

TYPE MC HCF-SG (SMARTGROUND™) - COPPER CONDUCTOR - ALUMINUM ARMOR - 600V THHN/THWN-2 INNERS

ENGINEERING SPECIFICATIONS

Standards

Underwriters Laboratories Standards UL-83, UL 1063, UL-1569, UL-1581, UL-2556 for type MC; Federal Specification A-A59544; NEMA RV 1-201 NEMA WC70/ICEA S-95-658; IEEE 1202 (70,000 Btu/hr) Vertical Cable Tray Flame Test; NFPA 70 (NEC®) Article 330; ARRA 2009 Section 1605 "Buy American" Compliant; RoHS Compliant; MasterSpec Division 26 Sections 260519, 260523; UL Listing #E-301130



APPLICATIONS

Type MC cable shall be permitted as follows:

- Suitable for applications requiring branch circuits for electrical systems in patient care areas/spaces of health care facilities per NEC 517.13(a) and (b) or for use in essential electrical systems when in accordance with NEC 517.30(C)(3)(3);
- Acceptable in facilities such as hospitals, nursing homes, dental offices, and other types of medical facilities including out-patient facilities;
- Permitted use for branch circuits in industrial, commercial, and multi-residential buildings;
- Acceptable for power, lighting, control, and signal circuits;
- Allowable in concealed or exposed systems;
- Permitted use in dry locations and embedded in plaster finish on brick or other masonry except in damp or wet locations;
- Utilized for environmental air-handling spaces (NEC 300.22(C)(1));
- Allowable in assembly occupancies (NEC 518.4);
- Allowable installations in approved raceways and cable trays (NEC 392);
- Suitable for installation under raised floors for IT equipment (NEC 645.5(E));
- Permitted in Class I Div. 2, Class II Div. 2, and Class III Div. 1 Hazardous Locations;
- Listed for use with UL 1479 - 1, 2, and 3 Hour Through-Penetration Firestop Systems.

CONSTRUCTION

Available in sizes 12 AWG through 10 AWG. Encore's Metal-Clad Cable is constructed with soft-drawn copper, Type THHN/THWN-2 conductors rated 90°C dry. All conductors are individually wrapped with flame retardant colored protective paper with print legend and cabled together to form the cable core. Includes green ground same size as circuit conductors. The bare aluminum grounding/bonding conductor is located outside the paper wrap and is cabled with the insulated conductors and in constant contact with sheathing per NEC 250.118(10)(b). Interlocked aluminum armor is applied over the entire assembly.



- 1 Removable SmartColorID[®] Label
- 2 Interlocked Aluminum Armor
- 3 Colored Flame-Retardant Protective Paper Covering
- 4 Aluminum Ground/Bond Wire
- 5 THHN/THWN-2 Stranded or Solid Copper Conductors

Type MC HCF-SG (SmartGround) - Copper Conductor - Aluminum Armor - THHN/THWN-2 Innere

| Conductors | | | Green THHN Copper Ground (AWG) | Outside Diameter Over Armor (in) | Total Weight of Type MC-Copper Conductor (lbs/1000 ft) | Allowable Ampacity (Amps) ² | | | Standard Packaging (ft) | |
|------------|----------|------------------------|--------------------------------|----------------------------------|--|--|------|------|-------------------------|-------|
| AWG/No. | Type | Grounding/Bonding Wire | | | | 60°C | 75°C | 90°C | Coils | Reels |
| 12/2 | Solid | 10 Solid AL | 12 | 0.515 | 118 | 20 | 25 | 30 | 250' | 1000' |
| 12/3 | Solid | 10 Solid AL | 12 | 0.570 | 144 | 20 | 25 | 30 | 250' | 1000' |
| 12/4 | Solid | 10 Solid AL | 12 | 0.594 | 175 | 20 | 25 | 30 | 250' | 1000' |
| 10/2 | Solid | 8 Solid AL | 10 | 0.620 | 171 | 30 | 35 | 40 | 250' | 1000' |
| 10/3 | Solid | 8 Solid AL | 10 | 0.671 | 212 | 30 | 35 | 40 | 250' | 1000' |
| 10/4 | Solid | 8 Solid AL | 10 | 0.700 | 254 | 30 | 35 | 40 | 250' | 1000' |
| 12/2 | Stranded | 10 Solid AL | 12 | 0.551 | 144 | 20 | 25 | 30 | 250' | 1000' |
| 12/3 | Stranded | 10 Solid AL | 12 | 0.599 | 175 | 20 | 25 | 30 | 250' | 1000' |
| 12/4 | Stranded | 10 Solid AL | 12 | 0.645 | 205 | 20 | 25 | 30 | 250' | 1000' |
| 10/2 | Stranded | 8 Solid AL | 10 | 0.642 | 203 | 30 | 35 | 40 | 250' | 1000' |
| 10/3 | Stranded | 8 Solid AL | 10 | 0.697 | 249 | 30 | 35 | 40 | 250' | 1000' |
| 10/4 | Stranded | 8 Solid AL | 10 | 0.747 | 294 | 30 | 35 | 40 | 250' | 1000' |

Standard Conductor Color Coding

| No. | 120V/208V/240V |
|--------|----------------------|
| 2 | Black/White |
| 3 | Black/Red/White |
| 4 | Black/Red/Blue/White |
| Ground | Green |

| No. | 277V/480V |
|--------|--------------------------|
| 2 | Brown/Gray |
| 3 | Brown/Orange/Gray |
| 4 | Brown/Orange/Yellow/Gray |
| Ground | Green |

SmartColorID Legend:



¹ SmartColorID manufactured under Patent No. 7,954,530, 8,454,785, 8,826,960 & 8,905,108

² Ampacity of conductors are based on NFPA 70 (NEC) Table 310.15(B)(16). See 110.14(C), 240.4(D) and 310.15(B) for other limitations where applicable.

For equipment marked for use at higher temperatures, the conductor ampacity shall be limited to the following per NEC 110.14(C):

60°C when terminated to equipment for circuits rated 100 amperes or less or marked for size 14 AWG through 1 AWG conductor.

75°C when terminated to equipment for circuits rated over 100 amperes or marked for conductors larger than 1 AWG.

90°C for ampacity derating purposes.

When the neutral is considered current-carrying conductor, the ampacity of 4/C cables shall be reduced by a factor of 0.80 per NEC 310.15(B)(3)(a).

The above data is approximate and subject to normal manufacturing tolerances.

Type MC-HCF-SG (SmartGround) Multi-Neutral - Copper Conductor - Aluminum Armor - THHN/THWN-2 Innere

| Phase Conductors AWG/No. | Conductor Type | Neutral Conductor AWG/No. | Green Ground Conductor AWG/No. | Aluminum Bond Wire | Overall Diameter (in) | Approximate Net Weight (lbs/1000 ft) | Allowable Ampacity (Amps) | | | Standard Packaging (ft) |
|--------------------------|----------------|---------------------------|--------------------------------|--------------------|-----------------------|--------------------------------------|---------------------------|------|------|-------------------------|
| | | | | | | | 60°C | 75°C | 90°C | |
| 12/3 | Solid | 12/3 | 12/1 | 10 AWG Solid | 0.655 | 226.47 | 20 | 25 | 30 | 1000' Reels |
| 10/3 | Solid | 10/3 | 10/1 | 8 AWG Solid | 0.760 | 334.42 | 30 | 35 | 40 | 1000' Reels |

FEATURES

The NEC 250.118(10)(b) recognizes the combination of interlocking armor and bond wire as an equipment grounding conductor. The green insulated copper equipment grounding conductor sized per NEC 517.13(B) and 250.122. Installation costs reduced by up to 50% over raceway and wire. Weight of aluminum armor is as much as 45% less than steel. Suitable for type MCI-A fittings. SmartColorID labels are spaced at regular intervals on the exterior of the metal sheathing and are removable. For ease of installation and pulling, cable is reverse wound on reels. Coils are designed to be pulled from the inside.

Multiple Neutral Color Coding

| No. | 120V/208V/240V/277V/480V |
|-----|--------------------------|
| 2 | Black/Red |
| 3 | Black/Red/Blue |
| 4 | Black/Red/Blue/Orange |

| Ground | Color |
|--------|-------|
| 1 | Green |

| Multiple Neutrals | Color |
|-------------------|---|
| 2 | White w/Black Stripe White w/Red Stripe |
| 3 | White w/Black Stripe White w/Red Stripe White w/Blue Stripe |

| Multiple Neutrals | Color |
|-------------------|--|
| 4 | White w/Black Stripe White w/Red Stripe White w/Blue Stripe White w/Orange Stripe |

TYPE MC HCF-SG (SMARTGROUND™) - COPPER CONDUCTOR - STEEL ARMOR - 600V THHN/THWN-2 INNERS

ENGINEERING SPECIFICATIONS

Standards

Underwriters Laboratories Standards UL-83, UL 1063, UL-1569, UL-1581, UL-2556 for type MC; Federal Specification A-A59544; NEMA RV 1-2014, NEMA WC70/CEA S-95-658; IEEE 1202 (70,000 Btu/hr) Vertical Cable Tray Flame Test; NFPA 70 (NEC®) Article 330; ARRA 2009 Section 1605 "Buy American" Compliant; RoHS Compliant; MasterSpec Division 26 Sections 260519, 260523; UL Listing #E-301130



SMARTCOLORID®
HCF-SG™

APPLICATIONS

Type MC cable shall be permitted as follows:

- Suitable for applications requiring branch circuits for non-essential, general purposes electrical systems in patient care areas/spaces of health care facilities per NEC 517.13(a) and (b) or for use in essential electrical systems when in accordance with NEC 517.30(C)(3)(3);
- Acceptable in facilities such as hospitals, nursing homes, dental offices, and other types of medical facilities including out-patient facilities;
- Permitted use for branch circuits in industrial, commercial, and multi-residential buildings;
- Acceptable for power, lighting, control, and signal circuits;
- Allowable in concealed or exposed systems;
- Permitted use in dry locations and embedded in plaster finish on brick or other masonry except in damp or wet locations;
- Utilized for environmental air-handling spaces (NEC 300.22(C)(1));
- Allowable in assembly occupancies (NEC 518.4);
- Permissible in theaters, audience areas of motion pictures, television studios, and similar locations (NEC 520.5);
- Allowable installations in approved raceways and cable trays (NEC 392);
- Suitable for installation under raised floors for IT equipment (NEC 645.5(E));
- Permitted in Class I Div. 2, Class II Div. 2, and Class III Div. 1 Hazardous Locations;
- Listed for use with UL 1479 - 1, 2, and 3 Hour Through-Penetration Firestop Systems.

CONSTRUCTION

Available in sizes 12 AWG through 10 AWG. Encore's Metal-Clad Cable is constructed with soft-drawn copper, Type THHN/THWN-2 conductors rated 90°C dry. All conductors are individually wrapped with flame retardant colored protective paper with print legend and cabled together to form the cable core. Includes green ground same size as circuit conductors. The bare aluminum grounding/bonding conductor is located outside the paper wrap and is cabled with the insulated conductors and in constant contact with sheathing per NEC 250.118(10)(b). Interlocked galvanized lightweight steel armor is applied over the entire assembly.



- 1 Removable SmartColorID® Label
- 2 Interlocked Galvanized Lightweight Steel Armor
- 3 Colored Flame-Retardant Protective Paper Covering
- 4 Aluminum Ground/Bond Wire
- 5 PVC Insulation with Nylon Jacket
- 6 THHN/THWN-2 Solid Copper

| Conductors | | | Green THHN Copper Ground (AWG) | Outside Diameter Over Armor (in) | Total Weight of Type MC-Copper Conductor (lbs/1000 ft) | Allowable Ampacity (Amps) ² | | | Standard Packaging (ft) | |
|------------|-------|------------------------|--------------------------------|----------------------------------|--|--|------|------|-------------------------|-------|
| AWG/No. | Type | Grounding/Bonding Wire | | | | 60°C | 75°C | 90°C | Coils | Reels |
| 12/2 | Solid | 10 Solid AL | 12 | 0.490 | 171 | 20 | 25 | 30 | 250' | 1000' |
| 12/3 | Solid | 10 Solid AL | 12 | 0.503 | 202 | 20 | 25 | 30 | 250' | 1000' |
| 12/4 | Solid | 10 Solid AL | 12 | 0.538 | 232 | 20 | 25 | 30 | 250' | 1000' |
| 10/2 | Solid | 8 Solid AL | 10 | 0.544 | 234 | 30 | 35 | 40 | 250' | 1000' |
| 10/3 | Solid | 8 Solid AL | 10 | 0.587 | 280 | 30 | 35 | 40 | 250' | 1000' |
| 10/4 | Solid | 8 Solid AL | 10 | 0.632 | 327 | 30 | 35 | 40 | 250' | 1000' |

¹ SmartColorID manufactured under Patent No. 7,954,530, 8,454,785, 8,826,960 & 8,905,108

² Ampacity of conductors are based on NFPA 70 (NEC) Table 310.15(B)(16). See 110.14(C), 240.4(D) and 310.15(B) for other limitations where applicable.

For equipment marked for use at higher temperatures, the conductor ampacity shall be limited to the following per NEC 110.14(C):

60°C when terminated to equipment for circuits rated 100 amperes or less or marked for size 14 AWG through 1 AWG conductor.

75°C when terminated to equipment for circuits rated over 100 amperes or marked for conductors larger than 1 AWG.

90°C for ampacity derating purposes.

When the neutral is considered current-carrying conductor, the ampacity of 4/C cables shall be reduced by a factor of 0.80 per NEC 310.15(B)(3)(a).

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FEATURES

The NEC 250.118(10)(b) recognizes the combination of interlocking armor and bond wire as an equipment grounding conductor. The green insulated copper equipment grounding conductor sized per NEC 517.13(B) and 250.122. Suitable for type MCI-A fittings. SmartColorID labels are spaced at regular intervals on the exterior of the metal sheathing and are removable. For ease of installation and pulling, cable is reverse wound on reels. Coils are designed to be pulled from the inside.

NOTE

Insulating anti-short bushings are not required by Section 330.40 of the NEC.

Standard Conductor Color Coding

| No. | 120V/208V/240V | No. | 277V/480V |
|--------|----------------------|--------|--------------------------|
| 2 | Black/White | 2 | Brown/Gray |
| 3 | Black/Red/White | 3 | Brown/Orange/Gray |
| 4 | Black/Red/Blue/White | 4 | Brown/Orange/Yellow/Gray |
| Ground | Green | Ground | Green |

SmartColorID Legend:

