

A+ Tradesman Continuing Education

WORKBOOK

Code Verbiage Identification

- When referencing the changes in the National Electrical Code, the code committees identifies new verbiage by highlighting the word(s).
- For this training program
- All code ***“Quotes”*** and text information in this presentation will be identified ***Bold and Italicized*** directly from the 2014 NEC.
- New verbiage to the code will be Underlined only for easy distinction.

90.1 (A) Purpose

- ***(A) The purpose of this Code is the practical safeguard of persons and property from hazards arising from the use of electricity. This Code is not intended as a design specification or an instruction manual for untrained persons.***

90.8 (B) Wiring Planning

- ***(B) Number of Circuits in Enclosures.***
- ***It is elsewhere provided in this Code that the number of wires and circuits confined in a single enclosure be varyingly restricted. Limiting the number of circuits in a single enclosure minimizes the effects from a short circuit or ground fault***

100 Definition- Adjustable Speed Drive

- Adjustable Speed Drive
- Adjustable Speed Drive and Adjustable Speed Drive System power conversion equipment that provides a means of adjusting the speed of an electric motor.

- Informational Note: A variable frequency drive is one type electronic adjustable speed drive that controls the rotational speed of an alternating current electric motor by controlling the frequency and voltage of the electrical power supplied to the motor.
- Adjustable Speed Drive System
- A combination of an adjustable speed drive, its associated motor(s), and auxiliary equipment.

100 Definitions- Control Circuit

- The circuit of a control apparatus or system that carries the electric signals directing the performance of the controller by does not carry the main power current.

100 Definition- Coordination (Selective)

- ***Localization of an overcurrent condition to restrict outages to the circuit or equipment affected, accomplished by the selection and installation of overcurrent protective devices and their ratings or settings for the full range of available overcurrents, from overload to the maximum available fault current, and for the full range of overcurrent protective device opening times associated with those overcurrents.***

100 Definition- Device

- ***A unit of an electrical system, other than a conductor, that carries or controls electric energy as its principle function.***

100 Definition- Effective Ground-Fault Current Path

- ***An intentionally constructed, low-impedance electrically conductive path designed and intended to carry current under ground-fault conditions from the point of a ground fault on a wiring system to the electrical supply source and that facilitates the operation of the overcurrent protective device or ground-fault detectors.*** on high-impedance grounded systems.—

Definition 100- Intersystem Bonding Termination

- ***A device that provides a means for connecting intersystem bonding conductors for communications systems to the grounding electrode system.***

100 Definition- Premises Wiring (System)

- ***Interior and exterior wiring, including power, lighting, control, and signal circuit wiring together with all their associated hardware, fittings, and wiring devices, both permanently and temporarily installed. This includes (a) wiring from the service point or power source to the outlets or (b) wiring from and including the power source to the outlets where there is no service point. Such wiring does not include wiring internal to appliances, luminaires, motors, controllers, motor control centers, and similar equipment...***
- Informational Note:
- Power sources include, but are not limited to, interconnected or stand-alone batteries, solar photovoltaic systems, other distributed generation systems, or generators.

100 Definition- Raceway

- ***An enclosed channel of metallic or nonmetallic materials designed expressly for holding wires, cables, or busbars, with additional functions as permitted in this Code.***
- Informational Note:
- A raceway is identified within specific article definitions.

100 Definition- Accessible, Readily (Readily Accessible)

- ***Capable of being reached quickly for operation, renewal, or inspections without requiring those to whom ready access is requisite to actions such as; to use tools, to climb over or remove obstacles, or to resort to portable ladders, and so forth.***

100 Definition- Separately Derived System

- An electrical source, **other than a service**, having **no direct connection(s)** to circuit conductors of any other electrical source other than those established by grounding and bonding connections.

100 Definition- Retrofit Kit

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

100 Definition- Substation

- ***An enclosure assemblage of equipment (e.g., switches, interrupting devices, circuit breakers, buses, and transformers) through which electric energy is passed for the purpose of distribution, switching, or modifying its characteristics.***

100 Definition- Switchgear

- ***An assembly completely enclosed on all sides and top with sheet metal (except for ventilation openings and inspection windows) and containing primary power circuit switching, interrupting devices, or both, with buses and connections. The assembly may include control and auxiliary devices. Access to the interior of the enclosure is provided by doors, removable covers, or both.***
- Information Note:
- All switchgear subject to NEC requirements is metal enclosed. Switchgear rated 1000 volts or less may be identified as “low-voltage power circuit breaker switchgear”. Switchgear rated over 1000 volts may be identified as “metal-enclosed switch-gear” or “metal-clad switchgear”. Switchgear is available in non-arc-resistant or arc-resistant constructions.

110.16 Arc-Flash Hazard Warning

- ***Electrical equipment, such as switchboards, switchgear, panel-boards, industrial control panels, meter socket enclosures, and motor control centers, that are in other than dwelling units and are likely to require examination, adjustment, servicing, or maintenance while energized shall***

be field or factory marked to warn qualified persons of potential electric arc flash hazards. The marking shall meet the requirements in 110.21 (B) and shall be located so as to be clearly visible to qualified persons before examination, adjustment, servicing, or maintenance of the equipment

110.21 Marking

- (A) Manufacturer Markings.
- ***The manufacturer's name, trademark, or other descriptive marking by which the organization responsible for the product can be identified shall be placed on all electrical equipment. Other markings that indicate voltage, current, wattage, or other ratings shall be provide a specified elsewhere in this Code. The marking or label shall be of sufficient durability to withstand the environment involved.***
- (B) Field Applied Hazard Markings.
- Where caution, warning, or danger signs or labels are required by this Code, the labels shall meet the following requirements:
- (1) the marking shall adequately warn of the hazard using effective words and/or colors and/or symbols.
- Informational Note:
- ANSI Z535.4-2011, Products Safety Signs and Labels, provides guidelines for suitable font sizes, words, colors, symbols, and location requirements for labels.

110.24 (A) Available Fault Current

- ***(A) Field Marking***
- ***Service equipment in other than dwelling units shall be legibly marked in the field with the maximum available fault current. The field marking(s) shall include the date the fault current calculation was performed and be of sufficient durability to withstand the environment involved.***
- Informational Note: the available fault current marking(s) addressed in 110.24 are related to required short-circuit current ratings of equipment. NFPA 70E-2012, Standard for Electrical Safety in the Workplace, provides

assistance in determining severity or potential exposure, planning safe work practices, and selecting personal protective equipment.

110.25 Lockable Disconnecting Means

- Where a disconnect means is required to be lockable open, elsewhere in this Code, it shall be capable of being locked in the open position. The provisions for locking shall remain in place with or without the lock installed.
- Exception:
- Cord-and-plug connection locking provision shall not be required to remain in place without the lock installed.

110.26 (C) (3) Spaces About Electrical Equipment

- ***Access and working space shall be provided and maintained about all electrical equipment to permit ready and safe operation and maintenance of such equipment...***
- ***(C) Entrance to and Egress from Working Spaces***
- ***(E) Personnel Doors. Where equipment rated 800 1200 A or more that contains overcurrent devices, switching devices, or control devices is installed and there is a personnel door(s) intended for entrance to and egress from the working space less than 7.6m (25ft) from the nearest edge of the working space, the door(s) shall open in the direction of egress and be equipped with listed panic hardware.***

110.27 (A) (4) Parts Guarded Against Accidental Contact

Except as elsewhere required or permitted by this Code, live parts of electrical equipment operating at 50 volts or more shall be guarded against accidental contact by approved enclosures or by any of the following:

- ***(4) by elevation of 2.5m (8 feet) or more **above the floor or other working surface** as shown in (a) or (b) below:***
- ***(a) a minimum of 2.5m (8 ft) for 50-300 volts***
- ***(b) a minimum of 2.6m (8.5 ft) for 301-600 volts***

200.4 (B) Neutral Conductors

- Neutral conductors shall be installed in accordance with (A) and (B).
- (A) Installation.
- ***Neutral conductors shall not be used for more than one branch circuit, for more than one multiwire branch circuit, or for more than one set of ungrounded feeder conductors unless specifically permitted elsewhere in this Code.***
- (B) Multiple Circuits.
- If more than one neutral conductor associated with different circuits is in an enclosure, grounded circuit conductors of each circuit shall be identified or grouped to correspond with the ungrounded circuit conductor(s) by wire markers, cable ties, or similar means in at least one location within the enclosure.
- Exception No. 1
- The requirement for grouping or identifying shall not apply if the branch circuit or feeder conductor enter from a cable or a raceway unique to the circuit that makes the grouping obvious.
- Exception No. 2.
- The requirement for grouping or identifying shall not apply where branch circuit conductors pass through a box or conduit body without a loop as described in 314.16 (B)(1) or without a splice or termination.

210.5 Identification for Branch Circuits

- (2) Branch Circuits Supplied From Direct Current Systems.
- Where a branch circuit is supplied from a dc system operation at more than 50 volts, each ungrounded conductor of 4 AWG or larger shall be identified by polarity at all termination, connection, and splice points by marking tape, tagging, or other approved means, each ungrounded conductor of 6 AWG or smaller shall be identified by polarity at all termination, connection, and splice points in compliance with 210.5(C)(2)(a) and (b). The identification methods utilized for conductor originating within each

branch-circuit distribution equipment shall be documented in a manner that is readily available or shall be permanently posted at each branch-circuit panelboard or similar branch-circuit distribution equipment.

- (a) Positive Polarity, Sizes 6 AWG or Smaller.
- Where the positive polarity of a dc system does not serve as the connection point for the grounded conductor, each positive ungrounded conductor shall be identified by one of the following:
 - (1) A continuous red outer finish
 - (2) A continuous red stripe durably marked along the conductor's length on insulation or a color other than green, white, gray or black.
 - (3) Imprinted plus signs "+" or the word "POSITIVE" or "POS" durably marked on insulation of a color other than green, white, gray, or black, and repeated at intervals not exceeding 610mm (24 in.) in accordance with 310.120(B)
- (b) Negative Polarity, Sizes 6 AWG or smaller.
- Where the negative polarity of a dc system does not serve as the connection point for the grounded conductor, each negative ungrounded conductor shall be identified by one of the following means.
 - (1) A continuous black outer finish.
 - (2) A continuous black stripe durably marked along the conductor's length on insulation or a color other than green, white, gray or red.
 - (3) Imprinted plus signs "-" or the word "NEGATIVE" or "NEG" durably marked on insulation of a color other than green, white, gray, or red, and repeated at intervals not exceeding 610mm (24 in.) in accordance with 310.120(B)

210.8 (A) (7) Ground-Fault Circuit-Interrupter Protection for Personnel

- ***Ground-fault circuit-interrupter protection interruption for personnel shall be provided as required in 210.8(A) through (C). The ground-fault circuit-interrupter shall be installed in a readily accessible location.***

- (A) Dwelling Units, (7) Sinks-
- ***Where receptacles are installed with 1.8m (6 ft) of the outside edge of the sink.***
- (A) Dwelling Units. (9) Bathtubs or Shower Stalls-
- ***Where receptacles are installed with 1.8m (6 ft) of the outside edge of the bathtub or shower stall.***
- ***Dwelling Units.***
- ***All 125-volt, single-phase, 15- and 20-ampere receptacles installed in the locations specified in 210.8(A)(1) through (10) shall have ground-fault circuit-interrupter protection for personnel.***
- (10) Laundry areas
- (B) Other than Dwelling Units.
- ***All 125-volt, single-phase, 15- and 20-ampere receptacles installed in the locations specified in 210.8(B)(1) through (8) shall have ground-fault circuit-interrupter protection for personnel.***
- (8) Garages, service bays, and similar areas other than vehicle exhibition halls and showrooms.
- 210.8 (D) Kitchen Dishwasher Branch Circuits.
- GFCI protection shall be provided for outlets that supply dishwashers installed in dwelling unit locations.

210.12 Arc-Fault Circuit Interrupter Protection

- Arc-Fault circuit-interrupter protection shall be provided as required in 210.12(A), (B) and (C). The arc-fault circuit interrupter shall be installed in a readily accessible location.
- (A) Dwelling Units.
- ***All 120-volt single phase, 15- and 20-ampere branch circuits supplying outlets or devices installed in dwelling unit kitchens, family rooms, dining rooms, living rooms, parlors, libraries, dens, bedrooms, sunrooms,***

recreation rooms, closets, hallways, laundry areas, or similar rooms or areas shall be protected by any of the following means described in 210.12 (A)(1) through (6):

- ***(1) A listed combination type arc-fault circuit interrupter, installed to provide protection of the entire branch circuit.***
- (2) A listed branch/feeder type AFCI installed at the origin of the branch circuit in combination with a listed outlet branch circuit type arc-fault circuit interrupter installed at the first outlet box on the branch circuit. The first outlet box in the branch circuit shall be marked to indicate that it is the first outlet of the circuit.
- (3) A listed supplemental arc protection circuit breaker installed at the origin of the branch circuit in combination with a listed outlet branch circuit type arc-fault circuit interrupter installed at the first outlet box on the branch circuit where all of the following conditions are met:
 - (a) The branch circuit wiring shall be continuous from the branch circuit overcurrent device to the outlet branch circuit arc-fault circuit interrupter.
 - (b) the maximum length of the branch circuit from the branch circuit device to the first outlet shall not exceed 15.2m (50 ft) for a 14 AWG or 21.3m (70 ft) for a 12 AWG conductor.
 - (c) The first outlet box in the branch circuit shall be marked to indicate that it is the first outlet of the circuit.
- (4) A listed outlet branch circuit type arc-fault circuit interrupter installed at the first outlet on the branch circuit in combination with the listed branch circuit overcurrent protective device where all of the following conditions are met:
 - (a) The branch circuit wiring shall be continuous from the branch circuit overcurrent device to the outlet branch circuit arc-fault circuit interrupter.
 - (b) The maximum length of the branch circuit wiring from the branch circuit overcurrent device to the first outlet shall not exceed 15.2m (50 ft) for a 14 AWG or 21.3m (70 ft) for a 12 AWG conductor.

- (c) The first outlet box in the branch circuit shall be marked to indicate that it is the first outlet of the circuit.
- (d) The combination of the branch circuit overcurrent device and outlet branch circuit AFCI is identified as meeting the requirements for a "System Combination" type AFCI and is listed as such.
- (5) If RMC, IMC, EMT, Type MC, or steel armored Type AC cables meeting **the requirements of 250.118, metal wireways, metal auxiliary gutters and metal outlet and junction boxes are installed for the portion of the branch circuit between the branch-circuit overcurrent device and the first outlet, it shall be permitted to install a listed outlet branch-circuit type AFCI at the first outlet to provide protection for the remaining portion of the branch circuit.**
- (6) **Where a listed metal or nonmetallic conduit or tubing or Type MC cable is encased in not less than 50mm (2 in.) of concrete for the portion of the branch circuit between the branch-circuit overcurrent device and the first outlet, it shall be permitted to install a listed outlet branch circuit type AFCI at the first outlet to provide protection for the remaining portion of the branch circuit.**
- **Information Note No. 1:**
- **For information on combination type and branch/feeder type arc-fault circuits interrupters, see UL 1699-1999, Standard for Arc-Fault Circuit Interrupters. For information on outlet branch circuit type arc-fault circuit interrupters, see UL Subject 1699A Outline of Investigation for Outlet Branch Circuit combination AFCI's, see UL Subject 1699C, Outline of Investigation for System Combination Arc-Fault Circuit Interrupters**

210.12 (B) Arc-Fault Circuit Interrupter Protection

- Arc-Fault circuit-interrupter protection shall be provide as required in 210.12 (A) (B), and (C). The arc-fault circuit interrupter shall be installed in a readily accessible location.

- Exception:
- AFCI protection shall not be required where the extension of the existing conductors is not more than 1.8m (6 ft) and does not include any additional outlets or devices.

210.13 Ground-Fault Protection of Equipment

- Each branch-circuit disconnect rated 1000amperes or more and installed on solidly grounded wye electrical systems of more than 150 volts to ground, but not exceeding 600 volts phase-to-phase shall be provided with ground-fault protection or equipment in accordance with the provisions of 230.95
- Informational Note: For buildings that contain health care occupancies, see the requirements of 517.17
- Exception No.1:
- The provisions of this section shall not apply to a disconnecting means for a continuous industrial process where a nonorderly shutdown will introduce additional or increase hazards.
- Exception No. 2:
- The provisions of this section shall not apply if ground-fault protection of equipment is provided on the supply side of the branch circuit and on the load side of any transformer supplying the branch circuit.

210.17 Electric Vehicle Branch Circuit

- Outlets installed for a the purpose of charging electric vehicles shall be supplied by a separate branch circuit. The circuit shall have no other outlets.
- Informational Note:
- See 625.2 for the definition of "Electrical Vehicle"

210.52 Dwelling Unit Receptacle Outlets

- ***(G) Basements, Garages, Accessory Buildings.***

- **For a one family dwelling, at least one receptacle outlet shall be installed in the following specified areas. These receptacles shall be *in addition to required for specific equipment*.**
- **(1) Garages.**
- ***In each attached garage and in each detached garage with electric power.* The branch circuit supplying this receptacle(s) shall not supply outlets outside of the garage. At least one receptacle outlet shall be installed for each car space.**
- **(2) Accessory Buildings.**
- **In each building with electric power accessory.**
- **(3) Basements.**
- ***In each separate unfinished portion* of a basement.**

210.64 Electrical Service Areas

- **At least one 125 volt, single phase, 15- or 20- ampere-rated receptacle outlet shall be installed within 15m (50 ft) of the electrical service equipment.**
- **Exception:**
- **The receptacle outlet shall not be required to be installed in one- and two family dwellings.**

220.12 Lighting Load for Specific Occupancies

- ***A unit load of not less than that specified in Table 220.12 for occupancies specified therein shall constitute the minimum lighting load. The floor area for each floor shall be calculated from the outside dimensions of the building, dwelling unit, or other area involved. For dwelling units, the calculated floor area shall not include open porches, garages, or unused or unfinished spaces not adaptable for future use.***
- **Exception:**
- **Where the building is designed and constructed to comply with an energy code adopted by the local authority, the lighting load shall be permitted to**

be calculated at the values specified in the energy code where the following conditions are met:

- (1) A power monitor system is installed that will provide continuous information regarding the total general lighting load of the building.
- (2) The power monitoring system will be set with alarm values to alert the building owner or manager if the lighting load exceeds the values set by the energy code.
- (3) The demand factors specified in 220.42 are not applied to the general lighting load.

220.42 reads: ***General Lighting.***

- ***The demand factors specified in Table 220.42 shall apply to that portion of the total branch-circuit load calculated for general illumination. They shall not be applied in determining the number of branch circuits for general illumination.***

225.52 (A) Disconnecting Means

- ***(A) Location:***
- ***A building or structure disconnecting means shall be located in accordance with 225.32, or, if not readily accessible, it shall be operable by mechanical linkage from a readily accessible point for multi-building industrial installations under single management, it shall be permitted to be electrically operated by a readily accessible remote-control device in a separate building or structure.***

230.30 Installation. (Underground Service Conductors)

- (A) Insulation.
- Underground service conductors shall be insulated for the applied voltage.
- (B) Wiring Methods.
- Underground service conductors shall be installed in accordance with the applicable requirements of this Code covering the type of wiring method used and shall be limited to the following methods:

- (1) Type RMC conduit
- (2) Type IMC conduit
- (3) Type NUCC conduit
- (4) Type HDPE conduit
- (5) Type PVC conduit
- (6) Type RTRC conduit
- (7) Type IGS cable
- (8) Type USE conductors or cables
- (9) Type MV or Type MC cable identified for direct burial applications
- (1MI cable, where suitably protected against physical damage and corrosive conditions.

230.82 Equipment Connected to the Supply Side of Service Disconnect

- ***Only the following equipment shall be permitted to be connected to the supply side of the service disconnecting means:***
- ***(1) Cable limiters or other current-limiting devices.***
- ***(2) Meters and meter sockets minimally rated not in excess of ~~600~~ 1000 volts, provided that all metal housings and service enclosures are grounded in accordance with Part VII and bonded in accordance with Part V of Article 250.***
- ***(3) Meter disconnect switches nominally rated not in excess of ~~600~~ 1000 volts that have a short-circuit current rating equal to or greater than the available short-circuit current, provided all metal housings and service enclosures are grounded in accordance with Part VII and bonded in accordance with Part V of Article 250. A meter disconnect switch shall be capable of interrupting the load served. A meter disconnect shall be legibly field marked on its exterior in a manner suitable for the environment as follows:***
METER DISCONNECT NOT SERVICE EQUIPMENT

240.87 Arc Energy Reduction

- Where the highest continuous current trip setting for which the actual overcurrent device installed in a circuit breaker is rated or can be adjusted is 1200 amperes or higher then 240.87 (A) and (B) shall apply.
- (A) Documentation.
- Documentation shall be available to those authorized to design, install, operate, or inspect the installation as to the location of the circuit breaker(s)
- (B) Methods of Reduce Clearing Time.
- ***One of the following or approved equivalent means shall be provided:***
- ***(1) Zone-selective interlocking***
- ***(2) Differential relaying***
- ***(3) Energy-reducing maintenance switching with local status indicator***
- (4) Energy-reducing active arc-flash mitigation system
- (5) An approved equivalent means
- Information Note No. 2:
- An energy-reducing active arc-flash mitigation system helps in reducing duration in the electrical distribution system. No change in circuit breaker or the settings of other devices is required during maintenance when a worker is working within an arc-flash boundary as defined in NFPA 70E 2012, Standard for Electrical Safety in the Workplace.

250.21 (C) Alternating-Current Systems of 50 Volts to 1000 Volts Not Required to Be Grounded

- ***(C) Marking.***
- ***Ungrounded systems shall be legibly marked***

“Caution **Ungrounded System** Operating Volts Between Conductors”

at the source or first disconnecting means of the system. The marking shall be of sufficient durability to withstand the environment involved.

250.24 Grounding Service-Supplied Alternation-Current Systems

- **(A) System Grounding Connections.**
- **A premises wiring system supplied by a grounded ac service shall have a grounding electrode conductor connected to the grounded service conductor, at each service, in accordance with 250.24 (A)(1) through (A)(5).**
- **(1) General.**
- **The grounding electrode conductor connection shall be make at any accessible point from the load end of the overhead service conductor, service drop, underground service conductors, or service lateral or bus to which the grounded service conductor is connected at the service disconnecting means.**
- **Informational Note:**
- **See definitions of Service Conductors, Overhead, Service Conductors, Underground, Service Drop, and Service Lateral in Article 100.**

250.64 Grounding Electrode Conductor Installation

- **Grounding electrode conductors at the service, at each building or structure where supplied by a feeder(s) or branch circuit(s), or at a separately derived system shall be installed as specified in 250.64(A) through (F).**
- **(D) Building or Structures with Multiple Disconnecting Means in Separate Enclosures.**
- **For a service or feeder with two or more disconnecting means in separate enclosures supplying a building or structure, the grounding electrode connections shall be made in accordance with 250.64(D)(1), (D)(2), or (D)(3).**

250.167 Direct Current Ground-Fault Detection

- (A) Ungrounded Systems.
- Ground-fault detection systems shall be required for ungrounded systems.
- (B) Grounded Systems.
- Ground-fault detection shall be permitted for grounded systems.
- (C) Marking.
- Direct-current system shall be legibly marked to indicated the grounding type at the dc source or the first disconnecting means of the system. The marking shall be of sufficient durability to withstand the environment involved.

250.194 Grounding and Bonding of Fences and Other Metal Structures

- Metallic fences enclosing, and other metal structures in surrounding, a substation with exposed electrical conductors and equipment shall be grounded and bonded to limit step, touch, and transfer voltage.
- (A) Metal Fences.
- Where metal fences are located within 5m (16 ft) of the exposed electrical conductors or equipment, the fence shall be bonded to the grounding electrode system with wire-type bonding jumpers as follows:
- (1) Bonding jumpers shall be installed at each fence corner and at maximum 50m (160 ft) intervals along the fence.
- (2) Where bare overhead conductors cross the fence, bonding jumpers shall be installed on each side of the crossing.
- (3) Gates shall be bonded to the gate support post, and each gate support post shall be bonded to the grounding electrode system.
- (4) Any gate or other opening in the fence shall be bonded across the opening by a buried bonding jumper.
- (5) The grounding grid or grounding electrode systems shall be extended to cover the swing of all gates.

- (6) the barbed wire strands above the fence shall be bonded to the grounding electrode system.
- Alternate designs performed under engineering supervision shall be permitted for grounding or bonding of metal fences.
- (B) Metal Structures.
- All exposed conductive metal structures, including guy wires within 2.5m (8 ft) vertically or 5m (16 ft) horizontally of exposed conductors or equipment and subject to contact by persons shall be bonded to the grounding electrode system in the area.

285.13 Type 4 and Other Component Type SPD's

- Type 4 component assemblies and other components type SPD's shall only be installed by the equipment manufacturer.
- Type 4 Surge Protective Devices (SPD) under this new code provision are only permissible when install by the manufacturer as part of a listed piece of equipment. These devices are generally incomplete devices. Code now mandates that they are only acceptable when provided within listed equipment as an integral component.