Chapter E 6

ADOPTION OF NATIONAL ELECTRICAL SAFETY CODE, 1977 EDITION, AND WISCONSIN AMENDMENT THERETO

E 6.01 Adoption of code for electrical and communication facilities
E 6.02 Consent to incorporate NESC-1977 by reference
E 6.03 Omissions from NESC-1977
E 6.04 Changes or additions to NESC-1977

Note: The Electrical Code, Volume 1 as it existed on September 30, 1979 was repealed and a Electrical Code, Volume 1 was created effective October 1, 1979.

E 6.01 Adoption of code for electrical and communication facilities. The National Electrical Safety Code-1977 (also American National Standards Institute C2 including C2.1-1971, C2.2-1976, C2.3-1973 and C2.4-1973) which in turn includes Section 9 and Parts 1 through 4 and indices, subject to omissions as shown in section E 6.03 and changes and additions shown in section E 6.04, is hereby incorporated by reference into the Wisconsin Administrative Code, Electrical, Volume 1. Interim amendments of the NESC-1977 will have no effect in the state of Wisconsin until such time as this section is correspondingly revised to reflect these changes.

History: Cr. Register, September, 1979, No. 285, eff. 10-1-79.

E 6.02 Consent to incorporate NESC-1977 by reference. Pursuant to s. 227.025, Stats., the attorney general and the revisor of statutes have consented to the incorporation by reference of these standards contained in the NESC-1977 (except for the omissions as shown in section E 6.03 and the changes and additions as shown in section E 6.04) which can be obtained from the Institute of Electrical and Electronic Engineers, Inc., 345 East 47th Street, New York, NY 10017. Copies of the afore-mentioned standard code are on file in the offices of the public service commission, the secretary of state, and the revisor of statutes.

History: Cr. Register, September, 1979, No. 285, eff. 10-1-79.

E 6.03 Omissions from NESC-1977. The following sections of the NESC-1977 are not incorporated as part of the Wisconsin State Electrical Code, Volume 1:

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Footnote 19, Table 232-1	117, 120
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History: Cr. Register, September, 1979, No. 285, eff. 10-1-79.

E 6.04 Changes or additions to NESC-1977. Following are the changes or additions to the NESC-1977. (The following changes or additions have been prefixed by the letter E to denote that such changes or additions are rules of this state and not those of NESC-1977. Following the E designation is the referenced NESC section or subsection and the page on which it is found in the NESC. Example: E 214-A (NESC 214A, p. 107) The word "Change" following the section number and heading means that the corresponding wording of the NESC-1977 has been changed and that the new wording is substituted at the appropriate location. The word "Addition" following the section number and heading means that a new requirement is incorporated in the NESC-1977 and that the new requirement is inserted at the appropriate location.)

SECTION 9. GROUNDING METHODS FOR ELECTRIC SUPPLY AND COMMUNICATION FACILITIES

E 96-A-3 (NESC 96A3, p. 29) Multiple Grounded Systems. (Change) Change the first sentence to read:

The neutral, which shall be of sufficient size and ampacity for the duty involved, shall be connected to made electrodes at each transformer location and at a sufficient number of additional points to total not less than nine grounds in each mile of line, not including grounds at individual services.

E 97-C (NESC 97C, p. 30) Separation of Grounding Conductors. (Change)

C. Primary and secondary circuits utilizing a single conductor as a common neutral shall have at least nine ground connections on such conductor in each mile of line exclusive of ground connections at customers' service equipment.

PART 1. RULES FOR THE INSTALLATION AND MAINTENANCE OF ELECTRICAL SUPPLY STATIONS AND EQUIPMENT

SECTION 11. PROTECTIVE ARRANGEMENTS IN ELECTRICAL SUPPLY STATIONS

E 110-A (NESC 110A, p. 48) Enclosure of Equipment. (Change) Change second paragraph and note to read:

Metal fences, when used to enclose electrical supply stations having energized electrical conductors or equipment that can be reached by

trespassers, shall be a minimum of eight feet in height and shall be effectively grounded. In the case of chain-link, mesh or other open-type fences through which sticks or other objects can be inserted to make contact with live parts or parts that may become alive, horizontal clearance as specified in column 3 of Table 2 (Minimum clearance from live parts) shall be provided. Other types of construction such as nonmetallic material shall present equivalent barriers to climbing or other unauthorized entry.

Note: It is recommended that, where permissible, a one-foot extension, carrying three strands of barbed wire, be used above the fence fabric, either as an outside or inside the fence overhang, or as a vertical extension of the fence to obtain the required overall height.

SECTION A. DEFINITIONS OF SPECIAL TERMS (p. 97)

Administrative Authority (Change): The authority for the enforcement of this code is vested in the public service commission with respect to the installation and operation of circuits or equipment by public utilities and railroads in the exercise of their functions as utilities and railroads.

PART 2. SAFETY RULES FOR THE INSTALLATION AND MAINTENANCE OF OVERHEAD ELECTRIC SUPPLY AND COMMUNICATION LINES

SECTION 21. GENERAL REQUIREMENTS

E 217 (follows NESC 216, p. 109) Marking of Poles Carrying High Voltages. (Addition)

E217. Marking of Poles Carrying High Voltages. 1. Section 196.67, Wis. Stats., provides the following in part: Every corporation, company or person constructing, operating or maintaining an electric transmission line with a voltage of 6,000 or more between conductors or between conductors and the ground shall place warning signs, not less than 4 feet nor more than 6 feet from the ground, upon all poles or other structures supporting such line when within 100 feet of school grounds, and when within 100 feet of any place where such line crosses a public highway and when within any city or village.

Every such sign shall be in red, black, orange or reflective letters not less than 2 inches high on a contrasting background and shall read: "Danger—High Voltage." The public service commission may establish standards for electric transmission line pole signs having at least equivalent warning qualities to signs specified in this subsection, and warning signs meeting standards established or approved by the public service commission shall be deemed to be in compliance with this section.

Note: This has been interpreted as applying to distribution as well as transmission lines.

2. In the alternative, the public service commission approves for use as electric transmission and distribution pole (and structure) warning signs those "Danger—High Voltage" warning signs which meet the requirements as to format of subsections 1926.200(a) and (b) of Part 1926-Safety and Health Regulations for Construction-1974 (OSHA) as found in the Code of Federal Regulations, subject to the following condition:

The overall dimensions of these signs shall be not less than 10 inches by 7 inches, except that in those situations where use of a sign of this size is not practicable, two or more signs not smaller than 7 inches by 5 inches may be substituted. Letters of the words "High Voltage" shall be in red, black, orange, or reflective letters on the contrasting (white) background and at least 2 inches in height.

Exception: For those specific signs having dimensions of 10 inches (horizontal) by 7 inches (vertical), the height of letters shall be not less than 1¼ inches.

SECTION 23. CLEARANCES

E 231-C (NESC 231C, p. 115) Clearances from Railroad Tracks. (Change) Change Exception 1 to read:

Exception 1. At industrial sidings, a clearance of not less than 7 feet shall be permitted where the supporting structure is not the controlling obstruction, provided sufficient space for a driveway is left where cars are loaded or unloaded.

Table E 232-1 (NESC Table 232-1, pp. 116-120) Minimum Vertical Clearance of Wires, Conductors and Cables Above Ground, Rails, or Water (Changes and Additions)

Table E 232-1 which follows includes the following changes in NESC Table 232-1:

Footnote 18 has been changed.

Footnote 19 has been deleted.

Footnotes 24 and 25 have been added.

Item 7 contains different requirements for vertical clearances over water areas.

Table E 232-1. Minimum Vertical Clearance of Wires, Conductors, and Cables Above Ground, Rails, or Water

(Voltages are phase to ground for effectively grounded circuits and those other circuits where all ground faults are cleared by promptly de-energizing the faulted section, both initially and following subsequent breaker operations. See the definition section for voltages of other systems.)

Nature of surface underneath wires, conductors, or cables	Communication conductors and cables, guys, messengers, surge protection wires, neutral conductors meeting Rule 230 E1, and supply cables meeting Rule 230C1⑩ (ft) Rule	Supply line conductors, street lighting conductors and service drops⑧ Open supply line conductors 0 to 750 V. Supply cables of all voltages meeting 230C2 of 230C3 (ft)	Open supply line conductors 750 V to 15kV (ft)	Open supply line conductors to 15 to 50 kV (ft)	Trolly and electified railroad contact conductors and associated span or messenger wires① 0 to 750 V kV to ground (ft)	750 V to 50 ground (ft)
Where wires, conductors, or cables cross over						
1. Track rails of railroads (except electrified railroads using over-head trolley conductors) ②⑧⑫	③⑧27	③27	③28	30	④22	④22
2. Roads, streets, alleys, commercial driveways, parking lots subject to truck traffic ⑫⑬	⑥⑬18	18	20	22	⑤18	⑥20
3. Residential driveways and commercial areas not subject to truck traffic⑫⑬	10	③15	20	22	⑥18	⑤20
4. Other land traversed by vehicles such as cultivated, grazing, forest, orchard, etc.⑫⑬	18	18	20	22	—	—
5. Spaces or ways accessible to pedestrians only⑨	⑦15	⑧⑬15	15	17	16	18
6. Water areas not suitable for sailboating or where sailboating is prohibited⑬	16	16	17	17	—	—

7. Water areas suitable for sailboating including lakes, ponds, reservoirs, tidal waters, rivers, streams, and canals with an unobstructed surface area of:①⑦						
(a) Less than 10 acres	18	18	20	22	—	—
(b) 10 to 80 acres	30	30	31	33	—	—
(c) Over 80 acres	40	40	40	42	—	—
8. Public or posted private land and water areas for rigging or launching sailboats	Clearance above ground shall be 5 ft. greater than in 7 above, for the type of water areas served by the launching site					
Where wires, conductors, or cables run along and within the limits of highways or other road rights-of-way but do not overhang the roadway						
9. Streets or alleys in urban districts	②③18	④18	20	22	⑥18	⑥20
10. Roads in rural district	②③14	⑧18	20	22	⑥18	⑥20

①Where subways, tunnels, or bridges require it, less clearances above ground or rails than required by Table 232 1 may be used locally. The trolley and electrified railroad contact conductor should be graded very gradually from the regular construction down to the reduced elevation.

②For wire, conductors, or cables crossing over mine, logging, and similar railways which handle only cars lower than standard freight cars, the clearance may be reduced by an amount equal to the difference in height between the highest loaded car handled and 20 ft., but the clearances shall not be reduced below that required for street crossings.

③These clearances may be reduced in 25 ft. where paralleled by trolley contact conductor on the same street or highway.

④In communities where 21 ft. has been established, this clearance may be continued if carefully maintained. The elevation of the contact conductor should be the same in the crossing and next adjacent spans. (See Rule 289D2 for conditions which must be met where uniform height above rail is impractical.)

⑥In communities where 16 ft. has been established for trolley and electrified railroad contact conductors 0 to 750 V to ground, or 18 ft. for trolley and electrified railroad contact conductors exceeding 750 V, or where local conditions make it impractical to obtain the clearance given in the table, these reduced clearances may be used if carefully maintained.

⑧If a communication service drop or a guy which is effectively grounded or is insulated against the highest voltage to which it is exposed, up to 8.7 kV, crosses residential streets and roads, the clearance may be reduced to 16 ft. at the side of the traveled way provided the clearance at the center of the traveled way is at least 18 ft. This reduction in clearance does not apply to arterial streets and highways which are primarily for through traffic, usually on a continuous route.

⑦This clearance may be reduced to the following values: *feet*

(a)	For insulated communication conductors and communication cables	8
(b)	For conductors of other communication circuits	10
(c)	For guys	8

(d)	For supply cables meeting Rule 230C1	10

⑧This clearance may be reduced to the following values:

		feet
(a)	Supply conductors limited to 300 V to ground if more than 25 ft. measured in any direction from a swimming pool, swimming area, or diving platform	12
(b)	Supply conductors limited to 150 V to ground and meeting Rules 230C2 or 230C3 and located at the electric service entrance to buildings	10

⑨Spaces and ways accessible to pedestrians only are areas where vehicular traffic is not normally encountered or not reasonably anticipated. Land subject to (but not limited to) highway right-of-way maintenance equipment, logging equipment, all-terrain vehicles, etc., shall not be considered as accessible to pedestrians only.

⑩Where a supply or communication line along a road is located relative to fences, ditches, embankments, etc., so that the ground under the line will never be traveled except by pedestrians, this clearance may be reduced to the following values:

		feet
(a)	Insulated communication conductor and communication cables	8
(b)	Conductors of other communication circuits	10
(c)	Supply cables of any voltage meeting Rule 230C1 and supply cables limited to 150 V to ground meeting Rules 230C2 or 230C3	10
(d)	Supply conductors limited to 300 V to ground	12
(e)	Guys	8

⑪No clearance from ground is required or anchor guys not crossing track rails, streets, driveways, roads, or pathways.

⑫This clearance may be reduced to 13 ft. for communication conductors where no part of the line overhangs any part of the highway which is ordinarily traveled, and where it is unlikely that loaded vehicles will be crossing under the line.

⑬Where communication wires or cables or supply cables meeting Rule 230C1 cross over or run along alleys, driveways, or parking lots, this clearance may be reduced to 15 ft. for spans limited to 150 ft.

⑭Where supply circuits of 600 V or less, with transmitted power of 5000 W or less, are run along fenced (or otherwise guarded) private right-of-way in accordance with the provisions specified in Rule 220B2, this clearance may be reduced to 10 ft.

⑮The value may be reduced to 25 ft. for guys, for cables carried on messengers, and for supply cables meeting Rule 230C1. This value may be reduced to 25 ft. for conductors effectively grounded throughout their length and associated with supply circuits of 0 to 22 kV, only if such conductors are stranded, are of corrosion-resistant material, and conform to the strength and tension requirements for messengers given in Rule 261I.

⑯Adjacent to tunnels and overhead bridges which restrict the height of loaded rail cars to less than 20 ft., these clearances may be reduced by the difference between the highest loaded rail car handled and 20 ft., if mutually agreed to by the parties at interest.

⑰These clearances are for land cultivated or traversed by vehicles and equipment whose overall operating height is less than 14 ft.

⑱For controlled impoundments, the surface area and corresponding clearances shall be based upon the design high water level. For other waters, the surface area and clearances shall be based on normal high water. The clearance over rivers, streams, and canals shall be based upon the largest surface area of any 1 mi. long segment which includes the crossing. The clearance over a canal or similar waterway providing access for sailboats to a larger body of water shall be the same as that required for the larger body of water.

⑲Where the U.S. Army Corps of Engineers or its surrogate has issued a crossing permit, clearances of that permit shall govern.

⑳See Rule 234H for the required horizontal and diagonal clearances to rail cars.

㉑These clearances do not allow for future road resurfacing.

[7]For the purpose of this rule, trucks are defined as any vehicle exceeding 8 ft. in height.

[8]A diagonal clearance the same as the vertical clearance shall be maintained to uneven or sloping terrain within a horizontal distance of ½ of the vertical clearance, all distances to be measured from the conductors in their wind-displaced position as defined in Rule 234A1.

[8]The clearance for communication conductors and cables not supported by a messenger shall be permitted to be installed at a minimum of 15 feet.

Table E 232-2 (NESC, Table 232-2, pp. 124-125) Minimum Vertical Clearance of Rigid Live Parts Above Ground (Addition)

Table E 232-2 which follows includes the following addition in NESC Table 232-2:

Footnote 8 has been added.

Table E 232-2. Minimum Vertical Clearance of Rigid Live Parts Above Ground

(Voltages are phase to ground for effectively grounded circuits and those other circuits where all ground faults are cleared by promptly de-energizing the faulted section, both initially and following subsequent breaker operations. See the definition section for voltages of other systems.)

Nature of surface below live parts	0 to 750 V (ft)	750 V to 15 kV (ft)	15 to 50 kV (ft)
1. Where live parts overhang:			
a. Roads, street, alleys, parking lots subject to truck traffic. ⑤⑥	16	18	20⑧
b. Residential driveways and commercial areas not subject to truck traffic such as parking lots and drive-in establishments. ⑤⑥	①13	18	20⑧
c. Other land traversed by vehicles such as cultivated land, grazing land, forest, orchard, etc. ③	16	18	20
d. Spaces and ways accessible to pedestrians only. ⑦	①④13	13	15⑧
2. Where live parts are along and within the limits of highways or other road rights-of-way but do not overhang the roadway:			
a. Streets and alleys in urban districts.	②16	18	20⑧
b. Roads in rural districts.	②13	16	18

①This clearance may be reduced to the following values: *feet*

(a) Live parts limited to 300 V to ground 12

(b) Live parts limited to 150 V to ground and short lengths of supply cables meeting Rule 230C2 or 230C3 and located at the electric service entrance to building 10

②Where a supply line along a road is limited to 300 V to ground and is located relative to fences, ditches, embankments, etc. so that the ground under the line will never be traveled except by pedestrians, this clearance may be reduced to 12 ft.

③These clearances are for land cultivated or traversed by vehicles and equipment whose overall operating height is less than 14 ft.

④Where supply circuits of 600 V or less, with transmitted power of 5000 W or less, are run along fenced (or otherwise guarded) private rights-of-way in accordance with the provision specified in Rule 220B2, this clearance may be reduced to 10 ft.

⑤For the purpose of this rule, trucks are defined as any vehicle exceeding 8 ft. in height.

⑥These clearances do not allow for future road resurfacing.

⑦Spaces and ways accessible to pedestrians only are areas where vehicular traffic is not normally encountered or not reasonably anticipated. Land subject to (but not limited to) highway right-of-way maintenance equipment, logging equipment, all-terrain vehicles, etc., shall not be considered as accessible to pedestrians only.

⑧Except for rigid live parts overhanging alleys, this clearance shall be permitted to be reduced to 18 feet.

E 234-A-4 (following NESC 234A3, p. 139) Transmission Lines Over Dwelling Occupancies. (Addition)

4. Transmission Lines Over Dwelling Occupancies

Supply lines designed to operate at voltages in excess of 35 kV shall not be constructed over dwelling occupancies or mobile homes intended for residential occupancy, and dwelling occupancies or mobile homes intended for residential occupancy shall not be located under such lines. This provision is also intended to cover the line conductors in their wind-displaced position as defined in Rule 234A1.

E 234-C-5-d (preceding NESC 234C6, p. 146) Open Supply Conductors Attached to Buildings. (Addition)

d. Service head and service drop attachments and communication cables or conductors attached to or carried along the surface of a building shall be so located that no part of the drip-loops or service drop conductors within 3 feet of the service head and service drop attachments shall be less than 12 inches from communication cables or conductors.

E 234-C-7 (following NESC 234C6, p. 146) Near Stored Materials (Addition)

7. Near Stored Materials
Lines should not be run over areas where material is regularly stored and handled by cranes or other types of high machinery unless the clearance of such lines is adequate to permit full use of the equipment.

E 234-C-8 (NESC 234C, p. 146) Near Storage Tanks. (Addition)

8. Near Storage Tanks
A horizontal clearance of at least 15 feet shall be maintained between above-ground flammable liquids storage tanks and open conductors operating at more than 300 volts to ground. When voltages are 300 volts or below, a horizontal clearance of not less than 8 feet shall be maintained.

Note: This requirement does not apply to LPG tanks with capacity of 1,000 gallons or less.

E 234-C-9 (NESC 234C, p. 146) Near Wells. (Addition)

9. Near Wells
A horizontal distance of at least ¾ of the required vertical clearance of the conductors to ground shall be maintained between open conductors and wells.

SECTION 24. GRADES OF CONSTRUCTION

Table E 242-1 (NESC Table 242-1, pp. 188-190) Grades of Construction for Supply Conductors Alone, at Crossing, or on the Same Structures With Other Conductors. (Addition)

Add Footnote 11 to the column heading "Exceeding 8.7 kV". Footnote 11 to read as follows:

[11]Grade B construction shall always be used if the voltage exceeds 175 kV (to ground).

SECTION 25. LOADING FOR GRADES B, C, AND D

E 250-D (following NESC 250C, p. 196) Longitudinal Capability. (Addition)

D. Longitudinal Capability

Each supply line designed to operate at 300 kV (phase to phase) or above shall be constructed to limit the effects of a cascading-type failure to a line segment of about 6 miles but not exceeding 10 miles in length. Such construction requirement may be met by providing at appropriate intervals structures and associated facilities having full dead-end capability under the loading provisions of 250A, B and C. Consideration shall be given to factors such as structure type and material, length of line, distance between dead-end or heavy angle structures, and other basic design criteria in determining the length of such individual line segments. For lines supported by "flexible" structures designed with plastic (energy-absorbing) capability in failure, this requirement may be met if such design and construction will provide equivalent limitation to longitudinal cascading.

PART 3. SAFETY RULES FOR THE INSTALLATION AND MAINTENANCE OF UNDERGROUND ELECTRIC-SUPPLY AND COMMUNICATION LINES

SECTION 31. GENERAL REQUIREMENTS APPLYING TO UNDERGROUND LINES

E 311-D (following NESC 311C, p. 257) Markers. (Addition)

D. Markers. When underground electric supply lines over 750 volts are located outside cities, villages and developed areas, their location shall be marked (recognizable to the public) at each road crossing, railroad crossing, or drainage ditch crossing to identify the location of the facility to reduce the possibility of damage or interference.

E 314-B (NESC 314B, p. 258) Conductive Parts to be Grounded. (Change) Revise the first sentence to read:

Cable sheaths and shields, equipment frames and cases (including pad-mounted devices), and lamp posts of conductive material shall be effectively grounded.

E 316 (NESC 316, p. 259) Induced Voltage. (Addition) Add note to read:

Note: Steady state induced voltages of 50 volts, AC rms or more, are considered hazardous for the purposes of this rule.

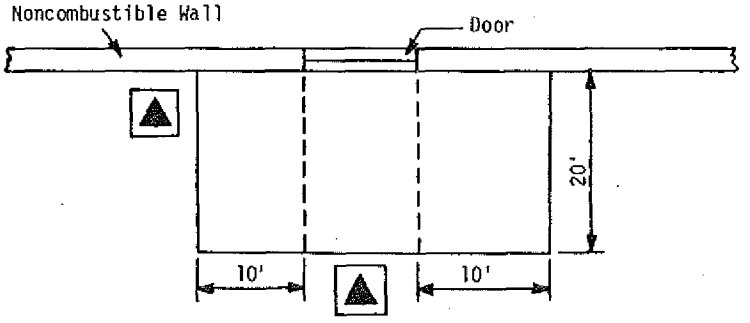
E 317 (following NESC 316, p. 259) Outdoor Location of Oil-Insulated Padmounted Transformers Near Buildings. (Addition)

E 317 Outdoor Location of Oil-Insulated Padmounted Transformers Near Buildings

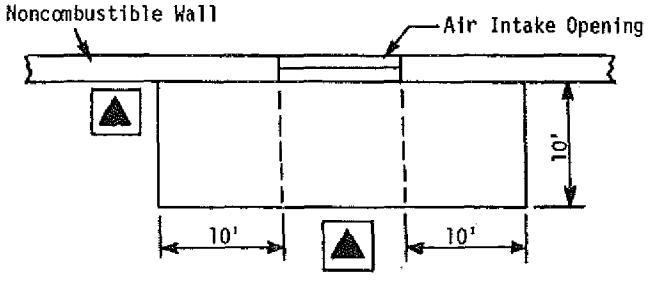
A. Noncombustible Walls

Padmounted oil-insulated transformers may be located directly next to noncombustible walls if the following clearances are maintained from doors, windows and other building openings:

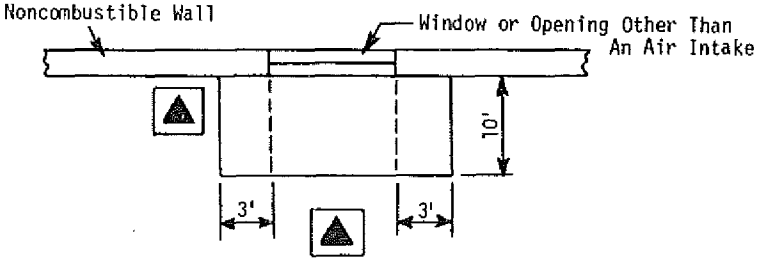
1. Padmounted oil-insulated transformers shall not be located within a zone extending 20′ outward and 10′ to either side of a building door.



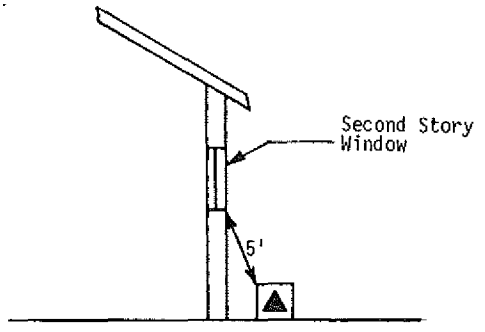
2. Padmounted oil-insulated transformers shall not be located within a zone extending 10′ outward and 10′ to either side of an air intake opening. If the air intake opening is above the transformer, there must be a 25′ vertical distance from the opening to the transformer.



3. Padmounted oil-insulated transformers shall not be located within a zone extending 10′ outward and 3′ to either side of a building window or opening other than an air intake.



For second story windows, the transformer shall not be located less than 5′ from any part of said window.



B. Combustible Walls

1. Padmounted oil-insulated transformers in sizes up to 100 kVA shall be located according to the provisions set forth for noncombustible walls.

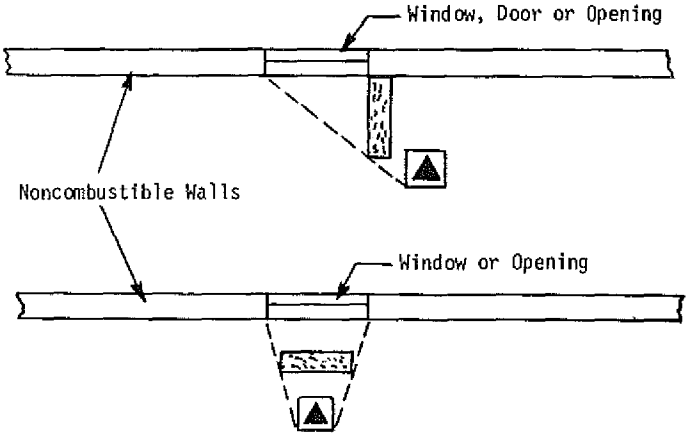
2. Padmounted oil-insulated transformers in sizes above 100 kVA shall be located a minimum of 10′ from the building wall in addition to the clearances from building doors, windows and other openings set forth for noncombustible walls. Also, a sump shall be installed for transformers in sizes exceeding 500 kVA if the immediate terrain is pitched toward the building.

C. Barriers

If the clearances specified above cannot be obtained, a fire-resistant barrier may be constructed in lieu of the separation. The following methods of construction are acceptable:

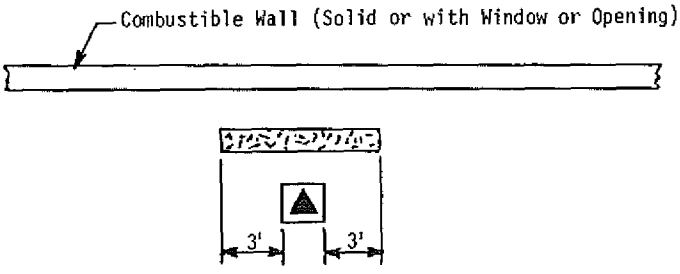
1. Noncombustible Walls

The barrier shall extend to a projection line from the corner of the padmount to the furthest corner of the window, door or opening in question. The height of the barrier shall be 1' above the top of the padmount transformer.



2. Combustible Walls

The barrier shall extend 3′ beyond each side of the padmount transformer. The height of the barrier shall be 1′ above the top of the transformer.



D. Fire Escapes

Padmounted oil-insulated transformers shall be located such that a minimum clearance of 20′ is maintained from fire escapes at all times.

Note: Also see 450-26, NEC-1978.

SECTION 32. UNDERGROUND CONDUIT SYSTEMS

E 320-B-7 (following NESC 320B6, p. 261) Gas Lines. (Addition)

7. Gas Lines.

a. The separation in any direction of gas transmission lines from electric supply and communications conduit systems shall be a minimum of 12 inches.

b. The separation in any direction of gas distribution or service lines from electric supply and communications conduit systems shall be a minimum of 6 inches.

Note: The definition of gas "transmission line", "distribution line", and "service line" as used herein is the same as that found in section 192.3, Wis. Adm. Code (part of Chapter PSC 135—Gas Safety).

SECTION 35. DIRECT BURIED CABLE

E 352-E (following NESC 352D, p. 274) Gas Lines. (Addition)

E. Gas Lines

The separation in any direction of gas pipelines from direct buried electric supply and communication facilities shall be a minimum of 12 inches.

E 353-D-2 (NESC 353D2, p. 275) Depth of Burial. (Addition)

Exception 1: Temporary installations of secondary underground cables, operating at less than 600 volts, shall be permitted to be laid on the ground, provided they are suitably protected. This will permit placing underground cables on the ground during winter months.

E 354-C-2 (NESC 354C2, p. 276) Bare Grounded Conductor (Addition) Add second exception as follows:

Exception 2: Cables with multiple concentric conductor closely spaced circumferentially and an outer semi-conductive jacket over the concentric shall be permitted.

E 354-E-4 (NESC 354E4, p. 277) Adequate Bonding. (Change)

4. Adequate Bonding

a. Bonding shall be provided between the effectively grounded supply conductor or conductors and the communication cable shield or sheath (preferably at intervals not to exceed 1000 feet).

b. At each above- or below-grade transformer and/or above- or below-grade pedestal, all existing grounds shall be interconnected. These include primary neutral, secondary neutral, power cable shield, metal duct or sheath and communications cable shield.

c. Communication protectors, communication service cable shields and secondary neutrals shall be connected to a common ground at each customer's service entrance, when communication circuits are underground without separation from power conductors.

PART 4. RULES FOR THE OPERATION OF ELECTRIC-SUPPLY AND COMMUNICATIONS LINES AND EQUIPMENT

SECTION 42. SUPPLY SYSTEMS—RULES FOR EMPLOYEES

E 422-B (NESC 422B, p. 305) Table 1A—AC Minimum Clearance from Live Parts. (Addition)

Add exception following note below Table 1A as follows:

Exception: For 345 kV, 500 kV and 700 kV, the minimum working distance and the minimum clear hot-stick distance shall be permitted to be reduced, provided that such distances are not less than the shortest distance between the energized part and a grounded surface.

E 423-D (NESC 423D, p. 309) Employee Protective Grounds. (Change) Replace 2nd sentence with the following:

Grounds shall be placed between the work location and all sources of energy and as close as practicable to the work location, or grounds shall be placed at the work location.

E 426-B (NESC 426B, p. 312) Ventilation and Testing for Gas in Manholes and Unventilated Vaults. (Change)

B. Ventilation and Testing for Gas in Manholes and Unventilated Vaults

Manholes shall not be entered until they have been determined to be free from dangerous gases, by testing with approved testing devices, by ventilation, or by other adequate means.

History: Cr. Register, September, 1979, No. 285, eff. 10-1-79.