Second Interim Collection of the National Electrical Safety Code Interpretations

1991–1993 inclusive

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National Electrical Safety Code Committee, ANSI C2

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Abstract: This edition includes official interpretations of the National Electrical Safety Code as made by the Interpretations Subcommittee of the National Electrical Safety Code Committee, ANSI C2.

Keywords: electric supply stations, overhead electric supply and communication lines, underground electric supply and communication lines, clearances to electric supply and communication lines, strength requirements for electric supply and communication structures.

Foreword

In response to repeated public inquiries and requests from C2 Committee members, the IEEE C2 Secretariat arranged for publication of Interpretation Requests received and Interpretations made by the National Electrical Safety Code Subcommittee on Interpretations. The original requests have been lightly edited to remove extraneous matter and focus on the C2 problem presented. Some illustrations have been redrawn for publication. With these exceptions, requests are in the form received.

The first volume, INTERPRETATIONS 1961–1977, published in 1978, included the first interpretation request received for the 6th Edition of Part 2 (IR 92, May 1961) and ended with the last interpretation issued in 1977 (IR 212). The second volume, INTERPRETATIONS 1978–1980, continued with IR 213 issued in 1978 and ended with the last interpretation issued in 1980 (IR 283). It also includes all interpretations found in the archives and applying to the 5th and prior editions of the Code (IR 11 through IR 90). Where no copy of an interpretation request or an interpretation could be found in the archives, this fact is noted. The third volume, INTERPRETATIONS 1981–1984, continued with interpretation IR 284 issued in 1981 and ended with IR 361 issued in 1984. It also contains requests IR 362 to IR 366, but did not include their interpretations, as the Interpretations Subcommittee still had them under consideration at press time. INTERPRETATIONS 1984–1987 incorporated IR 362 to IR 366 with their interpretations, continued with IR 367, issued in 1984, and ended with IR 415, which was requested in 1987. The next volume, INTERPRETATIONS 1988–1990, incorporates interpretations for IR 407, IR 413, and IR 414, which were not included in the previous volume, and includes interpretation requests through IR 443.

The First Interim Collection 1991–1993 provided interpretations for IR 442 and IR 443, which were still under consideration at press time of the previous volume. In addition, it incorporated interpretations for IR 444 through IR 447. This volume, the Second Interim Collection 1991–1993, provides interpretations for IR 448 through IR 453. It also contains request IR 454, although an interpretation has not yet been provided for it.

The Secretariat hopes that the publication of all interpretations will prove helpful to those concerned with the National Electrical Safety Code.

Procedure for Requesting an Interpretation

Requests for interpretation should be addressed to:

Secretary for Interpretations
National Electrical Safety Code Committee, ANSI C2
IEEE Standards Office
445 Hoes Lane
P.O. Box 1331
Piscataway, NJ 08855-1331

Requests for interpretations should include:

1. The rule number in question.
2. The applicable conditions for the case in question.

Line drawings should be black ink or excellent black pencil originals. Photos should be black-and-white glossy prints. These illustrations must be reproduced for committee circulation and eventually will be used to supplement the text of our next edition. Clear diagrams and pictures will make the work of interpretation easier and more valuable to C2 users.

Requests, including all supplementary material, must be in a form that is easily reproduced. If suitable for Subcommittee consideration, requests will be sent to the Interpretations Subcommittee. After consideration by the Subcommittee, which may involve many exchanges of correspondence, the inquirer will be notified of the Subcommittee's decision. Decisions will be published from time to time in cumulative form and may be ordered from IEEE.

Interpretations are issued to explain and clarify the intent of specific rules and are not intended to supply consulting information on the application of the code. The Interpretations Subcommittee does not make new rules to fit situations not yet covered.

Contents

Section 9. Grounding Methods for Electric Supply and Communication Facilities

92B1

Use of grounded conductor as a grounding conductor for bonding noncurrent-carrying metal parts

REQUEST (Feb. 8, 91) IR 448

I recently became involved with the inspection of the grounding of metal poles for highway lighting. The project consists of service equipment feeding 120 V fixtures mounted on metal poles. The fixtures are fed with underground branch circuits. A ground rod is driven at each pole.

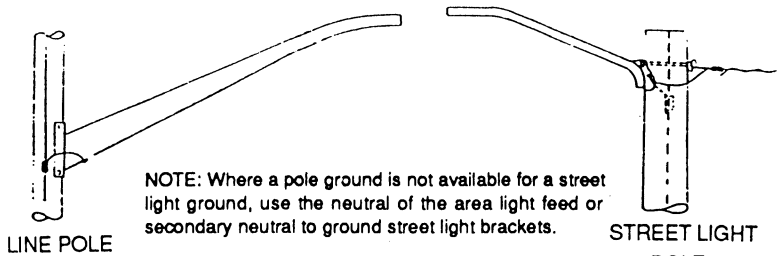
The standards used in designing the project were taken from a company that is bound by the National Electrical Safety Code. The State Statutes require us to use ANSI/NFPA 70-1990, National Electrical Code.

This company's specifications require using the grounded (neutral) conductor not only as the multiwire branch circuit conductor, but also as the equipment grounding conductor for bonding the noncurrent-carrying metal parts. Their standards experts quoted NESC Section 9 (92B1) as the source for requiring the use of the grounded conductor as a grounding conductor. I am enclosing a drawing of the company's requirements.

Section 410-15 (b) of the NEC requires the metal poles be bonded with a grounding conductor recognized by Section 250-91 (b). Section 250-61 (b) is very specific in not allowing the use of the grounded conductor for grounding the noncurrent-carrying metal parts of equipment on the load side of the service disconnecting means.

I feel that Section 92B1 of the NESC agrees with the NEC by stating, "The grounding connections shall be made at the source, and at the line side of all service equipment." I would appreciate an interpretation of Section 9 of the NESC on using the grounded conductor as a grounding conductor for bonding the noncurrent-carrying metal parts in a situation similar to the one described.

92B1



GROUNDING STREET LIGHT STANDARDS

To ensure that the breakaway base functions in the proper manner, the #12 ground conductor shall run through the grounding lug and connect to the neutral conductor. The grounding lug is too large for the #12 conductor and a small piece of #4 copperweld or #6 copper shall be used to fill the lug. See Street Light Chapter for complete wiring installation detail.

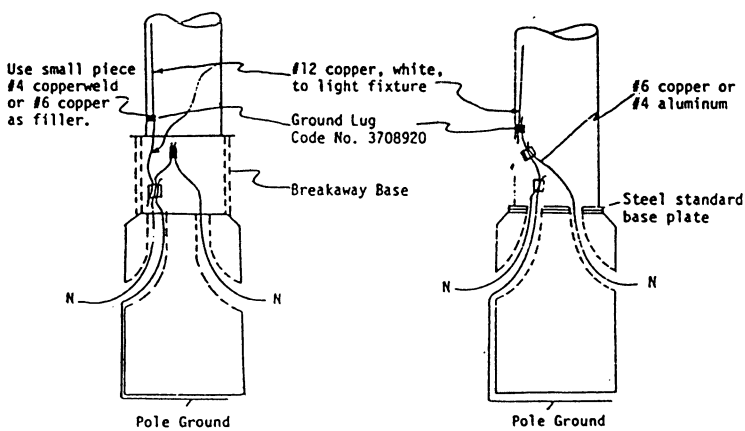


Fig IR 448-1

INTERPRETATION

The fundamental question to be answered is whether the NEC or the NESC should be applied. The NESC applies if the facility is operated and maintained by a utility, as covered by Rule 011. Under these conditions, the grounding system described in the request for interpretation meets NESC requirements. Specifically, the NESC does not require a separate grounding conductor, in parallel with an effectively grounded neutral, for grounding of metal poles.

However, the requestor states: "The project consists of service euqipment feeding 120 V fixtures...on metal poles...fed with underground branch circuits." If this project consists of a low-voltage distribution system operated and maintained by a nonutility entity, the NEC applies. The NESC Interpretations Subcommittee is not empowered to interpret NEC requirements.

234C1

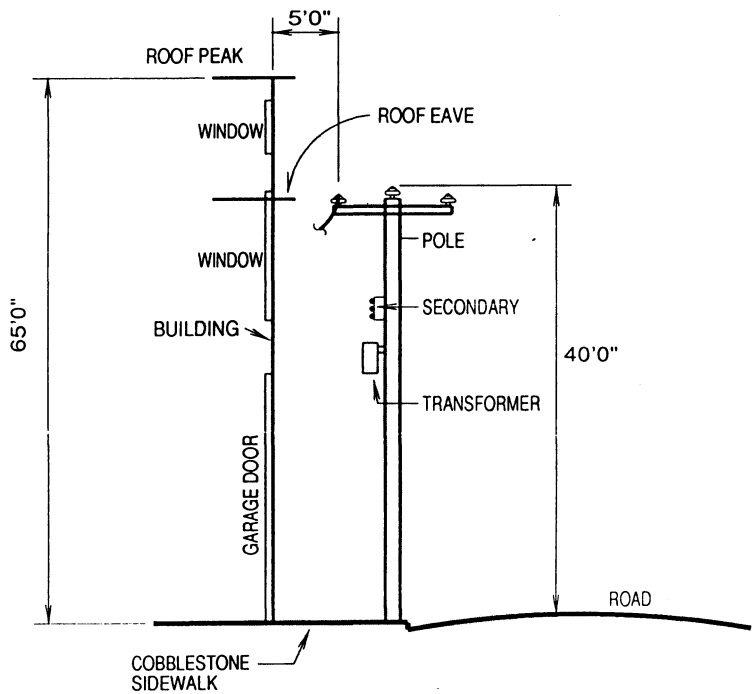


Fig IR 453-2
Side View

Rule 234C, Table 234-1

Horizontal clearance from structure that leans from the vertical

REQUEST (Jul. 29, 91) IR 454

Our Association is faced with the need to establish the clearance requirement of the National Electrical Safety Code for power lines in the phase to ground voltage range of 750 V to 8.7 kV that pass near water tanks of heights which make vertical clearance impractical.

The tanks are constructed similar to the attached drawing with four metal legs supporting the tanks. The horizontal distance between legs is greater at the ground than at the tank. In any of our tank locations (as represented on the attached drawing) the horizontal distance clearance requirement and the diagonal distance from the conductor to the nearest point on the structure 15 greater than the vertical clearance requirement of Table 234-1. Also, the conductors are higher above ground than the code requirement by Table 232-1.

Our understanding of the clearance envelope is indicated on the attached drawing; however, the code is not clear in Section 234C as to how the horizontal requirement should be applied to a side of the water tank support leg that has a slight lean such as is the case on our attached drawing. Also, the Clearance Diagrams for Building and Other Structures in Figure 234-1 do not address our specific concern. In each of these clearance diagrams the horizontal measurement is from a vertical surface. Should the horizontal measurement be made horizontally from the conductor to the leaning support leg or perpendicular to the support leg out to the conductor?

INTERPRETATION

(In process)

234C

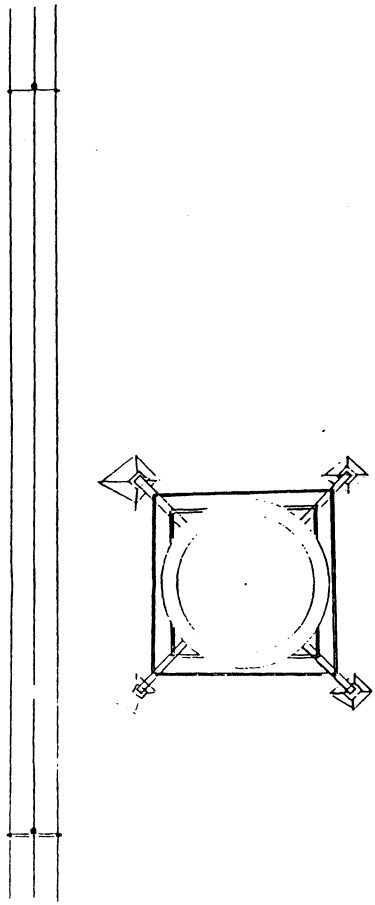


Fig IR 454-1
Top View

NOTES:

(1) A permanent ladder is attached for access to the top of the tank.
(2) Tank is supported by four steel legs.
(3) Tank is cylindrical with rounded top and bottom.
(4) The position of the conductors relative to the tank are in the maximum displaced position toward the tank according to Rule 234 for conductor temperature, loading, and wind displacement.
(5) This request is in the Medium Loading District with span length less than 250 ft between the supporting power pole on each side of the water tank.

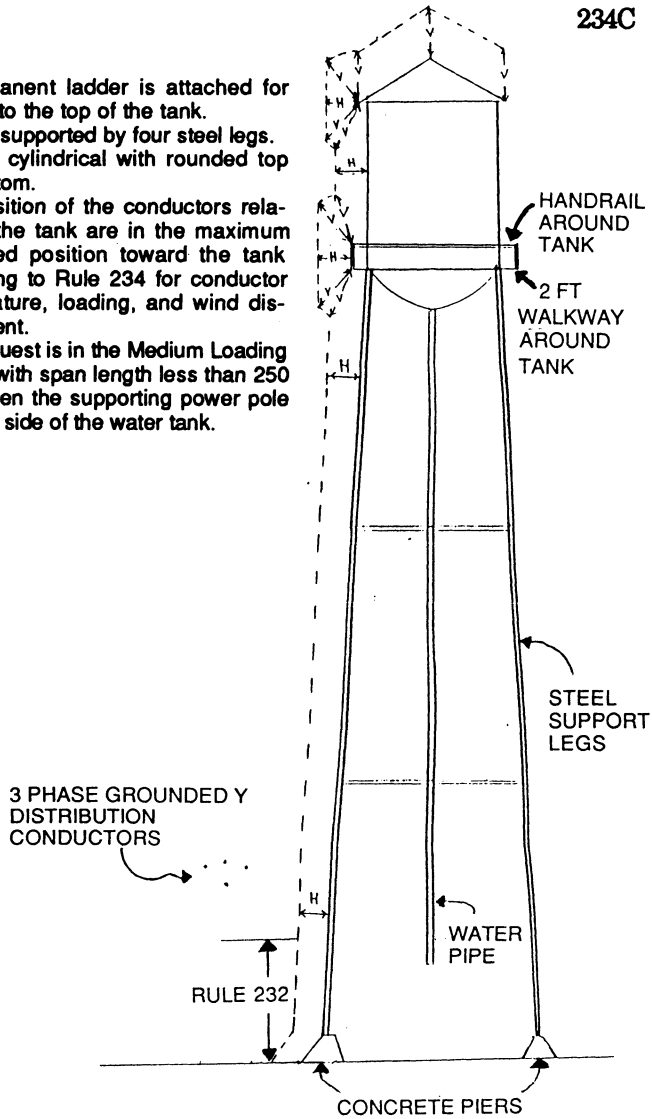


Fig IR 454-2
Side View

Rule 234C1

Definition of zone for raising ladders

REQUEST (Jul. 11, 91) IR 453

Please explain the meaning of the last five lines of Rule 234C1—the zone as applied under the conditions shown in the enclosed figures.

1. Ladder Space
   Where buildings or other installations exceed three stories [or 50 feet (15 m)] in height, overhead lines should be arranged where practical so that a clear space or zone at least 6 feet (1.80 m) wide will be left either adjacent to the building or beginning not over 8 feet (2.45 m) from the building, to facilitate the raising of ladders where necessary for fire fighting.

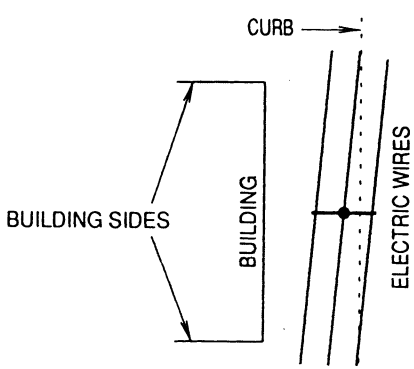


Fig IR 453-1
Top View

234C1

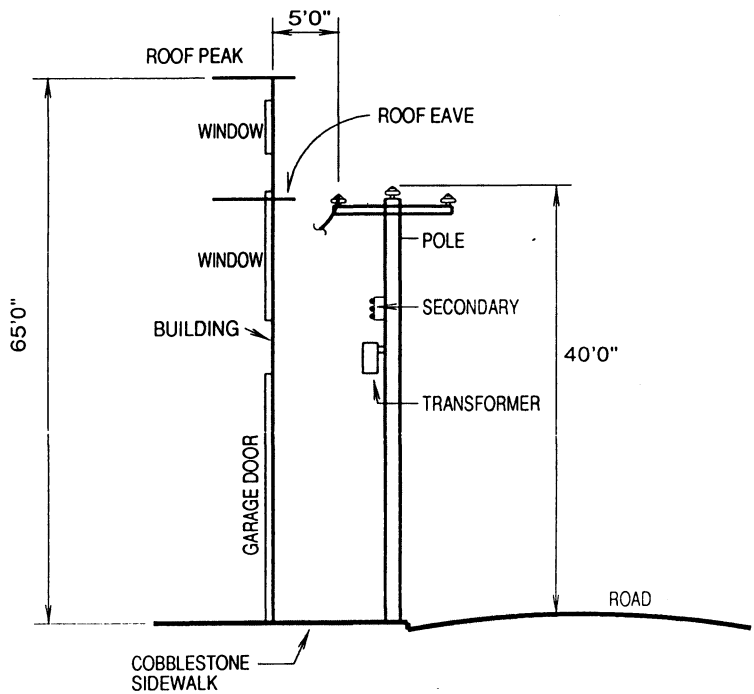


Fig IR 453-2
Side View

INTERPRETATION

The description of the clear space or zone in Rule 234C1 is specific; it is a clear space at least 6 ft wide located either:

(a) adjacent to the building, or
(b) beginning not over 8 ft from the building

Application of Rule 234C1 is as follows:

1. It applies where buildings or other installations exceed three stories or 50 ft in height.
2. It is a "should" or advisory rule, to be followed insofar as practical (see Rule 015, 1987 Edition).
3. It does not apply if the Exception to Rule 234C1 governs.
4. See also Rule 234A1, 1987 Edition, for wind displacement requirements.

The Interpretations Subcommittee cannot comment on specific installations such as the graphic included with your request for interpretation, as this would constitute consulting advice.

Rule 264B and Rule 264G2

Strength of guy and anchor assembly

REQUEST (Ap. 8, 91) IR 451

The strength required for the anchor and rod assembly is given in Rule 264G2 as "an ultimate strength not less than that required of the guy(s) by Rule 264B." Rule 264B says, "For guy wires conforming to ASTM Standards, the minimum breaking strength value therein defined shall be the rated breaking strength required in this code."

Do these two rules only require the guy and anchor assembly to "meet the requirements of Section 26 for the applicable grade of construction" or do they additionally require the strength of the anchor assembly in all cases to exceed the rated breaking strength of any guy wire that conforms to ASTM Standards? In other words, do Rules 264G2 and 264B prohibit the use of a 10 M guy in an 8000 lb anchor assembly?

INTERPRETATION

The general rules for guying are given in Rule 264; specific strength requirements are contained in Rules 261, 262, and 263 for various grades of construction.

Rule 264G2 requires the anchor and rod assembly to have an ultimate strength not less than that *required of the guy* by Rule 264B. Note that the anchor and rod assembly must meet the strength *required* of the guy for the applicable grade of construction. The rules do not prohibit use of an oversize guy with an anchor-rod assembly sized to meet the rules.

Rule 277

Definition of rated ultimate strength

REQUEST (Jul. 8, 91) IR 452

I am working on a special assignment calling for me to make recommendation regarding the sizing of insulators and hardware.

With respect to M&E ratings of insulators, paragraph 272 refers to ANSI C29.1 through 7 for voltage data, paragraph 273 refers to ANSI C29.1 for insulation level data, and paragraph 274 refers to applicable American National Standards for testing procedures.

Paragraph 277 says insulators shall withstand all applicable loads specified in Section 25, except those of Rule 250C, without exceeding certain percentages of their rated ultimate strength for specific applications.

What is meant by "their rated ultimate strength"? Is it the ANSI rating, or the supplier rating, for a given ANSI Class?

In the NOTES under paragraph 277, note 2 says see ANSI C29.1. Are the line designers restricted to no more than the given percentages in paragraph 277, of the ANSI M&E Ratings, or of the Supplier's (Manufacturer's) M&E ratings?

Many companies are selecting insulators based on the supplier's catalogue ratings, while others such as REA are working with ANSI M&E ratings.

INTERPRETATION (Nov. 18, 91)

Insulators having manufacturer's ratings which differ from those listed in ANSI C29.1 may be used. Note 2 is provided for reference.

Insulators shall be tested by the manufacturer in accordance with applicable American National Standards; see Rule 274. Also, rated ultimate strength must be based on the strength under actual long-term duration of the loads that will be applied to the insulator during its use, as discussed in IR 395 (Oct. 26, 86).

Rule 279A2b(2)

Installation of guy insulators

REQUEST (Mar. 12, 91) IR 449

We have reviewed the NESC Rule 279 pertaining to guy insulators, related rules, applicable interpretations, and the discussions of the 1944 NESC (H39) and the 1949 NESC (H43). However, it is apparent that Rule 279A2b(2) can be interpreted in several ways resulting in widely differing guying practices. This rule will be used as guidance in the design of a guying standard for those cases where guys should or must include guy insulators. Conditions under which this rule applies include the guying of transmission or distribution structures with and without distribution underbuild or other types of underbuilds. A succinct response to the following three questions should satisfy our request for interpretation.

1. Does Rule 279A2b(2) require guy insulators to be installed in a manner that protects line workers in the work space from the potential hazard of a grounded guy?
2. Does Rule 279A2b(2) require guy insulators to be installed in a guy wire in a manner that protects the public from exposure to a metallic portion of the guy wire that may become energized due to the failure of one or more system components?

3. Does Rule 279A2b(2) require guy insulators to be installed in a guy wire in a manner that protects the public from exposure to a metallic portion of the guy wire that may become energized due to a jerked or oscillated power conductor or guy?

INTERPRETATION

The answers to your questions regarding Rule 279A2b(2) are:

1. No. Rule 279 requires guy insulators for ungrounded guys only, under specified conditions. Therefore, the NESC does not require guy insulators to protect line workers from a grounded guy. Neither does the NESC prohibit such insulators.
2. The requirement for guy insulators, which applies only to ungrounded guys, is intended to protect the public against an abnormal situation, such as an energized guy due to a slack or broken conductor or guy. The requirement (attached or exposed to Rule 279A2a) is specific; it is not intended to cover all possible component failures.
3. Yes, as applied to ungrounded guys. See also answer to question 2.

Note that the answers to questions 2 and 3 do not apply to guys that are grounded in accordance with Rule 215C2.