)
600-volt class motor control centers (MCCs) Parameters: Available fault current not exceeding 65 kA; fault clearing time not exceeding 0.03 sec (2 cycles); minimum working distance 455 mm (18 in.)	2	1.5 m (5 ft)
600-volt class motor control centers (MCCs) Parameters: Available fault current not exceeding of 42 kA fault clearing time not exceeding 0.33 sec (20 cycles); minimum working distance 455 mm (18 in.)	4	4.3 m (14 ft)
600-volt class switchgear (with power circuit breakers or fused switches) and 600-volt class switchboards Parameters: Available fault current not exceeding 35 kA; fault clearing time not exceeding 0.5 sec (30 cycles); minimum working distance 455 mm (18 in.)	4	6 m (20 ft)
Other 600-volt class (277 volts through 600 volts, nominal) equipment Parameters: Available fault current not exceeding 65 kA; fault clearing time not exceeding 0.03 sec (2 cycles); minimum working distance 455 mm (18 in.)	2	1.5 m (5 ft)
NEMA E2 (fused contactor) motor starters, 2.3 kV through 7.2 kV Parameters: Available fault current not exceeding 35 kA; fault clearing time not exceeding 0.24 sec (15 cycles); minimum working distance 910 mm (36 in.)	4	12 m (40 ft)
Metal-clad switchgear, 1 kV through 15 kV Parameters: Available fault current not exceeding 35 kA; fault clearing time not exceeding 0.24 sec (15 cycles); minimum working distance 910 mm (36 in.)	4	12 m (40 ft)
Metal enclosed interrupter switchgear, fused or unfused type construction, 1 kV through 15 kV Parameters: Available fault current not exceeding 35 kA; fault clearing time not exceeding 0.24 sec (15 cycles); minimum working distance 910 mm (36 in.)	4	12 m (40 ft)
Other equipment 1 kV through 15 kV Parameters: Available fault current not exceeding 35 kA; fault clearing time not exceeding 0.24 sec (15 cycles); minimum working distance 910 mm (36 in.)	4	12 m (40 ft)
Arc-resistant equipment up to 600-volt class Parameters: DOORS CLOSED and SECURED; with an available fault current and a fault clearing time that does not exceed the arc-resistant rating of the equipment*	N/A	N/A
Arc-resistant equipment 1 kV through 15 kV Parameters: DOORS CLOSED and SECURED; with an available fault current and a fault clearing time that does not exceed the arc-resistant rating of the equipment*	N/A	N/A

N/A: Not applicable

Note:

For equipment rated 600 volts and below and protected by upstream current-limiting fuses or current-limiting molded case circuit breakers sized at 200 amperes or less, the arc flash PPE category ~~can~~ shall be permitted to be reduced by one number but not below arc flash PPE category 1.

*For DOORS OPEN refer to the corresponding non-arc-resistant equipment section of this table.

Informational Note No. 1 to Table 130.7(C)(15)(a): The following are typical fault clearing times of overcurrent protective devices:

(1) 0.5 cycle fault clearing time is typical for current-limiting fuses and current-limiting molded case circuit breakers when the fault current is within the current limiting range.

(2) 1.5 cycle fault clearing time is typical for molded case circuit breakers rated less than 1000 volts with an instantaneous integral trip when the fault current is within the instantaneous trip region.

(3) 3.0 cycle fault clearing time is typical for insulated case circuit breakers rated less than 1000 volts with an instantaneous integral trip or relay operated trip when the fault current is within the instantaneous trip region.

(4) 5.0 cycle fault clearing time is typical for relay operated circuit breakers rated 1 kV to 35 kV when the relay operates in the instantaneous range ~~(i.e., "no intentional delay")~~ when the fault current is within the instantaneous trip region.

(5) 20 cycle fault clearing time is typical for low-voltage power and insulated case circuit breakers with a short time fault clearing delay for motor inrush when the fault current is within the instantaneous trip region.

(6) 30 cycle fault clearing time is typical for low-voltage power and insulated case circuit breakers with a short time fault clearing delay without instantaneous trip when the fault current is within the instantaneous trip region.

Informational Note No. 2 to Table 130.7(C)(15)(a): See Table 1 of IEEE 1584-2002, *Guide for Performing Arc Flash Hazard Calculations*, for further information regarding list items (2) through (4) in Informational Note No. 1.

Informational Note No. 3 to Table 130.7(C)(15)(a): See IEEE C37.20.7, ~~*Guide*~~ *Recommended Practice for Testing Switchgear Rated Up to 52 kV for Internal Arcing Faults*, for an example of a standard that provides information for arc-resistant equipment referred to in Table 130.7(C)(15)(a).

Informational Note No. 4 to Table 130.7(C)(15)(a): See O.2.4(9) for information on arc-resistant equipment.

Table 130.7(C)(15)(b) Arc Flash PPE Categories for dc Systems

Equipment	Arc Flash PPE Category	Arc Flash Boundary
Storage batteries, dc switchboards, and other dc supply sources~~(~~ , excluding capacitors covered in Article 360~~)~~ Parameters: Greater than 150 volts and less than or equal to 600 volts Maximum arc duration and minimum working distance: 2 sec @ 455 mm (18 in.)		
Available fault current less than 1.5 kA	2	900 mm (3 ft)
Available fault current greater than or equal to 1.5 kA and less than 3 kA	2	1.2 m (4 ft)
Available fault current greater than or equal to 3 kA and less than 7 kA	3	1.8 m (6 ft)
Available fault current greater than or equal to 7 kA and less than 10 kA	4	2.5 m (8 ft)

Notes:

(1) ~~Apparel that can be expected to~~ If there is a likelihood that apparel will be exposed to an electrolyte ~~must meet~~ , both of the following conditions shall apply to apparel :

(a) Be evaluated for electrolyte protection

Informational Note: See ASTM F1296, *Standard Guide for Evaluating Chemical Protective Clothing*, for information on evaluating apparel for protection from electrolyte.

(b) Be arc rated

Informational Note No. 1: See ASTM F1891, *Standard Specification for Arc and Flame Resistant Rainwear*, for information on evaluating arc-rated apparel.

Informational Note No. 2: A two-second arc duration is assumed if there is no overcurrent protective device (OCPD) or if the fault clearing time is not known. If the fault clearing time is known and is less than 2 seconds, an incident energy analysis could provide a more representative result.

Informational Note No. 3: See D.5 for the basis for table values and alternative methods to determine dc incident energy. Methods should be used with good engineering judgment. When determining available fault current, the effects of cables and any other impedances in the circuit should be included. Direct-current (dc) circuit modeling is the best method to determine the available short-circuit current at the point of the arc. Battery cell short-circuit current can be obtained from the battery manufacturer.

Informational Note No. 4: The methods for estimating the dc arc flash incident energy that were used to determine the categories for this table are based on open-air incident energy calculations. Open-air calculations were used because many battery systems and other dc process systems are in open areas or rooms. If the specific task is within an enclosure, the incident energy can be higher and additional PPE protection beyond the value shown in this table should be considered.

Informational Note No. 5: See the following references for dc voltages below 150 volts nominal:

(1) J. G. Hildreth and K. Feeney, “Arc Flash Hazards of 125 Vdc Station Battery Systems,” 2018 IEEE Power & Energy Society General Meeting (PESGM), 2018, pp. 1–5, doi: 10.1109/PESGM.2018.8586181.

(2) US Department of Energy Bonneville Power Administration Engineering and Technical Services Report BPA F 5450.05, “DC Arc Flash: 125V, 1300 amp-hour battery,” May 11, 2017.

(3) K. Gray, S. Robert, and T. L. Gauthier, "Low Voltage 100–500 Vdc Arc Flash Testing," 2020 IEEE IAS Electrical Safety Workshop (ESW), 2020, pp. 1–7, doi: 10.1109/ESW42757.2020.9188336.

Table 130.7(C)(15)(c) Personal Protective Equipment (PPE)

Arc Flash PPE Category	PPE
1	**Arc-Rated Clothing, Minimum Arc Rating of 4 cal/cm^2 (16.75 J/cm^2)[a]**
	Arc-rated long-sleeve shirt and pants or arc-rated coverall
	Arc-rated face shield[b] or arc-rated arc flash suit hood
	Arc-rated jacket, parka, high-visibility apparel, rainwear, or hard hat liner (AN)[c]
	Protective Equipment
	Hard hat
	Safety glasses or safety goggles (SR)
	Hearing protection in the form of ~~(~~ ear canal inserts~~)~~ [d]
	Heavy-duty leather gloves, arc-rated gloves, or rubber insulating gloves with protectors (SR)[e]
	Leather footwear[f] (AN)
2	**Arc-Rated Clothing, Minimum Arc Rating of 8 cal/cm^2 (33.5 J/cm^2)[a]**
	Arc-rated long-sleeve shirt and pants or arc-rated coverall
	Arc-rated arc flash suit hood or arc-rated face shield[b] and arc-rated balaclava
	Arc-rated jacket, parka, high-visibility apparel, rainwear, or hard hat liner (AN)[c]
	Protective Equipment
	Hard hat
	Safety glasses or safety goggles (SR)
	Hearing protection in the form of ~~(~~ ear canal inserts~~)~~ [d]
	Heavy-duty leather gloves, arc-rated gloves, or rubber insulating gloves with protectors (SR)[e]
	Leather footwear[f]
3	**Arc-Rated Clothing Selected so That the System Arc Rating Meets the Required Minimum Arc Rating of 25 cal/cm^2 (104.7 J/cm^2)[a]**
	Arc-rated long-sleeve shirt (AR)

Arc Flash PPE Category	PPE
	Arc-rated pants (AR)
	Arc-rated coverall (AR)
	Arc-rated arc flash suit jacket (AR)
	Arc-rated arc flash suit pants (AR)
	Arc-rated arc flash suit hood
	Arc-rated gloves or rubber insulating gloves with protectors (SR)[e]
	Arc-rated jacket, parka, high-visibility apparel, rainwear, or hard hat liner (AN)[c]
	Protective Equipment
	Hard hat
	Safety glasses or safety goggles (SR)
	Hearing protection in the form of ~~(~~ ear canal inserts~~)~~ [d]
	Leather footwear[f]
4	**Arc-Rated Clothing Selected so That the System Arc Rating Meets the Required Minimum Arc Rating of 40 cal/cm^2 (167.5 J/cm^2)[a]**
	Arc-rated long-sleeve shirt (AR)
	Arc-rated pants (AR)
	Arc-rated coverall (AR)
	Arc-rated arc flash suit jacket (AR)
	Arc-rated arc flash suit pants (AR)
	Arc-rated arc flash suit hood
	Arc-rated gloves or rubber insulating gloves with protectors (SR)[e]
	Arc-rated jacket, parka, high-visibility apparel, rainwear, or hard hat liner (AN)[c]
	Protective Equipment
	Hard hat
	Safety glasses or safety goggles (SR)
	Hearing protection in the form of ~~(~~ ear canal inserts~~)~~ [d]
	Leather footwear[f]

AN: As needed (optional). AR: As required. SR: Selection required.

[a] ~~*Arc rating* is defined in Article 100.~~ Arc ratings shall be permitted to be for a single layer, such as an arc-rated shirt and pants or a coverall, or for an arc flash suit or a multilayer system if tested as a combination consisting of an arc-rated shirt and pants, coverall, and arc flash suit.

[b] Face shields are to have wrap-around guarding to protect not only the face but also the forehead, ears, and neck, or, alternatively, an arc-rated arc flash suit hood is required to be worn.

[c] The arc rating of outer layers worn over arc-rated clothing as protection from the elements or for other safety purposes, and that are not used as part of a layered system, shall not be required to be equal to or greater than the estimated incident energy exposure.

[d] Other types of hearing protection are permitted to be used in lieu of or in addition to ear canal inserts provided they are worn under an arc-rated arc flash suit hood.

[e] Rubber insulating gloves with protectors provide arc flash protection in addition to electric shock protection. Higher class rubber insulating gloves with protectors, due to their increased material thickness, provide increased arc flash protection.

[f] Footwear other than leather or dielectric shall be permitted to be used provided it has been tested to demonstrate no ignition, melting or dripping at the minimum arc rating for the respective arc flash PPE category.

Supplemental Information

File Name	Description	Approved
attachment_for_SR_90_130.7_C_15_.docx	attachment for SR 90 130.7(C)(15)	

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Wed Aug 27 09:37:50 EDT 2025

Committee Statement

Committee Statement: The word "maximum" is deleted in front of "available fault current" in 130.7(C)(15)(a)(1) Informational Note, 130.7(C)(15)(a)(2)(a), 130.7(C)(15)(b)(1) Informational Note, and 130.7(C)(15)(b)(2)(a) to correlate with definition of "available fault current" in Article 100. The word “maximum” is unnecessary as “available fault current” is the "largest amount of current capable of being delivered…”.

Table 130.7(C)(15)(b) - The parenthesis were removed from "excluding capacitors covered in Article 360" as the expression is intended to be an exception to the equipment listed in this row of this table.

Table 130.7(C)(15)(b) – The parenthesis were removed from “excluding capacitors covered in Article 360” and it has been editorially revised to “other than capacitors covered in Article 360” as the expression is intended to be an exception to the equipment listed in this row of the table.

Table 130.7(C)(15)(b) – Table Note (1) is editorially revised to avoid the use of the vague and unenforceable term “can” and to express the requirement as “shall” rather than “must.”

Table 130.7(C)(15)(b) - Table Note (2) is revised to be Table 130.7(C)(15)(b) Informational Note No. 2 as it does not contain any requirements. The remaining Informational Notes have been renumbered accordingly

In accordance with the NEC Style Manual Section 3.5.1.1, parenthetical expressions are removed. This revision modifies “Hearing protection (ear canal inserts)d” to “Hearing protection, ear canal insertsd” in four locations in Table 130.7(C)(15)(c).

Response Message: SR-90-NFPA 70E-2025

Public Comment No. 37-NFPA 70E-2025 [Section No. 130.7(C)(15)]

Public Comment No. 233-NFPA 70E-2025 [Section No. 130.7(C)(15)]

Public Comment No. 58-NFPA 70E-2025 [Section No. 130.7(C)(15)]

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
24 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul

Dyson, Thomas B.

Katekar, Chaitanya

Stallcup, James G.

Affirmative All

Barnhart, Paul D.

Crow, Daryld Ray

Dollard, Jr., James T.

Gallo, Ernest J.

Gray, Bobby J.

Guier, Jarod

Hacke, Donald Charles

Harris, William R.

Hickman, Palmer L.

Hilbert, Mark R.

Lubaczewski, Scott

McKinch, Terrance L.

McNellis, Mark

Miller, Charles R.

Mohla, Daleep C.

Niemira, James K.

Norwood, Thomas D.

Pace, David A.

Schamel, Duke W.

Steinman, Gregory J.

Tobias, John M.

West, Rodney J.

Widup, Ron

Wolf, Jason

Affirmative with Comment

Barrios, Louis A.

The 3rd committee statement should be modified as follows "Table 130.7(C)(15)(b) - The parenthesis were removed from "excluding capacitors covered in Article 360" as the expression is intended to be an exception to the equipment listed in this row of this table." The technical committee decided not to editorially revise the statement as noted in the committee statement during the Second Draft Meeting. The 5th committee statement should be modified as follows: "Table 130.7(C)(15)(b) - Table Note (2) is revised to be Table 130.7(C)(15)(b) Informational Note No. 2 as it does not contain any requirements. The remaining Informational Notes have been renumbered accordingly". Table Note 2 became Info Note 2, not Info Note 1 as stated in the Committee Statement.

Second Revision No. 91-NFPA 70E-2025 [Section No. 130.7(D)(1)]

(1) Insulated Tools and Equipment.

Tools and handling equipment used within the restricted approach boundary, or where they present an electrical contact hazard, shall be insulated.

Informational Note: See 130.4(E), Electric Shock Protection Boundaries.

(a) *Requirements for Insulated Tools.* The following requirements shall apply to insulated tools:

(1) Insulated tools shall be rated for the voltages on which they are used.

(2) Insulated tools shall be designed and constructed for the environment to which they are exposed and the manner in which they are used.

(3) Insulated tools shall be protected from damage to the insulating material.

(4) Insulated tools and equipment shall be inspected prior to each use.

(5) Inspection shall look for damage to the insulation or damage that can limit the tool from performing its intended function or could increase the potential for an incident ~~(e.g., damaged tip on a screwdriver)~~ .

(b) *Fuse or Fuseholder Handling Equipment.* Fuse or fuseholder handling equipment, insulated for the circuit voltage, shall be used to remove or install a fuse if the fuse terminals are energized.

(c) *Ropes and Handlines.* Ropes and handlines used within the limited approach boundary shall be nonconductive.

(d) *Fiberglass-Reinforced Plastic Rods.* Fiberglass-reinforced plastic rod and tube used for live line tools shall meet the requirements of applicable state, federal, or local codes and standards.

Informational Note: See ASTM F711, *Standard Specification for Fiberglass-Reinforced Plastic (FRP) Rod and Tube Used in Live Line Tools*, for further information concerning visual inspection and testing of fiberglass-reinforced plastic rods and tubes.

(e) *Portable Ladders.* Portable ladders shall ~~have nonconductive side rails when used within the limited approach boundary or where the employee or ladder could contact exposed energized electrical conductors or circuit parts. Nonconductive ladders shall meet the requirements of applicable state, federal, or local codes and standards.~~ comply with the following:

(1) Ladders shall have nonconductive side rails when used within the limited approach boundary or where the employee or ladder could contact exposed energized electrical conductors or circuit parts.

(2) Nonconductive ladders shall meet the requirements of applicable state, federal, or local codes and standards.

Informational Note: See Table Informational Note 130.7(E) for a list of standards that contain information on portable ladders.

Supplemental Information

File Name	Description	Approved
attachment_for_SR_91_130.7_D_1_.docx	attachment for SR 91 130.7(D(1)	
70E_SR_91_130.7_D_1.docx	For prod use	

Submitter Information Verification

Committee: EEW-AAA

Submittal Date: Wed Aug 27 09:40:57 EDT 2025

Committee Statement

Committee Statement: The parenthetical expression is deleted to comply with the NEC Style Manual. Parent text and list item numbering are added in 130.7(D)(1)(e) for clarity and compliance with the NEC Style Manual. The reference to a damaged tool is deleted as there are many possible ways a tool could be damaged.

Response Message: SR-91-NFPA 70E-2025

Public Comment No. 59-NFPA 70E-2025 [Section No. 130.7(D)(1)]

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.

West, Rodney J.

Widup, Ron

Wolf, Jason

Second Revision No. 92-NFPA 70E-2025 [Section No. 130.7(D)(2)]

(2) Barriers.

The following requirements shall apply to barriers:

(1) Exposed energized electrical conductors or circuit parts operating at 50 volts or more shall be guarded by a barrier in accordance with 130.7(D)(2)(a) through 130.7(D)(2)(c) to prevent unintentional contact while an employee is working within the restricted approach boundary of those conductors or circuit parts.

(2) Barriers shall be supported to remain in place and shall prevent unintentional contact by a person, tool, or equipment.

(a) *Rubber Insulating Equipment.* Rubber insulating equipment used for protection from unintentional contact with energized conductors or circuit parts shall be rated for the voltage and shall meet the requirements of applicable state, federal, or local codes and standards.

Informational Note: See Table Informational Note 130.7(E) for a list of examples of standards that contain information on rubber insulating equipment.

(b) *Voltage-Rated Plastic Guard Equipment.* Plastic guard equipment for protection of employees from unintentional contact with energized conductors or circuit parts, or for protection of employees or energized equipment or material from contact with ground, shall be rated for the voltage and shall meet the requirements of applicable state, federal, or local codes and standards.

Informational Note: See Table Informational Note 130.7(E) for a list of examples of standards that contain information on voltage-rated plastic guard equipment.

(c) *Field-Fabricated Physical or Mechanical Barriers.* ~~Physical~~ The following shall apply to field-fabricated physical or mechanical ~~(field-fabricated)~~ barriers ~~shall be installed no closer than the restricted approach boundary distance given in Table 130.4(E)(a) and Table 130.4(E)(b). While the barrier is being installed, the restricted approach boundary distance specified in Table 130.4(E)(a) and Table 130.4(E)(b) shall be maintained, or the energized conductors or circuit parts shall be placed in an electrically safe work condition.~~ :

(1) The barriers shall be installed no closer than the restricted approach boundary distance given in Table 130.4(E)(a) and Table 130.4(E)(b).

(2) While the barrier is being installed, the restricted approach boundary distance specified in Table 130.4(E)(a) and Table 130.4(E)(b) shall be maintained, or the energized conductors or circuit parts shall be placed in an electrically safe work condition.

Supplemental Information

File Name	Description	Approved
70E_SR-92_130.7_D_2_.docx		

Submitter Information Verification

Committee: EEW-AAA

Submittal Date: Wed Aug 27 09:42:57 EDT 2025

Committee Statement

Committee Statement: The parenthetical statement “field fabricated” in 130.7(D)(2)(c) has been moved to precede the phrase “physical or mechanical barriers” in the title as this requirement is specific to those types of barriers. This also correlates with and distinguishes this type of barrier from the barriers identified as “rubber insulating equipment” and “voltage-rated plastic guard equipment” in 130.7(D)(2)(a) and 130.7(D)(2)(b) respectively.

This revision editorially provides compliance with the NEC Style Manual by adding parent text and list item numbering.

Response Message: SR-92-NFPA 70E-2025

Public Comment No. 60-NFPA 70E-2025 [Section No. 130.7(D)(2)]

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.

West, Rodney J.

Widup, Ron

Wolf, Jason

Second Revision No. 56-NFPA 70E-2025 [Section No. 130.8(D)]

(D) Conductive Articles Being Worn.

Conductive articles of jewelry and clothing ~~(~~such as watchbands, bracelets, rings, key chains, necklaces, metalized aprons, cloth with conductive thread, metal headgear, or metal frame glasses~~)~~ , shall not be worn within the restricted approach boundary or where they present an electrical contact hazard with exposed energized electrical conductors or circuit parts.

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Tue Aug 26 14:59:34 EDT 2025

Committee Statement

Committee Statement: The parenthetical marks were deleted to comply with the NEC Style Manual Section 3.5.1.1 to avoid using parenthetical notes.
Response Message: SR-56-NFPA 70E-2025

Ballot Results

This item has passed ballot

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.

Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 57-NFPA 70E-2025 [Section No. 130.8(E)(1)]

(1) General.

~~Conductive materials, tools, and equipment that are in contact with any part of an employee's body shall be handled in a manner that prevents unintentional contact with energized electrical conductors or circuit parts. Such materials and equipment shall include, but are not limited to, long conductive objects, such as ducts, pipes and tubes, conductive hose and rope, metal-lined rules and scales, steel tapes, pulling lines, metal scaffold parts, structural members, bull floats, and chains.~~

(a) Conductive materials, tools, and equipment that are in contact with any part of an employee's body shall be handled in a manner that prevents unintentional contact with energized electrical conductors or circuit parts.

(b) Such materials and equipment shall include, but are not limited to, long conductive objects, such as ducts, pipes and tubes, conductive hose and rope, metal-lined rules and scales, steel tapes, pulling lines, metal scaffold parts, structural members, bull floats, and chains.

Supplemental Information

File Name	Description	Approved
70E_SR-57_130.8_E_1_.docx		

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Tue Aug 26 15:00:31 EDT 2025

Committee Statement

Committee Statement: This section was revised into a and b to create subdivisions to comply with the NEC Style Manual Section 3.5.1.2.
Response Message: SR-57-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.

Barrios, Louis A.

Crow, Daryld Ray

Dollard, Jr., James T.

Gallo, Ernest J.

Gray, Bobby J.

Guier, Jarod

Hacke, Donald Charles

Harris, William R.

Hickman, Palmer L.

Hilbert, Mark R.

Lubaczewski, Scott

McKinch, Terrance L.

McNellis, Mark

Miller, Charles R.

Mohla, Daleep C.

Niemira, James K.

Norwood, Thomas D.

Pace, David A.

Schamel, Duke W.

Steinman, Gregory J.

Tobias, John M.

West, Rodney J.

Widup, Ron

Wolf, Jason

Second Revision No. 58-NFPA 70E-2025 [Section No. 130.8(H)]

(H) Clear Spaces.

~~Working space required by other codes and standards shall not be used for storage. This space shall be kept clear to permit safe operation and maintenance of electrical equipment.~~

(1) Storage.

Working space required by other codes and standards shall not be used for storage.

(2) Operation and Maintenance.

~~This~~ The space referenced in 130.8(H)(1) shall be kept clear to permit safe operation and maintenance of electrical equipment.

Supplemental Information

File Name	Description	Approved
70E_SR-58_130.8_H_.docx		

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Tue Aug 26 15:01:45 EDT 2025

Committee Statement

Committee Statement: This section was revised to create titled subdivisions to comply with the NEC Style Manual Section 3.5.1.2.
Response Message: SR-58-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.

Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 59-NFPA 70E-2025 [Section No. 130.8(I)]

(I) Housekeeping Duties.

(1) Employees shall not perform housekeeping duties inside the limited approach boundary where there is a possibility of contact with energized electrical conductors or circuit parts, unless adequate safeguards ~~(~~, such as insulating equipment or barriers~~)~~, are provided to prevent contact.

(2) Electrically conductive cleaning materials ~~(~~, including conductive solids such as steel wool, metalized cloth, and silicon carbide, as well as conductive liquid solutions~~)~~, shall not be used inside the limited approach boundary unless procedures to prevent electrical contact are followed.

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Tue Aug 26 15:02:52 EDT 2025

Committee Statement

Committee Statement: In order to comply with the NEC Style Manual Section 3.5.1.1, parentheses were deleted and replaced with commas as the information contained, although not all inclusive, is useful.

Response Message: SR-59-NFPA 70E-2025

Public Comment No. 61-NFPA 70E-2025 [Section No. 130.8(I)]

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.

Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 60-NFPA 70E-2025 [Section No. 130.8(J)]

(J) Occasional Use of Flammable Materials.

~~Where flammable materials are present only occasionally, electric equipment capable of igniting them shall not be permitted to be used, unless measures are taken to prevent hazardous conditions from developing. Such materials shall include, but are not limited to, flammable gases, vapors, or liquids, combustible dust, and ignitible fibers or flyings.~~

~~Informational Note: See *NFPA 70* , *National Electrical Code* , for electrical installation requirements for locations where flammable materials are present on a regular basis.~~

(1) Ignition Capable Electric Equipment.

Where flammable materials are present only occasionally, electric equipment capable of igniting them shall not be permitted to be used, unless measures are taken to prevent hazardous conditions from developing.

(2) Material Types.

Such materials shall include, but are not limited to, flammable gases, vapors, or liquids, combustible dust, and ignitible fibers or flyings.

Informational Note: See *NFPA 70*, *National Electrical Code*, for electrical installation requirements for locations where flammable materials are present on a regular basis.

Supplemental Information

File Name	Description	Approved
70E_SR-60_130.8_J_.docx		

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Tue Aug 26 15:04:29 EDT 2025

Committee Statement

Committee Statement: This section was revised to create titled subdivisions to comply with the NEC Style Manual Section 3.5.1.2.
Response Message: SR-60-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya

Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 61-NFPA 70E-2025 [Section No. 130.8(L)]

(L) Routine Opening and Closing of Circuits.

~~Load-rated switches, circuit breakers, or other devices specifically designed as disconnecting means shall be used for the opening, reversing, or closing of circuits under load conditions. Cable connectors not of the load-break type, fuses, terminal lugs, and cable splice connections shall not be permitted to be used for such purposes, except in an emergency.~~

(1) Load-Break Type.

Load-rated switches, circuit breakers, or other devices specifically designed as disconnecting means shall be used for the opening, reversing, or closing of circuits under load conditions.

(2) Not of the Load-Break Type.

Cable connectors not of the load-break type, fuses, terminal lugs, and cable splice connections shall not be permitted to be used for such purposes, except in an emergency.

Supplemental Information

File Name	Description	Approved
70E_SR-61_130.8_L_.docx		

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Tue Aug 26 15:05:58 EDT 2025

Committee Statement

Committee Statement: This section was revised to create titled subdivisions to comply with the NEC Style Manual Section 3.5.1.2.
Response Message: SR-61-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 62-NFPA 70E-2025 [Section No. 130.8(M)]

(M) Reclosing Circuits After Protective Device Operation.

After a circuit is de-energized by the automatic operation of a circuit protective device, the ~~circuit shall not be manually re-energized until a qualified person or persons determines the equipment and circuit can be safely energized. Manually reclosing circuit breakers or re-energizing circuits through replaced fuses shall be prohibited until the fault has been cleared.~~ following shall be required prior to re-energization:

(1) The circuit shall not be manually re-energized until a qualified person or persons determines the equipment and circuit can be safely energized.

(2) Manually reclosing circuit breakers or re-energizing circuits through replaced fuses shall be prohibited until the fault has been cleared.

Exception: When it is determined from the design of the circuit and the overcurrent devices involved that the automatic operation of a device was caused by an overload rather than a fault condition, examination of the circuit or connected equipment shall not be required before the circuit is re-energized.

Supplemental Information

File Name	Description	Approved
70E_SR-62_130.8_M_.docx		

Submitter Information Verification

Committee: EEW-AAA

Submittal Date: Tue Aug 26 15:07:16 EDT 2025

Committee Statement

Committee Statement: This section was revised to create a list to comply with the NEC Style Manual Section 3.5.1.2.

Response Message: SR-62-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul

Dyson, Thomas B.

Katekar, Chaitanya

Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 63-NFPA 70E-2025 [Section No. 130.8(N)]

(N) Safety Interlocks.

~~Only qualified persons following the requirements for working inside the restricted approach boundary as covered by 130.4(G) shall be permitted to defeat or bypass an electrical safety interlock over which the person has sole control, and then only temporarily while the qualified person is working on the equipment. The safety interlock system shall be returned to its operable condition when the work is completed.~~

(1) Bypass.

Only qualified persons following the requirements for working inside the restricted approach boundary as covered by 130.4(G) shall be permitted to defeat or bypass an electrical safety interlock over which the person has sole control, and then only temporarily while the qualified person is working on the equipment.

(2) Return to Service.

The safety interlock system shall be returned to its operable condition when the work is completed.

Supplemental Information

File Name	Description	Approved
70E_SR-63_130.8_N_.docx		

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Tue Aug 26 15:08:55 EDT 2025

Committee Statement

Committee Statement: This section was revised to create titled subdivisions to comply with the NEC Style Manual Section 3.5.1.2.
Response Message: SR-63-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 64-NFPA 70E-2025 [Section No. 130.8(O)(1)]

(1) Safety Signs and Tags.

~~Safety signs, safety symbols, or tags shall be used where necessary to warn employees about electrical hazards that might endanger them. Such signs and tags shall meet the requirements of applicable state, federal, or local codes and standards.~~

(a) Safety signs, safety symbols, or tags shall be used where necessary to warn employees about electrical hazards that might endanger them.

(b) Such signs and tags as referenced in 130.8(O)(1)(a) shall meet the requirements of applicable state, federal, or local codes and standards.

Informational Note No. 1: Safety signs, tags, and barricades used to identify energized “look-alike” equipment can be employed as an additional preventive measure.

Informational Note No. 2: See Table Informational Note 130.7(E), for a list of examples of standards that contain information on safety signs and tags.

Supplemental Information

File Name	Description	Approved
70E_SR-64_1308_O_1_.docx		

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Tue Aug 26 15:10:12 EDT 2025

Committee Statement

Committee Statement: This section was revised by adding subdivisions to separate independent requirements to comply with the NEC Style Manual Section 3.5.1.2.

Response Message: SR-64-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.

Barrios, Louis A.

Crow, Daryld Ray

Dollard, Jr., James T.

Gallo, Ernest J.

Gray, Bobby J.

Guier, Jarod

Hacke, Donald Charles

Harris, William R.

Hickman, Palmer L.

Hilbert, Mark R.

Lubaczewski, Scott

McKinch, Terrance L.

McNellis, Mark

Miller, Charles R.

Mohla, Daleep C.

Niemira, James K.

Norwood, Thomas D.

Pace, David A.

Schamel, Duke W.

Steinman, Gregory J.

Tobias, John M.

West, Rodney J.

Widup, Ron

Wolf, Jason

Second Revision No. 65-NFPA 70E-2025 [Section No. 130.8(O)(2)]

(2) Barricades.

~~Barricades shall be used in conjunction with safety signs where it is necessary to prevent or limit employee access to work areas containing energized conductors or circuit parts. Conductive barricades shall not be used where it might increase the likelihood of exposure to an electrical hazard. Barricades shall be placed no closer than the limited approach boundary given in Table 130.4(E)(a) and Table 130.4(E)(b). Where the arc flash boundary is greater than the limited approach boundary, barricades shall not be placed closer than the arc flash boundary.~~

(a) Barricades shall be used in conjunction with safety signs where it is necessary to prevent or limit employee access to work areas containing energized conductors or circuit parts.

(b) Conductive barricades shall not be used where it might increase the likelihood of exposure to an electrical hazard.

(c) Barricades shall be placed no closer than the limited approach boundary given in Table 130.4(E)(a) and Table 130.4(E)(b).

(d) Where the arc flash boundary is greater than the limited approach boundary, barricades shall not be placed closer than the arc flash boundary.

Supplemental Information

File Name	Description	Approved
70E_SR-65_130.8_O_2_.docx		

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Tue Aug 26 15:11:11 EDT 2025

Committee Statement

Committee Statement: This section was revised by adding subdivisions to separate independent requirements to comply with the NEC Style Manual Section 3.5.1.2.

Response Message: SR-65-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul

Dyson, Thomas B.

Katekar, Chaitanya
Stallcup, James G.

Affirmative All
Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 66-NFPA 70E-2025 [Section No. 130.8(O)(3)]

(3) Attendants.

~~If signs and barricades do not provide sufficient warning and protection from electrical hazards, an attendant shall be stationed to warn and protect employees. The primary duty and responsibility of an attendant providing manual signaling and alerting shall be to keep unqualified employees outside a work area where the unqualified employee might be exposed to electrical hazards. An attendant shall remain in the area as long as there is a potential for employees to be exposed to the electrical hazards.~~

(a) If signs and barricades do not provide sufficient warning and protection from electrical hazards, an attendant shall be stationed to warn and protect employees.

(b) The primary duty and responsibility of an attendant providing manual signaling and alerting shall be to keep unqualified employees outside a work area where the unqualified employee might be exposed to electrical hazards.

(c) An attendant shall remain in the area as long as there is a potential for employees to be exposed to the electrical hazards.

Supplemental Information

File Name	Description	Approved
70E_SR-66_130.8_O_3_.docx		

Submitter Information Verification

Committee: EEW-AAA

Submittal Date: Tue Aug 26 15:12:23 EDT 2025

Committee Statement

Committee Statement: This section was revised by adding subdivisions to separate independent requirements to comply with the NEC Style Manual Section 3.5.1.2.

Response Message: SR-66-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul

Dyson, Thomas B.

Katekar, Chaitanya

Stallcup, James G.

Affirmative All

Barnhart, Paul D.

Barrios, Louis A.

Crow, Daryld Ray

Dollard, Jr., James T.

Gallo, Ernest J.

Gray, Bobby J.

Guier, Jarod

Hacke, Donald Charles

Harris, William R.

Hickman, Palmer L.

Hilbert, Mark R.

Lubaczewski, Scott

McKinch, Terrance L.

McNellis, Mark

Miller, Charles R.

Mohla, Daleep C.

Niemira, James K.

Norwood, Thomas D.

Pace, David A.

Schamel, Duke W.

Steinman, Gregory J.

Tobias, John M.

West, Rodney J.

Widup, Ron

Wolf, Jason

Second Revision No. 67-NFPA 70E-2025 [Section No. 130.9(A)]

(A) Uninsulated and Energized.

~~Where work is performed in locations containing uninsulated energized overhead lines that are not guarded or isolated, precautions shall be taken to prevent employees from contacting such lines directly with any unguarded parts of their body or indirectly through conductive materials, tools, or equipment. Where the work to be performed is such that contact with uninsulated energized overhead lines is possible, the lines shall be de-energized and visibly grounded at the point of work or suitably guarded.~~

(1) Not Guarded or Isolated.

Where work is performed in locations containing uninsulated energized overhead lines that are not guarded or isolated, precautions shall be taken to prevent employees from contacting such lines directly with any unguarded parts of their body or indirectly through conductive materials, tools, or equipment.

(2) Possible Contact.

Where the work to be performed is such that contact with uninsulated energized overhead lines is possible, the lines shall be de-energized and visibly grounded at the point of work or suitably guarded.

Supplemental Information

File Name	Description	Approved
70E_SR-67_130.9_A_.docx		

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Tue Aug 26 15:14:06 EDT 2025

Committee Statement

Committee Statement: This section was revised to create titled subdivisions to comply with the NEC Style Manual Section 3.5.1.2.
Response Message: SR-67-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
23 Affirmative All
2 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.

Crow, Daryld Ray

Dollard, Jr., James T.

Gallo, Ernest J.

Gray, Bobby J.

Guier, Jarod

Hacke, Donald Charles

Harris, William R.

Hickman, Palmer L.

Hilbert, Mark R.

Lubaczewski, Scott

McKinch, Terrance L.

McNellis, Mark

Miller, Charles R.

Mohla, Daleep C.

Norwood, Thomas D.

Pace, David A.

Schamel, Duke W.

Steinman, Gregory J.

Tobias, John M.

West, Rodney J.

Widup, Ron

Wolf, Jason

Affirmative with Comment

Barrios, Louis A.

The title of second level subdivision (2) should be "Possible Contact" not "Possible Contract".

Niemira, James K.

fix title of 130.9(A)(2): change "Possible Contract" to "Possible Contact"

Second Revision No. 68-NFPA 70E-2025 [Section No. 130.9(C)]

(C) De-energizing ~~or Guarding~~ .

If the lines are to be de-energized, arrangements shall be made with the person or organization that operates or controls the lines to de-energize them and visibly ground them at the point of work. ~~If arrangements are made to use protective measures, such as guarding, isolating, or insulation, these precautions shall prevent each employee from contacting such lines directly with any part of his or her body or indirectly through conductive materials, tools, or equipment.~~

(D) Guarding, Isolating, or Insulation.

If arrangements are made to use protective measures, such as guarding, isolating, or insulation, these precautions shall prevent each employee from contacting such lines directly with any part of his or her body or indirectly through conductive materials, tools, or equipment.

Supplemental Information

File Name	Description	Approved
70E_SR-68_130.9_C_.docx		

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Tue Aug 26 15:15:09 EDT 2025

Committee Statement

Committee Statement: This section was revised to create titled subdivisions to comply with the NEC Style Manual Section 3.5.1.2.
Response Message: SR-68-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.

Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 69-NFPA 70E-2025 [Section No. 130.9(D)]

(E) Employer and Employee Responsibility.

~~The employer and employee shall be responsible for ensuring that guards or protective measures are satisfactory for the conditions. Employees shall comply with established work methods and the use of protective equipment.~~

(1) Joint Responsibility.

The employer and employee shall be responsible for ensuring that guards or protective measures are satisfactory for the conditions.

(2) Employee Responsibility.

Employees shall comply with established work methods and the use of protective equipment.

Supplemental Information

File Name	Description	Approved
70E_SR-69_130.9_D_.docx		

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Tue Aug 26 15:16:28 EDT 2025

Committee Statement

Committee Statement: This section was revised to create titled subdivisions to comply with the NEC Style Manual Section 3.5.1.2.
Response Message: SR-69-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.

Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 70-NFPA 70E-2025 [Section No. 130.9(F)(1)]

(1) Elevated Equipment.

Where any vehicle or mechanical equipment structure will be elevated near energized overhead lines, it shall be operated so that the limited approach boundary distance of Column 2 of Table 130.4(E)(a)~~, column 2~~ or Column 2 of Table 130.4(E)(b)~~, column 2,~~ is maintained. ~~However, under any of the following conditions, the clearances shall be permitted to be reduced:~~

(0) ~~If the vehicle is in transit with its structure lowered, the limited approach boundary to overhead lines in Table 130.4(E)(a) , column 2 or Table 130.4(E)(b) , column 2, shall be permitted to be reduced by 1.83 m (6 ft). If insulated barriers, rated for the voltages involved, are installed and they are not part of an attachment to the vehicle, the clearance shall be permitted to be reduced to the design working dimensions of the insulating barrier.~~

(0) ~~If the equipment is an aerial lift insulated for the voltage involved, and if the work is performed by a qualified person, the clearance (between the uninsulated portion of the aerial lift and the power line) shall be permitted to be reduced to the restricted approach boundary given in Table 130.4(E)(a) , column 4 or Table 130.4(E)(b) , column 4.~~

Exception: ~~However, under any of the following conditions, the~~ The clearances shall be permitted to be reduced under any of the following conditions :

(1) If the vehicle is in transit with its structure lowered, the limited approach boundary to overhead lines in Column 2 of Table 130.4(E)(a)~~, column 2~~ or Column 2 of Table 130.4(E)(b)~~, column 2,~~ shall be permitted to be reduced by 1.83 m (6 ft). If insulated barriers, rated for the voltages involved, are installed and they are not part of an attachment to the vehicle, the clearance shall be permitted to be reduced to the design working dimensions of the insulating barrier.

(2) If the equipment is an aerial lift insulated for the voltage involved, and if the work is performed by a qualified person, the clearance (between the uninsulated portion of the aerial lift and the power line) shall be permitted to be reduced to the restricted approach boundary given in Column 4 of Table 130.4(E)(a)~~, column 4~~ or Column 4 of Table 130.4(E)(b)~~, column 4~~ .

Supplemental Information

File Name	Description	Approved
70E_SR-70_130.9_F_1_.docx		

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Tue Aug 26 15:18:00 EDT 2025

Committee Statement

Committee Statement: This section was separating the second sentence into an exception to comply with the NEC Style Manual. Editorial changes were also made to match the revision structure.

Response Message: SR-70-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
23 Affirmative All

2 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul

Dyson, Thomas B.

Katekar, Chaitanya

Stallcup, James G.

Affirmative All

Barnhart, Paul D.

Crow, Daryld Ray

Dollard, Jr., James T.

Gallo, Ernest J.

Gray, Bobby J.

Guier, Jarod

Hacke, Donald Charles

Harris, William R.

Hickman, Palmer L.

Hilbert, Mark R.

Lubaczewski, Scott

McKinch, Terrance L.

McNellis, Mark

Miller, Charles R.

Mohla, Daleep C.

Norwood, Thomas D.

Pace, David A.

Schamel, Duke W.

Steinman, Gregory J.

Tobias, John M.

West, Rodney J.

Widup, Ron

Wolf, Jason

Affirmative with Comment

Barrios, Louis A.

In list item (2) of the new Exception, delete the parenthesis so that the statement reads as follows: "..., the clearance between the uninsulated portion of the aerial lift and the power line shall be permitted to be reduced...". This change is recommended in order to meet the NEC Style Manual.

Niemira, James K.

delete the parentheses in list item 2 of the exception: "...the clearance between the uninsulated portion of the aerial lift and the power line shall be permitted to be reduced..."

Second Revision No. 71-NFPA 70E-2025 [Section No. 130.9(F)(3)]

(3) Equipment Grounding.

~~If any vehicle or mechanical equipment is capable of having parts of its structure elevated within the limited approach boundary of exposed movable conductors of energized overhead lines and is intentionally grounded, employees working on the ground near the point of grounding shall not stand at the grounding location whenever there is a possibility of overhead line contact. Additional precautions, such as the use of barricades, dielectric overshoe footwear, or insulation, shall be taken to protect employees from hazardous ground potentials (step and touch potential).~~

(a) If any vehicle or mechanical equipment is capable of having parts of its structure elevated within the limited approach boundary of exposed movable conductors of energized overhead lines and is intentionally grounded, employees working on the ground near the point of grounding shall not stand at the grounding location whenever there is a possibility of overhead line contact.

(b) Additional precautions, such as the use of barricades, dielectric overshoe footwear, or insulation, shall be taken to protect employees from hazardous ground potentials~~(~~ , such as step and touch potential~~)~~ .

Informational Note: Upon contact of the elevated structure with the energized lines, hazardous ground potentials can develop within a few feet or more outward from the grounded point.

Supplemental Information

File Name	Description	Approved
70E_SR-71_130.9_F_3_.docx		

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Tue Aug 26 15:21:32 EDT 2025

Committee Statement

Committee Statement: This section was revised by adding subdivisions to separate independent requirements to comply with the NEC Style Manual Section 3.5.1.2. The parenthetical marks were deleted to comply with the NEC Style Manual Section 3.5.1.1 to avoid using parenthetical notes.

Response Message: SR-71-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul

Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All
Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 72-NFPA 70E-2025 [Section No. 130.10]

130.10 Underground Electrical Lines and Equipment.

~~Before excavation starts where~~ Where there exists ~~a reasonable~~ the possibility of contacting electrical lines or equipment~~, the employer shall take the necessary steps to contact the appropriate owners or authorities to identify and mark the location of the electrical lines or equipment. When it has been determined that a reasonable possibility of contacting electrical lines or equipment exists, appropriate safe work practices and PPE shall be used during the excavation.~~ during excavation, the following shall apply:

(1) The employer shall take the necessary steps to contact the appropriate owners or authorities to identify and mark the location of the electrical lines or equipment.

(2) Safe work practices and PPE shall be used during the excavation.

Supplemental Information

File Name	Description	Approved
70E_SR-72_130.10.docx		

Submitter Information Verification

Committee: EEW-AAA

Submittal Date: Tue Aug 26 15:23:26 EDT 2025

Committee Statement

Committee Statement: This section was revised to a list to comply with the NEC Style Manual.

The words "appropriate" and “reasonable” were deleted because of the NEC Correlating Committee request to comply with the NEC Style Manual Section 3.2.1 and avoid using unenforceable or vague terms

Response Message: SR-72-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul

Dyson, Thomas B.

Katekar, Chaitanya

Stallcup, James G.

Affirmative All

Barnhart, Paul D.

Barrios, Louis A.

Crow, Daryld Ray

Dollard, Jr., James T.

Gallo, Ernest J.

Gray, Bobby J.

Guier, Jarod

Hacke, Donald Charles

Harris, William R.

Hickman, Palmer L.

Hilbert, Mark R.

Lubaczewski, Scott

McKinch, Terrance L.

McNellis, Mark

Miller, Charles R.

Mohla, Daleep C.

Niemira, James K.

Norwood, Thomas D.

Pace, David A.

Schamel, Duke W.

Steinman, Gregory J.

Tobias, John M.

West, Rodney J.

Widup, Ron

Wolf, Jason

Second Revision No. 93-NFPA 70E-2025 [Section No. 205.4]

205.4 General Maintenance Requirements.

~~Electrical equipment shall be maintained in accordance with manufacturers' instructions or industry consensus standards to reduce the risk associated with failure. The equipment owner or the owner's designated representative shall be responsible for maintenance of the electrical equipment and documentation.~~

(A) Maintenance.

Electrical equipment shall be maintained in accordance with manufacturers' instructions or industry consensus standards to reduce the risk associated with failure.

(B) Responsibility.

The equipment owner or the owner's designated representative shall be responsible for the maintenance of the electrical equipment and documentation.

Informational Note No. 1: Common industry practice is to apply test or calibration decals to equipment to indicate the test or calibration date and overall condition of equipment that has been tested and maintained in the field. These decals provide the employee with immediate indication of the last maintenance date and if the tested device or system was found acceptable on the date of test. This local information can assist the employee in the assessment of overall electrical equipment maintenance status.

Informational Note No. 2: Noncontact diagnostic methods, in addition to scheduled maintenance activities of electrical equipment, can assist in the identification of electrical anomalies.

Supplemental Information

File Name	Description	Approved
70E_SR-93_205.4.docx		

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Wed Aug 27 09:46:29 EDT 2025

Committee Statement

Committee Statement: The section was revised to comply with the NEC Style Manual Section 3.5.1.2. No technical changes were made.

Response Message: SR-93-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All
Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 94-NFPA 70E-2025 [Section No. 205.8]

205.8 Guarding of Energized Conductors and Circuit Parts.

~~Enclosures shall be maintained to guard against unintentional contact with exposed energized conductors and circuit parts and other electrical hazards. Covers and doors shall be in place with all associated fasteners and latches secured.~~

(A) Enclosures.

Enclosures shall be maintained to guard against unintentional contact with exposed energized conductors and circuit parts and other electrical hazards.

(B) Covers and Doors.

Covers and doors shall be in place with all associated fasteners and latches secured.

Supplemental Information

File Name	Description	Approved
70E_SR-94_205.8.docx		

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Wed Aug 27 09:47:51 EDT 2025

Committee Statement

Committee Statement: The section was revised to comply with the NEC Style Manual Section 3.5.1.2. No technical changes were made.

Response Message: SR-94-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.

Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 95-NFPA 70E-2025 [Section No. 225.2]

225.2 Fuses.

~~Fuses shall be maintained free of breaks or cracks in fuse cases, ferrules, and insulators. Fuse clips shall be maintained to provide adequate contact with fuses. Fuseholders for current-limiting fuses shall not be modified to allow the insertion of fuses that are not current-limiting. Non-current limiting fuses shall not be modified to allow their insertion into current-limiting fuseholders.~~ The following shall apply to fuse installations:

(1) Fuses shall be maintained free of breaks or cracks in fuse cases, ferrules, and insulators.

(2) Fuse clips shall be maintained to provide adequate contact with fuses.

(3) Fuseholders for current-limiting fuses shall not be modified to allow the insertion of fuses that are not current-limiting.

(4) Non-current limiting fuses shall not be modified to allow their insertion into current-limiting fuseholders.

Supplemental Information

File Name	Description	Approved
70E_SR-95_225.2.docx		

Submitter Information Verification

Committee: EEW-AAA

Submittal Date: Wed Aug 27 09:49:17 EDT 2025

Committee Statement

Committee Statement: The section was revised to comply with the NEC Style Manual Section 3.5.1.2 No technical changes were made.

Response Message: SR-95-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul

Dyson, Thomas B.

Katekar, Chaitanya

Stallcup, James G.

Affirmative All

Barnhart, Paul D.

Barrios, Louis A.

Crow, Daryld Ray

Dollard, Jr., James T.

Gallo, Ernest J.

Gray, Bobby J.

Guier, Jarod

Hacke, Donald Charles

Harris, William R.

Hickman, Palmer L.

Hilbert, Mark R.

Lubaczewski, Scott

McKinch, Terrance L.

McNellis, Mark

Miller, Charles R.

Mohla, Daleep C.

Niemira, James K.

Norwood, Thomas D.

Pace, David A.

Schamel, Duke W.

Steinman, Gregory J.

Tobias, John M.

West, Rodney J.

Widup, Ron

Wolf, Jason

Second Revision No. 96-NFPA 70E-2025 [Section No. 240.2]

240.2 Ventilation.

~~When forced or natural ventilation systems are required by the battery system design and are present, they shall be examined and maintained to prevent buildup of explosive mixtures. This maintenance shall include a functional test of any associated detection and alarm systems.~~ The following shall apply to ventilation systems:

(1) When forced or natural ventilation systems are required by the battery system design and are present, they shall be examined and maintained to prevent buildup of explosive mixtures.

(2) This maintenance shall include a functional test of any associated detection and alarm systems.

Informational Note: “Natural ventilation” implies there are no mechanical mechanisms. Maintenance includes activities such as inspection and removal of any obstructions to natural air flow.

Supplemental Information

File Name	Description	Approved
70E_SR-96_240.2.docx		

Submitter Information Verification

Committee: EEW-AAA

Submittal Date: Wed Aug 27 09:53:07 EDT 2025

Committee Statement

Committee Statement: The section was revised to comply with the NEC Style Manual Section 3.5.1.2. No technical changes were made

Response Message: SR-96-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul

Dyson, Thomas B.

Katekar, Chaitanya

Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 97-NFPA 70E-2025 [Section No. 240.4]

240.4 Cell Ventilation and Cell Flame Arresters ~~and Cell Ventilation~~ .

~~When present, battery cell ventilation openings shall be unobstructed. Cell flame arresters shall be inspected for proper installation and unobstructed ventilation and shall be replaced when necessary in accordance with the manufacturer's instructions.~~

(A) Cell Ventilation.

When present, battery cell ventilation openings shall be unobstructed.

(B) Cell Flame Arresters.

Cell flame arresters shall be inspected for proper installation and unobstructed ventilation and shall be replaced when necessary in accordance with the manufacturer's instructions.

Supplemental Information

File Name	Description	Approved
70E_SR-97_240.4.docx		

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Wed Aug 27 09:54:17 EDT 2025

Committee Statement

Committee Statement: The section was revised to comply with the NEC Style Manual Section 3.5.1.2. No technical changes were made.

The order of the title was changed to align with the section text.

Response Message: SR-97-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
23 Affirmative All
2 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.

Crow, Daryld Ray

Dollard, Jr., James T.

Gallo, Ernest J.

Gray, Bobby J.

Guier, Jarod

Hacke, Donald Charles

Harris, William R.

Hickman, Palmer L.

Hilbert, Mark R.

Lubaczewski, Scott

McKinch, Terrance L.

McNellis, Mark

Miller, Charles R.

Mohla, Daleep C.

Norwood, Thomas D.

Pace, David A.

Schamel, Duke W.

Steinman, Gregory J.

Tobias, John M.

West, Rodney J.

Widup, Ron

Wolf, Jason

Affirmative with Comment

Barrios, Louis A.

I recommend editorially changing new subclause (B) as follows to improve the grammar: "Cell flame arresters shall be inspected to ensure proper installation and unobstructed ventilation, and replaced as necessary in accordance with the manufacturer's instructions". This change will also delete the second "shall" in order to comply with the NEC Style Manual.

Niemira, James K.

240.4(B) has 2 requirements in one subdivision and should be split into 2 list items: (B) Cell Flame Arresters. 1) Cell flame arresters shall be inspected for proper installation and unobstructed ventilation. 2) Cell flame arresters shall be replaced when necessary in accordance with the manufacturer's instructions.

Second Revision No. 98-NFPA 70E-2025 [Section No. 250.4]

250.4 Temporary Protective Grounding Equipment.

(A) Inspection.

~~Personal protective ground cable sets shall be inspected for cuts in the protective sheath and damage to the conductors. Clamps and connector strain relief devices shall be checked for tightness. These inspections shall be made at intervals thereafter as service conditions require, but in no case shall the interval exceed 1 year.~~

(1) Initial Inspection.

Temporary protective grounding equipment shall be inspected before use as follows:

(1) The cable sets shall be inspected for cuts in the protective sheath and damage to the conductors.

(2) Clamps and connector strain relief devices shall be checked for tightness.

(2) Inspection Interval.

These inspections shall be made at intervals thereafter as service conditions require, but in no case shall the interval exceed 1 year.

(B) Testing.

~~Prior to being returned to service, temporary protective grounding equipment that has been repaired or modified shall be tested. Temporary protective grounding equipment shall be tested as service conditions require.~~

(1) Return to Service Testing.

Prior to being returned to service, temporary protective grounding equipment that has been repaired or modified shall be tested.

(2) Testing Interval.

Temporary protective grounding equipment shall be tested as service conditions require.

Informational Note: See ASTM F2249, *Standard Specification for In-Service Test Methods for Temporary Grounding Jumper Assemblies Used on De-energized Electric Power Lines and Equipment*, for guidance for inspecting and testing temporary protective grounding equipment.

(C) Grounding and Testing Devices.

~~Grounding and testing devices shall be stored in a clean and dry area. Grounding and testing devices shall be properly inspected and tested before each use.~~

(1) Storage.

Grounding and testing devices shall be stored in a clean and dry area.

(2) Inspection and Testing.

Grounding and testing devices shall be ~~properly~~ inspected and tested before each use.

Informational Note: See IEEE C37.20.6, *Standard for 4.76 kV to 38 kV Rated Ground and Test Devices Used in Enclosures,* Section 9.5 for guidance on testing of grounding and testing devices.

Supplemental Information

File Name	Description	Approved
70E_SR-98_250.4.docx		

Submitter Information Verification

Committee: EEW-AAA

Submittal Date: Wed Aug 27 09:56:56 EDT 2025

Committee Statement

Committee Statement: 250.4 is editorial revised to comply with the NEC Style Manual Section 3.5.1.2. No technical changes were made.

The title of 250.4 and the phrase “personal protective ground cable sets” in 250.4(A) are editorially revised to “temporary protective grounding equipment” to align with how the equipment is referred to in 250.4 (B) and throughout the standard.

The word “properly” was deleted from (C)(2) as a vague and unenforceable term per NEC Style Manual Section 3.2.1.

Response Message: SR-98-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.

Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 99-NFPA 70E-2025 [Section No. 250.5]

250.5 Test Instruments.

~~Test instruments and associated test leads used to verify the absence or presence of voltage shall be maintained to assure functional integrity. The maintenance program shall include functional verification as described in 110.6(E)~~ .

(A) Maintenance.

Test instruments and associated test leads used to verify the absence or presence of voltage shall be maintained to assure functional integrity.

(B) Functional Verification.

The maintenance program shall include functional verification as described in 110.6(E).

Supplemental Information

File Name	Description	Approved
70E_SR-99_250.5.docx		

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Wed Aug 27 09:58:45 EDT 2025

Committee Statement

Committee Statement: The section was revised to comply with the NEC Style Manual Section 3.5.1.2. No technical changes were made.

Response Message: SR-99-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.

Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 100-NFPA 70E-2025 [Section No. 300.3]

~~**300.3** Organization.~~

~~Chapter 3 of this standard is divided into Articles. Article 300 applies generally to electrical hazards associated with special equipment within the scope of Chapter 3. Article 310 applies to dc electrical hazards. Article 320 applies to capacitor electrical hazards. Article 330 covers electrical hazards from 1 Hz to 110 MHz, other than dc and 50/60 Hz. Article 350 applies to electrolytic cells. Article 360 applies to batteries and battery rooms. Article 370 applies to research and development laboratories. Article 380 applies to electrical double-layer capacitors. Article 390 applies to photovoltaic systems.~~

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Wed Aug 27 10:03:12 EDT 2025

Committee Statement

Committee Statement: The section is deleted as it repeats Chapter 3 table of contents.
Response Message: SR-100-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.

Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 192-NFPA 70E-2025 [Article 310]

Global SR-169

Article 310 ~~Safety-Related Work Practices:~~ dc Electrical Hazards ~~(Reserved)~~

310.1 Scope.

This article identifies direct current (dc) electrical hazard thresholds for the implementation of electrical safety-related requirements for the practical safeguarding of employees while working with dc. This article applies only to the systems covered in Chapter 3.

310.2 dc Electrical Hazard Thresholds.

Risk control shall be selected and applied from the hierarchy of risk control if any of the following hazard thresholds for dc systems are exceeded:

(1) For contact thermal hazards if the power is equal to or greater than 1000 W

(2) For electric shock hazards if the voltage is equal to or greater than 100 volts dc and the current is greater than 40 mA

(3) For arc flash hazards if the voltage is greater than 150 volts dc and the incident energy is greater than 1.2 cal/cm^2

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Thu Sep 04 14:21:57 EDT 2025

Committee Statement

Committee Statement: Added Article 310 to improve usability of Chapter 3 by consolidating the electrical hazards related to DC that require implementing risk control.
Response Message: SR-192-NFPA 70E-2025

Public Comment No. 143-NFPA 70E-2025 [New Article after 310]

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
24 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.

Crow, Daryld Ray

Dollard, Jr., James T.

Gallo, Ernest J.

Gray, Bobby J.

Guier, Jarod

Hacke, Donald Charles

Harris, William R.

Hickman, Palmer L.

Hilbert, Mark R.

Lubaczewski, Scott

McKinch, Terrance L.

McNellis, Mark

Miller, Charles R.

Mohla, Daleep C.

Niemira, James K.

Norwood, Thomas D.

Pace, David A.

Schamel, Duke W.

Steinman, Gregory J.

Tobias, John M.

West, Rodney J.

Widup, Ron

Wolf, Jason

Affirmative with Comment

Barrios, Louis A.

During the next edition I recommend taking a look at the phrases "safety-related requirements" and "safety-related work practices" as used throughout Chapter 3 and align their use in Article titles and requirements for consistency. During the next edition I also recommend taking a look at the phrases "Electrical Hazard Thresholds" and "Exposure Levels" as used throughout Chapter 3 and align their use in section titles and requirements for consistency. For example, in 310.1, 310.2, 320.3, 330.4, , "hazard thresholds" is used, whereas, in 360.3(A) and 380.2, "Electrical Hazard Thresholds" and "Energy Hazard Thresholds" was changed to "Exposure Levels" in SR-121 and SR-144. I also recommend changing the phrase "Risk control shall be selected and applied from the hierarchy of risk control..." to "Risk control measures shall be selected and applied from the hierarchy of risk control..." for readability. Addition of the word "measures" correlates with 360.3(B)(2)(b) list item 1 where the phrase "additional protective measures" is used.

Second Revision No. 103-NFPA 70E-2025 [Section No. 320.3]

320.3 Stored Energy Hazard Thresholds.

~~Appropriate controls~~ Risk control shall be selected and applied from the hierarchy of risk control where any of the following hazard thresholds are exceeded:

(1) *Contact Thermal Hazard.* Less than 100 volts and greater than 100 joules of stored energy ~~(contact thermal hazard)~~

(2) *Electric Shock Hazard.* Greater than or equal to 100 volts and greater than 1.0 joules of stored energy ~~(electric shock hazard)~~

(3) *Electric Shock Hazard.* Greater than or equal to 400 volts and greater than 0.25 joules of stored energy ~~(electric shock hazard)~~

(4) *Arc Flash Hazard.* Greater than or equal to 1.2 cal/cm^2 incident energy at the working distance ~~(arc flash hazard)~~

(5) *Hearing Acoustic Hazard.* Greater than 100 joules of stored energy regardless of voltage ~~(hearing acoustic hazard)~~

(6) *Lung Collapse Acoustic Hazard.* Greater than 122 kJ of stored energy when the rate of change of current (dI/dt) is greater than 10^9 amperes per second ~~(lung collapse acoustic hazard)~~

Supplemental Information

File Name	Description	Approved
70E_SR-103_320.3.docx		

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Wed Aug 27 10:09:39 EDT 2025

Committee Statement

Committee Statement: The changes remove parenthetical language to comply with NEC Style Manual Section 3.5.1.1.

Numbers ”109” were changed to “109” to correct the error in the numbers and units and spelled out the rate of change of current in list item (6) to clarify dI/dt.

A vague and unenforceable term “appropriate” is removed and replaced with a phrase that aligns with how controls are applied elsewhere in the standard and to comply with NEC Style Manual Section 3.2.1.

Response Message: SR-103-NFPA 70E-2025

Public Comment No. 102-NFPA 70E-2025 [Section No. 320.3]

Public Comment No. 68-NFPA 70E-2025 [Section No. 320.3]

Public Comment No. 146-NFPA 70E-2025 [Section No. 320.3]

Public Comment No. 178-NFPA 70E-2025 [Section No. 320.3]

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters

4 Not Returned
24 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul

Dyson, Thomas B.

Katekar, Chaitanya

Stallcup, James G.

Affirmative All

Barnhart, Paul D.

Crow, Daryld Ray

Dollard, Jr., James T.

Gallo, Ernest J.

Gray, Bobby J.

Guier, Jarod

Hacke, Donald Charles

Harris, William R.

Hickman, Palmer L.

Hilbert, Mark R.

Lubaczewski, Scott

McKinch, Terrance L.

McNellis, Mark

Miller, Charles R.

Mohla, Daleep C.

Niemira, James K.

Norwood, Thomas D.

Pace, David A.

Schamel, Duke W.

Steinman, Gregory J.

Tobias, John M.

West, Rodney J.

Widup, Ron

Wolf, Jason

Affirmative with Comment

Barrios, Louis A.

I recommend changing the phrase "Risk control shall be selected and applied from the hierarchy of risk control..." to "Risk control measures shall be selected and applied from the hierarchy of risk control..." for readability. Addition of the word "measures" correlates with 360.3(B)(2)(b) list item 1 where the phrase "additional protective measures" is used. In the second sentence of the committee statement, the second "109" should be "10 < superscript> 9". A note to NFPA Editorial Staff, please take a look at how the titles, or brief descriptions, of each list item is segregated from the hazard threshold. For SR No. 103, 320.3, each is italicized and ends with a ".". However, in SR No. 104, Section 320.4(B)(3), these list item titles, or brief descriptions are not italicized, and are segregated by

":". This inconsistency becomes confusing, especially what appears to be nested colons in list item (4). These list item titles should be editorially changed for consistency.

Second Revision No. 104-NFPA 70E-2025 [Section No. 320.4(B)(3)]

(3) PPE and Hazards.

When the additional protective measures include the use of PPE, the following shall be determined:

(1) Capacitor voltage and stored energy for the worker exposure: An exposure shall be considered to exist when a conductor or circuit part that could potentially remain energized with hazardous stored energy is exposed.

(2) ~~Thermal~~ Contact thermal hazard: ~~The appropriate thermal~~ Thermal PPE if the stored energy of the exposed part is greater than 100 joules.

(3) Electric shock hazard: ~~The appropriate electric~~ Electric shock PPE in accordance with 130.7 if the voltage is greater than or equal to 100 volts.

(4) Arc flash and arc blast hazard at the ~~appropriate~~ working distance: ~~The appropriate protection~~ Protection for the arc flash and arc blast hazard as follows:

a. Arc flash PPE in accordance with 130.7 if the incident energy exceeds 1.2 cal/cm^2 (5 J/cm^2) at the working distance.

b. Hearing protection where the stored energy exceeds 100 joules.

c. The lung protection boundary if stored energy is above 122 kJ and dI/dt is greater than ~~109~~ 10 ^{9} A/sec. Employees shall not enter the lung protection boundary.

d. Alerting techniques in accordance with 130.8(O) to warn employees of the hazards.

(5) Required test and grounding method meeting the following requirements:

a. Soft grounding shall be used for stored energy greater than 1000 joules.

b. If capacitors are equipped with bleed resistors, or if using a soft grounding system, the required discharge wait time shall be determined where applicable.

(6) Develop a written procedure that captures all of the required steps to place the equipment in an electrically safe work condition and includes information about the amount of stored energy available, how long to wait after de-energization before opening the enclosure, how to test for absence of voltage, and what to do if there is still stored energy present.

Informational Note No. 1: See Informative Annex R for more information on calculating capacitor stored energy, arc flash, and arc blast boundaries.

Informational Note No. 2: Heavy duty leather with a minimum thickness of 0.03 in. (0.7 mm) provides protection from thermal hazards.

Informational Note No. 3: For 320.4(B)(3)(4)c. only, the current risetime can be modeled using voltage, capacitance, and system impedances.

Submitter Information Verification

Committee: EEW-AAA

Submittal Date: Wed Aug 27 10:16:09 EDT 2025

Committee Statement

Committee Statement: The changes correct errors in the numbers and units in Item 3. Additionally, a vague and unenforceable term is removed to comply with NEC Style Manual Section 3.2.1.

Response Message: SR-104-NFPA 70E-2025

Public Comment No. 147-NFPA 70E-2025 [Section No. 320.4(B)(3)]

Public Comment No. 185-NFPA 70E-2025 [Section No. 320.4(B)(3)]

Ballot Results

This item has passed ballot

29 Eligible Voters
4 Not Returned
24 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Affirmative with Comment

Barrios, Louis A.

See comment for SR-103 related to the inconsistency of the list item titles, or short descriptions, and how they should be editorially changed for consistency.

Second Revision No. 105-NFPA 70E-2025 [Section No. 320.5(A)]

(A) Written Procedure.

Where a conductor or circuit part is connected to a capacitor~~(s)~~ operating at or above the thresholds in 320.3, a written procedure shall be used to document the necessary steps and sequence to discharge the capacitor~~(s)~~ and place the equipment into an electrically safe work condition and incorporate the risk assessment performed in 320.4(B). ~~The written procedure shall incorporate the results of the risk assessment performed in 320.5(B) and specify the following at a minimum:~~

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Wed Aug 27 10:22:07 EDT 2025

Committee Statement

Committee Statement: The second sentence is incorporated into the first sentence to comply with the NEC Style Manual.
Response Message: SR-105-NFPA 70E-2025

Ballot Results

This item has passed ballot

29 Eligible Voters
3 Not Returned
22 Affirmative All
3 Affirmative with Comments
1 Negative with Comments
0 Abstention

Not Returned

Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Carney, Dawn M.
Conkwright, Jeffrey Paul
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.

Hilbert, Mark R.

Lubaczewski, Scott

McKinch, Terrance L.

McNellis, Mark

Miller, Charles R.

Mohla, Daleep C.

Norwood, Thomas D.

Pace, David A.

Schamel, Duke W.

Steinman, Gregory J.

Widup, Ron

Wolf, Jason

Affirmative with Comment

Barrios, Louis A.

Based on supplemental ballot comments, there appears to be an interest in further improving the language in 320.5(A). I offer the two recommendations below provided in my original ballot. Option 1: "(A) Written Procedure. Where a conductor or circuit part is connected to a capacitor operating at or above the thresholds in 320.3, a written procedure incorporating the results of the risk assessment performed in 320.4(B) shall be used to document the necessary steps and sequence to discharge the capacitor and place the equipment into an electrically safe work condition." Option 2 as an alternative: "(A) Written Procedure. Where a conductor or circuit part is connected to a capacitor operating at or above the thresholds in 320.3, a written procedure shall document the following: (1) The results of the risk assessment performed in 320.4(B), (2) the necessary steps and sequence to discharge the capacitor and place the equipment into an electrically safe work condition." Both versions address the correction of 320.5(B) to 320.4(B), and both versions address deletion of the parentheticals to comply with NEC Style Manual.

Niemira, James K.

As written, the sentence is convoluted and nearly non-sensical due to misplaced modifier. The parenthetical "(s)" should also be removed to comply with NEC MOS. Rewrite as follows: "(A) Written Procedure. Where a conductor or circuit part is connected to a capacitor operating at or above the thresholds in 320.3, a written procedure that incorporates the results of the risk assessment performed in 320.4(B) shall be used to document the necessary steps and sequence to discharge the capacitor and place the equipment into an electrically safe work condition."

West, Rodney J.

Thank you for correcting the reference to 320.4(B). While the langauge is not as we would like to see, the langauge appears to convey the general requirement and hopefully can be improved next cycle.

Negative with Comment

Hickman, Palmer L.

While are making the effort to "fix" this section, perhaps the "(s)" can be removed in the two locations where they are used in 320.5(A) to comply with 3.5.3 of the NEC Style Manual stating: "Plural. Unless referring to a single item of equipment, references to electrical components and parts shall be plural rather than singular."

Second Revision No. 106-NFPA 70E-2025 [Section No. 320.5(B)]

(B) Safe Work Practices.

In order to place the capacitor~~(s)~~ into an electrically safe work condition, a qualified person shall use ~~the appropriate~~ safe work practices and PPE and shall apply the following process for establishing and verifying an electrically safe work condition:

(1) ~~Determine~~ The qualified person shall determine all the possible sources of electrical supply to the specific equipment~~. Check~~ including, but not limited to, checking applicable up-to-date drawings, diagrams, and identification tags.

(2) After properly interrupting the load current, the qualified person shall open the disconnecting device(s) for each source.

(3) Wherever possible, the qualified person shall visually verify that all blades of the disconnecting devices are fully open or that drawout-type circuit breakers are withdrawn to the fully disconnected position.

(4) ~~Apply~~ The qualified person shall apply lockout/tagout devices in accordance with a documented and established policy.

(5) ~~Determine~~ The qualified person shall determine the capacitors are discharged in accordance with the following:

   a. If bleed resistors or automatic discharge systems are applicable, and before an employee crosses the limited approach boundary, they shall wait the prescribed time for the capacitors to discharge to less than the thresholds in 320.3 and proceed to step (6).

   b. For systems without bleed resistors or automatic discharge systems, the employee shall discharge the capacitors with ~~an adequately rated~~ a grounding device ~~(e.g., ground stick)~~ rated for the application .

   b. ~~Perform soft grounding above 1000 joules and remote soft grounding above 100 kJ.~~

   c. If the ~~capacitor(s)~~ capacitors are not referenced to ground through either terminal, ~~use~~ a shorting stick shall be used to discharge the capacitor from terminal to terminal.

   d. A hard shorting stick ~~is~~ shall be permitted to be used up to 1000 joules~~, a soft shorting stick (containing a discharge resistor) is permitted to be used up to 100 kJ, and remote soft shorting is permitted above 100 kJ~~ .

   e. A soft shorting stick, which contains a discharge resistor,shall be used above 1000 joules and up to 100 kJ.

   f. Remote soft shorting ~~is permitted~~ shall be used above 100 kJ.

(6) ~~Verify~~ The qualified person shall verify that the capacitors are discharged and grounded in accordance with the following:

   a. For capacitors less than 1000 joules, verification shall be permitted to be done either by testing or by grounding.

   b. For capacitors between 1000 joules and less than 100 kJ, verification shall be done using testing or soft grounding, then hard grounding.

   c. Above 100 kJ, an engineered and redundant system shall be used for remote testing and grounding.

   d. ~~An adequately rated~~ A grounding device ~~(ground stick)~~ rated for the application or portable test instrument shall be used to test between each capacitor terminal and from each terminal to ground to ~~assure~~ ensure that the capacitor is de-energized.

(7) When test instruments are used for testing the absence of voltage, the qualified person shall verify the operation of the test instrument on a known dc voltage source before and after each absence of voltage procedure is performed.

(8) If voltage remains, the qualified person shall determine and correct the cause, and repeat step (5) to discharge the capacitors.

(9) ~~Determine~~ The qualified person shall determine the use of shorting wires in accordance with the following:

   a. Where recharging can occur due to dielectric absorption or induced voltages, all the capacitor terminals shall be connected together and grounded with a bare or transparent-insulated wire.

   b. For series capacitors, the shorting wires shall be attached across each individual capacitor's terminals.

(10) For single capacitors or for a parallel capacitor bank, the grounding device ~~shall be permitted to~~ might be left attached to the capacitor terminals for the duration of the work~~ (e.g., a ground stick)~~ .

(11) For single, series, or parallel capacitors, an approved engineered discharge path that remains in place after zero energy is verified~~,~~ shall be permitted to be used instead of additional shorting wires, ~~as long as the engineered system is inspected after the zero-energy verification and before the work begins. The engineered system shall ensure that all capacitors are shorted and grounded.~~ provided the engineered system complies with the following:

a. The engineered system ~~is~~ shall be inspected after the zero-energy verification and before the work begins.

b. The engineered system shall ensure that all capacitors are shorted and grounded.

Exception: Lockout/tagout shall not be required for work on cord- and plug-connected equipment for which exposure to the hazards of unexpected energization of the equipment is controlled by the unplugging of the equipment from the energy source, provided that the plug is under the exclusive control of the employee performing the servicing and maintenance for the duration of the work.

Supplemental Information

File Name	Description	Approved
Attachement_for_SR_106_Section_320.5_B_.docx	Attachment for SR 106 Section 320.5(B)	
70E_SR-106_320.5_B_.docx	For prod use	

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Wed Aug 27 10:24:56 EDT 2025

Committee Statement

Committee Statement: The changes remove parenthetical language to comply with NEC Style Manual Section 3.5.1.1.

The vague and unenforceable term “appropriate” is removed to comply with NEC Style Manual Section 3.2.1.

The two sentences in List Item 1 were combined to comply with NEC Style Manual Section 3.5.1.2 Multiple Requirements.

New list items were added to comply with the NEC Style Manual Section 3.5.1.2, which states that multiple requirements within a single subdivision shall be avoided. Additional subdivisions or lists shall be used to express independent requirements.

This revision cleans up formatting errors and clarifies requirements for soft, hard and remote shorting. Changed soft grounding from “shall be permitted” to “shall be required” is consistent with 320.5(B)(6)(b) and (c).

Existing list Item 5(c) is removed as it contained redundant requirements now covered in 5(d)&(e)&(f).

Response Message: SR-106-NFPA 70E-2025

Public Comment No. 69-NFPA 70E-2025 [Section No. 320.5(B)]

Public Comment No. 148-NFPA 70E-2025 [Section No. 320.5(B)]

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments

0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 107-NFPA 70E-2025 [Section No. 320.6(B)(3)]

(3) Resistors.

Resistors shall be visually inspected for cracks or other defects and electrically tested for ~~proper~~ rated resistance.

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Wed Aug 27 10:27:54 EDT 2025

Committee Statement

Committee Statement: A vague and unenforceable term is replaced to comply with NEC Style Manual Section 3.2.1.
Response Message: SR-107-NFPA 70E-2025

Public Comment No. 70-NFPA 70E-2025 [Section No. 320.6]

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.

Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 108-NFPA 70E-2025 [Section No. 330.1]

330.1 Scope.

This article covers the hazards and safety-related work practices ~~or~~ for equipment that includes ~~ac~~ sub radio frequency (sub RF) waveforms from 1 Hz to 3 kHz and radio frequency (~~sub~~ RF) ~~and~~ waveforms from 3 kHz to 110 MHz ~~(RF)~~. It does not cover dc or power frequencies of 50/60 Hz. Typical equipment includes the following:

(1) Electric arc welding equipment

(2) High-power radio, radar, and television transmitting towers and antennas

(3) Industrial dielectric and ~~radio frequency (~~ RF~~)~~ induction heaters

(4) Shortwave or RF diathermy devices

(5) Equipment that includes rectifiers and inverters such as the following:

a. Motor drives

b. Uninterruptible power supply systems

c. Lighting controllers

(6) Generators producing sub RF ~~(1 kHz to 3 kHz)~~ and RF ~~(3 kHz to 100 MHz)~~ fields

(7) Ionizing radiation field generators including X-rays, magnetrons, klystrons, thyratrons, vacuum tubes, and similar high-voltage vacuum devices

(8) Nonionizing radiation field generating equipment, including the following:

a. Antennas and RF transmission lines

b. Radar equipment

c. Industrial scientific and medical equipment

d. RF induction and dielectric heaters

e. Industrial microwave heaters and diathermy radiators

f. Magnetic resonance imagers (MRIs)

g. Large electromagnets

Informational Note: See the following standards for specific guidance on safety-related work practices around equipment containing sub RF and RF electrical hazards:

(1) IEEE C95.1, *IEEE Standard for Safety Levels with Respect to Human Exposure to Electric, Magnetic, and Electromagnetic Fields, 0 Hz to 300 GHz*~~, 2019~~

(2) International Electrotechnical Commission IEC TS 60479-1, *Effects of Current on Human Beings and Livestock, Part 1: General Aspects*

Submitter Information Verification

Committee: EEW-AAA

Submittal Date: Wed Aug 27 10:29:00 EDT 2025

Committee Statement

Committee Statement: Parenthetical expressions are deleted to comply with the NEC Style Manual Section 3.5.1.1.

Radio frequency and sub radio frequency are added to meet the NFPA Manual of Style to spell out acronyms at the first use.

Added “practices for” in the scope for consistency.

Edition dates for documents referenced in informational notes are provided in Annex A.

Response Message: SR-108-NFPA 70E-2025

Public Comment No. 106-NFPA 70E-2025 [Section No. 330.1]

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
23 Affirmative All
2 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Affirmative with Comment

Barrios, Louis A.

Editorially change "or" to "for" in 330.1 so that it reads "This article covers the hazards and safety-related work practices for equipment..." This change is already captured in the Committee Statement.

Niemira, James K.

change "or" to "for" in the scope statement: "This article covers the hazards and safety-related work practices for equipment that includes..."

Second Revision No. 109-NFPA 70E-2025 [Section No. 330.4]

330.4 Electrical Hazard Thresholds.

Exposure levels shall not exceed those identified in the following list unless ~~appropriate controls are~~ risk control from the hierarchy of risk control is selected and implemented:

(1) Alternating current (ac) (1 Hz to 3 kHz): 50 volts and 3 milliamperes (not including 50/60 Hz)

(2) Alternating current (ac) (3 kHz to 100 kHz): 1 x f mA, f in kHz

(3) Alternating current (ac) (100 kHz to 3 MHz): 100 mA

(4) Alternating current (ac) (3 MHz to 30 MHz):100 $(f/3)^{*0.3}$ mA , f in MHz

(5) Alternating current (ac) (30 MHz to 110 MHz): 200 mA

Informational Note No. 1: See IEEE Std C95.1~~-2019~~ , *IEEE Standard for Safety Levels with Respect to Human Exposure to Electrical, Magnetic, and Electromagnetic Fields, 0 Hz to 300 GHz*, for information regarding hazard thresholds for workers trained in sub RF and RF contact electric shock.

Informational Note No. 2: RF electric shock thresholds depend on current and frequency, not voltage.

Submitter Information Verification

Committee: EEW-AAA

Submittal Date: Wed Aug 27 10:33:49 EDT 2025

Committee Statement

Committee Statement: A vague and unenforceable term “appropriate” is removed and replaced with a phrase that aligns with how controls are applied elsewhere in the standard and to comply with NEC Style Manual Section 3.2.1.

Edition dates for documents referenced in informational notes are provided in Annex A.

Response Message: SR-109-NFPA 70E-2025

Public Comment No. 66-NFPA 70E-2025 [Article 330]

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
24 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul

Dyson, Thomas B.

Katekar, Chaitanya

Stallcup, James G.

Affirmative All

Barnhart, Paul D.

Crow, Daryld Ray

Dollard, Jr., James T.

Gallo, Ernest J.

Gray, Bobby J.

Guier, Jarod

Hacke, Donald Charles

Harris, William R.

Hickman, Palmer L.

Hilbert, Mark R.

Lubaczewski, Scott

McKinch, Terrance L.

McNellis, Mark

Miller, Charles R.

Mohla, Daleep C.

Niemira, James K.

Norwood, Thomas D.

Pace, David A.

Schamel, Duke W.

Steinman, Gregory J.

Tobias, John M.

West, Rodney J.

Widup, Ron

Wolf, Jason

Affirmative with Comment

Barrios, Louis A.

I recommend changing the phrase "...risk control from the hierarchy of risk control..." to "...risk control measures from the hierarchy of risk control..." for readability. Addition of the word "measures" correlates with 360.3(B)(2)(b) list item 1 where the phrase "additional protective measures" is used. I recommend adding the following to the Committee Statement: Units of measure, "mA", were added to list item (4), which had been inadvertently omitted.

Second Revision No. 111-NFPA 70E-2025 [New Section after 330.5(B)]

(C) Workers Exposed to EM Hazards.

Workers shall be trained to identify and protect themselves from EM hazards.

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Wed Aug 27 10:39:58 EDT 2025

Committee Statement

Committee Statement: Additional requirements were added to address training associated with electromagnetic (EM) field hazards, not sufficiently addressed in Article 330.

Response Message: SR-111-NFPA 70E-2025

Public Comment No. 149-NFPA 70E-2025 [Section No. 330.5]

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.

Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 110-NFPA 70E-2025 [Section No. 330.5 [Excluding any Sub-Sections]]

The employer and employee shall implement the responsibilities, training requirements, and safe work practices in accordance with ~~110.5~~ 110.4 for working with sub RF and RF hazards~~,~~ with the ~~exceptions~~ additional requirements in 330.5(A) ~~and~~ , 330.5(B), and 330.5(C) .

Informational Note: Equipment that contains RF electrical hazards also could produce nonionizing radiation hazards ~~— that is,~~ such as RF electromagnetic fields (EM). Risk assessment should be performed to determine if there is a risk to EM exposure.

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Wed Aug 27 10:37:30 EDT 2025

Committee Statement

Committee Statement: Changed “exceptions” to “additional requirements” to clarify that these are in addition to the training requirements in Section 110.4.

Changed Section 110.5 to 110.4 to better align with the qualified worker training.

Response Message: SR-110-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.

Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 112-NFPA 70E-2025 [Section No. 350.3(B)]

(B) Training Requirements.

~~Employees shall be trained to understand the specific electrical hazards associated with electrical energy on the cell line. Employees shall be trained in safety-related work practices and procedural requirements to provide protection from the electrical hazards associated with their respective job or task assignment.~~

(1) Specific Electrical Hazards.

Employees shall be trained to understand the specific electrical hazards associated with electrical energy on the cell line.

(2) Safety-Related Work Practices.

Employees shall be trained in safety-related work practices and procedural requirements to provide protection from the electrical hazards associated with their respective job or task assignment.

Supplemental Information

File Name	Description	Approved
70E_SR-112_350.3_B_.docx		

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Wed Aug 27 10:43:15 EDT 2025

Committee Statement

Committee Statement: Added subdivisions and titles to comply with the NEC Style Manual Section 3.5.1.2, which states that multiple requirements within a single subdivision shall be avoided. Additional subdivisions or lists shall be used to express independent requirements.

Response Message: SR-112-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 113-NFPA 70E-2025 [Section No. 350.4(A)]

(A) Qualified Persons.

(1) Training.

~~Qualified persons shall be trained and knowledgeable in the operation of cell line working zone equipment and specific work methods and shall be trained to avoid the electrical hazards that are present. Such persons shall be familiar with the proper use of precautionary techniques and PPE. Training for a qualified person shall include the following:~~

(0) ~~Skills and techniques to avoid an electric shock hazard:~~

0. ~~Between exposed energized surfaces, which might include temporarily insulating or guarding parts to permit the employee to work on exposed energized parts~~

0. ~~Between exposed energized surfaces and grounded equipment, other grounded objects, or the earth itself, that might include temporarily insulating or guarding parts to permit the employee to work on exposed energized parts~~

(0) ~~Method of determining the cell line working zone area boundaries~~

(a) Qualified persons shall be the following:

(1) ~~trained~~ Trained and knowledgeable in the operation of cell line working zone equipment and specific work methods

(2) ~~trained~~ Trained to avoid the electrical hazards that are present~~.~~

(3) ~~Such persons shall be familiar~~ Familiar with the proper use of precautionary techniques and PPE~~.~~

(b) Training for a qualified person shall include the following:

(1) Skills and techniques to avoid an electric shock hazard:

a. Between exposed energized surfaces, which might include temporarily insulating or guarding parts to permit the employee to work on exposed energized parts

b. Between exposed energized surfaces and grounded equipment, other grounded objects, or the earth itself, that might include temporarily insulating or guarding parts to permit the employee to work on exposed energized parts

(2) Method of determining the cell line working zone area boundaries

(2) ~~Qualified Persons~~ Cell Line Working Zone .

Qualified persons shall be permitted to work within the cell line working zone.

Supplemental Information

File Name	Description	Approved
attachment_for_SR_113_350.4_A_.docx	attachment for SR 113 350.4(A)	
70E_SR-113_350.4_A_.docx	For prod use	

Submitter Information Verification

Committee: EEW-AAA

Submittal Date: Wed Aug 27 10:51:32 EDT 2025

Committee Statement

Committee Statement: Added lists to comply with the NEC Style Manual Section 3.5.1.2, which states that multiple requirements within a single subdivision shall be avoided. Additional subdivisions or lists shall be used to express independent requirements.

Response Message: SR-113-NFPA 70E-2025

Ballot Results

This item has passed ballot

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron

Wolf, Jason

Second Revision No. 114-NFPA 70E-2025 [Section No. 350.5(A)]

(A) General.

Operation and maintenance of electrolytic cell lines might require contact by employees with exposed energized surfaces such as buses, electrolytic cells, and their attachments. ~~The approach distances referred to in Table 130.4(E)(a) and Table 130.4(E)(b) shall not apply to work performed by qualified persons in the cell line working zone. Safeguards such as safety-related work practices and other safeguards shall be used to protect employees from injury while working in the cell line working zone. These safeguards shall be consistent with the nature and extent of the related electrical hazards. Safeguards might be different for energized cell lines and de-energized cell lines. Hazardous battery effect voltages shall be dissipated to consider a cell line de-energized.~~

(1) Approach Distances.

The approach distances referred to in Table 130.4(E)(a) and Table 130.4(E)(b) shall not apply to work performed by qualified persons in the cell line working zone.

(2) Safeguards.

Safeguards such as safety-related work practices and other safeguards shall be used to protect employees from injury while working in the cell line working zone.

(3) Consistency.

These safeguards shall be consistent with the nature and extent of the related electrical hazards.

(4) Battery Effect Voltages.

Hazardous battery effect voltages shall be dissipated to consider a cell line de-energized.

Informational Note No. 1: Exposed energized surfaces might not present an electrical hazard. Electric shock hazards are related to current through the body, producing possible injury or damage to health. Electric shock severity is a function of many factors, including skin and body resistance, current path through the body, paths in parallel with the body, and system voltage. Arc flash burns and arc blasts are a function of the arcing current and the duration of arc exposure.

Informational Note No. 2: A cell line or group of cell lines operated as a unit for the production of a particular metal, gas, or chemical compound might differ from other cell lines producing the same product because of variations in the particular raw materials used, output capacity, use of proprietary methods or process practices, or other modifying factors. Detailed standard electrical safety-related work practice requirements could become overly restrictive without accomplishing the stated purpose of Chapter 1.

Supplemental Information

File Name	Description	Approved
70E_SR-114_350.5_A_.docx		

Submitter Information Verification

Committee: EEW-AAA

Submittal Date: Wed Aug 27 10:52:41 EDT 2025

Committee Statement

Committee Statement: Added subdivisions and titles to comply with the NEC Style Manual Section 3.5.1.2, which states that multiple requirements within a single subdivision shall be avoided. Additional subdivisions or lists shall be used to express independent requirements. A statement was removed in the new subdivision (3) because it does not contain a requirement.

Response Message: SR-114-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 115-NFPA 70E-2025 [Sections 350.5(C)(1), 350.5(C)(2), 350.5(C)(3)]

(1) General.

~~Each task performed in the electrolytic cell line working zone shall be analyzed for the likelihood of arc flash injury. If there is a likelihood of personal injury, appropriate measures shall be taken to protect persons exposed to the arc flash hazards, including one or more of the following:~~

(0) ~~Providing appropriate PPE *[see 350.5(D)(2)]* to prevent injury from the arc flash hazard~~

(0) ~~Altering work procedures to reduce the likelihood of occurrence of an arc flash incident~~

(0) ~~Scheduling the task so that work can be performed when the cell line is de-energized~~

(a) Each task performed in the electrolytic cell line working zone shall be analyzed for the likelihood of arc flash injury.

(b) If there is a likelihood of personal injury, ~~appropriate~~ measures shall be taken to protect persons exposed to the arc flash hazards, including one or more of the following:

(1) Providing ~~appropriate~~ PPE *[see 350.5(D)(2)]* to prevent injury from the arc flash hazard

(2) Altering work procedures to reduce the likelihood of occurrence of an arc flash incident

(3) Scheduling the task so that work can be performed when the cell line is de-energized

(2) Routine Tasks.

~~Arc flash risk assessment shall be done for all routine tasks performed in the cell line work zone. The results of the arc flash risk assessment shall be used in training employees in job procedures that minimize the possibility of arc flash hazards. The training shall be included in the requirements of 350.3 .~~

(a) Arc flash risk assessment shall be done for all routine tasks performed in the cell line work zone.

(b) The results of the arc flash risk assessment shall be used in training employees in job procedures that minimize the possibility of arc flash hazards.

(c) The training shall be included in the requirements of 350.3.

(3) Nonroutine Tasks.

~~Before a nonroutine task is performed in the cell line working zone, an arc flash risk assessment shall be done. If an arc flash hazard is a possibility during nonroutine work, appropriate instructions shall be given to employees involved on how to minimize the risk associated with arc flash.~~

(a) Before a nonroutine task is performed in the cell line working zone, an arc flash risk assessment shall be done.

(b) If an arc flash hazard is a possibility during nonroutine work, ~~appropriate~~ instructions shall be given to employees involved on how to minimize the risk associated with arc flash.

Supplemental Information

File Name	Description	Approved
70E_SR-115_350.5_C_1_.docx		

Submitter Information Verification

Committee: EEW-AAA

Submittal Date: Wed Aug 27 10:55:28 EDT 2025

Committee Statement

Committee Statement: Added subdivisions to comply with the NEC Style Manual Section 3.5.1.2, which states that multiple requirements within a single subdivision shall be avoided. Additional subdivisions are used to express independent requirements. A vague and unenforceable term “appropriate” is removed to comply with NEC Style Manual Section 3.2.1.

Response Message: SR-115-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
24 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron

Wolf, Jason

Affirmative with Comment

Niemira, James K.

List items in 350.5(C)(1)(b) should be listed in the reverse sequence to emphasize that elimination of the hazard is preferred: 1) do the work while de-energized, 2) modify the work to reduce the hazard, 3) use PPE

Second Revision No. 116-NFPA 70E-2025 [Section No. 350.5(D)(6)]

(6) Safe Work Practices.

~~Employees shall be trained in safe work practices. The training shall include why the work practices in a cell line working zone are different from similar work situations in other areas of the plant. Employees shall comply with established safe work practices and the safe use of protective equipment.~~

(a) Employees shall be trained in safe work practices.

(b) The training shall include why the work practices in a cell line working zone are different from similar work situations in other areas of the plant.

(c) Employees shall comply with established safe work practices and the safe use of protective equipment.

(d) Safe work practice training shall include attitude awareness instruction.

Informational Note: Simultaneous contact with energized parts and ground can cause serious electric shock. Of special importance is the need to be aware of body position where contact may be made with energized parts of the electrolytic cell line and grounded surfaces.

(d) ~~*Attitude Awareness.* Safe work practice training shall include attitude awareness instruction. Simultaneous contact with energized parts and ground can cause serious electric shock. Of special importance is the need to be aware of body position where contact may be made with energized parts of the electrolytic cell line and grounded surfaces.~~

(e) ~~*Bypassing of Safety Equipment.*~~ Safe work practice training shall include techniques to prevent bypassing the protection of safety equipment. ~~Clothing may bypass protective equipment if the clothing is wet. Trouser legs should be kept at appropriate length, and shirt sleeves should be a good fit so as not to drape while reaching. Jewelry and other metal accessories that may bypass protective equipment shall not be worn while working in the cell line working zone.~~

Informational Note: ~~Clothing may~~ Wet clothing could bypass protective equipment ~~if the clothing is wet~~ . Trouser legs should be ~~kept at appropriate~~ of a length, and shirt sleeves should ~~be a good~~ fit so as not to drape while reaching.

(f) Jewelry and other metal accessories ~~that may bypass protective equipment~~ shall not be worn while working in the cell line working zone where it will bypass protective equipment .

Supplemental Information

File Name	Description	Approved
attachment_for_SR_116_350.5_D_.docx	attachment for SR 116 350.5(D)	
70E_SR-116_350.5_D_6_.docx	For prod use	

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Wed Aug 27 10:59:40 EDT 2025

Committee Statement

Committee Statement: Added subdivisions to comply with the NEC Style Manual Section 3.5.1.2, which states that multiple requirements within a single subdivision shall be avoided. Additional subdivisions or lists are used to express independent requirements. A vague and unenforceable term “appropriate” is removed or replaced to comply with NEC Style Manual Section 3.2.1. Recommendations are converted to mandatory language.

Response Message: SR-116-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 117-NFPA 70E-2025 [Section No. 350.5(D)(8)]

(8) Portable Cutout-Type Switches.

~~Portable cell cutout switches that are connected shall be considered as energized and as an extension of the cell line working zone. Appropriate procedures shall be used to ensure proper cutout switch connection and operation.~~

(a) Portable cell cutout switches that are connected shall be considered as energized and as an extension of the cell line working zone.

(b) ~~Appropriate procedures~~ Procedures shall be used to ensure ~~proper~~ correct cutout switch connection and operation.

Supplemental Information

File Name	Description	Approved
70E_SR-117_350.5_D_8_.docx		

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Wed Aug 27 11:01:12 EDT 2025

Committee Statement

Committee Statement: Added subdivisions to comply with the NEC Style Manual Section 3.5.1.2, which states that multiple requirements within a single subdivision shall be avoided. Additional subdivisions are used to express independent requirements. A vague and unenforceable term “appropriate” is removed and “proper” changed to “correct” to comply with NEC Style Manual Section 3.2.1.

Response Message: SR-117-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 118-NFPA 70E-2025 [Section No. 350.5(D)(9)]

(9) Cranes and Hoists.

~~Cranes and hoists shall meet the requirements of applicable codes and standards to safeguard employees. Insulation required for safeguarding employees, such as insulated crane hooks, shall be periodically tested.~~

(a) Cranes and hoists shall meet the requirements of applicable codes and standards to safeguard employees.

(b) Insulation required for safeguarding employees, such as insulated crane hooks, shall be periodically tested.

Supplemental Information

File Name	Description	Approved
70E_SR-118_350.5_D_9_.docx		

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Wed Aug 27 11:02:43 EDT 2025

Committee Statement

Committee Statement: The format change is necessary to comply with the NEC Style Manual Section 3.5.1.2, which states that multiple requirements within a single subdivision shall be avoided. Additional subdivisions are used to express independent requirements.

Response Message: SR-118-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.

Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 119-NFPA 70E-2025 [Sections 350.6(A), 350.6(B), 350.6(C)]

(A) Portable Electrical Equipment.

~~The grounding requirements of 110.7(B) shall not be permitted within an energized cell line working zone. Portable electrical equipment and associated power supplies shall meet the requirements of applicable codes and standards.~~

(1) Grounding.

The grounding requirements of 110.7(B) shall not be permitted within an energized cell line working zone.

(2) Codes and Standards.

Portable electrical equipment and associated power supplies shall meet the requirements of applicable codes and standards.

(B) Auxiliary Nonelectric Connections.

~~Auxiliary nonelectric connections such as air, water, and gas hoses shall meet the requirements of applicable codes and standards. Pneumatic-powered tools and equipment shall be supplied with nonconductive air hoses in the cell line working zone.~~

(1) Codes and Standards.

Auxiliary nonelectric connections such as air, water, and gas hoses shall meet the requirements of applicable codes and standards.

(2) Air Hoses.

Pneumatic-powered tools and equipment shall be supplied with nonconductive air hoses in the cell line working zone.

(C) Welding Machines.

~~Welding machine frames shall be considered at cell potential when within the cell line working zone. Safety-related work practices shall require that the cell line not be grounded through the welding machine or its power supply. Welding machines located outside the cell line working zone shall be barricaded to prevent employees from touching the welding machine and ground simultaneously where the welding cables are in the cell line working zone.~~

(1) Frames.

Welding machine frames shall be considered at cell potential when within the cell line working zone.

(2) Grounding.

Safety-related work practices shall require that the cell line not be grounded through the welding machine or its power supply.

(3) Barricades.

Welding machines located outside the cell line working zone shall be barricaded to prevent employees from touching the welding machine and ground simultaneously where the welding cables are in the cell line working zone.

Supplemental Information

File Name	Description	Approved
70E_SR-119_350.6_A_.docx		

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Wed Aug 27 11:03:45 EDT 2025

Committee Statement

Committee Statement: Added subdivisions and titles to comply with the NEC Style Manual Section 3.5.1.2, which states that multiple requirements within a single subdivision shall be avoided. Additional subdivisions are used to express independent requirements.

Response Message: SR-119-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron

Wolf, Jason

Second Revision No. 120-NFPA 70E-2025 [Section No. 360.1]

360.1 Scope.

This article covers electrical safety requirements for the practical safeguarding of employees while working with ~~exposed stationary storage~~ batteries that ~~exceed one or more of the hazard thresholds listed in 360.3(A)~~ present an electrical hazard .

Informational Note: See the following documents for additional information on best practices for safely working on ~~stationary~~ batteries:

(1) NFPA 1, *Fire Code*, Chapter 52, Stationary Storage Battery Systems~~, 2021~~

(2) *NFPA 70*, *National Electrical Code*, Article 480, Storage Batteries~~, 2020~~

(3) IEEE 450, *IEEE Recommended Practice for Maintenance, Testing, and Replacement of Vented Lead-Acid Batteries for Stationary Applications*~~, 2020~~

(4) IEEE 937, *Recommended Practice for Installation and Maintenance of Lead-Acid Batteries for Photovoltaic Systems*~~, 2019~~

(5) IEEE 1106, *IEEE Recommended Practice for Installation, Maintenance, Testing, and Replacement of Vented Nickel-Cadmium Batteries for Stationary Applications*~~, 2005 (R 2011)~~

(6) IEEE 1184, *IEEE Guide for Batteries for Uninterruptible Power Supply Systems*~~, 2015~~

(7) IEEE 1188, *IEEE Recommended Practice for Maintenance, Testing, and Replacement of Valve-Regulated Lead-Acid (VRLA) Batteries for Stationary Applications*, 1188a~~-2014~~

(8) IEEE 1657, *Recommended Practice for Personnel Qualifications for Installation and Maintenance of Stationary Batteries*~~, 2018~~

(9) OSHA 29 CFR 1910.305(j)(7), “Storage batteries”

(10) OSHA 29 CFR 1926.441, “Batteries and battery charging”

(11) DHHS (NIOSH) Publication No. 94-110, *Applications Manual for the Revised NIOSH Lifting Equation*~~, 1994~~

(12) IEEE/ASHRAE 1635, *Guide for the Ventilation and Thermal Management of Batteries for Stationary Applications*~~, 2018~~

(13) NFPA 855, *Standard for the Installation of Stationary Energy Storage Systems*~~, 2020~~

(14) UL 9540, *Energy Storage Systems and Equipment*~~, 2020~~

(15) UL 9540A, *Test Method for Evaluating Thermal Runaway Fire Propagation in Battery Energy Storage Systems*~~, 2019~~

(16) UL 9540B, *Outline of Investigation for Large Scale Fire Test for Residential Battery Energy Storage Systems*~~, 2024~~

Submitter Information Verification

Committee: EEW-AAA

Submittal Date: Wed Aug 27 11:06:33 EDT 2025

Committee Statement

Committee Statement: The reference to 360.3(A) is removed as to not reference a specific requirement in the scope of an article. The scope has been clarified to align with the Article 90 scope and include all batteries that present a hazard.

Edition dates for documents referenced in informational notes are provided in Annex A.

Response Message: SR-120-NFPA 70E-2025

Public Comment No. 163-NFPA 70E-2025 [Section No. 360.1]

Public Comment No. 124-NFPA 70E-2025 [Section No. 360.1]

Public Comment No. 62-NFPA 70E-2025 [Section No. 360.1]

Public Comment No. 150-NFPA 70E-2025 [Section No. 360.1]

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul

Dyson, Thomas B.

Katekar, Chaitanya

Stallcup, James G.

Affirmative All

Barnhart, Paul D.

Barrios, Louis A.

Crow, Daryld Ray

Dollard, Jr., James T.

Gallo, Ernest J.

Gray, Bobby J.

Guier, Jarod

Hacke, Donald Charles

Harris, William R.

Hickman, Palmer L.

Hilbert, Mark R.

Lubaczewski, Scott

McKinch, Terrance L.

McNellis, Mark

Miller, Charles R.

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Niemira, James K.

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Pace, David A.

Schamel, Duke W.

Steinman, Gregory J.

Tobias, John M.

West, Rodney J.

Widup, Ron

Wolf, Jason

Second Revision No. 121-NFPA 70E-2025 [Section No. 360.3(A)]

(A) ~~Electrical Hazard Thresholds~~ Exposure Levels .

Exposure levels shall not exceed the following unless ~~appropriate controls are~~ risk control from the hierarchy of risk control is selected and implemented:

(1) Alternating current (ac): 50 volts and 5 milliamperes

(2) Direct current (dc): 100 volts and 40 milliamperes

(3) ~~Thermal~~ Contact thermal : 1000 watts short-circuit power

Informational Note No. 1: Available short-circuit power is calculated by multiplying the battery's nominal voltage by its available short-circuit current at the battery terminals, then dividing the result by four.

Informational Note 2: See Department of Energy, *DOE Electrical Safety Handbook*, for electrical hazard thresholds.

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Wed Aug 27 11:10:28 EDT 2025

Committee Statement

Committee Statement: The title is revised to better reflect the subject of the section.

Additionally, a vague and unenforceable term "appropriate" is removed and replaced with a phrase that aligns with how controls are applied elsewhere in the standard and to comply with NEC Style Manual Section 3.2.1.

Response Message: SR-121-NFPA 70E-2025

Public Comment No. 64-NFPA 70E-2025 [Section No. 360.3(A)]

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
24 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul

Dyson, Thomas B.

Katekar, Chaitanya

Stallcup, James G.

Affirmative All

Barnhart, Paul D.

Crow, Daryld Ray

Dollard, Jr., James T.

Gallo, Ernest J.

Gray, Bobby J.

Guier, Jarod

Hacke, Donald Charles

Harris, William R.

Hickman, Palmer L.

Hilbert, Mark R.

Lubaczewski, Scott

McKinch, Terrance L.

McNellis, Mark

Miller, Charles R.

Mohla, Daleep C.

Niemira, James K.

Norwood, Thomas D.

Pace, David A.

Schamel, Duke W.

Steinman, Gregory J.

Tobias, John M.

West, Rodney J.

Widup, Ron

Wolf, Jason

Affirmative with Comment

Barrios, Louis A.

I recommend changing the phrase "...risk control from the hierarchy of risk control..." to "...risk control measures from the hierarchy of risk control..." for readability. Addition of the word "measures" correlates with 360.3(B)(2)(b) list item 1 where the phrase "additional protective measures" is used.

Second Revision No. 122-NFPA 70E-2025 [Section No. 360.3(B)(2)]

(2) Battery Contact Thermal Risk Assessment.

(a) *Estimate of Likelihood and Severity.* The estimate of likelihood of occurrence of injury or damage to health and the potential severity of injury or damage to health from contact thermal hazards shall take into consideration all the following:

(1) The available short-circuit power to which personnel will be exposed

(2) The work task and tools

Informational Note No. 1: Assembling a battery string or returning a battery to service commonly involves manipulating wires or flexible circuit elements that could be installed improperly, resulting in a battery short circuit.

Informational Note No. 2: Electrical measurements with undamaged, insulated probes and specific-gravity measurements on the electrolyte have a low likelihood of resulting in a short circuit.

(3) The design of the equipment including the spacing of exposed electrical conductors in relation to length of potential shorting materials used in the task

(4) The equipment operating condition and the condition of maintenance

(b) *Additional Protective Measures.* The following shall apply when protective measures are taken:

(1) If additional protective measures are required, they shall be selected and implemented according to the hierarchy of risk ~~controls~~ control identified in 110.3(H)(3).

(2) When the additional protective measures include the use of PPE, the following shall be determined and made available to the employee:

a. ~~Proper hand~~ Hand protection based on performance characteristics relative to the task, conditions present, duration of use, and available short-circuit power of the battery

b. ~~Proper eye~~ Eye protection including safety goggles or safety glasses or face shield

c. Tools meeting one of the following criteria:

- Equipped with handles rated for the voltage on which they are used in accordance with 130.7(D)(1)
- Length of tools for work on batteries selected to minimize the likelihood of short circuit

(3) Employees shall keep battery terminals and all electrical conductors clear of unintended contact with tools, test equipment, liquid containers, and other foreign objects.

Informational Note: The PPE for contact thermal hazards might be covered by other hazard risk assessments.

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Wed Aug 27 11:12:24 EDT 2025

Committee Statement

Committee Statement: "Controls" was changed to "control" in (2)(b) item (1) to align with how controls are applied elsewhere in the standard.

Numbering in 360.3(B)(2)(b)(2)(c) list Items 1 and 2 is revised to comply with the NEC Style Manual Section 2.1.6.3.4 regarding subdivision numbering. The text “one of” is added to prevent misinterpretation that both conditions are necessary.

The term “proper” is removed as it is vague and unenforceable in accordance with the NEC Style Manual.

Response Message: SR-122-NFPA 70E-2025

Public Comment No. 164-NFPA 70E-2025 [Section No. 360.3(B)(2)]

Public Comment No. 38-NFPA 70E-2025 [Section No. 360.3(B)(2)]

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.

Tobias, John M.

West, Rodney J.

Widup, Ron

Wolf, Jason

Second Revision No. 123-NFPA 70E-2025 [Section No. 360.3(B)(3)]

(3) Battery Electric Shock Risk Assessment.

(a) *Estimate of Likelihood and Severity.* The estimate of likelihood of occurrence of injury or damage to health and the potential severity of injury or damage to health from battery shock hazards shall take into consideration all the following:

(1) The dc voltage to which personnel will be exposed

(2) The design of the equipment, including the grounding configuration and the ~~spacing~~ separation distance of exposed electrical conductors

(3) The potential for hazardous ac voltage on the battery enclosure or rack

(4) The equipment operating condition and the condition of maintenance

(b) *Additional Protective Measures.* The following shall apply when protective measures are taken:

(1) If additional protective measures are required, they shall be selected and implemented according to the hierarchy of risk ~~controls~~ control identified in 110.3(H)(3).

(2) If protective measures include the use of shock protection PPE, they shall be selected so as not to conflict with PPE requirements for chemical hazards.

(3) Boundary requirements established in 130.4 shall apply when personnel approach exposed energized electrical conductors or circuit parts operating at not less than 100 volts and 40 milliamperes between battery terminals or between a single terminal and a grounded surface.

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Wed Aug 27 11:15:16 EDT 2025

Committee Statement

Committee Statement: "Controls" was changed to "control" in (3)(b) item (1) to align with how controls are applied elsewhere in the standard.

The language in Item (2) is revised to be consistent across all battery risk assessment sections.

Response Message: SR-123-NFPA 70E-2025

Public Comment No. 166-NFPA 70E-2025 [Section No. 360.3(B)(3)]

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 124-NFPA 70E-2025 [Section No. 360.3(B)(4)]

(4) Battery Arc Flash Risk Assessment.

(a) *General.* General requirements for arc flash risk assessment shall be as follows:

(1) An electric arc flash risk assessment shall be performed on ~~stationary storage~~ battery systems operating at 150 volts or more before a person interacts with the system in a ~~matter~~ manner likely to create an arc flash hazard.

(2) The requirements of 130.5 shall apply if it has been determined that the likelihood of an arc flash hazard exceeds an acceptable threshold.

(b) *Estimate of Likelihood and Severity.* The estimate of likelihood of occurrence of injury or damage to health and the potential severity of injury or damage to health from battery arc flash hazards shall take into consideration all the following:

(1) The dc voltage and available fault current to which personnel will be exposed

(2) The work task

(3) The design of the battery, including the grounding configuration, the separation distance of exposed electrical conductors, and any overcurrent protection devices and their operating times

(4) The equipment operating condition and the condition of maintenance

Informational Note: See Table 130.5(C)(3) and D.5 for more information on evaluating the likelihood and severity of a battery arc flash hazard.

(c) *Additional Protective Measures.* The following shall apply when protective measures are taken:

(1) If additional protective measures are required, they shall be selected and implemented according to the hierarchy of risk ~~controls~~ control identified in 110.3(H)(3).

(2) If protective measures include the use of arc flash PPE, the following shall be determined:

a. The location of the gap where an arc could occur

b. The arc flash boundary

c. The PPE to be used within the arc flash boundary

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Wed Aug 27 11:16:42 EDT 2025

Committee Statement

Committee Statement: The word “matter” is changed editorially to “manner.” The words “stationary storage” is removed to align with the modified scope statement in Section 360.1.

"Controls" was changed to "control" in (2)(c) Item (1) to align with how controls are applied elsewhere in the standard.

Response Message: SR-124-NFPA 70E-2025

Public Comment No. 83-NFPA 70E-2025 [Section No. 360.3(B)(4)]

Public Comment No. 210-NFPA 70E-2025 [Section No. 360.3(B)(4)]

Public Comment No. 39-NFPA 70E-2025 [Section No. 360.3(B)(4)]

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 125-NFPA 70E-2025 [Section No. 360.3(F)]

(F) Warning Signs.

The following warning signs or labels shall be posted in ~~appropriate~~ locations that are visible to employees before they are exposed to the associated hazards :

(1) Electrical hazard warnings indicating the electric shock hazard, arc flash hazard, and contact thermal hazard based on the results of the battery risk assessment in 360.3(B)

Informational Note No.1: Because internal resistance, prospective short-circuit current, or both are not always provided on battery container labels or data sheets, and because many variables can be introduced into a battery layout, the battery manufacturer should be consulted for accurate data. Variables can include, but are not limited to, the following:

(1) Series connections
(2) Parallel connections
(3) Charging methodology
(4) Temperature
(5) Charge status
(6) Direct-current (dc) distribution cable size and length
(7) Grounding configuration of the battery
(8) The potential for hazardous ac voltage on the battery enclosure or rack

Informational Note No. 2: See 130.5(H) for requirements for equipment labeling.

(2) Chemical hazard warnings, applicable to the worst case when multiple battery types are installed in the same space, indicating the following:

a. Potential presence of explosive gas ~~(when applicable to the battery type)~~
b. Prohibition of open flame and smoking
c. Danger of chemical burns from the electrolyte ~~(when applicable to the battery type)~~

(3) Notice for personnel to use and wear protective equipment and apparel ~~appropriate~~ applicable to the hazard for the battery

(4) Notice prohibiting access to unauthorized personnel

Supplemental Information

File Name	Description	Approved
70E_SR-125_360.3_F_.docx		

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Wed Aug 27 11:18:50 EDT 2025

Committee Statement

Committee Statement: A vague and unenforceable term “appropriate” is removed or replaced with a phrase to address what “appropriate” meant to comply with NEC Style Manual Section 3.2.1. Parenthetical expressions are deleted to comply with the NEC Style Manual Section 3.5.1.1.

Response Message: SR-125-NFPA 70E-2025

Public Comment No. 65-NFPA 70E-2025 [Section No. 360.3(F)]

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 126-NFPA 70E-2025 [Sections 360.4(A)(1), 360.4(A)(2), 360.4(A)(3)]

(1) ~~Head Needed~~ Procedures .

The battery hazardous energy control program shall specify procedures to safeguard workers from exposure to battery electrical hazards.

(2) ~~Head Needed~~ Work Plans .

Employees performing work within the restricted approach boundary of a battery shall plan work to minimize exposure to electric shock and arc flash hazards.

(3) ~~Head Needed~~ Risk Reduction Methods .

Employees performing battery circuit manipulation shall plan work through a sectionalizing procedure or other risk reduction methods.

Exception 1: Work within the restricted approach boundary of an installed battery charger shall not be considered battery circuit manipulation.

Exception 2: A sectionalizing procedure shall not be required for batteries below 100 volts dc or 40 milliamperes.

Informational Note No. 1: Work within the restricted approach boundary of an installed battery charger is ~~more appropriately~~ controlled through complex lockout/tagout according to 120.5(A)(5) as it can be ~~deenergized~~ de-energized and an electrically safe work condition can be established.

Informational Note No. 2: Examples of battery circuit manipulation include bolting, unbolting, connecting, disconnecting, or otherwise increasing or decreasing the series or parallel combination of cells that make up a battery. This might involve work within the limited or restricted approach boundary.

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Wed Aug 27 11:21:32 EDT 2025

Committee Statement

Committee Statement: Titles are provided in 360.4(A)(1), (2) and (3) in accordance with NEC Style Manual Section 2.1.6.3.2 regarding subdivision titles. A vague and unenforceable term “more appropriately” is removed to comply with NEC Style Manual Section 3.2.1.

Response Message: SR-126-NFPA 70E-2025

Public Comment No. 63-NFPA 70E-2025 [Section No. 360.4]

Public Comment No. 100-NFPA 70E-2025 [Section No. 360.4(A)]

Public Comment No. 167-NFPA 70E-2025 [Section No. 360.4(A)(1)]

Public Comment No. 168-NFPA 70E-2025 [Section No. 360.4(A)(2)]

Public Comment No. 169-NFPA 70E-2025 [Section No. 360.4(A)(3)]

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments

0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 127-NFPA 70E-2025 [Section No. 360.4(B)(2)]

(2) Battery Charger Mode.

~~The battery charger~~ Before the battery is sectionalized, battery chargers shall either be placed into bypass mode or turned off~~, deenergized, and locked out prior to sectionalizing the battery~~ .

(3) Lockout/Tagout.

Battery chargers shall be locked out and tagged out in accordance with a documented and established procedure.

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Wed Aug 27 11:23:48 EDT 2025

Committee Statement

Committee Statement: Revised and added a new subdivision to clarify that the requirement to lock applies to both bypass mode and to turned off mode. The requirement to lock it is independent of the requirement to switch it into bypass or off.

Response Message: SR-127-NFPA 70E-2025

Public Comment No. 172-NFPA 70E-2025 [New Section after 360.4(B)(2)]

Public Comment No. 170-NFPA 70E-2025 [Section No. 360.4(B)(2)]

Ballot Results

This item has passed ballot

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.

Gray, Bobby J.
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Hacke, Donald Charles
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Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 128-NFPA 70E-2025 [Section No. 360.4(C)(2)]

(2) Non-Unique Circuit Elements.

Removal or disconnection of non-unique intercell busbars, wires, or other circuit elements shall be permitted for use as ~~lockout~~ energy isolation devices in battery systems if the following conditions are met:

(1) The circuit elements are identified in the sectionalizing procedure.

(2) The visibility of the circuit element's presence or ~~absent~~ absence in the circuit is unobstructed.

(3) Once removed, the circuit elements are, individually or in groups, secured against reinstallation and tagged with REMOVED FOR SECTIONALIZING.

(4) Any similar circuit elements in the work area have been identified and either removed or secured against reinstallation and marked DO NOT USE.

Informational Note No. 1: Locked cabinets or boxes and nylon cable ties are commonly used to secure non-unique circuit elements against reinstallation and to attach ~~the appropriate~~ a tag.

Informational Note No. 2: It is best practice to mark or tag both sides of a circuit element before removal or disconnection to ensure that it is reinstalled properly after completion of work.

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Wed Aug 27 11:25:54 EDT 2025

Committee Statement

Committee Statement: Edited to clarify the "lockout device" was intended to be "energy isolation device".

A vague and unenforceable term "appropriate" is removed from the informational note to comply with NEC Style Manual Section 3.2.1.

Response Message: SR-128-NFPA 70E-2025

Public Comment No. 173-NFPA 70E-2025 [Section No. 360.4(C)(2)]

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.

Barrios, Louis A.

Crow, Daryld Ray

Dollard, Jr., James T.

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Gray, Bobby J.

Guier, Jarod

Hacke, Donald Charles

Harris, William R.

Hickman, Palmer L.

Hilbert, Mark R.

Lubaczewski, Scott

McKinch, Terrance L.

McNellis, Mark

Miller, Charles R.

Mohla, Daleep C.

Niemira, James K.

Norwood, Thomas D.

Pace, David A.

Schamel, Duke W.

Steinman, Gregory J.

Tobias, John M.

West, Rodney J.

Widup, Ron

Wolf, Jason

Second Revision No. 129-NFPA 70E-2025 [Section No. 360.4(D)(3)]

(3) Complex Battery Sectionalizing Procedure.

(a) A complex battery sectionalizing procedure shall be permitted where one or more of the following exists:

(1) Any electrical work on a battery and its charger (non-battery electrical work covered by traditional LOTO)

(2) Multiple battery strings connected in parallel

(3) Multiple battery chargers connected in parallel

(4) Multiple single-string batteries with chargers located near each other

(5) Multiple energy sources (excluding the battery)

(6) Multiple crews

(7) Multiple crafts

(8) Multiple locations

(9) Multiple employers

(10) Multiple disconnecting means

(11) Multiple sequences

(12) Job or task that requires more than one work period

(b) All complex sectionalizing procedures shall require a written plan of execution that identifies the person in charge.

(c) The complex sectionalizing procedure shall vest primary responsibility in an authorized employee for employees working under the protection of a group lockout or tagout device such as an operation lock or lockbox.

(d) The person in charge shall be held accountable for safe execution of the complex sectionalizing procedure.

(e) Each authorized employee shall conduct the following:

(1) Review the battery risk assessment associated with the present configuration of the battery to identify the required protective measures, including PPE.

(2) Affix a personal lock-out or tagout device to the group lockout device, group lockbox, or comparable mechanism when the employee begins work.

(3) Remove those devices when the employee stops working on the battery being serviced or maintained.

(f) All complex sectionalizing plans shall identify the method to account for all persons who might be exposed to electrical hazards in the course of the sectionalizing.

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Wed Aug 27 11:28:12 EDT 2025

Committee Statement

Committee Statement: Edited to clarify that the group sectionalizing procedures should account for how the group moves between risk assessments and PPE in stages. Unlike other equipment batteries stay energized even when disconnected so employees need to understand the present condition of the battery to know what controls are needed to keep them safe.

Response Message: SR-129-NFPA 70E-2025

Public Comment No. 174-NFPA 70E-2025 [Section No. 360.4(D)(3)]

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron

Wolf, Jason

Second Revision No. 130-NFPA 70E-2025 [Section No. 360.4(E)(4)]

(4) Initial Assembly, Installation, or Release for Return to Service.

(a) The procedure shall identify steps to be taken when the job or task requiring battery sectionalizing is completed.

(b) The procedure shall identify the means and the order that battery circuit connections are to be made in and any resulting changes in the battery risk assessment in accordance with 360.3(B) .

(c) The procedure shall identify ~~any wires or flexible~~ the method and sequence to install circuit elements ~~that could be reinstalled improperly resulting in~~ to avoid a battery short circuit.

(c) ~~Reinstallation of these circuit elements shall be identified in the procedure as having an elevated risk of short circuit.~~

(c) ~~When returning a battery to service, employees shall wear the identified PPE prior to making any circuit connection that increases the risk of shock, thermal, or arc flash hazard.~~

(d) When ~~returning a battery to service~~ performing battery circuit manipulation , employees shall wear the PPE identified ~~PPE~~ for the resulting circuit configuration prior to making any circuit connection that increases the risk of electric shock, contact thermal, or arc flash hazard.

Supplemental Information

File Name	Description	Approved
attchment_for_SR_120_360.4_E_4_.docx	attachment for SR 120 360.4(E)(4)	
70E_SR-130_360.4_E_4_.docx	For prod use	

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Wed Aug 27 11:32:19 EDT 2025

Committee Statement

Committee Statement: Changed title to be more inclusive of all work activities that are related to assembling battery systems.

Redundant requirements and subdivisions were removed or relocated, and new subdivisions were added to clarify the requirements for the written procedure to address hazard during assembly of battery systems.

Changed subdivision (d) to be more inclusive of all work activities that are related to assembling battery systems.

Response Message: SR-130-NFPA 70E-2025

Public Comment No. 175-NFPA 70E-2025 [Section No. 360.4(E)(4)]

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All

0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 133-NFPA 70E-2025 [Section No. 370.5(B)]

(B) Personnel Protection.

~~Safety-related work practices shall be used to safeguard employees from injury while they are exposed to electrical hazards from exposed electrical conductors or circuit parts that are or can become energized. The specific safety-related work practices shall be consistent with the electrical hazard(s) and the associated risk. For calibration and adjustment of equipment as it pertains to sensors, motor controllers, control hardware, and other devices that need to be installed inside equipment or control cabinet, surrounded by electrical hazards, the ESA shall define the required PPE based on the risk and exposure.~~

~~Use of electrical insulating blankets, covers, or barriers shall be permitted to prevent inadvertent contact to exposed terminals and conductors. Insulated/nonconductive adjustment and alignment tools shall be used where feasible.~~ The following shall apply to personnel protection:

(1) Safety-related work practices shall be used to safeguard employees from injury while they are exposed to electrical hazards from exposed electrical conductors or circuit parts that are or can become energized.

(2) The specific safety-related work practices shall be consistent with the electrical hazard(s) and the associated risk.

(3) For calibration and adjustment of equipment as it pertains to sensors, motor controllers, control hardware, and other devices that need to be installed inside equipment or control cabinet, surrounded by electrical hazards, the ESA shall define the required PPE based on the risk and exposure.

(4) Use of electrical insulating blankets, covers, or barriers shall be permitted to prevent inadvertent contact to exposed terminals and conductors.

(5) Insulated/nonconductive adjustment and alignment tools shall be used where feasible.

Supplemental Information

File Name	Description	Approved
70E_SR-133_370.5_B_.docx		

Submitter Information Verification

Committee: EEW-AAA

Submittal Date: Wed Aug 27 11:37:31 EDT 2025

Committee Statement

Committee Statement: Added list items and charging statement to comply with the NEC Style Manual Section 3.5.1.2, which states that multiple requirements within a single subdivision shall be avoided. Lists are used to express independent requirements.

Response Message: SR-133-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul

Dyson, Thomas B.

Katekar, Chaitanya

Stallcup, James G.

Affirmative All

Barnhart, Paul D.

Barrios, Louis A.

Crow, Daryld Ray

Dollard, Jr., James T.

Gallo, Ernest J.

Gray, Bobby J.

Guier, Jarod

Hacke, Donald Charles

Harris, William R.

Hickman, Palmer L.

Hilbert, Mark R.

Lubaczewski, Scott

McKinch, Terrance L.

McNellis, Mark

Miller, Charles R.

Mohla, Daleep C.

Niemira, James K.

Norwood, Thomas D.

Pace, David A.

Schamel, Duke W.

Steinman, Gregory J.

Tobias, John M.

West, Rodney J.

Widup, Ron

Wolf, Jason

Second Revision No. 132-NFPA 70E-2025 [Section No. 370.5 [Excluding any Sub-Sections]]

Each laboratory or R&D system application shall designate a qualified person ~~as defined in this article~~ to ensure the use of ~~appropriate~~ electrical safety-related work practices and controls.

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Wed Aug 27 11:36:17 EDT 2025

Committee Statement

Committee Statement: A vague and unenforceable term “appropriate” is removed to comply with NEC Style Manual Section 3.2.1. Removed “as defined in this article”, as a qualified person is defined in Article 100.

Response Message: SR-132-NFPA 70E-2025

Public Comment No. 101-NFPA 70E-2025 [Section No. 370.5 [Excluding any Sub-Sections]]

Public Comment No. 67-NFPA 70E-2025 [Section No. 350.5]

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles

Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 134-NFPA 70E-2025 [Section No. 370.7(A)(1)]

(1) Marking.

~~Marking of equipment shall be required for, but not limited to, equipment fabricated, designed, or developed for research testing and evaluation of electrical systems. Marking shall sufficiently list all voltages entering and leaving control cabinets, enclosures, and equipment.~~

~~Caution, Warning, or Danger labels shall be affixed to the exterior describing specific hazards and safety concerns.~~

(a) Marking of equipment shall be required for, but not limited to, the equipment fabricated, designed, or developed for research testing and the evaluation of electrical systems.

(b) Marking shall sufficiently list all the voltages entering and leaving control cabinets, enclosures, and equipment.

(c) Caution, Warning, or Danger labels shall be affixed to the exterior describing specific hazards and safety concerns.

Informational Note: See ANSI Z535, *Series of Standards for Safety Signs and Tags*, for more information on precautionary marking of electrical systems or equipment.

Supplemental Information

File Name	Description	Approved
70E_SR-134_370.7_A_1_.docx		

Submitter Information Verification

Committee: EEW-AAA

Submittal Date: Wed Aug 27 11:39:34 EDT 2025

Committee Statement

Committee Statement: Added subdivisions to comply with the NEC Style Manual Section 3.5.1.2, which states that multiple requirements within a single subdivision shall be avoided. Additional subdivisions are used to express independent requirements.

Response Message: SR-134-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul

Dyson, Thomas B.

Katekar, Chaitanya
Stallcup, James G.

Affirmative All
Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 135-NFPA 70E-2025 [Section No. 370.7(A)(2)]

(2) Documentation.

~~Sufficient documentation shall be provided and readily available to personnel that install, operate, and maintain equipment that describes operation, shutdown, safety concerns, and nonstandard installations.~~

~~Schematics, drawings, and bill of materials describing power feeds, voltages, currents, and parts used for construction, maintenance, and operation of the equipment shall be provided.~~

(a) Sufficient documentation shall be provided and readily available to personnel that install, operate, and maintain equipment that describes operation, shutdown, safety concerns, and nonstandard installations.

(b) Schematics, drawings, and bill of materials describing power feeds, voltages, currents, and parts used for construction, maintenance, and operation of the equipment shall be provided.

Supplemental Information

File Name	Description	Approved
70E_SR-135_370.7_A_2_.docx		

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Wed Aug 27 11:40:53 EDT 2025

Committee Statement

Committee Statement: Added subdivisions to comply with the NEC Style Manual Section 3.5.1.2, which states that multiple requirements within a single subdivision shall be avoided. Additional subdivisions are used to express independent requirements.

Response Message: SR-135-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
24 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.

Crow, Daryld Ray

Dollard, Jr., James T.

Gallo, Ernest J.

Gray, Bobby J.

Guier, Jarod

Hacke, Donald Charles

Harris, William R.

Hickman, Palmer L.

Hilbert, Mark R.

Lubaczewski, Scott

McKinch, Terrance L.

McNellis, Mark

Miller, Charles R.

Mohla, Daleep C.

Niemira, James K.

Norwood, Thomas D.

Pace, David A.

Schamel, Duke W.

Steinman, Gregory J.

Tobias, John M.

West, Rodney J.

Widup, Ron

Wolf, Jason

Affirmative with Comment

Barrios, Louis A.

For the next edition I recommend changing list item (a) to "Sufficient documentation that describes operation, shutdown, safety concerns, and nonstandard installations shall be provided and readily available to personnel that install, operate, and maintain equipment." This relocates the series describing the documentation to immediately follow it.

Second Revision No. 136-NFPA 70E-2025 [Section No. 370.7(A)(3)]

(3) Shutdown Procedures.

~~Safety requirements and emergency shutdown procedures of equipment shall include lockout/tagout (LOTO) requirements. If equipment-specific LOTO is required, then documentation outlining this procedure and PPE requirements shall be made readily available.~~

(a) Safety requirements and emergency shutdown procedures of equipment shall include lockout/tagout (LOTO) requirements.

(b) If equipment-specific LOTO is required, then documentation outlining this procedure and PPE requirements shall be made readily available.

Supplemental Information

File Name	Description	Approved
70E_SR-136_370.7_A_3_.docx		

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Wed Aug 27 11:41:58 EDT 2025

Committee Statement

Committee Statement: Added subdivisions to comply with the NEC Style Manual Section 3.5.1.2, which states that multiple requirements within a single subdivision shall be avoided. Additional subdivisions are used to express independent requirements.

Response Message: SR-136-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.

Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 137-NFPA 70E-2025 [Section No. 370.7(A)(5)]

(5) Approvals.

~~Drawings, standard operational procedures, and equipment shall be approved by the ESA on site before initial startup. Assembly of equipment shall comply with national standards where applicable unless research application requires exceptions. Equipment that does not meet the applicable standards shall be required to be approved by the ESA. Proper safety shutdown procedures and PPE requirements shall be considered in the absence of grounding and/or bonding.~~

(a) Drawings, standard operational procedures, and equipment shall be approved by the ESA on site before initial startup.

(b) Assembly of equipment shall comply with national standards where applicable unless research application requires exceptions.

(c) Equipment that does not meet the applicable standards shall be required to be approved by the ESA.

(d) ~~Proper safety~~ Safety shutdown procedures and PPE requirements shall be considered in the absence of grounding and/or bonding.

Supplemental Information

File Name	Description	Approved
70E_SR-137_370.7_A_5_.docx		

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Wed Aug 27 11:42:55 EDT 2025

Committee Statement

Committee Statement: Added subdivisions to comply with the NEC Style Manual Section 3.5.1.2, which states that multiple requirements within a single subdivision shall be avoided. Additional subdivisions are used to express independent requirements.

The term “proper” is removed as it is vague and unenforceable in accordance with the NEC Style Manual.

Response Message: SR-137-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 138-NFPA 70E-2025 [Section No. 370.7(B)]

(B) Tools, Training, and Maintenance.

~~Documentation shall be provided if special tools, unusual PPE, or other equipment is necessary for proper maintenance and operation of equipment. The ESA shall make the determination of appropriate training and qualifications required to perform specific tasks.~~

(1) Documentation.

Documentation shall be provided if special tools, unusual PPE, or other equipment is necessary for ~~proper~~ maintenance and operation of equipment.

(2) Training Qualifications.

The ESA shall make the determination of ~~appropriate~~ training and qualifications required to perform specific tasks.

Supplemental Information

File Name	Description	Approved
70E_SR-138_370.7_B_.docx		

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Wed Aug 27 11:44:20 EDT 2025

Committee Statement

Committee Statement: Added subdivisions and titles to comply with the NEC Style Manual Section 3.5.1.2, which states that multiple requirements within a single subdivision shall be avoided. Additional subdivisions are used to express independent requirements.

Vague and unenforceable terms “appropriate” and “proper” are removed to comply with NEC Style Manual Section 3.2.1.

Response Message: SR-138-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
23 Affirmative All
2 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul

Dyson, Thomas B.

Katekar, Chaitanya

Stallcup, James G.

Affirmative All

Barnhart, Paul D.

Crow, Daryld Ray

Dollard, Jr., James T.

Gallo, Ernest J.

Gray, Bobby J.

Guier, Jarod

Hacke, Donald Charles

Harris, William R.

Hickman, Palmer L.

Hilbert, Mark R.

Lubaczewski, Scott

McKinch, Terrance L.

McNellis, Mark

Miller, Charles R.

Mohla, Daleep C.

Norwood, Thomas D.

Pace, David A.

Schamel, Duke W.

Steinman, Gregory J.

Tobias, John M.

West, Rodney J.

Widup, Ron

Wolf, Jason

Affirmative with Comment

Barrios, Louis A.

As noted in the Committee Statement, "proper" should be deleted from second level subdivision (1). Also, the title of the second subdivision should be "Training and Qualifications" and not "Training Qualifications" based on the content of the clause.

Niemira, James K.

delete the word "proper" from 370.7(B)(1): change from: "...or other equipment is necessary for proper maintenance and operation..." change to: "...or other equipment is necessary for maintenance and operation..."

Second Revision No. 139-NFPA 70E-2025 [Section No. 370.8]

390.8 Custom Built, Unlisted Research Equipment, >1000 Volts ac or dc.

~~Installations shall comply with all requirements of 390.7 .~~

~~In the event that research equipment requires PPE beyond what is commercially available, the ESA shall determine safe work practices and PPE to be used.~~

(A) Installations.

Installations shall comply with all requirements of 390.7.

(B) PPE.

In the event that research equipment requires PPE beyond what is commercially available, the ESA shall determine safe work practices and PPE to be used.

Supplemental Information

File Name	Description	Approved
70E_SR-139_370.8.docx		

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Wed Aug 27 11:46:12 EDT 2025

Committee Statement

Committee Statement: Added subdivisions and titles to comply with the NEC Style Manual Section 3.5.1.2, which states that multiple requirements within a single subdivision shall be avoided. Additional subdivisions are used to express independent requirements.

Response Message: SR-139-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 140-NFPA 70E-2025 [Section No. 380.1]

370.1 Scope.

This article covers electrical safety requirements for the practical safeguarding of employees while working with exposed electrical double layer capacitors (EDLCs) that ~~exceed 100 volts dc nominal or a theoretical maximum power exceeding 1000 watts~~ present an electrical hazard .

370.2 Exposure Levels.

Risk control shall be selected and applied from the hierarchy of risk control where any of the hazard thresholds identified in 310.2 are exceeded.

Informational Note: The theoretical maximum power for EDLCs is calculated as V*V/(4*R), where V is the initial voltage across the string of capacitors and R is the equivalent series resistance of the string of capacitors, including all connection resistances.

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Wed Aug 27 11:49:32 EDT 2025

Committee Statement

Committee Statement: Removed required energy thresholds from scope statement and made new Section 380.2 to define the thresholds and added informational note about calculating theoretical maximum power for EDLCs.

Response Message: SR-140-NFPA 70E-2025

Public Comment No. 205-NFPA 70E-2025 [New Section after 380.2(A)]

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
24 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Crow, Daryld Ray
Dollard, Jr., James T.

Gallo, Ernest J.

Gray, Bobby J.

Guier, Jarod

Hacke, Donald Charles

Harris, William R.

Hickman, Palmer L.

Hilbert, Mark R.

Lubaczewski, Scott

McKinch, Terrance L.

McNellis, Mark

Miller, Charles R.

Mohla, Daleep C.

Niemira, James K.

Norwood, Thomas D.

Pace, David A.

Schamel, Duke W.

Steinman, Gregory J.

Tobias, John M.

West, Rodney J.

Widup, Ron

Wolf, Jason

Affirmative with Comment

Barrios, Louis A.

I recommend changing the phrase "Risk control shall be selected and applied from the hierarchy of risk control..." to "Risk control measures shall be selected and applied from the hierarchy of risk control..." for readability. Addition of the word "measures" correlates with 360.3(B)(2)(b) list item 1 where the phrase "additional protective measures" is used.

Second Revision No. 141-NFPA 70E-2025 [Section No. 380.2(B)(4)]

(4) PPE.

~~The appropriate~~ PPE ~~for the hazards~~ shall be ~~determined meeting~~ selected in accordance with the following ~~conditions~~ :

(1) Contact thermal hazard ~~— the appropriate thermal~~ : Thermal PPE shall be in accordance with 130.7(C)(7)(e) if the theoretical maximum power of the exposed part is greater than 1000 watts.

(2) Electric shock hazard ~~— the appropriate electric~~ : Electric shock PPE shall be in accordance with ~~130.7 if~~ 130.7(C) if the voltage is greater than ~~or equal to~~ 100 volts dc.

(3) Arc flash ~~at the appropriate working distance — the appropriate protection for the arc flash, as follows:~~ hazard: Arc flash PPE shall be in accordance with 130.7(C) if the voltage exceeds 150 volts dc and the incident energy exceeds 1.2 cal/cm^2 (5 J/cm^2) at the working distance.

~~Alerting techniques in accordance with 130.8(O) to warn employees of the hazards~~

Submitter Information Verification

Committee: EEW-AAA

Submittal Date: Wed Aug 27 11:51:34 EDT 2025

Committee Statement

Committee Statement: Removed the vague and unenforceable term "appropriate" per the NEC Style Manual, Section 3.2.1 and made the list items parallel structure per the NEC Style Manual, Section 3.5.5.2. Since alerting techniques are already addressed in 130.8(O), it was removed.

Response Message: SR-141-NFPA 70E-2025

Public Comment No. 127-NFPA 70E-2025 [Section No. 380.2(B)(4)]

Public Comment No. 207-NFPA 70E-2025 [Section No. 380.2(B)(4)]

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul

Dyson, Thomas B.

Katekar, Chaitanya

Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 142-NFPA 70E-2025 [Section No. 380.3(B)(1)]

(1) EDLC Discharge.

~~Unless a discharge method is provided by the manufacturer, an appropriately sized and safeguarded resistor shall be selected, and a method shall be described to fully discharge the EDLC system.~~

(a) Unless a discharge method is provided by the manufacturer, ~~an appropriately sized and safeguarded resistor~~ a guarded resistor that is rated to discharge the system shall be selected.

(b) A method shall be described to fully discharge the EDLC system.

Supplemental Information

File Name	Description	Approved
70E_SR-142_380.3_B_1_.docx		

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Wed Aug 27 11:57:45 EDT 2025

Committee Statement

Committee Statement: Added subdivisions to comply with the NEC Style Manual Section 3.5.1.2, which states that multiple requirements within a single subdivision shall be avoided. Additional subdivisions are used to express independent requirements.

A vague and unenforceable term “appropriately” is removed and replaced to comply with NEC Style Manual Section 3.2.1.

Response Message: SR-142-NFPA 70E-2025

Public Comment No. 128-NFPA 70E-2025 [Section No. 380.3(B)(1)]

Public Comment No. 209-NFPA 70E-2025 [Section No. 380.3(B)(1)]

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.

Barrios, Louis A.

Crow, Daryld Ray

Dollard, Jr., James T.

Gallo, Ernest J.

Gray, Bobby J.

Guier, Jarod

Hacke, Donald Charles

Harris, William R.

Hickman, Palmer L.

Hilbert, Mark R.

Lubaczewski, Scott

McKinch, Terrance L.

McNellis, Mark

Miller, Charles R.

Mohla, Daleep C.

Niemira, James K.

Norwood, Thomas D.

Pace, David A.

Schamel, Duke W.

Steinman, Gregory J.

Tobias, John M.

West, Rodney J.

Widup, Ron

Wolf, Jason

Second Revision No. 143-NFPA 70E-2025 [Section No. 380.3(C)(1)]

(1) Uninstalled Capacitors.

~~All~~ After being discharged, uninstalled capacitors shall be short-circuited with a conductor ~~of appropriate size after being discharged~~ that is sized to maintain the capacitors in a discharged state and withstand mechanical abuse during storage and transport .

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Wed Aug 27 12:00:01 EDT 2025

Committee Statement

Committee Statement: Deleted the vague and unenforceable term "appropriate" per the NEC Style Manual, Section 3.2.1, and clarified the shorting is both for discharge state and mechanical abuse during storage and transport.

Response Message: SR-143-NFPA 70E-2025

Public Comment No. 129-NFPA 70E-2025 [Section No. 380.3(C)(1)]

Public Comment No. 211-NFPA 70E-2025 [Section No. 380.3(C)(1)]

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod

Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 144-NFPA 70E-2025 [Sections 390.1, 390.2, 390.3, 390.4]

380.1 Scope.

This article covers electrical safety requirements for the practical safeguarding of employees while working on ~~dc~~ photovoltaic (PV) arrays, which present an electrical hazard .

Informational Note: See other articles in Chapter 3 for hazards associated with the other components of PV systems, such as combiner boxes and inverters.

380.2 ~~Energy Hazard Thresholds~~ Exposure Levels .

~~Appropriate controls shall be applied where~~ Risk control shall be selected and implemented from the hierarchy of risk control if any of the following thresholds are exceeded:

(1) Direct-current (dc) contact thermal hazard: 1000 watts

(2) Direct-current (dc) electric shock hazard: 100 volts and 40 milliamperes

(3) Direct-current (dc) arc flash hazard: 150 volts and 1.2 cal/cm^2

380.3 Electrical Safety Training.

(A) Application of Training Requirements.

The training requirements shall apply to employees exposed to electrical hazards associated with work on or near PV arrays, including the interconnected photovoltaic equipment, and collection systems.

(B) Qualified Person Training.

Employees who install, operate, maintain, or repair PV installations and equipment shall be trained to do the following:

(1) Understand the operating characteristics of the PV modules and equipment with which they will work.

(2) Recognize the continuously energized nature of PV panels.

(3) Perform a risk assessment for energized electrical work.

(4) Develop and follow procedures that minimize exposure.

(5) Use control measures, including PPE, to prevent injury.

380.4 Qualified Person.

Only qualified persons shall work on PV installations and equipment.

380.5 PV Risk Assessment.

Prior to any work on an energized PV array, a risk assessment shall be performed to identify the contact thermal, ~~electrical~~ electric shock, and arc flash hazards and assess the risks associated with the type of tasks to be performed.

380.6 Specific Work Procedures.

(A) ~~Hazard Thresholds~~ Job Safety Plan .

~~No~~ If work ~~shall be~~ is performed on an exposed PV ~~terminals~~ terminal greater than the contact thermal, electric shock, or arc flash thresholds, a risk assessment shall be documented in the written job safety plan .

(B) Conductor Manipulation.

Before manipulating any connectors on an energized system ~~(plugging or unplugging)~~ , a risk assessment shall be performed to determine the maximum open circuit voltage that would be generated and the maximum current to be interrupted.

Informational Note: This risk assessment will determine if the action can be performed safely and what PPE would be required.

(C) Plugging and Unplugging Connectors.

~~Robust procedures~~ Procedures for plugging and unplugging connectors on an energized PV system shall be developed that ~~consider the possibility of making wrong connections and creating a short circuit and the controls necessary to prevent such a situation.~~ include the following:

(1) Prevention of connections that create a short circuit and the controls necessary to prevent such a situation~~.~~

(2) Verification of no load current prior to disconnecting

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Wed Aug 27 12:01:27 EDT 2025

Committee Statement

Committee Statement: Clarified in the scope statement that this article is only applicable to the DC hazards of PV arrays. A new informational note notifies users that other PV equipment is covered by other articles.

The vague and unenforceable term “appropriate” is removed and replaced with a phrase that aligns with how controls are applied elsewhere in the standard and to comply with NEC Style Manual Section 3.2.1.

Added a new section for employee training to clarify the specific PV related training needed to work on these systems.

In the specific procedure section, language was clarified for usability.

Deleted and replaced the vague and unenforceable term "robust" per the NEC Style Manual, Section 3.2.1.

Response Message: SR-144-NFPA 70E-2025 RESPONSE TO 126: Risk assessment was not changed as it is redundant to existing language. The information note was not added as it included a requirement.

Public Comment No. 226-NFPA 70E-2025 [Article 390]

Public Comment No. 34-NFPA 70E-2025 [Section No. 390.1]

Public Comment No. 130-NFPA 70E-2025 [Section No. 390.2]

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
23 Affirmative All
1 Affirmative with Comments
1 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul

Dyson, Thomas B.

Katekar, Chaitanya

Stallcup, James G.

Affirmative All

Barnhart, Paul D.

Crow, Daryld Ray

Dollard, Jr., James T.

Gallo, Ernest J.

Gray, Bobby J.

Guier, Jarod

Hacke, Donald Charles

Harris, William R.

Hickman, Palmer L.

Hilbert, Mark R.

Lubaczewski, Scott

McKinch, Terrance L.

McNellis, Mark

Miller, Charles R.

Mohla, Daleep C.

Niemira, James K.

Norwood, Thomas D.

Pace, David A.

Steinman, Gregory J.

Tobias, John M.

West, Rodney J.

Widup, Ron

Wolf, Jason

Affirmative with Comment

Barrios, Louis A.

380.1 Scope is grammatically incorrect. As currently written, use of the term "which" implies all PV systems "present an electrical hazard". This article only applies to PV systems "that" present an electrical hazard. Change 380.1 as follows: "This article covers electrical safety requirements for the practical safeguarding of employees while working on photovoltaic (PV) arrays that present an electrical hazard". The phrase "that present an electrical hazard" is correctly stated in 360.1 and 370.1. I recommend changing the phrase "Risk control shall be selected and implemented from the hierarchy of risk control..." to "Risk control measures shall be selected and applied from the hierarchy of risk control..." for readability. Addition of the word "measures" correlates with 360.3(B)(2)(b) list item 1 where the phrase "additional protective measures" is used. Also, "applied" replaces "implemented" for consistency with how this phrase is applied elsewhere in Chapter 3.

Negative with Comment

Schamel, Duke W.

Remove Section 380.4 because it is unnecessary, as the topic of “qualified person” is thoroughly covered in Section 110.4(2). This requirement might be misinterpreted as needing a concrete worker to be trained in bi-directional power flow and other complex electrical hazards related to PV systems, which are unrelated to the concrete worker’s specific job duties.

Second Revision No. 159-NFPA 70E-2025 [Section No. A.3.1]

A.3.1 ANSI Publications.

American National Standards Institute, Inc., ~~25 West 43rd Street~~ 1180 Avenue of the Americas , ~~4th~~ 10th Floor, New York, NY 10036.

ANSI/ASC A14.1, *American National Standard for Ladders — Wood — Safety Requirements,*~~2007~~ 2017 .

ANSI/ASC A14.3, *American National Standard for Ladders — Fixed — Safety Requirements,* 2008, reaffirmed 2018 .

ANSI/ASC A14.4, *American National Standard Safety Requirements for Job Made Wooden Ladders,*~~2009~~ 2018 .

ANSI/ASC A14.5, *American National Standard for Ladders — Portable Reinforced Plastic — Safety Requirements,*~~2007~~ 2017 .

ANSI C84.1, *Electric Power Systems and Equipment — Voltage Ratings (60 Hz)*, ~~2011~~ 2020 .

ANSI/AIHA Z10, *American National Standard for Occupational Health and Safety Management Systems*, ~~2012~~ 2019 .

ANSI Z535, *Series of Standards for Safety Signs and Tags,*~~2011~~ 2022 .

ANSI Z535.4, *Product Safety Signs and Labels*, ~~2011~~ 2023 .

ANSI/NETA MTS, *Standard for Maintenance Testing Specifications for Electrical Power Distribution Equipment and Systems*, ~~2011~~ 2023 .

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Wed Aug 27 12:54:04 EDT 2025

Committee Statement

Committee Statement: Referenced standards are updated to current edition.
Response Message: SR-159-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.

Barrios, Louis A.

Crow, Daryld Ray

Dollard, Jr., James T.

Gallo, Ernest J.

Gray, Bobby J.

Guier, Jarod

Hacke, Donald Charles

Harris, William R.

Hickman, Palmer L.

Hilbert, Mark R.

Lubaczewski, Scott

McKinch, Terrance L.

McNellis, Mark

Miller, Charles R.

Mohla, Daleep C.

Niemira, James K.

Norwood, Thomas D.

Pace, David A.

Schamel, Duke W.

Steinman, Gregory J.

Tobias, John M.

West, Rodney J.

Widup, Ron

Wolf, Jason

Second Revision No. 160-NFPA 70E-2025 [Section No. A.3.2]

A.3.2 ASTM Publications.

ASTM International, 100 Barr Harbor Drive, P.O Box C700, West Conshohocken, PA 19428-2959.

ASTM D120, *Standard Specification for Rubber Insulating Gloves*, ~~2014a~~ 2022 .

ASTM D1048, *Standard Specification for Rubber Insulating Blankets,*~~2014~~ 2024 .

ASTM D1049, *Standard Specification for Rubber Insulating Covers,* 1998 ~~(R 2017)~~ , revised 2022 .

ASTM D1050, *Standard Specification for Rubber Insulating Line Hoses,* 2005 ~~(R 2017)~~ , revised 2022 .

ASTM D1051, *Standard Specification for Rubber Insulating Sleeves*, ~~2014a~~ 2023 .

ASTM F478, *Standard Specification for In-Service Care of Insulating Line Hose and Covers*, 2014a (R 2023) .

ASTM F479, *Standard Specification for In-Service Care of Insulating Blankets,* 2006 ~~(R 2017)~~ , revised 2022 .

ASTM F496, *Standard Specification for In-Service Care of Insulating Gloves and Sleeves*, ~~2014a~~ 2024 .

ASTM F696, *Standard Specification for Leather Protectors for Rubber Insulating Gloves and Mittens,*~~2006 (R 2011)~~ 2024 .

ASTM F711, *Standard Specification for Fiberglass-Reinforced Plastic (FRP) Rod and Tube Used in Live Line Tools,* 2017, revised 2022 .

ASTM F712, *Standard Test Methods and Specifications for Electrically Insulating Plastic Guard Equipment for Protection of Workers,*~~2006 (R 2011)~~ 2024 .

ASTM F855, *Standard Specification for Temporary Protective Grounds to Be Used on De-energized Electric Power Lines and Equipment*, ~~2017~~ 2023 .

ASTM F887, *Standard Specification for Personal Climbing Equipment*, ~~2016~~ 2023 .

ASTM F1116, *Standard Test Method for Determining Dielectric Strength of Dielectric Footwear*, ~~2014a~~ 2021 .

ASTM F1117, *Standard Specification for Dielectric Footwear*, 2003 ~~(R 2013)~~ , revised 2019 .

ASTM F1236, *Standard Guide for Visual Inspection of Electrical Protective Rubber Products,*~~2016~~ 2025a .

ASTM F1296, *Standard Guide for Evaluating Chemical Protective Clothing*, ~~2015~~ 2008, revised 2023 .

ASTM F1449, *Standard Guide for Industrial Laundering of Flame, Thermal, and Arc Resistant Clothing*, ~~2015~~ 2020 .

ASTM F1505, *Standard Specification for Insulated and Insulating Hand Tools,* 2016, revised 2021 .

ASTM F1506, *Standard Performance Specification for Flame Resistant and Electric Arc Rated Protective Clothing Worn by Workers Exposed to Flames and Electric Arcs*, ~~2018~~ 2022 .

ASTM F1742, *Standard Specification for PVC Insulating Sheeting*, 2003 ~~(R 2011)~~ , revised 2024 .

ASTM F1891, *Standard Specification for Arc and Flame Resistant Rainwear,*~~2012~~ 2025 .

ASTM F1959/F1959M, *Standard Test Method for Determining the Arc Rating of Materials for Clothing,*~~2014~~ 2024b .

ASTM F2178 /F2178M , *Standard Test Method for Determining the Arc Rating and Standard Specification for Eye or Face Protective Products*, ~~2017b~~ 2023a .

ASTM F2249, *Standard Specification for In-Service Test Methods for Temporary Grounding Jumper Assemblies Used on De-energized Electric Power Lines and Equipment*, ~~2003 (R 2015)~~ 2024 .

ASTM F2320, *Standard Specification for Rubber Insulating Sheeting*, ~~2011~~ 2018, revised 2022 .

ASTM F2412, *Standard Test Methods for Foot Protections*, ~~2018~~ 2024 .

ASTM F2413, *Standard Specification for Performance Requirements for Protective (Safety) Toe Cap Footwear*, ~~2017~~ 2024 .

ASTM F2522, *Standard Test Method for Determining the Protective Performance of a Shield Attached on Live Line Tools or on Racking Rods for Electric Arc Hazards*, ~~2017~~ 2012, revised 2022 .

ASTM F2675/F2675M, *Standard Test Method for Determining Arc Ratings of Hand Protective Products Developed and Used for Electrical Arc Flash Protection*, ~~2013~~ 2023 .

ASTM F2676, *Standard ~~Test Method for Determining the Protective Performance of an Arc Protective Blanket for Electric Arc Hazards~~ Specification for Arc Protective Blankets* , ~~2016~~ 2022 .

ASTM F2677, *Standard Specification for Electrically Insulating Aprons*, ~~(R 2013)~~ 2008a, revised 2024 .

ASTM F2757, *Standard Guide for Home Laundering Care and Maintenance of ~~Flame, Thermal, and Arc Resistant~~ Flame Resistant Rated Clothing*, ~~2016~~ 2020 .

ASTM F3258, *Standard Specification for Protectors for Rubber Insulating Gloves Meeting Specific Performance Requirements*, 2023 .

ASTM F3272, *Standard Guide for Selection, Care, and Use of Arc Protective Blankets*, ~~2018~~ 2023 .

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Wed Aug 27 12:56:33 EDT 2025

Committee Statement

Committee Statement: Referenced standards are updated to current edition.
Response Message: SR-160-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.

Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 161-NFPA 70E-2025 [Section No. A.3.3]

A.3.3 IEC Publications.

International Electrotechnical Commission, 3, rue de Varembé, P.O. Box 131, CH-1211 Geneva 20, Switzerland.

IEC TS 60479-1, *Effects of Current on Human Beings and Livestock, Part 1: General Aspects*, ~~4th edition, 2016~~ 2018 .

IEC TS 60479-2, *Effects of Current on Human Beings and Livestock, Part 2: Special Aspects*, ~~3rd edition, 2007~~ 2019 .

IEC 61243-1, *Live Working — Voltage Detectors — Part 1: Capacitive type to be used for voltages exceeding 1kV a.c.*, 2021.

IEC 61243-2, *Live Working — Voltage Detectors — Part 2: Resistive type to be used for voltages of 1kV to 36 kV a.c.*, 1995, amendment 2, 2002.

IEC 61243-3, *Live Working — Voltage Detectors — Part 3: Two-pole low voltage type*, 2014.

IEC 61482-1-1, *Live working — Protective clothing against the thermal hazards of an electric arc — Part 1-1: Test methods — Method 1: Determination of the arc rating (ELIM, ATPV, and/or EBT) of clothing materials and of protective clothing using an open arc*, 2019 .

IEC 61482-2, *Live working — Protective clothing against the thermal hazards of an electric arc — Part 2: Requirements*, 2018 .

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Wed Aug 27 13:06:48 EDT 2025

Committee Statement

Committee Statement: Referenced standards are updated to current edition.
Response Message: SR-161-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 162-NFPA 70E-2025 [Section No. A.3.4]

A.3.4 IEEE Publications.

~~Institute of Electrical and Electronics Engineers,~~ IEEE Operations Center, 445 Hoes Lane, ~~P. O. Box 1331,~~ Piscataway, NJ ~~08855-1331~~ 08854-4141 .

IEEE C2, *National Electrical Safety Code*, 2023.

IEEE C37.20.6, *Standard for 4.76 kV to 38 kV Rated Ground and Test Devices Used in Enclosures*, 2024.

IEEE C37.20.7, ~~*Guide*~~ *Recommended Practice for Testing Switchgear Rated up to 52 kV for Internal Arcing Faults*, ~~2007/Corrigendum 1, 2010~~ 2024 .

IEEE C95.1, *IEEE Standard for Safety Levels with Respect to Human Exposure to Electric, Magnetic, and Electromagnetic Fields, 0 Hz to 300 GHz*, 2019, corrigendum 2, 2020 .

IEEE 450, *IEEE Recommended Practice for Maintenance, Testing, and Replacement of Vented Lead-Acid Batteries for Stationary Applications*, ~~2010~~ 2020 .

IEEE 463, *Electrical Safety Practices in Electrolytic Cell Line Working Zones*, ~~2013~~ 2019 .

IEEE 516, *Guide for Maintenance Methods on Energized Power Lines*, 2021, corrigendum 2, 2020 .

IEEE 937, *Recommended Practice for Installation and Maintenance of Lead-Acid Batteries for Photovoltaic Systems*, ~~2007~~ 2019 .

IEEE 946, *Recommended Practice for the Design of DC Auxiliary Powers Systems for Generating Stations* , 2020.

IEEE 1106, *Recommended Practice for Installation, Maintenance, Testing, and Replacement of Vented Nickel-Cadmium Batteries for Stationary Applications*, ~~2010~~ 2015 .

IEEE 1184, *Guide for Batteries for Uninterruptible Power Supply Systems*, ~~2006~~ 2022 .

IEEE 1188a , *Recommended Practice for Maintenance, Testing, and Replacement of Valve-Regulated Lead-Acid (VRLA) Batteries for Stationary Applications*, ~~2005 (R 2010)~~ 2014 .

IEEE 1491, *Guide for Selection and Use of Battery Monitoring Equipment in Stationary Applications*, 2012.

IEEE 1584™, *Guide for Performing Arc Flash Hazard Calculations*, 2018.

IEEE/ASHRAE 1635, *Guide for the Ventilation and Thermal Management of Batteries for Stationary Applications*, ~~2018~~ 2022 .

IEEE 1657, *Recommended Practice for Personnel Qualifications for Installation and Maintenance of Stationary Batteries*, ~~2009~~ 2018 .

IEEE 3007.1, *Recommended Practice for the Operation and Management of Industrial and Commercial Power Systems*, 2010.

IEEE 3007.2, *Recommended Practice for the Maintenance of Industrial and Commercial Power Systems*, 2010.

IEEE 3007.3, *Recommended Practice for Electrical Safety in Industrial and Commercial Power Systems*, 2012.

~~Ashton, C., "Modifying the DC Arc-Flash Max Power Formula to Give More Realistic Predictions of Maximum Arc-Flash Energy," in Proc. of IEEE Electrical Safety Workshop, Tucson, p. 71, March 2024.~~

Doan, D.R., "Arc flash calculations for exposures to DC systems," *IEEE Transactions on Industry Applications*, Vol. 46, No. 6, pp. 2299–2302, November/December 2010.

Doughty, R.L., Neal, T.E., and Floyd, H.L., II, "Predicting Incident Energy to Better Manage the Electrical Arc Hazard on 600 V Power Distribution Systems," Record of Conference Papers IEEE IAS 45th Annual Petroleum and Chemical Industry Conference, September 28–30, 1998.

Gordon, L. and Bradley, J., "Modeling the Conversion of Electrical Energy to Acoustic Energy for Arcs and Applications for the Selection of PPE," IEEE Paper No. ESW 2024-09 presented at the IEEE IAS Electrical Safety Workshop, Tucson, AZ, 2024.

~~Gordon, L., "Modeling the Dynamic Behavior of DC Arcs," *IEEE Trans. on Industry Applications* , Vol. 60, No. 1, pp 1946–1955, January/February 2024.~~

Gray, K., Robert, S., and Gauthier, T.L., "Low Voltage 100-500 Vdc Arc Flash Testing," 2020 IEEE IAS Electrical Safety Workshop (ESW), pp. 1–7, doi: 10.1109/ESW42757.2020.9188336, 2020.

Hildreth, J.G. and Feeney, K., "Arc Flash Hazards of 125 Vdc Station Battery Systems," 2018 IEEE Power & Energy Society General Meeting (PESGM), pp. 1–5, doi: 10.1109/PESGM.2018.8586181, 2018.

Hoagland, E. H., Maurice, C., Haines, A., and Maurice, A., "Arc Flash Pressure and Door Ejection Measurement," *IEEE Transactions on Industry Applications*, 56(4): 3297–3305, 2020.

Hoagland, E. H., Maurice, C., Haines, A., and Maurice, A., "Arc Flash Pressure Measurement by the Physical Method, Effect of Metal Vapor on Arc Blast," *IEEE Transactions on Industry Applications*, 53(2): 1576–1582, 2017.

Lee, R., “The Other Electrical Hazard: Electrical Arc Flash Burns,” *IEEE Trans. Applications*, Vol. 1A-18, No. 3, May/June 1982.

Lee, W., Zhang, Z., Rau, S., Gammon, T., Johnson, B. C., and Beyreis, J., “Arc Flash Light Intensity Measurement System Design,” *IEEE Transactions on Industry Applications*, 51(5): 4267–4274, 2015.

Rasmussen, J., “Skills, rules, and knowledge; signals, signs, and symbols, and other distinctions in human performance models,” *IEEE Transactions on Systems, Man, and Cybernetics*, (3), 257–266, 1983.

Rau, S., Zhang, Z., Lee, W., and Dini, D. A., “Arc Flash Visible Light Intensity as Viewed From Human Eyes,” *IEEE Transactions on Industry Applications*, 53(5): 5068–5077, 2017.

Rosewater, D.M., “Reducing Risk When Performing Energized Work on Batteries,” *IEEE Transactions on Industry Applications*, Vol. 60, No. 2, pp. 2732–2741, doi: 10.1109/TIA.2023.3332828, March-April 2024.

Technical paper ESW 2012-24 presented at IEEE ESW conference, *Arc Flash Hazards, Incident Energy, PPE Ratings and Thermal Burn Injury — A Deeper Look*, Tammy Gammon, Wei-Jen Lee, and Ben Johnson.

Technical Paper ESW 2015-17 presented at IEEE ESW conference, OSHA Subpart V, *Electric Power and Distribution*, April 11, 2014.

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Wed Aug 27 13:24:43 EDT 2025

Committee Statement

Committee Statement: Referenced standards are updated to current edition.
Response Message: SR-162-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod

Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 163-NFPA 70E-2025 [Section No. A.3.5]

A.3.5 ISEA Publications.

International Safety Equipment Association, ~~1901 North Moore Street~~ 1101 Wilson Blvd, Suite #1425 , Arlington, VA 22209-1762.

ANSI/ISEA 125, *American National Standard for Conformity Assessment of Safety and Personal Protective Equipment*, 2014.

ANSI/ISEA Z87.1, *American National Standard for Occupational and Educational Eye and Face Protection*, ~~2015~~ 2020 .

ANSI/ISEA Z89.1, *American National Standard for Head Protection*, 2014.

ANSI/ISEA Z358.1, *American National Standard for Emergency Eye Wash and Shower Equipment*, ~~2009~~ 2014 .

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Wed Aug 27 13:30:28 EDT 2025

Committee Statement

Committee Statement: Referenced standards are updated to current edition.
Response Message: SR-163-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.

Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 164-NFPA 70E-2025 [Section No. A.3.6]

A.3.6 ISO Publications.

International Organization for Standardization, ISO Central Secretariat, BIBC II, Chemin de Blandonnet 8, CP 401, 1214 Vernier, Geneva, Switzerland.

ISO 9001, *Quality management systems*, 2015.

ISO 14001, *Environmental Management Systems — Requirements with Guidance for Use*, ~~2004~~ 2015, amendment 1, 2024 .

ISO 17025, *General requirements for the competence of testing and calibration laboratories*, 2017.

ISO 17065, *Conformity assessment — Requirements for bodies certifying products, processes and services*, 2012.

ISO 31000, *Risk management — Guidelines*, 2018.

ISO 31010, *Risk management — Risk assessment techniques*, 2019.

ISO 45001, *Occupational Health and Safety Management Systems — Requirements with Guidance for Use*, 2018 .

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Wed Aug 27 13:31:44 EDT 2025

Committee Statement

Committee Statement: Referenced standards are updated to current edition.
Response Message: SR-164-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.

Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 165-NFPA 70E-2025 [Section No. A.3.8]

A.3.8 NIOSH Publications.

National Institute for Occupational Safety and Health, Centers for Disease Control and Prevention, 1600 Clifton Road, Room 4505, MS E-20, Atlanta, GA 30329.

DHHS (NIOSH) Publication No. 94-110, *Applications Manual for the Revised NIOSH Lifting Equation*, 1994, revised 2021 .

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Wed Aug 27 13:33:11 EDT 2025

Committee Statement

Committee Statement: Referenced standards are updated to current edition.
Response Message: SR-165-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.

Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 166-NFPA 70E-2025 [Section No. A.3.9]

A.3.9 UL Publications.

Underwriters Laboratories Inc., 333 Pfingsten Road, Northbrook, IL 60062-2096.

UL 943, *Ground-Fault Circuit Interrupters*, 2016, revised 2023.

UL 943C, *Outline of Investigation for Special Purpose Ground-Fault Circuit-Interrupters*, 2012, revised 2015.

UL 1436, *Outlet Circuit Testers and Other Similar Indicating Devices*, 2016.

UL RP 2986, *Recommended Practice for Measuring Incident Energy Exposure*, 2015.

ANSI/ZCSA/UL 9540, *Energy Storage Systems and Equipment*, 2023.

UL 9540A, *Test Method for Evaluating Thermal Runaway Fire Propagation in Battery Energy Storage Systems*, ~~2019~~ 2025 .

UL 9540B, *Outline of Investigation for Large Scale Fire Test for Residential Battery Energy Storage Systems*, 2024.

UL 61010-1, *Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use, Part 1: General Requirements*, 2012, revised ~~2023~~ 2024 .

UL 61010-2-033, *Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use — Part 2-033: Particular Requirements for Hand-Held Multimeters and Other Meters, for Domestic and Professional use, Capable of Measuring Mains Voltage*, ~~2020~~ 2024 .

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Wed Aug 27 13:33:58 EDT 2025

Committee Statement

Committee Statement: Referenced standards are updated to current edition.
Response Message: SR-166-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.

Barrios, Louis A.

Crow, Daryld Ray

Dollard, Jr., James T.

Gallo, Ernest J.

Gray, Bobby J.

Guier, Jarod

Hacke, Donald Charles

Harris, William R.

Hickman, Palmer L.

Hilbert, Mark R.

Lubaczewski, Scott

McKinch, Terrance L.

McNellis, Mark

Miller, Charles R.

Mohla, Daleep C.

Niemira, James K.

Norwood, Thomas D.

Pace, David A.

Schamel, Duke W.

Steinman, Gregory J.

Tobias, John M.

West, Rodney J.

Widup, Ron

Wolf, Jason

Second Revision No. 167-NFPA 70E-2025 [Section No. A.3.11]

A.3.11 Other Publications.

~~Ammerman, R.F., Gammon, T., Sen, P.K., and Nelson, J.P., "DC-arc models and incident-energy calculations," in Proc. of Petroleum Chem. Ind. Conference, pp. 1–3, 2009.~~

Dalziel, Charles F., "A Study of the Hazards of Impulse Currents," Transactions of the American Institute of Electrical Engineers. Part III: Power Apparatus and Systems, Volume 72, Issue 2, 1953, DOI: 10.1109/AIEEPAS.1953.4498738.

Gordon, Lloyd B. and Cartelli, Laura, "A Complete Electrical Hazard Classification System and Its Application," IEEE Transactions on Industry Applications, Vol. 54, pp. 6554–6565, November/December 2018.

Hummer, Charles R., Pearson, Richard J., and Porschet, Donald H., "Safe Distances From a High-Energy Capacitor Bank for Ear and Lung Protection," Army Research Laboratory Report, ARL-TN-608, July 2014.

"Hazard Assessment Phase II," Copyright Material, Kinectrics Inc., Report No. K-012623-RA-0002-R00.

~~Keyes, C. and Maurice, C., "DC arc hazard assessment phase II," *Kinectrics* , Toronto, ON, Canada, Tech. Rep. K-012623-RA-0001-R00, July 2007.~~

Occupational Injuries From Electrical Shock and Arc Flash Events Final Report, Richard Campbell and David Dini, Fire Protection Research Foundation, Quincy, MA.

Occupational Electrical Injuries in the US, 2003–2009, James Cawley and Brett C. Banner, ESFI.

~~Paukert, J., "The arc voltage and arc resistance of LV fault arcs," in Proc. 7th Int. Symp. Switching Arc Phenomena, pp. 49–51, 1993.~~

Reason, J., *Human Error*, Cambridge, UK: Cambridge University Press, 1990.

Richmond, D.R., Yelverton, J.T., Fletcher, E.R., and Phillips, YY, "Physical Correlates of Eardrum Rupture," Annals of Otology Rhinology and Laryngology, Vol. 109 (May 1989): 35–41.

Scott, Mark, "Working Safely with Hazardous Capacitors: Establishing Practical Thresholds for Risks Associated With Stored Capacitor Energy," IEEE Industry Applications Magazine, Vol. 25, Issue 3, 2019: 44–53.

~~Stokes, A., and Oppenlander, W., "Electric arcs in open air," *J. Phys. D: Appl. Phys.* , Vol. 24, pp. 26–35, 1991.~~

US Department of Energy Bonneville Power Administration Engineering and Technical Services Report BPA F 5450.05, "DC Arc Flash: 125V, 1300 amp-hour battery," May 11, 2017.

Supplemental Information

File Name	Description	Approved
70E_SR-167_A.3.11.docx		

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Wed Aug 27 13:36:33 EDT 2025

Committee Statement

Committee Statement: A document no longer referenced is deleted.
Response Message: SR-167-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 145-NFPA 70E-2025 [Section No. D.5.1]

D.5.1 ~~Dynamic Behavior of DC Arcs~~ Maximum Power Method .

~~Direct-current arcs are similar to three-phase ac arcs in that continuously flowing current maintains the hot plasma, as compared to single-phase ac arcs, which cool at current zeros, which contributes to self-extinction. However, dc arcs have a unique difference to three-phase ac arcs. The spatially varying magnetic fields of the three phases of a three-phase arc combines to give a net zero effect on the motion of the arc. However, the magnetic field of a dc arc provides a continuous orthogonal force on the arc that causes the arc to move laterally and elongate.~~ ~~*(see reference 1)*~~ : The following method of estimating dc arc flash incident energy that follows was published in the *IEEE Transactions on Industry Applications (see reference 2 of D.5.2)* . This method is based on the concept that the maximum power possible in a dc arc will occur when the arcing voltage is one-half the system voltage. Testing completed for Bruce Power *(see reference 3 of D.5.2)* has shown that this calculation is conservatively high in estimating the arc flash value. This method applies to dc systems rated up to 1000 volts.

$$I_{arc} = 0.5 \times I_{bf}$$
$$IE_m = 0.01 \times V_{sys} \times I_{arc} \times T_{arc} / D^2 \qquad \text{[D.5.1]}$$

where:

I_{arc} = arcing current, amperes

I_{bf} = system bolted fault current, amperes

IE_m = estimated dc arc flash incident energy at the maximum power point, cal/cm^2

V_{sys} = system voltage, volts

T_{arc} = arcing time, sec

D = working distance, cm

For exposures where the arc is in a box or enclosure, it would be prudent to consider additional PPE protection beyond the values shown in Table 130.7(C)(15)(b) .

Supplemental Information

File Name	Description	Approved
attachment_for_SR_145_D.5.1.docx	attachment_for_SR_145_D.5.1	

Submitter Information Verification

Committee: EEW-AAA

Submittal Date: Wed Aug 27 12:14:03 EDT 2025

Committee Statement

Committee Statement: Informative Annex D.5.1 created by First Revision 71 is deleted. The substantiation provided for First Revision 71 stated that “Direct-current arcs are similar to three-phase ac arcs in that continuously flowing current maintains the hot plasma”. No technical testing data was provided to support this analogy. The Technical Committee notes that in a DC arc the continuously following current maintains the hot plasma. However, three-phase AC arcs generate plasma alternately between different phases, that is, they push different portions of the hot plasma and are not uniform.

Further peer-reviewed research and validation are required to establish a comprehensive procedure for addressing the DC arc-flash hazards before Informative Annex D.5 Direct-Current Incident Energy Calculations is revised.

This restores the content found in Informative Annex D.5.1, of the 2024 Edition of NFPA 70E with an editorial correction.

Response Message: SR-145-NFPA 70E-2025

Public Comment No. 142-NFPA 70E-2025 [Section No. D.5]

Public Comment No. 232-NFPA 70E-2025 [Section No. D.5.1]

Public Comment No. 141-NFPA 70E-2025 [Section No. D.5.1]

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
22 Affirmative All
1 Affirmative with Comments
2 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Affirmative with Comment

Hilbert, Mark R.

Many recognized industry experts put a significant amount of time and effort into the language accepted for the First Draft. All involved agreed there is a need for updated information and additional considerations for direct-current incident energy calculations. I recommend the work of these task groups be continued between editions so acceptable revisions can be made for the next edition.

Negative with Comment

Gallo, Ernest J.

This material was removed without significant technical justification. It was well argued at the committee and should have been included as valuable informative annex material.

Gray, Bobby J.

The language accepted in the first draft is based on fundamental physics and verified testing. The formula chosen originally was done with the understanding it would be revised to narrow the accuracy. That has not changed over five cycles. It is irresponsible to ignore the work and opinion of recognized experts in this field in an annex without technical rebuttal.

Second Revision No. 146-NFPA 70E-2025 [Section No. D.5.2]

D.5.2 ~~Arc Extinction Observations Provides Voltage/Gap Bounds~~ Detailed Arcing Current and Energy Calculations Method .

~~If erosion and magnetic forces cause a dc arc to elongate to a threshold, the arc self-extinguishes. The extinction length is determined by the arc voltage and initial gap distance. Once the voltage drop in the arc exceeds the source voltage, the arc can no longer sustain.~~

~~An equation can be written, based on measurements, to provide a lower voltage bound for a given gap distance, below which, an arc cannot be sustain~~ *~~(see references 1, 2, 3)~~* ~~:~~

$$V_{min} = 1.06 \times g + 100 \quad \text{[D.5.2a]}$$

DELETED

~~or~~

$$g_{min} = V - 100 \times 1.06 \quad \text{[D.5.2b]}$$

DELETED

~~where:~~

~~V_{min} = voltage below which an arc can't be sustained~~

~~g = gap distance, cm (in.)~~

~~g_{min} = gap above which an arc can't be sustained, cm (in.)~~

~~V = system voltage~~

~~Table D.5.2 provides a maximum gap distance for various voltages above which an arc will extinguish.~~

~~Table D.5.2 Maximum Gap Distance.~~

~~System Voltage (volts)~~	~~Gap Distance, above which arc will quickly extinguish~~	
	~~cm~~	~~in.~~
~~150~~	~~0.47~~	~~0.18~~
~~250~~	~~1.4~~	~~0.55~~
~~550~~	~~4.2~~	~~1.7~~
~~600~~	~~4.7~~	~~1.8~~
~~1000~~	~~8.5~~	~~3.3~~

A thorough theoretical review of dc arcing current and energy was published in the *IEEE Transactions on Industry Applications* . Readers are advised to refer to that paper *(see reference 1)* for those detailed calculations.

References:

1. "DC-Arc Models and Incident-Energy Calculations," Ammerman, R.F., et al., *IEEE Transactions on Industry Applications* , Vol. 46, No. 5.

2. "Arc flash calculations for exposures to DC systems," Doan, D.R., *IEEE Transactions on Industry Applications* , Vol. 46, No. 6.

3. "DC arc hazard assessment phase II," Copyright Material, Kinectrics Inc., Report No. K-012623-RA-0002-R00.

Supplemental Information

File Name	Description	Approved
attachment_for_SR_146_D.5.2.docx	attachment_for_SR_146_D.5.2	

Submitter Information Verification

Committee: EEW-AAA

Submittal Date: Wed Aug 27 12:15:35 EDT 2025

Committee Statement

Committee Statement: Informative Annex D.5.2 created by First Revision 71 is deleted for the following reasons:

• The origin, basis, and or validation of Equations D.5.2a and D.5.2b is not clear.

• Equation D5.2(b)is incorrectly derived from D.5.2(a).

• Table D5.2 does not correspond to equation D5.2(a) – i.e., using the equation as shown, the calculations do not yield the values shown in the table.

• The proposed equations for arc sustainability only consider gap and voltage, not other factors such as electrode configuration or arcing current.

• There are no stated limitations for use of the equations – are they valid for all dc sources, all voltages, all currents?

• The fact that there is no definition of "sustainability" also makes application difficult – it is unclear what the recommendation would be for worker protection in systems falling outside the gap/voltage parameters.

• There exists experimental data provided by K. Gray, S. Robert, and T. Gauthier in “Low voltage 100–500 vdc arc flash testing,” in 2020 IEEE IAS Electrical Safety Workshop (ESW), 2020, pp.1–7 that suggests hazardous energy may be released from arcs with final arc gaps greater than the distances in the provided table.

• Finally, results from these equations reflected in Table D5.2 are substantially different than results of FR58 utilized in Table 130.7(C) (5)(b). Following FR 58, the gap distance where the arc cannot be sustained is 1 mm/volt. This would yield a gap distance for 250 V DC of 250 mm or 25 cm versus 1.4 cm in Table 5.2. This wide disparity would be confusing as both cannot be correct

Further peer-reviewed research and validation are required to establish a comprehensive procedure for addressing the DC arc-flash hazards before Informative Annex D.5 Direct-Current Incident Energy Calculations is revised.

This restores the content found in Informative Annex D.5.2 of the 2024 Edition of NFPA 70E.

Response Message: SR-146-NFPA 70E-2025

Public Comment No. 190-NFPA 70E-2025 [Section No. D.5.2]

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
22 Affirmative All
1 Affirmative with Comments
2 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul

Dyson, Thomas B.

Katekar, Chaitanya

Stallcup, James G.

Affirmative All

Barnhart, Paul D.

Barrios, Louis A.

Crow, Daryld Ray

Dollard, Jr., James T.

Guier, Jarod

Hacke, Donald Charles

Harris, William R.

Hickman, Palmer L.

Lubaczewski, Scott

McKinch, Terrance L.

McNellis, Mark

Miller, Charles R.

Mohla, Daleep C.

Niemira, James K.

Norwood, Thomas D.

Pace, David A.

Schamel, Duke W.

Steinman, Gregory J.

Tobias, John M.

West, Rodney J.

Widup, Ron

Wolf, Jason

Affirmative with Comment

Hilbert, Mark R.

Many recognized industry experts put a significant amount of time and effort into the language accepted for the First Draft. All involved agreed there is a need for updated information and additional considerations for direct-current incident energy calculations. I recommend the work of these task groups be continued between editions so acceptable revisions can be made for the next edition.

Negative with Comment

Gallo, Ernest J.

This material was removed without significant technical justification. It was well argued at the committee and should have been included as valuable informative annex material.

Gray, Bobby J.

The language accepted in the first draft is based on fundamental physics and verified testing. The formula chosen originally was done with the understanding it would be revised to narrow the accuracy. That has not changed over five cycles. It is irresponsible to ignore the work and opinion of recognized experts in this field in an annex without technical rebuttal.

Second Revision No. 147-NFPA 70E-2025 [Section No. D.5.3]

~~**D.5.3** Maximum Power Method.~~

~~The following method of estimating dc arc flash incident energy *(see reference 4)* is based on the concept that the maximum power possible in a dc arc will occur when the arcing voltage is one-half the system voltage. Multiple tests have shown that this calculation is conservatively high in estimating the arc flash value *(see reference 4)* . This method applies to dc systems rated up to 1000 volts.~~

$$I_{arc} = 0.5 \times I_{bf}$$
$$IE_m = 0.01 \times V_{sys} \times I_{arc} \times T_{arc} / D^2$$

DELETED

~~[D.5.3a]~~

~~where:~~

~~I_{arc} = arcing current, amperes~~

~~I_{bf} = system bolted fault current, amperes~~

~~IE_m = estimated dc arc flash incident energy at the maximum power point, cal/cm^2~~

~~V_{sys} = nominal system voltage, volts~~

~~T_{arc} = arcing time, sec~~

~~D = working distance, cm~~

~~For exposures where the arc is in a box or enclosure, it would be prudent to consider additional PPE protection beyond the values shown in Table 130.7(C)(15)(b) .~~

~~While IEEE 1584 *(see reference 5)* does not have arc-in-a-box/enclosure multipliers for dc panelboards and cabinets, reflected energy is reflected energy regardless of whether the initial source of the energy was ac or dc. Given that dc panelboards (fuse or breaker distribution boxes) are often of very similar dimensions to ac panelboards, the multiplier of 1.6 for calculated arc flash energy from a dc distribution panelboard found in IEEE 1584 for ac panelboards could be assumed to be prudent.~~

~~While there are larger dc distribution cabinets, most large dc enclosures contain batteries, and have quite a bit of depth to them relatively. Using typical distances of centralized large UPS battery cabinets, calculations show *(see reference 6)* that typical reflected energy at the typical calculation distance of 18 in. (455 mm) in front of the cabinet for low-voltage systems yields an approximate additional 3 percent to 4 percent energy. This essentially means that a multiplier for arc-in-a-box is generally not needed for incident energy of large dc battery cabinets at 18 in. (455 mm) in front of it. However, due to ratios of direct vs. reflected distance becoming closer the further the human is away from the box/enclosure, a multiplier for the arc flash boundary for these large dc battery cabinets might be prudent.~~

~~The following formula was derived *(see reference 3)* for the arc flash boundary distance multiplier from the large enclosure curves for ac switchgear in IEEE 1584.~~

$$K_{ab} = \left[0.55 \times \ln(d_{ab})\right] - 0.6$$

DELETED

~~[D.5.3b]~~

~~where:~~

~~K_{ab} = arc flash boundary distance multiplier for large dc battery cabinets~~

~~d_{ab} = calculated arc flash boundary (in.) without an arc-in-a-box/enclosure multiplier~~

Submitter Information Verification

Committee: EEW-AAA

Submittal Date: Wed Aug 27 12:19:54 EDT 2025

Committee Statement

Committee Statement: Informative Annex D.5.3 created by First Revision 71 is deleted. The specific “enclosure multipliers” and the equation to modify the arc-flash boundary distance for dc systems found in D.5.3 were based on the application of IEEE Std. 1584. The IEEE Std. 1584 was developed based on testing of ac

systems, not DC systems. Arcing phenomena in ac and dc systems are different, and there has not been any testing performed to substantiate the validity of applying parameters derived based on ac testing to dc systems.

The text from NFPA 70E 2024 Informative Annex D.5.3 is restored with some revisions under a separate revision.

Further peer-reviewed research and validation are necessary to establish a comprehensive procedure for addressing dc arc-flash hazards before Informative Annex D.5 is revised.

Response Message: SR-147-NFPA 70E-2025

Public Comment No. 191-NFPA 70E-2025 [Section No. D.5.3]

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
22 Affirmative All
1 Affirmative with Comments
2 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul

Dyson, Thomas B.

Katekar, Chaitanya

Stallcup, James G.

Affirmative All

Barnhart, Paul D.

Barrios, Louis A.

Crow, Daryld Ray

Dollard, Jr., James T.

Guier, Jarod

Hacke, Donald Charles

Harris, William R.

Hickman, Palmer L.

Lubaczewski, Scott

McKinch, Terrance L.

McNellis, Mark

Miller, Charles R.

Mohla, Daleep C.

Niemira, James K.

Norwood, Thomas D.

Pace, David A.

Schamel, Duke W.

Steinman, Gregory J.

Tobias, John M.

West, Rodney J.

Widup, Ron

Wolf, Jason

Affirmative with Comment

Hilbert, Mark R.

Many recognized industry experts put a significant amount of time and effort into the language accepted for the First Draft. All involved agreed there is a need for updated information and additional considerations for direct-current incident energy calculations. I recommend the work of these task groups be continued between editions so acceptable revisions can be made for the next edition.

Negative with Comment

Gallo, Ernest J.

This material was removed without significant technical justification. It was well argued at the committee and should have been included as valuable informative annex material.

Gray, Bobby J.

The language accepted in the first draft is based on fundamental physics and verified testing. The formula chosen originally was done with the understanding it would be revised to narrow the accuracy. That has not changed over five cycles. It is irresponsible to ignore the work and opinion of recognized experts in this field in an annex without technical rebuttal.

Second Revision No. 148-NFPA 70E-2025 [Section No. D.5.4]

~~**D.5.4** Modified Maximum Power Method.~~

~~Repeated experiments by multiple companies *(see reference 3)* have shown that the maximum power method produces fairly accurate results at around 500 Vdc, where arc sustaining times average about 2 seconds. For lower voltages (which are quite common), the arc cannot sustain itself (even with close electrodes in an optimal configuration) for nearly that long, and the maximum sustaining time becomes lower and lower as the voltage goes down. Empirical derivation of a maximum sustaining time yields the formula in Equation D.5.4.~~

$$T_{arc} = 0.0043 \times V_{sys}$$ ~~[D.5.4]~~

DELETED

~~Modifying the maximum power incident energy formula with this new value of T_{arc} yields results much closer to the values seen in actual testing and to the values produced by the iterative methods.~~

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Wed Aug 27 12:21:20 EDT 2025

Committee Statement

Committee Statement: D.5.4 is deleted for the following reasons.

The information does not clarify whether this method of modifying the maximum power method applies to batteries, photovoltaic (PV) systems, converters, capacitors, etc. This method may apply to batteries but would not apply to other dc current/voltage sources, but this is not stated in D.5.4.

Figure 1 of the cited reference, Ashton, C., "Modifying the DC Arc-Flash Max Power Formula to Give More Realistic Predictions of Maximum Arc-Flash Energy," in Proc. of IEEE Electrical Safety Workshop, Tucson, p. 71, March 2024, clearly shows that there are several outlier test points which are not captured under the D.5.4 equation curve. The Authors of this reference indicate that equation D.5.4 was developed by "curve fitting the results so that most of the points fit under the curve". The use of the term "most" is not a scientifically precise method to apply curve fitting methods (e.g., using one or two standard deviations). Ignoring several of these outliers means that equation D.5.4 can produce incident energy predictions that are not sufficiently conservative.

Voltage is not the only factor that should be used to determine arc sustainability and its duration. The gap between conductors, electrode configuration (orientation), and available fault current need to be considered. Foreign contaminants and conductor material are also factors that have been found in certain laboratory tests to increase arc sustainability and cannot be neglected. Allowing this information to remain in NFPA 70E Informative Annex D.5 can create a hazardous condition by generalizing various dc systems operating at various voltages as not capable of producing harmful incident energy.

Response Message: SR-148-NFPA 70E-2025

Public Comment No. 192-NFPA 70E-2025 [Section No. D.5.4]

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
22 Affirmative All

1 Affirmative with Comments
2 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul

Dyson, Thomas B.

Katekar, Chaitanya

Stallcup, James G.

Affirmative All

Barnhart, Paul D.

Barrios, Louis A.

Crow, Daryld Ray

Dollard, Jr., James T.

Guier, Jarod

Hacke, Donald Charles

Harris, William R.

Hickman, Palmer L.

Lubaczewski, Scott

McKinch, Terrance L.

McNellis, Mark

Miller, Charles R.

Mohla, Daleep C.

Niemira, James K.

Norwood, Thomas D.

Pace, David A.

Schamel, Duke W.

Steinman, Gregory J.

Tobias, John M.

West, Rodney J.

Widup, Ron

Wolf, Jason

Affirmative with Comment

Hilbert, Mark R.

Many recognized industry experts put a significant amount of time and effort into the language accepted for the First Draft. All involved agreed there is a need for updated information and additional considerations for direct-current incident energy calculations. I recommend the work of these task groups be continued between editions so acceptable revisions can be made for the next edition.

Negative with Comment

Gallo, Ernest J.

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Gray, Bobby J.

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Second Revision No. 149-NFPA 70E-2025 [Section No. D.5.5]

~~**D.5.5** Stokes/Oppenlander Method.~~

~~This is an empirical method based on tests for dc arcs from 0.1 amperes to 1 kA. *(see reference 7).*~~

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Wed Aug 27 12:22:47 EDT 2025

Committee Statement

Committee Statement: D.5.5 is deleted as it does not contain enough information to be useful, and the information it does contain describes the range of the Stokes arc characteristics method as “0.1 to 1.0 kA” which is inaccurate. The Stokes method has been documented in at least six technical papers as being capable of reproducing arc current, voltage and resistance values for bolted short-circuit currents up to 20 kA or higher.

Allowing this first revision to remain in NFPA 70E 2027 could invalidate calculations done per existing NFPA 70E 2012 to 2024 Annex D.5.2 which recommended this method be used according to how Ammerman, et al., intended. The Stokes/Oppenlander equations only provide the initial step for calculating the arc current, voltage and resistance and DO NOT provide an incident energy calculation method or equations. It cannot be explicitly listed as an incident energy calculation method under a section called “Direct Current Incident Energy Calculations”.

Response Message: SR-149-NFPA 70E-2025

Public Comment No. 180-NFPA 70E-2025 [Section No. D.5.5]

Public Comment No. 193-NFPA 70E-2025 [Section No. D.5.5]

Public Comment No. 237-NFPA 70E-2025 [Section No. D.5.5]

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
22 Affirmative All
1 Affirmative with Comments
2 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul

Dyson, Thomas B.

Katekar, Chaitanya

Stallcup, James G.

Affirmative All

Barnhart, Paul D.

Barrios, Louis A.

Crow, Daryld Ray

Dollard, Jr., James T.

Guier, Jarod

Hacke, Donald Charles

Harris, William R.

Hickman, Palmer L.

Lubaczewski, Scott

McKinch, Terrance L.

McNellis, Mark

Miller, Charles R.

Mohla, Daleep C.

Niemira, James K.

Norwood, Thomas D.

Pace, David A.

Schamel, Duke W.

Steinman, Gregory J.

Tobias, John M.

West, Rodney J.

Widup, Ron

Wolf, Jason

Affirmative with Comment

Hilbert, Mark R.

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Negative with Comment

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Gray, Bobby J.

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Second Revision No. 150-NFPA 70E-2025 [Section No. D.5.6]

~~**D.5.6** Paukert Method.~~

~~This is an empirical method based on data of dc arc measurements from seven sources. It predicts high current arc characteristics~~ ~~*(see reference 8)*~~ ~~.~~

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Wed Aug 27 12:23:39 EDT 2025

Committee Statement

Committee Statement: Annex D.5.6 is deleted as the Paukert method equations on their own do not provide an “incident energy calculation method” but rather, they provide the initial step of calculating the arc current, arc voltage and arc resistance. This arc resistance method cannot be explicitly listed as an incident energy calculation method and the proper way to utilize it is as done in the Ammerman method already published in NFPA 70E 2012 to 2024 editions under the existing section D.5.2.

Additionally, D.5.6 states that the Paukert method produces "high arcing current characteristics" yet it does not define what a high arcing current characteristic is. This statement can create confusion. A comparative analysis vs other methods may be required to provide a qualitative statement about how high these arc currents can be.

Response Message: SR-150-NFPA 70E-2025

Public Comment No. 181-NFPA 70E-2025 [Section No. D.5.6]

Public Comment No. 194-NFPA 70E-2025 [Section No. D.5.6]

Public Comment No. 240-NFPA 70E-2025 [Section No. D.5.6]

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
22 Affirmative All
1 Affirmative with Comments
2 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul

Dyson, Thomas B.

Katekar, Chaitanya

Stallcup, James G.

Affirmative All

Barnhart, Paul D.

Barrios, Louis A.

Crow, Daryld Ray

Dollard, Jr., James T.

Guier, Jarod

Hacke, Donald Charles

Harris, William R.

Hickman, Palmer L.

Lubaczewski, Scott

McKinch, Terrance L.

McNellis, Mark

Miller, Charles R.

Mohla, Daleep C.

Niemira, James K.

Norwood, Thomas D.

Pace, David A.

Schamel, Duke W.

Steinman, Gregory J.

Tobias, John M.

West, Rodney J.

Widup, Ron

Wolf, Jason

Affirmative with Comment

Hilbert, Mark R.

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Negative with Comment

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Gray, Bobby J.

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Second Revision No. 151-NFPA 70E-2025 [Section No. D.5.7]

~~**D.5.7** Kinectrics Physics Model.~~

~~This is a physics model based on mass and energy conservation principles. It is used to compute plasma temperature and resistance using discretized energy balance equations for finite elements across the radius of the arc. It is an iterative technique *(see reference 9).*~~

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Wed Aug 27 12:24:25 EDT 2025

Committee Statement

Committee Statement: Ac and dc arc characteristics and fundamental physical behavior are very different and theoretical equations developed for ac systems are not applicable to dc systems. The reference D.5.7 promotes the use of an ac system software application to be used for dc incident energy calculations. The Committee is unable to verify the applicability of the equations to dc systems.

Response Message: SR-151-NFPA 70E-2025

Public Comment No. 158-NFPA 70E-2025 [Section No. D.5.7]

Public Comment No. 182-NFPA 70E-2025 [Section No. D.5.7]

Public Comment No. 195-NFPA 70E-2025 [Section No. D.5.7]

Public Comment No. 228-NFPA 70E-2025 [Section No. D.5.7]

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
22 Affirmative All
1 Affirmative with Comments
2 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul

Dyson, Thomas B.

Katekar, Chaitanya

Stallcup, James G.

Affirmative All

Barnhart, Paul D.

Barrios, Louis A.

Crow, Daryld Ray

Dollard, Jr., James T.

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Miller, Charles R.

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Niemira, James K.

Norwood, Thomas D.

Pace, David A.

Schamel, Duke W.

Steinman, Gregory J.

Tobias, John M.

West, Rodney J.

Widup, Ron

Wolf, Jason

Affirmative with Comment

Hilbert, Mark R.

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Second Revision No. 152-NFPA 70E-2025 [Section No. D.5.8]

~~**D.5.8** Ammerman/Sen Method.~~

~~This is a circuit/thermal model that assumes complete conversion of electrical arc energy into thermal energy. Arc power is determined from an iterative technique constrained by arc power and circuit characteristics *(see reference 2).*~~

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Wed Aug 27 12:25:11 EDT 2025

Committee Statement

Committee Statement: The 2012 through 2024 Editions of NFPA 70E already reference this dc arc-flash model and incident energy calculation method in D.5.2 which is being retained for the 2027 Edition by the action on the second revision to D.5.2. The additional commentary or description of the Ammerman method does not add any technical value for the qualified person that is estimating the dc arc-flash incident energy.

Response Message: SR-152-NFPA 70E-2025

Public Comment No. 196-NFPA 70E-2025 [Section No. D.5.8]

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
22 Affirmative All
1 Affirmative with Comments
2 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Guier, Jarod
Hacke, Donald Charles

Harris, William R.

Hickman, Palmer L.

Lubaczewski, Scott

McKinch, Terrance L.

McNellis, Mark

Miller, Charles R.

Mohla, Daleep C.

Niemira, James K.

Norwood, Thomas D.

Pace, David A.

Schamel, Duke W.

Steinman, Gregory J.

Tobias, John M.

West, Rodney J.

Widup, Ron

Wolf, Jason

Affirmative with Comment

Hilbert, Mark R.

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Second Revision No. 153-NFPA 70E-2025 [Section No. D.5.9]

D.5.3 Short Circuit Current and Clearing Time.

~~The short-circuit current of the source (battery, EDLC, or PV) needs to be obtained from the manufacturer. The circuit clearing time needs to be determined by analysis of the battery management system, solar management system, and/or fusing.~~ Determining the short-circuit current is necessary to use Table 130.7(C)(15)(b) .

~~Clearing times from arc dynamics are still under study, but recent dc arc tests provide information to predict arc lifetime as a function of gap distance, voltage, and short-circuit current *(see references 1 and 3)* .~~ Additionally, determining the short-circuit current, calculating the arcing current, and selecting the interrupting rating of overcurrent protective devices is necessary to perform incident energy calculations.

The manufacturer or the equipment supplier is the best source to obtain the data necessary to calculate the dc short-circuit current from sources such as batteries, capacitors, motors, and photovoltaics. The total short-circuit current in the system depends on the total network impedance between the source and the point of the arc fault.

The duration of the dc arc is determined by a qualified person based on the clearing time of the overcurrent protective devices using the arcing current. the clearing time might need to consider the discharge time of energy storing components in the circuit as well.

For example, the short-circuit current a battery can deliver depends on the total impedance of the short-circuit path. For lead-calcium batteries, a conservative estimate of the short-circuit current at 25°C is 10 times the battery's 1-minute discharge rating, to 1.75 volts per cell at 25°C with a specific gravity of 1.215. For a more accurate value tailored to a specific application, consult the battery manufacturer or the equipment supplier.

Reference:

1. IEEE 946, *Recommended Practice for the Design of DC Auxiliary Powers Systems for Generating Stations* .

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Wed Aug 27 12:25:56 EDT 2025

Committee Statement

Committee Statement: Annex D.5.9 created by First Revision 71 is deleted to eliminate the implied requirement that information must be sourced exclusively from the manufacturer. As equipment is not always procured directly from the manufacturer by the end user, the relevant data may be obtained through multiple channels by either the equipment supplier or the end user. Clearing time during an arcing fault is determined by qualified personnel based on system design parameters and engineering analysis.

The final paragraph has been removed as it does not offer relevant information or guidance to the intended user of this standard.

The reference to 50% of the short-circuit current has been removed to indicate that max power is not the only recommended method. The detailed method provides more accurate results, but the arcing current is typically determined using iterative methods.

The text from D.5.3 Short Circuit Current in the 2024 edition of NFPA 70E has been restored with some revisions. This information, which conservatively estimated battery short circuit current has been in NFPA 70E for multiple cycles, remains applicable and should be retained for lead-calcium batteries, which continue to represent a substantial portion of installed battery systems. This conservative estimation approach has been validated by IEEE 946-2020, IEEE Recommended Practice for the Design of DC Power Systems for Stationary Applications. Annex C, Section C.3 of the standard provides detailed calculations and comparisons between actual short-circuit current and estimates based on the battery's 1-minute rating.

Response Message: SR-153-NFPA 70E-2025

Public Comment No. 197-NFPA 70E-2025 [Section No. D.5.9]

Public Comment No. 242-NFPA 70E-2025 [Section No. D.5.9]

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
22 Affirmative All
1 Affirmative with Comments
2 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Affirmative with Comment

Hilbert, Mark R.

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Negative with Comment

Gallo, Ernest J.

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Gray, Bobby J.

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Second Revision No. 154-NFPA 70E-2025 [Section No. D.5.10]

~~**D.5.4** References.~~

(0) ~~Gordon, L., "Modeling the Dynamic Behavior of DC Arcs," *IEEE Transactions on Industry Applications*, Vol. 60, No. 1, pp. 1946–1955, January/February 2024.~~

(0) ~~Ammerman, R.F., Gammon, T., Sen, P.K., and Nelson, J.P., "DC arc models and incident energy calculations," in Proc. of Petroleum Chem. Ind. Conference, pp. 1–3, 2009.~~

(0) ~~Ashton, C., "Modifying the DC Arc-Flash Max Power Formula to Give More Realistic Predictions of Maximum Arc-Flash Energy," in Proc. of IEEE Electrical Safety Workshop, Tucson, p. 71, March 2024.~~

(0) ~~Doan, D.R., "Arc flash calculations for exposures to DC systems," *IEEE Transactions on Industry Applications*, Vol. 46, No. 6, pp. 2299–2302, November/December 2010.~~

(0) ~~IEEE 1584, *Guide for Performing Arc Flash Calculations*, 2018.~~

(0) ~~Rosewater, D.M., "Reducing Risk When Performing Energized Work on Batteries," in *IEEE Transactions on Industry Applications*, Vol. 60, No. 2, pp. 2732–2741, doi: 10.1109/TIA.2023.3332828, March-April 2024.~~

(0) ~~Stokes, A. and Oppenlander, W., "Electric arcs in open air," *J. Phys. D: Appl. Phys.*, Vol. 24, pp. 26–35, 1991.~~

(0) ~~Paukert, J., "The arc voltage and arc resistance of LV fault arcs," in Proc. 7th Int. Symp. Switching Arc Phenomena, pp. 49–51, 1993.~~

(0) ~~Keyes, C. and Maurice, C., "DC arc hazard assessment phase II," *Kinectrics*, Toronto, ON, Canada, Tech. Rep. K-012623-RA-0001-R00, July 2007.~~

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Wed Aug 27 12:36:01 EDT 2025

Committee Statement

Committee Statement: The references in Informative Annex D.5.10 are no longer necessary, other than No. 2 which is already referred to in D.5.2. See actions on the second revisions to D.5.5 which deleted the sections containing the references.

Response Message: SR-154-NFPA 70E-2025

Public Comment No. 198-NFPA 70E-2025 [Section No. D.5.10]

Public Comment No. 229-NFPA 70E-2025 [Section No. D.5.10]

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
22 Affirmative All
1 Affirmative with Comments
2 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul

Dyson, Thomas B.

Katekar, Chaitanya

Stallcup, James G.

Affirmative All

Barnhart, Paul D.

Barrios, Louis A.

Crow, Daryld Ray

Dollard, Jr., James T.

Guier, Jarod

Hacke, Donald Charles

Harris, William R.

Hickman, Palmer L.

Lubaczewski, Scott

McKinch, Terrance L.

McNellis, Mark

Miller, Charles R.

Mohla, Daleep C.

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Norwood, Thomas D.

Pace, David A.

Schamel, Duke W.

Steinman, Gregory J.

Tobias, John M.

West, Rodney J.

Widup, Ron

Wolf, Jason

Affirmative with Comment

Hilbert, Mark R.

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Negative with Comment

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Second Revision No. 155-NFPA 70E-2025 [Section No. F.3]

F.3 Hierarchy of Risk Control.

The purpose of specifying and adhering to a hierarchy of risk control methods is to identify the most effective individual or combination of preventive or protective measures to reduce the risk associated with a hazard. Each risk control method is considered less effective than the one before it. Table F.3 lists the hierarchy of risk control identified in this and other safety standards and provides examples of each.

Table F.3 The Hierarchy of Risk Control Methods

Risk Control Method	Examples
(1) Elimination	Conductors and circuit parts in an electrically safe working condition
(2) Substitution	~~Reduce the hazard by replacing~~ Replace 120 volts control circuitry with 24 Vac or Vdc control circuitry
(3) Engineering controls	Guard energized electrical conductors and circuit parts to reduce the likelihood of electrical contact or arcing faults
(4) Awareness	Signs alerting of the potential presence of hazards
(5) Administrative controls	Procedures and job planning tools
(6) PPE	Electric shock and arc flash PPE

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Wed Aug 27 12:37:01 EDT 2025

Committee Statement

Committee Statement: The revision to the “Substitution” example in Table F.3 aligns with the other risk control method examples, none of which identifies the purpose of the method, rather they each are just an example.

“Reduce the hazard…” is inaccurate. Hazards are not reduced, increased, greater, lesser, etc. A hazard either is or is not a source of harm.

Response Message: SR-155-NFPA 70E-2025

Public Comment No. 236-NFPA 70E-2025 [Section No. F.3]

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All
Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 168-NFPA 70E-2025 [Sections H.4.1, H.4.2]

H.4.1 Introduction.

Section 130.7(C)(14) requires personal protective equipment (PPE) provided by a supplier or manufacturer to conform to ~~appropriate~~ applicable product standards ~~by one of three methods~~ . Additional information for these conformity assessment methods can be found within ANSI/ISEA 125, *American National Standard for Conformity Assessment of Safety and Personal Protective Equipment*. ANSI/ISEA 125 establishes criteria for conformity assessment of safety and PPE that is sold with claims of compliance with product performance standards. ANSI/ISEA 125 contains provisions for data collection, product verification, conformation of quality and manufacturing production control, and roles and responsibilities of suppliers, testing organizations, and third-party certification organizations.

H.4.2 Level of Conformity.

ANSI/ISEA 125, *American National Standard for Conformity Assessment of Safety and Personal Protective Equipment*, provides for three different levels of conformity assessment: Level 1, Level 2, and Level 3. Level 2 and Level 3 are recognized in 130.7(C)(14)(b) . Exception No. 1 to 130.7(C)(14)(b) allows the use of Level 1 legacy PPE.

Level 1 conformity is where the supplier or manufacturer is making a self-declaration that a product meets all of the requirements of the standard(s) to which conformance is claimed. A supplier Declaration of Conformity for each product is required to be made available for examination upon request.

Level 2 conformity is where the supplier or manufacturer is making a self-declaration that a product meets all of the requirements of the standard(s) to which conformance is claimed, the supplier or manufacturer has a registered ISO 9001 (*Quality management systems*) quality management system or equivalent quality management system, and all testing has been carried out by an ISO 17025, *General requirements for the competence of testing and calibration laboratories*, accredited testing laboratory. A supplier Declaration of Conformity for each product is required to be made available for examination upon request.

Level 3 conformity is where the products are certified by an ISO 17065, *Conformity assessment — Requirements for bodies certifying products, processes and services*, accredited independent third-party certification organization (CO). All product testing is directed by the CO, and all changes to the product must be reviewed and retested if necessary. Compliant products are issued a Declaration of Conformity by the CO and products are marked with the CO's mark or label.

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Wed Aug 27 14:02:44 EDT 2025

Committee Statement

Committee Statement: H.4.1 and H.4.2 are revised from "appropriate product standards" to "applicable product standards" to avoid the use of vague and unenforceable terms, and to correlate with revisions in 130.7(C)(14)(b).

Response Message: SR-168-NFPA 70E-2025

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments

0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 156-NFPA 70E-2025 [Annex K]

Informative Annex K General Categories of Electrical Hazards

This informative annex is not a part of the requirements of this NFPA document but is included for informational purposes only.

K.1 General.

Contact with or exposure to electricity continues to be one of the leading causes of workplace fatalities and injuries in the United States. Between 2011 and 2022, there were a total of 1,322 workplace fatalities involving electricity. According to the Occupational Safety and Health Administration (OSHA), an annual average of 113 Americans died in the workplace between 2011 and 2020 due to contact with electricity. Of these fatalities, 30 percent were in occupations that can be considered electrical occupations with employees who have received training on electrical safety and the relevant codes and standards of working around electricity. Seventy percent of the fatalities occurred in non-electrically related occupations. Working on or near energized equipment or parts was identified as the leading cause with 48 percent of the fatalities, closely followed by contact with overhead power lines with 41 percent. Electrical fatalities continue to stay consistent with an average 1.5 percent decrease in workplace electrical fatalities year over year. Electrical fatalities account for 6 percent of all workplace fatalities.

About 98 percent of fatal occupational electric injuries are electric shock injuries. A corporate case study examining electrical injury reporting and safety practices found that 40 percent of electrical incidents involved 250 volts or less and were indicative of a misperception of electrical safety as a high-voltage issue. In addition, electrical incidents once again were found to involve a large share of non-electrical workers, with approximately one-half of incidents involving workers from outside electrical crafts. Research of electrical fatalities in construction found that the highest proportion of fatalities occurred in establishments with 10 or fewer employees and pointed out that smaller employers could have fewer formal training requirements and less structured training in safety practices.

There are two general categories of electrical hazards addressed extensively by the requirements of this standard: electric shock hazards and arc flash hazards. Each of these hazards are discussed separately in this informative annex. A third category of hazard is a contact thermal hazard ~~related to the overheating of a conductor, circuit part, or other conductive object caused by electric current~~ . This type of hazard is ~~referred to but not specifically addressed by the requirements of this standard~~ associated with contact with a conductive object as it dissipates heat as it conducts current. A contact thermal hazard is not discussed in this informative annex.

K.2 Electric Shock.

Over 40 percent of all electrical fatalities in the US involved overhead power line contact. This includes overhead power line fatalities from direct contact by a worker, contact through hand-carried objects, and contact through machines and vehicles. ~~Comparing~~ It was observed that electrical injuries are more often fatal than many other injury categories when the ratio of total electrical fatalities was compared to total ~~electrical injuries (~~ fatal and nonfatal~~)~~ electrical injuries ~~, it was noticed that electrical injuries are more often fatal than many other injury categories~~ . For example, from 2003 to 2009 there were 20,033 electrical injuries, of which 1,573 were fatalities. One worker died for every 12.74 electrical injuries. For the same period there were 1,718,219 fall injuries of which 5,279 were fatalities — one worker died for every 325 injuries.

A more detailed look at the demographics for 168 electrical fatalities in 2009 showed that 99 percent of deaths were the result of electrocution, and 70 percent occurred while the worker was performing a constructing, repairing, or cleaning activity.

Shock injuries can be divided into the thermal effect of electric current on the human body and the effect of electric current on the body's nervous system. The thermal effect can result in skin burns that might require skin grafting and, if deep enough into subcutaneous tissue, might require amputation of the affected body part. The immediate effect on the nervous system can include loss of voluntary muscle control, asphyxiation, ventricular fibrillation, and cardiac arrest.

The long-term effects of shock injuries, known as electric shock sequela, are the topic of ongoing research. Sequela is an after-effect of a disease, condition, or injury; the plural is sequelae. These long-term effects can include psychological, neurological, and physical symptoms, which can occur and persist whether visible physical trauma occurred or not.

K.3 Arc Flash.

K.3.1 General.

In the recently issued 29 CFR Subpart V, OSHA identified 99 injuries that involved burns from arcs from energized equipment faults or failures, resulting in 21 fatalities and 94 hospitalized injuries for the period January 1991 through December 1998.

Based on this data, OSHA estimated that an average of at least eight burn injuries from arcs occur each year involving employees doing work covered by OSHA rules, leading to 12 nonfatal injuries and two fatalities per year. Of the reports indicating the extent of the burn injury, 75 percent reported third-degree burns.

During the period involved, federal OSHA only required nonfatal injuries to be reported when there were three or more workers hospitalized. OSHA found that there were six injuries for every fatality in California, which requires the reporting of every hospitalized injury.

Using that data, OSHA estimated that would be at least 36 injuries to every fatality, and probably many more. Also, many nonfatal electric shocks involve burns from associated electric arcs.

Since January 1, 2015, federal OSHA has required every hospitalized injury to be reported.

Four types of energies are released by an arcing event, each with different effects on the human body.

K.3.2 Thermal Energy.

The thermal energy developed by an arcing event is conveyed radiantly ~~(~~ , convectively, and conductively from the arc to a worker by means of infrared energy ~~)~~ , ~~convectively (~~ plasma and hot ~~gases)~~ gases , and ~~conductively (~~ molten metal ~~) from the arc to a worker~~ . Depending on the thermal density of this energy, skin burns can result from direct exposure to the arc thermal energy, and from clothing ignition and burning, which can transfer additional thermal energy to the skin. Internal burns can occur in the upper respiratory system such as the mouth, throat, and nose due to inhalation of hot gases produced by the arc plasma and hot gas, and by burning clothing.

The arc flash PPE requirements of this standard primarily address the thermal component of arc energy.

K.3.3 Mechanical Energy (Sudden Pressure Release).

At one time, it was proposed that the vaporization of copper or other metals by the arc produced life-threatening blast pressures. Recent research into arc blast phenomena does not support this theory. While it is true that copper expands several thousand times in volume when transitioning from metal to vapor, only a small amount of copper that is in or is immediately adjacent to the arc plasma stays in a vapor state. Beyond the plasma, the copper vapor drops below the vaporization temperature and condenses into molten copper or reacts chemically and becomes a copper compound.

Research has shown that what was considered to be arc blast pressure is primarily a function the instantaneous heating, expansion, and containment of the air surrounding the arc in an electrical equipment enclosure, which can cause the enclosure to fail. Enclosure failure can result in a sudden release of pressure and a mechanical transfer of energy caused by contact with ejected enclosure components.

Physical trauma can result from being struck by enclosure components. Most of the documented injuries have been from door ejections, broken parts of the equipment caused by the arcing event, and shattered insulators. Concussions and falls have also been recorded.

Research indicates that the pressures developed are substantially less than previously proposed, and that the pressure release is negligible for an open enclosure ~~(i.e., if the enclosure door is open)~~ . Research has also shown that there is no correlation of pressure release to incident energy.

The release of mechanical energy should be considered in the risk assessment process. Protective measures could include operating equipment while standing to the side of the equipment or use of remote racking or other measures to prevent “line-of-fire” injuries.

The release of mechanical energy is normally prevented by arc-resistant equipment as such equipment contains and redirects any pressure away from the worker, provided the equipment is in the arc-resistant configuration.

See Hoagland et al. (2017 and 2020) for more information on the release of mechanical energy caused by an electric arc.

K.3.4 Acoustic ~~(Sound)~~ Energy.

The instantaneous conversion of metals and gases to plasma can produce sound pressure levels in excess of 130 dB. According to the Centers for Disease Control and Prevention (CDC), an instantaneous sound pressure level of 120 dB or higher can cause immediate harm to hearing.

The acoustic energy component of arc energy is addressed to a limited extent by the requirement in this standard to use hearing protection when within the arc flash boundary. See Gordon et al., “Modeling the Conversion of Electrical Energy to Acoustic Energy for Arcs and Applications for the Selection of PPE” for more information on the release of acoustic energy caused by an electric arc.

K.3.5 Light Energy.

The name of the phenomenon, arc flash, came from the intense light produced by an electric arc. The light emitted by an arc contains intense levels in the infrared (IR), visible ~~(light)~~ , and ultraviolet ~~(UV)~~ spectrums . These intense components impinging upon a worker and clothing are a significant portion of thermal injury discussed in K.3.2, for some cases up to 50 percent. Documented test research indicates that the light intensity produced by an arcing event depends on a variety of factors such as voltage, current, arc length, and current risetime.

Tests also indicate that the relative luminosity ~~(i.e.~~ , the brightness that is observed by someone in front of the arcing event~~)~~ , is affected by proximity to the arc, by the conductor configuration ~~(~~ whether it is vertical or horizontal~~)~~ , the arc length, and whether the arc is in an enclosure, and if so, the enclosure dimensions.

The light energy component of arc energy is not currently specifically addressed by the requirements of this standard. However, AR PPE clothing protects from the light, especially the UV. AR rated face shields and suit hoods are also rated to block the arc UV.

See Lee et al. (2015) and Rau et al. (2017) for more information on the release of light energy caused by an electric arc.

K.4 Other Information.

For additional information, the following documents are available:

Occupational Injuries From Electrical Shock and Arc Flash Events Final Report, Richard Campbell and David Dini, Fire Protection Research Foundation, Quincy, MA.

Occupational Electrical Injuries in the US, 2003–2009, by James Cawley and Brett C. Banner, ESFI.

Technical paper ESW 2012-24 presented at IEEE ESW conference, *Arc Flash Hazards, Incident Energy, PPE Ratings and Thermal Burn Injury — A Deeper Look*, by Tammy Gammon, Wei-Jen Lee, and Ben Johnson.

Technical Paper ESW 2015-17 presented at IEEE ESW conference, OSHA Subpart V, *Electric Power and Distribution*, April 11, 2014.

Hoagland, E. H., Maurice, C., Haines, A., and Maurice, A., “Arc Flash Pressure Measurement by the Physical Method, Effect of Metal Vapor on Arc Blast,” *IEEE Transactions on Industry Applications*, 53(2): 1576–1582, 2017.

Hoagland, E. H., Maurice, C., Haines, A., and Maurice, A., “Arc Flash Pressure and Door Ejection Measurement,” *IEEE Transactions on Industry Applications*, 56(4): 3297–3305, 2020.

Lee, W., Zhang, Z., Rau, S., Gammon, T., Johnson, B. C., and Beyreis, J., “Arc Flash Light Intensity Measurement System Design,” *IEEE Transactions on Industry Applications*, 51(5): 4267–4274, 2015.

Rau, S., Zhang, Z., Lee, W., and Dini, D. A., “Arc Flash Visible Light Intensity as Viewed From Human Eyes,” *IEEE Transactions on Industry Applications*, 53(5): 5068–5077, 2017.

Gordon, L. and Bradley, J., “Modeling the Conversion of Electrical Energy to Acoustic Energy for Arcs and Applications for the Selection of PPE,” IEEE Paper No. ESW 2024-09 presented at the IEEE IAS Electrical Safety Workshop, Tucson, AZ, 2024.

Submitter Information Verification

Committee: EEW-AAA

Submittal Date: Wed Aug 27 12:39:22 EDT 2025

Committee Statement

Committee Statement: In the third sentence of K.1, "annual" has be added before "average" for clarity.

The last paragraph of K.1 has been revised to correlate with the revisions to Chapter 3 regarding contact thermal hazards.

Parenthetical expressions have been either deleted or the associated text has been revised to incorporate the expression without use of parentheses per the NEC Style Manual.

Response Message: SR-156-NFPA 70E-2025

Public Comment No. 71-NFPA 70E-2025 [Annex K]

Public Comment No. 103-NFPA 70E-2025 [Section No. K.1]

Public Comment No. 239-NFPA 70E-2025 [Section No. K.1]

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 157-NFPA 70E-2025 [Section No. L.1]

L.1 Application of Safeguards.

This informative annex provides a typical application of safeguards in electrolytic areas where electrical hazards exist. Take, for example, an employee working on an energized cell. The employee uses manual contact to make adjustments and repairs. Consequently, the exposed energized cell and grounded metal floor could present an electrical hazard. Safeguards for this employee can be provided in the following ways:

(1) Protective boots can be worn that isolate the employee's feet from the floor and that provide a safeguard from the electrical hazard.

(2) Protective gloves can be worn that isolate the employee's hands from the energized cell and that provide a safeguard.

(3) If the work task causes severe deterioration, wear, or damage to personal protective equipment (PPE), the employee might have to wear both protective gloves and boots.

(4) A permanent or temporary insulating surface can be provided for the employee to stand on to provide a safeguard.

(5) The design of the installation can be modified to provide a conductive surface for the employee to stand on. If the conductive surface is bonded to the cell, a safeguard will be provided by voltage equalization.

(6) Safe work practices can provide safeguards. If protective boots are worn, the employee should not make long reaches over energized ~~(~~ or grounded~~)~~ surfaces such that his or her elbow bypasses the safeguard. If such movements are required, protective sleeves, protective mats, or special tools should be used. Training on the nature of electrical hazards and proper use and condition of safeguards is, in itself, a safeguard.

(7) The energized cell can be temporarily bonded to ground.

Submitter Information Verification

Committee: EEW-AAA
Submittal Date: Wed Aug 27 12:46:39 EDT 2025

Committee Statement

Committee Statement: The second sentence in L.1(6) has been revised to incorporate the parenthetical expression "(or grounded)" without the use of parentheses.

Response Message: SR-157-NFPA 70E-2025

Public Comment No. 72-NFPA 70E-2025 [Annex L]

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason

Second Revision No. 158-NFPA 70E-2025 [Annex O]

Informative Annex O Employee Safety-Related Design Concepts

This informative annex is not a part of the requirements of this NFPA document but is included for informational purposes only.

O.1 Introduction.

This informative annex covers employee safety-related design concepts for electrical equipment and installations in workplaces covered by the scope of this standard. This informative annex discusses design considerations that have impact on the application of the safety-related work practices only.

This informative annex does not discuss specific design requirements. The facility owner or manager or the employer should choose design options that eliminate hazards or reduce risk and enhance the effectiveness of safety-related work practices.

~~**O.1.1**~~

~~This informative annex covers employee safety-related design concepts for electrical equipment and installations in workplaces covered by the scope of this standard. This informative annex discusses design considerations that have impact on the application of the safety-related work practices only.~~

~~**O.1.2**~~

~~This informative annex does not discuss specific design requirements. The facility owner or manager or the employer should choose design options that eliminate hazards or reduce risk and enhance the effectiveness of safety-related work practices.~~

O.2 General Design Considerations.

Employers, facility owners, and managers who have responsibility for facilities and installations having electrical energy as a potential hazard to employees and other personnel should ensure that electrical hazard risk assessments are performed during the design of electrical systems and installations.

Design option decisions should facilitate the ability to eliminate hazards or reduce risk by doing the following:

(1) Reducing the likelihood of exposure

(2) Reducing the magnitude or severity of exposure

(3) Enabling achievement of an electrically safe work condition

~~**O.2.1**~~

~~Employers, facility owners, and managers who have responsibility for facilities and installations having electrical energy as a potential hazard to employees and other personnel should ensure that electrical hazard risk assessments are performed during the design of electrical systems and installations.~~

~~**O.2.2**~~

~~Design option decisions should facilitate the ability to eliminate hazards or reduce risk by doing the following:~~

(0) ~~Reducing the likelihood of exposure~~

(0) ~~Reducing the magnitude or severity of exposure~~

(0) ~~Enabling achievement of an electrically safe work condition~~

O.2.3 Incident Energy Reduction Methods.

The following methods have proved to be effective in reducing incident energy:

(0) Zone-selective interlocking. This is a method that allows two or more circuit breakers to communicate with each other so that a short circuit or ground fault will be cleared by the breaker closest to the fault with no intentional delay. Clearing the fault in the shortest time aids in reducing the incident energy.

(0) Differential relaying. The concept of this protection method is that current flowing into protected equipment must equal the current out of the equipment. If these two currents are not equal, a fault must exist within the equipment, and the relaying can be set to operate for a fast interruption. Differential relaying uses current transformers located on the line and load sides of the protected equipment and fast acting relay.

(0) Energy-reducing maintenance switching with a local status indicator. An energy-reducing maintenance switch allows a worker to set a circuit breaker trip unit to operate faster while the worker is working within an arc flash boundary, as defined in NFPA *70E* , and then to set the circuit breaker back to a normal setting after the work is complete.

(0) Energy-reducing active arc flash mitigation system. This system can reduce the arcing duration by creating a low impedance current path, located within a controlled compartment, to cause the arcing fault to transfer to the new current path, while the upstream breaker clears the circuit. The system works without compromising existing selective coordination in the electrical distribution system.

(0) Energy-reducing line side isolation. This is equipment that encloses the line side conductors and circuit parts and has been listed to provide both electric shock and arc flash protection from events on the line side of a circuit breaker or switch.

(0) Arc flash relay. An arc flash relay typically uses light sensors to detect the light produced by an arc flash event. Once a certain level of light is detected, the relay will issue a trip signal to an upstream overcurrent device.

(0) High-resistance grounding. A great majority of electrical faults are of the phase-to-ground type. High-resistance grounding will insert an impedance in the ground return path and will typically limit the fault current to 10 amperes and below (at 5 kV nominal or below), leaving insufficient fault energy and thereby helping reduce the arc flash hazard level. High-resistance grounding will not affect arc flash energy for line-to-line or line-to-line-to-line arcs.

(0) Current-limiting devices. Current-limiting protective devices reduce incident energy by clearing the fault faster and by reducing the current seen at the arc source. The energy reduction becomes effective for current above the current-limiting threshold of the current-limiting fuse or current limiting circuit breaker.

(0) Shunt-trip. Adding a shunt-trip that is signaled to open from an open-fuse relay to switches 800 amperes and greater reduces incident energy by opening the switch immediately when the first fuse opens. The reduced clearing time reduces incident energy. This is especially helpful for arcing currents that are not within the current-limiting threshold of the three current-limiting fuses.

O.2.4 Additional Safety-by-Design Methods.

The following methods have proven to be effective in reducing risk associated with an arc flash or electric shock hazard:

(0) Installing finger-safe components, covers, and insulating barriers reduces exposure to energized parts.

(0) Installing disconnects within sight of each motor or driven machine increases the likelihood that the equipment will be put into an electrically safe work condition before work has begun.

(0) Installing current limiting cable limiters can help reduce incident energy. Additionally, cable limiters can be used to provide short-circuit protection (and therefore incident energy reduction) for feeder tap conductors that are protected at up to 10 times their ampacity, a situation where the tap conductor can easily vaporize.

(0) Installing inspection windows for noncontact inspection reduces the need to open doors or remove covers.

(0) Installing a single service fused disconnect switch or circuit breaker provides protection for buses that would be unprotected if six disconnect switches are used.

(0) Installing metering to provide remote monitoring of voltage and current levels reduces exposure to electrical hazards by placing the worker farther away from the hazard.

(0) Installing Type 2 "no damage" current limiting protection to motor controllers reduces incident energy whenever the arcing current is within the current limiting threshold of the current-limiting fuse or current-limiting circuit breaker.

(0) Installing adjustable instantaneous trip protective devices and lowering the trip settings can reduce the incident energy.

(0) Installing arc-resistant equipment, designed to divert hot gases, plasma, and other products of an arc flash out of the enclosure so that a worker is not exposed when standing in front of the equipment with all doors and covers closed and latched, reduces the risk of arc flash exposure.

(0) Installing provisions that provide remote racking of equipment, such as remote-controlled motorized remote racking of a circuit breaker or an MCC bucket, allows the worker to be located outside the arc flash boundary. An extended length hand-operated racking tool also adds distance between the worker and the equipment, reducing the worker's exposure.

(0) Installing provisions that provide remote opening and closing of circuit breakers and switches could permit workers to operate the equipment from a safe distance, outside the arc flash boundary.

(0) Class C, D, and E special purpose ground fault circuit interrupters exist for circuits operating at voltages outside the range for Class A GFCI protection. See UL 943C, *Outline of Investigation for Special Purpose Ground-Fault Circuit-Interrupters*, for additional information.

(0) Installing high-impedance protected test points for voltage measurement through door.

O.3 Incident Energy Reduction Methods.

The following methods have proved to be effective in reducing incident energy:

(1) Zone-selective interlocking. This is a method that allows two or more circuit breakers to communicate with each other so that a short circuit or ground fault will be cleared by the breaker closest to the fault with no intentional delay. Clearing the fault in the shortest time aids in reducing the incident energy.

(2) Differential relaying. The concept of this protection method is that current flowing into protected equipment must equal the current out of the equipment. If these two currents are not equal, a fault must exist within the equipment, and the relaying can be set to operate for a fast interruption. Differential relaying uses current transformers located on the line and load sides of the protected equipment and fast acting relay.

(3) Energy-reducing maintenance switching with a local status indicator. An energy-reducing maintenance switch allows a worker to set a circuit breaker trip unit to operate faster while the worker is working within an arc flash boundary, as defined in NFPA *70E*, and then to set the circuit breaker back to a normal setting after the work is complete.

(4) Energy-reducing active arc flash mitigation system. This system can reduce the arcing duration by creating a low impedance current path, located within a controlled compartment, to cause the arcing fault to transfer to the new current path, while the upstream breaker clears the circuit. The system works without compromising existing selective coordination in the electrical distribution system.

(5) Energy-reducing line side isolation. This is equipment that encloses the line side conductors and circuit parts and has been listed to provide both electric shock and arc flash protection from events on the line side of a circuit breaker or switch.

(6) Arc flash relay. An arc flash relay typically uses light sensors to detect the light produced by an arc flash event. Once a certain level of light is detected, the relay will issue a trip signal to an upstream overcurrent device.

(7) High-resistance grounding. A great majority of electrical faults are of the phase-to-ground type. High-resistance grounding will insert an impedance in the ground return path and will typically limit the fault current to 10 amperes and below (at 5 kV nominal or below), leaving insufficient fault energy and thereby helping reduce the arc flash hazard level. High-resistance grounding will not affect arc flash energy for line-to-line or line-to-line-to-line arcs.

(8) Current-limiting devices. Current-limiting protective devices reduce incident energy by clearing the fault faster and by reducing the current seen at the arc source. The energy reduction becomes effective for current above the current-limiting threshold of the current-limiting fuse or current limiting circuit breaker.

(9) Shunt-trip. Adding a shunt-trip that is signaled to open from an open-fuse relay to switches 800 amperes and greater reduces incident energy by opening the switch immediately when the first fuse opens. The reduced clearing time reduces incident energy. This is especially helpful for arcing currents that are not within the current-limiting threshold of the three current-limiting fuses.

O.4 Additional Safety-by-Design Methods.

The following methods have proven to be effective in reducing risk associated with an arc flash or electric shock hazard:

(1) Installing finger-safe components, covers, and insulating barriers reduces exposure to energized parts.

(2) Installing disconnects within sight of each motor or driven machine increases the likelihood that the equipment will be put into an electrically safe work condition before work has begun.

(3) Installing current limiting cable limiters can help reduce incident energy. Additionally, cable limiters can be used to provide short-circuit protection (and therefore incident energy reduction) for feeder tap conductors that are protected at up to 10 times their ampacity, a situation where the tap conductor can easily vaporize.

(4) Installing inspection windows for noncontact inspection reduces the need to open doors or remove covers.

(5) Installing a single service fused disconnect switch or circuit breaker provides protection for buses that would be unprotected if six disconnect switches are used.

(6) Installing metering to provide remote monitoring of voltage and current levels reduces exposure to electrical hazards by placing the worker farther away from the hazard.

(7) Installing Type 2 “no damage” current limiting protection to motor controllers reduces incident energy whenever the arcing current is within the current limiting threshold of the current-limiting fuse or current-limiting circuit breaker.

(8) Installing adjustable instantaneous trip protective devices and lowering the trip settings can reduce the incident energy.

(9) Installing arc-resistant equipment, designed to divert hot gases, plasma, and other products of an arc flash out of the enclosure so that a worker is not exposed when standing in front of the equipment with all doors and covers closed and latched, reduces the risk of arc flash exposure.

(10) Installing provisions that provide remote racking of equipment, such as remote-controlled motorized remote racking of a circuit breaker or an MCC bucket, allows the worker to be located outside the arc flash boundary. An extended length hand-operated racking tool also adds distance between the worker and the equipment, reducing the worker's exposure.

(11) Installing provisions that provide remote opening and closing of circuit breakers and switches could permit workers to operate the equipment from a safe distance, outside the arc flash boundary.

(12) Class C, D, and E special purpose ground fault circuit interrupters exist for circuits operating at voltages outside the range for Class A GFCI protection. See UL 943C, *Outline of Investigation for Special Purpose Ground-Fault Circuit-Interrupters*, for additional information.

(13) Installing high-impedance protected test points for voltage measurement through door.

Supplemental Information

File Name	Description	Approved
70E_SR-158_Annex_O.docx		

Submitter Information Verification

Committee: EEW-AAA

Submittal Date: Wed Aug 27 12:48:42 EDT 2025

Committee Statement

Committee Statement: Annex O has been editorially simplified into four first-level subdivisions as follows:

Second-level subdivisions O.1.1, O.1.2, O.2.1 and O.2.2 have been eliminated as they are unnecessary.

Second-level subdivisions O.2.3 and O.2.4 have been revised to be first-level subdivisions O.3 and O.4 respectively.

Response Message: SR-158-NFPA 70E-2025

Public Comment No. 73-NFPA 70E-2025 [Section No. O.1]

Ballot Results

✔ **This item has passed ballot**

29 Eligible Voters
4 Not Returned
25 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Conkwright, Jeffrey Paul
Dyson, Thomas B.
Katekar, Chaitanya
Stallcup, James G.

Affirmative All

Barnhart, Paul D.
Barrios, Louis A.
Crow, Daryld Ray
Dollard, Jr., James T.
Gallo, Ernest J.
Gray, Bobby J.
Guier, Jarod
Hacke, Donald Charles
Harris, William R.
Hickman, Palmer L.
Hilbert, Mark R.
Lubaczewski, Scott
McKinch, Terrance L.
McNellis, Mark
Miller, Charles R.
Mohla, Daleep C.
Niemira, James K.
Norwood, Thomas D.
Pace, David A.
Schamel, Duke W.
Steinman, Gregory J.
Tobias, John M.
West, Rodney J.
Widup, Ron
Wolf, Jason