260519   WIRES AND CABLES

PART 1:   GENERAL

1.01   SUMMARY

   A.   This section is intended to cover wire and cable requirements for low voltage electric
        power distribution, including service, feeder, and branch circuit applications. This
        section does not cover wire and cable for control, instrumentation, communications,
        or individual luminaires.

1.02   SYSTEM DESCRIPTION

   A.   All power wires/cables, including distribution, service, branch, and feeders circuits
        shall be color coded as follows:

        1.   120/208 volt, 3 phase, 4 wire, Wye system

           a.   Phase A - Black
           b.   Phase B - Red
           c.   Phase C - Blue
           d.   Neutral - White
           e.   Grounding Conductor - Green

        2.   277/480 volt, 3 phase, 4 wire, Wye system

           a.   Phase A - Brown
           b.   Phase B - Orange
           c.   Phase C - Yellow
           d.   Neutral - Gray
           e.   Grounding Conductor - Green

        3.   120/240 volt, 3 phase, 4 wire, Delta system

           a.   Phase A - Black
           b.   Phase B - Orange (wild leg)
           c.   Phase C - Blue
           d.   Neutral - White
           e.   Grounding Conductor - Green
PART 2: PRODUCTS

2.01 MATERIALS

A. Conductors shall be annealed copper; 98% conductivity.

B. Minimum size conductor for general wiring shall be #12.

C. THHN/THWN-2 shall be used in interior dry locations or interior wet locations.

D. XHHW-2 shall be used for outdoor feeder and branch circuits, underground street lighting, low voltage distribution, and underground building service entrances. XHHW-2 shall be used in indoor dry or wet locations where needed for additional insulation abrasion resistance and/or long vertical cable runs as determined by the design engineer.

E. PV or USE-2 Solar Wire shall be used for outdoor solar PV power applications. Wire shall be listed as sunlight resistant.

F. Conductors for building feeder and branch circuits shall be insulated for 600 volts.

G. Aluminum conductors are not approved for new installations.

H. Use stranded conductors for all sizes of general wiring. Solid wire is allowed only for wire sizes of 12 AWG and smaller for special applications.

I. Type MC Cable with full-rated ground conductor is allowed only after the first pull point beyond the local branch circuit panelboard. Type THHN/THWN-2 or XHHW-2 wire in conduit shall be required from the branch circuit panelboard to the first pull point.

J. Applications involving multiple parallel runs of MC cable per circuit will require custom oversized MC cable ground conductors to meet NEC requirements and must be approved by Facilities Engineering.

PART 3 – EXECUTION

3.01 EXISTING WORK

A. Remove abandoned wire and cable. Patch surfaces as required where removed cables pass through building finishes. Install pull string in conduits that are intended to remain for future use when removing abandoned cables.
B. Remove abandoned junction boxes when wire, cable, and conduit is removed. Install blank covers on abandoned boxes not removed.

C. Provide access to existing wiring connections that are remaining active.

3.02 INSTALLATION

A. Identify each conductor with its source panel name and circuit number. If circuit cables are bundled and tie-wrapped together, the cables may be identified as a group by panel name and circuit number. Cables shall be identified in wireways, splice boxes, and junction boxes.

B. Identify grounded (neutral) conductors in accordance with NEC Article 200 when they are in common raceways and enclosures.

C. When two or more neutral conductors are located in one raceway, individually identify each with the proper circuit number.

D. Sharing of neutral conductors for multiple circuits is prohibited.

E. Wires and cable shall be installed in a neat and workman like manner. Wire and cable shall be routed parallel or perpendicular to walls, beams, ceiling supports, and building structure.

F. Cables and conduits shall be directly supported to the building structure and independent of other piping, mechanical equipment, or ceiling supports. Cable supports shall be listed for the intended use.

G. Nylon tie wraps are not acceptable for cable supports. Nylon tie wraps are acceptable for cable training and bundling.

H. Splices shall only be made within accessible locations, accessible splice boxes or manholes.

I. Wires shall be placed in and properly tightened in circuit breaker or switch terminals per the manufacturer’s torque requirements listed on the terminal device or installation instructions using a properly calibrated torque screwdriver or torque wrench.