Public Comment No. 1153-NFPA 70-2021 [Global Input]

The Correlating Committee directs the Chair of CMP-13 to assign a task group to review all the definitions under their purview for compliance with the NEC Style Manual and to review definitions identified by the Correlating Committee that may contain correlation issues. The attachment includes a list of those definitions identified that need to be reviewed.

Additional Proposed Changes

File Name	Description	Approved
13_CN_362_Global.pdf	13 CN362	

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 362 appeared in the First Draft Report on First Revision No. 9192.

The Correlating Committee directs the Chair of CMP-13 to assign a task group to review all the definitions under their purview for compliance with the NEC Style Manual and to review definitions identified by the Correlating Committee that may contain correlation issues. The attachment includes a list of those definitions identified that need to be reviewed.

Related Item

- First Revision No. 9192

Submitter Information Verification

Submitter Full Name: CC on NEC-AAC
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:
Submittal Date: Tue Aug 10 11:46:52 EDT 2021
Committee: NEC-P13

Correlating Committee Note No. 362-NFPA 70-2021 [Global Input]

Supplemental Information

File Name	Description	Approved
NEC_P13_Definitions_TG_Attachment_CN362.docx		

Submitter Information Verification

Committee: NEC-P13
Submittal Date: Thu May 06 22:42:52 EDT 2021

Committee Statement

Committee Statement: The Correlating Committee directs the Chair of CMP-13 to assign a task group to review all the definitions under their purview for compliance with the NEC Style Manual and to review definitions identified by the Correlating Committee that may contain correlation issues. The attachment includes a list of those definitions identified that need to be reviewed.

First Revision No. 9192-NFPA 70-2021 [Global Input]

Ballot Results

This item has passed ballot

12 Eligible Voters
0 Not Returned
12 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Affirmative All

Ayer, Lawrence S.
Gallo, Ernest J.
Hickman, Palmer L.
Holub, Richard A.
Hunter, Dean C.
Johnston, Michael J.
Kendall, David H.
Kovacik, John R.
Manche, Alan
McDaniel, Roger D.
Porter, Christine T.
Williams, David A.

Correlating Committee Definitions Task Group
CMP-13 - Definitions

CMP-13 Definitions	Correlating Committee Comments
	The Correlating Committee directs the Chair of CMP-13 to assign a task group to review all the definitions under their purview for compliance with the NEC Style Manual and to review definitions identified by the Correlating Committee that may contain correlation issues. The attachment includes a list of those definitions identified that need to be reviewed.
Diversion Load Controller. Equipment that regulates the output of a wind generator by diverting power from the generator to dc or ac loads or to an interconnected utility service. (CMP-4)	The Correlating Committee assigns the definition of Diversion Load Controller to CMP-13. Code-Making Panel 13 should review and compare this definition with the Diversion Charge Controller definition and consider using the same term for consistency.
Inverter Utilization Output Circuit. Conductors between the multimode or stand-alone inverter and utilization equipment. (706) (CMP-13)	The Correlating Committee directs the panel to review the definition of Inverter Utilization Output Circuit and consider correlation with the definition of Power Source Output Circuit.
Normal/Emergency Power Source. A power source on the output side of a transfer switch or uninterruptible power supply that is automatically available upon loss of normal power. (700) (CMP-13).	The Correlating Committee directs that this definition title be reviewed for its use within the article. The term "normal/emergency power source" is not used in Article 700. The term "normal/emergency source" is used in 700.23.
Optional Standby Systems. Those systems intended to supply power to public or private facilities or property where life safety does not depend on the performance of the system. These systems are intended to supply on-site generated or stored power to selected loads either automatically or manually. (CMP-13) Informational Note: Optional standby systems are typically installed to provide an alternate source of electric power for such facilities as industrial and commercial buildings, farms, and residences and to serve loads such as heating and refrigeration systems, data processing and communications systems, and industrial processes that, when stopped during any power outage, could cause discomfort, serious interruption of the process, damage to the product or process, or the like.	4.1.1 Redundant Informational Note The Correlating Committee directs the panel to reconsider the definition, regarding the need for the informational note. This Informational Note is presently located in the Scope of Article 702.

Stored-Energy Power Supply System (SEPSS). This definition shall apply within this article and throughout the code. A complete functioning EPSS powered by a stored-energy electrical source. (CMP-13)	The Correlating Committee directs the panel to review the definition of Stored-Energy Power Supply System for compliance with the NEC Style Manual. The definition should follow the NEC Style Manual 2.2.2, recommendations for denoting the application of definitions by removing the first sentence.
DC System, Reference-Grounded (Reference-Grounded DC System). A system that is not solidly grounded but has a low-resistance electrical reference that maintains voltage to ground in normal operation. (712) (CMP-13)	Task Group 6 Diversion Charge Controller (13), Grounded, Functionally (4) and Referenced-Grounded 2.2.2.4 Multiple Terms
Diversion Charge Controller. Equipment that regulates the charging process of an ESS by diverting power from energy storage to direct-current or alternating-current loads or to an interconnected utility service. (706) (CMP- 13)	Task Group 6 Diversion Charge Controller, Grounded, Functionally 2.2.2.4 Multiple Terms
Grounded, Functionally (Functionally Grounded). A system that has an electrical ground reference for operational purposes that is not solidly grounded. (712) (CMP-13) Informational Note: Examples of operational reasons for functionally grounded systems include ground-fault detection and performance-related issues for some power sources.	Task Group 6 Diversion Charge Controller (13), Grounded, Functionally (4) and Referenced-Grounded 2.2.2.4 Multiple Terms
Critical Operations Areas, Designated [Designated Critical Operations Areas (DCOA)]. Areas within a facility or site designated as requiring critical operations power. (CMP-13)	The term modifier to be in parentheses and then the acronym in parentheses.
DC System, Three-Wire, Grounded (Grounded Three-Wire DC System). A system with a solid connection or reference-ground between the center point of a bipolar dc power source and the equipment grounding system. (712) (CMP-13)	2.2.2.3 Base Term Group with DC System, Grounded Three-Wire
DC System, Two-Wire, Grounded (Grounded Two-Wire DC System). A system that has a solid connection or reference-ground between one of the current-carrying conductors and the equipment grounding system. (712) (CMP-13)	2.2.2.3 Base Term Group with DC System, Grounded Two-Wire
DC System, Ungrounded (Ungrounded DC System). A system that has no direct or resistive connection between the current-carrying conductors and the equipment grounding system. (712) (CMP-13)	2.2.2.3 Base Term Group with DC System, Ungrounded
Emergency Luminaire, Battery- Equipped (Battery- Equipped Emergency Luminaire). A luminaire with a rechargeable battery, a battery charging means, and an automatic load control relay. (700) (701) (CMP-13)	2.2.2.3.2 Article Number (Can't have two)

Emergency Power Supply System (EPSS). This definition shall apply within this article and throughout the code. A complete functioning EPS system coupled to a system of conductors, disconnecting means and overcurrent protective devices, transfer switches, and all control, supervisory, and support devices up to and including the load terminals of the transfer equipment needed for the system to operate as a safe and reliable source of electric power. [110:3.3.4] (CMP-13)	2.2.2 Delete the first sentence
Luminaire, Emergency, Directly Controlled (Directly Controlled Emergency Luminaire). A luminaire supplied by the facility emergency power system and with a control input for dimming or switching that provides an emergency illumination level upon loss of normal power. (700) (CMP-13) Informational Note: See ANSI/UL 924, Emergency Lighting and Power Equipment, for information covering directly controlled emergency luminaires.	2.2.2.3 Base Term Group By Emergency Luminaire
Microgrid, Direct Current [Direct Current Microgrid (DC Microgrid)]. A direct current microgrid is a power distribution system consisting of more than one interconnected dc power source, supplying dc-dc converter(s), dc load(s), and/or ac load(s) powered by dc-ac inverter(s). A dc microgrid is typically not directly connected to an ac primary source of electricity, but some dc microgrids interconnect via one or more dc-ac bidirectional converters or dc-ac inverters. (712) (CMP-13) Informational Note: Direct current power sources include ac-dc converters (rectifiers), bidirectional dc-ac inverters/converters, photovoltaic systems, wind generators, energy storage systems (including batteries), and fuel cells.	2.2.2.5 Alternate Term Title has 2 sets of Paren. Definition last sentence should be an Informational Note
Nominal Voltage (as applied to battery or cell). The value assigned to a cell or battery of a given voltage class for the purpose of convenient designation. The operating voltage of the cell or battery may vary above or below this value. (CMP-13) Informational Note: The most common nominal cell voltages are 2 volts per cell for the lead-acid batteries, 1.2 volts per cell for alkali batteries, and 3.2 to 3.8 volts per cell for Li-ion batteries. Nominal voltages might vary with different chemistries.	2.2.2.3 Base Term Group by Voltage, Nominal (Nominal Voltage) (as applied…. Retained)
Primary DC Source. A source that supplies the majority of the dc load in a dc microgrid. (712) (CMP-13)	2.2.2.3 Base Term Group by Primary Source 2.2.2.5 Alternate Term (Primary DC Source)
Supervisory Control and Data Acquisition (SCADA). An electronic system that provides monitoring and controls for the operation of the critical operations power system. This can include the fire alarm system, security system, control of the HVAC, the start/stop/monitoring of	The second sentence should be an Informational Note

the power supplies and electrical distribution system, annunciation and communications equipment to emergency personnel, facility occupants, and remote operators. (CMP-13)	
Switch, Bypass Isolation. A manual, nonautomatic, or automatic operated device used in conjunction with a transfer switch to provide a means of directly connecting load conductors to a power source and of disconnecting the transfer switch. (CMP-13)	2.2.2.3.1 Searchability 2.2.2.3 Base Term Transfer Switch, Bypass Isolation (Bypass Isolation Transfer Switch)
Switch, Meter-Mounted Transfer. (Meter-Mounted Transfer Switch). A transfer switch connected between the utility meter and the meter base or fabricated as part of the meter base. (CMP-13) Informational Note: Meter-mounted transfer switches can plug into the meter base or be fabricated as part of the meter base. Transfer switches that incorporate the meter base in the transfer equipment assembly are not considered meter-mounted transfer switches.	2.2.2.3 Base Term Transfer Switch, Meter-Mounted
Switch, Transfer. An automatic or nonautomatic device for transferring one or more load conductor connections from one power source to another. (CMP-13)	2.2.2.3 Base Term Transfer Switch
Voltage, Nominal (Nominal Voltage). A value assigned to a circuit or system for the purpose of conveniently designating its dc voltage class. (712) (CMP-13) Informational Note: The actual voltage at which a circuit operates can vary from the nominal voltage within a range that permits satisfactory operation of equipment.	2.2.2.4 Multiple Terms Nominal Voltage

Public Comment No. 1154-NFPA 70-2021 [Global Input]

The Correlating Committee notes that more than one related term is referenced in the definitions. Section 2.2.2.4 of the NEC Style Manual review this issue and the Correlating Committee establishes a Task Group with representation from CMP 4 and 13 to review the terms "Grounded, Functionally" and "Diversion Charge Controller" to consider one definition for each term for consistency and correlation, if applicable.

The task group should give consideration to the CMP-13 definition and correlate it with FR 9192.

The Correlating Committee assigns the definition of "Grounded, Functionally" to CMP-4.

The Correlating Committee assigns the definition of "Diversion Charge Controller" to CMP-13.

Each panel is assigned to revise the definitions under their purview to comply with the NEC Style Manual.

Additional Proposed Changes

File Name	Description	Approved
13_CN_396_Global.pdf	13 CN396	

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 396 appeared in the First Draft Report on First Revision Nos. 9192 and 9324.

The Correlating Committee notes that more than one related term is referenced in the definitions. Section 2.2.2.4 of the NEC Style Manual review this issue and the Correlating Committee establishes a Task Group with representation from CMP 4 and 13 to review the terms "Grounded, Functionally" and "Diversion Charge Controller" to consider one definition for each term for consistency and correlation, if applicable.

The task group should give consideration to the CMP-13 definition and correlate it with FR 9192.

The Correlating Committee assigns the definition of "Grounded, Functionally" to CMP-4.

The Correlating Committee assigns the definition of "Diversion Charge Controller" to CMP-13.

Each panel is assigned to revise the definitions under their purview to comply with the NEC Style Manual.

Related Item

• First Revision No. 9192 • First Revision No. 9324

Submitter Information Verification

Submitter Full Name: CC on NEC-AAC
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:
Submittal Date: Tue Aug 10 11:49:03 EDT 2021
Committee: NEC-P13

Correlating Committee Note No. 396-NFPA 70-2021 [Global Input]

Submitter Information Verification

Committee: NEC-P13
Submittal Date: Fri May 07 16:20:23 EDT 2021

Committee Statement

Committee Statement: The Correlating Committee notes that more than one related term is referenced in the definitions. Section 2.2.2.4 of the NEC Style Manual review this issue and the Correlating Committee establishes a Task Group with representation from CMP 4 and 13 to review the terms "Grounded, Functionally" and "Diversion Charge Controller" to consider one definition for each term for consistency and correlation, if applicable.

The task group should give consideration to the CMP-13 definition and correlate it with FR 9192.

The Correlating Committee assigns the definition of “Grounded, Functionally” to CMP-4.

The Correlating Committee assigns the definition of “Diversion Charge Controller” to CMP-13.

Each panel is assigned to revise the definitions under their purview to comply with the NEC Style Manual.

First Revision No. 9192-NFPA 70-2021 [Global Input]
First Revision No. 9324-NFPA 70-2021 [Global Input]

Ballot Results

This item has passed ballot

12 Eligible Voters
0 Not Returned
12 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Affirmative All

Ayer, Lawrence S.
Gallo, Ernest J.
Hickman, Palmer L.
Holub, Richard A.
Hunter, Dean C.
Johnston, Michael J.
Kendall, David H.
Kovacik, John R.
Manche, Alan
McDaniel, Roger D.
Porter, Christine T.
Williams, David A.

Public Comment No. 176-NFPA 70-2021 [Definition: Battery, Stationary Standby (Stationary Standby...]

Battery, Stationary Standby (Stationary Standby Battery).

A battery that spends the majority of the time on continuous float charge or in a high state of charge, in readiness for a discharge event upon the loss of normal power . (CMP-13)

Informational Note: Uninterruptible Power Supply (UPS) batteries are an example that falls under this definition.

Statement of Problem and Substantiation for Public Comment

Additional clarity is provided in the definition of stationary standby battery that the batteries only discharge their stored energy upon the loss of the normal power source and are not an ESS.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 175-NFPA 70-2021 [Section No. 480.1]	address the operation of standby batteries

Related Item

• FR 9030

Submitter Information Verification

Submitter Full Name: Brian Baughman
Organization: Generac Power Systems Inc.
Street Address:
City:
State:
Zip:
Submittal Date: Fri Jul 09 10:26:19 EDT 2021
Committee: NEC-P13

Public Comment No. 1368-NFPA 70-2021 [Definition: Critical Operations Areas, Designated (DCOA). (...]

Critical Operations Areas, Designated (~~DCOA).~~ ~~(~~ Designated Critical Operations Areas)(DCOA).

Areas within a facility or site designated as requiring critical operations power. (CMP-13)

Additional Proposed Changes

File Name	Description	Approved
CMP-13_definition_TG_summary_8-18.pdf	CMP-13 Definition TG summary	

Statement of Problem and Substantiation for Public Comment

Corrections needed to comply with NEC style manual.
This public comment is being submitted on behalf of a task group formed of CMP-13 members; Herb Daugherty, Jeff Jonas, Chad Kennedy, Linda Little and Charles Picard to address the NEC correlating committee comments related to the definitions under the purview of CMP-13.

Related Item

• FR-9192

Submitter Information Verification

Submitter Full Name: Jeff Jonas
Organization: Generac Power Systems, Inc.
Street Address:
City:
State:
Zip:
Submittal Date: Thu Aug 12 12:43:49 EDT 2021
Committee: NEC-P13

Correlating Committee Definitions Task Group
CMP-13 - Definitions
(prepared by Jeff Jonas, August 18, 2021)

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
	The Correlating Committee directs the Chair of CMP-13 to assign a task group to review all the definitions under their purview for compliance with the NEC Style Manual and to review definitions identified by the Correlating Committee that may contain correlation issues. The attachment includes a list of those definitions identified that need to be reviewed.	
Diversion Load Controller. Equipment that regulates the output of a wind generator by diverting power from the generator to dc or ac loads or to an interconnected utility service. (CMP-4)	The Correlating Committee assigns the definition of Diversion Load Controller to CMP-13. Code-Making Panel 13 should review and compare this definition with the Diversion Charge Controller definition and consider using the same term for consistency.	No action taken. Will be reviewed by task group 6 with "Diversion Charge Controller".
Inverter Utilization Output Circuit. Conductors between the multimode or stand-alone inverter and utilization equipment. (706) (CMP-13)	The Correlating Committee directs the panel to review the definition of Inverter Utilization Output Circuit and consider correlation with the definition of Power Source Output Circuit.	No action taken. More discussion required in the interconnection task group and the next code cycle.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Normal/Emergency Power Source. A power source on the output side of a transfer switch or uninterruptible power supply that is automatically available upon loss of normal power. (700) (CMP-13).	The Correlating Committee directs that this definition title be reviewed for its use within the article. The term "normal/emergency power source" is not used in Article 700. The term "normal/emergency source" is used in 700.23.	Submitted PC 1367 Change code language to include "power" after "Normal/ Emergency" in 700.23 to match the definition.
Optional Standby Systems. Those systems intended to supply power to public or private facilities or property where life safety does not depend on the performance of the system. These systems are intended to supply on-site generated or stored power to selected loads either automatically or manually. (CMP-13) ~~Informational Note: Optional standby systems are typically installed to provide an alternate source of electric power for such facilities as industrial and commercial buildings, farms, and residences and to serve loads such as heating and refrigeration systems, data processing and communications systems, and industrial processes that, when stopped during any power outage, could cause discomfort, serious interruption of the process, damage to the product or process, or the like.~~	4.1.1 Redundant Informational Note The Correlating Committee directs the panel to reconsider the definition, regarding the need for the informational note. This Informational Note is presently located in the Scope of Article 702.	CN 434 Submitted PC 1355 Requested changes made.
Stored-Energy Power Supply System (SEPSS). ~~This definition shall apply within this article and throughout the code.~~ A complete functioning EPSS powered by a stored-energy electrical source. (CMP-13)	The Correlating Committee directs the panel to review the definition of Stored-Energy Power Supply System for compliance with the NEC Style Manual. The definition should follow the NEC Style Manual 2.2.2, recommendations for denoting the application of definitions by removing the first sentence.	CN 435 Submitted PC 1366 Requested changes made.
DC System, Reference-Grounded (Reference-Grounded DC System). A system that is not solidly grounded but has a low-resistance electrical reference that maintains voltage to ground in normal operation. (712) (CMP-13)	Task Group 6 Diversion Charge Controller (13), Grounded, Functionally (4) and Referenced-Grounded 2.2.2.4 Multiple Terms	No action taken. Per a discussion with Chad Kennedy this definition is being handled by task group 6.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Diversion Charge Controller. Equipment that regulates the charging process of an ESS by diverting power from energy storage to direct-current or alternating-current loads or to an interconnected utility service. (706) (CMP-13)	Task Group 6 Diversion Charge Controller, Grounded, Functionally 2.2.2.4 Multiple Terms	No action taken. Per a discussion with Chad Kennedy this definition is being handled by task group 6.
Grounded, Functionally (Functionally Grounded). A system that has an electrical ground reference for operational purposes that is not solidly grounded. (712) (CMP-13) Informational Note: Examples of operational reasons for functionally grounded systems include ground-fault detection and performance-related issues for some power sources.	Task Group 6 Diversion Charge Controller (13), Grounded, Functionally (4) and Referenced-Grounded 2.2.2.4 Multiple Terms	No action taken. Per a discussion with Chad Kennedy this definition is being handled by task group 6.
Critical Operations Areas, Designated ({~~{~~Designated Critical Operations Areas) (DCOA)~~}~~. Areas within a facility or site designated as requiring critical operations power. (CMP-13)	The term modifier to be in parentheses and then the acronym in parentheses.	PC 1368 Requested changes made.
DC System, Grounded Three-Wire, ~~Grounded~~ (Grounded Three-Wire DC System). A system with a solid connection or reference-ground between the center point of a bipolar dc power source and the equipment grounding system. (712) (CMP-13)	2.2.2.3 Base Term Group with DC System, Grounded Three-Wire	PC 1369 Requested changes made.
DC System, Grounded Two-Wire, ~~Grounded~~ (Grounded Two-Wire DC System). A system that has a solid connection or reference-ground between one of the current-carrying conductors and the equipment grounding system. (712) (CMP-13)	2.2.2.3 Base Term Group with DC System, Grounded Two-Wire	PC 1370 Requested changes made.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
DC System, Ungrounded (Ungrounded DC System). A system that has no direct or resistive connection between the current-carrying conductors and the equipment grounding system. (712) (CMP-13)	2.2.2.3 Base Term Group with DC System, Ungrounded	No action taken. Looks to be correct as is.
Emergency Luminaire, Battery- Equipped (Battery- Equipped Emergency Luminaire). A luminaire with a rechargeable battery, a battery charging means, and an automatic load control relay. ~~(700) (701)~~ (CMP-13)	2.2.2.3.2 Article Number (Can't have two)	PC 1372 Requested changes made.
Emergency Power Supply System (EPSS). ~~This definition shall apply within this article and throughout the code.~~ A complete functioning EPS system coupled to a system of conductors, disconnecting means and overcurrent protective devices, transfer switches, and all control, supervisory, and support devices up to and including the load terminals of the transfer equipment needed for the system to operate as a safe and reliable source of electric power. [110:3.3.4] (CMP-13)	2.2.2 Delete the first sentence	PC 1373 Requested changes made.
Emergency **Luminaire,** ~~**Emergency**~~**, Directly Controlled (Directly Controlled Emergency Luminaire).** A luminaire supplied by the facility emergency power system and with a control input for dimming or switching that provides an emergency illumination level upon loss of normal power. (700) (CMP-13) Informational Note: See ANSI/UL 924, Emergency Lighting and Power Equipment, for information covering directly controlled emergency luminaires.	2.2.2.3 Base Term Group By Emergency Luminaire	PC 1374 Requested changes made.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Microgrid, Direct Current ~~[~~(Direct Current Microgrid) (DC Microgrid)~~]~~. A direct current microgrid is a power distribution system consisting of more than one interconnected dc power source, supplying dc-dc converter(s), dc load(s), and/or ac load(s) powered by dc-ac inverter(s). ~~A dc microgrid is typically not directly connected to an ac primary source of electricity, but some dc microgrids interconnect via one or more dc-ac bidirectional converters or dc-ac inverters.~~ (712) (CMP-13) Informational Note No. 1: Direct current power sources include ac-dc converters (rectifiers), bidirectional dc-ac inverters/converters, photovoltaic systems, wind generators, energy storage systems (including batteries), and fuel cells. Informational Note No. 2: A DC Microgrid is typically not directly connected to an ac primary source of electricity, but some dc microgrids interconnect via one or more dc-ac bidirectional converters or dc-ac inverters.	2.2.2.5 Alternate Term Title has 2 sets of Paren. Definition last sentence should be an Informational Note	PC 1927 Requested changes made.
Voltage, Nominal ~~Voltage~~ (Nominal Voltage) (as applied to battery or cell). The value assigned to a cell or battery of a given voltage class for the purpose of convenient designation. The operating voltage of the cell or battery may vary above or below this value. (CMP-13) Informational Note: The most common nominal cell voltages are 2 volts per cell for the lead-acid batteries, 1.2 volts per cell for alkali batteries, and 3.2 to 3.8 volts per cell for Li-ion batteries. Nominal voltages might vary with different chemistries.	2.2.2.3 Base Term Group by Voltage, Nominal (Nominal Voltage) (as applied…. Retained)	CN 446 PC 1375 Requested changes made.
Primary ~~DC~~ Source, DC (Primary DC Source). A source that supplies the majority of the dc load in a dc microgrid. (712) (CMP-13)	2.2.2.3 Base Term Group by Primary Source 2.2.2.5 Alternate Term (Primary DC Source)	PC 1376 Requested changes made.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Supervisory Control and Data Acquisition (SCADA). An electronic system that provides monitoring and controls for the operation of the critical operations power system. Informational Note: This can include the fire alarm system, security system, control of the HVAC, the start/stop/monitoring of the power supplies and electrical distribution system, annunciation and communications equipment to emergency personnel, facility occupants, and remote operators. (CMP-13)	The second sentence should be an Informational Note	PC 1378 Requested changes made.
~~the power supplies and electrical distribution system, annunciation and communications equipment to emergency personnel, facility occupants, and remote operators. (CMP-13)~~		
Transfer Switch, Bypass Isolation (Bypass Isolation Transfer Switch). A manual, nonautomatic, or automatic operated device used in conjunction with a transfer switch to provide a means of directly connecting load conductors to a power source and of disconnecting the transfer switch. (CMP-13)	2.2.2.3.1 Searchability 2.2.2.3 Base Term Transfer Switch, Bypass Isolation (Bypass Isolation Transfer Switch)	PC 1380 Requested changes made.
Transfer Switch, Meter-Mounted ~~Transfer~~. (Meter-Mounted Transfer Switch). A transfer switch connected between the utility meter and the meter base or fabricated as part of the meter base. (CMP-13) Informational Note: Meter-mounted transfer switches can plug into the meter base or be fabricated as part of the meter base. Transfer switches that incorporate the meter base in the transfer equipment assembly are not considered meter-mounted transfer switches.	2.2.2.3 Base Term Transfer Switch, Meter-Mounted	PC 1381 Requested changes made.
Transfer Switch~~, Transfer~~. An automatic or nonautomatic device for transferring one or more load conductor connections from one power source to another. (CMP-13)	2.2.2.3 Base Term Transfer Switch	PC 1379 Requested changes made.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Voltage, Nominal (Nominal Voltage). A value assigned to a circuit or system for the purpose of conveniently designating its dc voltage class. (712) (CMP-13) Informational Note: The actual voltage at which a circuit operates can vary from the nominal voltage within a range that permits satisfactory operation of equipment.	2.2.2.4 Multiple Terms Nominal Voltage	No action taken. Correct as is. Multiple terms are being used to describe 2 different things. Article 712 definition is limited to dc.

Public Comment No. 552-NFPA 70-2021 [Definition: DC System, Reference-Grounded. (Reference-Groun...]

~~**DC System, Reference-Grounded. (Reference-Grounded DC System)**~~

~~A system that is not solidly grounded but has a low-resistance electrical reference that maintains voltage to ground in normal operation. (712) (CMP-13)~~

Statement of Problem and Substantiation for Public Comment

Definitions Task Group 6, as directed by the Correlating Committee, has reviewed the multiple definitions of "Grounded, Functionally" and "DC System, Reference-Grounded. (Reference-Grounded DC System)" that were presented in the First Draft Report. The task group recommends either deleting this definition as a term no longer used in the requirements of the document, per Style Manual Section 2.2.2, or clarifying the distinction between reference grounded and functionally grounded as applied by the requirements of Article 712.

Related Item

• FR 9354

Submitter Information Verification

Submitter Full Name: Chad Kennedy
Organization: Schneider Electric
Street Address:
City:
State:
Zip:
Submittal Date: Fri Jul 30 08:36:27 EDT 2021
Committee: NEC-P13

Public Comment No. 1369-NFPA 70-2021 [Definition: DC System, Three-Wire, Grounded. (Grounded Thre...]

DC System, Grounded Three-~~Wire, Grounded.~~ Wire (Grounded Three-Wire DC System)

A system with a solid connection or reference-ground between the center point of a bipolar dc power source and the equipment grounding system. (712) (CMP-13)

Additional Proposed Changes

File Name	Description	Approved
CMP-13_definition_TG_summary_8-18.pdf	CMP-13 Definition TG summary	

Statement of Problem and Substantiation for Public Comment

This change is needed to improve the grouping of like terms in the definition section, article 100.
This public comment is being submitted on behalf of a task group formed of CMP-13 members; Herb Daugherty, Jeff Jonas, Chad Kennedy, Linda Little and Charles Picard to address the NEC correlating committee comments related to the definitions under the purview of CMP-13.

Related Item

• FR-9192

Submitter Information Verification

Submitter Full Name: Jeff Jonas
Organization: Generac Power Systems, Inc.
Street Address:
City:
State:
Zip:
Submittal Date: Thu Aug 12 12:45:42 EDT 2021
Committee: NEC-P13

Correlating Committee Definitions Task Group
CMP-13 - Definitions
(prepared by Jeff Jonas, August 18, 2021)

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
	The Correlating Committee directs the Chair of CMP-13 to assign a task group to review all the definitions under their purview for compliance with the NEC Style Manual and to review definitions identified by the Correlating Committee that may contain correlation issues. The attachment includes a list of those definitions identified that need to be reviewed.	
Diversion Load Controller. Equipment that regulates the output of a wind generator by diverting power from the generator to dc or ac loads or to an interconnected utility service. (CMP-4)	The Correlating Committee assigns the definition of Diversion Load Controller to CMP-13. Code-Making Panel 13 should review and compare this definition with the Diversion Charge Controller definition and consider using the same term for consistency.	No action taken. Will be reviewed by task group 6 with "Diversion Charge Controller".
Inverter Utilization Output Circuit. Conductors between the multimode or stand-alone inverter and utilization equipment. (706) (CMP-13)	The Correlating Committee directs the panel to review the definition of Inverter Utilization Output Circuit and consider correlation with the definition of Power Source Output Circuit.	No action taken. More discussion required in the interconnection task group and the next code cycle.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Normal/Emergency Power Source. A power source on the output side of a transfer switch or uninterruptible power supply that is automatically available upon loss of normal power. (700) (CMP-13).	The Correlating Committee directs that this definition title be reviewed for its use within the article. The term "normal/emergency power source" is not used in Article 700. The term "normal/emergency source" is used in 700.23.	Submitted PC 1367 Change code language to include "power" after "Normal/ Emergency" in 700.23 to match the definition.
Optional Standby Systems. Those systems intended to supply power to public or private facilities or property where life safety does not depend on the performance of the system. These systems are intended to supply on-site generated or stored power to selected loads either automatically or manually. (CMP-13) ~~Informational Note: Optional standby systems are typically installed to provide an alternate source of electric power for such facilities as industrial and commercial buildings, farms, and residences and to serve loads such as heating and refrigeration systems, data processing and communications systems, and industrial processes that, when stopped during any power outage, could cause discomfort, serious interruption of the process, damage to the product or process, or the like.~~	4.1.1 Redundant Informational Note The Correlating Committee directs the panel to reconsider the definition, regarding the need for the informational note. This Informational Note is presently located in the Scope of Article 702.	CN 434 Submitted PC 1355 Requested changes made.
Stored-Energy Power Supply System (SEPSS). ~~This definition shall apply within this article and throughout the code.~~ A complete functioning EPSS powered by a stored-energy electrical source. (CMP-13)	The Correlating Committee directs the panel to review the definition of Stored-Energy Power Supply System for compliance with the NEC Style Manual. The definition should follow the NEC Style Manual 2.2.2, recommendations for denoting the application of definitions by removing the first sentence.	CN 435 Submitted PC 1366 Requested changes made.
DC System, Reference-Grounded (Reference-Grounded DC System). A system that is not solidly grounded but has a low-resistance electrical reference that maintains voltage to ground in normal operation. (712) (CMP-13)	Task Group 6 Diversion Charge Controller (13), Grounded, Functionally (4) and Referenced-Grounded 2.2.2.4 Multiple Terms	No action taken. Per a discussion with Chad Kennedy this definition is being handled by task group 6.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Diversion Charge Controller. Equipment that regulates the charging process of an ESS by diverting power from energy storage to direct-current or alternating-current loads or to an interconnected utility service. (706) (CMP-13)	Task Group 6 Diversion Charge Controller, Grounded, Functionally 2.2.2.4 Multiple Terms	No action taken. Per a discussion with Chad Kennedy this definition is being handled by task group 6.
Grounded, Functionally (Functionally Grounded). A system that has an electrical ground reference for operational purposes that is not solidly grounded. (712) (CMP-13) Informational Note: Examples of operational reasons for functionally grounded systems include ground-fault detection and performance-related issues for some power sources.	Task Group 6 Diversion Charge Controller (13), Grounded, Functionally (4) and Referenced-Grounded 2.2.2.4 Multiple Terms	No action taken. Per a discussion with Chad Kennedy this definition is being handled by task group 6.
Critical Operations Areas, Designated ({~~{~~Designated Critical Operations Areas) (DCOA)~~}~~. Areas within a facility or site designated as requiring critical operations power. (CMP-13)	The term modifier to be in parentheses and then the acronym in parentheses.	PC 1368 Requested changes made.
DC System, Grounded Three-Wire, ~~Grounded~~ (Grounded Three-Wire DC System). A system with a solid connection or reference-ground between the center point of a bipolar dc power source and the equipment grounding system. (712) (CMP-13)	2.2.2.3 Base Term Group with DC System, Grounded Three-Wire	PC 1369 Requested changes made.
DC System, Grounded Two-Wire, ~~Grounded~~ (Grounded Two-Wire DC System). A system that has a solid connection or reference-ground between one of the current-carrying conductors and the equipment grounding system. (712) (CMP-13)	2.2.2.3 Base Term Group with DC System, Grounded Two-Wire	PC 1370 Requested changes made.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
DC System, Ungrounded (Ungrounded DC System). A system that has no direct or resistive connection between the current-carrying conductors and the equipment grounding system. (712) (CMP-13)	2.2.2.3 Base Term Group with DC System, Ungrounded	No action taken. Looks to be correct as is.
Emergency Luminaire, Battery- Equipped (Battery- Equipped Emergency Luminaire). A luminaire with a rechargeable battery, a battery charging means, and an automatic load control relay. ~~(700) (701)~~ (CMP-13)	2.2.2.3.2 Article Number (Can't have two)	PC 1372 Requested changes made.
Emergency Power Supply System (EPSS). ~~This definition shall apply within this article and throughout the code.~~ A complete functioning EPS system coupled to a system of conductors, disconnecting means and overcurrent protective devices, transfer switches, and all control, supervisory, and support devices up to and including the load terminals of the transfer equipment needed for the system to operate as a safe and reliable source of electric power. [110:3.3.4] (CMP-13)	2.2.2 Delete the first sentence	PC 1373 Requested changes made.
Emergency **Luminaire,** ~~**Emergency**~~**, Directly Controlled (Directly Controlled Emergency Luminaire).** A luminaire supplied by the facility emergency power system and with a control input for dimming or switching that provides an emergency illumination level upon loss of normal power. (700) (CMP-13) Informational Note: See ANSI/UL 924, Emergency Lighting and Power Equipment, for information covering directly controlled emergency luminaires.	2.2.2.3 Base Term Group By Emergency Luminaire	PC 1374 Requested changes made.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Microgrid, Direct Current ~~[~~(Direct Current Microgrid) (DC Microgrid)~~]~~. A direct current microgrid is a power distribution system consisting of more than one interconnected dc power source, supplying dc-dc converter(s), dc load(s), and/or ac load(s) powered by dc-ac inverter(s). ~~A dc microgrid is typically not directly connected to an ac primary source of electricity, but some dc microgrids interconnect via one or more dc-ac bidirectional converters or dc-ac inverters.~~ (712) (CMP-13) Informational Note No. 1: Direct current power sources include ac-dc converters (rectifiers), bidirectional dc-ac inverters/converters, photovoltaic systems, wind generators, energy storage systems (including batteries), and fuel cells. Informational Note No. 2: A DC Microgrid is typically not directly connected to an ac primary source of electricity, but some dc microgrids interconnect via one or more dc-ac bidirectional converters or dc-ac inverters.	2.2.2.5 Alternate Term Title has 2 sets of Paren. Definition last sentence should be an Informational Note	PC 1927 Requested changes made.
Voltage, Nominal ~~Voltage~~ (Nominal Voltage) (as applied to battery or cell). The value assigned to a cell or battery of a given voltage class for the purpose of convenient designation. The operating voltage of the cell or battery may vary above or below this value. (CMP-13) Informational Note: The most common nominal cell voltages are 2 volts per cell for the lead-acid batteries, 1.2 volts per cell for alkali batteries, and 3.2 to 3.8 volts per cell for Li-ion batteries. Nominal voltages might vary with different chemistries.	2.2.2.3 Base Term Group by Voltage, Nominal (Nominal Voltage) (as applied…. Retained)	CN 446 PC 1375 Requested changes made.
Primary ~~DC~~ Source, DC (Primary DC Source). A source that supplies the majority of the dc load in a dc microgrid. (712) (CMP-13)	2.2.2.3 Base Term Group by Primary Source 2.2.2.5 Alternate Term (Primary DC Source)	PC 1376 Requested changes made.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Supervisory Control and Data Acquisition (SCADA). An electronic system that provides monitoring and controls for the operation of the critical operations power system. Informational Note: This can include the fire alarm system, security system, control of the HVAC, the start/stop/monitoring of the power supplies and electrical distribution system, annunciation and communications equipment to emergency personnel, facility occupants, and remote operators. (CMP-13)	The second sentence should be an Informational Note	PC 1378 Requested changes made.
~~the power supplies and electrical distribution system, annunciation and communications equipment to emergency personnel, facility occupants, and remote operators. (CMP-13)~~		
Transfer Switch, Bypass Isolation (Bypass Isolation Transfer Switch). A manual, nonautomatic, or automatic operated device used in conjunction with a transfer switch to provide a means of directly connecting load conductors to a power source and of disconnecting the transfer switch. (CMP-13)	2.2.2.3.1 Searchability 2.2.2.3 Base Term Transfer Switch, Bypass Isolation (Bypass Isolation Transfer Switch)	PC 1380 Requested changes made.
Transfer Switch, Meter-Mounted ~~Transfer~~. (Meter-Mounted Transfer Switch). A transfer switch connected between the utility meter and the meter base or fabricated as part of the meter base. (CMP-13) Informational Note: Meter-mounted transfer switches can plug into the meter base or be fabricated as part of the meter base. Transfer switches that incorporate the meter base in the transfer equipment assembly are not considered meter-mounted transfer switches.	2.2.2.3 Base Term Transfer Switch, Meter-Mounted	PC 1381 Requested changes made.
Transfer Switch~~, Transfer~~. An automatic or nonautomatic device for transferring one or more load conductor connections from one power source to another. (CMP-13)	2.2.2.3 Base Term Transfer Switch	PC 1379 Requested changes made.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Voltage, Nominal (Nominal Voltage). A value assigned to a circuit or system for the purpose of conveniently designating its dc voltage class. (712) (CMP-13) Informational Note: The actual voltage at which a circuit operates can vary from the nominal voltage within a range that permits satisfactory operation of equipment.	2.2.2.4 Multiple Terms Nominal Voltage	No action taken. Correct as is. Multiple terms are being used to describe 2 different things. Article 712 definition is limited to dc.

Public Comment No. 1370-NFPA 70-2021 [Definition: DC System, Two-Wire, Grounded. (Grounded Two-Wi...]

DC System, Grounded Two-~~Wire, Grounded.~~ Wire (Grounded Two-Wire DC System).

A system that has a solid connection or reference-ground between one of the current-carrying conductors and the equipment grounding system. (712) (CMP-13)

Additional Proposed Changes

File Name	Description	Approved
CMP-13_definition_TG_summary_8-18.pdf	CMP-13 Definition TG summary	

Statement of Problem and Substantiation for Public Comment

This change is needed to improve the grouping of like terms in the definition section, article 100.
This public comment is being submitted on behalf of a task group formed of CMP-13 members; Herb Daugherty, Jeff Jonas, Chad Kennedy, Linda Little and Charles Picard to address the NEC correlating committee comments related to the definitions under the purview of CMP-13.

Related Item

• FR-9192

Submitter Information Verification

Submitter Full Name: Jeff Jonas
Organization: Generac Power Systems, Inc.
Street Address:
City:
State:
Zip:
Submittal Date: Thu Aug 12 12:47:39 EDT 2021
Committee: NEC-P13

Correlating Committee Definitions Task Group
CMP-13 - Definitions
(prepared by Jeff Jonas, August 18, 2021)

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
	The Correlating Committee directs the Chair of CMP-13 to assign a task group to review all the definitions under their purview for compliance with the NEC Style Manual and to review definitions identified by the Correlating Committee that may contain correlation issues. The attachment includes a list of those definitions identified that need to be reviewed.	
Diversion Load Controller. Equipment that regulates the output of a wind generator by diverting power from the generator to dc or ac loads or to an interconnected utility service. (CMP-4)	The Correlating Committee assigns the definition of Diversion Load Controller to CMP-13. Code-Making Panel 13 should review and compare this definition with the Diversion Charge Controller definition and consider using the same term for consistency.	No action taken. Will be reviewed by task group 6 with "Diversion Charge Controller".
Inverter Utilization Output Circuit. Conductors between the multimode or stand-alone inverter and utilization equipment. (706) (CMP-13)	The Correlating Committee directs the panel to review the definition of Inverter Utilization Output Circuit and consider correlation with the definition of Power Source Output Circuit.	No action taken. More discussion required in the interconnection task group and the next code cycle.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
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Optional Standby Systems. Those systems intended to supply power to public or private facilities or property where life safety does not depend on the performance of the system. These systems are intended to supply on-site generated or stored power to selected loads either automatically or manually. (CMP-13) ~~Informational Note: Optional standby systems are typically installed to provide an alternate source of electric power for such facilities as industrial and commercial buildings, farms, and residences and to serve loads such as heating and refrigeration systems, data processing and communications systems, and industrial processes that, when stopped during any power outage, could cause discomfort, serious interruption of the process, damage to the product or process, or the like.~~	4.1.1 Redundant Informational Note The Correlating Committee directs the panel to reconsider the definition, regarding the need for the informational note. This Informational Note is presently located in the Scope of Article 702.	CN 434 Submitted PC 1355 Requested changes made.
Stored-Energy Power Supply System (SEPSS). ~~This definition shall apply within this article and throughout the code.~~ A complete functioning EPSS powered by a stored-energy electrical source. (CMP-13)	The Correlating Committee directs the panel to review the definition of Stored-Energy Power Supply System for compliance with the NEC Style Manual. The definition should follow the NEC Style Manual 2.2.2, recommendations for denoting the application of definitions by removing the first sentence.	CN 435 Submitted PC 1366 Requested changes made.
DC System, Reference-Grounded (Reference-Grounded DC System). A system that is not solidly grounded but has a low-resistance electrical reference that maintains voltage to ground in normal operation. (712) (CMP-13)	Task Group 6 Diversion Charge Controller (13), Grounded, Functionally (4) and Referenced-Grounded 2.2.2.4 Multiple Terms	No action taken. Per a discussion with Chad Kennedy this definition is being handled by task group 6.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Diversion Charge Controller. Equipment that regulates the charging process of an ESS by diverting power from energy storage to direct-current or alternating-current loads or to an interconnected utility service. (706) (CMP-13)	Task Group 6 Diversion Charge Controller, Grounded, Functionally 2.2.2.4 Multiple Terms	No action taken. Per a discussion with Chad Kennedy this definition is being handled by task group 6.
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DC System, Grounded Three-Wire, ~~Grounded~~ (Grounded Three-Wire DC System). A system with a solid connection or reference-ground between the center point of a bipolar dc power source and the equipment grounding system. (712) (CMP-13)	2.2.2.3 Base Term Group with DC System, Grounded Three-Wire	PC 1369 Requested changes made.
DC System, Grounded Two-Wire, ~~Grounded~~ (Grounded Two-Wire DC System). A system that has a solid connection or reference-ground between one of the current-carrying conductors and the equipment grounding system. (712) (CMP-13)	2.2.2.3 Base Term Group with DC System, Grounded Two-Wire	PC 1370 Requested changes made.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
DC System, Ungrounded (Ungrounded DC System). A system that has no direct or resistive connection between the current-carrying conductors and the equipment grounding system. (712) (CMP-13)	2.2.2.3 Base Term Group with DC System, Ungrounded	No action taken. Looks to be correct as is.
Emergency Luminaire, Battery- Equipped (Battery- Equipped Emergency Luminaire). A luminaire with a rechargeable battery, a battery charging means, and an automatic load control relay. ~~(700) (701)~~ (CMP-13)	2.2.2.3.2 Article Number (Can't have two)	PC 1372 Requested changes made.
Emergency Power Supply System (EPSS). ~~This definition shall apply within this article and throughout the code.~~ A complete functioning EPS system coupled to a system of conductors, disconnecting means and overcurrent protective devices, transfer switches, and all control, supervisory, and support devices up to and including the load terminals of the transfer equipment needed for the system to operate as a safe and reliable source of electric power. [110:3.3.4] (CMP-13)	2.2.2 Delete the first sentence	PC 1373 Requested changes made.
Emergency **Luminaire,** ~~**Emergency**~~**, Directly Controlled (Directly Controlled Emergency Luminaire).** A luminaire supplied by the facility emergency power system and with a control input for dimming or switching that provides an emergency illumination level upon loss of normal power. (700) (CMP-13) Informational Note: See ANSI/UL 924, Emergency Lighting and Power Equipment, for information covering directly controlled emergency luminaires.	2.2.2.3 Base Term Group By Emergency Luminaire	PC 1374 Requested changes made.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Microgrid, Direct Current ~~[~~(Direct Current Microgrid) (DC Microgrid)~~]~~. A direct current microgrid is a power distribution system consisting of more than one interconnected dc power source, supplying dc-dc converter(s), dc load(s), and/or ac load(s) powered by dc-ac inverter(s). ~~A dc microgrid is typically not directly connected to an ac primary source of electricity, but some dc microgrids interconnect via one or more dc-ac bidirectional converters or dc-ac inverters.~~ (712) (CMP-13) Informational Note No. 1: Direct current power sources include ac-dc converters (rectifiers), bidirectional dc-ac inverters/converters, photovoltaic systems, wind generators, energy storage systems (including batteries), and fuel cells. Informational Note No. 2: A DC Microgrid is typically not directly connected to an ac primary source of electricity, but some dc microgrids interconnect via one or more dc-ac bidirectional converters or dc-ac inverters.	2.2.2.5 Alternate Term Title has 2 sets of Paren. Definition last sentence should be an Informational Note	PC 1927 Requested changes made.
Voltage, Nominal ~~Voltage~~ (Nominal Voltage) (as applied to battery or cell). The value assigned to a cell or battery of a given voltage class for the purpose of convenient designation. The operating voltage of the cell or battery may vary above or below this value. (CMP-13) Informational Note: The most common nominal cell voltages are 2 volts per cell for the lead-acid batteries, 1.2 volts per cell for alkali batteries, and 3.2 to 3.8 volts per cell for Li-ion batteries. Nominal voltages might vary with different chemistries.	2.2.2.3 Base Term Group by Voltage, Nominal (Nominal Voltage) (as applied…. Retained)	CN 446 PC 1375 Requested changes made.
Primary ~~DC~~ Source, DC (Primary DC Source). A source that supplies the majority of the dc load in a dc microgrid. (712) (CMP-13)	2.2.2.3 Base Term Group by Primary Source 2.2.2.5 Alternate Term (Primary DC Source)	PC 1376 Requested changes made.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Supervisory Control and Data Acquisition (SCADA). An electronic system that provides monitoring and controls for the operation of the critical operations power system. Informational Note: This can include the fire alarm system, security system, control of the HVAC, the start/stop/monitoring of the power supplies and electrical distribution system, annunciation and communications equipment to emergency personnel, facility occupants, and remote operators. (CMP-13)	The second sentence should be an Informational Note	PC 1378 Requested changes made.
~~the power supplies and electrical distribution system, annunciation and communications equipment to emergency personnel, facility occupants, and remote operators. (CMP-13)~~		
Transfer Switch, Bypass Isolation (Bypass Isolation Transfer Switch). A manual, nonautomatic, or automatic operated device used in conjunction with a transfer switch to provide a means of directly connecting load conductors to a power source and of disconnecting the transfer switch. (CMP-13)	2.2.2.3.1 Searchability 2.2.2.3 Base Term Transfer Switch, Bypass Isolation (Bypass Isolation Transfer Switch)	PC 1380 Requested changes made.
Transfer Switch, Meter-Mounted ~~Transfer~~. (Meter-Mounted Transfer Switch). A transfer switch connected between the utility meter and the meter base or fabricated as part of the meter base. (CMP-13) Informational Note: Meter-mounted transfer switches can plug into the meter base or be fabricated as part of the meter base. Transfer switches that incorporate the meter base in the transfer equipment assembly are not considered meter-mounted transfer switches.	2.2.2.3 Base Term Transfer Switch, Meter-Mounted	PC 1381 Requested changes made.
Transfer Switch~~, Transfer~~. An automatic or nonautomatic device for transferring one or more load conductor connections from one power source to another. (CMP-13)	2.2.2.3 Base Term Transfer Switch	PC 1379 Requested changes made.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Voltage, Nominal (Nominal Voltage). A value assigned to a circuit or system for the purpose of conveniently designating its dc voltage class. (712) (CMP-13) Informational Note: The actual voltage at which a circuit operates can vary from the nominal voltage within a range that permits satisfactory operation of equipment.	2.2.2.4 Multiple Terms Nominal Voltage	No action taken. Correct as is. Multiple terms are being used to describe 2 different things. Article 712 definition is limited to dc.

Public Comment No. 553-NFPA 70-2021 [Definition: Diversion Charge Controller.]

Diversion Controller (Diversion Charge Controller, Diversion Load Controller) .

Equipment that regulates the output of a source or charging process ~~of an ESS~~ by diverting power ~~from energy storage~~ to direct-current or alternating-current loads or to an interconnected utility service. ~~(706) (~~ CMP-13)

Statement of Problem and Substantiation for Public Comment

Definitions Task Group 6, as directed by the Correlating Committee, has reviewed the definitions and usage of the terms " Diversion Charge Controller" and "Diversion Load Controller." The task group, after reviewing usage in Articles 694 and 706, recommends an update to define the globally applicable term "Diversion Controller" with alternate terms (Diversion Charge Controller, Diversion Load Controller) per the Style Manual Section 2.2.2.2. The task group recommends this global definition should be assigned to CMP-13.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 554-NFPA 70-2021 [Definition: Diversion Charge Controller.]	
Public Comment No. 555-NFPA 70-2021 [Definition: Diversion Load Controller.]	
Public Comment No. 554-NFPA 70-2021 [Definition: Diversion Charge Controller.]	
Public Comment No. 555-NFPA 70-2021 [Definition: Diversion Load Controller.]	

Related Item

• FR 9192

Submitter Information Verification

Submitter Full Name: Chad Kennedy
Organization: Schneider Electric
Street Address:
City:
State:
Zip:
Submittal Date: Fri Jul 30 08:39:27 EDT 2021
Committee: NEC-P13

Public Comment No. 1979-NFPA 70-2021 [Definition: Diversion Load Controller.]

Diversion Load Controller.

Equipment that regulates the output of a wind generator by diverting power from the generator to dc or ac loads or to an interconnected utility service. (CMP-4)

Additional Proposed Changes

File Name	Description	Approved
CN_409.pdf	70_CN409	

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 409 appeared in the First Draft Report on First Revision No. 9324.

The Correlating Committee assigns the definition of Diversion Load Controller to CMP-13. Code-Making Panel 13 should review and compare this definition with the Diversion Charge Controller definition and consider using the same term for consistency.

Related Item

- First Revision No. 9324

Submitter Information Verification

Submitter Full Name: CC on NEC-AAC
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:
Submittal Date: Wed Aug 18 21:19:46 EDT 2021
Committee: NEC-P13

Correlating Committee Note No. 409-NFPA 70-2021 [Definition: Diversion Load Controller.]

Submitter Information Verification

Committee: NEC-AAC
Submittal Date: Sun May 09 20:51:39 EDT 2021

Committee Statement

Committee Statement: The Correlating Committee assigns the definition of Diversion Load Controller to CMP-13. Code-Making Panel 13 should review and compare this definition with the Diversion Charge Controller definition and consider using the same term for consistency.

First Revision No. 9324-NFPA 70-2021 [Global Input]

Ballot Results

This item has passed ballot

12 Eligible Voters
0 Not Returned
12 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Affirmative All

Ayer, Lawrence S.
Gallo, Ernest J.
Hickman, Palmer L.
Holub, Richard A.
Hunter, Dean C.
Johnston, Michael J.
Kendall, David H.
Kovacik, John R.
Manche, Alan
McDaniel, Roger D.
Porter, Christine T.
Williams, David A.

Public Comment No. 1372-NFPA 70-2021 [Definition: Emergency Luminaire, Battery-Equipped (Battery-...]

Emergency Luminaire, Battery-Equipped (Battery-Equipped Emergency Luminaire).

A luminaire with a rechargeable battery, a battery charging means, and an automatic load control relay. _ ~~(700) (701) (~~ CMP-13)

Additional Proposed Changes

File Name	Description	Approved
CMP-13_definition_TG_summary_8-18.pdf	CMP-13 Definition TG summary	

Statement of Problem and Substantiation for Public Comment

The NEC style manual does not allow more than one specific article reference. Remove references to comply with NEC style manual. This public comment is being submitted on behalf of a task group formed of CMP-13 members; Herb Daugherty, Jeff Jonas, Chad Kennedy, Linda Little and Charles Picard to address the NEC correlating committee comments related to the definitions under the purview of CMP-13.

Related Item

• CCN362

Submitter Information Verification

Submitter Full Name: Jeff Jonas
Organization: Generac Power Systems, Inc.
Street Address:
City:
State:
Zip:
Submittal Date: Thu Aug 12 12:50:56 EDT 2021
Committee: NEC-P13

Correlating Committee Definitions Task Group
CMP-13 - Definitions
(prepared by Jeff Jonas, August 18, 2021)

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CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Normal/Emergency Power Source. A power source on the output side of a transfer switch or uninterruptible power supply that is automatically available upon loss of normal power. (700) (CMP-13).	The Correlating Committee directs that this definition title be reviewed for its use within the article. The term "normal/emergency power source" is not used in Article 700. The term "normal/emergency source" is used in 700.23.	Submitted PC 1367 Change code language to include "power" after "Normal/ Emergency" in 700.23 to match the definition.
Optional Standby Systems. Those systems intended to supply power to public or private facilities or property where life safety does not depend on the performance of the system. These systems are intended to supply on-site generated or stored power to selected loads either automatically or manually. (CMP-13) ~~Informational Note: Optional standby systems are typically installed to provide an alternate source of electric power for such facilities as industrial and commercial buildings, farms, and residences and to serve loads such as heating and refrigeration systems, data processing and communications systems, and industrial processes that, when stopped during any power outage, could cause discomfort, serious interruption of the process, damage to the product or process, or the like.~~	4.1.1 Redundant Informational Note The Correlating Committee directs the panel to reconsider the definition, regarding the need for the informational note. This Informational Note is presently located in the Scope of Article 702.	CN 434 Submitted PC 1355 Requested changes made.
Stored-Energy Power Supply System (SEPSS). ~~This definition shall apply within this article and throughout the code.~~ A complete functioning EPSS powered by a stored-energy electrical source. (CMP-13)	The Correlating Committee directs the panel to review the definition of Stored-Energy Power Supply System for compliance with the NEC Style Manual. The definition should follow the NEC Style Manual 2.2.2, recommendations for denoting the application of definitions by removing the first sentence.	CN 435 Submitted PC 1366 Requested changes made.
DC System, Reference-Grounded (Reference-Grounded DC System). A system that is not solidly grounded but has a low-resistance electrical reference that maintains voltage to ground in normal operation. (712) (CMP-13)	Task Group 6 Diversion Charge Controller (13), Grounded, Functionally (4) and Referenced-Grounded 2.2.2.4 Multiple Terms	No action taken. Per a discussion with Chad Kennedy this definition is being handled by task group 6.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Diversion Charge Controller. Equipment that regulates the charging process of an ESS by diverting power from energy storage to direct-current or alternating-current loads or to an interconnected utility service. (706) (CMP-13)	Task Group 6 Diversion Charge Controller, Grounded, Functionally 2.2.2.4 Multiple Terms	No action taken. Per a discussion with Chad Kennedy this definition is being handled by task group 6.
Grounded, Functionally (Functionally Grounded). A system that has an electrical ground reference for operational purposes that is not solidly grounded. (712) (CMP-13) Informational Note: Examples of operational reasons for functionally grounded systems include ground-fault detection and performance-related issues for some power sources.	Task Group 6 Diversion Charge Controller (13), Grounded, Functionally (4) and Referenced-Grounded 2.2.2.4 Multiple Terms	No action taken. Per a discussion with Chad Kennedy this definition is being handled by task group 6.
Critical Operations Areas, Designated ({~~{~~Designated Critical Operations Areas) (DCOA)~~}~~. Areas within a facility or site designated as requiring critical operations power. (CMP-13)	The term modifier to be in parentheses and then the acronym in parentheses.	PC 1368 Requested changes made.
DC System, Grounded Three-Wire, ~~Grounded~~ (Grounded Three-Wire DC System). A system with a solid connection or reference-ground between the center point of a bipolar dc power source and the equipment grounding system. (712) (CMP-13)	2.2.2.3 Base Term Group with DC System, Grounded Three-Wire	PC 1369 Requested changes made.
DC System, Grounded Two-Wire, ~~Grounded~~ (Grounded Two-Wire DC System). A system that has a solid connection or reference-ground between one of the current-carrying conductors and the equipment grounding system. (712) (CMP-13)	2.2.2.3 Base Term Group with DC System, Grounded Two-Wire	PC 1370 Requested changes made.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
DC System, Ungrounded (Ungrounded DC System). A system that has no direct or resistive connection between the current-carrying conductors and the equipment grounding system. (712) (CMP-13)	2.2.2.3 Base Term Group with DC System, Ungrounded	No action taken. Looks to be correct as is.
Emergency Luminaire, Battery- Equipped (Battery- Equipped Emergency Luminaire). A luminaire with a rechargeable battery, a battery charging means, and an automatic load control relay. ~~(700) (701)~~ (CMP-13)	2.2.2.3.2 Article Number (Can't have two)	PC 1372 Requested changes made.
Emergency Power Supply System (EPSS). ~~This definition shall apply within this article and throughout the code.~~ A complete functioning EPS system coupled to a system of conductors, disconnecting means and overcurrent protective devices, transfer switches, and all control, supervisory, and support devices up to and including the load terminals of the transfer equipment needed for the system to operate as a safe and reliable source of electric power. [110:3.3.4] (CMP-13)	2.2.2 Delete the first sentence	PC 1373 Requested changes made.
Emergency **Luminaire,** ~~**Emergency**~~**, Directly Controlled (Directly Controlled Emergency Luminaire).** A luminaire supplied by the facility emergency power system and with a control input for dimming or switching that provides an emergency illumination level upon loss of normal power. (700) (CMP-13) Informational Note: See ANSI/UL 924, Emergency Lighting and Power Equipment, for information covering directly controlled emergency luminaires.	2.2.2.3 Base Term Group By Emergency Luminaire	PC 1374 Requested changes made.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Microgrid, Direct Current ~~[~~(Direct Current Microgrid) (DC Microgrid)~~]~~. A direct current microgrid is a power distribution system consisting of more than one interconnected dc power source, supplying dc-dc converter(s), dc load(s), and/or ac load(s) powered by dc-ac inverter(s). ~~A dc microgrid is typically not directly connected to an ac primary source of electricity, but some dc microgrids interconnect via one or more dc-ac bidirectional converters or dc-ac inverters.~~ (712) (CMP-13) Informational Note No. 1: Direct current power sources include ac-dc converters (rectifiers), bidirectional dc-ac inverters/converters, photovoltaic systems, wind generators, energy storage systems (including batteries), and fuel cells. Informational Note No. 2: A DC Microgrid is typically not directly connected to an ac primary source of electricity, but some dc microgrids interconnect via one or more dc-ac bidirectional converters or dc-ac inverters.	2.2.2.5 Alternate Term Title has 2 sets of Paren. Definition last sentence should be an Informational Note	PC 1927 Requested changes made.
Voltage, Nominal ~~Voltage~~ (Nominal Voltage) (as applied to battery or cell). The value assigned to a cell or battery of a given voltage class for the purpose of convenient designation. The operating voltage of the cell or battery may vary above or below this value. (CMP-13) Informational Note: The most common nominal cell voltages are 2 volts per cell for the lead-acid batteries, 1.2 volts per cell for alkali batteries, and 3.2 to 3.8 volts per cell for Li-ion batteries. Nominal voltages might vary with different chemistries.	2.2.2.3 Base Term Group by Voltage, Nominal (Nominal Voltage) (as applied…. Retained)	CN 446 PC 1375 Requested changes made.
Primary ~~DC~~ Source, DC (Primary DC Source). A source that supplies the majority of the dc load in a dc microgrid. (712) (CMP-13)	2.2.2.3 Base Term Group by Primary Source 2.2.2.5 Alternate Term (Primary DC Source)	PC 1376 Requested changes made.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Supervisory Control and Data Acquisition (SCADA). An electronic system that provides monitoring and controls for the operation of the critical operations power system. Informational Note: This can include the fire alarm system, security system, control of the HVAC, the start/stop/monitoring of the power supplies and electrical distribution system, annunciation and communications equipment to emergency personnel, facility occupants, and remote operators. (CMP-13)	The second sentence should be an Informational Note	PC 1378 Requested changes made.
~~the power supplies and electrical distribution system, annunciation and communications equipment to emergency personnel, facility occupants, and remote operators. (CMP-13)~~		
Transfer Switch, Bypass Isolation (Bypass Isolation Transfer Switch). A manual, nonautomatic, or automatic operated device used in conjunction with a transfer switch to provide a means of directly connecting load conductors to a power source and of disconnecting the transfer switch. (CMP-13)	2.2.2.3.1 Searchability 2.2.2.3 Base Term Transfer Switch, Bypass Isolation (Bypass Isolation Transfer Switch)	PC 1380 Requested changes made.
Transfer Switch, Meter-Mounted ~~Transfer~~. (Meter-Mounted Transfer Switch). A transfer switch connected between the utility meter and the meter base or fabricated as part of the meter base. (CMP-13) Informational Note: Meter-mounted transfer switches can plug into the meter base or be fabricated as part of the meter base. Transfer switches that incorporate the meter base in the transfer equipment assembly are not considered meter-mounted transfer switches.	2.2.2.3 Base Term Transfer Switch, Meter-Mounted	PC 1381 Requested changes made.
Transfer Switch~~, Transfer~~. An automatic or nonautomatic device for transferring one or more load conductor connections from one power source to another. (CMP-13)	2.2.2.3 Base Term Transfer Switch	PC 1379 Requested changes made.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Voltage, Nominal (Nominal Voltage). A value assigned to a circuit or system for the purpose of conveniently designating its dc voltage class. (712) (CMP-13) Informational Note: The actual voltage at which a circuit operates can vary from the nominal voltage within a range that permits satisfactory operation of equipment.	2.2.2.4 Multiple Terms Nominal Voltage	No action taken. Correct as is. Multiple terms are being used to describe 2 different things. Article 712 definition is limited to dc.

Public Comment No. 1373-NFPA 70-2021 [Definition: Emergency Power Supply System (EPSS).]

Emergency Power Supply System (EPSS).

~~This definition shall apply within this article and throughout the code.~~ A complete functioning EPS system coupled to a system of conductors, disconnecting means and overcurrent protective devices, transfer switches, and all control, supervisory, and support devices up to and including the load terminals of the transfer equipment needed for the system to operate as a safe and reliable source of electric power. [**110:**3.3.4] (CMP-13)

Additional Proposed Changes

File Name	Description	Approved
CMP-13_definition_TG_summary_8-18.pdf	CMP-13 Definition TG summary	

Statement of Problem and Substantiation for Public Comment

First sentence is unnecessary as all definitions apply throughout the code unless indicated. Reference NEC style manual clause 2.2.2. This public comment is being submitted on behalf of a task group formed of CMP-13 members; Herb Daugherty, Jeff Jonas, Chad Kennedy, Linda Little and Charles Picard to address the NEC correlating committee comments related to the definitions under the purview of CMP-13.

Related Item

• PI2788

Submitter Information Verification

Submitter Full Name: Jeff Jonas
Organization: Generac Power Systems, Inc.
Street Address:
City:
State:
Zip:
Submittal Date: Thu Aug 12 12:51:43 EDT 2021
Committee: NEC-P13

Correlating Committee Definitions Task Group
CMP-13 - Definitions
(prepared by Jeff Jonas, August 18, 2021)

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
	The Correlating Committee directs the Chair of CMP-13 to assign a task group to review all the definitions under their purview for compliance with the NEC Style Manual and to review definitions identified by the Correlating Committee that may contain correlation issues. The attachment includes a list of those definitions identified that need to be reviewed.	
Diversion Load Controller. Equipment that regulates the output of a wind generator by diverting power from the generator to dc or ac loads or to an interconnected utility service. (CMP-4)	The Correlating Committee assigns the definition of Diversion Load Controller to CMP-13. Code-Making Panel 13 should review and compare this definition with the Diversion Charge Controller definition and consider using the same term for consistency.	No action taken. Will be reviewed by task group 6 with "Diversion Charge Controller".
Inverter Utilization Output Circuit. Conductors between the multimode or stand-alone inverter and utilization equipment. (706) (CMP-13)	The Correlating Committee directs the panel to review the definition of Inverter Utilization Output Circuit and consider correlation with the definition of Power Source Output Circuit.	No action taken. More discussion required in the interconnection task group and the next code cycle.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Normal/Emergency Power Source. A power source on the output side of a transfer switch or uninterruptible power supply that is automatically available upon loss of normal power. (700) (CMP-13).	The Correlating Committee directs that this definition title be reviewed for its use within the article. The term "normal/emergency power source" is not used in Article 700. The term "normal/emergency source" is used in 700.23.	Submitted PC 1367 Change code language to include "power" after "Normal/ Emergency" in 700.23 to match the definition.
Optional Standby Systems. Those systems intended to supply power to public or private facilities or property where life safety does not depend on the performance of the system. These systems are intended to supply on-site generated or stored power to selected loads either automatically or manually. (CMP-13) ~~Informational Note: Optional standby systems are typically installed to provide an alternate source of electric power for such facilities as industrial and commercial buildings, farms, and residences and to serve loads such as heating and refrigeration systems, data processing and communications systems, and industrial processes that, when stopped during any power outage, could cause discomfort, serious interruption of the process, damage to the product or process, or the like.~~	4.1.1 Redundant Informational Note The Correlating Committee directs the panel to reconsider the definition, regarding the need for the informational note. This Informational Note is presently located in the Scope of Article 702.	CN 434 Submitted PC 1355 Requested changes made.
Stored-Energy Power Supply System (SEPSS). ~~This definition shall apply within this article and throughout the code.~~ A complete functioning EPSS powered by a stored-energy electrical source. (CMP-13)	The Correlating Committee directs the panel to review the definition of Stored-Energy Power Supply System for compliance with the NEC Style Manual. The definition should follow the NEC Style Manual 2.2.2, recommendations for denoting the application of definitions by removing the first sentence.	CN 435 Submitted PC 1366 Requested changes made.
DC System, Reference-Grounded (Reference-Grounded DC System). A system that is not solidly grounded but has a low-resistance electrical reference that maintains voltage to ground in normal operation. (712) (CMP-13)	Task Group 6 Diversion Charge Controller (13), Grounded, Functionally (4) and Referenced-Grounded 2.2.2.4 Multiple Terms	No action taken. Per a discussion with Chad Kennedy this definition is being handled by task group 6.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Diversion Charge Controller. Equipment that regulates the charging process of an ESS by diverting power from energy storage to direct-current or alternating-current loads or to an interconnected utility service. (706) (CMP-13)	Task Group 6 Diversion Charge Controller, Grounded, Functionally 2.2.2.4 Multiple Terms	No action taken. Per a discussion with Chad Kennedy this definition is being handled by task group 6.
Grounded, Functionally (Functionally Grounded). A system that has an electrical ground reference for operational purposes that is not solidly grounded. (712) (CMP-13) Informational Note: Examples of operational reasons for functionally grounded systems include ground-fault detection and performance-related issues for some power sources.	Task Group 6 Diversion Charge Controller (13), Grounded, Functionally (4) and Referenced-Grounded 2.2.2.4 Multiple Terms	No action taken. Per a discussion with Chad Kennedy this definition is being handled by task group 6.
Critical Operations Areas, Designated ({~~{~~Designated Critical Operations Areas) (DCOA)~~}~~. Areas within a facility or site designated as requiring critical operations power. (CMP-13)	The term modifier to be in parentheses and then the acronym in parentheses.	PC 1368 Requested changes made.
DC System, Grounded Three-Wire, ~~Grounded~~ (Grounded Three-Wire DC System). A system with a solid connection or reference-ground between the center point of a bipolar dc power source and the equipment grounding system. (712) (CMP-13)	2.2.2.3 Base Term Group with DC System, Grounded Three-Wire	PC 1369 Requested changes made.
DC System, Grounded Two-Wire, ~~Grounded~~ (Grounded Two-Wire DC System). A system that has a solid connection or reference-ground between one of the current-carrying conductors and the equipment grounding system. (712) (CMP-13)	2.2.2.3 Base Term Group with DC System, Grounded Two-Wire	PC 1370 Requested changes made.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
DC System, Ungrounded (Ungrounded DC System). A system that has no direct or resistive connection between the current-carrying conductors and the equipment grounding system. (712) (CMP-13)	2.2.2.3 Base Term Group with DC System, Ungrounded	No action taken. Looks to be correct as is.
Emergency Luminaire, Battery- Equipped (Battery- Equipped Emergency Luminaire). A luminaire with a rechargeable battery, a battery charging means, and an automatic load control relay. ~~(700) (701)~~ (CMP-13)	2.2.2.3.2 Article Number (Can't have two)	PC 1372 Requested changes made.
Emergency Power Supply System (EPSS). ~~This definition shall apply within this article and throughout the code.~~ A complete functioning EPS system coupled to a system of conductors, disconnecting means and overcurrent protective devices, transfer switches, and all control, supervisory, and support devices up to and including the load terminals of the transfer equipment needed for the system to operate as a safe and reliable source of electric power. [110:3.3.4] (CMP-13)	2.2.2 Delete the first sentence	PC 1373 Requested changes made.
Emergency **Luminaire,** ~~**Emergency**~~**, Directly Controlled (Directly Controlled Emergency Luminaire).** A luminaire supplied by the facility emergency power system and with a control input for dimming or switching that provides an emergency illumination level upon loss of normal power. (700) (CMP-13) Informational Note: See ANSI/UL 924, Emergency Lighting and Power Equipment, for information covering directly controlled emergency luminaires.	2.2.2.3 Base Term Group By Emergency Luminaire	PC 1374 Requested changes made.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Microgrid, Direct Current ~~[~~(Direct Current Microgrid) (DC Microgrid)~~]~~. A direct current microgrid is a power distribution system consisting of more than one interconnected dc power source, supplying dc-dc converter(s), dc load(s), and/or ac load(s) powered by dc-ac inverter(s). ~~A dc microgrid is typically not directly connected to an ac primary source of electricity, but some dc microgrids interconnect via one or more dc-ac bidirectional converters or dc-ac inverters.~~ (712) (CMP-13) Informational Note No. 1: Direct current power sources include ac-dc converters (rectifiers), bidirectional dc-ac inverters/converters, photovoltaic systems, wind generators, energy storage systems (including batteries), and fuel cells. Informational Note No. 2: A DC Microgrid is typically not directly connected to an ac primary source of electricity, but some dc microgrids interconnect via one or more dc-ac bidirectional converters or dc-ac inverters.	2.2.2.5 Alternate Term Title has 2 sets of Paren. Definition last sentence should be an Informational Note	PC 1927 Requested changes made.
Voltage, Nominal ~~Voltage~~ (Nominal Voltage) (as applied to battery or cell). The value assigned to a cell or battery of a given voltage class for the purpose of convenient designation. The operating voltage of the cell or battery may vary above or below this value. (CMP-13) Informational Note: The most common nominal cell voltages are 2 volts per cell for the lead-acid batteries, 1.2 volts per cell for alkali batteries, and 3.2 to 3.8 volts per cell for Li-ion batteries. Nominal voltages might vary with different chemistries.	2.2.2.3 Base Term Group by Voltage, Nominal (Nominal Voltage) (as applied…. Retained)	CN 446 PC 1375 Requested changes made.
Primary ~~DC~~ Source, DC (Primary DC Source). A source that supplies the majority of the dc load in a dc microgrid. (712) (CMP-13)	2.2.2.3 Base Term Group by Primary Source 2.2.2.5 Alternate Term (Primary DC Source)	PC 1376 Requested changes made.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Supervisory Control and Data Acquisition (SCADA). An electronic system that provides monitoring and controls for the operation of the critical operations power system. Informational Note: This can include the fire alarm system, security system, control of the HVAC, the start/stop/monitoring of the power supplies and electrical distribution system, annunciation and communications equipment to emergency personnel, facility occupants, and remote operators. (CMP-13)	The second sentence should be an Informational Note	PC 1378 Requested changes made.
~~the power supplies and electrical distribution system, annunciation and communications equipment to emergency personnel, facility occupants, and remote operators. (CMP-13)~~		
Transfer Switch, Bypass Isolation (Bypass Isolation Transfer Switch). A manual, nonautomatic, or automatic operated device used in conjunction with a transfer switch to provide a means of directly connecting load conductors to a power source and of disconnecting the transfer switch. (CMP-13)	2.2.2.3.1 Searchability 2.2.2.3 Base Term Transfer Switch, Bypass Isolation (Bypass Isolation Transfer Switch)	PC 1380 Requested changes made.
Transfer Switch, Meter-Mounted ~~Transfer~~. (Meter-Mounted Transfer Switch). A transfer switch connected between the utility meter and the meter base or fabricated as part of the meter base. (CMP-13) Informational Note: Meter-mounted transfer switches can plug into the meter base or be fabricated as part of the meter base. Transfer switches that incorporate the meter base in the transfer equipment assembly are not considered meter-mounted transfer switches.	2.2.2.3 Base Term Transfer Switch, Meter-Mounted	PC 1381 Requested changes made.
Transfer Switch~~, Transfer~~. An automatic or nonautomatic device for transferring one or more load conductor connections from one power source to another. (CMP-13)	2.2.2.3 Base Term Transfer Switch	PC 1379 Requested changes made.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Voltage, Nominal (Nominal Voltage). A value assigned to a circuit or system for the purpose of conveniently designating its dc voltage class. (712) (CMP-13) Informational Note: The actual voltage at which a circuit operates can vary from the nominal voltage within a range that permits satisfactory operation of equipment.	2.2.2.4 Multiple Terms Nominal Voltage	No action taken. Correct as is. Multiple terms are being used to describe 2 different things. Article 712 definition is limited to dc.

Public Comment No. 36-NFPA 70-2021 [Definition: Energy Management System.]

Energy Management System (EMS) .

A system consisting of any of the following: a monitor(s), communications equipment, a controller(s), a timer(s), or other device(s) that monitors and/or controls an electrical load or a power production or storage source. (CMP-13)

Statement of Problem and Substantiation for Public Comment

This public comment is submitted on behalf of the Energy Management Task Group formed under the direction of the Correlating Committee to review all current and proposed definitions and requirements related to load management, load management system, power control system, energy management system and related terms to ensure a coordinated approach throughout the Code. See CCN-279.

The task group members are; Chad Kennedy (Chair), Tim Zgonena, Rebekah Hren, Greg Ball, Jason Fisher, Doug Burkett, Robert Jordan, Matthew Grover, Tim Windey, Karl Reighard, and Brian Baughman. This task group of balanced interests provided the expertise to develop these public comments covering energy management across the NEC.

The definition of "Energy Management System" was revised to include an acronym for use throughout the Code.

This public comment is part of a series of actions recommended by the task group. See the related public comments which complete this action.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 1034-NFPA 70-2021 [Definition: Load Management System.]	
Public Comment No. 1036-NFPA 70-2021 [Definition: Load Management.]	
Public Comment No. 1037-NFPA 70-2021 [Section No. 750.30]	
Public Comment No. 1039-NFPA 70-2021 [Section No. 220.70]	
Public Comment No. 1041-NFPA 70-2021 [Section No. 625.42(A)]	
Public Comment No. 1042-NFPA 70-2021 [Section No. 625.42(B)]	
Public Comment No. 1043-NFPA 70-2021 [Section No. 705.13]	
Public Comment No. 1044-NFPA 70-2021 [Section No. 705.46]	
Public Comment No. 1045-NFPA 70-2021 [Section No. 700.4(C)]	
Public Comment No. 1046-NFPA 70-2021 [Section No. 701.4(C)]	
Public Comment No. 1047-NFPA 70-2021 [Section No. 702.4(B)]	
Public Comment No. 1048-NFPA 70-2021 [Section No. 708.22(B)]	
Public Comment No. 1049-NFPA 70-2021 [Section No. 705.80]	
Public Comment No. 1050-NFPA 70-2021 [Section No. 705.28(A)]	
Public Comment No. 1052-NFPA 70-2021 [Section No. 705.11(A)(1)]	
Public Comment No. 1053-NFPA 70-2021 [Section No. 705.12 [Excluding any Sub-Sections]]	
Public Comment No. 1406-NFPA 70-2021 [Section No. 230.82]	
Public Comment No. 1034-NFPA 70-2021 [Definition: Load Management System.]	
Public Comment No. 1036-NFPA 70-2021 [Definition: Load Management.]	
Public Comment No. 1037-NFPA 70-2021 [Section No. 750.30]	
Public Comment No. 1039-NFPA 70-2021 [Section No. 220.70]	
Public Comment No. 1041-NFPA 70-2021 [Section No. 625.42(A)]	
Public Comment No. 1042-NFPA 70-2021 [Section No. 625.42(B)]	
Public Comment No. 1043-NFPA 70-2021 [Section No. 705.13]	
Public Comment No. 1044-NFPA 70-2021 [Section No. 705.46]	
Public Comment No. 1045-NFPA 70-2021 [Section No. 700.4(C)]	
Public Comment No. 1046-NFPA 70-2021 [Section No. 701.4(C)]	
Public Comment No. 1047-NFPA 70-2021 [Section No. 702.4(B)]	
Public Comment No. 1048-NFPA 70-2021 [Section No. 708.22(B)]	
Public Comment No. 1049-NFPA 70-2021 [Section No. 705.80]	
Public Comment No. 1050-NFPA 70-2021 [Section No. 705.28(A)]	
Public Comment No. 1052-NFPA 70-2021 [Section No. 705.11(A)(1)]	
Public Comment No. 1053-NFPA 70-2021 [Section No. 705.12 [Excluding any Sub-Sections]]	
Public Comment No. 1406-NFPA 70-2021 [Section No. 230.82]	

Related Item

• CN-279

Submitter Information Verification

Submitter Full Name: Chad Kennedy
Organization: Schneider Electric
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 30 09:52:16 EDT 2021
Committee: NEC-P13

Public Comment No. 1463-NFPA 70-2021 [Definition: Grounded, Functionally. (Functionally Grounded)]

~~**Grounded, Functionally. (Functionally Grounded)**~~

~~A system that has an electrical ground reference for operational purposes that is not solidly grounded. (712) (CMP-13)~~

~~Informational Note: Examples of operational reasons for functionally grounded systems include ground-fault detection and performance-related issues for some power sources.~~

Statement of Problem and Substantiation for Public Comment

This definition is deleted in keeping with the request of this task group by the Correlating Committee (CCN-306) to “consider removing the definition of “DC Microgrid” and Article 712 based on the review of requirements in Article 705.” Since this term was limited to Article 712 it is deleted. It is the determination of this task group that the deletion of this, and other related terms moved from 712.2 in the first revision, and the requested action to deleted article 712 in the referenced FR, will not adversely impact users of this Code. It is the opinion of this task group that this action will in fact, improve the usability of this document by removing terms and requirements that conflict with other terms and requirements related to microgrids that are globally applied throughout this Code, other common regulatory documents, as well as other standards.
This task group carefully reviewed these terms to ensure their deletion would not cause confusion or gaps elsewhere in the Code. Article 705, and related definitions, contain the general requirements that apply to all microgrid installations.

This public comment is submitted on behalf of the task group formed under the direction of the Correlating Committee to review all current and proposed definitions and requirements related to microgrids to ensure a clear, consistent, and coordinated approach to addressing this topic throughout the Code.
The task group members are; Jason Fisher Chair, Brenton Michael Fedele, Ted Smith, Isaac Opalinsky, Pete Jackson, Jason Hopkins, John Kovacik, Steven Froemming, Krista Biason, Greg Ball, Chad Beebe, and Matthew Dozier. Through these individual's technical committee memberships, and their balanced interests, this task group provided the expertise to develop these public comments covering microgrids across the NEC.

This public comment is part of a series of actions recommended by the task group. See the related public comments which complete this action.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 1443-NFPA 70-2021 [Article 712]	Deletion of article 712

Related Item

• FR-9192

Submitter Information Verification

Submitter Full Name: Jason Fisher
Organization:
Affiliation: CC Second Draft Microgrid Task Group
Street Address:
City:
State:
Zip:
Submittal Date: Fri Aug 13 17:22:33 EDT 2021
Committee: NEC-P13

Public Comment No. 424-NFPA 70-2021 [Definition: Grounded, Functionally. (Functionally Grounded)]

~~**Grounded, Functionally. (Functionally Grounded)**~~

~~A system that has an electrical ground reference for operational purposes that is not solidly grounded. (712) (CMP-13)~~

~~Informational Note: Examples of operational reasons for functionally grounded systems include ground-fault detection and performance-related issues for some power sources.~~

Statement of Problem and Substantiation for Public Comment

This definition assigned to CMP-13 (Article 712) should be deleted as redundant with the synonymous global definition assigned to CMP-4.

Related Item

• Global FR 9324

Submitter Information Verification

Submitter Full Name: Rebekah Hren
Organization: IPPNC LLC
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jul 27 13:53:06 EDT 2021
Committee: NEC-P13

Public Comment No. 551-NFPA 70-2021 [Definition: Grounded, Functionally. (Functionally Grounded)]

~~**Grounded, Functionally. (Functionally Grounded)**~~

~~A system that has an electrical ground reference for operational purposes that is not solidly grounded. (712) (CMP-13)~~

~~Informational Note: Examples of operational reasons for functionally grounded systems include ground-fault detection and performance-related issues for some power sources.~~

Statement of Problem and Substantiation for Public Comment

Definitions Task Group 6, as directed by the Correlating Committee, has reviewed the multiple definitions of "Grounded, Functionally" that were presented in the First Draft Report. Deleting this definition assigned to CMP-13 (Article 712), while retaining the global definition assigned to CMP-4 resolves the multiple definitions issue with no alteration of the defined term or of its applicability or usage in the document.

Related Item

• FR 9192

Submitter Information Verification

Submitter Full Name: Chad Kennedy
Organization: Schneider Electric
Street Address:
City:
State:
Zip:
Submittal Date: Fri Jul 30 08:31:44 EDT 2021
Committee: NEC-P13

Public Comment No. 1036-NFPA 70-2021 [Definition: Load Management.]

Load Management.

The process ~~of limiting~~ within an energy management system that limits the total electrical load on an electrical supply system to a set value by adjusting or controlling the individual loads. (~~625) (~~ CMP-~~12~~ 13)

Informational Note: Load management is sometimes called *demand-side management* (DSM).

Statement of Problem and Substantiation for Public Comment

This public comment is submitted on behalf of the Energy Management Task Group formed under the direction of the Correlating Committee to review all current and proposed definitions and requirements related to load management, load management system, power control system, energy management system and related terms to ensure a coordinated approach throughout the Code. See CCN-279.

The task group members are; Chad Kennedy (Chair), Tim Zgonena, Rebekah Hren, Greg Ball, Jason Fisher, Doug Burkett, Robert Jordan, Matthew Grover, Tim Windey, Karl Reighard, and Brian Baughman. This task group of balanced interests provided the expertise to develop these public comments covering energy management across the NEC.

The definition of "Load Management" has been revised for clarity and correlation with Article 750. Load management is a function of a listed energy management system. The definition is assigned to CMP-13 since Article 750 is under their purview.

This public comment is part of a series of actions recommended by the task group. See the related public comments which complete this action.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 36-NFPA 70-2021 [Definition: Energy Management System.]	
Public Comment No. 1034-NFPA 70-2021 [Definition: Load Management System.]	
Public Comment No. 1037-NFPA 70-2021 [Section No. 750.30]	
Public Comment No. 1039-NFPA 70-2021 [Section No. 220.70]	
Public Comment No. 1041-NFPA 70-2021 [Section No. 625.42(A)]	
Public Comment No. 1042-NFPA 70-2021 [Section No. 625.42(B)]	
Public Comment No. 1043-NFPA 70-2021 [Section No. 705.13]	
Public Comment No. 1044-NFPA 70-2021 [Section No. 705.46]	
Public Comment No. 1045-NFPA 70-2021 [Section No. 700.4(C)]	
Public Comment No. 1046-NFPA 70-2021 [Section No. 701.4(C)]	
Public Comment No. 1047-NFPA 70-2021 [Section No. 702.4(B)]	
Public Comment No. 1048-NFPA 70-2021 [Section No. 708.22(B)]	
Public Comment No. 1049-NFPA 70-2021 [Section No. 705.80]	
Public Comment No. 1050-NFPA 70-2021 [Section No. 705.28(A)]	
Public Comment No. 1052-NFPA 70-2021 [Section No. 705.11(A)(1)]	
Public Comment No. 1053-NFPA 70-2021 [Section No. 705.12 [Excluding any Sub-Sections]]	
Public Comment No. 1406-NFPA 70-2021 [Section No. 230.82]	
Public Comment No. 36-NFPA 70-2021 [Definition: Energy Management System.]	
Public Comment No. 1034-NFPA 70-2021 [Definition: Load Management System.]	
Public Comment No. 1037-NFPA 70-2021 [Section No. 750.30]	
Public Comment No. 1039-NFPA 70-2021 [Section No. 220.70]	
Public Comment No. 1041-NFPA 70-2021 [Section No. 625.42(A)]	
Public Comment No. 1042-NFPA 70-2021 [Section No. 625.42(B)]	
Public Comment No. 1043-NFPA 70-2021 [Section No. 705.13]	
Public Comment No. 1044-NFPA 70-2021 [Section No. 705.46]	
Public Comment No. 1045-NFPA 70-2021 [Section No. 700.4(C)]	
Public Comment No. 1046-NFPA 70-2021 [Section No. 701.4(C)]	
Public Comment No. 1047-NFPA 70-2021 [Section No. 702.4(B)]	
Public Comment No. 1048-NFPA 70-2021 [Section No. 708.22(B)]	
Public Comment No. 1049-NFPA 70-2021 [Section No. 705.80]	
Public Comment No. 1050-NFPA 70-2021 [Section No. 705.28(A)]	
Public Comment No. 1052-NFPA 70-2021 [Section No. 705.11(A)(1)]	
Public Comment No. 1053-NFPA 70-2021 [Section No. 705.12 [Excluding any Sub-Sections]]	

Public Comment No. 1406-NFPA 70-2021 [Section No. 230.82]

Related Item

• CN-279

Submitter Information Verification

Submitter Full Name: Chad Kennedy
Organization: Schneider Electric
Street Address:
City:
State:
Zip:
Submittal Date: Thu Aug 05 21:19:59 EDT 2021
Committee: NEC-P13

Public Comment No. 1374-NFPA 70-2021 [Definition: Luminaire, Emergency,Directly Controlled. (Dire...]

Emergency Luminaire, ~~Emergency,~~ Directly Controlled. (Directly Controlled Emergency Luminaire)

A luminaire supplied by the facility emergency power system and with a control input for dimming or switching that provides an emergency illumination level upon loss of normal power. (700) (CMP-13)

Informational Note: See ANSI/UL 924, Emergency Lighting and Power Equipment, for information covering directly controlled emergency luminaires.

Additional Proposed Changes

File Name	Description	Approved
CMP-13_definition_TG_summary_8-18.pdf	CMP-13 Definition TG summary	

Statement of Problem and Substantiation for Public Comment

This change is needed to improve the grouping of like terms in the definition section, article 100.
This public comment is being submitted on behalf of a task group formed of CMP-13 members; Herb Daugherty, Jeff Jonas, Chad Kennedy, Linda Little and Charles Picard to address the NEC correlating committee comments related to the definitions under the purview of CMP-13.

Related Item

- FR-8777

Submitter Information Verification

Submitter Full Name: Jeff Jonas
Organization: Generac Power Systems, Inc.
Street Address:
City:
State:
Zip:
Submittal Date: Thu Aug 12 12:53:00 EDT 2021
Committee: NEC-P13

Correlating Committee Definitions Task Group
CMP-13 - Definitions
(prepared by Jeff Jonas, August 18, 2021)

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
	The Correlating Committee directs the Chair of CMP-13 to assign a task group to review all the definitions under their purview for compliance with the NEC Style Manual and to review definitions identified by the Correlating Committee that may contain correlation issues. The attachment includes a list of those definitions identified that need to be reviewed.	
Diversion Load Controller. Equipment that regulates the output of a wind generator by diverting power from the generator to dc or ac loads or to an interconnected utility service. (CMP-4)	The Correlating Committee assigns the definition of Diversion Load Controller to CMP-13. Code-Making Panel 13 should review and compare this definition with the Diversion Charge Controller definition and consider using the same term for consistency.	No action taken. Will be reviewed by task group 6 with "Diversion Charge Controller".
Inverter Utilization Output Circuit. Conductors between the multimode or stand-alone inverter and utilization equipment. (706) (CMP-13)	The Correlating Committee directs the panel to review the definition of Inverter Utilization Output Circuit and consider correlation with the definition of Power Source Output Circuit.	No action taken. More discussion required in the interconnection task group and the next code cycle.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Normal/Emergency Power Source. A power source on the output side of a transfer switch or uninterruptible power supply that is automatically available upon loss of normal power. (700) (CMP-13).	The Correlating Committee directs that this definition title be reviewed for its use within the article. The term "normal/emergency power source" is not used in Article 700. The term "normal/emergency source" is used in 700.23.	Submitted PC 1367 Change code language to include "power" after "Normal/ Emergency" in 700.23 to match the definition.
Optional Standby Systems. Those systems intended to supply power to public or private facilities or property where life safety does not depend on the performance of the system. These systems are intended to supply on-site generated or stored power to selected loads either automatically or manually. (CMP-13) ~~Informational Note: Optional standby systems are typically installed to provide an alternate source of electric power for such facilities as industrial and commercial buildings, farms, and residences and to serve loads such as heating and refrigeration systems, data processing and communications systems, and industrial processes that, when stopped during any power outage, could cause discomfort, serious interruption of the process, damage to the product or process, or the like.~~	4.1.1 Redundant Informational Note The Correlating Committee directs the panel to reconsider the definition, regarding the need for the informational note. This Informational Note is presently located in the Scope of Article 702.	CN 434 Submitted PC 1355 Requested changes made.
Stored-Energy Power Supply System (SEPSS). ~~This definition shall apply within this article and throughout the code.~~ A complete functioning EPSS powered by a stored-energy electrical source. (CMP-13)	The Correlating Committee directs the panel to review the definition of Stored-Energy Power Supply System for compliance with the NEC Style Manual. The definition should follow the NEC Style Manual 2.2.2, recommendations for denoting the application of definitions by removing the first sentence.	CN 435 Submitted PC 1366 Requested changes made.
DC System, Reference-Grounded (Reference-Grounded DC System). A system that is not solidly grounded but has a low-resistance electrical reference that maintains voltage to ground in normal operation. (712) (CMP-13)	Task Group 6 Diversion Charge Controller (13), Grounded, Functionally (4) and Referenced-Grounded 2.2.2.4 Multiple Terms	No action taken. Per a discussion with Chad Kennedy this definition is being handled by task group 6.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Diversion Charge Controller. Equipment that regulates the charging process of an ESS by diverting power from energy storage to direct-current or alternating-current loads or to an interconnected utility service. (706) (CMP-13)	Task Group 6 Diversion Charge Controller, Grounded, Functionally 2.2.2.4 Multiple Terms	No action taken. Per a discussion with Chad Kennedy this definition is being handled by task group 6.
Grounded, Functionally (Functionally Grounded). A system that has an electrical ground reference for operational purposes that is not solidly grounded. (712) (CMP-13) Informational Note: Examples of operational reasons for functionally grounded systems include ground-fault detection and performance-related issues for some power sources.	Task Group 6 Diversion Charge Controller (13), Grounded, Functionally (4) and Referenced-Grounded 2.2.2.4 Multiple Terms	No action taken. Per a discussion with Chad Kennedy this definition is being handled by task group 6.
Critical Operations Areas, Designated ({~~{~~Designated Critical Operations Areas) (DCOA)~~}~~. Areas within a facility or site designated as requiring critical operations power. (CMP-13)	The term modifier to be in parentheses and then the acronym in parentheses.	PC 1368 Requested changes made.
DC System, Grounded Three-Wire, ~~Grounded~~ (Grounded Three-Wire DC System). A system with a solid connection or reference-ground between the center point of a bipolar dc power source and the equipment grounding system. (712) (CMP-13)	2.2.2.3 Base Term Group with DC System, Grounded Three-Wire	PC 1369 Requested changes made.
DC System, Grounded Two-Wire, ~~Grounded~~ (Grounded Two-Wire DC System). A system that has a solid connection or reference-ground between one of the current-carrying conductors and the equipment grounding system. (712) (CMP-13)	2.2.2.3 Base Term Group with DC System, Grounded Two-Wire	PC 1370 Requested changes made.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
DC System, Ungrounded (Ungrounded DC System). A system that has no direct or resistive connection between the current-carrying conductors and the equipment grounding system. (712) (CMP-13)	2.2.2.3 Base Term Group with DC System, Ungrounded	No action taken. Looks to be correct as is.
Emergency Luminaire, Battery- Equipped (Battery- Equipped Emergency Luminaire). A luminaire with a rechargeable battery, a battery charging means, and an automatic load control relay. ~~(700) (701)~~ (CMP-13)	2.2.2.3.2 Article Number (Can't have two)	PC 1372 Requested changes made.
Emergency Power Supply System (EPSS). ~~This definition shall apply within this article and throughout the code.~~ A complete functioning EPS system coupled to a system of conductors, disconnecting means and overcurrent protective devices, transfer switches, and all control, supervisory, and support devices up to and including the load terminals of the transfer equipment needed for the system to operate as a safe and reliable source of electric power. [110:3.3.4] (CMP-13)	2.2.2 Delete the first sentence	PC 1373 Requested changes made.
Emergency **Luminaire,** ~~**Emergency**~~**, Directly Controlled (Directly Controlled Emergency Luminaire).** A luminaire supplied by the facility emergency power system and with a control input for dimming or switching that provides an emergency illumination level upon loss of normal power. (700) (CMP-13) Informational Note: See ANSI/UL 924, Emergency Lighting and Power Equipment, for information covering directly controlled emergency luminaires.	2.2.2.3 Base Term Group By Emergency Luminaire	PC 1374 Requested changes made.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Microgrid, Direct Current ~~[~~(Direct Current Microgrid) (DC Microgrid)~~]~~. A direct current microgrid is a power distribution system consisting of more than one interconnected dc power source, supplying dc-dc converter(s), dc load(s), and/or ac load(s) powered by dc-ac inverter(s). ~~A dc microgrid is typically not directly connected to an ac primary source of electricity, but some dc microgrids interconnect via one or more dc-ac bidirectional converters or dc-ac inverters.~~ (712) (CMP-13) Informational Note No. 1: Direct current power sources include ac-dc converters (rectifiers), bidirectional dc-ac inverters/converters, photovoltaic systems, wind generators, energy storage systems (including batteries), and fuel cells. Informational Note No. 2: A DC Microgrid is typically not directly connected to an ac primary source of electricity, but some dc microgrids interconnect via one or more dc-ac bidirectional converters or dc-ac inverters.	2.2.2.5 Alternate Term Title has 2 sets of Paren. Definition last sentence should be an Informational Note	PC 1927 Requested changes made.
Voltage, Nominal ~~Voltage~~ (Nominal Voltage) (as applied to battery or cell). The value assigned to a cell or battery of a given voltage class for the purpose of convenient designation. The operating voltage of the cell or battery may vary above or below this value. (CMP-13) Informational Note: The most common nominal cell voltages are 2 volts per cell for the lead-acid batteries, 1.2 volts per cell for alkali batteries, and 3.2 to 3.8 volts per cell for Li-ion batteries. Nominal voltages might vary with different chemistries.	2.2.2.3 Base Term Group by Voltage, Nominal (Nominal Voltage) (as applied…. Retained)	CN 446 PC 1375 Requested changes made.
Primary ~~DC~~ Source, DC (Primary DC Source). A source that supplies the majority of the dc load in a dc microgrid. (712) (CMP-13)	2.2.2.3 Base Term Group by Primary Source 2.2.2.5 Alternate Term (Primary DC Source)	PC 1376 Requested changes made.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Supervisory Control and Data Acquisition (SCADA). An electronic system that provides monitoring and controls for the operation of the critical operations power system. Informational Note: This can include the fire alarm system, security system, control of the HVAC, the start/stop/monitoring of the power supplies and electrical distribution system, annunciation and communications equipment to emergency personnel, facility occupants, and remote operators. (CMP-13)	The second sentence should be an Informational Note	PC 1378 Requested changes made.
~~the power supplies and electrical distribution system, annunciation and communications equipment to emergency personnel, facility occupants, and remote operators. (CMP-13)~~		
Transfer Switch, Bypass Isolation (Bypass Isolation Transfer Switch). A manual, nonautomatic, or automatic operated device used in conjunction with a transfer switch to provide a means of directly connecting load conductors to a power source and of disconnecting the transfer switch. (CMP-13)	2.2.2.3.1 Searchability 2.2.2.3 Base Term Transfer Switch, Bypass Isolation (Bypass Isolation Transfer Switch)	PC 1380 Requested changes made.
Transfer Switch, Meter-Mounted ~~Transfer~~. (Meter-Mounted Transfer Switch). A transfer switch connected between the utility meter and the meter base or fabricated as part of the meter base. (CMP-13) Informational Note: Meter-mounted transfer switches can plug into the meter base or be fabricated as part of the meter base. Transfer switches that incorporate the meter base in the transfer equipment assembly are not considered meter-mounted transfer switches.	2.2.2.3 Base Term Transfer Switch, Meter-Mounted	PC 1381 Requested changes made.
Transfer Switch~~, Transfer~~. An automatic or nonautomatic device for transferring one or more load conductor connections from one power source to another. (CMP-13)	2.2.2.3 Base Term Transfer Switch	PC 1379 Requested changes made.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Voltage, Nominal (Nominal Voltage). A value assigned to a circuit or system for the purpose of conveniently designating its dc voltage class. (712) (CMP-13) Informational Note: The actual voltage at which a circuit operates can vary from the nominal voltage within a range that permits satisfactory operation of equipment.	2.2.2.4 Multiple Terms Nominal Voltage	No action taken. Correct as is. Multiple terms are being used to describe 2 different things. Article 712 definition is limited to dc.

Public Comment No. 1445-NFPA 70-2021 [Definition: Microgrid, Direct Current. (Direct Current Micr...]

~~**Microgrid, Direct Current. (Direct Current Microgrid) (DC Microgrid)**~~

~~A direct current microgrid is a power distribution system consisting of more than one interconnected dc power source, supplying dc-dc converter(s), dc load(s), and/or ac load(s) powered by dc-ac inverter(s). A dc microgrid is typically not directly connected to an ac primary source of electricity, but some dc microgrids interconnect via one or more dc-ac bidirectional converters or dc-ac inverters. (712) (CMP-13)~~

~~Informational Note: Direct current power sources include ac-dc converters (rectifiers), bidirectional dc-ac inverters/converters, photovoltaic systems, wind generators, energy storage systems (including batteries), and fuel cells.~~

Statement of Problem and Substantiation for Public Comment

This definition is deleted in keeping with the request of this task group by the Correlating Committee (CCN-306) to “consider removing the definition of “DC Microgrid” and Article 712 based on the review of requirements in Article 705.” Since this term was limited to Article 712 it is deleted. It is the determination of this task group that the deletion of this, and other related terms moved from 712.2 in the first revision, and the requested action to deleted article 712 in the referenced FR, will not adversely impact users of this Code. It is the opinion of this task group that this action will in fact, improve the usability of this document by removing terms and requirements that conflict with other terms and requirements related to microgrids that are globally applied throughout this Code, other common regulatory documents, as well as other standards.
This task group carefully reviewed these terms to ensure their deletion would not cause confusion or gaps elsewhere in the Code. Article 705, and related definitions, contain the general requirements that apply to all microgrid installations.

This public comment is submitted on behalf of the task group formed under the direction of the Correlating Committee to review all current and proposed definitions and requirements related to microgrids to ensure a clear, consistent, and coordinated approach to addressing this topic throughout the Code.
The task group members are; Jason Fisher Chair, Brenton Michael Fedele, Ted Smith, Isaac Opalinsky, Pete Jackson, Jason Hopkins, John Kovacik, Steven Froemming, Krista Biason, Greg Ball, Chad Beebe, and Matthew Dozier. Through these individual's technical committee memberships, and their balanced interests, this task group provided the expertise to develop these public comments covering microgrids across the NEC.

This public comment is part of a series of actions recommended by the task group. See the related public comments which complete this action.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 1443-NFPA 70-2021 [Article 712]	Deletion of article 712

Related Item

- FR-9192

Submitter Information Verification

Submitter Full Name: Jason Fisher
Organization:
Affiliation: CC Second Draft Microgrid Task Group
Street Address:
City:
State:
Zip:
Submittal Date: Fri Aug 13 14:03:11 EDT 2021
Committee: NEC-P13

Public Comment No. 1927-NFPA 70-2021 [Definition: Microgrid, Direct Current. (Direct Current Micr...]

Microgrid, Direct Current. (Direct Current Microgrid) (DC Microgrid)

A direct current microgrid is a power distribution system consisting of more than one interconnected dc power source, supplying dc-dc converter(s), dc load(s), and/or ac load(s) powered by dc-ac inverter(s). ~~A dc microgrid is typically not directly connected to an ac primary source of electricity, but some dc microgrids interconnect via one or more dc-ac bidirectional converters or dc-ac inverters.~~ _ (712) (CMP-13)

Informational Note No. 1 : Direct current power sources include ac-dc converters (rectifiers), bidirectional dc-ac inverters/converters, photovoltaic systems, wind generators, energy storage systems (including batteries), and fuel cells.

Informational Note No. 2: A DC Microgrid is typically not directly connected to an ac primary source of electricity, but some dc microgrids interconnect via one or more dc-ac bidirectional converters of dc-ac inverters.

Additional Proposed Changes

File Name	Description	Approved
CMP-13_definition_TG_summary_8-18.pdf	CMP-13 Definition TG summary	

Statement of Problem and Substantiation for Public Comment

The last sentence is referring to a typical application and should be an Informational Note.
This public comment is being submitted on behalf of a task group formed of CMP-13 members; Herb Daugherty, Jeff Jonas, Chad Kennedy, Linda Little and Charles Picard to address the NEC correlating committee comments related to the definitions under the purview of CMP-13.

Related Item

• FR9192

Submitter Information Verification

Submitter Full Name: Jeff Jonas
Organization: Generac Power Systems, Inc.
Street Address:
City:
State:
Zip:
Submittal Date: Wed Aug 18 16:42:26 EDT 2021
Committee: NEC-P13

Correlating Committee Definitions Task Group
CMP-13 - Definitions

(prepared by Jeff Jonas, August 18, 2021)

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
	The Correlating Committee directs the Chair of CMP-13 to assign a task group to review all the definitions under their purview for compliance with the NEC Style Manual and to review definitions identified by the Correlating Committee that may contain correlation issues. The attachment includes a list of those definitions identified that need to be reviewed.	
Diversion Load Controller. Equipment that regulates the output of a wind generator by diverting power from the generator to dc or ac loads or to an interconnected utility service. (CMP-4)	The Correlating Committee assigns the definition of Diversion Load Controller to CMP-13. Code-Making Panel 13 should review and compare this definition with the Diversion Charge Controller definition and consider using the same term for consistency.	No action taken. Will be reviewed by task group 6 with "Diversion Charge Controller".
Inverter Utilization Output Circuit. Conductors between the multimode or stand-alone inverter and utilization equipment. (706) (CMP-13)	The Correlating Committee directs the panel to review the definition of Inverter Utilization Output Circuit and consider correlation with the definition of Power Source Output Circuit.	No action taken. More discussion required in the interconnection task group and the next code cycle.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Normal/Emergency Power Source. A power source on the output side of a transfer switch or uninterruptible power supply that is automatically available upon loss of normal power. (700) (CMP-13).	The Correlating Committee directs that this definition title be reviewed for its use within the article. The term "normal/emergency power source" is not used in Article 700. The term "normal/emergency source" is used in 700.23.	Submitted PC 1367 Change code language to include "power" after "Normal/ Emergency" in 700.23 to match the definition.
Optional Standby Systems. Those systems intended to supply power to public or private facilities or property where life safety does not depend on the performance of the system. These systems are intended to supply on-site generated or stored power to selected loads either automatically or manually. (CMP-13) ~~Informational Note: Optional standby systems are typically installed to provide an alternate source of electric power for such facilities as industrial and commercial buildings, farms, and residences and to serve loads such as heating and refrigeration systems, data processing and communications systems, and industrial processes that, when stopped during any power outage, could cause discomfort, serious interruption of the process, damage to the product or process, or the like.~~	4.1.1 Redundant Informational Note The Correlating Committee directs the panel to reconsider the definition, regarding the need for the informational note. This Informational Note is presently located in the Scope of Article 702.	CN 434 Submitted PC 1355 Requested changes made.
Stored-Energy Power Supply System (SEPSS). ~~This definition shall apply within this article and throughout the code.~~ A complete functioning EPSS powered by a stored-energy electrical source. (CMP-13)	The Correlating Committee directs the panel to review the definition of Stored-Energy Power Supply System for compliance with the NEC Style Manual. The definition should follow the NEC Style Manual 2.2.2, recommendations for denoting the application of definitions by removing the first sentence.	CN 435 Submitted PC 1366 Requested changes made.
DC System, Reference-Grounded (Reference-Grounded DC System). A system that is not solidly grounded but has a low-resistance electrical reference that maintains voltage to ground in normal operation. (712) (CMP-13)	Task Group 6 Diversion Charge Controller (13), Grounded, Functionally (4) and Referenced-Grounded 2.2.2.4 Multiple Terms	No action taken. Per a discussion with Chad Kennedy this definition is being handled by task group 6.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Diversion Charge Controller. Equipment that regulates the charging process of an ESS by diverting power from energy storage to direct-current or alternating-current loads or to an interconnected utility service. (706) (CMP-13)	Task Group 6 Diversion Charge Controller, Grounded, Functionally 2.2.2.4 Multiple Terms	No action taken. Per a discussion with Chad Kennedy this definition is being handled by task group 6.
Grounded, Functionally (Functionally Grounded). A system that has an electrical ground reference for operational purposes that is not solidly grounded. (712) (CMP-13) Informational Note: Examples of operational reasons for functionally grounded systems include ground-fault detection and performance-related issues for some power sources.	Task Group 6 Diversion Charge Controller (13), Grounded, Functionally (4) and Referenced-Grounded 2.2.2.4 Multiple Terms	No action taken. Per a discussion with Chad Kennedy this definition is being handled by task group 6.
Critical Operations Areas, Designated ([~~[~~Designated Critical Operations Areas) (DCOA)~~]~~. Areas within a facility or site designated as requiring critical operations power. (CMP-13)	The term modifier to be in parentheses and then the acronym in parentheses.	PC 1368 Requested changes made.
DC System, Grounded Three-Wire, ~~Grounded~~ (Grounded Three-Wire DC System). A system with a solid connection or reference-ground between the center point of a bipolar dc power source and the equipment grounding system. (712) (CMP-13)	2.2.2.3 Base Term Group with DC System, Grounded Three-Wire	PC 1369 Requested changes made.
DC System, Grounded Two-Wire, ~~Grounded~~ (Grounded Two-Wire DC System). A system that has a solid connection or reference-ground between one of the current-carrying conductors and the equipment grounding system. (712) (CMP-13)	2.2.2.3 Base Term Group with DC System, Grounded Two-Wire	PC 1370 Requested changes made.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
DC System, Ungrounded (Ungrounded DC System). A system that has no direct or resistive connection between the current-carrying conductors and the equipment grounding system. (712) (CMP-13)	2.2.2.3 Base Term Group with DC System, Ungrounded	No action taken. Looks to be correct as is.
Emergency Luminaire, Battery- Equipped (Battery- Equipped Emergency Luminaire). A luminaire with a rechargeable battery, a battery charging means, and an automatic load control relay. ~~(700) (701)~~ (CMP-13)	2.2.2.3.2 Article Number (Can't have two)	PC 1372 Requested changes made.
Emergency Power Supply System (EPSS). ~~This definition shall apply within this article and throughout the code.~~ A complete functioning EPS system coupled to a system of conductors, disconnecting means and overcurrent protective devices, transfer switches, and all control, supervisory, and support devices up to and including the load terminals of the transfer equipment needed for the system to operate as a safe and reliable source of electric power. [110:3.3.4] (CMP-13)	2.2.2 Delete the first sentence	PC 1373 Requested changes made.
Emergency **Luminaire,** ~~**Emergency**~~**, Directly Controlled (Directly Controlled Emergency Luminaire).** A luminaire supplied by the facility emergency power system and with a control input for dimming or switching that provides an emergency illumination level upon loss of normal power. (700) (CMP-13) Informational Note: See ANSI/UL 924, Emergency Lighting and Power Equipment, for information covering directly controlled emergency luminaires.	2.2.2.3 Base Term Group By Emergency Luminaire	PC 1374 Requested changes made.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Microgrid, Direct Current ~~[~~(Direct Current Microgrid) (DC Microgrid)~~]~~. A direct current microgrid is a power distribution system consisting of more than one interconnected dc power source, supplying dc-dc converter(s), dc load(s), and/or ac load(s) powered by dc-ac inverter(s). ~~A dc microgrid is typically not directly connected to an ac primary source of electricity, but some dc microgrids interconnect via one or more dc-ac bidirectional converters or dc-ac inverters.~~ (712) (CMP-13) Informational Note No. 1: Direct current power sources include ac-dc converters (rectifiers), bidirectional dc-ac inverters/converters, photovoltaic systems, wind generators, energy storage systems (including batteries), and fuel cells. Informational Note No. 2: A DC Microgrid is typically not directly connected to an ac primary source of electricity, but some dc microgrids interconnect via one or more dc-ac bidirectional converters or dc-ac inverters.	2.2.2.5 Alternate Term Title has 2 sets of Paren. Definition last sentence should be an Informational Note	PC 1927 Requested changes made.
Voltage, **Nominal ~~Voltage~~ (Nominal Voltage) (as applied to battery or cell).** The value assigned to a cell or battery of a given voltage class for the purpose of convenient designation. The operating voltage of the cell or battery may vary above or below this value. (CMP-13) Informational Note: The most common nominal cell voltages are 2 volts per cell for the lead-acid batteries, 1.2 volts per cell for alkali batteries, and 3.2 to 3.8 volts per cell for Li-ion batteries. Nominal voltages might vary with different chemistries.	2.2.2.3 Base Term Group by Voltage, Nominal (Nominal Voltage) (as applied…. Retained)	CN 446 PC 1375 Requested changes made.
Primary ~~DC~~ Source, DC (Primary DC Source). A source that supplies the majority of the dc load in a dc microgrid. (712) (CMP-13)	2.2.2.3 Base Term Group by Primary Source 2.2.2.5 Alternate Term (Primary DC Source)	PC 1376 Requested changes made.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Supervisory Control and Data Acquisition (SCADA). An electronic system that provides monitoring and controls for the operation of the critical operations power system. Informational Note: This can include the fire alarm system, security system, control of the HVAC, the start/stop/monitoring of the power supplies and electrical distribution system, annunciation and communications equipment to emergency personnel, facility occupants, and remote operators. (CMP-13)	The second sentence should be an Informational Note	PC 1378 Requested changes made.
~~the power supplies and electrical distribution system, annunciation and communications equipment to emergency personnel, facility occupants, and remote operators. (CMP-13)~~		
Transfer **Switch, Bypass Isolation** (Bypass Isolation Transfer Switch)**.** A manual, nonautomatic, or automatic operated device used in conjunction with a transfer switch to provide a means of directly connecting load conductors to a power source and of disconnecting the transfer switch. (CMP-13)	2.2.2.3.1 Searchability 2.2.2.3 Base Term Transfer Switch, Bypass Isolation (Bypass Isolation Transfer Switch)	PC 1380 Requested changes made.
Transfer **Switch, Meter-Mounted** ~~**Transfer**~~**. (Meter-Mounted Transfer Switch).** A transfer switch connected between the utility meter and the meter base or fabricated as part of the meter base. (CMP-13) Informational Note: Meter-mounted transfer switches can plug into the meter base or be fabricated as part of the meter base. Transfer switches that incorporate the meter base in the transfer equipment assembly are not considered meter-mounted transfer switches.	2.2.2.3 Base Term Transfer Switch, Meter-Mounted	PC 1381 Requested changes made.
Transfer **Switch**~~**, Transfer**~~**.** An automatic or nonautomatic device for transferring one or more load conductor connections from one power source to another. (CMP-13)	2.2.2.3 Base Term Transfer Switch	PC 1379 Requested changes made.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Voltage, Nominal (Nominal Voltage). A value assigned to a circuit or system for the purpose of conveniently designating its dc voltage class. (712) (CMP-13) Informational Note: The actual voltage at which a circuit operates can vary from the nominal voltage within a range that permits satisfactory operation of equipment.	2.2.2.4 Multiple Terms Nominal Voltage	No action taken. Correct as is. Multiple terms are being used to describe 2 different things. Article 712 definition is limited to dc.

Public Comment No. 1156-NFPA 70-2021 [Definition: Nominal Voltage (as applied to battery or cell).]

Nominal Voltage (as applied to battery or cell).

The value assigned to a cell or battery of a given voltage class for the purpose of convenient designation. The operating voltage of the cell or battery may vary above or below this value. (CMP-13)

Informational Note: The most common nominal cell voltages are 2 volts per cell for the lead-acid batteries, 1.2 volts per cell for alkali batteries, and 3.2 to 3.8 volts per cell for Li-ion batteries. Nominal voltages might vary with different chemistries.

Additional Proposed Changes

File Name	Description	Approved
13_CN_446.pdf	13 CN446	

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 446 appeared in the First Draft Report on First Revision Nos. 9043, 8462 and 9192.

The Correlating Committee notes that more than one related term is referenced in the definitions for Nominal Voltage and Voltage, Nominal. Section 2.2.2.4 of the NEC Style Manual review this issue and the Correlating Committee establishes a Task Group with representation from Code-Making Panels 1 and 13 to combine the terms, create a single definition and revise the definition to comply with the NEC Style Manual. The Correlating Committee assigns the purview of the term Voltage, Nominal (Nominal Voltage) to CMP-1. Each panel is assigned to revise the definitions under their purview to comply with the NEC Style Manual.

Related Item

• First Revision No. 9043 • First Revision No. 8462 • First Revision No. 9192

Submitter Information Verification

Submitter Full Name: CC on NEC-AAC
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:
Submittal Date: Tue Aug 10 11:56:21 EDT 2021
Committee: NEC-P13

Correlating Committee Note No. 446-NFPA 70-2021 [Definition: Nominal Voltage (Battery or Cell).]

Submitter Information Verification

Committee: NEC-P13
Submittal Date: Mon May 10 09:52:58 EDT 2021

Committee Statement

Committee Statement: The Correlating Committee notes that more than one related term is referenced in the definitions for Nominal Voltage and Voltage, Nominal. Section 2.2.2.4 of the NEC Style Manual review this issue and the Correlating Committee establishes a Task Group with representation from Code-Making Panels 1 and 13 to combine the terms, create a single definition and revise the definition to comply with the NEC Style Manual. The Correlating Committee assigns the purview of the term Voltage, Nominal (Nominal Voltage) to CMP-1. Each panel is assigned to revise the definitions under their purview to comply with the NEC Style Manual.

First Revision No. 9043-NFPA 70-2021 [Definition: Nominal Voltage (Battery or Cell).]

First Revision No. 8462-NFPA 70-2021 [Definition: Voltage, Nominal.]

First Revision No. 9192-NFPA 70-2021 [Global Input]

Ballot Results

This item has passed ballot

12 Eligible Voters
0 Not Returned
12 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Affirmative All

Ayer, Lawrence S.
Gallo, Ernest J.
Hickman, Palmer L.
Holub, Richard A.
Hunter, Dean C.
Johnston, Michael J.
Kendall, David H.
Kovacik, John R.
Manche, Alan
McDaniel, Roger D.
Porter, Christine T.
Williams, David A.

Public Comment No. 1375-NFPA 70-2021 [Definition: Nominal Voltage (as applied to battery or cell).]

Voltage, Nominal. (Nominal Voltage) (as applied to battery or cell).

The value assigned to a cell or battery of a given voltage class for the purpose of convenient designation. The operating voltage of the cell or battery may vary above or below this value. (CMP-13)

Informational Note: The most common nominal cell voltages are 2 volts per cell for the lead-acid batteries, 1.2 volts per cell for alkali batteries, and 3.2 to 3.8 volts per cell for Li-ion batteries. Nominal voltages might vary with different chemistries.

Additional Proposed Changes

File Name	Description	Approved
CMP-13_definition_TG_summary_8-18.pdf	CMP-13 Definition TG summary	

Statement of Problem and Substantiation for Public Comment

This change is needed to improve the grouping of like terms in the definition section, article 100.
This public comment is being submitted on behalf of a task group formed of CMP-13 members; Herb Daugherty, Jeff Jonas, Chad Kennedy, Linda Little and Charles Picard to address the NEC correlating committee comments related to the definitions under the purview of CMP-13.

Related Item

• CN446

Submitter Information Verification

Submitter Full Name: Jeff Jonas
Organization: Generac Power Systems, Inc.
Street Address:
City:
State:
Zip:
Submittal Date: Thu Aug 12 12:54:28 EDT 2021
Committee: NEC-P13

Correlating Committee Definitions Task Group
CMP-13 - Definitions
(prepared by Jeff Jonas, August 18, 2021)

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
	The Correlating Committee directs the Chair of CMP-13 to assign a task group to review all the definitions under their purview for compliance with the NEC Style Manual and to review definitions identified by the Correlating Committee that may contain correlation issues. The attachment includes a list of those definitions identified that need to be reviewed.	
Diversion Load Controller. Equipment that regulates the output of a wind generator by diverting power from the generator to dc or ac loads or to an interconnected utility service. (CMP-4)	The Correlating Committee assigns the definition of Diversion Load Controller to CMP-13. Code-Making Panel 13 should review and compare this definition with the Diversion Charge Controller definition and consider using the same term for consistency.	No action taken. Will be reviewed by task group 6 with "Diversion Charge Controller".
Inverter Utilization Output Circuit. Conductors between the multimode or stand-alone inverter and utilization equipment. (706) (CMP-13)	The Correlating Committee directs the panel to review the definition of Inverter Utilization Output Circuit and consider correlation with the definition of Power Source Output Circuit.	No action taken. More discussion required in the interconnection task group and the next code cycle.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Normal/Emergency Power Source. A power source on the output side of a transfer switch or uninterruptible power supply that is automatically available upon loss of normal power. (700) (CMP-13).	The Correlating Committee directs that this definition title be reviewed for its use within the article. The term "normal/emergency power source" is not used in Article 700. The term "normal/emergency source" is used in 700.23.	Submitted PC 1367 Change code language to include "power" after "Normal/ Emergency" in 700.23 to match the definition.
Optional Standby Systems. Those systems intended to supply power to public or private facilities or property where life safety does not depend on the performance of the system. These systems are intended to supply on-site generated or stored power to selected loads either automatically or manually. (CMP-13) ~~Informational Note: Optional standby systems are typically installed to provide an alternate source of electric power for such facilities as industrial and commercial buildings, farms, and residences and to serve loads such as heating and refrigeration systems, data processing and communications systems, and industrial processes that, when stopped during any power outage, could cause discomfort, serious interruption of the process, damage to the product or process, or the like.~~	4.1.1 Redundant Informational Note The Correlating Committee directs the panel to reconsider the definition, regarding the need for the informational note. This Informational Note is presently located in the Scope of Article 702.	CN 434 Submitted PC 1355 Requested changes made.
Stored-Energy Power Supply System (SEPSS). ~~This definition shall apply within this article and throughout the code.~~ A complete functioning EPSS powered by a stored-energy electrical source. (CMP-13)	The Correlating Committee directs the panel to review the definition of Stored-Energy Power Supply System for compliance with the NEC Style Manual. The definition should follow the NEC Style Manual 2.2.2, recommendations for denoting the application of definitions by removing the first sentence.	CN 435 Submitted PC 1366 Requested changes made.
DC System, Reference-Grounded (Reference-Grounded DC System). A system that is not solidly grounded but has a low-resistance electrical reference that maintains voltage to ground in normal operation. (712) (CMP-13)	Task Group 6 Diversion Charge Controller (13), Grounded, Functionally (4) and Referenced-Grounded 2.2.2.4 Multiple Terms	No action taken. Per a discussion with Chad Kennedy this definition is being handled by task group 6.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Diversion Charge Controller. Equipment that regulates the charging process of an ESS by diverting power from energy storage to direct-current or alternating-current loads or to an interconnected utility service. (706) (CMP-13)	Task Group 6 Diversion Charge Controller, Grounded, Functionally 2.2.2.4 Multiple Terms	No action taken. Per a discussion with Chad Kennedy this definition is being handled by task group 6.
Grounded, Functionally (Functionally Grounded). A system that has an electrical ground reference for operational purposes that is not solidly grounded. (712) (CMP-13) Informational Note: Examples of operational reasons for functionally grounded systems include ground-fault detection and performance-related issues for some power sources.	Task Group 6 Diversion Charge Controller (13), Grounded, Functionally (4) and Referenced-Grounded 2.2.2.4 Multiple Terms	No action taken. Per a discussion with Chad Kennedy this definition is being handled by task group 6.
Critical Operations Areas, Designated ({~~{~~Designated Critical Operations Areas) (DCOA)~~}~~. Areas within a facility or site designated as requiring critical operations power. (CMP-13)	The term modifier to be in parentheses and then the acronym in parentheses.	PC 1368 Requested changes made.
DC System, Grounded Three-Wire, ~~Grounded~~ (Grounded Three-Wire DC System). A system with a solid connection or reference-ground between the center point of a bipolar dc power source and the equipment grounding system. (712) (CMP-13)	2.2.2.3 Base Term Group with DC System, Grounded Three-Wire	PC 1369 Requested changes made.
DC System, Grounded Two-Wire, ~~Grounded~~ (Grounded Two-Wire DC System). A system that has a solid connection or reference-ground between one of the current-carrying conductors and the equipment grounding system. (712) (CMP-13)	2.2.2.3 Base Term Group with DC System, Grounded Two-Wire	PC 1370 Requested changes made.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
DC System, Ungrounded (Ungrounded DC System). A system that has no direct or resistive connection between the current-carrying conductors and the equipment grounding system. (712) (CMP-13)	2.2.2.3 Base Term Group with DC System, Ungrounded	No action taken. Looks to be correct as is.
Emergency Luminaire, Battery- Equipped (Battery- Equipped Emergency Luminaire). A luminaire with a rechargeable battery, a battery charging means, and an automatic load control relay. ~~(700) (701)~~ (CMP-13)	2.2.2.3.2 Article Number (Can't have two)	PC 1372 Requested changes made.
Emergency Power Supply System (EPSS). ~~This definition shall apply within this article and throughout the code.~~ A complete functioning EPS system coupled to a system of conductors, disconnecting means and overcurrent protective devices, transfer switches, and all control, supervisory, and support devices up to and including the load terminals of the transfer equipment needed for the system to operate as a safe and reliable source of electric power. [110:3.3.4] (CMP-13)	2.2.2 Delete the first sentence	PC 1373 Requested changes made.
Emergency **Luminaire,** ~~**Emergency**~~**, Directly Controlled (Directly Controlled Emergency Luminaire).** A luminaire supplied by the facility emergency power system and with a control input for dimming or switching that provides an emergency illumination level upon loss of normal power. (700) (CMP-13) Informational Note: See ANSI/UL 924, Emergency Lighting and Power Equipment, for information covering directly controlled emergency luminaires.	2.2.2.3 Base Term Group By Emergency Luminaire	PC 1374 Requested changes made.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Microgrid, Direct Current ~~[~~(Direct Current Microgrid) (DC Microgrid)~~]~~. A direct current microgrid is a power distribution system consisting of more than one interconnected dc power source, supplying dc-dc converter(s), dc load(s), and/or ac load(s) powered by dc-ac inverter(s). ~~A dc microgrid is typically not directly connected to an ac primary source of electricity, but some dc microgrids interconnect via one or more dc-ac bidirectional converters or dc-ac inverters.~~ (712) (CMP-13) Informational Note No. 1: Direct current power sources include ac-dc converters (rectifiers), bidirectional dc-ac inverters/converters, photovoltaic systems, wind generators, energy storage systems (including batteries), and fuel cells. Informational Note No. 2: A DC Microgrid is typically not directly connected to an ac primary source of electricity, but some dc microgrids interconnect via one or more dc-ac bidirectional converters or dc-ac inverters.	2.2.2.5 Alternate Term Title has 2 sets of Paren. Definition last sentence should be an Informational Note	PC 1927 Requested changes made.
Voltage, Nominal ~~Voltage~~ (Nominal Voltage) (as applied to battery or cell). The value assigned to a cell or battery of a given voltage class for the purpose of convenient designation. The operating voltage of the cell or battery may vary above or below this value. (CMP-13) Informational Note: The most common nominal cell voltages are 2 volts per cell for the lead-acid batteries, 1.2 volts per cell for alkali batteries, and 3.2 to 3.8 volts per cell for Li-ion batteries. Nominal voltages might vary with different chemistries.	2.2.2.3 Base Term Group by Voltage, Nominal (Nominal Voltage) (as applied…. Retained)	CN 446 PC 1375 Requested changes made.
Primary ~~DC~~ Source, DC (Primary DC Source). A source that supplies the majority of the dc load in a dc microgrid. (712) (CMP-13)	2.2.2.3 Base Term Group by Primary Source 2.2.2.5 Alternate Term (Primary DC Source)	PC 1376 Requested changes made.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Supervisory Control and Data Acquisition (SCADA). An electronic system that provides monitoring and controls for the operation of the critical operations power system. Informational Note: This can include the fire alarm system, security system, control of the HVAC, the start/stop/monitoring of the power supplies and electrical distribution system, annunciation and communications equipment to emergency personnel, facility occupants, and remote operators. (CMP-13)	The second sentence should be an Informational Note	PC 1378 Requested changes made.
~~the power supplies and electrical distribution system, annunciation and communications equipment to emergency personnel, facility occupants, and remote operators. (CMP-13)~~		
Transfer Switch, Bypass Isolation (Bypass Isolation Transfer Switch). A manual, nonautomatic, or automatic operated device used in conjunction with a transfer switch to provide a means of directly connecting load conductors to a power source and of disconnecting the transfer switch. (CMP-13)	2.2.2.3.1 Searchability 2.2.2.3 Base Term Transfer Switch, Bypass Isolation (Bypass Isolation Transfer Switch)	PC 1380 Requested changes made.
Transfer Switch, Meter-Mounted ~~Transfer~~. (Meter-Mounted Transfer Switch). A transfer switch connected between the utility meter and the meter base or fabricated as part of the meter base. (CMP-13) Informational Note: Meter-mounted transfer switches can plug into the meter base or be fabricated as part of the meter base. Transfer switches that incorporate the meter base in the transfer equipment assembly are not considered meter-mounted transfer switches.	2.2.2.3 Base Term Transfer Switch, Meter-Mounted	PC 1381 Requested changes made.
Transfer Switch~~, Transfer~~. An automatic or nonautomatic device for transferring one or more load conductor connections from one power source to another. (CMP-13)	2.2.2.3 Base Term Transfer Switch	PC 1379 Requested changes made.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Voltage, Nominal (Nominal Voltage). A value assigned to a circuit or system for the purpose of conveniently designating its dc voltage class. (712) (CMP-13) Informational Note: The actual voltage at which a circuit operates can vary from the nominal voltage within a range that permits satisfactory operation of equipment.	2.2.2.4 Multiple Terms Nominal Voltage	No action taken. Correct as is. Multiple terms are being used to describe 2 different things. Article 712 definition is limited to dc.

Public Comment No. 203-NFPA 70-2021 [Definition: Nominal Voltage (as applied to battery or cell).]

~~**Nominal Voltage (as applied to battery or cell).**~~

~~The value assigned to a cell or battery of a given voltage class for the purpose of convenient designation. The operating voltage of the cell or battery may vary above or below this value. (CMP-13)~~

~~Informational Note: The most common nominal cell voltages are 2 volts per cell for the lead-acid batteries, 1.2 volts per cell for alkali batteries, and 3.2 to 3.8 volts per cell for Li-ion batteries. Nominal voltages might vary with different chemistries.~~

Statement of Problem and Substantiation for Public Comment

From the reading of this, the definition seems almost the same as "voltage, nominal." Nominal voltage can fluctuate just like the battery voltage may fluctuate from its nameplate value. Thus it seems that the moving of it to article 100 creates a condition where it is unnecessary and may cause confusion. Having a "nominal voltage" associated with what articles the code user would have to skip around to find is in the jurisdiction of CMP 13; and a "voltage, nominal" that applies everywhere else makes the code more difficult to use. It is thought that this definition could be removed; or if need be in some way merged with the other definition: voltage, nominal.

Related Item

• Committee Input No. 8495-NFPA 70-2021 [Article 100 [Excluding any Sub-Sections]]

Submitter Information Verification

Submitter Full Name: Josh Weaver
Organization: Not Applicable
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jul 11 16:09:53 EDT 2021
Committee: NEC-P13

Public Comment No. 548-NFPA 70-2021 [Definition: Nominal Voltage (as applied to battery or cell).]

Voltage, Nominal (Nominal Voltage) (as applied to battery or cell).

The value assigned to a cell or battery of a given voltage class for the purpose of convenient designation. The operating voltage of the cell or battery may vary above or below this value. (CMP-13)

Informational Note: The most common nominal cell voltages are 2 volts per cell for the lead-acid batteries, 1.2 volts per cell for alkali batteries, and 3.2 to 3.8 volts per cell for Li-ion batteries. Nominal voltages might vary with different chemistries.

Statement of Problem and Substantiation for Public Comment

Definitions Task Group 7, as directed by the Correlating Committee, has reviewed the multiple definitions of "Nominal Voltage" that were presented in the First Draft Report. The task group recommends retaining this definition assigned to CMP-13 due to the specific applicability to a cell or battery. The formatting of the definition title and addition of the searchable term were added to comply with Section 2.2.2.3 of the NEC Style Manual.

Related Item

• FR 9043

Submitter Information Verification

Submitter Full Name: Chad Kennedy
Organization: Schneider Electric
Street Address:
City:
State:
Zip:
Submittal Date: Fri Jul 30 07:56:38 EDT 2021
Committee: NEC-P13

Public Comment No. 1155-NFPA 70-2021 [Definition: Normal/Emergency Power Source.]

Normal/Emergency Power Source.

A power source on the output side of a transfer switch or uninterruptible power supply that is automatically available upon loss of normal power. (700) (CMP-13).

Additional Proposed Changes

File Name	Description	Approved
.1628610847396	13 CN433	

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No.433 appeared in the First Draft Report on First Revision No. 8781.

The Correlating Committee directs that this definition title be reviewed for its use within the article. The term "normal/emergency power source" is not used in Article 700. The term "normal/emergency source" is used in 700.23.

Related Item

- First Revision No. 8781

Submitter Information Verification

Submitter Full Name: CC on NEC-AAC
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:
Submittal Date: Tue Aug 10 11:53:55 EDT 2021
Committee: NEC-P13

Correlating Committee Note No. 433-NFPA 70-2021 [Detail]

Submitter Information Verification

Committee: NEC-P13
Submittal Date: Sun May 09 22:25:03 EDT 2021

Committee Statement

Committee Statement: The Correlating Committee directs that this definition title be reviewed for its use within the article. The term "normal/emergency power source" is not used in Article 700. The term "normal/emergency source" is used in 700.23.

First Revision No. 8781-NFPA 70-2021 [Detail]

Ballot Results

This item has passed ballot

12 Eligible Voters
0 Not Returned
12 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Affirmative All

Ayer, Lawrence S.
Gallo, Ernest J.
Hickman, Palmer L.
Holub, Richard A.
Hunter, Dean C.
Johnston, Michael J.
Kendall, David H.
Kovacik, John R.
Manche, Alan
McDaniel, Roger D.
Porter, Christine T.
Williams, David A.

Public Comment No. 1788-NFPA 70-2021 [Definition: Normal/Emergency Power Source.]

Normal Power Source

A power source that has the capacity to feed all loads of a specific building or campus, and feeds this building / campus at all times unless an unscheduled outage of this source occurs. This source could be a utility service, on site power source(s) or a combination of the two, but at all times sufficient capacity to power the entire building/campus shall be maintained.

Normal/ Emergency Power Source.

A power source on the output side of a transfer switch or uninterruptible power supply that is automatically available upon loss of normal power. (700) (CMP-13).

Statement of Problem and Substantiation for Public Comment

The code uses the term "normal power" throughout, but a formal definition is lacking. Hopefully adding this to the definitions will help with current and future code iterations that address Normal, Essential, Microgrid and other such terms for power sources to facilitate conversation and modifications to help with the implementation of new technologies in the "clean power producers" field.

Related Item

• FR 8781, Public Comments 1782 & 1788

Submitter Information Verification

Submitter Full Name: Jamie Schnick
Organization: Office of Statewide Health Planning and Development (OSHPD) - California
Affiliation: Facilities Development Division
Street Address:
City:
State:
Zip:
Submittal Date: Tue Aug 17 18:59:43 EDT 2021
Committee: NEC-P13

Public Comment No. 1355-NFPA 70-2021 [Definition: Optional Standby Systems.]

Optional Standby Systems.

Those systems intended to supply power to public or private facilities or property where life safety does not depend on the performance of the system. These systems are intended to supply on-site generated or stored power to selected loads either automatically or manually. (CMP-13)

~~Informational Note: Optional standby systems are typically installed to provide an alternate source of electric power for such facilities as industrial and commercial buildings, farms, and residences and to serve loads such as heating and refrigeration systems, data processing and communications systems, and industrial processes that, when stopped during any power outage, could cause discomfort, serious interruption of the process, damage to the product or process, or the like.~~

Additional Proposed Changes

File Name	Description	Approved
CMP-13_definition_TG_summary_8-18.pdf	CMP-13 Definition TG summary	

Statement of Problem and Substantiation for Public Comment

This informational note is presently located in the scope of article 702 making it redundant here.
This public comment is being submitted on behalf of a task group formed of CMP-13 members; Herb Dougherty, Jeff Jonas, Chad Kennedy and Charles Picard to address the NEC correlating committee comments related to the definitions under the purview of CMP-13.

Related Item

- CN434

Submitter Information Verification

Submitter Full Name: Jeff Jonas
Organization: Generac Power Systems, Inc.
Street Address:
City:
State:
Zip:
Submittal Date: Thu Aug 12 12:13:41 EDT 2021
Committee: NEC-P13

Correlating Committee Definitions Task Group
CMP-13 - Definitions
(prepared by Jeff Jonas, August 18, 2021)

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
	The Correlating Committee directs the Chair of CMP-13 to assign a task group to review all the definitions under their purview for compliance with the NEC Style Manual and to review definitions identified by the Correlating Committee that may contain correlation issues. The attachment includes a list of those definitions identified that need to be reviewed.	
Diversion Load Controller. Equipment that regulates the output of a wind generator by diverting power from the generator to dc or ac loads or to an interconnected utility service. (CMP-4)	The Correlating Committee assigns the definition of Diversion Load Controller to CMP-13. Code-Making Panel 13 should review and compare this definition with the Diversion Charge Controller definition and consider using the same term for consistency.	No action taken. Will be reviewed by task group 6 with "Diversion Charge Controller".
Inverter Utilization Output Circuit. Conductors between the multimode or stand-alone inverter and utilization equipment. (706) (CMP-13)	The Correlating Committee directs the panel to review the definition of Inverter Utilization Output Circuit and consider correlation with the definition of Power Source Output Circuit.	No action taken. More discussion required in the interconnection task group and the next code cycle.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Normal/Emergency Power Source. A power source on the output side of a transfer switch or uninterruptible power supply that is automatically available upon loss of normal power. (700) (CMP-13).	The Correlating Committee directs that this definition title be reviewed for its use within the article. The term "normal/emergency power source" is not used in Article 700. The term "normal/emergency source" is used in 700.23.	Submitted PC 1367 Change code language to include "power" after "Normal/ Emergency" in 700.23 to match the definition.
Optional Standby Systems. Those systems intended to supply power to public or private facilities or property where life safety does not depend on the performance of the system. These systems are intended to supply on-site generated or stored power to selected loads either automatically or manually. (CMP-13) ~~Informational Note: Optional standby systems are typically installed to provide an alternate source of electric power for such facilities as industrial and commercial buildings, farms, and residences and to serve loads such as heating and refrigeration systems, data processing and communications systems, and industrial processes that, when stopped during any power outage, could cause discomfort, serious interruption of the process, damage to the product or process, or the like.~~	4.1.1 Redundant Informational Note The Correlating Committee directs the panel to reconsider the definition, regarding the need for the informational note. This Informational Note is presently located in the Scope of Article 702.	CN 434 Submitted PC 1355 Requested changes made.
Stored-Energy Power Supply System (SEPSS). ~~This definition shall apply within this article and throughout the code.~~ A complete functioning EPSS powered by a stored-energy electrical source. (CMP-13)	The Correlating Committee directs the panel to review the definition of Stored-Energy Power Supply System for compliance with the NEC Style Manual. The definition should follow the NEC Style Manual 2.2.2, recommendations for denoting the application of definitions by removing the first sentence.	CN 435 Submitted PC 1366 Requested changes made.
DC System, Reference-Grounded (Reference-Grounded DC System). A system that is not solidly grounded but has a low-resistance electrical reference that maintains voltage to ground in normal operation. (712) (CMP-13)	Task Group 6 Diversion Charge Controller (13), Grounded, Functionally (4) and Referenced-Grounded 2.2.2.4 Multiple Terms	No action taken. Per a discussion with Chad Kennedy this definition is being handled by task group 6.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Diversion Charge Controller. Equipment that regulates the charging process of an ESS by diverting power from energy storage to direct-current or alternating-current loads or to an interconnected utility service. (706) (CMP-13)	Task Group 6 Diversion Charge Controller, Grounded, Functionally 2.2.2.4 Multiple Terms	No action taken. Per a discussion with Chad Kennedy this definition is being handled by task group 6.
Grounded, Functionally (Functionally Grounded). A system that has an electrical ground reference for operational purposes that is not solidly grounded. (712) (CMP-13) Informational Note: Examples of operational reasons for functionally grounded systems include ground-fault detection and performance-related issues for some power sources.	Task Group 6 Diversion Charge Controller (13), Grounded, Functionally (4) and Referenced-Grounded 2.2.2.4 Multiple Terms	No action taken. Per a discussion with Chad Kennedy this definition is being handled by task group 6.
Critical Operations Areas, Designated ({~~{~~Designated Critical Operations Areas) (DCOA)~~}~~. Areas within a facility or site designated as requiring critical operations power. (CMP-13)	The term modifier to be in parentheses and then the acronym in parentheses.	PC 1368 Requested changes made.
DC System, Grounded Three-Wire, ~~Grounded~~ (Grounded Three-Wire DC System). A system with a solid connection or reference-ground between the center point of a bipolar dc power source and the equipment grounding system. (712) (CMP-13)	2.2.2.3 Base Term Group with DC System, Grounded Three-Wire	PC 1369 Requested changes made.
DC System, Grounded Two-Wire, ~~Grounded~~ (Grounded Two-Wire DC System). A system that has a solid connection or reference-ground between one of the current-carrying conductors and the equipment grounding system. (712) (CMP-13)	2.2.2.3 Base Term Group with DC System, Grounded Two-Wire	PC 1370 Requested changes made.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
DC System, Ungrounded (Ungrounded DC System). A system that has no direct or resistive connection between the current-carrying conductors and the equipment grounding system. (712) (CMP-13)	2.2.2.3 Base Term Group with DC System, Ungrounded	No action taken. Looks to be correct as is.
Emergency Luminaire, Battery- Equipped (Battery- Equipped Emergency Luminaire). A luminaire with a rechargeable battery, a battery charging means, and an automatic load control relay. ~~(700) (701)~~ (CMP-13)	2.2.2.3.2 Article Number (Can't have two)	PC 1372 Requested changes made.
Emergency Power Supply System (EPSS). ~~This definition shall apply within this article and throughout the code.~~ A complete functioning EPS system coupled to a system of conductors, disconnecting means and overcurrent protective devices, transfer switches, and all control, supervisory, and support devices up to and including the load terminals of the transfer equipment needed for the system to operate as a safe and reliable source of electric power. [110:3.3.4] (CMP-13)	2.2.2 Delete the first sentence	PC 1373 Requested changes made.
Emergency **Luminaire,** ~~**Emergency**~~**, Directly Controlled (Directly Controlled Emergency Luminaire).** A luminaire supplied by the facility emergency power system and with a control input for dimming or switching that provides an emergency illumination level upon loss of normal power. (700) (CMP-13) Informational Note: See ANSI/UL 924, Emergency Lighting and Power Equipment, for information covering directly controlled emergency luminaires.	2.2.2.3 Base Term Group By Emergency Luminaire	PC 1374 Requested changes made.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Microgrid, Direct Current ~~[~~(Direct Current Microgrid) (DC Microgrid)~~]~~. A direct current microgrid is a power distribution system consisting of more than one interconnected dc power source, supplying dc-dc converter(s), dc load(s), and/or ac load(s) powered by dc-ac inverter(s). ~~A dc microgrid is typically not directly connected to an ac primary source of electricity, but some dc microgrids interconnect via one or more dc-ac bidirectional converters or dc-ac inverters.~~ (712) (CMP-13) Informational Note No. 1: Direct current power sources include ac-dc converters (rectifiers), bidirectional dc-ac inverters/converters, photovoltaic systems, wind generators, energy storage systems (including batteries), and fuel cells. Informational Note No. 2: A DC Microgrid is typically not directly connected to an ac primary source of electricity, but some dc microgrids interconnect via one or more dc-ac bidirectional converters or dc-ac inverters.	2.2.2.5 Alternate Term Title has 2 sets of Paren. Definition last sentence should be an Informational Note	PC 1927 Requested changes made.
Voltage, Nominal ~~Voltage~~ (Nominal Voltage) (as applied to battery or cell). The value assigned to a cell or battery of a given voltage class for the purpose of convenient designation. The operating voltage of the cell or battery may vary above or below this value. (CMP-13) Informational Note: The most common nominal cell voltages are 2 volts per cell for the lead-acid batteries, 1.2 volts per cell for alkali batteries, and 3.2 to 3.8 volts per cell for Li-ion batteries. Nominal voltages might vary with different chemistries.	2.2.2.3 Base Term Group by Voltage, Nominal (Nominal Voltage) (as applied…. Retained)	CN 446 PC 1375 Requested changes made.
Primary ~~DC~~ Source, DC (Primary DC Source). A source that supplies the majority of the dc load in a dc microgrid. (712) (CMP-13)	2.2.2.3 Base Term Group by Primary Source 2.2.2.5 Alternate Term (Primary DC Source)	PC 1376 Requested changes made.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Supervisory Control and Data Acquisition (SCADA). An electronic system that provides monitoring and controls for the operation of the critical operations power system. Informational Note: This can include the fire alarm system, security system, control of the HVAC, the start/stop/monitoring of the power supplies and electrical distribution system, annunciation and communications equipment to emergency personnel, facility occupants, and remote operators. (CMP-13)	The second sentence should be an Informational Note	PC 1378 Requested changes made.
~~the power supplies and electrical distribution system, annunciation and communications equipment to emergency personnel, facility occupants, and remote operators. (CMP-13)~~		
Transfer Switch, Bypass Isolation (Bypass Isolation Transfer Switch). A manual, nonautomatic, or automatic operated device used in conjunction with a transfer switch to provide a means of directly connecting load conductors to a power source and of disconnecting the transfer switch. (CMP-13)	2.2.2.3.1 Searchability 2.2.2.3 Base Term Transfer Switch, Bypass Isolation (Bypass Isolation Transfer Switch)	PC 1380 Requested changes made.
Transfer Switch, Meter-Mounted ~~Transfer~~. (Meter-Mounted Transfer Switch). A transfer switch connected between the utility meter and the meter base or fabricated as part of the meter base. (CMP-13) Informational Note: Meter-mounted transfer switches can plug into the meter base or be fabricated as part of the meter base. Transfer switches that incorporate the meter base in the transfer equipment assembly are not considered meter-mounted transfer switches.	2.2.2.3 Base Term Transfer Switch, Meter-Mounted	PC 1381 Requested changes made.
Transfer Switch~~, Transfer~~. An automatic or nonautomatic device for transferring one or more load conductor connections from one power source to another. (CMP-13)	2.2.2.3 Base Term Transfer Switch	PC 1379 Requested changes made.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Voltage, Nominal (Nominal Voltage). A value assigned to a circuit or system for the purpose of conveniently designating its dc voltage class. (712) (CMP-13) Informational Note: The actual voltage at which a circuit operates can vary from the nominal voltage within a range that permits satisfactory operation of equipment.	2.2.2.4 Multiple Terms Nominal Voltage	No action taken. Correct as is. Multiple terms are being used to describe 2 different things. Article 712 definition is limited to dc.

Public Comment No. 1987-NFPA 70-2021 [Definition: Optional Standby Systems.]

Optional Standby Systems.

Those systems intended to supply power to public or private facilities or property where life safety does not depend on the performance of the system. These systems are intended to supply on-site generated or stored power to selected loads either automatically or manually. (CMP-13)

Informational Note: Optional standby systems are typically installed to provide an alternate source of electric power for such facilities as industrial and commercial buildings, farms, and residences and to serve loads such as heating and refrigeration systems, data processing and communications systems, and industrial processes that, when stopped during any power outage, could cause discomfort, serious interruption of the process, damage to the product or process, or the like.

Additional Proposed Changes

File Name	Description	Approved
CN_434.pdf	70_CN434	

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 434 appeared in the First Draft Report on First Revision No. 9192.

The Correlating Committee directs the panel to reconsider the definition, regarding the need for the informational note. This Informational Note is presently located in the Scope of Article 702.

Related Item

• First Revision No. 9192

Submitter Information Verification

Submitter Full Name: CC on NEC-AAC
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:
Submittal Date: Wed Aug 18 21:34:39 EDT 2021
Committee: NEC-P13

Correlating Committee Note No. 434-NFPA 70-2021 [Definition: Optional Standby Systems.]

Submitter Information Verification

Committee: NEC-AAC
Submittal Date: Sun May 09 22:25:38 EDT 2021

Committee Statement

Committee Statement: The Correlating Committee directs the panel to reconsider the definition, regarding the need for the informational note. This Informational Note is presently located in the Scope of Article 702.

First Revision No. 9192-NFPA 70-2021 [Global Input]

Ballot Results

This item has passed ballot

12 Eligible Voters
0 Not Returned
12 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Affirmative All

Ayer, Lawrence S.
Gallo, Ernest J.
Hickman, Palmer L.
Holub, Richard A.
Hunter, Dean C.
Johnston, Michael J.
Kendall, David H.
Kovacik, John R.
Manche, Alan
McDaniel, Roger D.
Porter, Christine T.
Williams, David A.

Public Comment No. 1376-NFPA 70-2021 [Definition: Primary DC Source.]

Primary Source, DC. (Primary DC Source.)

A source that supplies the majority of the dc load in a dc microgrid. (712) (CMP-13)

Additional Proposed Changes

File Name	Description	Approved
CMP-13_definition_TG_summary_8-18.pdf	CMP-13 Definition TG summary	

Statement of Problem and Substantiation for Public Comment

This change is needed to improve the grouping of like terms in the definition section, article 100.
This public comment is being submitted on behalf of a task group formed of CMP-13 members; Herb Daugherty, Jeff Jonas, Chad Kennedy, Linda Little and Charles Picard to address the NEC correlating committee comments related to the definitions under the purview of CMP-13.

Related Item

- FR-9192

Submitter Information Verification

Submitter Full Name: Jeff Jonas
Organization: Generac Power Systems, Inc.
Street Address:
City:
State:
Zip:
Submittal Date: Thu Aug 12 12:56:07 EDT 2021
Committee: NEC-P13

Correlating Committee Definitions Task Group
CMP-13 - Definitions
(prepared by Jeff Jonas, August 18, 2021)

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
	The Correlating Committee directs the Chair of CMP-13 to assign a task group to review all the definitions under their purview for compliance with the NEC Style Manual and to review definitions identified by the Correlating Committee that may contain correlation issues. The attachment includes a list of those definitions identified that need to be reviewed.	
Diversion Load Controller. Equipment that regulates the output of a wind generator by diverting power from the generator to dc or ac loads or to an interconnected utility service. (CMP-4)	The Correlating Committee assigns the definition of Diversion Load Controller to CMP-13. Code-Making Panel 13 should review and compare this definition with the Diversion Charge Controller definition and consider using the same term for consistency.	No action taken. Will be reviewed by task group 6 with "Diversion Charge Controller".
Inverter Utilization Output Circuit. Conductors between the multimode or stand-alone inverter and utilization equipment. (706) (CMP-13)	The Correlating Committee directs the panel to review the definition of Inverter Utilization Output Circuit and consider correlation with the definition of Power Source Output Circuit.	No action taken. More discussion required in the interconnection task group and the next code cycle.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Normal/Emergency Power Source. A power source on the output side of a transfer switch or uninterruptible power supply that is automatically available upon loss of normal power. (700) (CMP-13).	The Correlating Committee directs that this definition title be reviewed for its use within the article. The term "normal/emergency power source" is not used in Article 700. The term "normal/emergency source" is used in 700.23.	Submitted PC 1367 Change code language to include "power" after "Normal/ Emergency" in 700.23 to match the definition.
Optional Standby Systems. Those systems intended to supply power to public or private facilities or property where life safety does not depend on the performance of the system. These systems are intended to supply on-site generated or stored power to selected loads either automatically or manually. (CMP-13) ~~Informational Note: Optional standby systems are typically installed to provide an alternate source of electric power for such facilities as industrial and commercial buildings, farms, and residences and to serve loads such as heating and refrigeration systems, data processing and communications systems, and industrial processes that, when stopped during any power outage, could cause discomfort, serious interruption of the process, damage to the product or process, or the like.~~	4.1.1 Redundant Informational Note The Correlating Committee directs the panel to reconsider the definition, regarding the need for the informational note. This Informational Note is presently located in the Scope of Article 702.	CN 434 Submitted PC 1355 Requested changes made.
Stored-Energy Power Supply System (SEPSS). ~~This definition shall apply within this article and throughout the code.~~ A complete functioning EPSS powered by a stored-energy electrical source. (CMP-13)	The Correlating Committee directs the panel to review the definition of Stored-Energy Power Supply System for compliance with the NEC Style Manual. The definition should follow the NEC Style Manual 2.2.2, recommendations for denoting the application of definitions by removing the first sentence.	CN 435 Submitted PC 1366 Requested changes made.
DC System, Reference-Grounded (Reference-Grounded DC System). A system that is not solidly grounded but has a low-resistance electrical reference that maintains voltage to ground in normal operation. (712) (CMP-13)	Task Group 6 Diversion Charge Controller (13), Grounded, Functionally (4) and Referenced-Grounded 2.2.2.4 Multiple Terms	No action taken. Per a discussion with Chad Kennedy this definition is being handled by task group 6.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Diversion Charge Controller. Equipment that regulates the charging process of an ESS by diverting power from energy storage to direct-current or alternating-current loads or to an interconnected utility service. (706) (CMP-13)	Task Group 6 Diversion Charge Controller, Grounded, Functionally 2.2.2.4 Multiple Terms	No action taken. Per a discussion with Chad Kennedy this definition is being handled by task group 6.
Grounded, Functionally (Functionally Grounded). A system that has an electrical ground reference for operational purposes that is not solidly grounded. (712) (CMP-13) Informational Note: Examples of operational reasons for functionally grounded systems include ground-fault detection and performance-related issues for some power sources.	Task Group 6 Diversion Charge Controller (13), Grounded, Functionally (4) and Referenced-Grounded 2.2.2.4 Multiple Terms	No action taken. Per a discussion with Chad Kennedy this definition is being handled by task group 6.
Critical Operations Areas, Designated ({~~{~~Designated Critical Operations Areas) (DCOA)~~}~~. Areas within a facility or site designated as requiring critical operations power. (CMP-13)	The term modifier to be in parentheses and then the acronym in parentheses.	PC 1368 Requested changes made.
DC System, Grounded Three-Wire, ~~Grounded~~ (Grounded Three-Wire DC System). A system with a solid connection or reference-ground between the center point of a bipolar dc power source and the equipment grounding system. (712) (CMP-13)	2.2.2.3 Base Term Group with DC System, Grounded Three-Wire	PC 1369 Requested changes made.
DC System, Grounded Two-Wire, ~~Grounded~~ (Grounded Two-Wire DC System). A system that has a solid connection or reference-ground between one of the current-carrying conductors and the equipment grounding system. (712) (CMP-13)	2.2.2.3 Base Term Group with DC System, Grounded Two-Wire	PC 1370 Requested changes made.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
DC System, Ungrounded (Ungrounded DC System). A system that has no direct or resistive connection between the current-carrying conductors and the equipment grounding system. (712) (CMP-13)	2.2.2.3 Base Term Group with DC System, Ungrounded	No action taken. Looks to be correct as is.
Emergency Luminaire, Battery- Equipped (Battery- Equipped Emergency Luminaire). A luminaire with a rechargeable battery, a battery charging means, and an automatic load control relay. ~~(700) (701)~~ (CMP-13)	2.2.2.3.2 Article Number (Can't have two)	PC 1372 Requested changes made.
Emergency Power Supply System (EPSS). ~~This definition shall apply within this article and throughout the code.~~ A complete functioning EPS system coupled to a system of conductors, disconnecting means and overcurrent protective devices, transfer switches, and all control, supervisory, and support devices up to and including the load terminals of the transfer equipment needed for the system to operate as a safe and reliable source of electric power. [110:3.3.4] (CMP-13)	2.2.2 Delete the first sentence	PC 1373 Requested changes made.
Emergency **Luminaire,** ~~**Emergency**~~**, Directly Controlled (Directly Controlled Emergency Luminaire).** A luminaire supplied by the facility emergency power system and with a control input for dimming or switching that provides an emergency illumination level upon loss of normal power. (700) (CMP-13) Informational Note: See ANSI/UL 924, Emergency Lighting and Power Equipment, for information covering directly controlled emergency luminaires.	2.2.2.3 Base Term Group By Emergency Luminaire	PC 1374 Requested changes made.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Microgrid, Direct Current ~~[~~(Direct Current Microgrid) (DC Microgrid)~~]~~. A direct current microgrid is a power distribution system consisting of more than one interconnected dc power source, supplying dc-dc converter(s), dc load(s), and/or ac load(s) powered by dc-ac inverter(s). ~~A dc microgrid is typically not directly connected to an ac primary source of electricity, but some dc microgrids interconnect via one or more dc-ac bidirectional converters or dc-ac inverters.~~ (712) (CMP-13) Informational Note No. 1: Direct current power sources include ac-dc converters (rectifiers), bidirectional dc-ac inverters/converters, photovoltaic systems, wind generators, energy storage systems (including batteries), and fuel cells. Informational Note No. 2: A DC Microgrid is typically not directly connected to an ac primary source of electricity, but some dc microgrids interconnect via one or more dc-ac bidirectional converters or dc-ac inverters.	2.2.2.5 Alternate Term Title has 2 sets of Paren. Definition last sentence should be an Informational Note	PC 1927 Requested changes made.
Voltage, Nominal ~~Voltage~~ (Nominal Voltage) (as applied to battery or cell). The value assigned to a cell or battery of a given voltage class for the purpose of convenient designation. The operating voltage of the cell or battery may vary above or below this value. (CMP-13) Informational Note: The most common nominal cell voltages are 2 volts per cell for the lead-acid batteries, 1.2 volts per cell for alkali batteries, and 3.2 to 3.8 volts per cell for Li-ion batteries. Nominal voltages might vary with different chemistries.	2.2.2.3 Base Term Group by Voltage, Nominal (Nominal Voltage) (as applied…. Retained)	CN 446 PC 1375 Requested changes made.
Primary ~~DC~~ Source, DC (Primary DC Source). A source that supplies the majority of the dc load in a dc microgrid. (712) (CMP-13)	2.2.2.3 Base Term Group by Primary Source 2.2.2.5 Alternate Term (Primary DC Source)	PC 1376 Requested changes made.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Supervisory Control and Data Acquisition (SCADA). An electronic system that provides monitoring and controls for the operation of the critical operations power system. Informational Note: This can include the fire alarm system, security system, control of the HVAC, the start/stop/monitoring of the power supplies and electrical distribution system, annunciation and communications equipment to emergency personnel, facility occupants, and remote operators. (CMP-13)	The second sentence should be an Informational Note	PC 1378 Requested changes made.
~~the power supplies and electrical distribution system, annunciation and communications equipment to emergency personnel, facility occupants, and remote operators. (CMP-13)~~		
Transfer Switch, Bypass Isolation (Bypass Isolation Transfer Switch). A manual, nonautomatic, or automatic operated device used in conjunction with a transfer switch to provide a means of directly connecting load conductors to a power source and of disconnecting the transfer switch. (CMP-13)	2.2.2.3.1 Searchability 2.2.2.3 Base Term Transfer Switch, Bypass Isolation (Bypass Isolation Transfer Switch)	PC 1380 Requested changes made.
Transfer Switch, Meter-Mounted ~~Transfer~~. (Meter-Mounted Transfer Switch). A transfer switch connected between the utility meter and the meter base or fabricated as part of the meter base. (CMP-13) Informational Note: Meter-mounted transfer switches can plug into the meter base or be fabricated as part of the meter base. Transfer switches that incorporate the meter base in the transfer equipment assembly are not considered meter-mounted transfer switches.	2.2.2.3 Base Term Transfer Switch, Meter-Mounted	PC 1381 Requested changes made.
Transfer Switch~~, Transfer~~. An automatic or nonautomatic device for transferring one or more load conductor connections from one power source to another. (CMP-13)	2.2.2.3 Base Term Transfer Switch	PC 1379 Requested changes made.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Voltage, Nominal (Nominal Voltage). A value assigned to a circuit or system for the purpose of conveniently designating its dc voltage class. (712) (CMP-13) Informational Note: The actual voltage at which a circuit operates can vary from the nominal voltage within a range that permits satisfactory operation of equipment.	2.2.2.4 Multiple Terms Nominal Voltage	No action taken. Correct as is. Multiple terms are being used to describe 2 different things. Article 712 definition is limited to dc.

Public Comment No. 1466-NFPA 70-2021 [Definition: Primary DC Source.]

~~**Primary DC Source.**~~

~~A source that supplies the majority of the dc load in a dc microgrid. (712) (CMP-13)~~

Statement of Problem and Substantiation for Public Comment

This definition is deleted in keeping with the request of this task group by the Correlating Committee (CCN-306) to “consider removing the definition of “DC Microgrid” and Article 712 based on the review of requirements in Article 705.” Since this term was limited to Article 712 it is deleted. It is the determination of this task group that the deletion of this, and other related terms moved from 712.2 in the first revision, and the requested action to deleted article 712 in the referenced FR, will not adversely impact users of this Code. It is the opinion of this task group that this action will in fact, improve the usability of this document by removing terms and requirements that conflict with other terms and requirements related to microgrids that are globally applied throughout this Code, other common regulatory documents, as well as other standards.
This task group carefully reviewed these terms to ensure their deletion would not cause confusion or gaps elsewhere in the Code. Article 705, and related definitions, contain the general requirements that apply to all microgrid installations.

This public comment is submitted on behalf of the task group formed under the direction of the Correlating Committee to review all current and proposed definitions and requirements related to microgrids to ensure a clear, consistent, and coordinated approach to addressing this topic throughout the Code.
The task group members are; Jason Fisher Chair, Brenton Michael Fedele, Ted Smith, Isaac Opalinsky, Pete Jackson, Jason Hopkins, John Kovacik, Steven Froemming, Krista Biason, Greg Ball, Chad Beebe, and Matthew Dozier. Through these individual's technical committee memberships, and their balanced interests, this task group provided the expertise to develop these public comments covering microgrids across the NEC.

This public comment is part of a series of actions recommended by the task group. See the related public comments which complete this action.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 1443-NFPA 70-2021 [Article 712]	Deletion of article 712

Related Item

• FR-9192

Submitter Information Verification

Submitter Full Name: Jason Fisher
Organization:
Affiliation: CC Second Draft Microgrid Task Group
Street Address:
City:
State:
Zip:
Submittal Date: Fri Aug 13 17:32:56 EDT 2021
Committee: NEC-P13

Public Comment No. 1366-NFPA 70-2021 [Definition: Stored-Energy Power Supply System (SEPSS).]

Stored-Energy Power Supply System (SEPSS).

~~This definition shall apply within this article and throughout the code.~~ A complete functioning EPSS powered by a stored-energy electrical source. (CMP-13)

Additional Proposed Changes

File Name	Description	Approved
CMP-13_definition_TG_summary_8-18.pdf	CMP-13 Definition TG summary	

Statement of Problem and Substantiation for Public Comment

First sentence is unnecessary as all definitions apply throughout the code unless indicated. Reference NEC style manual clause 2.2.2. This public comment is being submitted on behalf of a task group formed of CMP-13 members; Herb Daugherty, Jeff Jonas, Chad Kennedy, Linda Little and Charles Picard to address the NEC correlating committee comments related to the definitions under the purview of CMP-13.

Related Item

• CN435

Submitter Information Verification

Submitter Full Name: Jeff Jonas
Organization: Generac Power Systems, Inc.
Street Address:
City:
State:
Zip:
Submittal Date: Thu Aug 12 12:40:11 EDT 2021
Committee: NEC-P13

Correlating Committee Definitions Task Group
CMP-13 - Definitions
(prepared by Jeff Jonas, August 18, 2021)

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
	The Correlating Committee directs the Chair of CMP-13 to assign a task group to review all the definitions under their purview for compliance with the NEC Style Manual and to review definitions identified by the Correlating Committee that may contain correlation issues. The attachment includes a list of those definitions identified that need to be reviewed.	
Diversion Load Controller. Equipment that regulates the output of a wind generator by diverting power from the generator to dc or ac loads or to an interconnected utility service. (CMP-4)	The Correlating Committee assigns the definition of Diversion Load Controller to CMP-13. Code-Making Panel 13 should review and compare this definition with the Diversion Charge Controller definition and consider using the same term for consistency.	No action taken. Will be reviewed by task group 6 with "Diversion Charge Controller".
Inverter Utilization Output Circuit. Conductors between the multimode or stand-alone inverter and utilization equipment. (706) (CMP-13)	The Correlating Committee directs the panel to review the definition of Inverter Utilization Output Circuit and consider correlation with the definition of Power Source Output Circuit.	No action taken. More discussion required in the interconnection task group and the next code cycle.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Normal/Emergency Power Source. A power source on the output side of a transfer switch or uninterruptible power supply that is automatically available upon loss of normal power. (700) (CMP-13).	The Correlating Committee directs that this definition title be reviewed for its use within the article. The term "normal/emergency power source" is not used in Article 700. The term "normal/emergency source" is used in 700.23.	Submitted PC 1367 Change code language to include "power" after "Normal/ Emergency" in 700.23 to match the definition.
Optional Standby Systems. Those systems intended to supply power to public or private facilities or property where life safety does not depend on the performance of the system. These systems are intended to supply on-site generated or stored power to selected loads either automatically or manually. (CMP-13) ~~Informational Note: Optional standby systems are typically installed to provide an alternate source of electric power for such facilities as industrial and commercial buildings, farms, and residences and to serve loads such as heating and refrigeration systems, data processing and communications systems, and industrial processes that, when stopped during any power outage, could cause discomfort, serious interruption of the process, damage to the product or process, or the like.~~	4.1.1 Redundant Informational Note The Correlating Committee directs the panel to reconsider the definition, regarding the need for the informational note. This Informational Note is presently located in the Scope of Article 702.	CN 434 Submitted PC 1355 Requested changes made.
Stored-Energy Power Supply System (SEPSS). ~~This definition shall apply within this article and throughout the code.~~ A complete functioning EPSS powered by a stored-energy electrical source. (CMP-13)	The Correlating Committee directs the panel to review the definition of Stored-Energy Power Supply System for compliance with the NEC Style Manual. The definition should follow the NEC Style Manual 2.2.2, recommendations for denoting the application of definitions by removing the first sentence.	CN 435 Submitted PC 1366 Requested changes made.
DC System, Reference-Grounded (Reference-Grounded DC System). A system that is not solidly grounded but has a low-resistance electrical reference that maintains voltage to ground in normal operation. (712) (CMP-13)	Task Group 6 Diversion Charge Controller (13), Grounded, Functionally (4) and Referenced-Grounded 2.2.2.4 Multiple Terms	No action taken. Per a discussion with Chad Kennedy this definition is being handled by task group 6.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Diversion Charge Controller. Equipment that regulates the charging process of an ESS by diverting power from energy storage to direct-current or alternating-current loads or to an interconnected utility service. (706) (CMP-13)	Task Group 6 Diversion Charge Controller, Grounded, Functionally 2.2.2.4 Multiple Terms	No action taken. Per a discussion with Chad Kennedy this definition is being handled by task group 6.
Grounded, Functionally (Functionally Grounded). A system that has an electrical ground reference for operational purposes that is not solidly grounded. (712) (CMP-13) Informational Note: Examples of operational reasons for functionally grounded systems include ground-fault detection and performance-related issues for some power sources.	Task Group 6 Diversion Charge Controller (13), Grounded, Functionally (4) and Referenced-Grounded 2.2.2.4 Multiple Terms	No action taken. Per a discussion with Chad Kennedy this definition is being handled by task group 6.
Critical Operations Areas, Designated ({~~{~~Designated Critical Operations Areas) (DCOA)~~}~~. Areas within a facility or site designated as requiring critical operations power. (CMP-13)	The term modifier to be in parentheses and then the acronym in parentheses.	PC 1368 Requested changes made.
DC System, Grounded Three-Wire, ~~Grounded~~ (Grounded Three-Wire DC System). A system with a solid connection or reference-ground between the center point of a bipolar dc power source and the equipment grounding system. (712) (CMP-13)	2.2.2.3 Base Term Group with DC System, Grounded Three-Wire	PC 1369 Requested changes made.
DC System, Grounded Two-Wire, ~~Grounded~~ (Grounded Two-Wire DC System). A system that has a solid connection or reference-ground between one of the current-carrying conductors and the equipment grounding system. (712) (CMP-13)	2.2.2.3 Base Term Group with DC System, Grounded Two-Wire	PC 1370 Requested changes made.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
DC System, Ungrounded (Ungrounded DC System). A system that has no direct or resistive connection between the current-carrying conductors and the equipment grounding system. (712) (CMP-13)	2.2.2.3 Base Term Group with DC System, Ungrounded	No action taken. Looks to be correct as is.
Emergency Luminaire, Battery- Equipped (Battery- Equipped Emergency Luminaire). A luminaire with a rechargeable battery, a battery charging means, and an automatic load control relay. ~~(700) (701)~~ (CMP-13)	2.2.2.3.2 Article Number (Can't have two)	PC 1372 Requested changes made.
Emergency Power Supply System (EPSS). ~~This definition shall apply within this article and throughout the code.~~ A complete functioning EPS system coupled to a system of conductors, disconnecting means and overcurrent protective devices, transfer switches, and all control, supervisory, and support devices up to and including the load terminals of the transfer equipment needed for the system to operate as a safe and reliable source of electric power. [110:3.3.4] (CMP-13)	2.2.2 Delete the first sentence	PC 1373 Requested changes made.
Emergency **Luminaire,** ~~**Emergency**~~**, Directly Controlled (Directly Controlled Emergency Luminaire).** A luminaire supplied by the facility emergency power system and with a control input for dimming or switching that provides an emergency illumination level upon loss of normal power. (700) (CMP-13) Informational Note: See ANSI/UL 924, Emergency Lighting and Power Equipment, for information covering directly controlled emergency luminaires.	2.2.2.3 Base Term Group By Emergency Luminaire	PC 1374 Requested changes made.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Microgrid, Direct Current ~~[~~(Direct Current Microgrid) (DC Microgrid)~~]~~. A direct current microgrid is a power distribution system consisting of more than one interconnected dc power source, supplying dc-dc converter(s), dc load(s), and/or ac load(s) powered by dc-ac inverter(s). ~~A dc microgrid is typically not directly connected to an ac primary source of electricity, but some dc microgrids interconnect via one or more dc-ac bidirectional converters or dc-ac inverters.~~ (712) (CMP-13) Informational Note No. 1: Direct current power sources include ac-dc converters (rectifiers), bidirectional dc-ac inverters/converters, photovoltaic systems, wind generators, energy storage systems (including batteries), and fuel cells. Informational Note No. 2: A DC Microgrid is typically not directly connected to an ac primary source of electricity, but some dc microgrids interconnect via one or more dc-ac bidirectional converters or dc-ac inverters.	2.2.2.5 Alternate Term Title has 2 sets of Paren. Definition last sentence should be an Informational Note	PC 1927 Requested changes made.
Voltage, Nominal ~~Voltage~~ (Nominal Voltage) (as applied to battery or cell). The value assigned to a cell or battery of a given voltage class for the purpose of convenient designation. The operating voltage of the cell or battery may vary above or below this value. (CMP-13) Informational Note: The most common nominal cell voltages are 2 volts per cell for the lead-acid batteries, 1.2 volts per cell for alkali batteries, and 3.2 to 3.8 volts per cell for Li-ion batteries. Nominal voltages might vary with different chemistries.	2.2.2.3 Base Term Group by Voltage, Nominal (Nominal Voltage) (as applied…. Retained)	CN 446 PC 1375 Requested changes made.
Primary ~~DC~~ Source, DC (Primary DC Source). A source that supplies the majority of the dc load in a dc microgrid. (712) (CMP-13)	2.2.2.3 Base Term Group by Primary Source 2.2.2.5 Alternate Term (Primary DC Source)	PC 1376 Requested changes made.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Supervisory Control and Data Acquisition (SCADA). An electronic system that provides monitoring and controls for the operation of the critical operations power system. Informational Note: This can include the fire alarm system, security system, control of the HVAC, the start/stop/monitoring of the power supplies and electrical distribution system, annunciation and communications equipment to emergency personnel, facility occupants, and remote operators. (CMP-13)	The second sentence should be an Informational Note	PC 1378 Requested changes made.
~~the power supplies and electrical distribution system, annunciation and communications equipment to emergency personnel, facility occupants, and remote operators. (CMP-13)~~		
Transfer Switch, Bypass Isolation (Bypass Isolation Transfer Switch). A manual, nonautomatic, or automatic operated device used in conjunction with a transfer switch to provide a means of directly connecting load conductors to a power source and of disconnecting the transfer switch. (CMP-13)	2.2.2.3.1 Searchability 2.2.2.3 Base Term Transfer Switch, Bypass Isolation (Bypass Isolation Transfer Switch)	PC 1380 Requested changes made.
Transfer Switch, Meter-Mounted ~~Transfer~~. (Meter-Mounted Transfer Switch). A transfer switch connected between the utility meter and the meter base or fabricated as part of the meter base. (CMP-13) Informational Note: Meter-mounted transfer switches can plug into the meter base or be fabricated as part of the meter base. Transfer switches that incorporate the meter base in the transfer equipment assembly are not considered meter-mounted transfer switches.	2.2.2.3 Base Term Transfer Switch, Meter-Mounted	PC 1381 Requested changes made.
Transfer Switch~~, Transfer~~. An automatic or nonautomatic device for transferring one or more load conductor connections from one power source to another. (CMP-13)	2.2.2.3 Base Term Transfer Switch	PC 1379 Requested changes made.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Voltage, Nominal (Nominal Voltage). A value assigned to a circuit or system for the purpose of conveniently designating its dc voltage class. (712) (CMP-13) Informational Note: The actual voltage at which a circuit operates can vary from the nominal voltage within a range that permits satisfactory operation of equipment.	2.2.2.4 Multiple Terms Nominal Voltage	No action taken. Correct as is. Multiple terms are being used to describe 2 different things. Article 712 definition is limited to dc.

Public Comment No. 1988-NFPA 70-2021 [Definition: Stored-Energy Power Supply System (SEPSS).]

Stored-Energy Power Supply System (SEPSS).

This definition shall apply within this article and throughout the code. A complete functioning EPSS powered by a stored-energy electrical source. (CMP-13)

Additional Proposed Changes

File Name	Description	Approved
CN_435.pdf	70_CN435	

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 435 appeared in the First Draft Report on First Revision No. 9619.

The Correlating Committee directs the panel to review the definition of Stored-Energy Power Supply System for compliance with the NEC Style Manual. The definition should follow the NEC Style Manual 2.2.2, recommendations for denoting the application of definitions by removing the first sentence.

Related Item

• First Revision No. 9619

Submitter Information Verification

Submitter Full Name: CC on NEC-AAC
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:
Submittal Date: Wed Aug 18 21:36:42 EDT 2021
Committee: NEC-P13

Correlating Committee Note No. 435-NFPA 70-2021 [Definition: Stored-Energy Power Supply System (SEPSS).]

Submitter Information Verification

Committee: NEC-AAC
Submittal Date: Sun May 09 22:26:31 EDT 2021

Committee Statement

Committee Statement: The Correlating Committee directs the panel to review the definition of Stored-Energy Power Supply System for compliance with the NEC Style Manual. The definition should follow the NEC Style Manual 2.2.2, recommendations for denoting the application of definitions by removing the first sentence.

First Revision No. 9619-NFPA 70-2021 [Detail]

Ballot Results

This item has passed ballot

12 Eligible Voters
0 Not Returned
12 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Affirmative All

Ayer, Lawrence S.
Gallo, Ernest J.
Hickman, Palmer L.
Holub, Richard A.
Hunter, Dean C.
Johnston, Michael J.
Kendall, David H.
Kovacik, John R.
Manche, Alan
McDaniel, Roger D.
Porter, Christine T.
Williams, David A.

Public Comment No. 1378-NFPA 70-2021 [Definition: Supervisory Control and Data Acquisition (SCADA...]

Supervisory Control and Data Acquisition (SCADA).

An electronic system that provides monitoring and controls for the operation of the critical operations power system.

Informational Note: This can include the fire alarm system, security system, control of the HVAC, the start/stop/monitoring of the power supplies and electrical distribution system, annunciation and communications equipment to emergency personnel, facility occupants, and remote operators. (CMP-13)

Additional Proposed Changes

File Name	Description	Approved
CMP-13_definition_TG_summary_8-18.pdf	CMP-13 Definition TG summary	

Statement of Problem and Substantiation for Public Comment

The last sentence is referring to a typical application and should be an Informational Note.
This public comment is being submitted on behalf of a task group formed of CMP-13 members; Herb Daugherty, Jeff Jonas, Chad Kennedy, Linda Little and Charles Picard to address the NEC correlating committee comments related to the definitions under the purview of CMP-13.

Related Item

- FR-9192

Submitter Information Verification

Submitter Full Name: Jeff Jonas
Organization: Generac Power Systems, Inc.
Street Address:
City:
State:
Zip:
Submittal Date: Thu Aug 12 12:58:27 EDT 2021
Committee: NEC-P13

Correlating Committee Definitions Task Group
CMP-13 - Definitions
(prepared by Jeff Jonas, August 18, 2021)

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
	The Correlating Committee directs the Chair of CMP-13 to assign a task group to review all the definitions under their purview for compliance with the NEC Style Manual and to review definitions identified by the Correlating Committee that may contain correlation issues. The attachment includes a list of those definitions identified that need to be reviewed.	
Diversion Load Controller. Equipment that regulates the output of a wind generator by diverting power from the generator to dc or ac loads or to an interconnected utility service. (CMP-4)	The Correlating Committee assigns the definition of Diversion Load Controller to CMP-13. Code-Making Panel 13 should review and compare this definition with the Diversion Charge Controller definition and consider using the same term for consistency.	No action taken. Will be reviewed by task group 6 with "Diversion Charge Controller".
Inverter Utilization Output Circuit. Conductors between the multimode or stand-alone inverter and utilization equipment. (706) (CMP-13)	The Correlating Committee directs the panel to review the definition of Inverter Utilization Output Circuit and consider correlation with the definition of Power Source Output Circuit.	No action taken. More discussion required in the interconnection task group and the next code cycle.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Normal/Emergency Power Source. A power source on the output side of a transfer switch or uninterruptible power supply that is automatically available upon loss of normal power. (700) (CMP-13).	The Correlating Committee directs that this definition title be reviewed for its use within the article. The term "normal/emergency power source" is not used in Article 700. The term "normal/emergency source" is used in 700.23.	Submitted PC 1367 Change code language to include "power" after "Normal/ Emergency" in 700.23 to match the definition.
Optional Standby Systems. Those systems intended to supply power to public or private facilities or property where life safety does not depend on the performance of the system. These systems are intended to supply on-site generated or stored power to selected loads either automatically or manually. (CMP-13) ~~Informational Note: Optional standby systems are typically installed to provide an alternate source of electric power for such facilities as industrial and commercial buildings, farms, and residences and to serve loads such as heating and refrigeration systems, data processing and communications systems, and industrial processes that, when stopped during any power outage, could cause discomfort, serious interruption of the process, damage to the product or process, or the like.~~	4.1.1 Redundant Informational Note The Correlating Committee directs the panel to reconsider the definition, regarding the need for the informational note. This Informational Note is presently located in the Scope of Article 702.	CN 434 Submitted PC 1355 Requested changes made.
Stored-Energy Power Supply System (SEPSS). ~~This definition shall apply within this article and throughout the code.~~ A complete functioning EPSS powered by a stored-energy electrical source. (CMP-13)	The Correlating Committee directs the panel to review the definition of Stored-Energy Power Supply System for compliance with the NEC Style Manual. The definition should follow the NEC Style Manual 2.2.2, recommendations for denoting the application of definitions by removing the first sentence.	CN 435 Submitted PC 1366 Requested changes made.
DC System, Reference-Grounded (Reference-Grounded DC System). A system that is not solidly grounded but has a low-resistance electrical reference that maintains voltage to ground in normal operation. (712) (CMP-13)	Task Group 6 Diversion Charge Controller (13), Grounded, Functionally (4) and Referenced-Grounded 2.2.2.4 Multiple Terms	No action taken. Per a discussion with Chad Kennedy this definition is being handled by task group 6.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Diversion Charge Controller. Equipment that regulates the charging process of an ESS by diverting power from energy storage to direct-current or alternating-current loads or to an interconnected utility service. (706) (CMP-13)	Task Group 6 Diversion Charge Controller, Grounded, Functionally 2.2.2.4 Multiple Terms	No action taken. Per a discussion with Chad Kennedy this definition is being handled by task group 6.
Grounded, Functionally (Functionally Grounded). A system that has an electrical ground reference for operational purposes that is not solidly grounded. (712) (CMP-13) Informational Note: Examples of operational reasons for functionally grounded systems include ground-fault detection and performance-related issues for some power sources.	Task Group 6 Diversion Charge Controller (13), Grounded, Functionally (4) and Referenced-Grounded 2.2.2.4 Multiple Terms	No action taken. Per a discussion with Chad Kennedy this definition is being handled by task group 6.
Critical Operations Areas, Designated ({~~{~~Designated Critical Operations Areas) (DCOA)~~}~~. Areas within a facility or site designated as requiring critical operations power. (CMP-13)	The term modifier to be in parentheses and then the acronym in parentheses.	PC 1368 Requested changes made.
DC System, Grounded Three-Wire, ~~Grounded~~ (Grounded Three-Wire DC System). A system with a solid connection or reference-ground between the center point of a bipolar dc power source and the equipment grounding system. (712) (CMP-13)	2.2.2.3 Base Term Group with DC System, Grounded Three-Wire	PC 1369 Requested changes made.
DC System, Grounded Two-Wire, ~~Grounded~~ (Grounded Two-Wire DC System). A system that has a solid connection or reference-ground between one of the current-carrying conductors and the equipment grounding system. (712) (CMP-13)	2.2.2.3 Base Term Group with DC System, Grounded Two-Wire	PC 1370 Requested changes made.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
DC System, Ungrounded (Ungrounded DC System). A system that has no direct or resistive connection between the current-carrying conductors and the equipment grounding system. (712) (CMP-13)	2.2.2.3 Base Term Group with DC System, Ungrounded	No action taken. Looks to be correct as is.
Emergency Luminaire, Battery- Equipped (Battery- Equipped Emergency Luminaire). A luminaire with a rechargeable battery, a battery charging means, and an automatic load control relay. ~~(700) (701)~~ (CMP-13)	2.2.2.3.2 Article Number (Can't have two)	PC 1372 Requested changes made.
Emergency Power Supply System (EPSS). ~~This definition shall apply within this article and throughout the code.~~ A complete functioning EPS system coupled to a system of conductors, disconnecting means and overcurrent protective devices, transfer switches, and all control, supervisory, and support devices up to and including the load terminals of the transfer equipment needed for the system to operate as a safe and reliable source of electric power. [110:3.3.4] (CMP-13)	2.2.2 Delete the first sentence	PC 1373 Requested changes made.
Emergency **Luminaire,** ~~**Emergency**~~**, Directly Controlled (Directly Controlled Emergency Luminaire).** A luminaire supplied by the facility emergency power system and with a control input for dimming or switching that provides an emergency illumination level upon loss of normal power. (700) (CMP-13) Informational Note: See ANSI/UL 924, Emergency Lighting and Power Equipment, for information covering directly controlled emergency luminaires.	2.2.2.3 Base Term Group By Emergency Luminaire	PC 1374 Requested changes made.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Microgrid, Direct Current ~~[~~(Direct Current Microgrid) (DC Microgrid)~~]~~. A direct current microgrid is a power distribution system consisting of more than one interconnected dc power source, supplying dc-dc converter(s), dc load(s), and/or ac load(s) powered by dc-ac inverter(s). ~~A dc microgrid is typically not directly connected to an ac primary source of electricity, but some dc microgrids interconnect via one or more dc-ac bidirectional converters or dc-ac inverters.~~ (712) (CMP-13) Informational Note No. 1: Direct current power sources include ac-dc converters (rectifiers), bidirectional dc-ac inverters/converters, photovoltaic systems, wind generators, energy storage systems (including batteries), and fuel cells. Informational Note No. 2: A DC Microgrid is typically not directly connected to an ac primary source of electricity, but some dc microgrids interconnect via one or more dc-ac bidirectional converters or dc-ac inverters.	2.2.2.5 Alternate Term Title has 2 sets of Paren. Definition last sentence should be an Informational Note	PC 1927 Requested changes made.
Voltage, Nominal ~~Voltage~~ (Nominal Voltage) (as applied to battery or cell). The value assigned to a cell or battery of a given voltage class for the purpose of convenient designation. The operating voltage of the cell or battery may vary above or below this value. (CMP-13) Informational Note: The most common nominal cell voltages are 2 volts per cell for the lead-acid batteries, 1.2 volts per cell for alkali batteries, and 3.2 to 3.8 volts per cell for Li-ion batteries. Nominal voltages might vary with different chemistries.	2.2.2.3 Base Term Group by Voltage, Nominal (Nominal Voltage) (as applied…. Retained)	CN 446 PC 1375 Requested changes made.
Primary ~~DC~~ Source, DC (Primary DC Source). A source that supplies the majority of the dc load in a dc microgrid. (712) (CMP-13)	2.2.2.3 Base Term Group by Primary Source 2.2.2.5 Alternate Term (Primary DC Source)	PC 1376 Requested changes made.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Supervisory Control and Data Acquisition (SCADA). An electronic system that provides monitoring and controls for the operation of the critical operations power system. Informational Note: This can include the fire alarm system, security system, control of the HVAC, the start/stop/monitoring of the power supplies and electrical distribution system, annunciation and communications equipment to emergency personnel, facility occupants, and remote operators. (CMP-13)	The second sentence should be an Informational Note	PC 1378 Requested changes made.
~~the power supplies and electrical distribution system, annunciation and communications equipment to emergency personnel, facility occupants, and remote operators. (CMP-13)~~		
Transfer Switch, Bypass Isolation (Bypass Isolation Transfer Switch). A manual, nonautomatic, or automatic operated device used in conjunction with a transfer switch to provide a means of directly connecting load conductors to a power source and of disconnecting the transfer switch. (CMP-13)	2.2.2.3.1 Searchability 2.2.2.3 Base Term Transfer Switch, Bypass Isolation (Bypass Isolation Transfer Switch)	PC 1380 Requested changes made.
Transfer Switch, Meter-Mounted ~~Transfer~~. (Meter-Mounted Transfer Switch). A transfer switch connected between the utility meter and the meter base or fabricated as part of the meter base. (CMP-13) Informational Note: Meter-mounted transfer switches can plug into the meter base or be fabricated as part of the meter base. Transfer switches that incorporate the meter base in the transfer equipment assembly are not considered meter-mounted transfer switches.	2.2.2.3 Base Term Transfer Switch, Meter-Mounted	PC 1381 Requested changes made.
Transfer Switch~~, Transfer~~. An automatic or nonautomatic device for transferring one or more load conductor connections from one power source to another. (CMP-13)	2.2.2.3 Base Term Transfer Switch	PC 1379 Requested changes made.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Voltage, Nominal (Nominal Voltage). A value assigned to a circuit or system for the purpose of conveniently designating its dc voltage class. (712) (CMP-13) Informational Note: The actual voltage at which a circuit operates can vary from the nominal voltage within a range that permits satisfactory operation of equipment.	2.2.2.4 Multiple Terms Nominal Voltage	No action taken. Correct as is. Multiple terms are being used to describe 2 different things. Article 712 definition is limited to dc.

Public Comment No. 1380-NFPA 70-2021 [Definition: Switch, Bypass Isolation.]

Transfer Switch, Bypass Isolation. (Bypass Isolation Transfer Switch)

A manual, nonautomatic, or automatic operated device used in conjunction with a transfer switch to provide a means of directly connecting load conductors to a power source and of disconnecting the transfer switch. (CMP-13)

Additional Proposed Changes

File Name	Description	Approved
CMP-13_definition_TG_summary_8-18.pdf	CMP-13 Definition TG summary	

Statement of Problem and Substantiation for Public Comment

This change is needed to improve the grouping of like terms in the definition section, article 100.
This public comment is being submitted on behalf of a task group formed of CMP-13 members; Herb Daugherty, Jeff Jonas, Chad Kennedy, Linda Little and Charles Picard to address the NEC correlating committee comments related to the definitions under the purview of CMP-13.

Related Item

• CCN362

Submitter Information Verification

Submitter Full Name: Jeff Jonas
Organization: Generac Power Systems, Inc.
Street Address:
City:
State:
Zip:
Submittal Date: Thu Aug 12 13:01:37 EDT 2021
Committee: NEC-P13

Correlating Committee Definitions Task Group
CMP-13 - Definitions
(prepared by Jeff Jonas, August 18, 2021)

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
	The Correlating Committee directs the Chair of CMP-13 to assign a task group to review all the definitions under their purview for compliance with the NEC Style Manual and to review definitions identified by the Correlating Committee that may contain correlation issues. The attachment includes a list of those definitions identified that need to be reviewed.	
Diversion Load Controller. Equipment that regulates the output of a wind generator by diverting power from the generator to dc or ac loads or to an interconnected utility service. (CMP-4)	The Correlating Committee assigns the definition of Diversion Load Controller to CMP-13. Code-Making Panel 13 should review and compare this definition with the Diversion Charge Controller definition and consider using the same term for consistency.	No action taken. Will be reviewed by task group 6 with "Diversion Charge Controller".
Inverter Utilization Output Circuit. Conductors between the multimode or stand-alone inverter and utilization equipment. (706) (CMP-13)	The Correlating Committee directs the panel to review the definition of Inverter Utilization Output Circuit and consider correlation with the definition of Power Source Output Circuit.	No action taken. More discussion required in the interconnection task group and the next code cycle.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Normal/Emergency Power Source. A power source on the output side of a transfer switch or uninterruptible power supply that is automatically available upon loss of normal power. (700) (CMP-13).	The Correlating Committee directs that this definition title be reviewed for its use within the article. The term "normal/emergency power source" is not used in Article 700. The term "normal/emergency source" is used in 700.23.	Submitted PC 1367 Change code language to include "power" after "Normal/ Emergency" in 700.23 to match the definition.
Optional Standby Systems. Those systems intended to supply power to public or private facilities or property where life safety does not depend on the performance of the system. These systems are intended to supply on-site generated or stored power to selected loads either automatically or manually. (CMP-13) ~~Informational Note: Optional standby systems are typically installed to provide an alternate source of electric power for such facilities as industrial and commercial buildings, farms, and residences and to serve loads such as heating and refrigeration systems, data processing and communications systems, and industrial processes that, when stopped during any power outage, could cause discomfort, serious interruption of the process, damage to the product or process, or the like.~~	4.1.1 Redundant Informational Note The Correlating Committee directs the panel to reconsider the definition, regarding the need for the informational note. This Informational Note is presently located in the Scope of Article 702.	CN 434 Submitted PC 1355 Requested changes made.
Stored-Energy Power Supply System (SEPSS). ~~This definition shall apply within this article and throughout the code.~~ A complete functioning EPSS powered by a stored-energy electrical source. (CMP-13)	The Correlating Committee directs the panel to review the definition of Stored-Energy Power Supply System for compliance with the NEC Style Manual. The definition should follow the NEC Style Manual 2.2.2, recommendations for denoting the application of definitions by removing the first sentence.	CN 435 Submitted PC 1366 Requested changes made.
DC System, Reference-Grounded (Reference-Grounded DC System). A system that is not solidly grounded but has a low-resistance electrical reference that maintains voltage to ground in normal operation. (712) (CMP-13)	Task Group 6 Diversion Charge Controller (13), Grounded, Functionally (4) and Referenced-Grounded 2.2.2.4 Multiple Terms	No action taken. Per a discussion with Chad Kennedy this definition is being handled by task group 6.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Diversion Charge Controller. Equipment that regulates the charging process of an ESS by diverting power from energy storage to direct-current or alternating-current loads or to an interconnected utility service. (706) (CMP-13)	Task Group 6 Diversion Charge Controller, Grounded, Functionally 2.2.2.4 Multiple Terms	No action taken. Per a discussion with Chad Kennedy this definition is being handled by task group 6.
Grounded, Functionally (Functionally Grounded). A system that has an electrical ground reference for operational purposes that is not solidly grounded. (712) (CMP-13) Informational Note: Examples of operational reasons for functionally grounded systems include ground-fault detection and performance-related issues for some power sources.	Task Group 6 Diversion Charge Controller (13), Grounded, Functionally (4) and Referenced-Grounded 2.2.2.4 Multiple Terms	No action taken. Per a discussion with Chad Kennedy this definition is being handled by task group 6.
Critical Operations Areas, Designated ({~~{~~Designated Critical Operations Areas) (DCOA)~~}~~. Areas within a facility or site designated as requiring critical operations power. (CMP-13)	The term modifier to be in parentheses and then the acronym in parentheses.	PC 1368 Requested changes made.
DC System, Grounded Three-Wire, ~~Grounded~~ (Grounded Three-Wire DC System). A system with a solid connection or reference-ground between the center point of a bipolar dc power source and the equipment grounding system. (712) (CMP-13)	2.2.2.3 Base Term Group with DC System, Grounded Three-Wire	PC 1369 Requested changes made.
DC System, Grounded Two-Wire, ~~Grounded~~ (Grounded Two-Wire DC System). A system that has a solid connection or reference-ground between one of the current-carrying conductors and the equipment grounding system. (712) (CMP-13)	2.2.2.3 Base Term Group with DC System, Grounded Two-Wire	PC 1370 Requested changes made.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
DC System, Ungrounded (Ungrounded DC System). A system that has no direct or resistive connection between the current-carrying conductors and the equipment grounding system. (712) (CMP-13)	2.2.2.3 Base Term Group with DC System, Ungrounded	No action taken. Looks to be correct as is.
Emergency Luminaire, Battery- Equipped (Battery- Equipped Emergency Luminaire). A luminaire with a rechargeable battery, a battery charging means, and an automatic load control relay. ~~(700) (701)~~ (CMP-13)	2.2.2.3.2 Article Number (Can't have two)	PC 1372 Requested changes made.
Emergency Power Supply System (EPSS). ~~This definition shall apply within this article and throughout the code.~~ A complete functioning EPS system coupled to a system of conductors, disconnecting means and overcurrent protective devices, transfer switches, and all control, supervisory, and support devices up to and including the load terminals of the transfer equipment needed for the system to operate as a safe and reliable source of electric power. [110:3.3.4] (CMP-13)	2.2.2 Delete the first sentence	PC 1373 Requested changes made.
Emergency **Luminaire,** ~~**Emergency**~~**, Directly Controlled (Directly Controlled Emergency Luminaire).** A luminaire supplied by the facility emergency power system and with a control input for dimming or switching that provides an emergency illumination level upon loss of normal power. (700) (CMP-13) Informational Note: See ANSI/UL 924, Emergency Lighting and Power Equipment, for information covering directly controlled emergency luminaires.	2.2.2.3 Base Term Group By Emergency Luminaire	PC 1374 Requested changes made.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Microgrid, Direct Current ~~[~~(Direct Current Microgrid) (DC Microgrid)~~]~~. A direct current microgrid is a power distribution system consisting of more than one interconnected dc power source, supplying dc-dc converter(s), dc load(s), and/or ac load(s) powered by dc-ac inverter(s). ~~A dc microgrid is typically not directly connected to an ac primary source of electricity, but some dc microgrids interconnect via one or more dc-ac bidirectional converters or dc-ac inverters.~~ (712) (CMP-13) Informational Note No. 1: Direct current power sources include ac-dc converters (rectifiers), bidirectional dc-ac inverters/converters, photovoltaic systems, wind generators, energy storage systems (including batteries), and fuel cells. Informational Note No. 2: A DC Microgrid is typically not directly connected to an ac primary source of electricity, but some dc microgrids interconnect via one or more dc-ac bidirectional converters or dc-ac inverters.	2.2.2.5 Alternate Term Title has 2 sets of Paren. Definition last sentence should be an Informational Note	PC 1927 Requested changes made.
Voltage, Nominal ~~Voltage~~ (Nominal Voltage) (as applied to battery or cell). The value assigned to a cell or battery of a given voltage class for the purpose of convenient designation. The operating voltage of the cell or battery may vary above or below this value. (CMP-13) Informational Note: The most common nominal cell voltages are 2 volts per cell for the lead-acid batteries, 1.2 volts per cell for alkali batteries, and 3.2 to 3.8 volts per cell for Li-ion batteries. Nominal voltages might vary with different chemistries.	2.2.2.3 Base Term Group by Voltage, Nominal (Nominal Voltage) (as applied…. Retained)	CN 446 PC 1375 Requested changes made.
Primary ~~DC~~ Source, DC (Primary DC Source). A source that supplies the majority of the dc load in a dc microgrid. (712) (CMP-13)	2.2.2.3 Base Term Group by Primary Source 2.2.2.5 Alternate Term (Primary DC Source)	PC 1376 Requested changes made.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Supervisory Control and Data Acquisition (SCADA). An electronic system that provides monitoring and controls for the operation of the critical operations power system. Informational Note: This can include the fire alarm system, security system, control of the HVAC, the start/stop/monitoring of the power supplies and electrical distribution system, annunciation and communications equipment to emergency personnel, facility occupants, and remote operators. (CMP-13)	The second sentence should be an Informational Note	PC 1378 Requested changes made.
~~the power supplies and electrical distribution system, annunciation and communications equipment to emergency personnel, facility occupants, and remote operators. (CMP-13)~~		
Transfer Switch, Bypass Isolation (Bypass Isolation Transfer Switch). A manual, nonautomatic, or automatic operated device used in conjunction with a transfer switch to provide a means of directly connecting load conductors to a power source and of disconnecting the transfer switch. (CMP-13)	2.2.2.3.1 Searchability 2.2.2.3 Base Term Transfer Switch, Bypass Isolation (Bypass Isolation Transfer Switch)	PC 1380 Requested changes made.
Transfer Switch, Meter-Mounted ~~Transfer~~. (Meter-Mounted Transfer Switch). A transfer switch connected between the utility meter and the meter base or fabricated as part of the meter base. (CMP-13) Informational Note: Meter-mounted transfer switches can plug into the meter base or be fabricated as part of the meter base. Transfer switches that incorporate the meter base in the transfer equipment assembly are not considered meter-mounted transfer switches.	2.2.2.3 Base Term Transfer Switch, Meter-Mounted	PC 1381 Requested changes made.
Transfer Switch~~, Transfer~~. An automatic or nonautomatic device for transferring one or more load conductor connections from one power source to another. (CMP-13)	2.2.2.3 Base Term Transfer Switch	PC 1379 Requested changes made.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Voltage, Nominal (Nominal Voltage). A value assigned to a circuit or system for the purpose of conveniently designating its dc voltage class. (712) (CMP-13) Informational Note: The actual voltage at which a circuit operates can vary from the nominal voltage within a range that permits satisfactory operation of equipment.	2.2.2.4 Multiple Terms Nominal Voltage	No action taken. Correct as is. Multiple terms are being used to describe 2 different things. Article 712 definition is limited to dc.

Public Comment No. 1281-NFPA 70-2021 [Definition: Switch, Meter-Mounted Transfer. (Meter-Mounted ...]

Switch, Meter-Mounted Transfer. (Meter-Mounted Transfer Switch)

A transfer switch connected between the utility meter and the meter base or fabricated as part of the meter base~~. (CMP-13)~~

~~Informational Note: Meter-mounted transfer switches can plug into the meter base or be fabricated as part of the meter base. Transfer switches~~

, not including those that incorporate the meter base in the transfer equipment

~~assembly are not considered meter-mounted transfer switches.~~

. (CMP-13)

Statement of Problem and Substantiation for Public Comment

This editorial revision deletes the first sentence of the information note as it tells me nothing that the definition didn't already state. The note also seems to expand the definition through exclusion, so why not have it as part of the definition?

Related Item

• FR 9128

Submitter Information Verification

Submitter Full Name: Ryan Jackson
Organization: Ryan Jackson
Street Address:
City:
State:
Zip:
Submittal Date: Wed Aug 11 15:31:07 EDT 2021
Committee: NEC-P13

Public Comment No. 1381-NFPA 70-2021 [Definition: Switch, Meter-Mounted Transfer. (Meter-Mounted ...]

Transfer Switch, Meter-Mounted ~~Transfer~~ . (Meter-Mounted Transfer Switch)

A transfer switch connected between the utility meter and the meter base or fabricated as part of the meter base. (CMP-13)

Informational Note: Meter-mounted transfer switches can plug into the meter base or be fabricated as part of the meter base. Transfer switches that incorporate the meter base in the transfer equipment assembly are not considered meter-mounted transfer switches.

Additional Proposed Changes

File Name	Description	Approved
CMP-13_definition_TG_summary_8-18.pdf	CMP-13 Definition TG summary	

Statement of Problem and Substantiation for Public Comment

This change is needed to improve the grouping of like terms in the definition section, article 100.
This public comment is being submitted on behalf of a task group formed of CMP-13 members; Herb Daugherty, Jeff Jonas, Chad Kennedy, Linda Little and Charles Picard to address the NEC correlating committee comments related to the definitions under the purview of CMP-13.

Related Item

• FR9128

Submitter Information Verification

Submitter Full Name: Jeff Jonas
Organization: Generac Power Systems, Inc.
Street Address:
City:
State:
Zip:
Submittal Date: Thu Aug 12 13:02:40 EDT 2021
Committee: NEC-P13

Correlating Committee Definitions Task Group
CMP-13 - Definitions
(prepared by Jeff Jonas, August 18, 2021)

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
	The Correlating Committee directs the Chair of CMP-13 to assign a task group to review all the definitions under their purview for compliance with the NEC Style Manual and to review definitions identified by the Correlating Committee that may contain correlation issues. The attachment includes a list of those definitions identified that need to be reviewed.	
Diversion Load Controller. Equipment that regulates the output of a wind generator by diverting power from the generator to dc or ac loads or to an interconnected utility service. (CMP-4)	The Correlating Committee assigns the definition of Diversion Load Controller to CMP-13. Code-Making Panel 13 should review and compare this definition with the Diversion Charge Controller definition and consider using the same term for consistency.	No action taken. Will be reviewed by task group 6 with "Diversion Charge Controller".
Inverter Utilization Output Circuit. Conductors between the multimode or stand-alone inverter and utilization equipment. (706) (CMP-13)	The Correlating Committee directs the panel to review the definition of Inverter Utilization Output Circuit and consider correlation with the definition of Power Source Output Circuit.	No action taken. More discussion required in the interconnection task group and the next code cycle.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Normal/Emergency Power Source. A power source on the output side of a transfer switch or uninterruptible power supply that is automatically available upon loss of normal power. (700) (CMP-13).	The Correlating Committee directs that this definition title be reviewed for its use within the article. The term "normal/emergency power source" is not used in Article 700. The term "normal/emergency source" is used in 700.23.	Submitted PC 1367 Change code language to include "power" after "Normal/ Emergency" in 700.23 to match the definition.
Optional Standby Systems. Those systems intended to supply power to public or private facilities or property where life safety does not depend on the performance of the system. These systems are intended to supply on-site generated or stored power to selected loads either automatically or manually. (CMP-13) ~~Informational Note: Optional standby systems are typically installed to provide an alternate source of electric power for such facilities as industrial and commercial buildings, farms, and residences and to serve loads such as heating and refrigeration systems, data processing and communications systems, and industrial processes that, when stopped during any power outage, could cause discomfort, serious interruption of the process, damage to the product or process, or the like.~~	4.1.1 Redundant Informational Note The Correlating Committee directs the panel to reconsider the definition, regarding the need for the informational note. This Informational Note is presently located in the Scope of Article 702.	CN 434 Submitted PC 1355 Requested changes made.
Stored-Energy Power Supply System (SEPSS). ~~This definition shall apply within this article and throughout the code.~~ A complete functioning EPSS powered by a stored-energy electrical source. (CMP-13)	The Correlating Committee directs the panel to review the definition of Stored-Energy Power Supply System for compliance with the NEC Style Manual. The definition should follow the NEC Style Manual 2.2.2, recommendations for denoting the application of definitions by removing the first sentence.	CN 435 Submitted PC 1366 Requested changes made.
DC System, Reference-Grounded (Reference-Grounded DC System). A system that is not solidly grounded but has a low-resistance electrical reference that maintains voltage to ground in normal operation. (712) (CMP-13)	Task Group 6 Diversion Charge Controller (13), Grounded, Functionally (4) and Referenced-Grounded 2.2.2.4 Multiple Terms	No action taken. Per a discussion with Chad Kennedy this definition is being handled by task group 6.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Diversion Charge Controller. Equipment that regulates the charging process of an ESS by diverting power from energy storage to direct-current or alternating-current loads or to an interconnected utility service. (706) (CMP-13)	Task Group 6 Diversion Charge Controller, Grounded, Functionally 2.2.2.4 Multiple Terms	No action taken. Per a discussion with Chad Kennedy this definition is being handled by task group 6.
Grounded, Functionally (Functionally Grounded). A system that has an electrical ground reference for operational purposes that is not solidly grounded. (712) (CMP-13) Informational Note: Examples of operational reasons for functionally grounded systems include ground-fault detection and performance-related issues for some power sources.	Task Group 6 Diversion Charge Controller (13), Grounded, Functionally (4) and Referenced-Grounded 2.2.2.4 Multiple Terms	No action taken. Per a discussion with Chad Kennedy this definition is being handled by task group 6.
Critical Operations Areas, Designated ({~~{~~Designated Critical Operations Areas) (DCOA)~~}~~. Areas within a facility or site designated as requiring critical operations power. (CMP-13)	The term modifier to be in parentheses and then the acronym in parentheses.	PC 1368 Requested changes made.
DC System, Grounded Three-Wire, ~~Grounded~~ (Grounded Three-Wire DC System). A system with a solid connection or reference-ground between the center point of a bipolar dc power source and the equipment grounding system. (712) (CMP-13)	2.2.2.3 Base Term Group with DC System, Grounded Three-Wire	PC 1369 Requested changes made.
DC System, Grounded Two-Wire, ~~Grounded~~ (Grounded Two-Wire DC System). A system that has a solid connection or reference-ground between one of the current-carrying conductors and the equipment grounding system. (712) (CMP-13)	2.2.2.3 Base Term Group with DC System, Grounded Two-Wire	PC 1370 Requested changes made.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
DC System, Ungrounded (Ungrounded DC System). A system that has no direct or resistive connection between the current-carrying conductors and the equipment grounding system. (712) (CMP-13)	2.2.2.3 Base Term Group with DC System, Ungrounded	No action taken. Looks to be correct as is.
Emergency Luminaire, Battery- Equipped (Battery- Equipped Emergency Luminaire). A luminaire with a rechargeable battery, a battery charging means, and an automatic load control relay. ~~(700) (701)~~ (CMP-13)	2.2.2.3.2 Article Number (Can't have two)	PC 1372 Requested changes made.
Emergency Power Supply System (EPSS). ~~This definition shall apply within this article and throughout the code.~~ A complete functioning EPS system coupled to a system of conductors, disconnecting means and overcurrent protective devices, transfer switches, and all control, supervisory, and support devices up to and including the load terminals of the transfer equipment needed for the system to operate as a safe and reliable source of electric power. [110:3.3.4] (CMP-13)	2.2.2 Delete the first sentence	PC 1373 Requested changes made.
Emergency **Luminaire,** ~~**Emergency**~~**, Directly Controlled (Directly Controlled Emergency Luminaire).** A luminaire supplied by the facility emergency power system and with a control input for dimming or switching that provides an emergency illumination level upon loss of normal power. (700) (CMP-13) Informational Note: See ANSI/UL 924, Emergency Lighting and Power Equipment, for information covering directly controlled emergency luminaires.	2.2.2.3 Base Term Group By Emergency Luminaire	PC 1374 Requested changes made.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Microgrid, Direct Current ~~[~~(Direct Current Microgrid) (DC Microgrid)~~]~~. A direct current microgrid is a power distribution system consisting of more than one interconnected dc power source, supplying dc-dc converter(s), dc load(s), and/or ac load(s) powered by dc-ac inverter(s). ~~A dc microgrid is typically not directly connected to an ac primary source of electricity, but some dc microgrids interconnect via one or more dc-ac bidirectional converters or dc-ac inverters.~~ (712) (CMP-13) Informational Note No. 1: Direct current power sources include ac-dc converters (rectifiers), bidirectional dc-ac inverters/converters, photovoltaic systems, wind generators, energy storage systems (including batteries), and fuel cells. Informational Note No. 2: A DC Microgrid is typically not directly connected to an ac primary source of electricity, but some dc microgrids interconnect via one or more dc-ac bidirectional converters or dc-ac inverters.	2.2.2.5 Alternate Term Title has 2 sets of Paren. Definition last sentence should be an Informational Note	PC 1927 Requested changes made.
Voltage, Nominal ~~Voltage~~ (Nominal Voltage) (as applied to battery or cell). The value assigned to a cell or battery of a given voltage class for the purpose of convenient designation. The operating voltage of the cell or battery may vary above or below this value. (CMP-13) Informational Note: The most common nominal cell voltages are 2 volts per cell for the lead-acid batteries, 1.2 volts per cell for alkali batteries, and 3.2 to 3.8 volts per cell for Li-ion batteries. Nominal voltages might vary with different chemistries.	2.2.2.3 Base Term Group by Voltage, Nominal (Nominal Voltage) (as applied…. Retained)	CN 446 PC 1375 Requested changes made.
Primary ~~DC~~ Source, DC (Primary DC Source). A source that supplies the majority of the dc load in a dc microgrid. (712) (CMP-13)	2.2.2.3 Base Term Group by Primary Source 2.2.2.5 Alternate Term (Primary DC Source)	PC 1376 Requested changes made.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Supervisory Control and Data Acquisition (SCADA). An electronic system that provides monitoring and controls for the operation of the critical operations power system. Informational Note: This can include the fire alarm system, security system, control of the HVAC, the start/stop/monitoring of the power supplies and electrical distribution system, annunciation and communications equipment to emergency personnel, facility occupants, and remote operators. (CMP-13)	The second sentence should be an Informational Note	PC 1378 Requested changes made.
~~the power supplies and electrical distribution system, annunciation and communications equipment to emergency personnel, facility occupants, and remote operators. (CMP-13)~~		
Transfer Switch, Bypass Isolation (Bypass Isolation Transfer Switch). A manual, nonautomatic, or automatic operated device used in conjunction with a transfer switch to provide a means of directly connecting load conductors to a power source and of disconnecting the transfer switch. (CMP-13)	2.2.2.3.1 Searchability 2.2.2.3 Base Term Transfer Switch, Bypass Isolation (Bypass Isolation Transfer Switch)	PC 1380 Requested changes made.
Transfer Switch, Meter-Mounted ~~Transfer~~. (Meter-Mounted Transfer Switch). A transfer switch connected between the utility meter and the meter base or fabricated as part of the meter base. (CMP-13) Informational Note: Meter-mounted transfer switches can plug into the meter base or be fabricated as part of the meter base. Transfer switches that incorporate the meter base in the transfer equipment assembly are not considered meter-mounted transfer switches.	2.2.2.3 Base Term Transfer Switch, Meter-Mounted	PC 1381 Requested changes made.
Transfer Switch~~, Transfer~~. An automatic or nonautomatic device for transferring one or more load conductor connections from one power source to another. (CMP-13)	2.2.2.3 Base Term Transfer Switch	PC 1379 Requested changes made.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Voltage, Nominal (Nominal Voltage). A value assigned to a circuit or system for the purpose of conveniently designating its dc voltage class. (712) (CMP-13) Informational Note: The actual voltage at which a circuit operates can vary from the nominal voltage within a range that permits satisfactory operation of equipment.	2.2.2.4 Multiple Terms Nominal Voltage	No action taken. Correct as is. Multiple terms are being used to describe 2 different things. Article 712 definition is limited to dc.

Public Comment No. 2134-NFPA 70-2021 [Definition: Switch, Meter-Mounted Transfer. (Meter-Mounted ...]

Switch, Meter-Mounted Transfer. (Meter-Mounted Transfer Switch)

A transfer switch connected between the utility meter and the meter base~~, or fabricated as part of the meter base~~ . (CMP-13)

Informational Note: Meter-mounted transfer switches can plug into the meter base~~, or be fabricated as part of the meter base~~ . Transfer switches that incorporate the meter base in the transfer equipment assembly are not considered meter-mounted transfer switches.

Statement of Problem and Substantiation for Public Comment

Meter mounted transfer switches are not provided as a part of the meter base. Rather they are physically located between the meter and the meter socket. This change will add clarity to this definition and avoid unnecessary confusion when applying the code requirements.

Related Item

• FR-9128

Submitter Information Verification

Submitter Full Name: Jeff Jonas
Organization: Generac Power Systems, Inc.
Street Address:
City:
State:
Zip:
Submittal Date: Thu Aug 19 13:31:24 EDT 2021
Committee: NEC-P13

Public Comment No. 33-NFPA 70-2021 [Definition: Switch, Meter-Mounted Transfer. (Meter-Mounted ...]

Switch, Meter-Mounted Transfer. (Meter-Mounted Transfer Switch)

A transfer switch ~~connected~~ incorporated within a collar or similar enclosure and installed between the utility meter and the existing meter base ~~or fabricated as part of the meter base~~ . (CMP-13)

Informational Note No 1 : Meter-mounted transfer switches can plug into the meter base or be fabricated as part of the meter base. Transfer switches that incorporate the meter base in the transfer equipment assembly are not considered meter-mounted transfer switches.

Informational Note No 2 : Meter-mounted transfer switches differ in construction from meter socket enclosures that incorporate the transfer switch within the overall assembly.

Additional Proposed Changes

File Name	Description	Approved
Integrated_ATS_LoadCenter_STRAIGHT_No_Meter_.jpg	Picture of UL 1008 listed Meter, main, ATS, panelboard	
IntegratedMeter_ATS_LoadCenter_STRAIGHT_OPEN1.jpg	Picture of UL 1008 Listed meter, main, ATS, panelboard with covers off	
RXGUW200A3_Meter_Main_Panel_Spec.pdf	Spec Sheet	
RXUW200A3_RXUW150A3_Meter_Main_Spec.pdf	Spec sheet for meter main ATS without the panelboard	
Meter_mounted_ATS.jpg	Example of a meter mounted transfer switch	
MMTS_Install_Diagram.pdf	diagram explaining the the PC language for Meter-mounted transfer switches	

Statement of Problem and Substantiation for Public Comment

The first revision definition is confusing and does not provide clarity to the code. There are commercially available meter mounted transfer switches that are listed to UL 1008M and transfer switches that included the meter socket enclosure within the overall assembly that are listed to Annex N in the 8th Edition of UL 1008. The FD definition blurs the line between these different types of transfer equipment. There needs to be clear delineation in the code between a meter mounted transfer switch and a transfer switch the contains a meter base.

Related Item

• FR 9128

Submitter Information Verification

Submitter Full Name: Brian Baughman
Organization: Generac Power Systems Inc.
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 30 08:45:46 EDT 2021
Committee: NEC-P13


GENERAC


UTILITY
SERVICE
DISCONNECT
ON
OFF
200A

GENERAC®

Automatic
Transfer Switches

Integrated Meter Transfer Switch with Load Center Service Entrance Rated

200 Amps, Single Phase
RXGUW200A3



Description

The RXGUW integrated meter transfer switch with load center combines the automatic transfer switch, the meter socket, and a 42-circuit load center, saving installation time and labor. The all-in-one design meets NEC® emergency disconnect requirements and reduces overall clutter on the home's exterior for a cleaner, more appealing aesthetic.

The open transition type transfer switch is designed for use with single phase generators using an Evolution™ or Nexus™ controller in optional standby applications. A 4 jaw meter socket, ringless type cover, and horn bypass come standard. Optional accessories, such as ring type covers and 5th jaws, are available to meet local requirements.

The RXGUW transfer switches are housed in an aluminum NEMA/ETL Type 3R enclosure suitable for either outdoor or indoor installation. The Heavy Duty Generac Contactor is an ETL recognized device, designed for years of service. All switches are covered by a 5 year limited warranty.

Intelligent Load Management

Each switch comes standard with a Smart A/C Management module (SACM) to manage up to 4 individual HVAC (24 VAC controlled) loads with no additional hardware. When used in tandem with Smart Management Modules (SMM), up to 8 loads can be managed, providing the most installation efficient power management options available.

GENERAC®

200 Amps, Single Phase — Integrated Meter Transfer Switch with Load Center

Functions

All timing and sensing functions originate in the generator controller.

Utility Voltage Drop-out	<65%
Timer to Generator Start	10 Second Factory Set, Adjustable Between 2 - 1,500 Seconds by a Qualified Dealer*
Engine Warmup Delay	5 Seconds
Standby Voltage Sensor	65% for 5 Seconds
Utility Voltage Pickup	>80%
Re-transfer Time Delay	15 Seconds
Engine Cooldown Timer	60 Seconds
Exerciser	Nexus™: 12 Minutes Weekly Evolution™: 5 to 12 Minutes Adjustable, Weekly/Bi-weekly/Monthly
The Transfer Switch can be Operated Manually Without Power Applied	

* When used in conjunction with units utilizing Evolution™ controls

Specifications

Model	**RXGUW200A3**
Amps	200
Voltage	120/240, 1ø
Load Transition Type (Automatic)	Open Transition Service Rated
Enclosure Type	NEMA 3R
ETL Rating	ETL
Withstand Rating (Amps)	22,000
Lug Range	350 MCM - #6



Accessories

Accessory	Description
G0074010 Ring Style Meter Cover	Replacement outer top cover and sealing ring for ring style meter retainment. Verify you have the proper type to meet local code requirements.
G0074020 Fifth Jaw Metering Kit	Includes all pieces necessary to perform conversion of the standard Four Jaw Meter Socket into a Five Jaw Meter Socket. Verify you have the proper type to meet local code requirements.

GENERAC®

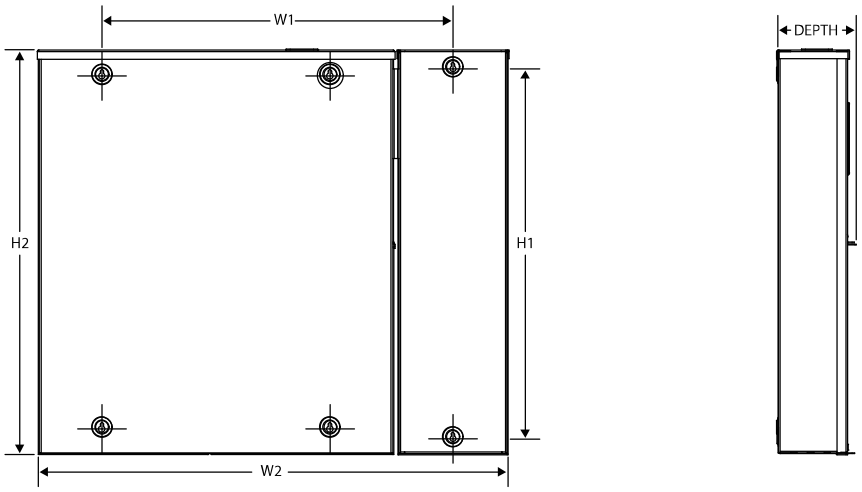
200 Amps, Single Phase

Integrated Meter Transfer Switch with Load Center

Dimensions

Model		RXGUW200A3
Height - in (cm)	H1	37.8 (96.0)
	H2	42.5 (107.9)
Width - in (cm)	W1	32.6 (82.8)
	W2	43.4 (110.2)
Depth - in (cm)		7.3 (18.5)
Weight - lbs (kg)		49.0 (22.2)

Note: Dimensions are for estimation purposes only.



Note: Image shown is backside of unit.

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Automatic
Transfer Switches

Integrated Meter Transfer Switch
Service Entrance Rated



150 - 200 Amps, Single Phase
Model: RXUW150A3
RXUW200A3

*Assembled in the USA using domestic and foreign parts

Description

The RXUW integrated meter transfer switch combines the meter socket and the automatic transfer switch, which saves installation time and labor. The all-in-one design meets NEC emergency disconnect requirements and reduces overall clutter on the home's exterior for a cleaner, more appealing aesthetic.

The open transition type transfer switch is designed for use with single phase generators using an Evolution™ or Nexus™ controller in optional standby applications. A horn bypass, 4 jaw meter socket, and ringless type cover come standard. Optional accessories, such as ring type covers and 5th jaws, are available to meet local requirements.

The RXUW transfer switches are housed in an aluminum NEMA/ETL Type 3R enclosure suitable for either outdoor or indoor installation. The Heavy Duty Generac Contactor is an ETL recognized device, designed for years of service. All switches are covered by a 5 year limited warranty.

Intelligent Load Management

Each switch comes standard with a Smart A/C Management module (SACM) to manage up to 4 individual HVAC (24 VAC controlled) loads with no additional hardware. When used in tandem with Smart Management Modules (SMM), up to 8 loads can be managed, providing the most installation efficient power management options available.

GENERAC®

150 - 200 Amps, Single Phase — Integrated Meter Transfer Switch

Functions

All timing and sensing functions originate in the generator controller.

Utility Voltage Drop-out	<65%
Timer to Generator Start	10 Second Factory Set, Adjustable Between 2 - 1,500 Seconds by a Qualified Dealer*
Engine Warmup Delay	5 Seconds
Standby Voltage Sensor	65% for 5 Seconds
Utility Voltage Pickup	>80%
Re-transfer Time Delay	15 Seconds
Engine Cooldown Timer	60 Seconds
Exerciser	Nexus™: 12 Minutes Weekly Evolution™: 5 to 12 Minutes Adjustable, Weekly/Bi-weekly/Monthly
The Transfer Switch can be Operated Manually Without Power Applied	

* When used in conjunction with units utilizing Evolution™ controls

Specifications

Model	**RXUW150A3**	**RXUW200A3**
Amps	150	200
Voltage	120/240, 1ø	120/240, 1ø
Load Transition Type (Automatic)	Open Transition Service Rated	Open Transition Service Rated
Enclosure Type	NEMA 3R	NEMA 3R
ETL Rating	ETL	ETL
Withstand Rating (Amps)	22,000	22,000
Lug Range	350 MCM - #6	350 MCM - #6

Accessories

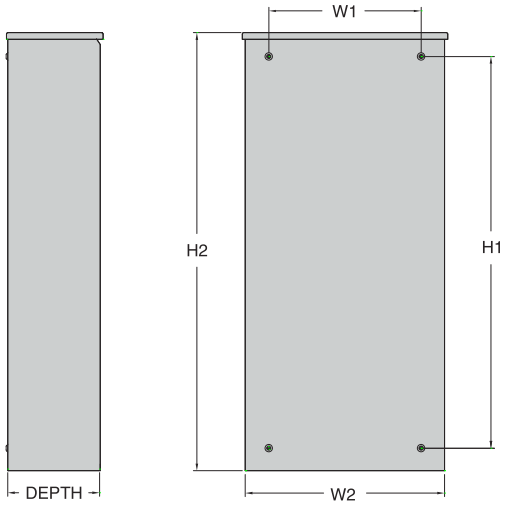
Accessory	**Description**
G0074010 Ring Style Meter Cover	Replacement outer top cover and sealing ring for ring style meter retainment. Verify you have the proper type to meet local code requirements.
G0074020 Fifth Jaw Metering Kit	Includes all pieces necessary to perform conversion of the standard Four Jaw Meter Socket into a Five Jaw Meter Socket. Verify you have the proper type to meet local code requirements.
G0074040 Meter Safety Flash Shield	Safety flash shield for standard and horn bypass type meter jaws. Used with ring-less style meter retainment.
G0074050 Side Connection Lug Kit	Includes all pieces necessary to convert the standard four jaw meter socket into a socket with side lug line connections.
G0074060 24 in. Pedestal Extension Kit	Includes all pieces to extend the transfer switch enclosure by 24 in. for underground service feed.
G0074070 48 in. Pedestal Extension Kit	Includes all pieces to extend the transfer switch enclosure by 48 in. for underground service feed.

150 - 200 Amps, Single Phase

Integrated Meter Transfer Switch

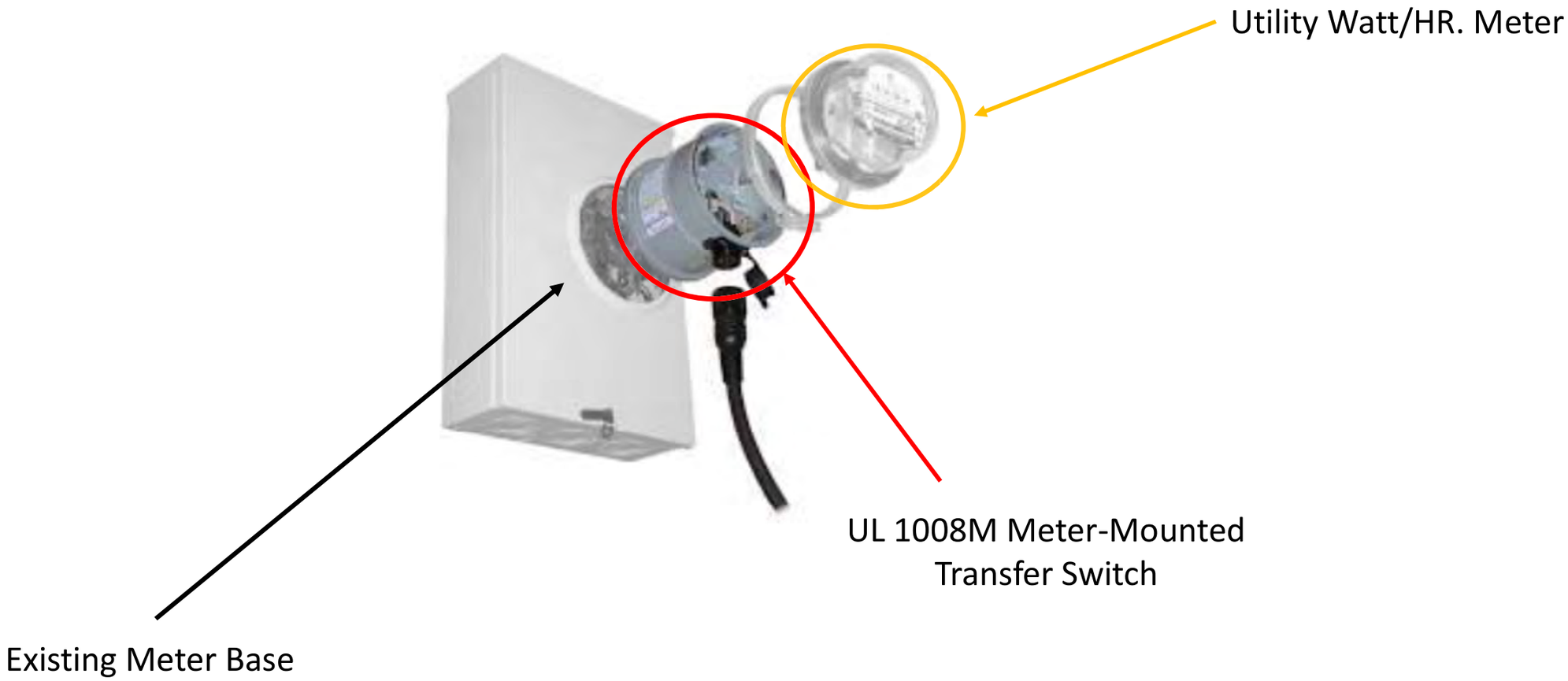
Dimensions

Model		RXUW150A3	RXUW200A3
Height - in (mm)	H1	31.5 (800.0)	31.5 (800.0)
	H2	37.2 (945.8)	37.2 (945.8)
Width - in (mm)	W1	9.1 (230.0)	9.1 (230.0)
	W2	17.0 (438.0)	17.0 (438.0)
Depth - in (mm)		6.3 (162.1)	6.3 (162.1)
Weight - lbs (kg)		49.0 (22.2)	49.0 (22.2)



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Utility Watt/HR. Meter
UL 1008M Meter-Mounted
Transfer Switch
Existing Meter Base

Public Comment No. 1379-NFPA 70-2021 [Definition: Switch, Transfer.]

Transfer Switch, ~~Transfer~~ .

An automatic or nonautomatic device for transferring one or more load conductor connections from one power source to another. (CMP-13)

Additional Proposed Changes

File Name	Description	Approved
CMP-13_definition_TG_summary_8-18.pdf	CMP-13 Definition TG summary	

Statement of Problem and Substantiation for Public Comment

This change is needed to improve the grouping of like terms in the definition section, article 100.
This public comment is being submitted on behalf of a task group formed of CMP-13 members; Herb Daugherty, Jeff Jonas, Chad Kennedy, Linda Little and Charles Picard to address the NEC correlating committee comments related to the definitions under the purview of CMP-13.

Related Item

• CCN362

Submitter Information Verification

Submitter Full Name: Jeff Jonas
Organization: Generac Power Systems, Inc.
Street Address:
City:
State:
Zip:
Submittal Date: Thu Aug 12 13:00:24 EDT 2021
Committee: NEC-P13

Correlating Committee Definitions Task Group
CMP-13 - Definitions
(prepared by Jeff Jonas, August 18, 2021)

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
	The Correlating Committee directs the Chair of CMP-13 to assign a task group to review all the definitions under their purview for compliance with the NEC Style Manual and to review definitions identified by the Correlating Committee that may contain correlation issues. The attachment includes a list of those definitions identified that need to be reviewed.	
Diversion Load Controller. Equipment that regulates the output of a wind generator by diverting power from the generator to dc or ac loads or to an interconnected utility service. (CMP-4)	The Correlating Committee assigns the definition of Diversion Load Controller to CMP-13. Code-Making Panel 13 should review and compare this definition with the Diversion Charge Controller definition and consider using the same term for consistency.	No action taken. Will be reviewed by task group 6 with "Diversion Charge Controller".
Inverter Utilization Output Circuit. Conductors between the multimode or stand-alone inverter and utilization equipment. (706) (CMP-13)	The Correlating Committee directs the panel to review the definition of Inverter Utilization Output Circuit and consider correlation with the definition of Power Source Output Circuit.	No action taken. More discussion required in the interconnection task group and the next code cycle.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Normal/Emergency Power Source. A power source on the output side of a transfer switch or uninterruptible power supply that is automatically available upon loss of normal power. (700) (CMP-13).	The Correlating Committee directs that this definition title be reviewed for its use within the article. The term "normal/emergency power source" is not used in Article 700. The term "normal/emergency source" is used in 700.23.	Submitted PC 1367 Change code language to include "power" after "Normal/ Emergency" in 700.23 to match the definition.
Optional Standby Systems. Those systems intended to supply power to public or private facilities or property where life safety does not depend on the performance of the system. These systems are intended to supply on-site generated or stored power to selected loads either automatically or manually. (CMP-13) ~~Informational Note: Optional standby systems are typically installed to provide an alternate source of electric power for such facilities as industrial and commercial buildings, farms, and residences and to serve loads such as heating and refrigeration systems, data processing and communications systems, and industrial processes that, when stopped during any power outage, could cause discomfort, serious interruption of the process, damage to the product or process, or the like.~~	4.1.1 Redundant Informational Note The Correlating Committee directs the panel to reconsider the definition, regarding the need for the informational note. This Informational Note is presently located in the Scope of Article 702.	CN 434 Submitted PC 1355 Requested changes made.
Stored-Energy Power Supply System (SEPSS). ~~This definition shall apply within this article and throughout the code.~~ A complete functioning EPSS powered by a stored-energy electrical source. (CMP-13)	The Correlating Committee directs the panel to review the definition of Stored-Energy Power Supply System for compliance with the NEC Style Manual. The definition should follow the NEC Style Manual 2.2.2, recommendations for denoting the application of definitions by removing the first sentence.	CN 435 Submitted PC 1366 Requested changes made.
DC System, Reference-Grounded (Reference-Grounded DC System). A system that is not solidly grounded but has a low-resistance electrical reference that maintains voltage to ground in normal operation. (712) (CMP-13)	Task Group 6 Diversion Charge Controller (13), Grounded, Functionally (4) and Referenced-Grounded 2.2.2.4 Multiple Terms	No action taken. Per a discussion with Chad Kennedy this definition is being handled by task group 6.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Diversion Charge Controller. Equipment that regulates the charging process of an ESS by diverting power from energy storage to direct-current or alternating-current loads or to an interconnected utility service. (706) (CMP-13)	Task Group 6 Diversion Charge Controller, Grounded, Functionally 2.2.2.4 Multiple Terms	No action taken. Per a discussion with Chad Kennedy this definition is being handled by task group 6.
Grounded, Functionally (Functionally Grounded). A system that has an electrical ground reference for operational purposes that is not solidly grounded. (712) (CMP-13) Informational Note: Examples of operational reasons for functionally grounded systems include ground-fault detection and performance-related issues for some power sources.	Task Group 6 Diversion Charge Controller (13), Grounded, Functionally (4) and Referenced-Grounded 2.2.2.4 Multiple Terms	No action taken. Per a discussion with Chad Kennedy this definition is being handled by task group 6.
Critical Operations Areas, Designated ({~~{~~Designated Critical Operations Areas) (DCOA)~~}~~. Areas within a facility or site designated as requiring critical operations power. (CMP-13)	The term modifier to be in parentheses and then the acronym in parentheses.	PC 1368 Requested changes made.
DC System, Grounded Three-Wire, ~~Grounded~~ (Grounded Three-Wire DC System). A system with a solid connection or reference-ground between the center point of a bipolar dc power source and the equipment grounding system. (712) (CMP-13)	2.2.2.3 Base Term Group with DC System, Grounded Three-Wire	PC 1369 Requested changes made.
DC System, Grounded Two-Wire, ~~Grounded~~ (Grounded Two-Wire DC System). A system that has a solid connection or reference-ground between one of the current-carrying conductors and the equipment grounding system. (712) (CMP-13)	2.2.2.3 Base Term Group with DC System, Grounded Two-Wire	PC 1370 Requested changes made.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
DC System, Ungrounded (Ungrounded DC System). A system that has no direct or resistive connection between the current-carrying conductors and the equipment grounding system. (712) (CMP-13)	2.2.2.3 Base Term Group with DC System, Ungrounded	No action taken. Looks to be correct as is.
Emergency Luminaire, Battery- Equipped (Battery- Equipped Emergency Luminaire). A luminaire with a rechargeable battery, a battery charging means, and an automatic load control relay. ~~(700) (701)~~ (CMP-13)	2.2.2.3.2 Article Number (Can't have two)	PC 1372 Requested changes made.
Emergency Power Supply System (EPSS). ~~This definition shall apply within this article and throughout the code.~~ A complete functioning EPS system coupled to a system of conductors, disconnecting means and overcurrent protective devices, transfer switches, and all control, supervisory, and support devices up to and including the load terminals of the transfer equipment needed for the system to operate as a safe and reliable source of electric power. [110:3.3.4] (CMP-13)	2.2.2 Delete the first sentence	PC 1373 Requested changes made.
Emergency **Luminaire,** ~~**Emergency**~~**, Directly Controlled (Directly Controlled Emergency Luminaire).** A luminaire supplied by the facility emergency power system and with a control input for dimming or switching that provides an emergency illumination level upon loss of normal power. (700) (CMP-13) Informational Note: See ANSI/UL 924, Emergency Lighting and Power Equipment, for information covering directly controlled emergency luminaires.	2.2.2.3 Base Term Group By Emergency Luminaire	PC 1374 Requested changes made.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Microgrid, Direct Current ~~[~~(Direct Current Microgrid) (DC Microgrid)~~]~~. A direct current microgrid is a power distribution system consisting of more than one interconnected dc power source, supplying dc-dc converter(s), dc load(s), and/or ac load(s) powered by dc-ac inverter(s). ~~A dc microgrid is typically not directly connected to an ac primary source of electricity, but some dc microgrids interconnect via one or more dc-ac bidirectional converters or dc-ac inverters.~~ (712) (CMP-13) Informational Note No. 1: Direct current power sources include ac-dc converters (rectifiers), bidirectional dc-ac inverters/converters, photovoltaic systems, wind generators, energy storage systems (including batteries), and fuel cells. Informational Note No. 2: A DC Microgrid is typically not directly connected to an ac primary source of electricity, but some dc microgrids interconnect via one or more dc-ac bidirectional converters or dc-ac inverters.	2.2.2.5 Alternate Term Title has 2 sets of Paren. Definition last sentence should be an Informational Note	PC 1927 Requested changes made.
Voltage, Nominal ~~Voltage~~ (Nominal Voltage) (as applied to battery or cell). The value assigned to a cell or battery of a given voltage class for the purpose of convenient designation. The operating voltage of the cell or battery may vary above or below this value. (CMP-13) Informational Note: The most common nominal cell voltages are 2 volts per cell for the lead-acid batteries, 1.2 volts per cell for alkali batteries, and 3.2 to 3.8 volts per cell for Li-ion batteries. Nominal voltages might vary with different chemistries.	2.2.2.3 Base Term Group by Voltage, Nominal (Nominal Voltage) (as applied…. Retained)	CN 446 PC 1375 Requested changes made.
Primary ~~DC~~ Source, DC (Primary DC Source). A source that supplies the majority of the dc load in a dc microgrid. (712) (CMP-13)	2.2.2.3 Base Term Group by Primary Source 2.2.2.5 Alternate Term (Primary DC Source)	PC 1376 Requested changes made.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Supervisory Control and Data Acquisition (SCADA). An electronic system that provides monitoring and controls for the operation of the critical operations power system. Informational Note: This can include the fire alarm system, security system, control of the HVAC, the start/stop/monitoring of the power supplies and electrical distribution system, annunciation and communications equipment to emergency personnel, facility occupants, and remote operators. (CMP-13)	The second sentence should be an Informational Note	PC 1378 Requested changes made.
~~the power supplies and electrical distribution system, annunciation and communications equipment to emergency personnel, facility occupants, and remote operators. (CMP-13)~~		
Transfer Switch, Bypass Isolation (Bypass Isolation Transfer Switch). A manual, nonautomatic, or automatic operated device used in conjunction with a transfer switch to provide a means of directly connecting load conductors to a power source and of disconnecting the transfer switch. (CMP-13)	2.2.2.3.1 Searchability 2.2.2.3 Base Term Transfer Switch, Bypass Isolation (Bypass Isolation Transfer Switch)	PC 1380 Requested changes made.
Transfer Switch, Meter-Mounted ~~Transfer~~. (Meter-Mounted Transfer Switch). A transfer switch connected between the utility meter and the meter base or fabricated as part of the meter base. (CMP-13) Informational Note: Meter-mounted transfer switches can plug into the meter base or be fabricated as part of the meter base. Transfer switches that incorporate the meter base in the transfer equipment assembly are not considered meter-mounted transfer switches.	2.2.2.3 Base Term Transfer Switch, Meter-Mounted	PC 1381 Requested changes made.
Transfer Switch~~, Transfer~~. An automatic or nonautomatic device for transferring one or more load conductor connections from one power source to another. (CMP-13)	2.2.2.3 Base Term Transfer Switch	PC 1379 Requested changes made.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Voltage, Nominal (Nominal Voltage). A value assigned to a circuit or system for the purpose of conveniently designating its dc voltage class. (712) (CMP-13) Informational Note: The actual voltage at which a circuit operates can vary from the nominal voltage within a range that permits satisfactory operation of equipment.	2.2.2.4 Multiple Terms Nominal Voltage	No action taken. Correct as is. Multiple terms are being used to describe 2 different things. Article 712 definition is limited to dc.

Public Comment No. 1282-NFPA 70-2021 [Definition: Voltage, Nominal. (Nominal Voltage)]

~~**Voltage, Nominal. (Nominal Voltage)**~~

~~A value assigned to a circuit or system for the purpose of conveniently designating its dc voltage class. (712) (CMP-13)~~

~~Informational Note: The actual voltage at which a circuit operates can vary from the nominal voltage within a range that permits satisfactory operation of equipment.~~

Statement of Problem and Substantiation for Public Comment

This definition is identical to the global definition that is already in Article 100.

Related Item

• FR 9192

Submitter Information Verification

Submitter Full Name: Ryan Jackson
Organization: Ryan Jackson
Street Address:
City:
State:
Zip:
Submittal Date: Wed Aug 11 15:40:08 EDT 2021
Committee: NEC-P13

Public Comment No. 1465-NFPA 70-2021 [Definition: Voltage, Nominal. (Nominal Voltage)]

~~**Voltage, Nominal. (Nominal Voltage)**~~

~~A value assigned to a circuit or system for the purpose of conveniently designating its dc voltage class. (712) (CMP-13)~~

~~Informational Note: The actual voltage at which a circuit operates can vary from the nominal voltage within a range that permits satisfactory operation of equipment.~~

Statement of Problem and Substantiation for Public Comment

This definition is deleted in keeping with the request of this task group by the Correlating Committee (CCN-306) to “consider removing the definition of “DC Microgrid” and Article 712 based on the review of requirements in Article 705.” Since this term was limited to Article 712 it is deleted. It is the determination of this task group that the deletion of this, and other related terms moved from 712.2 in the first revision, and the requested action to deleted article 712 in the referenced FR, will not adversely impact users of this Code. It is the opinion of this task group that this action will in fact, improve the usability of this document by removing terms and requirements that conflict with other terms and requirements related to microgrids that are globally applied throughout this Code, other common regulatory documents, as well as other standards.
This task group carefully reviewed these terms to ensure their deletion would not cause confusion or gaps elsewhere in the Code. Article 705, and related definitions, contain the general requirements that apply to all microgrid installations.

This public comment is submitted on behalf of the task group formed under the direction of the Correlating Committee to review all current and proposed definitions and requirements related to microgrids to ensure a clear, consistent, and coordinated approach to addressing this topic throughout the Code.
The task group members are; Jason Fisher Chair, Brenton Michael Fedele, Ted Smith, Isaac Opalinsky, Pete Jackson, Jason Hopkins, John Kovacik, Steven Froemming, Krista Biason, Greg Ball, Chad Beebe, and Matthew Dozier. Through these individual's technical committee memberships, and their balanced interests, this task group provided the expertise to develop these public comments covering microgrids across the NEC.

This public comment is part of a series of actions recommended by the task group. See the related public comments which complete this action.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 1443-NFPA 70-2021 [Article 712]	Deletion of article 712

Related Item

• FR-9192

Submitter Information Verification

Submitter Full Name: Jason Fisher
Organization:
Affiliation: CC Second Draft Microgrid Task Group
Street Address:
City:
State:
Zip:
Submittal Date: Fri Aug 13 17:31:07 EDT 2021
Committee: NEC-P13

Public Comment No. 550-NFPA 70-2021 [Definition: Voltage, Nominal. (Nominal Voltage)]

~~**Voltage, Nominal. (Nominal Voltage)**~~

~~A value assigned to a circuit or system for the purpose of conveniently designating its dc voltage class. (712) (CMP-13)~~

~~Informational Note: The actual voltage at which a circuit operates can vary from the nominal voltage within a range that permits satisfactory operation of equipment.~~

Statement of Problem and Substantiation for Public Comment

Definitions Task Group 7, as directed by the Correlating Committee, has reviewed the multiple definitions of "Nominal Voltage" that were presented in the First Draft Report. Deleting this definition assigned to CMP-13 (Article 712), while retaining the global definition assigned to CMP-1 resolves the multiple definitions issue with no alteration of the defined term or of its applicability or usage in the document.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 549-NFPA 70-2021 [Definition: Voltage, Nominal.]	
Public Comment No. 549-NFPA 70-2021 [Definition: Voltage, Nominal.]	

Related Item

• FR 9192

Submitter Information Verification

Submitter Full Name: Chad Kennedy
Organization: Schneider Electric
Street Address:
City:
State:
Zip:
Submittal Date: Fri Jul 30 08:07:19 EDT 2021
Committee: NEC-P13

Public Comment No. 1464-NFPA 70-2021 [Definitions (100): DC System, ... to DC System, ...]

Definitions (100): DC System, ... to DC System, ...

~~**DC System, Reference-Grounded. (Reference-Grounded DC System)**~~

~~A system that is not solidly grounded but has a low-resistance electrical reference that maintains voltage to ground in normal operation. (712) (CMP-13)~~

~~**DC System, Three-Wire, Grounded. (Grounded Three-Wire DC System)**~~

~~A system with a solid connection or reference-ground between the center point of a bipolar dc power source and the equipment grounding system. (712) (CMP-13)~~

~~**DC System, Two-Wire, Grounded. (Grounded Two-Wire DC System)**~~

~~A system that has a solid connection or reference-ground between one of the current-carrying conductors and the equipment grounding system. (712) (CMP-13)~~

~~**DC System, Ungrounded. (Ungrounded DC System)**~~

~~A system that has no direct or resistive connection between the current-carrying conductors and the equipment grounding system. (712) (CMP-13)~~

Statement of Problem and Substantiation for Public Comment

These definitions are deleted in keeping with the request of this task group by the Correlating Committee (CCN-306) to “consider removing the definition of “DC Microgrid” and Article 712 based on the review of requirements in Article 705.” Since these terms were limited to Article 712, they are deleted. It is the determination of this task group that the deletion of these, and other related terms moved from 712.2 in the first revision, and the requested action to deleted article 712 in the referenced FR, will not adversely impact users of this Code. It is the opinion of this task group that this action will in fact, improve the usability of this document by removing terms and requirements that conflict with other terms and requirements related to microgrids that are globally applied throughout this Code, other common regulatory documents, as well as other standards.
This task group carefully reviewed these terms to ensure their deletion would not cause confusion or gaps elsewhere in the Code. Article 705, and related definitions, contain the general requirements that apply to all microgrid installations.

This public comment is submitted on behalf of the task group formed under the direction of the Correlating Committee to review all current and proposed definitions and requirements related to microgrids to ensure a clear, consistent, and coordinated approach to addressing this topic throughout the Code.
The task group members are; Jason Fisher Chair, Brenton Michael Fedele, Ted Smith, Isaac Opalinsky, Pete Jackson, Jason Hopkins, John Kovacik, Steven Froemming, Krista Biason, Greg Ball, Chad Beebe, and Matthew Dozier. Through these individual's technical committee memberships, and their balanced interests, this task group provided the expertise to develop these public comments covering microgrids across the NEC.

This public comment is part of a series of actions recommended by the task group. See the related public comments which complete this action.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 1443-NFPA 70-2021 [Article 712]	Deletion of article 712

Related Item

• FR-9192

Submitter Information Verification

Submitter Full Name: Jason Fisher
Organization:
Affiliation: CC Second Draft Microgrid Task Group
Street Address:
City:
State:
Zip:
Submittal Date: Fri Aug 13 17:26:05 EDT 2021
Committee: NEC-P13

Public Comment No. 1114-NFPA 70-2021 [Section No. 445.4]

445.4 Reconditioned Generators.

The reconditioning of generators shall be in accordance with instructions provided by a generator manufacturer. The generator nameplate shall not be required to be removed. Where a generator is reconditioned it shall be identified as reconditioned and marked in accordance with 110.21(A)(2).

Reconditioned, rewound, or repaired classified (hazardous) generators identified for use in Class I, Division 1 (or Zone 0 or 1) locations shall be listed as reconditioned (or certified as reconditioned).

Informational Note No. 1: See ANSI/EASA AR100-2015, *Recommended Practice for the Repair of Rotating Electrical Apparatus*, for information pertaining to the rewinding and repair of generators.

Informational Note No. 2: See Title 40, Code of Federal Regulations, for emissions nameplate labeling of engine generators subject to Environmental Protection Agency regulations.

Additional Proposed Changes

File Name	Description	Approved
13_CN_253.pdf	13 CN253	

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 253 appeared in the First Draft Report on First Revision No. 8975.

The Correlating Committee directs the panel to reconsider the text in this section to remove redundant requirements in accordance with 4.1.1 of the NEC Style Manual and correlate with FR 8663 and FR 8577.

Related Item

• First Revision No. 8975

Submitter Information Verification

Submitter Full Name: CC on NEC-AAC
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:
Submittal Date: Mon Aug 09 15:37:43 EDT 2021
Committee: NEC-P13

Correlating Committee Note No. 253-NFPA 70-2021 [New Section after 445.1]

Submitter Information Verification

Committee: NEC-P13
Submittal Date: Thu May 06 09:39:12 EDT 2021

Committee Statement

Committee Statement: The Correlating Committee directs the panel to reconsider the text in this section to remove redundant requirements in accordance with 4.1.1 of the NEC Style Manual and correlate with FR 8663 and FR 8577.

The panel should consider deleting the phrase "(or certified as reconditioned)" as it is covered by Article 110.

First Revision No. 8975-NFPA 70-2021 [New Section after 445.1]

Ballot Results

This item has passed ballot

12 Eligible Voters
0 Not Returned
12 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Affirmative All

Ayer, Lawrence S.
Gallo, Ernest J.
Hickman, Palmer L.
Holub, Richard A.
Hunter, Dean C.
Johnston, Michael J.
Kendall, David H.
Kovacik, John R.
Manche, Alan
McDaniel, Roger D.
Porter, Christine T.
Williams, David A.

Public Comment No. 1830-NFPA 70-2021 [Section No. 445.4]

445.4 ~~Reconditioned Generators.~~

~~The reconditioning of generators shall be in accordance with instructions provided by a generator manufacturer. The generator nameplate shall not be required to be removed. Where a generator is reconditioned it shall be identified as reconditioned and marked in accordance with 110.21(A)(2) .~~

~~Reconditioned, rewound, or repaired classified (hazardous) generators identified for use in Class I, Division 1 (or Zone 0 or 1) locations shall be listed as reconditioned (or certified as reconditioned).~~

~~Informational Note No. 1: See ANSI/EASA AR100-2015, *Recommended Practice for the Repair of Rotating Electrical Apparatus* , for information pertaining to the rewinding and repair of generators.~~

~~Informational Note No. 2: See Title 40, Code of Federal Regulations, for emissions nameplate labeling of engine generators subject to Environmental Protection Agency regulations.~~

Statement of Problem and Substantiation for Public Comment

Article 445 is for generators. Per the definition in article 100, this is the machine that converts mechanical energy into electrical energy by means of a prime mover and alternator and/or inverter. It's also called a generator set.

With that in mind, what does "reconditioning" mean for a genset? It's not a normal practice for stationary gensets to be reconditioned, and there are no manufacturer's instructions for doing it. How would you know that a reconditioned genset would be performing exactly like the original genset? How would the certification(s) be maintained on the reconditioned genset? For these reasons we should not have a section in the code for reconditioned generators (or gensets).

Related Item

• FR 8975

Submitter Information Verification

Submitter Full Name: Timothy Windey
Organization: Cummins Power Generation
Street Address:
City:
State:
Zip:
Submittal Date: Wed Aug 18 09:50:36 EDT 2021
Committee: NEC-P13

Public Comment No. 44-NFPA 70-2021 [Section No. 445.4]

445.4 Reconditioned Generators.

The reconditioning of generators shall be in accordance with instructions provided by a generator manufacturer. The generator nameplate shall not be required to be removed. Where a generator is reconditioned it shall be identified as reconditioned and marked in accordance with 110.21(A)(2).

Reconditioned, rewound, or repaired classified (hazardous) generators identified for use in Class I, Division 1 (or Zone 0 or 1) locations shall be listed as reconditioned (or certified as reconditioned).

Informational Note No. 1: See ANSI/EASA AR100-~~2015~~ 2020 , *Recommended Practice for the Repair of Rotating Electrical Apparatus*, for information pertaining to the rewinding and repair of generators.

Informational Note No. 2: See Title 40, Code of Federal Regulations, for emissions nameplate labeling of engine generators subject to Environmental Protection Agency regulations.

Statement of Problem and Substantiation for Public Comment

Editorial. ANSI/EASA AR100-2020 is the current edition of this standard. EASA finalized the ANSI procedure for AR100 and published ANSI/EASA AR100-2020 in 2020.

It is available for download free of charge at the following link:

https://easa.com/DesktopModules/DnnSharp/SearchBoost/FileDownload.ashx?file=1988&sb-bhvr=1

Related Item

• FR 8975

Submitter Information Verification

Submitter Full Name: David Kendall
Organization: ABB Inc.
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 30 10:59:47 EDT 2021
Committee: NEC-P13

Public Comment No. 1477-NFPA 70-2021 [Section No. 445.11]

445.11 Marking.

Each generator shall be provided with a nameplate giving the manufacturer's name, the rated frequency, the number of phases if ac, the rating in kilowatts or kilovolt-amperes, the power factor, the normal volts and amperes corresponding to the rating, and the rated ambient temperature.

Nameplates or manufacturer's instructions shall provide the following information for all stationary generators and portable generators rated more than 15 kW:

(1) Alternator subtransient, transient, synchronous, and zero sequence reactances

(2) Generator set power rating category (prime, standby, or continuous)

(3) Alternator temperature rise at rated load and insulation system class

(4) Indication if the generator is protected against overload by inherent design, an overcurrent protective relay, a circuit breaker, or a fuse

(5) Available fault current for inverter-based generators, in lieu of the synchronous, subtransient, and transient reactances

Marking shall be provided by the manufacturer to indicate whether or not the generator neutral is bonded to its frame. Where the bonding is modified in the field, additional marking shall be required to indicate whether the neutral is bonded to the frame.

~~Equipment mounted to the generator assembly shall not conceal or obscure the generator nameplate~~ THe generator nameplate shall be accessible for inspection .

Statement of Problem and Substantiation for Public Comment

The language in the first draft may create unnecessary conflicts during the inspection of of UL listed generator sets. This requirement doesn't specify, for instance, if the label needs to be by the generator packager, or manufacturer of the alternator. It is not unreasonable to have to shut a generator off, lock it out, and need to peak behind a door, for instance, to look at the label on its alternator to see things that are alternator specific, like subtransient reactance. Yet, it is not unreasonable to think that some may believe needing to do this constitutes the label being obscured or concealed.

Related Item

• First Revision No. 8991-NFPA 70-2021 [Section No. 445.11]

Submitter Information Verification

Submitter Full Name: Josh Weaver
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Fri Aug 13 21:07:11 EDT 2021
Committee: NEC-P13

Public Comment No. 1832-NFPA 70-2021 [Section No. 445.11]

445.11 Marking.

Each generator shall be provided with a nameplate giving the manufacturer's name, the rated frequency, the number of phases if ac, the rating in kilowatts or kilovolt-amperes, the power factor, the normal volts and amperes corresponding to the rating, and the rated ambient temperature.

Nameplates or manufacturer's instructions shall provide the following information for all stationary generators and portable generators rated more than 15 kW:

(1) Alternator subtransient, transient, synchronous, and zero sequence reactances

(2) Generator set power rating category (examples include prime, standby, ~~or continuous~~ and continuous)

(3) Alternator temperature rise at rated load and insulation system class

(4) Indication if the generator is protected against overload by inherent design, an overcurrent protective relay, a circuit breaker, or a fuse

(5) Available fault current for inverter-based generators, in lieu of the synchronous, subtransient, and transient reactances

Marking shall be provided by the manufacturer to indicate whether or not the generator neutral is bonded to its frame. Where the bonding is modified in the field, additional marking shall be required to indicate whether the neutral is bonded to the frame.

Equipment mounted to the generator assembly shall not conceal or obscure the generator nameplate.

Statement of Problem and Substantiation for Public Comment

The power rating categories that are shown in parenthesis are not all inclusive. It's still a good idea to list them, but it needs to be clear to the reader that they're just examples.

Related Item

• FR 8991

Submitter Information Verification

Submitter Full Name: Timothy Windey
Organization: Cummins Power Generation
Street Address:
City:
State:
Zip:
Submittal Date: Wed Aug 18 09:58:22 EDT 2021
Committee: NEC-P13

Public Comment No. 1057-NFPA 70-2021 [Section No. 445.19(A)]

(A) General.

Generators shall have provisions to shut down the prime mover. The means of shutdown shall comply with all of the following:

(1) Be equipped with provisions to disable all prime mover start control circuits to render the prime mover incapable of starting

(2) Initiate a shutdown mechanism that requires a mechanical reset (restart)

The provisions to shut down the prime mover shall be permitted to satisfy the requirements of 445.18(A) where it is capable of being locked in the open position in accordance with 110.25.

Statement of Problem and Substantiation for Public Comment

If "mechanical reset" is the correct term, but is frequently misunderstood, it may be best to retain it but to add, in parentheses, the alternate term, which based on Mr. Fecteau's testimony will help others understand the intent.

Related Item

• PI 1301

Submitter Information Verification

Submitter Full Name: David Shapiro
Organization: Safety First Electrical
Street Address:
City:
State:
Zip:
Submittal Date: Fri Aug 06 19:54:23 EDT 2021
Committee: NEC-P13

Public Comment No. 1396-NFPA 70-2021 [Section No. 445.19(B)]

(B) Remote Emergency Shutdown.

For other than one- and two-family dwelling units, generators with greater than 15 kW rating shall be provided with a remote emergency stop switch to shut down the prime mover. The remote emergency stop switch shall be located outside the equipment room or generator enclosure at a readily accessible location and shall also meet the requirements of 445.19(A)(1) and (A)(2).

The remote emergency stop switch shall be permitted to be mounted on the exterior of the generator enclosure. The remote emergency stop switch shall have a ~~field applied~~ label as Generator Emergency Shutdown, and the label shall meet the requirements of 110.21(B).

Statement of Problem and Substantiation for Public Comment

So, if the manufacturer provides the label I have to rip it off and replace it with one of my own? That is indefensible.

Related Item

• FR 9028

Submitter Information Verification

Submitter Full Name: Ryan Jackson
Organization: Ryan Jackson
Street Address:
City:
State:
Zip:
Submittal Date: Thu Aug 12 14:29:24 EDT 2021
Committee: NEC-P13

Public Comment No. 1512-NFPA 70-2021 [Section No. 445.20]

445.20 Ground-Fault Circuit-Interrupter Protection for Receptacles on 15-kW or Smaller Portable Generators.

Receptacle outlets that are a part of a 15-kW or smaller portable ~~generator shall have listed ground-fault circuit-interrupter protection (GFCI) for personnel integral to the generator or receptacle as indicated in either 445~~ , vehicle-mounted and trailer mounted generator shall comply with 4 45 .20(A) or (B):

(A) Unbonded (Floating Neutral) Generators.

~~Unbonded generators with both 125-volt and 125/250-volt receptacle outlets shall have listed GFCI protection for personnel integral to the generator or receptacle on all 125-volt, 15- and 20-ampere receptacle outlets.~~

~~Exception: GFCI protection shall not be required where the 125-volt receptacle outlets(s) is interlocked such that it is not available for use when any 125/250-volt receptacle(s) is in use~~

Grounding-type receptacles shall not be installed on the generator .

(B) Bonded Neutral Generators.

~~Bonded generators shall be provided with GFCI protection on all~~ All 125-volt, 15 ~~-~~ and 20-~~ampere receptacle outlets~~ ampere receptacles shall be provided with GFCI protection .

Informational Note: See 590.6(A)(3) for GFCI requirements for 15-kW or smaller portable generators used for temporary electric power and lighting.

Exception to ~~(A) and (~~ B): If the generator was manufactured or remanufactured prior to January 1, 2015, listed cord sets or devices incorporating listed GFCI protection for personnel identified for portable use shall be permitted.

Additional Proposed Changes

File Name	Description	Approved
PC_1512_Attachment_C_Phil_Simmons.pdf	445-20_Grounding_Type_Recep.pdf	

Statement of Problem and Substantiation for Public Comment

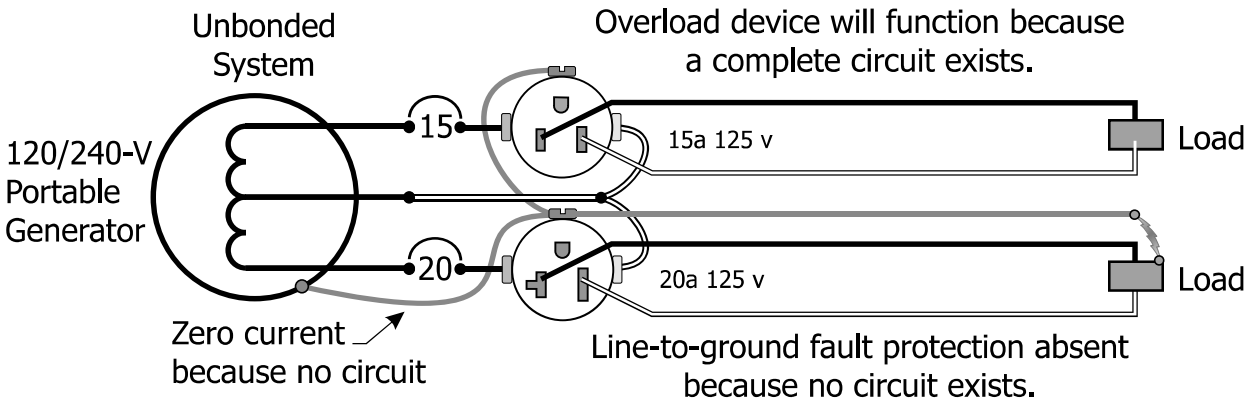
• The present language in 445.20(A) that permits a floating neutral for a portable generator is a violation of 250.34(C).
• A portable generator meets the definition of "separately derived system" in Article 100. It reads, "An electrical source, other than a service, having no electrical connection(s) to circuit conductors of any other electrical source other than those established by grounding and bonding connections."
• 250.34(C) requires the system conductor that is required to be grounded by 250.26 to be connected to the frame if the generator is a component of a separately derived system.
• For a common 120-volt generator that would be the grounded (often referred to as a neutral) conductor.
• For a 120/240-Volt generator the conductor required to be connected to the frame by 250.26 is the neutral conductor.
• A equipment grounding conductor cannot provide a ground-fault return path if a portable generator has an unbonded neutral.
• A GFCI cannot provide electric shock protection through a GFCI device if the portable generator has an unbonded neutral.
• Section 445.20(A) should not allow grounding-type devices such as grounding-type receptacles and GFCI devices to be mounted on a portable generator when they are not functional.
Section 250.34 was expanded in the 2020 NEC cycle to include vehicle-mounted and trailer-mounted generators. Section 445.20 should have a corresponding change.
• A portable generator can be safely and correctly connected to another electrical system as either separately derived or nonseparately derived. See the Warning signs required by NEC 702.7(C) for bonded neutral and floating neutral systems.

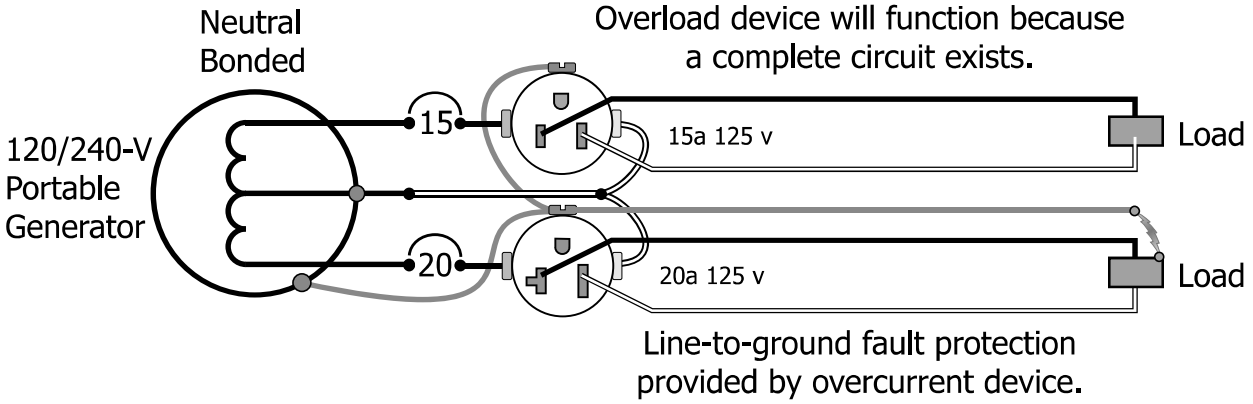
Related Item

• PI-4497

Submitter Information Verification

Submitter Full Name: Phil Simmons
Organization: Simmons Electrical Services
Street Address:
City:
State:
Zip:
Submittal Date: Sun Aug 15 19:22:56 EDT 2021
Committee: NEC-P13


Unbonded
System
Overload device will function because
a complete circuit exists.
120/240-V
Portable
Generator
15
20
15a 125 v
20a 125 v
Load
Load
Zero current
because no circuit
Line-to-ground fault protection absent
because no circuit exists.


Neutral
Bonded
Overload device will function because
a complete circuit exists.
120/240-V
Portable
Generator
15
20
15a 125 v
20a 125 v
Load
Load
Line-to-ground fault protection
provided by overcurrent device.

Public Comment No. 1058-NFPA 70-2021 [Section No. 445.20(A)]

(A) Unbonded (Floating Neutral) Generators.

Unbonded generators with both 125-volt and 125/250-volt receptacle outlets shall have listed GFCI protection for personnel integral to the generator or receptacle on all 125-volt, 15- and 20-ampere receptacle outlets. These shall be labeled *Ground Fault Interruption Not Provided.*

Exception: GFCI protection shall not be required where the 125-volt receptacle outlets(s) is interlocked such that it is not available for use when any 125/250-volt receptacle(s) is in use.

Statement of Problem and Substantiation for Public Comment

As Mr.Simmons notes, with a floating neutral, the GFCI will not operate in the event of a single ground fault. Nonetheless, it might be worthwhile to install GFCI devices against the possibility that the generator will be reconfigured in the future so the neutral is bonded.

Isolation offers a different sort of protection than GFCI operation, and it is only fair to alert users that the latter is not present despite appearances. The proposed label would be equivalent to the "No Ground Present" label required on three-prong receptacles used to extend two-wire circuits lacking a grounding method. Floating-neutral generators could arguably bear those labels as well, in that current flowing into grounding wires connected to the receptacles' third prongs will not complete a circuit as they would in normal equipment grounding, and thus potentially cause power interruption.

Related Item

• PI 4497

Submitter Information Verification

Submitter Full Name: David Shapiro
Organization: Safety First Electrical
Street Address:
City:
State:
Zip:
Submittal Date: Fri Aug 06 20:05:38 EDT 2021
Committee: NEC-P13

Public Comment No. 450-NFPA 70-2021 [New Section after 445.20(B)]

TITLE OF NEW CONTENT

445.22 Cybersecurity, Cyberweapon, Electromagnetic Pulse (EMP), Geomagnetic Disturbance (GMD), and Intentional Electromagnetic Interference (IEMI) Protection. Generators shall comply with either of the following:

(1) The generator shall be identified for cybersecurity, cyberweapon, EMP, GMD, and IEMI protection.

(2) A cybersecurity, cyberweapon, EMP, GMD, and IEMI protection failure modes effects analysis assessment shall be conducted to determine generator vulnerabilities.

The identification or assessment shall be reviewed when the system configuration changes and at not more than 5-year intervals. Documentation of the identification or assessment shall be made available to those authorized to inspect, operate, and maintain the system.

Statement of Problem and Substantiation for Public Comment

This Public Comment is a follow-up to PI 761, PI 3080, FR 8801, PI 766, and PI 4024. It does not require cybersecurity, cyberweapon, EMP, GMD, or IEMI protection, but rather calls for the generator to be identified for these threats or for a threat assessment to be completed. While the NEC® is not ready to mandate protection requirements, an assessment would show generator vulnerabilities. Acceptance of this Public Comment would at least bring the subject to the attention of owners, design engineers, electrical inspectors, and insurance companies, and set the table for requirements in future editions of the NEC® (or other NFPA standards). The format for this Public Comment is based upon the cybersecurity requirements found in FR 8801, which offers an assessment as an alternate for requiring protection.

PI 761 provided technical substantiation to require Electromagnetic Pulse (EMP) Protection for our critical infrastructure. While it appears that the NEC(R) is not ready to actually require EMP protection at this time, the security of our country is at stake. An EMP is fairly well understood as an extremely powerful electromagnetic wave that can impress 50,000 volts per meter on every piece of electrical equipment, destroying everything that is unprotected. An EMP is often associated with a nuclear explosion, but that is not the only cause of electromagnetic damage. A Geomagnetic Disturbance (GMD) is caused by a sunspot. While the EMP would be created by one of our adversaries, the sun spot is an act of God. These types of events can instantly initiate millions of fires in our unprotected electrical systems, overwhelming our fire-fighting capabilities. If millions of fires weren't bad enough, the unprotected electrical equipment would be damaged or completely destroyed, subjecting the country to years of blackout. Government intelligence studies, now unclassified, have predicted that from 66% to 90% of our population would die within one year, due to a lack of food, clean water, and medicine, if a significant EMP or GMD were to occur, while the country's electrical infrastructure remains unprotected. The final threat listed is an Intentional Electromagnetic Interference (IEMI). It is easily created by utilizing off-the-shelf parts, available for purchase on the internet, that will fit into a van. While much less powerful than a significant EMP or GMD, twenty vans, equipped with bench-made IEMI devices and scattered throughout the country, can shut down major industries and major parts of the country for weeks, if not months, through a coordinated attack, similar to 9/11, by targeting key industries/vulnerabilities. In conclusion, these electromagnetic threats to our unprotected electrical infrastructure, and therefor to our entire country, are absolutely real, and must be addressed.

PI 4024 provided significant substantiation for the need to protect critical infrastructure against cyber attack for equipment connected to the internet. However, equipment does not need to be connected to the internet in order to be damaged or destroyed by cyber threats. Equipment can be damaged by cyber weapons such as malicious computer worms that attack SCADA (control) systems. A great example is the Stuxnet worm that destroyed the centrifuges in Iran. Thus, this Public Comment deletes the PI 4024 reference to the internet and adds cyberweapon to the list of threats that need to be either protected against or assessed.

Related Item

• PI 766 • PI 3080 • FR 8801 • PI 4024 • PI 3055 • FR 7947 • PI 4026 • FR 8880 • FR 8917 • PI 2888 • FR 8914 • PI 3083

Submitter Information Verification

Submitter Full Name: Vincent Saporita
Organization: Saporita Consulting
Affiliation: Saporita Consulting
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jul 27 16:20:53 EDT 2021
Committee: NEC-P13

Public Comment No. 1116-NFPA 70-2021 [Section No. 480.1]

480.1 Scope.

This article applies to all installations of stationary standby batteries composed of lead-acid or nickel-cadmium cells.

Informational Note No. 1: See Article 706 for installations that do not meet the definition of stationary standby batteries or are composed of cells other than lead-acid or nickel-cadmium.

Informational Note No. 2: The following standards are frequently referenced for the installation of stationary batteries:

(1) IEEE 484, *Recommended Practice for Installation Design and Installation of Vented Lead-Acid Batteries for Stationary Applications*

(2) IEEE 485, *Recommended Practice for Sizing Vented Lead-Acid Storage Batteries for Stationary Applications*

(3) IEEE 1145, *Recommended Practice for Installation and Maintenance of Nickel-Cadmium Batteries for Photovoltaic (PV) Systems*

(4) IEEE 1187, *IEEE Recommended Practice for Installation Design, and Installation of Valve-Regulated Lead-Acid Batteries for Stationary Applications*

(5) IEEE 1375, *IEEE Guide for the Protection of Stationary Battery Systems*

(6) IEEE 1578, *Recommended Practice for Stationary Battery Electrolyte Spill Containment and Management*

(7) IEEE 1635/ASHRAE 21, *Guide for the Ventilation and Thermal Management of Batteries for Stationary Applications*

(8) UL 1973, *Standard for Batteries for Use in Stationary, Vehicle Auxiliary Power, and Light Electric Rail (LER) Applications*

(9) UL Subject 2436, *Outline of Investigation for Spill Containment for Stationary Lead Acid Battery Systems*

(10) UL 1989, *Standard for Standby Batteries*

(11) UL Subject 1974, *Standard for Evaluation of Repurposed Batteries*

(12) NFPA 855-2020, *Standard for the Installation of Stationary Energy Storage Systems*

Additional Proposed Changes

File Name	Description	Approved
13_CN_290.pdf	13 CN290	

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 290 appeared in the First Draft Report on First Revision No. 9030.

The Correlating Committee has purview over article scopes and requests the Panel to review and adjust the change in scope so as not to limit the scope. The FR limits Article 480 to only lead-acid and nickel-cadmium for stationary standby batteries.

There are other battery technologies that are used for stationary standby applications.

Related Item

• First Revision No. 9030

Submitter Information Verification

Submitter Full Name: CC on NEC-AAC
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:
Submittal Date: Mon Aug 09 15:57:57 EDT 2021
Committee: NEC-P13

Correlating Committee Note No. 290-NFPA 70-2021 [Section No. 480.1]

Submitter Information Verification

Committee: NEC-P13
Submittal Date: Thu May 06 13:06:02 EDT 2021

Committee Statement

Committee Statement: The Correlating Committee has purview over article scopes and requests the Panel to review and adjust the change in scope so as not to limit the scope. The FR limits Article 480 to only lead-acid and nickel-cadmium for stationary standby batteries.

There are other battery technologies that are used for stationary standby applications.

First Revision No. 9030-NFPA 70-2021 [Section No. 480.1]

Ballot Results

This item has passed ballot

12 Eligible Voters
0 Not Returned
12 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Affirmative All

Ayer, Lawrence S.
Gallo, Ernest J.
Hickman, Palmer L.
Holub, Richard A.
Hunter, Dean C.
Johnston, Michael J.
Kendall, David H.
Kovacik, John R.
Manche, Alan
McDaniel, Roger D.
Porter, Christine T.
Williams, David A.

Public Comment No. 1399-NFPA 70-2021 [Section No. 480.1]

480.1 Scope.

This article applies to all installations of stationary standby batteries composed of lead-acid or nickel-cadmium cells.

Informational Note No. 1: See Article 706 for installations that do not meet the definition of stationary standby batteries or are composed of cells other than lead-acid or nickel-cadmium.

Informational Note No. 2: The following standards are frequently referenced for the installation of stationary batteries:

(1) IEEE 484, *Recommended Practice for Installation Design and Installation of Vented Lead-Acid Batteries for Stationary Applications*

(2) IEEE 485, *Recommended Practice for Sizing Vented Lead-Acid Storage Batteries for Stationary Applications*

(3) IEEE 1145, *Recommended Practice for Installation and Maintenance of Nickel-Cadmium Batteries for Photovoltaic (PV) Systems*

(4) IEEE 1187, *IEEE Recommended Practice for Installation Design, and Installation of Valve-Regulated Lead-Acid Batteries for Stationary Applications*

(5) IEEE 1375, *IEEE Guide for the Protection of Stationary Battery Systems*

(6) IEEE 1578, *Recommended Practice for Stationary Battery Electrolyte Spill Containment and Management*

(7) IEEE 1635/ASHRAE 21, *Guide for the Ventilation and Thermal Management of Batteries for Stationary Applications*

(8) UL 1973, *Standard for Batteries for Use in Stationary, Vehicle Auxiliary Power, and Light Electric Rail (LER) Applications*

(9) UL Subject 2436, *Outline of Investigation for Spill Containment for Stationary Lead Acid Battery Systems*

(10) UL 1989, *Standard for Standby Batteries*

(11) UL Subject 1974, *Standard for Evaluation of Repurposed Batteries*

(12) ~~NFPA 855-2020, *Standard for the Installation of Stationary Energy Storage Systems*~~

Statement of Problem and Substantiation for Public Comment

Why would there be an informational note for a topic that is not covered by this article? As indicated in informational note 1, I need to go to 706 for energy storage systems. Although it is very unlikely that anyone is going to take the time to read 12(!) informational notes, the last one is superfluous.

Related Item

• FR 9030

Submitter Information Verification

Submitter Full Name: Ryan Jackson
Organization: Ryan Jackson
Street Address:
City:
State:
Zip:
Submittal Date: Thu Aug 12 14:36:46 EDT 2021
Committee: NEC-P13

Public Comment No. 1683-NFPA 70-2021 [Section No. 480.1]

480.1 Scope.

This article applies to all installations of stationary standby batteries ~~composed of lead-acid or nickel-cadmium cells~~ that cannot discharge their stored energy in parallel with the electrical power production and distribution network .

Informational Note No. 1: See Article 706 for battery installations that do not meet the definition of stationary standby batteries ~~or are composed of cells other than lead-acid or nickel-cadmium~~ and can discharge their stored energy in parallel with the electrical power production and distribution network .

Informational Note No. 2: The following standards are frequently referenced for the installation of stationary batteries:

(1) IEEE 484, *Recommended Practice for Installation Design and Installation of Vented Lead-Acid Batteries for Stationary Applications*

(2) IEEE 485, *Recommended Practice for Sizing Vented Lead-Acid Storage Batteries for Stationary Applications*

(3) IEEE 1145, *Recommended Practice for Installation and Maintenance of Nickel-Cadmium Batteries for Photovoltaic (PV) Systems*

(4) IEEE 1187, *IEEE Recommended Practice for Installation Design, and Installation of Valve-Regulated Lead-Acid Batteries for Stationary Applications*

(5) IEEE 1375, *IEEE Guide for the Protection of Stationary Battery Systems*

(6) IEEE 1578, *Recommended Practice for Stationary Battery Electrolyte Spill Containment and Management*

(7) IEEE 1635/ASHRAE 21, *Guide for the Ventilation and Thermal Management of Batteries for Stationary Applications*

(8) UL 1973, *Standard for Batteries for Use in Stationary, Vehicle Auxiliary Power, and Light Electric Rail (LER) Applications*

(9) UL Subject 2436, *Outline of Investigation for Spill Containment for Stationary Lead Acid Battery Systems*

(10) UL 1989, *Standard for Standby Batteries*

(11) UL Subject 1974, *Standard for Evaluation of Repurposed Batteries*

(12) NFPA 855-2020, *Standard for the Installation of Stationary Energy Storage Systems*

Statement of Problem and Substantiation for Public Comment

The first draft changed to the scope of Article 480 to limit the application of the requirements in Article 480 to solely lead-acid or nickel-cadmium battery chemistries without replacement or additional requirements for other chemistry types within the NEC.

The industry is moving to lithium-ion based chemistries for stationary standby batteries and this revision creates a requirement void in the NEC. Stationary standby batteries are not considered energy storage systems (ESS) in terms of product safety standards and application so the informational note directing users to Article 706 is not appropriate and adds confusion. Standards such as UL 1973 listed in informational note 2 apply to all battery chemistries and provide the certification requirements to meet the 480.3 listing requirement.

Related Item

• FR 9030

Submitter Information Verification

Submitter Full Name: Megan Hayes
Organization: Nema
Street Address:
City:
State:
Zip:
Submittal Date: Tue Aug 17 11:40:53 EDT 2021
Committee: NEC-P13

Public Comment No. 175-NFPA 70-2021 [Section No. 480.1]

480.1 Scope.

This article applies to all installations of stationary standby batteries ~~composed of lead-acid or nickel-cadmium cells~~ that do not discharge stored energy in parallel with the electric power production and distribution network .

Informational Note No. 1: See Article 706 for installations that do not meet the definition of stationary standby ~~batteries or are composed of cells other than lead-acid or nickel-cadmium~~ battery .

Informational Note No. 2: The following standards are frequently referenced for the installation of stationary batteries:

(1) IEEE 484, *Recommended Practice for Installation Design and Installation of Vented Lead-Acid Batteries for Stationary Applications*

(2) IEEE 485, *Recommended Practice for Sizing Vented Lead-Acid Storage Batteries for Stationary Applications*

(3) IEEE 1145, *Recommended Practice for Installation and Maintenance of Nickel-Cadmium Batteries for Photovoltaic (PV) Systems*

(4) IEEE 1187, *IEEE Recommended Practice for Installation Design, and Installation of Valve-Regulated Lead-Acid Batteries for Stationary Applications*

(5) IEEE 1375, *IEEE Guide for the Protection of Stationary Battery Systems*

(6) IEEE 1578, *Recommended Practice for Stationary Battery Electrolyte Spill Containment and Management*

(7) IEEE 1635/ASHRAE 21, *Guide for the Ventilation and Thermal Management of Batteries for Stationary Applications*

(8) UL 1973, *Standard for Batteries for Use in Stationary, Vehicle Auxiliary Power, and Light Electric Rail (LER) Applications*

(9) UL Subject 2436, *Outline of Investigation for Spill Containment for Stationary Lead Acid Battery Systems*

(10) UL 1989, *Standard for Standby Batteries*

(11) UL Subject 1974, *Standard for Evaluation of Repurposed Batteries*

(12) NFPA 855-2020, *Standard for the Installation of Stationary Energy Storage Systems*

Statement of Problem and Substantiation for Public Comment

The First Draft revision to the scope of 480.1 creates a safety concern and void in the code for standby battery systems that utilize Li-ion batteries. If the Li-ion batteries do not operate in parallel with the utility source or other interconnected power sources during normal use, the batteries would not meet the definition of an ESS, and their installation would be outside the purview of the NEC. The removal of battery chemistry from the scope of Article 480 will ensure that any type of standby battery chemistry be installed in accordance with the requirements in Article 480.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 176-NFPA 70-2021 [Definition: Battery, Stationary Standby (Stationary Standby...]	

Related Item

• FR 9030

Submitter Information Verification

Submitter Full Name: Brian Baughman
Organization: Generac Power Systems Inc.
Street Address:
City:
State:
Zip:
Submittal Date: Fri Jul 09 10:01:46 EDT 2021
Committee: NEC-P13

Public Comment No. 1059-NFPA 70-2021 [Section No. 480.10(G)]

(G) Illumination.

Illumination of at least 100 lux (10 footcandle) shall be provided for working spaces containing stationary standby batteries. The lighting outlets shall not be controlled by automatic means only. Additional lighting outlets shall not be required where the work space is illuminated by an adjacent light source. The location of luminaires shall not cause the following:

(1) Expose personnel to energized battery components while performing maintenance on the luminaires in the battery space

(2) Create a hazard to the battery upon failure of the luminaire

Statement of Problem and Substantiation for Public Comment

If illumination is required for safe work around these systems, not specifying a minimum means in some cases inadequate illumination. The source of the proposed figure comes from authorities in the field per PI 205.

Related Item

• PI 205 • PI4333

Submitter Information Verification

Submitter Full Name: David Shapiro
Organization: Safety First Electrical
Street Address:
City:
State:
Zip:
Submittal Date: Fri Aug 06 20:42:53 EDT 2021
Committee: NEC-P13

Public Comment No. 1117-NFPA 70-2021 [Section No. 480.10(G)]

(G) Illumination.

Illumination shall be provided for working spaces containing stationary standby batteries. The lighting outlets shall not be controlled by automatic means only. Additional lighting outlets shall not be required where the work space is illuminated by an adjacent light source. The location of luminaires shall not cause the following:

(1) Expose personnel to energized battery components while performing maintenance on the luminaires in the battery space

(2) Create a hazard to the battery upon failure of the luminaire

Additional Proposed Changes

File Name	Description	Approved
13_CN_291.pdf	13 CN291	

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 291 appeared in the First Draft Report on First Revision No. 9069.

The Correlating Committee directs the panel to review the transition "cause the following" from the charging paragraph to the list.

Related Item

• First Revision No. 9069

Submitter Information Verification

Submitter Full Name: CC on NEC-AAC
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:
Submittal Date: Mon Aug 09 15:59:54 EDT 2021
Committee: NEC-P13

Correlating Committee Note No. 291-NFPA 70-2021 [Section No. 480.10(G)]

Submitter Information Verification

Committee: NEC-P13
Submittal Date: Thu May 06 13:22:42 EDT 2021

Committee Statement

Committee Statement: The Correlating Committee directs the panel to review the transition "cause the following" from the charging paragraph to the list.

First Revision No. 9069-NFPA 70-2021 [Section No. 480.10(G)]

Ballot Results

This item has passed ballot

12 Eligible Voters
0 Not Returned
12 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Affirmative All

Ayer, Lawrence S.
Gallo, Ernest J.
Hickman, Palmer L.
Holub, Richard A.
Hunter, Dean C.
Johnston, Michael J.
Kendall, David H.
Kovacik, John R.
Manche, Alan
McDaniel, Roger D.
Porter, Christine T.
Williams, David A.

Public Comment No. 1118-NFPA 70-2021 [Section No. 695.1(B)]

(B) Not Covered.

This article does not cover the following:

(1) The performance, maintenance, and acceptance testing of the fire pump system and the internal wiring of the components of the system

(2) The installation of pressure maintenance (jockey or makeup) pumps

Informational Note No. 1: See Article 430 for the installation of pressure maintenance (jockey or makeup) pumps supplied by the fire pump circuit or another source.

(3) Transfer equipment upstream of the fire pump transfer switch(es)

Informational Note No. 2: See NFPA 20-2019, *Standard for the Installation of Stationary Pumps for Fire Protection*, for further information.

(4) Water pumps installed in one- and two-family dwellings and used for fire suppression

Informational Note No. 3: See NFPA 13D-2019, *Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes*, for further information.

Additional Proposed Changes

File Name	Description	Approved
13_CN_292.pdf	13 CN292	

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 292 appeared in the First Draft Report on First Revision No. 9007.

The Correlating Committee advises that article title and article scope statements are the responsibility of the Correlating Committee and the Correlating Committee accepts the panel action.

Related Item

• First Revision No. 9007

Submitter Information Verification

Submitter Full Name: CC on NEC-AAC
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:
Submittal Date: Mon Aug 09 16:01:56 EDT 2021
Committee: NEC-P13

Correlating Committee Note No. 292-NFPA 70-2021 [Section No. 695.1(B)]

Submitter Information Verification

Committee: NEC-P13
Submittal Date: Thu May 06 14:01:35 EDT 2021

Committee Statement

Committee Statement: The Correlating Committee advises that article title and article scope statements are the responsibility of the Correlating Committee and the Correlating Committee accepts the panel action.

First Revision No. 9007-NFPA 70-2021 [Section No. 695.1(B)]

Ballot Results

This item has passed ballot

12 Eligible Voters
0 Not Returned
12 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Affirmative All

Ayer, Lawrence S.
Gallo, Ernest J.
Hickman, Palmer L.
Holub, Richard A.
Hunter, Dean C.
Johnston, Michael J.
Kendall, David H.
Kovacik, John R.
Manche, Alan
McDaniel, Roger D.
Porter, Christine T.
Williams, David A.

Public Comment No. 2163-NFPA 70-2021 [Section No. 695.5(C)(2)]

(2) Overcurrent Protection.

The transformer size, the feeder size, and the overcurrent protective device(s) shall be coordinated such that overcurrent protection is provided for the transformer in accordance with 450.3 and for the feeder in accordance with 215.3, and such that the overcurrent protective device(s) is selected or set to carry indefinitely the sum of the locked-rotor current of the fire pump motor(s), the pressure maintenance pump motor(s), the full-load current of the associated fire pump accessory equipment, and 100 percent of the remaining loads supplied by the transformer. ~~The requirement to carry the locked-rotor currents indefinitely shall not apply to conductors or devices other than overcurrent devices in the fire pump motor circuit(s).~~

Statement of Problem and Substantiation for Public Comment

695.5 (C) (2) is a subsection of 695.5 (C) which specifically references 695.3 (C). It is describing the transformer typically in a unit substation commonly used in a campus multibuilding complex. The primary breaker and the transformer is sized and has primary protection for 100 percent of the load which includes locked rotor current. However the secondary branch device supplying the fire pump must coordinate with upstream devises, which is typically a tie and a secondary main and the primary transformer protection, but is not required to be set at locked rotor current.

This comment correlates with PI No. 923-NFPA 70-2020 [Section No. 695.4 (B) (1)] in that the existing text (last sentence in 695.5 (C) (2)) contradicts the reference to [20:9.2.3] and the associated requirements in NFPA 20.

Related Item

• PI No. 923-NFPA 70-2020 [Section No. 695.4(B)(1)

Submitter Information Verification

Submitter Full Name: Lawrence Forshner
Organization: Bard Rao Athanas Consulting
Affiliation: self
Street Address:
City:
State:
Zip:
Submittal Date: Thu Aug 19 15:02:27 EDT 2021
Committee: NEC-P13

Public Comment No. 273-NFPA 70-2021 [Section No. 695.6(A)(1)]

(1) Services and On-Site Power Production Facilities.

Service conductors and conductors supplied by on-site power production facilities shall be physically routed outside a building(s) and shall be installed as service-entrance conductors in accordance with 230.6, 230.9, and Parts III and IV of Article 230. Where supply conductors cannot be physically routed outside of buildings, the conductors shall be permitted to be routed through the building(s) where installed in accordance with 230.6(1) or (2).

~~*Exception: The supply conductors within the fire pump room shall not be required to meet 230.6(1) or (2).*~~

Informational Note: See 250.24(C) for routing the grounded conductor to the service equipment.

Statement of Problem and Substantiation for Public Comment

As a follow up to PI 4178, the fire rating of the room is not the main area of concern with this proposal. 695.6(A)(2)Ex. has a different set of circumstances as it is a protected conductor, thus there is no challenge to that exception. The request to remove this exception is based in 230.6(3). There are no demands in the building and fire codes as to the construction method of a room, only the fire rating. The ratings demanded in those codes never exceed 2 hours. 230.6(3) sends you to article 450 part III where there are demands for a 3 hour rating and a construction method that shall not consist of studs and wallboards. This 3 hour rating and construction method would be a requirement for every other set of service conductors that enter a building or structure.

There are many large structures supplied by utility transformers with available fault currents approaching 200kA at the transformer terminals and could be in excess of 150kA at the service terminals. The allowance of these conductors inside fire pump rooms with no encasement or cover by concrete is extremely hazardous to personnel due to concussive forces from these extreme fault currents. These rooms are frequented by fire department and maintenance personnel.

CMP-4 saw fit to revise 705.11(C) in the first draft as they recognized an issue with service conductors installed in structures even under special conditions. If this CMP deems this exception necessary, at a minimum, please add the demand that the construction of the room must meet 450 part III.

Related Item

• PI 4178

Submitter Information Verification

Submitter Full Name: Albin Kneggs
Organization: City of Dallas
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 19 11:00:42 EDT 2021
Committee: NEC-P13

Public Comment No. 589-NFPA 70-2021 [Section No. 695.6(A)(1)]

(1) Services and On-Site Power Production Facilities.

Service conductors and conductors supplied by on-site power production facilities shall be physically routed outside a building(s) and shall be installed as service-entrance conductors in accordance with 230.6, 230.9, and Parts III and IV of Article 230. Where supply conductors cannot be physically routed outside of buildings, the conductors shall be permitted to be routed through the building(s) where installed in accordance with 230.6(1) or (2).

Exception: The supply conductors within the fire pump room shall not be required to meet 230.6(1) or (2), where the pump room meets the construction requirements of Article 450, Part III per 230 .6 (3).

Informational Note: See 250.24(C) for routing the grounded conductor to the service equipment.

Statement of Problem and Substantiation for Public Comment

Public Input No. 4178-NFPA 70-2020 [Section No. 695.6(A)(1)] should be accepted as edited in Public Comment No. 589-NFPA 70-2021.

Substantiation:

I don't agree totally with the substationiation given by the submitter of PI 4178, however he does have a point about the exception to 695.6 (A)(1) text awkwardly ignoring the rules of 230.71(A)(1). The edited text in PC 589 recognizes the challenges designers have laying out equipment in Fire Pump Rooms" while maintaining compliance with the rules of 230.6.

I also take exception to the panel statement. I would caution CMP 13 from suggesting, or implying that "Service Entrance Conductors" could travel through buildings or rooms with 2 hour ratings. Service entrance conductors should be limited in length within buildings by locating the disconnect per 230.70(A)(1) or be installed in a way that would be "Considered Outside the Building" per 230.6.

Editorially:
The majority of Fire Pump Installations utilize a dedicated feeder derived from a dedicated service connection. [20: 9.2.2(3)] with the Service Disconnect located in the Main Electric Room. The service disconnect could be in the pump room, but they are usually not, because, among other reasons, there is typically more room in the main electric room for the switch and the C/T enclosure. When a Service Connection dedicated to the fire pump is selected as the normal supply, [20: 9.2.1(1)] the Service Entrance Conductors enter the Fire Pump Controller. The challenge with this method (which I believe is the most reliable) is the Utility Co. has to permit C/T's and P/T's in the pad mount cabinet to accommodate metering. From my experience less than 10% of the installations utilize this design choice.

Related Item

• Public Input No. 4178-NFPA 70-2020 [Section No. 695.6(A)(1)] should be accepted as edited in Public Comment No. 589-NFPA 70-2021.

Submitter Information Verification

Submitter Full Name: Lawrence Forshner
Organization: Bard Rao Athanas Consulting
Affiliation: self
Street Address:
City:
State:
Zip:
Submittal Date: Mon Aug 02 07:35:51 EDT 2021
Committee: NEC-P13

Public Comment No. 1735-NFPA 70-2021 [Section No. 695.6(A)(2)]

(2) Feeders.

Fire pump supply conductors on the load side of the final disconnecting means and overcurrent device(s) permitted by 695.4(B) or conductors that connect directly to an on-site standby generator shall comply with all of the following:

(1) *Independent Routing.* The conductors shall be kept entirely independent of all other wiring.

(2) *Associated Fire Pump Loads.* The conductors shall supply only loads that are directly associated with the fire pump system.

(3) *Protection from Potential Damage.* The conductors shall be protected from potential damage by fire, structural failure, or operational accident.

(4) *Inside of a Building.* Where routed through a building, the conductors shall be protected from fire for 2 hours using one of the following methods:

a. The cable or raceway is encased in ~~a minimum 50 mm (2 in.) of concrete.~~ concrete to achieve 2 hrs of fire protection.

Informational note: See NFPA Research Paper *Fire Resistance of Concrete for Electrical Conductors (dated December 18, 2018)*, Table 5: *Fire Resistance Rating of Single Layer Concrete Walls, Floors and Roofs* to determine the thickness of concrete (by type) to achieve the required Fire Resistance

b. The cable or raceway is part of a listed fire-resistive cable system.

Informational Note No. 1: See UL 2196, *Fire Test for Circuit Integrity of Fire-Resistive Power, Instrumentation, Control and Data Cables*, for one method of defining a fire-resistive cable system.

Informational Note No. 2: See UL *Guide Information for Electrical Circuit Integrity Systems* (FHIT) for identifying the system and its installation limitations to maintain a minimum 2-hour fire-resistive rating.

Informational Note No. 3: The listing organization provides information for fire-resistive cable systems on proper installation requirements to maintain the fire rating.

c. The cable or raceway is protected by a listed electrical circuit protective system.

Informational Note No. 4: See UL 1724, *Fire Tests for Electrical Circuit Protective Systems*, for one method of defining an electrical circuit protective system.

Informational Note No. 5: See UL *Guide Information for Electrical Circuit Integrity Systems* (FHIT) for identifying the system and its installation limitations to maintain a minimum 2-hour fire-resistive rating.

Informational Note No. 6: The listing organization provides information for electrical circuit protective systems on proper installation requirements to maintain the fire rating.

Exception to 695.6(A)(2)(4): The supply conductors located in the electrical equipment room where they originate and in the fire pump room shall not be required to have the minimum 2-hour fire separation or fire-resistance rating unless otherwise required by 700.10(D) of this Code.

Additional Proposed Changes

File Name	Description	Approved
695-6_-_SD1.docx	Details, substantiation and alternative Informational note text.	

Statement of Problem and Substantiation for Public Comment

Based on the returned comments from the First draft, it was stated that it is understood that 2 inches of concrete may not equal 2 hours of fire protection. Further comments on this statement were included in the Final ballot. This proposal is recommending to change it from stating a given thickness which would not account for the fire resistances of the different aggregates used. By changing the wording to require the 2 hours of protection, and providing to the engineer the suitable method to determine required thickness, it would ensure that the circuits are adequately protected.

The attached document provides more details on the proposed Information note (and details as to what information the table would refer to) as well as an alternate note for use with a different source (IBC in this case) if preferred.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 1747-NFPA 70-2021 [Section No. 695.14(F)]	
Public Comment No. 1750-NFPA 70-2021 [Section No. 700.10(D)(2)]	
Public Comment No. 1752-NFPA 70-2021 [Section No. 708.10(C)(2)]	
Public Comment No. 1747-NFPA 70-2021 [Section No. 695.14(F)]	
Public Comment No. 1750-NFPA 70-2021 [Section No. 700.10(D)(2)]	
Public Comment No. 1752-NFPA 70-2021 [Section No. 708.10(C)(2)]	

Related Item

• PI 3685

Submitter Information Verification

Submitter Full Name: Ryan Drury
Organization: nVent
Street Address:
City:
State:
Zip:
Submittal Date: Tue Aug 17 15:41:22 EDT 2021
Committee: NEC-P13

This proposal is in reference to Public Input No. 3685-NFPA 70-2020.

It is a revision to the original proposal, as per the following (As highlighted in Yellow):

695.6 Power Wiring

(A) Supply Conductors

(2) Feeders

(4) Inside a building. Where routed through a building, the conductors shall be protected from the fire for 2 hours using one of the following methods:

a. The cable or raceway is encased in ~~a minimum 50 mm (2 in) of~~ concrete to achieve 2 hrs of fire protection.

Informational note: See NFPA Research Paper *Fire Resistance of Concrete for Electrical Conductors (dated December 18, 2018),* Table 5: *Fire Resistance Rating of Single Layer Concrete Walls, Floors and Roofs*, to determine the suitable thickness of concrete (by type) to achieve the required Fire Resistance

Or

Informational note: See 2018 International Building Code, Section 7, Table 722.3.2*: Minimum Equivalent Thickness (inches) of Bearing or nonbearing concrete masonry walls*, to determine the suitable thickness of concrete (by type) to achieve the required Fire Resistance

Substantiation:

Dictating a minimum thickness of concrete may be too onerous due to the variety of concrete types used. As such, the recommendation is to remove the specific requirement to achieving this, and utilizing existing fire resistance ratings for various concrete types, as found in Table 5 of the NFPA research paper. This ensure that the specifying engineer is given enough detail to design the encasement to protect the life safety circuits adequately for 2 hrs.

Table 5 as follows, for Reference:

Table 5: Fire Resistance Rating of Single Layer Concrete Walls, Floors and Roofs[13]

Aggregate Type Used in Concrete Masonry Unit	Minimum Equivalent Thickness for Fire Resistance Rating (inches)				
	4 Hours	3 Hours	2 Hours	1.5 Hours	1 Hour
Siliceous	6.9	6.2	4.9	4.3	3.5
Carbonate	6.7	6.1	4.5	3.9	3.1
Semi-Lightweight	5.3	4.5	3.7	3.3	2.8

Also included is an alternate informational note where an IBC code is referenced for the engineer to utilize for the specification. This is here to provide the option to the NFPA research paper or to a reference in the IBC.

Table 722.3.2 as follows, for reference

TABLE 722.3.2
MINIMUM EQUIVALENT THICKNESS (Inches) OF BEARING OR NONBEARING CONCRETE MASONRY WALLS[a, b, c, d]

TYPE OF AGGREGATE	FIRE-RESISTANCE RATING (hours)														
	½	¾	1	1¼	1½	1¾	2	2¼	2½	2¾	3	3¼	3½	3¾	4
Pumice or expanded slag	1.5	1.9	2.1	2.5	2.7	3.0	3.2	3.4	3.6	3.8	4.0	4.2	4.4	4.5	4.7
Expanded shale, clay or slate	1.8	2.2	2.6	2.9	3.3	3.4	3.6	3.8	4.0	4.2	4.4	4.6	4.8	4.9	5.1
Limestone, cinders or unexpanded slag	1.9	2.3	2.7	3.1	3.4	3.7	4.0	4.3	4.5	4.8	5.0	5.2	5.5	5.7	5.9
Calcareous or siliceous gravel	2.0	2.4	2.8	3.2	3.6	3.9	4.2	4.5	4.8	5.0	5.3	5.5	5.8	6.0	6.2

For SI: 1 inch = 25.4 mm.

a. Values between those shown in the table can be determined by direct interpolation.

b. Where combustible members are framed into the wall, the thickness of solid material between the end of each member and the opposite face of the wall, or between members set in from opposite sides, shall be not less than 93 percent of the thickness shown in the table.

c. Requirements of ASTM C55, ASTM C73, ASTM C90 or ASTM C744 shall apply.

d. Minimum required equivalent thickness corresponding to the hourly fire-resistance rating for units with a combination of aggregate shall be determined by linear interpolation based on the percent by volume of each aggregate used in manufacture.

Public Comment No. 1744-NFPA 70-2021 [Section No. 695.6(A)(2)]

(2) Feeders.

Fire pump supply conductors on the load side of the final disconnecting means and overcurrent device(s) permitted by 695.4(B) or conductors that connect directly to an on-site standby generator shall comply with all of the following:

(1) *Independent Routing.* The conductors shall be kept entirely independent of all other wiring.

(2) *Associated Fire Pump Loads.* The conductors shall supply only loads that are directly associated with the fire pump system.

(3) *Protection from Potential Damage.* The conductors shall be protected from potential damage by fire, structural failure, or operational accident.

(4) *Inside of a Building.* Where routed through a building, the conductors shall be protected from fire for 2 hours using one of the following methods:

a. The cable or raceway is encased in a ~~minimum 50 mm (2 in.~~ minimum 94 mm (3.7") of concrete.

b. The cable or raceway is part of a listed fire-resistive cable system.

Informational Note No. 1: See UL 2196, *Fire Test for Circuit Integrity of Fire-Resistive Power, Instrumentation, Control and Data Cables*, for one method of defining a fire-resistive cable system.

Informational Note No. 2: See UL *Guide Information for Electrical Circuit Integrity Systems* (FHIT) for identifying the system and its installation limitations to maintain a minimum 2-hour fire-resistive rating.

Informational Note No. 3: The listing organization provides information for fire-resistive cable systems on proper installation requirements to maintain the fire rating.

c. The cable or raceway is protected by a listed electrical circuit protective system.

Informational Note No. 4: See UL 1724, *Fire Tests for Electrical Circuit Protective Systems*, for one method of defining an electrical circuit protective system.

Informational Note No. 5: See UL *Guide Information for Electrical Circuit Integrity Systems* (FHIT) for identifying the system and its installation limitations to maintain a minimum 2-hour fire-resistive rating.

Informational Note No. 6: The listing organization provides information for electrical circuit protective systems on proper installation requirements to maintain the fire rating.

Exception to 695.6(A)(2)(4): The supply conductors located in the electrical equipment room where they originate and in the fire pump room shall not be required to have the minimum 2-hour fire separation or fire-resistance rating unless otherwise required by 700.10(D) of this Code.

Statement of Problem and Substantiation for Public Comment

Based on the returned comments from the First draft, it was stated that it is understood that 2 inches of concrete may not equal 2 hours of fire protection. Further comments on this statement were included in the Final ballot, detailing that the committee felt that 5" of thickness was too onerous. As such, the value specified is based on the minimum concrete thickness found to meet the 2 hr Fire resistance threshold detailed in Table 5, as found in the 2018 NFPA Research Foundation report "Fire Resistance of Concrete for Electrical Conductors".

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 1749-NFPA 70-2021 [Section No. 695.14(F)]	
Public Comment No. 1751-NFPA 70-2021 [Section No. 700.10(D)(2)]	
Public Comment No. 1754-NFPA 70-2021 [Section No. 708.10(C)(2)]	
Public Comment No. 1749-NFPA 70-2021 [Section No. 695.14(F)]	
Public Comment No. 1751-NFPA 70-2021 [Section No. 700.10(D)(2)]	
Public Comment No. 1754-NFPA 70-2021 [Section No. 708.10(C)(2)]	

Related Item

• PI 3685

Submitter Information Verification

Submitter Full Name: Ryan Drury
Organization: nVent
Street Address:
City:
State:
Zip:

Submittal Date: Tue Aug 17 16:00:23 EDT 2021
Committee: NEC-P13

Public Comment No. 1119-NFPA 70-2021 [Section No. 695.7]

695.7 Voltage Drop.

(A) Motor Starting.

Unless the requirements of 695.7(B) or (C) are met, the voltage at the fire pump controller line terminals shall not drop more than 15 percent below normal (controller-rated voltage) under motor starting conditions. [**20:**9.4.1]

(B) Emergency Run.

The requirements of 695.7(A) shall not apply to emergency-run mechanical starting, provided a successful start can be demonstrated on the standby generator system. [**20:**9.4.2]

(C) Bypass Mode.

The requirements of 695.7(A) shall not apply to the bypass mode of a variable speed pressure limiting control, provided a successful start can be demonstrated on the standby gen-set. [**20:**9.4.3]

(D) Motor Running.

The voltage at the contactor(s) load terminals to which the motor is connected shall not drop more than 5 percent below the voltage rating of the motor connected to those terminals when the motor is operating at 115 percent of the full-load current rating of the motor. [**20:**9.4.4]

Additional Proposed Changes

File Name	Description	Approved
13_CN_293.pdf	13 CN293	

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 293 appeared in the First Draft Report on First Revision No. 9017.

The Correlating Committee directs the panel to review the first sentence within (D) Motor Running for the correct use of terms. The term "contactor(s)" should be replaced with "contactor" to comply with 3.3.3 of the NEC Style Manual.

Related Item

• First Revision No. 9017

Submitter Information Verification

Submitter Full Name: CC on NEC-AAC
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:
Submittal Date: Mon Aug 09 16:04:38 EDT 2021
Committee: NEC-P13

Correlating Committee Note No. 293-NFPA 70-2021 [Section No. 695.7]

Submitter Information Verification

Committee: NEC-P13
Submittal Date: Thu May 06 14:04:34 EDT 2021

Committee Statement

Committee Statement: The Correlating Committee directs the panel to review the first sentence within (D) Motor Running for the correct use of terms. The term “contactor(s)” should be replaced with “contactor” to comply with 3.3.3 of the NEC Style Manual.

First Revision No. 9017-NFPA 70-2021 [Section No. 695.7]

Ballot Results

This item has passed ballot

12 Eligible Voters
0 Not Returned
12 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Affirmative All

Ayer, Lawrence S.
Gallo, Ernest J.
Hickman, Palmer L.
Holub, Richard A.
Hunter, Dean C.
Johnston, Michael J.
Kendall, David H.
Kovacik, John R.
Manche, Alan
McDaniel, Roger D.
Porter, Christine T.
Williams, David A.

Public Comment No. 745-NFPA 70-2021 [Section No. 695.7(A)]

(A) Motor Starting.

Unless the requirements of 695.7(B) or (C) are met, the voltage at the ~~fire pump controller line terminals~~ contactor load terminals to which the motor is connected shall not drop more than 15 percent below normal (controller-rated voltage) under motor starting conditions. [**20:**9.4.1]

Statement of Problem and Substantiation for Public Comment

Revised to be consistent with the language in 695.7(D). These rules are talking about the same thing, just with a change in the permitted voltage drop and the language should read the same in both first level subdivisions.

Related Item

• FR-9017

Submitter Information Verification

Submitter Full Name: Don Ganiere
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Tue Aug 03 15:59:32 EDT 2021
Committee: NEC-P13

Public Comment No. 1747-NFPA 70-2021 [Section No. 695.14(F)]

(F) Generator Control Wiring Methods.

Control conductors installed between the fire pump power transfer switch and the standby generator supplying the fire pump during normal power loss shall be kept entirely independent of all other wiring. The integrity of the generator remote start circuit shall be monitored for broken, disconnected, or shorted wires. Loss of integrity shall start the generator(s).

Informational Note: See NFPA 20-2019, *Standard for the Installation of Stationary Pumps for Fire Protection*, 3.3.7.2, for more information on fault-tolerant external control circuits.

The control conductors shall be protected to resist potential damage by fire or structural failure. Where routed through a building, the conductors shall be protected from fire for 2 hours using one of the following methods:

(1) The cable or raceway is encased in ~~a minimum 50 mm (2 in.) of concrete.~~ concrete to achieve 2 hrs of fire protection.

Informational note: See NFPA Research Paper *Fire Resistance of Concrete for Electrical Conductors (dated December 18, 2018)*, Table 5: *Fire Resistance Rating of Single Layer Concrete Walls, Floors and Roofs* , to determine the thickness of concrete (by type) to achieve the required Fire Resistance

(2) The cable or raceway is part of a listed fire-resistive cable system.

Informational Note No. 1: See UL 2196-2017, *Standard for Fire Test for Circuit Integrity of Fire-Resistive Power, Instrumentation, Control and Data Cables*, for testing requirements for fire-resistive cables.

Informational Note No. 2: The listing organization provides information for fire-resistive cable systems on proper installation requirements to maintain the fire rating.

(3) The cable or raceway is protected by a listed electrical circuit protective system.

Informational Note No. 3: See UL 1724, *Fire Tests for Electrical Circuit Protection Systems*, for testing requirements for circuit protective systems.

Informational Note No. 4: Electrical circuit protective systems could include, but are not limited to, thermal barriers or a protective shaft.

Informational Note No. 5: The listing organization provides information for electrical circuit protective systems on proper installation requirements to maintain the fire rating.

Additional Proposed Changes

File Name	Description	Approved
695-14_-_SD1.docx	Details, Substation and alternative Information Note.	

Statement of Problem and Substantiation for Public Comment

Based on the returned comments from the First draft, it was stated that it is understood that 2 inches of concrete may not equal 2 hours of fire protection. Further comments on this statement were included in the Final ballot. This proposal is recommending to change it from stating a given thickness which would not account for the fire resistances of the different aggregates used. By changing the wording to require the 2 hours of protection, and providing to the engineer the suitable method to determine required thickness, it would ensure that the circuits are adequately protected.

The attached document provides more details on the proposed Information note (and details as to what information the table would refer to) as well as an alternate note for use with a different source (IBC in this case) if preferred.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 1735-NFPA 70-2021 [Section No. 695.6(A)(2)]	
Public Comment No. 1750-NFPA 70-2021 [Section No. 700.10(D)(2)]	
Public Comment No. 1752-NFPA 70-2021 [Section No. 708.10(C)(2)]	
Public Comment No. 1735-NFPA 70-2021 [Section No. 695.6(A)(2)]	
Public Comment No. 1750-NFPA 70-2021 [Section No. 700.10(D)(2)]	
Public Comment No. 1752-NFPA 70-2021 [Section No. 708.10(C)(2)]	

Related Item

• PI 3707

Submitter Information Verification

Submitter Full Name: Ryan Drury
Organization: nVent
Street Address:

City:	
State:	
Zip:	
Submittal Date:	Tue Aug 17 16:05:11 EDT 2021
Committee:	NEC-P13

This proposal is in reference to Public Input No. 3707-NFPA 70-2020.

It is a revision to the original proposal, as per the following (As highlighted in Yellow):

695.14 Control Wiring

(F) Generator Control Wiring Methods

The control conductors shall be protected to resist potential damage by fire or structural failure. Where routed through a building, the conductors shall be protected from the fire for 2 hours using one of the following methods:

(1) The cable or raceway is encased in ~~a minimum 50 mm (2 in) of~~ concrete to achieve 2 hrs of fire protection

Informational note: See NFPA Research Paper *Fire Resistance of Concrete for Electrical Conductors (dated December 18, 2018),* Table 5: *Fire Resistance Rating of Single Layer Concrete Walls, Floors and Roofs*, to determine the suitable thickness of concrete (by type) to achieve the required Fire Resistance

Or

Informational note: See 2018 International Building Code, Section 7, Table 722.3.2*: Minimum Equivalent Thickness (inches) of Bearing or nonbearing concrete masonry walls*, to determine the suitable thickness of concrete (by type) to achieve the required Fire Resistance

Substantiation:

Dictating a minimum thickness of concrete may be too onerous due to the variety of concrete types used. As such, the recommendation is to remove the specific requirement to achieving this, and utilizing existing fire resistance ratings for various concrete types, as found in Table 5 of the NFPA research paper. This ensure that the specifying engineer is given enough detail to design the encasement to protect the life safety circuits adequately for 2 hrs.

Table 5 as follows, for Reference:

Table 5: Fire Resistance Rating of Single Layer Concrete Walls, Floors and Roofs[13]

Aggregate Type Used in Concrete Masonry Unit	Minimum Equivalent Thickness for Fire Resistance Rating (inches)				
	4 Hours	3 Hours	2 Hours	1.5 Hours	1 Hour
Siliceous	6.9	6.2	4.9	4.3	3.5
Carbonate	6.7	6.1	4.5	3.9	3.1
Semi-Lightweight	5.3	4.5	3.7	3.3	2.8

Also included is an alternate informational note where an IBC code is referenced for the engineer to utilize for the specification. This is here to provide the option to the NFPA research paper or to a reference in the IBC.

Table 722.3.2 as follows, for reference

TABLE 722.3.2
MINIMUM EQUIVALENT THICKNESS (Inches) OF BEARING OR NONBEARING CONCRETE MASONRY WALLS[a, b, c, d]

TYPE OF AGGREGATE	FIRE-RESISTANCE RATING (hours)														
	½	¾	1	1¼	1½	1¾	2	2¼	2½	2¾	3	3¼	3½	3¾	4
Pumice or expanded slag	1.5	1.9	2.1	2.5	2.7	3.0	3.2	3.4	3.6	3.8	4.0	4.2	4.4	4.5	4.7
Expanded shale, clay or slate	1.8	2.2	2.6	2.9	3.3	3.4	3.6	3.8	4.0	4.2	4.4	4.6	4.8	4.9	5.1
Limestone, cinders or unexpanded slag	1.9	2.3	2.7	3.1	3.4	3.7	4.0	4.3	4.5	4.8	5.0	5.2	5.5	5.7	5.9
Calcareous or siliceous gravel	2.0	2.4	2.8	3.2	3.6	3.9	4.2	4.5	4.8	5.0	5.3	5.5	5.8	6.0	6.2

For SI: 1 inch = 25.4 mm.

a. Values between those shown in the table can be determined by direct interpolation.

b. Where combustible members are framed into the wall, the thickness of solid material between the end of each member and the opposite face of the wall, or between members set in from opposite sides, shall be not less than 93 percent of the thickness shown in the table.

c. Requirements of ASTM C55, ASTM C73, ASTM C90 or ASTM C744 shall apply.

d. Minimum required equivalent thickness corresponding to the hourly fire-resistance rating for units with a combination of aggregate shall be determined by linear interpolation based on the percent by volume of each aggregate used in manufacture.

Public Comment No. 1749-NFPA 70-2021 [Section No. 695.14(F)]

(F) Generator Control Wiring Methods.

Control conductors installed between the fire pump power transfer switch and the standby generator supplying the fire pump during normal power loss shall be kept entirely independent of all other wiring. The integrity of the generator remote start circuit shall be monitored for broken, disconnected, or shorted wires. Loss of integrity shall start the generator(s).

Informational Note: See NFPA 20-2019, *Standard for the Installation of Stationary Pumps for Fire Protection*, 3.3.7.2, for more information on fault-tolerant external control circuits.

The control conductors shall be protected to resist potential damage by fire or structural failure. Where routed through a building, the conductors shall be protected from fire for 2 hours using one of the following methods:

(1) The cable or raceway is encased in a minimum ~~50 mm~~ 94 mm (~~2 in~~ 3 . 7") of concrete.

(2) The cable or raceway is part of a listed fire-resistive cable system.

Informational Note No. 1: See UL 2196-2017, *Standard for Fire Test for Circuit Integrity of Fire-Resistive Power, Instrumentation, Control and Data Cables*, for testing requirements for fire-resistive cables.

Informational Note No. 2: The listing organization provides information for fire-resistive cable systems on proper installation requirements to maintain the fire rating.

(3) The cable or raceway is protected by a listed electrical circuit protective system.

Informational Note No. 3: See UL 1724, *Fire Tests for Electrical Circuit Protection Systems*, for testing requirements for circuit protective systems.

Informational Note No. 4: Electrical circuit protective systems could include, but are not limited to, thermal barriers or a protective shaft.

Informational Note No. 5: The listing organization provides information for electrical circuit protective systems on proper installation requirements to maintain the fire rating.

Statement of Problem and Substantiation for Public Comment

Based on the returned comments from the First draft, it was stated that it is understood that 2 inches of concrete may not equal 2 hours of fire protection. Further comments on this statement were included in the Final ballot, detailing that the committee felt that 5" of thickness was too onerous. As such, the value specified is based on the minimum concrete thickness found to meet the 2 hr Fire resistance threshold detailed in Table 5, as found in the 2018 NFPA Research Foundation report "Fire Resistance of Concrete for Electrical Conductors".

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 1744-NFPA 70-2021 [Section No. 695.6(A)(2)]	
Public Comment No. 1751-NFPA 70-2021 [Section No. 700.10(D)(2)]	
Public Comment No. 1754-NFPA 70-2021 [Section No. 708.10(C)(2)]	
Public Comment No. 1744-NFPA 70-2021 [Section No. 695.6(A)(2)]	
Public Comment No. 1751-NFPA 70-2021 [Section No. 700.10(D)(2)]	
Public Comment No. 1754-NFPA 70-2021 [Section No. 708.10(C)(2)]	

Related Item

• PI 3707

Submitter Information Verification

Submitter Full Name: Ryan Drury
Organization: nVent
Street Address:
City:
State:
Zip:
Submittal Date: Tue Aug 17 16:09:00 EDT 2021
Committee: NEC-P13

Public Comment No. 452-NFPA 70-2021 [New Section after 695.15]

TITLE OF NEW CONTENT

695.16 Cybersecurity, Cyberweapon, Electromagnetic Pulse (EMP), Geomagnetic Disturbance (GMD), and Intentional Electromagnetic Interference (IEMI) Protection. Fire pumps shall comply with either of the following:

(1) The fire pump shall be identified for cybersecurity, cyberweapon, EMP, GMD, and IEMI protection.

(2) A cybersecurity, cyberweapon, EMP, GMD, and IEMI protection failure modes effects analysis assessment shall be conducted to determine fire pump vulnerabilities.

The identification or assessment shall be reviewed when the system configuration changes and at not more than 5-year intervals. Documentation of the identification or assessment shall be made available to those authorized to inspect, operate, and maintain the system.

Statement of Problem and Substantiation for Public Comment

This Public Comment is a follow-up to PI 761, PI 3080, FR 8801, PI 764, and PI 4024. It does not require cybersecurity, cyberweapon, EMP, GMD, or IEMI protection, but rather calls for the fire pump to be identified for these threats or for a threat assessment to be completed. While the NEC® is not ready to mandate protection requirements, an assessment would show fire pump vulnerabilities. Acceptance of this Public Comment would at least bring the subject to the attention of owners, design engineers, electrical inspectors, and insurance companies, and set the table for requirements in future editions of the NEC® (or other NFPA standards). The format for this Public Comment is based upon the cybersecurity requirements found in FR 8801, which offers an assessment as an alternate for requiring protection.

PI 761 provided technical substantiation to require Electromagnetic Pulse (EMP) Protection for our critical infrastructure. While it appears that the NEC(R) is not ready to actually require EMP protection at this time, the security of our country is at stake. An EMP is fairly well understood as an extremely powerful electromagnetic wave that can impress 50,000 volts per meter on every piece of electrical equipment, destroying everything that is unprotected. An EMP is often associated with a nuclear explosion, but that is not the only cause of electromagnetic damage. A Geomagnetic Disturbance (GMD) is caused by a sunspot. While the EMP would be created by one of our adversaries, the sun spot is an act of God. These types of events can instantly initiate millions of fires in our unprotected electrical systems, overwhelming our fire-fighting capabilities. If millions of fires weren't bad enough, the unprotected electrical equipment would be damaged or completely destroyed, subjecting the country to years of blackout. Government intelligence studies, now unclassified, have predicted that from 66% to 90% of our population would die within one year, due to a lack of food, clean water, and medicine, if a significant EMP or GMD were to occur, while the country's electrical infrastructure remains unprotected. The final threat listed is an Intentional Electromagnetic Interference (IEMI). It is easily created by utilizing off-the-shelf parts, available for purchase on the internet, that will fit into a van. While much less powerful than a significant EMP or GMD, twenty vans, equipped with bench-made IEMI devices and scattered throughout the country, can shut down major industries and major parts of the country for weeks, if not months, through a coordinated attack, similar to 9/11, by targeting key industries/vulnerabilities. In conclusion, these electromagnetic threats to our unprotected electrical infrastructure, and therefor to our entire country, are absolutely real, and must be addressed.

PI 4024 provided significant substantiation for the need to protect critical infrastructure against cyber attack for equipment connected to the internet. However, equipment does not need to be connected to the internet in order to be damaged or destroyed by cyber threats. Equipment can be damaged by cyber weapons such as malicious computer worms that attack SCADA (control) systems. A great example is the Stuxnet worm that destroyed the centrifuges in Iran. Thus, this Public Comment deletes the PI 4024 reference to the internet and adds cyberweapon to the list of threats that need to be either protected against or assessed.

Related Item

• PI 764 • PI 3080 • FR 8801 • PI 4024 • PI 3055 • FR 7947 • PI 4026 • FR 8880 • FR 8917 • PI 2888 • FR 8914 • PI 3083

Submitter Information Verification

Submitter Full Name: Vincent Saporita
Organization: Saporita Consulting
Affiliation: Saporita Consulting
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jul 27 16:36:31 EDT 2021
Committee: NEC-P13

Public Comment No. 1685-NFPA 70-2021 [Section No. 695.15]

695.15 Surge Protection.

A listed surge protective device (SPD) shall be installed in or on the fire pump controller.

A Type 1 SPD shall be installed in accordance with Part II of Article 242.

Exception: Surge-protective devices shall not be required in or on a fire pump controller for diesel fire pumps.

Statement of Problem and Substantiation for Public Comment

The proposed additional requirement for a Type 1 SPD aligns with 10.4.1.1 of NFPA 20.

Related Item

• FR 9020

Submitter Information Verification

Submitter Full Name: Megan Hayes
Organization: Nema
Street Address:
City:
State:
Zip:
Submittal Date: Tue Aug 17 11:50:51 EDT 2021
Committee: NEC-P13

Public Comment No. 1236-NFPA 70-2021 [Section No. 700.3(A)]

(A) Testing and document of Commissioning ~~Witness Test~~ .

The authority having jurisdiction shall ~~conduct or~~ witness the ~~commissioning and~~ testing of the complete system upon installation and ~~periodically afterward.~~ be given the completed Commissioning Report.

Information Note: See NECA 90-2009 Standard for Commissioning Building Electrical Systems.

Statement of Problem and Substantiation for Public Comment

The process of Commissioning this Emergency System could be spread over several days or months. Whereas the Testing of the system is done over a few hours or less. Having the AHJ attend all phases of the Commissioning process is not practical and needs to be revised to just the Testing phase of the commissioning process. Having the third party Commissioning company turn over the final report will meet the intent of this section to document that the Emergency System is fully compliant with the design and the code. Also, adding an Informational note to assist the AHJ as to what to look for in a Commissioning Report. NEIS 90-2009 Standard for Commissioning Building Electrical Systems.

Related Item

• FR #8784

Submitter Information Verification

Submitter Full Name: Michael Smith
Organization: ZAK Company dba K & F Electric
Street Address:
City:
State:
Zip:
Submittal Date: Wed Aug 11 10:50:59 EDT 2021
Committee: NEC-P13

Public Comment No. 1833-NFPA 70-2021 [Section No. 700.3(A)]

(A) Commissioning Witness Test.

The authority having jurisdiction shall conduct or witness the ~~commissioning and testing of~~ commissioning of the complete system upon installation and periodically afterward.

Statement of Problem and Substantiation for Public Comment

The words “and testing” are redundant and therefore should be removed from the requirement. “Testing” is included in the definition of the term “commissioning”. Please refer to the definitions in article 100.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 1846-NFPA 70-2021 [Section No. 701.3(A)]	
Public Comment No. 1846-NFPA 70-2021 [Section No. 701.3(A)]	

Related Item

• FR 8784

Submitter Information Verification

Submitter Full Name: Timothy Windey
Organization: Cummins Power Generation
Street Address:
City:
State:
Zip:
Submittal Date: Wed Aug 18 10:07:55 EDT 2021
Committee: NEC-P13

Public Comment No. 1887-NFPA 70-2021 [Section No. 700.3(A)]

(A) Commissioning Witness Test.

The authority having jurisdiction shall conduct or witness the commissioning and testing of the complete system upon installation and periodically afterward.

Informational Note: See NECA 90, Standard for Commissioning Building Electrical Systems.

Statement of Problem and Substantiation for Public Comment

Commissioning building electrical systems (emergency systems) involves multiple processes and system checks and documentation. NECA-90 provides thorough information on effective commissioning of systems to ensure that required objectives are met. This document helps ensure those conducting the witness testing and commissioning have the necessary information. Note: For correlation, the same revisions and informational note should be included in Section 708.6(A) that addresses the same concerns.

Related Item

• FR 8784

Submitter Information Verification

Submitter Full Name: Agnieszka Golriz
Organization: NECA
Street Address:
City:
State:
Zip:
Submittal Date: Wed Aug 18 13:40:35 EDT 2021
Committee: NEC-P13

Public Comment No. 765-NFPA 70-2021 [Section No. 700.3(F)]

(F) Temporary Source of Power for Maintenance or Repair of the Alternate Source of Power.

If the emergency system relies on a single alternate source of power, which will be disabled for maintenance or repair, the emergency system shall include permanent switching means to connect a portable or temporary alternate source of power that shall be available for the duration of the maintenance or repair. The permanent switching means to connect a portable or temporary alternate source of power shall comply with the following:

(1) Connection to the portable or temporary alternate source of power shall not require modification of the permanent system wiring.

(2) Transfer of power between the normal power source and the emergency power source shall be in accordance with 700.12.

(3) The connection point for the portable or temporary alternate source shall be marked with the phase rotation and system bonding requirements.

(4) The switching means, including the interlocks, shall be listed and provided with mechanical or mechanical and electrical interlocking to prevent inadvertent interconnection of power sources.

(5) The switching means shall include a contact point that shall annunciate at a location remote from the generator or at another facility monitoring system to indicate that the permanent emergency source is disconnected from the emergency system.

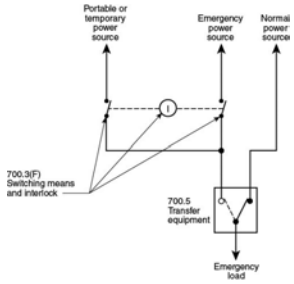
(6) ~~The permanent connection point for the temporary generator shall be located outdoors and shall not have cables from the connection point to the temporary generator routed through exterior windows, doors, or similar openings.~~ Wiring and equipment from the temporary generator to the permanent switching means shall comply with "Article 590 Temporary Installations". Temporary wiring methods shall be acceptable only if approved based on the condition of use and any special requirements of the temporary installation per 590.2(B).

(7) A permanent label shall be field applied at the permanent connection point to identify the system voltage, maximum amperage, short-circuit current rating of the load side of equipment supplied, and ungrounded conductor identification in accordance with 210.5.

It shall be permissible to use manual switching to switch from the permanent source of power to the portable or temporary alternate source of power and to use the switching means for connection of a load bank.

Informational Note: See Informational Note Figure 700.3(F) for one example of many possible methods to achieve the requirements of 700.3(F).

Figure Informational Note Figure 700.3(F)



Exception: The permanent switching means to connect a portable or temporary alternate source of power for the duration of the maintenance or repair shall not be required where any of the following conditions exists:

(1) All processes that rely on the emergency system source are capable of being disabled during maintenance or repair of the emergency source of power.

(2) The building or structure is unoccupied and fire protection systems are fully functional and do not require an alternate power source.

(3) Other temporary means can be substituted for the emergency system.

(4) A permanent alternate emergency source, such as, but not limited to, a second on-site standby generator or separate electric utility service connection, capable of supporting the emergency system, exists.

Statement of Problem and Substantiation for Public Comment

First Revision No. 8786-NFPA 70-2021 [Section No. 700.3(F)] should be revised based on Public Comment No. 765-NFPA 70-2021

All of the submitted PI's, addressing 700.3(F), weather accepted or resolved, made valid proposals with substantiations describing unique installations. Most of the problem's identified can be resolved by the existing code text in Article 590. My recollection of the original substantiation for 700.3(F) was to have a way of "switching" to a temporary source with temporary conductors and equipment connected to a permanent switching means. The temporary installation required for a 4 hour oil change would be much different than the length of time required for a complete engine rebuild. Article 590 already exists and requires AHJ approval "based on the condition of use and any special requirements". The panel statement to PI 1830 states that" "Article 590 applies in all cases where temporary power is utilized". Subsection (6) is confusing and contradicts subsection(1). It calls for "modification of the permanent system wiring." by installing a "permanent connection point". Would the conductors from the "permanent connection point" to the switching means be permanent? If the generator and the "permanent connection point" are located outdoors how do the cables get routed through windows and door? :"Do we

really need a code rule to tell them not to place the generator in a way that the diesel exhaust could enter the building?

Related Item

• First Revision No. 8786 NFPA 70 2021 [Section No. 700.3(F)] should be revised based on PC 765 -NFPA 70 2021

Submitter Information Verification

Submitter Full Name: Lawrence Forshner
Organization: Bard Rao Athanas Consulting
Affiliation: self
Street Address:
City:
State:
Zip:
Submittal Date: Wed Aug 04 09:40:11 EDT 2021
Committee: NEC-P13

Public Comment No. 1641-NFPA 70-2021 [Section No. 700.4(A)]

~~**(A)** Rating.~~

~~The emergency system equipment shall be suitable for the available fault current at its terminals.~~

Statement of Problem and Substantiation for Public Comment

The committee rejected this PI by stating that an emergency system can be supplied by multiple sources. This is both true and completely irrelevant. Sections 110.9 and 110.10 cover this issue, and repeating it here violates 4.1.1 of the style manual.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 1642-NFPA 70-2021 [Section No. 702.4(A)]	

Related Item

- PI 572

Submitter Information Verification

Submitter Full Name: Ryan Jackson
Organization: Ryan Jackson
Street Address:
City:
State:
Zip:
Submittal Date: Mon Aug 16 19:02:43 EDT 2021
Committee: NEC-P13

Public Comment No. 941-NFPA 70-2021 [Section No. 700.4(A)]

(A) Rating.

The emergency system equipment interrupting and short-circuit current ratings shall be suitable for the available fault current at its terminals. Emergency system equipment shall be marked with the available fault current and the date the calculation was performed. The marking shall comply with 110.21(B)(3).

Statement of Problem and Substantiation for Public Comment

Text has been added to require the marking of the available fault current and date of calculation for emergency system equipment. The wording is similar to NEC 408.6 that requires this marking on all panelboards, switchboards and switchgear. This would then apply for all emergency system panelboards, switchboards and switchgear. However, there is other emergency equipment that would benefit from this marking such as emergency system transfer switches, enclosed circuit breakers and fused or non-fused disconnects to make sure the equipment interrupting and short-circuit current ratings are adequate for the available fault current. Having the equipment ratings as well as the available fault current marked on the equipment also increases the ability of the electrical inspector to evaluate the proper application of equipment.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 945-NFPA 70-2021 [Section No. 701.4(A)]	Similar requirement
Public Comment No. 945-NFPA 70-2021 [Section No. 701.4(A)]	

Related Item

- Public Input No. 394

Submitter Information Verification

Submitter Full Name: Daniel Neeser
Organization: Eaton's Bussmann Division
Street Address:
City:
State:
Zip:
Submittal Date: Thu Aug 05 11:04:41 EDT 2021
Committee: NEC-P13

Public Comment No. 1152-NFPA 70-2021 [Section No. 700.4(B)]

(B) Capacity.

An emergency system shall have adequate capacity in accordance with Article 220 or by another approved method. The system capacity shall be sufficient for the rapid load changes and transient power and energy requirements associated with any expected loads.

Additional Proposed Changes

File Name	Description	Approved
13_CN_309.pdf	13 CN309	

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 309 appeared in the First Draft Report on First Revision No. 8790.

The Correlating Committee directs the panel to revise the requirement to remove the reference to an entire article in accordance with 4.1.4 of the NEC Style Manual.

Related Item

• First Revision No. 8790

Submitter Information Verification

Submitter Full Name: CC on NEC-AAC
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:
Submittal Date: Tue Aug 10 11:44:43 EDT 2021
Committee: NEC-P13

Correlating Committee Note No. 309-NFPA 70-2021 [Section No. 700.4(B)]

Submitter Information Verification

Committee: NEC-P13
Submittal Date: Thu May 06 14:52:38 EDT 2021

Committee Statement

Committee Statement: The Correlating Committee directs the panel to revise the requirement to remove the reference to an entire article in accordance with 4.1.4 of the NEC Style Manual.

First Revision No. 8790-NFPA 70-2021 [Section No. 700.4(B)]

Ballot Results

This item has passed ballot

12 Eligible Voters
0 Not Returned
12 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Affirmative All

Ayer, Lawrence S.
Gallo, Ernest J.
Hickman, Palmer L.
Holub, Richard A.
Hunter, Dean C.
Johnston, Michael J.
Kendall, David H.
Kovacik, John R.
Manche, Alan
McDaniel, Roger D.
Porter, Christine T.
Williams, David A.

Public Comment No. 126-NFPA 70-2021 [Section No. 700.4(B)]

(B) Capacity.

An emergency system shall have adequate capacity in accordance with ~~Article~~ ~~220~~ this *Code* , or by another approved method. The system capacity shall be sufficient for the rapid load changes and transient power and energy requirements associated with any expected loads.

Statement of Problem and Substantiation for Public Comment

The NEC style manual prohibits a reference back to an entire Article in the Code. The reference to Article 220 is unnecessary as the requirements in Chapters 1-4 apply throughout the code.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 127-NFPA 70-2021 [Section No. 701.4(B)]	
Public Comment No. 128-NFPA 70-2021 [Section No. 702.4(B)(2)]	

Related Item

• FR 8790

Submitter Information Verification

Submitter Full Name: Brian Baughman
Organization: Generac Power Systems Inc.
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jul 06 10:12:38 EDT 2021
Committee: NEC-P13

Public Comment No. 1045-NFPA 70-2021 [Section No. 700.4(C)]

(C) Selective Load ~~Pickup and Load Shedding~~ Management .

The alternate power source shall be permitted to supply emergency, legally required standby, and optional standby system loads where the source has adequate capacity or where load management (that includes automatic selective load pickup and load shedding) is provided as needed to ensure adequate power to the following in order of priority:

(1) Emergency circuits

(2) Legally required standby circuits

(3) Optional standby circuits

Statement of Problem and Substantiation for Public Comment

This public comment is submitted on behalf of the Energy Management Task Group formed under the direction of the Correlating Committee to review all current and proposed definitions and requirements related to load management, load management system, power control system, energy management system and related terms to ensure a coordinated approach throughout the Code. See CCN-279.

The task group members are; Chad Kennedy (Chair), Tim Zgonena, Rebekah Hren, Greg Ball, Jason Fisher, Doug Burkett, Robert Jordan, Matthew Grover, Tim Windey, Karl Reighard, and Brian Baughman. This task group of balanced interests provided the expertise to develop these public comments covering energy management across the NEC.

Technical Substantiation:
The title has been modified so that it doesn't include functions from the actual requirement, and that it does include the proper level of abstraction along with the use of common terminology. This will improve consistency in the code. The requirement has been modified to include the common terminology while retaining the extremely important functional context that's needed.
Related TG PC's: 701.4(C), 708.22(B)

This public comment is part of a series of actions recommended by the task group. See the related public comments which complete this action.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 36-NFPA 70-2021 [Definition: Energy Management System.]	
Public Comment No. 1034-NFPA 70-2021 [Definition: Load Management System.]	
Public Comment No. 1036-NFPA 70-2021 [Definition: Load Management.]	
Public Comment No. 1039-NFPA 70-2021 [Section No. 220.70]	
Public Comment No. 1041-NFPA 70-2021 [Section No. 625.42(A)]	
Public Comment No. 1042-NFPA 70-2021 [Section No. 625.42(B)]	
Public Comment No. 1037-NFPA 70-2021 [Section No. 750.30]	
Public Comment No. 1048-NFPA 70-2021 [Section No. 708.22(B)]	
Public Comment No. 1049-NFPA 70-2021 [Section No. 705.80]	
Public Comment No. 1050-NFPA 70-2021 [Section No. 705.28(A)]	
Public Comment No. 1044-NFPA 70-2021 [Section No. 705.46]	
Public Comment No. 1043-NFPA 70-2021 [Section No. 705.13]	
Public Comment No. 1052-NFPA 70-2021 [Section No. 705.11(A)(1)]	
Public Comment No. 1053-NFPA 70-2021 [Section No. 705.12 [Excluding any Sub-Sections]]	
Public Comment No. 1046-NFPA 70-2021 [Section No. 701.4(C)]	
Public Comment No. 1047-NFPA 70-2021 [Section No. 702.4(B)]	
Public Comment No. 1406-NFPA 70-2021 [Section No. 230.82]	
Public Comment No. 36-NFPA 70-2021 [Definition: Energy Management System.]	
Public Comment No. 1034-NFPA 70-2021 [Definition: Load Management System.]	
Public Comment No. 1036-NFPA 70-2021 [Definition: Load Management.]	
Public Comment No. 1037-NFPA 70-2021 [Section No. 750.30]	
Public Comment No. 1039-NFPA 70-2021 [Section No. 220.70]	
Public Comment No. 1041-NFPA 70-2021 [Section No. 625.42(A)]	
Public Comment No. 1042-NFPA 70-2021 [Section No. 625.42(B)]	
Public Comment No. 1043-NFPA 70-2021 [Section No. 705.13]	
Public Comment No. 1044-NFPA 70-2021 [Section No. 705.46]	
Public Comment No. 1046-NFPA 70-2021 [Section No. 701.4(C)]	
Public Comment No. 1047-NFPA 70-2021 [Section No. 702.4(B)]	

Public Comment No. 1048-NFPA 70-2021 [Section No. 708.22(B)]
Public Comment No. 1049-NFPA 70-2021 [Section No. 705.80]
Public Comment No. 1050-NFPA 70-2021 [Section No. 705.28(A)]
Public Comment No. 1052-NFPA 70-2021 [Section No. 705.11(A)(1)]
Public Comment No. 1053-NFPA 70-2021 [Section No. 705.12 [Excluding any Sub-Sections]]
Public Comment No. 1406-NFPA 70-2021 [Section No. 230.82]

Related Item

• CN-279

Submitter Information Verification

Submitter Full Name: Chad Kennedy
Organization: Schneider Electric
Street Address:
City:
State:
Zip:
Submittal Date: Fri Aug 06 09:41:52 EDT 2021
Committee: NEC-P13

Public Comment No. 1854-NFPA 70-2021 [Section No. 700.5]

700.5 Transfer Equipment.

(A) General.

Transfer equipment shall be automatic, listed, and marked for emergency use. Transfer equipment shall be designed and installed to prevent the inadvertent interconnection of normal and emergency sources of supply in any operation of the transfer equipment. Transfer equipment and electric power production systems installed to permit operation in parallel with the normal source shall meet the requirements of Article 705. Meter-mounted transfer switches shall not be permitted for emergency system use.

(B) Bypass Isolation Switches.

Means shall be permitted to bypass and isolate the transfer equipment. Where bypass isolation switches are used, inadvertent parallel operation shall be prevented.

(C) Automatic Transfer Switches.

Automatic transfer switches shall be electrically operated and mechanically held. Automatic transfer switches shall not be permitted to be reconditioned.

(D) Redundant Transfer Equipment

Where emergency loads are supplied by a single

~~automatic transfer switch~~

feeder , the

~~automatic transfer switch shall include a bypass isolation function~~

emergency power system shall include redundant transfer equipment to facilitate maintenance as required in 700.3(C) without jeopardizing continuity of power.

~~When the automatic transfer switch has been bypassed to facilitate maintenance, the bypass switch shall automatically transfer the load between power sources upon loss of the connected power source, or it shall remain~~

If the redundant transfer equipment is manual (or non-automatic), then it shall be actively supervised by a qualified person

~~who can manually initiate a transfer of the load between power sources. Where bypass isolation switches are used, inadvertent parallel operation shall be avoided. Exception: The requirement for a bypass isolation transfer switch~~

when the primary (automatic) transfer equipment is disabled for maintenance or repair.

Exception: The requirement for redundancy with the transfer equipment shall not apply where any of the following conditions

~~exists~~

exist :

(1) All processes that rely on the emergency system source are capable of being disabled during maintenance or repair activities without jeopardizing the safety to human life .

(2) The building or structure is unoccupied and fire protection systems are fully functional and do not require an alternate power source.

(3) Other temporary means shall be permitted to be substituted for the emergency system.

(4) A

~~permanent switching means to bypass the transfer equipment is provided to supply the connected load. The~~

(1) written

~~procedures for bypassing the transfer equipment and ensuring operation by qualified persons shall be made available to the authority having jurisdiction. Where the switching means is not capable of automatically starting and transferring the load to the~~

(1) emergency

~~source, the switching means shall be supervised and provisions for manually performing these functions shall be provided. A written emergency~~

(1) plan that includes mitigation actions and responsibilities for qualified persons to address the recognized site hazards for the duration of the maintenance or repair activities shall be developed and implemented. The emergency plan shall be made available to the authority having jurisdiction.

~~(~~

~~C) Automatic Transfer Switches.~~

~~Automatic transfer switches shall be electrically operated and mechanically held. Automatic transfer switches shall not be permitted to be reconditioned.~~

~~(D)~~

~~**E)** Use.~~

~~Transfer equipment shall supply only emergency loads.~~

~~Informational Note: Transfer equipment that supplies emergency loads provides separation of this load type from any others and is independent of any equipment used to combine or parallel sources.~~

~~(~~

~~E~~

~~**F)** Documentation.~~

~~The short circuit current rating of the transfer equipment, based on the specific overcurrent protective device type and settings protecting the transfer equipment, shall be field marked on the exterior of the transfer equipment.~~

Additional Proposed Changes

File Name	Description	Approved
700.5_B_Public_Comment_option_2_Final.docx		

Statement of Problem and Substantiation for Public Comment

Note: TerraView messed up the formatting, so please refer to the attachment for clarification.

Substantiation: The new 700.5(B) requirement is one vendor's solution to having a degree of redundancy for emergency systems. There are multiple ways to safely and reliably meet the requirement for ensuring continuity of power when an emergency load is supplied by a single feeder. We shouldn't be directing the reader to do it with just one product in mind. In addition, there is only one vendor that has a product offering that satisfies the requirement in the main paragraph. There are other allowed ways to meet the requirement, but they are exceptions. This elevates the main text solution above the others. Finally, the product standard for transfer switches doesn't yet have any content for bypass isolation transfer switches with automatic transfer bypass function.
If we are going to add a requirement here for redundancy with the automatic transfer equipment, we should be more closely mirroring the content in section 708.24. Therefore the wording for section 705 was rolled back to the way it read in the 2020 edition, and a new "Redundant Transfer Equipment" section was inserted right after 700.5(C) that talks about the functionality that's needed when emergency loads are supplied by a single feeder.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 1850-NFPA 70-2021 [Section No. 708.24(D)]	
Public Comment No. 1850-NFPA 70-2021 [Section No. 708.24(D)]	

Related Item

- FR 8794

Submitter Information Verification

Submitter Full Name: Timothy Windey
Organization: Cummins Power Generation
Street Address:
City:
State:
Zip:
Submittal Date: Wed Aug 18 11:22:48 EDT 2021
Committee: NEC-P13

700.5(B) Transfer Equipment

(A) General
Content same as before.

(B) Bypass Isolation Switches
Delete current content and replace with two sentences below from the 2020 code.
Means shall be permitted to bypass and isolate the transfer equipment. Where bypass isolation switches are used, inadvertent parallel operation shall be ~~avoided.~~ prevented.

(C) Automatic Transfer Switches
Content same as before.

Note: Insert new section as follows:
(D) Redundant Transfer Equipment
Where emergency loads are supplied by a single feeder, the emergency power system shall include redundant transfer equipment to facilitate maintenance as required in 700.3(C) without jeopardizing continuity of power. If the redundant transfer equipment is manual (or non-automatic), then it shall be actively supervised by a qualified person when the primary (automatic) transfer equipment is disabled for maintenance or repair.

Exception: The requirement for redundancy with the transfer equipment shall not apply where any of the following conditions exist:

(1) All processes that rely on the emergency system source are capable of being disabled during maintenance or repair activities without jeopardizing the safety to human life.
(2) The building or structure is unoccupied and fire protection systems are fully functional and do not require an alternate power source.
(3) Other temporary means shall be permitted to be substituted for the emergency system.
(4) A written emergency plan that includes mitigation actions and responsibilities for qualified persons to address the recognized site hazards for the duration of the maintenance or repair activities shall be developed and implemented. The emergency plan shall be made available to the authority having jurisdiction.

Note: Former (D) becomes (E)
(E) Use
Content same as before.

Note: Former (E) becomes (F)
(F) Documentation
Content same as before.

Substantiation:

The new 700.5(B) requirement is one vendor's solution to having a degree of redundancy for emergency systems. There are multiple ways to safely and reliably meet the requirement for ensuring continuity of power when an emergency load is supplied by a single feeder. We shouldn't be directing the reader to do it with just one product in mind. In addition, there is only one vendor that has a product offering that satisfies the requirement in the main paragraph. There are other allowed ways to meet the requirement, but they are exceptions. This elevates the main text solution above the others. Finally, the product standard for transfer switches doesn't yet have any content for bypass isolation transfer switches with automatic transfer bypass function.

If we are going to add a requirement here for redundancy with the automatic transfer equipment, we should be more closely mirroring the content in section 708.24. Therefore the wording for section 705 was rolled back to the way it read in the 2020 edition, and a new "Redundant Transfer Equipment" section was inserted right after 700.5(C) that talks about the functionality that's needed when emergency loads are supplied by a single feeder.

Related PC's:
My PC for article 708.24

Public Comment No. 41-NFPA 70-2021 [Section No. 700.5]

700.5 Transfer Equipment.

(A) General.

Transfer equipment shall be automatic, listed, and marked for emergency use. Transfer equipment shall be designed and installed to prevent the inadvertent interconnection of normal and emergency sources of supply in any operation of the transfer equipment. Transfer equipment and electric power production systems installed to permit operation in parallel with the normal source shall meet the requirements of Article 705. Meter-mounted transfer switches shall not be permitted for emergency system use.

(B) Bypass Isolation Switches.

Where emergency loads are supplied by a single automatic transfer switch, the automatic transfer switch shall include a bypass isolation function to facilitate maintenance as required in 700.3(C) without jeopardizing continuity of power. When the automatic transfer switch has been bypassed to facilitate maintenance, the bypass switch shall automatically transfer the load between power sources upon loss of the connected power source, or it shall remain actively supervised by a qualified person who can manually initiate a transfer of the load between power sources. Where bypass isolation switches are used, inadvertent parallel operation shall be avoided.

Exception: The requirement for a bypass isolation transfer switch shall not apply where any of the following conditions exists:

(1) All processes that rely on the emergency system source are capable of being disabled during maintenance or repair activities.

(2) The building or structure is unoccupied and fire protection systems are fully functional and do not require an alternate power source.

(3) Other temporary means shall be permitted to be substituted for the emergency system.

(4) A permanent switching means to bypass the transfer equipment is provided to supply the connected load. The written procedures for bypassing the transfer equipment and ensuring operation by qualified persons shall be made available to the authority having jurisdiction. Where the switching means is not capable of automatically starting and transferring the load to the emergency source, the switching means shall be supervised and provisions for manually performing these functions shall be provided.

(5) A written emergency plan that includes mitigation actions and responsibilities for qualified persons to address the recognized site hazards for the duration of the maintenance or repair activities shall be developed and implemented. The emergency plan shall be made available to the authority having jurisdiction.

(C) Automatic Transfer Switches.

Automatic transfer switches shall be electrically operated and mechanically held. ~~Automatic transfer switches shall not be permitted to be reconditioned.~~

(D) Use.

Transfer equipment shall supply only emergency loads.

Informational Note: Transfer equipment that supplies emergency loads provides separation of this load type from any others and is independent of any equipment used to combine or parallel sources.

(E) Documentation.

The short-circuit current rating of the transfer equipment, based on the specific overcurrent protective device type and settings protecting the transfer equipment, shall be field marked on the exterior of the transfer equipment.

(F) Reconditioning of Transfer Switches.

Transfer Switches within the scope of this article shall be permitted to be reconditioned in accordance with 700.5(F)(1) through 700.5(F)(4).

(1) The reconditioning process shall be performed in accordance with instructions provided by the manufacturer.

(2) Reconditioning shall be performed using design qualified parts verified under applicable standards.

(3) Reconditioned transfer switches shall be listed or field labeled as reconditioned, and previously applied listing marks, if any, within the portions reconditioned shall be removed.

(4) If equipment has been damaged by fire, products of combustion, or water, it shall be specifically evaluated by its manufacturer or a qualified testing laboratory prior to being returned to service.

Statement of Problem and Substantiation for Public Comment

The Committee Statement may be correct for some designs of the power switching element, but it is ignoring the other components and power switching elements that are designed to be serviced.

First, transfer switch equipment includes many systems and components in addition to the power switching element. There are typically controllers, control power, metering, and communication systems. These other system performance characteristics can be determined by immediate measurement and test, not destructive or end-of-life testing cited in the statement. When transfer switch equipment that has only limited service and a control system needs to be replaced or updated because of failure or obsolescence, the transfer equipment can be restored to full functional performance. Some would consider this reconditioning. The current code could force the complete

replacement of the enclosure, power bus, wiring, power switching element, and other systems when only an updated controller is needed. This will cause longer times to put the transfer equipment back into service, eliminating the backup performance during this longer period.

Second, the suitability of a specific power switching element is addressed in the PI. Item (F)(1) states “in accordance with instructions provided by the manufacturer.” If an element is not intended to be serviceable the manufacturer will provide that information.

For reference, consider Molded Case Circuit Breakers (MCCB) and Low Voltage Power Circuit Breakers (LVPCB). Manufactures state that their MCCBs are not serviceable and do not provide instructions or parts for these circuit breakers. This is because the committee statement “performance characteristics cannot be determined by visual or measurement means, and can only be determined by testing to destruction or to end-of-life” is correct for MCCBs and one of the reasons manufactures state they cannot be reconditioned. Manufacturers do support the reconditioning of LVPCBs. Instructions to inspect and repair, and replacement parts for these products are provided. The NEC follows this approach in section 240.88(A), and 700.5 should use the same approach.

Related Item

• PI 2753-NFPA 70-2020

Submitter Information Verification

Submitter Full Name: John Cowans
Organization: Siemens
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 30 10:04:51 EDT 2021
Committee: NEC-P13

Public Comment No. 40-NFPA 70-2021 [Section No. 700.5(B)]

(B) Bypass Isolation Switches.

~~Where emergency loads are supplied by a single automatic transfer switch, the automatic transfer switch shall include a bypass isolation function to facilitate maintenance as required in 700.3(C) without jeopardizing continuity of power. When the automatic transfer switch has been bypassed to facilitate maintenance, the bypass switch shall automatically transfer the load between power sources upon loss of the connected power source, or it shall remain actively supervised by a qualified person who can manually initiate a transfer of the load between power sources~~ Means shall be permitted to bypass and isolate the transfer equipment . Where bypass isolation switches are used, inadvertent parallel operation shall be avoided.

~~*Exception: The requirement for a bypass isolation transfer switch shall not apply where any of the following conditions exists:*~~

(1) ~~*All processes that rely on the emergency system source are capable of being disabled during maintenance or repair activities.*~~

(2) ~~*The building or structure is unoccupied and fire protection systems are fully functional and do not require an alternate power source.*~~

(3) ~~*Other temporary means shall be permitted to be substituted for the emergency system.*~~

(4) ~~*A permanent switching means to bypass the transfer equipment is provided to supply the connected load. The written procedures for bypassing the transfer equipment and ensuring operation by qualified persons shall be made available to the authority having jurisdiction. Where the switching means is not capable of automatically starting and transferring the load to the emergency source, the switching means shall be supervised and provisions for manually performing these functions shall be provided.*~~

(5) ~~*A written emergency plan that includes mitigation actions and responsibilities for qualified persons to address the recognized site hazards for the duration of the maintenance or repair activities shall be developed and implemented. The emergency plan shall be made available to the authority having jurisdiction.*~~

Statement of Problem and Substantiation for Public Comment

The changes introduced by FR 8794-NFPA 70-2021 relate to maintenance of transfer switches and was created in response to PIs 1327-NFPA 70-2020 and 2231-NFPA 70-2020. No data, documented occurrences, or anecdotal evidence is provided in either of the PIs to show that the current requirements in 700.5(B) have created a danger to the health or safety of any persons. Furthermore, NFPA 70 is an installation code and only addresses items that can be inspected after installation or after completion of other permitted work, while NFPA 70B addresses maintenance and related procedures. The requirement for supervision and automatic transfer while the device is undergoing maintenance would be better addressed in NFPA 70B.

Additionally, NFPA 110 Section 6.4.4 requires that "...the bypass-isolation switch shall be designed so it can function as an independent nonautomatic transfer switch..." To correlate with the requirements of NFPA 110, operation of the bypass switch should not be introduced in this Code.

Related Item

• FR 8794-NFPA 70-2021

Submitter Information Verification

Submitter Full Name: John Cowans
Organization: Siemens
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 30 09:55:32 EDT 2021
Committee: NEC-P13

Public Comment No. 1121-NFPA 70-2021 [Section No. 700.6(C)]

(C) Storage Battery Charging Malfunction.

To indicate a charging malfunction on a battery required for source readiness, including starting the prime mover, is not functioning.

Additional Proposed Changes

File Name	Description	Approved
13_CN_294.pdf	13 CN294	

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 294 appeared in the First Draft Report on First Revision No. 8798.

The Correlating Committee directs the panel to revise 700.6(A) through (D) into complete sentences to comply with the NEC Style Manual.

Related Item

• First Revision No. 8798

Submitter Information Verification

Submitter Full Name: CC on NEC-AAC
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:
Submittal Date: Mon Aug 09 16:10:56 EDT 2021
Committee: NEC-P13

Correlating Committee Note No. 294-NFPA 70-2021 [Section No. 700.6(C)]

Submitter Information Verification

Committee: NEC-P13
Submittal Date: Thu May 06 14:10:52 EDT 2021

Committee Statement

Committee Statement: The Correlating Committee directs the panel to revise 700.6(A) through (D) into complete sentences to comply with the NEC Style Manual.

First Revision No. 8798-NFPA 70-2021 [Section No. 700.6(C)]

Ballot Results

This item has passed ballot

12 Eligible Voters
0 Not Returned
12 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Affirmative All

Ayer, Lawrence S.
Gallo, Ernest J.
Hickman, Palmer L.
Holub, Richard A.
Hunter, Dean C.
Johnston, Michael J.
Kendall, David H.
Kovacik, John R.
Manche, Alan
McDaniel, Roger D.
Porter, Christine T.
Williams, David A.

Public Comment No. 1122-NFPA 70-2021 [Section No. 700.9]

700.9 Cybersecurity.

Emergency systems that are connected to a communication network and have the capability to permit control of any portion of the premises emergency electrical system shall comply with either of the following:

(1) The ability to control the system is limited to a direct connection through a local nonnetworked interface.

(2) It is connected through a networked interface complying with one of the following methods:

a. The system and associated software are identified as being evaluated for cybersecurity.

b. A cybersecurity assessment is conducted on the connected system to determine vulnerabilities to cyberattacks.

The cybersecurity assessment shall be conducted when the system configuration changes and at not more than 5-year intervals.

Documentation of the evaluation, assessment, and certification shall be made available to those authorized to inspect, operate, and maintain the system.

Informational Note No. 1: See ISA 62443, *Cybersecurity Standards* series; UL 2900, *Cybersecurity Standards* series; or the *NIST Framework for Improving Critical Infrastructure Cybersecurity*, Version 1.1, for assessment requirements.

Informational Note No. 2: Examples of the commissioning certification used to demonstrate the system has been investigated for cybersecurity vulnerabilities could be one of the following:

(1) The ISA Security Compliance Institute (ISCI) conformity assessment program

(2) Certification of compliance by a nationally recognized test laboratory

(3) Manufacturer certification for the specific type and brand of system provided

Additional Proposed Changes

File Name	Description	Approved
13_CN_295.pdf	13 CN295	

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 295 appeared in the First Draft Report on First Revision No. 8801.

The Correlating Committee requests that the Panel determine if "Qualified Electrical Testing Laboratory" or other terminology would be more appropriate than "Nationally Recognized Testing Laboratory" in consideration of the NEC Style Manual, Section 3.2.5.3, Consistent Application of Terms.

Related Item

• First Revision No. 8801

Submitter Information Verification

Submitter Full Name: CC on NEC-AAC
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:
Submittal Date: Mon Aug 09 16:13:42 EDT 2021
Committee: NEC-P13

Correlating Committee Note No. 295-NFPA 70-2021 [New Section after 700.8]

Submitter Information Verification

Committee: NEC-P13
Submittal Date: Thu May 06 14:15:47 EDT 2021

Committee Statement

Committee Statement: The Correlating Committee requests that the Panel determine if “Qualified Electrical Testing Laboratory” or other terminology would be more appropriate than "Nationally Recognized Testing Laboratory" in consideration of the NEC Style Manual, Section 3.2.5.3, Consistent Application of Terms.

First Revision No. 8801-NFPA 70-2021 [New Section after 700.8]

Ballot Results

This item has passed ballot

12 Eligible Voters
0 Not Returned
12 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Affirmative All

Ayer, Lawrence S.
Gallo, Ernest J.
Hickman, Palmer L.
Holub, Richard A.
Hunter, Dean C.
Johnston, Michael J.
Kendall, David H.
Kovacik, John R.
Manche, Alan
McDaniel, Roger D.
Porter, Christine T.
Williams, David A.

Public Comment No. 1240-NFPA 70-2021 [Section No. 700.9]

700.9 Cybersecurity.

Emergency systems that are connected to a communication network and have the capability to permit control of any portion of the premises emergency electrical system shall comply with either of the following:

(1) The ability to control the system is limited to a direct connection through a local nonnetworked interface.

(2) It is connected through a networked interface complying with one of the following methods:

a. The system and associated software are identified as being evaluated for cybersecurity.

b. A cybersecurity assessment is conducted on the connected system to determine vulnerabilities to cyberattacks.

The cybersecurity assessment shall be conducted when the system configuration changes and at not more than 5-year intervals.

Documentation of ~~the evaluation, assessment, and~~ the assessment certification shall be made available to those authorized to inspect, operate, and maintain the system.

Informational Note No. 1: See ISA 62443, *Cybersecurity Standards* series; UL 2900, *Cybersecurity Standards* series; the *ioXt Security Pledge* , or the *NIST Framework for Improving Critical Infrastructure Cybersecurity*, Version 1.1, for assessment requirements.

Informational Note No. 2: Examples of the ~~commissioning~~ assessment certification used to demonstrate the system has been investigated for cybersecurity vulnerabilities could be one of the following:

(1) The ISA Security Compliance Institute (ISCI) conformity ~~assessment~~ certification program

(2) The ioXt Alliance certification program

(3) Certification of compliance by a ~~nationally recognized test~~ qualified cybersecurity testing laboratory

(4) Manufacturer certification for the specific type and brand of system provided

Statement of Problem and Substantiation for Public Comment

Providing documentation of the evaluation and assessment is not necessary and could introduce cybersecurity risks. This information should not be made public. However, documentation of the assessment certification is appropriate and sufficient.

The ioXt Alliance cybersecurity assessment criteria (ioXt Pledge) and certification program are globally recognized including acceptance by the Design Lights Consortium for cybersecurity certification of Networked Lighting Controls. The ioXt Alliance stated mission is to build confidence in the Internet of Things products through multi-stakeholder, international, harmonized and standardized security and privacy requirements, product compliance programs, and public transparency of those requirements and programs.

There are no Nationally Recognized Testing Laboratories with cybersecurity standards as part of their scope. Certification by a qualified cybersecurity testing laboratory is more appropriate.

Related Item

• Public Input No. 3080-NFPA 70-2020 [New Section after 700.8] • First Revision No. 8801-NFPA 70-2021 [New Section after 700.8]

Submitter Information Verification

Submitter Full Name: Robert Spehalski
Organization: Lutron Electronics Co., Inc.
Street Address:
City:
State:
Zip:
Submittal Date: Wed Aug 11 11:11:45 EDT 2021
Committee: NEC-P13

Public Comment No. 1889-NFPA 70-2021 [Section No. 700.9]

700.9 Cybersecurity.

Emergency systems that are connected to a communication network and have the capability to permit control of any portion of the premises emergency electrical system shall comply with either of the following:

(1) The ability to control the system is limited to a direct connection through a local nonnetworked interface.

(2) It is connected through a networked interface complying with one of the following methods:

a. The system and associated software are identified as being evaluated for cybersecurity.

b. A cybersecurity assessment is conducted on the connected system to determine vulnerabilities to cyberattacks.

The cybersecurity assessment shall be conducted when the system configuration changes and at not more than 5-year intervals.

Documentation of the evaluation, assessment, and certification shall be made available to those authorized to inspect, operate, and maintain the system.

Informational Note No. 1: See ISA 62443, *Cybersecurity Standards* series; UL 2900, *Cybersecurity Standards* series; or the *NIST Framework for Improving Critical Infrastructure Cybersecurity*, Version 1.1, for assessment requirements.

Informational Note No. 2: Examples of the commissioning certification used to demonstrate the system has been investigated for cybersecurity vulnerabilities could be one of the following:

(1) The ISA Security Compliance Institute (ISCI) conformity assessment program

(2) Certification of compliance by a ~~nationally recognized test laboratory~~ qualifiied electrical testing laboratory

(3) Manufacturer certification for the specific type and brand of system provided

Statement of Problem and Substantiation for Public Comment

Section 3.2.5.3 titled “Nationally Recognized Testing Laboratory” indicates that use of the terms “Nationally Recognized Testing Laboratory” or “NRTL” shall be avoided. The Nationally Recognized Testing Laboratory program, also known as NRTL, is an OSHA program for the accreditation of laboratories that test products for the workplace and is not to be applied generally in the NEC. The preferred term to use is “Qualified Electrical Testing Laboratory” to align with Section 90.7.

Related Item

• FR 8801

Submitter Information Verification

Submitter Full Name: Agnieszka Golriz
Organization: NECA
Street Address:
City:
State:
Zip:
Submittal Date: Wed Aug 18 13:42:16 EDT 2021
Committee: NEC-P13

Public Comment No. 2017-NFPA 70-2021 [Section No. 700.9]

700.9 Cybersecurity.

Emergency systems that are connected to a communication network and have the capability to permit control of any portion of the premises emergency electrical system shall comply with either of the following:

(1) The ability to control the system is limited to a direct connection through a local nonnetworked interface.

(2) It is connected through a networked interface complying with one of the following methods:

a. The system and associated software are identified as being evaluated for cybersecurity.

b. A cybersecurity assessment is conducted on the connected system to determine vulnerabilities to cyberattacks.

The cybersecurity assessment shall be conducted when the system ~~configuration changes and~~ software version is changed and at not more than 5-year intervals.

Documentation of the ~~evaluation, assessment, and certification~~ assessment certification shall be made available to those authorized to inspect, operate, and maintain the system.

Informational Note No. 1: See ISA 62443, *Cybersecurity Standards* series; UL 2900, *Cybersecurity Standards* series; ~~or the~~ *NIST Framework for Improving Critical Infrastructure Cybersecurity*, Version 1.1~~, for~~ ;ioXT Certification Program; Cloud Security Alliance STAR; or the UL 1376 IoT Security Rating for assessment requirements.

Informational Note No. 2: Examples of the ~~commissioning~~ assessment certification used to demonstrate the system has been investigated for cybersecurity vulnerabilities could be one of the following:

(1) The ISA Security Compliance Institute (ISCI) conformity assessment program

(2) Certification of compliance by a nationally recognized test laboratory

(3) Manufacturer certification for the specific type and brand of system provided

(4) Certification established through multi-stakeholder organization developed process

Statement of Problem and Substantiation for Public Comment

Performing cybersecurity assessments “when the system configuration changes” is not well defined. There are many levels and instances of configuration changes within a system. This is subject to interpretation and it is unreasonable to perform an assessment for simple configuration adjustments and changes. Assessments should be considered each time the system software version is changed.

An assessment certification should suffice as evidence for compliance. Documentation between the assessment body and manufacturer is private and should not be publicly shared due to cybersecurity risks of vulnerability exposure.

Informational Note 1 should include cybersecurity assessment certification processes developed and supported by multi-stakeholder organizations such as the ioXt Alliance (used by some lighting control manufacturers due to its specific lighting control profile), and in the case of systems connected to the cloud, certification such as STAR by the Cloud Security Alliance. Including such organizations in the informational note will acknowledge system application specific cybersecurity assessments certifications are applicable for compliance.

Informational Note 2 should more appropriately refer consistently to the “Assessment Certification”. There is no reference to a “Commissioning” Certification in the proposed requirement and the term “Commissioning” has a significantly different meaning in the building environment.

Cybersecurity vulnerability assessment through respected organizations that use a multi-stakeholder development process and may assess specific equipment targeting its intended use and risk levels has been added as Informational Note 2 list item 4. This strengthens the ability of the proposal to acknowledge these cybersecurity specific certification programs.

Related Item

• The First Draft language we are proposing edits to arose from FR-8801-NFPA 70-2021, which itself resulted from PI-3080 that was modified and then supported during the First Draft meetings by CMP-13.

Submitter Information Verification

Submitter Full Name: Stephen Rood
Organization: Legrand North America
Street Address:
City:
State:
Zip:
Submittal Date: Wed Aug 18 23:48:34 EDT 2021
Committee: NEC-P13

Public Comment No. 2051-NFPA 70-2021 [Section No. 700.9]

700.9 Cybersecurity.

Emergency systems that are connected to a communication network and have the capability to permit control of any portion of the premises emergency electrical system shall comply with either of the following:

(1) The ability to control the system is limited to a direct connection through a local nonnetworked interface.

(2) It is connected through a networked interface complying with one of the following methods:

a. The system and associated software are identified as being evaluated for cybersecurity.

b. A cybersecurity assessment is conducted on the connected system to determine vulnerabilities to cyberattacks.

The cybersecurity assessment shall be conducted when the system configuration changes and at not more than 5-year intervals.

Documentation of the evaluation, assessment, and certification shall be made available to those authorized to inspect, operate, and maintain the system.

Informational Note No. 1: See ISA 62443/IEC 62443 , *Cybersecurity Standards* series; UL 2900, *Cybersecurity Standards* series; or the *NIST Framework for Improving Critical Infrastructure Cybersecurity*, Version 1.1, for assessment requirements.

Informational Note No. 2: Examples of the commissioning certification used to demonstrate the system has been investigated for cybersecurity vulnerabilities could be one of the following:

(1) The ISA Security Compliance Institute (ISCI) conformity assessment program

(2) Certification of compliance by a nationally recognized test laboratory

(3) Manufacturer certification for the specific type and brand of system provided

Statement of Problem and Substantiation for Public Comment

The ISA 62443 series of cybersecurity standards are ANSI accredited adoptions of the IEC 62443 series. Accordingly, I suggest that Informational Note 1 should be clarified to reflect this.

Related Item

• FR 8801

Submitter Information Verification

Submitter Full Name: Michael o`boyle
Organization: Signify North America
Street Address:
City:
State:
Zip:
Submittal Date: Thu Aug 19 09:51:21 EDT 2021
Committee: NEC-P13

Public Comment No. 2074-NFPA 70-2021 [Section No. 700.9]

700.9 Cybersecurity.

Emergency systems that are connected to a communication network and have the capability to permit control of any portion of the premises emergency electrical system shall comply with either of the following:

(1) The ability to control the system is limited to a direct connection through a local nonnetworked interface.

(2) It is connected through a networked interface complying with one of the following methods:

a. The ~~system and associated software are~~ interface is identified as being evaluated for cybersecurity.

b. A cybersecurity assessment is conducted on the connected system to determine vulnerabilities to cyberattacks.

~~The cybersecurity assessment shall be conducted when the system configuration changes and at not more than 5-year intervals.~~

~~Documentation of the evaluation, assessment, and~~ .

Assessment certification shall be made available to those authorized to inspect, operate, and maintain the system.

Informational Note No. 1: See ISA 62443, *Cybersecurity Standards* series; UL 2900, *Cybersecurity Standards* series; assessments developed by collaborative multi-stakeholder organization processes; or the *NIST Framework for Improving Critical Infrastructure Cybersecurity*, Version 1.1, for assessment requirements.

Informational Note No. 2: Examples of the ~~commissioning~~ assessment certification used to demonstrate the system has been investigated for cybersecurity vulnerabilities could be one of the following:

(1) The ISA Security Compliance Institute (ISCI) conformity assessment program

(2) Certification of compliance by a nationally recognized test laboratory

(3) Manufacturer certification for the specific type and brand of system provided

(4) Assessment certification established through a collaborative multi-stakeholder organization developed process

Statement of Problem and Substantiation for Public Comment

The suggested change in the text of 700.9 (2)a. is because it is the interface that is evaluated, not the system and software. The system vulnerabilities are most critical at the connection interface and the full system is most likely comprised of equipment from multiple manufactures.
Cybersecurity assessments upon each system configuration change and at intervals of not more than 5-years cannot practically be accomplished or enforced. The definition of “configuration change” is not defined and subject to many interpretations. In-situ cybersecurity assessment with vulnerability are not practical on installed, operating systems. There is no enforcement mechanism for a 5-year interval assessment making the requirement essentially void.
An assessment certification should suffice as evidence for compliance. Documentation between the assessment body and manufacturer is private and should not be publicly shared due to cybersecurity risks of vulnerability exposure.
Informational Note 1 should include cybersecurity assessment processes developed and supported by collaborative multi-stakeholder organization.
Informational Note 2 should refer consistently to the Assessment Certification. There is no reference to a Commissioning Certification in the proposed requirement.
Cybersecurity vulnerability assessment through respected organizations that use a multi-stakeholder development process and may assess specific equipment targeting its intended use and risk levels has been added as item 4.

Related Item

• FR 8801

Submitter Information Verification

Submitter Full Name: Michael o`boyle
Organization: Signify North America
Street Address:
City:
State:
Zip:
Submittal Date: Thu Aug 19 10:30:00 EDT 2021
Committee: NEC-P13

Public Comment No. 2127-NFPA 70-2021 [Section No. 700.9]

~~**700.9** Cybersecurity.~~

~~Emergency systems that are connected to a communication network and have the capability to permit control of any portion of the premises emergency electrical system shall comply with either of the following:~~

(1) ~~The ability to control the system is limited to a direct connection through a local nonnetworked interface.~~

(2) ~~It is connected through a networked interface complying with one of the following methods:~~

(3) ~~The system and associated software are identified as being evaluated for cybersecurity.~~

(4) ~~A cybersecurity assessment is conducted on the connected system to determine vulnerabilities to cyberattacks.~~

~~The cybersecurity assessment shall be conducted when the system configuration changes and at not more than 5-year intervals.~~

~~Documentation of the evaluation, assessment, and certification shall be made available to those authorized to inspect, operate, and maintain the system.~~

~~Informational Note No. 1: See ISA 62443, *Cybersecurity Standards* series; UL 2900, *Cybersecurity Standards* series; or the *NIST Framework for Improving Critical Infrastructure Cybersecurity* , Version 1.1, for assessment requirements.~~

~~Informational Note No. 2: Examples of the commissioning certification used to demonstrate the system has been investigated for cybersecurity vulnerabilities could be one of the following:~~

(1) ~~The ISA Security Compliance Institute (ISCI) conformity assessment program~~

(2) ~~Certification of compliance by a nationally recognized test laboratory~~

(3) ~~Manufacturer certification for the specific type and brand of system provided~~

Statement of Problem and Substantiation for Public Comment

While I applaud the panel for recognizing the cybersecurity threat, the code requirements as stated lead users of the code to the false conclusion that installations that meet these requirements will be secure. That is not what these requirements accomplish, and the code language should either be removed in its entirety (1st preference) or revised as indicated in my other public comment (2nd preference). Please note that cybersecurity code language was rejected by CMP 1 and CMP 12 in the first draft.

Standards such as UL 2900 only serve to establish that a secure system is possible using the listed components. It makes no further guarantees. Security is ultimately the responsibility and liability of the building operator that maintains the constituent systems.

Put in physical security terms, these standards require devices to have lock features, much like residential building codes require that exterior access doors include a deadbolt lock. However, if the building occupant is annoyed by the lock and simply leaves the key in the door, security is lost. While this kind of poor physical security habit is abhorrent to any reasonable person, the cybersecurity equivalent of this practice occurs on a daily basis. Poorly formed passwords, or good passwords that are too difficult to remember that are then scribbled on notes under keyboards lead to frequent security breaches. Further, no software system is immune from bugs and can be susceptible to further exploits.

The reason that the assessments and certifications suggested in the proposed code language are of minor value to cybersecurity is due to the fact that these systems depend entirely on how they are configured in the actual building. A networking device can be 99% secure from the factory, and then have all security features defeated by a user configuration in a matter of minutes.

The proposed code attempts to address this by allowing an assessment to be conducted as an alternative to the device certificate. This is highly misleading as both are required to achieve true security. Allowing only one contributes to a false sense of security. Assessing an installed network requires a high level of sophistication and technical knowledge. These evaluations also require an enormous amount of trust with the assessing entity, and any code that forces disclosure of security measures to third parties is dangerous to overall security. Further, an ongoing recertification interval of 5 years is completely useless as vulnerabilities and their exploits occur on the order of days and weeks, let alone months. Requiring recertification on reconfiguration similarly would be untenable as networks experience configuration changes often on a weekly or even daily basis, and defining which trigger the need for a recertification would be onerous at best. Due to the obvious difficulties presented to the authorities having jurisdiction, the whole issue of on-site assessments should be omitted from the NEC and left to more appropriate NFPA documents such as NFPA 70B or other regulatory processes.

It's important to remember that even if security is perfect at the moment of final inspection in the context of the NEC, the most likely outcome is that any breach will occur after the authority having jurisdiction has signed off on building occupancy. This places the vast majority of the cybersecurity problem outside of the reach of the NEC, which is why my first preference is for wholesale removal of these requirements. There is some value in ensuring devices are able to be secured, but even insecure devices can be made secure by competent security professionals using additional security layers. Thus, I feel any resources required by the NEC to solve the device security listing would be better allocated to solving the operational challenges, and as such belong in a more appropriate NFPA document such as NFPA 70B or a dedicated NFPA Cybersecurity document.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 2128-NFPA 70-2021 [Section No. 700.9]	Alternate code edits if this comment is not accepted.
Public Comment No. 2128-NFPA 70-2021 [Section No. 700.9]	

Related Item

- FR-8801-NFPA 70-2021

Submitter Information Verification

Submitter Full Name: Jason Potterf
Organization: Cisco
Affiliation: Entertainment Services and Technology Association (ESTA)
Street Address:
City:
State:
Zip:
Submittal Date: Thu Aug 19 13:10:31 EDT 2021
Committee: NEC-P13

Public Comment No. 2128-NFPA 70-2021 [Section No. 700.9]

700.9 Cybersecurity.

Emergency systems that are connected to a communication network and have the capability to permit control of any portion of the premises emergency electrical system shall comply with either of the following:

(1) The ability to control the system is limited to a direct connection through a local nonnetworked interface.

(2) ~~It is connected through a networked interface complying with one of the following methods: The system and associated software are identified as being evaluated for - cybersecurity.~~

(3) ~~A cybersecurity assessment is conducted on the connected system to determine vulnerabilities to cyberattacks.~~

~~The cybersecurity assessment shall be conducted when the system configuration changes and at not more than 5-year intervals~~

(1) having the features necessary to achieve acceptable levels of cybersecurity if properly configured and maintained .

Documentation of the evaluation, assessment, and certification shall be made available to those authorized to inspect, operate, and maintain the system.

Informational Note No. 1: See ISA 62443, *Cybersecurity Standards* series; UL 2900, *Cybersecurity Standards* series; or the *NIST Framework for Improving Critical Infrastructure Cybersecurity*, Version 1.1, for assessment requirements.

Informational Note No. 2: Examples of the commissioning certification used to demonstrate the system has been investigated for cybersecurity vulnerabilities could be one of the following:

(1) The ISA Security Compliance Institute (ISCI) conformity assessment program

(2) Certification of compliance by a nationally recognized test laboratory

(3) Manufacturer certification for the specific type and brand of system provided

Informational Note No. 3: Cybersecurity is a specialized field requiring constant, vigilant attention to security vulnerabilities. Installation of devices that can be secured is an important first step, but not sufficient to guarantee a secure system.

Statement of Problem and Substantiation for Public Comment

While I applaud the panel for recognizing the cybersecurity threat, the code requirements as stated lead users of the code to the false conclusion that installations that meet these requirements will be secure. That is not what these requirements accomplish, and the code language should either be removed in its entirety (1st preference) or revised as indicated in this public comment (2nd preference). Please note that cybersecurity code language was rejected by CMP 1 and CMP 12 in the first draft.

Standards such as UL 2900 only serve to establish that a secure system is possible using the listed components. It makes no further guarantees. Security is ultimately the responsibility and liability of the building operator that maintains the constituent systems.

Put in physical security terms, these standards require devices to have lock features, much like residential building codes require that exterior access doors include a deadbolt lock. However, if the building occupant is annoyed by the lock and simply leaves the key in the door, security is lost. While this kind of poor physical security habit is abhorrent to any reasonable person, the cybersecurity equivalent of this practice occurs on a daily basis. Poorly formed passwords, or good passwords that are too difficult to remember that are then scribbled on notes under keyboards lead to frequent security breaches. Further, no software system is immune from bugs and can be susceptible to further exploits.

The reason that the assessments and certifications suggested in the proposed code language are of minor value to cybersecurity is due to the fact that these systems depend entirely on how they are configured in the actual building. A networking device can be 99% secure from the factory, and then have all security features defeated by a user configuration in a matter of minutes.

The proposed code attempts to address this by allowing an assessment to be conducted as an alternative to the device certificate. This is highly misleading as both are required to achieve true security. Allowing only one contributes to a false sense of security. Assessing an installed network requires a high level of sophistication and technical knowledge. These evaluations also require an enormous amount of trust with the assessing entity, and any code that forces disclosure of security measures to third parties is dangerous to overall security. Further, an ongoing recertification interval of 5 years is completely useless as vulnerabilities and their exploits occur on the order of days and weeks, let alone months. Requiring recertification on reconfiguration similarly would be untenable as networks experience configuration changes often on a weekly or even daily basis, and defining which trigger the need for a recertification would be onerous at best. Due to the obvious difficulties presented to the authorities having jurisdiction, the whole issue of on-site assessments should be omitted from the NEC and left to more appropriate NFPA documents such as NFPA 70B or other regulatory processes.

It's important to remember that even if security is perfect at the moment of final inspection in the context of the NEC, the most likely outcome is that any breach will occur after the authority having jurisdiction has signed off on building occupancy. This places the vast majority of the cybersecurity problem outside of the reach of the NEC, which is why my first preference is for wholesale removal of these requirements. There is some value in ensuring devices are able to be secured, but even insecure devices can be made secure by competent security professionals using additional security layers. Thus, I feel any resources required by the NEC to solve the device security listing would be better allocated to solving the operational challenges, and as such belong in a more appropriate NFPA document such as NFPA 70B or a dedicated NFPA Cybersecurity document.

Terra Misbehavior Note: Terra improperly renumbered my edit. My added language should be (2) under (1) and not a second (1) item.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 2127-NFPA 70-2021 [Section No. 700.9]	Preferred code edit.
Public Comment No. 2127-NFPA 70-2021 [Section No. 700.9]	

Related Item

- FR-8801-NFPA 70-2021

Submitter Information Verification

Submitter Full Name: Jason Potterf
Organization: Cisco
Affiliation: Entertainment Services and Technology Association (ESTA)
Street Address:
City:
State:
Zip:
Submittal Date: Thu Aug 19 13:11:52 EDT 2021
Committee: NEC-P13

Public Comment No. 2145-NFPA 70-2021 [Section No. 700.9]

700.9 ~~Cybersecurity~~ Security .

Emergency systems that ~~are connected to a communication network and~~ have the capability to permit control of any portion of the premises emergency electrical system shall comply with either of the following:

(1) The ability to control the system is limited to a direct connection through a ~~local~~ nonnetworked interface for which all user interface elements are located in a single room or enclosure that is secured by a locking door . The locking door shall be identified as being evaluated for physical security.

(2) It is connected through a networked interface complying with one of the following methods:

a. The system and associated software are identified as being evaluated for cybersecurity.

b. A cybersecurity assessment is conducted on the connected system to determine vulnerabilities to cyberattacks.

The cybersecurity assessment shall be conducted when the system configuration changes and at not more than 5-year intervals.

Documentation of the evaluation, assessment, and certification shall be made available to those authorized to inspect, operate, and maintain the system.

Informational Note No. 1: See ISA 62443, *Cybersecurity Standards* series; UL 2900, *Cybersecurity Standards* series; or the *NIST Framework for Improving Critical Infrastructure Cybersecurity*, Version 1.1, for assessment requirements.

Informational Note No. 2: Examples of the commissioning certification used to demonstrate the system has been investigated for cybersecurity vulnerabilities could be one of the following:

(1) The ISA Security Compliance Institute (ISCI) conformity assessment program

(2) Certification of compliance by a nationally recognized test laboratory

(3) Manufacturer certification for the specific type and brand of system provided

Informational Note No. 3: See NFPA 730-2020, Guide for Premises Security, and ANSI/TIA-5017-2016, Telecommunications Physical Network Security Standard, for further information regarding physical security.

Statement of Problem and Substantiation for Public Comment

The proposed requirements imply that cybersecurity attacks are the only security threat to system integrity. The section should either be removed in its entirety, deferring physical security to more appropriate documents (1st preference), or revised as indicated in this public comment (2nd preference).

Any code language which implies that a local connection is more secure than a remote connection is misguided and inadequate. To correct this language, it should include similar security evaluation requirements against physical security attacks as those specified for cybersecurity attacks.

Security and the integrity of the system against remote attacks is just as necessary for in-person attackers as social engineering attacks are common and effective. Impersonation of service personnel has been demonstrated time and time again as an effective way to gain access to building systems, and is often faster and easier than a similar cyberattack. Some of the most notable cyberattacks in recent history, such as Stuxnet, were achieved by authorized personnel plugging infected memory devices into isolated systems. Further, there is a disturbing trend towards hybrid physical and cyber attacks in which remote access is covertly provisioned without the victim's knowledge by an in-person attack due to lax physical security.

As is the case with cybersecurity, physical security is only as good as its enforcement on the day of the attack. A locked door is only useful if the staff keep it locked. Personnel training, system maintenance, and access control system security all play a role. None of these are within the scope of the NEC, the electrical contractors, nor the authorities having jurisdiction and their inspectors. Thus, the only value the NEC can bring is to ensure that these systems can be secured by including appropriate physical security features, and this value is minimal. Instead of focusing on requirements enforced by the NEC at the time of building inspection, resources would be better used to address the problems with day-to-day security through a more appropriate NFPA document than NFPA 70.

Related Item

• FR-8801-NFPA 70-2021

Submitter Information Verification

Submitter Full Name: Jason Potterf
Organization: Cisco
Affiliation: Entertainment Services and Technology Association (ESTA)
Street Address:
City:
State:
Zip:
Submittal Date: Thu Aug 19 13:57:05 EDT 2021

Committee: NEC-P13

Public Comment No. 2213-NFPA 70-2021 [Section No. 700.9]

700.9 Cybersecurity.

Emergency systems that are connected to a communication network and have the capability to permit control of any portion of the premises emergency electrical system shall comply with either of the following:

(1) The ability to control the system is limited to within a ~~direct connection through a local nonnetworked interface. It is connected through a networked interface complying with~~

(2) local area network. The local area network shall be physically dedicated to the emergency system(s) and shall not have any physical or virtual connections with other networks. Equipment with access to the dedicated network shall not be made accessible to other networks.

(3) The emergency system(s) is/are connected in a way other than described above. In that case, the networked equipment of the emergency system(s) and the local area network to which the emergency system(s) is/are a part of shall comply with one of the following methods:

a. The networked system ~~and~~ , associated software ~~are identified as being evaluated for cybersecurity~~ , and cybersecurity policies and procedures for the facility shall be certified to known cybersecurity standards and practices .

b. A cybersecurity assessment is conducted on the connected system to determine vulnerabilities to cyberattacks , with mitigation plans documented and implemented .

The cybersecurity assessment shall be conducted when the system configuration changes and at not more than 5-year intervals.

Documentation of the evaluation, assessment, and certification shall be made available to those authorized to inspect, operate, and maintain the system.

Informational Note No. 1: See ISA 62443, *Cybersecurity Standards* series; UL 2900, *Cybersecurity Standards* series; or the *NIST Framework for Improving Critical Infrastructure Cybersecurity*, Version 1.1, for assessment requirements.

Informational Note No. 2: Examples of the commissioning certification used to demonstrate the system has been investigated for cybersecurity vulnerabilities could be one of the following:

(1) The ISA Security Compliance Institute (ISCI) conformity assessment program

(2) Certification of compliance by a nationally recognized test laboratory

(3) Manufacturer certification for the specific type and brand of system provided

Statement of Problem and Substantiation for Public Comment

For island mode, the text was modified to align with terms commonly used by networking professionals to reduce ambiguity. Furthermore, emergency systems such as paralleling switchgear are already a self-contained networked system. The term “physically dedicated” would prevent any solutions sharing one physical connection with multiple local area networks, such as VLAN. The term “shall not have any physical or virtual connections with other networks” would prevent the emergency system from being accessed by devices from other networks (e.g. office wifi, manufacturing network, etc.) as well as devices connected into the local area network through VPN solutions. Equipment such as laptops, tablets, and smart phones shall be made accessible only to this dedicated network to ensure that they do not infect the dedicated network with malware obtained from other networks.

Any networking method other than island mode shall have their cybersecurity capabilities either certified by a third party or have a vulnerability assessment done, mitigation plans documented and implemented. Cybersecurity capabilities applies not only on the equipment and network, but also the policies and procedures for the site. Many cybersecurity breaches are results of human errors not vulnerabilities in software.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 2222-NFPA 70-2021 [Section No. 701.9]	
Public Comment No. 2222-NFPA 70-2021 [Section No. 701.9]	

Related Item

• FR 8801

Submitter Information Verification

Submitter Full Name: Timothy Windey
Organization: Cummins Power Generation
Street Address:
City:
State:
Zip:
Submittal Date: Thu Aug 19 16:58:22 EDT 2021

Committee: NEC-P13

Public Comment No. 455-NFPA 70-2021 [Section No. 700.9]

700.

~~9- Cybersecurity.~~

~~Emergency systems that are connected to a communication network and have the capability to permit control of any portion of the premises emergency electrical system The cybersecurity assessment shall be conducted~~

9 Cybersecurity, Cyberweapon, Electromagnetic Pulse (EMP), Geomagnetic Disturbance (GMD), and Intentional Electromagnetic Interference (IEMI) Protection. Emergency systems shall comply with either of the following:

- ~~The ability to control the system is limited to a direct connection through a local nonnetworked interface.~~
- ~~It is connected through a networked interface complying with one of the following methods:~~

(1) ~~The system and associated software are identified as being evaluated for cybersecurity.~~

(2) ~~A cybersecurity assessment is conducted on the connected system to determine vulnerabilities to cyberattacks.~~

(1) The system shall be identified for cybersecurity, cyberweapon, EMP, GMD, and IEMI protection.

(2) A cybersecurity, cyberweapon, EMP, GMD, and IEMI protection failure modes effects analysis assessment shall be conducted to determine system vulnerabilities.

The identification or assessment shall be reviewed when the system configuration changes and at not more than 5-year intervals.

~~Documentation~~

Documentation of the

~~evaluation, assessment, and certification~~

identification or assessment shall be made available to those authorized to inspect, operate, and maintain the system.

Informational Note No. 1: See ISA 62443, *Cybersecurity Standards* series; UL 2900, *Cybersecurity Standards* series; or the *NIST Framework for Improving Critical Infrastructure Cybersecurity*, Version 1.1, for assessment requirements.

Informational Note No. 2: Examples of the commissioning certification used to demonstrate the system has been investigated for cybersecurity vulnerabilities could be one of the following:

(1) The ISA Security Compliance Institute (ISCI) conformity assessment program

(2) Certification of compliance by a nationally recognized test laboratory

(3) Manufacturer certification for the specific type and brand of system provided

Statement of Problem and Substantiation for Public Comment

This Public Comment is a follow-up to PI 761, PI 3080, FR 8801, PI 761, and PI 4024. It does not require cybersecurity, cyberweapon, EMP, GMD, or IEMI protection, but rather calls for the emergency system to be identified for these threats or for a threat assessment to be completed. While the NEC® is not ready to mandate protection requirements, an assessment would show system vulnerabilities. Acceptance of this Public Comment would at least bring the subject to the attention of owners, design engineers, electrical inspectors, and insurance companies, and set the table for requirements in future editions of the NEC® (or other NFPA standards). The format for this Public Comment is based upon the cybersecurity requirements found in FR 8801 which offesr an assessment as an alternate for requiring protection.

PI 761 provided technical substantiation to require Electromagnetic Pulse (EMP) Protection for our critical infrastructure. While it appears that the NEC(R) is not ready to actually require EMP protection at this time, the security of our country is at stake. An EMP is fairly well understood as an extremely powerful electromagnetic wave that can impress 50,000 volts per meter on every piece of electrical equipment, destroying everything that is unprotected. An EMP is often associated with a nuclear explosion, but that is not the only cause of electromagnetic damage. A Geomagnetic Disturbance (GMD) is caused by a sunspot. While the EMP would be created by one of our adversaries, the sun spot is an act of God. Either one can take out every piece of unprotected electrical equipment, subjecting the country to years of blackout. Government intelligence studies, now unclassified, have predicted that from 66% to 90% of our population would die within one year, due to a lack of food, clean water, and medicine, if a significant EMP or GMD were to occur, while the country's electrical infrastructure remains unprotected. The final threat listed is an Intentional Electromagnetic Interference (IEMI). It is easily created by utilizing off-the-shelf parts, available for purchase on the internet, that will fit into a van. While much less powerful than a significant EMP or GMD, twenty vans, equipped with bench-made IEMI devices and scattered throughout the country, can shut down major industries and major parts of the country for weeks, if not months, through a coordinated attack, similar to 9/11, by targeting key industries/vulnerabilities. In conclusion, these electromagnetic threats to our unprotected electrical infrastructure, and therefor to our entire country, are absolutely real, and must be addressed.

PI 4024 and PI 3080 provided significant substantiation for the need to protect critical infrastructure against cyber attack for equipment connected to the internet. However, equipment does not need to be connected to the internet in order to be damaged or destroyed by cyber threats. Equipment can be damaged by cyber weapons such as malicious computer worms that attack SCADA (control) systems. A

great example is the Stuxnet worm that destroyed the centrifuges in Iran. Thus, this Public Comment deletes the PI 4024 reference to the internet and adds cyberweapon to the list of threats that need to be either protected against or assessed.

Related Item

• PI 761 • PI 3080 • FR 8801 • PI 4024 • PI 3055 • FR 7947 • PI 4026 • FR 8880 • FR 8917 • PI 2888 • FR 8914 • PI 3083

Submitter Information Verification

Submitter Full Name: Vincent Saporita
Organization: Saporita Consulting
Affiliation: Saporita Consulting
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jul 27 16:57:44 EDT 2021
Committee: NEC-P13

Public Comment No. 1835-NFPA 70-2021 [Section No. 700.10(B)]

(B) Wiring.

Wiring from an emergency source or emergency source distribution overcurrent protection to emergency loads shall be kept entirely independent of all other wiring and equipment unless otherwise permitted in the following:

(1) Wiring from the normal power source located in transfer equipment enclosures

(2) Wiring supplied from two sources in exit or emergency luminaires

(3) Wiring from two sources in a listed load control relay supplying exit or emergency luminaires, or in a common junction box, attached to exit or emergency luminaires

(4) Wiring within a common junction box attached to unit equipment, containing only the branch circuit supplying the unit equipment and the emergency circuit supplied by the unit equipment

(5) Wiring within a traveling cable to an elevator

(6) Wiring from an emergency source to supply emergency and other (nonemergency) loads in accordance with the following:

(7) Separate vertical switchgear sections or separate vertical switchboard sections, with or without a common bus, or individual disconnects mounted in separate enclosures shall be used to separate emergency loads from all other loads.

(8) The common bus of separate sections of the switchgear, separate sections of the switchboard, or the individual enclosures shall be either of the following:

(9) Supplied by single or multiple feeders without overcurrent protection at the source

(10) Supplied by single or multiple feeders with overcurrent protection, provided that the overcurrent protection that is common to an emergency system and any nonemergency system(s) is selectively coordinated with the next downstream overcurrent protective device in the nonemergency system(s)

Informational Note: See Informational Note Figure 700.10(B)(a) and Informational Note Figure 700.10(B)(b) for further information.

Figure Informational Note Figure 700.10(B)(a) Single or Multiple Feeders Without Overcurrent Protection.

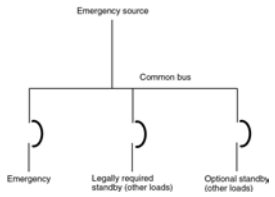
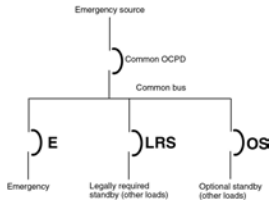


Figure Informational Note Figure 700.10(B)(b) Single or Multiple Feeders with Overcurrent Protection.



(11) Emergency circuits shall not originate from the same vertical switchgear section, vertical switchboard section, panelboard enclosure, or individual disconnect enclosure as other circuits.

(12) It shall be permissible to use single or multiple feeders to supply distribution equipment between an emergency source and the point where the emergency loads are separated from all other loads.

(13) At the standby or alternate power source, such as a generator, over current protective devices (most commonly circuit breakers) supplied directly from the source shall be permitted to supply emergency and non-emergency loads provided that complete separation begins immediately after the line side connections.

Wiring of two or more emergency circuits supplied from the same source shall be permitted in the same raceway, cable, box, or cabinet.

Additional Proposed Changes

File Name	Description	Approved
700.10_B_6_e_Public_Comment_Final.docx		

Statement of Problem and Substantiation for Public Comment

Note: TerraView messed up the formatting. Please see the attached file for the proposed change.

Substantiation: For Gensets with multiple set mounted circuit breakers in applications that feed emergency and non-emergency loads, there is significant confusion with 700.10(B)(5). There are four sub-sections (a-d), and people don't know which one(s) to apply to this case. This includes AHJ's. Even code experts are having trouble with this and are coming up with different answers. This is wasting time and money and causing inconsistencies. The proposed new text in sub-section e clearly addresses this case with the correct requirement. Since this problem and the proposed solution did get public review (via my 1st draft ballot comments), this concept is open to a SR and would not be considered new material.

Related Item

• FR 8803 and my 1st draft ballot comment for 700.10(B)(5)

Submitter Information Verification

Submitter Full Name: Timothy Windey
Organization: Cummins Power Generation
Street Address:
City:
State:
Zip:
Submittal Date: Wed Aug 18 10:23:52 EDT 2021
Committee: NEC-P13

700.10(B)(6)(e).

At the standby or alternate power source, such as a generator, over current protective devices (most commonly circuit breakers) supplied directly from the source shall be permitted to supply emergency and non-emergency loads provided that complete separation begins immediately after the line side connections.

Substantiation:

For Gensets with multiple set mounted circuit breakers in applications that feed emergency and non-emergency loads, there is significant confusion with 700.10(B)(5). There are four sub-sections (a-d), and people don't know which one(s) to apply to this case. This includes AHJ's. Even code experts are having trouble with this and are coming up with different answers. This is wasting time and money and causing inconsistencies. The proposed new text clearly addresses this case with the correct requirement.

Since this problem and the proposed solution did get public review (via my 1st draft ballot comments), this concept is open to a SR and would not be considered new material.

Related PC's:

None

Public Comment No. 1750-NFPA 70-2021 [Section No. 700.10(D)(2)]

(2) Feeder-Circuit Wiring.

Feeder-circuit wiring shall meet one of the following conditions:

(1) The cable or raceway is installed in spaces or areas that are fully protected by an approved automatic fire protection system.

(2) The cable or raceway is protected by a listed electrical circuit protective system with a minimum 2-hour fire rating.

Informational Note No. 1: See UL 1724, *Fire Tests for Electrical Circuit Protection Systems,* for one method of defining an electrical circuit protective system. The UL *Guide Information for Electrical Circuit Integrity Systems* (FHIT) contains information to identify the system and its installation limitations to maintain a minimum 2-hour fire-resistive rating and is available from the certification body.

(3) The cable or raceway is a listed fire-resistive cable system with a minimum 2-hour fire rating.

Informational Note No. 2: See UL 2196-2017, *Standard for Fire Test for Circuit Integrity of Fire-Resistive Power, Instrumentation, Control and Data Cables*, for one method of defining a fire-resistive cable system.

(4) The cable or raceway is protected by a listed fire-rated assembly that has a minimum fire rating of 2 hours and contains only emergency circuits.

(5) The cable or raceway is encased ~~in a minimum of 50 mm (2 in.) of concrete.~~ in concrete to achieve 2 hrs of fire protection.

Informational note No. 3: See NFPA Research Paper *Fire Resistance of Concrete for Electrical Conductors (dated December 18, 2018),* Table 5: *Fire Resistance Rating of Single Layer Concrete Walls, Floors and Roofs* , to determine the thickness of concrete (by type) to achieve the required Fire Resistance

Additional Proposed Changes

File Name	Description	Approved
700-10_-_SD1.docx	Details, Substation and Alternative Informational Note	

Statement of Problem and Substantiation for Public Comment

Based on the returned comments from the First draft, it was stated that it is understood that 2 inches of concrete may not equal 2 hours of fire protection. Further comments on this statement were included in the Final ballot. This proposal is recommending to change it from stating a given thickness which would not account for the fire resistances of the different aggregates used. By changing the wording to require the 2 hours of protection, and providing to the engineer the suitable method to determine required thickness, it would ensure that the circuits are adequately protected.

The attached document provides more details on the proposed Information note (and details as to what information the table would refer to) as well as an alternate note for use with a different source (IBC in this case) if preferred.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 1735-NFPA 70-2021 [Section No. 695.6(A)(2)]	
Public Comment No. 1747-NFPA 70-2021 [Section No. 695.14(F)]	
Public Comment No. 1752-NFPA 70-2021 [Section No. 708.10(C)(2)]	
Public Comment No. 1735-NFPA 70-2021 [Section No. 695.6(A)(2)]	
Public Comment No. 1747-NFPA 70-2021 [Section No. 695.14(F)]	
Public Comment No. 1752-NFPA 70-2021 [Section No. 708.10(C)(2)]	

Related Item

• PI 3710

Submitter Information Verification

Submitter Full Name: Ryan Drury
Organization: nVent
Street Address:
City:
State:
Zip:
Submittal Date: Tue Aug 17 16:11:34 EDT 2021
Committee: NEC-P13

This proposal is in reference to Public Input No. 3710-NFPA 70-2020.

It is a revision to the original proposal, as per the following (As highlighted in Yellow):

700.10 Wiring, Emergency Systems

(D) Fire Protection

(2) Feeder Circuit Wiring

Feeder Circuit Wiring shall meet one of the following conditions:

(5) The cable or raceway is encased in ~~50 mm (2 in) of~~ concrete to achieve 2 hrs of fire protection.

> Informational note: See NFPA Research Paper *Fire Resistance of Concrete for Electrical Conductors (dated December 18, 2018),* Table 5: *Fire Resistance Rating of Single Layer Concrete Walls, Floors and Roofs*, to determine the suitable thickness of concrete (by type) to achieve the required Fire Resistance

Or

> Informational note: See 2018 International Building Code, Section 7, Table 722.3.2*: Minimum Equivalent Thickness (inches) of Bearing or nonbearing concrete masonry walls*, to determine the suitable thickness of concrete (by type) to achieve the required Fire Resistance

Substantiation:

Dictating a minimum thickness of concrete may be too onerous due to the variety of concrete types used. As such, the recommendation is to remove the specific requirement to achieving this, and utilizing existing fire resistance ratings for various concrete types, as found in Table 5 of the NFPA research paper. This ensure that the specifying engineer is given enough detail to design the encasement to protect the life safety circuits adequately for 2 hrs.

Table 5 as follows, for Reference:

Table 5: Fire Resistance Rating of Single Layer Concrete Walls, Floors and Roofs[13]

Aggregate Type Used in Concrete Masonry Unit	Minimum Equivalent Thickness for Fire Resistance Rating (inches)				
	4 Hours	3 Hours	2 Hours	1.5 Hours	1 Hour
Siliceous	6.9	6.2	4.9	4.3	3.5
Carbonate	6.7	6.1	4.5	3.9	3.1
Semi-Lightweight	5.3	4.5	3.7	3.3	2.8

Also included is an alternate informational note where an IBC code is referenced for the engineer to utilize for the specification. This is here to provide the option to the NFPA research paper or to a reference in the IBC.

Table 722.3.2 as follows, for reference

TABLE 722.3.2
MINIMUM EQUIVALENT THICKNESS (Inches) OF BEARING OR NONBEARING CONCRETE MASONRY WALLS[a, b, c, d]

TYPE OF AGGREGATE	FIRE-RESISTANCE RATING (hours)														
	½	¾	1	1¼	1½	1¾	2	2¼	2½	2¾	3	3¼	3½	3¾	4
Pumice or expanded slag	1.5	1.9	2.1	2.5	2.7	3.0	3.2	3.4	3.6	3.8	4.0	4.2	4.4	4.5	4.7
Expanded shale, clay or slate	1.8	2.2	2.6	2.9	3.3	3.4	3.6	3.8	4.0	4.2	4.4	4.6	4.8	4.9	5.1
Limestone, cinders or unexpanded slag	1.9	2.3	2.7	3.1	3.4	3.7	4.0	4.3	4.5	4.8	5.0	5.2	5.5	5.7	5.9
Calcareous or siliceous gravel	2.0	2.4	2.8	3.2	3.6	3.9	4.2	4.5	4.8	5.0	5.3	5.5	5.8	6.0	6.2

For SI: 1 inch = 25.4 mm.

a. Values between those shown in the table can be determined by direct interpolation.

b. Where combustible members are framed into the wall, the thickness of solid material between the end of each member and the opposite face of the wall, or between members set in from opposite sides, shall be not less than 93 percent of the thickness shown in the table.

c. Requirements of ASTM C55, ASTM C73, ASTM C90 or ASTM C744 shall apply.

d. Minimum required equivalent thickness corresponding to the hourly fire-resistance rating for units with a combination of aggregate shall be determined by linear interpolation based on the percent by volume of each aggregate used in manufacture.

Public Comment No. 1751-NFPA 70-2021 [Section No. 700.10(D)(2)]

(2) Feeder-Circuit Wiring.

Feeder-circuit wiring shall meet one of the following conditions:

(1) The cable or raceway is installed in spaces or areas that are fully protected by an approved automatic fire protection system.

(2) The cable or raceway is protected by a listed electrical circuit protective system with a minimum 2-hour fire rating.

Informational Note No. 1: See UL 1724, *Fire Tests for Electrical Circuit Protection Systems,* for one method of defining an electrical circuit protective system. The UL *Guide Information for Electrical Circuit Integrity Systems* (FHIT) contains information to identify the system and its installation limitations to maintain a minimum 2-hour fire-resistive rating and is available from the certification body.

(3) The cable or raceway is a listed fire-resistive cable system with a minimum 2-hour fire rating.

Informational Note No. 2: See UL 2196-2017, *Standard for Fire Test for Circuit Integrity of Fire-Resistive Power, Instrumentation, Control and Data Cables*, for one method of defining a fire-resistive cable system.

(4) The cable or raceway is protected by a listed fire-rated assembly that has a minimum fire rating of 2 hours and contains only emergency circuits.

(5) The cable or raceway is encased in a minimum of ~~50 mm~~ 94 mm (~~2 in~~ 3 . 7") of concrete.

Statement of Problem and Substantiation for Public Comment

Based on the returned comments from the First draft, it was stated that it is understood that 2 inches of concrete may not equal 2 hours of fire protection. Further comments on this statement were included in the Final ballot, detailing that the committee felt that 5" of thickness was too onerous. As such, the value specified is based on the minimum concrete thickness found to meet the 2 hr Fire resistance threshold detailed in Table 5, as found in the 2018 NFPA Research Foundation report "Fire Resistance of Concrete for Electrical Conductors".

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 1744-NFPA 70-2021 [Section No. 695.6(A)(2)]	
Public Comment No. 1749-NFPA 70-2021 [Section No. 695.14(F)]	
Public Comment No. 1754-NFPA 70-2021 [Section No. 708.10(C)(2)]	
Public Comment No. 1744-NFPA 70-2021 [Section No. 695.6(A)(2)]	
Public Comment No. 1749-NFPA 70-2021 [Section No. 695.14(F)]	
Public Comment No. 1754-NFPA 70-2021 [Section No. 708.10(C)(2)]	

Related Item

- PI 3710

Submitter Information Verification

Submitter Full Name: Ryan Drury
Organization: nVent
Street Address:
City:
State:
Zip:
Submittal Date: Tue Aug 17 16:16:15 EDT 2021
Committee: NEC-P13

Public Comment No. 215-NFPA 70-2021 [Section No. 700.10(D)(2)]

(2) Feeder-Circuit Wiring.

Feeder-circuit wiring shall meet one of the following conditions:

(1) The cable or raceway is installed in ~~spaces or areas that~~ occupancies that are fully protected by an approved automatic fire protection system.

Informational Note 1. See NFPA 13 Standard for the Installation of Sprinkler Systems Chapter 8.15.1 Concealed spaces and Chapter 8.15.2 Vertical Shafts .

(2) The cable or raceway is protected by a listed electrical circuit protective system with a minimum 2-hour fire rating.

Informational Note No. 1: See UL 1724, *Fire Tests for Electrical Circuit Protection Systems,* for one method of defining an electrical circuit protective system. The UL *Guide Information for Electrical Circuit Integrity Systems* (FHIT) contains information to identify the system and its installation limitations to maintain a minimum 2-hour fire-resistive rating and is available from the certification body.

(3) The cable or raceway is a listed fire-resistive cable system with a minimum 2-hour fire rating.

Informational Note No. 2: See UL 2196-2017, *Standard for Fire Test for Circuit Integrity of Fire-Resistive Power, Instrumentation, Control and Data Cables*, for one method of defining a fire-resistive cable system.

(4) The cable or raceway is protected by a listed fire-rated assembly that has a minimum fire rating of 2 hours and contains only emergency circuits.

(5) The cable or raceway is encased in a minimum of 50 mm (2 in.) of concrete.

Statement of Problem and Substantiation for Public Comment

Public Input No. 1826-NFPA 70-2020 [Section N0. 700.10(D)(2)] should be accepted as edited in Public Comment No. 215-NFPA 70-2021.

Substantiation:

The first condition/choice in 700.10(D) (2) as to how to protect "feeder circuit wiring" from fire describes a fire suppression system for the spaces and areas where the feeders are installed. Does that mean the rest of the building does not require a fire suppression system? If so what is the standard that only applies to the "spaces and areas" that would guide the AHJ to approve the installation? The language that was accepted in the 1999 code cycle (15-130a 700.9(c)(1) A98-ROP) "700.9(c)(1)(a) Be installed within buildings that are fully protected by an approved automatic fire suppression system." with a statement that "This action clarifies the intent of the panel.", recognizes NFPA 13's tremendous track record, level of safety and impressive statistics for protecting people and property from fire. There was an attempt to revise the text in ROP 15-115 1999 code cycle to "in spaces that are fully protected" which was rejected. PANEL STATEMENT to ROP 15-115: "Fully sprinklered buildings in accordance with NFPA 13 will provide adequate protection.

There is no suggestion in 700.10(D) (2) (1) or reference to an acceptable duration that a fully sprinklered building would have to endure a fire. Nor should there be. A 2 hour duration anywhere in the building would be completely unacceptable to those responsible for NFPA 13. Sections 700.10(D) (2) (2) through (5) appropriately provide protection for a duration of 2 hours because the building is not equipped with a suppression system that would put the fire out. The Standard: see "{13}1.1.3...is written with the assumption that the sprinkler system shall be designed to protect against a single fire originating within the building."

.." In the 2005 NEC code cycle "ROP May 2004 proposal 13-116 Log # 1791 NEC P13 (700-9(D))" was accepted and changed "within buildings" to "in spaces or areas". The proposal was completely void of any technical substantiation. It said the 1999 NEC allowed feeders unprotected provided they are in fully sprinklered buildings." A fully sprinklered building conforming to NFPA 13 Standard is written such that the "sprinkler system shall be designed to protect against a single fire within the building." NFPA 13 does not ignore the voids and shafts. Section 8.15 of Chapter 8 "Special Situations" references when they require sprinkler coverage and when they do not, with extensive annex material on the subject.

The added "informational note" directs the Architect and design consultants to Chapter 8.15.1 and 8.15.2 of NFPA 13 which address the requirements for concealed spaces and vertical shafts.

Related Item

• Public Input No. 1826-NFPA 70-2020 [Section N0. 700.10(D)(2)] should be accepted as edited in Public Comment No. 215-NFPA 70-2021

Submitter Information Verification

Submitter Full Name: Lawrence Forshner
Organization: Bard Rao Athanas Consulting
Affiliation: self
Street Address:
City:

State:	
Zip:	
Submittal Date:	Mon Jul 12 14:39:39 EDT 2021
Committee:	NEC-P13

Public Comment No. 2080-NFPA 70-2021 [Section No. 700.10(D)(4)]

(4) Source Control Wiring.

Control conductors installed between the Emergency Power Source Supply/Stored-Energy Emergency Source Supply (EPSS/SEPSS) and transfer equipment or control systems that initiate the operation of emergency sources or initiate the automatic connection to emergency loads shall be kept entirely independent of all other wiring and shall meet the conditions of 700.10(D)(2). The integrity of source control wiring shall be monitored for broken, disconnected, or shorted wires. Loss of integrity shall result in the following actions:

(1) *Generators*. Shall start the generator(s).

(2) *All other sources*. Shall be considered a system malfunction and initiate the designated signal(s) in 700.6(A).

Statement of Problem and Substantiation for Public Comment

The full wording that supports acronyms is generally required to be provided at the first use in and article, as covered in the Style Manual at 3.2.3. It is true that defined terms in Article 100 are permitted to be used throughout the document, but that is only a permission and is extremely user-unfriendly. Article 100 is going to be as long as some NFPA standards and will be incredibly difficult for users. Spelling out acronyms within their first use in articles, especially those for which the full alphabetical expansion is not apparent and therefore requiring a prolonged search process, si much more user-friendly.

Related Item

• FR-8807

Submitter Information Verification

Submitter Full Name: Frederic Hartwell
Organization: Hartwell Electrical Services, Inc.
Street Address:
City:
State:
Zip:
Submittal Date: Thu Aug 19 11:07:56 EDT 2021
Committee: NEC-P13

Public Comment No. 1586-NFPA 70-2021 [Section No. 700.11(B)]

(B) Identification.

Emergency circuits shall be permanently marked ~~so they will be readily identified~~ as a component of an emergency circuit or system by the following methods:

(1) All boxes and enclosures for Class 2 emergency circuits shall be permanently marked as a component of an emergency circuit or system.

(2) Where boxes or enclosures are not encountered, exposed cable, cable tray, or raceways systems shall be permanently marked ~~to be identified as a component of an emergency circuit or system,~~ within 3 m (1 ft) of each connector and at intervals not to exceed 7.6 m (25 ft).

Statement of Problem and Substantiation for Public Comment

The present text uses the defined term "identified," but uses it incorrectly. See the Article 100 definition.

Related Item

• FR8818

Submitter Information Verification

Submitter Full Name: Ryan Jackson
Organization: Ryan Jackson
Street Address:
City:
State:
Zip:
Submittal Date: Mon Aug 16 15:06:04 EDT 2021
Committee: NEC-P13

Public Comment No. 1649-NFPA 70-2021 [Section No. 700.11(C)]

(C) Separation of Circuits.

Class 2 emergency circuits shall be wired in a listed, jacketed cable or with one of the wiring methods of Chapter 3. Class 2 emergency circuits, if bundled, shall be ~~separated from~~ bundled separately from nonemergency Class 2 circuits. Separation from other circuits shall comply with 725.136.

Statement of Problem and Substantiation for Public Comment

While separation of emergency and non-emergency line voltage circuits makes sense, as when damaged one may harm the other, the first-draft task group on Class 2 emergency lighting recommended not requiring separation at all due to Class 2 circuits inherent safety. Identification requirements in 700.11B do an adequate job of ensuring emergency cables are not disturbed.

Requiring separation of emergency Class 2 circuits from non-emergency Class 2 circuits creates significant correlating concerns with 722.140 (formerly 725.136) as this is the section which defines acceptable separation practice, but makes no mention of emergency vs non-emergency Class 2 circuits. To make 700.11C clear and inspectable would require additional changes to 722.140.

I'm proposing a compromise, which is to require that Class 2 emergency circuits, if bundled, be bundled together. This, in addition to identification requirements, will ensure that maintenance tasks for non-emergency bundles do not risk disturbing emergency circuits. Requiring separate cable trays for emergency and non-emergency circuits would be cumbersome to install and provide no additional safety, but it is quick and easy for installers to bundle the circuits separately.

Related Item

• FR-8818-NFPA 70-2021

Submitter Information Verification

Submitter Full Name: Jason Potterf
Organization: Cisco
Affiliation: Entertainment Services and Technology Association (ESTA)
Street Address:
City:
State:
Zip:
Submittal Date: Mon Aug 16 22:12:43 EDT 2021
Committee: NEC-P13

Public Comment No. 1693-NFPA 70-2021 [Section No. 700.11(C)]

(C) Separation of Circuits.

Class 2 emergency circuits shall be ~~wired in a listed, jacketed cable or with one of the wiring methods of Chapter 3. Class 2 emergency circuits shall be~~ separated from nonemergency Class 2 circuits. Separation from other circuits shall comply with 725.136.

Statement of Problem and Substantiation for Public Comment

There is a conflict between clause C and D of 700.11. Removing the conflict from clause C strengthens 700.11 overall. Clause D should remain as currently written. It would be extremely dangerous to allow low voltage emergency lighting power to be installed without conduit or armored jacket, as fire in one part of a building could quickly destroy emergency lighting power to parts of the building that were not already involved in the fire, hindering the evacuation of occupants. Plenum rated cable by itself would not provide sufficient protection, as the jacket is only intended to be low smoke emitting, not protective of the conductors.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 1698-NFPA 70-2021 [Section No. 700.11(D)]	

Related Item

• Article 700.11

Submitter Information Verification

Submitter Full Name: Javid Butler
Organization: hc/lambda LLC
Street Address:
City:
State:
Zip:
Submittal Date: Tue Aug 17 12:27:54 EDT 2021
Committee: NEC-P13

Public Comment No. 9-NFPA 70-2021 [Sections 700.11(C), 700.11(D)]

Sections 700.11(C), 700.11(D)

(C) Separation of Circuits.

Class 2 emergency circuits shall be wired in a listed, jacketed cable or with one of the wiring methods of Chapter 3. Class 2 emergency circuits shall not be required to be separated from nonemergency Class 2 circuits. Separation from other circuits shall comply with 725.136.

(D) Protection.

~~Wiring~~ Where subject to physical damage, wiring shall comply with the requirements of 300.4 and be installed in a raceway, armored or metal-clad cable, or cable tray.

Statement of Problem and Substantiation for Public Comment

700.11(C) requires separation of Class 2 Emergency circuits from other Class 2 circuits. This was a change to PI 2850 made by CMP13, but without technical substantiation for the change. There is no valid reason for this, due to the power-limited nature of these circuits and the very low likelihood of damage to Class 2 Emergency circuits from other Class 2 circuits. This separation requirement should be removed. The only valid separation requirement is that of 725.136, which is stated in 700.11(C).

700.11(D) requires installation of Class 2 Emergency circuits in a raceway, armored, or metal-clad cable, or cable tray. 700.11(C) allows installation if Class 2 emergency circuits either in a listed jacketed cable or in one of the Chapter 3 wiring methods. These two sections contradict each other, and this contradiction must be resolved. The panel removed from PI 2850 the words “Where subject to physical damage…” from the beginning of 700.11(D). The result is that all Class 2 Emergency circuits from end-to-end would be required to be installed in a Chapter 3 wiring method. I believe this is not necessary from a safety point-of-view and is fundamentally incompatible with the structured cord-and-plug wiring methods of many Class 2 systems, including Power over Ethernet (PoE). The unintended but practical result would be to prohibit Emergency circuits from PoE and similar systems. There is no valid safety reason for such a prohibition. The words “Where subject to physical damage…” should be added back to 700.11(D). This will also resolve the contradiction between 700.11(C) and 700.11(D).

Related Item

• PI 2850

Submitter Information Verification

Submitter Full Name: Steven Terry
Organization: Electronic Theatre Controls Inc
Affiliation: US Institute for Theatre Technology
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jun 29 11:56:22 EDT 2021
Committee: NEC-P13

Public Comment No. 1079-NFPA 70-2021 [Section No. 700.11(D)]

(D) Protection.

~~Wiring~~ Where subject to physical damage, wiring shall comply with the requirements of 300.4 and be installed in a raceway, armored or metal-clad cable, or cable tray.

Statement of Problem and Substantiation for Public Comment

The original proposal (PI 2850) was to require more robust wiring methods only "where subject to physical damage".
The reworded language in FR 8818 will likely be interpreted to always require a raceway, AC or MC cable, or a cable tray even if wiring methods are not subject to physical damage.
I can see this as a huge hurdle for the POE industry to comply with since data cables have RJ-45 terminals to plug directly into data ports on luminaires and network switches. PoE luminaires and network switches have no provisions to be connected by a raceway or metal clad/armored cable connector. That would leave the POE industry only one option; to use a cable tray for all CAT 5 and CAT 6 data cables between network switches and POE luminaires/equipment.
I can't think of any similar emergency circuit protection requirements in Article 700 for line voltage emergency lighting systems. Currently, nonmetallic sheathed cable TYPE NM (chapter 3 wiring method) is permitted for line voltage emergency lighting in many occupancies. TYPE NM cable is no more robust and provides no additional protection over CAT 5,6 data cables.

Related Item

• PI 2850

Submitter Information Verification

Submitter Full Name: Jeff Simpson
Organization: ElectricalLicenseRenewal.com
Street Address:
City:
State:
Zip:
Submittal Date: Mon Aug 09 10:22:25 EDT 2021
Committee: NEC-P13

Public Comment No. 1651-NFPA 70-2021 [Section No. 700.11(D)]

(D) Protection.

Wiring shall comply with the requirements of 300.4 and be installed in a raceway, armored or metal-clad cable, or cable tray.

Exception: Class 2 emergency circuits supplied by listed Class 2 emergency lighting systems which ensure circuit integrity by self-diagnostic processes that result in circuit failure or equipment failure being reported within one hour of the failure shall be permitted to be installed using any wiring method allowed for non-emergency Class 2 circuits.

Statement of Problem and Substantiation for Public Comment

The Class 2 emergency lighting task group closely considered the correct set of requirements and a few observations were made.

First, traditional line voltage systems are often under-maintained, and required periodic testing is frequently out of compliance. Second, many Class 2 systems have innate safety as Class 2 circuits do not produce a hazard when exposed. Third, many Class 2 emergency lighting systems include innate communications capabilities which make essentially continuous testing a real possibility, with any equipment or wiring failure immediately reportable to building staff. The net results of all of this is that Class 2 emergency lighting systems could be many times safer than current practice.

Out of this, the task group proposed that 700.11D explicitly call out that 300.4 wiring methods are only required when the emergency lighting conductors are subject to physical damage, perhaps by being exposed in a hallway or otherwise uncovered. The first draft is ambiguous, as this explicit language is removed, even though identical language is stated in 300.4 - "Where subject to physical damage, conductors, raceways, and cable shall be protected." This leaves significant ambiguity for users of the code.

If it is the intent of the panel for 300.4 methods to be utilized for the entirety of a Class 2 emergency lighting cable, then this poses significant adoption challenges to this technology which stands to greatly improve emergency lighting system integrity. Most Class 2 power supplies are not fitted with the means to interface with 300.4 wiring methods such as junction boxes with knock-outs. Fully enclosing these systems is hazardous to the equipment due to risk of electronics overheating and not necessary as any fault in the system can be reported immediately.

I will concede that one could construct a "dumb" emergency lighting system without these advanced features. Thus I feel it is appropriate to make these wiring method requirements contingent on these advanced reporting features, therefore I have proposed this as an exception in this public comment.

Related Item

• FR-8818-NFPA 70-2021

Submitter Information Verification

Submitter Full Name: Jason Potterf
Organization: Cisco
Affiliation: Entertainment Services and Technology Association (ESTA)
Street Address:
City:
State:
Zip:
Submittal Date: Mon Aug 16 22:32:23 EDT 2021
Committee: NEC-P13

Public Comment No. 1698-NFPA 70-2021 [Section No. 700.11(D)]

(D) Protection.

Wiring shall comply with the requirements of 300.4 and be installed in a raceway, armored or metal-clad cable~~, or cable tray~~ .

Statement of Problem and Substantiation for Public Comment

After submitting my comment on Clause C I realized that Clause D included cable trays as an option. Unarmored cable should not be used for low voltage emergency lighting power even when installed in a cable tray. A fire in proximity to a cable tray with unarmored low voltage emergency lighting cables could destroy cables supplying emergency power to parts of the building not involved with the fire at that time, hindering the evacuation of occupants.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 1693-NFPA 70-2021 [Section No. 700.11(C)]	

Related Item

• 700.11

Submitter Information Verification

Submitter Full Name: Javid Butler
Organization: hc/lambda
Street Address:
City:
State:
Zip:
Submittal Date: Tue Aug 17 12:52:44 EDT 2021
Committee: NEC-P13

Public Comment No. 1844-NFPA 70-2021 [Section No. 700.12(C) [Excluding any Sub-Sections]]

The emergency power source shall be of suitable rating and capacity to supply and maintain the total load for the duration determined by the system design. In no case shall the duration be less than 2 hours of system operation unless used for emergency illumination in 700.12(C)(4) or unit equipment in 700.12(I). Additionally, the power source shall comply with 700.12(C)(1) through (C)(5) as applicable.

Informational Note: See NFPA 110-2022, Standard for Emergency and Standby Power Systems, for information on Classification of Emergency Power Supply Systems (EPSS), which defines the minimum time for which the EPSS is designed to operate at rated load without being refueled or recharged .

Statement of Problem and Substantiation for Public Comment

We should be referencing the “Classification of EPSS” information in NFPA 110 via an informational note, as that is directly applicable to this section.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 1848-NFPA 70-2021 [Section No. 701.12(C) [Excluding any Sub-Sections]]	
Public Comment No. 1848-NFPA 70-2021 [Section No. 701.12(C) [Excluding any Sub-Sections]]	

Related Item

• FR 8843

Submitter Information Verification

Submitter Full Name: Timothy Windey
Organization: Cummins Power Generation
Street Address:
City:
State:
Zip:
Submittal Date: Wed Aug 18 10:48:24 EDT 2021
Committee: NEC-P13

Public Comment No. 1140-NFPA 70-2021 [Section No. 700.12(H)]

(H) Battery-Equipped Emergency Luminaires.

(1) Listing.

All battery-equipped emergency luminaires shall be listed.

Informational Note No. 1: See ANSI/UL 924, *Emergency Lighting and Power Equipment*, for the requirements covering battery-equipped emergency luminaires and emergency battery packs. A listed emergency battery pack installed in a listed luminaire will provide similar functionality as a listed battery-equipped emergency luminaire.

Informational Note No. 2: Unit equipment is a type of battery-equipped emergency luminaire.

(2) Installation.

Battery-equipped emergency luminaires shall be installed in accordance with the following:

(1) Battery-equipped emergency luminaires shall be permanently fixed in place (i.e., not portable).

(2) Wiring to each luminaire shall be installed in accordance with the requirements of any of the wiring methods in Chapter 3 unless otherwise specified in Part II, IV, or V of this article. Flexible cord-and-plug connection shall be permitted, provided that the cord does not exceed 900 mm (3 ft) in length. Flexible cord, with or without a plug, provided that the cord does not exceed 1800 mm (6 ft) in length, shall also be permitted for battery-equipped emergency luminaires installed in accordance with 410.62(C)(1).

(3) The branch circuit feeding the battery-equipped emergency luminaire shall be one of the following:

a. The same branch circuit as that serving the normal lighting in the area and connected ahead of any local switches.

b. The same or a different branch circuit as that serving the normal lighting in the area if that circuit is equipped with means to monitor the status of that area's normal lighting branch circuit ahead of any local switches.

c. Where the normal lighting circuit is served by one or more branch circuits, a separate branch circuit, provided with a lock-on feature, that originates from the same panelboard as the normal lighting circuits. The branch circuit disconnecting means for this branch circuit shall be provided with a lock-on feature.

(4) The branch circuit that feeds battery-equipped emergency luminaires shall be clearly identified at the distribution panel.

(5) Emergency luminaires that obtain power from a battery-equipped emergency luminaire shall be wired to the battery-equipped emergency luminaires as required in Part II, IV, or V of this article.

(6) Remote luminaires providing lighting for the exterior of an exit door shall be permitted to be supplied by the battery-equipped emergency luminaire serving the area immediately inside the exit door.

Additional Proposed Changes

File Name	Description	Approved
13_CN_298.pdf	13 CN298	

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 298 appeared in the First Draft Report on First Revision No. 9195.

The Correlating Committee directs the panel to revise the requirement to remove the reference to an entire article in accordance with 4.1.4 of the NEC Style Manual. Since the reference points to the same article as the requirement, the panel should consider replacing "Article 700" with "this article."

Related Item

• First Revision No. 9195

Submitter Information Verification

Submitter Full Name: CC on NEC-AAC
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:
Submittal Date: Tue Aug 10 10:45:25 EDT 2021
Committee: NEC-P13

Correlating Committee Note No. 298-NFPA 70-2021 [Section No. 700.12(H)]

Submitter Information Verification

Committee: NEC-P13
Submittal Date: Thu May 06 14:21:54 EDT 2021

Committee Statement

Committee Statement: The Correlating Committee directs the panel to revise the requirement to remove the reference to an entire article in accordance with 4.1.4 of the NEC Style Manual. Since the reference points to the same article as the requirement, the panel should consider replacing “Article 700” with “this article.”

First Revision No. 9195-NFPA 70-2021 [Section No. 700.12(H)]

Ballot Results

This item has passed ballot

12 Eligible Voters
0 Not Returned
12 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Affirmative All

Ayer, Lawrence S.
Gallo, Ernest J.
Hickman, Palmer L.
Holub, Richard A.
Hunter, Dean C.
Johnston, Michael J.
Kendall, David H.
Kovacik, John R.
Manche, Alan
McDaniel, Roger D.
Porter, Christine T.
Williams, David A.

Public Comment No. 1682-NFPA 70-2021 [Section No. 700.12(H)]

(H) Battery-Equipped Emergency Luminaires.

(1) Listing.

All battery-equipped emergency luminaires shall be listed.

Informational Note No. 1: See ANSI/UL 924, *Emergency Lighting and Power Equipment*, for the requirements covering battery-equipped emergency luminaires and emergency battery packs. A listed emergency battery pack installed in a listed luminaire will provide similar functionality as a listed battery-equipped emergency luminaire.

Informational Note No. 2: Unit equipment is a type of battery-equipped emergency luminaire.

(2) Installation.

Battery-equipped emergency luminaires shall be installed in accordance with the following:

(1) Battery-equipped emergency luminaires shall be permanently fixed in place (i.e., not portable).

(2) Wiring to each luminaire shall be installed in accordance with the requirements of any of the wiring methods in Chapter 3 unless otherwise specified in Part II, IV, or V of this article. Flexible cord-and-plug connection shall be permitted for unit equipment , provided that the cord does ~~not exceed~~ not exceed 900 mm (3 ft) in length. Flexible cord, with or without a plug, ~~provided that the cord does not exceed 1800 mm (6 ft) in length,~~ shall also be permitted for battery-equipped emergency luminaires installed in accordance with 410.62(C)(1).

(3) The branch circuit feeding the battery-equipped emergency luminaire shall be one of the following:

a. The same branch circuit as that serving the normal lighting in the area and connected ahead of any local switches.

b. The same or a different branch circuit as that serving the normal lighting in the area if that circuit is equipped with means to monitor the status of that area's normal lighting branch circuit ahead of any local switches.

c. Where the normal lighting circuit is served by one or more branch circuits, a separate branch circuit, provided with a lock-on feature, that originates from the same panelboard as the normal lighting circuits. The branch circuit disconnecting means for this branch circuit shall be provided with a lock-on feature.

(4) The branch circuit that feeds battery-equipped emergency luminaires shall be clearly identified at the distribution panel.

(5) Emergency luminaires that obtain power from a ~~battery-equipped emergency luminaire shall~~ unit equipment shall be wired to the ~~battery-equipped emergency luminaires as~~ unit equipment as required in Part II, IV, or V of this article.

(6) Remote luminaires providing lighting for the exterior of an exit door shall be permitted to be supplied by the ~~battery-equipped emergency luminaire~~ unit equipment serving the area immediately inside the exit door.

Statement of Problem and Substantiation for Public Comment

Informational note #2 to 700.12(H)(1) mentions "unit equipment" and the Article 100 definition of "unit equipment" was revised by CMP-13; however, all additional references to unit equipment were removed from 700.12(H). While the inclusion of "battery-equipped emergency luminaires" is needed, some of the specific references to unit equipment are still appropriate. Specifically, 700.12(2)(2) has limited the length of flexible cord on unit equipment to 3 feet since at least 1975. The FR removed this reference to unit equipment so that it now applies to "battery-equipped emergency luminaires". This then makes the requirement appear to conflict with the next sentence, which establishes a 6-foot limit. The reference to unit equipment needs to be added back to the sentence relative to the 3-foot limit.

CMP-13 provided no substantiation for limiting the length of cord on a battery-equipped emergency luminaire to 6 feet and this length limitation was not in the original PI. There are thousands of battery-equipped emergency luminaires in the field with longer cords and no reported problems. Section 410.62(C), which is referenced, requires the cord to be directly below the outlet and visible over its entire length, so there is no reason to limit the length of the cord.

700.12(H)2, 5, and 6 the term battery equipped luminaire was changed back to unit equipment to better identify the products that utilize these provisions.

Related Item

• FR 700.12(H)

Submitter Information Verification

Submitter Full Name: Megan Hayes
Organization: Nema
Street Address:
City:
State:
Zip:
Submittal Date: Tue Aug 17 11:26:39 EDT 2021
Committee: NEC-P13

Public Comment No. 1587-NFPA 70-2021 [Section No. 700.12(H)(2)]

(2) Installation.

Battery-equipped emergency luminaires shall be installed in accordance with the following:

(1) Battery-equipped emergency luminaires shall be permanently fixed in place (i.e., not portable).

(2) Wiring to each luminaire shall be installed in accordance with the requirements of any of the wiring methods in Chapter 3 unless otherwise specified in Part II, IV, or V of this article. Flexible cord-and-plug connection shall be permitted, provided that the cord does not exceed 900 mm (3 ft) in length. Flexible cord, with or without a plug, provided that the cord does not exceed 1800 mm (6 ft) in length, shall also be permitted for battery-equipped emergency luminaires installed in accordance with 410.62(C)(1).

(3) The branch circuit feeding the battery-equipped emergency luminaire shall be one of the following:

a. The same branch circuit as that serving the normal lighting in the area and connected ahead of any local switches.

b. The same or a different branch circuit as that serving the normal lighting in the area if that circuit is equipped with means to monitor the status of that area's normal lighting branch circuit ahead of any local switches.

c. Where the normal lighting circuit is served ~~by~~ more than one ~~or more~~ branch ~~circuits~~ circuit , a separate branch circuit, provided with a lock-on feature, that originates from the same panelboard as the normal lighting circuits. ~~The branch circuit disconnecting means for this branch circuit shall be provided with a lock-on feature.~~

(4) The branch circuit that feeds battery-equipped emergency luminaires shall be clearly identified at the distribution panel.

(5) Emergency luminaires that obtain power from a battery-equipped emergency luminaire shall be wired to the battery-equipped emergency luminaires as required in Part II, IV, or V of this article.

(6) Remote luminaires providing lighting for the exterior of an exit door shall be permitted to be supplied by the battery-equipped emergency luminaire serving the area immediately inside the exit door.

Statement of Problem and Substantiation for Public Comment

The second sentence is marked for deletion as it is redundant to the first. The first sentence should be revised to require more than one circuit before utilizing this option. If the circuit supplying just the battery-powered equipment is opened, with the normal circuit remaining closed, we will lose all emergency lighting in about 2 hours time. This fact is recognized by requiring the lock-on mechanism to prevent manual opening of the circuit. But if that circuit is opened is opened automatically by an overcurrent condition we will lose the emergency circuit and it might never be reset, leaving us in total darkness when the normal lighting is lost. Additionally, if we lose the lose only the normal lighting circuit, as can happen if an electrician is working on that circuit, we do not have any emergency lighting at all. This problem was addressed in the 2017 and previous version by allowing this to happen only if there are three lighting circuits. When that requirement was removed we greatly decreased the requirements for emergency lighting and did so without any real substantiation.

Related Item

• PI 577

Submitter Information Verification

Submitter Full Name: Ryan Jackson
Organization: Ryan Jackson
Street Address:
City:
State:
Zip:
Submittal Date: Mon Aug 16 15:10:50 EDT 2021
Committee: NEC-P13

Public Comment No. 1781-NFPA 70-2021 [Section No. 700.12(H)(2)]

(2) Installation.

Battery-equipped emergency luminaires shall be installed in accordance with the following:

(1) Battery-equipped emergency luminaires shall be permanently fixed in place (i.e., not portable).

(2) Wiring to each luminaire shall be installed in accordance with the requirements of any of the wiring methods in Chapter 3 unless otherwise specified in Part II, IV, or V of this article. Flexible cord-and-plug connection shall be permitted for unit equipment , provided that the cord does not exceed 900 mm (3 ft) in length. Flexible cord, with or without a plug, ~~provided that the cord does not exceed 1800 mm (6 ft) in length,~~ shall also be permitted for battery-equipped emergency luminaires installed in accordance with 410.62(C)(1).

(3) The branch circuit feeding the battery-equipped emergency luminaire shall be one of the following:

a. The same branch circuit as that serving the normal lighting in the area and connected ahead of any local switches.

b. The same or a different branch circuit as that serving the normal lighting in the area if that circuit is equipped with means to monitor the status of that area's normal lighting branch circuit ahead of any local switches.

c. Where the normal lighting circuit is served by one or more branch circuits, a separate branch circuit, provided with a lock-on feature, that originates from the same panelboard as the normal lighting circuits. The branch circuit disconnecting means for this branch circuit shall be provided with a lock-on feature.

(4) The branch circuit that feeds battery-equipped emergency luminaires shall be clearly identified at the distribution panel.

(5) Emergency luminaires that obtain power from a battery-equipped emergency luminaire shall be wired to the battery-equipped emergency luminaires as required in Part II, IV, or V of this article.

(6) Remote luminaires providing lighting for the exterior of an exit door shall be permitted to be supplied by the battery-equipped emergency luminaire serving the area immediately inside the exit door.

Statement of Problem and Substantiation for Public Comment

The phrase "for unit equipment" is needed in the 2nd sentence of subclause (2) because that is the only product type whose cord length is (and always has been) limited to 3 ft in length. This cord length limit has always applied to unit equipment under Article 700 (and in UL 924). The phrase "for unit equipment" was included in PI 2204; the committee statement associated with FR 8848 gives no explanation as to its deletion.

The committee also added the 6 ft cord length when creating FR 8848, with no explanation provided. A 6 ft minimum cord length is quite common for appliances and other devices intended for connection to wall-mounted receptacles near grade level, and is generally seen as an effective means to limit the use of extension cords and the fire/trip hazard they can present. But this isn't applicable to ceiling-mounted emergency luminaires that are part of the building infrastructure. Unit equipment cords are limited to 3 ft lengths to prevent them from being connected to a receptacle within easy reach of building occupants, reducing the chance of them being inadvertently disconnected. The constraint that these other luminaires must be installed per 410.62(C)(1) places them directly below a ceiling outlet which also renders them as not occupant accessible.

The objective of the PI is to allow high bay and pendant luminaires to serve as part of a facility's emergency lighting system, where their wide beam spread can provide good emergency illumination coverage to the floor below. There are many high ceiling applications where a cord length more than 6 ft will be needed. If the committee is determined to establish a maximum cord length, a 25 ft maximum would be reasonable and avoid disqualifying luminaires suitable for this purpose. UL 924 currently does not have such a cord length limit but can consider adopting one if a limit is adopted here in Article 700.

Related Item

• PI 2204, FR 8848

Submitter Information Verification

Submitter Full Name: Michael Shulman
Organization: UL LLC
Street Address:
City:
State:
Zip:
Submittal Date: Tue Aug 17 18:37:09 EDT 2021
Committee: NEC-P13

Public Comment No. 1367-NFPA 70-2021 [Section No. 700.23]

700.23 Dimmer and Relay Systems.

A dimmer or relay system containing more than one dimmer or relay and listed for use in emergency systems shall be permitted to be used as a control device for energizing emergency lighting circuits. Upon failure of normal power, the dimmer or relay system shall be permitted to selectively energize only those branch circuits required to provide minimum emergency illumination using a control bypass function. Where the dimmer or relay system is fed by a normal/emergency power source from an upstream transfer switch, normal power sensing for this function shall be permitted to be from a normal-only power source upstream of the transfer switch. All branch circuits supplied by the dimmer or relay system cabinet shall comply with the wiring methods of Part II of Article 700.

Additional Proposed Changes

File Name	Description	Approved
CMP-13_definition_TG_summary_8-18.pdf	CMP-13 Definition TG summary	

Statement of Problem and Substantiation for Public Comment

This change is needed to clarify the code text and match the definition.
This public comment is being submitted on behalf of a task group formed of CMP-13 members; Herb Daugherty, Jeff Jonas, Chad Kennedy, Linda Little and Charles Picard to address the NEC correlating committee comments related to the definitions under the purview of CMP-13.

Related Item

• FR-8781

Submitter Information Verification

Submitter Full Name: Jeff Jonas
Organization: Generac Power Systems, Inc.
Street Address:
City:
State:
Zip:
Submittal Date: Thu Aug 12 12:41:50 EDT 2021
Committee: NEC-P13

Correlating Committee Definitions Task Group
CMP-13 - Definitions
(prepared by Jeff Jonas, August 18, 2021)

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
	The Correlating Committee directs the Chair of CMP-13 to assign a task group to review all the definitions under their purview for compliance with the NEC Style Manual and to review definitions identified by the Correlating Committee that may contain correlation issues. The attachment includes a list of those definitions identified that need to be reviewed.	
Diversion Load Controller. Equipment that regulates the output of a wind generator by diverting power from the generator to dc or ac loads or to an interconnected utility service. (CMP-4)	The Correlating Committee assigns the definition of Diversion Load Controller to CMP-13. Code-Making Panel 13 should review and compare this definition with the Diversion Charge Controller definition and consider using the same term for consistency.	No action taken. Will be reviewed by task group 6 with "Diversion Charge Controller".
Inverter Utilization Output Circuit. Conductors between the multimode or stand-alone inverter and utilization equipment. (706) (CMP-13)	The Correlating Committee directs the panel to review the definition of Inverter Utilization Output Circuit and consider correlation with the definition of Power Source Output Circuit.	No action taken. More discussion required in the interconnection task group and the next code cycle.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Normal/Emergency Power Source. A power source on the output side of a transfer switch or uninterruptible power supply that is automatically available upon loss of normal power. (700) (CMP-13).	The Correlating Committee directs that this definition title be reviewed for its use within the article. The term "normal/emergency power source" is not used in Article 700. The term "normal/emergency source" is used in 700.23.	Submitted PC 1367 Change code language to include "power" after "Normal/ Emergency" in 700.23 to match the definition.
Optional Standby Systems. Those systems intended to supply power to public or private facilities or property where life safety does not depend on the performance of the system. These systems are intended to supply on-site generated or stored power to selected loads either automatically or manually. (CMP-13) ~~Informational Note: Optional standby systems are typically installed to provide an alternate source of electric power for such facilities as industrial and commercial buildings, farms, and residences and to serve loads such as heating and refrigeration systems, data processing and communications systems, and industrial processes that, when stopped during any power outage, could cause discomfort, serious interruption of the process, damage to the product or process, or the like.~~	4.1.1 Redundant Informational Note The Correlating Committee directs the panel to reconsider the definition, regarding the need for the informational note. This Informational Note is presently located in the Scope of Article 702.	CN 434 Submitted PC 1355 Requested changes made.
Stored-Energy Power Supply System (SEPSS). ~~This definition shall apply within this article and throughout the code.~~ A complete functioning EPSS powered by a stored-energy electrical source. (CMP-13)	The Correlating Committee directs the panel to review the definition of Stored-Energy Power Supply System for compliance with the NEC Style Manual. The definition should follow the NEC Style Manual 2.2.2, recommendations for denoting the application of definitions by removing the first sentence.	CN 435 Submitted PC 1366 Requested changes made.
DC System, Reference-Grounded (Reference-Grounded DC System). A system that is not solidly grounded but has a low-resistance electrical reference that maintains voltage to ground in normal operation. (712) (CMP-13)	Task Group 6 Diversion Charge Controller (13), Grounded, Functionally (4) and Referenced-Grounded 2.2.2.4 Multiple Terms	No action taken. Per a discussion with Chad Kennedy this definition is being handled by task group 6.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Diversion Charge Controller. Equipment that regulates the charging process of an ESS by diverting power from energy storage to direct-current or alternating-current loads or to an interconnected utility service. (706) (CMP-13)	Task Group 6 Diversion Charge Controller, Grounded, Functionally 2.2.2.4 Multiple Terms	No action taken. Per a discussion with Chad Kennedy this definition is being handled by task group 6.
Grounded, Functionally (Functionally Grounded). A system that has an electrical ground reference for operational purposes that is not solidly grounded. (712) (CMP-13) Informational Note: Examples of operational reasons for functionally grounded systems include ground-fault detection and performance-related issues for some power sources.	Task Group 6 Diversion Charge Controller (13), Grounded, Functionally (4) and Referenced-Grounded 2.2.2.4 Multiple Terms	No action taken. Per a discussion with Chad Kennedy this definition is being handled by task group 6.
Critical Operations Areas, Designated ({~~{~~Designated Critical Operations Areas) (DCOA)~~}~~. Areas within a facility or site designated as requiring critical operations power. (CMP-13)	The term modifier to be in parentheses and then the acronym in parentheses.	PC 1368 Requested changes made.
DC System, Grounded Three-Wire, ~~Grounded~~ (Grounded Three-Wire DC System). A system with a solid connection or reference-ground between the center point of a bipolar dc power source and the equipment grounding system. (712) (CMP-13)	2.2.2.3 Base Term Group with DC System, Grounded Three-Wire	PC 1369 Requested changes made.
DC System, Grounded Two-Wire, ~~Grounded~~ (Grounded Two-Wire DC System). A system that has a solid connection or reference-ground between one of the current-carrying conductors and the equipment grounding system. (712) (CMP-13)	2.2.2.3 Base Term Group with DC System, Grounded Two-Wire	PC 1370 Requested changes made.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
DC System, Ungrounded (Ungrounded DC System). A system that has no direct or resistive connection between the current-carrying conductors and the equipment grounding system. (712) (CMP-13)	2.2.2.3 Base Term Group with DC System, Ungrounded	No action taken. Looks to be correct as is.
Emergency Luminaire, Battery- Equipped (Battery- Equipped Emergency Luminaire). A luminaire with a rechargeable battery, a battery charging means, and an automatic load control relay. ~~(700) (701)~~ (CMP-13)	2.2.2.3.2 Article Number (Can't have two)	PC 1372 Requested changes made.
Emergency Power Supply System (EPSS). ~~This definition shall apply within this article and throughout the code.~~ A complete functioning EPS system coupled to a system of conductors, disconnecting means and overcurrent protective devices, transfer switches, and all control, supervisory, and support devices up to and including the load terminals of the transfer equipment needed for the system to operate as a safe and reliable source of electric power. [110:3.3.4] (CMP-13)	2.2.2 Delete the first sentence	PC 1373 Requested changes made.
Emergency **Luminaire,** ~~**Emergency**~~**, Directly Controlled (Directly Controlled Emergency Luminaire).** A luminaire supplied by the facility emergency power system and with a control input for dimming or switching that provides an emergency illumination level upon loss of normal power. (700) (CMP-13) Informational Note: See ANSI/UL 924, Emergency Lighting and Power Equipment, for information covering directly controlled emergency luminaires.	2.2.2.3 Base Term Group By Emergency Luminaire	PC 1374 Requested changes made.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Microgrid, Direct Current ~~[~~(Direct Current Microgrid) (DC Microgrid)~~]~~. A direct current microgrid is a power distribution system consisting of more than one interconnected dc power source, supplying dc-dc converter(s), dc load(s), and/or ac load(s) powered by dc-ac inverter(s). ~~A dc microgrid is typically not directly connected to an ac primary source of electricity, but some dc microgrids interconnect via one or more dc-ac bidirectional converters or dc-ac inverters.~~ (712) (CMP-13) Informational Note No. 1: Direct current power sources include ac-dc converters (rectifiers), bidirectional dc-ac inverters/converters, photovoltaic systems, wind generators, energy storage systems (including batteries), and fuel cells. Informational Note No. 2: A DC Microgrid is typically not directly connected to an ac primary source of electricity, but some dc microgrids interconnect via one or more dc-ac bidirectional converters or dc-ac inverters.	2.2.2.5 Alternate Term Title has 2 sets of Paren. Definition last sentence should be an Informational Note	PC 1927 Requested changes made.
Voltage, Nominal ~~Voltage~~ (Nominal Voltage) (as applied to battery or cell). The value assigned to a cell or battery of a given voltage class for the purpose of convenient designation. The operating voltage of the cell or battery may vary above or below this value. (CMP-13) Informational Note: The most common nominal cell voltages are 2 volts per cell for the lead-acid batteries, 1.2 volts per cell for alkali batteries, and 3.2 to 3.8 volts per cell for Li-ion batteries. Nominal voltages might vary with different chemistries.	2.2.2.3 Base Term Group by Voltage, Nominal (Nominal Voltage) (as applied…. Retained)	CN 446 PC 1375 Requested changes made.
Primary ~~DC~~ Source, DC (Primary DC Source). A source that supplies the majority of the dc load in a dc microgrid. (712) (CMP-13)	2.2.2.3 Base Term Group by Primary Source 2.2.2.5 Alternate Term (Primary DC Source)	PC 1376 Requested changes made.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Supervisory Control and Data Acquisition (SCADA). An electronic system that provides monitoring and controls for the operation of the critical operations power system. Informational Note: This can include the fire alarm system, security system, control of the HVAC, the start/stop/monitoring of the power supplies and electrical distribution system, annunciation and communications equipment to emergency personnel, facility occupants, and remote operators. (CMP-13)	The second sentence should be an Informational Note	PC 1378 Requested changes made.
~~the power supplies and electrical distribution system, annunciation and communications equipment to emergency personnel, facility occupants, and remote operators. (CMP-13)~~		
Transfer Switch, Bypass Isolation (Bypass Isolation Transfer Switch). A manual, nonautomatic, or automatic operated device used in conjunction with a transfer switch to provide a means of directly connecting load conductors to a power source and of disconnecting the transfer switch. (CMP-13)	2.2.2.3.1 Searchability 2.2.2.3 Base Term Transfer Switch, Bypass Isolation (Bypass Isolation Transfer Switch)	PC 1380 Requested changes made.
Transfer Switch, Meter-Mounted ~~Transfer~~. (Meter-Mounted Transfer Switch). A transfer switch connected between the utility meter and the meter base or fabricated as part of the meter base. (CMP-13) Informational Note: Meter-mounted transfer switches can plug into the meter base or be fabricated as part of the meter base. Transfer switches that incorporate the meter base in the transfer equipment assembly are not considered meter-mounted transfer switches.	2.2.2.3 Base Term Transfer Switch, Meter-Mounted	PC 1381 Requested changes made.
Transfer Switch~~, Transfer~~. An automatic or nonautomatic device for transferring one or more load conductor connections from one power source to another. (CMP-13)	2.2.2.3 Base Term Transfer Switch	PC 1379 Requested changes made.

CMP-13 Definitions	Correlating Committee Comments	Task Group Comments
Voltage, Nominal (Nominal Voltage). A value assigned to a circuit or system for the purpose of conveniently designating its dc voltage class. (712) (CMP-13) Informational Note: The actual voltage at which a circuit operates can vary from the nominal voltage within a range that permits satisfactory operation of equipment.	2.2.2.4 Multiple Terms Nominal Voltage	No action taken. Correct as is. Multiple terms are being used to describe 2 different things. Article 712 definition is limited to dc.

Public Comment No. 2154-NFPA 70-2021 [Section No. 700.32(C)]

(C) Modifications.

~~Where~~ If modifications, additions, or deletions to the emergency system(s) occur, selective coordination of the emergency system(s) OCPDs with all supply-side and load-side OCPDs shall be reevaluated.

Exception: Selective coordination shall not be required between two overcurrent devices located in series if no loads are connected in parallel with the downstream device.

Informational Note: See Informational Note Figure 700.32 for an example of how emergency system OCPDs selectively coordinate with all supply-side OCPDs.

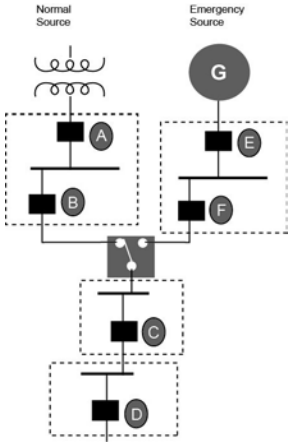
OCPD D selectively coordinates with OCPDs C, F, E, B, and A.

OCPD C selectively coordinates with OCPDs F, E, B, and A.

OCPD F selectively coordinates with OCPD E.

OCPD B is not required to selectively coordinate with OCPD A because OCPD B is not an emergency system OCPD.

Figure Informational Note Figure 700.32 Emergency System Selective Coordination.



Statement of Problem and Substantiation for Public Comment

700.32(C) describes a condition and not a location; use of the word "where" no longer complies with the Style Manual.

Related Item

• FR-9113

Submitter Information Verification

Submitter Full Name: Frederic Hartwell
Organization: Hartwell Electrical Services, Inc.
Street Address:
City:
State:
Zip:
Submittal Date: Thu Aug 19 14:17:06 EDT 2021
Committee: NEC-P13

Public Comment No. 1846-NFPA 70-2021 [Section No. 701.3(A)]

(A) Commissioning Witness Test.

The authority having jurisdiction shall conduct or witness the commissioning ~~and testing~~ of the complete system upon installation.

Statement of Problem and Substantiation for Public Comment

The words “and testing” are redundant and therefore should be removed from the requirement. “Testing” is included in the definition of the term “commissioning”. Please refer to the definitions in article 100.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 1833-NFPA 70-2021 [Section No. 700.3(A)]	
Public Comment No. 1833-NFPA 70-2021 [Section No. 700.3(A)]	

Related Item

• FR 8867

Submitter Information Verification

Submitter Full Name: Timothy Windey
Organization: Cummins Power Generation
Street Address:
City:
State:
Zip:
Submittal Date: Wed Aug 18 10:54:05 EDT 2021
Committee: NEC-P13

Public Comment No. 945-NFPA 70-2021 [Section No. 701.4(A)]

(A) Rating.

Legally required standby system equipment interrupting and short-circuit current ratings shall be suitable for the available fault current at its terminals. Legally required standby system equipment shall be marked with the available fault current and the date the calculation was performed. The marking shall comply with 110.21(B)(3).

Statement of Problem and Substantiation for Public Comment

Text has been added to require the marking of the available fault current and date of calculation for legally required standby system equipment. The wording is similar to NEC 408.6 that requires this marking on all panelboards, switchboards and switchgear. This would then apply for all legally required standby system panelboards, switchboards and switchgear. However, there is other legally required standby equipment that would benefit from this marking such as legally required standby system transfer switches, enclosed circuit breakers and fused or non-fused disconnects to make sure the equipment interrupting and short-circuit current ratings are adequate for the available fault current. Having the equipment ratings as well as the available fault current marked on the equipment also increases the ability of the electrical inspector to evaluate the proper application of equipment.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 941-NFPA 70-2021 [Section No. 700.4(A)]	Similar requirement
Public Comment No. 941-NFPA 70-2021 [Section No. 700.4(A)]	

Related Item

• Public Input No. 395

Submitter Information Verification

Submitter Full Name: Daniel Neeser
Organization: Eaton’s Bussmann Division
Street Address:
City:
State:
Zip:
Submittal Date: Thu Aug 05 11:25:16 EDT 2021
Committee: NEC-P13

Public Comment No. 1142-NFPA 70-2021 [Section No. 701.4(B)]

(B) Capacity.

A legally required standby system shall have adequate capacity in accordance with Article 220 or by another approved method. The system capacity shall be sufficient for the rapid load changes and transient power and energy requirements associated with any expected loads.

Additional Proposed Changes

File Name	Description	Approved
13_CN_299.pdf	13 CN299	

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 299 appeared in the First Draft Report on First Revision No. 8869.

The Correlating Committee directs the panel to revise the requirement to remove the reference to an entire article in accordance with 4.1.4 of the NEC Style Manual.

Related Item

• First Revision No. 8869

Submitter Information Verification

Submitter Full Name: CC on NEC-AAC
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:
Submittal Date: Tue Aug 10 10:59:18 EDT 2021
Committee: NEC-P13

Correlating Committee Note No. 299-NFPA 70-2021 [Section No. 701.4(B)]

Submitter Information Verification

Committee: NEC-P13
Submittal Date: Thu May 06 14:23:12 EDT 2021

Committee Statement

Committee Statement: The Correlating Committee directs the panel to revise the requirement to remove the reference to an entire article in accordance with 4.1.4 of the NEC Style Manual.

First Revision No. 8869-NFPA 70-2021 [Section No. 701.4(B)]

Ballot Results

This item has passed ballot

12 Eligible Voters
0 Not Returned
12 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Affirmative All

Ayer, Lawrence S.
Gallo, Ernest J.
Hickman, Palmer L.
Holub, Richard A.
Hunter, Dean C.
Johnston, Michael J.
Kendall, David H.
Kovacik, John R.
Manche, Alan
McDaniel, Roger D.
Porter, Christine T.
Williams, David A.

Public Comment No. 127-NFPA 70-2021 [Section No. 701.4(B)]

(B) Capacity.

A legally required standby system shall have adequate capacity in accordance with ~~Article~~ 220 ~~or~~ this *Code* , or by another approved method. The system capacity shall be sufficient for the rapid load changes and transient power and energy requirements associated with any expected loads.

Statement of Problem and Substantiation for Public Comment

The NEC style manual prohibits a reference back to an entire Article in the Code. The reference to Article 220 is unnecessary as the requirements in Chapters 1-4 apply throughout the code.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 126-NFPA 70-2021 [Section No. 700.4(B)]	System capacity
Public Comment No. 128-NFPA 70-2021 [Section No. 702.4(B)(2)]	

Related Item

• FR 8869

Submitter Information Verification

Submitter Full Name: Brian Baughman
Organization: Generac Power Systems Inc.
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jul 06 10:20:27 EDT 2021
Committee: NEC-P13

Public Comment No. 1046-NFPA 70-2021 [Section No. 701.4(C)]

(C) Load ~~Pickup and Load Shedding~~ Management .

The alternate power source shall be permitted to supply legally required standby and optional standby system loads where the alternate source has adequate capacity or where load management (that includes automatic selective load pickup and load shedding ~~are provided~~) is provided that will ensure adequate power to the legally required standby circuits.

Statement of Problem and Substantiation for Public Comment

This public comment is submitted on behalf of the Energy Management Task Group formed under the direction of the Correlating Committee to review all current and proposed definitions and requirements related to load management, load management system, power control system, energy management system and related terms to ensure a coordinated approach throughout the Code. See CCN-279.

The task group members are; Chad Kennedy (Chair), Tim Zgonena, Rebekah Hren, Greg Ball, Jason Fisher, Doug Burkett, Robert Jordan, Matthew Grover, Tim Windey, Karl Reighard, and Brian Baughman. This task group of balanced interests provided the expertise to develop these public comments covering energy management across the NEC.

Technical Substantiation:
The title has been modified so that it doesn't include functions from the actual requirement, and that it does include the proper level of abstraction along with the use of common terminology. This will improve consistency in the code. The requirement has been modified to include the common terminology while retaining the extremely important functional context that's needed.
Related TG PC's: 701.4(C), 708.22(B)

This public comment is part of a series of actions recommended by the task group. See the related public comments which complete this action.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 36-NFPA 70-2021 [Definition: Energy Management System.]	
Public Comment No. 1034-NFPA 70-2021 [Definition: Load Management System.]	
Public Comment No. 1036-NFPA 70-2021 [Definition: Load Management.]	
Public Comment No. 1039-NFPA 70-2021 [Section No. 220.70]	
Public Comment No. 1041-NFPA 70-2021 [Section No. 625.42(A)]	
Public Comment No. 1042-NFPA 70-2021 [Section No. 625.42(B)]	
Public Comment No. 1045-NFPA 70-2021 [Section No. 700.4(C)]	
Public Comment No. 1037-NFPA 70-2021 [Section No. 750.30]	
Public Comment No. 1048-NFPA 70-2021 [Section No. 708.22(B)]	
Public Comment No. 1049-NFPA 70-2021 [Section No. 705.80]	
Public Comment No. 1050-NFPA 70-2021 [Section No. 705.28(A)]	
Public Comment No. 1044-NFPA 70-2021 [Section No. 705.46]	
Public Comment No. 1043-NFPA 70-2021 [Section No. 705.13]	
Public Comment No. 1053-NFPA 70-2021 [Section No. 705.12 [Excluding any Sub-Sections]]	
Public Comment No. 1052-NFPA 70-2021 [Section No. 705.11(A)(1)]	
Public Comment No. 1047-NFPA 70-2021 [Section No. 702.4(B)]	
Public Comment No. 1406-NFPA 70-2021 [Section No. 230.82]	
Public Comment No. 36-NFPA 70-2021 [Definition: Energy Management System.]	
Public Comment No. 1034-NFPA 70-2021 [Definition: Load Management System.]	
Public Comment No. 1036-NFPA 70-2021 [Definition: Load Management.]	
Public Comment No. 1037-NFPA 70-2021 [Section No. 750.30]	
Public Comment No. 1039-NFPA 70-2021 [Section No. 220.70]	
Public Comment No. 1041-NFPA 70-2021 [Section No. 625.42(A)]	
Public Comment No. 1042-NFPA 70-2021 [Section No. 625.42(B)]	
Public Comment No. 1043-NFPA 70-2021 [Section No. 705.13]	
Public Comment No. 1044-NFPA 70-2021 [Section No. 705.46]	
Public Comment No. 1045-NFPA 70-2021 [Section No. 700.4(C)]	
Public Comment No. 1047-NFPA 70-2021 [Section No. 702.4(B)]	
Public Comment No. 1048-NFPA 70-2021 [Section No. 708.22(B)]	
Public Comment No. 1049-NFPA 70-2021 [Section No. 705.80]	
Public Comment No. 1050-NFPA 70-2021 [Section No. 705.28(A)]	
Public Comment No. 1052-NFPA 70-2021 [Section No. 705.11(A)(1)]	

Public Comment No. 1053-NFPA 70-2021 [Section No. 705.12 [Excluding any Sub-Sections]]

Public Comment No. 1406-NFPA 70-2021 [Section No. 230.82]

Related Item

• CN-279

Submitter Information Verification

Submitter Full Name: Chad Kennedy
Organization: Schneider Electric
Street Address:
City:
State:
Zip:
Submittal Date: Fri Aug 06 09:46:45 EDT 2021
Committee: NEC-P13

Public Comment No. 42-NFPA 70-2021 [Section No. 701.5]

701.5 Transfer Equipment.

(A) General.

Transfer equipment shall be automatic, listed, and marked for emergency system or legally required standby use. Transfer equipment shall be designed and installed to prevent the inadvertent interconnection of normal and alternate sources of supply in any operation of the transfer equipment. Transfer equipment and electric power production systems installed to permit operation in parallel with the normal source shall meet the requirements of Article 705. Meter-mounted transfer switches shall not be permitted for legally required system use.

(B) Bypass Isolation Switches.

Means to bypass and isolate the transfer switch equipment shall be permitted. Where bypass isolation switches are used, inadvertent parallel operation shall be avoided.

(C) Automatic Transfer Switches.

Automatic transfer switches shall be electrically operated and mechanically held. ~~Automatic transfer switches shall not be permitted to be reconditioned.~~

(D) Documentation.

The short-circuit current rating of the transfer equipment, based on the specific overcurrent protective device type and settings protecting the transfer equipment, shall be field marked on the exterior of the transfer equipment.

(E) Reconditioning Transfer Switches.

Transfer Switches within the scope of this article shall be permitted to be reconditioned in accordance with 701.5(E)(1) through 701.5(E)(4).

(1) The reconditioning process shall be performed in accordance with instructions provided by the manufacturer.

(2) Reconditioning shall be performed using design qualified parts, verified under applicable standards.

(3) Reconditioned transfer switches shall be listed or field labeled as reconditioned, and previously applied listing marks, if any, within the portions reconditioned shall be removed.

(4) If equipment has been damaged by fire, products of combustion, or water, it shall be specifically evaluated by its manufacturer or a qualified testing laboratory prior to being returned to service

Statement of Problem and Substantiation for Public Comment

The Committee Statement may be correct for some designs of the power switching element, but it is ignoring the other components and power switching elements that are designed to be serviced.

First, transfer switch equipment includes many systems and components in addition to the power switching element. There are typically controllers, control power, metering, and communication systems. These other system performance characteristics can be determined by immediate measurement and test, not destructive or end-of-life testing cited in the statement. When transfer switch equipment that has only limited service and a control system needs to be replaced or updated because of failure or obsolescence, the transfer equipment can be restored to full functional performance. Some would consider this reconditioning. The current code could force the complete replacement of the enclosure, power bus, wiring, power switching element, and other systems when only an updated controller is needed. This will cause longer times to put the transfer equipment back into service, eliminating the backup performance during this longer period.

Second, the suitability of a specific power switching element is addressed in the PI. Item (E)(1) states “in accordance with instructions provided by the manufacturer.” If an element is not intended to be serviceable the manufacturer will provide that information.

For reference, consider Molded Case Circuit Breakers (MCCB) and Low Voltage Power Circuit Breakers (LVPCB). Manufactures state that their MCCBs are not serviceable and do not provide instructions or parts for these circuit breakers. This is because the committee statement “performance characteristics cannot be determined by visual or measurement means, and can only be determined by testing to destruction or to end-of-life” is correct for MCCBs and one of the reasons manufactures state they cannot be reconditioned. Manufacturers do support the reconditioning of LVPCBs. Instructions to inspect and repair, and replacement parts for these products are provided. The NEC follows this approach in section 240.88(A) and 701.5 should use the same approach.

Related Item

• PI 2757-NFPA 70-2020

Submitter Information Verification

Submitter Full Name: John Cowans
Organization: Siemens
Street Address:
City:
State:

Zip:	
Submittal Date:	Wed Jun 30 10:18:13 EDT 2021
Committee:	NEC-P13

Public Comment No. 1143-NFPA 70-2021 [Section No. 701.6(C)]

(C) Battery Charging Malfunction.

To indicate charging malfunction on a battery required for source readiness, including the prime mover starting battery.

Informational Note: See NFPA 110-2019, *Standard for Emergency and Standby Power Systems*, for signals for generator sets.

Additional Proposed Changes

File Name	Description	Approved
13_CN_300.pdf	13 CN300	

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 300 appeared in the First Draft Report on First Revision No. 8877.

The Correlating Committee directs the panel to revise 701.6(A) through (D) into complete sentences to comply with the NEC Style Manual.

Related Item

• First Revision No. 8877

Submitter Information Verification

Submitter Full Name: CC on NEC-AAC
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:
Submittal Date: Tue Aug 10 11:01:37 EDT 2021
Committee: NEC-P13

Correlating Committee Note No. 300-NFPA 70-2021 [Section No. 701.6(C)]

Submitter Information Verification

Committee: NEC-P13
Submittal Date: Thu May 06 14:24:28 EDT 2021

Committee Statement

Committee Statement: The Correlating Committee directs the panel to revise 701.6(A) through (D) into complete sentences to comply with the NEC Style Manual.

First Revision No. 8877-NFPA 70-2021 [Section No. 701.6(C)]

Ballot Results

This item has passed ballot

12 Eligible Voters
0 Not Returned
12 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Affirmative All

Ayer, Lawrence S.
Gallo, Ernest J.
Hickman, Palmer L.
Holub, Richard A.
Hunter, Dean C.
Johnston, Michael J.
Kendall, David H.
Kovacik, John R.
Manche, Alan
McDaniel, Roger D.
Porter, Christine T.
Williams, David A.

Public Comment No. 1123-NFPA 70-2021 [Section No. 701.9]

701.9 Cybersecurity.

Legally required systems that are connected to a communication network and have the capability to permit control of any portion of the premises legally required electrical system shall comply with either of the following:

(1) The ability to control the system is limited to a direct connection through a local nonnetworked interface.

(2) It is connected through a networked interface complying with one of the following methods:

a. The system and associated software are identified as being evaluated for cybersecurity.

b. A cybersecurity assessment is conducted on the connected system to determine vulnerabilities to cyberattacks.

The cybersecurity assessment shall be conducted when the system configuration changes and at not more than 5-year intervals.

Documentation of the evaluation, assessment, and certification shall be made available to those authorized to inspect, operate, and maintain the system.

Informational Note No. 1: See ANSI/ISA 62443, *Cybersecurity Standards* series; UL 2900, *Cybersecurity Standards* series; or the *NIST Framework for Improving Critical Infrastructure Cybersecurity*, Version 1.1, for assessment requirements.

Informational Note No. 2: Examples of the commissioning certification used to demonstrate the system has been investigated for cybersecurity vulnerabilities could be one of the following:

(1) The ISA Security Compliance Institute (ISCI) conformity assessment program

(2) Certification of compliance by a nationally recognized testing laboratory

(3) Manufacturer certification for the specific type and brand of system provided

Additional Proposed Changes

File Name	Description	Approved
13_CN_296.pdf	13 CN296	

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 296 appeared in the First Draft Report on First Revision No. 8880.

The Correlating Committee requests that the Panel determine if "Qualified Electrical Testing Laboratory" or other terminology would be more appropriate than "Nationally Recognized Testing Laboratory" in consideration of the NEC Style Manual, Section 3.2.5.3, Consistent Application of Terms.

Related Item

• First Revision No. 8880

Submitter Information Verification

Submitter Full Name: CC on NEC-AAC
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:
Submittal Date: Mon Aug 09 16:23:15 EDT 2021
Committee: NEC-P13

Correlating Committee Note No. 296-NFPA 70-2021 [New Section after 701.7(B)]

Submitter Information Verification

Committee: NEC-P13
Submittal Date: Thu May 06 14:18:51 EDT 2021

Committee Statement

Committee Statement: The Correlating Committee requests that the Panel determine if “Qualified Electrical Testing Laboratory” or other terminology would be more appropriate than "Nationally Recognized Testing Laboratory" in consideration of the NEC Style Manual, Section 3.2.5.3, Consistent Application of Terms.

First Revision No. 8880-NFPA 70-2021 [New Section after 701.7(B)]

Ballot Results

This item has passed ballot

12 Eligible Voters
0 Not Returned
12 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Affirmative All

Ayer, Lawrence S.
Gallo, Ernest J.
Hickman, Palmer L.
Holub, Richard A.
Hunter, Dean C.
Johnston, Michael J.
Kendall, David H.
Kovacik, John R.
Manche, Alan
McDaniel, Roger D.
Porter, Christine T.
Williams, David A.

Public Comment No. 1890-NFPA 70-2021 [Section No. 701.9]

701.9 Cybersecurity.

Legally required systems that are connected to a communication network and have the capability to permit control of any portion of the premises legally required electrical system shall comply with either of the following:

(1) The ability to control the system is limited to a direct connection through a local nonnetworked interface.

(2) It is connected through a networked interface complying with one of the following methods:

a. The system and associated software are identified as being evaluated for cybersecurity.

b. A cybersecurity assessment is conducted on the connected system to determine vulnerabilities to cyberattacks.

The cybersecurity assessment shall be conducted when the system configuration changes and at not more than 5-year intervals.

Documentation of the evaluation, assessment, and certification shall be made available to those authorized to inspect, operate, and maintain the system.

Informational Note No. 1: See ANSI/ISA 62443, *Cybersecurity Standards* series; UL 2900, *Cybersecurity Standards* series; or the *NIST Framework for Improving Critical Infrastructure Cybersecurity*, Version 1.1, for assessment requirements.

Informational Note No. 2: Examples of the commissioning certification used to demonstrate the system has been investigated for cybersecurity vulnerabilities could be one of the following:

(1) The ISA Security Compliance Institute (ISCI) conformity assessment program

(2) Certification of compliance by a ~~nationally recognized testing laboratory~~ qualified electrical testing laboratory

(3) Manufacturer certification for the specific type and brand of system provided

Statement of Problem and Substantiation for Public Comment

Section 3.2.5.3 titled “Nationally Recognized Testing Laboratory” indicates that use of the terms “Nationally Recognized Testing Laboratory” or “NRTL” shall be avoided. The Nationally Recognized Testing Laboratory program, also known as NRTL, is an OSHA program for the accreditation of laboratories that test products for the workplace and is not to be applied generally in the NEC. The preferred term to use is “Qualified Electrical Testing Laboratory” to align with Section 90.7.

Related Item

• FR 8880

Submitter Information Verification

Submitter Full Name: Agnieszka Golriz
Organization: NECA
Street Address:
City:
State:
Zip:
Submittal Date: Wed Aug 18 13:45:34 EDT 2021
Committee: NEC-P13

Public Comment No. 2123-NFPA 70-2021 [Section No. 701.9]

~~**701.9** Cybersecurity.~~

~~Legally required systems that are connected to a communication network and have the capability to permit control of any portion of the premises legally required electrical system shall comply with either of the following:~~

(1) ~~The ability to control the system is limited to a direct connection through a local nonnetworked interface.~~

(2) ~~It is connected through a networked interface complying with one of the following methods:~~

(3) ~~The system and associated software are identified as being evaluated for cybersecurity.~~

(4) ~~A cybersecurity assessment is conducted on the connected system to determine vulnerabilities to cyberattacks.~~

~~The cybersecurity assessment shall be conducted when the system configuration changes and at not more than 5-year intervals.~~

~~Documentation of the evaluation, assessment, and certification shall be made available to those authorized to inspect, operate, and maintain the system.~~

~~Informational Note No. 1: See ANSI/ISA 62443, *Cybersecurity Standards* series; UL 2900, *Cybersecurity Standards* series; or the *NIST Framework for Improving Critical Infrastructure Cybersecurity* , Version 1.1, for assessment requirements.~~

~~Informational Note No. 2: Examples of the commissioning certification used to demonstrate the system has been investigated for cybersecurity vulnerabilities could be one of the following:~~

(1) ~~The ISA Security Compliance Institute (ISCI) conformity assessment program~~

(2) ~~Certification of compliance by a nationally recognized testing laboratory~~

(3) ~~Manufacturer certification for the specific type and brand of system provided~~

Statement of Problem and Substantiation for Public Comment

Cyber security requirements come from other guidelines and should not be referenced in the NEC.
These guidelines are created on a per business application and are done through IT organizations covering OT, IT, IOT, and power networks.

Having NEC drive these guidelines will create a disaster in the business and government applications.

Requesting AHJs to do this is just crazy ... almost none will have that skill.

I have reviewed this with several corporate cyber security teams who all claim this had zero enforcement and lacks any merit.

Related Item

• FR8880

Submitter Information Verification

Submitter Full Name: Joel Goergen
Organization: Cisco Systems, Inc.
Affiliation: Cisco Systems
Street Address:
City:
State:
Zip:
Submittal Date: Thu Aug 19 13:00:06 EDT 2021
Committee: NEC-P13

Public Comment No. 2130-NFPA 70-2021 [Section No. 701.9]

~~**701.9** Cybersecurity.~~

~~Legally required systems that are connected to a communication network and have the capability to permit control of any portion of the premises legally required electrical system shall comply with either of the following:~~

(1) ~~The ability to control the system is limited to a direct connection through a local nonnetworked interface.~~

(2) ~~It is connected through a networked interface complying with one of the following methods:~~

(3) ~~The system and associated software are identified as being evaluated for cybersecurity.~~

(4) ~~A cybersecurity assessment is conducted on the connected system to determine vulnerabilities to cyberattacks.~~

~~The cybersecurity assessment shall be conducted when the system configuration changes and at not more than 5-year intervals.~~

~~Documentation of the evaluation, assessment, and certification shall be made available to those authorized to inspect, operate, and maintain the system.~~

~~Informational Note No. 1: See ANSI/ISA 62443, *Cybersecurity Standards* series; UL 2900, *Cybersecurity Standards* series; or the *NIST Framework for Improving Critical Infrastructure Cybersecurity* , Version 1.1, for assessment requirements.~~

~~Informational Note No. 2: Examples of the commissioning certification used to demonstrate the system has been investigated for cybersecurity vulnerabilities could be one of the following:~~

(1) ~~The ISA Security Compliance Institute (ISCI) conformity assessment program~~

(2) ~~Certification of compliance by a nationally recognized testing laboratory~~

(3) ~~Manufacturer certification for the specific type and brand of system provided~~

Statement of Problem and Substantiation for Public Comment

While I applaud the panel for recognizing the cybersecurity threat, the code requirements as stated lead users of the code to the false conclusion that installations that meet these requirements will be secure. That is not what these requirements accomplish, and the code language should either be removed in its entirety (1st preference) or revised as indicated in my other public comment (2nd preference). Please note that cybersecurity code language was rejected by CMP 1 and CMP 12 in the first draft.

Standards such as UL 2900 only serve to establish that a secure system is possible using the listed components. It makes no further guarantees. Security is ultimately the responsibility and liability of the building operator that maintains the constituent systems.

Put in physical security terms, these standards require devices to have lock features, much like residential building codes require that exterior access doors include a deadbolt lock. However, if the building occupant is annoyed by the lock and simply leaves the key in the door, security is lost. While this kind of poor physical security habit is abhorrent to any reasonable person, the cybersecurity equivalent of this practice occurs on a daily basis. Poorly formed passwords, or good passwords that are too difficult to remember that are then scribbled on notes under keyboards lead to frequent security breaches. Further, no software system is immune from bugs and can be susceptible to further exploits.

The reason that the assessments and certifications suggested in the proposed code language are of minor value to cybersecurity is due to the fact that these systems depend entirely on how they are configured in the actual building. A networking device can be 99% secure from the factory, and then have all security features defeated by a user configuration in a matter of minutes.

The proposed code attempts to address this by allowing an assessment to be conducted as an alternative to the device certificate. This is highly misleading as both are required to achieve true security. Allowing only one contributes to a false sense of security. Assessing an installed network requires a high level of sophistication and technical knowledge. These evaluations also require an enormous amount of trust with the assessing entity, and any code that forces disclosure of security measures to third parties is dangerous to overall security. Further, an ongoing recertification interval of 5 years is completely useless as vulnerabilities and their exploits occur on the order of days and weeks, let alone months. Requiring recertification on reconfiguration similarly would be untenable as networks experience configuration changes often on a weekly or even daily basis, and defining which trigger the need for a recertification would be onerous at best. Due to the obvious difficulties presented to the authorities having jurisdiction, the whole issue of on-site assessments should be omitted from the NEC and left to more appropriate NFPA documents such as NFPA 70B or other regulatory processes.

It's important to remember that even if security is perfect at the moment of final inspection in the context of the NEC, the most likely outcome is that any breach will occur after the authority having jurisdiction has signed off on building occupancy. This places the vast majority of the cybersecurity problem outside of the reach of the NEC, which is why my first preference is for wholesale removal of these requirements. There is some value in ensuring devices are able to be secured, but even insecure devices can be made secure by competent security professionals using additional security layers. Thus, I feel any resources required by the NEC to solve the device security listing would be better allocated to solving the operational challenges, and as such belong in a more appropriate NFPA document such as NFPA 70B or a dedicated NFPA Cybersecurity document.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 2131-NFPA 70-2021 [Section No. 701.9]	Alternate code change if this comment is not accepted.
Public Comment No. 2131-NFPA 70-2021 [Section No. 701.9]	

Related Item

- FR-8880-NFPA 70-2021

Submitter Information Verification

Submitter Full Name: Jason Potterf
Organization: Cisco
Affiliation: Entertainment Services and Technology Association (ESTA)
Street Address:
City:
State:
Zip:
Submittal Date: Thu Aug 19 13:18:15 EDT 2021
Committee: NEC-P13

Public Comment No. 2131-NFPA 70-2021 [Section No. 701.9]

701.9 Cybersecurity.

Legally required systems that are connected to a communication network and have the capability to permit control of any portion of the premises legally required electrical system shall comply with either of the following:

(1) The ability to control the system is limited to a direct connection through a local nonnetworked interface.

(2) ~~It is connected through a networked interface complying with one of the following methods: The system and associated software are identified as being evaluated for - cybersecurity.~~

(3) ~~A cybersecurity assessment is conducted on the connected system to determine vulnerabilities to cyberattacks.~~

~~The cybersecurity assessment shall be conducted when the system configuration changes and at not more than 5-year intervals~~

(1) having the features necessary to achieve acceptable levels of cybersecurity if properly configured and maintained .

Documentation of the evaluation, assessment, and certification shall be made available to those authorized to inspect, operate, and maintain the system.

Informational Note No. 1: See ANSI/ISA 62443, *Cybersecurity Standards* series; UL 2900, *Cybersecurity Standards* series; or the *NIST Framework for Improving Critical Infrastructure Cybersecurity* , Version 1.1, for assessment requirements.

Informational Note No. 2: Examples of the commissioning certification used to demonstrate the system has been investigated for cybersecurity vulnerabilities could be one of the following:

(1) The ISA Security Compliance Institute (ISCI) conformity assessment program

(2) Certification of compliance by a nationally recognized testing laboratory

(3) Manufacturer certification for the specific type and brand of system provided

Informational Note No. 3: Cybersecurity is a specialized field requiring constant, vigilant attention to security vulnerabilities. Installation of devices that can be secured is an important first step, but not sufficient to guarantee a secure system.

Statement of Problem and Substantiation for Public Comment

While I applaud the panel for recognizing the cybersecurity threat, the code requirements as stated lead users of the code to the false conclusion that installations that meet these requirements will be secure. That is not what these requirements accomplish, and the code language should either be removed in its entirety (1st preference) or revised as indicated in this public comment (2nd preference). Please note that cybersecurity code language was rejected by CMP 1 and CMP 12 in the first draft.

Standards such as UL 2900 only serve to establish that a secure system is possible using the listed components. It makes no further guarantees. Security is ultimately the responsibility and liability of the building operator that maintains the constituent systems.

Put in physical security terms, these standards require devices to have lock features, much like residential building codes require that exterior access doors include a deadbolt lock. However, if the building occupant is annoyed by the lock and simply leaves the key in the door, security is lost. While this kind of poor physical security habit is abhorrent to any reasonable person, the cybersecurity equivalent of this practice occurs on a daily basis. Poorly formed passwords, or good passwords that are too difficult to remember that are then scribbled on notes under keyboards lead to frequent security breaches. Further, no software system is immune from bugs and can be susceptible to further exploits.

The reason that the assessments and certifications suggested in the proposed code language are of minor value to cybersecurity is due to the fact that these systems depend entirely on how they are configured in the actual building. A networking device can be 99% secure from the factory, and then have all security features defeated by a user configuration in a matter of minutes.

The proposed code attempts to address this by allowing an assessment to be conducted as an alternative to the device certificate. This is highly misleading as both are required to achieve true security. Allowing only one contributes to a false sense of security. Assessing an installed network requires a high level of sophistication and technical knowledge. These evaluations also require an enormous amount of trust with the assessing entity, and any code that forces disclosure of security measures to third parties is dangerous to overall security. Further, an ongoing recertification interval of 5 years is completely useless as vulnerabilities and their exploits occur on the order of days and weeks, let alone months. Requiring recertification on reconfiguration similarly would be untenable as networks experience configuration changes often on a weekly or even daily basis, and defining which trigger the need for a recertification would be onerous at best. Due to the obvious difficulties presented to the authorities having jurisdiction, the whole issue of on-site assessments should be omitted from the NEC and left to more appropriate NFPA documents such as NFPA 70B or other regulatory processes.

It's important to remember that even if security is perfect at the moment of final inspection in the context of the NEC, the most likely outcome is that any breach will occur after the authority having jurisdiction has signed off on building occupancy. This places the vast majority of the cybersecurity problem outside of the reach of the NEC, which is why my first preference is for wholesale removal of these requirements. There is some value in ensuring devices are able to be secured, but even insecure devices can be made secure by competent security professionals using additional security layers. Thus, I feel any resources required by the NEC to solve the device security listing would be better allocated to solving the operational challenges, and as such belong in a more appropriate NFPA document such as NFPA 70B or a dedicated NFPA Cybersecurity document.

Terra Misbehavior Note: Terra improperly renumbered my edit. My added language should be (2) under (1) and not a second (1) item.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 2130-NFPA 70-2021 [Section No. 701.9]	Preferred code change.
Public Comment No. 2130-NFPA 70-2021 [Section No. 701.9]	

Related Item

- FR-8880-NFPA 70-2021

Submitter Information Verification

Submitter Full Name: Jason Potterf
Organization: Cisco
Affiliation: Entertainment Services and Technology Association (ESTA)
Street Address:
City:
State:
Zip:
Submittal Date: Thu Aug 19 13:19:47 EDT 2021
Committee: NEC-P13

Public Comment No. 2148-NFPA 70-2021 [Section No. 701.9]

701.9 ~~Cybersecurity~~ Security .

Legally required systems that ~~are connected to a communication network and~~ have the capability to permit control of any portion of the premises legally required electrical system shall comply with either of the following:

(1) The ability to control the system is limited to a direct connection through a local nonnetworked interface for which all user interface elements are located in a single room or enclosure that is secured by a locking door . The locking door shall be identified as being evaluated for physical security.

(2) It is connected through a networked interface complying with one of the following methods:

a. The system and associated software are identified as being evaluated for cybersecurity.

b. A cybersecurity assessment is conducted on the connected system to determine vulnerabilities to cyberattacks.

The cybersecurity assessment shall be conducted when the system configuration changes and at not more than 5-year intervals.

Documentation of the evaluation, assessment, and certification shall be made available to those authorized to inspect, operate, and maintain the system.

Informational Note No. 1: See ANSI/ISA 62443, *Cybersecurity Standards* series; UL 2900, *Cybersecurity Standards* series; or the *NIST Framework for Improving Critical Infrastructure Cybersecurity*, Version 1.1, for assessment requirements.

Informational Note No. 2: Examples of the commissioning certification used to demonstrate the system has been investigated for cybersecurity vulnerabilities could be one of the following:

(1) The ISA Security Compliance Institute (ISCI) conformity assessment program

(2) Certification of compliance by a nationally recognized testing laboratory

(3) Manufacturer certification for the specific type and brand of system provided

Informational Note No. 3: See NFPA 730-2020, Guide for Premises Security, and ANSI/TIA-5017-2016, Telecommunications Physical Network Security Standard, for further information regarding physical security.

Statement of Problem and Substantiation for Public Comment

The proposed requirements imply that cybersecurity attacks are the only security threat to system integrity. The section should either be removed in its entirety, deferring physical security to more appropriate documents (1st Preference), or revised as indicated in this public comment (2nd Preference).

Any code language which implies that a local connection is more secure than a remote connection is misguided and inadequate. To correct this language, it should include similar security evaluation requirements against physical security attacks as those specified for cybersecurity attacks.

Security and the integrity of the system against remote attacks is just as necessary for in-person attackers as social engineering attacks are common and effective. Impersonation of service personnel has been demonstrated time and time again as an effective way to gain access to building systems, and is often faster and easier than a similar cyberattack. Some of the most notable cyberattacks in recent history, such as Stuxnet, were achieved by authorized personnel plugging infected memory devices into isolated systems. Further, there is a disturbing trend towards hybrid physical and cyber attacks in which remote access is covertly provisioned without the victim's knowledge by an in-person attack due to lax physical security.

As is the case with cybersecurity, physical security is only as good as its enforcement on the day of the attack. A locked door is only useful if the staff keep it locked. Personnel training, system maintenance, and access control system security all play a role. None of these are within the scope of the NEC, the electrical contractors, nor the authorities having jurisdiction and their inspectors. Thus, the only value the NEC can bring is to ensure that these systems can be secured by including appropriate physical security features, and this value is minimal. Instead of focusing on requirements enforced by the NEC at the time of building inspection, resources would be better used to address the problems with day-to-day security through a more appropriate NFPA document than NFPA 70.

Related Item

• FR-8880-NFPA 70-2021

Submitter Information Verification

Submitter Full Name: Jason Potterf
Organization: Cisco
Affiliation: Entertainment Services and Technology Association (ESTA)
Street Address:
City:
State:
Zip:
Submittal Date: Thu Aug 19 14:03:31 EDT 2021

Committee: NEC-P13

Public Comment No. 2222-NFPA 70-2021 [Section No. 701.9]

701.9 Cybersecurity.

Legally required systems that are connected to a communication network and have the capability to permit control of any portion of the premises legally required electrical system shall comply with either of the following:

(1) The ability to control the system is limited to within a ~~direct connection through a local nonnetworked interface. It is connected through a networked interface complying with~~

(2) local area network. The local area network shall be physically dedicated to the emergency system(s) and shall not have any physical or virtual connections with other networks. Equipment with access to the dedicated network shall not be made accessible to other networks.

(3) The emergency system(s) is/are connected in a way other than described above. In that case, the networked equipment of the emergency system(s) and the local area network to which the emergency system(s) is/are a part of shall comply with one of the following methods:

a. The networked system ~~and~~ , associated software ~~are identified as being evaluated for cybersecurity~~ , and cybersecurity policies and procedures for the facility shall be certified to known cybersecurity standards and practices .

b. A cybersecurity assessment is conducted on the connected system to determine vulnerabilities to cyberattacks , with mitigation plans documented and implemented .

The cybersecurity assessment shall be conducted when the system configuration changes and at not more than 5-year intervals.

Documentation of the evaluation, assessment, and certification shall be made available to those authorized to inspect, operate, and maintain the system.

Informational Note No. 1: See ANSI/ISA 62443, *Cybersecurity Standards* series; UL 2900, *Cybersecurity Standards* series; or the *NIST Framework for Improving Critical Infrastructure Cybersecurity*, Version 1.1, for assessment requirements.

Informational Note No. 2: Examples of the commissioning certification used to demonstrate the system has been investigated for cybersecurity vulnerabilities could be one of the following:

(1) The ISA Security Compliance Institute (ISCI) conformity assessment program

(2) Certification of compliance by a nationally recognized testing laboratory

(3) Manufacturer certification for the specific type and brand of system provided

Statement of Problem and Substantiation for Public Comment

For island mode, the text was modified to align with terms commonly used by networking professionals to reduce ambiguity. Furthermore, emergency systems such as paralleling switchgear are already a self-contained networked system. The term “physically dedicated” would prevent any solutions sharing one physical connection with multiple local area networks, such as VLAN. The term “shall not have any physical or virtual connections with other networks” would prevent the emergency system from being accessed by devices from other networks (e.g. office wifi, manufacturing network, etc.) as well as devices connected into the local area network through VPN solutions. Equipment such as laptops, tablets, and smart phones shall be made accessible only to this dedicated network to ensure that they do not infect the dedicated network with malware obtained from other networks.

Any networking method other than island mode shall have their cybersecurity capabilities either certified by a third party or have a vulnerability assessment done, mitigation plans documented and implemented. Cybersecurity capabilities applies not only on the equipment and network, but also the policies and procedures for the site. Many cybersecurity breaches are results of human errors not vulnerabilities in software.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 2213-NFPA 70-2021 [Section No. 700.9]	
Public Comment No. 2213-NFPA 70-2021 [Section No. 700.9]	

Related Item

• FR 8880

Submitter Information Verification

Submitter Full Name: Timothy Windey
Organization: Cummins Power Generation
Street Address:
City:
State:
Zip:
Submittal Date: Thu Aug 19 17:34:03 EDT 2021

Committee: NEC-P13

Public Comment No. 459-NFPA 70-2021 [Section No. 701.9]

701.

~~9- Cybersecurity.~~

~~Legally required systems that are connected to a communication network and have the capability to permit control of any portion of the premises legally required electrical system The cybersecurity assessment shall be conducted~~

9 Cybersecurity, Cyberweapon, Electromagnetic Pulse (EMP), Geomagnetic Disturbance (GMD), and Intentional Electromagnetic Interference (IEMI) Protection. Legally required standby systems shall comply with either of the following:

- ~~The ability to control the system is limited to a direct connection through a local nonnetworked interface.~~
- ~~It is connected through a networked interface complying with one of the following methods:~~

(1) ~~The system and associated software are identified as being evaluated for cybersecurity.~~

(2) ~~A cybersecurity assessment is conducted on the connected system to determine vulnerabilities to cyberattacks.~~

(1) The system shall be identified for cybersecurity, cyberweapon, EMP, GMD, and IEMI protection.

(2) A cybersecurity, cyberweapon, EMP, GMD, and IEMI protection failure modes effects analysis assessment shall be conducted to determine system vulnerabilities.

The identification or assessment shall be reviewed when the system configuration changes and at not more than 5-year intervals.

~~Documentation~~

Documentation of the

~~evaluation, assessment, and certification~~

identification or assessment shall be made available to those authorized to inspect, operate, and maintain the system.

Informational Note No. 1: See ANSI/ISA 62443, *Cybersecurity Standards* series; UL 2900, *Cybersecurity Standards* series; or the *NIST Framework for Improving Critical Infrastructure Cybersecurity*, Version 1.1, for assessment requirements.

Informational Note No. 2: Examples of the commissioning certification used to demonstrate the system has been investigated for cybersecurity vulnerabilities could be one of the following:

(1) The ISA Security Compliance Institute (ISCI) conformity assessment program

(2) Certification of compliance by a nationally recognized testing laboratory

(3) Manufacturer certification for the specific type and brand of system provided

Statement of Problem and Substantiation for Public Comment

This Public Comment is a follow-up to PI 761, PI 3080, FR 8801, FR 8880, PI 771, and PI 4024. It does not require cybersecurity, cyberweapon, EMP, GMD, or IEMI protection, but rather calls for the legally required standby system to be identified for these threats or for a threat assessment to be completed. While the NEC® is not ready to mandate protection requirements, an assessment would show system vulnerabilities. Acceptance of this Public Comment would at least bring the subject to the attention of owners, design engineers, electrical inspectors, and insurance companies, and set the table for requirements in future editions of the NEC® (or other NFPA standards). The format for this Public Comment is based upon the cybersecurity requirements found in FR 8801, which offers an assessment as an alternate for requiring protection.

PI 761 provided technical substantiation to require Electromagnetic Pulse (EMP) Protection for our critical infrastructure. While it appears that the NEC(R) is not ready to actually require EMP protection at this time, the security of our country is at stake. An EMP is fairly well understood as an extremely powerful electromagnetic wave that can impress 50,000 volts per meter on every piece of electrical equipment, destroying everything that is unprotected. An EMP is often associated with a nuclear explosion, but that is not the only cause of electromagnetic damage. A Geomagnetic Disturbance (GMD) is caused by a sunspot. While the EMP would be created by one of our adversaries, the sun spot is an act of God. These types of events can instantly initiate millions of fires in our unprotected electrical systems, overwhelming our fire-fighting capabilities. If millions of fires weren't bad enough, the unprotected electrical equipment would be damaged or completely destroyed, subjecting the country to years of blackout. Government intelligence studies, now unclassified, have predicted that from 66% to 90% of our population would die within one year, due to a lack of food, clean water, and medicine, if a significant EMP or GMD were to occur, while the country's electrical infrastructure remains unprotected. The final threat listed is an Intentional Electromagnetic Interference (IEMI). It is easily created by utilizing off-the-shelf parts, available for purchase on the internet, that will fit into a van. While much less powerful than a significant EMP or GMD, twenty vans, equipped with bench-made IEMI devices and scattered throughout the country, can shut down major industries and major parts of the country for weeks, if not months, through a coordinated attack, similar to 9/11, by targeting key industries/vulnerabilities. In conclusion, these electromagnetic threats to our unprotected electrical infrastructure, and therefor to our entire country, are absolutely real, and must be addressed.

PI 4024 provided significant substantiation for the need to protect critical infrastructure against cyber attack for equipment connected to the internet. However, equipment does not need to be connected to the internet in order to be damaged or destroyed by cyber threats.

Equipment can be damaged by cyber weapons such as malicious computer worms that attack SCADA (control) systems. A great example is the Stuxnet worm that destroyed the centrifuges in Iran. Thus, this Public Comment deletes the PI 4024 reference to the internet and adds cyberweapon to the list of threats that need to be either protected against or assessed.

Related Item

• PI 771 • PI 3080 • FR 8801 • PI 4024 • PI 3055 • FR 7947 • PI 4026 • FR 8880 • FR 8917 • PI 2888 • FR 8914 • PI 3083

Submitter Information Verification

Submitter Full Name: Vincent Saporita
Organization: Saporita Consulting
Affiliation: Saporita Consulting
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jul 27 17:36:47 EDT 2021
Committee: NEC-P13

Public Comment No. 1848-NFPA 70-2021 [Section No. 701.12(C) [Excluding any Sub-Sections]]

The alternate power source shall be of suitable rating and capacity to supply and maintain the total load for the duration determined by the system design. In no case shall the duration be less than 2 hours of system operation. Additionally, the power source shall comply with 701.12(C)(1) through (C)(5) as applicable.

Informational Note: See NFPA 110-2022, Standard for Emergency and Standby Power Systems, for information on Classification of Emergency Power Supply Systems (EPSS), which defines the minimum time for which the EPSS is designed to operate at rated load without being refueled or recharged .

Statement of Problem and Substantiation for Public Comment

We should be referencing the “Classification of EPSS” information in NFPA 110 via an informational note, as that is directly applicable to this section.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 1844-NFPA 70-2021 [Section No. 700.12(C) [Excluding any Sub-Sections]]	
Public Comment No. 1844-NFPA 70-2021 [Section No. 700.12(C) [Excluding any Sub-Sections]]	

Related Item

• FR 8967

Submitter Information Verification

Submitter Full Name: Timothy Windey
Organization: Cummins Power Generation
Street Address:
City:
State:
Zip:
Submittal Date: Wed Aug 18 11:00:19 EDT 2021
Committee: NEC-P13

Public Comment No. 2155-NFPA 70-2021 [Section No. 701.12(D)(3)]

(3) Outdoor Generator Sets.

~~Where~~ If an outdoor-housed generator set is equipped with a readily accessible disconnecting means in accordance with 445.18, and the disconnecting means is located within sight of the building or structure supplied, an additional disconnecting means shall not be required where ungrounded conductors serve or pass through the building or structure. Where the generator supply conductors terminate at a disconnecting means in or on a building or structure, the disconnecting means shall meet the requirements of 225.36.

Statement of Problem and Substantiation for Public Comment

This rule describes a condition and not a location; the use of the word "where" no longer complies with the Style Manual.

Related Item

• FR-8967

Submitter Information Verification

Submitter Full Name: Frederic Hartwell
Organization: Hartwell Electrical Services, Inc.
Street Address:
City:
State:
Zip:
Submittal Date: Thu Aug 19 14:21:35 EDT 2021
Committee: NEC-P13

Public Comment No. 529-NFPA 70-2021 [Section No. 701.12(E)(1)]

(1) Types.

Systems shall consist of one or more of the following system types:

(1) Uninterruptible power supply (UPS) that is listed and marked for emergency system or legally required standby use

Informational Note: See UL 1778, *Uninterruptable Power Systems,* for further information.

(2) Fuel cell system

(3) Energy storage system (ESS)

(4) Storage battery

(5) Other approved equivalent stored energy sources that comply with 701.12

Statement of Problem and Substantiation for Public Comment

This PC has been added in response to the introduction of SEPSSs in FR 8886-NFPA 70-2021. The reliability and performance characteristics required to ensure power is maintained to essential loads are evaluated and documented as a prerequisite to obtaining specialized emergency system and legally required standby system listings and markings for transfer equipment. The UPS replaces the switching function of the transfer equipment when it used to supply emergency/backup power in the case of a primary supply outage. The UPS equipment used in these types of installations should have the same listing and marking requirements as transfer equipment to ensure that the UPS provides, at minimum, the same level of performance and reliability as transfer equipment is required to provide.

Related Item

• FR 8886-NFPA 70-2021

Submitter Information Verification

Submitter Full Name: John Cowans
Organization: Siemens
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jul 29 10:24:14 EDT 2021
Committee: NEC-P13

Public Comment No. 1145-NFPA 70-2021 [Section No. 701.12(I)]

(I) Battery-Equipped Emergency Luminaires, Used for Legally Required Standby Systems.

Battery-equipped emergency luminaires used for legally required standby systems shall comply with 700.12(H):

Additional Proposed Changes

File Name	Description	Approved
13_CN_301.pdf	13 CN301	

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 301 appeared in the First Draft Report on First Revision No. 8891.

The Correlating Committee directs the panel to revise the requirement to remove the reference to an entire article in accordance with 4.1.4 of the NEC Style Manual. Since the reference points to the same article as the requirement, the panel should consider replacing "Article 701" with "this article."

Related Item

• First Revision No. 8891

Submitter Information Verification

Submitter Full Name: CC on NEC-AAC
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:
Submittal Date: Tue Aug 10 11:06:02 EDT 2021
Committee: NEC-P13

Correlating Committee Note No. 301-NFPA 70-2021 [Section No. 701.12(I)]

Submitter Information Verification

Committee: NEC-P13
Submittal Date: Thu May 06 14:26:01 EDT 2021

Committee Statement

Committee Statement: The Correlating Committee directs the panel to revise the requirement to remove the reference to an entire article in accordance with 4.1.4 of the NEC Style Manual. Since the reference points to the same article as the requirement, the panel should consider replacing "Article 701" with "this article."

First Revision No. 8891-NFPA 70-2021 [Section No. 701.12(I)]

Ballot Results

This item has passed ballot

12 Eligible Voters
0 Not Returned
12 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Affirmative All

Ayer, Lawrence S.
Gallo, Ernest J.
Hickman, Palmer L.
Holub, Richard A.
Hunter, Dean C.
Johnston, Michael J.
Kendall, David H.
Kovacik, John R.
Manche, Alan
McDaniel, Roger D.
Porter, Christine T.
Williams, David A.

Public Comment No. 2157-NFPA 70-2021 [Section No. 701.32(C)]

(C) Modifications.

~~Where~~ If modifications, additions, or deletions to the legally required standby system(s) occur, selective coordination of the legally required system(s) OCPDs with all supply-side and load-side OCPDs shall be reevaluated.

Exception: Selective coordination shall not be required between two overcurrent devices located in series if no loads are connected in parallel with the downstream device.

Informational Note: See Informational Note Figure 701.32 for an example of how legally required standby system OCPDs selectively coordinate with all supply-side OCPDs.

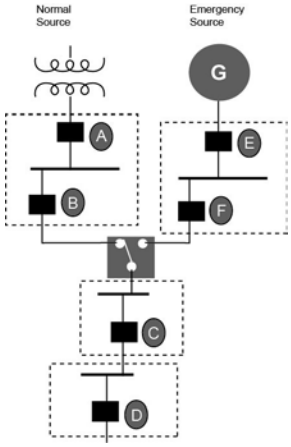
OCPD D selectively coordinates with OCPDs C, F, E, B, and A.

OCPD C selectively coordinates with OCPDs F, E, B, and A.

OCPD F selectively coordinates with OCPD E.

OCPD B is not required to selectively coordinate with OCPD A because OCPD B is not a legally required standby system OCPD.

Figure Informational Note Figure 701.32 Legally Required Standby System Selective Coordination.



Statement of Problem and Substantiation for Public Comment

This rule describes a condition and not a location; the use of the word "where" no longer complies with the Style Manual

Related Item

• FR-8895

Submitter Information Verification

Submitter Full Name: Frederic Hartwell
Organization: Hartwell Electrical Services, Inc.
Street Address:
City:
State:
Zip:
Submittal Date: Thu Aug 19 14:25:29 EDT 2021
Committee: NEC-P13

Public Comment No. 460-NFPA 70-2021 [New Section after 702.1]

TITLE OF NEW CONTENT

702.3 Cybersecurity, Cyberweapon, Electromagnetic Pulse (EMP), Geomagnetic Disturbance (GMD), and Intentional Electromagnetic Interference (IEMI) Protection. Optional standby systems shall comply with either of the following:

(1) The system shall be identified for cybersecurity, cyberweapon, EMP, GMD, and IEMI protection.

(2) A cybersecurity, cyberweapon, EMP, GMD, and IEMI protection failure modes effects analysis assessment shall be conducted to determine system vulnerabilities.

The identification or assessment shall be reviewed when the system configuration changes and at not more than 5-year intervals. Documentation of the identification or assessment shall be made available to those authorized to inspect, operate, and maintain the system.

Statement of Problem and Substantiation for Public Comment

This Public Comment is a follow-up to PI 761, PI 3080, FR 8801, PI 775, and PI 4024. It does not require cybersecurity, cyberweapon, EMP, GMD, or IEMI protection, but rather calls for the optional standby system to be identified for these threats or for a threat assessment to be completed. While the NEC® is not ready to mandate protection requirements, an assessment would show system vulnerabilities. Acceptance of this Public Comment would at least bring the subject to the attention of owners, design engineers, electrical inspectors, and insurance companies, and set the table for requirements in future editions of the NEC® (or other NFPA standards). The format for this Public Comment is based upon the cybersecurity requirements found in FR 8801, which offers an assessment as an alternate for requiring protection.

PI 761 provided technical substantiation to require Electromagnetic Pulse (EMP) Protection for our critical infrastructure. While it appears that the NEC(R) is not ready to actually require EMP protection at this time, the security of our country is at stake. An EMP is fairly well understood as an extremely powerful electromagnetic wave that can impress 50,000 volts per meter on every piece of electrical equipment, destroying everything that is unprotected. An EMP is often associated with a nuclear explosion, but that is not the only cause of electromagnetic damage. A Geomagnetic Disturbance (GMD) is caused by a sunspot. While the EMP would be created by one of our adversaries, the sun spot is an act of God. These types of events can instantly initiate millions of fires in our unprotected electrical systems, overwhelming our fire-fighting capabilities. If millions of fires weren't bad enough, the unprotected electrical equipment would be damaged or completely destroyed, subjecting the country to years of blackout. Government intelligence studies, now unclassified, have predicted that from 66% to 90% of our population would die within one year, due to a lack of food, clean water, and medicine, if a significant EMP or GMD were to occur, while the country's electrical infrastructure remains unprotected. The final threat listed is an Intentional Electromagnetic Interference (IEMI). It is easily created by utilizing off-the-shelf parts, available for purchase on the internet, that will fit into a van. While much less powerful than a significant EMP or GMD, twenty vans, equipped with bench-made IEMI devices and scattered throughout the country, can shut down major industries and major parts of the country for weeks, if not months, through a coordinated attack, similar to 9/11, by targeting key industries/vulnerabilities. In conclusion, these electromagnetic threats to our unprotected electrical infrastructure, and therefor to our entire country, are absolutely real, and must be addressed.

PI 4024 provided significant substantiation for the need to protect critical infrastructure against cyber attack for equipment connected to the internet. However, equipment does not need to be connected to the internet in order to be damaged or destroyed by cyber threats. Equipment can be damaged by cyber weapons such as malicious computer worms that attack SCADA (control) systems. A great example is the Stuxnet worm that destroyed the centrifuges in Iran. Thus, this Public Comment deletes the PI 4024 reference to the internet and adds cyberweapon to the list of threats that need to be either protected against or assessed.

Related Item

• PI 775 • PI 3080 • FR 8801 • PI 4024 • PI 3055 • FR 7947 • PI 4026 • FR 8880 • FR 8917 • PI 2888 • FR 8914 • PI 3083

Submitter Information Verification

Submitter Full Name: Vincent Saporita
Organization: Saporita Consulting
Affiliation: Saporita Consulting
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jul 27 17:55:27 EDT 2021
Committee: NEC-P13

Public Comment No. 1642-NFPA 70-2021 [Section No. 702.4(A)]

~~**(A)** Available Fault Current.~~

~~Optional standby system equipment shall be suitable for the available fault current at its terminals.~~

Statement of Problem and Substantiation for Public Comment

The committee made no attempt to address this PI. The statement seems to be referring to a different PI, as mine simply attempts to delete redundant material, as required by 4.1.1 of the style manual.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 1641-NFPA 70-2021 [Section No. 700.4(A)]	Similar

Related Item

• PI 575

Submitter Information Verification

Submitter Full Name: Ryan Jackson
Organization: Ryan Jackson
Street Address:
City:
State:
Zip:
Submittal Date: Mon Aug 16 19:05:13 EDT 2021
Committee: NEC-P13

Public Comment No. 1047-NFPA 70-2021 [Section No. 702.4(B)]

(B) System Capacity.

(1) Manual and Nonautomatic ~~Transfer Equipment~~ Load Connection .

Where the connection of load is manual or nonautomatic ~~transfer equipment is used~~ , an optional standby system shall have adequate capacity and rating for the supply of all equipment intended to be operated at one time. The user of the optional standby system shall be permitted to select the load connected to the system.

Informational Note: Manual and nonautomatic transfer equipment use human intervention.

(2) Automatic ~~Transfer Equipment~~ Load Connection .

Where ~~automatic transfer equipment is used~~ the connection of load is automatic , an optional standby system shall comply with 702.4(B)(2)(a) or (B)(2)(b) in accordance with Article 220 or by another approved method.

(a) *Full Load.* The standby source shall be capable of supplying the full load that is ~~transferred by the automatic transfer equipment~~ automatically connected .

(b) ~~*Load*~~ *Energy Management System* . Where a system is employed in accordance with 750.30 that will automatically manage the connected load, the standby source shall have a capacity sufficient to supply the maximum load that will be connected by the ~~load management system~~ EMS .

Statement of Problem and Substantiation for Public Comment

This public comment is submitted on behalf of the Energy Management Task Group formed under the direction of the Correlating Committee to review all current and proposed definitions and requirements related to load management, load management system, power control system, energy management system and related terms to ensure a coordinated approach throughout the Code. See CCN-279.

The task group members are; Chad Kennedy (Chair), Tim Zgonena, Rebekah Hren, Greg Ball, Jason Fisher, Doug Burkett, Robert Jordan, Matthew Grover, Tim Windey, Karl Reighard, and Brian Baughman. This task group of balanced interests provided the expertise to develop these public comments covering energy management across the NEC.

Technical Substantiation:
The text has been revised to provide additional clarity for the system sizing requirements of the optional standby system. The method of application of the load onto the standby source, whether it is manually, non-automatically, or automatically will determine how the load shall be calculated in accordance with the code. Equipment types are under the purview of 702.5 and are not necessary in 702.4.

This public comment is part of a series of actions recommended by the task group. See the related public comments which complete this action.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 36-NFPA 70-2021 [Definition: Energy Management System.]	
Public Comment No. 1034-NFPA 70-2021 [Definition: Load Management System.]	
Public Comment No. 1036-NFPA 70-2021 [Definition: Load Management.]	
Public Comment No. 1039-NFPA 70-2021 [Section No. 220.70]	
Public Comment No. 1041-NFPA 70-2021 [Section No. 625.42(A)]	
Public Comment No. 1042-NFPA 70-2021 [Section No. 625.42(B)]	
Public Comment No. 1045-NFPA 70-2021 [Section No. 700.4(C)]	
Public Comment No. 1046-NFPA 70-2021 [Section No. 701.4(C)]	
Public Comment No. 1037-NFPA 70-2021 [Section No. 750.30]	
Public Comment No. 1048-NFPA 70-2021 [Section No. 708.22(B)]	
Public Comment No. 1049-NFPA 70-2021 [Section No. 705.80]	
Public Comment No. 1044-NFPA 70-2021 [Section No. 705.46]	
Public Comment No. 1050-NFPA 70-2021 [Section No. 705.28(A)]	
Public Comment No. 1043-NFPA 70-2021 [Section No. 705.13]	
Public Comment No. 1053-NFPA 70-2021 [Section No. 705.12 [Excluding any Sub-Sections]]	
Public Comment No. 1052-NFPA 70-2021 [Section No. 705.11(A)(1)]	
Public Comment No. 1406-NFPA 70-2021 [Section No. 230.82]	
Public Comment No. 36-NFPA 70-2021 [Definition: Energy Management System.]	
Public Comment No. 1034-NFPA 70-2021 [Definition: Load Management System.]	
Public Comment No. 1036-NFPA 70-2021 [Definition: Load Management.]	
Public Comment No. 1037-NFPA 70-2021 [Section No. 750.30]	
Public Comment No. 1039-NFPA 70-2021 [Section No. 220.70]	

Public Comment No. 1041-NFPA 70-2021 [Section No. 625.42(A)]
Public Comment No. 1042-NFPA 70-2021 [Section No. 625.42(B)]
Public Comment No. 1043-NFPA 70-2021 [Section No. 705.13]
Public Comment No. 1044-NFPA 70-2021 [Section No. 705.46]
Public Comment No. 1045-NFPA 70-2021 [Section No. 700.4(C)]
Public Comment No. 1046-NFPA 70-2021 [Section No. 701.4(C)]
Public Comment No. 1048-NFPA 70-2021 [Section No. 708.22(B)]
Public Comment No. 1049-NFPA 70-2021 [Section No. 705.80]
Public Comment No. 1050-NFPA 70-2021 [Section No. 705.28(A)]
Public Comment No. 1052-NFPA 70-2021 [Section No. 705.11(A)(1)]
Public Comment No. 1053-NFPA 70-2021 [Section No. 705.12 [Excluding any Sub-Sections]]
Public Comment No. 1406-NFPA 70-2021 [Section No. 230.82]

Related Item

• CN-279

Submitter Information Verification

Submitter Full Name: Chad Kennedy
Organization: Schneider Electric
Street Address:
City:
State:
Zip:
Submittal Date: Fri Aug 06 09:51:12 EDT 2021
Committee: NEC-P13

Public Comment No. 128-NFPA 70-2021 [Section No. 702.4(B)(2)]

(2) Automatic Interconnection and Transfer Equipment.

Where automatic interconnection or transfer equipment is used, an optional standby system capacity calculation shall comply with 702.4(B)(2)(a) or (B)(2)(b) in accordance with ~~Article 220 or~~ this *Code* , or by another approved method.

(a) *Full Load.* The standby source shall be capable of supplying the full load that is transferred by the automatic transfer equipment.

(b) ~~*Load*~~ *Energy Management System* . Where a system is employed that will automatically manage the connected load, the standby source shall have a capacity sufficient to supply the maximum load that will be connected by the load management system.

Statement of Problem and Substantiation for Public Comment

The NEC style manual prohibits a reference back to an entire Article in the Code. The reference to Article 220 is unnecessary as the requirements in Chapters 1-4 apply throughout the code. The addition of Interconnection Equipment provides correlation with FR 9614 to 702.5. Regardless of whether the load is applied to the standby source through the use of transfer equipment, microgrid interconnection device, UL 1008B Source Interconnection Switch, or multimode inverter the same system capacity requirements will apply to the standby power source.

The term Energy Management System is the appropriate term in place of load management. Energy management systems listed to UL 916 are listed to provide load management. The use of the proper term will also provide correlation with Article 750.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 126-NFPA 70-2021 [Section No. 700.4(B)]	System capacity
Public Comment No. 127-NFPA 70-2021 [Section No. 701.4(B)]	System capacity

Related Item

• FR 8898 • PI 407

Submitter Information Verification

Submitter Full Name: Brian Baughman
Organization: Generac Power Systems Inc.
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jul 06 10:23:35 EDT 2021
Committee: NEC-P13

Public Comment No. 1936-NFPA 70-2021 [Section No. 702.4(B)(2)]

(2) Automatic Transfer Equipment.

Where automatic transfer equipment is used, an optional standby system shall comply with 702.4(B)(2)(a) or (B)(2)(b) in accordance with Article 220 or by another approved method.

(a) *Full Load.* The standby source shall be capable of supplying the full load that is transferred by the automatic transfer equipment.

(b) *Load Management.* Where a system is employed that will automatically manage the connected load, the standby source shall have a capacity sufficient to supply the maximum load that will be connected by the load management system.

Additional Proposed Changes

File Name	Description	Approved
CN_310.pdf	70_CN310	

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 310 appeared in the First Draft Report.

The Correlating Committee directs the panel to revise the requirement to remove the reference to an entire article in accordance with 4.1.4 of the NEC Style Manual.

Related Item

• Correlating Note No. 310

Submitter Information Verification

Submitter Full Name: CC on NEC-AAC
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:
Submittal Date: Wed Aug 18 17:07:17 EDT 2021
Committee: NEC-P13

Correlating Committee Note No. 310-NFPA 70-2021 [Section No. 702.4(B)(2)]

Submitter Information Verification

Committee: NEC-AAC
Submittal Date: Thu May 06 14:53:35 EDT 2021

Committee Statement

Committee Statement: The Correlating Committee directs the panel to revise the requirement to remove the reference to an entire article in accordance with 4.1.4 of the NEC Style Manual.

Ballot Results

This item has passed ballot

12 Eligible Voters
0 Not Returned
12 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Affirmative All

Ayer, Lawrence S.
Gallo, Ernest J.
Hickman, Palmer L.
Holub, Richard A.
Hunter, Dean C.
Johnston, Michael J.
Kendall, David H.
Kovacik, John R.
Manche, Alan
McDaniel, Roger D.
Porter, Christine T.
Williams, David A.

Public Comment No. 2120-NFPA 70-2021 [Section No. 702.4(B)(2)]

(2) Automatic Transfer Equipment.

Where automatic transfer equipment is used, an optional standby system shall comply with 702.4(B)(2)(a) or (B)(2)(b) in accordance with Article 220 or by another approved method.

(a) *Full Load.* The standby source shall be capable of supplying the full load that is transferred by the automatic transfer equipment.

(b) *Load Management.* Where a system is employed that will automatically manage the connected load, the standby source shall have a capacity sufficient to supply the maximum load that will be connected by the load management system.

(c) *Protected Equipment* . Where the standby source(s) has demonstrated through its listing that in overload conditions it shuts down safely without causing breakers to operate or loads to be energized outside of suitable voltage and frequency limits, the standby source capacity shall be permitted to be less than the maximum connected load.

Statement of Problem and Substantiation for Public Comment

Standby system technologies continue to evolve as does their application by consumers. Systems using inverter based technologies in particular are capable of operating in both utility interactive mode (complying with 705) and in islanded mode where they can be considered Standby Systems in accordance with 702.

These systems may be installed to benefit customers while connected to the utility (e.g. reducing utility usage with solar and energy storage) but are also capable of providing a seamless backup source during utility outages, for example connected with a microgrid interconnection device (MID). Their options as written are to use a manual transfer, create a backup panel with few connected loads, or size the standby system for the entire house connected loads.

The proposed new option acknowledges that these new technologies can and already do make the transfer automatically and allow customers to manage their loads in island mode, while also ensuring that if the system is overloaded it can safely shut down without harming either the system or loads. From the customer perspective:

- During an outage that may be caused by climate/weather events, not having to go to the breaker panel to manipulate source and loads is a benefit

- Pre-selecting loads for backup capability (in a backup panel) is unnecessarily restrictive: Depending on the outage season, duration, or cause – the customer may want to operate an air-conditioner or a cooktop range or a hot-water heater, but the combination would not likely be permitted in the backup panel.

- Rarely is operating load approaching the full connected load, so rarely does a system shut down immediately upon transfer. If it does, customers are able to turn off loads and restart their system without having to open (or reclose) breakers.

Related Item

• PI-407-NFPA 70-2020

Submitter Information Verification

Submitter Full Name: Greg Ball
Organization: Tesla
Street Address:
City:
State:
Zip:
Submittal Date: Thu Aug 19 12:55:17 EDT 2021
Committee: NEC-P13

Public Comment No. 1115-NFPA 70-2021 [Section No. 702.5]

702.5 Interconnection or Transfer Equipment.

(A) General.

Interconnection or transfer equipment shall be required for all standby systems subject to the requirements of this article. Equipment shall be suitable for the intended use and shall be listed, designed, and installed so as to prevent the inadvertent interconnection of all sources of supply in any operation of the equipment.

Exception: Temporary connection of a portable generator without transfer equipment shall be permitted where conditions of maintenance and supervision ensure that only qualified persons service the installation and where the normal supply is physically isolated by a lockable disconnecting means or by disconnection of the normal supply conductors.

(B) Transfer Switches.

(1) Reconditioned.

Transfer switches shall not be permitted to be reconditioned.

(2) Meter-Mounted Transfer Switches.

Transfer switches installed between the utility meter and the meter enclosure shall be listed meter-mounted transfer switches and shall be approved. Meter-mounted transfer switches shall be of the manual or nonautomatic type unless rated as determined by 702.4(B)(2).

Informational Note No. 1: See UL 1008M, *Transfer Switch Equipment, Meter Mounted*, for more information.

Informational Note No. 2: Manual and nonautomatic transfer equipment use human intervention.

(C) Documentation.

In other than dwelling units, the short-circuit current rating of the transfer equipment, based on the specific overcurrent protective device type and settings protecting the transfer equipment, shall be field marked on the exterior of the transfer equipment.

(D) Parallel Installation.

Systems installed to permit operation in parallel with the normal source shall also meet Part I or Part II of Article 705.

Additional Proposed Changes

File Name	Description	Approved
13_CN_258.pdf	13 CN258	

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 258 appeared in the First Draft Report on First Revision No. 9614.

The Correlating Committee directs the panel to reconsider the text "shall not be permitted to be" for clarification and ease of use. Simplifying the text to state that the equipment "shall not be reconditioned" is suggested as an alternative.

The Correlating Committee directs the panel to review and determine if the phrase "suitable for the intended use" is necessary within the context of this requirement.

Related Item

• First Revision No. 9614

Submitter Information Verification

Submitter Full Name: CC on NEC-AAC
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:
Submittal Date: Mon Aug 09 15:55:43 EDT 2021
Committee: NEC-P13

Correlating Committee Note No. 258-NFPA 70-2021 [Section No. 702.5]

Submitter Information Verification

Committee: NEC-P13
Submittal Date: Thu May 06 09:47:13 EDT 2021

Committee Statement

Committee Statement: The Correlating Committee directs the panel to reconsider the text “shall not be permitted to be” for clarification and ease of use. Simplifying the text to state that the equipment “shall not be reconditioned” is suggested as an alternative.

The Correlating Committee directs the panel to review and determine if the phrase “suitable for the intended use” is necessary within the context of this requirement.

First Revision No. 9614-NFPA 70-2021 [Section No. 702.5]

Ballot Results

This item has passed ballot

12 Eligible Voters
0 Not Returned
12 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Affirmative All

Ayer, Lawrence S.
Gallo, Ernest J.
Hickman, Palmer L.
Holub, Richard A.
Hunter, Dean C.
Johnston, Michael J.
Kendall, David H.
Kovacik, John R.
Manche, Alan
McDaniel, Roger D.
Porter, Christine T.
Williams, David A.

Public Comment No. 43-NFPA 70-2021 [Section No. 702.5]

702.5 Interconnection or Transfer Equipment.

(A) General.

Interconnection or transfer equipment shall be required for all standby systems subject to the requirements of this article. Equipment shall be suitable for the intended use and shall be listed, designed, and installed so as to prevent the inadvertent interconnection of all sources of supply in any operation of the equipment.

Exception: Temporary connection of a portable generator without transfer equipment shall be permitted where conditions of maintenance and supervision ensure that only qualified persons service the installation and where the normal supply is physically isolated by a lockable disconnecting means or by disconnection of the normal supply conductors.

(B) Transfer Switches.

(1) Reconditioned.

Transfer switches

~~shall not~~

other than Meter Mounted Transfer Switches within the scope of this article shall be permitted to be reconditioned in accordance with 702 . 5(B)(1)(1) through 702.5(B)(1)(4)

(1) The reconditioning process shall be performed in accordance with instructions provided by the manufacturer.

(2) Reconditioning shall be performed using design qualified parts verified under applicable standards.

(3) Reconditioned transfer switch shall be listed or field labeled as reconditioned, and previously applied listing marks, if any, within the portions reconditioned shall be removed.

(4) If equipment has been damaged by fire, products of combustion, or water, it shall be specifically evaluated by its manufacturer or a qualified testing laboratory prior to being returned to service.

(2) Meter-Mounted Transfer Switches.

Transfer switches installed between the utility meter and the meter enclosure shall be listed meter-mounted transfer switches and shall be approved. Meter-mounted transfer switches shall be of the manual or nonautomatic type unless rated as determined by 702.4(B)(2). Meter Mounted Transfer Switches shall not be permitted to be reconditioned.

Informational Note No. 1: See UL 1008M, *Transfer Switch Equipment, Meter Mounted*, for more information.

Informational Note No. 2: Manual and nonautomatic transfer equipment use human intervention.

(C) Documentation.

In other than dwelling units, the short-circuit current rating of the transfer equipment, based on the specific overcurrent protective device type and settings protecting the transfer equipment, shall be field marked on the exterior of the transfer equipment.

(D) Parallel Installation.

Systems installed to permit operation in parallel with the normal source shall also meet Part I or Part II of Article 705.

Statement of Problem and Substantiation for Public Comment

The Committee Statement may be correct for some designs of the power switching element, but it is ignoring the other components and power switching elements that are designed to be serviced.

First, transfer switch equipment includes many systems and components in addition to the power switching element. There are typically controllers, control power, metering, and communication systems. These other system performance characteristics can be determined by immediate measurement and test, not destructive or end-of-life testing cited in the statement. When transfer switch equipment that has only limited service and a control system needs to be replaced or updated because of failure or obsolescence, the transfer equipment can be restored to full functional performance. Some would consider this reconditioning. The current code could force the complete replacement of the enclosure, power bus, wiring, power switching element, and other systems when only an updated controller is needed. This will cause longer times to put the transfer equipment back into service, eliminating the backup performance during this longer period.

Second, the suitability of a specific power switching element is addressed in the PI. Item (B)(1)(1) states “in accordance with instructions provided by the manufacturer.” If an element is not intended to be serviceable the manufacturer will provide that information.

For reference, consider Molded Case Circuit Breakers (MCCB) and Low Voltage Power Circuit Breakers (LVPCB). Manufactures state that their MCCBs are not serviceable and do not provide instructions or parts for these circuit breakers. This is because the committee statement “performance characteristics cannot be determined by visual or measurement means, and can only be determined by testing to destruction or to end-of-life” is correct for MCCBs and one of the reasons manufactures state they cannot be reconditioned. Manufacturers do support the reconditioning of LVPCBs. Instructions to inspect and repair, and replacement parts for these products are provided. The NEC follows this approach in section 240.88(A) and 702.5 should use the same approach.

Related Item

• PI 2759-NFPA 70-2020

Submitter Information Verification

Submitter Full Name: John Cowans
Organization: Siemens
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 30 10:39:46 EDT 2021
Committee: NEC-P13

Public Comment No. 1589-NFPA 70-2021 [Section No. 702.5(B)(2)]

(2) Meter-Mounted Transfer Switches.

~~Transfer switches installed between the utility meter and the meter enclosure shall be listed meter-mounted transfer switches and shall be approved.~~

Meter-mounted transfer switches shall be of the manual or nonautomatic type unless rated as determined by 702.4(B)(2) .

Informational Note No. 1: See UL 1008M, *Transfer Switch Equipment, Meter Mounted*, for more information.

Informational Note No. 2: Manual and nonautomatic transfer equipment use human intervention.

Statement of Problem and Substantiation for Public Comment

The deleted text is redundant. See 702.5(A) and 110.2.

Related Item

• FR 9614

Submitter Information Verification

Submitter Full Name: Ryan Jackson
Organization: Ryan Jackson
Street Address:
City:
State:
Zip:
Submittal Date: Mon Aug 16 15:25:00 EDT 2021
Committee: NEC-P13

Public Comment No. 1146-NFPA 70-2021 [Section No. 702.7(A)]

(A) Standby.

A sign shall be placed at the service-entrance equipment for commercial installations, industrial installations, and multifamily housing that indicates the type and location of each on-site optional standby power source. For one- and two-family dwelling units, a sign shall be placed at the disconnecting means required in 230.85 that indicates the location of each permanently installed on-site optional standby power source disconnect or means to shut down the prime mover as required in 445.18(D).

Additional Proposed Changes

File Name	Description	Approved
13_CN_302.pdf	13 CN302	

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 302 appeared in the First Draft Report on First Revision No. 8904.

The Correlating Committee directs the panel to revise the requirement to use the standard term “multifamily dwelling” in compliance with 3.2.4 of the NEC Style Manual.

Related Item

• First Revision No. 8904

Submitter Information Verification

Submitter Full Name: CC on NEC-AAC
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:
Submittal Date: Tue Aug 10 11:09:20 EDT 2021
Committee: NEC-P13

Correlating Committee Note No. 302-NFPA 70-2021 [Section No. 702.7(A)]

Submitter Information Verification

Committee: NEC-P13
Submittal Date: Thu May 06 14:29:10 EDT 2021

Committee Statement

Committee Statement: The Correlating Committee directs the panel to revise the requirement to use the standard term “multifamily dwelling” in compliance with 3.2.4 of the NEC Style Manual.

First Revision No. 8904-NFPA 70-2021 [Section No. 702.7(A)]

Ballot Results

This item has passed ballot

12 Eligible Voters
0 Not Returned
12 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Affirmative All

Ayer, Lawrence S.
Gallo, Ernest J.
Hickman, Palmer L.
Holub, Richard A.
Hunter, Dean C.
Johnston, Michael J.
Kendall, David H.
Kovacik, John R.
Manche, Alan
McDaniel, Roger D.
Porter, Christine T.
Williams, David A.

Public Comment No. 1590-NFPA 70-2021 [Section No. 702.7(A)]

(A) Standby.

A sign shall be placed at the ~~service-entrance equipment for commercial installations, industrial installations, and multifamily housing~~ service equipment for other than one- and two-family dwellings that indicates the type and location of each on-site optional standby power source. For one- and two-family dwelling units, a sign shall be placed at the disconnecting means required in 230.85 that indicates the location of each permanently installed on-site optional standby power source disconnect or means to shut down the prime mover as required in 445.18(D).

Statement of Problem and Substantiation for Public Comment

A commercial installation does not include educational facilities or institutional facilities, as these locations do not engage in commerce. It seems that the intent is that the rule applies to everything but one- and two-family dwellings, so why not phrase it that way? The word "entrance" is marked for removal in an effort to use the defined term "service equipment" in Article 100. There is no such thing as "service-entrance equipment."

Related Item

• FR 8904 • PI 579

Submitter Information Verification

Submitter Full Name: Ryan Jackson
Organization: Ryan Jackson
Street Address:
City:
State:
Zip:
Submittal Date: Mon Aug 16 15:27:02 EDT 2021
Committee: NEC-P13

Public Comment No. 1147-NFPA 70-2021 [Section No. 706.1]

706.1 Scope.

This article applies to all energy storage systems (ESS) having a capacity greater than 3.6 MJ (1 kWh) that may be stand-alone or interactive with other electric power production sources. These systems are primarily intended to store and provide energy during normal operating conditions.

Informational Note No. 1: For batteries rated in ampere hours, kWh is equal to the nominal rated voltage times ampere-hour rating divided by 1000.

Informational Note No. 2: See Article 480 for installations that meet the definition of stationary standby batteries and are composed of lead-acid or nickel-cadmium cells. For all other chemistries and for lead-acid and nickel-cadmium stored energy systems that do not fall under the definition of stationary standby batteries, this article applies.

Informational Note No. 3: The following standards are frequently referenced for the installation of ESSs:

(1) NFPA 1-2021, *Fire Code*

(2) NFPA 111-2019, *Standard on Stored Electrical Energy Emergency and Standby Power Systems*

(3) NECA 416-2016, *Recommended Practice for Installing Energy Storage Systems (ESS)*

(4) UL 810A, *Electrochemical Capacitors*

(5) NFPA 855-2020, *Standard for the Installation of Stationary Energy Storage Systems*

(6) UL 1973, *Standard for Batteries for Use in Stationary, Vehicle Auxiliary Power, and Light Electric Rail (LER) Applications*

(7) UL 1989, *Standard for Standby Batteries*

(8) UL 9540, *Standard for Safety Energy Storage Systems and Equipment*

(9) UL Subject 2436, *Spill Containment For Stationary Lead Acid Battery Systems*

Additional Proposed Changes

File Name	Description	Approved
13_CN_303.pdf	13 CN303	

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 303 appeared in the First Draft Report on First Revision No. 9074.

The Correlating Committee directs the Panel to review the last sentence of Informational Note No. 2 for compliance with 3.1.3 of the NEC Style Manual. If the Panel modifies the scope of Article 480 the informational note should also be considered to be revised to correlate.

Related Item

• First Revision No. 9074

Submitter Information Verification

Submitter Full Name: CC on NEC-AAC
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:
Submittal Date: Tue Aug 10 11:11:22 EDT 2021
Committee: NEC-P13

Correlating Committee Note No. 303-NFPA 70-2021 [Section No. 706.1]

Submitter Information Verification

Committee: NEC-P13
Submittal Date: Thu May 06 14:30:43 EDT 2021

Committee Statement

Committee Statement: The Correlating Committee directs the Panel to review the last sentence of Informational Note No. 2 for compliance with 3.1.3 of the NEC Style Manual. If the Panel modifies the scope of Article 480 the informational note should also be considered to be revised to correlate.

First Revision No. 9074-NFPA 70-2021 [Section No. 706.1]

Ballot Results

This item has passed ballot

12 Eligible Voters
0 Not Returned
12 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Affirmative All

Ayer, Lawrence S.
Gallo, Ernest J.
Hickman, Palmer L.
Holub, Richard A.
Hunter, Dean C.
Johnston, Michael J.
Kendall, David H.
Kovacik, John R.
Manche, Alan
McDaniel, Roger D.
Porter, Christine T.
Williams, David A.

Public Comment No. 160-NFPA 70-2021 [Section No. 706.7]

706.

~~7 Commissioning and Maintenance.~~

~~**(A)** Commissioning.~~

7 Commissioning

ESSs shall be commissioned upon installation. This shall not apply in one- and two-family dwellings where the ESS does not exceed a 20 kWh capacity.

Informational Note:

~~See~~

See NFPA 855-2020, *Standard for the Installation of Stationary Energy Storage Systems* , for information related to the commissioning of ESSs.

~~**(B)** Maintenance.~~

~~ESSs shall be maintained in proper and safe operating condition. The required maintenance shall be in accordance with the manufacturer's requirements and industry standards. A written record of the system maintenance shall be kept and shall include records of repairs and replacements necessary to maintain the system in proper and safe operating condition.~~

~~Informational Note: See NFPA 70B-2019, *Recommended Practice for Electrical Equipment Maintenance* , or ANSI/NETA ATS-2017, *Standard for Acceptance Testing Specifications for Electrical Power Equipment and Systems* , for information related to general electrical equipment maintenance and developing an effective electrical preventive maintenance (EPM) program.~~

Statement of Problem and Substantiation for Public Comment

The National Electrical Code DOES NOT cover maintenance. Mainatainence is outside of the scope of the NEC. See 90.2(A). The NEC covers the INSTALLATION and the REMOVAL of conductors and equipment. It does not cover the maintenance of equipment. That is the role of NFPA 70B, the Recommended Practice for Electrical Equipment...MAINTENANCE.
The CMP's statement (in the rejection of my PI) that that the maintenance "requirements" should be retained because of different AHJs is non sequitur. If the scope of the NEC does not include maintenance then any article within the document can not possible include maintenance. Anybody that has any familiarity with the NEC agrees that you must read the article's scope before reading the content of the article, yet this Code-Making Panel seems to think that we need not read the scope of the NEC! You might as well have a "rule" that says you must brush your teeth and wait one hour after swimming before using an energy storage system. It would have as much a place as a maintenance "requirement" in an installation code.

Related Item

• PI 584

Submitter Information Verification

Submitter Full Name: Ryan Jackson
Organization: Ryan Jackson
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jul 07 18:21:32 EDT 2021
Committee: NEC-P13

Public Comment No. 461-NFPA 70-2021 [New Section after 706.9]

TITLE OF NEW CONTENT

706.10 Cybersecurity, Cyberweapon, Electromagnetic Pulse (EMP), Geomagnetic Disturbance (GMD), and Intentional Electromagnetic Interference (IEMI) Protection. Energy storage systems shall comply with either of the following:

(1) The system shall be identified for cybersecurity, cyberweapon, EMP, GMD, and IEMI protection.

(2) A cybersecurity, cyberweapon, EMP, GMD, and IEMI protection failure modes effects analysis assessment shall be conducted to determine system vulnerabilities.

The identification or assessment shall be reviewed when the system configuration changes and at not more than 5-year intervals. Documentation of the identification or assessment shall be made available to those authorized to inspect, operate, and maintain the system.

Statement of Problem and Substantiation for Public Comment

This Public Comment is a follow-up to PI 761, PI 3080, FR 8801, PI 762, and PI 4024. It does not require cybersecurity, cyberweapon, EMP, GMD, or IEMI protection, but rather calls for the energy system to be identified for these threats or for a threat assessment to be completed. While the NEC® is not ready to mandate protection requirements, an assessment would show system vulnerabilities. Acceptance of this Public Comment would at least bring the subject to the attention of owners, design engineers, electrical inspectors, and insurance companies, and set the table for requirements in future editions of the NEC® (or other NFPA standards). The format for this Public Comment is based upon the cybersecurity requirements found in FR 8801, which offers an assessment as an alternate for requiring protection.

PI 761 provided technical substantiation to require Electromagnetic Pulse (EMP) Protection for our critical infrastructure. While it appears that the NEC(R) is not ready to actually require EMP protection at this time, the security of our country is at stake. An EMP is fairly well understood as an extremely powerful electromagnetic wave that can impress 50,000 volts per meter on every piece of electrical equipment, destroying everything that is unprotected. An EMP is often associated with a nuclear explosion, but that is not the only cause of electromagnetic damage. A Geomagnetic Disturbance (GMD) is caused by a sunspot. While the EMP would be created by one of our adversaries, the sun spot is an act of God. These types of events can instantly initiate millions of fires in our unprotected electrical systems, overwhelming our fire-fighting capabilities. If millions of fires weren't bad enough, the unprotected electrical equipment would be damaged or completely destroyed, subjecting the country to years of blackout. Government intelligence studies, now unclassified, have predicted that from 66% to 90% of our population would die within one year, due to a lack of food, clean water, and medicine, if a significant EMP or GMD were to occur, while the country's electrical infrastructure remains unprotected. The final threat listed is an Intentional Electromagnetic Interference (IEMI). It is easily created by utilizing off-the-shelf parts, available for purchase on the internet, that will fit into a van. While much less powerful than a significant EMP or GMD, twenty vans, equipped with bench-made IEMI devices and scattered throughout the country, can shut down major industries and major parts of the country for weeks, if not months, through a coordinated attack, similar to 9/11, by targeting key industries/vulnerabilities. In conclusion, these electromagnetic threats to our unprotected electrical infrastructure, and therefor to our entire country, are absolutely real, and must be addressed.

PI 4024 provided significant substantiation for the need to protect critical infrastructure against cyber attack for equipment connected to the internet. However, equipment does not need to be connected to the internet in order to be damaged or destroyed by cyber threats. Equipment can be damaged by cyber weapons such as malicious computer worms that attack SCADA (control) systems. A great example is the Stuxnet worm that destroyed the centrifuges in Iran. Thus, this Public Comment deletes the PI 4024 reference to the internet and adds cyberweapon to the list of threats that need to be either protected against or assessed.

Related Item

• PI 762 • PI 3080 • FR 8801 • PI 4024 • PI 3055 • FR 7947 • PI 4026 • FR 8880 • FR 8917 • PI 2888 • FR 8914 • PI 3083

Submitter Information Verification

Submitter Full Name: Vincent Saporita
Organization: Saporita Consulting
Affiliation: Saporita Consulting
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jul 27 18:06:35 EDT 2021
Committee: NEC-P13

Public Comment No. 1643-NFPA 70-2021 [Section No. 706.20]

706.20 General.

(A) Ventilation.

Provisions appropriate to the energy storage technology shall be made for sufficient diffusion and ventilation of any possible gases from the storage device, if present, to prevent the accumulation of an explosive mixture. Ventilation of an ESS shall be permitted to be provided in accordance with the manufacturer's recommendations and listing for the system.

Informational Note No. 1: See NFPA 855-2020, *Standard for the Installation of Stationary Energy Storage Systems*, for technology-specific guidance. Not all ESS technologies require ventilation.

Informational Note No. 2: See IEEE 1635-2018/ASHRAE Guideline 21-2018, *Guide for the Ventilation and Thermal Management of Batteries for Stationary Applications*, as a source for design of ventilation of batteries.

(B) Dwelling Units.

An ESS for one- and two-family dwelling units shall not exceed 100 volts dc between conductors or to ground.

Exception: Where live parts are not accessible during routine ESS maintenance, a maximum ESS voltage of 600 volts dc shall be permitted.

~~**(2)**~~

(C) ~~Spaces About ESS Components.~~

~~**(1)** General.~~

~~Working spaces for ESS shall comply with 110.26 and 110.34 .~~

Space Between Components.

ESSs shall be permitted to have space between components in accordance with the manufacturer's instructions and listing.

Informational Note: Additional space may be needed to accommodate ESS hoisting equipment, tray removal, or spill containment.

Statement of Problem and Substantiation for Public Comment

This is a violation of 4.1.1 of the style manual.

Related Item

• PI 587

Submitter Information Verification

Submitter Full Name: Ryan Jackson
Organization: Ryan Jackson
Street Address:
City:
State:
Zip:
Submittal Date: Mon Aug 16 19:09:08 EDT 2021
Committee: NEC-P13

Public Comment No. 2188-NFPA 70-2021 [Section No. 706.30(B)]

(B) Conductor Ampacity.

The ampacity of the ~~feeder~~ output circuit conductors ~~from the~~ of the ESS(s) connected to the wiring system serving the loads to be serviced by the system shall not be less than the greater of the ~~(1)~~ nameplate(s)-rated circuit current as determined in accordance with 706.30(A)(1), or ~~(A)(2)~~ the rating of the ESS(s) overcurrent protective device(s).

Statement of Problem and Substantiation for Public Comment

The language in this section in the first draft contains what appears to be a typo and is confusing to most users of this Code. The reference to "(1)" is not clear what it refers to. These suggested editorial changes help clarify the requirements without changing them and use terms that are in use within this article. Conductor types and sizes within a listed ESS are evaluated through its listing so the addition of the term "output" in this section would further clarify what circuits this section is applied to.

Related Item

• PI-3849

Submitter Information Verification

Submitter Full Name: Jason Fisher
Organization: Solar Technical Consulting LLC
Affiliation: SEIA
Street Address:
City:
State:
Zip:
Submittal Date: Thu Aug 19 16:10:34 EDT 2021
Committee: NEC-P13

Public Comment No. 1148-NFPA 70-2021 [Section No. 706.31(A)]

(A) Circuits and Equipment.

ESS circuit conductors shall be protected in accordance Article 240. Protection devices for ESS circuits shall be in accordance with 706.31(B) through (F). Circuits shall be protected at the source from overcurrent.

Additional Proposed Changes

File Name	Description	Approved
13_CN_304.pdf	13 CN304	

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No.304 appeared in the First Draft Report on First Revision No. 9090.

The Correlating Committee directs the panel to review the requirement in 706.31 (A) and (B) and revise in accordance with 4.1.1 and 4.1.4 of the NEC Style Manual. The first sentence as written is redundant with the requirements in Chapter 2 and includes a reference to an entire article.

Related Item

• First Revision No. 9090

Submitter Information Verification

Submitter Full Name: CC on NEC-AAC
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:
Submittal Date: Tue Aug 10 11:24:49 EDT 2021
Committee: NEC-P13

Correlating Committee Note No. 304-NFPA 70-2021 [Section No. 706.31(A)]

Submitter Information Verification

Committee: NEC-P13
Submittal Date: Thu May 06 14:38:07 EDT 2021

Committee Statement

Committee Statement: The Correlating Committee directs the panel to review the requirement in 706.31(A) and (B) and revise in accordance with 4.1.1 and 4.1.4 of the NEC Style Manual. The first sentence as written is redundant with the requirements in Chapter 2 and includes a reference to an entire article.

First Revision No. 9090-NFPA 70-2021 [Section No. 706.31(A)]

Ballot Results

This item has passed ballot

12 Eligible Voters
0 Not Returned
12 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Affirmative All

Ayer, Lawrence S.
Gallo, Ernest J.
Hickman, Palmer L.
Holub, Richard A.
Hunter, Dean C.
Johnston, Michael J.
Kendall, David H.
Kovacik, John R.
Manche, Alan
McDaniel, Roger D.
Porter, Christine T.
Williams, David A.

Public Comment No. 2139-NFPA 70-2021 [Section No. 706.31(A)]

(A) Circuits and Equipment.

ESS circuit conductors shall be protected in accordance Article 240. Protection devices for ESS circuits shall be in accordance with 706.31(B) through (F). Circuits shall be protected at the source from overcurrent. A circuit conductor connected at one end to an ESS utilizing a listed electronic power converter with limited fault current shall be permitted to be protected only at the point of connection to the higher fault current source.

Statement of Problem and Substantiation for Public Comment

The panel rejected PI 4567 to clarify requirements for ESS circuits that shall be protected "at the source from overcurrent." The rejection was partly due to the use of the term "current-limited" which has an established meaning in other applications, not matching the intent of the PI.

ESS systems with listed power electronic interfaces have low and/or very brief short-circuit current relative to the utility, conventional generators, and direct battery interfaces. As such the appropriate location for overcurrent protection of conductors for ESS installations connected to the utility or other primary source is at the utility/primary source side. However, the requirement as written is interpreted by some AHJs as requiring overcurrent protection at both the panel and the ESS output - often only a few feet away from each other.

Related Item

• Public Input No. 4567-NFPA 70-2020

Submitter Information Verification

Submitter Full Name: Greg Ball
Organization: Tesla
Street Address:
City:
State:
Zip:
Submittal Date: Thu Aug 19 13:43:40 EDT 2021
Committee: NEC-P13

Public Comment No. 332-NFPA 70-2021 [Section No. 706.50]

706.50 General.

All electrical connections to and from the system and system components shall be in accordance with the applicable provisions of this *Code*. The systems shall comply with Parts I, II, III and ~~III~~ IV of this article.

Statement of Problem and Substantiation for Public Comment

The Part IV of Article 706 appears to have inadvertently been left off of this revision. This Part would also apply to flow batteries.

Related Item

• FR9134

Submitter Information Verification

Submitter Full Name: Laurie Florence
Organization: UL LLC
Street Address:
City:
State:
Zip:
Submittal Date: Fri Jul 23 11:54:53 EDT 2021
Committee: NEC-P13

Public Comment No. 351-NFPA 70-2021 [Section No. 708.4(B)]

(B) Identification of Hazards.

Hazards to be considered at a minimum shall include, but shall not be limited to, the following:

(1) Naturally occurring hazards (geological, meteorological, and biological)

(2) Human-caused events (accidental and intentional) [**1600:**5.3.2]

(3)

Informational Note No. 1: A geomagnetic disturbance (GMD), is an example of a naturally occurring hazard.

Informational Note No. 2: An electromagnetic pulse (EMP), and an intentional electromagnetic interference (IEMI) are examples of a human-caused hazards.

Statement of Problem and Substantiation for Public Comment

While it does not appear that the NEC(R) is ready at this time to require GMD, EMP, or IEMI protection, it is prudent to list them as examples of very real hazards.

A GMD, caused by a sunspot, or an EMP, typically associated with a nuclear explosion, could fry our unprotected critical infrastructure, causing a blackout of our country for years. An IEMI, created by internet-purchased, readily available, off-the-shelf parts, is much less powerful. However twenty vans wth IEMP devices, could easily shut down our country for months at a time.

This Public Comment would not require protection from these threats, but rather, through Informational Notes, brings them to the discussion table and hopefully will lead to actual requirements for protection in future editions of the NEC(R).

Related Item

• PI 761

Submitter Information Verification

Submitter Full Name: Vincent Saporita
Organization: Saporita Consulting
Affiliation: Saporita Consulting
Street Address:
City:
State:
Zip:
Submittal Date: Sat Jul 24 14:32:54 EDT 2021
Committee: NEC-P13

Public Comment No. 1124-NFPA 70-2021 [Section No. 708.7]

708.7 Cybersecurity.

COPS that are connected to a communication network and have the capability to permit control of any portion of the premises COPS shall comply with either of the following:

(1) The ability to control the system is limited to a direct connection through a local nonnetworked interface.

(2) It is connected through a networked interface complying with one of the following methods:

a. The system and associated software are identified as being evaluated for cybersecurity.

b. A cybersecurity assessment is conducted on the connected system to determine vulnerabilities to cyberattacks.

The cybersecurity assessment shall be conducted when the system configuration changes and at not more than 5-year intervals.

Documentation of the evaluation, assessment, and certification shall be made available to those authorized to inspect, operate, and maintain the system.

Informational Note No. 1: See ANSI/ISA 62443, *Cybersecurity Standards* series; UL 2900, *Cybersecurity Standards* series; or the *NIST Framework for Improving Critical infrastructure Cybersecurity*, Version 1.1, for assessment requirements.

Informational Note No. 2: Examples of the commissioning certification used to demonstrate the system has been investigated for cybersecurity vulnerabilities could be one of the following:

(1) The ISA Security Compliance Institute (ISCI) conformity assessment program

(2) Certification of compliance by a nationally recognized test laboratory

(3) Manufacturer certification for the specific type and brand of system provided

Additional Proposed Changes

File Name	Description	Approved
13_CN_297.pdf	13 CN297	

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 297 appeared in the First Draft Report on First Revision No. 8914.

The Correlating Committee requests that the Panel determine if "Qualified Electrical Testing Laboratory" or other terminology would be more appropriate than "Nationally Recognized Testing Laboratory" in consideration of the NEC Style Manual, Section 3.2.5.3, Consistent Application of Terms.

Related Item

• First Revision No. 8914

Submitter Information Verification

Submitter Full Name: CC on NEC-AAC
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:
Submittal Date: Mon Aug 09 16:25:50 EDT 2021
Committee: NEC-P13

Correlating Committee Note No. 297-NFPA 70-2021 [New Section after 708.6(E)]

Submitter Information Verification

Committee: NEC-P13
Submittal Date: Thu May 06 14:19:28 EDT 2021

Committee Statement

Committee Statement: The Correlating Committee requests that the Panel determine if “Qualified Electrical Testing Laboratory” or other terminology would be more appropriate than "Nationally Recognized Testing Laboratory" in consideration of the NEC Style Manual, Section 3.2.5.3, Consistent Application of Terms.

First Revision No. 8914-NFPA 70-2021 [New Section after 708.6(E)]

Ballot Results

This item has passed ballot

12 Eligible Voters
0 Not Returned
12 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Affirmative All

Ayer, Lawrence S.
Gallo, Ernest J.
Hickman, Palmer L.
Holub, Richard A.
Hunter, Dean C.
Johnston, Michael J.
Kendall, David H.
Kovacik, John R.
Manche, Alan
McDaniel, Roger D.
Porter, Christine T.
Williams, David A.

Public Comment No. 1891-NFPA 70-2021 [Section No. 708.7]

708.7 Cybersecurity.

COPS that are connected to a communication network and have the capability to permit control of any portion of the premises COPS shall comply with either of the following:

(1) The ability to control the system is limited to a direct connection through a local nonnetworked interface.

(2) It is connected through a networked interface complying with one of the following methods:

(3) The system and associated software are identified as being evaluated for cybersecurity.

(4) A cybersecurity assessment is conducted on the connected system to determine vulnerabilities to cyberattacks.

The cybersecurity assessment shall be conducted when the system configuration changes and at not more than 5-year intervals.

Documentation of the evaluation, assessment, and certification shall be made available to those authorized to inspect, operate, and maintain the system.

Informational Note No. 1: See ANSI/ISA 62443, *Cybersecurity Standards* series; UL 2900, *Cybersecurity Standards* series; or the *NIST Framework for Improving Critical infrastructure Cybersecurity*, Version 1.1, for assessment requirements.

Informational Note No. 2: Examples of the commissioning certification used to demonstrate the system has been investigated for cybersecurity vulnerabilities could be one of the following:

(1) The ISA Security Compliance Institute (ISCI) conformity assessment program

(2) Certification of compliance by a ~~nationally recognized test laboratory~~ qualified electrical testing laboratory

(3) Manufacturer certification for the specific type and brand of system provided

Statement of Problem and Substantiation for Public Comment

Section 3.2.5.3 titled “Nationally Recognized Testing Laboratory” indicates that use of the terms “Nationally Recognized Testing Laboratory” or “NRTL” shall be avoided. The Nationally Recognized Testing Laboratory program, also known as NRTL, is an OSHA program for the accreditation of laboratories that test products for the workplace and is not to be applied generally in the NEC. The preferred term to use is “Qualified Electrical Testing Laboratory” to align with Section 90.7.

Related Item

• FR 8914

Submitter Information Verification

Submitter Full Name: Agnieszka Golriz
Organization: NECA
Street Address:
City:
State:
Zip:
Submittal Date: Wed Aug 18 13:47:02 EDT 2021
Committee: NEC-P13

Public Comment No. 2118-NFPA 70-2021 [Section No. 708.7]

708.7 Cybersecurity.

COPS that are connected to a communication network and have the capability to permit control of any portion of the premises COPS shall comply with either of the following:

(1) The ability to control the system is limited to a direct connection through a local nonnetworked interface.

(2) ~~It is connected through a networked interface complying with one of the following methods:~~ The system and associated software are identified as being evaluated for ~~cybersecurity.~~

(3) ~~A cybersecurity assessment is conducted on the connected system to determine vulnerabilities to cyberattacks.~~

~~The cybersecurity assessment shall be conducted when the system configuration changes and at not more than 5-year intervals~~

(1) having the features necessary to achieve acceptable levels of cybersecurity if properly configured and maintained.

Documentation of the evaluation, assessment, and certification shall be made available to those authorized to inspect, operate, and maintain the system.

Informational Note No. 1: See ANSI/ISA 62443, *Cybersecurity Standards* series; UL 2900, *Cybersecurity Standards* series; or the *NIST Framework for Improving Critical infrastructure Cybersecurity*, Version 1.1, for assessment requirements.

Informational Note No. 2: Examples of the commissioning certification used to demonstrate the system has been investigated for cybersecurity vulnerabilities could be one of the following:

(1) The ISA Security Compliance Institute (ISCI) conformity assessment program

(2) Certification of compliance by a nationally recognized test laboratory

(3) Manufacturer certification for the specific type and brand of system provided

Informational Note No. 3: Cybersecurity is a specialized field requiring constant, vigilant attention to security vulnerabilities. Installation of devices that can be secured is an important first step, but not sufficient to guarantee a secure system.

Statement of Problem and Substantiation for Public Comment

While I applaud the panel for recognizing the cybersecurity threat, the code requirements as stated lead users of the code to the false conclusion that installations that meet these requirements will be secure. That is not what these requirements accomplish, and the code language should either be removed in its entirety (1st preference) or revised as indicated in this public comment (2nd preference). Please note that cybersecurity code language was rejected by CMP 1 and CMP 12 in the first draft.

Standards such as UL 2900 only serve to establish that a secure system is possible using the listed components. It makes no further guarantees. Security is ultimately the responsibility and liability of the building operator that maintains the constituent systems.

Put in physical security terms, these standards require devices to have lock features, much like residential building codes require that exterior access doors include a deadbolt lock. However, if the building occupant is annoyed by the lock and simply leaves the key in the door, security is lost. While this kind of poor physical security habit is abhorrent to any reasonable person, the cybersecurity equivalent of this practice occurs on a daily basis. Poorly formed passwords, or good passwords that are too difficult to remember that are then scribbled on notes under keyboards lead to frequent security breaches. Further, no software system is immune from bugs and can be susceptible to further exploits.

The reason that the assessments and certifications suggested in the proposed code language are of minor value to cybersecurity is due to the fact that these systems depend entirely on how they are configured in the actual building. A networking device can be 99% secure from the factory, and then have all security features defeated by a user configuration in a matter of minutes.

The proposed code attempts to address this by allowing an assessment to be conducted as an alternative to the device certificate. This is highly misleading as both are required to achieve true security. Allowing only one contributes to a false sense of security. Assessing an installed network requires a high level of sophistication and technical knowledge. These evaluations also require an enormous amount of trust with the assessing entity, and any code that forces disclosure of security measures to third parties is dangerous to overall security. Further, an ongoing recertification interval of 5 years is completely useless as vulnerabilities and their exploits occur on the order of days and weeks, let alone months. Requiring recertification on reconfiguration similarly would be untenable as networks experience configuration changes often on a weekly or even daily basis, and defining which trigger the need for a recertification would be onerous at best. Due to the obvious difficulties presented to the authorities having jurisdiction, the whole issue of on-site assessments should be omitted from the NEC and left to more appropriate NFPA documents such as NFPA 70B or other regulatory processes.

It's important to remember that even if security is perfect at the moment of final inspection in the context of the NEC, the most likely outcome is that any breach will occur after the authority having jurisdiction has signed off on building occupancy. This places the vast majority of the cybersecurity problem outside of the reach of the NEC, which is why my first preference is for wholesale removal of these requirements. There is some value in ensuring devices are able to be secured, but even insecure devices can be made secure by competent security professionals using additional security layers. Thus, I feel any resources required by the NEC to solve the device security listing would be better allocated to solving the operational challenges, and as such belong in a more appropriate NFPA document such as NFPA 70B or a dedicated NFPA Cybersecurity document.

Terra Misbehavior Note: Terra improperly renumbered my edit. My added language should be (2) under (1) and not a second (1) item.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 2125-NFPA 70-2021 [Section No. 708.7]	Preferred code change.
Public Comment No. 2125-NFPA 70-2021 [Section No. 708.7]	

Related Item

- FR-8914-NFPA 70-2021

Submitter Information Verification

Submitter Full Name: Jason Potterf
Organization: Cisco
Affiliation: Entertainment Services and Technology Association (ESTA)
Street Address:
City:
State:
Zip:
Submittal Date: Thu Aug 19 12:54:15 EDT 2021
Committee: NEC-P13

Public Comment No. 2125-NFPA 70-2021 [Section No. 708.7]

~~**708.7** Cybersecurity.~~

~~COPS that are connected to a communication network and have the capability to permit control of any portion of the premises COPS shall comply with either of the following:~~

(1) ~~The ability to control the system is limited to a direct connection through a local nonnetworked interface.~~

(2) ~~It is connected through a networked interface complying with one of the following methods:~~

(3) ~~The system and associated software are identified as being evaluated for cybersecurity.~~

(4) ~~A cybersecurity assessment is conducted on the connected system to determine vulnerabilities to cyberattacks.~~

~~The cybersecurity assessment shall be conducted when the system configuration changes and at not more than 5-year intervals.~~

~~Documentation of the evaluation, assessment, and certification shall be made available to those authorized to inspect, operate, and maintain the system.~~

~~Informational Note No. 1: See ANSI/ISA 62443, *Cybersecurity Standards* series; UL 2900, *Cybersecurity Standards* series; or the *NIST Framework for Improving Critical Infrastructure Cybersecurity* , Version 1.1, for assessment requirements.~~

~~Informational Note No. 2: Examples of the commissioning certification used to demonstrate the system has been investigated for cybersecurity vulnerabilities could be one of the following:~~

(1) ~~The ISA Security Compliance Institute (ISCI) conformity assessment program~~

(2) ~~Certification of compliance by a nationally recognized test laboratory~~

(3) ~~Manufacturer certification for the specific type and brand of system provided~~

Statement of Problem and Substantiation for Public Comment

While I applaud the panel for recognizing the cybersecurity threat, the code requirements as stated lead users of the code to the false conclusion that installations that meet these requirements will be secure. That is not what these requirements accomplish, and the code language should either be removed in its entirety (1st preference) or revised as indicated in my other public comment (2nd preference). Please note that cybersecurity code language was rejected by CMP 1 and CMP 12 in the first draft.

Standards such as UL 2900 only serve to establish that a secure system is possible using the listed components. It makes no further guarantees. Security is ultimately the responsibility and liability of the building operator that maintains the constituent systems.

Put in physical security terms, these standards require devices to have lock features, much like residential building codes require that exterior access doors include a deadbolt lock. However, if the building occupant is annoyed by the lock and simply leaves the key in the door, security is lost. While this kind of poor physical security habit is abhorrent to any reasonable person, the cybersecurity equivalent of this practice occurs on a daily basis. Poorly formed passwords, or good passwords that are too difficult to remember that are then scribbled on notes under keyboards lead to frequent security breaches. Further, no software system is immune from bugs and can be susceptible to further exploits.

The reason that the assessments and certifications suggested in the proposed code language are of minor value to cybersecurity is due to the fact that these systems depend entirely on how they are configured in the actual building. A networking device can be 99% secure from the factory, and then have all security features defeated by a user configuration in a matter of minutes.

The proposed code attempts to address this by allowing an assessment to be conducted as an alternative to the device certificate. This is highly misleading as both are required to achieve true security. Allowing only one contributes to a false sense of security. Assessing an installed network requires a high level of sophistication and technical knowledge. These evaluations also require an enormous amount of trust with the assessing entity, and any code that forces disclosure of security measures to third parties is dangerous to overall security. Further, an ongoing recertification interval of 5 years is completely useless as vulnerabilities and their exploits occur on the order of days and weeks, let alone months. Requiring recertification on reconfiguration similarly would be untenable as networks experience configuration changes often on a weekly or even daily basis, and defining which trigger the need for a recertification would be onerous at best. Due to the obvious difficulties presented to the authorities having jurisdiction, the whole issue of on-site assessments should be omitted from the NEC and left to more appropriate NFPA documents such as NFPA 70B or other regulatory processes.

It's important to remember that even if security is perfect at the moment of final inspection in the context of the NEC, the most likely outcome is that any breach will occur after the authority having jurisdiction has signed off on building occupancy. This places the vast majority of the cybersecurity problem outside of the reach of the NEC, which is why my first preference is for wholesale removal of these requirements. There is some value in ensuring devices are able to be secured, but even insecure devices can be made secure by competent security professionals using additional security layers. Thus, I feel any resources required by the NEC to solve the device security listing would be better allocated to solving the operational challenges, and as such belong in a more appropriate NFPA document such as NFPA 70B or a dedicated NFPA Cybersecurity document.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 2118-NFPA 70-2021 [Section No. 708.7]	Alternative code change if this comment is not accepted.
Public Comment No. 2118-NFPA 70-2021 [Section No. 708.7]	

Related Item

- FR-8914-NFPA 70-2021

Submitter Information Verification

Submitter Full Name: Jason Potterf
Organization: Cisco
Affiliation: Entertainment Services and Technology Association (ESTA)
Street Address:
City:
State:
Zip:
Submittal Date: Thu Aug 19 13:03:30 EDT 2021
Committee: NEC-P13

Public Comment No. 2151-NFPA 70-2021 [Section No. 708.7]

708.7 ~~Cybersecurity~~ Security .

COPS that ~~are connected to a communication network and~~ have the capability to permit control of any portion of the premises COPS shall comply with either of the following:

(1) The ability to control the system is limited to a direct connection through a local nonnetworked interface for which all user interface elements are located in a single room or enclosure that is secured by a locking door . The locking door shall be identified as being evaluated for physical security.

(2) It is connected through a networked interface complying with one of the following methods:

(3) The system and associated software are identified as being evaluated for cybersecurity.

(4) A cybersecurity assessment is conducted on the connected system to determine vulnerabilities to cyberattacks.

The cybersecurity assessment shall be conducted when the system configuration changes and at not more than 5-year intervals.

Documentation of the evaluation, assessment, and certification shall be made available to those authorized to inspect, operate, and maintain the system.

Informational Note No. 1: See ANSI/ISA 62443, *Cybersecurity Standards* series; UL 2900, *Cybersecurity Standards* series; or the *NIST Framework for Improving Critical infrastructure Cybersecurity*, Version 1.1, for assessment requirements.

Informational Note No. 2: Examples of the commissioning certification used to demonstrate the system has been investigated for cybersecurity vulnerabilities could be one of the following:

(1) The ISA Security Compliance Institute (ISCI) conformity assessment program

(2) Certification of compliance by a nationally recognized test laboratory

(3) Manufacturer certification for the specific type and brand of system provided

Informational Note No. 3: See NFPA 730-2020, Guide for Premises Security, and ANSI/TIA-5017-2016, Telecommunications Physical Network Security Standard, for further information regarding physical security.

Statement of Problem and Substantiation for Public Comment

The proposed requirements imply that cybersecurity attacks are the only security threat to system integrity. The section should either be removed in its entirety, deferring physical security to more appropriate documents (1st Preference), or revised as indicated in this public comment (2nd Preference).

Any code language which implies that a local connection is more secure than a remote connection is misguided and inadequate. To correct this language, it should include similar security evaluation requirements against physical security attacks as those specified for cybersecurity attacks.

Security and the integrity of the system against remote attacks is just as necessary for in-person attackers as social engineering attacks are common and effective. Impersonation of service personnel has been demonstrated time and time again as an effective way to gain access to building systems, and is often faster and easier than a similar cyberattack. Some of the most notable cyberattacks in recent history, such as Stuxnet, were achieved by authorized personnel plugging infected memory devices into isolated systems. Further, there is a disturbing trend towards hybrid physical and cyber attacks in which remote access is covertly provisioned without the victim's knowledge by an in-person attack due to lax physical security.

As is the case with cybersecurity, physical security is only as good as its enforcement on the day of the attack. A locked door is only useful if the staff keep it locked. Personnel training, system maintenance, and access control system security all play a role. None of these are within the scope of the NEC, the electrical contractors, nor the authorities having jurisdiction and their inspectors. Thus, the only value the NEC can bring is to ensure that these systems can be secured by including appropriate physical security features, and this value is minimal. Instead of focusing on requirements enforced by the NEC at the time of building inspection, resources would be better used to address the problems with day-to-day security through a more appropriate NFPA document than NFPA 70.

Terra Misbehavior Note: Terra improperly renumbered my edit and flagged some unedited text as edited. I did not intend to modify a. and .b under item (2) in this public comment, but Terra made them (3) and (4) erroneously.

Related Item

• FR-8914-NFPA 70-2021

Submitter Information Verification

Submitter Full Name: Jason Potterf
Organization: Cisco
Affiliation: Entertainment Services and Technology Association (ESTA)
Street Address:
City:

State:	
Zip:	
Submittal Date:	Thu Aug 19 14:08:06 EDT 2021
Committee:	NEC-P13

Public Comment No. 1752-NFPA 70-2021 [Section No. 708.10(C)(2)]

(2) Fire Protection for Feeders.

Feeders shall meet one of the following conditions:

(1) The cable or raceway is protected by a listed electrical circuit protective system with a minimum 2-hour fire rating.

Informational Note No. 1: See UL 1724, *Fire Tests for Electrical Circuit Protective Systems*, for one method of defining an electrical circuit protective system, by establishing a rating when tested. UL *Guide Information for Electrical Circuit Integrity Systems* (FHIT) contains information to identify the system and its installation limitations to maintain a minimum 2-hour fire resistive rating.

(2) The cable or raceway is a listed fire-resistive cable system with a minimum 2-hour fire rating.

Informational Note No. 2: See UL 2196-2017, *Standard for Fire Test for Circuit Integrity of Fire-Resistive Power, Instrumentation, Control and Data Cables*, for testing requirements for fire-resistive cables.

Informational Note No. 3: The listing organization provides information for fire-resistive cable systems on proper installation requirements to maintain the fire rating.

(3) The cable or raceway is protected by a listed fire-rated assembly that has a minimum fire rating of 2 hours.

(4) The cable or raceway is encased ~~in a minimum of 50 mm (2 in.) of concrete.~~ in concrete to achieve 2 hrs of fire protection .

Informational note No. 4: See NFPA Research Paper *Fire Resistance of Concrete for Electrical Conductors (dated December 18, 2018),* Table 5: *Fire Resistance Rating of Single Layer Concrete Walls, Floors and Roofs* , to determine the thickness of concrete (by type) to achieve the required Fire Resistance

Additional Proposed Changes

File Name	Description	Approved
708-10_-_SD1.docx	Details, Substantiation and alternative informational note.	

Statement of Problem and Substantiation for Public Comment

Based on the returned comments from the First draft, it was stated that it is understood that 2 inches of concrete may not equal 2 hours of fire protection. Further comments on this statement were included in the Final ballot. This proposal is recommending to change it from stating a given thickness which would not account for the fire resistances of the different aggregates used. By changing the wording to require the 2 hours of protection, and providing to the engineer the suitable method to determine required thickness, it would ensure that the circuits are adequately protected.

The attached document provides more details on the proposed Information note (and details as to what information the table would refer to) as well as an alternate note for use with a different source (IBC in this case) if preferred.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 1735-NFPA 70-2021 [Section No. 695.6(A)(2)]	
Public Comment No. 1747-NFPA 70-2021 [Section No. 695.14(F)]	
Public Comment No. 1750-NFPA 70-2021 [Section No. 700.10(D)(2)]	
Public Comment No. 1735-NFPA 70-2021 [Section No. 695.6(A)(2)]	
Public Comment No. 1747-NFPA 70-2021 [Section No. 695.14(F)]	
Public Comment No. 1750-NFPA 70-2021 [Section No. 700.10(D)(2)]	

Related Item

• PI 3717

Submitter Information Verification

Submitter Full Name: Ryan Drury
Organization: nVent
Street Address:
City:
State:
Zip:
Submittal Date: Tue Aug 17 16:19:11 EDT 2021
Committee: NEC-P13

This proposal is in reference to Public Input No. 3717-NFPA 70-2020.

It is a revision to the original proposal, as per the following (As highlighted in Yellow):

708.10 Feeder and Branch Circuit Wiring

(C) COPS Feeder Wiring Requirements

(2) Fire Protection for Feeders

Feeders shall meet one of the following Conditions

(4) The cable or raceway is encased in ~~50 mm (2 in) of~~ concrete to achieve 2 hrs of fire protection.

> Informational note: See NFPA Research Paper *Fire Resistance of Concrete for Electrical Conductors (dated December 18, 2018),* Table 5: *Fire Resistance Rating of Single Layer Concrete Walls, Floors and Roofs*, to determine the suitable thickness of concrete (by type) to achieve the required Fire Resistance

Or

> Informational note: See 2018 International Building Code, Section 7, Table 722.3.2*: Minimum Equivalent Thickness (inches) of Bearing or nonbearing concrete masonry walls*, to determine the suitable thickness of concrete (by type) to achieve the required Fire Resistance

Substantiation:

Dictating a minimum thickness of concrete may be too onerous due to the variety of concrete types used. As such, the recommendation is to remove the specific requirement to achieving this, and utilizing existing fire resistance ratings for various concrete types, as found in Table 5 of the NFPA research paper. This ensure that the specifying engineer is given enough detail to design the encasement to protect the life safety circuits adequately for 2 hrs.

Table 5 as follows, for Reference:

Table 5: Fire Resistance Rating of Single Layer Concrete Walls, Floors and Roofs[13]

Aggregate Type Used in Concrete Masonry Unit	Minimum Equivalent Thickness for Fire Resistance Rating (inches)				
	4 Hours	3 Hours	2 Hours	1.5 Hours	1 Hour
Siliceous	6.9	6.2	4.9	4.3	3.5
Carbonate	6.7	6.1	4.5	3.9	3.1
Semi-Lightweight	5.3	4.5	3.7	3.3	2.8

Also included is an alternate informational note where an IBC code is referenced for the engineer to utilize for the specification. This is here to provide the option to the NFPA research paper or to a reference in the IBC.

Table 722.3.2 as follows, for reference

TABLE 722.3.2
MINIMUM EQUIVALENT THICKNESS (Inches) OF BEARING OR NONBEARING CONCRETE MASONRY WALLS[a, b, c, d]

TYPE OF AGGREGATE	FIRE-RESISTANCE RATING (hours)														
	½	¾	1	1¼	1½	1¾	2	2¼	2½	2¾	3	3¼	3½	3¾	4
Pumice or expanded slag	1.5	1.9	2.1	2.5	2.7	3.0	3.2	3.4	3.6	3.8	4.0	4.2	4.4	4.5	4.7
Expanded shale, clay or slate	1.8	2.2	2.6	2.9	3.3	3.4	3.6	3.8	4.0	4.2	4.4	4.6	4.8	4.9	5.1
Limestone, cinders or unexpanded slag	1.9	2.3	2.7	3.1	3.4	3.7	4.0	4.3	4.5	4.8	5.0	5.2	5.5	5.7	5.9
Calcareous or siliceous gravel	2.0	2.4	2.8	3.2	3.6	3.9	4.2	4.5	4.8	5.0	5.3	5.5	5.8	6.0	6.2

For SI: 1 inch = 25.4 mm.

a. Values between those shown in the table can be determined by direct interpolation.

b. Where combustible members are framed into the wall, the thickness of solid material between the end of each member and the opposite face of the wall, or between members set in from opposite sides, shall be not less than 93 percent of the thickness shown in the table.

c. Requirements of ASTM C55, ASTM C73, ASTM C90 or ASTM C744 shall apply.

d. Minimum required equivalent thickness corresponding to the hourly fire-resistance rating for units with a combination of aggregate shall be determined by linear interpolation based on the percent by volume of each aggregate used in manufacture.

Public Comment No. 1754-NFPA 70-2021 [Section No. 708.10(C)(2)]

(2) Fire Protection for Feeders.

Feeders shall meet one of the following conditions:

(1) The cable or raceway is protected by a listed electrical circuit protective system with a minimum 2-hour fire rating.

Informational Note No. 1: See UL 1724, *Fire Tests for Electrical Circuit Protective Systems*, for one method of defining an electrical circuit protective system, by establishing a rating when tested. UL *Guide Information for Electrical Circuit Integrity Systems* (FHIT) contains information to identify the system and its installation limitations to maintain a minimum 2-hour fire resistive rating.

(2) The cable or raceway is a listed fire-resistive cable system with a minimum 2-hour fire rating.

Informational Note No. 2: See UL 2196-2017, *Standard for Fire Test for Circuit Integrity of Fire-Resistive Power, Instrumentation, Control and Data Cables*, for testing requirements for fire-resistive cables.

Informational Note No. 3: The listing organization provides information for fire-resistive cable systems on proper installation requirements to maintain the fire rating.

(3) The cable or raceway is protected by a listed fire-rated assembly that has a minimum fire rating of 2 hours.

(4) The cable or raceway is encased in a minimum of ~~50 mm~~ 94 mm (~~2 in~~ 3 .7 in.) of concrete.

Statement of Problem and Substantiation for Public Comment

Based on the returned comments from the First draft, it was stated that it is understood that 2 inches of concrete may not equal 2 hours of fire protection. Further comments on this statement were included in the Final ballot, detailing that the committee felt that 5" of thickness was too onerous. As such, the value specified is based on the minimum concrete thickness found to meet the 2 hr Fire resistance threshold detailed in Table 5, as found in the 2018 NFPA Research Foundation report "Fire Resistance of Concrete for Electrical Conductors".

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 1744-NFPA 70-2021 [Section No. 695.6(A)(2)]	
Public Comment No. 1749-NFPA 70-2021 [Section No. 695.14(F)]	
Public Comment No. 1751-NFPA 70-2021 [Section No. 700.10(D)(2)]	
Public Comment No. 1744-NFPA 70-2021 [Section No. 695.6(A)(2)]	
Public Comment No. 1749-NFPA 70-2021 [Section No. 695.14(F)]	
Public Comment No. 1751-NFPA 70-2021 [Section No. 700.10(D)(2)]	

Related Item

• PI 3717

Submitter Information Verification

Submitter Full Name: Ryan Drury
Organization: nVent
Street Address:
City:
State:
Zip:
Submittal Date: Tue Aug 17 16:24:04 EDT 2021
Committee: NEC-P13

Public Comment No. 1048-NFPA 70-2021 [Section No. 708.22(B)]

(B) Selective Load ~~Pickup, Load Shedding, and Peak Load Shaving~~ Management .

The alternate power source shall be permitted to supply COPS emergency, legally required standby, and optional loads where the source has adequate capacity or where load management (that includes automatic selective load pickup and load shedding) is provided as needed to ensure adequate power to (1) the COPS and emergency circuits, (2) the legally required standby circuits, and (3) the optional standby circuits, in that order of priority. The alternate power source shall be permitted to be used for peak load shaving, provided these conditions are met.

Peak load-shaving operation shall be permitted for satisfying the test requirement of 708.6(B), provided all other conditions of 708.6 are met.

Statement of Problem and Substantiation for Public Comment

This public comment is submitted on behalf of the Energy Management Task Group formed under the direction of the Correlating Committee to review all current and proposed definitions and requirements related to load management, load management system, power control system, energy management system and related terms to ensure a coordinated approach throughout the Code. See CCN-279.

The task group members are; Chad Kennedy (Chair), Tim Zgonena, Rebekah Hren, Greg Ball, Jason Fisher, Doug Burkett, Robert Jordan, Matthew Grover, Tim Windey, Karl Reighard, and Brian Baughman. This task group of balanced interests provided the expertise to develop these public comments covering energy management across the NEC.

Technical Substantiation:
The title has been modified so that it doesn't include functions from the actual requirement, and that it does include the proper level of abstraction along with the use of common terminology. This will improve consistency in the code. The requirement has been modified to include the common terminology while retaining the extremely important functional context that's needed.
Related TG PC's: 700.4(C), 701.4(C)

This public comment is part of a series of actions recommended by the task group. See the related public comments which complete this action.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 36-NFPA 70-2021 [Definition: Energy Management System.]	
Public Comment No. 1034-NFPA 70-2021 [Definition: Load Management System.]	
Public Comment No. 1036-NFPA 70-2021 [Definition: Load Management.]	
Public Comment No. 1039-NFPA 70-2021 [Section No. 220.70]	
Public Comment No. 1041-NFPA 70-2021 [Section No. 625.42(A)]	
Public Comment No. 1042-NFPA 70-2021 [Section No. 625.42(B)]	
Public Comment No. 1043-NFPA 70-2021 [Section No. 705.13]	
Public Comment No. 1044-NFPA 70-2021 [Section No. 705.46]	
Public Comment No. 1045-NFPA 70-2021 [Section No. 700.4(C)]	
Public Comment No. 1046-NFPA 70-2021 [Section No. 701.4(C)]	
Public Comment No. 1047-NFPA 70-2021 [Section No. 702.4(B)]	
Public Comment No. 1049-NFPA 70-2021 [Section No. 705.80]	
Public Comment No. 1050-NFPA 70-2021 [Section No. 705.28(A)]	
Public Comment No. 1052-NFPA 70-2021 [Section No. 705.11(A)(1)]	
Public Comment No. 1053-NFPA 70-2021 [Section No. 705.12 [Excluding any Sub-Sections]]	
Public Comment No. 1037-NFPA 70-2021 [Section No. 750.30]	
Public Comment No. 1406-NFPA 70-2021 [Section No. 230.82]	
Public Comment No. 36-NFPA 70-2021 [Definition: Energy Management System.]	
Public Comment No. 1034-NFPA 70-2021 [Definition: Load Management System.]	
Public Comment No. 1036-NFPA 70-2021 [Definition: Load Management.]	
Public Comment No. 1037-NFPA 70-2021 [Section No. 750.30]	
Public Comment No. 1039-NFPA 70-2021 [Section No. 220.70]	
Public Comment No. 1041-NFPA 70-2021 [Section No. 625.42(A)]	
Public Comment No. 1042-NFPA 70-2021 [Section No. 625.42(B)]	
Public Comment No. 1043-NFPA 70-2021 [Section No. 705.13]	
Public Comment No. 1044-NFPA 70-2021 [Section No. 705.46]	
Public Comment No. 1045-NFPA 70-2021 [Section No. 700.4(C)]	
Public Comment No. 1046-NFPA 70-2021 [Section No. 701.4(C)]	

Public Comment No. 1047-NFPA 70-2021 [Section No. 702.4(B)]
Public Comment No. 1049-NFPA 70-2021 [Section No. 705.80]
Public Comment No. 1050-NFPA 70-2021 [Section No. 705.28(A)]
Public Comment No. 1052-NFPA 70-2021 [Section No. 705.11(A)(1)]
Public Comment No. 1053-NFPA 70-2021 [Section No. 705.12 [Excluding any Sub-Sections]]
Public Comment No. 1406-NFPA 70-2021 [Section No. 230.82]

Related Item

• CN-279

Submitter Information Verification

Submitter Full Name: Chad Kennedy
Organization: Schneider Electric
Street Address:
City:
State:
Zip:
Submittal Date: Fri Aug 06 10:01:28 EDT 2021
Committee: NEC-P13

Public Comment No. 45-NFPA 70-2021 [Section No. 708.24]

708.24 Transfer Equipment.

(A) General.

Transfer equipment, including automatic transfer switches, shall be automatic, listed, and identified for emergency use. Transfer equipment shall be designed and installed to prevent the inadvertent interconnection of normal and critical operations sources of supply in any operation of the transfer equipment. Transfer equipment and electric power production systems installed to permit operation in parallel with the normal source shall meet the requirements of Article 705.

~~Transfer equipment shall not be permitted to be reconditioned.~~

(B) Bypass Isolation Switches.

Means shall be permitted to bypass and isolate the transfer equipment. Where bypass isolation switches are used, inadvertent parallel operation shall be avoided.

(C) Automatic Transfer Switches.

Where used with sources that are not inherently synchronized, automatic transfer switches shall comply with the following:

(1) Automatic transfer switches shall be listed for emergency use.

(2) Automatic transfer switches shall be electrically operated and mechanically held.

(D) Bypass Isolation Automatic Transfer Switches.

Where loads are supplied by only one automatic transfer switch, the automatic transfer switch shall include a bypass isolation switch to facilitate maintenance as required in 708.6(C) without jeopardizing continuity of power. When the bypass isolation transfer switch is in the bypass mode, either it shall automatically initiate transfer between power sources upon loss of the connected power source or it shall remain actively supervised by a qualified person who can manually initiate a transfer between power sources.

(E) Use.

Transfer equipment shall supply only COPS loads.

(F) Documentation.

The short-circuit current rating of the transfer equipment, based on the specific overcurrent protective device type and settings protecting the transfer equipment, shall be field marked on the exterior of the transfer equipment.

(G) Reconditioning of Transfer Switches.

(1) Meter Mounted Transfer Switches shall not be permitted to be reconditioned.

(2) Transfer switches other than Meter Mounted Transfer Switches within the scope of this article shall be permitted to be reconditioned in accordance with 708.24(G)(2)a through 708.24(G)(2)d.

(3) The reconditioning process shall be performed in accordance with instructions provided by the manufacturer.

(4) Reconditioning shall be performed using design qualified parts, verified under applicable standards.

(5) Reconditioned transfer switch shall be listed or field labeled as reconditioned, and previously applied listing marks, if any, within the portions reconditioned shall be removed.

(6) If equipment has been damaged by fire, products of combustion, or water, it shall be specifically evaluated by its manufacturer or a qualified testing laboratory prior to being returned to service.

Statement of Problem and Substantiation for Public Comment

The Committee Statement may be correct for some designs of the power switching element, but it is ignoring the other components and power switching elements that are designed to be serviced.

First, transfer switch equipment includes many systems and components in addition to the power switching element. There are typically controllers, control power, metering, and communication systems. These other system performance characteristics can be determined by immediate measurement and test, not destructive or end-of-life testing cited in the statement. When transfer switch equipment that has only limited service and a control system needs to be replaced or updated because of failure or obsolescence, the transfer equipment can be restored to full functional performance. Some would consider this reconditioning. The current code could force the complete replacement of the enclosure, power bus, wiring, power switching element, and other systems when only an updated controller is needed. This will cause longer times to put the transfer equipment back into service, eliminating the backup performance during this longer period.

Second, the suitability of a specific power switching element is addressed in the PI. Item (G)(2)(1) states “in accordance with instructions provided by the manufacturer.” If an element is not intended to be serviceable the manufacturer will provide that information.

For reference, consider Molded Case Circuit Breakers (MCCB) and Low Voltage Power Circuit Breakers (LVPCB). Manufactures state that their MCCBs are not serviceable and do not provide instructions or parts for these circuit breakers. This is because the committee statement “performance characteristics cannot be determined by visual or measurement means, and can only be determined by testing to

destruction or to end-of-life" is correct for MCCBs and one of the reasons manufactures state they cannot be reconditioned. Manufacturers do support the reconditioning of LVPCBs. Instructions to inspect and repair, and replacement parts for these products are provided. The NEC follows this approach in section 240.88(A) and 708.24 should use the same approach.

Related Item

• PI 2761-NFPA 70-2020

Submitter Information Verification

Submitter Full Name: John Cowans
Organization: Siemens
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 30 11:03:07 EDT 2021
Committee: NEC-P13

Public Comment No. 1149-NFPA 70-2021 [Section No. 708.24(A)]

(A) General.

Transfer equipment, including automatic transfer switches, shall be automatic, listed, and identified for emergency use. Transfer equipment shall be designed and installed to prevent the inadvertent interconnection of normal and critical operations sources of supply in any operation of the transfer equipment. Transfer equipment and electric power production systems installed to permit operation in parallel with the normal source shall meet the requirements of Article 705.

Transfer equipment shall not be permitted to be reconditioned.

Additional Proposed Changes

File Name	Description	Approved
13_CN_305.pdf	13 CN305	

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 305 appeared in the First Draft Report on First Revision No.8939.

The Correlating Committee directs the panel to revise the requirement to remove the reference to an entire article in accordance with 4.1.4 of the NEC Style Manual.

Related Item

• First Revision No. 8939

Submitter Information Verification

Submitter Full Name: CC on NEC-AAC
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:
Submittal Date: Tue Aug 10 11:28:08 EDT 2021
Committee: NEC-P13

Correlating Committee Note No. 305-NFPA 70-2021 [Section No. 708.24(A)]

Submitter Information Verification

Committee: NEC-P13
Submittal Date: Thu May 06 14:41:48 EDT 2021

Committee Statement

Committee Statement: The Correlating Committee directs the panel to revise the requirement to remove the reference to an entire article in accordance with 4.1.4 of the NEC Style Manual.

First Revision No. 8939-NFPA 70-2021 [Section No. 708.24(A)]

Ballot Results

This item has passed ballot

12 Eligible Voters
0 Not Returned
12 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Affirmative All

Ayer, Lawrence S.
Gallo, Ernest J.
Hickman, Palmer L.
Holub, Richard A.
Hunter, Dean C.
Johnston, Michael J.
Kendall, David H.
Kovacik, John R.
Manche, Alan
McDaniel, Roger D.
Porter, Christine T.
Williams, David A.

Public Comment No. 1850-NFPA 70-2021 [Section No. 708.24(D)]

(D) ~~Bypass Isolation Automatic Transfer Switches~~ Redundant Transfer Equipment .

Where loads are supplied by ~~only one automatic transfer switch~~ a single feeder , the upstream automatic transfer ~~switch~~ equipment shall include ~~a bypass isolation switch to~~ redundancy to facilitate maintenance as required in 708.6(C) without jeopardizing continuity of power. ~~When~~ If the ~~bypass isolation~~ redundant transfer ~~switch is in the bypass mode, either it shall automatically initiate transfer between power sources upon loss of the connected power source or it shall remain~~ equipment is manual (or non-automatic), then it shall be actively supervised by a qualified person ~~who can manually initiate a transfer between power sources~~ when the primary (automatic) transfer equipment is disabled for maintenance or repair .

Statement of Problem and Substantiation for Public Comment

The second sentence in the 708.24(D) requirement is one vendor's solution to having a degree of redundancy for COPS systems. There are multiple ways to safely and reliably meet the requirement for ensuring continuity of power when a COPS load is supplied by a single feeder. We shouldn't be directing the reader to do it with just one product in mind. In addition, there is only one vendor that has a product offering that can satisfy the requirement. Finally, the product standard for transfer switches doesn't yet have any content for bypass isolation transfer switches with automatic bypass function.

The wording was modified so that it talks about the functionality that's needed when COPS loads are supplied by a single feeder rather than mandating the use of a specific product.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 1854-NFPA 70-2021 [Section No. 700.5]	
Public Comment No. 1854-NFPA 70-2021 [Section No. 700.5]	

Related Item

- FR 8794

Submitter Information Verification

Submitter Full Name: Timothy Windey
Organization: Cummins Power Generation
Street Address:
City:
State:
Zip:
Submittal Date: Wed Aug 18 11:06:09 EDT 2021
Committee: NEC-P13

Public Comment No. 350-NFPA 70-2021 [Section No. 708.30]

708.30 Branch Circuits Supplied by COPS.

Branch circuits supplied by the COPS shall only supply equipment specified as required for critical operations use.

708.32 Cybersecurity, Cyberweapon, Electromagnetic Pulse (EMP), Geomagnetic Disturbance (GMD), and Intentional Electromagnetic Interference (IEMI) Protection. COPS shall comply with either of the following:

(1) The system shall be identified for cybersecurity, cyberweapon, EMP, GMD, and IEMI protection.

(2) A cybersecurity, cyberweapon, EMP, GMD, and IEMI protection failure modes effects analysis assessment shall be conducted to determine system vulnerabilities.

The identification or assessment shall be reviewed when the system configuration changes and at not more than 5-year intervals. Documentation of the identification or assessment shall be made available to those authorized to inspect, operate, and maintain the system.

Statement of Problem and Substantiation for Public Comment

This Public Comment is a follow-up to PI 761, PI 3080, FR 8801, and PI 4024. It does not require cybersecurity, cyberweapon, EMP, GMD, or IEMI protection, but rather calls for the COPS to be identified for these threats or for a threat assessment to be completed. While the NEC® is not ready to mandate protection requirements, an assessment would show system vulnerabilities. Acceptance of this Public Comment would at least bring the subject to the attention of owners, design engineers, electrical inspectors, and insurance companies, and set the table for requirements in future editions of the NEC® (or other NFPA standards). The format for this Public Comment is based upon the cybersecurity requirements found in FR 8801 and FR 8914 which offer an assessment as an alternate for requiring protection.

PI 761 provided technical substantiation to require Electromagnetic Pulse (EMP) Protection for our critical infrastructure. While it appears that the NEC(R) is not ready to actually require EMP protection at this time, the security of our country is at stake. An EMP is fairly well understood as an extremely powerful electromagnetic wave that can impress 50,000 volts per meter on every piece of electrical equipment, destroying everything that is unprotected. An EMP is often associated with a nuclear explosion, but that is not the only cause of electromagnetic damage. A Geomagnetic Disturbance (GMD) is caused by a sunspot. While the EMP would be created by one of our adversaries, the sun spot is an act of God. These types of events can instantly initiate millions of fires in our unprotected electrical systems, overwhelming our fire-fighting capabilities. If millions of fires weren't bad enough, the unprotected electrical equipment would be damaged or completely destroyed, subjecting the country to years of blackout. Government intelligence studies, now unclassified, have predicted that from 66% to 90% of our population would die within one year, due to a lack of food, clean water, and medicine, if a significant EMP or GMD were to occur, while the country's electrical infrastructure remains unprotected. The final threat listed is an Intentional Electromagnetic Interference (IEMI). It is easily created by utilizing off-the-shelf parts, available for purchase on the internet, that will fit into a van. While much less powerful than a significant EMP or GMD, twenty vans, equipped with bench-made IEMI devices and scattered throughout the country, can shut down major industries and major parts of the country for weeks, if not months, through a coordinated attack, similar to 9/11, by targeting key industries/vulnerabilities. In conclusion, these electromagnetic threats to our unprotected electrical infrastructure, and therefor to our entire country, are absolutely real, and must be addressed.

PI 4024 provided significant substantiation for the need to protect critical infrastructure against cyber attack for equipment connected to the internet. However, equipment does not need to be connected to the internet in order to be damaged or destroyed by cyber threats. Equipment can be damaged by cyber weapons such as malicious computer worms that attack SCADA (control) systems. A great example is the Stuxnet worm that destroyed the centrifuges in Iran. Thus, this Public Comment deletes the PI 4024 reference to the internet and adds cyberweapon to the list of threats that need to be either protected against or assessed.

Related Item

• PI 761 • FR 8801 • PI 3080 • PI 4024 • PI 3055 • FR 7947 • PI 4026 • PI 3083

Submitter Information Verification

Submitter Full Name: Vincent Saporita
Organization: Saporita Consulting
Affiliation: Saporita Consulting
Street Address:
City:
State:
Zip:
Submittal Date: Sat Jul 24 13:39:05 EDT 2021
Committee: NEC-P13

Public Comment No. 312-NFPA 70-2021 [Section No. 708.52(A)]

(A) Applicability.

The requirements of 708.52 shall apply to critical operations (including multiple occupancy buildings) with critical operation areas.

(1) For fused disconnects, where the available fault current is 10,000 amperes or greater, the ground-fault protection provisions of Section 210.13, 215.10, 230.95, and 240.13 shall not apply if the fuses have a clearing time of 0.07 seconds or less at the lower of the calculated minimum available arcing current or 38% of the available fault current, or if the disconnect switch complies with Section 240.67(B)(1), 240.67(B)(3), or 240.67(B)(4) and is set to operate at the lower of the calculated minimum arcing current or 38% of the available fault current.

(2) For circuit breakers, where the available fault current is 10,000 amperes or greater, the ground-fault protection provisions of Section 210.13, 215.10, 230.95, and 240.13shall not apply if the circuit breaker complies with Section 240.87(B)(2), 240.87(B)(4), 240.87(B)(5), or 240.87(B)(6), and is set to operate at the lower of the calculated minimum arcing current or 38% of the available fault current.

Statement of Problem and Substantiation for Public Comment

This Public Comment utilizes the concepts raised in Public Inputs 693, 694, 695, and 696 to provide an alternate to the GFPE requirements required elsewhere in this Code. (Because the concepts were raised in the Public Input stage, they are not considered “new material”). When these alternate methods are utilized, it provides the consulting engineer with significantly more design options to meet the selective coordination requirements of 708.54. This becomes especially important now, because it appears that GFPE will be required at 800 amperes and above, rather than 1000 amperes and above, making selective coordination even more challenging for the consulting engineer.

The following is the substantiation provided for the Public Comments to add exceptions to 210.13, 215.10, 230.95, and 240.13. It provides the technical background necessary to implement the changes to 708.52.

"A sincere “Thank You” goes to Code Making Panels 2 and 10 for discovering the flaw with Public Inputs 693, 694, 695, and 696. The Panels stated: “Substantiation was not provided to support the equivalency of alternate technologies. As an example, it is possible that alternate systems could be set such that they might provide arc energy reduction, but not operate during a lower level ground fault where traditional GFPE will provide protection.” To rectify this flaw, this Public Comment has added the requirement that the methods to reduce clearing time operate at the lower of the calculated minimum arcing current or 38% of the available fault current. While an arcing fault from phase to ground is almost certainly going to escalate into a three phase arcing fault, it is possible that the arcing fault could remain as a phase to ground arcing fault. When this occurs, it has been shown, in numerous IEEE papers, that the minimum phase to ground arcing fault, on a 480/277 volt, solidly grounded system, must be at least 38% of the available fault current in order to sustain the arc. With this requirement added in, it is assured that the method to reduce clearing time will function to clear the circuit.
In addition to this requirement, and to add even more conservatism, this Public Comment has added a minimum available fault current of 10,000 amperes to the proposed requirement. Based on a 32mm spacing, 480 volts, and HCB configuration, IEEE 1584-2018 calculates the minimum arcing current to be 6.09 kA for an available (bolted) fault current of 10,000 amperes. The minimum arcing current of 6.09 KA is 5 times the maximum 1200 ampere setting and 2 times the 3000 ampere value used with the one second maximum delay. (NEC 230.95(A) allows for a maximum setting of 1200 amperes and a maximum time delay of 1 second at 3000 amperes or greater.) The 6.09 KA current for 60 cycles produces an expected equipment damage level of 36,540 KW-Cycles (6.09KA X 100 arcing volts X 60 cycles). In contrast, this Public Comment would provide a worst case, expected equipment damage level of only 4,263 KW-Cycles. Yes, that is correct, the proposed exception would allow less than 12% of the damage level allowed by the existing 230.95(A) requirements.

The following paragraphs provide a detailed comparison of expected equipment damage levels allowed by 230.95(A), proposed exceptions for fusible switches (240.67), and proposed exceptions for circuit breakers (240.87).

Expected Equipment Damage from 230.95(A)

For a 32mm spacing, 480 volts, and HCB configuration, and an available fault current of 10kA, the IEEE 1584-2018 arcing current is 7.07kA with a minimum arcing current of 6.09kA. Using the maximum 230.95(A) opening time of 60 cycles, the expected equipment damage is 36,540 kW-cycles.

For a 32mm spacing, 480 volts, and HCB configuration, and an available fault current of 25kA, the IEEE 1584-2018 arcing current is 17.64kA with a minimum arcing current of 15.21kA. Using the maximum 230.95(A) opening time of 60 cycles, the expected equipment damage is 91,260 kW-cycles.

For a 32mm spacing, 480 volts, and HCB configuration, and an available fault current of 50kA, the IEEE 1584-2018 arcing current is 30.14kA with a minimum arcing current of 25.98kA. Using the maximum 230.95(A) opening time of 60 cycles, the expected equipment damage is 155,880 kW-cycles.

Expected Equipment Damage from Proposed Exceptions for Fusible Switches (240.67)

For a 32mm spacing, 480 volts, and HCB configuration, and an available fault current of 10kA, the IEEE 1584-2018 arcing current is 7.07kA with a minimum arcing current of 6.09kA. Assuming an opening time of 4 cycles for 240.67(B), the expected equipment damage is 2,436 kW-cycles. Assuming an opening time of 7 cycles for 240.67(B)(1) or (B)(3), the expected equipment damage is 4,263 kW-cycles. Assuming an opening time of 1/2 cycle for 240.67(B)(4), the expected equipment damage is 305 kW-cycles. Worst case damage (4,263 kW-cycles) is less than 12% of the damage allowed by 230.95(A) (36,540 kW-cycles).

For a 32mm spacing, 480 volts, and HCB configuration, and an available fault current of 25kA, the IEEE 1584-2018 arcing current is 17.64kA with a minimum arcing current of 15.21kA. Assuming an opening time of 4 cycles for 240.67(B), the expected equipment damage

is 6,084 kW-cycles. Assuming an opening time of 7 cycles for 240.67(B)(1) or (B)(3), the expected equipment damage is 10,647 kW-cycles. Assuming an opening time of 1/2 cycle for 240.67(B)(4), the expected equipment damage is 761 kW-cycles. Worst case damage (10,647 kW-cycles) is less than 12% of the damage allowed by 230.95(A) (91,260 kW-cycles).

For a 32mm spacing, 480 volts, and HCB configuration, and an available fault current of 50kA, the IEEE 1584-2018 arcing current is 30.14kA with a minimum arcing current of 25.98kA. Assuming an opening time of 4 cycles for 240.67(B), the expected equipment damage is 10,392 kW-cycles. Assuming an opening time of 7 cycles for 240.67(B)(1) or (B)(3), the expected equipment damage is 18,186 kW-cycles. Assuming an opening time of 1/2 cycle for 240.67(B)(4), the expected equipment damage is 1,299 kW-cycles. Worst case damage (18,186 kW-cycles) is less than 12% of the damage allowed by 230.95(A) (155,880 kW-cycles)

Expected Equipment Damage from Proposed Exceptions for Circuit Breakers (240.87)

For a 32mm spacing, 480 volts, and HCB configuration, and an available fault current of 10kA, the IEEE 1584-2018 arcing current is 7.07kA with a minimum arcing current of 6.09kA. Assuming an opening time of 4 cycles for 240.87(B)(1), (B)(2), or (B)(4), the expected equipment damage is 2,436 kW-cycles. Assuming an opening time of 3 cycles for 240.87(B)(5) or (B)(6), the expected equipment damage is 1,827 kW-cycles. Worst case damage (2,426 KW-Cycles) is less than 7% of the damage allowed by 230.95(A) (36,540 kW-cycles).

For a 32mm spacing, 480 volts, and HCB configuration, and an available fault current of 25kA, the IEEE 1584-2018 arcing current is 17.64kA with a minimum arcing current of 15.21kA. Assuming an opening time of 4 cycles for 240.87(B)(1), (B)(2), or (B)(4), the expected equipment damage is 6,084 kW-cycles. Assuming an opening time of 3 cycles for 240.87(B)(5) or (B)(6), the expected equipment damage is 4,563 kW-cycles. Worst case damage (6,084 kW-Cycles) is less than 7% of the damage allowed by 230.95(A) (91,260 kW-cycles).

For a 32mm spacing, 480 volts, and HCB configuration, and an available fault current of 50kA, the IEEE 1584-2018 arcing current is 30.14kA with a minimum arcing current of 25.98kA. Assuming an opening time of 4 cycles for 240.87(B)(1), (B)(2), or (B)(4), the expected equipment damage is 10,392 kW-cycles. Assuming an opening time of 3 cycles for 240.87(B)(5) or (B)(6), the expected equipment damage is 7,794 kW-cycles. Worst case damage (10,392 KW-Cycles) is less than 7% of the damage allowed by 230.95(A) (155,880 kW-cycles).

Other Change from Public Input Stage

The other change that is made from the original Public Input is that the text lists the methods that can be used rather than the methods that cannot be used.

Background from Public Input Stage

A requirement (230.95) for ground fault protection of equipment (GFPE) was added to the 1971 NEC® because 480/277 volt, solidly grounded wye services, protected by 1000 ampere and larger overcurrent protective devices, were burning down due to arcing faults. 208/120 volt services and those services protected by smaller overcurrent protective devices were not burning down, so they weren't included in the new requirement. Over many Code cycles, GFPE requirements were also added for branch circuits (210.13), feeders (215.10), and equipment (240.13). In all cases, the intent was to limit damage to the switchboard, switchgear, panelboard or equipment, not the downstream conductors or busway.

The electrical industry has evolved considerably since those early GFPE requirements were introduced. IEEE 1584 now predicts the magnitude of the arcing current along with the incident energy to which a worker could be exposed while working on energized equipment. It has become clearly evident that the level of protection necessary to protect an employee is orders of magnitude greater than that required to protect equipment.

Energy reducing maintenance switches (240.67(B)(2) and 240.87(B)(3)) are excluded because energy-reducing maintenance switches are typically turned off when a worker is not working on energized equipment, whereas ground fault protection is constantly protecting the equipment, whether or not a worker is working on the energized equipment.

The Approved Equivalent Means (240.67(B)(5) and 240.87(B)(7)) are excluded because the opening times for these methods are unknown at this time.

Key Benefit

One very key benefit of this Public Comment is that when these alternate methods are utilized, it provides the consulting engineer with significantly more design options to meet the selective coordination requirements of 700.32, 701.32, and 708.54. This becomes especially important now, because it appears that GFPE will be required at 800 amperes and above, rather than 1000 amperes and above, making selective coordination even more challenging for the consulting engineer.

Conclusion

This Public Comment takes advantage of the arc-energy reduction requirements found in 240.67 and 240.87. It provides an exception for GFPE requirements whenever specific 240.67 and 240.87 methods to reduce clearing time are utilized. The methods to reduce clearing time will limit the arcing fault damage to the equipment to a level that is considerably less than currently allowed by the requirements found in 230.95(A)."

Related Item

• PI 693 • PI 694 • PI 695 • PI 696

Submitter Information Verification

Submitter Full Name: Vincent Saporita
Organization: Saporita Consulting
Affiliation: Saporita Consulting
Street Address:

City:	
State:	
Zip:	
Submittal Date:	Tue Jul 20 16:16:31 EDT 2021
Committee:	NEC-P13

Public Comment No. 2158-NFPA 70-2021 [Section No. 708.54(C)]

(C) Modifications.

~~Where~~ If modifications, additions, or deletions to the critical operations power system(s) occur, selective coordination of the critical operations power system(s) OCPDs with all supply-side and load-side OCPDs shall be reevaluated.

Exception: Selective coordination shall not be required between two overcurrent devices located in series if no loads are connected in parallel with the downstream device.

Informational Note: See Informational Note Figure 708.54 for an example of how critical operations power system OCPDs selectively coordinate with all supply-side OCPDs.

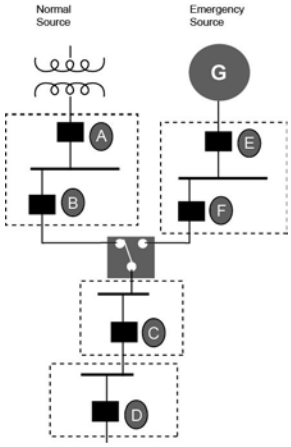
OCPD D selectively coordinates with OCPDs C, F, E, B, and A.

OCPD C selectively coordinates with OCPDs F, E, B, and A.

OCPD F selectively coordinates with OCPD E.

OCPD B is not required to selectively coordinate with OCPD A because OCPD B is not a critical operations power system OCPD.

Figure Informational Note Figure 708.54 Critical Operations Power System Selective Coordination.



Statement of Problem and Substantiation for Public Comment

This rule describes a condition and not a location; the use of the word "where" no longer complies with the Style Manual.

Related Item

• FR-8944

Submitter Information Verification

Submitter Full Name: Frederic Hartwell
Organization: Hartwell Electrical Services, Inc.
Street Address:
City:
State:
Zip:
Submittal Date: Thu Aug 19 14:38:42 EDT 2021
Committee: NEC-P13

Public Comment No. 1443-NFPA 70-2021 [Article 712]

Article 712 Direct Current Microgrids

Part I. General

712.1 Scope.

This article applies to direct current microgrids.

712.3 Other Articles.

Wherever the requirements of other articles of this *Code* and Article 712 differ, the requirements of Article 712 shall apply. DC microgrids interconnected through an inverter or bi-directional converter with ac electric power production sources shall comply with Article 705 .

712.4 Listing and Labeling.

Any equipment used in the dc circuits of a dc microgrid shall be listed and labeled for dc use.

712.8 Commissioning.

Direct current microgrid systems shall be commissioned upon installation.

712.10 Directory.

(A) Source Directory.

A permanent directory denoting all dc electric power sources operating to supply the dc microgrid shall be installed at each source location capable of acting as the primary dc source.

(B) Building Directory.

A building supplied by a dc microgrid system shall have a permanent plaque or directory installed outside the building at each service equipment location or at an approved readily visible location. The plaque or directory shall denote the location of each power source disconnecting means on or in the building or be grouped with other plaques or directories for other on-site sources.

Exception: *Multiple power production sources that are grouped at one location shall be permitted to be identified as a group.*

Part II. Circuit Requirements

712.25 Identification of Circuit Conductors.

Circuit conductors in dc microgrids that are not solidly grounded shall be identified according to the requirements of 210.5(C)(2) for branch circuits and 215.12(C)(2) for feeders.

712.30 System Voltage.

The system voltage of a dc microgrid shall be determined by one of the following methods:

(1) The nominal voltage to ground for solidly grounded systems

(2) The nominal voltage to ground for reference-grounded systems

(3) The highest nominal voltage between conductors for resistively grounded dc systems and ungrounded dc systems.

Informational Note: Examples of nominal dc system voltages include but are not limited to 24, 48, 125, 190/380, or 380 volts.

Part III. Disconnecting Means

712.34 DC Source Disconnecting Means.

The output of each dc source shall have a readily accessible disconnecting means that is lockable open in accordance with 110.25 and adjacent to the source.

712.35 Disconnection of Ungrounded Conductors.

In solidly grounded two- and three-wire systems, the disconnecting means shall simultaneously open all ungrounded conductors. In ungrounded, resistively grounded, functionally grounded, and reference-grounded systems, such devices shall open all current-carrying conductors.

712.37 Directional Current Devices.

Disconnecting means shall be listed, shall be marked for use in a single current direction, and shall only be used in the designated current direction.

Informational Note: Examples of directional current devices are magnetically quenched contactors and semiconductor switches in overcurrent devices.

Part IV. Wiring Methods

712.52 System Grounding.

(A) General.

Direct-current microgrids shall be grounded in accordance with 250.162 .

~~**(B)** Over 300 Volts.~~

~~DC microgrids operating at voltages greater than 300 volts dc shall be reference-grounded dc systems or functionally grounded dc systems.~~

~~**712.55** Ground-Fault Detection Equipment.~~

~~Ungrounded, reference grounded, or functionally grounded dc microgrids operating at greater than 60 volts dc shall have ground-fault detection that indicates that a fault has occurred. The ground-fault equipment shall be marked in accordance with 250.167(C) or in accordance with any marking rules that apply to the power source equipment.~~

~~**712.57** Arc-Fault Protection.~~

~~Where required elsewhere in this *Code*, specific systems within the dc microgrid shall have arc-fault protection. The arc-fault protection equipment shall be listed.~~

~~Informational Note: See 90.4 when suitable equipment for arc-fault protection is not available.~~

~~**Part V.** Marking~~

~~**712.62** Distribution Equipment and Conductors.~~

~~Distribution equipment and conductors shall be marked as required elsewhere in this *Code*.~~

~~**712.65** Available DC Fault Current.~~

~~**(A)** Field Marking.~~

~~The available dc fault current on the dc microgrid shall be field marked at the dc source(s). The field marking(s) shall include the date the available fault current calculation was performed and be of sufficient durability to withstand the environment involved.~~

~~**(B)** Modifications.~~

~~When modifications to the electrical installation occur that affect the available fault current at the dc source, the available fault current shall be verified or recalculated as necessary to ensure the equipment ratings are sufficient for the available fault current at the line terminals of the equipment. The required field marking(s) in 712.65(A) shall indicate the new available fault current and date.~~

~~**Part VI.** Protection~~

~~**712.70** Overcurrent Protection.~~

~~Equipment and conductors connected to more than one electrical source shall have overcurrent protective devices to provide protection from all sources.~~

~~**712.72** Interrupting and Short-Circuit Current Ratings.~~

~~Consideration shall be given to the contribution of available fault currents from all interconnected power sources for the interrupting ratings and short-circuit current ratings of equipment in the dc microgrid system(s). Overcurrent protective devices and equipment used within a dc microgrid shall have an interrupting rating at nominal circuit voltage or a short-circuit current rating sufficient for the available fault current at the line terminals of the equipment.~~

~~**Part VII.** Systems over 1000 Volts~~

~~**712.80** General.~~

~~Systems with a maximum voltage between conductors of over 1000 volts dc shall comply with Article 490 and other requirements in this *Code* applicable to installations rated over 1000 volts.~~

Statement of Problem and Substantiation for Public Comment

This article is deleted in keeping with the request of this task group by the Correlating Committee (CCN-306) to “consider removing the definition of “DC Microgrid” and Article 712 based on the review of requirements in Article 705.” It is the determination of this task group that the deletion of this article and related term will not adversely impact users of this Code and will in fact, improve the usability of this document by removing terms and requirements that conflict with other terms and requirements that are globally applied throughout this Code, other common regulatory documents, and other standards. This task group carefully reviewed the language in each section of this article and compared these to other requirements located in article 705, in addition to other related articles including those in Chapters 1 through 4.

As part of this work this task group reviewed the related public inputs and actions taken by CMP-13 and CMP-4 with regards to this article and topic. We are satisfied that the actions taken by CMP4 during the first revision in response to related public inputs, addressed any substantive gaps that existed between article 705 and 712 in the 2020 edition.

For reference by the Committee, the following points address each section in this article and this task group’s analysis.

- 712.1 is deleted as redundant since the interconnection of power production sources (both ac or dc) has been covered under Article 705 since 1987. Article 705 has covered microgrid systems for several cycles. Each power source is further addressed in each related article (i.e. 690 for PV systems or 706 for energy storage systems) and any specific load requirements are covered under general Chapter 2 rules or as modified in such articles as 700 or 701. The existence of Article 712 alongside article 705 is confusing to a user since many power sources used in microgrids are dc sources but may connect to other sources either through dc connections, or ac connections through a dedicated inverter. It is therefore not practical to try to define a “dc microgrid” as being different from a “microgrid” since the vast majority of microgrids addressed in 705 will involve the connection of dc sources and dc distribution equipment, regardless of the presence of ac connections. This fact is supported in practice since the term “dc microgrid” is not used in the vast majority of microgrid commercial or regulatory references.
- 712.3 is deleted as redundant. The reference to 705 is insufficient to add any clarity since the two articles overlap significantly already.
- 712.4 is deleted since this is adequately covered in 705.6. Language for microgrid devices to be listed was added into 705.6 during the first revision (FR-9374). The existing 705.6 language is more preferred since it addresses specific pieces of equipment.
- 712.8 is deleted as no longer required with the deletion of this article.
- 712.10 is deleted as this requirement is included in 705.10. Though there are slight variations in the two sections’ original text, they are not substantial enough to result in different requirements being enforced.

- 712.25 is deleted as pointers back to 210 and 215 are not required.
- 712.30 is deleted as the voltages in various systems are defined by a calculation based on the technologies used. This issue is adequately covered in each source article and in 705.14.
- 712.34 and 712.35 are deleted as these requirements are already addressed in the specific source articles as referenced in 705.20.
- 712.37 is deleted. Existing requirements in 110.3 and 705.6 deemed adequate.
- 712.52 is deleted as unnecessary. Article 250 adequately addresses the installation requirements for these applications. Chapters 1 – 4 apply to all wiring in a microgrid that does not fall under the scope of any particular power source system such as PV in Article 690.
- 712.55 is deleted and was effectively moved to new 705.75 (see FR-9412).
- 712.57 is deleted as the requirements elsewhere in the NEC already address this, as noted in the informational note. This text is not required and is duplicative.
- 712.62 is deleted as unnecessary to repeat requirements located elsewhere in the Code.
- 712.65 is deleted as fault current marking requirements are found in 110.9/10/16, in addition to any modifications in each source article.
- 712.70 is deleted and is covered in 705.30(A).
- 712.72 is deleted as interrupting rating requirements and SCCR requirements are addressed in 110.9 and 110.10.
- 712.80 is unnecessary since it does not contain modifications or additions to requirements elsewhere in the Code.

This public comment is submitted on behalf of the task group formed under the direction of the Correlating Committee to review all current and proposed definitions and requirements related to microgrids to ensure a clear, consistent, and coordinated approach to addressing this topic throughout the Code.
The task group members are; Jason Fisher Chair, Brenton Michael Fedele, Ted Smith, Isaac Opalinsky, Pete Jackson, Jason Hopkins, John Kovacik, Steven Froemming, Krista Biason, Greg Ball, Chad Beebe, and Matthew Dozier. Through these individual's technical committee memberships, and their balanced interests, this task group provided the expertise to develop these public comments covering microgrids across the NEC.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 1445-NFPA 70-2021 [Definition: Microgrid, Direct Current. (Direct Current Micr...]	
Public Comment No. 1463-NFPA 70-2021 [Definition: Grounded, Functionally. (Functionally Grounded)]	
Public Comment No. 1464-NFPA 70-2021 [Definitions (100): DC System, ... to DC System, ...]	
Public Comment No. 1465-NFPA 70-2021 [Definition: Voltage, Nominal. (Nominal Voltage)]	
Public Comment No. 1466-NFPA 70-2021 [Definition: Primary DC Source.]	

Related Item

• PI-2829 Public Input from CC AE task group to delete article 712

Submitter Information Verification

Submitter Full Name: Jason Fisher
Organization:
Affiliation: CC Second Draft Microgrid Task Group
Street Address:
City:
State:
Zip:
Submittal Date: Fri Aug 13 13:48:36 EDT 2021
Committee: NEC-P13

Public Comment No. 1150-NFPA 70-2021 [Section No. 712.57]

712.57 Arc-Fault Protection.

Where required elsewhere in this *Code*, specific systems within the dc microgrid shall have arc-fault protection. The arc-fault protection equipment shall be listed.

Informational Note: See 90.4 when suitable equipment for arc-fault protection is not available.

Additional Proposed Changes

File Name	Description	Approved
13_CN_307.pdf	13 CN307	

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 307 appeared in the First Draft Report on First Revision No. 9118.

The Correlating Committee directs the panel to review the informational note for redundancy in compliance with 4.1.1 of the NEC Style Manual.

Related Item

• First Revision No. 9118

Submitter Information Verification

Submitter Full Name: CC on NEC-AAC
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:
Submittal Date: Tue Aug 10 11:31:38 EDT 2021
Committee: NEC-P13

Correlating Committee Note No. 307-NFPA 70-2021 [Section No. 712.57]

Submitter Information Verification

Committee: NEC-P13
Submittal Date: Thu May 06 14:49:13 EDT 2021

Committee Statement

Committee Statement: The Correlating Committee directs the panel to review the informational note for redundancy in compliance with 4.1.1 of the NEC Style Manual.

First Revision No. 9118-NFPA 70-2021 [Section No. 712.57]

Ballot Results

This item has passed ballot

12 Eligible Voters
0 Not Returned
12 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Affirmative All

Ayer, Lawrence S.
Gallo, Ernest J.
Hickman, Palmer L.
Holub, Richard A.
Hunter, Dean C.
Johnston, Michael J.
Kendall, David H.
Kovacik, John R.
Manche, Alan
McDaniel, Roger D.
Porter, Christine T.
Williams, David A.

Public Comment No. 463-NFPA 70-2021 [New Section after 712.72]

TITLE OF NEW CONTENT

712.74 Cybersecurity, Cyberweapon, Electromagnetic Pulse (EMP), Geomagnetic Disturbance (GMD), and Intentional Electromagnetic Interference (IEMI) Protection. Direct current microgrids shall comply with either of the following:

(1) The system shall be identified for cybersecurity, cyberweapon, EMP, GMD, and IEMI protection.

(2) A cybersecurity, cyberweapon, EMP, GMD, and IEMI protection failure modes effects analysis assessment shall be conducted to determine system vulnerabilities.

The identification or assessment shall be reviewed when the direct current microgrid configuration changes and at not more than 5-year intervals. Documentation of the identification or assessment shall be made available to those authorized to inspect, operate, and maintain the system.

Statement of Problem and Substantiation for Public Comment

This Public Comment is a follow-up to PI 761, PI 3080, FR 8801, PI 758, and PI 4024. It does not require cybersecurity, cyberweapon, EMP, GMD, or IEMI protection, but rather calls for the direct current microgrid to be identified for these threats or for a threat assessment to be completed. While the NEC® is not ready to mandate protection requirements, an assessment would show direct current microgrid vulnerabilities. Acceptance of this Public Comment would at least bring the subject to the attention of owners, design engineers, electrical inspectors, and insurance companies, and set the table for requirements in future editions of the NEC® (or other NFPA standards). The format for this Public Comment is based upon the cybersecurity requirements found in FR 8801, which offers an assessment as an alternate for requiring protection.

PI 761 provided technical substantiation to require Electromagnetic Pulse (EMP) Protection for our critical infrastructure. While it appears that the NEC(R) is not ready to actually require EMP protection at this time, the security of our country is at stake. An EMP is fairly well understood as an extremely powerful electromagnetic wave that can impress 50,000 volts per meter on every piece of electrical equipment, destroying everything that is unprotected. An EMP is often associated with a nuclear explosion, but that is not the only cause of electromagnetic damage. A Geomagnetic Disturbance (GMD) is caused by a sunspot. While the EMP would be created by one of our adversaries, the sun spot is an act of God. These types of events can instantly initiate millions of fires in our unprotected electrical systems, overwhelming our fire-fighting capabilities. If millions of fires weren't bad enough, the unprotected electrical equipment would be damaged or completely destroyed, subjecting the country to years of blackout. Government intelligence studies, now unclassified, have predicted that from 66% to 90% of our population would die within one year, due to a lack of food, clean water, and medicine, if a significant EMP or GMD were to occur, while the country's electrical infrastructure remains unprotected. The final threat listed is an Intentional Electromagnetic Interference (IEMI). It is easily created by utilizing off-the-shelf parts, available for purchase on the internet, that will fit into a van. While much less powerful than a significant EMP or GMD, twenty vans, equipped with bench-made IEMI devices and scattered throughout the country, can shut down major industries and major parts of the country for weeks, if not months, through a coordinated attack, similar to 9/11, by targeting key industries/vulnerabilities. In conclusion, these electromagnetic threats to our unprotected electrical infrastructure, and therefor to our entire country, are absolutely real, and must be addressed.

PI 4024 provided significant substantiation for the need to protect critical infrastructure against cyber attack for equipment connected to the internet. However, equipment does not need to be connected to the internet in order to be damaged or destroyed by cyber threats. Equipment can be damaged by cyber weapons such as malicious computer worms that attack SCADA (control) systems. A great example is the Stuxnet worm that destroyed the centrifuges in Iran. Thus, this Public Comment deletes the PI 4024 reference to the internet and adds cyberweapon to the list of threats that need to be either protected against or assessed.

Related Item

• PI 758 • PI 3080 • FR 8801 • PI 4024 • PI 3055 • FR 7947 • PI 4026 • FR 8880 • FR 8917 • PI 2888 • FR 8914 • PI 3083

Submitter Information Verification

Submitter Full Name: Vincent Saporita
Organization: Saporita Consulting
Affiliation: Saporita Consulting
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jul 27 18:20:28 EDT 2021
Committee: NEC-P13

Public Comment No. 1151-NFPA 70-2021 [Section No. 750.6]

750.6 Listing.

Energy management systems shall be listed under one of the following conditions:

(1) Listed as a complete energy management system

(2) Listed as a kit for field installation in switch or overcurrent device enclosures

(3) Identified as a recognized component of a field-installed accessory kit as part of the listed equipment

Additional Proposed Changes

File Name	Description	Approved
13_CN_308.pdf	13 CN308	

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 308 appeared in the First Draft Report on First Revision No. 9119.

The Correlating Committee directs the panel to review the informational note for redundancy in compliance with 4.1.1 of the NEC Style Manual. The term "listed" should not be repeated within the list items since the charging statement includes this requirement. The panel should review the use of the term "recognized component" within list item (3) since this term is specific to a particular Qualified Electrical Testing Laboratory.

Related Item

• First Revision No. 9119

Submitter Information Verification

Submitter Full Name: CC on NEC-AAC
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:
Submittal Date: Tue Aug 10 11:42:48 EDT 2021
Committee: NEC-P13

Correlating Committee Note No. 308-NFPA 70-2021 [New Definition after Definition: Monitor.]

Submitter Information Verification

Committee: NEC-P13
Submittal Date: Thu May 06 14:50:34 EDT 2021

Committee Statement

Committee Statement: The Correlating Committee directs the panel to review the informational note for redundancy in compliance with 4.1.1 of the NEC Style Manual. The term “listed” should not be repeated within the list items since the charging statement includes this requirement. The panel should review the use of the term “recognized component” within list item (3) since this term is specific to a particular Qualified Electrical Testing Laboratory.

First Revision No. 9119-NFPA 70-2021 [New Definition after Definition: Monitor.]

Ballot Results

This item has passed ballot

12 Eligible Voters
0 Not Returned
12 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Affirmative All

Ayer, Lawrence S.
Gallo, Ernest J.
Hickman, Palmer L.
Holub, Richard A.
Hunter, Dean C.
Johnston, Michael J.
Kendall, David H.
Kovacik, John R.
Manche, Alan
McDaniel, Roger D.
Porter, Christine T.
Williams, David A.

Public Comment No. 1615-NFPA 70-2021 [Section No. 750.6]

750.6 Listing.

Energy management systems shall be ~~listed under~~ one or more of the following ~~conditions~~ :

(1) Listed as a complete energy management system

(2) Listed as a kit for field installation in switch or overcurrent device enclosures

(3) Identified as a recognized component of a field-installed accessory kit as part of the listed equipment

Statement of Problem and Substantiation for Public Comment

These are not "conditions."

Related Item

• FR 9119

Submitter Information Verification

Submitter Full Name: Ryan Jackson
Organization: Ryan Jackson
Street Address:
City:
State:
Zip:
Submittal Date: Mon Aug 16 16:47:47 EDT 2021
Committee: NEC-P13

Public Comment No. 2190-NFPA 70-2021 [Section No. 750.6]

750.6 Listing.

Energy management systems shall be listed under one of the following conditions:

(1) Listed as a complete energy management system

(2) Listed as a kit for field installation in switch or overcurrent device enclosures

(3) Identified as a recognized component of a field-installed accessory kit as part of the listed equipment, or designed under engineering supervision

Statement of Problem and Substantiation for Public Comment

Listing can't be the only solution for determining what equipment complies with the safety concerns of this article. Energy Management Systems (or Power Control Systems) may limit current across busbars and conductors through signaling. If there is more potential current being provided by DERs and the service across a busbar or conductor than its rated ampacity, monitoring devices will signal the current levels to a control system and the control system will signal to loads or power sources to reduce the total power at that point. In many cases, this can be accomplished by devices that have been tested in advance to behave this way together. But many control systems have to coordinate components from different manufacturers, possibly installed at different times, and it isn't practical, or even feasible, to test most of these configurations in advance. Nor should we create a compliance situation that regularly demands the added expense of field testing under a UL standard (if this is even possible); the only outcome of the additional administrative burden will be to disallow perfectly viable custom solutions, rather than to institute standards which ensure their safety.

Listing is a process for testing components as they are manufactured. It's not an appropriate vehicle for engineering heterogeneous components being connected in the field. There should be a dispensation for qualified personnel to design and install custom control systems that can limit current to busbars and conductors under whatever conditions the CMP deems appropriate. Utilizing certified components within such customized solutions is certainly attainable, but no certification regime exists today to encompass the entire system. The common practice utilized today to design EMSs (or PCSs) for non-residential buildings would be negated if the only options for compliance include listing. The NEC allows for deference to engineering supervision in limited cases, and this area of controls is an area where such an allowance is definitely needed.

This public comment was developed with and is supported by the following parties:
Jeffrey Quackenbush (submitter of initial Public Input 4389 on 705.13)
Brian Lydic – IREC
Anthony Johnson - Ageto Energy

Related Item

• Public Input 4389 on 705.13

Submitter Information Verification

Submitter Full Name: Justine Sanchez
Organization: Mayfield Renewables
Street Address:
City:
State:
Zip:
Submittal Date: Thu Aug 19 16:12:22 EDT 2021
Committee: NEC-P13

Public Comment No. 1037-NFPA 70-2021 [Section No. 750.30]

750.30 Load and Source Management.

Energy management systems shall be permitted to monitor and control electrical loads ~~unless restricted~~ and sources in accordance with 750.30(A) through (C).

(A) Load Shedding Controls.

An energy management system shall not override the load shedding controls put in place to ensure the minimum electrical capacity for the following:

(1) Fire pumps

(2) Emergency systems

(3) Legally required standby systems

(4) Critical operations power systems

(B) Disconnection of Power.

An energy management system shall not ~~be permitted to~~ cause disconnection of power to the following:

(1) Elevators, escalators, moving walks, or stairway lift chairs

(2) Positive mechanical ventilation for hazardous (classified) locations

(3) Ventilation used to exhaust hazardous gas or reclassify an area

(4) Circuits supplying emergency lighting

(5) Essential electrical systems in health care facilities

(C) Capacity of Branch Circuit, Feeder, or Service.

An energy management system shall not cause a branch circuit, feeder, or service to be overloaded ~~at any time.~~ . If an EMS is used to limit the current on a conductor, 750.30(C)(1) through (C)(4) shall apply:

(1) Current setpoint. A single value equal to the maximum ampere setpoint of the EMS shall be permitted for one or more of the following.

(2) For calculating the connected load per 220.70.

(3) For the maximum source current permitted by EMS control.

(4) System malfunction. The EMS shall use monitoring and controls to automatically cease current flow upon malfunction of the EMS.

(5) Settings. Adjustable settings shall be permitted if access to the settings are accomplished by at least one of the following:

(6) Located behind removable and sealable covers over the adjustment means

(7) Located behind a cover or door that requires the use of a tool to open

(8) Located behind locked doors accessible only to qualified personnel

(9) Password protected with password accessible only to qualified personnel

(10) Software that has password protected access to the adjusting means accessible to qualified personnel only

(11) Marking. The equipment that supplies the branch circuit, feeder or service shall be field marked with the following information:

(12) Maximum current setting

(13) Date of calculation and setting

(14) identification of loads and sources associated with the current limiting feature

(15) The following or equivalent wording: "The setting for the EMS current limiting feature shall not be bypassed"

The markings shall meet the requirements in 110.21(B) and shall be located such that they are clearly visible to qualified persons before examination, adjustment, servicing, or maintenance of the equipment.

Statement of Problem and Substantiation for Public Comment

This public comment is submitted on behalf of the Energy Management Task Group formed under the direction of the Correlating Committee to review all current and proposed definitions and requirements related to load management, load management system, power control system, energy management system and related terms to ensure a coordinated approach throughout the Code. See CCN-279.

The task group members are; Chad Kennedy (Chair), Tim Zgonena, Rebekah Hren, Greg Ball, Jason Fisher, Doug Burkett, Robert Jordan, Matthew Grover, Tim Windey, Karl Reighard, and Brian Baughman. This task group of balanced interests provided the expertise to develop

these public comments covering energy management across the NEC.

Technical Substantiation:
References to sources as well as loads are added to this section in keeping with the definition of an EMS. The text "be permitted to" in (B) was removed to comply with Section 3.3.1.4 of the NEC Style Manual and improve the clarity of this section. The phrase "at any time" has been struck for lacking sufficient clarity to be uniformly applied. With the new addition of 705.6 requiring listings for all EMS, any allowable time periods related to the product's performance are located in the relevant standard. The remaining new language in (C) has been moved and assembled here by this task group from other sections in this Code. Significant discussion among all representative interests and a selection of related Technical Committee members resulted in this new language. Requirements from multiple sections in other articles are replaced by these changes. This new language would consolidate all these related sections into a single set of requirements located within the appropriate Article 750 whose scope covers EMS. This will allow for greater consistency when applying this Code among all users and applications.

Related TG PCs:
220.70, 625.42, 705.13, 705.80

This public comment is part of a series of actions recommended by the task group. See the related public comments which complete this action.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 36-NFPA 70-2021 [Definition: Energy Management System.]	
Public Comment No. 1034-NFPA 70-2021 [Definition: Load Management System.]	
Public Comment No. 1036-NFPA 70-2021 [Definition: Load Management.]	
Public Comment No. 1039-NFPA 70-2021 [Section No. 220.70]	
Public Comment No. 1041-NFPA 70-2021 [Section No. 625.42(A)]	
Public Comment No. 1042-NFPA 70-2021 [Section No. 625.42(B)]	
Public Comment No. 1043-NFPA 70-2021 [Section No. 705.13]	
Public Comment No. 1044-NFPA 70-2021 [Section No. 705.46]	
Public Comment No. 1045-NFPA 70-2021 [Section No. 700.4(C)]	
Public Comment No. 1046-NFPA 70-2021 [Section No. 701.4(C)]	
Public Comment No. 1047-NFPA 70-2021 [Section No. 702.4(B)]	
Public Comment No. 1048-NFPA 70-2021 [Section No. 708.22(B)]	
Public Comment No. 1049-NFPA 70-2021 [Section No. 705.80]	
Public Comment No. 1050-NFPA 70-2021 [Section No. 705.28(A)]	
Public Comment No. 1052-NFPA 70-2021 [Section No. 705.11(A)(1)]	
Public Comment No. 1053-NFPA 70-2021 [Section No. 705.12 [Excluding any Sub-Sections]]	
Public Comment No. 1406-NFPA 70-2021 [Section No. 230.82]	
Public Comment No. 36-NFPA 70-2021 [Definition: Energy Management System.]	
Public Comment No. 1034-NFPA 70-2021 [Definition: Load Management System.]	
Public Comment No. 1036-NFPA 70-2021 [Definition: Load Management.]	
Public Comment No. 1039-NFPA 70-2021 [Section No. 220.70]	
Public Comment No. 1041-NFPA 70-2021 [Section No. 625.42(A)]	
Public Comment No. 1042-NFPA 70-2021 [Section No. 625.42(B)]	
Public Comment No. 1043-NFPA 70-2021 [Section No. 705.13]	
Public Comment No. 1044-NFPA 70-2021 [Section No. 705.46]	
Public Comment No. 1045-NFPA 70-2021 [Section No. 700.4(C)]	
Public Comment No. 1046-NFPA 70-2021 [Section No. 701.4(C)]	
Public Comment No. 1047-NFPA 70-2021 [Section No. 702.4(B)]	
Public Comment No. 1048-NFPA 70-2021 [Section No. 708.22(B)]	
Public Comment No. 1049-NFPA 70-2021 [Section No. 705.80]	
Public Comment No. 1050-NFPA 70-2021 [Section No. 705.28(A)]	
Public Comment No. 1052-NFPA 70-2021 [Section No. 705.11(A)(1)]	
Public Comment No. 1053-NFPA 70-2021 [Section No. 705.12 [Excluding any Sub-Sections]]	
Public Comment No. 1406-NFPA 70-2021 [Section No. 230.82]	

Related Item

- CN-279

Submitter Information Verification

Submitter Full Name: Chad Kennedy
Organization: Schneider Electric
Street Address:

City:	
State:	
Zip:	
Submittal Date:	Thu Aug 05 21:29:22 EDT 2021
Committee:	NEC-P13

Public Comment No. 91-NFPA 70-2021 [New Part after IV.]

NEC 700.12(I) NETWORK SWITCHES FOR POE EMERGENCY LIGHTING

(1) The switch that serves the emergency egress lighting will be dedicated to emergency egress lighting, no other devices shall be connected to the switch or any other downstream component connected to the network switch.

(2) The switch that serves the emergency egress lighting will be physically separate from all other systems, either in a locked rack or in another space altogether.

(3) The switch shall include a "time to energize" inscription on the nameplate indicating the number of seconds the switch takes to energize and provide power to the light fixtures after power is applied.

(4) The firmware of the switch shall comply with all the following requirements:

(5) The switch shall be designed to prevent Remote Access and Administration. The switch can only be configured through physically connecting to the switch.

(6) The switch should only be allowed software access through a form of Multi-Factor Authentication.

(7) The switch shall be designed such that adding a new device to a downstream connection results in that device not being operational without reconfiguring the switch.

(8) The firmware of the switch should only allow a firmware upgrade of to a new, listed cryptographically signed by the switch manufacturer (minimum of AES-256 bit encryption) firmware version, preventing generic firmware from being applied to the switch.

(9) Informational Note: The reason for the above firmware requirements are to reduce the possibility of an untrained Network Administrator or an untrained Telecommunication installer from accidentally effecting the function of the emergency egress lighting system. Since Network Administrators, Telecommunication installers, and other non-Electrician personal may be adjusting the network topology of the system, frameworks shall be in place within the software of the system to reduce the possibility of accidentally effecting the emergency egress lighting systems.

(10) The wiring to the light fixtures shall meet the requirements of physical separation per this article. The sheething of the wire shall be marked in one of two ways below:

(11) Written indication that it is for emergency egress lighting only marked at the same interval as the listing requirements of the cable;

(12) The cable shall be a different color from all other network cables. The color shall be consistent throughout a facility.

Additional Proposed Changes

File Name	Description	Approved
NEC_700_-_PoE_Network_Switch_-_additional_explination.pdf		

Statement of Problem and Substantiation for Public Comment

With the rapid development of Power over Ethernet (PoE) lighting I am concerned about the code-effects around emergency egress lighting in both hospitals and buildings. I am hoping to provide some guidelines around the minimum requirements for network deployed emergency egress lighting to ensure public safety is maintained as these systems are rapidly deployed.

Please note: I submitted this to the NEC 517.30(C)(6) section also.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 92-NFPA 70-2021 [New Section after 517.30(D)]	

Related Item

• 700.12

Submitter Information Verification

Submitter Full Name: Paul Erskine
Organization: [Not Specified]
Street Address:
City:
State:

Zip:	
Submittal Date:	Thu Jul 01 18:53:25 EDT 2021
Committee:	NEC-P13

To whom it may concern,

With the rapid development of Power over Ethernet (PoE) lighting I am concerned about the code-effects around emergency egress lighting in both hospitals and buildings.

The reason for my concern around these switches is due to the stability of networks from firmware upgrades and configurations. There are many stories over the last several years about network admins misapplying network configurations and taking down portions of the internet, such as the stories below. This is not intended to blame Network Admins, but they are not trained in the NEC and they may not even know what they are affecting. These are only stories because of the scale of the effect, we never hear about the building-wide or office-wide issue in the news.

- 2021-06-08: Internet outage impacts websites and apps around the world: Live updates (cnn.com). From the story: So what exactly happened? Fastly said it had identified a service configuration that triggered disruptions across its servers. The company has disabled that configuration.
  Link: https://edition.cnn.com/world/live-news/internet-outage-websites-apps-world-intl/index.html

- 2020-07-18: Much Of The Internet Went Down Yesterday: Here's The Reason Why (forbes.com). From the story: The outage…was caused by human error. …and the subsequent internet outages, was "a configuration error in our backbone network."
  Link: https://www.forbes.com/sites/daveywinder/2020/07/18/internet-down-human-error-not-cyber-attack-to-blame-says-cloudflare/

- 2016-11-07: BGP errors are to blame for Monday's Twitter outage, not DDoS attacks | CSO Online. From the story: Early Monday morning, an engineer somewhere likely re-configured a router and accidentally removed the path to Twitter.com (AS13414) entirely.
  Link: https://www.csoonline.com/article/3138934/bgp-errors-are-to-blame-for-monday-s-twitter-outage-not-ddos-attacks.html

The intent of this upload is to provide a beginning concept for regulating PoE lighting when it involves emergency egress, life safety, or critical branch power. I understand this is not currently written exactly how code is written, but I am hoping the committee can adjust to make it appropriate.

Thank you for your consideration of this. Please let me know any questions.

Public Comment No. 193-NFPA 70-2021 [Definitions (100): Grounded, F... to Grounded, F...]

Definitions (100): Grounded, F... to Grounded, F...

Grounded, Functionally. (Functionally Grounded) - As applied to Direct Current Microgrids

A system that has an electrical ground reference for operational purposes that is not solidly grounded. (712) (CMP-13)

Informational Note: Examples of operational reasons for functionally grounded systems include ground-fault detection and performance-related issues for some power sources.

Grounded, Functionally. (Functionally Grounded) - As applied to Photovoltaic Systems

A system that has an electrical ground reference for operational purposes that is not solidly grounded. (CMP-4)

Informational Note: A functionally grounded system is often connected to ground through an electronic means internal to an inverter or charge controller that provides ground-fault protection. Examples of operational purposes for functionally grounded systems include ground-fault detection and performance-related issues for some power sources.

Statement of Problem and Substantiation for Public Comment

Having 2 definitions here will likely cause confusion. For the definitions for things such as accessible, we have long had an Accessible - As Applied To Equipment and an Accessible - As Applied To Wiring Methods. Or, for a defined word that means something different when applied to a specific article, Conductor, Insulated (as applied to messenger supported wiring).

It would seem prudent for the NEC to keep this convention for all definitions.

Related Item

• Committee Input No. 8495-NFPA 70-2021 [Article 100 [Excluding any Sub-Sections]]

Submitter Information Verification

Submitter Full Name: Josh Weaver
Organization: Not Applicable
Street Address:
City:
State:
Zip:
Submittal Date: Sat Jul 10 21:01:29 EDT 2021
Committee: NEC-P04

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Public Comment No. 666-NFPA 70-2021 [Global Input]

The Correlating Committee directs the panel to review the reference to Article 450 in 724.40(A) for compliance in accordance with section 4.1.1 of the NEC Style Manual. It is not necessary to repeat requirements in Chapter 4.

The Correlating Committee directs the panel to review references to entire "Articles" and revise in accordance with section 4.1.4 of the NEC Style Manual.

The Correlating Committee directs the panel to reconsider the deleted text in 725.41 (B) for correlation with 300.3(C)(1) and the impact on these circuits occupying the same enclosure or raceway.

The Correlating Committee directs that FR-9591 be sent to CMP-3, CMP-11, CMP-9, CMP-12, CMP-13, CMP-18 for information.

The Correlating Committee directs that the Panel review the elimination of 725.41 (B) as it appears to have eliminated the ability to mix full voltage remote control and signaling circuits with Class 1.

The Correlating Committee further requests clarity with regard to the use and application of the terms remote-control, branch circuit and signaling circuit, branch circuit as it applies to the revisions in this new article that were formerly located in Part II of Article 725.

Additional Proposed Changes

File Name	Description	Approved
3_CN_368_Global.pdf	3 CN368	✓

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 368 appeared in the First Draft Report on First Revision No. 9591.

The Correlating Committee directs the panel to review the reference to Article 450 in 724.40(A) for compliance in accordance with section 4.1.1 of the NEC Style Manual. It is not necessary to repeat requirements in Chapter 4.

The Correlating Committee directs the panel to review references to entire "Articles" and revise in accordance with section 4.1.4 of the NEC Style Manual.

The Correlating Committee directs the panel to reconsider the deleted text in 725.41 (B) for correlation with 300.3(C)(1) and the impact on these circuits occupying the same enclosure or raceway.

The Correlating Committee directs that FR-9591 be sent to CMP-3, CMP-11, CMP-9, CMP-12, CMP-13, CMP-18 for information.

The Correlating Committee directs that the Panel review the elimination of 725.41 (B) as it appears to have eliminated the ability to mix full voltage remote control and signaling circuits with Class 1.

The Correlating Committee further requests clarity with regard to the use and application of the terms remote-control, branch circuit and signaling circuit, branch circuit as it applies to the revisions in this new article that were formerly located in Part II of Article 725.

Related Item

• First Revision No. 9591

Submitter Information Verification

Submitter Full Name: CC on NEC-AAC
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:
Submittal Date: Tue Aug 03 09:02:36 EDT 2021
Committee: NEC-P03

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Public Comment No. 715-NFPA 70-2021 [Definition: Interactive Mode.]

Interactive Mode.

The operating mode for power production equipment that is operating in parallel with and capable of delivering energy to an electric power production and distribution network or other primary source. (CMP-4)

Additional Proposed Changes

File Name	Description	Approved
4_CN_410.pdf	70_CN410	✓

Statement of Problem and Substantiation for Public Comment

The following CC Note No. 410 appeared in the First Draft Report on First Revision No. 9347.

The Correlating Committee directs the panel to consider how this term is applied to systems in multiple articles as well as describing an operational state for individual equipment such as an inverter. The panel should consider including an informational note which clarifies that an interactive mode may be part of either interactive equipment, or of an interactive system.
This note is sent to CMP 12 and CMP 13 for information.

Related Item

• First Revision No. 9347

Submitter Information Verification

Submitter Full Name: CC on NEC-AAC
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:
Submittal Date: Tue Aug 03 13:31:01 EDT 2021
Committee: NEC-P04

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Public Comment No. 759-NFPA 70-2021 [Global Input]

**Align alternate energy source articles per Mr. Domisovich's suggestion and the CMP's clarification.
I do urge, in addition, that they be grouped under an overall Chapter or subchapter.**

Statement of Problem and Substantiation for Public Comment

Usability

Related Item

• PI 4685

Submitter Information Verification

Submitter Full Name: David Shapiro
Organization: Safety First Electrical
Street Address:
City:
State:
Zip:
Submittal Date: Wed Aug 04 03:11:45 EDT 2021
Committee: NEC-P04

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Public Comment No. 896-NFPA 70-2021 [Global Input]

The Correlating Committee directs all panels to change the Section titles pertaining to reconditioning to "Reconditioned Equipment." and relocate the requirements to Section XXX.2 of the article if available or other section near the beginning of the article. If an article has multiple sections the panel should consider combining all reconditioning sections into subdivisions of XXX.2.

Additional Proposed Changes

File Name	Description	Approved
CN_259_Global.pdf	70_CN259	✓

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 259 appeared in the First Draft Report.

The Correlating Committee directs all panels to change the Section titles pertaining to reconditioning to "Reconditioned Equipment." and relocate the requirements to Section XXX.2 of the article if available or other section near the beginning of the article. If an article has multiple sections the panel should consider combining all reconditioning sections into subdivisions of XXX.2.

Related Item

• Correlating Note No. 259

Submitter Information Verification

Submitter Full Name: CC on NEC-AAC
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:
Submittal Date: Wed Aug 04 15:45:37 EDT 2021
Committee: NEC-P01

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Public Comment No. 897-NFPA 70-2021 [Global Input]

The Correlating Committee requests that Panels 3, 7, 8, 9, 12, 13, 15, 16 and 18 reconsider the text "shall not be permitted to be" for clarification and ease of use. Simplifying the text to state "shall not be" is suggested as an alternative.

Additional Proposed Changes

File Name	Description	Approved
CN_260_Global.pdf	70_CN260	✓

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 26 appeared in the First Draft Report.

The Correlating Committee requests that Panels 3, 7, 8, 9, 12, 13, 15, 16 and 18 reconsider the text "shall not be permitted to be" for clarification and ease of use. Simplifying the text to state "shall not be" is suggested as an alternative.

Related Item

- Correlating Note No. 260

Submitter Information Verification

Submitter Full Name: CC on NEC-AAC
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:
Submittal Date: Wed Aug 04 15:47:24 EDT 2021
Committee: NEC-P03

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Public Comment No. 1025-NFPA 70-2021 [Definition: Health Care Microgrid.]

Health Care Microgrid.

A group of interconnected loads and distributed energy resources within clearly defined boundaries that acts as a single controllable entity with respect to the utility. [**99:**3.3.75] (517) (CMP-15)

Additional Proposed Changes

File Name	Description	Approved
15_CN_306_Detail.pdf	70_CN306	✓

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 306 appeared in the First Draft Report on First Revision No. 8062.

A task group is established consisting of members from CMPs 4, 13 and 15 to review all current and proposed definitions and requirements related for microgrids. General requirements that apply to all microgrid installations should be located within Article 705 for consistency and usability. CMP 13 should consider removing the definition of "DC Microgrid" and Article 712 based on the review of requirements in Article 705. CMP 15 should reconsider the use of the term and requirements for "Health Care Microgrids" in Article 517 and remove requirements which are redundant to those within Article 705.

Related Item

• First Revision No. 8062

Submitter Information Verification

Submitter Full Name: CC on NEC-AAC
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:
Submittal Date: Thu Aug 05 20:05:12 EDT 2021
Committee: NEC-P15

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Public Comment No. 1034-NFPA 70-2021 [Definition: Load Management System.]

~~**Load Management System.**~~

~~Associated interconnected equipment that will actively regulate the individual loads via load control equipment such that the total load on the electrical supply system stays below a given maximum permitted total value. The system performs the task of load management. (625) (CMP-12)~~

~~Informational Note: Load control equipment consists of equipment or modules within a piece of equipment that communicate with individual loads and other load control equipment within a load management system to manage the total load on the electrical supply system. The communications between load control equipment, as well as the implementation of the control process, may be achieved through hardware, software, or a combination of both.~~

Statement of Problem and Substantiation for Public Comment

This public comment is submitted on behalf of the Energy Management Task Group formed under the direction of the Correlating Committee to review all current and proposed definitions and requirements related to load management, load management system, power control system, energy management system and related terms to ensure a coordinated approach throughout the Code. See CCN-279.

The task group members are; Chad Kennedy (Chair), Tim Zgonena, Rebekah Hren, Greg Ball, Jason Fisher, Doug Burkett, Robert Jordan, Matthew Grover, Tim Windey, Karl Reighard, and Brian Baughman. This task group of balanced interests provided the expertise to develop these public comments covering energy management across the NEC.

The definition of "Load Management System" is removed from the Code, as it is redundant with the definition of Energy Management System and the requirements of Article 750.

This public comment is part of a series of actions recommended by the task group. See the related public comments which complete this action.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 36-NFPA 70-2021 [Definition: Energy Management System.]	
Public Comment No. 1036-NFPA 70-2021 [Definition: Load Management.]	
Public Comment No. 1039-NFPA 70-2021 [Section No. 220.70]	
Public Comment No. 1041-NFPA 70-2021 [Section No. 625.42(A)]	
Public Comment No. 1042-NFPA 70-2021 [Section No. 625.42(B)]	
Public Comment No. 1045-NFPA 70-2021 [Section No. 700.4(C)]	
Public Comment No. 1046-NFPA 70-2021 [Section No. 701.4(C)]	
Public Comment No. 1047-NFPA 70-2021 [Section No. 702.4(B)]	
Public Comment No. 1052-NFPA 70-2021 [Section No. 705.11(A)(1)]	
Public Comment No. 1053-NFPA 70-2021 [Section No. 705.12 [Excluding any Sub-Sections]]	
Public Comment No. 1043-NFPA 70-2021 [Section No. 705.13]	
Public Comment No. 1050-NFPA 70-2021 [Section No. 705.28(A)]	
Public Comment No. 1044-NFPA 70-2021 [Section No. 705.46]	
Public Comment No. 1048-NFPA 70-2021 [Section No. 708.22(B)]	
Public Comment No. 1049-NFPA 70-2021 [Section No. 705.80]	
Public Comment No. 1037-NFPA 70-2021 [Section No. 750.30]	
Public Comment No. 1406-NFPA 70-2021 [Section No. 230.82]	

Related Item

• CN 279

Submitter Information Verification

Submitter Full Name: Chad Kennedy
Organization: Schneider Electric
Street Address:
City:
State:
Zip:
Submittal Date: Thu Aug 05 21:05:07 EDT 2021
Committee: NEC-P12

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Public Comment No. 1469-NFPA 70-2021 [Definition: Health Care Microgrid.]

~~**Health Care Microgrid.**~~

~~A group of interconnected loads and distributed energy resources within clearly defined boundaries that acts as a single controllable entity with respect to the utility. [**99:** 3.3.75] (517) (CMP-15)~~

Statement of Problem and Substantiation for Public Comment

Term is deleted as redundant with the global defined term in 100 for microgrid. With the changes made in the related comments, the deleted term is no longer used in the mandatory text of this Code. The term “microgrid” remains defined in article 100 and the general requirements for microgrids remain in 705. NFPA-99 and NFPA-70 article 517 give additional constraints on the installation of microgrids to supply health care facilities.

This public comment is submitted on behalf of the task group formed under the direction of the Correlating Committee to review all current and proposed definitions and requirements related to microgrids to ensure a clear, consistent, and coordinated approach to addressing this topic throughout the Code.
The task group members are; Jason Fisher Chair, Brenton Michael Fedele, Ted Smith, Isaac Opalinsky, Pete Jackson, Jason Hopkins, John Kovacik, Steven Froemming, Krista Biason, Greg Ball, Chad Beebe, and Matthew Dozier. Through these individual's technical committee memberships, and their balanced interests, this task group provided the expertise to develop these public comments covering microgrids across the NEC.

This public comment is part of a series of actions recommended by the task group. See the related public comments which complete this action.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 1467-NFPA 70-2021 [Section No. 517.30(B)]	Replacement of term in 517.30(B)
Public Comment No. 1468-NFPA 70-2021 [Section No. 517.30(C)(5)]	Replacement of term in 517.30(C)(5)

Related Item

- FR-8062

Submitter Information Verification

Submitter Full Name: Jason Fisher
Organization:
Affiliation: CC Second Draft Microgrid Task Group
Street Address:
City:
State:
Zip:
Submittal Date: Fri Aug 13 17:47:55 EDT 2021
Committee: NEC-P15

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Public Comment No. 1782-NFPA 70-2021 [Definition: Health Care Microgrid.]

Health Care Microgrid.

A group of interconnected loads and distributed energy resources within clearly defined boundaries that acts as a single controllable entity with respect to the ~~utility.~~ Normal Source and/or Essential Source for Health Care Facilities. At a minimum the Health Care Microgrid shall consist of (1) Distributed Energy Resources (DER's) and a Microgrid Controll System and includes the avility to disconnectfromthe primary source and operate in island mode. [**99:**3.3.75] (517) (CMP-15)

Statement of Problem and Substantiation for Public Comment

Clarification of what a healthcare microgrid is and introduction of the concept that if configured correctly, that a microgrid could be use as an Essential Source.

Related Item

• FR-8062, FR-9359, FR-9360 & Public Comment 1782

Submitter Information Verification

Submitter Full Name: Jamie Schnick
Organization: Office of Statewide Health Planning and Development (OSHPD) - California
Affiliation: Facilities Development Division
Street Address:
City:
State:
Zip:
Submittal Date: Tue Aug 17 18:39:12 EDT 2021
Committee: NEC-P15

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Public Comment No. 1961-NFPA 70-2021 [Global Input]

The Correlating Committee directs all panels to review all references to Article 722 under their purview. Class 1 system in Article 725 has been relocated to Article 722. Each panel shall appoint a task group to review all necessary references to verify their accuracy and submit public comments where necessary.

Additional Proposed Changes

File Name	Description	Approved
CN_375_Global.pdf	70_CN375	✓

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 375 appeared in the First Draft Report.

The Correlating Committee directs all panels to review all references to Article 722 under their purview. Class 1 system in Article 725 has been relocated to Article 722. Each panel shall appoint a task group to review all necessary references to verify their accuracy and submit public comments where necessary.

Related Item

• Correlating Note No. 375

Submitter Information Verification

Submitter Full Name: CC on NEC-AAC
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:
Submittal Date: Wed Aug 18 20:37:05 EDT 2021
Committee: NEC-P16

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Public Comment No. 1964-NFPA 70-2021 [Global Input]

The Correlating Committee accepts the action taken by CMP 6 to create new Article 315 (FR 8616).

The Correlating Committee advises that article scope statements are the responsibility of the Correlating Committee and the Correlating Committee accepts the panel action.

The Correlating Committee directs all panels to review all references to Article 311 under their purview. Article 311 has been relocated to Article 315. Each panel shall appoint a task group to review all necessary references to verify their accuracy and submit Public Comments where necessary.

Additional Proposed Changes

File Name	Description	Approved
CN_390_Global.pdf	70_CN390	✓

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 390 appeared in the First Draft Report.

The Correlating Committee accepts the action taken by CMP 6 to create new Article 315 (FR 8616).

The Correlating Committee advises that article scope statements are the responsibility of the Correlating Committee and the Correlating Committee accepts the panel action.

The Correlating Committee directs all panels to review all references to Article 311 under their purview. Article 311 has been relocated to Article 315. Each panel shall appoint a task group to review all necessary references to verify their accuracy and submit Public Comments where necessary.

Related Item

• Correlating Note No. 390

Submitter Information Verification

Submitter Full Name: CC on NEC-AAC
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:
Submittal Date: Wed Aug 18 20:44:11 EDT 2021
Committee: NEC-P06

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