

Questions and Answers for Heating and A/C Contractors

1. How do we accomplish grounding of furnaces and / or water heaters on two wire circuits?

250.134 Equipment Fastened in Place or Connected by Permanent Wiring Methods (Fixed) — Grounding.

Unless grounded by connection to the grounded circuit conductor as permitted by 250.32, 250.140, and 250.142, non-current-carrying metal parts of equipment, raceways, and other enclosures, if grounded, shall be grounded by one of the following methods

250-134 (A) or (B).

(A) **Equipment Grounding Conductor Types.** By connecting to any of the equipment grounding conductors permitted by 250.118.

(B) **With Circuit Conductors.** By connecting to an equipment grounding conductor contained within the same raceway, cable, or otherwise run with the circuit conductors.

Exception No. 1: As provided in 250.130(C), the equipment grounding conductor shall be permitted to be run

separately from the circuit conductors.

Exception No. 2: For dc circuits, the equipment grounding conductor shall be permitted to be run separately from the circuit conductors.

250.130 (C) **Non-grounding Receptacle Replacement or Branch Circuit Extensions.** The equipment grounding conductor of a grounding-type receptacle or a branch-circuit extension shall be permitted to be connected to any of the following:

(1) Any accessible point on the grounding electrode system as described in 250.50

(2) Any accessible point on the grounding electrode conductor

(3) The equipment grounding terminal bar within the enclosure where the branch circuit for the receptacle or branch circuit originates

(4) An equipment grounding conductor that is part of another branch circuit that originates from the enclosure where the branch circuit for the receptacle or branch circuit originates

(5) For grounded systems, the grounded service conductor within the service equipment enclosure

(6) For ungrounded systems, the grounding terminal bar within the service equipment enclosure

A circuit size conductor from the furnace may be split bolted to the grounding electrode conductor, or properly connected to the water pipe beside the connection of the grounding electrode conductor, or ran within the first 5 feet of where the metallic pipe enters the structure.

2. Does a cable to a furnace need to be protected?

334.15 (B) Protection from Physical Damage. The cable shall be protected from physical damage where necessary by conduit, electrical metallic tubing, Schedule 80 PVC rigid nonmetallic conduit. Type RTRC marked with the suffix -XW, or other approved means. Where passing through a floor, the cable shall be enclosed in rigid metal conduit, intermediate metal conduit, electrical metallic tubing, Schedule 80 PVC conduit, Type RTRC marked with the suffix -XW, or other approved means extending at least 150 mm (6 in.) above the floor. Type NMC cable installed in shallow chases or grooves in masonry, concrete, or adobe shall be protected in accordance with the requirements in 300.4(F) and covered with plaster, adobe, or similar finish.

Yes, cables must be protected where they are subject to physical damage.

3. Are service lights and receptacles required for existing furnace change outs?

210-70. Lighting Outlets Required. At least one lighting outlet controlled by a light switch located at the point of entry to the attic, underfloor space, utility room, and basement shall be installed where these spaces are used for storage or contain equipment requiring servicing. The lighting outlet shall be provided at or near the equipment requiring servicing (c) Other Locations. At least one wall switch-controlled lighting outlet shall be installed at or near equipment requiring servicing such as heating, air-conditioning, and refrigeration equipment in attics or underfloor spaces. The wall switch shall be located at the point of entry to the attic or underfloor space.

Questions and Answers for Heating and A/C Contractors

Service lights and receptacles are not required for replacement of like for like change outs only. Gas pack to split system, new installations, new circuits to existing furnaces, and etc. will require service lights and GFCI receptacles to be installed at the unit. The switch for the light is required at the access entrance of the attic or crawl space. The installation of the required light and GFCI shall be installed only by the electrical contractor.

4. What are the clearances on electrical equipment? (Meters, service equipment, sub-panels, & etc.)

See 110-16 of the NC Elec. Code for Working Space About Electric Equipment (600 Volts, Nominal, or Less).

Sufficient access and working space shall be provided and maintained about all electric equipment to permit ready and safe operation and maintenance of such equipment.

All electrical equipment requires a minimum of 36 inches in front of the equipment and 30 inches wide for service or repair of the equipment.

5. Can I use romex in metal or non-metallic flex from the disconnect or through the wall to the unit?

336-4 (a) Type NM. Type NM cable shall be permitted for both exposed and concealed work in normally dry locations. It shall be permissible to install or fish Type NM cable in air voids in masonry block or tile walls where such walls are not exposed or subject to excessive moisture or dampness.

No, romex is approved for dry locations only. The conductors must be marked with a "W" to indicate they are approved for a wet or damp location.

6. How do I schedule an electrical inspection.

a. Just as with other inspections, through IRIS or your contractor dashboard. Where access is needed to be arranged through homeowner please request a H1 inspection. The inspector will contact the homeowner for an appointment time.

DO NOT MAKE APPOINTMENTS FOR THE ELECTRICAL INSPECTOR!!!!

7. Can the required light and receptacle be on the same circuit as the furnace?

422-12 Central Heating Equipment.

Central heating equipment other than fixed electric space-heating equipment shall be supplied by an individual branch circuit.

Exception: Auxiliary equipment such as a pump, valve, humidifier, or electrostatic air cleaner directly associated with the heating equipment shall be permitted to be connected to the same branch circuit.

Article 422-12 clearly states that the light and required receptacle will not be connected to the same branch circuit as the furnace.

8. How much electrical work is included in my (MINIMUM) permit fee?

The reconnection of the wires from the disconnect to the equipment only. The scope of electrical work included with the replacement permit, is restricted to the scope of work allowed for the SP-PH license. Service changes and all other alterations will require additional electrical permits.

Questions and Answers for Heating and A/C Contractors

9. What is considered electrical contracting?

The General Statutes Chapter 87-Article 4 defines electrical contracting as; 87-43.

Electrical contracting defined; licenses.

Electrical contracting shall be defined as engaging or offering to engage in the business of installing, maintaining, altering or repairing any electric work, wiring, devices, appliances or equipment. No person, partnership, firm or corporation shall engage, or offer to engage, in the business of electrical contracting within the State of North Carolina without having received a license in the applicable classification described in G.S. 87-43.3 from the State Board of Examiners of Electrical Contractors in compliance with the provisions of this Article, regardless of whether the offer was made or the work was performed by a qualified individual as defined in G.S.87-41.1. In each separate place of business operated by an electrical contractor at least one listed qualified individual shall be regularly on active duty and shall have the specific duty and authority to supervise and direct all electrical wiring or electrical installation work done or made by such separate place of business. Every person, partnership, firm or corporation engaging in the business of electrical contracting shall display a current certificate of license in his principal place of business and in each branch place of business which he operates. Licenses issued hereunder shall be signed by the chairman and the secretary-treasurer of the Board, under the seal of the Board. A registry of all licenses issued to electrical contractors shall be kept by the secretary-treasurer of the Board, and said registry shall be open for public inspection during ordinary business hours.

You are not allowed to install or advertise to install any electrical work with out a license form the North Carolina Electrical License Board.

10. How much electrical wiring am I allowed to do under my SP-PH license?

.0807. SCOPE OF SP-PH LICENSE

A special restricting plumbing, heating, and air conditioning electrical contracting license (SP-PH) authorizes the licensee to install, maintain, or repair electric wiring or devices only as an incident to the licensee's plumbing, heating, or air conditioning business. Furthermore, the license authorizes the licensee to install, maintain, or repair only wiring that is directly related to plumbing, heating, or air conditioning equipment and that:

- (1) is restricted to circuits or parts of circuits that operate at voltages not exceeding 600 volts, phase-to-phase;
- (2) is electrically isolated from the building wiring system by an overcurrent protective, isolating device, such as a fused switch or circuit breaker, that
 - (a) has been installed, complete with line-side connections, by others;
 - (b) is permanently and legibly marked to identify the equipment served by the device; and
 - (c) is located within an enclosure intended solely for, and limited to, serving the specific plumbing, heating, or air conditioning equipment involved, or is located within a panelboard that serves the building wiring system and is likewise permanently and legibly marked to identify the equipment served by the device, provided wiring is installed by others from the load-side terminals of the device to a junction box, auxiliary gutter, or similar disconnecting means located outside the panelboard, but in sight of and within 50 feet of, the plumbing, heating, or air conditioning equipment served;
- (3) originates at the load-side terminals of the protective isolating device;

Questions and Answers for Heating and A/C Contractors

- (4) except for control wiring, is physically adjacent to the plumbing, heating, or air conditioning equipment from the equipment. Control wiring that receives its control power from the plumbing, heating, or air conditioning equipment involved may extend beyond these limits if the control voltage does not exceed 120 volts to ground and the wiring is protected from overcurrent; and
- (5) is not installed in a location considered as hazardous under the National Electrical Code. Statutory Authority G.S. 87-42; 87-43.3;

Eff. October 1, 1988.

This license restricts you to a reconnect of a unit only.

The SP-PH license DOES NOT ALLOW changing or replacement of overcurrent protection (breakers), changing, extensions, or replacement of branch circuits or feeders, changing or replacement of circuit or fuse panels, changing or replacement of disconnects, or other electrical equipment that is a part of the home.

11. When am I required to get an electrical permit?

G.S. 153A-357. Permits. No person may commence or proceed with:

- (1) The construction, reconstruction, alteration, repair, movement to another site, removal, or demolition of any building;
- (2) The installation, extension, or general repair of any plumbing system;
- (3) The installation, extension, alteration, or general repair of any heating or cooling equipment system; or
- (4) The installation, extension, alteration, or general repair of any electrical wiring, devices, appliances, or equipment

Without first securing from the inspection department with jurisdiction over the site of the work each permit required by the State Building Code and any other State or local law or local ordinance or regulation applicable to the work. A permit shall be in writing and shall contain a provision that the work done shall comply with the State Building and all other applicable State and Local laws and local ordinances and regulations.

An electrical permit is required for any and all premises wiring: This includes interior and exterior wiring, power, lighting, control and signal circuit wiring (low voltage) together with all of their associated hardware, fittings, and wiring devices, both permanently and temporarily installed, that extends from the service point of utility conductors or source of a separately derived system to the outlet(s). Such wiring does not include wiring internal to appliances, fixtures, motors, controllers, motor control centers, and similar equipment.

12. How many inspectors are required for a furnace or a/c change out or new installation?

Customers in single family or townhome dwellings can expect a one (1) multi-trade inspector to handle their project. For all other customers, two (2) inspectors will visit their project. One for the mechanical installation and one for the electrical installation.

Revised: 4/11/16

CONTACT:

- General permit information - call 980-314-CODE
- General electrical code questions - call RTAC 704-432-7822 or CTAC 704-432-4668
- Code Interpretations - call Gary Mullis, Electrical Code Administrator, 980-314-3098