

National Electrical Code (NEC) Article 645.5

Supply Circuits and Interconnecting Cables for Information Technology Equipment

645.5(A) Branch-Circuit Conductors: The branch-circuit conductors supplying one or more units of information technology equipment shall have an ampacity not less than 125 percent of the total connected load.

645.5(B) Power-Supply Cords: Information technology equipment shall be permitted to be connected to branch-circuits by power-supply cords.

- (1) Power-supply cords shall not exceed 4.5 m (15 ft).
- (2) Power-supply cords shall be listed and a type permitted for use on listed information technology equipment or shall be constructed of listed flexible cord and listed attachment plugs and cord connectors of a type permitted for information technology equipment.
- (3) Plugs and receptacles used to connect the power-supply cords shall be listed and identified for the system voltage and current applied.

Informational Note No. 1: See UL 60950-1, *Safety of Information Technology Equipment — Safety — Part 1: General Requirements*, or UL 62368-1, *Audio/Video, Information and Communication Technology Equipment — Part 1: Safety Requirements*, for one method of determining if cords are of a permitted type.

Informational Note No. 2: See ANSI/NEMA WD-6, *Wiring Devices — Dimensional Specifications*, which identifies plug and receptacle configurations L25-30P and L25-30R for 240 Vac and L26-30P and L26-30R for 240/415 Vac.

645.5(C) Interconnecting Cables: Separate information technology equipment units shall be permitted to be interconnected by means of listed cables and cable assemblies. The 4.5 m (15 ft) limitation in 645.5(B)(1) shall not apply to interconnecting cables.

645.5(D) Physical Protection: Where exposed to physical damage, power-supply cords, branch-circuit supply conductors, and interconnecting cables shall be protected.

645.5(E) Under Raised Floors: Where the area under the floor is accessible and openings minimize the entrance of debris beneath the floor, power-supply cords, communication cables, connecting cables, interconnecting cables, cord-and-plug connections, and receptacles associated with the information technology equipment shall be permitted under a raised floor of approved construction. The installation requirements shall comply with 645.5(E)(1) through (E)(3).

Source: 2023 Edition—National Electrical Code
Note, NEC code is subject to interpretation and each governing jurisdiction may interpret the code differently. Always consult your local inspectors for clarification on local rules and regulations.

645.5(E)(1) Installation Requirements for Branch Circuit Supply Conductors Under a Raised Floor.

(a) The Supply conductors shall be installed in accordance with the requirements of 300.11.

(b) In addition to the wiring methods of 300.22(C), the following wiring methods shall also be permitted:

- (1) Rigid metal conduit
- (2) Rigid nonmetallic conduit
- (3) Intermediate metal conduit
- (4) Electrical metallic tubing
- (5) Electrical nonmetallic tubing
- (6) Metal wireway
- (7) Nonmetallic wireway
- (8) Surface metal raceway with metal cover
- (9) Surface nonmetallic raceway
- (10) Flexible metal conduit
- (11) Liquid-tight flexible metal conduit
- (12) Liquid-tight flexible nonmetallic conduit
- (13) Type MI cable
- (14) Type MC cable
- (15) Type AC cable
- (16) Associated metallic and nonmetallic boxes or enclosures
- (17) Type TC power and control tray cable

Note: *Branch-circuit conductors installed under the raised floor of an ITE room using any of the wiring methods listed are required to conform to the specific article for the wiring method used.*

Cabling Under a Raised Floor—Key Definitions

NFPA 75 (2020)

3.3.2 Air Space. The space below a raised floor or above a suspended ceiling used to circulate environmental air within the Information Technology Equipment room/ITE area.

3.3.12 Interconnecting Cables. Signal and power cables for operation and control of a system.

3.3.20 Plenum. A compartment or chamber to which one or more ducts are connected and that forms part of the air distribution system.

3.3.22* Raised Floor. A platform with removable panels where equipment is installed, with the intervening space between it and the main building floor used to house interconnecting cables and at times is used as a means for supplying conditioned air to the Information Technology Equipment and the room.

The space under a raised floor in an ITE room is defined as Air Space not a Plenum.

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National Electrical Code (NEC) Article 645.5 (cont.)

Supply Circuits and Interconnecting Cables for Information Technology Equipment

645.5(E)(2) Installation Requirements for Power-Supply Cords, Data Cables, Interconnecting Cables, and Grounding Conductors Under a Raised Floor. The following cords, cables, and conductors shall be permitted to be installed under a raised floor:

- (1) Power-supply cords of listed information technology equipment in accordance with 645.5(B).
- (2) Interconnecting cables enclosed in a raceway.
- (3) Equipment grounding conductors.
- (4) Where the air space under a raised floor is protected by an automatic fire suppression system, in addition to wiring installed in compliance with 722.135(B), Types CL2R, CL3R, CL2, and CL3 and substitute cables, including CMP, CMR, CM, and CMG installed in accordance with 722.135(E), shall be permitted under raised floors.
- (5) Where the air space under a raised floor is not protected by an automatic fire suppression system, in addition to wiring installed in compliance with 722.135(B), substitute cable Type CMP installed in accordance with 722.135(E) shall be permitted under raised floors.
- (6) Listed Type DP cable having adequate fire-resistant characteristics suitable for use under raised floors of an information technology equipment room.

Informational Note: See CSA “Vertical Flame Test-Cables in Cable Trays” as described in CSA C22.2 No. 0.3, *Test Methods for Electrical Wires and Cables*, for on method of defining resistance to the spread of fire where the damage (char length) of the cable does not exceed 1.5m (4 ft 11 in.) or “UL Flame Exposure, Vertical Flame Tray Test” in UL 1685, *Standard for Safety for Vertical-Tray Fire Propagation and Smoke-Release Test for Electrical and Optical-Fiber Cables*. The smoke measurements in the test method are not applicable.

UL 60950-1, *Safety of Information Technology Equipment — Safety — Part 1: General Requirements*, or UL 62368-1, *Audio/Video, Information and Communication Technology Equipment — Part 1: Safety Requirements*, for one method of determining if cords are of a permitted type.

645.5(E)(3) Installation Requirements for Fiber Cables Under a Raised Floor. The installation of optical fiber cables shall comply with either of the following:

- (1) Where the air space under a raised floor is protected by an automatic fire suppression system, optical fiber cables installed in accordance with 770.113(C), Types OFNR, OFCR, OFNG, OFCG, OFN, and OFC shall be permitted under raised floors.
- (2) Where the air space under a raised floor is not protected by an automatic fire suppression system, only optical fiber cables installed in accordance with 770.113(C) shall be permitted under raised floors.

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Note, NEC code is subject to interpretation and each governing jurisdiction may interpret the code differently. Always consult your local inspectors for clarification on local rules and regulations.

645.5(F) Securing in Place: Power-supply cords; communications cables, connecting cables, interconnecting cables, and associated boxes, connectors, plugs, and receptacles that are listed as part of, or for, information technology equipment shall not be required to be secured in place where installed under raised floor.

Informational Note: See 300.11 for securement requirements for raceways and cables not listed as part of, or for, information technology equipment.

645.5(G) Abandoned Supply Circuits and Interconnecting Cables: The accessible portion of abandoned supply circuits and interconnecting cables shall be removed unless contained in a raceway.

645.5(H) Installed Supply Circuits and Interconnecting Cables Identified for Future Use.

(1) Cable Identification Means. Supply circuits and interconnecting cables identified for future use shall be marked with a tag of sufficient durability to withstand the environment involved.

(2) Cable Tag Criteria. Supply circuit tags and interconnecting cable tags shall have the following information:

- (1) Date identified for future use
- (2) Date of intended use
- (3) Information relating to the intended future use

Note: *Supply cords of ITE equipment are permitted to be run through holes in a raised floor to connect to receptacles located below the raised floor. Openings in a raised floor through which cords and cables are run must be made so the cords and cables are not subject to abrasion.*

Other than branch-circuit conductors and power supply cords, interconnecting cables used under raised floors are required to be enclosed in a raceway, be listed as Type DP (data processing) cables, or be of the appropriate cable type permitted by 645.5(E)(2)(4).

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