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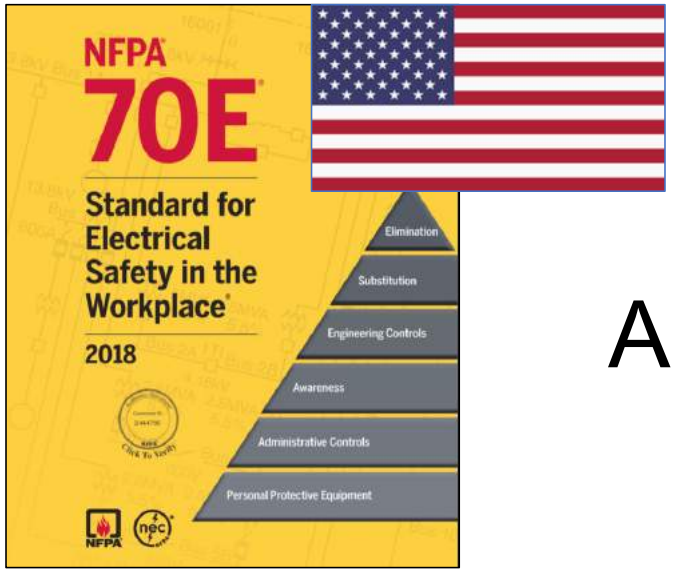
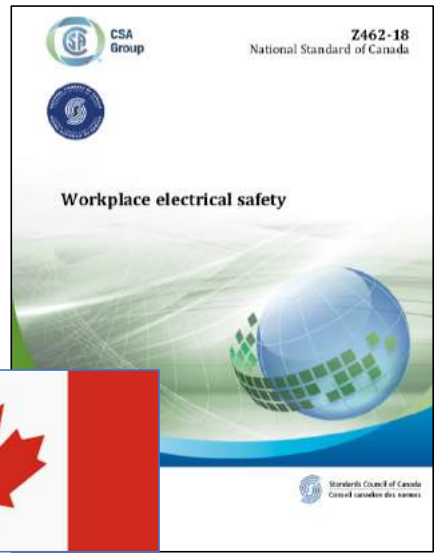
Understanding the Differences Between NFPA 70E & CSA Z462 Including a Peek Into the 2021 Editions



Webinar
April 16, 2020



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Who am I? www.twbesc.ca Check my LinkedIn Profile

- Terry Becker, P.Eng., CESCP, IEEE Senior Member.
- 28 Years experience in Electrical Engineering.
- Mobil Oil, DPH, PanCanadian Energy, EnCana, ESPS, Danatec, TW Becker Electrical Safety Consulting Inc..
- CSA Z462 Workplace electrical safety Standard, First-Past Vice Chair, Voting Member, Clause 4.1 & Annexes WG Leader.
- CSA Z463 Maintenance of electrical systems Standard, Voting Member [Canadian version of NFPA 70B].
- IEEE 1584 Guide for Arc Flash Hazard Calculations Standard. Voting Member. [Also IEEE 1584.1 Sub-Committee]
- 12 years specifically devoted to Electrical Safety Consulting.

Who am I? www.twbesc.ca Check my LinkedIn Profile

- Implement External Electrical Safety Audits.
- Develop and implement Electrical Safety Programs.
- Develop and provide Electrical Safety Program Roll Out Training.
- SME and visionary of Electrical Safety Training System (ESTS) e-Learning.
- Develop and deliver 1 & 2 Day Low Voltage & High Voltage Arc Flash & Shock Training.
- Developed and implement Electrical Safety Competency Validation Process.
- Presented at Conferences and Workshops in Canada, USA, Australia and India on Electrical Safety, CSA Z462 and NFPA 70E.

Disclaimer

- The information presented is the technical seminar is the opinion and interpretation of the information presented by TW Becker Electrical Safety Consulting Inc., and Terry Becker, P.Eng.. CESCP, IEEE Senior Member.
- TW Becker Electrical Safety Consulting Inc. and Terry Becker, P.Eng. accept no liability for the information provided.
- You are advised to consult the NFPA and the published 2021 Edition of NFPA 70E when it publishes for specific formal interpretation.
- You are advised to consult CSA Group and the published 2021 Edition of CSA Z462 when it publishes for specific formal interpretation.

Disclaimer

- Not all potential changes will be reviewed.
- Information on potential changes is available on NFPA's website based on First Revision and Second Revision reports and information provided.

Agenda

- Introduction.
- Technical harmonization.
- NFPA, NFPA 70E Technical Committee and process.
- CSA Group, CSA Z462 Technical Committee and process.
- Interpretation and Application.
- IEEE 1584 and IEEE 1584.1.
- NFPA 70E 2021 Public Comments, Second Revision, Expected Changes.
- CSA Z462 Key Differences & 2021 Expected Changes.
- Conclusion.
- Questions.

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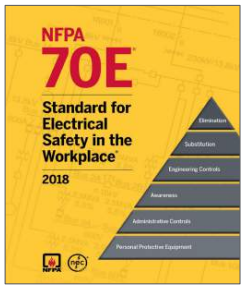
Introduction NFPA 70E



- Public may not be aware of the processes followed.
- NFPA 70E first published in 1979. Focused on “installations.”
- 1979, NFPA 70E Standard for Electrical Safety Requirements for Employee Workplaces.
- 2004, NFPA 70E Standard for Electrical Safety in the Workplace title change (IEEE 1584 published 2002).
- 2021 will be the 12th Edition of NFPA 70E.
- **GOOD NEWS! The 2021 Edition will not include substantial technical changes. Slowing down. Clean up, reorganization of content. New information on capacitors!**

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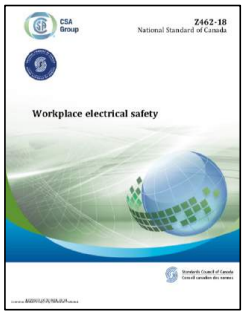
Introduction CSA Z462



- NFPA & CSA sign MOU in 2005.
- Harmonization of Standards for North America.
- NFPA 70E selected.
- CSA Z462 Workplace electrical safety, Technical Committee constituted 2006.
- CSA Z462 First Edition, December 2008 (70E, 2009).
- CSA Z462, 2012 some additional Annexes e.g. Annex A Aligning Implementation of this Standard with Occupational Health and Safety Management Standards, Annex Q Equipment Labeling.
- CSA Z462, 2018, 4th Edition.
- CSA Z462, 2021, 5th Edition.

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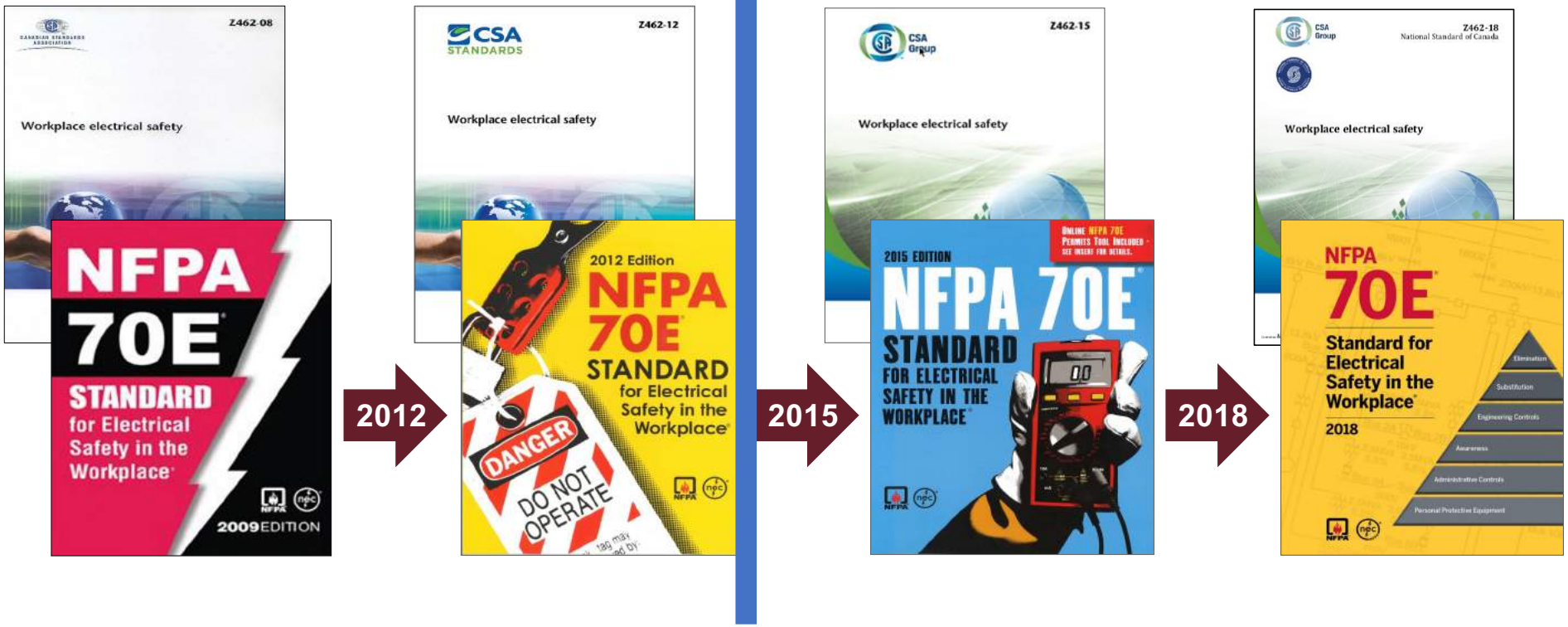
Technical Harmonization



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NFPA & NFPA 70E Public Input / Public Comment Process

Submitting Public Input / Public Comment Through the Online Submission System

Soon after the current edition is published, a Standard is open for Public Input.

Before accessing the Online Submission System, you must first sign in at www.nfpa.org. *Note: You will be asked to sign-in or create a free online account with NFPA before using this system:*

a. Click on Sign In at the upper right side of the page.
b. Under the Codes and Standards heading, click on the "List of NFPA Codes & Standards," and then select your document from the list or use one of the search features.

OR

a. Go directly to your specific document information page by typing the convenient shortcut link of www.nfpa.org/document# (Example: NFPA 921 would be www.nfpa.org/921). Sign in at the upper right side of the page.

To begin your Public Input, select the link "The next edition of this standard is now open for Public Input" located on the About tab, Current & Prior Editions tab, and the Next Edition tab. Alternatively, the Next Edition tab includes a link to Submit Public Input online.

At this point, the NFPA Standards Development Site will open showing details for the document you have selected. This "Document Home" page site includes an explanatory introduction, information on the current document phase and closing date, a left-hand navigation panel that includes useful links, a document Table of Contents, and icons at the top you can click for Help when using the site. The Help icons and navigation panel will be visible except when you are actually in the process of creating a Public Input.

Once the First Draft Report becomes available there is a Public Comment period during which anyone may submit a Public Comment on the First Draft. Any objections or further related changes to the content of the First Draft must be submitted at the Comment stage.

To submit a Public Comment you may access the online submission system utilizing the same steps as previously explained for the submission of Public Input.

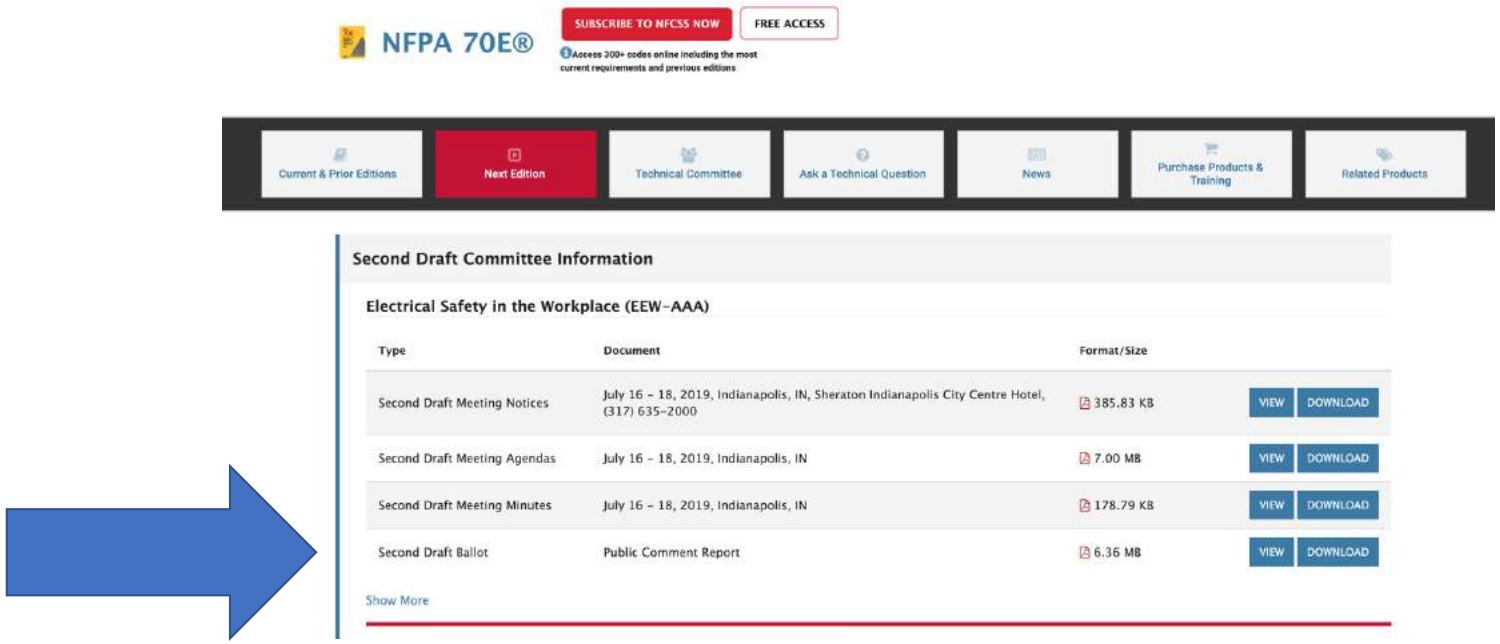
For further information on submitting public input and public comments, go to: http://www.nfpa.org/publicinput.

NFPA 70E 2021 Edition Second Revision Draft

- NFPA website, NFPA 70E.

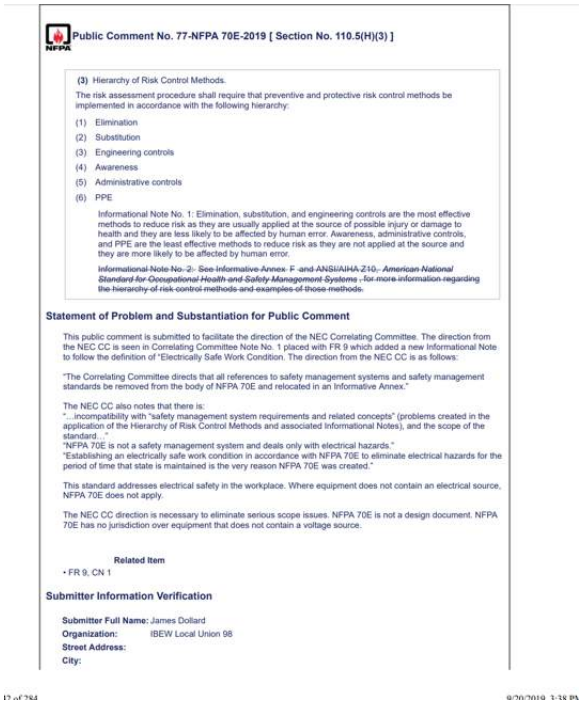
NFPA 70E 2021 Edition Second Draft Ballot

- https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=70E&tab=nextedition



NFPA 70E 2021 Edition Second Draft Ballot

- https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=70E&tab=nextedition



Public Comment No. 77-NFPA 70E-2019 [Section No. 110.5(H)(3)]

(3) Hierarchy of Risk Control Methods.

The risk assessment procedure shall require that preventive and protective risk control methods be implemented in accordance with the following hierarchy:

(1) Elimination
(2) Substitution
(3) Engineering controls
(4) Awareness
(5) Administrative controls
(6) PPE

Informational Note No. 1: Elimination, substitution, and engineering controls are the most effective methods to reduce risk as they are usually applied at the source of possible injury or damage to health and they are less likely to be affected by human error. Awareness, administrative controls, and PPE are the least effective methods to reduce risk as they are not applied at the source and they are more likely to be affected by human error.

~~Informational Note No. 2: See Informative Annex F and ANSI/AIHA Z10, *American National Standard for Occupational Health and Safety Management Systems*, for more information regarding the hierarchy of risk control methods and examples of those methods.~~

Statement of Problem and Substantiation for Public Comment

This public comment is submitted to facilitate the direction of the NEC Correlating Committee. The direction from the NEC CC is seen in Correlating Committee Note No. 1 placed with FR 9 which added a new Informational Note to follow the definition of "Electrically Safe Work Condition. The direction from the NEC CC is as follows:

"The Correlating Committee directs that all references to safety management systems and safety management standards be removed from the body of NFPA 70E and relocated in an Informative Annex."

The NEC CC also notes that there is:
"...incompatibility with "safety management system requirements and related concepts" (problems created in the application of the Hierarchy of Risk Control Methods and associated Informational Notes), and the scope of the standard..."
"NFPA 70E is not a safety management system and deals only with electrical hazards."
"Establishing an electrically safe work condition in accordance with NFPA 70E to eliminate electrical hazards for the period of time that state is maintained is the very reason NFPA 70E was created."

This standard addresses electrical safety in the workplace. Where equipment does not contain an electrical source, NFPA 70E does not apply.

The NEC CC direction is necessary to eliminate serious scope issues. NFPA 70E is not a design document. NFPA 70E has no jurisdiction over equipment that does not contain a voltage source.

Related Item

• FR 9, CN 1

Submitter Information Verification

Submitter Full Name: James Dollard
Organization: IBEW Local Union 98
Street Address:
City:

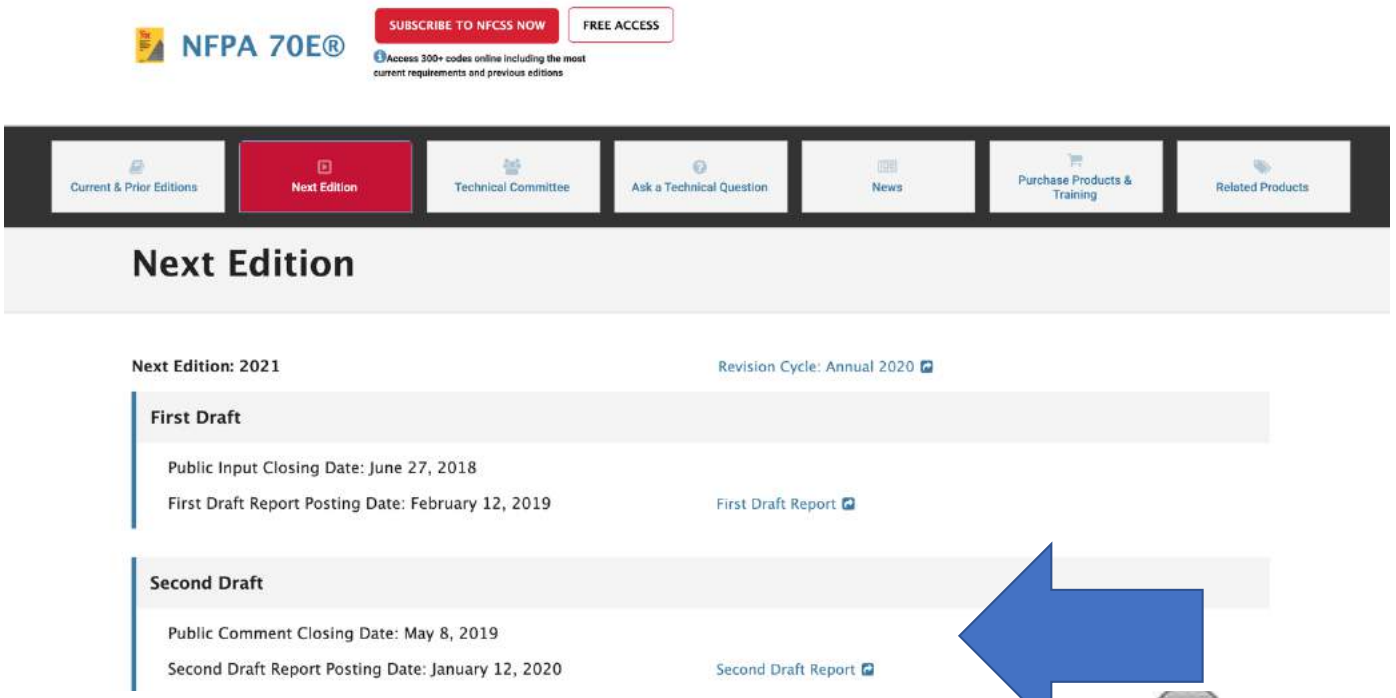
State:
Zip:
Submittal Date: Mon May 06 09:19:24 EDT 2019
Committee: EEW-AAA

Committee Statement

Committee Action: Rejected but see related SR
Resolution: SR-4-NFPA 70E-2019
Statement: The reference to ANSI/AIHA Z10 is deleted as directed by the Correlating Committee and to clarify that it is only one example of many standards that provide information regarding the hierarchy of risk control methods.

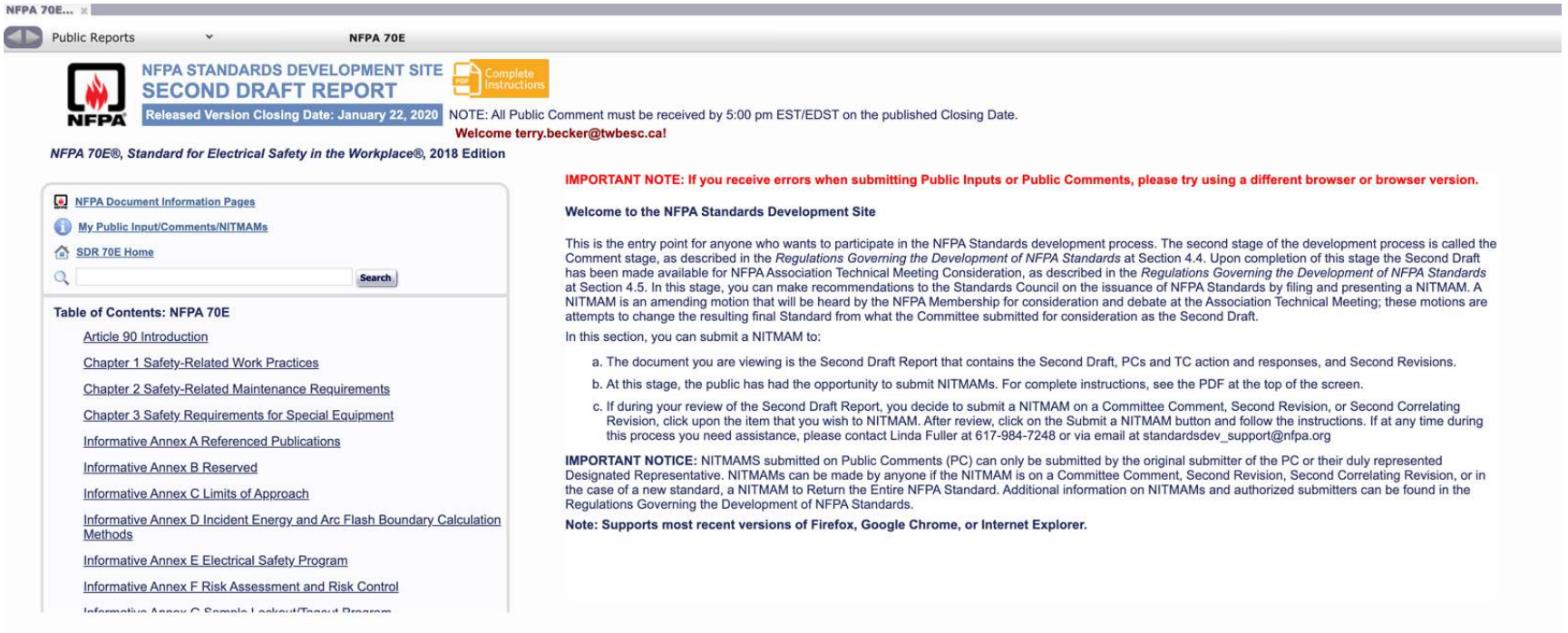
NFPA 70E 2021 Edition Second Draft Report

- https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=70E&tab=nextedition



NFPA 70E 2021 Edition Second Draft Report

- NFPA website, NFPA 70E.



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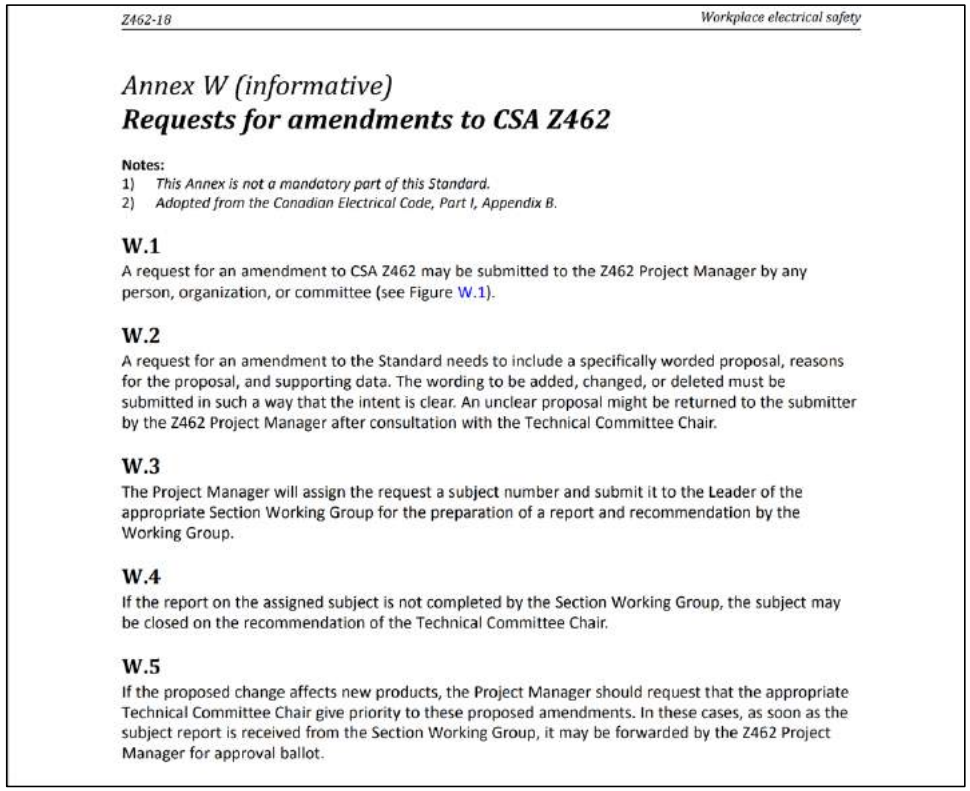
CSA Group – Request For Amendments Process



Z462-18 Workplace electrical safety

Annex W (informative)
Requests for amendments to CSA Z462

Notes:
1) *This Annex is not a mandatory part of this Standard.*
2) *Adopted from the Canadian Electrical Code, Part I, Appendix B.*

W.1
A request for an amendment to CSA Z462 may be submitted to the Z462 Project Manager by any person, organization, or committee (see Figure W.1).

W.2
A request for an amendment to the Standard needs to include a specifically worded proposal, reasons for the proposal, and supporting data. The wording to be added, changed, or deleted must be submitted in such a way that the intent is clear. An unclear proposal might be returned to the submitter by the Z462 Project Manager after consultation with the Technical Committee Chair.

W.3
The Project Manager will assign the request a subject number and submit it to the Leader of the appropriate Section Working Group for the preparation of a report and recommendation by the Working Group.

W.4
If the report on the assigned subject is not completed by the Section Working Group, the subject may be closed on the recommendation of the Technical Committee Chair.

W.5
If the proposed change affects new products, the Project Manager should request that the appropriate Technical Committee Chair give priority to these proposed amendments. In these cases, as soon as the subject report is received from the Section Working Group, it may be forwarded by the Z462 Project Manager for approval ballot.

- Formal process.
- Not as structured as NFPA 70E process, website.
- All “Requests for Amendments” reviewed by CSA Z462 Technical Committee.
- Review NFPA 70E Public Comments for inclusion.

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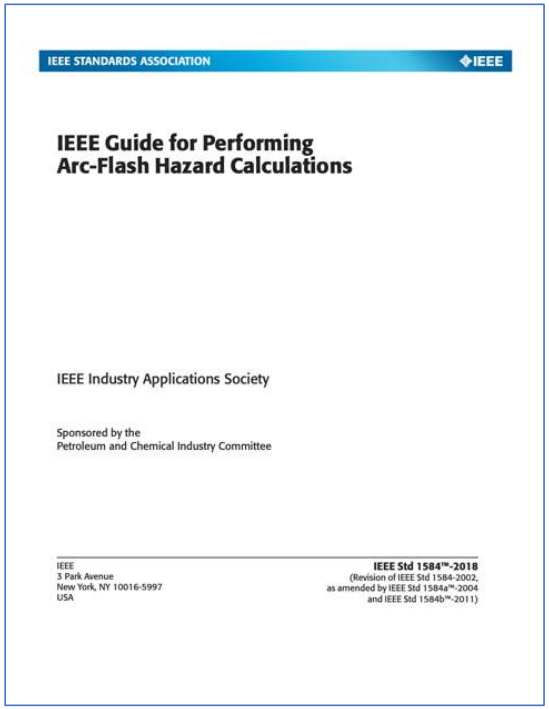
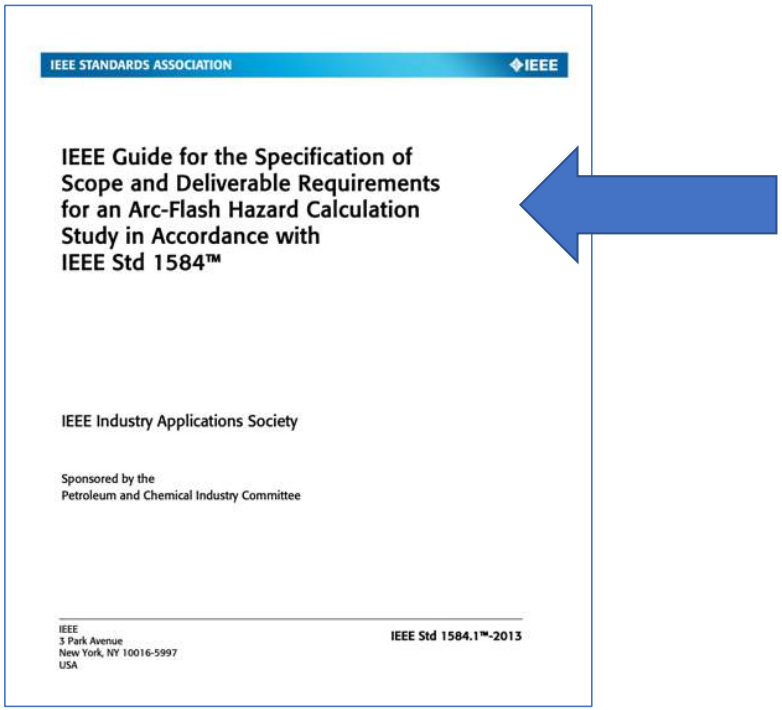
Interpretation & Application

- NFPA 70E and CSA Z462 are NOT adopted into OHSA or OH&S Regulations.
- Industry accepted best practices Standard. Benchmarking.
- Due diligence approach for application.
- Interpretation important.
- **Requires Electrical Safety Program to be developed and implemented.**
- Work task based.
- Risk Assessment Procedure required.
- Shock and Arc Flash Risk Assessments, risk assessment processes.

IEEE 1584 & IEEE 1584.1

- Not many Electrical Engineers know IEEE 1584.1 exists.





Interpretation & Application

- Specific to IEEE 1584 arc flash hazard calculations.
- Historical error related to including HRC# correlated to calculated incident energy.
- Clarified in NFPA 70E and CSA Z462 2018 Editions.
- DO NOT include an HRC#, CAT # or Level “letter” in the ”Results Table” on arc flash & shock equipment label.
- NFPA 70E Table 130.5(G) or CSA Z462 Table 3 advise that when incident energy analysis method is used arc flash PPE is specified with two arc-rated levels in cal/cm^2.
- Level 1 – 1.2 to 12.0 cal/cm^2 ATPV. Everyday/Task wear.
- Level 2 - > 12.0 cal/cm^2 ATPV. Arc flash suit.

Interpretation & Application

N **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/cm² up to 12 cal/cm²
Arc-rated clothing with an arc rating equal to or greater than the estimated incident energy[a]
Long-sleeve shirt and pants or 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) (AN)
Heavy-duty leather gloves, arc-rated gloves, or rubber insulating gloves with leather protectors (SR)[c]
Hard hat
Safety glasses or safety goggles (SR)
Hearing protection
Leather footwear
Incident energy exposures greater than 12 cal/cm²
Arc-rated clothing with an arc rating equal to or greater than the estimated incident energy[a]
Long-sleeve shirt and pants or coverall or arc flash suit (SR)
Arc-rated arc flash suit hood
Arc-rated outerwear (e.g., jacket, parka, rainwear, hard hat liner) (AN)
Arc-rated gloves or rubber insulating gloves with leather protectors (SR)[c]
Hard hat
Safety glasses or safety goggles (SR)
Hearing protection
Leather footwear

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 leather protectors provide arc flash protection in addition to shock protection. Higher class rubber insulating gloves with leather protectors, due to their increased material thickness, provide increased arc flash protection.

Δ **Table 3**
Selection of arc-rated clothing and other PPE when the incident energy analysis method is used
(See Clause 4.3.5.6.2.)

Incident energy exposures equal to 1.2 cal/cm² (5 J/cm²) up to 12 cal/cm² (50 J/cm²)
Arc-rated clothing with an arc rating equal to or greater than the estimated incident energy*
• Long-sleeve shirt and pants or coverall or arc flash suit (SR)
• Arc-rated faceshield and arc-rated balaclava or arc flash suit hood (SR)
• Arc-rated outerwear (e.g., jacket, parka, rainwear, hard hat liner) (AN)
Heavy duty leather gloves, arc-rated gloves or rubber insulating gloves with leather protectors (SR)[‡]
Hard hat
Safety glasses or safety goggles (SR)
Hearing protection
Leather footwear

Table 3 (Concluded)

Incident energy exposures greater than 12 cal/cm ² (50 J/cm²)
Arc-rated clothing with an arc rating equal to or greater than the estimated incident energy*
• Long-sleeve shirt and pants or coverall or arc flash suit (SR)
• Arc-rated arc flash suit hood
• Arc-rated outerwear (e.g., jacket, parka, rainwear, hard hat liner) (AN)
Arc-rated gloves or rubber insulating gloves with leather protectors (SR)[‡]
Hard hat
Safety glasses or safety goggles (SR)
Hearing protection
Leather footwear

Legend:
SR = Selection of one in group is required.
AN = As needed

Interpretation & Application

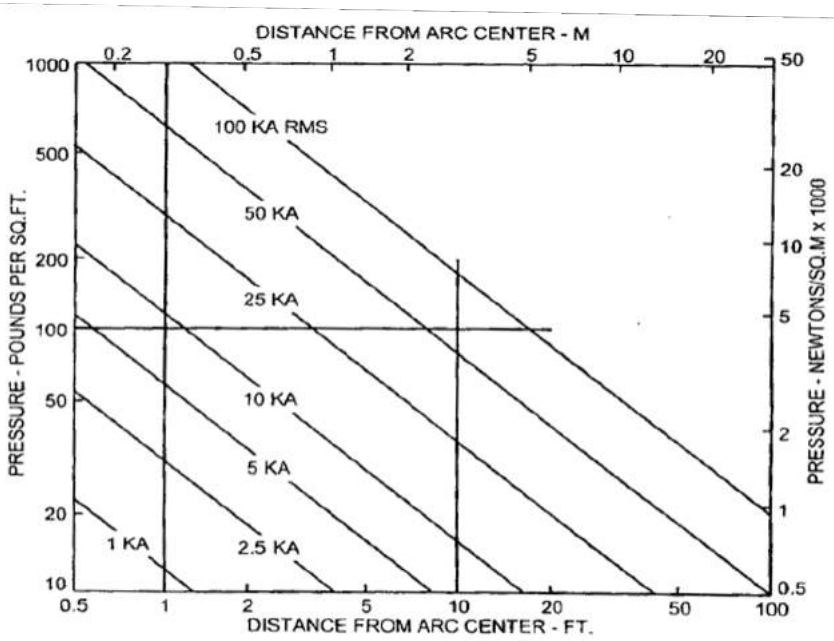
1.2 – 12.0 cal/cm^2 Arc Thermal Performance Value

> 12.0 to 140 cal/cm^2 Arc Thermal Performance Value

Photo Credit Oberon Company

Interpretation & Application

- 40 cal/cm^2 is NOT a "Dangerous" incident energy level where "No PPE Exists!"
- Myth. Arc blast pressure correlates to arcing fault current, Dr. Ralph Lee research in 1980s.
- Misapplication of HRC 4.
- IEEE 3007, was Yellow Book.

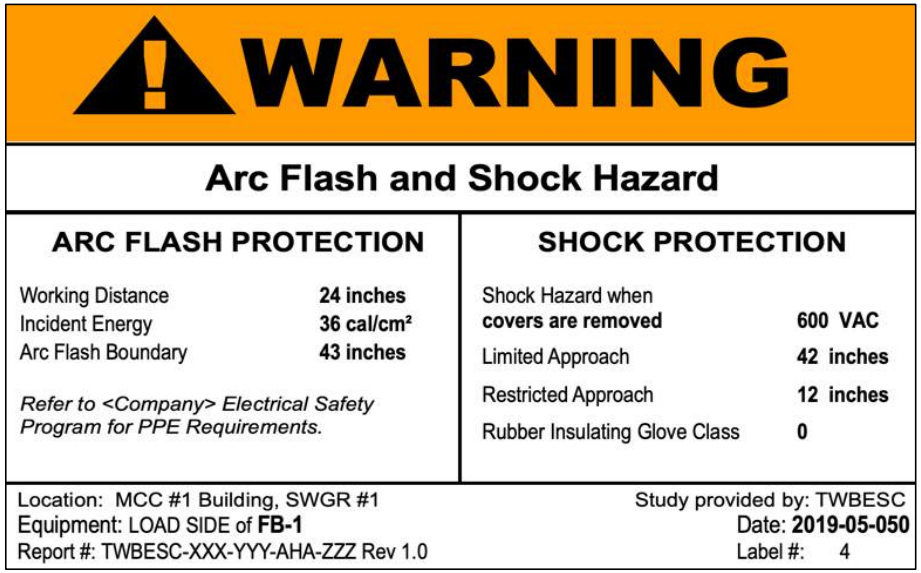


Source: Lee [B15].

Figure 7-3—Pressure vs. distance from arc center

Interpretation & Application

- Examples of compliant arc flash & shock equipment labels.



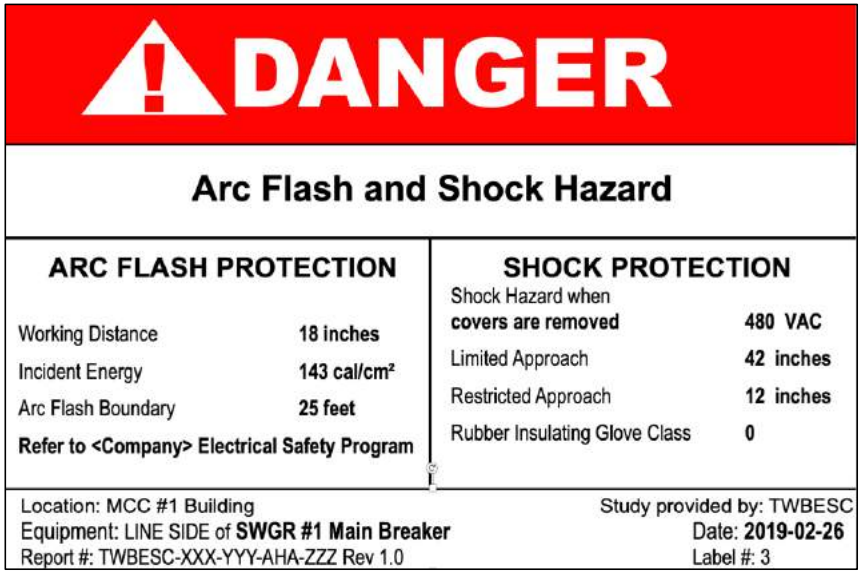
WARNING

Arc Flash and Shock Hazard

ARC FLASH PROTECTION		SHOCK PROTECTION	
Working Distance	**24 inches**	Shock Hazard when **covers are removed**	**600 VAC**
Incident Energy	**36 cal/cm²**	Limited Approach	**42 inches**
Arc Flash Boundary	**43 inches**	Restricted Approach	**12 inches**
Refer to <Company> Electrical Safety Program for PPE Requirements.		Rubber Insulating Glove Class	**0**

Location: MCC #1 Building, SWGR #1
Equipment: LOAD SIDE of **FB-1**
Report #: TWBESC-XXX-YYY-AHA-ZZZ Rev 1.0

Study provided by: TWBESC
Date: **2019-05-050**
Label #: 4



DANGER

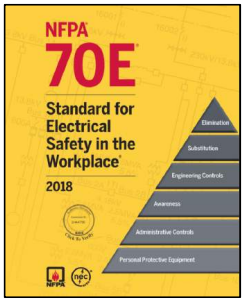
Arc Flash and Shock Hazard

ARC FLASH PROTECTION		SHOCK PROTECTION	
Working Distance	**18 inches**	Shock Hazard when **covers are removed**	**480 VAC**
Incident Energy	**143 cal/cm²**	Limited Approach	**42 inches**
Arc Flash Boundary	**25 feet**	Restricted Approach	**12 inches**
Refer to <Company> Electrical Safety Program		Rubber Insulating Glove Class	**0**

Location: MCC #1 Building
Equipment: LINE SIDE of **SWGR #1 Main Breaker**
Report #: TWBESC-XXX-YYY-AHA-ZZZ Rev 1.0

Study provided by: TWBESC
Date: **2019-02-26**
Label #: 3

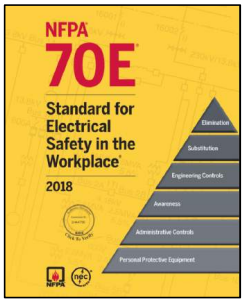
NFPA 70E 2021 Public Comments, Second Revision, Expected Changes



- NOT ALL POTENTIAL CHANGES WILL BE REVIEWED.

- **NOTE:**
- Due to reorganization of content Article numbers will be changed in Article 110.
- Article numbering changes will be reflected in specific Articles in Article 120 and 130 to cross correlate.

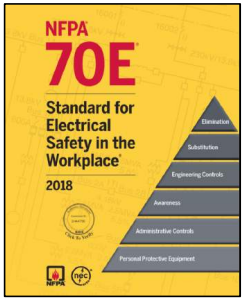
NFPA 70E 2021 Public Comments, Second Revision, Expected Changes



- NOT ALL POTENTIAL CHANGES WILL BE REVIEWED.
- CHAPTER 1, ARTICLE 100 DEFINITIONS

- Balaclava (wording changes, clarification)
- Barrier (minor wording deletion, clarify context)
- Electrically Safe Work Condition (wording, temporary state)
- Equipment, Arc Resistant (SWGR replaced, Equipment)
- Fault Current Available (clarify may be different due to location)

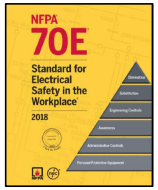
NFPA 70E 2021 Public Comments, Second Revision, Expected Changes



- NOT ALL POTENTIAL CHANGES WILL BE REVIEWED.
- CHAPTER 1, ARTICLE 100 DEFINITIONS

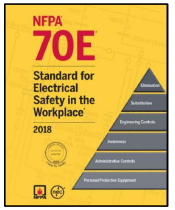
- Field Evaluation (note clarification, additional resources)
- Shock Hazard (add word exposed, correlate def exposed)
- Voltage, Nominal (add Note DC battery voltages, NEC correlation)
- Working On (wording change, electrical equipment conductors or circuit parts)

NFPA 70E 2021 Public Comments, Second Revision, Expected Changes



- NOT ALL POTENTIAL CHANGES WILL BE REVIEWED.
- CHAPTER 1, ARTICLE 110 GENERAL REQUIREMENTS FOR ELECTRICAL SAFETY-RELATED WORK PRACTICES
- [Reorganization of context, content flow, intent, etc.. Articles moved. Article number changes.]
- Article 105.4 Priority moved to Article 110.1. Notes updated, ref Annex F elimination, new wording Electrically Safe Work Condition definition.
- Article 110.1 Priority
- Article 110.2 General
- Article 110.3 Electrically Safe Work Condition
- Article 110.4 Energized Work
- Article 110.5 Electrical Safety Program

NFPA 70E 2021 Public Comments, Second Revision, Expected Changes



- NOT ALL POTENTIAL CHANGES WILL BE REVIEWED.
- CHAPTER 1, ARTICLE 110 GENERAL REQUIREMENTS FOR ELECTRICAL SAFETY-RELATED WORK PRACTICES

- Intent is communicating elimination is the first priority.
- Electrically Safe Work Condition.
- Energized work shall be justified.
- Normal operating conditions defined.
- Then indicate Electrical Safety Program required.

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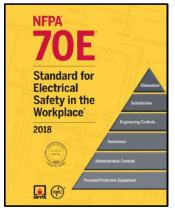
NFPA 70E 2021 Public Comments, Second Revision, Expected Changes



- NOT ALL POTENTIAL CHANGES WILL BE REVIEWED.
- CHAPTER 1, ARTICLE 110 GENERAL REQUIREMENTS FOR ELECTRICAL SAFETY-RELATED WORK PRACTICES
- (new Article numbers because of reorganization).
- Article 110.5 Electrical Safety Program (note, delete reference to ANSI Z10, point to Annex P).
- Article 110.5 (H)(1) (wording made generic that a “process to be used”, removing the words “by the employer”).
- Article 110.5(I)(1) Job Safety Planning (note change, NEW Annex J example job safety planning checklist added).

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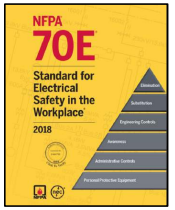
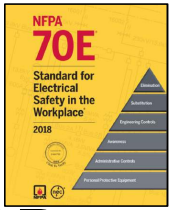


- NOT ALL POTENTIAL CHANGES WILL BE REVIEWED.
- CHAPTER 1, ARTICLE 110 GENERAL REQUIREMENTS FOR ELECTRICAL SAFETY-RELATED WORK PRACTICES
- (new Article numbers because of reorganization).

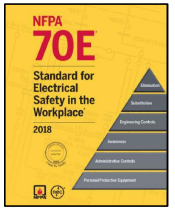
- Article 110.5 (L) Lockout/Tagout Program (clarify that this Program can be a part of Electrical Safety Program or separate with employer's overall OHSMS)

NFPA 70E 2021 Public Comments, Second Revision, Expected Changes



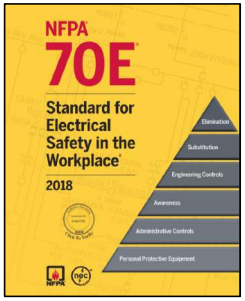
- NOT ALL POTENTIAL CHANGES WILL BE REVIEWED.
- CHAPTER 1, ARTICLE 110 GENERAL REQUIREMENTS FOR ELECTRICAL SAFETY-RELATED WORK PRACTICES
- (new Article numbers because of reorganization).
- Article 110.6 Training Requirements (A) Electrical Safety Training (1) Qualified Person - (Added Item f. employer via supervision or inspections annually confirm that employees are complying with Standard).
- Article 110.6 Training Requirements (A) Electrical Safety Training (4) Type of Training (added wording “Classroom training can include interactive electronic or web-based training components”).

NFPA 70E 2021 Public Comments, Second Revision, Expected Changes



- NOT ALL POTENTIAL CHANGES WILL BE REVIEWED.
- CHAPTER 1, ARTICLE 110 GENERAL REQUIREMENTS FOR ELECTRICAL SAFETY-RELATED WORK PRACTICES
- (new Article numbers because of reorganization).
- Article 110.8 Test Instruments and Equipment (A) Testing (deleted reference to operating voltages, 50V replaced with “where an electrical hazard exists”).
- Article 110.9 Portable Cord-and-Plug-Connected Electric Equipment (D) Conductive or Wet Work Locations (added “or Wet”, updated wording match content of article).

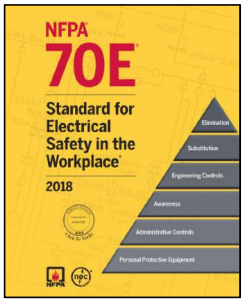
NFPA 70E 2021 Public Comments, Second Revision, Expected Changes



- NOT ALL POTENTIAL CHANGES WILL BE REVIEWED.
- CHAPTER 1, ARTICLE 120 ESTABLISHING AN ELECTRICALLY SAFE WORK CONDITION

- Article 120.2 Lockout/Tagout Principles (B) Lockout/Tagout Procedure (added sentence “The procedure shall meet the requirements of applicable codes, standards, and regulations for lockout and tagging of electrical sources.”).

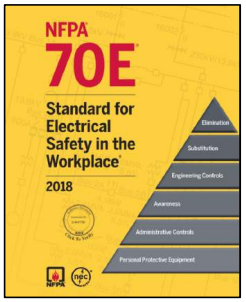
NFPA 70E 2021 Public Comments, Second Revision, Expected Changes



- NOT ALL POTENTIAL CHANGES WILL BE REVIEWED.
- CHAPTER 1, ARTICLE 120 ESTABLISHING AN ELECTRICALLY SAFE WORK CONDITION

- Article 120.4 Lockout/Tagout Procedures (B) Elements of Control (2) Stored Energy (new Note added for reference to new capacitor content in new Article 360 Safety-Related Requirements for Capacitors and new Annex R Working With Capacitors).

NFPA 70E 2021 Public Comments, Second Revision, Expected Changes



- NOT ALL POTENTIAL CHANGES WILL BE REVIEWED.
- CHAPTER 1, ARTICLE 120 ESTABLISHING AN ELECTRICALLY SAFE WORK CONDITION

- Article 120.5 Process for Establishing and Verifying an Electrically Safe Work Condition (8 step procedure/process).
- Wording changes (5):
- “Block or relieve stored nonelectrical energy in devices to the extent the circuit parts cannot be unintentionally energized by devices.”

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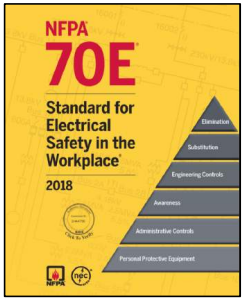

- NOT ALL POTENTIAL CHANGES WILL BE REVIEWED.
- CHAPTER 1, ARTICLE 120 ESTABLISHING AN ELECTRICALLY SAFE WORK CONDITION

- Article 120.5 Process for Establishing and Verifying an Electrically Safe Work Condition
- Wording changes (7):
- Delete “verify it is de-energized” and change to ”test for absence of voltage.”

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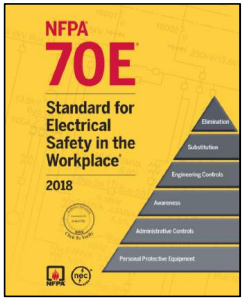

- NOT ALL POTENTIAL CHANGES WILL BE REVIEWED.
- CHAPTER 1, ARTICLE 120 ESTABLISHING AN ELECTRICALLY SAFE WORK CONDITION

- Article 120.5 Process for Establishing and Verifying an Electrically Safe Work Condition
- Wording changes (7) Exception No. 1 to 7: (wording changes):

Exception No. 1 to 7: An adequately rated permanently mounted ~~test device~~ absence of voltage tester shall be permitted to be used to ~~verify~~ test for the absence of voltage of the conductors or circuit parts at the work location, provided it meets the all 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 ~~verifying~~ 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 any known voltage source before and after ~~verifying~~ testing for the absence of voltage.

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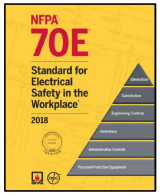
NFPA 70E 2021 Public Comments, Second Revision, Expected Changes



- NOT ALL POTENTIAL CHANGES WILL BE REVIEWED.
- CHAPTER 1, ARTICLE 130 WORK INVOLVING ELECTRICAL HAZARDS
- Some Articles relocated to Article 110 as noted.
- Renumbering of Articles.
- Article 130.1 General (revised wording, to clarify intent, use of information in Article 130).
- Article 130 covers requirements, work involving electrical hazards, work practices, assessments, precautions, and procedures when electrically safe work condition cannot be established.

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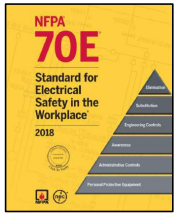
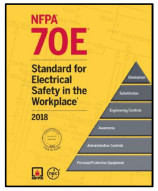


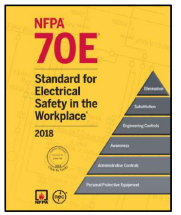
- NOT ALL POTENTIAL CHANGES WILL BE REVIEWED.
- CHAPTER 1, ARTICLE 130 WORK INVOLVING ELECTRICAL HAZARDS
- Article 130.1 General (revised wording, to clarify intent, use of information in Article 130).
- Use work practices and safeguard employee from injury when exposed to electrical hazards.
- If energized conductors or circuit parts voltage equal to or greater than 50V work is performed based on justification the following requirements shall apply:

NFPA 70E 2021 Public Comments, Second Revision, Expected Changes



- NOT ALL POTENTIAL CHANGES WILL BE REVIEWED.
- CHAPTER 1, ARTICLE 130 WORK INVOLVING ELECTRICAL HAZARDS
- [new content]
- 1. Only Qualified Persons.
- 2. EEWP may be required.
- 3. Shall complete a Shock Risk Assessment.
- 4. Shall complete an Arc Flash Risk Assessment.
- All requirements of Article 130 apply whether incident energy analysis or the arc flash PPE category method used.

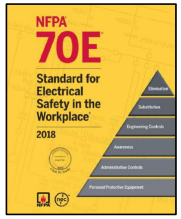
NFPA 70E 2021 Public Comments, Second Revision, Expected Changes



- NOT ALL POTENTIAL CHANGES WILL BE REVIEWED.
- CHAPTER 1, ARTICLE 130 WORK INVOLVING ELECTRICAL HAZARDS

- Article 130.5(G) Incident Energy Analysis Method.
- List item ”e” added to clarify that for outwear that is worn over arc-rated clothing as protection from elements or for other purposes, doesn’t have to be greater than or equal to calculated incident energy exposure. The primary arc-rated clothing underneath it will be.

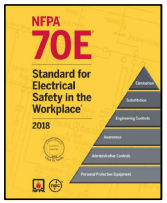
NFPA 70E 2021 Public Comments, Second Revision, Expected Changes



- NOT ALL POTENTIAL CHANGES WILL BE REVIEWED.
- CHAPTER 1, ARTICLE 130 WORK INVOLVING ELECTRICAL HAZARDS

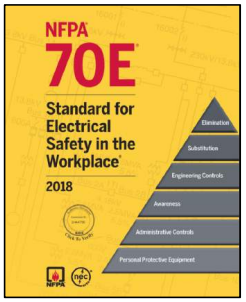
- Article 130.7 (C)(1) General (new Note added to provide guidance of what the “user” can do if arc-rated clothing is not available that is equal to or greater than calculated incident energy only for absence of voltage testing, risk reduction).

NFPA 70E 2021 Public Comments, Second Revision, Expected Changes



- NOT ALL POTENTIAL CHANGES WILL BE REVIEWED.
- CHAPTER 1, ARTICLE 130 WORK INVOLVING ELECTRICAL HAZARDS
- (new content)
- 1. Use non-contact proximity test instrument secondary side of transformer before using contact test instrument.
- 2. If equipment design allows observe visible disconnect.
- 3. Increase the working distance.
- 4. Consider system design options to reduce the incident energy level.

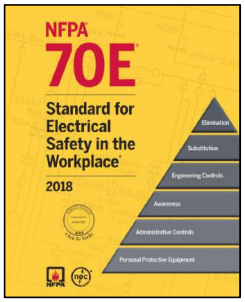
NFPA 70E 2021 Public Comments, Second Revision, Expected Changes



- NOT ALL POTENTIAL CHANGES WILL BE REVIEWED.
- CHAPTER 2, SAFETY RELATED MAINTENANCE REQUIREMENTS

- Refer to NFPA 70E 2021.

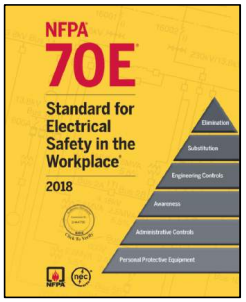
NFPA 70E 2021 Public Comments, Second Revision, Expected Changes



- NOT ALL POTENTIAL CHANGES WILL BE REVIEWED.
- CHAPTER 3, SAFETY REQUIREMENTS FOR SPECIAL EQUIPMENT

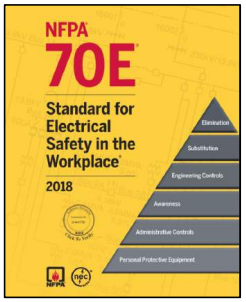
- Article 320 Safety Requirements Related to Batteries and Battery Rooms 320.3 Safety Procedures (A) General Safety Hazards (2) Battery Risk Assessment
- Added content Note. Refer to Annex F for battery risk assessment flow chart.

NFPA 70E 2021 Public Comments, Second Revision, Expected Changes



- NOT ALL POTENTIAL CHANGES WILL BE REVIEWED.
- CHAPTER 3, SAFETY REQUIREMENTS FOR SPECIAL EQUIPMENT
- **NEW Article 360 Safety-Related Requirements for Capacitors**
- Completely new Article.
- Laboratory research and Public Comment.
- New Annex R Working With Capacitors complimentary to Article 360, more detailed information.

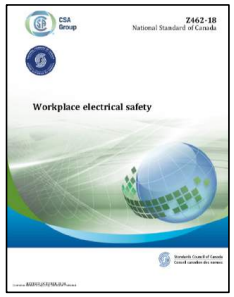
NFPA 70E 2021 Public Comments, Second Revision, Expected Changes



- NOT ALL POTENTIAL CHANGES WILL BE REVIEWED.
- ANNEXES
- (updates, changes or new)

- Annex D – IEEE 1584 2018 content additions. All formulas deleted.
- Annex J - Job Safety Planning Checklist example form added.
- Annex R – [NEW] Working With Capacitors

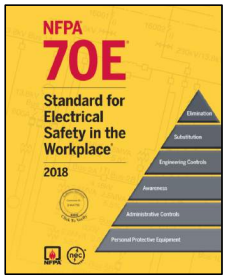
CSA Z462 2021 Expected Changes

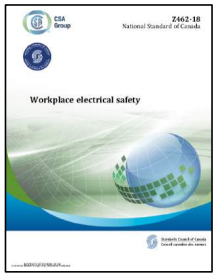


- NOT ALL POTENTIAL CHANGES WILL BE REVIEWED.

- Goal is to remain technically harmonized with NFPA 70E.
- Reviewing existing CSA Z462 Table 6A, NFPA 70E Table 130.7 (C)(15)(a).
- New Annexes, Switching & Isolation, Temporary Protective Grounding.
- Updates to Annex O Safety-Related Design Requirements.
- Updates to Annex Q Equipment Labeling (not in 70E).
- Updates to Annex U Human Performance.

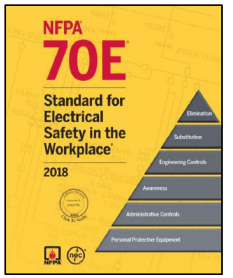
Conclusion

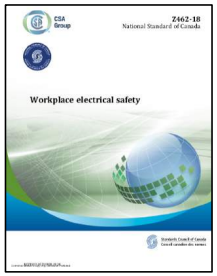




- 70E and Z462 follow formal processes for public input or request for amendment.
- 70E and Z462 required interpretation and effective implementation, not adopted into OSHA or OH&S law.
- **GOOD NEWS, 2021 NFPA 70E and CSA Z462 2021 quantity and significance of changes is reduced.**
- **When published, employer needs to review published changes.**

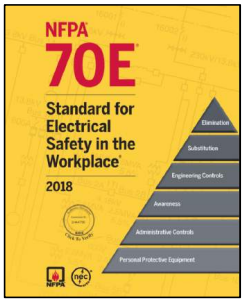
Conclusion





- Update your company's Electrical Safety Program.
- Provide NFPA 70E/CSA Z462 2021 Edition Arc Flash & Shock Training to employees.
- Provide Electrical Safety Program update training to your employees.

Questions



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Conclusion

- **THANKs to EASYPOWER!**

- THANK YOU for attending?

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