

except that single insulation, as provided by an insulated hanger, may be permitted when the span wire or bracket is supported on wooden poles supporting only trolley, railway feeder, or communication conductors used in the operation of the railway concerned. In case insulated hangers are not used, the strain insulator shall be located so that in the event of a broken span wire the energized part of the span wire cannot be reached from the ground.

(a) *Exception*: This rule does not apply to insulated feeder taps used as span wires.

History: Cr. Register, January, 1968, No. 145, eff. 2-1-68.

E 128.06 Overhead conductors. (1) **IDENTIFICATION.** All conductors of electrical supply and communication lines should be arranged to occupy definite positions throughout, as far as practicable, or shall be so constructed, located, marked, or numbered, or attached to distinctive insulators or crossarms, as to facilitate identification by employees authorized to work thereon. This does not prohibit systematic transposition of conductors.

(2) **BRANCH CONNECTIONS.** (a) *Accessibility.* Connections of branches to supply circuits, service drops, and equipment in overhead construction shall be readily accessible to authorized employees. When possible, connections should be made at poles or other structures.

(b) *Clearance.* Branch connections shall be supported and placed so that swinging or sagging cannot bring them in contact with other conductors, or interfere with the safe use of pole steps, or reduce the climbing or lateral working space.

(3) **COMMON NEUTRAL.** Primary and secondary circuits may utilize a single conductor as a common neutral if such conductor is grounded as indicated in sections E 103.02(2)(d) and (e).

(4) **SERVICE DROPS.** Service drops shall comply with NEC-1971 sections 230-21 through 230-27 except as changed in volume 2 (see section E 230.24) and except as otherwise provided in volume No. 1.

History: Cr. Register, January, 1968, No. 145, eff. 2-1-68; am. (4), Register, April, 1972, No. 196, eff. 5-1-72.

E 128.07 Equipment on poles. (1) **IDENTIFICATION.** All equipment of electrical supply and communication lines should be arranged to occupy definite positions throughout, as far as practicable, or shall be constructed, located, marked, or numbered so as to facilitate identification by employees authorized to work thereon.

(2) **LOCATION.** Transformers, regulators, lightning arresters, and switches when located below conductors or other attachments shall be mounted outside of the climbing space. This equipment shall be so placed that unguarded conductors entering the equipment will have clearances from ground specified in table 2, subsection E 123.03(3).

(3) **GUARDING.** Current-carrying parts of switches, automatic circuit-breakers, and lightning arresters shall be suitably enclosed or guarded if all the following conditions apply:

- (a) If of more than 300 volts, and
- (b) If located on the climbing side of the pole less than 20 inches from the pole center, and
- (c) If located below the top crossarm.

(4) **HAND CLEARANCE.** All current-carrying parts of switches, fuses, lightning arresters, also transformer connections and other connec-

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tions which may require operation or adjustment while alive and are exposed at such times, shall be arranged so that in their adjustment while alive the hand need not be brought nearer to any other current-carrying part at a different voltage than the clearances from pole surfaces required in table 9, section E 123.06(1)(c)1. for conductors of corresponding voltages. (See also sections E 142.03 (1), (2) and (3), for clearances from live parts).

(5) STREET-LIGHTING EQUIPMENT. (a) *Clearance from pole surface.* All exposed metal parts of lamps and their supports (unless effectively insulated from the current-carrying parts) shall be maintained at the following distances from the surface of wood poles:

	Inches
1. In general -----	20
2. If located on the side of the pole opposite the designated climbing side -----	5

Exception: This does not apply where lamps are located at pole tops.

(b) *Clearance above ground.* Street lamps shall be mounted at not less than the following heights above ground:

	Feet
1. Over walkways -----	10
2. Over roadways—	
Connected to circuits of 150 volts or less -----	14
Connected to circuits of more than 150 volts -----	15

Note: Drops to street lights need have no greater clearance than the street lights themselves.

(c) *Horizontal clearances.* Arc and incandescent lamps in series circuits should have at least 3 feet horizontal clearance from windows, porches, and other spaces accessible to the general public.

(d) *Material of suspension.* The lowering rope or chain for lighting units arranged to be lowered for examination or maintenance, shall be of a material and strength designed to withstand climatic conditions and to sustain the lighting unit safely. The lowering rope or chain, its supports, and fastenings shall be examined periodically.

(e) *Insulators in suspension ropes.* Effective insulators as specified in section E 128.04(1), shall be inserted at least 8 feet from the ground in metallic suspension ropes or chains supporting lighting units of series circuits.

(f) *Arc-lamp disconnectors.* A suitable device shall be provided by which each arc lighting unit on series circuits of more than 300 volts may be safely and entirely disconnected from the circuit before the lamp is handled unless the lamps are always worked on from suitable insulating stools, platforms, or tower wagons, or handled with suitable insulating tools, and treated as under full voltage of the circuit concerned.

(g) *Grounding lamp posts.* Metal lamp posts shall be effectively grounded.

(6) TRANSFORMERS. Transformers mounted on arms or poles on public thoroughfares shall be at a height above ground not less than 10 feet where over walkways and not less than 15 feet where over roadways.

(a) *Exception:* Where it is the established practice to mount trans-

formers at lesser distances above ground, such practice may be continued if the reduced mounting heights are carefully maintained.

History: Cr. Register, January, 1968, No. 145, eff. 2-1-68.

E 128.08 Protection for exposed overhead communication lines.

(1) **OPEN WIRE.** Communication lines for public use and fire-alarm lines shall be treated as follows if at any point they are exposed to supply (including trolley) lines of more than 400 volts.

(a) At stations for public use they shall be protected by one of the methods specified in NEC-1971 Article 800 except as changed in volume 2 (see sections E 800.02 and E 800.21).

(b) Elsewhere they shall be isolated by elevation or otherwise guarded so as to be inaccessible to the public.

(2) **METAL-SHEATHED CABLE.** Metal-sheathed cables and messengers shall be isolated or grounded in conformity with the general requirements of chapter E 121.

History: Cr. Register, January, 1968, No. 145, eff. 2-1-68; am. (1) (a), Register, April, 1972, No. 196, eff. 5-1-72.

E 128.09 Circuits of one class used exclusively in the operation of circuits of another class. (1) OVERHEAD COMMUNICATION CIRCUITS, USED EXCLUSIVELY IN THE OPERATION OF SUPPLY CIRCUITS. (a) Choice of method. Communication circuits used exclusively in the operation of supply lines may be run either as ordinary communication circuits or as supply circuits under the conditions specified in section E 128.09(1) (c) and (d), respectively. After selection of the type of communication-circuit construction and protection for any section which is isolated, or is separated by transformers, such construction and protection shall be consistently adhered to throughout the extent of such isolated section of the communication system.

(b) *Guarding.* Communication circuits used in the operation of supply lines shall be isolated by elevation or otherwise guarded at all points so as to be inaccessible to the public.

(c) *Where ordinary communication line construction may be used.* Communication circuits used in the operation of supply lines may be run as ordinary communication conductors under the following conditions:

1. Where such circuits are below supply conductors in the operation of which they are used (including high voltage trolley feeders) at crossings, conflicts, or on commonly used poles, provided:

a. Such communication circuits occupy a position below all other conductors or equipment at crossings, conflicts or on commonly used poles.

b. Such communication circuits and their connected equipment are adequately guarded and are accessible only to authorized persons.

c. The precautions in Wis. Adm. Code chapter E 144 and NEC-1971 Article 800 except as changed in volume 2 (see sections E 800.02 and E 800.21) have been taken.

d. Where such circuits are below supply conductors in the operation of which they are used and are above other supply or communication conductors at wire crossings, conflicts, or on the same poles, provided the communication circuits are protected by fuseless lightning arresters, drainage coils, or other suitable devices to prevent the communication circuit voltage from normally exceeding 400 volts.

Note: The grades of construction for communication conductors with inverted levels apply.

(d) *Where supply line construction must be used.* Communication circuits used in the operation of supply lines shall comply with all requirements for the supply lines with which they are used, where they do not comply with the provisions of section E 128.09(1)(c)1. or 2.

1. Exception 1: Where the voltage of supply conductors concerned exceeds 8,700, the communication conductors need only meet the requirements for supply conductor of 5,000 to 8,700 volts.

2. Exception 2: Where the supply conductors are required to meet grade C, the size of the communication conductors may be the same as for grade D (see section E 126.03(9)(b)) for spans up to 150 feet.

(2) **SUPPLY CIRCUITS USED EXCLUSIVELY IN THE OPERATION OF COMMUNICATION CIRCUITS.** Circuits used for supplying power solely to apparatus forming part of a communication system may be run either in open wire or in aerial or underground cable as follows:

(a) Where run in open wire, such circuits shall have the grades of construction, clearances, insulation, etc. prescribed elsewhere in part 2 for supply or communication circuits of the voltage concerned.

(b) Where run in aerial or underground cable and the following requirements are met, the grades of construction, clearances, separations, locations, etc. prescribed elsewhere in part 2 for communication cables shall apply.

1. Such cables are covered with effectively grounded continuous metal sheaths or are carried in metal cable rings on effectively grounded messengers.

2. All circuits in such cables are owned or operated by one party and are maintained only by qualified employees.

3. Supply circuits included in such cables are terminated at points accessible only to qualified employees.

4. Communication circuits brought out of such a cable, if they do not terminate in a repeater station or terminal office, shall be so protected or arranged that in the event of a failure within the cable, the voltage on these communication circuits will not exceed 400 volts.

5. Terminal apparatus for the power supply shall be arranged so that live parts are inaccessible when such supply circuits are energized.

a. Exception: The provisions of sections E 128.09 (2) (a) and (b), do not apply to supply circuits of 550 volts or less and which carry power not in excess of 3,200 watts, covered in section E 122.01 (2) (c).

History: Cr. Register, January, 1968, No. 145, eff. 2-1-68; am. (1) (c) 1. c., Register, April, 1972, No. 196, eff. 5-1-72.

E 128.10 Overhead electric railway construction. (1) **TROLLEY CONTACT CONDUCTOR SUPPORTS.** All overhead trolley-contact conductors shall be supported and arranged so that the breaking of a single contact conductor fastening will not allow the trolley conductor, live span wire, or current-carrying connection to come within 10 feet (measured vertically) from the ground, or from any platform accessible to the general public. Span-wire insulation for trolley contact conductors shall comply with section E 128.05.

(2) **HIGH-VOLTAGE CONTACT CONDUCTORS.** Every trolley contact conductor of more than 750 volts in urban districts where not on fenced right of way shall be suspended so as to minimize the liability of a