

## Bulletin 26-24-6

Heating, ventilating, air conditioning (HVAC) & refrigeration installations  
Rules 2-116, 4-004, 12-010, 12-100, 12-112, 12-402, 12-506, 12-518,, 12-610, 12-618,  
16-220, 26-654, 26-806 and 28-604

Issued May 2022

Supersedes Bulletin 26-24-5

### Scope

- 1) Introduction
- 2) Bonding of heating ducts
- 3) Wiring methods
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  - b) Mechanical protection for non-metallic-sheathed cable
  - c) Extra low voltage wiring
- 4) Ductless split A/C systems
  - a) Wiring methods for ductless split system.
  - b) Refrigeration and air conditioning equipment split unit disconnect requirements
- 5) HVAC equipment

### 1) Introduction

In addition to this Bulletin, several other Bulletins provide information about HVAC wiring installation requirements:

- Bulletin 2-10-\* Electrical equipment near combustible gas equipment;
- Bulletin 10-14-\* Equipotential bonding of non-electrical equipment;
- Bulletin 12-19-\* Non-metallic sheathed cable wiring methods; and
- Bulletin 26-15-\* Disconnect switch location for furnaces, ground source heat pumps, and central units.
- Bulletin 26-27-\* Receptacles required for maintenance of equipment

### 2) Bonding of heating ducts

#### Question 1

If a flexible piece of duct is installed between the furnace and duct system, is there a requirement for a bond jumper across the flex duct in residential installations?

#### Answer 1

The Ontario Electrical Safety Code (OESC) does not require bonding of metal duct systems in residential installations.

### **3) Wiring methods**

#### **a) Requirements for armoured cables**

##### **Question 2**

When a furnace is replaced, is an anti-short bushing required to be installed in the old armoured cable?

##### **Answer 2**

Yes, anti-shorts are required.

##### **Rationale 2**

Rule 12-610 1) a) states that where conductors emerge from armour, they shall be protected from abrasion by bushings of insulating material or equivalent devices. Quite often, when armoured cable is field cut, the aluminum or steel edge is left sharp by the saw or cutter. The bushing is required to protect the conductors from damage.

##### **Question 3**

Can the electrical drop to the furnace that is usually armoured cable (BX), be supported to a black iron or copper gas line?

##### **Answer 3**

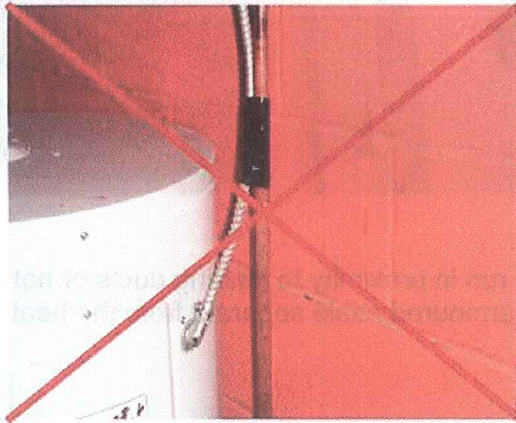
Yes, if the armoured cable is not subject to mechanical damage by the operation of the gas shut-off valve or any other routine work that might be performed, then supporting to a black iron gas pipe is acceptable. If the gas pipe has to be removed, any electrical cabling in the vicinity will need to be moved anyway to facilitate the use of tools such as pipe wrenches, etc. The fastener for supporting the cable to the gas pipe shall be suitable for the purpose such as approved tie-wraps for the application. The use of electrical tape is not acceptable because the adhesive on the tape will deteriorate with time and temperature and the tape will let go. See Photo B1.

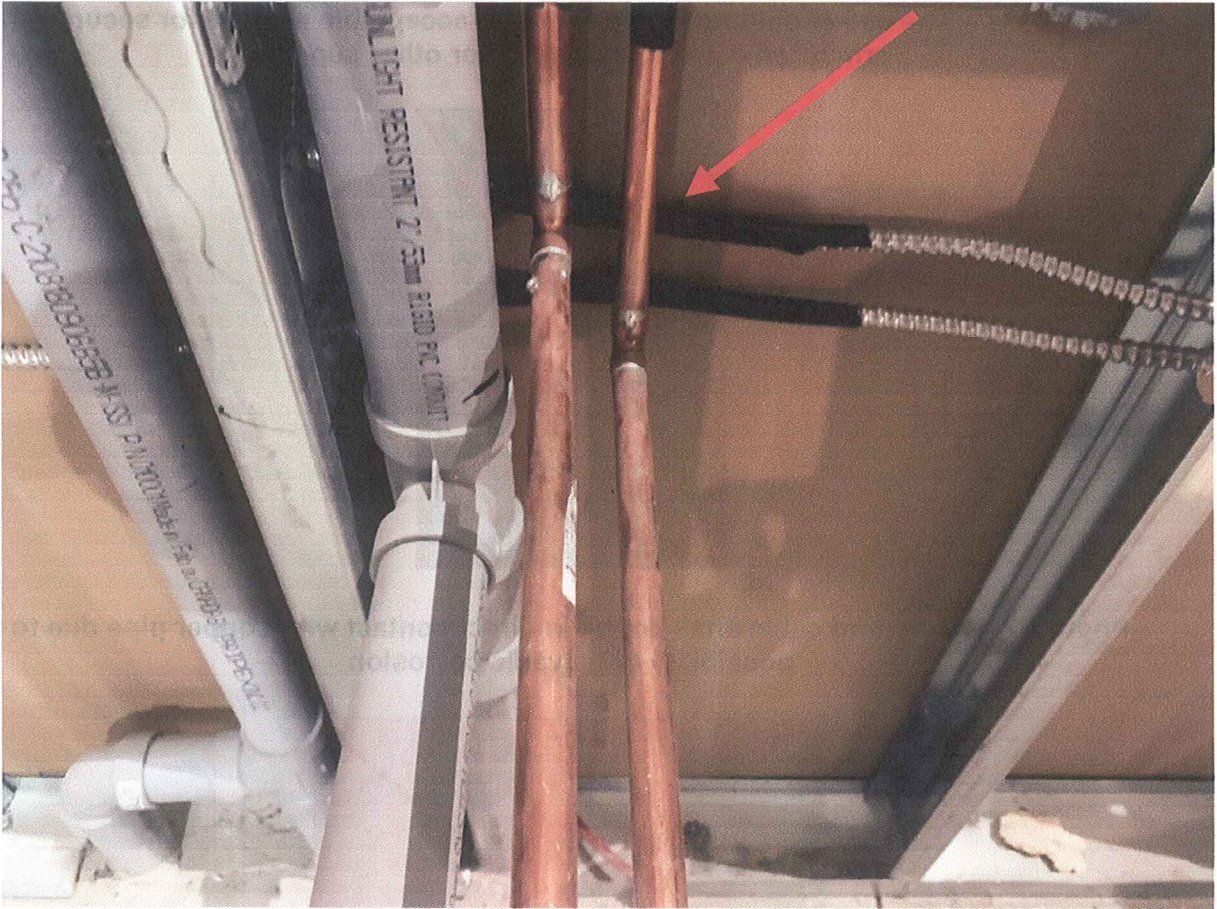
If the gas or other piping used for support is copper, then precautions need to be taken, as per Rule 2-116 2), to insure that galvanic corrosion between dissimilar metals is addressed (e.g. armoured cable taped to the copper pipe). See Photo B2.

**Photo B1 – The use of electrical tape is not an acceptable method for securing armoured cable to a gas pipe or other support**



**Photo B2 – Armoured cable shall not be in direct contact with copper pipe due to possibility of galvanic corrosion**





**Question 4**

When armored cable is run in proximity to heating ducts or hot water pipes, is there a requirement to keep the armored cable separate from the heat source, in order to limit the transfer of heat?

**Answer 4**

Yes, an air space or a thermal barrier would be an acceptable method of limiting the transfer of heat when armored cable is run in proximity to a heating source, similar to the non-metallic sheathed cable requirements of Rule 12-506 4). Alternatively, if an air space or thermal barrier is not provided and the armored cable is routed in direct contact with a heating plenum, duct or hot water pipe, then the ampacity correction factors in Table 5A shall be applied, as per Rule 4-004 7) b) i).

**Rationale 4**

Rule 4-004 7) b) i) requires the application of further correction factors when conductors are installed in an ambient temperature that exceeds or can be expected to exceed the 30 °C ambient temperature on which Tables 1, 2, 3, and 4 are based. Therefore, when armored cable is run in direct contact with a heating plenum, duct or hot water pipe, the conductor ampacity needs to be derated. Since the determination of the ambient

temperature requires a manufacturer or engineer's calculation and may be impractical to estimate, a more practical solution is to provide an air space or a thermal barrier, as specified by Rule 12-506 for non-metallic sheathed cable. There is no restriction on supporting armoured cable directly to a cold air plenum or duct.

**Note**

Rule 12-618 requires that armoured cable be secured within 300 mm of an enclosure and at intervals of not more than 1.5 m throughout the run.

**b) Mechanical protection for non-metallic sheathed cable**

**Question 5**

Can NMSC be installed below 1.5 m above the floor for a residential furnace drop?

**Answer 5**

Yes, however, exposed NMSC installed below 1.5 m above the floor requires mechanical protection, as per Rule 12-518. This includes all cable drops to residential furnaces where the cable is not protected by location (e.g. the furnace is mounted directly beside a studded wall, and the cable is run between the studs). Examples of acceptable installations include running the NMSC in flexible conduit or a raceway or replacement of the NMSC with armoured cable (BX) for the drop.

**c) Extra low voltage wiring**

**Question 6**

Can extra low voltage (Class 2) wiring that operates a humidifier, be run inside a return air duct (drop at furnace)?

**Answer 6**

Yes, provided that a cable approved for the application such as type LVT is used. (Rules 16-220, 12-010, 12-100)

**Question 7**

When joining extra low voltage (Class 2) wiring for the furnace control, do all joints need to be made in a box?

**Answer 7**

No, provided that the joints are made with approved wire connectors and are accessible after completion of the installation. (Rule 12-112)

**Rationale 7**

On extra low voltage, Class 2 circuits, operating at voltages of less than 30 V, the joints need not be in a box because the circuit is limited to 30 V or less and 100 VA or less. Voltage and energy limited circuits are neither a shock or fire hazard. Rule 12-112 requires joints and splices to be mechanically and electrically secure and the splices to be insulated to the equivalent level of the insulation on the conductors.

#### **4) Ductless split AC systems**

##### **(a) Wiring methods for ductless split systems**

Cables and wiring methods permitted by Section 12 for interconnection of units in ductless mini-split air conditioners, shall be used if suitable for termination.

In addition, Electrical Safety Authority(ESA) will permit TC-ER cable (certified to CSA standard C22.22 No. 230) to be used for interconnection of units in ductless mini-split air conditioners installations provided that it is installed:

- as per Rules 12-508, 12-512, 12-518 and 12-520;
- continuously supported; and
- not pulled through joists (structural members).

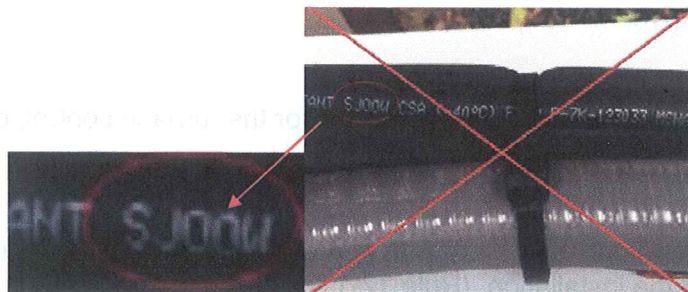
TC-ER cables comply with the crush and impact requirements of armoured (or metal clad) cables. Based on Rule 12-602 1), similar to armoured cables, TC-ER cables will be permitted to be installed on a building while being continuously supported.

As of June 2021, ESA no longer accepts cables certified to UL standard UL1277 such as Type TC cable marked as “TC-ER-JP”, and Type PLTC for interconnection of units in ductless mini-split air conditioners.

Flexible cord (such as SJOOW (see Photo B3)) is not allowed by the OESC Rule 12-402 3) to be used as a substitute for the fixed wiring of structures and shall not be

- i) permanently secured to any structural member;
- ii) run through holes in walls, ceilings, or floors; or
- iii) run through doorways, windows, or similar openings;

##### **Photo B3 - SJOOW flexible cord used for interconnection wiring of a split system**



##### **(b) Refrigeration and air conditioning equipment split unit disconnect requirements**

###### **Question 8**

Is a disconnecting means required for an interior refrigeration or air conditioning equipment fan coil/evaporator unit, such as the indoor unit of a split A/C system, walk in coolers, etc.?

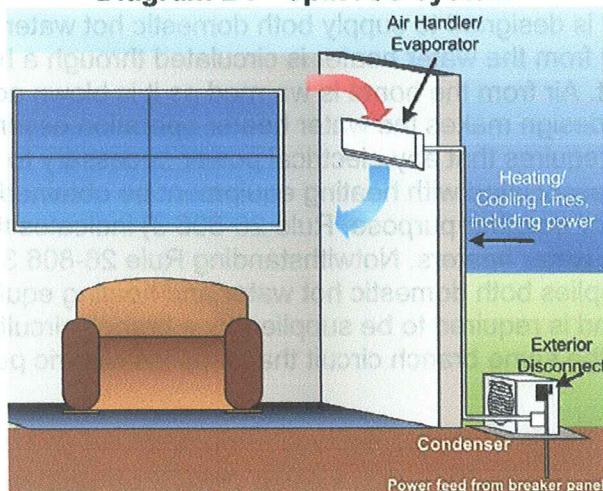
**Answer 8**

No.

**Rationale 8**

The requirement of Rule 28-604 5) is intended to provide disconnecting means for the motor compressor to facilitate a quick response when filling or evacuating coolant from the refrigerant lines of a unit at the compressor. The Interior Air Handler/fan coil does not contain a hermetically sealed motor compressor.

**Diagram B1 - Split A/C system**



**5) HVAC equipment**

**Question 9**

Can HRVs (heat recovery ventilators) and special air cleaners, that are not physically attached to the furnace, be supplied by the same circuit as the furnace?

**Answer 9**

Yes, HRVs, special air cleaners and other equipment associated with the heating system, which are physically and not physically attached to the furnace, are permitted to be supplied by the furnace circuit.

**Rationale 9**

The intent of Rule 26-806 is to ensure that only equipment that is associated with the operation of the heating system or installed to improve the operation of the heating system, be supplied from a separate circuit, used for no other purpose. If the circuit is loaded with equipment that is not associated with the heating system, tripping of the overcurrent device may occur, resulting in loss of heat. In addition, consideration needs to be made to make sure that the heating unit and associated equipment meets the requirement of Rule 8-104.

**Question 10**

Is a gas water heater that supplies both domestic hot water and heating equipment permitted to be supplied by a general purpose branch circuit?

**Answer 10**

No, a gas water heater that supplies both domestic hot water and heating equipment shall be supplied by a branch circuit that does not supply any other outlets or by the same branch circuit that supplies the heating unit and associated equipment, as required by Rule 26-806.

**Rationale 10**

When a water heater is designed to supply both domestic hot water and heating equipment, hot water from the water heater is circulated through a heat exchanger coil in an air handling unit. Air from the home is warmed as it is blown across the heat exchanger coil. This design makes the water heater operation essential for the heating unit. Rule 26-806 1) requires that any electrical power necessary to operate the electrical equipment associated with heating equipment be obtained from a single branch circuit, used for no other purpose. Rule 26-806 3) indicates that Subrule 1) does not apply to gas-fired water heaters. Notwithstanding Rule 26-806 3), operation of a gas water heater that supplies both domestic hot water and heating equipment is critical for heating equipment and is required to be supplied by a branch circuit provided solely for a water heater or by the same branch circuit that supplies electric power to the heating unit.

**Question 11**

Does a receptacle for a gas water heater require a separate branch circuit for a power vent and ignition circuit?

**Answer 11**

No, a gas water heater is not required to be on a separate circuit by the OESC.

**Rationale 11**

The Appendix B Note to Rule 26-806 states: "Subrule 1) is intended to apply only to central heating equipment that does not use electricity as the source of heat. It is not intended to apply to electrical components of non-electric heating equipment such as water heaters, fireplace inserts, room heaters, or other similar auxiliary heating equipment that has electric auto-ignition, controls, or blower motors rated not more than 1/8 hp."

The receptacle is permitted to be supplied by the dedicated circuit for utility room receptacles that is required by Rule 26-654 c) or by any convenient general purpose receptacle/lighting circuit, if the water heater is not located in the utility room.

**Question 12**

Does the Code permit tapping from the branch circuit supplying a furnace to supply associated equipment, such as a humidifier, an air cleaner or a condensate pump for the A/C?

**Answer 12**



Yes. Rule 26-806 4) permits auxiliary equipment that is part of the furnace (such as a pump, valve, humidifier or electrostatic air cleaner, directly associated and operating in combination with the heating equipment) to be connected to the same branch circuit.

**Rationale 12**

The Code allows the tap conductor supplying associated equipment for the heating system to be without individual overcurrent protection when the associated equipment is essential to the operation of the heating system (e.g. a circulating pump is essential to a hot water boiler).