

**Public Comment No. 824-NFPA 70-2021 [Global Input]**

The Correlating Committee directs the Chair of CMP-18 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

<u>File Name</u>	<u>Description Approved</u>
18_CN_367_Global.pdf	70_CN367

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 367 appeared in the First Draft Report on First Revision No. 7641.

The Correlating Committee directs the Chair of CMP-18 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. 7641

Submitter Information Verification

Submitter Full Name: CC on NEC-AAC

Organization: NEC Correlating Committee

Street Address:

City:

State:

Zip:

Submittal Date: Wed Aug 04 12:51:48 EDT 2021

Committee: NEC-P18

**Correlating Committee Note No. 367-NFPA 70-2021 [Global Input]****Supplemental Information**

<u>File Name</u>	<u>Description Approved</u>
NEC_P18_Definitions_TG_Attachment_CN367.docx	

Submitter Information Verification**Committee:** NEC-P18**Submittal Date:** Thu May 06 22:46:36 EDT 2021**Committee Statement**

Committee Statement: The Correlating Committee directs the Chair of CMP-18 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. 7641-NFPA 70-2020 [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. 1531-NFPA 70-2021 [Definition: Attachment Fitting, Weight Supporting (WSAF).]****Attachment Fitting, Weight_ Supporting (WSAF).**

A device that, by insertion into a weight_ supporting ceiling receptacle, establishes a connection between the conductors of the attached utilization equipment and the branch-circuit conductors connected to the weight_ supporting ceiling receptacle. (CMP-18)

Informational Note No 1 : A weight_ supporting attachment fitting is different from an attachment plug because no cord is associated with the fitting. A weight_ supporting attachment fitting in combination with a weight_ supporting ceiling receptacle secures the associated utilization equipment in place and supports its weight.

Informational Note No. 2: See ANSI/NEMA WD 6 "American National Standard for Wiring Devices - Dimensional Specifications", for the standard configuration of weight-supporting attachment fittings and related weight-supporting ceiling receptacles.

Statement of Problem and Substantiation for Public Comment

This informational note is being added to provide reference information to users that weight-supporting attachments fittings and related weight-supporting ceiling receptacles now have a standard configuration established in ANSI/NEMA WD 6, "American National Standard for Wiring Devices – Dimensional Specifications", just as do attachment plugs and related types of receptacles. These devices are designated in the standard as:

WS3-50R, WS3-50AF for three poles, WS4-50R and WS4-50AF for four poles; and

WS3-70R, WS3-70AF for three poles, WS4-70R and WS4-70AF for four poles

These identifiers designate the special configuration of "weight-supporting", the weight rating (50- or 70- pounds), and the application as a "receptacle" or the "attachment fitting". These devices being relatively new to the electrical and lighting industry creates the need in the NEC for the information provided in the informational note so users can find the specific characteristics of these devices.

Editorially, a dash was added between "weight" and "supporting" for consistency within the Code.

Related Item

- FR 7637

Submitter Information Verification

Submitter Full Name: Megan Hayes

Organization: Nema

Street Address:

City:

State:

Zip:

Submittal Date: Mon Aug 16 11:25:05 EDT 2021

Committee: NEC-P18

**Public Comment No. 1667-NFPA 70-2021 [Definition: Attachment Fitting, Weight Supporting (WSAF).]****Attachment Fitting, Weight Supporting (Weight Supporting Attachment Fitting) (WSAF).**

A device that, by insertion into a weight supporting ceiling receptacle, establishes a connection between the conductors of the attached utilization equipment and the branch-circuit conductors connected to the weight supporting ceiling receptacle. (CMP-18)

Informational Note: A weight supporting attachment fitting is different from an attachment plug because no cord is associated with the fitting. A weight supporting attachment fitting in combination with a weight supporting ceiling receptacle secures the associated utilization equipment in place and supports its weight.

Statement of Problem and Substantiation for Public Comment

This comment was prepared by a CMP-18 Definitions Task Group consisting of the following members: B. Fahey, C. Kurten, F. Carpenter, J. Potter, M. O'Boyle, P. Costello, R. Wright, R. Alley. Pursuant to the Technical Correlating Committee direction, the task group reviewed this definition and recommend the suggested changes to align the definition with the NEC Style Manual.

Related Item

- FR-7637-NFPA 70-2020

Submitter Information Verification

Submitter Full Name: Frederick Carpenter

Organization: Acuity Brands Lighting

Street Address:

City:

State:

Zip:

Submittal Date: Tue Aug 17 07:24:10 EDT 2021

Committee: NEC-P18

**Public Comment No. 563-NFPA 70-2021 [Definition: Attachment Fitting, Weight Supporting (WSAF).]****Attachment Fitting, Weight Supporting (WSAF).**

A device that, by insertion into a weight-supporting ceiling receptacle, establishes a connection between the conductors of the attached utilization equipment and the branch-circuit conductors connected to the weight supporting ceiling receptacle. (CMP-18)

Informational Note No.1 : A weight supporting attachment fitting is different from an attachment plug because no cord is associated with the fitting. A weight supporting attachment fitting in combination with a weight supporting ceiling receptacle secures the associated utilization equipment in place and supports its weight.

Informational Note No.2: See ANSI/NEMA WD 6 "American National Standard for Wiring Devices — Dimensional Specifications", for the standard configuration of weigh-supporting attachment fittings and related weight-supporting ceiling receptacles.

Additional Proposed Changes

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
Public_Comment_WSAF_Definitions_Draft_FNL.docx	Comment Code text and substantiation provided for clarity to CMP members.	

Statement of Problem and Substantiation for Public Comment

This informational note is being added to provide reference information to users that weight-supporting attachments fittings and related weight-supporting ceiling receptacles now have a standard configuration established in ANSI/NEMA WD 6, "American National Standard for Wiring Devices – Dimensional Specifications", just as do attachment plugs and related types of receptacles. These devices are designated in the standard as:

WS3-50R, WS3-50AF for three poles, WS4-50R and WS4-50AF for four poles; and

WS3-70R, WS3-70AF for three poles, WS4-70R and WS4-70AF for four poles

These identifiers designate the special configuration of "weight-supporting", the weight rating (50- or 70- pounds), and the application as a "receptacle" or the "attachment fitting". These devices being relatively new to the electrical and lighting industry creates the need in the NEC for the information provided in the informational note so users can find the specific characteristics of these devices.

Editorially, a dash was added between "weight" and "supporting" for consistency within the Code.

Related Item

- FR 7637

Submitter Information Verification

Submitter Full Name: Charles Mello

Organization: Cdcmello Consulting LLC

Affiliation: Submitted on behalf of Sky Technologies

Street Address:

City:

State:

Zip:

Submittal Date: Fri Jul 30 14:43:38 EDT 2021

Committee: NEC-P18

PUBLIC COMMENT TO FR 7637 (CMP 18)

Attachment Fitting, Weight-Supporting (WSAF).

A device that, by insertion into a weight-supporting ceiling receptacle, establishes a connection between the conductors of the attached utilization equipment and the branch-circuit conductors connected to the weight-supporting ceiling receptacle. (CMP-18)

Informational Note No. 1: A weight-supporting attachment fitting is different from an attachment plug because no cord is associated with the fitting. A weight-supporting attachment fitting in combination with a weight-supporting ceiling receptacle secures the associated utilization equipment in place and supports its weight.

Informational Note No. 2: See ANSI/NEMA WD 6 “American National Standard for Wiring Devices — Dimensional Specifications”, for the standard configuration of weight-supporting attachment fittings and related weight-supporting ceiling receptacles.

Substantiation

This informational note is being added to provide reference information to users that weight-supporting attachment fittings and related weight-supporting ceiling receptacles now have a standard configuration established in ANSI/NEMA WD 6, “American National Standard for Wiring Devices – Dimensional Specifications”, just as do attachment plugs and related types of receptacles. These devices are designated in the standard as:

WS3-50R, WS3-50AF for three poles, WS4-50R and WS4-50AF for four poles; and

WS3-70R, WS3-70AF for three poles, WS4-70R and WS4-70AF for four poles

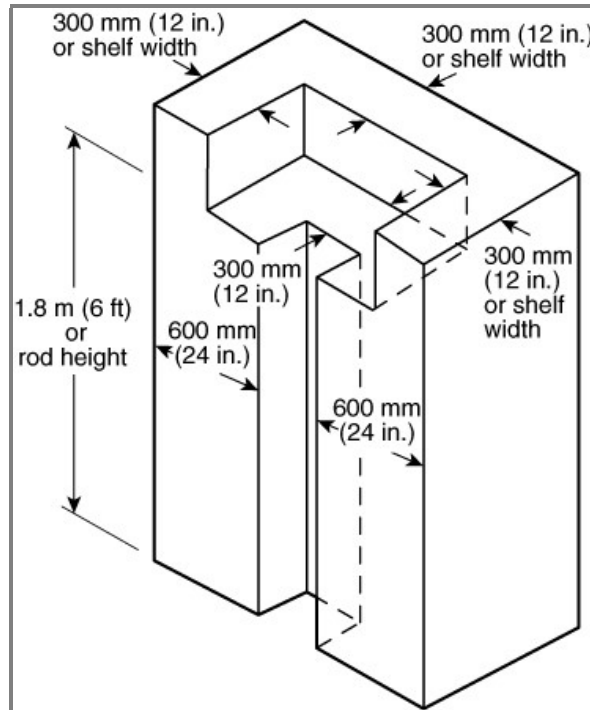
These identifiers designate the special configuration of “weight-supporting”, the weight rating (50- or 70-pounds), and the application as a “receptacle” or the “attachment fitting”. These devices being relatively new to the electrical and lighting industry creates the need in the NEC for the information provided in the informational note so users can find the specific characteristics of these devices.

Editorially, a dash was added between “weight” and “supporting” for consistency within the Code.

**Public Comment No. 1187-NFPA 70-2021 [Definition: Clothes Closet Storage Space.]****Clothes Closet Storage Space.**

The volume bounded by the sides and back closet walls and planes extending from the closet floor vertically to a height of 1.8 m (6 ft) or to the highest clothes-hanging rod and parallel to the walls at a horizontal distance of 600 mm (24 in.) from the sides and back of the closet walls, respectively, and continuing vertically to the closet ceiling parallel to the walls at a horizontal distance of 300 mm (12 in.) or the width of the shelf, whichever is greater; for a closet that permits access to both sides of a hanging rod, this space includes the volume below the highest rod extending 300 mm (12 in.) on either side of the rod on a plane horizontal to the floor extending the entire length of the rod. (410) (CMP-18)

Figure Figure Informational Note Figure 100.1 Clothes Closet Storage Space.

**Statement of Problem and Substantiation for Public Comment**

This drawing is a collection of requirements (every measurement being a requirement) and not a definition. it should remain in Article 410.

Related Item

- Global FR 7641

Submitter Information Verification

Submitter Full Name: Frederic Hartwell

Organization: Hartwell Electrical Services, Inc.

Street Address:

City:

State:

Zip:

Submission Date: Tue Aug 10 14:40:14 EDT 2021

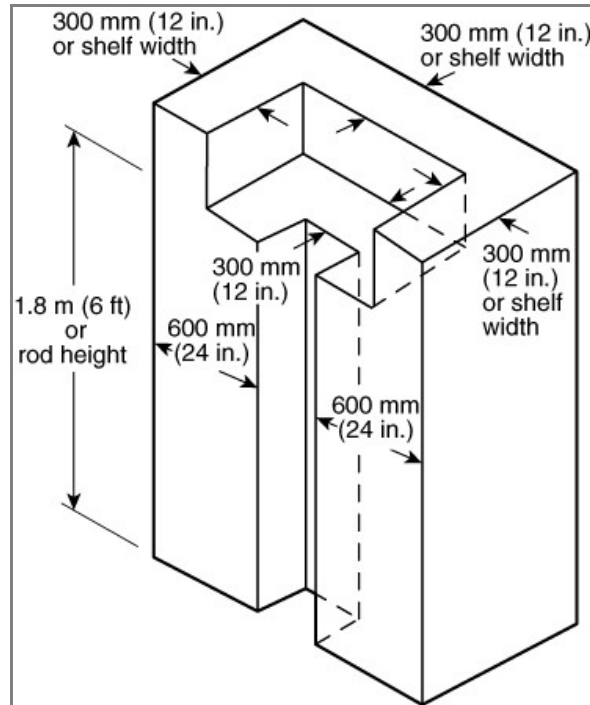
Committee: NEC-P18

**Public Comment No. 1677-NFPA 70-2021 [Definition: Clothes Closet Storage Space.]****Clothes Closet Storage Space.**

The volume bounded by the sides and back closet walls and planes extending from the closet floor vertically to a height of 1.8 m (6 ft) or to the highest clothes-hanging rod and parallel to the walls at a horizontal distance of 600 mm (24 in.) from the sides and back of the closet walls, respectively, and continuing vertically to the closet ceiling parallel to the walls at a horizontal distance of 300 mm (12 in.) or the width of the shelf, whichever is greater; for a closet that permits access to both sides of a hanging rod, this space includes the volume below the highest rod extending 300 mm (12 in.) on either side of the rod on a plane horizontal to the floor extending the entire length of the rod.

The area within a clothes closet in which combustible materials may be kept. (410) (CMP-18)

Figure Figure Informational Note Figure 100.1 Clothes Closet Storage Space.

**Statement of Problem and Substantiation for Public Comment**

This comment was prepared by a CMP-18 Definitions Task Group consisting of the following members: B. Fahey, C. Kurten, F. Carpenter, J. Potterf, M. O'Boyle, P. Costello, R. Wright, R. Alley. Pursuant to the Technical Correlating Committee direction, the task group reviewed this definition and recommend the suggested changes to align the definition with the NEC Style Manual. The content, including the figure, should be moved to 410.16 as suggested by a companion comment. The suggested changes to the definition provide simplification and clarity.

Related Item

• FR-7641

Submitter Information Verification

Submitter Full Name: Michael o'boyle

Organization: Signify North America

Street Address:

City:

State:

Zip:

Submission Date: Tue Aug 17 10:21:09 EDT 2021

Committee: NEC-P18

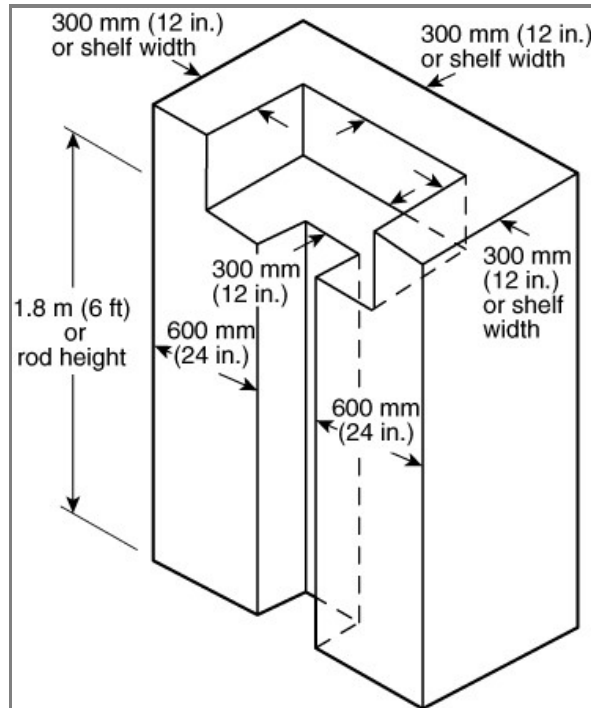


Public Comment No. 68-NFPA 70-2021 [Definition: Clothes Closet Storage Space.]

Clothes Closet Storage Space.

The volume bounded by the sides and back closet walls and planes extending from the closet floor vertically to a height of 1.8 m (6 ft), or to the highest clothes-hanging rod, and parallel to the walls at a horizontal distance of 600 mm (24 in.) from the sides and back of the closet walls, respectively, and continuing vertically. The volume extends vertically to the closet ceiling parallel to the walls at a horizontal distance of 300 mm (12 in.) or the width of the shelf, whichever is greater; for a closet that permits access to both sides of a hanging rod, this space includes the volume below the highest rod extending 300 mm (12 in.) on either side of the rod on a plane horizontal to the floor extending the entire length of the rod. (410) (CMP-18)

~~Figure Figure~~ Informational Note Figure 100.1 Clothes Closet Storage Space.



Statement of Problem and Substantiation for Public Comment

This definition has the dubious honor of being the longest sentence in the NEC. It certainly qualifies as an example of a run-on sentence. This Comment intends to be editorial in nature only, to break up the long sentence without changing the meaning, and improve the sentence syntax.

Related Item

• PI-3013, PI-3327

Submitter Information Verification

Submitter Full Name: Phil Simmons

Organization: Simmons Electrical Services

Street Address:

City:

State:

Zip:

Submittal Date: Thu Jul 01 13:44:53 EDT 2021

Committee: NEC-P18

**Public Comment No. 1738-NFPA 70-2021 [Definition: Connector, Load]****Connector, Load (Load Connector)**

An electromechanical connector used for power from the busbar to utilization equipment. (393) (CMP-18)

Statement of Problem and Substantiation for Public Comment

This comment was prepared by a CMP-18 Definitions Task Group consisting of the following members: B. Fahey, C. Kurten, F. Carpenter, J. Potterf, M. O'Boyle, P. Costello, R. Wright, R. Alley. Pursuant to the Technical Correlating Committee direction, the task group reviewed this definition and recommend the suggested changes to align the definition with the NEC Style Manual.

The suggested change is to comply with NEC Style Manual 2.2.2.3.1 (Searchable Terms).

Related Item

- FR 7641

Submitter Information Verification

Submitter Full Name: Michael o`boyle

Organization: Signify North America

Street Address:

City:

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Submittal Date: Tue Aug 17 15:46:41 EDT 2021

Committee: NEC-P18

**Public Comment No. 1743-NFPA 70-2021 [Definition: Connector, Pendant.]****Connector, Pendant. (Pendant Connector)**

An electromechanical or mechanical connector used to suspend low-voltage luminaire or utilization equipment below the grid rail and to supply power to connect from the busbar to utilization equipment. (393) (CMP-18)

Statement of Problem and Substantiation for Public Comment

This comment was prepared by a CMP-18 Definitions Task Group consisting of the following members: B. Fahey, C. Kurten, F. Carpenter, J. Potterf, M. O'Boyle, P. Costello, R. Wright, R. Alley. Pursuant to the Technical Correlating Committee direction, the task group reviewed this definition and recommend the suggested changes to align the definition with the NEC Style Manual.

The suggested change is to comply with NEC Style Manual 2.2.2.3.1 (Searchable Terms).

Related Item

- FR 7641

Submitter Information Verification

Submitter Full Name: Michael o'boyle

Organization: Signify North America

Street Address:

City:

State:

Zip:

Submittal Date: Tue Aug 17 15:59:56 EDT 2021

Committee: NEC-P18

**Public Comment No. 1746-NFPA 70-2021 [Definition: Connector, Power Feed.]****Connector, Power Feed. (Power Feed Connector)**

An electromechanical connector used to connect the power supply to a power distribution cable, to connect directly to the busbar, or to connect from a power distribution cable to the busbar. (393) (CMP-18)

Statement of Problem and Substantiation for Public Comment

This comment was prepared by a CMP-18 Definitions Task Group consisting of the following members: B. Fahey, C. Kurten, F. Carpenter, J. Potterf, M. O'Boyle, P. Costello, R. Wright, R. Alley. Pursuant to the Technical Correlating Committee direction, the task group reviewed this definition and recommend the suggested changes to align the definition with the NEC Style Manual.

The suggested change is to comply with NEC Style Manual 2.2.2.3.1 (Searchable Terms).

Related Item

- FR 7641

Submitter Information Verification

Submitter Full Name: Michael o`boyle

Organization: Signify North America

Street Address:

City:

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Zip:

Submittal Date: Tue Aug 17 16:03:11 EDT 2021

Committee: NEC-P18

**Public Comment No. 1748-NFPA 70-2021 [Definition: Connector, Rail to Rail.]****Connector, Rail to Rail. (Rail to Rail Connector)**

An electromechanical connector used to interconnect busbars from one ceiling grid rail to another grid rail. (393) (CMP-18)

Statement of Problem and Substantiation for Public Comment

This comment was prepared by a CMP-18 Definitions Task Group consisting of the following members: B. Fahey, C. Kurten, F. Carpenter, J. Potterf, M. O'Boyle, P. Costello, R. Wright, R. Alley. Pursuant to the Technical Correlating Committee direction, the task group reviewed this definition and recommend the suggested changes to align the definition with the NEC Style Manual.

The suggested change is to comply with NEC Style Manual 2.2.2.3.1 (Searchable Terms).

Related Item

- FR 7641

Submitter Information Verification

Submitter Full Name: Michael o'boyle

Organization: Signify North America

Street Address:

City:

State:

Zip:

Submittal Date: Tue Aug 17 16:05:25 EDT 2021

Committee: NEC-P18

**Public Comment No. 1742-NFPA 70-2021 [Definition: Connector.]****Connector.**

A term used to refer to an An electromechanical fitting. (393) (CMP-18)

Statement of Problem and Substantiation for Public Comment

This comment was prepared by a CMP-18 Definitions Task Group consisting of the following members: B. Fahey, C. Kurten, F. Carpenter, J. Potterf, M. O'Boyle, P. Costello, R. Wright, R. Alley. Pursuant to the Technical Correlating Committee direction, the task group reviewed this definition and recommend the suggested changes to align the definition with the NEC Style Manual.

The suggested change adds clarity.

Related Item

- FR 7641

Submitter Information Verification

Submitter Full Name: Michael o`boyle

Organization: Signify North America

Street Address:

City:

State:

Zip:

Submittal Date: Tue Aug 17 15:56:39 EDT 2021

Committee: NEC-P18

**Public Comment No. 1666-NFPA 70-2021 [Definition: Multioutlet Assembly.]****Multioutlet Assembly.**

A surface, flush, or freestanding assemblage consisting of ~~a~~ with a raceway and fittings or other enclosure provided with one or more receptacles, for the purpose of supplying power to utilization equipment. (CMP-18)

Statement of Problem and Substantiation for Public Comment

This comment was prepared by a CMP-18 Definitions Task Group consisting of the following members: B. Fahey, C. Kurten, F. Carpenter, J. Potter, M. O'Boyle, P. Costello, R. Wright, R. Alley. Pursuant to the Technical Correlating Committee direction, the task group reviewed this definition and recommend the suggested changes to align the definition with the NEC Style Manual.

Related Item

- FR-7638-NFPA 70-2020

Submitter Information Verification

Submitter Full Name: Frederick Carpenter

Organization: Acuity Brands Lighting

Street Address:

City:

State:

Zip:

Submittal Date: Tue Aug 17 07:11:23 EDT 2021

Committee: NEC-P18

**Public Comment No. 825-NFPA 70-2021 [Definition: Multioutlet Assembly.]****Multioutlet Assembly.**

A surface, flush, or freestanding assemblage consisting of a raceway and fittings or other enclosure provided with one or more receptacles, for the purpose of supplying power to utilization equipment. (CMP-18)

Additional Proposed Changes

<u>File Name</u>	<u>Description Approved</u>
18_CN_444.pdf	70_CN444

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 444 appeared in the First Draft Report on First Revision No. 7638.

The Correlating Committee directs the Panel to review the language of this definition, as "consisting of a number of things constitutes a requirement, and is not in compliance with 2.2.2.2 of the NEC Style Manual.

Related Item

- First Revision No. 7638

Submitter Information Verification

Submitter Full Name: CC on NEC-AAC

Organization: NEC Correlating Committee

Street Address:

City:

State:

Zip:

Submittal Date: Wed Aug 04 12:54:19 EDT 2021

Committee: NEC-P18

**Correlating Committee Note No. 444-NFPA 70-2021 [Definition: Multioutlet Assembly.]****Submitter Information Verification**

Committee: NEC-P18

Submittal Date: Mon May 10 09:46:24 EDT 2021

Committee Statement

Committee Statement: The Correlating Committee directs the Panel to review the language of this definition, as "consisting of" a number of things constitutes a requirement, and is not in compliance with 2.2.2.2 of the NEC Style Manual.

First Revision No. 7638-NFPA 70-2020 [Definition: Multioutlet Assembly.]

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. 1618-NFPA 70-2021 [Definition: Photovoltaic (PV) Powered Sign.]

Sign, Photovoltaic (PV) Powered (Photovoltaic (PV) Powered Sign) (PV Powered Sign) .

A complete sign powered by solar energy consisting of all components and subassemblies for installation either as an off-grid stand-alone, on-grid interactive, or non-grid interactive system. (600) (CMP-18)

Statement of Problem and Substantiation for Public Comment

This public comment resolves conflicts between the first revision definition text (FR-7641-NFPA 70-2020) and the NEC Style Manual. Specifically, 2.2.2.3 Base Term and 2.2.25 Alternate Term style guidance is implemented.

This comment was prepared by a CMP-18 Definitions Task Group consisting of the following members: B. Fahey, C. Kurten, F. Carpenter, J. Potterf, M. O'Boyle, P. Costello, R. Wright, R. Alley. Pursuant to the Technical Correlating Committee direction, the task group reviewed this definition and recommend the suggested changes to align the definition with the NEC Style Manual.

Related Item

- FR-7641-NFPA 70-2020

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 16:54:05 EDT 2021

Committee: NEC-P18

**Public Comment No. 1275-NFPA 70-2021 [Definition: Receptacle, Weight Supporting Ceiling (WSCR).]****Receptacle, Weight Supporting Ceiling (WSCR).**

A contact device installed at the ~~an~~ outlet box for the connection and support of luminaries and ceiling-suspended (paddle) fans using a weight supporting attachment fitting (WASF). (CMP-18)

Statement of Problem and Substantiation for Public Comment

These revisions should be viewed as editorial for the purpose of providing consistent use of terms in the NEC, particularly in Article 422.

Related Item

- FR 7639

Submitter Information Verification

Submitter Full Name: Ryan Jackson

Organization: Ryan Jackson

Street Address:

City:

State:

Zip:

Submittal Date: Wed Aug 11 15:09:12 EDT 2021

Committee: NEC-P18

**Public Comment No. 1532-NFPA 70-2021 [Definition: Receptacle, Weight Supporting Ceiling (WSCR).]****Receptacle, Weight-Supporting Ceiling (WSCR).**

A contact device installed at the outlet box for the connection and support of luminaries and paddle fans using a weight - supporting attachment fitting (~~WASF~~ WSAF). (CMP-18)

Informational Note: See ANSI/NEMA WD 6 "American National Standard for Wiring Devices - Dimensional Specifications" for the standard configuration of weight-supporting ceiling receptacles and related weight-supporting attachment fittings.

Statement of Problem and Substantiation for Public Comment

This informational note is being added to provide reference information to users that weight-supporting ceiling receptacles and related weight-supporting attachment fittings now have a standard configuration established in ANSI/NEMA WD 6, "American National Standard for Wiring Devices – Dimensional Specifications", just as do attachment plugs and related types of receptacles. These devices are designated in the standard as:

WS3-50R, WS3-50AF for three poles, WS4-50R and WS4-50AF for four poles; and

WS3-70R, WS3-70AF for three poles, WS4-70R and WS4-70AF for four poles

These identifiers designate the special configuration of "weight-supporting", the weight rating (50- or 70- pounds), and the application as a "receptacle" or the "attachment fitting". These devices being relatively new to the electrical and lighting industry creates the need in the NEC for the information provided in the informational note so users can find the specific characteristics of these devices.

Editorially, a dash was added between "weight" and "supporting" for consistency within the Code, and "WASF" was corrected to be "WSAF" as an acronym for weight-supporting attachment fitting.

Related Item

- FR 7639

Submitter Information Verification

Submitter Full Name: Megan Hayes

Organization: Nema

Street Address:

City:

State:

Zip:

Submittal Date: Mon Aug 16 11:32:45 EDT 2021

Committee: NEC-P18

**Public Comment No. 1624-NFPA 70-2021 [Definition: Receptacle, Weight Supporting Ceiling (WSCR).]****Receptacle, Weight Supporting Ceiling (Weight Supporting Ceiling Receptacle). (WSCR).**

A contact device installed at the outlet box for the connection and support of luminaries and paddle fans using a weight supporting attachment fitting (WASF WSAF). (CMP-18)

Statement of Problem and Substantiation for Public Comment

There was a typographical error in FR-7639-NFPA 70-2020 which added the definition of a Weight Supporting Ceiling Receptacle. This definition incorrectly referred to a weight supporting attachment fitting (WSAF) as a WASF. Also, the searchable title was added to comply with the NEC Style Manual, specifically 2.2.2.3.1 "Searchable Title.

This comment was prepared by a CMP-18 Definitions Task Group consisting of the following members: B. Fahey, C. Kurten, F. Carpenter, J. Potterf, M. O'Boyle, P. Costello, R. Wright, R. Alley. Pursuant to the Technical Correlating Committee direction, the task group reviewed this definition and recommend the suggested changes to align the definition with the NEC Style Manual.

Related Item

- FR-7639-NFPA 70-2020

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 17:11:46 EDT 2021

Committee: NEC-P18

**Public Comment No. 564-NFPA 70-2021 [Definition: Receptacle, Weight Supporting Ceiling (WSCR).]****Receptacle, Weight Supporting Ceiling (WSCR).**

A contact device installed at the outlet box for the connection and support of luminaries and paddle fans using a weight-supporting attachment fitting (WASF WASF). (CMP-18)

Informational Note: See ANSI/NEMA WD 6 "American National Standard for Wiring Devices — Dimensional Specifications", for the standard configuration of weight-supporting ceiling receptacles and related weight-supporting attachment fittings.

Additional Proposed Changes

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
Public_Comment_WSCR_Definitions_Draft_FNL.docx	Code text and substantiation to provide clarity to CMP-18 of code text changes.	

Statement of Problem and Substantiation for Public Comment

This informational note is being added to provide reference information to users that weight-supporting ceiling receptacles and related weight-supporting attachment fittings now have a standard configuration established in ANSI/NEMA WD 6, "American National Standard for Wiring Devices – Dimensional Specifications", just as do attachment plugs and related types of receptacles. These devices are designated in the standard as:

WS3-50R, WS3-50AF for three poles, WS4-50R and WS4-50AF for four poles; and

WS3-70R, WS3-70AF for three poles, WS4-70R and WS4-70AF for four poles

These identifiers designate the special configuration of "weight-supporting", the weight rating (50- or 70- pounds), and the application as a "receptacle" or the "attachment fitting". These devices being relatively new to the electrical and lighting industry creates the need in the NEC for the information provided in the informational note so users can find the specific characteristics of these devices.

Editorially, a dash was added between "weight" and "supporting" for consistency within the Code, and "WASF" was corrected to be "WASF" as an acronym for weight-supporting attachment fitting.

Related Item

- FR 7639

Submitter Information Verification

Submitter Full Name: Charles Mello
Organization: Cdcmello Consulting Llc
Affiliation: Submitted on behalf of Sky Technologies
Street Address:
City:
State:
Zip:
Submittal Date: Fri Jul 30 14:53:25 EDT 2021
Committee: NEC-P18

PUBLIC COMMENT TO FR 7639 (CMP 18)

Receptacle, Weight-Supporting Ceiling (WSCR).

A contact device installed at the outlet box for the connection and support of luminaries and paddle fans using a weight-supporting attachment fitting (~~WASF~~ WSAF). (CMP-18)

Informational Note: See ANSI/NEMA WD 6 “American National Standard for Wiring Devices — Dimensional Specifications”, for the standard configuration of weight-supporting ceiling receptacles and related weight-supporting attachment fittings.

Substantiation

This informational note is being added to provide reference information to users that weight-supporting ceiling receptacles and related weight-supporting attachment fittings now have a standard configuration established in ANSI/NEMA WD 6, “American National Standard for Wiring Devices – Dimensional Specifications”, just as do attachment plugs and related types of receptacles. These devices are designated in the standard as:

WS3-50R, WS3-50AF for three poles, WS4-50R and WS4-50AF for four poles; and

WS3-70R, WS3-70AF for three poles, WS4-70R and WS4-70AF for four poles

These identifiers designate the special configuration of “weight-supporting”, the weight rating (50- or 70-pounds), and the application as a “receptacle” or the “attachment fitting”. These devices being relatively new to the electrical and lighting industry creates the need in the NEC for the information provided in the informational note so users can find the specific characteristics of these devices.

Editorially, a dash was added between “weight” and “supporting” for consistency within the Code, and “WASF” was corrected to be “WSAF” as an acronym for weight-supporting attachment fitting.

**Public Comment No. 1255-NFPA 70-2021 [Definition: Receptacle.]****Receptacle.**

A contact device installed at the outlet for the connection of an attachment plug, ~~or for the direct connection of electrical utilization equipment designed to mate with the corresponding contact device~~. A single receptacle is a single contact device with no other contact device on the same yoke or strap. A multiple receptacle is two or more contact devices on the same yoke or strap. (CMP-18)

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

Statement of Problem and Substantiation for Public Comment

With the addition of the defined term "weight supporting ceiling receptacle" there is no need to have the language that I have marked for deletion. This not only simplifies the definition, but removes the problem of how general the current language is. For example, you can easily argue that a phone jack or coaxial cable connection point is a receptacle with the current definition.

Related Item

- FR-7639

Submitter Information Verification

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Organization: Ryan Jackson

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State:

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Submittal Date: Wed Aug 11 13:55:31 EDT 2021

Committee: NEC-P18

**Public Comment No. 1669-NFPA 70-2021 [Definition: Retrofit Kit, General Use.]****Retrofit Kit, General Use (General Use Retrofit Kit) .**

A kit consisting of primary parts, which does not include all the parts for a complete subassembly but includes a list of required parts and installation instructions to complete the subassembly in the field. (600) (CMP-18)

Statement of Problem and Substantiation for Public Comment

This comment was prepared by a CMP-18 Definitions Task Group consisting of the following members: B. Fahey, C. Kurten, F. Carpenter, J. Potter, M. O'Boyle, P. Costello, R. Wright, R. Alley. Pursuant to the Technical Correlating Committee direction, the task group reviewed this definition and recommend the suggested changes to align the definition with the NEC Style Manual.

Related Item

- FR-7641-NFPA 70-2020

Submitter Information Verification

Submitter Full Name: Frederick Carpenter

Organization: Acuity Brands Lighting

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City:

State:

Zip:

Submittal Date: Tue Aug 17 07:35:27 EDT 2021

Committee: NEC-P18

**Public Comment No. 1670-NFPA 70-2021 [Definition: Retrofit Kit, Sign Specific.]****Retrofit Kit, Sign Specific (Sign Specific Retrofit Kit) .**

A kit consisting of the necessary parts and hardware to allow for field installation in a host sign, based on the included installation instructions. (600) (CMP-18)

Statement of Problem and Substantiation for Public Comment

This comment was prepared by a CMP-18 Definitions Task Group consisting of the following members: B. Fahey, C. Kurten, F. Carpenter, J. Potter, M. O'Boyle, P. Costello, R. Wright, R. Alley. Pursuant to the Technical Correlating Committee direction, the task group reviewed this definition and recommend the suggested changes to align the definition with the NEC Style Manual.

Related Item

- FR-7641-NFPA 70-2020

Submitter Information Verification

Submitter Full Name: Frederick Carpenter

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Submittal Date: Tue Aug 17 07:40:22 EDT 2021

Committee: NEC-P18

**Public Comment No. 1668-NFPA 70-2021 [Definition: Retrofit Kit.]****Retrofit Kit.**

A ~~general term for a~~ complete subassembly of parts and devices for field conversion of utilization equipment. (CMP-18)

Statement of Problem and Substantiation for Public Comment

This comment was prepared by a CMP-18 Definitions Task Group consisting of the following members: B. Fahey, C. Kurten, F. Carpenter, J. Potter, M. O'Boyle, P. Costello, R. Wright, R. Alley. Pursuant to the Technical Correlating Committee direction, the task group reviewed this definition and recommend the suggested changes to align the definition with the NEC Style Manual.

Related Item

• FR-7641-NFPA 70-2020 • PI-3327-NFPA 70-2020

Submitter Information Verification

Submitter Full Name: Frederick Carpenter

Organization: Acuity Brands Lighting

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Submittal Date: Tue Aug 17 07:28:55 EDT 2021

Committee: NEC-P18

**Public Comment No. 1993-NFPA 70-2021 [Definitions (100): Retrofit Ki... to Retrofit Ki...]****Definitions (100): Retrofit Ki... to Retrofit Ki...****Retrofit Kit.**

A general term for a complete subassembly of parts and devices for field conversion of utilization equipment. (CMP-18)

Retrofit Kit, General Use.

A kit consisting of primary parts, which does not include all the parts for a complete subassembly but includes a list of required parts and installation instructions to complete the subassembly in the field. (600) (CMP-18)

Retrofit Kit, Sign Specific.

A kit consisting of the necessary parts and hardware to allow for field installation in a host sign, based on the included installation instructions. (600) (CMP-18)

Additional Proposed Changes

<u>File Name</u>	<u>Description Approved</u>
CN_445.pdf	70_CN445

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 445 appeared in the First Draft Report on First Revision No. 7641.

The Correlating Committee directs the Panel to review the definitions for "Retrofit Kit", "Retrofit Kit, General Use" and "Retrofit Kit, Sign Specific" for compliance with 2.2.2.4 of the NEC Style Manual.

Related Item

- First Revision No. 7641

Submitter Information Verification

Submitter Full Name: CC on NEC-AAC

Organization: NEC Correlating Committee

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Submittal Date: Wed Aug 18 21:43:45 EDT 2021

Committee: NEC-P18

**Correlating Committee Note No. 445-NFPA 70-2021 [Definitions (100): Retrofit Ki... to Retrofit Ki...]****Submitter Information Verification**

Committee: NEC-AAC

Submittal Date: Mon May 10 09:48:02 EDT 2021

Committee Statement

Committee Statement: The Correlating Committee directs the Panel to review the definitions for "Retrofit Kit", "Retrofit Kit, General Use" and "Retrofit Kit, Sign Specific" for compliance with 2.2.2.4 of the NEC Style Manual.

First Revision No. 7641-NFPA 70-2020 [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. 815-NFPA 70-2021 [Section No. 406.3(C)]**

(C) CO/ALR Receptacles.

Receptacles rated 20 amperes or less and designed for the direct connection of aluminum conductors shall be marked CO/ALR.

Additional Proposed Changes

<u>File Name</u>	<u>Description Approved</u>
18_CN_176.pdf	70_CN176

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 176 appeared in the First Draft Report on First Revision No. 7601.

The Correlating Committee directs that FR-7601 be reviewed for correlation with 240.4(D) due to the CMP-10 action to resolve PI 3238. The Panel is directed to correlate with 240.4(D) or remove requirements which rely on references to 240.4(D). The Correlating Committee directs that this action be forwarded to CMP-9 and CMP-1 O for information.

Related Item

- First Revision No. 7601

Submitter Information Verification

Submitter Full Name: CC on NEC-AAC

Organization: NEC Correlating Committee

Street Address:

City:

State:

Zip:

Submittal Date: Wed Aug 04 12:15:21 EDT 2021

Committee: NEC-P18

**Correlating Committee Note No. 176-NFPA 70-2021 [New Section after 406.3(C)]****Submitter Information Verification**

Committee: NEC-P18

Submittal Date: Wed May 05 11:20:00 EDT 2021

Committee Statement

Committee Statement: The Correlating Committee directs that FR-7601 be reviewed for correlation with 240.4(D) due to the CMP-10 action to resolve PI 3238. The Panel is directed to correlate with 240.4(D) or remove requirements which rely on references to 240.4(D). The Correlating Committee directs that this action be forwarded to CMP-9 and CMP-10 for information.

First Revision No. 7601-NFPA 70-2020 [New Section after 406.3(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. 113-NFPA 70-2021 [Section No. 406.3(D)]****(D) Receptacles for Copper-Clad Aluminum Conductors.**

Terminals of 15-ampere and 20-ampere receptacles not marked CO/ALR shall be used with copper and copper-clad aluminum conductors only. Terminals marked CO/ALR shall be permitted to be used with aluminum, copper, and copper-clad aluminum conductors that are sized in accordance with 240.4(D).

Screwless terminals of the conductor push-in type construction (also known as *push-in-terminals*) employed in a receptacle shall be connected with 14 AWG solid copper wire only.

~~Screwless terminals of the conductor push-in type construction (also known as *push-in-terminals*) employed in a receptacle that is listed and identified for use with 14 AWG solid copper-clad aluminum wire shall be permitted to be connected with 14 AWG solid copper-clad aluminum wire when installed on 10 ampere branch circuits only, in accordance with 240.4(D)(3).~~

Statement of Problem and Substantiation for Public Comment

There is not a NEMA standard configuration for a 10 amp receptacle and there are no provisions in Article 210 to permit the use of 10 amp receptacles.

Related Item

- FR-7601

Submitter Information Verification

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Submittal Date: Sun Jul 04 13:44:41 EDT 2021

Committee: NEC-P18



Public Comment No. 1462-NFPA 70-2021 [Section No. 406.3(D)]

(D) Receptacles for Copper-Clad Aluminum Conductors Receptacle Terminations .

Terminals of 15-ampere and 20-ampere receptacles not marked CO/ALR shall be used with copper and copper-clad aluminum conductors only. Terminals marked CO/ALR shall be permitted to be used with aluminum, copper, and copper-clad aluminum conductors- that are sized in accordance with 240 . 4(D)-Screwless

Receptacles installed using screwless terminals of the conductor push-in type construction (also known as *push-in-terminals*) employed in a receptacle shall be installed on 15-ampere branch circuits and shall be connected with 14 AWG solid copper wire only.Screwless

Exception: Receptacles installed using screwless terminals of the conductor push-in type construction (also known as *push-in-terminals*) employed in a receptacle that is listed and identified for use with 14 AWG solid copper-clad aluminum wire- shall be permitted to be connected with using conductors other than 14 AWG solid copper -clad aluminum wire when installed on 10 ampere branch circuits only, in accordance with- 240.4(D)(3) . if listed and marked for other types of conductors.

Additional Proposed Changes

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
Public_Comment_for_406.3_D_Fnl.docx	This file is provided so the code panel can see the intended text in legislative format due to Terra issues.	

Statement of Problem and Substantiation for Public Comment

The Correlating Committee Bimetallics Task Group submitted 19 public inputs in a coordinated effort to recognize 14 AWG copper-clad aluminum with a 60°C rating of 10 amps. The results in the first draft by CMP-2, CMP-6, CMP-9, CMP-10 and CMP-18 had general acceptance of these public inputs and the addition of the new conductor size and rating.

CMP-18 included text in the new 406.3(D) referencing 240.4(D) in the first draft that created a correlation issue due to actions by CMP-10 on PI 3238 and as noted from the Correlating Committee note. CMP-9 also accepted the concept in 404.14(D), but the first draft text was significantly different for the same requirement. The requirement for receptacles in 406.3(D) and for snap switches in 404.14(D) should not have differences that could lead to confusion on why there are differences. A companion public comment with parallel language has been submitted for 404.14(D) to be considered by CMP-9 to bring both sections into alignment.

This public comment text removes the correlation issue and revises the language to accomplish three things:

-- To bring into the Code that wiring devices rated 15 and 20 amperes are suitable for installation with copper and copper-clad aluminum as provided in the UL guide information. This will help alleviate questions regarding wiring device termination that are being constantly asked by installers.

-- With the new allowance for 14 copper-clad aluminum, to ensure the Code is clear that the use of push-in type terminals is presently only suitable for 14 AWG copper. The UL standard and associated guide information under category code RTRT for receptacles with push-in terminals permits only 14 AWG solid copper conductors to be used at this time.

-- By the exception, to provide for a future allowance for other conductors, such as 14 AWG copper-clad aluminum, to be installed using push-in type terminals where the additional evaluation to the applicable UL standards has been completed and the listing and device markings permit the application.

Related Public Comments for This Document

<u>Related Comment</u>	<u>Relationship</u>
Public Comment No. 1460-NFPA 70-2021 [Section No. 404.14(D)]	Provides for parallel text for the same requirements
Public Comment No. 1460-NFPA 70-2021 [Section No. 404.14(D)]	

Related Item

- PI 3259 and FR 7601

Submitter Information Verification

Submitter Full Name: Charles Mello
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Submittal Date: Fri Aug 13 17:01:47 EDT 2021
Committee: NEC-18

Public Comment Proposed Code Text

406.3(D) Receptacles for Copper-Clad Aluminum Conductors Terminations.

Terminals of 15-ampere and 20-ampere receptacles not marked CO/ALR shall be used with copper and copper-clad aluminum conductors only. Terminals marked CO/ALR shall be permitted to be used with aluminum, copper, and copper-clad aluminum conductors. ~~that are sized in accordance with 240.4(D).~~

Receptacles installed using Sscrewless terminals of the conductor push-in type construction (also known as *push-in-terminals*) employed in a receptacle shall be installed on 15-ampere branch circuits and shall be connected with 14 AWG solid copper wire only.

*Exception: Receptacles installed using Sscrewless terminals of the conductor push-in type construction (also known as *push-in-terminals*) shall be permitted to be connected using conductors other than 14 AWG solid copper if listed and marked for other types of conductors.*
~~employed in a receptacle that is listed and identified for use with 14 AWG solid copper-clad aluminum wire shall be permitted to be connected with 14 AWG solid copper-clad aluminum wire when installed on 10-ampere branch circuits only, in accordance with 240.4(D)(3).~~

PC Substantiation

The Correlating Committee Bimetallics Task Group submitted 19 public inputs in a coordinated effort to recognize 14 AWG copper-clad aluminum with a 60°C rating of 10 amps. The results in the first draft by CMP-2, CMP-6, CMP-9, CMP-10 and CMP-18 had general acceptance of these public inputs and the addition of the new conductor size and rating.

CMP-18 included text in the new 406.3(D) referencing 240.4(D) in the first draft that created a correlation issue due to actions by CMP-10 on PI 3238 and as noted from the Correlating Committee note. CMP-9 also accepted the concept in 404.14(D), but the first draft text was significantly different for the same requirement. The requirement for receptacles in 406.3(D) and for snap switches in 404.14(D) should not have differences that could lead to confusion on why there are differences. A companion public comment with parallel language has been submitted for 404.14(D) to be considered by CMP-9 to bring both sections into alignment.

This public comment text removes the correlation issue and revises the language to accomplish three things:

- To bring into the Code that wiring devices rated 15 and 20 amperes are suitable for installation with copper and copper-clad aluminum as provided in the UL guide information. This will help alleviate questions regarding wiring device termination that are being constantly asked by installers.
- With the new allowance for 14 copper-clad aluminum, to ensure the Code is clear that the use of push-in type terminals is presently only suitable for 14 AWG copper. The UL standard and associated guide information under category code RTRT for receptacles with push-in terminals permits only 14 AWG solid copper conductors to be used at this time.
- By the exception, to provide for a future allowance for other conductors, such as 14 AWG copper-clad aluminum, to be installed using push-in type terminals where the additional evaluation to the applicable UL standards has been completed and the listing and device markings permit the application.

**Public Comment No. 1943-NFPA 70-2021 [Section No. 406.3(D)]****(D) Receptacles for Copper-Clad Aluminum Conductors.**

Terminals of 15-ampere and 20-ampere receptacles not marked CO/ALR shall be used with copper and copper-clad aluminum conductors only. Terminals marked CO/ALR shall be permitted to be used with aluminum, copper, and copper-clad aluminum conductors that are sized in accordance with 240.4(D).

Screwless terminals of the conductor push-in type construction (also known as *push-in-terminals*) employed in a receptacle shall be connected with 14 AWG solid copper wire only.

~~Screwless terminals of the conductor push-in type construction (also known as *push-in-terminals*) employed in a receptacle that is listed and identified for use with 14 AWG solid copper-clad aluminum wire shall be permitted to be connected with 14 AWG solid copper-clad aluminum wire when installed on 10 ampere branch circuits only, in accordance with 240.4(D)(3).~~

Additional Proposed Changes

<u>File Name</u>	<u>Description</u>
PC_1447_1772_1937_1939_1940_1943_2068_2073_2075_Attachment_C_Dave_Watson.pdf	WO_2021-260_14_AWG_Copper_Clad_Aluminum_Tem _Initial_Findings.pdf

Statement of Problem and Substantiation for Public Comment

Testing performed by Southwire (at the Southwire Cofer Technology Center, an ISO 17025 accredited test lab by A2LA) indicates that the maximum temperature ratings for products made with 14 AWG Copper-Clad Aluminum conductors are exceeded when using the proposed ampacities (10 Amps at 60°C for NM-B Cable and 20 Amps at 90°C for THHN conductors installed in flexible metal conduit) while the products are installed within insulated walls and ceilings/attics that are typical of residential and commercial installations. A test report is attached, and it is anticipated that more information (including additional test reports) will be available to the code-making panel from further testing conducted by Southwire and other testing facilities. Additional information in support of this position is available for the Code-Making Panels.

Related Public Comments:

PC-1447 - Tables 310.16 and 310.17
PC-1772 - Section 210.24
PC-2075 - Section 240.4(D)
PC-1937 - Section 310.3(A)
PC-2068 - Section 330.104
PC-1939 - Section 334.104
PC-2073 - Section 336.104
PC-1940 - Section 340.104
PC-1943 - Section 406.3(D)

Related Item

• FR-7601

Submitter Information Verification

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Submittal Date: Wed Aug 18 17:34:04 EDT 2021

Committee: NEC-P18



Southwire®

D.B. Cofer Technology Center

111 Development Drive • Carrollton, GA 30117

Temperature Study of 14 AWG Copper-Clad Aluminum Products -Initial Findings-

Test Performed: August 6th – August 18th, 2021

Report Date: August 19th, 2021

Requested by: Dave Watson

Cofer Center Work Order #: 2021-260

Report by: _____

Steven Powers, PE

Lab Manager, Cofer Technology Center

&

Dave Watson

Principal Engineer, Codes & Standard Engineering

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Disclaimer:

The information is accurate to the best of Southwire Company's knowledge at the time of publication. Southwire Company, LLC and its affiliates disclaim all liability for any errors, omissions, corruption or virus in this message or any attachments. For engineering design information, please contact Southwire Applications Engineering at cabletechsupport@southwire.com.

Introduction

During the First Draft of the 2023 NEC, the smallest size allowed for copper-clad conductors was extended to 14 AWG (from the previous limit of 12 AWG) in several NEC sections, including Table 310.16 and Table 310.17. The proposed Table 310.16 ampacities are 10 Amps at 60 °C, 15 Amps at 75 °C, and 20 Amps at 90 °C. The test data supplied by the American Bimetallic Association in support of this First Draft change addressed performance in open air only. Southwire believes testing in normal residential and commercial installation environments (within insulated walls and ceilings/attics) is also needed to properly assess the safety of 14 AWG copper-clad conductors at these ampacities.

Summary

Testing was performed at Southwire's D.B. Cofer Technology Center (CTC) in a climate-controlled lab. Data was gathered using equipment and processes that are part of the CTC's ISO 17025 Quality Management System. The overall procedure and test apparatus were customer defined and not a part of the CTC's ISO 17015 scope of accreditation.

The test results show that the maximum temperature ratings for products made with 14 AWG copper-clad aluminum conductors are exceeded when using the proposed ampacities (testing was performed using 10 Amps at 60 °C for NM-B Cable and 20 Amps at 90 °C for THHN conductors installed in flexible metallic conduit) while the products are installed within insulated walls and ceilings/attics that are typical of residential and commercial installations. It is anticipated that more information (including possible additions to this test report and additional test reports) will be available to the code-making panel from further testing conducted by Southwire and other testing facilities.

Samples

Southwire obtained 14 AWG copper-clad aluminum bare conductor (using AA-8000 series AL alloy and meeting ASTM B566) and used it to manufacture 14/2 NM-B Cable and 14 AWG THHN/THWN conductors. Since these sizes of copper-clad aluminum are not included within the relevant UL standards at this time (UL 719 and UL 83), we used the same constructions as required for 14 AWG copper products (allowing for the manufacturing variations required due to the lower tensile strength and temperature performance of copper-clad aluminum as compared to copper).

Procedure

Testing was performed on a custom wood and drywall apparatus according to Figure 1. The apparatus was designed to replicate the construction of a traditional wood framed residential wall and ceiling. The apparatus could be flipped 90° from a vertical position (replicating a wall) and a horizontal position

(replicating a ceiling). For the data contained in this report, certified electricians were used to install the samples and make electrical connections.

Complete test setup consisted of the following elements:

1. Wooden apparatus either oriented in the vertical plane (wall) or the horizontal plane (ceiling) constructed using 2"x6" wood boards and ½" sheetrock,
2. Fiberglass insulation (R6.7, R13, R30),
3. Chroma programmable load current supply,
4. Fluke amp probe,
5. Voltage meters,
6. Graphtec temperature datalogger.

Table 1: Equipment Used

Equipment	Cofer Asset #
Graphtec GL 840 Data Logger	948
Fluke 336 Clamp Meter	189
Chroma Model 63803 Programable Load	NA
Fluke 289 Multimeter	267
Fluke 789 Multimeter	679

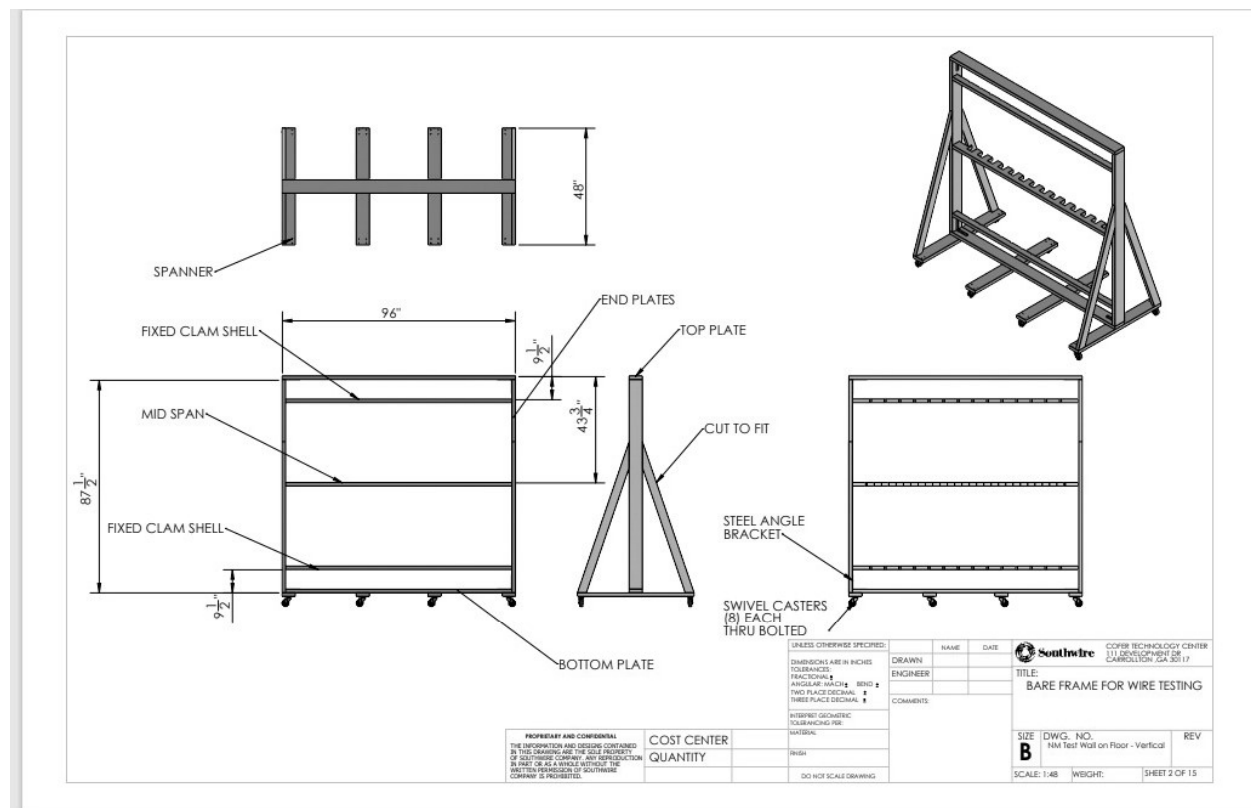


Figure 1: Test Apparatus

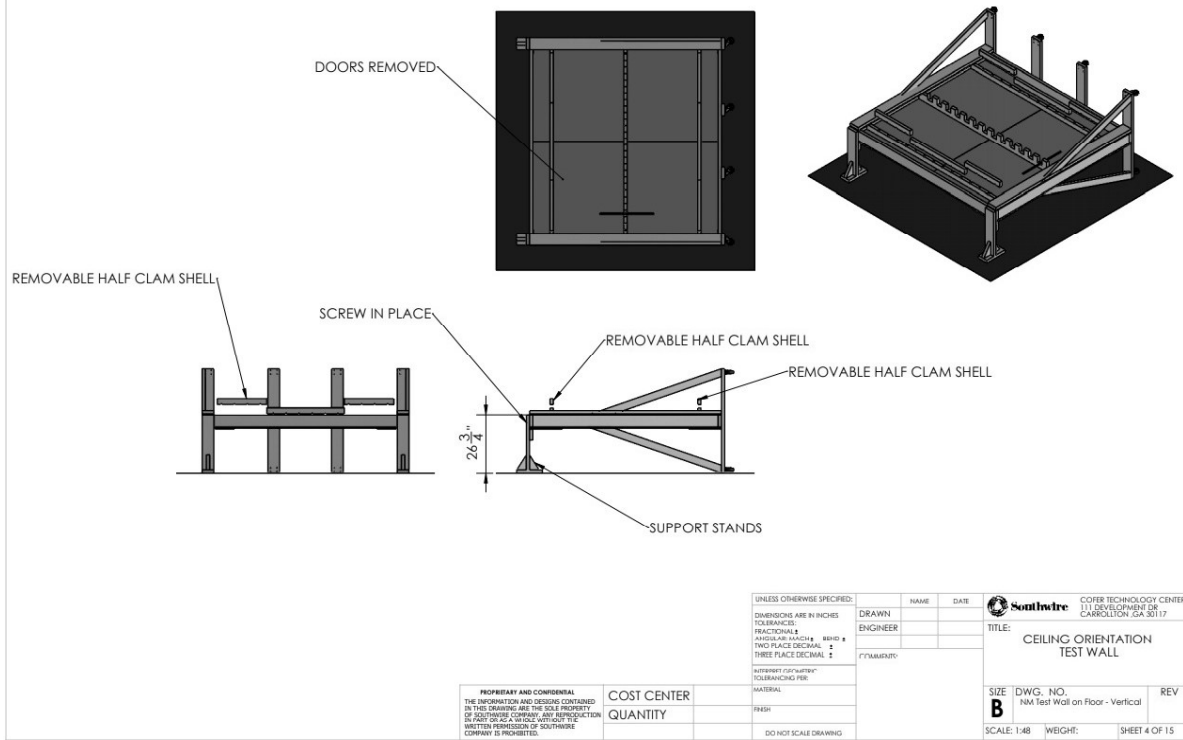


Figure 2: Test Apparatus in Ceiling Configuration

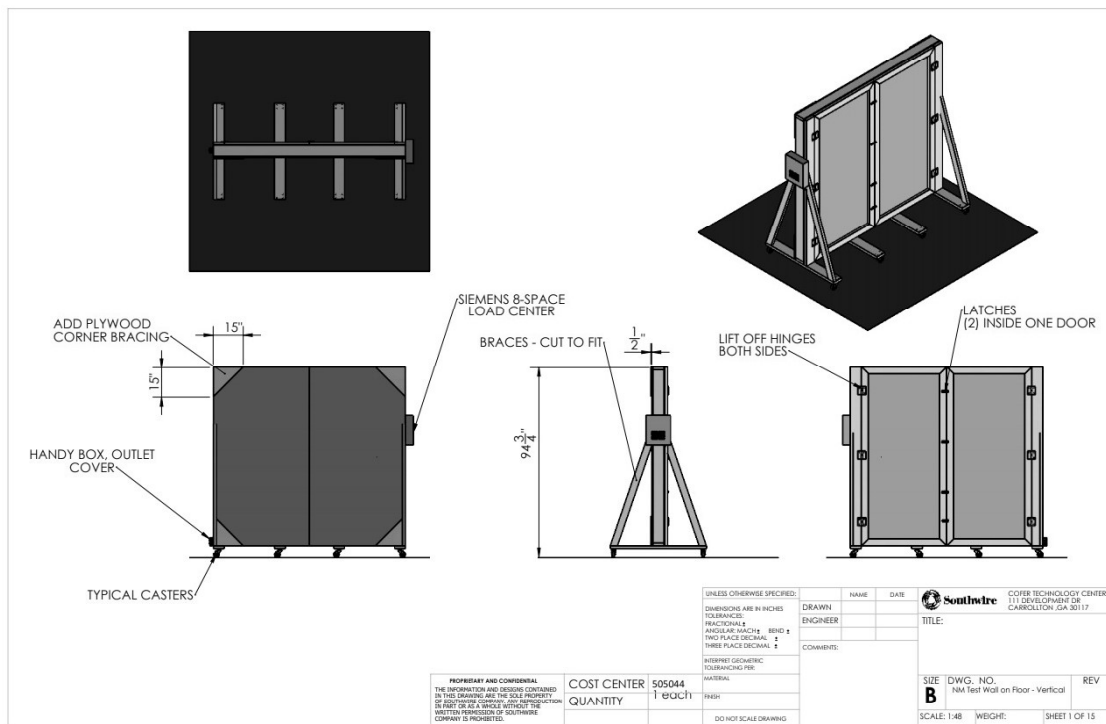


Figure 3: Test Apparatus in Wall Configuration

The following procedure was used for each test.

1. A sufficient length of NM cable or THHN (typically 61 feet) is cut from a coil,
2. While the structure is in the horizontal orientation, one end is terminated in a Siemens EQ 125 Amp 8-Space 16-Circuit Main Lug Flush Mount Indoor Load Center to a Siemens Single-Pole Type QP Circuit Breaker, the amperage based upon the capability of the cable (10, 15, 20 amps typical) or specified by the customer,
3. The sample is secured in the wall at the specified spacing, typically 12" by pulling it through $\frac{3}{4}$ " holes that were drilled through the boards located on either end of the structure,
4. The samples were secured to the apparatus,
 - a. The cable samples are secured to the middle board with nail on staples listed for NM cable (vertical wall and NM-B),
 - b. The THHN samples were pulled through the flexible metal conduit (FMC), and the FMC was terminated in the electrical boxes of both end of the circuit,
5. The other end of the cable is terminated to a duplex outlet on the opposite side of the structure,
6. Thermocouples are installed in the apparatus as follows:
 - a. One ambient (#8),
 - b. One placed inside the cable where it enters the single gang receptacle box (#1) and another one inside the cable where it enters the load center panel (#7),
 - c. Five others placed inside the sample
 - i. The thermocouples in the cable samples are placed approximately 10 feet apart by cutting a small slit in the outer jacket and placing the end of the thermocouple next to the conductors under the paper then two (2) wraps of electrical tape are placed over the slit (#2 through #6),
 - ii. The thermocouples in the FMC were taped to the black conductor using electrical tape every 10 feet,
 - d. One on the black conductor connected to the breaker right at the terminating screw (#9)
7. A specified R-value layer of insulation is placed over the sample and is tucked into the structure to minimize air gaps/heat loss,
8. For wall testing, the sheetrock doors are installed while the structure is horizontal, locked and then the structure is stood to the vertical orientation,
9. For ceiling testing, the sheetrock doors are left off, and the apparatus is left in the horizontal position,
10. The incoming power to the panel is turned ON,
11. The initial incoming voltage and outgoing voltage is recorded,
12. The temperature data logger data collection is launched,
13. The power supply is set to the specified current level (10, 12, 15, 20 amps typical) and is engaged,
14. The current level is verified with the amp probe,
15. The loaded voltages as shown in the corresponding voltage meters are recorded.

Each thermocouple was constructed at the CTC from special-limit-of-error thermocouple wire. After each thermocouple was welded and connected to the data logger, the thermocouple end was placed in an ice bath to verify its functionality and accuracy.

After a specified amount of time or at the point where the cable exceeds the temperature limitation as set forth in the NEC for NM-B Cable (60 °C) or THHN/THWN conductors (90 °C) as indicated on the datalogger screen, the power supply is turned off and the data logger collection is stopped.

Results

Several limits were observed for this study. These limits, coupled with judgement, were considered when determining when to stop a test. Some of these limits include the following:

- Temperature limit of 60°C for NM-B Cable,
- Temperature limit of 90°C for THHN/THWN conductors installed in conduit,
- A temperature rise of 30°C above ambient for NM-B Cable,
- A temperature rise of 60°C above ambient for THHN/THWN conductors installed in conduit,
- An elapsed time of 3 hours (“continuous use” classification).

For the ampacities given in NEC Tables 310.16 and 310.17, the ambient temperature is 30 °C. The total temperature achieved by the cable or conductor is composed of the ambient temperature plus the temperature rise above ambient due to conduction of current. For NM-B Cable (Max Temp = 60 °C), this maximum temperature rise is 30 °C above ambient. For THHN/THWN conductors installed in conduit (Max Temp = 90 °C), this maximum temperature rise is 60 °C above ambient. Normally when installation occurs in an area with a lower ambient temperature, the allowable conductor ampacity is increased per NEC 310.15. However, this testing had to be performed with the appropriate OCPD sizes (10 Amps for NM-B Cable and 20 Amps for THHN/THWN conductors in conduit) to ensure accuracy of the results. Since our testing occurred in an environment with an ambient temperature of less than 30 °C and we were limited in the current we could use for testing by the OCPD, we are using the maximum temperature rise above ambient as the measure of pass/fail results.

The temperature on multiple channels on Figure 2 exceeded the limit of the data logger after approximately 26 minutes. The test lasted for 47 minutes before it was decided to stop testing. The maximum temperature recorded was 102°C above ambient.

See Figures 4 and 5 below for the temperature profile for AWG 14/2 copper-clad aluminum and 14 AWG THHN copper-clad aluminum while the apparatus was in the ceiling orientation. See Figures 6 and 7 for data in the wall orientation.

WO 2021-260 Copper Clad Aluminum Temperature Study 14/2 CCA Spaced 12" in R43 Insulation @ 10 Amps in Ceiling Configuration

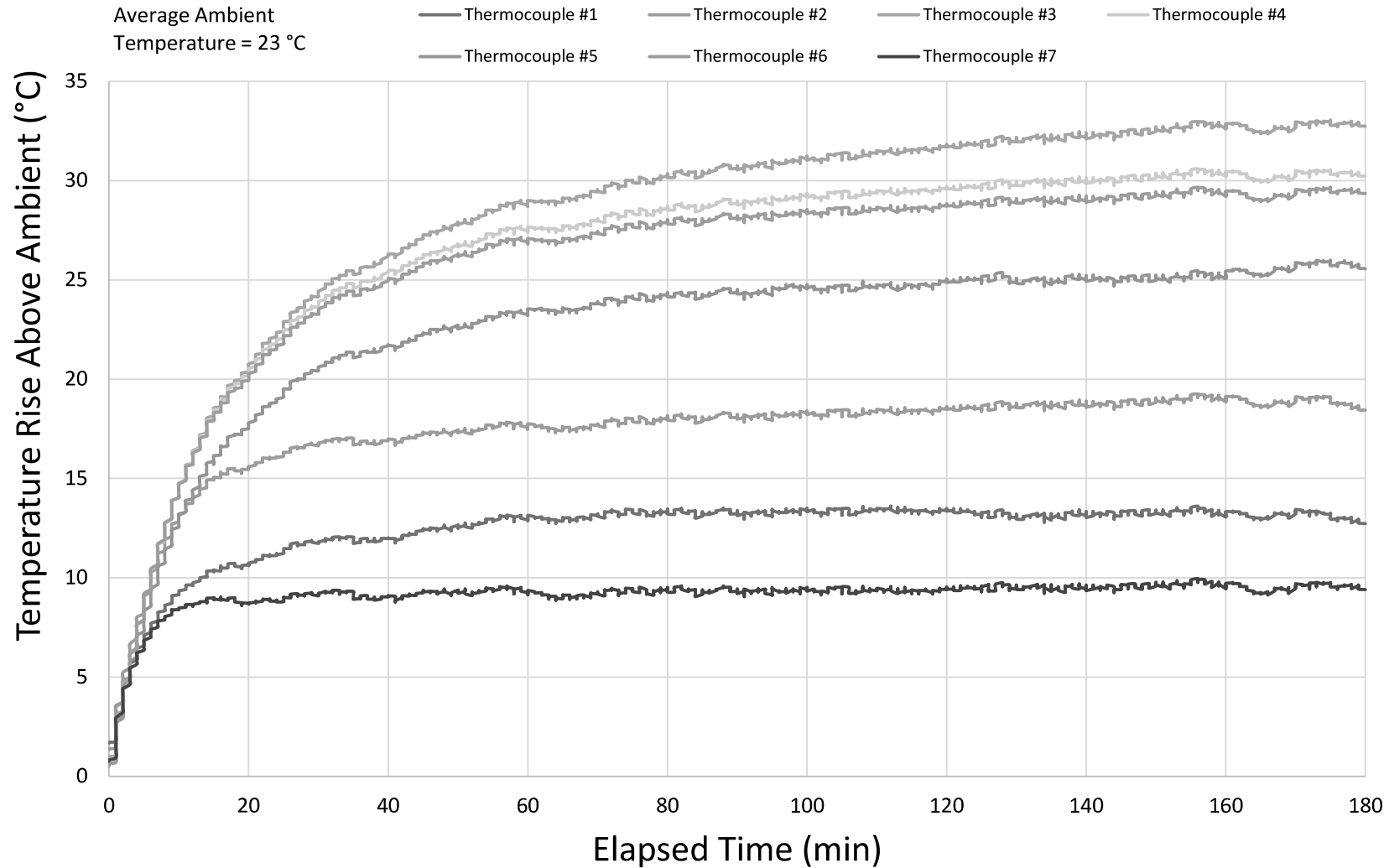


Figure 4: 14/2 CCA Spaced 12" in R43 Insulation at 10 Amps in Ceiling Configuration

WO 2021-260 Copper Clad Aluminum Temperature Study 14 AWG CCA
THHN in 1/2" Flexible Metal Conduit, 12" Spacing in R43 Insulation @ 20
Amps in Ceiling Configuration

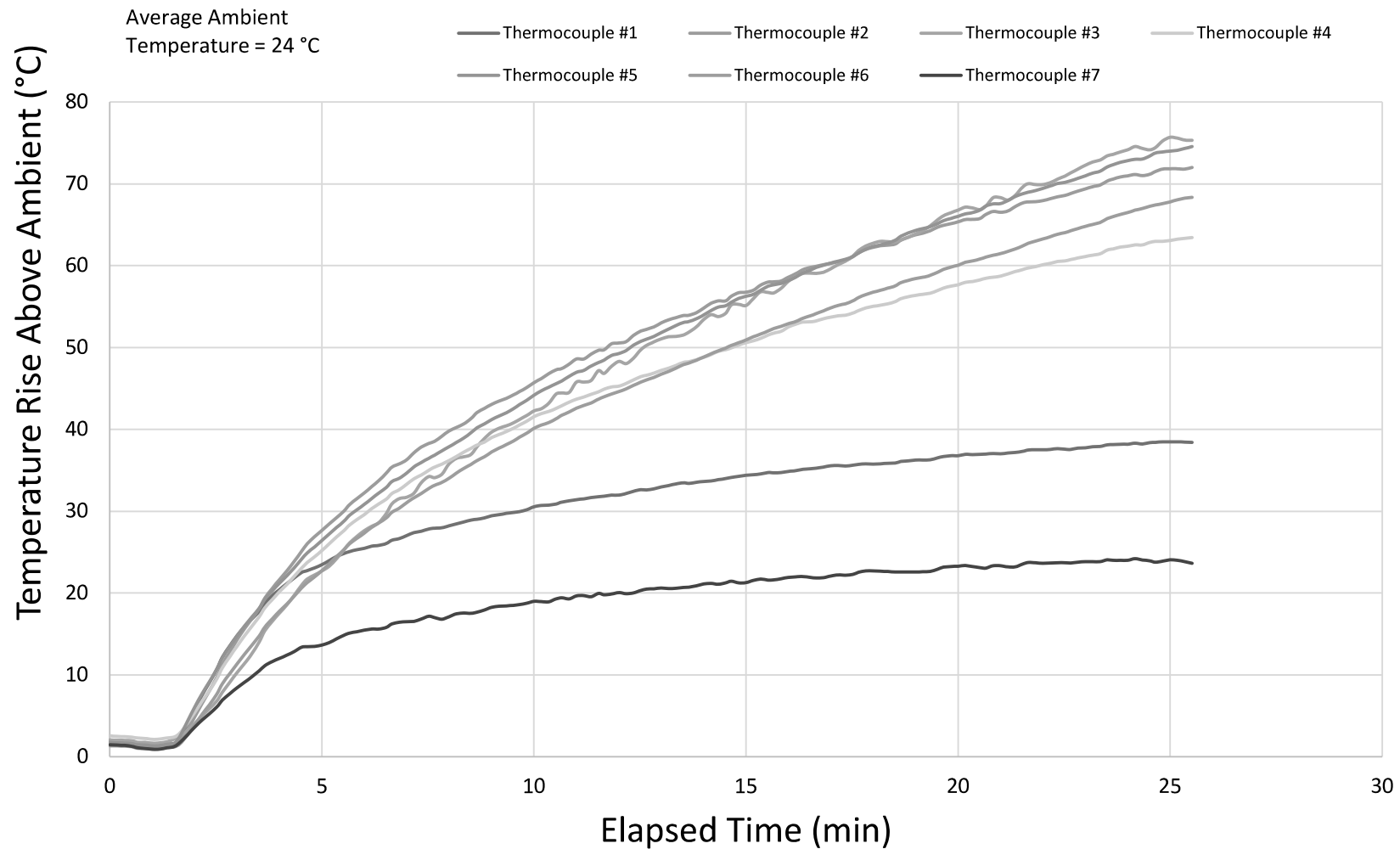


Figure 5: 14 AWG CCA THHN in 1/2" FMC Spaced 12" in R43 Insulation at 20 Amps in Ceiling Configuration

WO 2021-260 Copper Clad Aluminum Temperature Profile Study - 14/2 CCA Spaced 12" in R26 Insulation @ 10 Amps in Wall Configuration

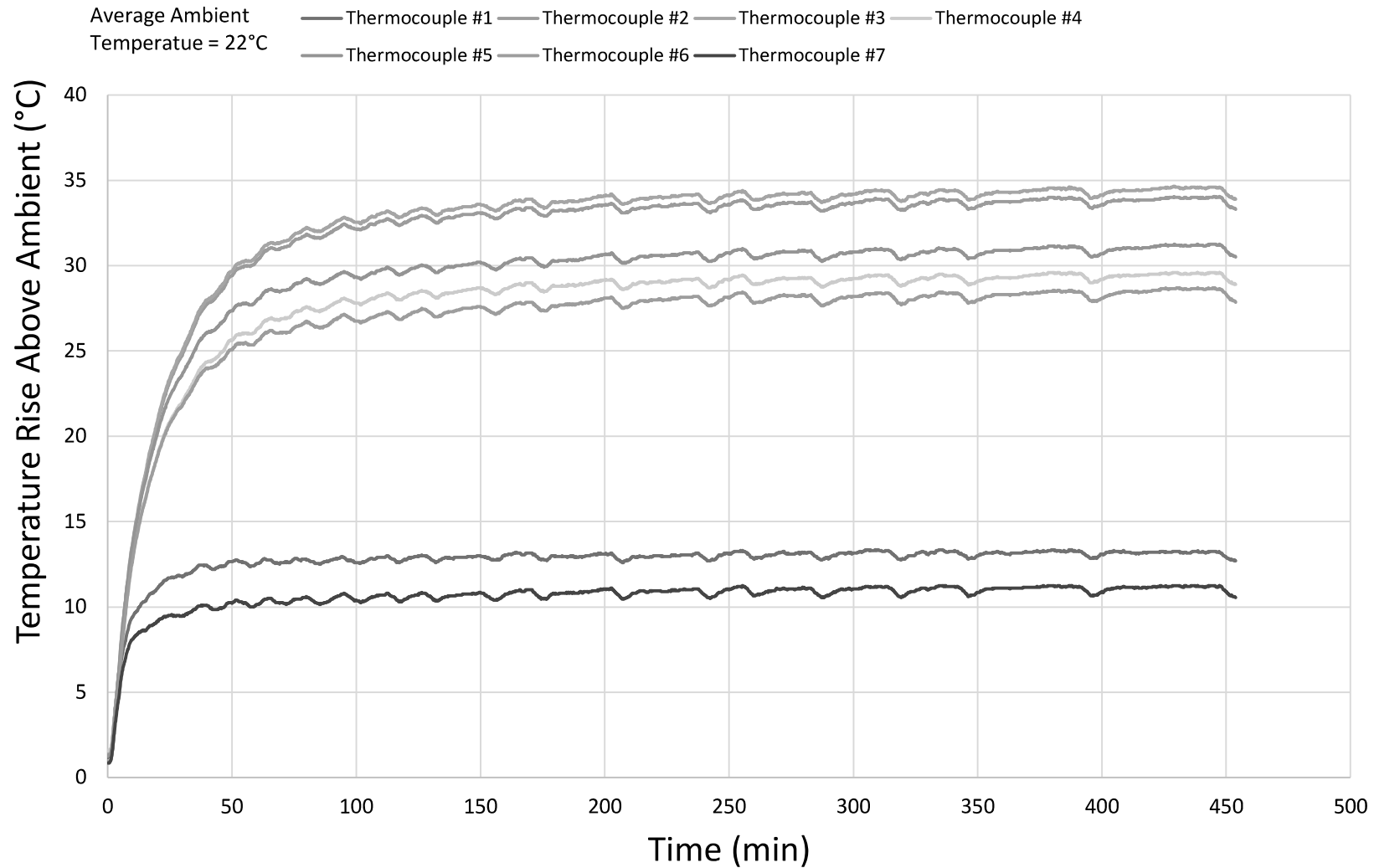


Figure 6: 14/2 CCA Spaced 12" in R26 Insulation at 10 Amps in Wall Configuration

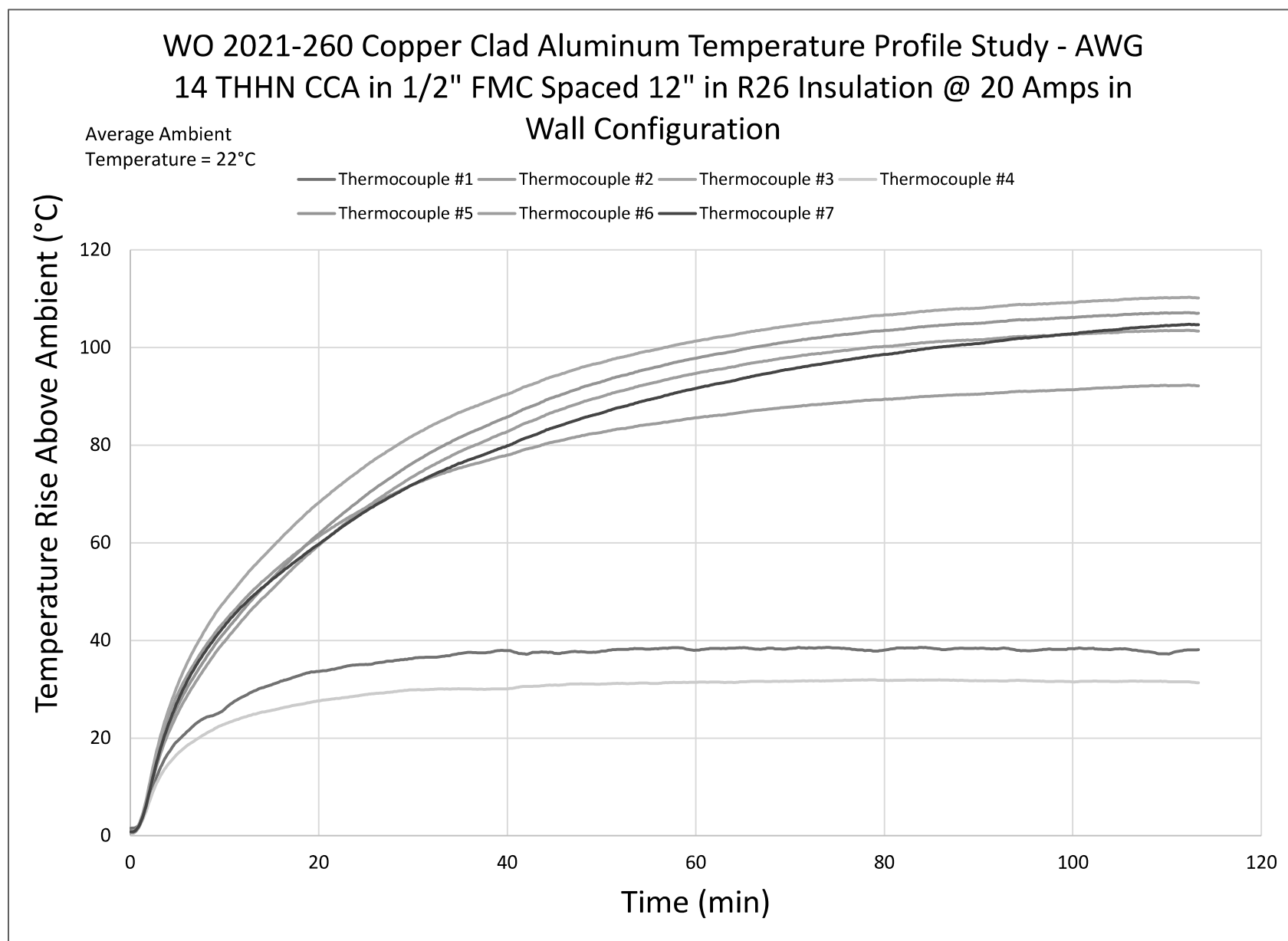


Figure 7: AWG 14 THHN CCA in 1/2" FMC Spaced 12" in R26 Insulation at 20 Amps in Wall Configuration

Appendix A: Calibration Certificates



Applied Technical Services

Certificate of Calibration

Certificate #3019464

**Customer:**

Southwire Company - D.B.Cofer
D.B.Cofer Technology Center
111 Development Drive
Carrollton, GA 30119

**Calibration Location:**

Southwire Company - D.B.Cofer
D.B.Cofer Technology Center
111 Development Drive
Carrollton, GA 30119

Instrument Information:

Manufacturer: Fluke
Model Number: 336
Description: Clamp Meter, AC / DC
Asset Number: 189
Serial Number: 88307992
PO Number: 4503214624

Calibration Information/Results:

As Found Condition : In Tolerance
Action Taken / As Left: In Tolerance - No Adjustment
Temperature: 71° F
Humidity: 55% RH
Calibration Date: 01-Jun-2021
Calibration Due Date: 01-Jun-2022
Calibration Interval: 12 Months

Calib. Procedure: ATS-1044 Rev 2:Calibration of Clamp-On Meters

This instrument has been calibrated using primary or secondary standards whose calibration is traceable to the International System of Units (SI) through the National Institute of Standards and Technology (NIST) or applicable ASTM specification number for hardness testing equipment. Some measurements are traceable to natural, physical constants, consensus standards, or ratio type measurements.

The reported expanded measurement uncertainty is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a confidence level of approximately 95%. This calibration certificate may contain data that is not covered by the Scope of Accreditation. The unaccredited test points, where applicable, are indicated by an asterisk (*), or confined to clearly marked sections. Functional tests are not accredited. The expanded measurement uncertainty is not considered when determining in-tolerance or out-of-tolerance conditions. Results are reviewed, if applicable, to establish where any measurement results exceeded the stated calibration tolerance and to communicate results by means of this certificate.

All calibrations are performed in accordance with the ATS Quality Manual QM1, Rev. 18, dated 10/16/20. Applied Technical Services, Inc.'s Quality System complies with the applicable requirements of ANSI/NCSL Z540-1, ISO 9001:2015, 10CFR50 Appendix B, 10CFR Part 21, and ISO/IEC 17025:2017. The reported data is valid only at the time of the test and related only to the item calibrated. Calibration due dates appearing on this certificate and calibration label are determined by the client and do not imply continued conformance to specifications. This certificate shall not be reproduced except in full, without written permission of Applied Technical Services, Inc.

Technical Remarks:

Calibrated By: *Taylor, Collin A*

Name

Calibration Tech

Title

Calibration Equipment Utilized

Standard I.D.	Mfg.	Model No.	Description	Serial	Cal. Date	Due Date
ATS-04852	Fluke	5522A/1G	Calibrator, Multi-Function	2034901	02/03/2021	02/03/2022
ATS-4049	Fluke	5500A/COIL	Current Amplifier, 50 Turn Current Coil	SV0001521	03/11/2021	03/11/2026

Calibration Data

FUNCTION TESTED	Nominal Value	CALIBRATION TOLERANCE	As Found	Out of Tol	As Left
AC Voltage Accuracy	20.0 V @ 50 Hz	19.3 to 20.7 V [EMU 58 mV]	20.2		Same
	600.0 V @ 50 Hz	593.5 to 606.5 V [EMU 200 mV]	600.9		Same
	600.0 V @ 400 Hz	563.5 to 636.5 V [EMU 200 mV]	593.2		Same
DC Voltage Accuracy	20.0 V	19.3 to 20.7 V [EMU 58 mV]	20.3		Same
	-20.0 V	-20.7 to -19.3 V [EMU 58 mV]	-20.1		Same
	600.0 V	593.5 to 606.5 V [EMU 59 mV]	601.3		Same
	-600.0 V	-606.5 to -593.5 V [EMU 59 mV]	-601.2		Same
Continuity Test: Audible Tone	25 Ohm	Pass/Fail	PASS		Same
Resistance Accuracy	600.0 Ohm	590.5 to 609.5 Ohm [EMU 61 mOhm]	603.0		Same

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Issue date: 01-Jun-2021

Batch Number: 2398705

Calibration Data

FUNCTION TESTED	Nominal Value	CALIBRATION TOLERANCE	As Found	Out of Tol	As Left
	6000 Ohm	5905 to 6095 Ohm [EMU 610 mOhm]	6009		Same
AC Current Accuracy	20.0 A @ 50 Hz	19.1 to 20.9 A [EMU 0.37 A]	20.1		Same
	200.0 A @ 50 Hz	195.5 to 204.5 A [EMU 2 A]	200.5		Same
	500.0 A @ 50 Hz	489.5 to 510.5 A [EMU 3.7 A]	501.2		Same
	600.0 A @ 50 Hz	587.5 to 612.5 A [EMU 4.3 A]	601.3		Same
INRUSH Verification	250.0 A @ 60 Hz	245.6 to 255.6 A [EMU 2.3 A]	253.6		Same
DC Current Accuracy	0.0 A	-0.5 to 0.5 A [EMU 58 mA]	0.0		Same
	20.0 A	19.1 to 20.9 A [EMU 0.25 A]	20.2		Same
	-20.0 A	-20.9 to -19.1 A [EMU 0.25 A]	-20.2		Same
	600.0 A	587.5 to 612.5 A [EMU 3.5 A]	601.3		Same
	-600.0 A	-612.5 to -587.5 A [EMU 3.5 A]	-601.0		Same

End Of Report

Test Number: 3019464 Asset Number: 189 Desc: Fluke / 336, Clamp Meter, AC / DC

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Issue date: 01-Jun-2021

Batch Number: 2398705



Applied Technical Services
Certificate of Calibration
 Certificate #3019662

**Customer:**

Southwire Company - D.B.Cofer
 D.B.Cofer Technology Center
 111 Development Drive
 Carrollton, GA 30119

**Calibration Location:**

Southwire Company - D.B.Cofer
 D.B.Cofer Technology Center
 111 Development Drive
 Carrollton, GA 30119

Instrument Information:

Manufacturer: Graphtec
Model Number: GL840
Description: Data Acquisition Unit - Temperature
Asset Number: 948
Serial Number: C61215753
PO Number: 4503214624

Calibration Information/Results:

As Found Condition : In Tolerance
Action Taken / As Left: In Tolerance - No Adjustment
Temperature: 71° F
Humidity: 55% RH
Calibration Date: 02-Jun-2021
Calibration Due Date: 02-Jun-2022
Calibration Interval: 12 Months

Calib. Procedure: ATS-1046 Rev 2:Calibration of Data Loggers/Chart Recorders/Multifunction Recorders

This instrument has been calibrated using primary or secondary standards whose calibration is traceable to the International System of Units (SI) through the National Institute of Standards and Technology (NIST) or applicable ASTM specification number for hardness testing equipment. Some measurements are traceable to natural, physical constants, consensus standards, or ratio type measurements.

The reported expanded measurement uncertainty is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a confidence level of approximately 95%. This calibration certificate may contain data that is not covered by the Scope of Accreditation. The unaccredited test points, where applicable, are indicated by an asterisk (*), or confined to clearly marked sections. Functional tests are not accredited. The expanded measurement uncertainty is not considered when determining in-tolerance or out-of-tolerance conditions. Results are reviewed, if applicable, to establish where any measurement results exceeded the stated calibration tolerance and to communicate results by means of this certificate.

All calibrations are performed in accordance with the ATS Quality Manual QM1, Rev. 18, dated 10/16/20. Applied Technical Services, Inc.'s Quality System complies with the applicable requirements of ANSI/NCCL Z540-1, ISO 9001:2015, 10CFR50 Appendix B, 10CFR Part 21, and ISO/IEC 17025:2017. The reported data is valid only at the time of the test and related only to the item calibrated. Calibration due dates appearing on this certificate and calibration label are determined by the client and do not imply continued conformance to specifications. This certificate shall not be reproduced except in full, without written permission of Applied Technical Services, Inc.

Technical Remarks:

Calibrated By: *Fugita, Aaron J*
 Name

Calibration Tech
 Title

Calibration Equipment Utilized

Standard I.D.	Mfg.	Model No.	Description	Serial	Cal. Date	Due Date
ATS-04962	Fluke	5522A	Calibrator, Multi-Function	2356901	10/07/2020	10/07/2021

Calibration Data

FUNCTION TESTED	Nominal Value	CALIBRATION TOLERANCE	As Found	Out of Tol	As Left
CH. 1	50.00 °C	48.45 to 51.55 °C [EMU 0.07 °C]	49.10		Same
CH.1	200.00 °C	198.45 to 201.55 °C [EMU 0.09 °C]	199.45		Same
CH. 2	50.00 °C	48.45 to 51.55 °C [EMU 0.07 °C]	49.65		Same
CH. 2	200.00 °C	198.45 to 201.55 °C [EMU 0.09 °C]	199.55		Same
CH. 3	50.00 °C	48.45 to 51.55 °C [EMU 0.07 °C]	49.45		Same
CH. 3	200.00 °C	198.45 to 201.55 °C [EMU 0.09 °C]	199.50		Same
CH. 4	50.00 °C	48.45 to 51.55 °C [EMU 0.07 °C]	49.50		Same
CH. 4	200.00 °C	198.45 to 201.55 °C [EMU 0.09 °C]	199.50		Same
CH. 5	50.00 °C	48.45 to 51.55 °C [EMU 0.07 °C]	49.75		Same
CH. 5	200.00 °C	198.45 to 201.55 °C [EMU 0.09 °C]	199.60		Same

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Calibration Data

FUNCTION TESTED	Nominal Value	CALIBRATION TOLERANCE	As Found	Out of Tot	As Left
CH. 6	50.00 °C	48.45 to 51.55 °C [EMU 0.07 °C]	49.55		Same
CH. 6	200.00 °C	198.45 to 201.55 °C [EMU 0.09 °C]	199.50		Same
CH. 7	50.00 °C	48.45 to 51.55 °C [EMU 0.07 °C]	49.50		Same
CH. 7	200.00 °C	198.45 to 201.55 °C [EMU 0.09 °C]	199.50		Same
CH. 8	50.00 °C	48.45 to 51.55 °C [EMU 0.07 °C]	49.55		Same
CH. 8	200.00 °C	198.45 to 201.55 °C [EMU 0.09 °C]	199.30		Same
CH. 9	50.00 °C	48.45 to 51.55 °C [EMU 0.07 °C]	49.40		Same
CH. 9	200.00 °C	198.45 to 201.55 °C [EMU 0.09 °C]	199.45		Same
CH. 10	50.00 °C	48.45 to 51.55 °C [EMU 0.07 °C]	49.55		Same
CH. 10	200.00 °C	198.45 to 201.55 °C [EMU 0.09 °C]	199.65		Same
CH. 11	50.00 °C	48.45 to 51.55 °C [EMU 0.07 °C]	49.90		Same
CH. 11	200.00 °C	198.45 to 201.55 °C [EMU 0.09 °C]	199.80		Same
CH. 12	50.00 °C	48.45 to 51.55 °C [EMU 0.07 °C]	49.90		Same
CH. 12	200.00 °C	198.45 to 201.55 °C [EMU 0.09 °C]	199.80		Same
CH. 13	50.00 °C	48.45 to 51.55 °C [EMU 0.07 °C]	49.90		Same
CH. 13	200.00 °C	198.45 to 201.55 °C [EMU 0.09 °C]	199.80		Same
CH. 14	50.00 °C	48.45 to 51.55 °C [EMU 0.07 °C]	49.80		Same
CH. 14	200.00 °C	198.45 to 201.55 °C [EMU 0.09 °C]	199.80		Same
CH. 15	50.00 °C	48.45 to 51.55 °C [EMU 0.07 °C]	49.80		Same
CH. 15	200.00 °C	198.45 to 201.55 °C [EMU 0.09 °C]	199.70		Same
CH. 16	50.00 °C	48.45 to 51.55 °C [EMU 0.07 °C]	49.60		Same
CH. 16	200.00 °C	198.45 to 201.55 °C [EMU 0.09 °C]	199.60		Same
CH. 17	50.00 °C	48.45 to 51.55 °C [EMU 0.07 °C]	49.90		Same
CH. 17	200.00 °C	198.45 to 201.55 °C [EMU 0.09 °C]	199.50		Same
CH. 18	50.00 °C	48.45 to 51.55 °C [EMU 0.07 °C]	49.90		Same
CH. 18	200.00 °C	198.45 to 201.55 °C [EMU 0.09 °C]	199.80		Same
CH. 19	50.00 °C	48.45 to 51.55 °C [EMU 0.07 °C]	49.70		Same
CH. 19	200.00 °C	198.45 to 201.55 °C [EMU 0.09 °C]	199.80		Same
CH. 20	50.00 °C	48.45 to 51.55 °C [EMU 0.07 °C]	50.10		Same
CH. 20	200.00 °C	198.45 to 201.55 °C [EMU 0.07 °C]	200.20		Same

End Of Report

Test Number: 3019662 Asset Number: 948 Desc: Graphtec / GL840, Data Acquisition Unit - Temperature

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Issue date: 02-Jun-2021

Batch Number: 2398705



Applied Technical Services
Certificate of Calibration
 Certificate #3019509

**Customer:**

Southwire Company - D.B.Cofer
 D.B.Cofer Technology Center
 111 Development Drive
 Carrollton, GA 30119

**Calibration Location:**

Southwire Company - D.B.Cofer
 D.B.Cofer Technology Center
 111 Development Drive
 Carrollton, GA 30119

Instrument Information:

Manufacturer: Fluke
Model Number: 289
Description: Multimeter, Digital - Handheld
Asset Number: 267
Serial Number: 10140030
PO Number: 4503214624

Calibration Information/Results:

As Found Condition : In Tolerance
Action Taken / As Left: In Tolerance - No Adjustment
Temperature: 71° F
Humidity: 54% RH
Calibration Date: 01-Jun-2021
Calibration Due Date: 01-Jun-2022
Calibration Interval: 12 Months

Calib. Procedure: ATS-1040 Rev 2:Calibration of Handheld Digital Multimeters

This instrument has been calibrated using primary or secondary standards whose calibration is traceable to the International System of Units (SI) through the National Institute of Standards and Technology (NIST) or applicable ASTM specification number for hardness testing equipment. Some measurements are traceable to natural, physical constants, consensus standards, or ratio type measurements.

The reported expanded measurement uncertainty is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a confidence level of approximately 95%. This calibration certificate may contain data that is not covered by the Scope of Accreditation. The unaccredited test points, where applicable, are indicated by an asterisk (*), or confined to clearly marked sections. Functional tests are not accredited. The expanded measurement uncertainty is not considered when determining in-tolerance or out-of-tolerance conditions. Results are reviewed, if applicable, to establish where any measurement results exceeded the stated calibration tolerance and to communicate results by means of this certificate.

All calibrations are performed in accordance with the ATS Quality Manual QM1, Rev. 18, dated 10/16/20. Applied Technical Services, Inc.'s Quality System complies with the applicable requirements of ANSI/NCSL Z540-1, ISO 9001:2015, 10CFR50 Appendix B, 10CFR Part 21, and ISO/IEC 17025:2017. The reported data is valid only at the time of the test and related only to the item calibrated. Calibration due dates appearing on this certificate and calibration label are determined by the client and do not imply continued conformance to specifications. This certificate shall not be reproduced except in full, without written permission of Applied Technical Services, Inc.

Technical Remarks:

Calibrated By: *Taylor, Collin A*
 Name

Calibration Tech
 Title

Calibration Equipment Utilized

Standard I.D.	Mfg.	Model No.	Description	Serial	Cal. Date	Due Date
ATS-04852	Fluke	5522A/1G	Calibrator, Multi-Function	2034901	02/03/2021	02/03/2022

Calibration Data

FUNCTION TESTED	Nominal Value	CALIBRATION TOLERANCE	As Found	Out of Tol	As Left
DC mV: 50mV Range: REL Offset On	0.000 mV	-0.020 to 0.020 mV [EMU 1.2 μ V]	0.001		Same
DC mV: 50mV Range: REL Offset On	0.025 mV	0.005 to 0.045 mV [EMU 1.2 μ V]	0.027		Same
	-0.025 mV	-0.045 to -0.005 mV [EMU 1.2 μ V]	-0.022		Same
	50.000 mV	49.955 to 50.045 mV [EMU 2.1 μ V]	50.011		Same
500mV Range: Rel Off	500.00 mV	499.85 to 500.15 mV [EMU 9.5 μ V]	500.00		Same
	-250.00 mV	-250.08 to -249.92 mV [EMU 8.3 μ V]	-250.07		Same
mV DC/AC: 500mV Range	50.00 mV @ 0 Hz	49.97 to 50.03 mV [EMU 6.1 μ V]	49.99		Same
	250.00 mV @ 35 kHz	237.10 to 262.90 mV [EMU 96 μ V]	248.33		Same
Ohms:REL On: 4 wire: 500Ohm Rng	0.00 Ohm	-0.10 to 0.10 Ohm [EMU 5.9 mOhm]	-0.01		Same
	0.20 Ohm	0.10 to 0.30 Ohm [EMU 5.9 mOhm]	0.18		Same

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Issue date: 01-Jun-2021

Batch Number: 2398705

Calibration Data

FUNCTION TESTED	Nominal Value	CALIBRATION TOLERANCE	As Found	Out of Tol	As Left
	500.00 Ohm	499.65 to 500.35 Ohm [EMU 17 mOhm]	499.91		Same
5 kOhm Range: Rel Off	5.0000 kOhm	4.9973 to 5.0027 kOhm [EMU 170 mOhm]	5.0020		Same
50 kOhm Range	50.000 kOhm	49.973 to 50.027 kOhm [EMU 1.7 Ohm]	49.980		Same
500 kOhm Range	500.00 kOhm	499.60 to 500.40 kOhm [EMU 19 Ohm]	499.66		Same
5 MOhm Range	5.0000 MOhm	4.9921 to 5.0079 MOhm [EMU 0.7 kOhm]	4.9930		Same
30 MOhm Range	30.000 MOhm	29.546 to 30.454 MOhm [EMU 10 kOhm]	29.904		Same
500 MOhm Range	300.0 MOhm	275.8 to 324.2 MOhm [EMU 1 MOhm]	293.3		Same
AC mV: 50mV Range	5.000 mV @ 20Hz	4.865 to 5.135 mV [EMU 10 µV]	4.973		Same
	50.000 mV @ 65kHz	48.210 to 51.790 mV [EMU 72 µV]	49.580		Same
ACmV: 500mV Range	50.00 mV @ 100kHz	47.85 to 52.15 mV [EMU 72 µV]	49.32		Same
	250.00 mV @ 65 kHz	240.85 to 259.15 mV [EMU 45 µV]	248.39		Same
	500.00 mV @ 45Hz	498.25 to 501.75 mV [EMU 140 µV]	499.90		Same
ACmV: Hz	45.000 Hz @ 500mV	44.986 to 45.014 Hz [EMU 580 µHz]	45.000		Same
	950.00 kHz @ 600mV	949.90 to 950.10 kHz [EMU 5.8 Hz]	950.00		Same
VAC: 5V Range	0.1000 V @ 60 Hz	0.0952 to 0.1048 V [EMU 62 µV]	0.1023		Same
	0.5000 V @ 10 kHz	0.4945 to 0.5055 V [EMU 150 µV]	0.4965		Same
	3.0000 V @ 100 kHz	2.8160 to 3.1840 V [EMU 2.2 mV]	3.0363		Same
VAC, Hz% (Duty Cycle) 5 Vpp @50 kHz Sq.	15.00 %	4.90 to 25.10 %	23.16		Same
VAC: 50V Range	15.000 V @ 100 kHz	14.435 to 15.565 V [EMU 15 mV]	15.024		Same
VAC, Lo Pass 500V Range	50.00 V @ 60 Hz	48.60 to 51.40 V [EMU 13 mV]	50.00		Same
"Lo Pass" 500V Rng: 50V @ 1.6kHz	0.00 V	0.00 to 8.00 V	0.00		Same
VAC: 500V Range	500.00 V @ 10kHz	497.75 to 502.25 V [EMU 160 mV]	499.47		Same
VAC: 1000V Range	1000.0 V @ 10kHz	993.5 to 1006.5 V [EMU 320 mV]	999.1		Same
DCV: 5V Range	4.0000 V	3.9988 to 4.0012 V [EMU 89 µV]	4.0004		Same
DCV: 50V Range	-40.000 V	-40.012 to -39.988 V [EMU 1 mV]	-40.003		Same
DCV: 500V Range	400.00 V	399.86 to 400.14 V [EMU 10 mV]	400.05		Same
DCV: 1000V Range	600.0 V	599.6 to 600.4 V [EMU 59 mV]	600.1		Same
DCV: DC/AC	0.2000 V @ 0 Hz	0.1978 to 0.2022 V [EMU 58 µV]	0.2002		Same
	2.0000 V @ 5kHz	1.9640 to 2.0360 V [EMU 360 µV]	1.9994		Same
ACV Peak: 4Vpp Sq Wave:+1V Offset	2.000 V @ 2 kHz	1.863 to 2.137 V [EMU 680 µV]	1.996		Same
Capacitance	5.00 nF	4.90 to 5.10 nF [EMU 23 pF]	4.92		Same
Diode Test: 3.5kOhm Input	2.0000 V	2.0000 to 3.1000 V [EMU 63 µV]	2.8900		Same
Diode Test: 0Ohm Input	0.0000 V	Pass/Fail	PASS		Same
Lo Ohm Test: REL offset	0.200 Ohm	0.180 to 0.220 Ohm [EMU 1.2 mOhm]	0.194		Same
@ 50 Ohm Range	50.000 Ohm	49.905 to 50.095 Ohm [EMU 2.9 mOhm]	50.001		Same
µA AC: 500µA Range	500.00 µA @ 60 Hz	496.80 to 503.20 µA [EMU 0.65 µA]	499.56		Same
	500.00 µA @ 30 kHz	492.85 to 507.15 µA [EMU 5.6 µA]	498.08		Same
µA AC: 5000µA Range	5000.00 µA @ 30kHz	4928.50 to 5071.50 µA [EMU 24 µA]	4999.30		Same
µA DC: 500µA Range	500.00 µA	499.42 to 500.58 µA [EMU 0.1 µA]	500.01		Same
µA DC: 5000µA Range	5000.0 µA	4996.0 to 5004.0 µA [EMU 0.75 µA]	5000.3		Same
mA AC: 50mA Range	4.000 mA @ 20Hz	3.940 to 4.060 mA [EMU 5.6 µA]	3.979		Same
	30.000 mA @ 30 kHz	29.375 to 30.625 mA [EMU 120 µA]	29.922		Same
mA AC: 400mA Range	300.00 mA @ 30kHz	284.60 to 315.40 mA [EMU 1.4 mA]	300.41		Same
	400.00 mA @ 60Hz	397.55 to 402.45 mA [EMU 300 µA]	400.05		Same
mA DC: 50mA Range	0.100 mA	0.090 to 0.110 mA [EMU 0.58 µA]	0.098		Same
	50.000 mA	49.965 to 50.035 mA [EMU 7.5 µA]	50.001		Same
mA DC: 400mA Range	400.00 mA	399.38 to 400.62 mA [EMU 120 µA]	399.97		Same
AAC: 5A Range	5.0000 A @ 1kHz	4.9580 to 5.0420 A [EMU 7 mA]	4.9983		Same
AAC: 10A Range	5.000 A @ 1 kHz	4.955 to 5.045 A [EMU 7 mA]	4.998		Same
ADC: 5A Range	5.0000 A	4.9840 to 5.0160 A [EMU 3 mA]	5.0001		Same
ADC: 10A Range	10.000 A	9.968 to 10.032 A [EMU 5.5 mA]	10.001		Same
LoZ: 1 kVolt Range	120.0 V @ 60Hz	113.6 to 126.4 V [EMU 63 mV]	120.2		Same
Temperature: Type K	0.0 °C	-1.0 to 1.0 °C [EMU 0.17 °C]	1.0		Same
	100.0 °C	98.0 to 102.0 °C [EMU 0.17 °C]	101.5		Same

Test Number: 3019509 Asset Number: 267 Desc: Fluke / 289, Multimeter, Digital - Handheld

Applied Technical Services
1049 Triad Court
Marietta, GA 30062

Phone 770 423-1400 www.atslab.com

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ATS 501, 10/20

Issue date: 01-Jun-2021

Batch Number: 2398705

Calibration Data

FUNCTION TESTED	Nominal Value	CALIBRATION TOLERANCE	As Found	Out of Tol	As Left
	1000.0 °C	989.0 to 1011.0 °C [EMU 0.27 °C]	1001.7		Same
Audible Tone from Length of Leads	25.0 Ohm	PASS/FAIL	PASS		Same

End Of Report

Test Number: 3019509 Asset Number: 267 Desc: Fluke / 289, Multimeter, Digital - Handheld

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Marietta, GA 30062
Phone 770 423-1400 www.atslab.com

ATS 501, 10/20

Issue date: 01-Jun-2021

Batch Number: 2398705



Applied Technical Services Certificate of Calibration



Certificate #3019603



Customer:

Southwire Company - D.B.Cofer
D.B.Cofer Technology Center
111 Development Drive
Carrollton, GA 30119

Calibration Location:

Southwire Company - D.B.Cofer
D.B.Cofer Technology Center
111 Development Drive
Carrollton, GA 30119

Instrument Information:

Manufacturer: Fluke
Model Number: 789
Description: Process Meter
Asset Number: 679
Serial Number: 25200003
PO Number: 4503214624

Calibration Information/Results:

As Found Condition : In Tolerance
Action Taken / As Left: In Tolerance - No Adjustment
Temperature: 73° F
Humidity: 53% RH
Calibration Date: 01-Jun-2021
Calibration Due Date: 01-Jun-2022
Calibration Interval: 12 Months

Calib. Procedure: ATS-1040 Rev 2:Calibration of Handheld Digital Multimeters

This instrument has been calibrated using primary or secondary standards whose calibration is traceable to the International System of Units (SI) through the National Institute of Standards and Technology (NIST) or applicable ASTM specification number for hardness testing equipment. Some measurements are traceable to natural, physical constants, consensus standards, or ratio type measurements.

The reported expanded measurement uncertainty is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a confidence level of approximately 95%. This calibration certificate may contain data that is not covered by the Scope of Accreditation. The unaccredited test points, where applicable, are indicated by an asterisk (*), or confined to clearly marked sections. Functional tests are not accredited. The expanded measurement uncertainty is not considered when determining in-tolerance or out-of-tolerance conditions. Results are reviewed, if applicable, to establish where any measurement results exceeded the stated calibration tolerance and to communicate results by means of this certificate.

All calibrations are performed in accordance with the ATS Quality Manual QM1, Rev. 18, dated 10/16/20. Applied Technical Services, Inc.'s Quality System complies with the applicable requirements of ANSI/NCSL Z540-1, ISO 9001:2015, 10CFR50 Appendix B, 10CFR Part 21, and ISO/IEC 17025:2017. The reported data is valid only at the time of the test and related only to the item calibrated. Calibration due dates appearing on this certificate and calibration label are determined by the client and do not imply continued conformance to specifications. This certificate shall not be reproduced except in full, without written permission of Applied Technical Services, Inc.

Technical Remarks:

Calibrated By: *Taylor, Collin A*

Name

Calibration Tech

Title

Calibration Equipment Utilized

Standard I.D.	Mfg.	Model No.	Description	Serial	Cal. Date	Due Date
ATS-04852	Fluke	5522A/1G	Calibrator, Multi-Function	2034901	02/03/2021	02/03/2022
ATS-4124	Agilent Technologies	34401A	Multimeter, Digital - Benchtop	3146A21255	10/07/2020	10/07/2021

Calibration Data

FUNCTION TESTED	Nominal Value	CALIBRATION TOLERANCE	As Found	Out of Tol	As Left
AC Voltage Accuracy: 400mV Range	100.0 mV @60Hz	98.9 to 101.1 mV [EMU 62 μ V]	99.8		Same
	300.0 mV @60Hz	297.5 to 302.5 mV [EMU 77 μ V]	299.9		Same
4V Range	1.000 V @60Hz	0.991 to 1.009 V [EMU 610 μ V]	0.999		Same
	2.000 V @60Hz	1.984 to 2.016 V [EMU 680 μ V]	1.998		Same
	3.000 V @60Hz	2.977 to 3.023 V [EMU 770 μ V]	2.999		Same
40V Range	10.00 V @60Hz	9.91 to 10.09 V [EMU 6.1 mV]	9.99		Same
	30.00 V @60Hz	29.77 to 30.23 V [EMU 7.7 mV]	29.99		Same
400V Range	100.0 V @60Hz	99.1 to 100.9 V [EMU 61 mV]	99.9		Same
	300.0 V @60Hz	297.7 to 302.3 V [EMU 83 mV]	299.9		Same

Applied Technical Services

1049 Triad Court
Marietta, GA 30062

Phone 770 423-1400 www.at slab.com

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ATS 501, 10/20

Issue date: 01-Jun-2021

Batch Number: 2398705

Calibration Data

FUNCTION TESTED	Nominal Value	CALIBRATION TOLERANCE	As Found	Out of Tol	As Left
1000V Range	100 V @60Hz	97 to 103 V [EMU 580 mV]	100		Same
	800 V @60Hz	792 to 808 V [EMU 630 mV]	801		Same
Frequency Accuracy: 199.99 Hz Range	100.00 Hz @ 5 V	99.99 to 100.01 Hz [EMU 5.8 mHz]	100.00		Same
1999.9 Hz Range	1000.0 Hz @ 5 V	999.9 to 1000.1 Hz [EMU 58 mHz]	1000.0		Same
19.999 kHz Range	10.000 kHz @ 5 V	9.999 to 10.001 kHz [EMU 0.58 Hz]	10.000		Same
DC Voltage Accuracy: 4 V Range	1.000 V	0.998 to 1.002 V [EMU 580 μ V]	1.000		Same
	3.000 V	2.996 to 3.004 V [EMU 580 μ V]	3.000		Same
40 V Range	10.00 V	9.98 to 10.02 V [EMU 5.8 mV]	10.00		Same
	30.00 V	29.96 to 30.04 V [EMU 5.8 mV]	30.00		Same
400 V Range	100.0 V	99.8 to 100.2 V [EMU 58 mV]	100.0		Same
	300.0 V	299.6 to 300.4 V [EMU 58 mV]	300.0		Same
1000 V Range	100 V	99 to 101 V [EMU 580 mV]	100		Same
	800 V	798 to 802 V [EMU 580 mV]	800		Same
400 mV Range	100.0 mV	99.7 to 100.3 mV [EMU 58 μ V]	100.1		Same
	300.0 mV	299.5 to 300.5 mV [EMU 58 μ V]	300.0		Same
Resistance Accuracy: 400 Ohm Range	120.0 Ohm	119.6 to 120.4 Ohm [EMU 58 mOhm]	120.0		Same
	300.0 Ohm	299.2 to 300.8 Ohm [EMU 59 mOhm]	300.0		Same
4 kOhm Range	1.200 kOhm	1.197 to 1.203 kOhm [EMU 580 mOhm]	1.200		Same
	3.000 kOhm	2.993 to 3.007 kOhm [EMU 590 mOhm]	3.000		Same
40 kOhm Range	12.00 kOhm	11.97 to 12.03 kOhm [EMU 5.8 Ohm]	12.00		Same
	30.00 kOhm	29.93 to 30.07 kOhm [EMU 5.9 Ohm]	29.99		Same
400 kOhm Range	120.0 kOhm	119.7 to 120.3 kOhm [EMU 58 Ohm]	120.0		Same
	200.0 kOhm	199.5 to 200.5 kOhm [EMU 58 Ohm]	200.0		Same
4 MOhm Range	1.200 MOhm	1.193 to 1.207 MOhm [EMU 0.59 kOhm]	1.200		Same
	3.000 MOhm	2.987 to 3.013 MOhm [EMU 0.61 kOhm]	2.999		Same
40 MOhm Range	12.00 MOhm	11.67 to 12.33 MOhm [EMU 8 kOhm]	12.00		Same
	30.00 MOhm	29.22 to 30.78 MOhm [EMU 12 kOhm]	30.00		Same
DC Current Accuracy: 30 mA Range	4.000 mA	3.996 to 4.004 mA [EMU 0.87 μ A]	4.000		Same
	12.000 mA	11.992 to 12.008 mA [EMU 1.6 μ A]	12.000		Same
	20.000 mA	19.988 to 20.012 mA [EMU 2.3 μ A]	19.999		Same
1 A Range	0.100 A	0.098 to 0.102 A [EMU 580 μ A]	0.100		Same
	0.400 A	0.398 to 0.402 A [EMU 590 μ A]	0.400		Same
AC Current Accuracy: 1 A Range	0.100 A @ 60 Hz	0.097 to 0.103 A [EMU 580 μ A]	0.100		Same
	0.400 A @ 60 Hz	0.394 to 0.406 A [EMU 650 μ A]	0.401		Same
Current Source: DC mA Test	4.000 mA	3.996 to 4.004 mA [EMU 0.59 μ A]	3.999		Same
	12.000 mA	11.992 to 12.008 mA [EMU 1.1 μ A]	11.999		Same
	20.000 mA	19.988 to 20.012 mA [EMU 1.3 μ A]	20.000		Same
Loop Power	>30 V	Pass / Fail	PASS		Same
250 Ohm Button	>24 V	Pass / Fail	PASS		Same
Diode Test	2.000 V	1.959 to 2.041 V [EMU 580 μ V]	1.999		Same
Continuity Test Beeper On	120 Ohm	Pass Fail	PASS		Same
Beeper Off	240 Ohm	Pass Fail	PASS		Same

End Of Report

Test Number: 3019603 Asset Number: 679 Desc: Fluke / 789, Process Meter

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Phone 770 423-1400 www.atslab.com

ATS 501, 10/20

Issue date: 01-Jun-2021

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Appendix B: Pictures



Figure B.1: Apparatus in Ceiling Configuration with Insulation



Figure B.2: Thermocouple Installed in NM-B Sample



Figure B.3: Thermocouple Installed in NM-B Sample

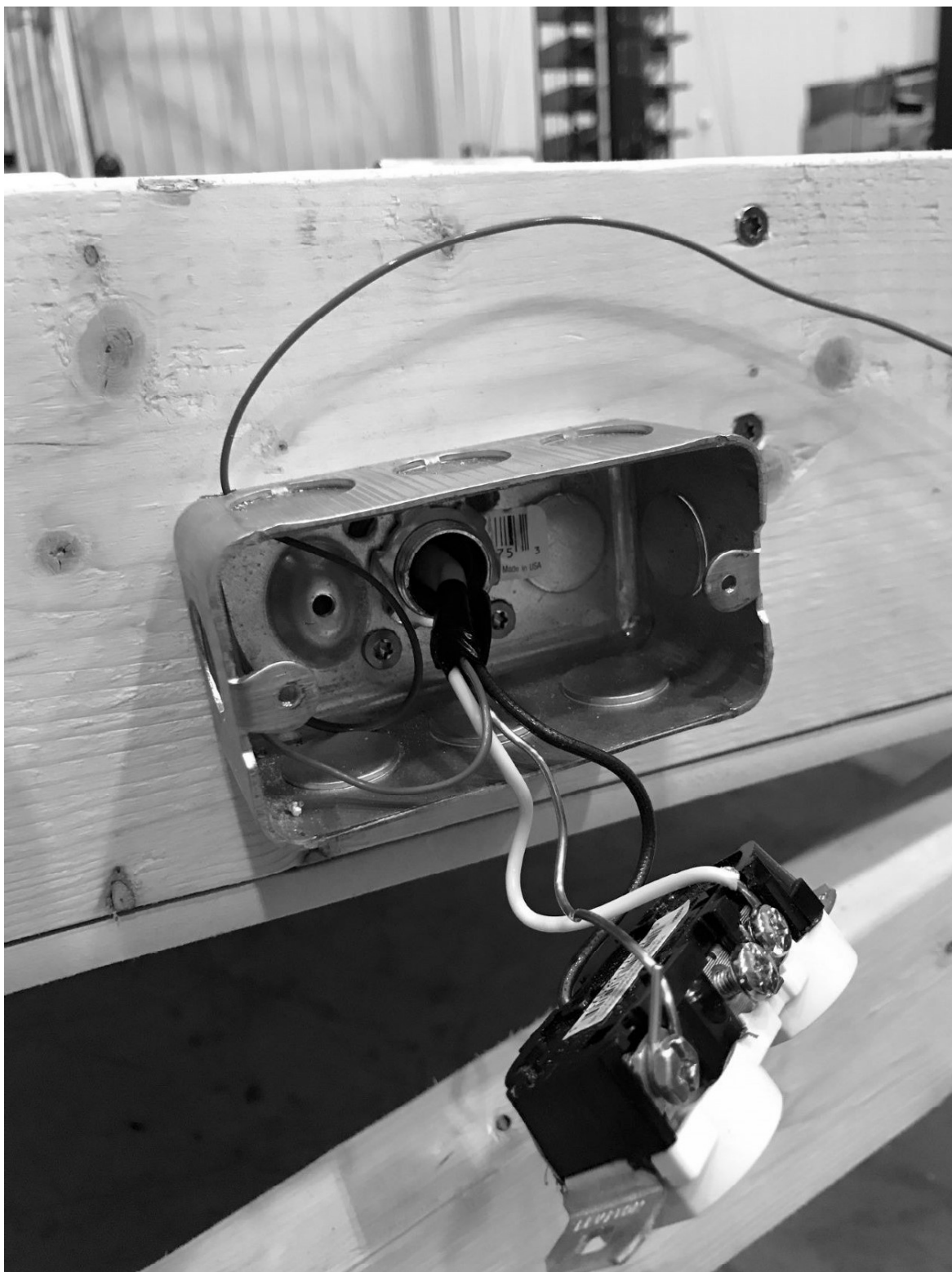


Figure B.4: Thermocouple Installed in Electrical Box

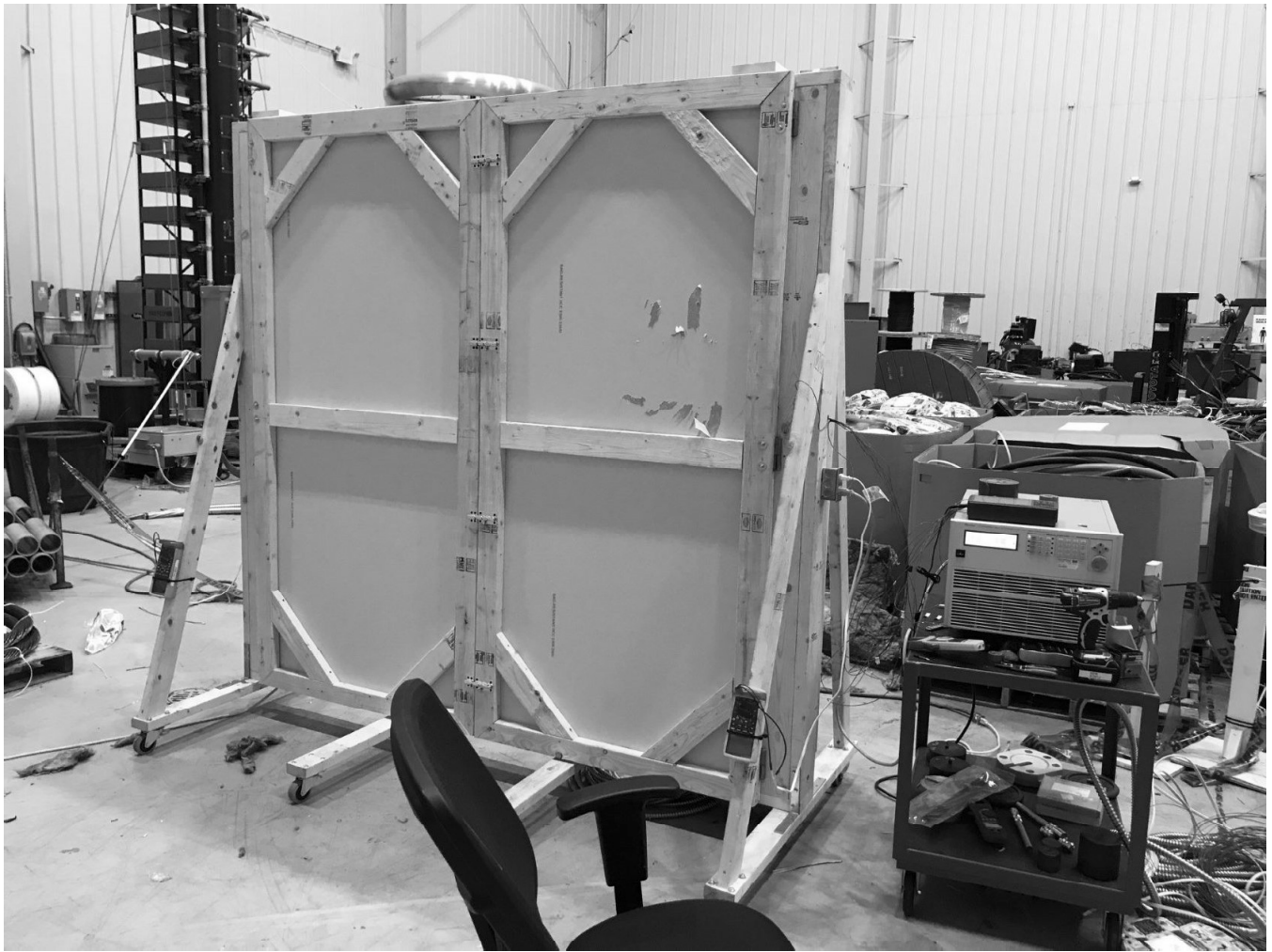


Figure B.5: Apparatus in Wall Configuration with Sheetrock Doors Closed



Figure B.6: Flexible Metal Conduit Installed in Apparatus



Figure B.7: Breaker Box



Figure B.8: Ampmeter, Data Logger, and Load Bank



Figure B.9: NM-B Sample Installed in Apparatus in Ceiling Configuration

**Public Comment No. 2009-NFPA 70-2021 [Section No. 406.3(D)]****(D) Receptacles for Copper-Clad Aluminum Conductors.**

Terminals of 15-ampere and 20-ampere receptacles not marked CO/ALR shall be ~~used with~~ permitted for use with copper and copper-clad aluminum conductors only where so listed. Terminals marked CO/ALR shall be permitted to be used with aluminum, copper, and copper-clad aluminum conductors that are sized in accordance with 240.4(D).

Screwless terminals of the conductor push-in type construction (also known as *push-in-terminals*) employed in a receptacle shall be connected with 14 AWG solid copper wire only.

~~Screwless terminals of the conductor push-in type construction (also known as *push-in-terminals*) employed in a receptacle that is listed and identified for use with 14 AWG solid copper-clad aluminum wire shall be permitted to be connected with 14 AWG solid copper-clad aluminum wire when installed on 10 ampere branch circuits only, in accordance with 240.4(D)(3).~~

Statement of Problem and Substantiation for Public Comment

14 AWG copper-clad aluminum conductors should not be permitted for 10 amp branch circuit applications. To assess the safety of 14 AWG copper-clad aluminum conductors used in branch circuit applications with an assigned ampacity of 10 amps at 60C, tests were conducted at the Marmon Innovation and Technology Center in Hartford, CT. This is a UL Certified Laboratory with personnel experienced in a wide range of certification and performance tests for wire and cable products.

To evaluate the realistic application of 14 AWG copper clad conductors in residential and commercial type installations, cables were installed in thermal insulation and a load applied. NM-B cables are commonly installed in thermal insulation and are permitted to be embedded and surrounded by thermal insulation in ceilings and walls. The cable temperature was measured to determine the temperature rise over time. NM-B cable with 14 AWG copper-clad conductors with a load of less than 10 amps reached temperatures above 60C in approximately one hour. These tests were performed in an ambient temperature of less than 30C. Only a single cable was installed in the installation with significant spacing between the cable sections in order to avoid mutual heating due to proximity. The NEC permits multiple cables to be installed in thermal insulation without temperature correction, which would result in even higher temperatures due to the heat contribution from multiple cables.

These results show that in common, everyday installations, 14 AWG copper-clad aluminum conductors will overheat when loaded to 10 amps.

Related Item

- FR 7601

Submitter Information Verification

Submitter Full Name: Christel Hunter

Organization: Cerro Wire

Street Address:

City:

State:

Zip:

Submittal Date: Wed Aug 18 22:57:44 EDT 2021

Committee: NEC-P18

**Public Comment No. 114-NFPA 70-2021 [Section No. 406.3(H)]**

~~(H)– Receptacle Faceplate Connections.~~

~~All 125-volt 15- or 20-ampere receptacle connections tightened by use of tools shall not be used as points of connection for faceplate power unless specifically evaluated and identified by the receptacle manufacturer.~~

Statement of Problem and Substantiation for Public Comment

This is redundant to the change in 110.14(A) that was made by FR-8556. There is no need to duplicate this rule here.

Related Item

• FR-8556 • FR-7603

Submitter Information Verification

Submitter Full Name: Don Ganiere

Organization: [Not Specified]

Street Address:

City:

State:

Zip:

Submittal Date: Sun Jul 04 13:49:24 EDT 2021

Committee: NEC-P18

**Public Comment No. 1652-NFPA 70-2021 [Section No. 406.3(H)]****(H) Receptacle Faceplate Connections.**

All 125-volt 15- or 20-ampere receptacle connections tightened by use of tools shall not be used as points of connection for faceplate power unless specifically evaluated and identified by the receptacle manufacturer the faceplate is specifically listed for this connection method.

Statement of Problem and Substantiation for Public Comment

It is highly unusual for the original manufacturer of a device to which an accessory is attached to be the party to define if a connection method is safe. This is the job of the listing agency, conforming to current and potential future safety standards. Further, it is the burden of the accessory listing process to determine its safe attachment, not the original device.

Related Public Comments for This Document**Related Comment****Relationship**

Public Comment No. 1653-NFPA 70-2021 [Section No. 406.6(D)]

Related Item

- FR-7603-NFPA 70-2020

Submitter Information Verification

Submitter Full Name: Jason Potterf

Organization: Cisco

Affiliation: Entertainment Services and Technology Association (ESTA)

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City:

State:

Zip:

Submittal Date: Mon Aug 16 23:05:56 EDT 2021

Committee: NEC-P18

**Public Comment No. 171-NFPA 70-2021 [Section No. 406.3(H)]****(H) Receptacle Faceplate Connections.**

All 125-volt 15- or 20-ampere receptacle connections tightened by use of tools shall not be used as points of connection for faceplate power unless specifically evaluated and identified by the receptacle manufacturer, or listed for the purpose .

Statement of Problem and Substantiation for Public Comment

The addition of the wording "or listed for the purpose" should be added to the article so that a Faceplate manufacturer has the ability to have their product tested to the listing requirement of the article. The receptacle manufacturer should not have the ability to create a monopoly for their own benefit. To date we have had zero lawsuits, zero claims and zero complaints related to safety. Without having a listing company, ETL or UL managing the certifications of the products, manufacturers will have the ability to market and create videos that will violate the product safety protocol and requirements.

Related Public Comments for This Document**Related Comment**

Public Comment No. 169-NFPA 70-2021 [Section No. 406.6(D)]

Relationship

Both Address Lighted and USB faceplates

Related Item

- FR7603

Submitter Information Verification

Submitter Full Name: John Quast

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Street Address:

City:

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Submittal Date: Thu Jul 08 16:51:10 EDT 2021

Committee: NEC-P18

**Public Comment No. 1756-NFPA 70-2021 [Section No. 406.3(H)]****~~(H)– Receptacle Faceplate Connections.~~**

~~All 125-volt 15- or 20-ampere receptacle connections tightened by use of tools shall not be used as points of connection for faceplate power unless specifically evaluated and identified by the receptacle manufacturer.~~

Statement of Problem and Substantiation for Public Comment

The section should not be located in 406.3. Section 406.6 contains the requirements for receptacle faceplates. Including this text in this section creates an opportunity for inconsistencies between the two sections.

With respect to the technical concerns with the language in FR 7603, there are at least two and these are explained in more detail in Public Comment 1665 (Section No. 406.6(D)). A brief summary of the concerns include:

There is not much precedent for manufacturers of listed equipment, including receptacle manufacturers, to prohibit or permit how their products may be used after leaving their factories, beyond their instructions. Faceplate manufacturers do not get permission to use their plates on certain manufacturer's receptacles. Faceplates with illumination do not have to be qualified by receptacle manufacturers presently under UL514D. The requirements proposed for UL514D for spring-tensioned contacts, presently as a new Annex E, are for general use and adequately take into account the differences that receptacles present.

The receptacle manufacturers have stated that it is difficult to understand what type/model receptacle is in the wall as they have the same general model built a few different ways and they do not mark the model clearly on the products. If this system for permission from the receptacle manufacturers is pursued, there has to be means to identify the receptacle manufacturer and type on the receptacle in a more prominent way than there is today -- to require having that information visible when the faceplate is removed, such that there are no unnecessarily incursions into the electrical box just to look for a model or manufacturer. It also appears that the receptacle manufacturers are inserting themselves into the role of NRTL, where they determine if the combination is acceptable. How does the Code insure that the requirements from receptacle manufacturers will be standardized as to what is acceptable? A better solution would be a consensus standard and that work has mostly been done already in the proposal for Annex E to UL514D.

Related Item

- FR 7603

Submitter Information Verification

Submitter Full Name: William Koffel

Organization: Koffel Associates, Inc.

Affiliation: Representing SnapPower

Street Address:

City:

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Zip:

Submittal Date: Tue Aug 17 16:35:10 EDT 2021

Committee: NEC-P18

**Public Comment No. 623-NFPA 70-2021 [Section No. 406.3(H)]****(H) Receptacle Faceplate Connections.**

All 125-volt 15- or 20-ampere receptacle connections tightened by use of tools shall not be used as points of connection for faceplate power unless specifically evaluated and identified by the receptacle manufacturer.

Additional Proposed Changes

<u>File Name</u>	<u>Description Approved</u>
18_CN_72.pdf	70_CN72

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 72 appeared in the First Draft Report on First Revisions No. 7603.

The Correlating Committee directs the Panel to review the requirement for redundant language in the phrase "specifically evaluated and identified." By the definition of "identified" in Article 100, the manufacturer cannot identify something without having first evaluated it.

Related Item

- First Revision No. 7603

Submitter Information Verification

Submitter Full Name: CC on NEC-AAC

Organization: NEC Correlating Committee

Street Address:

City:

State:

Zip:

Submittal Date: Mon Aug 02 14:24:41 EDT 2021

Committee: NEC-P18

**Correlating Committee Note No. 72-NFPA 70-2021 [New Section after 406.3(F)]****Submitter Information Verification**

Committee: NEC-P18

Submittal Date: Tue May 04 10:15:22 EDT 2021

Committee Statement

Committee Statement: The Correlating Committee directs the Panel to review the requirement for redundant language in the phrase "specifically evaluated and identified." By the definition of "identified" in Article 100, the manufacturer cannot identify something without having first evaluated it.

First Revision No. 7603-NFPA 70-2020 [New Section after 406.3(F)]

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. 1133-NFPA 70-2021 [Section No. 406.4(D)(1)]**

~~(1)– Grounding-Type Receptacles . . . Receptacles at outlets with grounding means .~~

Where a grounding means exists in the receptacle enclosure or an equipment grounding conductor is installed in accordance with 250.130(C), grounding-type receptacles shall be used and shall be connected to the equipment grounding conductor in accordance with 406.4(C) or 250.130(C).

Statement of Problem and Substantiation for Public Comment

This title more accurately reflects the intent of the body. It will help eliminate the confusion Mr. Hartwell has observed in the field. Moreover, it will help prevent a serious misreading. When someone replaces grounding-type receptacles that were illegally installed at nongrounding outlets--as happens every week--should we require the electrician to run a grounding conductor to the outlet? He or she should treat it in accordance with (2), not (1), whether the former receptacle's ground had been left floating or had been bootlegged to the grounded conductor.

Related Public Comments for This Document

<u>Related Comment</u>	<u>Relationship</u>
Public Comment No. 1134-NFPA 70-2021 [Section No. 406.4(D)(2)]	Same issue
Public Comment No. 1134-NFPA 70-2021 [Section No. 406.4(D)(2)]	

Related Item

- PI4443

Submitter Information Verification

Submitter Full Name: David Shapiro

Organization: Safety First Electrical

Street Address:

City:

State:

Zip:

Submittal Date: Tue Aug 10 08:40:53 EDT 2021

Committee: NEC-P18



Public Comment No. 1134-NFPA 70-2021 [Section No. 406.4(D)(2)]

(2) ~~Non-Grounding-Type Receptacles~~ Receptacles at Outlets ~~Lacking Grounding Means~~ .

Where attachment to an equipment grounding conductor does not exist in the receptacle enclosure, the installation shall comply with 406.4(D)(2)(a), (D)(2)(b), or (D)(2)(c).

(a) A non-grounding-type receptacle(s) shall be permitted to be replaced with another non-grounding-type receptacle(s).

(b) A non-grounding-type receptacle(s) shall be permitted to be replaced with a ground-fault circuit interrupter-type of receptacle(s). These receptacles or their cover plates shall be marked "No Equipment Ground." An equipment grounding conductor shall not be connected from the ground-fault circuit-interrupter-type receptacle to any outlet supplied from the ground-fault circuit-interrupter receptacle.

(c) A non-grounding-type receptacle(s) shall be permitted to be replaced with a grounding-type receptacle(s) where supplied through a ground-fault circuit interrupter. Where grounding-type receptacles are supplied through the ground-fault circuit interrupter, grounding-type receptacles or their cover plates shall be marked "GFCI Protected" and "No Equipment Ground," visible after installation. An equipment grounding conductor shall not be connected between the grounding-type receptacles.

Informational Note No. 1: Some equipment or appliance manufacturers require that the branch circuit to the equipment or appliance includes an equipment grounding conductor.

Informational Note No. 2: See 250.114 for a list of a cord-and-plug-connected equipment or appliances that require an equipment grounding conductor.

Statement of Problem and Substantiation for Public Comment

This title more accurately reflects the intent of the body. It will help eliminate the confusion Mr. Hartwell has observed in the field. Moreover, it will help prevent a serious misreading. When someone replaces grounding-type receptacles that were illegally installed at nongrounding outlets--as happens every week--he or she should treat it in accordance with (2), not (1), whether the former receptacle's ground had been left floating or had been bootlegged to the grounded conductor.

Related Public Comments for This Document

<u>Related Comment</u>	<u>Relationship</u>
Public Comment No. 1133-NFPA 70-2021 [Section No. 406.4(D)(1)]	Same issue
Public Comment No. 1133-NFPA 70-2021 [Section No. 406.4(D)(1)]	

Related Item

• PI3444

Submitter Information Verification

Submitter Full Name: David Shapiro
Organization: Safety First Electrical
Street Address:
City:
State:
Zip:
Submittal Date: Tue Aug 10 08:50:19 EDT 2021
Committee: NEC-P18

**Public Comment No. 1135-NFPA 70-2021 [Section No. 406.4(D)(3)]****(3) Ground-Fault Circuit-Interrupter Protection.**

Ground-fault circuit-interrupter protection for receptacles shall be provided where replacements are made at receptacle outlets that are required to be so protected elsewhere in this Code. Ground-fault circuit interrupters shall be listed.

Exception: ~~Where the outlet box size will not permit the installation of the GFCI receptacle, the receptacle~~ P.I. ~~The receptacle~~ shall be permitted to be replaced with a new receptacle of the existing type, where GFCI protection is provided and the receptacle is marked "GFCI Protected" and "No Equipment Ground," in accordance with 406.4(D)(2)(a), (D)(2)(b), or (D)(2)(c), as applicable.

Statement of Problem and Substantiation for Public Comment

This text restates earlier permissions. This warrants its retention as an I.N. at most. The removed text adds a restriction that limits the use of circuit level or other upstream GFCI protection by box size without substantiation.

Related Item

- PI3444

Submitter Information Verification

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Organization: Safety First Electrical

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City:

State:

Zip:

Submittal Date: Tue Aug 10 08:59:03 EDT 2021

Committee: NEC-P18

**Public Comment No. 1829-NFPA 70-2021 [Section No. 406.4(D)(5)]****(5) Tamper-Resistant Receptacles.**

Listed tamper-resistant receptacles shall be provided where replacements are made at receptacle outlets that are required to be tamper-resistant elsewhere in this *Code*, except where a nongrounding receptacle is replaced with another nongrounding receptacle, or where aluminum branch-circuit conductors are directly terminated on a CO/ALR receptacle ~~replaced with another CO/ALR receptacle~~ installed as a replacement .

Statement of Problem and Substantiation for Public Comment

Perhaps inadvertently, the final wording in FR-7599 entirely defeats the purpose of the original PI. CO/ALR receptacles are generally not used to replace existing CO/ALR receptacles; they are used to replace noncompliant and hazardous conventional receptacles directly connected to aluminum wiring from 50 years ago. By limiting the permission to existing CO/ALR receptacles, the intended benefits of the change will be lost.

Related Item

- FR 7599

Submitter Information Verification

Submitter Full Name: Frederic Hartwell

Organization: Hartwell Electrical Services, Inc.

Street Address:

City:

State:

Zip:

Submittal Date: Wed Aug 18 09:34:19 EDT 2021

Committee: NEC-P18

**Public Comment No. 1382-NFPA 70-2021 [Section No. 406.4(G)]****(G) Protection of Floor Receptacles.**

~~Protection for floor receptacles shall be in accordance with the following: Standpipes of floor receptacles shall allow floor-cleaning equipment to be operated without damage to receptacles.~~

- ~~• All 125-volt, single-phase, 15- and 20-ampere floor receptacles installed in food courts or places of awaiting transportation where food or drinks are allowed shall be GFCI protected.~~

Statement of Problem and Substantiation for Public Comment

The first revision is not enforceable. An AHJ cannot possibly know where a facility "allows" food and drink. Furthermore, there was no technical substantiation to drive this change.

Related Item

- FR 7667

Submitter Information Verification

Submitter Full Name: Ryan Jackson

Organization: Ryan Jackson

Street Address:

City:

State:

Zip:

Submittal Date: Thu Aug 12 13:18:00 EDT 2021

Committee: NEC-P18

**Public Comment No. 1656-NFPA 70-2021 [Section No. 406.4(G)]****(G) Protection of Floor Receptacles.**

Protection for floor receptacles shall be in accordance with the following:

- (1) ~~Standpipes of floor.~~ Floor receptacles shall ~~allow~~ be installed in a manner that allows floor-cleaning equipment to be operated without damage to receptacles.
- (2) All 125-volt, single-phase, 15- and 20-ampere floor receptacles installed in food courts or places of awaiting transportation where food or drinks are allowed shall be GFCI protected.

Statement of Problem and Substantiation for Public Comment

The term standpipe has caused quite a bit of confusion, even among panel members. Users of the code have asked in internet forums what this term means as far back as 2007. A clear directive makes better code, and I have suggested one such clear directive.

Related Item

- FR-7667-NFPA 70-2020

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 23:54:53 EDT 2021
Committee: NEC-P18

**Public Comment No. 1674-NFPA 70-2021 [Section No. 406.4(G)]****(G) Protection of Floor Receptacles.**

Protection for floor receptacles shall be in accordance with the following:

- (1) - ~~Standpipes of floor~~ Floor receptacles shall allow floor-cleaning equipment to be operated without damage to receptacles.
- (2) All 125-volt, single-phase, 15- and 20-ampere floor receptacles installed in food courts or places of awaiting transportation where food or drinks are allowed shall be GFCI protected.

Statement of Problem and Substantiation for Public Comment

What is a "Standpipe" for a floor receptacle? Sounds like something akin to a "Ufer" ground or "Romex."

Related Item

• FR 7667 • PI 1081

Submitter Information Verification

Submitter Full Name: L. Keith Lofland

Organization: IAEI

Affiliation: None

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City:

State:

Zip:

Submittal Date: Tue Aug 17 09:24:45 EDT 2021

Committee: NEC-P18

**Public Comment No. 235-NFPA 70-2021 [Section No. 406.4(G)]****(G) Protection of Floor Receptacles.**

Protection for floor receptacles shall be in accordance with the following:

- (1) - ~~Standpipes~~ Physical protection of floor receptacles shall allow floor-cleaning equipment to be operated without damage to receptacles.
- (2) All 125-volt, single-phase, 15- and 20-ampere floor receptacles installed in food courts or places of awaiting transportation where food or drinks are allowed shall be GFCI protected.

Statement of Problem and Substantiation for Public Comment

This PI proposes to replace the undefined term "standpipes" with "physical protection" to better describe the requirement, improve clarity, and comply with the NEC Style Manual.

3.3.4 Word Clarity. Words and terms used in the documents shall be specific and clear in meaning, and shall avoid jargon, trade terminology, industry-specific terms, or colloquial language that is difficult to understand.

Related Item

- FR 7667

Submitter Information Verification

Submitter Full Name: Vincent Della Croce

Organization: Siemens

Street Address:

City:

State:

Zip:

Submittal Date: Thu Jul 15 09:26:41 EDT 2021

Committee: NEC-P18

**Public Comment No. 622-NFPA 70-2021 [Section No. 406.4(G)]****(G) Protection of Floor Receptacles.**

Protection for floor receptacles shall be in accordance with the following:

- (1) Standpipes of floor receptacles shall allow floor-cleaning equipment to be operated without damage to receptacles.
- (2) All 125-volt, single-phase, 15- and 20-ampere floor receptacles installed in food courts or places of awaiting transportation where food or drinks are allowed shall be GFCI protected.

Additional Proposed Changes

<u>File Name</u>	<u>Description Approved</u>
18_CN_73.pdf	70_CN73

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 72 appeared in the First Draft Report on First Revisions No. 7667.

The Correlating Committee directs the Panel to clarify the phrase "awaiting of transportation" in 406.4(G)(2).

Related Item

- First Revision No. 7667

Submitter Information Verification

Submitter Full Name: CC on NEC-AAC

Organization: NEC Correlating Committee

Street Address:

City:

State:

Zip:

Submittal Date: Mon Aug 02 14:21:35 EDT 2021

Committee: NEC-P18



Correlating Committee Note No. 73-NFPA 70-2021 [New Section after 406.4(F)]

Submitter Information Verification

Committee: NEC-P18

Submittal Date: Tue May 04 10:17:31 EDT 2021

Committee Statement

Committee Statement: The Correlating Committee directs the Panel to clarify the phrase "awaiting of transportation" in 406.4(G)(2).

First Revision No. 7667-NFPA 70-2020 [New Section after 406.4(F)]

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. 1167-NFPA 70-2021 [Section No. 406.5(D)]****(D) Position of Receptacle Faces.**

After installation, receptacle faces shall be flush with or project from faceplates of insulating material and shall project a minimum of 0.4 mm (0.015 in.) from metal faceplates.

Exception: Listed kits or assemblies encompassing receptacles and nonmetallic faceplates that cover the receptacle face, where the plate cannot be installed on any other receptacle, shall be permitted.

I.N. Use of listed kits or assemblies does not eliminate the requirement for receptacle faces to be flush or projecting when accessed for plug insertion.

Statement of Problem and Substantiation for Public Comment

Inspector Feck's field observation may be in part the result of installers presuming that the use of a kit or assembly such as a floor box eliminates the need to comply with various rules, including flush installation of the box for complete enclosure, as well as keeping receptacle faces flush or protruding. Because the language of this Exception could encourage that incorrect extrapolation, adding an I.N. may help.

Related Item

- PI1111

Submitter Information Verification

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Organization: Safety First Electrical

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City:

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Submittal Date: Tue Aug 10 13:41:28 EDT 2021

Committee: NEC-P18

**Public Comment No. 115-NFPA 70-2021 [Section No. 406.6(D)]**

(D) Receptacle Faceplate (Cover Plates) with Integral Night Light and/or USB Charger.

A flush device cover plate that additionally provides a night light and/or Class 2 output connector(s) shall be listed and constructed such that the night light and/or Class 2 circuitry is integral with the flush device cover plate.

Such a faceplate shall connect to the branch circuit using approved wiring methods. It shall not connect through the use of friction or spring contact members with the screw heads or other components of the receptacle- ~~unless specifically evaluated and identified by the receptacle manufacturer~~ .

Statement of Problem and Substantiation for Public Comment

The deleted text would be a correlation issue with the language in 110.14(A) that was added by FR-8556, as that language does not include "specifically evaluated and identified by the receptacle manufacturer".

Related Item

- FR-7564 • FR-8556

Submitter Information Verification

Submitter Full Name: Don Ganiere

Organization: [Not Specified]

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City:

State:

Zip:

Submittal Date: Sun Jul 04 13:58:41 EDT 2021

Committee: NEC-P18

**Public Comment No. 1653-NFPA 70-2021 [Section No. 406.6(D)]****(D) Receptacle Faceplate (Cover Plates) with Integral Night Light and/or USB Charger.**

A flush device cover plate that additionally provides a night light and/or Class 2 output connector(s) shall be listed and constructed such that the night light and/or Class 2 circuitry is integral with the flush device cover plate.

Such a faceplate shall connect to the branch circuit using approved wiring methods. It shall not connect through the use of magnetic, friction or spring contact members with the screw heads or other components of the receptacle unless specifically evaluated and identified by the receptacle manufacturer, the faceplate is specifically listed for this connection method.

Statement of Problem and Substantiation for Public Comment

It is highly unusual for the original manufacturer of a device to which an accessory is attached to be the party to define if a connection method is safe. This is the job of the listing agency, conforming to current and potential future safety standards. Further, it is the burden of the accessory listing process to determine its safe attachment, not the original device. Also, this language did not correlate with 110.14A, potentially allowing magnetic attachment without a listing requirement, which is far more dangerous due to lack of contact force and potential reduction in force if demagnetized.

Related Public Comments for This Document**Related Comment**

Public Comment No. 1652-NFPA 70-2021 [Section No. 406.3(H)]

Relationship

Same technology being regulated

Related Item

- FR-7564-NFPA 70-2020

Submitter Information Verification

Submitter Full Name: Jason Potterf

Organization: Cisco

Affiliation: Entertainment Services and Technology Association (ESTA)

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City:

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Submittal Date: Mon Aug 16 23:12:44 EDT 2021

Committee: NEC-P18



Public Comment No. 1665-NFPA 70-2021 [Section No. 406.6(D)]

(D) Receptacle Faceplate (Cover Plates) with Integral Night Light and/or USB Charger.

A flush device cover plate that additionally provides a night light and/or Class 2 output connector(s) shall be listed and constructed such that the night light and/or Class 2 circuitry is integral with the flush device cover plate.

Such a faceplate shall connect to the branch circuit using approved wiring methods. It shall not connect through the use of friction or spring contact members with the screw heads or other components of the receptacle unless specifically evaluated and identified by the receptacle manufacturer in accordance with the listing of the faceplate.

Statement of Problem and Substantiation for Public Comment

There are a number of concerns created by the First Revision that are being addressed by the Public Comment. These include:

- Restraint of trade
- Improper precedent of one manufacturer controlling the use of another product
- Lack of evaluation criteria
- Restricting the use of a safer product

1. Restraint of Trade without any technical substantiation.

I concur with the negative ballot comment from Mr. Jason D. Potterf. There has been no technical substantiation to justify a change to this section of the NEC. This is an attempt to use the NEC to ban an innovative spring-tensioned contact technology by competitors. The reality is that spring-tensioned contacts have an excellent safety record based upon over 4 million of these NRTL Listed products in the field, installed over six years. There are good designs, such as SnapPower's design, that have earned this exceptional record in the field by using proper materials and by accommodating the various receptacles in the field. The six years of successful and safe use should be leveraged to develop a standard in the form of a new Annex E of UL514D to encourage similar success by other manufacturers.

2. Improper precedent of one manufacturer controlling the use of another product.

There is not much precedent for manufacturers of listed equipment, including receptacle manufacturers, to prohibit or permit how their products may be used after leaving their factories, beyond their instructions. In fact, in lighting retrofit kits, there is a precedent for the opposite, where the original luminaire manufacturer does not have any say when its product is changed in the field, and the new combination of original and new is considered to be listed as well by a separate set of testing by the modifier and an NRTL. Receptacles are sometimes used inside equipment in hazardous locations, without permission from the manufacturer being needed, even though the installation instructions for the receptacles do not detail this, nor are the receptacle manufacturers asked to grant permission for such use. Faceplate manufacturers do not get permission to use their plates on certain manufacturer's receptacles. Traditional pluggable night light manufacturers did not have to get permission to put what are effectively little radiant heaters on receptacles, and receptacles are not tested by default for meeting their 30C rise on terminals with such a temperature load on their immediate front surface. Faceplates with illumination do not have to be qualified by receptacle manufacturers presently under UL514D. The requirements proposed for UL514D for spring-tensioned contacts, presently as a new Annex E, are for general use and adequately take into account the differences that receptacles present. At an extreme here, with this proposal, a receptacle manufacturer can require that its receptacle only be used with its company's illuminated cover plates. The potential for such a barrier is clearly not acceptable and should not be entertained here.

3. Lack of evaluation criteria.

- Inadequate marking of receptacles where visible without risking a hazard -The receptacle manufacturers have stated that it is difficult to identify the type/model receptacle is in the wall as they have the same general model built a few different ways and they do not mark the model clearly on the products. If this system for permission from the receptacle manufacturers is pursued, there has to be means to identify the receptacle manufacturer and type on the receptacle in a more prominent way that there is today -- to require having that information visible when the faceplate is removed, such that there are no unnecessarily incursions into the electrical box just to look for a model or manufacturer. If the First Draft language is to be retained the Code needs to establish how this "manufacturer permission" would actually play out in practice. With this in mind, consideration should be given to limiting the requirement for permission from the receptacle manufacturer to only new products.

- Installation instructions with receptacles permission granted - If a manufacturer gives permission, is that in the installation instructions for the receptacle? Are we then to assume that they will have access to the instructions down the road? Or even know the model of receptacle inherited when moving into a new home? If instructions are even provided on websites where it is updated over time, how would that be enforced from an NRTL standpoint over time? If moving forward the installation instructions are how this would be applied then the question again needs to be raised about existing installations. Our proposal for Annex E of UL514D took into account the various differences in the installed receptacle base, and proposed a test program for general use and installation that avoids these challenges.

- Receptacle manufacturers "evaluating" suitability - It appears that the receptacle manufacturers are inserting themselves into the role of NRTL, where they determine if the combination is acceptable. Are the evaluations conducted at the receptacle manufacturers' labs, to unpublished in-house standards and requirements that are possibly unattainable, with testing conducted outside of the view of the cover plate manufacturers? How does the Code insure that the requirements from receptacle manufacturers will be standardized as to what is acceptable? A better solution would be a consensus standard and that work has mostly been done already in the proposal for Annex E to UL514D.

4. Spring-tensioned contacts are inherently safer.

- Four million less traditional nightlights with blades accessible to children's fingers - Where faceplates are installed there is no need to have traditional pluggable nightlights, where their blades are easily accessible to children. For this reason alone, such spring-tensioned

contact designs should be encouraged, rather than be discouraged or banned. Faceplates keep the electrical connections inside the electrical box and are inherently safer.

- Less opportunities for miss-installation to remove a safe and functioning receptacle - The other competitive, traditional technology to spring-tensioned contacts, are receptacles with integrated nightlight functionality. It is common for Do-It-Yourselfers (DIYers) to replace receptacles, where there is the hope that they will correctly do approximately 12 things that are required for a safe installation. These include turning off the circuit breaker to the receptacle to stuffing blindly the receptacle with wires back into the box without damaging or disconnecting them to tightening the screws with the proper torque.

- Less wiring methods run to the front of receptacle faceplates - By banning spring-tensioned contacts, this change to the NEC is requiring that the #12 and #14 AWG wiring be routed past the sharp edges of the receptacle (the yoke in particular) from the back of the box, have enough slack to allow connection to the faceplate, and then have that needed service loop jammed back into the box, past and not into the front of the receptacle. There is a reason that there have not been many listings of these traditional means. In fact, there is only one traditionally-wired illuminated cover plate listed with UL, despite UL514D being updated in 2013 to allow them. SnapPower has a proposal to UL514D that just returned from review by the THSC and addresses safely designing and testing the spring-tension contacts that consumers want. The traditional wiring methods in this case are more dangerous, people don't want them, and manufacturers are not making them.

For the reasons stated above, we encourage acceptance of this Public Comment which will properly allow the use of listed receptacle cover plates as has historically been the practice.

Related Item

- FR 7564

Submitter Information Verification

Submitter Full Name: William Koffel

Organization: Koffel Associates, Inc.

Affiliation: Representing SnapPower

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City:

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Submittal Date: Tue Aug 17 03:28:03 EDT 2021

Committee: NEC-P18

**Public Comment No. 169-NFPA 70-2021 [Section No. 406.6(D)]****(D) Receptacle Faceplate (Cover Plates) with Integral Night Light and/or USB Charger.**

A flush device cover plate that additionally provides a night light and/or Class 2 output connector(s) shall be listed and constructed such that the night light and/or Class 2 circuitry is integral with the flush device cover plate.

Such a faceplate shall connect to the branch circuit using approved wiring methods. It shall not connect through the use of friction or spring contact members with the screw heads or other components of the receptacle unless specifically evaluated and identified by the receptacle manufacturer, or listed for the purpose .

Statement of Problem and Substantiation for Public Comment

The addition of the wording "or listed for the purpose" should be added to the article so that a Faceplate manufacturer has the ability to have their product tested to the listing requirement of the article. The receptacle manufacturer should not have the ability to create a monopoly for their own benefit. To date we have had zero lawsuits, zero claims and zero complaints related to safety. Without having a listing company, ETL or UL managing the certifications of the products, manufacturers will have the ability to market and create videos that will violate the product safety protocol and requirements.

Related Public Comments for This Document**Related Comment****Relationship**

Public Comment No. 171-NFPA 70-2021 [Section No. 406.3(H)]

Related Item

- FR7564

Submitter Information Verification

Submitter Full Name: John Quast

Organization: AmerTac

Street Address:

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Submittal Date: Thu Jul 08 16:29:00 EDT 2021

Committee: NEC-P18

**Public Comment No. 638-NFPA 70-2021 [Section No. 406.6(D)]**

(D) Receptacle Faceplate (Cover Plates) with Integral Night Light and/or USB Charger.

A flush device cover plate that additionally provides a night light and/or Class 2 output connector(s) shall be listed and constructed such that the night light and/or Class 2 circuitry is integral with the flush device cover plate.

Such a faceplate shall connect to the branch circuit using approved wiring methods. It shall not connect through the use of friction or spring contact members with the screw heads or other components of the receptacle unless specifically evaluated and identified by the receptacle manufacturer.

Additional Proposed Changes

<u>File Name</u>	<u>Description Approved</u>
18_CN_74.pdf	70_CN74

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 74 appeared in the First Draft Report on First Revision No. 7564.

The Correlating Committee directs the Panel review FR 7564 as it relates to FR 8556 (110.14(A)). Since this requirement will appear in Article 110, it is directed that this action be reviewed for compliance with 4.1.1 of the NEC Style Manual. It is not necessary to repeat requirements in Chapters 1-4.

Related Item

- First Revision No. 7564

Submitter Information Verification

Submitter Full Name: CC on NEC-AAC

Organization: NEC Correlating Committee

Street Address:

City:

State:

Zip:

Submittal Date: Mon Aug 02 16:17:34 EDT 2021

Committee: NEC-P18

**Correlating Committee Note No. 74-NFPA 70-2021 [Section No. 406.6(D)]****Submitter Information Verification**

Committee: NEC-P18

Submittal Date: Tue May 04 10:19:07 EDT 2021

Committee Statement

Committee Statement: The Correlating Committee directs the Panel review FR 7564 as it relates to FR 8556 (110.14(A)). Since this requirement will appear in Article 110, it is directed that this action be reviewed for compliance with 4.1.1 of the NEC Style Manual. It is not necessary to repeat requirements in Chapters 1-4.

First Revision No. 7564-NFPA 70-2020 [Section No. 406.6(D)]

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. 1831-NFPA 70-2021 [Section No. 406.9]

406.9 Receptacles in Damp or Wet Locations.

(A) Damp Locations.

A receptacle installed outdoors in a location protected from the weather or in other damp locations shall have an enclosure for the receptacle that is weatherproof when the receptacle is covered (attachment plug cap not inserted and receptacle covers closed).

An installation suitable for wet locations shall also be considered suitable for damp locations.

A receptacle shall be considered to be in a location protected from the weather where located under roofed open porches, canopies, marquees, and the like, and will not be subjected to a beating rain or water runoff. All 125- and 250-volt nonlocking receptacles shall be a listed weather-resistant type. Hinged covers of outlet box hoods shall be able to open at least 90 degrees from the closed to open position, after installation.

Informational Note: See ANSI/NEMA WD 6–2016, *Wiring Devices — Dimensional Specifications*, for the types of receptacles covered by this requirement.

(B) Wet Locations.

(1) Receptacles of 15 Amperes and 20 Amperes in a Wet Location.

Receptacles of 15 amperes and 20 amperes, 125 volts and 250 volts installed in a wet location shall have an enclosure that is weatherproof whether or not the attachment plug cap is inserted. An outlet box hood installed for this purpose shall be listed and shall be identified as “extra-duty.” Other listed products, enclosures, or assemblies providing weatherproof protection that do not utilize an outlet box hood need not be identified “extra duty.” Hinged covers of outlet box hoods shall be able to open at least 90 degrees from the closed to open position, after installation.

Informational Note No. 1: See ANSI/UL 514D–2016, *Cover Plates for Flush-Mounted Wiring Devices*, for extra-duty outlet box hoods. “Extra duty” identification and requirements are not applicable to listed receptacles, faceplates, outlet boxes, enclosures, or assemblies that are identified as either being suitable for wet locations or rated as one of the outdoor enclosure-type numbers of Table 110.28 that does not utilize an outlet box hood.

Exception: 15- and 20-ampere, 125- through 250-volt receptacles installed in a wet location and subject to routine high-pressure spray washing shall be permitted to have an enclosure that is weatherproof when the attachment plug is removed.

All 15- and 20-ampere, 125- and 250-volt nonlocking-type receptacles shall be listed and so identified as the weather-resistant type.

Informational Note No. 2: See ANSI/NEMA WD 6–2016, *Wiring Devices — Dimensional Specifications*, for receptacle configurations. The configuration of weather-resistant receptacles covered by this requirement are identified as 5-15, 5-20, 6-15, and 6-20.

(2) Other Receptacles.

All other receptacles installed in a wet location shall be listed and so identified as the weather-resistant type, and installation shall comply with 406.9(B)(2)(a) or (B)(2)(b).

(a) A receptacle installed in a wet location, where the product intended to be plugged into it is not attended while in use, shall have an enclosure that is weatherproof with the attachment plug cap inserted or removed.

(b) A receptacle installed in a wet location where the product intended to be plugged into it will be attended while in use (e.g., portable tools) shall have an enclosure that is weatherproof when the attachment plug is removed.

(C) Bathtub and Shower Space.

Receptacles shall not be installed within a zone measured 900 mm (3 ft) horizontally from any outside edge of the bathtub or shower stall, including the space outside the bathtub or shower stall space below the zone.

The zone also includes the space measured vertically from the floor to 2.5 m (8 ft) above the top of the bathtub rim or shower stall threshold. The identified zone is all-encompassing and shall include the space directly over the bathtub or shower stall and the space below this zone, but not the space separated by a floor, wall, ceiling, door, window, or fixed barrier.

Exception No. 1: Receptacles installed in accordance with 680.73 shall be permitted.

Exception No. 2: In bathrooms with less than the required zone, the receptacle(s) required by 210.52(D) shall be permitted to be installed opposite the bathtub rim or shower stall threshold on the farthest wall within the room.

Exception No. 3: Weight supporting ceiling receptacles (WSCR) shall be permitted to be installed for listed luminaires that employ a weight supporting attachment fitting (WSAF) in damp locations complying with 410.10(D).

(D) Flush Mounting with Faceplate.

The enclosure for a receptacle installed in an outlet box flush-mounted in a finished surface shall be made weatherproof by means of a weatherproof faceplate assembly that provides a watertight connection between the plate and the finished surface.

Statement of Problem and Substantiation for Public Comment

The 90 degree open rule is an excellent addition to the Code. In fact it should apply in wet locations, perhaps even more urgently so, in addition to damp locations. The literal text of FR-7598, perhaps inadvertently, only adds the requirement to damp locations.

Related Item

• FR-7598

Submitter Information Verification

Submitter Full Name: Frederic Hartwell

Organization: Hartwell Electrical Services, Inc.

Street Address:

City:

State:

Zip:

Submittal Date: Wed Aug 18 09:51:26 EDT 2021

Committee: NEC-P18

**Public Comment No. 93-NFPA 70-2021 [Section No. 406.9(A)]****(A) Damp Locations.**

A receptacle installed outdoors in a location protected from the weather or in other damp locations shall have an enclosure for the receptacle that is weatherproof when the receptacle is covered (attachment plug cap not inserted and receptacle covers closed).

An installation suitable for wet locations shall also be considered suitable for damp locations.

A receptacle shall be considered to be in a location protected from the weather where located under roofed open porches, canopies, marquees, and the like, and will not be subjected to a beating rain or water runoff. All 125- and 250-volt nonlocking receptacles shall be a listed weather-resistant type. Hinged covers of outlet box hoods shall be able to open at least 90 degrees from the closed position, or fully open if the cover is not designed to open 90 degrees, from the closed to open position, after installation.

Informational Note: See ANSI/NEMA WD 6–2016, *Wiring Devices — Dimensional Specifications*, for the types of receptacles covered by this requirement.

Statement of Problem and Substantiation for Public Comment

There are listed outlet box hoods that have successfully served the market for decades that fully open slightly less than 90 degrees. The words from the first revision could be interpreted as a product construction requirement which I do not believe was the intent based on the public input.

Related Item

- FR 7598

Submitter Information Verification

Submitter Full Name: Gregory Steinman

Organization: ABB Installation Products Inc.

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City:

State:

Zip:

Submittal Date: Fri Jul 02 11:41:10 EDT 2021

Committee: NEC-P18



Public Comment No. 639-NFPA 70-2021 [Sections 406.9(A), 406.9(B)]

Sections 406.9(A), 406.9(B)

(A) Damp Locations.

A receptacle installed outdoors in a location protected from the weather or in other damp locations shall have an enclosure for the receptacle that is weatherproof when the receptacle is covered (attachment plug cap not inserted and receptacle covers closed).

An installation suitable for wet locations shall also be considered suitable for damp locations.

A receptacle shall be considered to be in a location protected from the weather where located under roofed open porches, canopies, marquees, and the like, and will not be subjected to a beating rain or water runoff. All 125- and 250-volt nonlocking receptacles shall be a listed weather-resistant type. Hinged covers of outlet box hoods shall be able to open at least 90 degrees from the closed to open position, after installation.

Informational Note: See ANSI/NEMA WD 6–2016, *Wiring Devices — Dimensional Specifications*, for the types of receptacles covered by this requirement.

(B) Wet Locations.

(1) Receptacles of 15 Amperes and 20 Amperes in a Wet Location.

Receptacles of 15 amperes and 20 amperes, 125 volts and 250 volts installed in a wet location shall have an enclosure that is weatherproof whether or not the attachment plug cap is inserted. An outlet box hood installed for this purpose shall be listed and shall be identified as "extra-duty." Other listed products, enclosures, or assemblies providing weatherproof protection that do not utilize an outlet box hood need not be identified "extra duty."

Informational Note No. 1: See ANSI/UL 514D–2016, *Cover Plates for Flush-Mounted Wiring Devices*, for extra-duty outlet box hoods. "Extra duty" identification and requirements are not applicable to listed receptacles, faceplates, outlet boxes, enclosures, or assemblies that are identified as either being suitable for wet locations or rated as one of the outdoor enclosure-type numbers of Table 110.28 that does not utilize an outlet box hood.

Exception: 15- and 20-ampere, 125- through 250-volt receptacles installed in a wet location and subject to routine high-pressure spray washing shall be permitted to have an enclosure that is weatherproof when the attachment plug is removed.

All 15- and 20-ampere, 125- and 250-volt nonlocking-type receptacles shall be listed and so identified as the weather-resistant type.

Informational Note No. 2: See ANSI/NEMA WD 6–2016, *Wiring Devices — Dimensional Specifications*, for receptacle configurations. The configuration of weather-resistant receptacles covered by this requirement are identified as 5-15, 5-20, 6-15, and 6-20.

(2) Other Receptacles.

All other receptacles installed in a wet location shall be listed and so identified as the weather-resistant type, and installation shall comply with 406.9(B)(2)(a) or (B)(2)(b).

(a) A receptacle installed in a wet location, where the product intended to be plugged into it is not attended while in use, shall have an enclosure that is weatherproof with the attachment plug cap inserted or removed.

(b) A receptacle installed in a wet location where the product intended to be plugged into it will be attended while in use (e.g., portable tools) shall have an enclosure that is weatherproof when the attachment plug is removed.

Additional Proposed Changes

File Name	Description Approved
18_CN_75.pdf	70_CN75

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 75 appeared in the First Draft Report on First Revision No. 7598.

The Correlating Committee directs that 406.9(6)(2) be rewritten to be consistent with the phrasing in 406.9(A), with respect to the "listed weather-resistant type" wording. Also, quotations marks for "extra duty" is not consistent with the action taken in FR 7506.

Related Item

- First Revision No. 7598

Submitter Information Verification

Submitter Full Name: CC on NEC-AAC

Organization: NEC Correlating Committee

Street Address:

City:

State:

Zip:

Submittal Date: Mon Aug 02 16:29:38 EDT 2021

Committee: NEC-P18

**Correlating Committee Note No. 75-NFPA 70-2021 [Sections 406.9(A), 406.9(B)]****Submitter Information Verification**

Committee: NEC-P18

Submittal Date: Tue May 04 10:23:27 EDT 2021

Committee Statement

Committee Statement: The Correlating Committee directs that 406.9(B)(2) be rewritten to be consistent with the phrasing in 406.9(A), with respect to the "listed weather-resistant type" wording. Also, quotations marks for "extra duty" is not consistent with the action taken in FR 7506.

First Revision No. 7598-NFPA 70-2020 [Sections 406.9(A), 406.9(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. 112-NFPA 70-2021 [Section No. 406.9(C)]****(C) Bathtub and Shower Space.**

Receptacles shall not be installed within a zone measured 900 mm (3 ft) horizontally from any outside edge of the bathtub or shower stall, including the space outside the bathtub or shower stall space below the zone.

The zone also includes the space measured vertically from the floor to 2.5 m (8 ft) above the top of the bathtub rim or shower stall threshold. The identified zone is all-encompassing and shall include the space directly over the bathtub or shower stall and the space below this zone, but not the space separated by a floor, wall, ceiling, door, window, or fixed barrier.

Exception No. 1: Receptacles installed in accordance with 680.73 shall be permitted.

Exception No. 2: In bathrooms with less than the required zone, the receptacle(s) required by 210.52(D) shall be permitted to be installed opposite the bathtub rim or shower stall threshold on the farthest wall within the room.

Exception No. 3: Weight supporting ceiling receptacles (WSCR) shall be permitted to be installed for listed luminaires that employ a weight supporting attachment fitting (WSAF) in damp locations complying with 410.10(D).

Exception No. 4: In a dwelling unit, a single receptacle shall be permitted for an electronic toilet or personal hygiene device such as an electronic bidet seat. The receptacle shall be readily accessible and located at one of the following: (1) The wall behind the toilet but not behind the tank. (2) The opposite side of the toilet from the bathtub or shower.

Statement of Problem and Substantiation for Public Comment

This revision is to incorporate an oversight as outlined in TIA Log No.: 1598 (which as of the date of this comment is currently still pending). Electronic "smart" toilets or more commonly bidets are growing in popularity in recent years. As discussed in the TIA, these devices are commonly located adjacent to a bathtub or shower and would be located within the prohibited space as defined in 406.9(c).

By prohibiting a receptacle in this space prevents a qualified installer from installing a legitimate product which requires power. Such a prohibition will result in a consumer work around that would be more unsafe than a single GFCI protected receptacle.

Related Item

- TIA Log No.: 1598 to NFPA 70

Submitter Information Verification

Submitter Full Name: James Kerins

Organization: [Not Specified]

Street Address:

City:

State:

Zip:

Submittal Date: Sun Jul 04 12:17:56 EDT 2021

Committee: NEC-P18

**Public Comment No. 1441-NFPA 70-2021 [Section No. 406.9(C)]****(C) Bathtub and Shower Space.**

Receptacles shall not be installed within a zone measured 900 mm (3 ft) horizontally from any outside edge of the bathtub or shower stall, including the space outside the bathtub or shower stall space below the zone.

The zone also includes the space measured vertically from the floor to 2.5 m (8 ft) above the top of the bathtub rim or shower stall threshold. The identified zone is all-encompassing and shall include the space directly over the bathtub or shower stall and the space below this zone, but not the space separated by a floor, wall, ceiling, ~~door~~, window, or fixed barrier.

Exception No. 1: Receptacles installed in accordance with 680.73 shall be permitted.

Exception No. 2: In bathrooms with less than the required zone, the receptacle(s) required by 210.52(D) shall be permitted to be installed opposite the bathtub rim or shower stall threshold on the farthest wall within the room.

Exception No. 3: Weight supporting ceiling receptacles (WSCR) shall be permitted to be installed for listed luminaires that employ a weight supporting attachment fitting (WSAF) in damp locations complying with 410.10(D).

Statement of Problem and Substantiation for Public Comment

The addition of "door" to this section may be interpreted to include a shower or tub door to the shower or tub stall enclosure. First, some doors on tub and shower enclosures are slide type and the hazard remains. Next, a shower and tub doors may be replaced with a curtain which will reintroduce the hazard.

Related Item

- FR No. 7608

Submitter Information Verification

Submitter Full Name: Peter Diamond

Organization: Town of Norfolk Massachusetts

Affiliation: Massachusetts Wire Inspector Association

Street Address:

City:

State:

Zip:

Submittal Date: Fri Aug 13 13:29:38 EDT 2021

Committee: NEC-P18



Public Comment No. 328-NFPA 70-2021 [Section No. 406.9(C)]

(C) Bathtub and Shower Space.

Receptacles shall not be installed within a zone measured 900 mm (3 ft) horizontally from any outside edge of the bathtub or shower stall, including the space outside the bathtub or shower stall space below the zone.

The zone also includes the space measured vertically from the floor to 2.5 m (8 ft) above the top of the bathtub rim or shower stall threshold. The identified zone is all-encompassing and shall include the space directly over the bathtub or shower stall and the space below this zone, but not the space separated by a floor, wall, ceiling, door, window, or fixed barrier.

Exception No. 1: Receptacles installed in accordance with 680.73 shall be permitted.

Exception No. 2: In bathrooms with less than the required zone, the receptacle(s) required by 210.52(D) shall be permitted to be installed opposite the bathtub rim or shower stall threshold on the farthest wall within the room.

Exception No. 3: Weight supporting ceiling receptacles (WSCR) shall be permitted to be installed for listed luminaires that employ a weight supporting attachment fitting (WSAF) in damp locations complying with 410.10(D).

Exception No. 4: In a dwelling unit, a single receptacle shall be permitted for an electronic toilet or personal hygiene device such as an electronic bidet seat. The receptacle shall be readily accessible and located on one of the following:

(1) The wall behind the toilet but not behind the tank

(2) The opposite side of the toilet from the bathtub or shower

Additional Proposed Changes

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
Proposed_TIA_1598_to_NFPA_70.pdf	Copy of TIA 1598 Sent to NFPA for Consideration.	

Statement of Problem and Substantiation for Public Comment

It is quite common for a toilet to be located next to a bathtub or shower in a residential bathroom. The existing text in NFPA 70 could prevent the installation of a receptacle that is necessary for the operation of an electronic toilet (also known as a "smart toilet") or personal hygiene device (e.g., electronic bidet seat) where a toilet is located within 3 feet horizontally of a bathtub or shower. Application of the receptacle placement requirements has the potential to place an undue burden on the consumer whereby additional cost may be incurred to position the receptacle in an acceptable location without considering potential structural barriers behind the wall that may further restrict installation. Therefore, the proposed exception is necessary to ensure that such plumbing products are permitted to be installed while not jeopardizing the level of electrical safety that the standard seeks. As such, due to the proximity of the individual receptacle to the bathtub or shower, it would be required by NEC Section 210.8(A)(9) to be protected by a Class A GFCI device minimizing any potential shock hazard. Moreover, it is our understanding that products like electronic toilets and personal hygiene devices were not taken into consideration during the discussion of the proposal prior to adoption into the current standard.

The emergency nature, links to supporting literature, and a figure for additional clarification for the proposed exception are included in the accompanying document TIA 1598.

Related Item

• FR-7608 • PI No.1258 • PI No.2586

Submitter Information Verification

Submitter Full Name: Kyle Thompson

Organization: PMI

Street Address:

City:

State:

Zip:

Submission Date: Thu Jul 22 13:27:47 EDT 2021

Committee: NEC-P18

NFPA 70®-2020 Edition

National Electrical Code®

TIA Log No.: 1598

Reference: 406.9(C), Exception No. 2(new)

Comment Closing Date: TBD

Submitter: Kerry Stackpole, Plumbing Manufacturers International (PMI)

www.nfpa.org/70

1. Add a new Exception No. 2 to Section 406.9(C) to read as follows:

406.9 Receptacles in Damp or Wet Locations. ...

(C) Bathtub and Shower Space. Receptacles shall not be installed within a zone measured 900 mm (3 ft) horizontally and 2.5 m (8 ft) vertically from the top of the bathtub rim or shower stall threshold. The identified zone is all-encompassing and shall include the space directly over the tub or shower stall.

Exception No. 1: In bathrooms with less than the required zone the receptacle(s) shall be permitted to be installed opposite the bathtub rim or shower stall threshold on the farthest wall within the room.

Exception No. 2: In a dwelling unit, a single receptacle shall be permitted for an electronic toilet or personal hygiene device such as an electronic bidet seat. The receptacle shall be readily accessible and located on one of the following:

(1) The wall behind the toilet but not behind the tank

(2) The opposite side of the toilet from the bathtub or shower

Substantiation: It is quite common for a toilet to be located next to a bathtub or shower in a residential bathroom. The existing text in NFPA 70 could prevent the installation of a receptacle that is necessary for the operation of an electronic toilet (also known as a “smart toilet”) or personal hygiene device (e.g., electronic bidet seat) where a toilet is located within 3 feet horizontally of a bathtub or shower. Application of the receptacle placement requirements has the potential to place an undue burden on the consumer whereby additional cost may be incurred to position the receptacle in an acceptable location without considering potential structural barriers behind the wall that may further restrict installation. Therefore, the proposed exception is necessary to ensure that such plumbing products are permitted to be installed while not jeopardizing the level of electrical safety that the standard seeks [see below photo(s)/diagram(s) that provide clarity for the proposed exception]. As such, due to the proximity of the individual receptacle to the bathtub or shower, it would be required by NEC Section 210.8(A)(9) to be protected by a Class A GFCI device minimizing any potential shock hazard. Moreover, it is our understanding that products like electronic toilets and personal hygiene devices were not taken into consideration during the discussion of the proposal prior to adoption into the current standard.

Emergency Nature: The proposed TIA intends to correct a circumstance in which the revised NFPA Standard has resulted in an adverse impact on a product or method that was inadvertently overlooked in the total revision process or was without adequate technical (safety) justification of the action.

Making an allowance for these listed products (which are permitted in all major plumbing codes), which have been in the market for decades, is necessary for safeguarding public health and safety. People all over the United States use such products in their bathrooms, and they are necessary for people with special needs or abilities to maintain their dignity, privacy and self-reliance. Ease of cleaning for seniors is of immediate benefit and critical to their hygiene. Additional hygiene-oriented benefits are obtained by people experiencing colorectal issues such as hemorrhoids, irritable bowel syndrome (IBS) and inflammatory bowel disease (IBD),¹ as well as women experiencing severe constipation during pregnancy² or recovering from postpartum activity. These products also help to maintain hand hygiene³ which is critical for preventing the spread of disease. Many smart toilets include health monitoring features that analyze one's stool or urine to detect health issues such as sugar levels for a diabetic. Also, smart toilets have proven to be quite beneficial for those who are rehabilitating from a stroke.⁴ Personal hygiene devices are necessary for some in maintaining their cleanliness as they may not be able to use toilet paper due to medical reasons. Also, personal hygiene devices have been proven to lead to fewer instances of rashes, hemorrhoids, and urinary tract infections. The bottom line is these products are necessary for many individuals around the United States for maintaining their health, and the existing text in NFPA 70 would prevent the installation of such products in many residential bathrooms.



1 “How to Decide If You Need a Bidet,” by Amber J. Tresca, 2019, Verywell Health, <https://www.verywellhealth.com/do-i-need-a-bidet-1942839>

2 “The Effect of Bidet Use on Severity of Constipation and Quality of Life Among Pregnant Women,” by Sultan Alan, Ebru Gozuyesil and Sule Gokyildiz Surucu, August 2020, Yonago Acta Medica (YAM), Journal of Medical Sciences, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7435113/>

3 “The Use of Electric Toilet Seats with Water Supply Is Efficacious in Maintaining Hand Hygiene in Experimental Model,” by Shigeharu Oie, Hiromi Aoshika, Emiko Arita and Akira Kamiya, 2018, Japanese Journal of Infectious Diseases, https://www.jstage.jst.go.jp/article/yoken/71/4/71_JJID.2017.515/article/-char/en

4 “Technology-assisted toilets: Improving independence and hygiene in stroke rehabilitation,” by David Yachnin, Georges Gharib, Jeffrey Jutai and Hillel Finestone, August 2017, Journal of Rehabilitation and Assistive Technologies Engineering, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6453101/>

**Public Comment No. 354-NFPA 70-2021 [Section No. 406.9(C)]****(C) Bathtub and Shower Space.**

Receptacles shall not be installed within a zone ~~measured 900 mm (3 ft) horizontally from any outside edge of the~~ which will encompass inside of the tub or shower of the bathtub or shower stall, including the space ~~outside the~~ measured vertically inside of the bathtub or shower stall space ~~below from the zone~~ floor to 2.5 m (8') above the top of the bath tub rim or shower stall threshold.

The zone also includes the space measured vertically from the floor to 2.5 m (8 ft) above the top of the bathtub rim or shower stall threshold. The identified zone is all-encompassing and shall include the space directly over the bathtub or shower stall and the space below this zone within the bath tub or shower stall, but not the space separated by a floor, wall, ceiling, door, window, or fixed barrier.

Exception No. 1: Receptacles installed in accordance with 680.73 shall be permitted.

Exception No. 2: In bathrooms with less than the required zone, the receptacle(s) required by 210.52(D) shall be permitted to be installed opposite the bathtub rim or shower stall threshold on the farthest wall within the room.

Exception No. 3: Weight supporting ceiling receptacles (WSCR) shall be permitted to be installed for listed luminaires that employ a weight supporting attachment fitting (WSAF) in damp locations complying with 410.10(D).

Statement of Problem and Substantiation for Public Comment

The outlets in this code section are required to have ground fault protection and should not pose any problems. As a wiring inspector for the past 18 years, I have had many occasions where I had to fail a job due to the fact that the home owner wanted to put a TV inside the tub area. The code language in the 2017 NEC in 406.9(C) clearly states that the restricted zone is within the bathtub and shower stall itself. There has never been a requirement in the NEC for the switch that controls a luminaire inside the tub or shower area and that is located just outside that bathtub and shower stall to be ground fault protected. I believe that the language should revert back to the 2017 NEC language. There has been several times since the 2020 code implementation that I have had to have the electrician move an outlet even though there was a glass shower wall that could not be penetrated but was within the 3' restricted zone.

Related Item

.

Submitter Information Verification

Submitter Full Name: Paul J Kennedy Jr

Organization: IAEI

Affiliation: Kennedy Seminars

Street Address:

City:

State:

Zip:

Submittal Date: Sun Jul 25 10:21:03 EDT 2021

Committee: NEC-P18



Public Comment No. 116-NFPA 70-2021 [Section No. 406.12]

406.12 Tamper-Resistant Receptacles.

All 15- and 20-ampere, 125- and 250-volt nonlocking-type receptacles in the following locations shall be listed tamper-resistant receptacles:

- (1) All dwelling units, boathouses, mobile homes and manufactured homes, including their attached and detached garages, accessory buildings- ~~to dwelling units~~ , and their common areas
- (2) Guest rooms and guest suites of hotels, motels, and their common areas
- (3) Child care facilities
- (4) Preschools and education facilities
- (5) Within clinics, medical and dental offices, and outpatient facilities, the following spaces and the like:
 - (6) Business offices accessible to the general public
 - (7) Lobbies, corridors, waiting spaces, and spaces used for patient sleeping
- (8) Places of awaiting transportation, gymnasiums, skating rinks, fitness centers, and auditoriums
- (9) Dormitory units
- (10) Residential care/assisted living facilities, social and substance abuse rehabilitation facilities, convents, and group homes
- (11) Foster care facilities, nursing homes, and psychiatric hospitals
- (12) Areas of agricultural buildings accessible to the general public and any common areas

Informational Note No. 1: See ANSI/NEMA WD 6-2016, *Wiring Devices — Dimensional Specifications*. This requirement would include receptacles identified as 5-15, 5-20, 6-15, and 6-20.

Informational Note No. 2: See NFPA 5000-2021, *Building Construction and Safety Code*, and the *International Building Code (IBC)-2021* for more information on occupancy classifications for the types of facilities covered by this requirement.

Exception to (1) through (10): Receptacles in the following locations shall not be required to be tamper resistant:

- (1) *Receptacles located more than 1.7 m (5 ½ ft) above the floor*
- (2) *Receptacles that are part of a luminaire or appliance*
- (3) *A single receptacle that is not readily accessible and that supplies one appliance, or a duplex receptacle that is not readily accessible and that supplies two appliances, where the receptacle outlet is installed within the space occupied by or designated for each appliance that, in normal use, is not easily moved from one place to another and that is cord-and-plug-connected in accordance with 400.10(A)(6), (A)(7), or (A)(8)*
- (4) *Nongrounding receptacles used for replacements as permitted in 406.4(D)(2)(a)*

Statement of Problem and Substantiation for Public Comment

The phrase "to dwelling units" is confusing and is not necessary.

Related Item

- FR-7663

Submitter Information Verification

Submitter Full Name: Don Ganiere

Organization: [Not Specified]

Street Address:

City:

State:

Zip:

Submission Date: Sun Jul 04 14:17:00 EDT 2021

Committee: NEC-P18



Public Comment No. 2092-NFPA 70-2021 [Section No. 406.12]

406.12 Tamper-Resistant Receptacles.

All 15- and 20-ampere, 125- and 250-volt nonlocking-type receptacles in the following locations shall be listed tamper-resistant receptacles:

- (1) All dwelling units, boathouses, mobile homes and manufactured homes, including their attached and detached garages, accessory buildings to dwelling units, and their common areas
- (2) Guest rooms and guest suites of hotels, motels, and their common areas
- (3) Child care facilities
- (4) Preschools and education facilities
- (5) Within clinics, medical and dental offices, and outpatient facilities, the following spaces and the like:
 - (6) Business offices and corridors accessible to the general public
 - (7) Lobbies
 - ~~corridors,~~
 - a. and waiting spaces
 - ~~and spaces used for patient sleeping~~
 - a. ~~-~~
 - b. Spaces of nursing homes and limited care facilities wired in accordance with Chapters 1 through 4 of this Code where these spaces are used exclusively as patient sleeping rooms
- (8) Places of awaiting transportation, gymnasiums, skating rinks, fitness centers, and auditoriums
- (9) Dormitory units
- (10) Residential care/assisted living facilities, social and substance abuse rehabilitation facilities, convents, and group homes
- (11) Foster care facilities, nursing homes, and psychiatric hospitals
- (12) Areas of agricultural buildings accessible to the general public and any common areas

Informational Note No. 1: See ANSI/NEMA WD 6-2016, *Wiring Devices — Dimensional Specifications*. This requirement would include receptacles identified as 5-15, 5-20, 6-15, and 6-20.

Informational Note No. 2: See NFPA 5000-2021, *Building Construction and Safety Code*, and the *International Building Code (IBC)*-2021 for more information on occupancy classifications for the types of facilities covered by this requirement.

Exception to (1) through (10): Receptacles in the following locations shall not be required to be tamper resistant:

- (1) *Receptacles located more than 1.7 m (5 ½ ft) above the floor*
- (2) *Receptacles that are part of a luminaire or appliance*
- (3) *A single receptacle that is not readily accessible and that supplies one appliance, or a duplex receptacle that is not readily accessible and that supplies two appliances, where the receptacle outlet is installed within the space occupied by or designated for each appliance that, in normal use, is not easily moved from one place to another and that is cord-and-plug-connected in accordance with 400.10(A)(6), (A)(7), or (A)(8)*
- (4) *Nongrounding receptacles used for replacements as permitted in 406.4(D)(2)(a)*

Statement of Problem and Substantiation for Public Comment

When we authored this text in the first revision, we missed the opportunity to make our language consistent with the exception language in 517.10 (B) which is the whole reason we must address tamper resistant receptacles in healthcare in 406 in the first place. This change makes the definitions crystal clear and leaves no room for loopholes where 517.10(B) and 406.12(5) didn't align perfectly.

Terra Misbehavior Note: Terra re-lettered my submission incorrectly. Under 5, there should be an A, B, and C item for each of the three lines I've proposed.

Related Item

- FR-7665-NFPA 70-2020

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 11:34:03 EDT 2021

Committee: NEC-P18



Public Comment No. 252-NFPA 70-2021 [Section No. 406.12]

406.12 Tamper-Resistant Receptacles.

All 15- and 20-ampere, 125- and 250-volt nonlocking-type receptacles in the following locations shall be listed tamper-resistant receptacles:

- (1) All dwelling units, boathouses, mobile homes and manufactured homes, including their attached and detached garages, accessory buildings to dwelling units, and their common areas
- (2) Guest rooms and guest suites of hotels, motels, and their common areas
- (3) Child care facilities
- (4) Preschools and education facilities
- (5) Within clinics, medical and dental offices, and outpatient facilities, the following spaces and the like:
 - (6) Business offices accessible to the general public
 - (7) Lobbies, corridors, waiting spaces, and spaces used for patient sleeping
- (8) Places of awaiting transportation, gymnasiums, skating rinks, fitness centers, and auditoriums
- (9) Dormitory units
- (10) Residential care/assisted living facilities, social and substance abuse rehabilitation facilities, ~~convents~~, and group homes
- (11) Foster care facilities, nursing homes, and psychiatric hospitals
- (12) Areas of agricultural buildings accessible to the general public and any common areas

Informational Note No. 1: See ANSI/NEMA WD 6-2016, *Wiring Devices — Dimensional Specifications*. This requirement would include receptacles identified as 5-15, 5-20, 6-15, and 6-20.

Informational Note No. 2: See NFPA 5000-2021, *Building Construction and Safety Code*, and the *International Building Code (IBC)*-2021 for more information on occupancy classifications for the types of facilities covered by this requirement.

Exception to (1) through (10): Receptacles in the following locations shall not be required to be tamper resistant:

- (1) *Receptacles located more than 1.7 m (5 ½ ft) above the floor*
- (2) *Receptacles that are part of a luminaire or appliance*
- (3) *A single receptacle that is not readily accessible and that supplies one appliance, or a duplex receptacle that is not readily accessible and that supplies two appliances, where the receptacle outlet is installed within the space occupied by or designated for each appliance that, in normal use, is not easily moved from one place to another and that is cord-and-plug-connected in accordance with 400.10(A)(6), (A)(7), or (A)(8)*
- (4) *Nongrounding receptacles used for replacements as permitted in 406.4(D)(2)(a)*

Statement of Problem and Substantiation for Public Comment

The term convents was added without any technical substantiation.

If the panel feels that this type of facility needs TR receptacles the term "convent" is not appropriate for use in this code.

That term is both religion and gender specific and could be a issue with the First and Fourteenth Amendments to the Constitution. The term is only used by one religion and only applies to facilities for women. There are at least two terms that apply to similar facilities for men.

If the panel needs to include this type of occupancy, and religion and gender neutral term such as "religious residential facility" must be considered.

Related Item

- FR-7660

Submitter Information Verification

Submitter Full Name: Don Ganiere

Organization: [Not Specified]

Street Address:

City:

State:

Zip:

Submittal Date: Thu Jul 15 21:59:37 EDT 2021

Committee: NEC-P18



Public Comment No. 524-NFPA 70-2021 [Section No. 406.12]

406.12 Tamper-Resistant Receptacles.

All 15- and 20-ampere, 125- and 250-volt nonlocking-type receptacles in the following locations shall be listed tamper-resistant receptacles:

- (1) All dwelling units, boathouses, mobile homes and manufactured homes, including their attached and detached garages, accessory buildings to dwelling units, and their common areas
- (2) Guest rooms and guest suites of hotels, motels, and their common areas
- (3) Child care facilities
- (4) Preschools and education facilities
- (5) ~~Within clinics, medical and dental offices, and outpatient facilities, the following spaces and the like:~~
 - (6) ~~Business offices accessible to the general public~~
 - (7) ~~Lobbies, corridors, waiting spaces, and spaces used for patient sleeping~~
- (8) Places of awaiting transportation, gymnasiums, skating rinks, fitness centers, and auditoriums
- (9) Dormitory units
- (10) Residential care/assisted living facilities, social and substance abuse rehabilitation facilities, convents, and group homes
- (11) Foster care facilities, nursing homes, and psychiatric hospitals
- (12) Areas of agricultural buildings accessible to the general public and any common areas

Informational Note No. 1: See ANSI/NEMA WD 6-2016, *Wiring Devices — Dimensional Specifications*. This requirement would include receptacles identified as 5-15, 5-20, 6-15, and 6-20.

Informational Note No. 2: See NFPA 5000-2021, *Building Construction and Safety Code*, and the *International Building Code (IBC)-2021* for more information on occupancy classifications for the types of facilities covered by this requirement.

Exception to (1) through (10): Receptacles in the following locations shall not be required to be tamper resistant:

- (1) *Receptacles located more than 1.7 m (5 ½ ft) above the floor*
- (2) *Receptacles that are part of a luminaire or appliance*
- (3) *A single receptacle that is not readily accessible and that supplies one appliance, or a duplex receptacle that is not readily accessible and that supplies two appliances, where the receptacle outlet is installed within the space occupied by or designated for each appliance that, in normal use, is not easily moved from one place to another and that is cord-and-plug-connected in accordance with 400.10(A)(6), (A)(7), or (A)(8)*
- (4) *Nongrounding receptacles used for replacements as permitted in 406.4(D)(2)(a)*

Statement of Problem and Substantiation for Public Comment

Standards Council Decision D#19-12, "...on a similar issue the Correlating Committee stated that the core chapters (chapters 1-4) have jurisdiction to address general branch circuit wiring and protection methods, since 406.12 addressed a wiring and protection method that previously was not otherwise addressed by CMP 15 in Article 517 the Correlating Committee encouraged CMP 15 to modify the relevant section in Article 517 if the panel believed an occupancy specific exclusion was warranted. The Council found this to be a reasonable approach to addressing overlapping functions in scopes.

To reduce the conflict, this needs to be deleted from 406.12 so that it can be appropriately address in article 517.

Related Public Comments for This Document

<u>Related Comment</u>	<u>Relationship</u>
Public Comment No. 523-NFPA 70-2021 [Section No. 517.10(B)]	
Public Comment No. 523-NFPA 70-2021 [Section No. 517.10(B)]	
<u>Related Item</u>	
• FR-8089	

Submitter Information Verification

Submitter Full Name: Chad Beebe
Organization: Ashe - Aha
Street Address:
City:
State:

Zip:

Submittal Date: Wed Jul 28 19:19:55 EDT 2021

Committee: NEC-P18



Public Comment No. 640-NFPA 70-2021 [Section No. 406.12]

406.12 Tamper-Resistant Receptacles.

All 15- and 20-ampere, 125- and 250-volt nonlocking-type receptacles in the following locations shall be listed tamper-resistant receptacles:

- (1) All dwelling units, boathouses, mobile homes and manufactured homes, including their attached and detached garages, accessory buildings to dwelling units, and their common areas
- (2) Guest rooms and guest suites of hotels, motels, and their common areas
- (3) Child care facilities
- (4) Preschools and education facilities
- (5) Within clinics, medical and dental offices, and outpatient facilities, the following spaces and the like:
 - a. Business offices accessible to the general public
 - b. Lobbies, corridors, waiting spaces, and spaces used for patient sleeping
- (6) Places of awaiting transportation, gymnasiums, skating rinks, fitness centers, and auditoriums
- (7) Dormitory units
- (8) Residential care/assisted living facilities, social and substance abuse rehabilitation facilities, convents, and group homes
- (9) Foster care facilities, nursing homes, and psychiatric hospitals
- (10) Areas of agricultural buildings accessible to the general public and any common areas

Informational Note No. 1: See ANSI/NEMA WD 6-2016, *Wiring Devices — Dimensional Specifications*. This requirement would include receptacles identified as 5-15, 5-20, 6-15, and 6-20.

Informational Note No. 2: See NFPA 5000-2021, *Building Construction and Safety Code*, and the *International Building Code (IBC)*-2021 for more information on occupancy classifications for the types of facilities covered by this requirement.

Exception to (1) through (10): Receptacles in the following locations shall not be required to be tamper resistant:

- (1) *Receptacles located more than 1.7 m (5 ½ ft) above the floor*
- (2) *Receptacles that are part of a luminaire or appliance*
- (3) *A single receptacle that is not readily accessible and that supplies one appliance, or a duplex receptacle that is not readily accessible and that supplies two appliances, where the receptacle outlet is installed within the space occupied by or designated for each appliance that, in normal use, is not easily moved from one place to another and that is cord-and-plug-connected in accordance with 400.10(A)(6), (A)(7), or (A)(8)*
- (4) *Nongrounding receptacles used for replacements as permitted in 406.4(D)(2)(a)*

Additional Proposed Changes

<u>File Name</u>	<u>Description Approved</u>
18_CN_76_Detail.pdf	70_CN76

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 76 appeared in the First Draft Report on First Revision No. 7662.

The Correlating Committee directs the Panel to consider rewriting exception (3) in two or more short sentences, expressed using a list or table, or both, to comply with 3.3.1.2 of the NEC Style Manual.

Related Item

- First Revision No. 7662

Submitter Information Verification

Submitter Full Name: CC on NEC-AAC

Organization: NEC Correlating Committee

Street Address:

City:

State:

Zip:

Submittal Date: Mon Aug 02 16:33:54 EDT 2021

Committee: NEC-P18



Correlating Committee Note No. 76-NFPA 70-2021 [Detail]

Submitter Information Verification

Committee: NEC-P18

Submittal Date: Tue May 04 10:25:31 EDT 2021

Committee Statement

Committee Statement: The Correlating Committee directs the Panel to consider rewriting exception (3) in two or more short sentences, expressed using a list or table, or both, to comply with 3.3.1.2 of the NEC Style Manual.

[First Revision No. 7662-NFPA 70-2020 \[Detail\]](#)

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. 641-NFPA 70-2021 [Section No. 406.12]

406.12 Tamper-Resistant Receptacles.

All 15- and 20-ampere, 125- and 250-volt nonlocking-type receptacles in the following locations shall be listed tamper-resistant receptacles:

- (1) All dwelling units, boathouses, mobile homes and manufactured homes, including their attached and detached garages, accessory buildings to dwelling units, and their common areas
- (2) Guest rooms and guest suites of hotels, motels, and their common areas
- (3) Child care facilities
- (4) Preschools and education facilities
- (5) Within clinics, medical and dental offices, and outpatient facilities, the following spaces and the like:
 - a. Business offices accessible to the general public
 - b. Lobbies, corridors, waiting spaces, and spaces used for patient sleeping
- (6) Places of awaiting transportation, gymnasiums, skating rinks, fitness centers, and auditoriums
- (7) Dormitory units
- (8) Residential care/assisted living facilities, social and substance abuse rehabilitation facilities, convents, and group homes
- (9) Foster care facilities, nursing homes, and psychiatric hospitals
- (10) Areas of agricultural buildings accessible to the general public and any common areas

Informational Note No. 1: See ANSI/NEMA WD 6-2016, *Wiring Devices — Dimensional Specifications*. This requirement would include receptacles identified as 5-15, 5-20, 6-15, and 6-20.

Informational Note No. 2: See NFPA 5000-2021, *Building Construction and Safety Code*, and the *International Building Code (IBC)*-2021 for more information on occupancy classifications for the types of facilities covered by this requirement.

Exception to (1) through (10): Receptacles in the following locations shall not be required to be tamper resistant:

- (1) Receptacles located more than 1.7 m (5 ½ ft) above the floor
- (2) Receptacles that are part of a luminaire or appliance
- (3) A single receptacle that is not readily accessible and that supplies one appliance, or a duplex receptacle that is not readily accessible and that supplies two appliances, where the receptacle outlet is installed within the space occupied by or designated for each appliance that, in normal use, is not easily moved from one place to another and that is cord-and-plug-connected in accordance with 400.10(A)(6), (A)(7), or (A)(8)
- (4) Nongrounding receptacles used for replacements as permitted in 406.4(D)(2)(a)

Additional Proposed Changes

<u>File Name</u>	<u>Description Approved</u>
18_CN_77_Detail.pdf	70_CN77

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 641 appeared in the First Draft Report on First Revision No. 7663.

The Correlating Committee refers FR 7663 to CMP 7 for information.

Related Item

- First Revision No. 7663

Submitter Information Verification

Submitter Full Name: CC on NEC-AAC

Organization: NEC Correlating Committee

Street Address:

City:

State:

Zip:

Submittal Date: Mon Aug 02 16:35:49 EDT 2021

Committee: NEC-P18



Correlating Committee Note No. 77-NFPA 70-2021 [Detail]

Submitter Information Verification

Committee: NEC-P18

Submittal Date: Tue May 04 10:26:52 EDT 2021

Committee Statement

Committee Statement: The Correlating Committee refers FR 7663 to CMP 7 for information.

[First Revision No. 7663-NFPA 70-2020 \[Detail\]](#)

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. 642-NFPA 70-2021 [Section No. 406.12]

406.12 Tamper-Resistant Receptacles.

All 15- and 20-ampere, 125- and 250-volt nonlocking-type receptacles in the following locations shall be listed tamper-resistant receptacles:

- (1) All dwelling units, boathouses, mobile homes and manufactured homes, including their attached and detached garages, accessory buildings to dwelling units, and their common areas
- (2) Guest rooms and guest suites of hotels, motels, and their common areas
- (3) Child care facilities
- (4) Preschools and education facilities
- (5) Within clinics, medical and dental offices, and outpatient facilities, the following spaces and the like:
 - a. Business offices accessible to the general public
 - b. Lobbies, corridors, waiting spaces, and spaces used for patient sleeping
- (6) Places of awaiting transportation, gymnasiums, skating rinks, fitness centers, and auditoriums
- (7) Dormitory units
- (8) Residential care/assisted living facilities, social and substance abuse rehabilitation facilities, convents, and group homes
- (9) Foster care facilities, nursing homes, and psychiatric hospitals
- (10) Areas of agricultural buildings accessible to the general public and any common areas

Informational Note No. 1: See ANSI/NEMA WD 6-2016, *Wiring Devices — Dimensional Specifications*. This requirement would include receptacles identified as 5-15, 5-20, 6-15, and 6-20.

Informational Note No. 2: See NFPA 5000-2021, *Building Construction and Safety Code*, and the *International Building Code (IBC)*-2021 for more information on occupancy classifications for the types of facilities covered by this requirement.

Exception to (1) through (10): Receptacles in the following locations shall not be required to be tamper resistant:

- (1) Receptacles located more than 1.7 m (5 ½ ft) above the floor
- (2) Receptacles that are part of a luminaire or appliance
- (3) A single receptacle that is not readily accessible and that supplies one appliance, or a duplex receptacle that is not readily accessible and that supplies two appliances, where the receptacle outlet is installed within the space occupied by or designated for each appliance that, in normal use, is not easily moved from one place to another and that is cord-and-plug-connected in accordance with 400.10(A)(6), (A)(7), or (A)(8)
- (4) Nongrounding receptacles used for replacements as permitted in 406.4(D)(2)(a)

Additional Proposed Changes

<u>File Name</u>	<u>Description Approved</u>
18_CN_78_Detail.pdf	70_CN78

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 78 appeared in the First Draft Report on First Revision No. 7665.

The Correlating Committee directs that the phrase "and the like" be reconsidered, as this phrase is not in compliance with 3.3.4 of the NEC Style Manual.

Related Item

- First Revision No. 7665

Submitter Information Verification

Submitter Full Name: CC on NEC-AAC
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:
Submittal Date: Mon Aug 02 16:41:06 EDT 2021
Committee: NEC-P18



Correlating Committee Note No. 78-NFPA 70-2021 [Detail]

Submitter Information Verification

Committee: NEC-P18

Submittal Date: Tue May 04 10:27:47 EDT 2021

Committee Statement

Committee Statement: The Correlating Committee directs that the phrase "and the like" be reconsidered, as this phrase is not in compliance with 3.3.4 of the NEC Style Manual.

[First Revision No. 7665-NFPA 70-2020 \[Detail\]](#)

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. 643-NFPA 70-2021 [Section No. 406.12]

406.12 Tamper-Resistant Receptacles.

All 15- and 20-ampere, 125- and 250-volt nonlocking-type receptacles in the following locations shall be listed tamper-resistant receptacles:

- (1) All dwelling units, boathouses, mobile homes and manufactured homes, including their attached and detached garages, accessory buildings to dwelling units, and their common areas
- (2) Guest rooms and guest suites of hotels, motels, and their common areas
- (3) Child care facilities
- (4) Preschools and education facilities
- (5) Within clinics, medical and dental offices, and outpatient facilities, the following spaces and the like:
 - a. Business offices accessible to the general public
 - b. Lobbies, corridors, waiting spaces, and spaces used for patient sleeping
- (6) Places of awaiting transportation, gymnasiums, skating rinks, fitness centers, and auditoriums
- (7) Dormitory units
- (8) Residential care/assisted living facilities, social and substance abuse rehabilitation facilities, convents, and group homes
- (9) Foster care facilities, nursing homes, and psychiatric hospitals
- (10) Areas of agricultural buildings accessible to the general public and any common areas

Informational Note No. 1: See ANSI/NEMA WD 6-2016, *Wiring Devices — Dimensional Specifications*. This requirement would include receptacles identified as 5-15, 5-20, 6-15, and 6-20.

Informational Note No. 2: See NFPA 5000-2021, *Building Construction and Safety Code*, and the *International Building Code* (IBC)-2021 for more information on occupancy classifications for the types of facilities covered by this requirement.

Exception to (1) through (10): Receptacles in the following locations shall not be required to be tamper resistant:

- (1) Receptacles located more than 1.7 m (5 ½ ft) above the floor
- (2) Receptacles that are part of a luminaire or appliance
- (3) A single receptacle that is not readily accessible and that supplies one appliance, or a duplex receptacle that is not readily accessible and that supplies two appliances, where the receptacle outlet is installed within the space occupied by or designated for each appliance that, in normal use, is not easily moved from one place to another and that is cord-and-plug-connected in accordance with 400.10(A)(6), (A)(7), or (A)(8)
- (4) Nongrounding receptacles used for replacements as permitted in 406.4(D)(2)(a)

Additional Proposed Changes

<u>File Name</u>	<u>Description Approved</u>
18_CN_79_Detail.pdf	70_CN79

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 79 appeared in the First Draft Report on First Revision No. 7669.

The Correlating Committee refers FR 7669 to CMP 15 for information. This FR relates to occupancies within their purview.

Related Item

- First Revision No. 7669

Submitter Information Verification

Submitter Full Name: CC on NEC-AAC

Organization: NEC Correlating Committee

Street Address:

City:

State:

Zip:

Submittal Date: Mon Aug 02 16:52:14 EDT 2021

Committee: NEC-P18



Correlating Committee Note No. 79-NFPA 70-2021 [Detail]

Submitter Information Verification

Committee: NEC-P18

Submittal Date: Tue May 04 10:28:46 EDT 2021

Committee Statement

Committee Statement: The Correlating Committee refers FR 7669 to CMP 15 for information. This FR relates to occupancies within their purview.

[First Revision No. 7669-NFPA 70-2020 \[Detail\]](#)

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. 644-NFPA 70-2021 [Section No. 406.12]

406.12 Tamper-Resistant Receptacles.

All 15- and 20-ampere, 125- and 250-volt nonlocking-type receptacles in the following locations shall be listed tamper-resistant receptacles:

- (1) All dwelling units, boathouses, mobile homes and manufactured homes, including their attached and detached garages, accessory buildings to dwelling units, and their common areas
- (2) Guest rooms and guest suites of hotels, motels, and their common areas
- (3) Child care facilities
- (4) Preschools and education facilities
- (5) Within clinics, medical and dental offices, and outpatient facilities, the following spaces and the like:
 - a. Business offices accessible to the general public
 - b. Lobbies, corridors, waiting spaces, and spaces used for patient sleeping
- (6) Places of awaiting transportation, gymnasiums, skating rinks, fitness centers, and auditoriums
- (7) Dormitory units
- (8) Residential care/assisted living facilities, social and substance abuse rehabilitation facilities, convents, and group homes
- (9) Foster care facilities, nursing homes, and psychiatric hospitals
- (10) Areas of agricultural buildings accessible to the general public and any common areas

Informational Note No. 1: See ANSI/NEMA WD 6-2016, *Wiring Devices — Dimensional Specifications*. This requirement would include receptacles identified as 5-15, 5-20, 6-15, and 6-20.

Informational Note No. 2: See NFPA 5000-2021, *Building Construction and Safety Code*, and the *International Building Code* (IBC)-2021 for more information on occupancy classifications for the types of facilities covered by this requirement.

Exception to (1) through (10): Receptacles in the following locations shall not be required to be tamper resistant:

- (1) *Receptacles located more than 1.7 m (5 ½ ft) above the floor*
- (2) *Receptacles that are part of a luminaire or appliance*
- (3) *A single receptacle that is not readily accessible and that supplies one appliance, or a duplex receptacle that is not readily accessible and that supplies two appliances, where the receptacle outlet is installed within the space occupied by or designated for each appliance that, in normal use, is not easily moved from one place to another and that is cord-and-plug-connected in accordance with 400.10(A)(6), (A)(7), or (A)(8)*
- (4) *Nongrounding receptacles used for replacements as permitted in 406.4(D)(2)(a)*

Additional Proposed Changes

<u>File Name</u>	<u>Description</u> <u>Approved</u>
18_CN_80_Detail.pdf	70_CN80

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 80 appeared in the First Draft Report on First Revision No. 7664.

The Correlating Committee is unclear of the difference between agricultural buildings and agricultural buildings that are accessible to the general public. The Correlating Committee refers FR 7664 to CMP's 7 and 15 for review and comment.

"Areas of agricultural buildings" is broad, and it has not been clearly established whether the occupancies described in the committee statement are mainly agricultural (CMP 7) or mainly amusement (CMP 15), or if the new code text accurately captures the intent.

Related Item

- First Revision No. 7664

Submitter Information Verification

Submitter Full Name: CC on NEC-AAC

Organization: NEC Correlating Committee

Street Address:

City:

State:

Zip:

Submission Date: Mon Aug 02 16:55:01 EDT 2021

Committee: NEC-P18



Correlating Committee Note No. 80-NFPA 70-2021 [Detail]

Submitter Information Verification

Committee: NEC-P18

Submittal Date: Tue May 04 10:29:42 EDT 2021

Committee Statement

Committee Statement: The Correlating Committee is unclear of the difference between agricultural buildings and agricultural buildings that are accessible to the general public. The Correlating Committee refers FR 7664 to CMP's 7 and 15 for review and comment.

"Areas of agricultural buildings" is broad, and it has not been clearly established whether the occupancies described in the committee statement are mainly agricultural (CMP 7) or mainly amusement (CMP 15), or if the new code text accurately captures the intent.

[First Revision No. 7664-NFPA 70-2020 \[Detail\]](#)

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. 816-NFPA 70-2021 [Section No. 410.7]****410.7** Reconditioned Equipment.

Luminaires, lampholders, ballasts, LED drivers, lamps, and retrofit kits shall not be permitted to be reconditioned. If a retrofit kit is installed in a luminaire in accordance with the installation instructions, the retrofitted luminaire shall not be considered reconditioned.

Additional Proposed Changes

<u>File Name</u>	<u>Description Approved</u>
18_CN_252.pdf	70_CN252

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 252 appeared in the First Draft Report on First Revision No. 7504.

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.

Related Item

- First Revision No. 7504

Submitter Information Verification

Submitter Full Name: CC on NEC-AAC

Organization: NEC Correlating Committee

Street Address:

City:

State:

Zip:

Submittal Date: Wed Aug 04 12:17:41 EDT 2021

Committee: NEC-P18

**Correlating Committee Note No. 252-NFPA 70-2021 [Section No. 410.7]****Submitter Information Verification**

Committee: NEC-P18

Submittal Date: Thu May 06 09:38:21 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.

First Revision No. 7504-NFPA 70-2020 [Section No. 410.7]

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. 1834-NFPA 70-2021 [Section No. 410.10(F)]****(F) Luminaires Installed in or Under Roof Decking.**

Luminaires installed in exposed or concealed locations under roof decking where subject to physical damage, shall be installed and supported so there is not less than 38 mm (1½ in.) measured from the lowest surface of the roof decking to the top of the luminaire.

Exception: The 38 mm (1 1/2 in.) spacing is not required where metal-corrugated sheet roof decking is covered with a minimum thickness 50 mm (2 in.) concrete slab, measured from the top of the corrugated roofing.

Statement of Problem and Substantiation for Public Comment

This exception correlates with the allowance coming into 300.4(E). The Correlating Committee has flagged the correlation issue; this comment is a response.

Related Item

• FR-9408 • FR-7656 • CC Note 81

Submitter Information Verification

Submitter Full Name: Frederic Hartwell

Organization: Hartwell Electrical Services, Inc.

Street Address:

City:

State:

Zip:

Submittal Date: Wed Aug 18 10:10:39 EDT 2021

Committee: NEC-P18

**Public Comment No. 718-NFPA 70-2021 [Section No. 410.10(F)]****(F) Luminaires Installed in or Under Roof Decking.**

Luminaires installed in exposed or concealed locations under roof decking where subject to physical damage, shall be installed and supported so there is not less than 38 mm (1½ in.) measured from the lowest surface of the roof decking to the top of the luminaire.

Additional Proposed Changes

<u>File Name</u>	<u>Description Approved</u>
18_CN_81.pdf	70_CN81

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 81 appeared in the First Draft Report on First Revision No. 7656.

The Correlating Committee refers FR 7656 to CMP 3 for information and correlation with 300.4(E).

Related Item

- First Revision No. 7656

Submitter Information Verification

Submitter Full Name: CC on NEC-AAC

Organization: NEC Correlating Committee

Street Address:

City:

State:

Zip:

Submittal Date: Tue Aug 03 13:42:16 EDT 2021

Committee: NEC-P18



Correlating Committee Note No. 81-NFPA 70-2021 [Section No. 410.10(F)]

Submitter Information Verification

Committee: NEC-P18

Submittal Date: Tue May 04 10:38:11 EDT 2021

Committee Statement

Committee Statement: The Correlating Committee refers FR 7656 to CMP 3 for information and correlation with 300.4(E).

First Revision No. 7656-NFPA 70-2020 [Section No. 410.10(F)]

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. 1678-NFPA 70-2021 [Section No. 410.16]

410.16 Luminaires in Clothes Closets.

(A) Clothes Closet Storage Space.

The clothes closet storage space shall be the volume bounded by the sides and back closet walls and planes extending from the closet floor vertically to a height of 1.8 m (6 ft) or to the highest clothes-hanging rod and parallel to the walls at a horizontal distance of 600 mm (24 in.) from the sides and back of the closet walls, respectively, and continuing vertically to the closet ceiling parallel to the walls at a horizontal distance of 300 mm (12 in.) or the width of the shelf, whichever is greater. For a closet that permits access to both sides of a hanging rod, the clothes closet storage space includes the volume below the highest rod extending 300 mm (12 in.) on either side of the rod on a plane horizontal to the floor extending the entire length of the rod. See Figure 410.16.

Figure 410.16 Clothes Closet Storage Space.

(B) Luminaire Types Permitted.

Only luminaires of the following types shall be permitted in a clothes closet:

- (1) Surface-mounted or recessed incandescent or LED luminaires with completely enclosed light sources
- (2) Surface-mounted or recessed fluorescent luminaires
- (3) Surface-mounted fluorescent or LED luminaires identified as suitable for installation within the clothes closet storage space

(B C) Luminaire Types Not Permitted.

Incandescent luminaires with open or partially enclosed lamps and pendant luminaires or lampholders shall not be permitted.

(C D) Location.

The minimum clearance between luminaires installed in clothes closets and the nearest point of a clothes closet storage space shall be as follows:

- (1) 300 mm (12 in.) for surface-mounted incandescent or LED luminaires with a completely enclosed light source installed on the wall above the door or on the ceiling.
- (2) 150 mm (6 in.) for surface-mounted fluorescent luminaires installed on the wall above the door or on the ceiling.
- (3) 150 mm (6 in.) for recessed incandescent or LED luminaires with a completely enclosed light source installed in the wall or the ceiling.
- (4) 150 mm (6 in.) for recessed fluorescent luminaires installed in the wall or the ceiling.
- (5) Surface-mounted fluorescent or LED luminaires shall be permitted to be installed within the clothes closet storage space where identified for this use.

Additional Proposed Changes

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
Fig_410.16.docx	New Figure 410.16	

Statement of Problem and Substantiation for Public Comment

This comment was prepared by a CMP-18 Definitions Task Group consisting of the following members: B. Fahey, C. Kurten, F. Carpenter, J. Potterf, M. O'Boyle, P. Costello, R. Wright, R. Alley. Pursuant to the Technical Correlating Committee direction, the task group reviewed the definition of Clothes Closet Storage Space and recommend the suggested changes to align the definition with the NEC Style Manual. This is a companion comment to PC 1677-NFPA 70-2021 submitted for the Article 100 definition of "Clothes Closet Storage Space". This change will move the requirement that was embedded in the definition to Art. 410.

Related Item

- FR-7641

Submitter Information Verification

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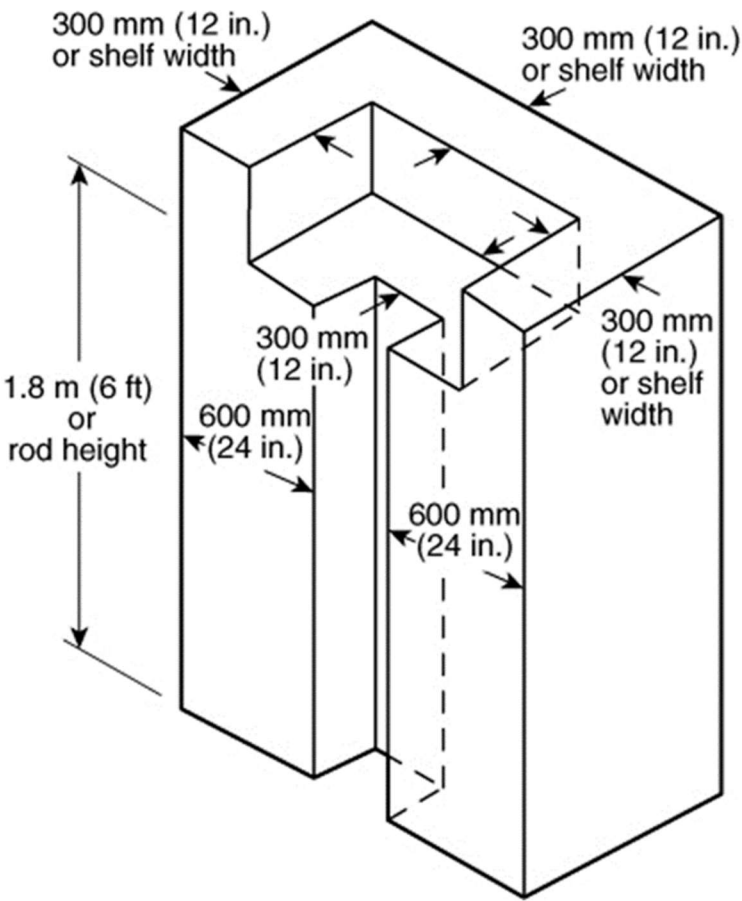
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Zip:

Submittal Date: Tue Aug 17 10:38:45 EDT 2021

Committee: NEC-P18

Figure 410.16 Clothes Closet Storage Space.





Public Comment No. 1214-NFPA 70-2021 [Section No. 410.36]

410.36 Means of Support.

(A) Luminaires Supported By Outlet Boxes.

Luminaires shall be permitted to be supported by outlet boxes or fittings installed as required by 314.23. The installation shall comply with the following requirements:

- (1) The outlet boxes or fittings shall comply with 314.27(A)(1) and 314.27(A)(2).
- (2) Luminaires shall be permitted to be supported in accordance with 314.27(E).
- (3) Outlet boxes complying with 314.27(E) shall be considered lighting outlets as required by 210.70(A), (B), and (C).
- (4) Where a weight supporting ceiling receptacle (WSCR) is incorporated into the installation, the installation of the outlet box and the WSCR shall comply with 314.27(E) and 410.36(B) .

(B) Luminaires Supported by Outlet Boxes and WSCR . If a luminaire is supported by an outlet box and a WSCR, the WSCR shall be used in combination with compatible weight-supporting attachment fittings (WSAF) that are identified for the support of equipment within the weight and mounting orientation limits of the listing. The support of luminaires shall be permitted in 410.36 (B)(1) or as required in accordance with 410.36 (B)(2).

A listed WSCR used in combination with compatible WSAF shall be permitted to be installed in outlet boxes for the sole support of luminaires in accordance with 314.27 in habitable rooms, in hallways and foyers.

Informational Note: See ANSI/NEMA WD 6, "American National Standard for Wiring Devices -Dimensional Specifications" for standard configurations of weight-supporting ceiling receptacles and weight-supporting attachment fittings.

Exception. In bedrooms of one- and two-family dwellings, listed WSCR used in combination with a compatible WSAF shall be installed in outlet boxes for the sole support of luminaires in accordance with 314.27. A WSCR shall not be required in outlet boxes for any of the following:

- (1) Electric discharge or LED tube-type luminaires
- (2) Track lighting
- (3) Recessed luminaires
- (4) Cove lighting

This exception shall become effective on January 1, 2026.

(C) Suspended Ceilings.

Framing members of suspended ceiling systems used to support luminaires shall be securely fastened to each other and shall be securely attached to the building structure at appropriate intervals. Luminaires shall be securely fastened to the ceiling framing member by mechanical means such as bolts, screws, or rivets. Listed clips identified for use with the type of ceiling framing member(s) and luminaire(s) shall also be permitted.

(C D) Luminaire Studs.

Luminaire studs that are not a part of outlet boxes, hickey, tripods, and crowfeet shall be made of steel, malleable iron, or other material suitable for the application.

(D E) Insulating Joints.

Insulating joints that are not designed to be mounted with screws or bolts shall have an exterior metal casing, insulated from both screw connections.

(E F) Raceway Fittings.

Raceway fittings used to support a luminaire(s) shall be capable of supporting the weight of the complete fixture assembly and lamp(s).

(F G) Busways.

Luminaires shall be permitted to be connected to busways in accordance with 368.17(C).

(G H) Trees.

Outdoor luminaires and associated equipment shall be permitted to be supported by trees.

Informational Note No. 1: See 225.26 for restrictions for support of overhead conductors.

Informational Note No. 2: See 300.5(D) for protection of conductors.

Additional Proposed Changes

File Name	Description	Approved
SupportingMaterial.pdf	Supporting material that provides public domain data on home improvements from the US Census Bureau and public domain injury data from CDC	
410.36_exception_alternative.docx	A word version of the PC language	

Statement of Problem and Substantiation for Public Comment

A companion public comment was submitted concurrently to Panel 9 to revise 314.27(E). A new 410.36(A)(4) was added to refer to 314.27(E) and 410.36(B) for supporting of luminaires of outlet boxes using the weight-supporting ceiling receptacle (WSCR). A new 410.36(B) was inserted, and all the other subsequent sections were renumbered. The new (B) text established permissive application to support luminaires. Also, the acronyms for the weight-supporting ceiling receptacle (WSCR) and weight-supporting attachment fitting (WSAF) were added in the text for consistency throughout the code. A new exception was added to require the use of the WSCR and WSAF with a future effective date if there is a ceiling outlet box installed in the bedroom. The exception includes four types of installations where WSCR and WSAF is not practical.

BEDROOM REQUIREMENT. This device is proposed to be required in bedrooms in one- and two-family dwellings because luminaires are frequently changed, sometimes to a paddle fan or a paddle fan with a light kit, and the bed could be an obstruction to safely making the change. Additionally, it is appropriate to implement new and promising technologies in limited applications to vet any potential issues.

EFFECTIVE DATE. The date was chosen to allow time for implementation by the industry, including depleting current inventory or retrofitting inventory.

STANDARD CONFIGURATION. This Public Comment follows the guidance provided by CMP 18 and CMP 9 during the First Draft Stage. The PI 3423 was resolved by CMP 18 with the following statement: "The lack of an industry standard configuration allows multiple configurations that can introduce complications if this rule shifts from permissible to mandatory." Since then, three configurations for both the WSAF and WSCR were approved by NEMA for inclusion in ANSI/NEMA WD 6, "American National Standard for Wiring Devices - Dimensional Specifications." These devices are designated in the standard as: WS3-50R, WS3-50AF for three poles; and WS3-70R, WS3-70AF for three poles, WS4-70R and WS4-70AF for four poles. These identifiers designate the special configuration of "weight-supporting" ("WS" prefix), the weight rating (50- or 70-pounds) and the application as a "receptacle" ("R" suffix) or the "attachment fitting" ("AF" suffix). The 50-pound configurations ("50" infix) are for the support of luminaires and the 70-pound configurations ("70" infix) are for the support of paddle fans. Informational notes for these new standard configurations in WD6 are being proposed to be added to the definitions for WSCR and WSAF in Article 100.

INTERCHANGEABILITY. The WSCR has been determined to be compatible with all known ceiling outlet boxes. The WSCR (receptacle) for paddle fans ("70" infix) can accept the WSAF for either fans ("70" infix) or luminaires ("50" infix). The WSCR for luminaires is keyed so that it will only accept the WSAF for luminaires. The WSCR for paddle fans is a more robust receptacle, which is designed to support up to 70-pounds and the vibration from the dynamic load of a fan. The WSCR for luminaires is designed to support up to a 50-pound static luminaire load. The keyed luminaire receptacle will prevent the installation of the WSAF for heavier paddle fans.

REDUCING THE HAZARD. The WSCR reduces the hazard by simplifying installation and most importantly, reducing the need to touch exposed conductors while installing luminaires. Furthermore, installing luminaires requires work on ladders and that, according to the CDC, falls are the leading cause of injuries. This is not just a problem for homeowners, it is also a problem for professionals. The use of ladders cannot be eliminated, but the simplified installation will reduce the time spent on ladders. It will also eliminate the need to juggle fixtures, while trying to make electrical connections. By engineering out the hazard, the human factors contributing to injuries or deaths are mitigated. The proposed changes to this section increase safety for the initial installation and for future exchanges of luminaires or ceiling-suspended (paddle) fans in one- and two-family dwellings. As documented in the Public Input 3423, OSHA reports point to two professional electricians' deaths that potentially could've been prevented by the use of WSCR. See the following links:

https://www.osha.gov/pls/imis/establishment.inspection_detail?id=18396960 https://www.osha.gov/pls/imis/establishment.inspection_detail?id=314163627 According to the American Housing Survey, which is a report generated every two years by the U.S. Census Bureau, a lot of home renovations are performed by the homeowner. Many homeowners are now installing their own luminaires. Some hire professionals, but often the installer is not an electrical professional. The installer could be a painter, carpenter, drywall or handy person. The data was provided during the first draft stage.

CONCLUSION PUBLIC SAFETY. The WSCR and WSAF would improve public safety; a previously installed WSCR (female portion in the ceiling) will:

- REDUCE installation time and time on ladders (due to ease of installation)
- REDUCE time standing on something substituting for a ladder (chair, table, sofa, etc.)
- ELIMINATE homeowners splicing of wiring especially while on ladders
- REDUCE incorrect installations that could lead to fires or shock hazards
- REDUCE the number of falling luminaires and paddle fans
- REDUCE injuries and deaths from -- shock and electrocution -- falls
- PROMOTE robust and safe first-time installation by professionals
- ALLOW quick connect for initial and future installations
- ELIMINATE straining of conductors and connectors holding the weight of luminaire during installation --- ELIMINATE the need to support the weight of the luminaire or ceiling paddle fan during wiring; the WSCR weighs ounces.
- FACILITATE safety because the inspector can verify the polarity of the wiring to the WSCR via a circuit tester (versus no polarity verification of luminaires/paddle fans currently)

ADDITIONAL BENEFITS TO MANUFACTURERS WHO LICENSE TECHNOLOGY. This submission complies with the ANSI/NFPA Essential Patent Policy, and the necessary documentation has been provided to NFPA.

The WSCR and WSAF would benefit manufacturers as follows:

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- INCREASE product lines containing the "quick connect/disconnect" feature

This 1:25 minute video demonstrates the simplicity of a WSCR/WSAF installation: <https://youtu.be/2ZB7qEIT8LA>

Related Item

- PI 3423

Submitter Information Verification

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Zip:

Submittal Date: Tue Aug 10 17:19:27 EDT 2021

Committee: NEC-P18

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- INCREASED business - interchangeability that anyone's luminaire/paddle fan can be replaced with yours
- DECREASE costs since multiple designs of connectors are not necessary
- INCREASE product lines containing the "quick connect/disconnect" feature

PROBLEMS AND SOLUTIONS SUMMARY

Problem: Traditional wiring

Existing practices allow wiring of luminaires and paddle fans that can result in faulty installations or hazards that can include:

- Shocks, electrocutions, injuries & death
- Fires & shorts
- Exposure & contacting energized conductors
- Incorrect & sloppy wiring
- Splicing wires while on a ladder
- Straining of conductors & connectors holding the weight of luminaire during installation
- Incorrect installations go undetected
 - Loss of grounding/bonding connections
- Incorrect support causing luminaires/paddle fans to fall or damage wires
- Falls from ladders during installation from:
 - Shocks
 - Unsteadiness and losing balance
 - Awkwardness - handling while connecting wires

Solution: Weight Supporting Ceiling Receptacle (WSCR)

Plugging-in luminaires & paddle fans using the WSCR & Weight Supporting Attachment Fitting (WSAF) will eliminate and/or reduce risk of faulty wire installations and can:

- Reduce shocks, electrocutions, injuries & deaths
- Eliminate the need to touch wires; no exposed wires
- Prevent fires due to incorrect or sloppy wiring
- Provide a means to check polarity
- Eliminate straining of conductors & connectors holding the weight of luminaire during installation
- Eliminate splicing wires while on a ladder
- Reduce majority of time on ladders (unsteadiness & losing balance)
- Reduce awkwardness of handling luminaires/paddle fans while connecting wires

Supporting Data for Public Comment

REQUIREMENTS FOR WEIGHT SUPPORTING CEILING RECEPTACLE
(WSCR) AND WEIGHT SUPPORTING ATTACHMENT FITTING (WSAF)

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MANY DIY'ERS MAKE THIS TECHNOLOGY CRUCIAL FOR SAFETY

Large Support Network for Do It Yourselfers

There is a significant market for do-it-yourself home improvement. Big-box retailers have sprung up across North America that supply products directly to the consumer. There are 2,286 North American Home Depot stores, 2155 Lowe's Stores, 5000 Ace Hardware stores, 3800 True Value stores, 4500 Do it Best stores, 1000 Harbor Freight stores and others that supply inexpensive tools to many of the DIYers. The DIY market is also supported by all sorts of YouTube videos, some of which is vendor supported, but much of which is generated by someone who may not be an expert. In addition, the Home and Garden TV Network (HGTV) has convinced many that they can make large profits by buying distressed existing home and flipping them. This has also encouraged homeowners to improve their own homes.

The big box stores are known for having large lighting departments that have extensive displays of fixtures. Many can arrange for a local contractor to do the installation. However, many consumers are taking on the project themselves or having some unlicensed handyman do the installation work.

The public comments will propose to require that lighting outlets utilize listed WSCR and WSAF (locking support-type receptacles to connect to compatible attachment fittings) on luminaires and paddle fans. The use of the WSCR and WSAF simplify the replacement of luminaires and paddle fans. The use of the WSCR and WSAF limits the exposure to energized parts for future fixture replacements. Falls from ladders are a safety problem for professionals in the workplace. They are also a safety problem in the home. Simplifying the replacement process limits the time spent on ladders, and reduces the extended reach from higher ladder steps, minimizing the number of falls.

Fixtures have varying degrees of installation complexity and a variety of fastening means. There is also a lot of variety of degrees of assembly that is required. Some of assembly might take place on the ladder. With WSCR and WSAF, all of the assembly can take place off the ladder and the completed assembly can simply be raised into position and plugged in.

Renovation Statistics

The American Housing Survey, produced by the Census Bureau is generated every two years¹. One of the many factors analyzed is home renovations. The survey analyzes professional and DIY renovations. The statistics appear to show a level percentage of DIY renovations out of the total number of renovations for each reporting period. Some renovations can easily be

¹ U. S. Census Bureau, *American Housing Survey*. (n.d.). Retrieved July 20, 2020, from https://www.census.gov/programs-surveys/ahs/data/interactive/ahstablecreator.html?s_areas=00000&s_year=2011&s_tablename=TABLE16&s_bygroup1=24&s_bygroup2=1&s_filtergroup1=1&s_filtergroup2=1.

performed by the homeowner. Surprisingly, the statistics also show a fairly consistent percentage of electrical renovations that are DIY. Permits are rarely taken out for DIY equipment replacements or renovations. That is sometimes the case with flipped homes. As a result, DIY work is rarely inspected by jurisdictional electrical inspectors. Even when permits are taken out, there is no guarantee that the work will be performed by professionals or that it will be inspected. Many jurisdictions will only spot check the work of homeowners because inspections cost money and if there is no inspection, the jurisdiction can just collect the permit fee. For those who are classified as professional, how many of the practitioners are electricians? How many are just handymen? Figures 1 through 4 illustrate the percentages of home improvement projects for a two-year period ending in 2017, 2015, 2013, and 2011. Figure 5 illustrates all of the electrical home improvement projects reported by the survey from 2010 through 2017. The background data is in Annex A.

**FIGURES 1-4: LARGE PERCENTAGE OF HOME IMPROVEMENTS DONE BY DIY'ers;
"PROFESSIONALS" CAN INCLUDE PAINTERS AND HANDYMEN, NOT ALWAYS ELECTRICIANS.**

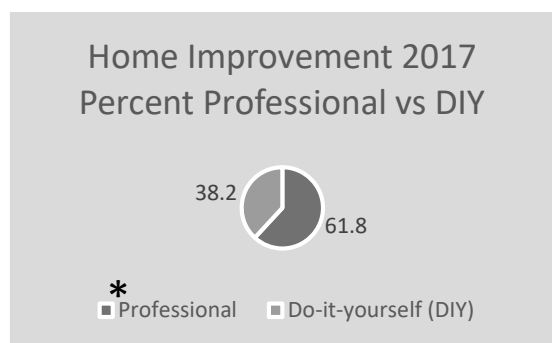


Figure 1.
* Professionals include handyman/painters/electricians

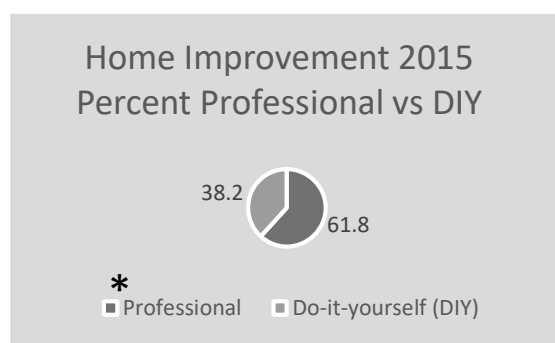


Figure 2.
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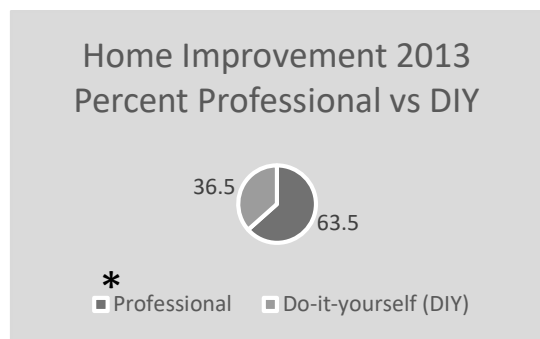


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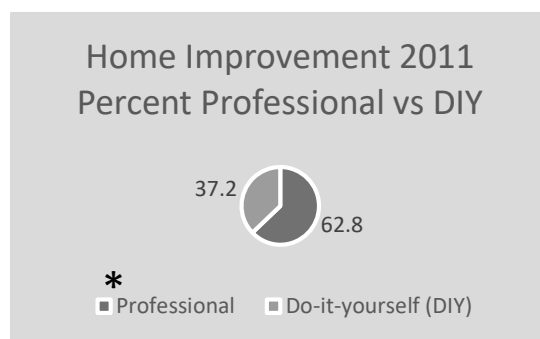
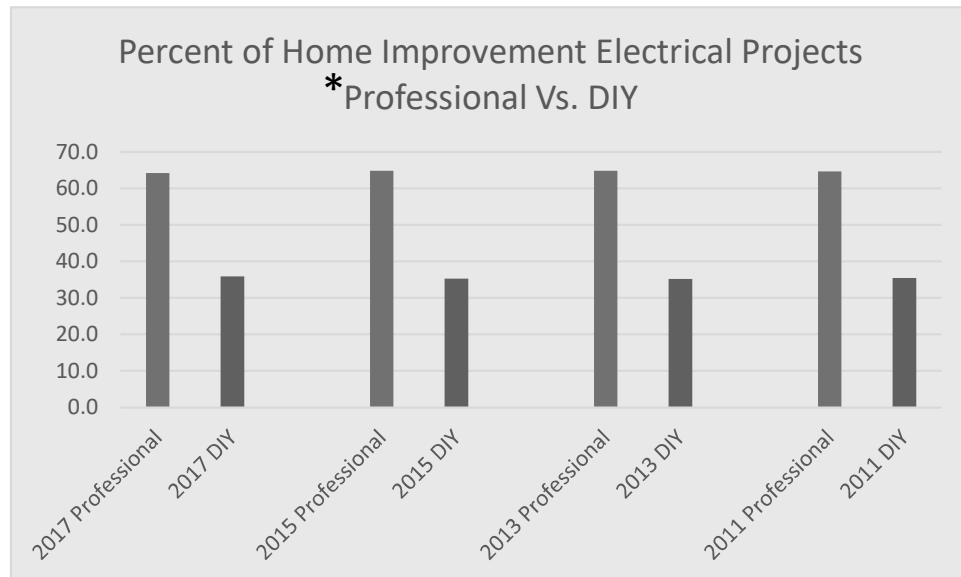


Figure 4.
* Professionals include handyman/painters/electricians

Electrical Home Improvement Projects

The number of people who are willing to do electrical work themselves has been a similar percentage to that of all DIY projects. It has also remained steady over the study periods of the survey. The raw statistics are included to provide a clearer picture of the types of home improvement projects undertaken. Many of the interior renovations likely include some electrical work, which may or may not be included separately as electrical work.



* Professionals include handyman/painters/electricians

Figure 5.

NFPA Residential Fire Statistics

NFPA estimates that 17,600 home fires in the US that are caused by faulty wiring connected with ceiling fans and lights (<https://www.nfpa.org/-/media/Files/News-and-Research/Fire-statistics-and-reports/Building-and-life-safety/oshomes.pdf>) The report notes “Electrical distribution or lighting equipment was the leading cause of home fire property damage. An average of 35,000 such fires caused 500 deaths; 1,130 injuries; and \$1.4 billion in direct property damage per year. Wiring and related equipment accounted for 7 percent of all home fires and 10 percent of all home fire deaths. Cords or plugs were involved in only 1 percent of the fires but 6 percent of the deaths. Extension cords dominated the cord or plug category. More information is available in the NFPA report, *Electrical Fires*².”

² Campbell, R. (2019, March). *Electrical Fires* (Tech.). Retrieved July 20, 2020, from National Fire Protection Association website: <https://www.nfpa.org/News-and-Research/Data-research-and-tools/Electrical/Electrical>

The following table notes fire statistics for lighting and distribution equipment. This is a rather broad category. There is a separate category for ceiling fans. It appears that fans category includes bathroom vent fans. It may also include kitchen exhaust fans.

Table 5.
Home Fires Involving Electrical Failure or Malfunction as Factor Contributing to Ignition
by Equipment Involved in Ignition, 2012-2016 Annual Averages

Equipment Involved	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Electrical distribution and lighting equipment	22,620	(50%)	310	(71%)	700	(56%)	\$786	(62%)
Wiring and related equipment	17,600	(39%)	190	(43%)	440	(35%)	\$588	(46%)
Cord or plug	2,080	(5%)	100	(23%)	130	(11%)	\$85	(7%)
Lamp, bulb or lighting	1,850	(4%)	10	(3%)	70	(5%)	\$64	(5%)
Transformers and power supplies	1,080	(2%)	10	(2%)	60	(5%)	\$49	(4%)

Later on, NFPA's *Electrical Fires* report contains the following table, which, for the same time period has different and larger numbers:

Table 14.
Home Fires Involving Electrical Distribution and Lighting Equipment, by Equipment Involved in Ignition
2012-2016 Annual Averages

Equipment Involved	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Wiring and related equipment	24,780	(67%)	270	(55%)	640	(53%)	\$853	(67%)
Lamp, bulb or lighting	4,970	(13%)	40	(9%)	200	(17%)	\$164	(13%)
Cord or plug	3,330	(11%)	160	(33%)	230	(19%)	\$143	(11%)
Transformers and power supplies	2,060	(9%)	20	(3%)	130	(11%)	\$108	(9%)
Other known equipment involved in ignition	20	(0%)	0	(0%)	0	(0%)	\$0	(0%)
Total	35,150	(100%)	490	(100%)	1,200	(100%)	\$1,270	(100%)

Injury Reports

OSHA Reports. Falls from ladders are a frequent hazard. They happen in commercial and industrial settings as well as in residential situations. For example: in the OSHA electrocution training materials, an OSHA Fatal Fact is presented³ that details a union electrician's death by electrocution during trouble shooting with lamps. The shock caused the electrician to fall off the ladder (OSHA Incident Report #0418800).⁴

Another example: in 2011, an electrician was electrocuted when the wires of a light fixture he was attempting to hang became stripped energizing the light fixture. As he grabbed one of the attached steel hanging cables, he received a fatal shock (OSHA Incident Report #0317700).⁵ It is reasonable to conclude that this incident could have been avoided if the new technology receptacle/attachment fitting technology had been used because the fixture could not have become energized, as there would be no access to electricity through the disconnected fixture.

NIOSH Reports. The National Institute for Occupational Safety and Health (NIOSH) conducts the Fatal Accident Circumstances and Epidemiology (FACE) Project. Data are collected from a sample of fatal accidents, including electrical-related fatalities.

For example: NIOSH FACE Report 87-55⁶ summarized a 1987 electrocution of a North Carolina electrician. While repairing a fluorescent light fixture over a kitchen sink in a single-family residence, a 33-year-old journeyman electrician was electrocuted when he contacted an energized wire on the load side of the ballast (400 volts). The ballast had been replaced. However, he could not get the light to operate properly. The electrician was sitting on the sink when he apparently contacted an energized wire on the load side of the ballast. The circuit had not been de-energized at the panel box or at the single-pole switch on the wall beside the sink.

It is reasonable to conclude that this incident might have been avoided if the WSCR/WSAF technology had been used. The receptacle would've already been installed, and the fixture could've been taken down through a simple quick disconnect for examination. If the fixture was determined to be in working order, additional work could be completed with the fixture

³ Construction Focus Four: Electrocution Hazards, Instructor Guide. OSHA Training Institute, OSHA Directorate of Training and Education, April 2011. Document can be found online at https://www.osha.gov/dte/outreach/construction/focus_four/electrocution/electr_ig.pdf

⁴ OSHA Report ID: 0418800 can be found at https://www.osha.gov/pls/imis/establishment.inspection_detail?id=18396960

⁵ OSHA Report ID: 0317700 can be found at https://www.osha.gov/pls/imis/establishment.inspection_detail?id=314163627⁶ NIOSH Face Reports 1982 to 2005 including 87-55 can be found at http://wwwn.cdc.gov/NIOSH-FACE/Default.cshtml?state=ALL&Incident_Year=ALL&Category2=0006&Submit=Submit#.VFjs8y7-DK0.email. This particular report can be located directly at <http://www.cdc.gov/niosh/face/in-house/full8755.html>

⁶ NIOSH Face Reports 1982 to 2005 including 87-55 can be found at http://wwwn.cdc.gov/NIOSH-FACE/Default.cshtml?state=ALL&Incident_Year=ALL&Category2=0006&Submit=Submit#.VFjs8y7-DK0.email. This particular report can be located directly at <http://www.cdc.gov/niosh/face/in-house/full8755.html>

⁷ 2004 Electrocutions Associated with Consumer Products, By Matthew V. Hnatov. Hazard Analysis Division, Directorate for Epidemiology, Consumer Products Safety Commission. April 2009

quickly disconnected and out of the vicinity so full attention could be given to the wiring. If the new technology had been used, the electrocution might have been avoided.

CPSC Data. It is important to note that CPSC data includes only the data the CPSC becomes aware of, and it is understood that there are many other incidents that are not reported or do not come to their attention. Consumers are not obligated to report incidents to the CPSC. The research from the National Electronic Injury Surveillance System (NEISS) database from 2009 to 2013 included the following:

- CPSC estimates 4 electrocution deaths per year associated with lighting products.⁷
- There were 38 incidents involving the installation of light fixtures that resulted in hospital emergency room visits;
- 32 of those incidents involved falls and at least four of those incidents involved the victims being shocked.

With the new technology, after the receptacle is installed in the ceiling, there is no additional wiring necessary, no weight or bulk of the fixture during the initial receptacle installation, certainty of connection of the fixture to the equipment grounding conductor, and no shock hazard during the quick connect of the fixture. Without the weight/bulk, the falls may not have occurred. With the new technology receptacle in place, installation of the luminaire is a quick connect and no shock would have occurred.

- There were 418 incidents involving changing light bulbs that resulted in hospital emergency room visits;
- 390 involved falls and at least six of those incidents involved the victims being shocked.
- There were 9 additional incidents associated with cleaning the light fixture that resulted in hospital emergency room visits; 8 of those involved falls.

Many of these incidents could have been avoided or minimized if the new technology receptacle/attachment fitting technology had been used. The fixture is simply disconnected and any bulb or fixture maintenance or cleaning can be done on a table, not at an elevation, thereby reducing the time at an elevated level, thereby reducing the hazard.

- There were 55 incidents involving a luminaire falling from the ceiling onto the victim that resulted in hospital emergency room visits.

If the receptacle/attachment fitting (WSCR/WSAF) technology had been used, many of these incidents could have been avoided or minimized. The new technology must pass weight support requirements in the UL product safety standards well beyond what the NEC permits.

⁷ 2004 Electrocutions Associated with Consumer Products, By Matthew V. Hnatov. Hazard Analysis Division, Directorate for Epidemiology, Consumer Products Safety Commission. April 2009

The NEC does not permit the assembly to support a luminaire weighing more than 50 lbs or a ceiling fan weighing more than 70 lbs, therefore the fixtures would not fall.

CDC Data. According to the Centers for Disease Control and Prevention (CDC), falls are the number one cause of injury. From 2001-2017, there were 144,895,242 falls reported to CDC. During the same period, there were 443,576 deaths from falls. It is not unreasonable to assume that many of these falls involved working on a luminaire. Ladder related accidents are common. In addition, some will resort to stools, chairs, and chairs with boxes or books on them to get to the right height. Detailed information can be found in Annex B. There is little information on what the victims were doing when they fell.

In 1997, Industrial Safety and Hygiene News (ISHN) noted “According the American Academy of Orthopedic Surgeons, every year 500,000 people are treated for ladder-related injuries and approximately 300 of these incidents prove to be fatal. The Liberty Mutual Research Institute for Safety found that in 2007 alone, more than 400 people died as a result of falls on or from ladders or scaffolding⁸.

Summary

When viewing data contained in the Annexes, it is important to note that there is no way to know the exact number of improper installations. For example, if there were one million annual installations of luminaires (it could be argued that there are significantly *more* annual installations per Annex A) and just 2% of them were improperly installed by an untrained do-it-yourselfers, that would result in 20,000 improperly installed luminaires.

⁸ 500,000 Falls from Ladders Annually; 97 Percent Occur at Home or on Farms. (July 6, 2017). *Industrial Safety and Hygiene News*. Retrieved July 20, 2020, from <https://www.ishn.com/articles/106830-000-falls-from-ladders-annually-97-percent-occur-at-home-or-on-farms>

Annex A. Home Renovations Reported in the American Housing Survey

Survey Notes: Estimates and Margins of Error in thousands of housing units, except as indicated. Medians are rounded to four significant digits as part of disclosure avoidance protocol. Margin of Error is calculated at the 90% confidence interval. Weighting consistent with Census 2010. Blank cells represent zero; Z rounds to zero; '.' Represents not applicable or no cases in sample; S represents estimates that did not meet publication standards or withheld to avoid disclosure.

Characteristics	Professional/Do- It-Yourself Total Estimate	Professional Estimate	Do-It-Yourself Estimate
HOME IMPROVEMENT ACTIVITY IN LAST TWO YEARS (2017)			
Total			
Number of projects (1,000)	113,155	69,975	43,181
Median expenditures (\$)	1,364	2,408	600
Total expenditures (1,000)	450,089,818	368,366,827	81,722,991
Disaster Repairs.			
Earthquake			
Number of projects (1,000)	S	S	S
Median expenditures (\$)	S	S	300
Total expenditures (1,000)	S	S	S
Tornado/hurricane			
Number of projects (1,000)	418	303	115
Median expenditures (\$)	7,000	7,000	S
Total expenditures (1,000)	4,490,105	3,276,862	S
Landslide			
Number of projects (1,000)	S	S	.
Median expenditures (\$)	6,020	6,020	.
Total expenditures (1,000)	S	S	.
Fire			

Number of projects (1,000)	113	85	S
Median expenditures (\$)	10,000	10,000	S
Total expenditures (1,000)	S	S	S
Flood			
Number of projects (1,000)	197	121	76
Median expenditures (\$)	S	13,500	S
Total expenditures (1,000)	5,283,698	S	S
Other			
Number of projects (1,000)	867	734	133
Median expenditures (\$)	9,500	10,500	3,800
Total expenditures (1,000)	10,898,601	10,190,039	708,562

Room Additions and Renovations

Bedroom			
Number of projects (1,000)	419	184	235
Median expenditures (\$)	7,000	23,000	2,000
Total expenditures (1,000)	7,289,971	6,000,692	1,289,280
Bath			
Number of projects (1,000)	274	162	112
Median expenditures (\$)	6,400	10,000	4,000
Total expenditures (1,000)	3,258,882	2,493,137	765,746
Recreation Room			
Number of projects (1,000)	196	105	91
Median expenditures (\$)	S	24,000	3,750
Total expenditures (1,000)	4,880,565	3,875,457	S
Kitchen			
Number of projects (1,000)	159	94	65
Median expenditures (\$)	S	30,000	S
Total expenditures (1,000)	4,559,506	3,686,182	S
Other			

Number of projects (1,000)	827	444	383
Median expenditures (\$)	6,500	12,500	S
Total expenditures (1,000)	13,508,584	11,125,843	2,382,741

Remodeling

Bath

Number of projects (1,000)	5,739	3,001	2,738
Median expenditures (\$)	3,000	5,250	1,500
Total expenditures (1,000)	35,305,520	26,856,855	8,448,665

Kitchen

Number of projects (1,000)	4,184	2,358	1,826
Median expenditures (\$)	6,000	10,000	3,000
Total expenditures (1,000)	49,553,906	37,772,420	11,781,486

Exterior Additions and Replacements

Attached garage/carport

Number of projects (1,000)	736	389	347
Median expenditures (\$)	2,800	4,500	2,200
Total expenditures (1,000)	6,120,015	4,365,016	1,754,999

Porch/deck/patio/terrace

Number of projects (1,000)	3,331	1,798	1,533
Median expenditures (\$)	2,500	4,400	1,000
Total expenditures (1,000)	18,805,519	14,757,663	4,047,856

Roofing

Number of projects (1,000)	6,766	5,656	1,110
Median expenditures (\$)	6,000	6,800	2,200
Total expenditures (1,000)	50,222,041	45,937,650	4,284,391

Siding

Number of projects (1,000)	1,937	1,264	672
Median expenditures (\$)	3,000	4,800	920

Total expenditures (1,000)	9,468,686	8,030,873	1,437,813
Windows/doors			
Number of projects (1,000)	7,443	4,799	2,644
Median expenditures (\$)	1,400	2,300	500
Total expenditures (1,000)	24,777,309	21,119,910	3,657,399
Chimney/stairs/other exterior additions			
Number of projects (1,000)	1,531	1,087	444
Median expenditures (\$)	1,072	1,440	480
Total expenditures (1,000)	3,856,308	3,133,861	722,448

Interior Additions and Replacements.

Insulation			
Number of projects (1,000)	2,712	1,451	1,261
Median expenditures (\$)	750	1,250	400
Total expenditures (1,000)	3,886,216	2,948,857	937,359
Water pipes			
Number of projects (1,000)	3,014	1,792	1,221
Median expenditures (\$)	550	1,000	200
Total expenditures (1,000)	4,549,002	3,972,440	576,562
Plumbing fixtures			
Number of projects (1,000)	8,192	3,924	4,268
Median expenditures (\$)	400	700	250
Total expenditures (1,000)	10,766,188	8,227,445	2,538,743
Electrical wiring/fuse boxes/breaker switches			
Number of projects (1,000)	4,487	2,879	1,609
Median expenditures (\$)	600	1,000	300
Total expenditures (1,000)	6,388,526	5,088,660	1,299,866
Security system			
Number of projects (1,000)	4,286	2,933	1,353

Median expenditures (\$)	400	400	400
Total expenditures (1,000)	2,605,279	1,732,909	872,370
Flooring/carpeting/paneling/ceiling tiles			
Number of projects (1,000)	10,438	6,364	4,074
Median expenditures (\$)	2,000	2,875	920
Total expenditures (1,000)	33,135,645	26,515,795	6,619,850
HVAC			
Number of projects (1,000)	9,930	8,571	1,359
Median expenditures (\$)	3,600	4,000	2,000
Total expenditures (1,000)	43,413,330	39,616,745	3,796,585
Septic tank			
Number of projects (1,000)	355	300	55
Median expenditures (\$)	3,000	3,000	S
Total expenditures (1,000)	1,474,779	1,387,439	S
Water heater/dishwasher/garbage disposal			
Number of projects (1,000)	14,569	8,457	6,113
Median expenditures (\$)	500	700	400
Total expenditures (1,000)	10,813,487	7,882,752	2,930,735
Other interior			
Number of projects (1,000)	1,901	1,250	651
Median expenditures (\$)	1,700	2,143	1,000
Total expenditures (1,000)	S	S	1,348,948

Lot or Yard Additions & Replacements

Driveways/walkways			
Number of projects (1,000)	3,858	2,627	1,231
Median expenditures (\$)	1,800	2,640	550
Total expenditures (1,000)	12,015,598	10,545,199	1,470,399
Fencing/walls			

Number of projects (1,000)	4,449	2,303	2,146
Median expenditures (\$)	1,300	2,600	601
Total expenditures (1,000)	10,140,802	7,603,533	2,537,269
Swimming pool/tennis court/recreational structures			
Number of projects (1,000)	967	537	431
Median expenditures (\$)	3,500	7,500	748
Total expenditures (1,000)	11,131,910	10,170,999	960,911
Shed/detached garage/other building			
Number of projects (1,000)	2,337	1,095	1,243
Median expenditures (\$)	2,000	3,100	1,000
Total expenditures (1,000)	11,680,657	7,570,385	4,110,272
Landscaping/sprinkler system			
Number of projects (1,000)	5,541	2,279	3,262
Median expenditures (\$)	900	2,000	500
Total expenditures (1,000)	13,390,741	9,353,303	4,037,438
Other			
Number of projects (1,000)	964	612	352
Median expenditures (\$)	2,000	3,000	500
Total expenditures (1,000)	4,583,936	4,169,719	414,217

Characteristics	Professional/Do-It-Yourself		
	Total Estimate	Professional Estimate	Do-It-Yourself Estimate
HOME IMPROVEMENT ACTIVITY IN LAST TWO YEARS (2015)			
Total			
Number of projects (1,000)	123,481	76,277	47,204
Median expenditures (\$)	1,200	2,000	600
Total expenditures (1,000)	431,497,494	347,110,853	84,386,641
Disaster Repairs.			
Earthquake			
Number of projects (1,000)	23	13	S
Median expenditures (\$)	S	S	S
Total expenditures (1,000)	194,698	172,620	S
Tornado/hurricane			
Number of projects (1,000)	339	263	76
Median expenditures (\$)	6,000	7,000	S
Total expenditures (1,000)	3,171,864	2,692,720	S
Lightning/fire			
Number of projects (1,000)	142	92	50
Median expenditures (\$)	S	S	S
Total expenditures (1,000)	5,161,751	S	S
Flood			
Number of projects (1,000)	211	139	72
Median expenditures (\$)	8,150	8,685	S
Total expenditures (1,000)	2,999,016	S	S
Other			
Number of projects (1,000)	823	708	115

Median expenditures (\$)	8,550	9,000	3,000
Total expenditures (1,000)	10,029,780	9,309,961	S

Room Additions and Renovations

Bedroom

Number of projects (1,000)	516	259	257
Median expenditures (\$)	5,000	17,000	2,000
Total expenditures (1,000)	10,997,017	8,903,760	2,093,257

Bath

Number of projects (1,000)	303	162	141
Median expenditures (\$)	S	10,000	2,500
Total expenditures (1,000)	3,463,143	2,847,832	615,311

Recreation Room

Number of projects (1,000)	253	124	130
Median expenditures (\$)	S	15,000	2,800
Total expenditures (1,000)	3,036,052	2,510,855	525,197

Kitchen

Number of projects (1,000)	198	133	65
Median expenditures (\$)	12,110	15,000	5,000
Total expenditures (1,000)	4,355,845	3,925,883	S

Other

Number of projects (1,000)	861	453	408
Median expenditures (\$)	5,000	8,000	2,000
Total expenditures (1,000)	9,920,768	7,905,575	2,015,193

Remodeling

Bath

Number of projects (1,000)	6,547	3,406	3,141
Median expenditures (\$)	3,000	5,000	1,500
Total expenditures (1,000)	37,537,408	28,304,879	9,232,529

Kitchen			
Number of projects (1,000)	4,740	2,595	2,145
Median expenditures (\$)	5,000	7,000	3,000
Total expenditures (1,000)	47,380,831	34,471,023	12,909,808

Exterior Additions and Replacements

Attached garage/carport			
Number of projects (1,000)	717	403	314
Median expenditures (\$)	4,000	5,000	2,500
Total expenditures (1,000)	5,304,691	3,745,563	1,559,127
Porch/deck/patio/terrace			
Number of projects (1,000)	3,616	1,953	1,663
Median expenditures (\$)	2,500	4,000	1,200
Total expenditures (1,000)	18,899,196	14,824,455	4,074,741
Roofing			
Number of projects (1,000)	8,035	6,543	1,492
Median expenditures (\$)	5,500	6,000	2,500
Total expenditures (1,000)	52,948,893	47,088,310	5,860,584
Siding			
Number of projects (1,000)	2,275	1,607	667
Median expenditures (\$)	3,000	4,000	1,000
Total expenditures (1,000)	12,524,667	10,787,609	1,737,057
Windows/doors			
Number of projects (1,000)	8,693	5,580	3,114
Median expenditures (\$)	1,500	2,000	600
Total expenditures (1,000)	27,257,002	22,199,593	5,057,410
Chimney/stairs/other exterior additions			
Number of projects (1,000)	1,479	983	496
Median expenditures (\$)	1,050	1,500	450
Total expenditures (1,000)	3,427,485	2,944,792	482,694

Interior Additions and Replacements.

Insulation

Number of projects (1,000)	3,531	1,862	1,669
Median expenditures (\$)	750	1,200	400
Total expenditures (1,000)	4,991,329	3,779,128	1,212,201

Water pipes

Number of projects (1,000)	3,540	2,080	1,461
Median expenditures (\$)	500	900	200
Total expenditures (1,000)	5,259,795	4,233,234	1,026,561

Plumbing fixtures

Number of projects (1,000)	9,116	4,313	4,804
Median expenditures (\$)	400	550	250
Total expenditures (1,000)	9,667,129	6,882,298	2,784,831

Electrical wiring/fuse boxes/breaker switches

Number of projects (1,000)	5,018	3,249	1,769
Median expenditures (\$)	600	916	240
Total expenditures (1,000)	7,302,161	6,141,821	1,160,340

Security system

Number of projects (1,000)	3,707	2,943	764
Median expenditures (\$)	350	300	400
Total expenditures (1,000)	2,194,706	1,705,733	488,973

Flooring/carpeting/paneling/ceiling tiles

Number of projects (1,000)	12,051	7,224	4,827
Median expenditures (\$)	1,674	2,300	800
Total expenditures (1,000)	32,026,087	24,970,431	7,055,656

HVAC

Number of projects (1,000)	10,301	8,915	1,387
Median expenditures (\$)	3,150	3,429	1,800
Total expenditures (1,000)	40,379,006	36,507,489	3,871,517

Septic tank			
Number of projects (1,000)	387	319	68
Median expenditures (\$)	3,000	3,000	900
Total expenditures (1,000)	1,584,211	1,255,016	S
Water heater/dishwasher/garbage disposal			
Number of projects (1,000)	15,838	9,316	6,522
Median expenditures (\$)	500	700	400
Total expenditures (1,000)	11,087,649	7,899,118	3,188,531
Other interior			
Number of projects (1,000)	1,661	1,192	469
Median expenditures (\$)	1,200	1,500	754
Total expenditures (1,000)	4,660,744	3,947,101	713,642

Lot or Yard Additions and Replacements

Driveways/walkways			
Number of projects (1,000)	4,099	2,712	1,387
Median expenditures (\$)	1,500	2,000	500
Total expenditures (1,000)	10,744,436	9,123,787	1,620,649
Fencing/walls			
Number of projects (1,000)	4,369	2,289	2,080
Median expenditures (\$)	1,000	2,000	600
Total expenditures (1,000)	9,239,951	6,722,489	2,517,462
Swimming pool/tennis court/recreational structures			
Number of projects (1,000)	806	445	361
Median expenditures (\$)	4,000	7,000	800
Total expenditures (1,000)	8,864,172	7,345,981	1,518,191
Shed/detached garage/other building			
Number of projects (1,000)	2,359	1,023	1,337
Median expenditures (\$)	1,500	2,500	1,000

Total expenditures (1,000)	9,333,571	5,637,621	3,695,950
Landscaping/sprinkler system			
Number of projects (1,000)	6,096	2,467	3,630
Median expenditures (\$)	800	2,000	500
Total expenditures (1,000)	12,123,260	8,640,867	3,482,393
Other			
Number of projects (1,000)	829	514	315
Median expenditures (\$)	1,500	2,250	S
Total expenditures (1,000)	3,429,179	2,945,964	483,215

Characteristics	Professional/Do-It-Yourself		
	Total Estimate	Professional Estimate	Do-It-Yourself Estimate
HOME IMPROVEMENT ACTIVITY IN LAST TWO YEARS (2013)			
Total			
Number of projects (1,000)	93,558	59,411	34,147
Median expenditures (\$)	1,000	2,000	500
Total expenditures (1,000)	300,831,306	246,338,538	54,492,768
Remodeling			
Kitchen			
Number of projects (1,000)	2,954	1,700	1,253
Median expenditures (\$)	5,000	6,200	3,000
Total expenditures (1,000)	26,626,680	18,827,473	7,799,207
Bath			
Number of projects (1,000)	4,064	2,168	1,896
Median expenditures (\$)	2,500	4,000	1,500
Total expenditures (1,000)	18,685,777	13,962,662	4,723,115
Room Additions and Renovations			
Kitchen			
Number of projects (1,000)	45	34	11
Median expenditures (\$)	35,000	35,821	15,000
Total expenditures (1,000)	1,584,009	1,441,692	142,317
Bath			
Number of projects (1,000)	546	293	253
Median expenditures (\$)	5,000	8,221	3,000
Total expenditures (1,000)	4,600,965	3,556,359	1,044,605

Bedroom

Number of projects (1,000)	907	451	456
Median expenditures (\$)	3,343	8,500	1,600
Total expenditures (1,000)	12,578,231	10,045,582	2,532,649

Recreation Room

Number of projects (1,000)	320	136	184
Median expenditures (\$)	5,000	6,627	3,700
Total expenditures (1,000)	2,899,929	1,581,672	1,318,257

Other

Number of projects (1,000)	1,624	798	826
Median expenditures (\$)	3,500	6,866	1,848
Total expenditures (1,000)	14,945,765	11,958,530	2,987,235

Systems and Equipment

Plumbing/pipes

Number of projects (1,000)	2,767	1,716	1,051
Median expenditures (\$)	500	800	200
Total expenditures (1,000)	3,604,401	3,009,925	594,475

Electrical system

Number of projects (1,000)	3,716	2,409	1,307
Median expenditures (\$)	500	800	200
Total expenditures (1,000)	4,269,937	3,549,517	720,420

Plumbing fixtures

Number of projects (1,000)	6,881	3,437	3,444
Median expenditures (\$)	331	500	200
Total expenditures (1,000)	5,957,561	4,210,317	1,747,244

HVAC

Number of projects (1,000)	7,250	6,340	910
Median expenditures (\$)	3,000	3,200	1,500
Total expenditures (1,000)	26,516,143	24,496,257	2,019,885

Appliances/major equipment			
Number of projects (1,000)	14,838	9,177	5,661
Median expenditures (\$)	400	500	334
Total expenditures (1,000)	8,617,672	6,333,578	2,284,094

Exterior Additions and Replacements.

Roofing			
Number of projects (1,000)	5,851	4,876	975
Median expenditures (\$)	5,000	5,500	1,800
Total expenditures (1,000)	36,079,462	33,223,391	2,856,071
Siding			
Number of projects (1,000)	1,677	1,219	458
Median expenditures (\$)	3,000	4,200	500
Total expenditures (1,000)	7,437,346	6,749,185	688,161
Windows/doors			
Number of projects (1,000)	6,491	4,108	2,383
Median expenditures (\$)	1,100	1,800	500
Total expenditures (1,000)	16,670,157	13,622,788	3,047,369

Interior Additions and Replacements.

Insulation			
Number of projects (1,000)	2,681	1,617	1,065
Median expenditures (\$)	573	955	300
Total expenditures (1,000)	3,060,617	2,498,934	561,683
Flooring/paneling/ceiling			
Number of projects (1,000)	14,241	8,534	5,706
Median expenditures (\$)	1,000	1,647	500
Total expenditures (1,000)	27,522,730	21,585,632	5,937,098
Other interior			
Number of projects (1,000)	1,761	1,236	524

Median expenditures (\$)	1,200	1,500	800
Total expenditures (1,000)	5,620,345	4,070,664	1,549,681

Other Additions and Replacements

Deck/porch

Number of projects (1,000)	489	282	207
Median expenditures (\$)	3,000	5,373	1,200
Total expenditures (1,000)	2,625,615	2,236,047	389,568

Patio/terrace/detached deck

Number of projects (1,000)	2,737	1,534	1,203
Median expenditures (\$)	2,000	3,500	1,000
Total expenditures (1,000)	11,324,775	9,034,084	2,290,691

Garage

Number of projects (1,000)	94	73	21
Median expenditures (\$)	18,000	24,000	500
Total expenditures (1,000)	2,206,566	2,140,830	65,736

Carport

Number of projects (1,000)	94	58	37
Median expenditures (\$)	1,400	2,269	500
Total expenditures (1,000)	440,123	381,558	58,565

Shed

Number of projects (1,000)	1,547	746	801
Median expenditures (\$)	1,400	2,500	800
Total expenditures (1,000)	8,344,883	6,885,567	1,459,315

Swimming pool/tennis court/recreational structures

Number of projects (1,000)	628	359	269
Median expenditures (\$)	3,000	5,075	600
Total expenditures (1,000)	4,951,069	4,436,168	514,901

Other exterior

Number of projects (1,000)	7,548	4,620	2,928
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Median expenditures (\$)	1,500	2,000	500
Total expenditures (1,000)	19,708,734	16,325,326	3,383,408

Disaster Repairs

Number of projects (1,000)	1,807	1,490	316
Median expenditures (\$)	7,000	7,600	2,000
Total expenditures (1,000)	23,951,815	20,174,799	3,777,017
Other interior			
Number of projects (1,000)	1,661	1,192	469
Median expenditures (\$)	1,200	1,500	754
Total expenditures (1,000)	4,660,744	3,947,101	713,642

Lot or Yard Additions and Replacements

Driveways/walkways			
Number of projects (1,000)	4,099	2,712	1,387
Median expenditures (\$)	1,500	2,000	500
Total expenditures (1,000)	10,744,436	9,123,787	1,620,649
Fencing/walls			
Number of projects (1,000)	4,369	2,289	2,080
Median expenditures (\$)	1,000	2,000	600
Total expenditures (1,000)	9,239,951	6,722,489	2,517,462
Swimming pool/tennis court/recreational structures			
Number of projects (1,000)	806	445	361
Median expenditures (\$)	4,000	7,000	800
Total expenditures (1,000)	8,864,172	7,345,981	1,518,191
Shed/detached garage/other building			
Number of projects (1,000)	2,359	1,023	1,337
Median expenditures (\$)	1,500	2,500	1,000
Total expenditures (1,000)	9,333,571	5,637,621	3,695,950

Landscaping/sprinkler system

Number of projects (1,000)	6,096	2,467	3,630
Median expenditures (\$)	800	2,000	500
Total expenditures (1,000)	12,123,260	8,640,867	3,482,393

Other

Number of projects (1,000)	829	514	315
Median expenditures (\$)	1,500	2,250	S
Total expenditures (1,000)	3,429,179	2,945,964	483,215

Characteristics	Professional/Do-It-Yourself		
	Total	Professional	Do-It-Yourself
HOME IMPROVEMENT ACTIVITY IN LAST TWO YEARS (2011)			
Total			
Number of projects (1,000)	116,263	73,015	43,248
Median expenditures (\$)	1,000	1,999	500
Total expenditures (1,000)	348,536,558	287,026,972	61,509,586
Remodeling			
Kitchen			
Number of projects (1,000)	3,608	2,081	1,527
Median expenditures (\$)	5,000	7,993	3,000
Total expenditures (1,000)	34,661,061	26,886,023	7,775,039
Bath			
Number of projects (1,000)	4,825	2,503	2,323
Median expenditures (\$)	2,500	4,000	1,500
Total expenditures (1,000)	22,723,885	16,388,045	6,335,840
Room Additions and Renovations			
Kitchen			
Number of projects (1,000)	63	52	11
Median expenditures (\$)	27,353	30,000	8,000
Total expenditures (1,000)	1,830,275	1,683,443	146,832
Bath			
Number of projects (1,000)	713	392	321
Median expenditures (\$)	3,500	5,882	2,000
Total expenditures (1,000)	4,523,881	3,460,385	1,063,497
Bedroom			

Number of projects (1,000)	1,142	506	636
Median expenditures (\$)	2,500	5,000	1,500
Total expenditures (1,000)	8,537,461	5,954,937	2,582,524
Recreation Room			
Number of projects (1,000)	490	202	288
Median expenditures (\$)	3,000	6,882	1,600
Total expenditures (1,000)	3,486,584	2,662,713	823,871
Other			
Number of projects (1,000)	1,978	997	981
Median expenditures (\$)	3,000	5,000	1,500
Total expenditures (1,000)	16,627,399	13,298,699	3,328,700

Systems and Equipment

Plumbing/pipes			
Number of projects (1,000)	3,312	2,082	1,231
Median expenditures (\$)	500	900	180
Total expenditures (1,000)	4,506,681	3,955,534	551,146
Electrical system			
Number of projects (1,000)	4,434	2,864	1,569
Median expenditures (\$)	500	800	200
Total expenditures (1,000)	4,976,258	4,231,366	744,892
Plumbing fixtures			
Number of projects (1,000)	7,944	3,811	4,133
Median expenditures (\$)	305	500	200
Total expenditures (1,000)	6,207,328	4,125,458	2,081,870
HVAC			
Number of projects (1,000)	9,574	8,365	1,209
Median expenditures (\$)	3,000	3,176	1,500
Total expenditures (1,000)	33,214,557	30,498,058	2,716,499
Appliances/major equipment			

Number of projects (1,000)	17,913	11,276	6,637
Median expenditures (\$)	400	500	320
Total expenditures (1,000)	10,213,056	7,588,909	2,624,147

Exterior Additions and Replacements.

Roofing

Number of projects (1,000)	7,269	5,950	1,319
Median expenditures (\$)	4,800	5,276	1,807
Total expenditures (1,000)	42,534,922	38,896,570	3,638,351

Siding

Number of projects (1,000)	2,154	1,444	710
Median expenditures (\$)	3,000	4,500	762
Total expenditures (1,000)	10,342,508	8,965,278	1,377,230

Windows/doors

Number of projects (1,000)	8,676	5,629	3,047
Median expenditures (\$)	1,282	2,000	500
Total expenditures (1,000)	23,145,692	19,648,147	3,497,546

Interior Additions and Replacements.

Insulation

Number of projects (1,000)	4,085	2,116	1,970
Median expenditures (\$)	500	1,000	300
Total expenditures (1,000)	4,287,875	3,214,117	1,073,757

Flooring/paneling/ceiling

Number of projects (1,000)	18,320	10,907	7,413
Median expenditures (\$)	1,000	1,510	500
Total expenditures (1,000)	31,910,709	25,087,900	6,822,809

Other interior

Number of projects (1,000)	1,780	1,218	561
Median expenditures (\$)	1,000	1,500	500

Total expenditures (1,000)	4,129,829	3,416,024	713,805
Other Additions and Replacements.			
Deck/porch			
Number of projects (1,000)	505	287	217
Median expenditures (\$)	2,000	3,000	1,342
Total expenditures (1,000)	2,701,309	2,290,101	411,208
Patio/terrace/detached deck			
Number of projects (1,000)	3,500	1,835	1,665
Median expenditures (\$)	2,000	3,176	1,000
Total expenditures (1,000)	13,022,905	9,963,322	3,059,583
Garage			
Number of projects (1,000)	158	87	71
Median expenditures (\$)	15,000	20,250	5,000
Total expenditures (1,000)	2,621,310	2,165,996	455,314
Carport			
Number of projects (1,000)	158	82	76
Median expenditures (\$)	1,500	1,600	1,300
Total expenditures (1,000)	399,581	240,654	158,927
Shed			
Number of projects (1,000)	2,098	977	1,121
Median expenditures (\$)	1,429	2,600	800
Total expenditures (1,000)	8,599,423	5,927,181	2,672,242
Swimming pool/tennis court/recreational structures			
Number of projects (1,000)	713	414	300
Median expenditures (\$)	2,500	6,000	500
Total expenditures (1,000)	7,417,915	7,102,007	315,908
Other exterior			
Number of projects (1,000)	9,003	5,419	3,584
Median expenditures (\$)	1,247	2,000	500

Total expenditures (1,000)	22,898,421	18,263,708	4,634,713
Disaster Repairs			
Number of projects (1,000)	1,846	1,519	327
Median expenditures (\$)	7,000	8,000	2,736
Total expenditures (1,000)	23,015,733	21,112,396	1,903,337
Other interior			
Number of projects (1,000)	1,661	1,192	469
Median expenditures (\$)	1,200	1,500	754
Total expenditures (1,000)	4,660,744	3,947,101	713,642
Lot or Yard Additions & Replacements			
Driveways/walkways			
Number of projects (1,000)	4,099	2,712	1,387
Median expenditures (\$)	1,500	2,000	500
Total expenditures (1,000)	10,744,436	9,123,787	1,620,649
Fencing/walls			
Number of projects (1,000)	4,369	2,289	2,080
Median expenditures (\$)	1,000	2,000	600
Total expenditures (1,000)	9,239,951	6,722,489	2,517,462
Swimming pool/tennis court/recreational structures			
Number of projects (1,000)	806	445	361
Median expenditures (\$)	4,000	7,000	800
Total expenditures (1,000)	8,864,172	7,345,981	1,518,191
Shed/detached garage/other building			
Number of projects (1,000)	2,359	1,023	1,337
Median expenditures (\$)	1,500	2,500	1,000
Total expenditures (1,000)	9,333,571	5,637,621	3,695,950
Landscaping/sprinkler system			
Number of projects (1,000)	6,096	2,467	3,630

Median expenditures (\$)	800	2,000	500
Total expenditures (1,000)	12,123,260	8,640,867	3,482,393
Other			
Number of projects (1,000)	829	514	315
Median expenditures (\$)	1,500	2,250	S
Total expenditures (1,000)	3,429,179	2,945,964	483,215

Annex B - CDC Injury Data

2001 - 2017, United States Fall Deaths and Rates per 100,000

All Races, Both Sexes, All Ages
ICD-10 Codes: W00-W19,X80,Y01,Y30

Number of Deaths	Population***	Crude Rate	Age-Adjusted Rate**
443,576	5,200,918,231	8.53	7.93

Reports for All Ages include those of unknown age.

* Rates based on 20 or fewer deaths may be unstable. Use with caution.

** Standard Population is 2000, all races, both sexes.

*** Population estimates are aggregated for multi-year reports to produce rates.

Produced by: National Center for Injury Prevention and Control, CDC

Data Source: NCHS Vital Statistics System for numbers of deaths. Bureau of Census for population estimates.

**10 Leading Causes of Nonfatal Unintentional Emergency Department Visits, United States
2001 - 2017, All Races, Both Sexes, Disposition: All Cases**

	Age Groups										
Rank	<1	1-4	5-9	10-14	15-24	25-34	35-44	45-54	55-64	65+	All Ages
1	Unintentional Fall 2,203,241	Unintentional Fall 14,695,505	Unintentional Fall 10,895,788	Unintentional Fall 10,193,254	Unintentional Struck by/ Against 16,379,505	Unintentional Fall 12,925,580	Unintentional Fall 12,965,891	Unintentional Fall 14,643,385	Unintentional Fall 13,392,906	Unintentional Fall 38,484,766	Unintentional Fall 144,895,252
2	Unintentional Struck by/ Against 533,293	Unintentional Struck by/ Against 6,058,063	Unintentional Struck by/ Against 6,868,690	Unintentional Struck by/ Against 9,721,402	Unintentional Fall 14,486,086	Unintentional Overexertion 11,152,537	Unintentional Overexertion 9,867,239	Unintentional Overexertion 7,534,235	Unintentional Struck by/ Against 4,040,364	Unintentional Struck by/ Against 4,271,311	Unintentional Struck by/ Against 74,260,233
3	Unintentional Other Bite/ Sting 211,421	Unintentional Other Bite/ Sting 2,496,959	Unintentional Cut/Pierce 1,921,531	Unintentional Overexertion 4,798,474	Unintentional MV-Occupant 12,889,729	Unintentional Struck by/ Against 10,888,727	Unintentional Struck by/ Against 8,646,276	Unintentional Struck by/ Against 6,849,399	Unintentional Overexertion 3,954,803	Unintentional Overexertion 3,338,390	Unintentional Overexertion 55,470,069
4	Unintentional Foreign Body 168,685	Unintentional Foreign Body 2,115,187	Unintentional Other Bite/ Sting 1,684,445	Unintentional Cut/Pierce 2,290,666	Unintentional Overexertion 12,057,868	Unintentional MV-Occupant 9,764,377	Unintentional MV-Occupant 7,404,124	Unintentional MV-Occupant 6,008,660	Unintentional MV-Occupant 3,674,071	Unintentional MV-Occupant 3,274,416	Unintentional MV-Occupant 46,257,031
5	Unintentional Fire/Burn 166,348	Unintentional Cut/Pierce 1,416,767	Unintentional Pedal Cyclist 1,438,614	Unintentional Pedal Cyclist 1,809,487	Unintentional Cut/Pierce 7,710,641	Unintentional Cut/Pierce 7,154,265	Unintentional Cut/Pierce 5,711,252	Unintentional Cut/Pierce 4,715,968	Unintentional Cut/Pierce 2,910,149	Unintentional Cut/Pierce 2,329,593	Unintentional Cut/Pierce 36,268,894
6	Unintentional Other Specified 134,502	Unintentional Overexertion 1,315,913	Unintentional Overexertion 1,354,807	Unintentional Unknown/ Unspecified 1,628,755	Unintentional Other Specified 4,030,764	Unintentional Other Specified 4,205,722	Unintentional Other Specified 4,087,399	Unintentional Other Specified 4,369,757	Unintentional Other Specified 2,336,522	Unintentional Other Bite/ Sting 1,433,760	Unintentional Other Specified 21,953,757
7	Unintentional Inhalation/ Suffocation 117,464	Unintentional Other Specified 932,167	Unintentional MV-Occupant 1,089,855	Unintentional MV-Occupant 1,437,342	Unintentional Other Bite/ Sting 2,956,648	Unintentional Other Bite/ Sting 2,807,584	Unintentional Poisoning 2,848,707	Unintentional Poisoning 3,189,281	Unintentional Poisoning 1,858,449	Unintentional Poisoning 1,409,344	Unintentional Other Bite/ Sting 18,634,091
8	Unintentional Cut/Pierce 106,012	Unintentional Fire/Burn 903,828	Unintentional Foreign Body 982,591	Unintentional Other Bite/ Sting 1,067,652	Unintentional Unknown/ Unspecified 2,697,889	Unintentional Poisoning 2,717,196	Unintentional Other Bite/ Sting 2,357,389	Unintentional Other Bite/ Sting 2,183,425	Unintentional Other Bite/ Sting 1,434,421	Unintentional Other Specified 1,124,089	Unintentional Poisoning 15,608,986
9	Unintentional Overexertion 94,101	Unintentional Poisoning 757,380	Unintentional Dog Bite 751,546	Unintentional Other Transport 903,792	Unintentional Poisoning 2,398,193	Unintentional Unknown/ Unspecified 1,865,642	Unintentional Unknown/ Unspecified 1,532,981	Unintentional Unknown/ Unspecified 1,303,370	Unintentional Unknown/ Unspecified 799,484	Unintentional Other Transport 1,096,837	Unintentional Unknown/ Unspecified 12,386,141
10	Unintentional Unknown/ Unspecified 90,681	Unintentional Unknown/ Unspecified 752,229	Unintentional Other Transport 689,682	Unintentional Dog Bite 598,757	Unintentional Other Transport 2,006,159	Unintentional Other Transport 1,563,933	Unintentional Other Transport 1,316,897	Unintentional Other Transport 1,149,322	Unintentional Other Transport 753,041	Unintentional Unknown/ Unspecified 1,054,400	Unintentional Foreign Body 9,979,708

National Center for Injury Prevention and Control, CDC

NEISS All Injury Program operated by the Consumer Product Safety Commission (CPSC).

**Public Comment No. 1458-NFPA 70-2021 [Section No. 410.40]****410.40– Equipment Grounding Conductor.**

~~Luminaires and lighting equipment shall be connected to an equipment grounding conductor as required by 250.112 and Part V of this article.~~

Statement of Problem and Substantiation for Public Comment

Section 410.40 does not contain specific requirements for luminaires to be connected to an equipment grounding conductor but instead directs the code user to 250.112 and Part V of Article 410. The specific requirements for luminaires to be connected to an equipment grounding conductor are found in 410.42. The issue with 410.40 directing the code user to 250.112 is that 250.112(J) points back to Part V of Article 410. This creates a confusing circular path for determining the grounding requirements for luminaires. By deleting Section 410.40 it will resolve the confusion and circular path for determining the requirements for grounding of luminaires. 410.42 still contains the requirements for when a luminaire must be connected to an equipment grounding conductor and when it is not. 250.112(J) will then become a pointer to where the requirements for luminaire grounding are found.

Related Item

- This Public Comment is related to FR 7507

Submitter Information Verification

Submitter Full Name: Christopher Jensen

Organization: UL LLC

Affiliation: UL LLC

Street Address:

City:

State:

Zip:

Submittal Date: Fri Aug 13 15:48:10 EDT 2021

Committee: NEC-P18

**Public Comment No. 719-NFPA 70-2021 [Section No. 410.40]****410.40** Equipment Grounding Conductor.

Luminaires and lighting equipment shall be connected to an equipment grounding conductor as required by 250.112 and Part V of this article.

Additional Proposed Changes

<u>File Name</u>	<u>Description Approved</u>
18_CN_82.pdf	70_CN82

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 82 appeared in the First Draft Report on First Revision No. 7507.

The Correlating Committee directs the Panel to review FR 7507 regarding the reference to 250.112 of Article 250. Requirements for grounding of luminaires are covered in Part V of this article (as stated in 250.112(J)).

Related Item

- First Revision No. 7507

Submitter Information Verification

Submitter Full Name: CC on NEC-AAC

Organization: NEC Correlating Committee

Street Address:

City:

State:

Zip:

Submittal Date: Tue Aug 03 13:47:48 EDT 2021

Committee: NEC-P18

**Correlating Committee Note No. 82-NFPA 70-2021 [Section No. 410.40]****Submitter Information Verification**

Committee: NEC-P18

Submittal Date: Tue May 04 10:41:09 EDT 2021

Committee Statement

Committee Statement: The Correlating Committee directs the Panel to review FR 7507 regarding the reference to 250.112 of Article 250. Requirements for grounding of luminaires are covered in Part V of this article (as stated in 250.112(J)).

First Revision No. 7507-NFPA 70-2020 [Section No. 410.40]

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. 1847-NFPA 70-2021 [Section No. 410.42]**

410.42 Luminaire(s) with Exposed Conductive Parts.

~~(A) – Equipment Grounding Conductor Required.~~

Exposed conductive parts that are accessible to unqualified persons shall be connected to an equipment grounding conductor.

~~(B) – Equipment Grounding Conductor Not Required.~~

Exception: Exposed conductive parts that comply with any of the following shall not be required to be connected to an equipment grounding conductor:

- (1) Parts separated from all live parts by a listed system of double insulation
- (2) Small isolated parts, such as mounting screws, clips, and decorative bands on glass spaced at least 38 mm (1 ¹/₂ in.) from lamp terminals
- (3) Portable luminaires with a polarized attachment plug

Statement of Problem and Substantiation for Public Comment

As written, (A) and (B) are in direct conflict. This is an example of where the use of an exception is much less confusing and far more straightforward.

Related Item

- FR-7617

Submitter Information Verification

Submitter Full Name: Frederic Hartwell

Organization: Hartwell Electrical Services, Inc.

Street Address:

City:

State:

Zip:

Submittal Date: Wed Aug 18 11:00:15 EDT 2021

Committee: NEC-P18

**Public Comment No. 720-NFPA 70-2021 [Section No. 410.42]****410.42** Luminaire(s) with Exposed Conductive Parts.**(A)** Equipment Grounding Conductor Required.

Exposed conductive parts that are accessible to unqualified persons shall be connected to an equipment grounding conductor.

(B) Equipment Grounding Conductor Not Required.

Exposed conductive parts that comply with any of the following shall not be required to be connected to an equipment grounding conductor:

- (1) Parts separated from all live parts by a listed system of double insulation
- (2) Small isolated parts, such as mounting screws, clips, and decorative bands on glass spaced at least 38 mm (1½ in.) from lamp terminals
- (3) Portable luminaires with a polarized attachment plug

Additional Proposed Changes

<u>File Name</u>	<u>Description Approved</u>
18_CN_83.pdf	70_CN83

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 83 appeared in the First Draft Report on First Revision No. 7617.

The Correlating Committee directs that FR 7617 be reviewed for correlation with 250.114(3)(e) and (4)(e), and clarify 410.42(A) regarding the phrase "accessible to unqualified persons" whether equipment grounding is required if accessible to any person. The Correlating Committee refers FR 7617 to CMP 5 for review and possible action.

Related Item

- First Revision No. 7617

Submitter Information Verification

Submitter Full Name: CC on NEC-AAC

Organization: NEC Correlating Committee

Street Address:

City:

State:

Zip:

Submittal Date: Tue Aug 03 13:50:28 EDT 2021

Committee: NEC-P18

**Correlating Committee Note No. 83-NFPA 70-2021 [Section No. 410.42]****Submitter Information Verification**

Committee: NEC-P18

Submittal Date: Tue May 04 10:43:01 EDT 2021

Committee Statement

Committee Statement: The Correlating Committee directs that FR 7617 be reviewed for correlation with 250.114(3)(e) and (4)(e), and clarify 410.42(A) regarding the phrase "accessible to unqualified persons" whether equipment grounding is required if accessible to any person. The Correlating Committee refers FR 7617 to CMP 5 for review and possible action.

First Revision No. 7617-NFPA 70-2020 [Section No. 410.42]

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. 1242-NFPA 70-2021 [Section No. 410.44]**

410.44 ~~Connection- Methods of Connecting~~ to the Equipment Grounding Conductor.

~~Luminaires and equipment~~

~~that require connection~~

~~shall be mechanically connected to an equipment grounding conductor~~

~~in accordance with 410.42(A) shall be provided with means for connecting a wire-type equipment grounding conductor that complies with 250.8 and is~~

~~as specified in 250.118 and sized in accordance with 250.122 .~~

~~Exception No. 1:~~

~~-Replacement~~

~~Replacement luminaires shall be permitted to connect an equipment grounding conductor in the same manner as replacement receptacles in compliance with 250.130(C) . The luminaire shall then comply with 410.42 .~~

~~Exception No. 2:~~

~~-Where~~

~~Where no equipment grounding conductor exists at the outlet, replacement luminaires that are GFCI protected or do not have exposed conductive parts shall not be required to be connected to an equipment grounding conductor.~~

Statement of Problem and Substantiation for Public Comment

FR 410.44 eliminated numerous methods for the equipment grounding conductor detailed in 250.118 with no justification. The original PI just sought to update the title.

Related Item

- FR 410.44

Submitter Information Verification

Submitter Full Name: Megan Hayes

Organization: Nema

Street Address:

City:

State:

Zip:

Submittal Date: Wed Aug 11 11:25:00 EDT 2021

Committee: NEC-P18

**Public Comment No. 1851-NFPA 70-2021 [Section No. 410.44]****410.44** Connection to the Equipment Grounding Conductor.

Luminaires and equipment that require connection to an equipment grounding conductor in accordance with 410.42 (A) shall be provided with means for connecting a wire-type equipment grounding conductor that complies with 250.8 and is sized in accordance with 250.122.

Exception No. 1: Replacement luminaires shall be permitted to connect an equipment grounding conductor in the same manner as replacement receptacles in compliance with 250.130(C). The luminaire shall then comply with 410.42.

Exception No. 2: Where no equipment grounding conductor exists at the outlet, replacement luminaires that are GFCI protected or do not have exposed conductive parts shall not be required to be connected to an equipment grounding conductor.

Statement of Problem and Substantiation for Public Comment

This correlates with Comment 1847.

Related Item

- FR-7510

Submitter Information Verification

Submitter Full Name: Frederic Hartwell

Organization: Hartwell Electrical Services, Inc.

Street Address:

City:

State:

Zip:

Submittal Date: Wed Aug 18 11:06:13 EDT 2021

Committee: NEC-P18

**Public Comment No. 1211-NFPA 70-2021 [Section No. 410.56(D)]****(D) Splices and Taps.**

No ~~unnecessary~~ splices or taps other than those extending the fixture wiring or joining the fixture wiring to conductors that enter or leave the luminaire shall be made within or on a luminaire.

Informational Note: See 110.14 for approved means of making connections.

Statement of Problem and Substantiation for Public Comment

This wordy unpacking provides guidance that is clearer than "unnecessary," which can be subjective. Joining fixture wiring to building wiring is unavoidable. Joining fixture wiring to wiring continuing to the next fixture is unavoidable. splicing a fixture lead that was damaged or that is overly short for some other reason, likewise. Using a luminaire as a junction box, beyond these requirements, is unnecessary.

Related Item

- PI 1231

Submitter Information Verification

Submitter Full Name: David Shapiro

Organization: Safety First Electrical

Street Address:

City:

State:

Zip:

Submittal Date: Tue Aug 10 16:38:53 EDT 2021

Committee: NEC-P18

**Public Comment No. 721-NFPA 70-2021 [Section No. 410.70]****410.70** Combustible Shades and Enclosures.

Air space shall be provided between lamps and shades or other enclosures of combustible material.

Additional Proposed Changes

<u>File Name</u>	<u>Description Approved</u>
18_CN_84.pdf	70_CN84

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 84 appeared in the First Draft Report on First Revision No. 7640.

The Correlating Committee directs the Panel to reconsider the revised Exception No. 4 for usability and clarity in accordance with 3.3.1.2 of the NEC Style Manual. Lengthy sentences should be avoided when possible.

Related Item

- First Revision No. 7640

Submitter Information Verification

Submitter Full Name: CC on NEC-AAC

Organization: NEC Correlating Committee

Street Address:

City:

State:

Zip:

Submittal Date: Tue Aug 03 13:52:15 EDT 2021

Committee: NEC-P18

**Correlating Committee Note No. 84-NFPA 70-2021 [New Section after 410.70]****Submitter Information Verification**

Committee: NEC-P18

Submittal Date: Tue May 04 10:49:04 EDT 2021

Committee Statement

Committee Statement: The Correlating Committee directs the Panel to reconsider the revised Exception No. 4 for usability and clarity in accordance with 3.3.1.2 of the NEC Style Manual. Lengthy sentences should be avoided when possible.

First Revision No. 7640-NFPA 70-2020 [New Section after 410.70]

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. 722-NFPA 70-2021 [Section No. 410.136(B)]****(B) Combustible Low-Density Cellulose Fiberboard.**

Where a surface-mounted luminaire containing a ballast, transformer, LED driver, or power supply is to be installed on combustible low-density cellulose fiberboard, it shall be marked for this condition or shall be spaced not less than 38 mm (1½ in.) from the surface of the fiberboard. Where such luminaires are partially or wholly recessed, the provisions of 410.110 through 410.126 shall apply.

Informational Note: See ASTM E84-20, *Standard Test Method for Surface Burning Characteristics of Building Materials*, or ANSI/UL 723-2018, *Standard for Test for Surface Burning Characteristics of Building Materials*. Combustible low-density cellulose fiberboard includes sheets, panels, and tiles that have a density of 320 kg/m³ (20 lb/ft³) or less and that are formed of bonded plant fiber material but does not include solid or laminated wood or fiberboard that has a density in excess of 320 kg/m³ (20 lb/ft³) or is a material that has been integrally treated with fire-retarding chemicals to the degree that the flame spread index in any plane of the material will not exceed 25, determined in accordance with tests for surface burning characteristics of building materials.

Additional Proposed Changes

<u>File Name</u>	<u>Description Approved</u>
18_CN_85.pdf	70_CN85

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 85 appeared in the First Draft Report on First Revision No. 7682.

The Correlating Committee directs the Panel to remove the phrase "the provisions of" to comply with 4.1.3 of the NEC Style Manual.

Related Item

- First Revision No. 7682

Submitter Information Verification

Submitter Full Name: CC on NEC-AAC

Organization: NEC Correlating Committee

Street Address:

City:

State:

Zip:

Submittal Date: Tue Aug 03 13:54:34 EDT 2021

Committee: NEC-P18

**Correlating Committee Note No. 85-NFPA 70-2021 [Section No. 410.136(B)]****Submitter Information Verification**

Committee: NEC-P18

Submittal Date: Tue May 04 10:54:07 EDT 2021

Committee Statement

Committee Statement: The Correlating Committee directs the Panel to remove the phrase "the provisions of" to comply with 4.1.3 of the NEC Style Manual.

First Revision No. 7682-NFPA 70-2020 [Section No. 410.136(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. 724-NFPA 70-2021 [Section No. 410.155(B)]**

(B) Equipment Grounding Conductor.

Lighting track shall be connected to the equipment grounding conductor in accordance with Part VI of Article 250, and the track sections shall be securely coupled to maintain continuity of the circuitry, polarization, and grounding throughout.

Additional Proposed Changes

<u>File Name</u>	<u>Description Approved</u>
18_CN_86.pdf	70_CN86

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 86 appeared in the First Draft Report on First Revision No. 7524.

The Correlating Committee directs that FR 7524 be reviewed for need of the reference to Part VI of Article 250. Requirements for grounding of luminaires are covered in Part V of this article (as stated in 250.112(J)).

Related Item

- First Revision No. 7524

Submitter Information Verification

Submitter Full Name: CC on NEC-AAC

Organization: NEC Correlating Committee

Street Address:

City:

State:

Zip:

Submittal Date: Tue Aug 03 13:56:06 EDT 2021

Committee: NEC-P18

**Correlating Committee Note No. 86-NFPA 70-2021 [Section No. 410.155(B)]****Submitter Information Verification**

Committee: NEC-P18

Submittal Date: Tue May 04 10:55:32 EDT 2021

Committee Statement

Committee Statement: The Correlating Committee directs that FR 7524 be reviewed for need of the reference to Part VI of Article 250. Requirements for grounding of luminaires are covered in Part V of this article (as stated in 250.112(J)).

First Revision No. 7524-NFPA 70-2020 [Section No. 410.155(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. 725-NFPA 70-2021 [Section No. 410.182]****410.182** Equipment Grounding Conductor.

Lighting equipment identified for horticultural use shall be connected to the equipment grounding conductor in accordance with Part VI of Article 250 and Part V of this article.

Additional Proposed Changes

<u>File Name</u>	<u>Description Approved</u>
18_CN_87.pdf	70_CN87

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 87 appeared in the First Draft Report on First Revision No. 7525.

The Correlating Committee directs that FR 7525 be reviewed for need of the reference to Part VI of Article 250. Requirements for grounding of luminaires are covered in Part V of this article (as stated in 250.112(J)).

Related Item

- First Revision No. 7525

Submitter Information Verification

Submitter Full Name: CC on NEC-AAC

Organization: NEC Correlating Committee

Street Address:

City:

State:

Zip:

Submittal Date: Tue Aug 03 13:57:49 EDT 2021

Committee: NEC-P18

**Correlating Committee Note No. 87-NFPA 70-2021 [Section No. 410.182]****Submitter Information Verification**

Committee: NEC-P18

Submittal Date: Tue May 04 10:56:34 EDT 2021

Committee Statement

Committee Statement: The Correlating Committee directs that FR 7525 be reviewed for need of the reference to Part VI of Article 250. Requirements for grounding of luminaires are covered in Part V of this article (as stated in 250.112(J)).

First Revision No. 7525-NFPA 70-2020 [Section No. 410.182]

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. 726-NFPA 70-2021 [Section No. 410.184]****410.184** Ground-Fault Circuit-Interrupter Protection.

Lighting equipment identified for horticultural use and employing flexible cord(s) with one or more separable connector(s) or attachment plug(s) shall be supplied by lighting outlets protected by a listed ground-fault circuit interrupter.

Exception: Circuits exceeding 150 volts to ground shall be protected by a listed special purpose ground-fault circuit interrupter.

Informational Note: See UL 943C, *Outline of Investigation for Special Purpose Ground-Fault Circuit-Interrupters*, for information on special purpose ground-fault circuit interrupters.

Additional Proposed Changes

<u>File Name</u>	<u>Description Approved</u>
18_CN_88.pdf	70_CN88

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 88 appeared in the First Draft Report on First Revision No. 7526.

The Correlating Committee directs that FR 7526 be reviewed for consistency between the rule, the exception, and the Committee Statement. The Correlating Committee refers FR 7526 to CMP 2 for information.

Related Item

- First Revision No. 7526

Submitter Information Verification

Submitter Full Name: CC on NEC-AAC

Organization: NEC Correlating Committee

Street Address:

City:

State:

Zip:

Submittal Date: Tue Aug 03 13:59:58 EDT 2021

Committee: NEC-P18

**Correlating Committee Note No. 88-NFPA 70-2021 [Section No. 410.184]****Submitter Information Verification**

Committee: NEC-P18

Submittal Date: Tue May 04 10:58:45 EDT 2021

Committee Statement

Committee Statement: The Correlating Committee directs that FR 7526 be reviewed for consistency between the rule, the exception, and the Committee Statement. The Correlating Committee refers FR 7526 to CMP 2 for information.

First Revision No. 7526-NFPA 70-2020 [Section No. 410.184]

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. 926-NFPA 70-2021 [Section No. 410.184]**

410.184– 184 Special Purpose Ground-Fault Circuit-Interrupter Protection (SPGFCI) and Ground-Fault Circuit Interrupter (GFCI) Protection .

Lighting equipment identified for horticultural use and employing flexible cord(s) with one or more separable connector(s) or attachment plug(s) shall be supplied by lighting outlets protected by a listed ground-fault circuit interrupter GFCI .

Exception: Circuits exceeding 150 volts to ground shall be protected by a listed special-purpose-ground-fault-circuit interrupter SPGFCI .

Informational Note: See UL 943C, *Outline of Investigation for Special Purpose Ground-Fault Circuit-Interrupters*, for information on special purpose ground-fault circuit interrupters.

Statement of Problem and Substantiation for Public Comment

This public comment is submitted on behalf of a Correlating Committee task group established to review the term Ground-Fault Circuit Interrupter and other terminology associated with ground-fault protective equipment throughout the NEC to ensure consistency with how these are defined in Article 100. The Task Group consisted of members of CMP 2, 7, 10 and 17. Task group members include the following: Thomas Domitrovich, Robert Osborne, Keith Lofland, Danish Zia, Kevin Arnold, Marcelo Valdes, Vince Della Croce, and Wes Wheeler. This change clarifies the two types of solutions mentioned in this section of the Code.

Related Item

- FR 7526

Submitter Information Verification

Submitter Full Name: Thomas Domitrovich

Organization: Eaton Corporation

Street Address:

City:

State:

Zip:

Submittal Date: Thu Aug 05 08:56:16 EDT 2021

Committee: NEC-P18

**Public Comment No. 727-NFPA 70-2021 [Section No. 410.186]****410.186** Support.

Fittings identified for support of horticultural lighting equipment shall be designed specifically for the horticultural lighting equipment on which they are installed, shall be used in accordance with the installation instructions provided, and shall be securely fastened.

Additional Proposed Changes

<u>File Name</u>	<u>Description Approved</u>
18_CN_89.pdf	70_CN89

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 89 appeared in the First Draft Report on First Revision No. 7527.

The Correlating Committee directs the Panel to reconsider the revised sentence for clarity, considering modification of the text into a list, as stated in the Committee Statement. Reconsider the use of the phrase "designed specifically for" and compliance with 3.2.1 of the NEC Style Manual, as the phrase is vague and unenforceable

Related Item

- First Revision No. 7527

Submitter Information Verification

Submitter Full Name: CC on NEC-AAC

Organization: NEC Correlating Committee

Street Address:

City:

State:

Zip:

Submittal Date: Tue Aug 03 14:01:49 EDT 2021

Committee: NEC-P18

**Correlating Committee Note No. 89-NFPA 70-2021 [Section No. 410.186]****Submitter Information Verification**

Committee: NEC-P18

Submittal Date: Tue May 04 11:00:57 EDT 2021

Committee Statement

Committee Statement: The Correlating Committee directs the Panel to reconsider the revised sentence for clarity, considering modification of the text into a list, as stated in the Committee Statement. Reconsider the use of the phrase “designed specifically for” and compliance with 3.2.1 of the NEC Style Manual, as the phrase is vague and unenforceable.

First Revision No. 7527-NFPA 70-2020 [Section No. 410.186]

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. 1384-NFPA 70-2021 [Section No. 410.193]****~~410.193— Installation.~~**

~~Luminaires intended to emit germicidal irradiation shall be installed in accordance with the manufacturer's instructions and equipment markings.~~

Statement of Problem and Substantiation for Public Comment

This is already required by 110.3(B).

Related Item

- FR 7528

Submitter Information Verification

Submitter Full Name: Ryan Jackson

Organization: Ryan Jackson

Street Address:

City:

State:

Zip:

Submittal Date: Thu Aug 12 13:40:38 EDT 2021

Committee: NEC-P18

**Public Comment No. 1385-NFPA 70-2021 [Section No. 410.195(D)]**

~~(D)– Mounting Height.~~

~~Luminaires intended to emit germicidal irradiation and installed in a building space that will be occupied during luminaire operation shall not be mounted below the minimum height specified by its listing and installation instructions.~~

Statement of Problem and Substantiation for Public Comment

This text leads one to believe that the instructions need only be followed under these specific conditions. That is obviously not the case. Section 110.3(B) already requires what this section mandates and does it more completely.

Related Item

- FR 7528

Submitter Information Verification

Submitter Full Name: Ryan Jackson

Organization: Ryan Jackson

Street Address:

City:

State:

Zip:

Submittal Date: Thu Aug 12 13:41:41 EDT 2021

Committee: NEC-P18

**Public Comment No. 1387-NFPA 70-2021 [Section No. 410.197(C)]**

~~(C) Installation.~~

~~A germicidal irradiation system shall be installed in accordance with the manufacturer's installation instructions and installation markings.~~

Statement of Problem and Substantiation for Public Comment

Section 110.3(B) already requires this.

Related Item

- FR 7528

Submitter Information Verification

Submitter Full Name: Ryan Jackson

Organization: Ryan Jackson

Street Address:

City:

State:

Zip:

Submittal Date: Thu Aug 12 13:44:58 EDT 2021

Committee: NEC-P18

**Public Comment No. 728-NFPA 70-2021 [Section No. 411.1]****411.1 Scope.**

This article covers lighting systems and their associated components operating at no more than 30 volts ac or 60 volts dc. Where wet contact is likely to occur, the limits are 15 volts ac or 30 volts dc.

Exception: This article shall not apply to lighting systems and associated components that exceed 15 volts ac or 30 volts dc where wet contact is likely to occur.

Informational Note: See 680.1 for swimming pools, fountains, and similar installations.

Additional Proposed Changes

<u>File Name</u>	<u>Description Approved</u>
18_CN_90.pdf	70_CN90

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 90 appeared in the First Draft Report on First Revision No. 7646.

The Correlating Committee advises that article scope statements are the responsibility of the Correlating Committee and the Correlating Committee rejects the Panel action. The Correlating Committee directs the Panel to re-write the scope statement without an exception, and without mandatory language, as exceptions to rules should be used sparingly (3.1.4 of the NEC Style Manual) and shall not contain requirements.

Related Item

- First Revision No. 7646

Submitter Information Verification

Submitter Full Name: CC on NEC-AAC

Organization: NEC Correlating Committee

Street Address:

City:

State:

Zip:

Submittal Date: Tue Aug 03 14:03:14 EDT 2021

Committee: NEC-P18

**Correlating Committee Note No. 90-NFPA 70-2021 [Section No. 411.1]****Submitter Information Verification**

Committee: NEC-P18

Submittal Date: Tue May 04 11:05:41 EDT 2021

Committee Statement

Committee Statement: The Correlating Committee advises that article scope statements are the responsibility of the Correlating Committee and the Correlating Committee rejects the Panel action. The Correlating Committee directs the Panel to re-write the scope statement without an exception, and without mandatory language, as exceptions to rules should be used sparingly (3.1.4 of the NEC Style Manual) and shall not contain requirements.

First Revision No. 7646-NFPA 70-2020 [Section No. 411.1]

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. 785-NFPA 70-2021 [Section No. 411.4(A)]****(A)** Listed System.

The luminaires, power supply, and luminaire fittings (including the exposed bare conductors) of a low-voltage lighting system shall be listed for use as part of the same identified lighting system and installed in accordance with its listing.

Additional Proposed Changes

<u>File Name</u>	<u>Description Approved</u>
18_CN_91.pdf	70_CN91

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 91 appeared in the First Draft Report on First Revision No. 7647.

The Correlating Committee directs the Panel to reconsider the addition of "and installed in accordance with its listing," as that is covered by 110.3(8). It is directed that this action be reviewed for compliance with 4.1.1 of the NEC Style Manual. It is not necessary to repeat requirements in Chapters 1-4.

Related Item

- First Revision No. 7647

Submitter Information Verification

Submitter Full Name: CC on NEC-AAC

Organization: NEC Correlating Committee

Street Address:

City:

State:

Zip:

Submittal Date: Wed Aug 04 10:37:44 EDT 2021

Committee: NEC-P18

**Correlating Committee Note No. 91-NFPA 70-2021 [Section No. 411.4(A)]****Submitter Information Verification**

Committee: NEC-P18

Submittal Date: Tue May 04 11:09:26 EDT 2021

Committee Statement

Committee Statement: The Correlating Committee directs the Panel to reconsider the addition of "and installed in accordance with its listing," as that is covered by 110.3(B). It is directed that this action be reviewed for compliance with 4.1.1 of the NEC Style Manual. It is not necessary to repeat requirements in Chapters 1-4.

First Revision No. 7647-NFPA 70-2020 [Section No. 411.4(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. 788-NFPA 70-2021 [Section No. 411.8]****411.8 Hazardous (Classified) Locations.**

Where installed in hazardous (classified) locations, low-voltage lighting systems shall conform with the requirements for such locations in addition to this article.

Additional Proposed Changes

<u>File Name</u>	<u>Description Approved</u>
18_CN_92.pdf	70_CN92

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 92 appeared in the First Draft Report on First Revision No. 7650.

The Correlating Committee directs that this action be reviewed for compliance with 4.1.1 of the NEC Style Manual. Committees shall always be mindful of the structure of the document as specified in 90.3 when contemplating the inclusion of a reference to another requirement.

Related Item

- First Revision No. 7650

Submitter Information Verification

Submitter Full Name: CC on NEC-AAC

Organization: NEC Correlating Committee

Street Address:

City:

State:

Zip:

Submittal Date: Wed Aug 04 10:43:27 EDT 2021

Committee: NEC-P18

**Correlating Committee Note No. 92-NFPA 70-2021 [Section No. 411.8]****Submitter Information Verification**

Committee: NEC-P18

Submittal Date: Tue May 04 11:18:26 EDT 2021

Committee Statement

Committee Statement: The Correlating Committee directs that this action be reviewed for compliance with 4.1.1 of the NEC Style Manual. Committees shall always be mindful of the structure of the document as specified in 90.3 when contemplating the inclusion of a reference to another requirement.

First Revision No. 7650-NFPA 70-2020 [Section No. 411.8]

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. 800-NFPA 70-2021 [Section No. 600.4(E)]**

(E) Durability.

Marking labels shall be permanent and able to withstand the environment involved.

Additional Proposed Changes

<u>File Name</u>	<u>Description Approved</u>
18_CN_93.pdf	70_CN93

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 93 appeared in the First Draft Report on First Revision No. 7625.

The Correlating Committee directs that this action be reviewed for compliance with 4.1.1 of the NEC Style Manual. Committees shall always be mindful of the structure of the document as specified in 90.3 when contemplating the inclusion of a reference to another requirement.

Related Item

- First Revision No. 7625

Submitter Information Verification

Submitter Full Name: CC on NEC-AAC

Organization: NEC Correlating Committee

Street Address:

City:

State:

Zip:

Submittal Date: Wed Aug 04 10:57:05 EDT 2021

Committee: NEC-P18

**Correlating Committee Note No. 93-NFPA 70-2021 [Section No. 600.4(E)]****Submitter Information Verification**

Committee: NEC-P18

Submittal Date: Tue May 04 11:20:01 EDT 2021

Committee Statement

Committee Statement: The Correlating Committee directs that this action be reviewed for compliance with 4.1.1 of the NEC Style Manual. Committees shall always be mindful of the structure of the document as specified in 90.3 when contemplating the inclusion of a reference to another requirement.

First Revision No. 7625-NFPA 70-2020 [Section No. 600.4(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. 1638-NFPA 70-2021 [Section No. 600.5(B)]****~~(B)– Marking.~~**

~~A disconnecting means for a sign, outline lighting system, or controller shall be marked to identify the sign, outline lighting system, or controller it controls.~~

~~Exception: An external disconnecting means that is mounted on the sign body, sign enclosure, sign pole, or controller shall not be required to identify the sign or outline lighting system it controls.~~

Statement of Problem and Substantiation for Public Comment

This section violates 4.1.2 of the style manual. According to the CMP, the sign industry only reads Article 600. If that is the case, they cannot make a safe installation. The NEC is not intended for untrained persons. See 90.1(A).

Related Item

- PI 542

Submitter Information Verification

Submitter Full Name: Ryan Jackson

Organization: Ryan Jackson

Street Address:

City:

State:

Zip:

Submittal Date: Mon Aug 16 18:51:48 EDT 2021

Committee: NEC-P18

**Public Comment No. 801-NFPA 70-2021 [Section No. 600.5(D)(2)]****(2) Enclosures as Pull Boxes.**

Electrical enclosures integral to the sign that are listed and labeled for the purpose are permitted to be used for voltages up to 600 volts as pull or junction boxes for conductors supplying other adjacent signs, outline lighting systems, or floodlights that are part of a sign and shall be permitted to contain both branch and secondary circuit conductors. Neon transformer boxes listed and labeled for the purpose shall be permitted to contain multiple voltages over 1000 volts. A disconnecting means shall be provided to de-energize all ungrounded conductors in the enclosures.

Additional Proposed Changes

<u>File Name</u>	<u>Description Approved</u>
18_CN_94.pdf	70_CN94

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 94 appeared in the First Draft Report on First Revision No. 7628.

The Correlating Committee directs the Panel to consider rewriting the first sentence into two or more short sentences, to comply with the 3.3.1.2 of the NEC Style Manual.

Related Item

- First Revision No. 7628

Submitter Information Verification

Submitter Full Name: CC on NEC-AAC

Organization: NEC Correlating Committee

Street Address:

City:

State:

Zip:

Submittal Date: Wed Aug 04 10:59:55 EDT 2021

Committee: NEC-P18

**Correlating Committee Note No. 94-NFPA 70-2021 [Section No. 600.5(D)(2)]****Submitter Information Verification**

Committee: NEC-P18

Submittal Date: Tue May 04 11:20:58 EDT 2021

Committee Statement

Committee Statement: The Correlating Committee directs the Panel to consider rewriting the first sentence into two or more short sentences, to comply with the 3.3.1.2 of the NEC Style Manual.

First Revision No. 7628-NFPA 70-2020 [Section No. 600.5(D)(2)]

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. 806-NFPA 70-2021 [Section No. 600.6]

600.6 Disconnects.

Each sign and outline lighting system, feeder conductor(s), or branch circuit(s) supplying a sign, outline lighting system, or skeleton tubing shall be controlled by an externally operable switch or circuit breaker that opens all ungrounded conductors and controls no other load. The indicating means of the disconnect shall be in accordance with 400.7 and clearly indicate the open (off) and closed (on) position. The switch or circuit breaker shall open all ungrounded conductors simultaneously on multiwire branch circuits in accordance with 210.4(B). Signs and outline lighting systems located within fountains shall have the disconnect located in accordance with 680.13.

Exception No. 1: A disconnecting means shall not be required for an exit directional sign located within a building.

Exception No. 2: A disconnecting means shall not be required for cord-connected signs with an attachment plug.

Informational Note: The location of the disconnect is intended to allow service or maintenance personnel and first responders complete and local control of the disconnecting means.

(A) Location.

The disconnecting means shall be accessible and located in accordance with 600.6(A)(1), (A)(2), or (A)(3). If the resulting location of the disconnecting means is remote from the sign it controls, it shall comply with 600.6(A)(4).

(1) At Point of Entry to a Sign.

The disconnect shall be located at the point the feeder circuit or branch circuit(s) supplying a sign or outline lighting system enters a sign enclosure, a sign body, or a pole in accordance with 600.5(D)(3). The disconnect shall open all ungrounded conductors where it enters the enclosure of the sign or pole.

Exception No. 1: A disconnect shall not be required for branch circuit(s) or feeder conductor(s) passing through the sign where not accessible and enclosed in a Chapter 3 listed raceway or metal-jacketed cable identified for the location.

Exception No. 2: A disconnect shall not be required at the point of entry to a sign enclosure or sign body for branch circuit(s) or feeder conductor(s) that supply an internal panelboard(s) in a sign enclosure or sign body. The conductors shall be enclosed where not accessible in a Chapter 3 listed raceway or metal-jacketed cable identified for the location. A field-applied permanent warning label that is visible during servicing shall be applied to the raceway at or near the point of entry into the sign enclosure or sign body. The warning label shall comply with 110.21(B) and state the following: "Danger. This raceway contains energized conductors." The marking shall include the location of the disconnecting means for the energized conductor(s). The disconnecting means shall be capable of being locked in the open position in accordance with 110.25.

(2) Within Sight of the Sign.

The disconnecting means shall be within sight of the sign or outline lighting system that it controls. Where the disconnecting means is out of the line of sight from any section that is able to be energized, the disconnecting means shall be lockable in accordance with 110.25. A permanent field-applied marking identifying the location of the disconnecting means shall be applied to the sign in a location visible during servicing. The warning label shall comply with 110.21(B).

(3) Within Sight of the Controller.

The following shall apply for signs or outline lighting systems operated by electronic or electromechanical controllers located external to the sign or outline lighting system:

- (1) The disconnecting means shall be located within sight of the controller or in the same enclosure with the controller.
- (2) The disconnecting means shall disconnect the sign or outline lighting system and the controller from all ungrounded supply conductors.
- (3) The disconnecting means shall be designed such that no pole can be operated independently and shall be lockable in accordance with 110.25.

Exception: Where the disconnecting means is not located within sight of the controller, a permanent field-applied marking identifying the location of the disconnecting means shall be applied to the controller in a location visible during servicing. The warning label shall comply with 110.21(B).

(4) Remote Location.

The disconnecting means, if located remote from the sign, sign body, or pole, shall be mounted at an accessible location available to first responders and service personnel. The location of the disconnect shall be marked with a label at the sign location and marked as the disconnect for the sign or outline lighting system. The label shall comply with 110.21(B).

(B) Control Switch Rating.

Switches, flashers, and similar devices controlling transformers and electronic power supplies shall be rated for controlling inductive loads or have a current rating not less than twice the current rating of the transformer or the electronic power supply.

Additional Proposed Changes

File Name	Description Approved
18_CN_96.pdf	70_CN96

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 96 appeared in the First Draft Report on First Revision No. 7629.

The Correlating Committee directs the Panel to remove references to general requirements contained in Chapters 1 through 4 to comply with 4.1.1 of the NEC Style Manual.

Related Item

- First Revision No. 7629

Submitter Information Verification

Submitter Full Name: CC on NEC-AAC

Organization: NEC Correlating Committee

Street Address:

City:

State:

Zip:

Submittal Date: Wed Aug 04 11:11:12 EDT 2021

Committee: NEC-P18

**Correlating Committee Note No. 96-NFPA 70-2021 [Section No. 600.6 [Excluding any Sub-Sections]]****Submitter Information Verification**

Committee: NEC-P18

Submittal Date: Tue May 04 11:24:44 EDT 2021

Committee Statement

Committee Statement: The Correlating Committee directs the Panel to remove references to general requirements contained in Chapters 1 through 4 to comply with 4.1.1 of the NEC Style Manual.

First Revision No. 7629-NFPA 70-2020 [Section No. 600.6 [Excluding any Sub-Sections]]

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. 803-NFPA 70-2021 [Section No. 600.6(A) [Excluding any Sub-Sections]]**

The disconnecting means shall be accessible and located in accordance with 600.6(A)(1), (A)(2), or (A)(3). If the resulting location of the disconnecting means is remote from the sign it controls, it shall comply with 600.6(A)(4).

Additional Proposed Changes

<u>File Name</u>	<u>Description Approved</u>
18_CN_95.pdf	70_CN95

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 95 appeared in the First Draft Report on First Revision No. 7631.

The Correlating Committee directs the Panel to review and reconsider this section for clarity and usability regarding requirements for a disconnecting means that is remote from a sign, regarding the use of the word "and" vs. "or".

Related Item

- First Revision No. 7631

Submitter Information Verification

Submitter Full Name: CC on NEC-AAC

Organization: NEC Correlating Committee

Street Address:

City:

State:

Zip:

Submittal Date: Wed Aug 04 11:02:42 EDT 2021

Committee: NEC-P18

**Correlating Committee Note No. 95-NFPA 70-2021 [Section No. 600.6(A) [Excluding any Sub-Sections]]****Submitter Information Verification**

Committee: NEC-P18

Submittal Date: Tue May 04 11:22:11 EDT 2021

Committee Statement

Committee Statement: The Correlating Committee directs the Panel to review and reconsider this section for clarity and usability regarding requirements for a disconnecting means that is remote from a sign, regarding the use of the word "and" vs. "or".

First Revision No. 7631-NFPA 70-2020 [Section No. 600.6(A) [Excluding any Sub-Sections]]

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. 238-NFPA 70-2021 [Section No. 600.7(B)(7)]****(7) Bonding Conductors.**

Bonding conductors installed outside of a sign or raceway shall be protected from physical damage. Bonding conductors shall comply with 250.120 and 250.122. Bonding conductor size shall also comply with one of the following:

- (1) Bonding conductors shall be copper and not smaller than 14 AWG.
- (2) Bonding conductors shall be copper-clad aluminum and not smaller than 12 AWG.

Statement of Problem and Substantiation for Public Comment

There are two sentences that start out with "bonding conductors shall comply with". It seems the second one should include the word also, to clarify that you must comply with both.

Related Item

- FR-7632

Submitter Information Verification

Submitter Full Name: Don Ganiere

Organization:

Street Address:

City:

State:

Zip:

Submittal Date: Thu Jul 15 10:11:36 EDT 2021

Committee: NEC-P18

**Public Comment No. 813-NFPA 70-2021 [Section No. 600.32(A)(4)]****(4) Spacing from Grounded Parts.**

Other than at the location of connection to a metal enclosure or sign body, nonmetallic conduit or flexible nonmetallic conduit shall be spaced not less than 38 mm (1½ in.) from grounded or bonded parts when the conduit contains a conductor operating at 100 Hz or less, and shall be spaced not less than 45 mm (1¾ in.) from grounded or bonded parts when the conduit contains a conductor operating at more than 100 Hz.

Additional Proposed Changes

<u>File Name</u>	<u>Description Approved</u>
18_CN_97.pdf	70_CN97

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 97 appeared in the First Draft Report on First Revision No. 7635.

The Correlating Committee directs the Panel to consider rewriting the paragraph in two or more short sentences, or expressed using a list, to comply with 3.3.1.2 of the NEC Style Manual. 18

Related Item

- First Revision No. 7635

Submitter Information Verification

Submitter Full Name: CC on NEC-AAC
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:
Submittal Date: Wed Aug 04 12:11:19 EDT 2021
Committee: NEC-P18

**Correlating Committee Note No. 97-NFPA 70-2021 [Section No. 600.32(A)(4)]****Submitter Information Verification**

Committee: NEC-P18

Submittal Date: Tue May 04 11:25:55 EDT 2021

Committee Statement

Committee Statement: The Correlating Committee directs the Panel to consider rewriting the paragraph in two or more short sentences, or expressed using a list, to comply with 3.3.1.2 of the NEC Style Manual.

First Revision No. 7635-NFPA 70-2020 [Section No. 600.32(A)(4)]

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. 1554-NFPA 70-2021 [Section No. 600.35]****~~600.35 – Retrofit Kits.~~****~~(A) – General.~~**

~~A general-use or sign-specific retrofit kit for a sign or outline lighting system shall include installation instructions and requirements for field conversion of a host sign. The retrofit kit shall be listed and labeled.~~

~~(B) – Installation.~~

~~The retrofit kit shall be installed in accordance with the installation instructions.~~

~~(1) – Wiring Methods.~~

~~Wiring methods shall be in accordance with Chapter 3.~~

~~*Exception: If powered from a Class 2 source, wiring methods shall be in accordance with 600.12(C) (1)(2) and (C)(2), 600.24 , and 600.33 .*~~

~~(2) – Damaged Parts.~~

~~All parts that are not replaced by a retrofit kit shall be inspected for damage. Any part found to be damaged or damaged during conversion of the sign shall be replaced or repaired to maintain the sign or outline lighting system's dry, damp, or wet location rating.~~

~~(3) – Workmanship.~~

~~Field conversion workmanship shall be in accordance with 110.12 .~~

~~(4) – Marking.~~

~~The retrofitted sign shall be marked in accordance with 600.4(B) .~~

Statement of Problem and Substantiation for Public Comment

This section is all repeated information and does not comply with 4.1.1 of the style manual.

Related Item

- PI 543

Submitter Information Verification

Submitter Full Name: Ryan Jackson

Organization: Ryan Jackson

Street Address:

City:

State:

Zip:

Submittal Date: Mon Aug 16 13:51:03 EDT 2021

Committee: NEC-P18

**Public Comment No. 814-NFPA 70-2021 [Section No. 605.3(B)]**

(B) Hazardous (Classified) Locations.

Where used in hazardous (classified) locations, these assemblies shall comply with the requirements for such locations in addition to this article.

Additional Proposed Changes

<u>File Name</u>	<u>Description Approved</u>
18_CN_99.pdf	70_CN99

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 99 appeared in the First Draft Report on First Revision No. 7651.

The Correlating Committee directs that this action be reviewed for compliance with 4.1.1 of the NEC Style Manual. Committees shall always be mindful of the structure of the document as specified in 90.3 when contemplating the inclusion of a reference to another requirement.

Related Item

- First Revision No. 7651

Submitter Information Verification

Submitter Full Name: CC on NEC-AAC

Organization: NEC Correlating Committee

Street Address:

City:

State:

Zip:

Submittal Date: Wed Aug 04 12:13:39 EDT 2021

Committee: NEC-P18

**Correlating Committee Note No. 99-NFPA 70-2021 [Section No. 605.3(B)]****Submitter Information Verification**

Committee: NEC-P18

Submittal Date: Tue May 04 11:27:31 EDT 2021

Committee Statement

Committee Statement: The Correlating Committee directs that this action be reviewed for compliance with 4.1.1 of the NEC Style Manual. Committees shall always be mindful of the structure of the document as specified in 90.3 when contemplating the inclusion of a reference to another requirement.

First Revision No. 7651-NFPA 70-2020 [Section No. 605.3(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. 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

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
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

Copyright Assignment

I, CC on NEC-AAC, hereby irrevocably grant and assign to the National Fire Protection Association (NFPA) all and full rights in copyright in this Public Comment (including both the Proposed Change and the Statement of Problem and Substantiation). I understand and intend that I acquire no rights, including rights as a joint author, in any publication of the NFPA in which this Public Comment in this or another similar or derivative form is used. I hereby warrant that I am the author of this Public Comment and

**Public Comment No. 226-NFPA 70-2021 [Sections Part XVII., 410.190, 410.191, 410.193, 410.195]****Sections Part XVII., 410.190, 410.191, 410.193, 410.195****Part XVII.** Special Provisions for Germicidal Irradiation Luminaires**410.190** General.**410.191** Listing.

Luminaires intended to emit germicidal irradiation shall be listed and identified as germicidal equipment.

410.193 Installation.

Luminaires ~~intended to emit germicidal irradiation~~ shall be installed in accordance with the manufacturer's instructions and equipment markings.

410.195 Locations Not Permitted.**(A)** General Lighting.

Luminaires ~~intended to emit germicidal irradiation~~ shall not be installed as lighting for general illumination unless such use is indicated in the manufacturer's instructions.

(B) Installed Location.

Luminaires ~~intended to emit germicidal irradiation~~ shall not be installed where likely to be subject to physical damage.

(C) Dwellings.

Luminaires ~~intended to emit germicidal~~ irradiation shall not be installed in a dwelling unless listed and identified for use in dwellings.

(D) Mounting Height.

Luminaires ~~intended to emit germicidal irradiation and~~ installed in a building space that will be occupied during luminaire operation shall not be mounted below the minimum height specified by its listing and installation instructions.

Statement of Problem and Substantiation for Public Comment

This PI proposes to delete the redundant use of "intended to emit germicidal irradiation". The title of Part XVII as well as Section 410.191 already reference germicidal irradiation luminaires so repeating the language is unnecessary.

Related Item

- FR 7528

Submitter Information Verification

Submitter Full Name: Vincent Della Croce

Organization: Siemens

Street Address:

City:

State:

Zip:

Submittal Date: Wed Jul 14 18:20:56 EDT 2021

Committee: NEC-P18

Copyright Assignment

I, Vincent Della Croce, hereby irrevocably grant and assign to the National Fire Protection Association (NFPA) all and full rights in copyright in this Public Comment (including both the Proposed Change and the Statement of Problem and Substantiation). I understand and intend that I acquire no rights, including rights as a joint author, in any publication of the NFPA in which this Public Comment in this or another similar or derivative form is used. I hereby warrant that I am the author of this Public Comment and that I have full power and authority to enter into this copyright assignment.

☒ By checking this box I affirm that I am Vincent Della Croce, and I agree to be legally bound by the above Copyright Assignment and the terms and conditions contained therein. I understand and intend that, by checking this box, I am creating an electronic signature that will, upon my submission of this form, have the same legal force and effect as a handwritten signature

that I have full power and authority to enter into this copyright assignment.

☒ By checking this box I affirm that I am CC on NEC-AAC, and I agree to be legally bound by the above Copyright Assignment and the terms and conditions contained therein. I understand and intend that, by checking this box, I am creating an electronic signature that will, upon my submission of this form, have the same legal force and effect as a handwritten signature

**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

<u>File Name</u>	<u>Description Approved</u>
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

Copyright Assignment

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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

<u>File Name</u>	<u>Description Approved</u>
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. 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

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
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:

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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

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
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

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Zip:

Submittal Date: Wed Aug 18 20:44:11 EDT 2021

Committee: NEC-P06

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Public Comment No. 2217-NFPA 70-2021 [New Definition after Definition: Corrosive Environment — Sw...]

Counter (Countertop).

A fixed or stationary surface that is typically intended for food preparation and serving, personal lavation or laundering or a similar surface that presents a routine risk of spillage of larger quantities of liquids upon outlets mounted directly on or in that surface. (406, 210)(CMP-18)

Informational Note: Counters and Countertops are distinguished from Work Surfaces ; see 406.5(E), 406.5(G)(1) and 406.5(H). See UL 498, Standard for Receptacles and Attachment Plugs , and UL 943, Standard for Ground-Fault Circuit Interrupters , establish for listed receptacle-outlet devices the performance evaluation and construction criteria [10 k-cycle mechanical endurance, mechanical loading, ½-gallon (1.89-L) spillage if retracted or when unretracted with and without attachment plugs inserted].

Statement of Problem and Substantiation for Public Comment

The additions of these definitions [Counter (Countertop) and Work Surface] are proffered to improve usability of the Code.

Within the various product safety standards for listed electrical outlet products applicable to counters and countertops versus those applicable solely to work surfaces, the differences in listing requirements are readily evident, both in terms of breadth and severity of those requirements, to those manufacturers, certification bodies (CBs), and standards development organizations (SDOs) directly involved with the listing of such electrical outlet products. The NEC®, however, provides no information as to how these applications, and these products accordingly, differ from one another.

Throughout the NEC®, strong distinction exists as to which equipment is suitable for which specific application is made:

- without any definitions whatsoever as to how Counters and Countertops differ from Work Surfaces, and
- without any Informational Notes to explain how the products suitable for each application are differently evaluated from one another.

In the complete absence within the NEC® of this differentiating information, there's considerable installer and enforcement confusion, and frequent product misapplications result. In some installations, products fully unsuitable and unlisted for either Countertop or Work Surface application are utilized and wrongly approved.

Although not explicitly stated [as it is for approval of Article Scopes (2.2.1)] in the 2020 NEC® Style Manual, it is recognized that the NEC® Correlating Committee has ultimate authority for assignment of which Code-Making Panel becomes responsible for a definition applicable to multiple Articles. CMP-18 is recommended for such CMP assignments for these new definitions based upon products (Article 406, CMP-18) rather than upon installation usage (Article 210, CMP-2).

Related Public Comments for This Document

Related Comment

Public Comment No. 2219-NFPA 70-2021 [New Definition after Definition: Wireways, Nonmetallic. (No...)]

Relationship

differentiated definition

Related Item

- Committee Input No. 9338-NFPA 70-2021

Submitter Information Verification

Submitter Full Name: Brian Rock

Organization: Hubbell Incorporated

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Submission Date: Thu Aug 19 17:04:07 EDT 2021

Committee: NEC-P02

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**Public Comment No. 868-NFPA 70-2021 [Section No. 314.27(E)]****(E) Weight-Supporting Ceiling Receptacles (WSCR) and Weight-Supporting Attachment Fittings (WSAF).**

Outlet boxes required in 314.27 shall be permitted to support listed weight-supporting ceiling receptacles (WSCR) used in combination with compatible weight-supporting attachment fittings (WSAF). The combination shall be identified for the support of equipment within the weight and mounting orientation limits of the listing. Where the WSCR is installed within a box, it shall be included in the fill calculation covered in 314.16(B)(4).

Additional Proposed Changes

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
9_CN_4_PC.pdf	9 CN4	✓

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 4 appeared in the First Draft Report on First Revision No. 7761.

The Correlating Committee refers FR 7761 to CMP 18 for information.

Related Item

- First Revision No. 7761

Submitter Information Verification

Submitter Full Name: CC on NEC-AAC

Organization: NEC Correlating Committee

Street Address:

City:

State:

Zip:

Submittal Date: Wed Aug 04 15:17:37 EDT 2021

Committee: NEC-P09

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Correlating Committee Note No. 4-NFPA 70-2021 [Section No. 314.27(E)]

Submitter Information Verification

Committee: NEC-P09

Submittal Date: Mon May 03 10:56:34 EDT 2021

Committee Statement

Committee Statement: The Correlating Committee refers FR 7761 to CMP 18 for information.

First Revision No. 7761-NFPA 70-2020 [Section No. 314.27(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.