First Revision No. 8326-NFPA 70-2018 [Global Input]

Annex C, insert new tables from attached word file.

Supplemental Information

File Name	Description	Approved
AnnexCTables.xls	For staff use	✓
Global_FR-8326_Panel_8_Annex_C_new_tables.docx		✓

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jan 16 09:54:29 EST 2018

Committee Statement and Meeting Notes

Committee Statement: The new tables for cable tray fill will add to the usability of the Annex C Tables by simplifying the determination of the number of conductors or cables used in different cable tray widths.

Response Message:

Committee Notes:

Date	Submitted By	
Jan 16, 2018	NEC-CMP Panel 08	Each tab has a different table. 7 new tables total.

Public Input No. 4004-NFPA 70-2017 [New Definition after Definition:]

Editorial Comment

Click here

Global FR-8326 Tables C.14—C.20 Panel 8

Table C.14 Number of Type MC Cables Allowed in Cable Tray (3C Multiconductor MC Cable Non-Jacketed Assembly) (Based on Fill per 392.9, Table 392.9, Column 1, Ampacity per 392.11)

Conductor Insulation Type	Conductor Size (AWG/kcmil)	Ventilated Tray Width [mm (in.)]											
		50 (2)	100 (4)	150 (6)	200 (8)	300 (12)	400 (16)	450 (18)	500 (20)	600 (24)	750 (30)	900 (36)	Dia Used
THHN													
	14	13	27	41	55	82	110	124	138	165	206	248	0.46
	12	10	20	31	41	62	83	93	104	124	160	192	0.53
	10	7	15	23	31	47	62	70	78	94	119	149	0.61
	8	6	12	18	25	37	50	56	63	75	96	116	0.68
	6	4	8	13	17	26	34	39	43	52	66	79	0.82
	4	2	5	8	11	17	23	26	29	35	45	55	0.99
	3	2	5	7	10	15	21	23	26	31	40	48	1.05
	2	2	4	6	9	13	18	20	22	27	34	41	1.13
	1	2	4	6	8	12	16	18	20	24	30	36	1.2
	1/0	1	3	5	7	11	14	16	18	22	28	34	1.25
	2/0	1	3	4	6	9	13	14	16	19	24	29	1.34
	3/0	1	2	3	5	7	10	11	13	15	20	24	1.49
	4/0	1	2	3	5	7	10	11	12	15	19	22	1.57
	250	1	2	3	4	6	9	10	11	13	17	20	1.74
	300	1	2	3	4	6	8	9	10	12	16	19	1.86
	350	1	2	3	4	6	8	9	10	12	15	18	1.96
	400	0	1	2	3	5	7	8	9	11	14	17	2.11
	500	0	1	2	3	5	7	7	8	10	13	16	2.24
	600	0	1	2	3	4	6	7	8	9	12	15	2.38
	700	0	1	2	3	4	6	7	7	9	11	14	2.52
	750	0	1	2	2	4	5	6	7	8	11	13	2.67
	800	0	1	2	2	4	5	6	6	8	10	12	2.85
	900	0	1	1	2	3	5	5	6	7	10	12	2.99
	1000	0	1	1	2	3	4	5	6	7	9	11	3.25

Notes:

1. Both aluminum and copper worst-case diameter used.
2. Ampacity per 310.16 and 310.18.

Table C.15 Number of Type MC Cables Allowed per *Code* (4C Multiconductor MC Cable Non-Jacketed Assembly)
[Based on Fill per 392.22, Table 392.22(A), Column 1, Ampacity per 392.80]

Conductor Insulation Type	Conductor Size (AWG/kcmil)	Ventilated Tray Width [mm (in.)]											
		50 (2)	100 (4)	150 (6)	200 (8)	225 (9)	300 (12)	400 (16)	450 (18)	500 (20)	600 (24)	750 (30)	900 (36)
THHN													
	14	13	27	40	54	61	81	108	122	135	162	202	243
	12	10	21	31	42	47	63	84	94	105	126	157	189
	10	7	15	23	31	35	47	62	70	78	94	117	141
	8	6	12	19	25	28	38	50	57	63	76	101	114
	6	4	8	13	17	19	26	34	39	43	52	65	78
	4	3	6	9	12	14	18	24	27	30	36	45	54
	3	2	5	7	10	11	15	21	23	26	31	38	46
	2	2	4	6	9	10	13	18	20	22	27	33	40
	1	2	4	6	8	9	12	16	18	20	24	30	36
	1/0	1	3	5	7	8	11	15	16	18	22	27	33
	2/0	1	3	4	6	7	9	12	14	16	19	23	28
	3/0	1	2	4	5	6	7	10	11	13	15	19	22
	4/0	1	2	3	5	6	7	10	11	12	15	18	22
	250	1	2	3	4	5	6	9	10	11	13	16	19
	300	1	2	3	4	5	6	8	9	10	12	15	18
	350	1	2	3	4	5	6	8	9	10	12	15	18
	400	0	1	2	3	3	5	7	8	9	11	13	14
	500	0	1	2	3	3	5	7	7	8	10	12	15
	600	0	1	2	3	3	5	5	7	8	10	12	15
	700	0	1	2	3	3	5	6	7	7	8	10	14
	750	0	1	2	2	2	4	5	6	6	8	11	13
	800	0	1	2	2	2	4	5	6	7	8	10	12
	900	0	1	2	2	2	4	5	6	6	8	10	12
	1000	0	1	1	1	1	3	4	5	5	7	9	11

Note: Both aluminum and copper largest commercial cable diameter used.

Table C.16 Number of Type TC Cables Allowed per *Code* (3C Multiconductor TC Cable Assembly)
[Based on Fill per 392.22, Table 392.22(A), Column 1, Ampacity per 392.80]

Conductor Insulation Type	Conductor Size (AWG/kcmil)	Ventilated Tray Width [mm (in.)]											
		50 (2)	100 (4)	150 (6)	200 (8)	225 (9)	300 (12)	400 (16)	450 (18)	500 (20)	600 (24)	750 (30)	900 (36)
THHN													
	14	13	27	40	54	61	81	108	122	135	162	202	243
	12	10	21	31	42	47	63	84	94	105	126	157	189
	10	7	15	23	31	35	47	62	70	78	94	117	141
	8	6	12	19	25	28	38	50	57	63	76	101	114
	6	4	8	13	17	19	26	34	39	43	52	65	78
	4	3	6	9	12	14	18	24	27	30	36	45	54
	3	2	5	7	10	11	15	21	23	26	31	38	46
	2	2	4	6	9	10	13	18	20	22	27	33	40
	1	2	4	6	8	9	12	16	18	20	24	30	36
	1/0	1	3	5	7	8	11	15	16	18	22	27	33
	2/0	1	3	4	6	7	9	12	14	16	19	23	28
	3/0	1	2	4	5	6	7	10	11	13	15	19	22
	4/0	1	2	3	5	6	7	10	11	12	15	18	22
	250	1	2	3	4	5	6	9	10	11	13	16	19
	300	1	2	3	4	5	6	8	9	10	12	15	18
	350	1	2	3	4	5	6	8	9	10	12	15	18
	400	0	1	2	3	3	5	7	8	9	11	13	14
	500	0	1	2	3	3	5	7	7	8	10	12	15
	600	0	1	2	3	3	5	5	7	8	10	12	15
	700	0	1	2	3	3	5	6	7	7	8	10	14
	750	0	1	2	2	2	4	5	6	6	8	11	13
	800	0	1	2	2	2	4	5	6	7	8	10	12
	900	0	1	2	2	2	4	5	6	6	8	10	12
	1000	0	1	1	1	1	3	4	5	5	7	9	11

Note: Both aluminum and copper largest commercial cable diameter used.

Table C.17 Number of Type TC Cables Allowed per *Code* (4C Multiconductor TC Cable Assembly)
[Based on Fill per 392.22, Table 392.22(A), Column 1, Ampacity per 392.80]

Conductor Insulation Type	Conductor Size (AWG/kcmil)	Ventilated Tray Width [mm (in.)]												
		50 (2)	100 (4)	150 (6)	200 (8)	225 (9)	300 (12)	400 (16)	450 (18)	500 (20)	600 (24)	750 (30)	900 (36)	Dia Used
THHN														
	14	11	23	35	47	53	71	95	107	119	143	182	219	0.49
	12	9	18	27	36	41	55	73	82	91	110	140	168	0.56
	10	6	13	20	27	30	41	54	61	68	82	104	125	0.65
	8	5	10	16	21	24	32	43	49	54	65	83	99	0.73
	6	4	8	13	17	19	26	34	39	43	52	66	79	0.82
	4	2	5	7	10	11	15	20	22	25	30	38	46	1.08
	3	2	4	6	8	9	13	17	19	22	26	33	40	1.15
	2	1	3	5	7	8	11	15	17	19	22	29	34	1.24
	1	1	3	4	6	7	9	12	14	16	19	24	29	1.35
	1/0	1	3	4	6	7	9	12	14	15	18	24	28	1.36
	2/0	1	2	3	5	6	7	10	11	13	15	20	24	1.49
	3/0	1	2	3	4	5	6	8	10	11	13	17	20	1.61
	4/0	1	2	3	4	5	6	9	10	11	13	17	20	1.75
	250	1	2	3	4	5	6	8	9	10	12	15	18	1.91
	300	0	0	0	0	0	0	0	0	0	0	0	0	
	350	0	1	2	3	3	5	7	8	9	10	13	16	2.16
	400	0	0	0	0	0	0	0	0	0	0	0	0	
	500	0	1	2	3	3	4	6	7	7	9	12	14	2.48
	600	0	0	0	0	0	0	0	0	0	0	0	0	
	700	0	0	0	0	0	0	0	0	0	0	0	0	
	750	0	1	1	2	2	3	5	5	6	7	10	12	2.96
	800	0	0	0	0	0	0	0	0	0	0	0	0	
	900	0	0	0	0	0	0	0	0	0	0	0	0	
	1000	0	0	0	0	0	0	0	0	0	0	0	0	

Note: Both aluminum and copper largest commercial cable diameter used.

Table C.18 Number of Single Conductor Cables Allowed in Cable Tray
[Based on Fill per 392.22, Table 392.22(A), Column 1, Ampacity per 392.80]

Conductor Insulation Type	Conductor Size (AWG/kcmil)	Ventilated Tray Width [mm (in.)]												
		50 (2)	100 (4)	150 (6)	200 (8)	225 (9)	300 (12)	400 (16)	450 (18)	500 (20)	600 (24)	750 (30)	900 (36)	Dia Used
THHN														
	1/0	4	8	12	16	18	24	32	36	40	48	61	74	0.486
	2/0	3	7	11	14	16	22	29	33	37	44	56	67	0.532
	3/0	3	6	10	13	15	20	26	30	33	40	51	61	0.584
	4/0	3	6	9	12	14	18	24	27	30	36	46	56	0.642
	250	5	10	16	21	23	32	42	48	53	64	81	98	0.711
	300	4	9	13	18	20	27	37	41	46	55	70	84	0.766
	350	4	8	12	16	18	24	32	36	40	48	61	74	0.817
	400	3	7	10	14	16	21	29	32	36	43	55	66	0.864
	500	3	6	9	12	13	18	24	27	30	36	45	55	0.949
	600	2	4	7	9	10	14	19	22	24	29	37	44	1.051
	700	2	4	6	8	9	12	17	19	21	25	32	39	1.122
	750	2	4	6	8	9	12	16	18	20	24	30	37	1.156
	800	1	3	5	7	8	11	15	17	19	23	29	35	1.188
	900	1	3	5	6	7	10	13	15	17	20	26	31	1.252
	1000	1	3	4	6	7	9	12	13	15	18	22	27	1.31

Table C.19 Number of Single Conductor Cables Allowed in Cable Tray
[Based on Fill per 392.22, Table 392.22(A), Column 1, Ampacity per 392.80]

Conductor Insulation Type	Conductor Size (AWG/kcmil)	Ventilated Tray Width [mm (in.)] 50 (2)	100 (4)	150 (6)	200 (8)	225 (9)	300 (12)	400 (16)	450 (18)	500 (20)	600 (24)	750 (30)	900 (36)	Dia Used
XHHW														
	1/0	4	8	12	16	18	24	32	36	40	49	62	74	0.482
	2/0	3	7	11	14	17	22	29	33	37	44	56	68	0.528
	3/0	3	6	10	13	15	20	27	30	33	40	51	62	0.58
	4/0	3	6	9	12	12	18	24	27	30	37	47	56	0.638
	250	5	10	16	21	24	32	43	49	54	65	83	98	0.705
	300	4	9	14	18	20	28	37	42	47	56	71	85	0.76
	350	4	8	12	16	18	24	33	37	41	49	62	75	0.811
	400	3	7	11	14	16	22	29	33	36	44	56	67	0.858
	500	3	6	9	12	13	18	24	27	30	36	46	55	0.943
	600	2	4	7	9	10	14	19	22	24	29	37	44	1.053
	700	2	4	6	8	9	12	17	19	21	25	32	39	1.124
	750	2	4	6	8	9	12	16	18	20	24	30	37	1.158
	800	1	3	5	7	8	11	15	17	19	23	29	35	1.19
	900	1	3	5	6	7	10	13	15	17	20	26	31	1.254
	1000	1	3	4	6	7	9	12	13	15	18	22	27	1.312

Table C.20 Number of Single Conductor Cables Allowed in Cable Tray
[Based on Fill per 392.22, Table 392.22(A), Column 1, Ampacity per 392.80]

Conductor Insulation Type	Conductor Size (AWG/kcmil)	Ventilated Tray Width [mm (in.)]												
		50 (2)	100 (4)	150 (6)	200 (8)	225 (9)	300 (12)	400 (16)	450 (18)	500 (20)	600 (24)	750 (30)	900 (36)	Dia Used
RHW														
	1/0	3	7	11	14	16	22	29	33	37	44	56	67	0.532
	2/0	3	6	10	13	15	20	27	30	34	40	51	62	0.578
	3/0	3	6	9	12	14	18	24	28	31	37	47	57	0.63
	4/0	2	5	8	11	13	17	22	25	28	34	43	52	0.688
250		4	9	13	18	20	27	37	41	46	55	70	84	0.765
300		4	8	12	16	17	24	32	36	40	48	61	73	0.82
350		3	7	10	14	15	21	28	32	35	42	54	65	0.871
400		3	6	9	12	14	19	25	28	32	38	49	58	0.918
500		2	5	8	10	12	16	21	24	26	32	41	49	1.003
600		2	4	6	8	9	13	17	19	21	26	33	40	1.113
700		1	3	5	7	8	11	15	17	19	23	29	35	1.184
750		1	3	5	7	8	10	14	16	18	21	27	33	1.218
800		1	3	5	6	7	10	13	15	17	20	26	31	1.25
900		1	3	4	6	7	9	12	14	15	18	23	28	1.314
1000		1	2	4	5	6	8	11	12	14	17	21	26	1.372

First Revision No. 7952-NFPA 70-2018 [Detail]

356.2 Definitions

Liquidtight Flexible Nonmetallic Conduit (LFNC).

(3) A corrugated internal and external surface without integral reinforcement within the raceway wall, designated as Type LFNC-C

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jan 11 12:19:39 EST 2018

Committee Statement and Meeting Notes

Committee Statement: Editorial revision to add “Type” before LFNC-C.
Response Message:

First Revision No. 7998-NFPA 70-2018 [Detail]

Change 356.10, list item (2) to read:

(2) Where protection of the contained conductors is required from vapors, machine oils, liquids, ~~or~~and solids.

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jan 11 16:20:30 EST 2018

Committee Statement and Meeting Notes

Committee Statement: Liquidtight Flexible Nonmetallic Conduit (LFNC) is tested for the protection and egress from machine oil per UL1660 Liquidtight Flexible Nonmetallic Conduit standard. In addition, LFNC will protect from liquids and solids at the same time therefore the "or" was replaced with "and".

Response Message:

Public Input No. 790-NFPA 70-2017 [Section No. 356.10]

First Revision No. 8004-NFPA 70-2018 [Detail]

Change 350.10, list item (1) to read:

(1) Where conditions of installation, operation, or maintenance require flexibility or protection from machine oils, liquids, vapors, ~~or~~and solids.

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jan 11 16:51:36 EST 2018

Committee Statement and Meeting Notes

Committee Statement: LFMC is permitted to be used with machine oils.
Response Message:

Public Input No. 789-NFPA 70-2017 [Section No. 350.10]

First Revision No. 8009-NFPA 70-2018 [Detail]

In 392.10(B)(1)(b) delete "the provisions of"

should read:

Welding cables shall comply with Article 630, Part IV.

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jan 11 17:11:03 EST 2018

Committee Statement and Meeting Notes

Committee Statement: The phrase “the provisions of” is unnecessary and is being deleted to increase usability.
Response Message:

First Revision No. 8011-NFPA 70-2018 [Detail]

Section 392.30

Add (4) to 392.30 and add (4) into parent text of (B).

(B) Cables and Conductors.

Cables and conductors shall be secured to and supported by the cable tray system in accordance with (1), (2) ~~and~~ , (3), and (4) as applicable:

(1) In other than horizontal runs, the cables shall be fastened securely to transverse members of the cable ~~runs~~tray.

(2) Supports shall be provided to prevent stress on cables where they enter raceways from cable tray systems.

(3) The system shall provide for the support of cables and raceway wiring methods in accordance with their corresponding articles. Where cable trays support individual conductors or multiconductor cables and where the conductors or multiconductor cables pass from one cable tray to another, or from a cable tray to raceway(s) or from a cable tray to equipment where the conductors are terminated, the distance between the cable trays or between the cable tray and the raceway(s) or the equipment shall not exceed 1.8 m (6 ft). The conductors shall be secured to the cable tray(s) at the transition, and they shall be protected, by guarding or by location, from physical damage.

(4) Cable ties shall be listed and identified as suitable for the application and for securement and support.

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jan 11 17:18:30 EST 2018

Committee Statement and Meeting Notes

Committee Statement: Cable ties are an acceptable means of securement when identified for securement and support. “Other Fasteners” is not included because they are not required to be listed.

Response Message:

Public Input No. 4354-NFPA 70-2017 [New Section after 392.30]

First Revision No. 8017-NFPA 70-2018 [Detail]

Delete "the provisions of" in 392.80(A)(1) Multiconductor Cables.

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jan 11 17:28:31 EST 2018

Committee Statement and Meeting Notes

Committee Statement: The phrase “the provisions of” is unnecessary and is being deleted to increase usability.
Response Message:

First Revision No. 8019-NFPA 70-2018 [Detail]

Delete "provisions" from 392.80(B)(1) Multiconductor Cables (2001 Volts or Over).

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jan 11 17:35:10 EST 2018

Committee Statement and Meeting Notes

Committee Statement: The word “provisions” is unnecessary and is being deleted to increase usability.
Response Message:

First Revision No. 8100-NFPA 70-2018 [Detail]

Change title of Annex C to:

Informative Annex C Conduit ~~and~~ , Tubing, and Cable Tray Fill Tables for Conductors and Fixture Wires of the Same Size

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Fri Jan 12 15:49:03 EST 2018

Committee Statement and Meeting Notes

Committee Statement: The title was revised to accommodate the addition of the Cable Tray Tables to Annex C.

Response Message:

Public Input No. 4013-NFPA 70-2017 [Annex C]

Editorial Comment

Click here

First Revision No. 8330-NFPA 70-2018 [Detail]

Chapter 9, Table 1, Note no. 2

Table 1 Percent of Cross Section of Conduit and Tubing for Conductors and Cables

Number of Conductors and/or Cables	Cross-Sectional Area (%)
1	53
2	31
Over 2	40

Informational Note No. 1: Table 1 is based on common conditions of proper cabling and alignment of conductors where the length of the pull and the number of bends are within reasonable limits. It should be recognized that, for certain conditions, a larger size conduit or a lesser conduit fill should be considered.

Informational Note No. 2: When pulling three conductors or cables into a raceway, if the ratio of the raceway (inside diameter) to the conductor or cable (outside diameter) is between 2.8 and 3.2, jamming can occur. While jamming can occur when pulling four or more conductors or cables into a raceway, the probability is very low.

Notes to Tables

1. See Informative Annex C for the maximum number of conductors and fixture wires, all of the same size (total cross-sectional area including insulation) permitted in trade sizes of the applicable conduit or tubing.
2. Table 1 applies only to complete conduit or tubing systems and is not intended to apply to sections of conduit or tubing used to protect exposed wiring and cable from physical damage.
3. Equipment grounding or bonding conductors, where installed, shall be included when calculating conduit or tubing fill. The actual dimensions of the equipment grounding or bonding conductor (insulated or bare) shall be used in the calculation.
4. Where conduit or tubing nipples having a maximum length not to exceed 600 mm (24 in.) are installed between boxes, cabinets, and similar enclosures, the nipples shall be permitted to be filled to 60 percent of their total cross-sectional area, and 310.15(B)(3)(a) adjustment factors need not apply to this condition.
5. For conductors not included in Chapter 9, such as multiconductor cables and optical fiber cables, the actual dimensions shall be used.
6. For combinations of conductors of different sizes, use actual dimensions or Table 5 and Table 5A for dimensions of conductors and Table 4 for the applicable conduit or tubing dimensions.
7. When calculating the maximum number of conductors or cables permitted in a conduit or tubing, all of the same size (total cross-sectional area including insulation), the next higher whole number shall be used to determine the maximum number of conductors permitted when the calculation results in a decimal greater than or equal to 0.8. When calculating the size for conduit or tubing permitted for a single conductor, one conductor shall be permitted when the calculation results in a decimal greater than or equal to 0.8.
8. Where bare conductors are permitted by other sections of this *Code*, the dimensions for bare conductors in Table 8 shall be permitted.
9. A multiconductor cable, optical fiber cable, or flexible cord of two or more conductors shall be treated as a single conductor for calculating percentage conduit or tubing fill area. For cables that have elliptical cross sections, the cross-sectional area calculation shall be based on using the major diameter of the ellipse as a circle diameter. Assemblies of single insulated conductors without an overall covering shall not be considered a cable when determining conduit or tubing fill area. The conduit or tubing fill for the assemblies shall be calculated based upon the individual conductors.

10. The values for approximate conductor diameter and area shown in Table 5 are based on worst-case scenario and indicate round concentric-lay-stranded conductors. Solid and round concentric-lay-stranded conductor values are grouped together for the purpose of Table 5. Round compact-stranded conductor values are shown in Table 5A. If the actual values of the conductor diameter and area are known, they shall be permitted to be used.

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jan 16 10:12:08 EST 2018

Committee Statement and Meeting Notes

Committee Statement: Table 1 does not apply to cable when used in incomplete sections of conduit or tubing, whether straight or bent, to protect from physical damage.
Response Message:

Public Input No. 2663-NFPA 70-2017 [Chapter 9]

First Revision No. 8367-NFPA 70-2018 [Detail]

Chapter 9, Last paragraph

Table 10 Conductor Stranding

Conductor Size		Number of Strands		
		Copper		Aluminum
AWG or kcmil	mm^2	Class B[a]	Class C	Class B[a]
24–30	0.20–0.05	b	—	—
22	0.32	7	—	—
20	0.52	10	—	—
18	0.82	16	—	—
16	1.3	26	—	—
14–2	2.1–33.6	7	19	7[c]
1–4/0	42.4–107	19	37	19
250–500	127–253	37	61	37
600–1000	304–508	61	91	61
1250–1500	635–759	91	127	91
1750–2000	886–1016	127	271	127

[a]Conductors with a lesser number of strands shall be permitted based on an evaluation for connectability and bending.

[b]Number of strands vary.

[c]Aluminum 14 AWG (2.1 mm^2) is not available.

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:

Submittal Date: Tue Jan 16 12:49:18 EST 2018

Committee Statement and Meeting Notes

Committee Statement: The reference to UL486A is being revised to reflect the correct reference of UL 486A-486B, Wire Connectors.

Response Message:

Editorial Comment

Click here

First Revision No. 8025-NFPA 70-2018 [Section No. 344.14]

344.14 Dissimilar Metals.

Where practicable, dissimilar metals in contact anywhere in the system shall be avoided to eliminate the possibility of galvanic action. ~~Aluminum~~ Stainless steel and aluminum fittings and enclosures shall be permitted to be used with galvanized steel RMC, and galvanized steel fittings and enclosures shall be permitted to be used with aluminum RMC where not subject to severe corrosive influences. Stainless steel ~~RMC~~ rigid conduit shall only be used with ~~stainless steel fittings and approved accessories, outlet boxes, and enclosures.~~ the following:

(1) Stainless steel fittings

(2) Stainless steel boxes and enclosures

(3) Steel (galvanized, painted, powder or PVC coated, and so forth) boxes and enclosures when not subject to severe corrosive influences

(4) Stainless steel, nonmetallic, or approved accessories

Supplemental Information

File Name	Description	Approved
Panel_8_FR-8025_344.14_leg_changes.docx	For staff use	✓

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jan 11 17:47:11 EST 2018

Committee Statement and Meeting Notes

Committee Statement: Stainless steel fittings are permitted to be used with galvanized steel RMC. The change provides additional clarity on what fittings are acceptable for use with stainless steel RMC.

Response Message:

Public Input No. 2709-NFPA 70-2017 [Section No. 344.14]

Editorial Comment

Click here

First Revision No. 8026-NFPA 70-2018 [Section No. 344.22]

344.22 Number of Conductors.

~~The~~ For complete systems, the number of conductors shall not exceed that permitted by the percentage fill specified in Table 1, Chapter 9.

Cables shall be permitted to be installed where such use is not prohibited by the respective cable articles. The number of cables shall not exceed the allowable percentage fill specified in Table 1, Chapter 9.

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jan 11 17:49:42 EST 2018

Committee Statement and Meeting Notes

Committee Statement: This First Revision clarifies that Table 1 of Chapter 9 applies to cables utilized with complete systems only.

Response Message:

Public Input No. 3490-NFPA 70-2017 [Section No. 344.22]

First Revision No. 7922-NFPA 70-2018 [Section No. 350.2]

350.2 Definition.

The definition in this section shall apply within this article and throughout the *Code* .

Liquidtight Flexible Metal Conduit (LFMC).

A raceway of circular cross section having an outer liquidtight, nonmetallic, sunlight-resistant jacket over an inner flexible metal core with associated couplings, connectors, and fittings for the installation of electric conductors.

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jan 11 10:23:43 EST 2018

Committee Statement and Meeting Notes

Committee Statement: This First Revision adds clarity to the use of the definition within this section and throughout the Code.

Response Message:

Public Input No. 2196-NFPA 70-2017 [Section No. 350.2]

First Revision No. 8006-NFPA 70-2018 [Section No. 350.30(A)]

(A) Securely Fastened.

LFMC shall be securely fastened in place by an approved means within 300 mm (12 in.) of each box, cabinet, conduit body, or other conduit termination and shall be supported and secured at intervals not to exceed 1.4 m (4½ ft). Where used, cable ties shall be listed and be identified for securement and support.

Exception No. 1: Where LFMC is fished between access points through concealed spaces in finished buildings or structures and supporting is impractical.

Exception No. 2: Where flexibility is necessary after installation, lengths from the last point where the raceway is securely fastened shall not exceed the following:

(1) 900 mm (3 ft) for metric designators 16 through 35 (trade sizes ½ through 1¼)

(2) 1200 mm (4 ft) for metric designators 41 through 53 (trade sizes 1½ through 2)

(3) 1500 mm (5 ft) for metric designators 63 (trade size 2½) and larger

Exception No. 3: Lengths not exceeding 1.8 m (6 ft) from a luminaire terminal connection for tap conductors to luminaires, as permitted in 410.117(C).

Exception No. 4: Lengths not exceeding 1.8 m (6 ft) from the last point where the raceway is securely fastened for connections within an accessible ceiling to luminaire(s) or other equipment.

For the purposes of ~~350.30~~ the exceptions , listed LFMC fittings shall be permitted as a means of securement and support.

Supplemental Information

File Name	Description	Approved
Panel_8_FR-8006_350.30_A_leg_changes.docx	For staff use	✓

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jan 11 16:58:34 EST 2018

Committee Statement and Meeting Notes

Committee Statement: Listed LFMC fittings have been evaluated for securement and support. The use of the fitting for that purpose is acceptable and sometimes necessary within the limitations of the Exceptions.

Response Message:

Public Input No. 1895-NFPA 70-2017 [Section No. 350.30(A)]

Editorial Comment

Click here

First Revision No. 8082-NFPA 70-2018 [Section No. 376.20]

376.20 Conductors Connected in Parallel.

Where single conductor cables comprising each phase, neutral, or grounded conductor of an alternating-current circuit are connected in parallel as permitted in 310.10(H), the conductors shall be installed in groups consisting of not more than one conductor per phase, neutral, or grounded conductor.

Informational Note: The purpose of having all parallel conductor sets within the same group is to prevent current imbalance in the paralleled conductors due to inductive reactance.

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Fri Jan 12 11:16:54 EST 2018

Committee Statement and Meeting Notes

Committee Statement: The relocated text is informational in nature and belongs more appropriately in an informational note. This is consistent with other Informational Notes.

Response Message:

Public Input No. 1537-NFPA 70-2017 [Section No. 376.20]

First Revision No. 7983-NFPA 70-2018 [Section No. 342.2]

342.2 Definition.

The definition in this section shall apply within this article and throughout the *Code* .

Intermediate Metal Conduit (IMC).

A steel threadable raceway of circular cross section designed for the physical protection and routing of conductors and cables and for use as an equipment grounding conductor when installed with its integral or associated coupling and appropriate fittings.

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jan 11 15:08:13 EST 2018

Committee Statement and Meeting Notes

Committee Statement: This First Revision adds clarity to the use of the definition within this section and throughout the Code.

Response Message:

Public Input No. 2192-NFPA 70-2017 [Section No. 342.2]

Editorial Comment

Click here

First Revision No. 8023-NFPA 70-2018 [New Section after 342.10(D)]

(E) Severe Physical Damage.

IMC shall be permitted to be installed where subject to severe physical damage.

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jan 11 17:44:55 EST 2018

Committee Statement and Meeting Notes

Committee Statement: New section 342.10(E) to clarifies that IMC is permitted to be installed where subject to severe physical damage.

Response Message:

Public Input No. 2703-NFPA 70-2017 [Section No. 342.10]

First Revision No. 7986-NFPA 70-2018 [Section No. 342.14]

342.14 Dissimilar Metals.

Where practicable, dissimilar metals in contact anywhere in the system shall be avoided to eliminate the possibility of galvanic action.

~~Aluminum~~ Stainless steel and aluminum fittings and enclosures shall be permitted to be used with galvanized steel IMC where not subject to severe corrosive influences.

Stainless steel IMC shall only be used with the following: ~~stainless steel fittings and approved accessories, outlet boxes, and enclosures.~~

(1) Stainless steel fittings

(2) Stainless steel boxes and enclosures

(3) Steel (galvanized, painted, powder or PVC coated, and so forth) boxes and enclosures when not subject to severe corrosive influences

(4) Stainless steel, nonmetallic, or approved accessories

Supplemental Information

File Name	Description	Approved
Panel_8_FR-7986_342.14_leg_changes.docx	For staff use	✓

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jan 11 15:16:36 EST 2018

Committee Statement and Meeting Notes

Committee Statement: Stainless steel fittings are permitted to be used with galvanized steel IMC. The change provides additional clarity on what fittings are acceptable for use with stainless steel IMC.

Response Message:

Public Input No. 2705-NFPA 70-2017 [Section No. 342.14]

Editorial Comment

Click here

First Revision No. 7987-NFPA 70-2018 [Section No. 342.22]

342.22 Number of Conductors.

~~The~~ For complete systems, the number of conductors shall not exceed that permitted by the percentage fill specified in Table 1, Chapter 9.

Cables shall be permitted to be installed where such use is not prohibited by the respective cable articles. The number of cables shall not exceed the allowable percentage fill specified in Table 1, Chapter 9.

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jan 11 15:22:00 EST 2018

Committee Statement and Meeting Notes

Committee Statement: This First Revision clarifies that Table 1 of Chapter 9 applies to cables utilized with complete systems only.
Response Message:

Public Input No. 3482-NFPA 70-2017 [Section No. 342.22]

First Revision No. 7988-NFPA 70-2018 [Section No. 342.28]

342.28 Reaming and Threading.

All cut ends shall be reamed or otherwise finished to remove rough edges. Where conduit is threaded in the field, a standard cutting die with a taper of 1 in 16 (¾ in. taper per foot) shall be used.

Informational Note: See ANSI/ASME ~~B.1.20.1-1983~~ B1.20.1-2013 , *Standard for Pipe Threads, General Purpose (Inch)*.

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jan 11 15:23:53 EST 2018

Committee Statement and Meeting Notes

Committee Statement: Updated ANSI/ASME B1.20.1 standard reference to current revision.
Response Message:

Public Input No. 824-NFPA 70-2017 [Section No. 342.28]

First Revision No. 8021-NFPA 70-2018 [Section No. 342.100]

342.100 Construction.

IMC shall be made of one of the following:

(1) Steel, with protective coatings

(2) Stainless steel

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jan 11 17:38:37 EST 2018

Committee Statement and Meeting Notes

Committee Statement: Moves section 342.100 Construction from Part II Installation to Part III Construction Specifications to be consistent with other raceway articles.

Response Message:

Public Input No. 613-NFPA 70-2017 [Sections 342.100, Part III.]

Public Input No. 3485-NFPA 70-2017 [New Part after III.]

Public Input No. 3483-NFPA 70-2017 [Section No. 342.100]

Public Input No. 1769-NFPA 70-2017 [Sections 342.100, Part III., 342.120]

Public Input No. 3417-NFPA 70-2017 [Section No. 342.100]

Public Input No. 471-NFPA 70-2017 [Sections 342.100, Part III.]

First Revision No. 7991-NFPA 70-2018 [Section No. 342.130]

~~**342.130** Standard Lengths.~~

~~The standard length of IMC shall be 3.05 m (10 ft), including an attached coupling, and each end shall be threaded. Longer or shorter lengths with or without coupling and threaded or unthreaded shall be permitted.~~

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jan 11 15:44:08 EST 2018

Committee Statement and Meeting Notes

Committee Statement: The National Electric Code is not a design manual or product standard. Standard length information for intermediate metal conduit is not necessary and can be deleted.

Response Message:

Public Input No. 2721-NFPA 70-2017 [Section No. 342.130]

First Revision No. 7992-NFPA 70-2018 [Section No. 344.2]

344.2 Definition.

The definition in this section shall apply within this article and throughout the *Code* .

Rigid Metal Conduit (RMC).

A threadable raceway of circular cross section designed for the physical protection and routing of conductors and cables and for use as an equipment grounding conductor when installed with its integral or associated coupling and appropriate fittings.

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jan 11 15:46:24 EST 2018

Committee Statement and Meeting Notes

Committee Statement: This First Revision adds clarity to the use of the definition within this section and throughout the Code.

Response Message:

Public Input No. 2193-NFPA 70-2017 [Section No. 344.2]

First Revision No. 7993-NFPA 70-2018 [Section No. 344.10(A)]

(A) Atmospheric Conditions and Occupancies.

(1) Galvanized Steel ~~and~~ , Stainless Steel, and Red Brass RMC.

Galvanized steel ~~and~~ , stainless steel, and red brass RMC shall be permitted under all atmospheric conditions and occupancies.

~~**(2)** Red Brass RMC.~~

~~Red brass RMC shall be permitted to be installed for direct burial and swimming pool applications.~~

(2) Aluminum RMC.

Aluminum RMC shall be permitted to be installed where approved for the environment. Rigid aluminum conduit encased in concrete or in direct contact with the earth shall be provided with approved supplementary corrosion protection.

(3) Ferrous Raceways and Fittings.

Ferrous raceways and fittings protected from corrosion solely by enamel shall be permitted only indoors and in occupancies not subject to severe corrosive influences.

Supplemental Information

File Name	Description	Approved
Panel_8_FR-7993_344.10_A_leg_changes.docx	For staff use--FINAL	✓

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jan 11 15:50:50 EST 2018

Committee Statement and Meeting Notes

Committee Statement: s
Response Message:

Public Input No. 2627-NFPA 70-2017 [Sections 344.10(A)(1), 344.10(A)(2)]

First Revision No. 7994-NFPA 70-2018 [New Section after 344.10(D)]

(E) Severe Physical Damage.

RMC shall be permitted to be installed where subject to severe physical damage.

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jan 11 15:54:21 EST 2018

Committee Statement and Meeting Notes

Committee Statement: New Section 344.10(E) to clarifies RMC is permitted to be installed where subject to severe physical damage.

Response Message:

Public Input No. 2707-NFPA 70-2017 [Section No. 344.10]

Editorial Comment

Click here

First Revision No. 7995-NFPA 70-2018 [Section No. 344.28]

344.28 Reaming and Threading.

All cut ends shall be reamed or otherwise finished to remove rough edges. Where conduit is threaded in the field, a standard cutting die with a 1 in 16 taper (¾ in. taper per foot) shall be used.

Informational Note: See ANSI/ASME ~~B.1.20.1-1983~~ B1.20.1-2013 , *Standard for Pipe Threads, General Purpose (Inch)*.

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jan 11 15:58:35 EST 2018

Committee Statement and Meeting Notes

Committee Statement: Updates ANSI/ASME B1.20.1 standard reference to current revision.
Response Message:

Public Input No. 825-NFPA 70-2017 [Section No. 344.28]

First Revision No. 7996-NFPA 70-2018 [Section No. 344.130]

~~**344.130** Standard Lengths.~~

~~The standard length of RMC shall be 3.05 m (10 ft), including an attached coupling, and each end shall be threaded. Longer or shorter lengths with or without coupling and threaded or unthreaded shall be permitted.~~

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jan 11 16:04:08 EST 2018

Committee Statement and Meeting Notes

Committee Statement: The National Electric Code is not a design manual or product standard. Standard length information for rigid metal conduit is not necessary and can be deleted.

Response Message:

Public Input No. 2723-NFPA 70-2017 [Section No. 344.130]

First Revision No. 7921-NFPA 70-2018 [Section No. 348.2]

348.2 Definition.

The definition in this section shall apply within this article and throughout the *Code* .

Flexible Metal Conduit (FMC).

A raceway of circular cross section made of helically wound, formed, interlocked metal strip.

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jan 11 10:17:57 EST 2018

Committee Statement and Meeting Notes

Committee Statement: This First Revision adds clarity to the use of the definition within this section and throughout the Code.

Response Message:

Committee Notes:

Date	Submitted By	
Jan 11, 2018	NEC-CMP Panel 08	Number and "Definition" are not new.

Public Input No. 2195-NFPA 70-2017 [Section No. 348.2]

First Revision No. 8003-NFPA 70-2018 [Section No. 348.22]

348.22 Number of Conductors.

The number of conductors shall not exceed that permitted by the percentage fill specified in Table 1, Chapter 9, or as permitted in Table 348.22, or for metric designator 12 (trade size ⅜).

Cables shall be permitted to be installed where such use is not prohibited by the respective cable articles. ~~The~~ For complete systems, the number of cables shall not exceed the allowable percentage fill specified in Table 1, Chapter 9.

Table 348.22 Maximum Number of Insulated Conductors in Metric Designator 12 (Trade Size ⅜) Flexible Metal Conduit (FMC)*

Size (AWG)	Types RFH-2, SF-2		Types TF, XHHW, TW		Types TFN, THHN, THWN		Types FEP, FEBP, PF, PGF	
	Fittings Inside Conduit	Fittings Outside Conduit	Fittings Inside Conduit	Fittings Outside Conduit	Fittings Inside Conduit	Fittings Outside Conduit	Fittings Inside Conduit	Fittings Outside Conduit
18	2	3	3	5	5	8	5	8
16	1	2	3	4	4	6	4	6
14	1	2	2	3	3	4	3	4
12	—	—	1	2	2	3	2	3
10	—	—	1	1	1	1	1	2

*In addition, one insulated, covered, or bare equipment grounding conductor of the same size shall be permitted.

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jan 11 16:47:08 EST 2018

Committee Statement and Meeting Notes

Committee Statement: This First Revision clarifies that Table 1 of Chapter 9 applies to cables utilized with complete systems only.

Response Message:

Committee Notes:

Date	Submitted By	
Jan 14, 2018	NEC-CMP Panel 08	No changes made to table.

Public Input No. 3493-NFPA 70-2017 [Section No. 348.22]

First Revision No. 7923-NFPA 70-2018 [Section No. 350.10]

Detail FR-8004

350.10 Uses Permitted.

LFMC shall be permitted to be used in exposed or concealed locations as follows:

(1) Where conditions of installation, operation, or maintenance require flexibility or protection from machine oils, liquids, vapors, ~~or~~and solids.

(2) In hazardous (classified) locations where specifically permitted by Chapter 5.

(3) For direct burial where listed and marked for the purpose.

(4) Conductors or cables rated at a temperature higher than the listed temperature rating of LFMC conduit shall be permitted to be installed in LFMC, provided the conductors or cables are not operated at a temperature higher than the listed temperature rating of the LFMC per 110.14(C).

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jan 11 10:24:54 EST 2018

Committee Statement and Meeting Notes

Committee Statement: Conductors or cables with higher temperature ratings are permitted to be used in LFMC as long as the conductors or cables are not operated at a higher temperature than the conduit temperature rating. The reference to 110.14(C) clarifies temperature rating associated to the ampacity of the conductor.

Response Message:

Public Input No. 1124-NFPA 70-2017 [Section No. 350.10]

Editorial Comment

Click here

First Revision No. 7926-NFPA 70-2018 [Section No. 350.12]

350.12 Uses Not Permitted.

LFMC shall not be used ~~as follows:~~ where subject to physical damage.

(0) ~~Where subject to physical damage~~

(0) ~~Where any combination of ambient and conductor temperature produces an operating temperature in excess of that for which the material is approved~~

Supplemental Information

File Name	Description	Approved
Panel_8_FR-7926_350.12_leg_changes.docx	For staff use--FINAL	✓

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jan 11 10:30:34 EST 2018

Committee Statement and Meeting Notes

Committee Statement: 350.12(2) is no longer required based on the action taken with new 350.10(4).
Response Message:

Committee Notes:

Date	Submitted By	
Jan 11, 2018	NEC-CMP Panel 08	Does this need to be a sentence? Can you have a list of one?

Public Input No. 1125-NFPA 70-2017 [Section No. 350.12]

First Revision No. 7928-NFPA 70-2018 [Section No. 350.22(A)]

(A) Metric Designators 16 through 103 (Trade Sizes ½ through 4).

The number of conductors shall not exceed that permitted by the percentage fill specified in Table 1, Chapter 9.

Cables shall be permitted to be installed where such use is not prohibited by the respective cable articles. ~~The~~ For complete systems, the number of cables shall not exceed the allowable percentage fill specified in Table 1, Chapter 9.

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jan 11 10:32:05 EST 2018

Committee Statement and Meeting Notes

Committee Statement: This First Revision clarifies that Table 1 of Chapter 9 applies to cables utilized with complete systems only.

Response Message:

Public Input No. 3495-NFPA 70-2017 [Section No. 350.22(A)]

First Revision No. 7934-NFPA 70-2018 [Section No. 352.2]

352.2 Definition.

The definition in this section shall apply within this article and throughout the *Code* .

Rigid Polyvinyl Chloride Conduit (PVC).

A rigid nonmetallic raceway of circular cross section, with integral or associated couplings, connectors, and fittings for the installation of electrical conductors and cables.

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jan 11 10:53:31 EST 2018

Committee Statement and Meeting Notes

Committee Statement: This First Revision adds clarity to the use of the definition within this section and throughout the Code.

Response Message:

Public Input No. 2198-NFPA 70-2017 [Section No. 352.2]

First Revision No. 8008-NFPA 70-2018 [Section No. 352.22]

352.22 Number of Conductors.

The number of conductors shall not exceed that permitted by the percentage fill specified in Table 1, Chapter 9.

Cables shall be permitted to be installed where such use is not prohibited by the respective cable articles. ~~The~~ For complete systems, the number of cables shall not exceed the allowable percentage fill specified in Table 1, Chapter 9.

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jan 11 17:03:04 EST 2018

Committee Statement and Meeting Notes

Committee Statement: This First Revision clarifies that Table 1 of Chapter 9 applies to cables utilized with complete systems only.
Response Message:

Public Input No. 3497-NFPA 70-2017 [Section No. 352.22]

First Revision No. 7904-NFPA 70-2018 [Section No. 353.2]

353.2 Definition.

The definition in this section shall apply within this article and throughout the *Code* .

High Density Polyethylene (HDPE) Conduit.

A nonmetallic raceway of circular cross section, with associated couplings, connectors, and fittings for the installation of electrical conductors.

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jan 11 09:29:37 EST 2018

Committee Statement and Meeting Notes

Committee Statement: This First Revision adds clarity to the use of the definition within this section and throughout the Code.

Response Message:

Public Input No. 2199-NFPA 70-2017 [Section No. 353.2]

First Revision No. 7905-NFPA 70-2018 [Section No. 353.22]

353.22 Number of Conductors.

The number of conductors shall not exceed that permitted by the percentage fill specified in Table 1, Chapter 9.

Cables shall be permitted to be installed where such use is not prohibited by the respective cable articles. ~~The~~ For complete systems, the number of cables shall not exceed the allowable percentage fill specified in Table 1, Chapter 9.

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jan 11 09:33:14 EST 2018

Committee Statement and Meeting Notes

Committee Statement: This First Revision clarifies that Table 1 of Chapter 9 applies to cables utilized with complete systems only.
Response Message:

Public Input No. 3499-NFPA 70-2017 [Section No. 353.22]

First Revision No. 7906-NFPA 70-2018 [Section No. 354.2]

354.2 Definition.

The definition in this section shall apply within this article and throughout the *Code* .

Nonmetallic Underground Conduit with Conductors (NUCC).

A factory assembly of conductors or cables inside a nonmetallic, smooth wall raceway with a circular cross section.

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jan 11 09:35:43 EST 2018

Committee Statement and Meeting Notes

Committee Statement: This First Revision adds clarity to the use of the definition within this section and throughout the Code.

Response Message:

Committee Notes:

Date	Submitted By	
Jan 11, 2018	NEC-CMP Panel 08	Number and "Definition" are not new

Public Input No. 2200-NFPA 70-2017 [Section No. 354.2]

First Revision No. 7908-NFPA 70-2018 [Section No. 355.2]

355.2 Definition.

The definition in this section shall apply within this article and throughout the *Code* .

Reinforced Thermosetting Resin Conduit (RTRC).

A rigid nonmetallic raceway of circular cross section, with integral or associated couplings, connectors, and fittings for the installation of electrical conductors and cables.

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jan 11 09:44:47 EST 2018

Committee Statement and Meeting Notes

Committee Statement: This First Revision adds clarity to the use of the definition within this section and throughout the Code.

Response Message:

Public Input No. 2205-NFPA 70-2017 [Section No. 355.2]

First Revision No. 7951-NFPA 70-2018 [Section No. 355.22]

355.22 Number of Conductors.

The number of conductors shall not exceed that permitted by the percentage fill specified in Table 1, Chapter 9. Cables shall be permitted to be installed where such use is not prohibited by the respective cable articles. ~~The~~ For complete systems, the number of cables shall not exceed the allowable percentage fill specified in Table 1, Chapter 9.

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jan 11 12:16:10 EST 2018

Committee Statement and Meeting Notes

Committee Statement: This First Revision clarifies that Table 1 of Chapter 9 applies to cables utilized with complete systems only.
Response Message:

Public Input No. 3502-NFPA 70-2017 [Section No. 355.22]

First Revision No. 7893-NFPA 70-2018 [Section No. 356.2]

356.2 Definition.

The definition in this section shall apply within this article and throughout the *Code* .

Detail FR-7952

Liquidtight Flexible Nonmetallic Conduit (LFNC).

A raceway of circular cross section of various types as follows:

(1) A smooth seamless inner core and cover bonded together and having one or more reinforcement layers between the core and covers, designated as Type LFNC-A

(2) A smooth inner surface with integral reinforcement within the raceway wall, designated as Type LFNC-B

(3) A corrugated internal and external surface without integral reinforcement within the raceway wall, designated as Type LFNC-C

Informational Note: FNMC is an alternative designation for LFNC.

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jan 11 08:24:41 EST 2018

Committee Statement and Meeting Notes

Committee Statement: This First Revision adds clarity to the use of the definition within this section and throughout the Code.

Response Message:

Committee Notes:

Date	Submitted By	
Jan 11, 2018	NEC-CMP Panel 08	Number and "Definition" not new text.

Public Input No. 2207-NFPA 70-2017 [Section No. 356.2]

First Revision No. 7894-NFPA 70-2018 [Section No. 356.10]

Detail FR-7998

356.10 Uses Permitted.

LFNC shall be permitted to be used in exposed or concealed locations for the following purposes:

Informational Note: Extreme cold can cause some types of nonmetallic conduits to become brittle and therefore more susceptible to damage from physical contact.

(1) Where flexibility is required for installation, operation, or maintenance.

(2) Where protection of the contained conductors is required from vapors, machine oils, liquids, ~~or~~and solids.

(3) For outdoor locations where listed and marked as suitable for the purpose.

(4) For direct burial where listed and marked for the purpose.

(5) Type LFNC shall be permitted to be installed in lengths longer than 1.8 m (6 ft) where secured in accordance with 356.30.

(6) Type LFNC-B as a listed manufactured prewired assembly, metric designator 16 through 27 (trade size ½ through 1) conduit.

(7) For encasement in concrete where listed for direct burial and installed in compliance with 356.42.

(8) Conductors or cables rated at a temperature rating of LFNC conduit shall be permitted to be installed in LFNC, provided the conductors or cables are not operated at a temperature higher than the listed temperature rating of the LFNC.

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jan 11 08:30:38 EST 2018

Committee Statement and Meeting Notes

Committee Statement: This first revision will correctly treat the permitted temperature of LFNC the same as ENT in 362.10(9) and PVC Conduit in 352.10(1) and relocates the temperature limitation on LFNC from 356.12 from uses not permitted to 356.10 for uses permitted consistent with other nonmetallic raceway articles.

Response Message:

Public Input No. 1127-NFPA 70-2017 [Section No. 356.12]

Public Input No. 1126-NFPA 70-2017 [Section No. 356.10]

Editorial Comment

Click here

First Revision No. 7895-NFPA 70-2018 [Section No. 356.22]

356.22 Number of Conductors.

The number of conductors shall not exceed that permitted by the percentage fill specified in Table 1, Chapter 9.

Cables shall be permitted to be installed where such use is not prohibited by the respective cable articles. ~~The~~ For complete systems, the number of cables shall not exceed the allowable percentage fill specified in Table 1, Chapter 9.

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jan 11 08:32:56 EST 2018

Committee Statement and Meeting Notes

Committee Statement: Section 356.22 references Table 1 in Chapter 9 for fill requirements. Note 2 to Table 1 in Chapter 9 only applies to complete systems, so the Table doesn't apply if the run is not considered a complete system.

Response Message:

Public Input No. 3503-NFPA 70-2017 [Section No. 356.22]

Editorial Comment

Click here

First Revision No. 7997-NFPA 70-2018 [Section No. 358.2]

358.2 Definition.

The definition in this section shall apply within this article and throughout the *Code* .

Electrical Metallic Tubing (EMT).

An unthreaded thinwall raceway of circular cross section designed for the physical protection and routing of conductors and cables and for use as an equipment grounding conductor when installed utilizing appropriate fittings.

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jan 11 16:05:49 EST 2018

Committee Statement and Meeting Notes

Committee Statement: This First Revision adds clarity to the use of the definition within this section and throughout the Code.

Response Message:

Public Input No. 2208-NFPA 70-2017 [Section No. 358.2]

First Revision No. 8084-NFPA 70-2018 [New Section after 358.10(D)]

(E) Physical Damage.

Steel and stainless steel EMT shall be permitted to be installed where subject to physical damage.

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Fri Jan 12 14:15:29 EST 2018

Committee Statement and Meeting Notes

Committee Statement: New section 358.10(E) to clarify EMT is permitted to be installed where subject to physical damage.

Response Message:

Public Input No. 2712-NFPA 70-2017 [Section No. 358.10]

First Revision No. 8085-NFPA 70-2018 [Section No. 358.14]

358.14 Dissimilar Metals.

Where practicable, dissimilar metals in contact anywhere in the system shall be avoided to eliminate the possibility of galvanic action.

~~Aluminum~~ Stainless steel and aluminum fittings and enclosures shall be permitted to be used with galvanized steel EMT, and galvanized steel fittings and enclosures shall be permitted to be used with aluminum EMT where not subject to severe corrosive influences.

Stainless steel EMT shall only be used with ~~stainless steel fittings and approved accessories, outlet boxes, and enclosures.~~ the following:

(1) Stainless steel fittings

(2) Stainless steel boxes and enclosures

(3) Steel (galvanized, painted, powder or PVC coated, and so forth) boxes and enclosures when not subject to severe corrosive influences

(4) Stainless steel, nonmetallic, or approved accessories

Supplemental Information

File Name	Description	Approved
Panel_8_FR-8085_358.14_leg_changes.docx	For staff use	✓

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Fri Jan 12 14:20:03 EST 2018

Committee Statement and Meeting Notes

Committee Statement: Stainless steel fittings are permitted to be used with galvanized steel EMT. The change provides additional clarity on what fittings are acceptable for use with stainless steel EMT.

Response Message:

Public Input No. 2716-NFPA 70-2017 [Section No. 358.14]

Editorial Comment

Click here

First Revision No. 8086-NFPA 70-2018 [Section No. 358.22]

358.22 Number of Conductors.

~~The~~ For complete systems, the number of conductors shall not exceed that permitted by the percentage fill specified in Table 1, Chapter 9.

Cables shall be permitted to be installed where such use is not prohibited by the respective cable articles. The number of cables shall not exceed the allowable percentage fill specified in Table 1, Chapter 9.

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Fri Jan 12 14:22:29 EST 2018

Committee Statement and Meeting Notes

Committee Statement: This First Revision clarifies that Table 1 of Chapter 9 applies to cables utilized with complete systems only.
Response Message:

Public Input No. 3506-NFPA 70-2017 [Section No. 358.22]

First Revision No. 7910-NFPA 70-2018 [Section No. 360.2]

360.2 Definition.

The definition in this section shall apply within this article and throughout the *Code* .

Flexible Metallic Tubing (FMT).

A metal raceway that is circular in cross section, flexible, and liquidtight without a nonmetallic jacket.

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jan 11 09:47:40 EST 2018

Committee Statement and Meeting Notes

Committee Statement: This First Revision adds clarity to the use of the definition within this section and throughout the Code.

Response Message:

Public Input No. 2209-NFPA 70-2017 [Section No. 360.2]

First Revision No. 7912-NFPA 70-2018 [Section No. 360.22(A)]

(A) FMT — Metric Designators 16 and 21 (Trade Sizes ½ and ¾).

The number of conductors in metric designators 16 (trade size ½) and 21 (trade size ¾) shall not exceed that permitted by the percentage fill specified in Table 1, Chapter 9.

Cables shall be permitted to be installed where such use is not prohibited by the respective cable articles. ~~The~~ For complete systems, the number of cables shall not exceed the allowable percentage fill specified in Table 1, Chapter 9.

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jan 11 09:48:47 EST 2018

Committee Statement and Meeting Notes

Committee Statement: This First Revision clarifies that Table 1 of Chapter 9 applies to cables utilized with complete systems only.
Response Message:

Public Input No. 3507-NFPA 70-2017 [Section No. 360.22(A)]

First Revision No. 7914-NFPA 70-2018 [Section No. 362.2]

362.2 Definition.

The definition in this section shall apply within this article and throughout the *Code*.

Electrical Nonmetallic Tubing (ENT).

A nonmetallic, pliable, corrugated raceway of circular cross section with integral or associated couplings, connectors, and fittings for the installation of electrical conductors. ENT is composed of a material that is resistant to moisture and chemical atmospheres and is flame retardant.

A pliable raceway is a raceway that can be bent by hand with a reasonable force but without other assistance.

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jan 11 09:50:49 EST 2018

Committee Statement and Meeting Notes

Committee Statement: This First Revision adds clarity to the use of the definition within this section and throughout the Code.

Response Message:

Public Input No. 2210-NFPA 70-2017 [Section No. 362.2]

First Revision No. 8001-NFPA 70-2018 [Section No. 362.10]

362.10 Uses Permitted.

For the purpose of this article, the first floor of a building shall be that floor that has 50 percent or more of the exterior wall surface area level with or above finished grade. One additional level that is the first level and not designed for human habitation and used only for vehicle parking, storage, or similar use shall be permitted. The use of ENT and fittings shall be permitted in the following:

(1) In any building not exceeding three floors above grade as follows:

a. For exposed work, where not prohibited by 362.12

b. Concealed within walls, floors, and ceilings

(2) In any building exceeding three floors above grade, ENT shall be concealed within walls, floors, and ceilings where the walls, floors, and ceilings provide a thermal barrier of material that has at least a 15-minute finish rating as identified in listings of fire-rated assemblies. The 15-minute-finish-rated thermal barrier shall be permitted to be used for combustible or noncombustible walls, floors, and ceilings.

Exception to (2): Where a fire sprinkler system(s) is installed in accordance with NFPA 13-~~2013~~ 2016 , Standard for the Installation of Sprinkler Systems, on all floors, ENT shall be permitted to be used within walls, floors, and ceilings, exposed or concealed, in buildings exceeding three floors abovegrade.

Informational Note: A finish rating is established for assemblies containing combustible (wood) supports. The finish rating is defined as the time at which the wood stud or wood joist reaches an average temperature rise of 121°C (250°F) or an individual temperature of 163°C (325°F) as measured on the plane of the wood nearest the fire. A finish rating is not intended to represent a rating for a membrane ceiling.

(3) In locations subject to severe corrosive influences as covered in 300.6 and where subject to chemicals for which the materials are specifically approved.

(4) In concealed, dry, and damp locations not prohibited by 362.12.

(5) Above suspended ceilings where the suspended ceilings provide a thermal barrier of material that has at least a 15-minute finish rating as identified in listings of fire-rated assemblies, except as permitted in 362.10(1)a.

Exception to (5): ENT shall be permitted to be used above suspended ceilings in buildings exceeding three floors above grade where the building is protected throughout by a fire sprinkler system installed in accordance with NFPA 13-~~2013~~ 2016 , Standard for the Installation of Sprinkler Systems.

(6) Encased in poured concrete, or embedded in a concrete slab on grade where ENT is placed on sand or approved screenings, provided fittings identified for this purpose are used for connections.

(7) For wet locations indoors as permitted in this section or in a concrete slab on or belowgrade, with fittings listed for the purpose.

(8) Metric designator 16 through 27 (trade size ½ through 1) as listed manufactured prewired assembly.

~~Informational Note: Extreme cold may cause some types of nonmetallic conduits to become brittle and therefore more susceptible to damage from physical contact.~~

(9) Conductors or cables rated at a temperature higher than the listed temperature rating of ENT shall be permitted to be installed in ENT, if the conductors or cables are not operated at a temperature higher than the listed temperature rating of the ENT.

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:

City:

State:

Zip:

Submittal Date: Thu Jan 11 16:39:55 EST 2018

Committee Statement and Meeting Notes

Committee Statement: Moved Informational Note from 362.10(8) to 362.12(8) for better usability of the term "extreme cold".

Response Message:

Committee Notes:

Date	Submitted By	
Jan 11, 2018	NEC-CMP Panel 08	ONLY CHANGE: Delete Informational Note following 362.10(8) This note is moving to follow 362.12(8)

Public Input No. 3512-NFPA 70-2017 [Section No. 362.10]

Public Input No. 3514-NFPA 70-2017 [New Section after 362.12]

Editorial Comment

Click here

First Revision No. 7915-NFPA 70-2018 [Section No. 362.22]

362.22 Number of Conductors.

The number of conductors shall not exceed that permitted by the percentage fill in Table 1, Chapter 9.

Cables shall be permitted to be installed where such use is not prohibited by the respective cable articles. ~~The~~ For complete systems, the number of cables shall not exceed the allowable percentage fill specified in Table 1, Chapter 9.

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jan 11 09:56:29 EST 2018

Committee Statement and Meeting Notes

Committee Statement: This First Revision clarifies that Table 1 of Chapter 9 applies to cables utilized with complete systems only.
Response Message:

Public Input No. 3508-NFPA 70-2017 [Section No. 362.22]

First Revision No. 8087-NFPA 70-2018 [Section No. 366.2]

366.2 Definitions.

The definitions in this section shall apply within this article and throughout the *Code* .

Metal Auxiliary Gutter.

A sheet metal enclosure used to supplement wiring spaces at meter centers, distribution centers, switchgear, switchboards, and similar points of wiring systems. The enclosure has hinged or removable covers for housing and protecting electrical wires, cable, and busbars. The enclosure is designed for conductors to be laid or set in place after the enclosures have been installed as a complete system.

Nonmetallic Auxiliary Gutter.

A flame-retardant, nonmetallic enclosure used to supplement wiring spaces at meter centers, distribution centers, switchgear, switchboards, and similar points of wiring systems. The enclosure has hinged or removable covers for housing and protecting electrical wires, cable, and busbars. The enclosure is designed for conductors to be laid or set in place after the enclosures have been installed as a complete system.

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Fri Jan 12 14:27:34 EST 2018

Committee Statement and Meeting Notes

Committee Statement: This First Revision adds clarity to the use of the definition within this section and throughout the Code.
Response Message:

Public Input No. 2211-NFPA 70-2017 [Section No. 366.2]

First Revision No. 8088-NFPA 70-2018 [Section No. 366.22]

366.22 Number of Conductors.

(A) Sheet Metal Auxiliary Gutters.

The sum of the cross-sectional areas of all contained conductors and cables at any cross section of a sheet metal auxiliary gutter shall not exceed 20 percent of the interior cross-sectional area of the sheet metal auxiliary gutter. ~~The adjustment factors in 310.15(C) (a) shall be applied only where the number of current-carrying conductors, including neutral conductors classified as current-carrying under the provisions of 310.15(E) , exceeds 30. Conductors for signaling circuits or controller conductors between a motor and its starter and used only for starting duty shall not be considered as current-carrying conductors.~~

(B) Nonmetallic Auxiliary Gutters.

The sum of cross-sectional areas of all contained conductors and cables at any cross section of the nonmetallic auxiliary gutter shall not exceed 20 percent of the interior cross-sectional area of the nonmetallic auxiliary gutter.

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Fri Jan 12 14:45:19 EST 2018

Committee Statement and Meeting Notes

Committee Statement: 366.22 relates to the number of conductors in sheet metal auxiliary gutters and 366.23 relates to the ampacity of conductors in sheet metal auxiliary gutters. The adjustment factor requirement is not within the scope of 366.22(A). This revision eliminates duplicate requirements by deleting the adjustment factor requirement in 366.22(A) and moving it to 366.23(A) without the phrase “the provisions of”, which is unnecessary and does not increase usability. This revision also clarifies that the adjustment factor requirement in 366.23(A) shall only be applied where the number of current carrying conductors exceeds 30 at any cross section of the sheet metal auxiliary gutter. The adjustment factors specified in 310.15(B)(3)(a) apply to conductors in nonmetallic auxiliary gutters and are applicable to the current carrying conductors up to and including the 20 percent fill specified in 366.22(B), which is consistent with the requirement in section 378.22.

Response Message:

Public Input No. 1047-NFPA 70-2017 [Section No. 366.22(A)]

Public Input No. 2977-NFPA 70-2017 [Sections 366.22, 366.23]

First Revision No. 8090-NFPA 70-2018 [Section No. 366.23]

366.23 Ampacity of Conductors.

(A) Sheet Metal Auxiliary Gutters.

~~Where~~ The adjustment factors in 310.15(B)(3)(a) shall be applied only where the number of current-carrying conductors ~~contained in the sheet metal auxiliary gutter is 30 or less, the adjustment factors specified in 310.15(C) (a) shall not apply.~~ , including neutral conductors classified as current-carrying under 310.15(B)(5), exceeds 30 at any cross section of the sheet metal auxiliary gutter. Conductors for signaling circuits or controller conductors between a motor and its starter and used only for starting duty shall not be considered as current-carrying conductors. The current carried continuously in bare copper bars in sheet metal auxiliary gutters shall not exceed 1.55 amperes/mm^2 (1000 amperes/$in.^2$) of cross section of the conductor. For aluminum bars, the current carried continuously shall not exceed 1.09 amperes/mm^2 (700 amperes/$in.^2$) of cross section of the conductor.

(B) Nonmetallic Auxiliary Gutters.

The adjustment factors specified in 310.15(C)(a) shall be applicable to the current-carrying conductors ~~in the nonmetallic auxiliary gutter.~~ up to and including the 20 percent fill specified in 366.22(B).

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Fri Jan 12 14:49:15 EST 2018

Committee Statement and Meeting Notes

Committee Statement: 366.22 relates to the number of conductors in sheet metal auxiliary gutters and 366.23 relates to the ampacity of conductors in sheet metal auxiliary gutters. The adjustment factor requirement is not within the scope of 366.22(A). This revision eliminates duplicate requirements by deleting the adjustment factor requirement in 366.22(A) and moving it to 366.23(A) without the phrase “the provisions of”, which is unnecessary and does not increase usability. This revision also clarifies that the adjustment factor requirement in 366.23(A) shall only be applied where the number of current carrying conductors exceeds 30 at any cross section of the sheet metal auxiliary gutter. The adjustment factors specified in 310.15(B)(3)(a) apply to conductors in nonmetallic auxiliary gutters and are applicable to the current carrying conductors up to and including the 20 percent fill specified in 366.22(B), which is consistent with the requirement in section 378.22.

Response Message:

Public Input No. 496-NFPA 70-2017 [Section No. 366.23(B)]

First Revision No. 8044-NFPA 70-2018 [Section No. 368.2]

368.2 Definition.

The definition in this section shall apply within this article and throughout the *Code* .

Busway.

A raceway consisting of a metal enclosure containing factory-mounted, bare or insulated conductors, which are usually copper or aluminum bars, rods, or tubes.

Informational Note: For cablebus, refer to Article 370.

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Fri Jan 12 08:05:30 EST 2018

Committee Statement and Meeting Notes

Committee Statement: This First Revision adds clarity to the use of the definition within this section and throughout the Code.

Response Message:

Public Input No. 2212-NFPA 70-2017 [Section No. 368.2]

First Revision No. 8055-NFPA 70-2018 [Section No. 368.17(A)]

(A) Rating of Overcurrent Protection — Feeders.

A busway shall be protected against overcurrent in accordance with the ~~allowable~~ current rating of the busway.

Exception No. 1: The applicable provisions of 240.4 shall be permitted.

Exception No. 2: Where used as transformer secondary ties, ~~the provisions of~~ 450.6(A)(3) shall be permitted.

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Fri Jan 12 08:48:07 EST 2018

Committee Statement and Meeting Notes

Committee Statement: The phrase "the provisions of" and "allowable" are unnecessary and were deleted to increase clarity.

Response Message:

First Revision No. 8052-NFPA 70-2018 [Section No. 368.56]

368.56 Branches from Busways.

Branches from busways shall be permitted to be made in accordance with 368.56(A), (B), and (C).

(A) General.

Branches from busways shall be permitted to use any of the following wiring methods:

(1) Type AC armored cable

(2) Type MC metal-clad cable

(3) Type MI mineral-insulated, metal-sheathed cable

(4) Type IMC intermediate metal conduit

(5) Type RMC rigid metal conduit

(6) Type FMC flexible metal conduit

(7) Type LFMC liquidtight flexible metal conduit

(8) Type PVC rigid polyvinyl chloride conduit

(9) Type RTRC reinforced thermosetting resin conduit

(10) Type LFNC liquidtight flexible nonmetallic conduit

(11) Type EMT electrical metallic tubing

(12) Type ENT electrical nonmetallic tubing

(13) Busways

(14) Strut-type channel raceway

(15) Surface metal raceway

(16) Surface nonmetallic raceway

Where a separate equipment grounding conductor is used, connection of the equipment grounding conductor to the busway shall comply with 250.8 and 250.12.

(B) Cord and Cable Assemblies.

Suitable cord and cable assemblies ~~approved~~ identified for extra-hard usage or hard usage and listed bus drop cable shall be permitted as branches from busways for the connection of portable equipment or the connection of stationary equipment to facilitate their interchange in accordance with 400.10 and 400.12 and the following conditions:

(1) The cord or cable shall be attached to the building by an approved means.

(2) The length of the cord or cable from a busway plug-in device to a suitable tension take-up support device shall not exceed 1.8 m (6 ft).

(3) The cord and cable shall be installed as a vertical riser from the tension take-up support device to the equipment served.

(4) Strain relief cable grips shall be provided for the cord or cable at the busway plug-in device and equipment terminations.

Exception to (B)(2): In industrial establishments only, where the conditions of maintenance and supervision ensure that only qualified persons service the installation, lengths exceeding 1.8 m (6 ft) shall be permitted between the busway plug-in device and the tension take-up support device where the cord or cable is supported at intervals not exceeding 2.5 m (8 ft).

(C) Branches from Trolley-Type Busways.

Suitable cord and cable assemblies ~~approved~~ identified for extra-hard usage or hard usage and listed bus drop cable shall be permitted as branches from trolley-type busways for the connection of movable equipment in accordance with 400.10 and 400.12.

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Fri Jan 12 08:41:38 EST 2018

Committee Statement and Meeting Notes

Committee Statement: CMP 8 replaces the word “approved” with “identified” to improve clarity. Cord and cable assemblies are marked with a type that designates them as suitable for hard usage, extra-hard usage or bus drop cable.

Response Message:

Public Input No. 569-NFPA 70-2017 [Section No. 368.56(C)]

Public Input No. 568-NFPA 70-2017 [Section No. 368.56(B)]

First Revision No. 8054-NFPA 70-2018 [Section No. 368.258]

368.258 Neutral Conductor.

Neutral bus, where required, shall be sized to carry all neutral load current, including harmonic currents, and shall have adequate momentary and short-circuit current rating consistent with system requirements.

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Fri Jan 12 08:45:54 EST 2018

Committee Statement and Meeting Notes

Committee Statement: The phrase “short-circuit rating” is changed to “short-circuit current rating” for clarity and consistency with the ratings marked on electrical equipment.

Response Message:

Public Input No. 1254-NFPA 70-2017 [Section No. 368.258]

First Revision No. 8058-NFPA 70-2018 [Section No. 368.320]

368.320 Marking.

Each busway run shall be provided with a permanent nameplate on which the following information shall be provided:

(1) Rated voltage.

(2) Rated continuous current; if bus is forced-cooled, both the normal forced-cooled rating and the self-cooled (not forced-cooled) rating for the same temperature rise shall be given.

(3) Rated frequency.

(4) Rated impulse withstand voltage.

(5) Rated 60-Hz withstand voltage (dry).

(6) Rated momentary current.

(7) Manufacturer's name or trademark.

Informational Note: See ~~ANSI C37.23-1987 (R1991)~~ IEEE C37.23-2015 , ~~*Guide*~~ *IEEE Standard for Metal-Enclosed Bus ~~and Calculating Losses in Isolated-Phase Bus~~* , for construction and testing requirements for metal-enclosed ~~buses~~ bus assemblies .

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Fri Jan 12 08:56:40 EST 2018

Committee Statement and Meeting Notes

Committee Statement: The informational note has been updated to IEEE C37.23-2015 which has superseded by the previously referenced ANSI C37.23 standard.

Response Message:

Public Input No. 826-NFPA 70-2017 [Section No. 368.320]

First Revision No. 8056-NFPA 70-2018 [Section No. 370.2]

370.2 Definition.

The definition in this section shall apply within this article and throughout the *Code* .

Cablebus.

An assembly of units or sections with insulated conductors having associated fittings forming a structural system used to securely fasten or support conductors and conductor terminations in a completely enclosed, ventilated, protective metal housing. This assembly is designed to carry fault current and to withstand the magnetic forces of such current.

Informational Note: Cablebus is ordinarily assembled at the point of installation from the components furnished or specified by the manufacturer in accordance with instructions for the specific job.

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Fri Jan 12 08:53:18 EST 2018

Committee Statement and Meeting Notes

Committee Statement: This First Revision adds clarity to the use of the definition within this section and throughout the Code.
Response Message:

Public Input No. 2213-NFPA 70-2017 [Section No. 370.2]

First Revision No. 8064-NFPA 70-2018 [Section No. 370.23]

370.23 Overcurrent Protection.

Cablebus shall be protected against overcurrent in accordance with the ~~allowable~~ ampacity of the cablebus conductors in accordance with 240.4.

Exception: Overcurrent protection shall be permitted in accordance with 240.100 and 240.101.

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Fri Jan 12 09:40:31 EST 2018

Committee Statement and Meeting Notes

Committee Statement: The word “allowable” is not necessary and has been removed for clarity.
Response Message:

Public Input No. 934-NFPA 70-2017 [Section No. 370.23]

First Revision No. 8063-NFPA 70-2018 [Section No. 370.80]

370.80 Ampacity of Conductors.

The ampacity of conductors in cablebus shall be in accordance with Table 310.17 and Table 310.19 for installations up to and including 2000 volts, or with Table 310.60(C)(69) and Table 310.60(C)(70) for installations 2001 volts to 35,000 volts.

Informational Note No. 1: See 110.14(C) for conductor temperature limitations due to termination provisions for installations up to and including 2000 volts.

Informational Note No. 2: See 110.40 for conductor temperature limitations due to termination provisions for installations 2001 volts to 35,000 volts.

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Fri Jan 12 09:34:17 EST 2018

Committee Statement and Meeting Notes

Committee Statement: Users of Article 370.80 may not be aware that the requirements in Sections 110.14(C) and 110.40 apply when the conductors terminate on equipment with a termination temperature limitation. Correct application of the termination temperature rating is a critical safety consideration for electrical systems.

The Informational Notes were accepted by CMP 8 for inclusion in Sections 370.80 and 392.80 for the 2017 NEC but were removed from Section 370.80 due to an unrelated appeal.

Response Message:

Public Input No. 2424-NFPA 70-2017 [New Section after 370.80]

Editorial Comment

Click here

First Revision No. 8072-NFPA 70-2018 [Section No. 372.2]

372.2 Definitions.

The definitions in this section shall apply only within this article.

Cell.

A single, enclosed tubular space in a floor made of precast cellular concrete slabs, the direction of the cell being parallel to the direction of the floor member.

Header.

Transverse metal raceways for electrical conductors, providing access to predetermined cells of a precast cellular concrete floor, thereby permitting the installation of electrical conductors from a distribution center to the floor cells.

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Fri Jan 12 10:24:21 EST 2018

Committee Statement and Meeting Notes

Committee Statement: This First Revision adds clarity and usability to the application of definitions within this section. This also achieves compliance with NEC Style Manual.

Response Message:

Public Input No. 1210-NFPA 70-2017 [Section No. 372.2]

First Revision No. 8073-NFPA 70-2018 [Section No. 372.18(D)]

(D) Inserts.

Inserts shall be leveled and sealed against the entrance of concrete. Inserts shall be of metal and shall be fitted with grounded-type receptacles. ~~A~~ An equipment grounding conductor or bonding jumper shall connect the insert receptacles to a positive ground connection provided on the header. Where cutting through the cell wall for setting inserts or other purposes (such as providing access openings between header and cells), chips and other dirt shall not be allowed to remain in the raceway, and the tool used shall be designed so as to prevent the tool from entering the cell and damaging the conductors.

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Fri Jan 12 10:25:57 EST 2018

Committee Statement and Meeting Notes

Committee Statement: Both equipment grounding conductor and bonding jumper are defined within Article 100 and incorporated into 372.18(D).

Response Message:

Public Input No. 3334-NFPA 70-2017 [Section No. 372.18(D)]

Public Input No. 2377-NFPA 70-2017 [Section No. 372.18(D)]

First Revision No. 8092-NFPA 70-2018 [New Section after 374.2]

374.6 Listing Requirements.

Cellular metal floor raceways shall be listed.

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Fri Jan 12 15:02:32 EST 2018

Committee Statement and Meeting Notes

Committee Statement: The ANSI Standard Cellular Metal Floor Raceways and Fittings, UL 209, provides the accepted construction, performance, and marking requirements for this equipment.
Response Message:

Editorial Comment

Click here

First Revision No. 8074-NFPA 70-2018 [Section No. 374.2]

374.2 Definitions.

The definitions in this section shall apply within this article and throughout the *Code* .

Cellular Metal Floor Raceway.

The hollow spaces of cellular metal floors, together with suitable fittings, that may be approved as enclosed channel for electrical conductors.

Cell.

A single enclosed tubular space in a cellular metal floor member, the axis of the cell being parallel to the axis of the metal floor member.

Header.

A transverse raceway for electrical conductors, providing access to predetermined cells of a cellular metal floor, thereby permitting the installation of electrical conductors from a distribution center to the cells.

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Fri Jan 12 10:27:23 EST 2018

Committee Statement and Meeting Notes

Committee Statement: This First Revision adds clarity to the use of the definition within this section and throughout the Code.

Public Input No. 2214-NFPA 70-2017 [Section No. 374.2]

First Revision No. 8078-NFPA 70-2018 [Section No. 376.2]

376.2 Definition.

The definition in this section shall apply within this article and throughout the *Code* .

Metal Wireways.

Sheet metal troughs with hinged or removable covers for housing and protecting electrical wires and cable and in which conductors are laid in place after the raceway has been installed as a complete system.

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Fri Jan 12 10:53:01 EST 2018

Committee Statement and Meeting Notes

Committee Statement: This First Revision adds clarity to the use of the definition within this section and throughout the Code.

Response Message:

Public Input No. 2215-NFPA 70-2017 [Section No. 376.2]

First Revision No. 8083-NFPA 70-2018 [Section No. 376.22(B)]

(B) Adjustment Factors.

The adjustment factors in 310.15(C)(a) shall be applied only where the number of current-carrying conductors, including neutral conductors classified as current-carrying under ~~the provisions of~~ 310.15(E), exceeds 30 at any cross section of the wireway. Conductors for signaling circuits or controller conductors between a motor and its starter and used only for starting duty shall not be considered as current-carrying conductors.

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Fri Jan 12 11:23:38 EST 2018

Committee Statement and Meeting Notes

Committee Statement: The phrase “the provisions of” is unnecessary and is being deleted to increase usability.
Response Message:

First Revision No. 7897-NFPA 70-2018 [Section No. 378.2]

378.2 Definition.

The definition in this section shall apply within this article and throughout the *Code* .

Nonmetallic Wireways.

Flame-retardant, nonmetallic troughs with removable covers for housing and protecting electrical wires and cables in which conductors are laid in place after the raceway has been installed as a complete system.

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jan 11 08:49:20 EST 2018

Committee Statement and Meeting Notes

Committee Statement: This First Revision adds clarity to the use of the definition within this section and throughout the Code.

Response Message:

Public Input No. 2216-NFPA 70-2017 [Section No. 378.2]

First Revision No. 7903-NFPA 70-2018 [Section No. 380.12]

380.12 Uses Not Permitted.

A multioutlet assembly shall not be installed as follows:

(1) Where concealed, except that it shall be permissible to surround the back and sides of a metal multioutlet assembly by the building finish or recess a nonmetallic multioutlet assembly in a baseboard

(2) Where subject to severe physical damage

(3) Where the voltage is 300 volts or more between conductors unless the assembly is of metal having a thickness of not less than 1.02 mm (0.040 in.)

(4) Where subject to corrosive vapors

(5) In hoistways

(6) In any hazardous (classified) location, except as permitted by other articles in this *Code*

(7) Where cord and plug connected

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jan 11 09:09:48 EST 2018

Committee Statement and Meeting Notes

Committee Statement: Multioutlet assemblies are intended only for permanent connection. This is consistent with the UL Product Category Guide Information for Multioutlet Assemblies (PVGT), which states:

"Multioutlet assemblies are intended to be connected to permanently installed branch circuits operating at frequencies between 50 and 400 Hz and dc (direct current) circuits."

As a listing is not currently available for cord and plug connection, "unless listed for the intended use" has not been added.

Response Message:

Public Input No. 3257-NFPA 70-2017 [Section No. 380.12]

First Revision No. 8065-NFPA 70-2018 [Section No. 384.2]

384.2 Definition.

The definition in this section shall apply within this article and throughout the *Code* .

Strut-Type Channel Raceway.

A metal raceway that is intended to be mounted to the surface of or suspended from a structure, with associated accessories for the installation of electrical conductors and cables.

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Fri Jan 12 09:46:52 EST 2018

Committee Statement and Meeting Notes

Committee Statement: This First Revision adds clarity to the use of the definition within this section and throughout the Code.

Response Message:

Public Input No. 2218-NFPA 70-2017 [Section No. 384.2]

First Revision No. 8067-NFPA 70-2018 [Section No. 386.2]

386.2 Definition.

The definition in this section shall apply within this article and throughout the *Code* .

Surface Metal Raceway.

A metal raceway that is intended to be mounted to the surface of a structure, with associated couplings, connectors, boxes, and fittings for the installation of electrical conductors.

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Fri Jan 12 09:50:16 EST 2018

Committee Statement and Meeting Notes

Committee Statement: This First Revision adds clarity to the use of the definition within this section and throughout the Code.

Response Message:

Public Input No. 2220-NFPA 70-2017 [Section No. 386.2]

First Revision No. 8068-NFPA 70-2018 [Section No. 388.2]

388.2 Definition.

The definition in this section shall apply within this article and throughout the *Code* .

Surface Nonmetallic Raceway.

A nonmetallic raceway that is intended to be mounted to the surface of a structure, with associated couplings, connectors, boxes, and fittings for the installation of electrical conductors.

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Fri Jan 12 09:53:18 EST 2018

Committee Statement and Meeting Notes

Committee Statement: This First Revision adds clarity to the use of the definition within this section and throughout the Code.

Response Message:

Public Input No. 2221-NFPA 70-2017 [Section No. 388.2]

First Revision No. 8094-NFPA 70-2018 [Article 390]

Article 390 Underfloor Raceways

Part I. General

390.1 Scope.

This article covers the use and installation requirements for underfloor raceways.

390.2 Definition.

The definition in this section shall apply within this article and throughout the *Code* .

Underfloor Raceway.

A raceway and associated components designed and intended for installation beneath or flush with the surface of a floor for the installation of cables and electrical conductors.

Part II. Installation

~~**390.3** Use.~~

390.10 Uses Permitted.

The installation of underfloor raceways shall be permitted beneath the surface of concrete or other flooring material or in office occupancies where laid flush with the concrete floor and covered with linoleum or equivalent floor covering.

390.12 Uses Not Permitted.

Underfloor raceways shall not be installed (1) where subject to corrosive vapors or (2) in any hazardous (classified) locations, except as permitted by 504.20 and in Class I, Division 2 locations as permitted in 501.10(B)(3). Unless made of a material approved for the condition or unless corrosion protection approved for the condition is provided, metal underfloor raceways, junction boxes, and fittings shall not be installed in concrete or in areas subject to severe corrosive influences.

390.15 Covering.

Raceway coverings shall comply with 390.15(A) through (D).

(A) Raceways Not over 100 mm (4 in.) Wide.

Half-round and flat-top raceways not over 100 mm (4 in.) in width shall have not less than 20 mm (¾ in.) of concrete or wood above the raceway.

Exception: As permitted in 390.15(C) and (D) for flat-top raceways.

(B) Raceways over 100 mm (4 in.) Wide But Not over 200 mm (8 in.) Wide.

Flat-top raceways over 100 mm (4 in.) but not over 200 mm (8 in.) wide with a minimum of 25 mm (1 in.) spacing between raceways shall be covered with concrete to a depth of not less than 25 mm (1 in.). Raceways spaced less than 25 mm (1 in.) apart shall be covered with concrete to a depth of 38 mm (1½ in.).

(C) Trench-Type Raceways Flush with Concrete.

Trench-type flush raceways with removable covers shall be permitted to be laid flush with the floor surface. Such approved raceways shall be designed so that the cover plates provide adequate mechanical protection and rigidity equivalent to junction box covers.

(D) Other Raceways Flush with Concrete.

In office occupancies, approved metal flat-top raceways, if not over 100 mm (4 in.) in width, shall be permitted to be laid flush with the concrete floor surface, provided they are covered with substantial linoleum that is not less than 1.6 mm (1/16 in.) thick or with equivalent floor covering. Where more than one and not more than three single raceways are each installed flush with the concrete, they shall be contiguous with each other and joined to form a rigid assembly.

390.20 Size of Conductors.

No conductor larger than that for which the raceway is designed shall be installed in underfloor raceways.

390.22 Maximum Number of Conductors in Raceway.

The combined cross-sectional area of all conductors or cables shall not exceed 40 percent of the interior cross-sectional area of the raceway.

390.23 Ampacity of Conductors.

The ampacity adjustment factors~~,~~ in ~~310.15(C)~~ , 310.15(B)(3) shall apply to conductors installed in underfloor raceways.

390.56 Splices and Taps.

Splices and taps shall be made only in junction boxes.

For the purposes of this section, so-called loop wiring (continuous, unbroken conductor connecting the individual outlets) shall not be considered to be a splice or tap.

Exception: Splices and taps shall be permitted in trench-type flush raceway having a removable cover that is accessible after installation. The conductors, including splices and taps, shall not fill more than 75 percent of the raceway area at that point.

390.57 Discontinued Outlets.

When an outlet is abandoned, discontinued, or removed, the sections of circuit conductors supplying the outlet shall be removed from the raceway. No splices or reinsulated conductors, such as would be the case with abandoned outlets on loop wiring, shall be allowed in raceways.

390.70 Laid in Straight Lines.

Underfloor raceways shall be laid so that a straight line from the center of one junction box to the center of the next junction box coincides with the centerline of the raceway system. Raceways shall be firmly held in place to prevent disturbing this alignment during construction.

390.71 Markers at Ends.

A suitable marker shall be installed at or near each end of each straight run of raceways to locate the last insert.

390.73 Dead Ends.

Dead ends of raceways shall be closed.

390.74 Junction Boxes.

Junction boxes shall be leveled to the floor grade and sealed to prevent the free entrance of water or concrete. Junction boxes used with metal raceways shall be metal and shall be electrically continuous with the raceways.

390.75 Inserts.

Inserts shall be leveled and sealed to prevent the entrance of concrete. Inserts used with metal raceways shall be metal and shall be electrically continuous with the raceway. Inserts set in or on fiber raceways before the floor is laid shall be mechanically secured to the raceway. Inserts set in fiber raceways after the floor is laid shall be screwed into the raceway. When cutting through the raceway wall and setting inserts, chips and other dirt shall not be allowed to remain in the raceway, and tools shall be used that are designed so as to prevent the tool from entering the raceway and damaging conductors that may be in place.

390.76 Connections to Cabinets and Wall Outlets.

Connections from underfloor raceways to distribution centers and wall outlets shall be made by approved fittings or by any of the wiring methods in Chapter 3, where installed in accordance with the ~~provisions of the~~ respective articles.

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:

Zip:

Submittal Date: Fri Jan 12 15:11:33 EST 2018

Committee Statement and Meeting Notes

Committee Statement: In accordance with the NEC Style manual, article 390 is being renumbered to provide parallel numbering with the similar articles contained in Chapter 3 of the Code.

This First Revision added clarity to the use of the definition within this section and throughout the Code.

The phrase “the provisions of” is unnecessary and is being deleted to increase usability.

Response Message:

Public Input No. 953-NFPA 70-2017 [Section No. 390.3]

Public Input No. 2222-NFPA 70-2017 [Section No. 390.2]

Public Input No. 964-NFPA 70-2017 [Section No. 390.14]

Public Input No. 965-NFPA 70-2017 [Section No. 390.15]

Public Input No. 960-NFPA 70-2017 [Section No. 390.9]

Public Input No. 966-NFPA 70-2017 [Section No. 390.17]

Public Input No. 954-NFPA 70-2017 [Section No. 390.4]

Public Input No. 957-NFPA 70-2017 [Section No. 390.6]

Public Input No. 958-NFPA 70-2017 [Section No. 390.7]

Public Input No. 955-NFPA 70-2017 [Section No. 390.5]

Public Input No. 961-NFPA 70-2017 [Section No. 390.10]

Public Input No. 963-NFPA 70-2017 [Section No. 390.13]

Public Input No. 959-NFPA 70-2017 [Section No. 390.8]

Public Input No. 962-NFPA 70-2017 [Section No. 390.11]

Public Input No. 952-NFPA 70-2017 [Section No. 390.1]

Editorial Comment

Click here

First Revision No. 7936-NFPA 70-2018 [Section No. 392.1]

392.1 Scope.

This article covers cable tray systems, including ladder, ventilated trough, ventilated channel, solid bottom, and other similar structures.

Informational Note: For further information on cable trays, see ANSI/NEMA–VE 1~~-2009~~ , *Metal Cable Tray Systems*; NECA/NEMA 105~~-2015~~ , *Standard for Installing Metal Cable Tray Systems*; and NEMA–FG 1~~-1993~~ , *Nonmetallic Cable Tray Systems*.

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jan 11 11:00:20 EST 2018

Committee Statement and Meeting Notes

Committee Statement: The edition years were removed from each standard listed so that the most current edition of the standard would be recognized in the information note.

CMP 8 recognizes that Scope revisions are under the purview of the Correlating Committee and recommends that they approve this First Revision.

Response Message:

Public Input No. 2726-NFPA 70-2017 [Section No. 392.1]

First Revision No. 7937-NFPA 70-2018 [Section No. 392.2]

392.2 Definition.

The definition in this section shall apply within this article and throughout the *Code* .

Cable Tray System.

A unit or assembly of units or sections and associated fittings forming a structural system used to securely fasten or support cables and raceways.

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jan 11 11:02:34 EST 2018

Committee Statement and Meeting Notes

Committee Statement: This First Revision adds clarity to the use of the definition within this section and throughout the Code.

Response Message:

Public Input No. 2224-NFPA 70-2017 [Section No. 392.2]

First Revision No. 7941-NFPA 70-2018 [Section No. 392.10(B)]

(B) In Industrial Establishments.

The wiring methods in Table 392.10(A) shall be permitted to be used in any industrial establishment under the conditions described in their respective articles. In industrial establishments only, where conditions of maintenance and supervision ensure that only qualified persons service the installed cable tray system, any of the cables in 392.10(B)(1) and (B)(2) shall be permitted to be installed in ladder, ventilated trough, solid bottom, or ventilated channel cable trays.

Detail FR-8009

(1) Single-Conductor Cables.

Single-conductor cables shall be permitted to be installed in accordance with (B)(1)(a) through (B)(1)(c).

(a) Single-conductor cables shall be 1/0 AWG or larger and shall be of a type listed and marked on the surface for use in cable trays. Where 1/0 AWG through 4/0 AWG single-conductor cables are installed in ladder cable tray, the maximum allowable rung spacing for the ladder cable tray shall be 225 mm (9 in.).

(b) Welding cables shall comply with ~~the provisions of~~ Article 630, Part IV.

(c) Single conductors used as equipment grounding conductors shall be insulated, covered, or bare, and they shall be 4 AWG or larger.

(2) Single- and Multiconductor Medium Voltage Cables.

Single- and multiconductor medium voltage cables shall be Type MV cable. Single conductors shall be installed in accordance with 392.10(B)(1).

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jan 11 11:14:04 EST 2018

Committee Statement and Meeting Notes

Committee Statement: Titles were added to 392.10(B)(1) and (2) in compliance with the NEC Style Manual Section 2.1.5.3.

The phrase “the provisions of” is unnecessary and is being deleted to increase usability.

Response Message:

Committee Notes:

Date	Submitted By	
Jan 11, 2018	NEC-CMP Panel 08	B is not new text- just the title is new.

Public Input No. 225-NFPA 70-2017 [Sections 392.10(B)(1), 392.10(B)(2)]

Public Input No. 221-NFPA 70-2017 [Sections 392.10(B)(1), 392.10(B)(2)]

Editorial Comment

Click here

First Revision No. 7940-NFPA 70-2018 [Section No. 392.10 [Excluding any Sub-Sections]]

Cable tray shall be permitted to be used as a support system for wiring methods containing service conductors, feeders, branch circuits, communications circuits, control circuits, and signaling circuits. Single insulated conductors shall be permitted in cable tray only when installed in accordance with 392.10(B)(1). Cable tray installations shall not be limited to industrial establishments. Where exposed to direct rays of the sun, insulated conductors and jacketed cables shall be identified as being sunlight resistant. Cable trays and their associated fittings shall be identified for the intended use.

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jan 11 11:08:54 EST 2018

Committee Statement and Meeting Notes

Committee Statement: This revision clarifies the use of single conductors in cable trays. The second sentence was modified for clarity from the original Public Input.

Response Message:

Public Input No. 1664-NFPA 70-2017 [Section No. 392.10]

First Revision No. 7945-NFPA 70-2018 [Section No. 392.18(H)]

(H) Marking.

Cable trays containing conductors ~~rated~~ operating over 600 volts shall have a permanent, legible warning notice carrying the wording “DANGER — HIGH VOLTAGE — KEEP AWAY” placed in a readily visible position on all cable trays, with the spacing of warning notices not to exceed 3 m (10 ft). The danger marking(s) or labels shall comply with 110.21(B).

Exception: Where not accessible (as applied to equipment), in industrial establishments where the conditions of maintenance and supervision ensure that only qualified persons service the installation, cable tray system warning notices shall be located where necessary for the installation to ensure safe maintenance and operation.

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jan 11 11:22:57 EST 2018

Committee Statement and Meeting Notes

Committee Statement: “Rated” was revised to “operated” to clarify the danger associated with voltage.
Response Message:

First Revision No. 7964-NFPA 70-2018 [New Section after 392.30]

392.44 Expansion Splice Plates.

Cable tray shall be provided with expansion splice plates where necessary to compensate for thermal expansion and contraction.

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jan 11 13:20:18 EST 2018

Committee Statement and Meeting Notes

Committee Statement: Expansion splice plates are added to Article 392 to address thermal expansion and contraction due to temperature variations.

Response Message:

Public Input No. 3528-NFPA 70-2017 [New Section after 392.30]

First Revision No. 8010-NFPA 70-2018 [Section No. 392.30(B)]

Detail FR-8011

(B) Cables and Conductors.

Cables and conductors shall be secured to and supported by the cable tray system in accordance with (1), (2) ~~and~~ , (3), and (4) as applicable:

(1) In other than horizontal runs, the cables shall be fastened securely to transverse members of the cable ~~runs~~ tray .

(2) Supports shall be provided to prevent stress on cables where they enter raceways from cable tray systems.

(3) The system shall provide for the support of cables and raceway wiring methods in accordance with their corresponding articles. Where cable trays support individual conductors or multiconductor cables and where the conductors or multiconductor cables pass from one cable tray to another, or from a cable tray to raceway(s) or from a cable tray to equipment where the conductors are terminated, the distance between the cable trays or between the cable tray and the raceway(s) or the equipment shall not exceed 1.8 m (6 ft). The conductors shall be secured to the cable tray(s) at the transition, and they shall be protected, by guarding or by location, from physical damage.

(4) Cable ties shall be listed and identified as suitable for the application and for securement and support.

Submitter Information Verification

Submitter Full Name: NEC-CMP Panel 08
Organization: [Not Specified]
Street Address:
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Submittal Date: Thu Jan 11 17:15:23 EST 2018

Committee Statement and Meeting Notes

Committee Statement: Multiconductor cables were added to 392.30(B) where transitioning from cable tray to another cable tray or raceway.
Response Message:

Public Input No. 2372-NFPA 70-2017 [Section No. 392.30(B)]

Editorial Comment

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First Revision No. 8013-NFPA 70-2018 [Section No. 392.46]

392.46 Bushed Conduit and Tubing.

A box shall not be required where cables or conductors are installed in bushed conduit and tubing used for support or for protection against physical damage or where conductors or cables transition to a raceway wiring method from the cable tray . Conductors shall be permitted to enter equipment in accordance with 392.46(A) or (B).

(A) Through Bushed Conduit or Tubing.

Individual conductors or multiconductor cables shall be permitted to enter enclosures where they are terminated through nonflexible bushed conduit or tubing installed for their protection provided they are secured at the point of transition from the cable tray and the conduit or tubing is sealed at the outer end using an approved means so as to prevent debris from entering the equipment through the conduit or tubing.

(B) Flanged Connections.

Individual conductors or multiconductor cables shall be permitted to enter enclosures through openings associated with flanges from cable trays where the cable tray is attached to the flange and the flange is mounted directly to the equipment. The openings shall be made such that the conductors are protected from abrasion and the opening shall be sealed or covered to prevent debris from entering the enclosure through the opening.

Informational Note: One method of preventing debris from entering the enclosure is to seal the outer end of the raceway or the opening with duct seal.

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Committee Statement and Meeting Notes

Committee Statement: 392.46 was revised to clarify a compliant application for conductors and cables to transition from the cable tray to raceways or to enter into enclosures.

Response Message:

Public Input No. 2375-NFPA 70-2017 [Section No. 392.46]

Editorial Comment

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First Revision No. 7966-NFPA 70-2018 [Section No. 392.60(A)]

(A) Metal Cable Trays.

Metal cable trays shall be permitted to be used as equipment grounding conductors where continuous maintenance and supervision ensure that qualified persons service the installed cable tray system and the cable tray complies with ~~provisions of~~ this section. Metal cable trays that support electrical conductors shall be grounded as required for conductor enclosures in accordance with 250.96 and Part IV of Article 250. Metal cable trays containing only non-power conductors shall be electrically continuous through approved connections or the use of a bonding jumper.

Informational Note: Examples of non-power conductors include nonconductive optical fiber cables and Class 2 and Class 3 ~~Remote Control Signaling and Power Limiting Circuits~~ remote-control, signaling, and power-limited circuits .

Table 392.60(A) Metal Area Requirements for Cable Trays Used as Equipment Grounding Conductor

Maximum Fuse Ampere Rating, Circuit Breaker Ampere Trip Setting, or Circuit Breaker Protective Relay Ampere Trip Setting for Ground-Fault Protection of Any Cable Circuit in the Cable Tray System	Minimum Cross-Sectional Area of Metal[a] *			
	Steel Cable Trays		Aluminum Cable Trays	
	mm^2	$in.^2$	mm^2	$in.^2$
60	129	0.20	129	0.20
100	258	0.40	129	0.20
200	451.5	0.70	129	0.20
400	645	1.00	258	0.40
600	967.5	1.50[b] †	258	0.40
1000	—	—	387	0.60
1200	—	—	645	1.00
1600	—	—	967.5	1.50
2000	—	—	1290	2.00[b] †

[a] * Total cross-sectional area of both side rails for ladder or trough cable trays; or the minimum cross-sectional area of metal in channel cable trays or cable trays of one-piece construction.

[b] † Steel cable trays shall not be used as equipment grounding conductors for circuits with ground-fault protection above 600 amperes. Aluminum cable trays shall not be used as equipment grounding conductors for circuits with ground-fault protection above 2000 amperes.

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Committee Statement and Meeting Notes

Committee Statement: The phrase “provisions of” is unnecessary and is being deleted to increase usability.

Response Message:

Committee Notes:

Date	Submitted By	
Jan 14, 2018	NEC-CMP Panel 08	No changes made to table.

Editorial Comment

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First Revision No. 8015-NFPA 70-2018 [Section No. 392.80(A)]

(A) Ampacity of Cables, Rated 2000 Volts or Less, in Cable Trays.

Informational Note: See 110.14(C) for conductor temperature limitations due to termination provisions.

Detail FR-8017

(1) Multiconductor Cables.

The ~~allowable~~ ampacity of multiconductor cables, nominally rated 2000 volts or less, installed according to the requirements of 392.22(A) shall be as given in Table 310.16 and Table 310.18, subject to ~~the provisions of~~ (A)(1)(a), (b), (c), and 310.14(A)(2).

(a) The adjustment factors of 310.15(C)(1)(a) shall apply only to multiconductor cables with more than three current-carrying conductors. Adjustment factors shall be limited to the number of current-carrying conductors in the cable and not to the number of conductors in the cable tray.

(b) Where cable trays are continuously covered for more than 1.8 m (6 ft) with solid unventilated covers, not over 95 percent of the ~~allowable~~ ampacities of Table 310.16 and Table 310.18 shall be permitted for multiconductor cables.

(c) Where multiconductor cables are installed in a single layer in uncovered trays, with a maintained spacing of not less than one cable diameter between cables, the ampacity shall not exceed the ~~allowable~~ ambient temperature-corrected ampacities of multiconductor cables, with not more than three insulated conductors rated 0 through 2000 volts in free air, in accordance with 310.14(B).

Informational Note: See Table B.310.15(B)(2)(3).

(2) Single-Conductor Cables.

The ~~allowable~~ ampacity of single-conductor cables shall be as permitted by 310.14(A)(2). The adjustment factors of 310.15(C)(a) shall not apply to the ampacity of cables in cable trays. The ampacity of single-conductor cables, or single conductors cabled together (triplexed, quadruplexed, ~~etc.~~ and so forth), nominally rated 2000 volts or less, shall comply with the following:

(a) Where installed according to the requirements of 392.22(B), the ampacities for 600 kcmil and larger single-conductor cables in uncovered cable trays shall not exceed 75 percent of the ~~allowable~~ ampacities in Table 310.17 and Table 310.19. Where cable trays are continuously covered for more than 1.8 m (6 ft) with solid unventilated covers, the ampacities for 600 kcmil and larger cables shall not exceed 70 percent of the ~~allowable~~ ampacities in Table 310.17 and Table 310.19.

(b) Where installed according to the requirements of 392.22(B), the ampacities for 1/0 AWG through 500 kcmil single-conductor cables in uncovered cable trays shall not exceed 65 percent of the ~~allowable~~ ampacities in Table 310.17 and Table 310.19. Where cable trays are continuously covered for more than 1.8 m (6 ft) with solid unventilated covers, the ampacities for 1/0 AWG through 500 kcmil cables shall not exceed 60 percent of the ~~allowable~~ ampacities in Table 310.17 and Table 310.19.

(c) Where single conductors are installed in a single layer in uncovered cable trays, with a maintained space of not less than one cable diameter between individual conductors, the ampacity of 1/0 AWG and larger cables shall not exceed the ~~allowable~~ ampacities in Table 310.17 and Table 310.19.

Exception to (2)(3)(c): For solid bottom cable trays, the ampacity of single conductor cables shall be determined by 310.14(B).

(d) Where single conductors are installed in a triangular or square configuration in uncovered cable trays, with a maintained free airspace of not less than 2.15 times one conductor diameter (2.15 × O.D.) of the largest conductor contained within the configuration and adjacent conductor configurations or cables, the ampacity of 1/0 AWG and larger cables shall not exceed the ~~allowable~~ ampacities of two or three single insulated conductors rated 0 through 2000 volts supported on a messenger in accordance with 310.15.

Informational Note: See Table 310.20.

(3) Combinations of Multiconductor and Single-Conductor Cables.

Where a cable tray contains a combination of multiconductor and single-conductor cables, the ~~allowable~~ ampacities shall be as given in 392.80(A)(1) for multiconductor cables and 392.80(A)(2) for single-conductor cables, provided that the following conditions apply:

(1) The sum of the multiconductor cable fill area as a percentage of the allowable fill area for the tray calculated in accordance with 392.22(A), and the single-conductor cable fill area as a percentage of the allowable fill area for the tray calculated in accordance with 392.22(B), totals not more than 100 percent.

(2) Multiconductor cables are installed according to 392.22(A), and single-conductor cables are installed according to 392.22(B) and 392.22(C).

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Committee Statement and Meeting Notes

Committee Statement: "Allowable" was deleted when used with ampacity since the intent for this section is to determine the ampacity of the conductor based upon its condition of use.

Response Message:

Committee Notes:

Date	Submitted By	
Jan 14, 2018	NEC-CMP Panel 08	No changes made to Exceptions or Informational Notes.

Public Input No. 936-NFPA 70-2017 [Section No. 392.80(A)(2)]

Public Input No. 935-NFPA 70-2017 [Section No. 392.80(A)(1)]

Editorial Comment

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First Revision No. 8018-NFPA 70-2018 [Section No. 392.80(B)]

(B) Ampacity of Type MV and Type MC Cables (2001 Volts or Over) in Cable Trays.

The ampacity of cables, rated 2001 volts, nominal, or over, installed according to 392.22(C) shall not exceed the requirements of this section.

Informational Note: See 110.40 for conductor temperature limitations due to termination provisions.

Detail FR-8019

(1) Multiconductor Cables (2001 Volts or Over).

The ~~allowable~~ ampacity of multiconductor cables shall be as given in Table 310.60(C)(75) and Table 310.60(C)(76), subject to the following ~~provisions~~:

(1) Where cable trays are continuously covered for more than 1.8 m (6 ft) with solid unventilated covers, not more than 95 percent of the ~~allowable~~ ampacities of Table 310.60(C)(75) and Table 310.60(C)(76) shall be permitted for multiconductor cables.

(2) Where multiconductor cables are installed in a single layer in uncovered cable trays, with maintained spacing of not less than one cable diameter between cables, the ampacity shall not exceed the allowable ampacities of Table 310.60(C)(71) and Table 310.60(C)(72).

(2) Single-Conductor Cables (2001 Volts or Over).

The ampacity of single-conductor cables, or single conductors cabled together (triplexed, quadruplexed, ~~etc~~ and so forth), shall comply with the following:

(1) The ampacities for 1/0 AWG and larger single-conductor cables in uncovered cable trays shall not exceed 75 percent of the allowable ampacities in Table 310.60(C)(69) and Table 310.60(C)(70). Where the cable trays are covered for more than 1.8 m (6 ft) with solid unventilated covers, the ampacities for 1/0 AWG and larger single-conductor cables shall not exceed 70 percent of the ~~allowable~~ ampacities in Table 310.60(C)(69) and Table 310.60(C)(70).

(2) Where single-conductor cables are installed in a single layer in uncovered cable trays, with a maintained space of not less than one cable diameter between individual conductors, the ampacity of 1/0 AWG and larger cables shall not exceed the ~~allowable~~ ampacities in Table 310.60(C)(69) and Table 310.60(C)(70).

(3) Where single conductors are installed in a triangular or square configuration in uncovered cable trays, with a maintained free air space of not less than 2.15 times the diameter (2.15 × O.D.) of the largest conductor contained within the configuration and adjacent conductor configurations or cables, the ampacity of 1/0 AWG and larger cables shall not exceed the ~~allowable~~ ampacities in Table 310.60(C)(67) and Table 310.60(C)(68).

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Committee Statement and Meeting Notes

Committee Statement: “Allowable” is deleted when used with ampacity since the intent for this section is to determine the ampacity of the conductor based upon its condition of use.

Response Message:

Public Input No. 937-NFPA 70-2017 [Section No. 392.80(B)(1)]

Editorial Comment

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