

PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

RESOLUTION NO. E-1863
PUBLIC UTILITIES DEPARTMENT
DIVISION: Utilities
February 13, 1980

SUBJECT: Changes to Rules of General Orders Nos. 95 and 128, concerning replacement of obsolete specifications by those of modern performance standards, for plastic pipe and U-shaped moulding used ~or protective covering.

WHEREAS: General Order No. 95, Rule No. 22.2, defines "Protective Covering". Rules Nos. 22.2-C and 22.2-D further define "Plastic Pipe" and "Rigid U-shaped Moulding", and discuss their usage. Rule 33.4-D(1)(a) of G.O. 128 lists circumstances of "Exception" to required underground depths when cables are mechanically protected by plastic pipe. However, specifications of the United States Department of Commerce Standard No. CS207 -60 presently listed in the above rules for plastic pipe and U-shaped moulding are obsolete and no longer used by industry.

The electrical plastic conduit industry currently uses the manufacturing standards of NEMA TC-2-1978, Which include performance requirements of the product to as sure standardization and quality control. Changing specifications in G.O. Nos. 95 and 128 to reflect this general standard will bring the orders into conformity with modern industrial usage, and allow utility construction by less expensive and more suitable pipe and moulding.

Appropriate revisions are thus required in G.O. 95 for Rules Nos. 22.2-C, 22.2-D, 54.6-C2, 54.6-E, 84.6-B and 84.6-E, and in G.O. 128 for Rule 33.4-D(1)(a). Proposed wording of the rules to reflect such changes to both the general as well as particular specifications discussed above is stated in the following implementing order.

These proposed changes have been distributed to all utilities and to their unions for review. No adverse comments have been received.

Pursuant to Government Code Sections 11380, 11423(b) and 11445(b), the Executive Director of the Commission transmitted on January 9, 1980, five copies of the proposed order amending G.O. 95 and G.O. 128 to the Speaker of the Assembly and five copies to the Chairman of the Senate Committee on Rules. No comments or objections to the adoption of the revised General Order have been received.

IT IS ORDERED that General Order No. 95 is amended to read as follows:

1. Rule 22.2 - Protective Covering, Suitable - Page 29- .

(Modification of paragraphs C and D, so as to read as follows:)

- C. PLASTIC PIPE made of rigid unplasticized polyvinyl chloride having the properties and dimensions specified as EPC-40-PVC and EPC-80-pvc in NEMA Standards Publication No. TC2-1978. The plastic pipe herein specified shall be installed only outside the climbing space on poles or structures.
- D. RIGID U-SHAPED MOLDING made of unplasticized polyvinyl chloride having the properties and physical characteristics specific for plastic pipe (Rule 22 .2-C) . The plastic moulding herein specified shall be installed only outside the climbing space on poles or structures.

2. Rule 54.6-C(2) - Lateral Conductors - Pages 114, 115

(Modification and deletion at end of paragraph, Conductors of 0-750 volts:)

. . . or are protected by plastic pipe having the properties of the material specified in Rule 22 .2-C.

3. Rule 54.6-E - Risers - Page 116

(Modification of end part of second paragraph)

. . . Such plastic pipe shall be of material as specified in Rule 22.2-C, designated as EPC-80-pvc with a minimum nominal pipe size of 2~ inches. Such plastic moulding shall be of material as specified in Rule 22.2-D, with a minimum nominal pipe size of 2 inches, with a minimum impact strength equal to 2 ½ nominal EPC-80-PVC plastic pipe, and installed with a backup plate of polyvinyl chloride material.

4. Rule 84.6-B - Ground Wires - Page 212

(Modification of beginning part of first paragraph)

Ground wires, other than lightning protection wires not attached to equipment or ground wires on grounded structures, s~ be covered by metal pipe or suitable covering of wood or metal, or of plastic pipe

material as specified in Rule 22.2-C, for a distance above the ground sufficient to protect against mechanical injury, but in no case shall such distance be less than 7 feet.

5. Rule 84.6-E - Risers - Page 213

(Modification of end part of first paragraph)

Such plastic pipe shall be of the material as specified in Rule 22.2-C, designated as EPC-80-pvc with a minimum nominal pipe size of 2 ½ inches.

General Order No. 128 is amended to read as follows:

1. Rule 33.4-D(1) (a) - Mechanical Protection - Page 26

(Modification of paragraph, so as to read as follows:)

- (a) Steel conduit or plastic pipe made of unplasticized polyvinyl chloride, having the properties and dimensions specified as EPC-40-pvc and EPC-80-pvc in NEMA Standards Publication No. TC2-1978, with a minimum wall thickness of 0.15 inches.

The effective date of this resolution is the date hereof.

I hereby certify that the foregoing Resolution was duly introduced, passed and adopted at a regular session of the Public Utilities Commission of the State of California, held on the 13th day of February 1980, the following Commissioners voting favorably thereon:

John E. Byson, President
Vernon L. Sturgeon
Richard D. Gravelle
Claire T. Dedrick, Commissioners

Memorandum

Date: January 8, 1980

To: THE COMMISSION
(Conference of February 13, 1980)

From: Public Utilities Commission - San Francisco - H. T. Sipe
Chief Electrical Engineer

File No.: E-1863

Subject: Proposed Resolution to Revise General Orders Nos. 95 and 128

RECOMMENDATION: The Commission should approve the Proposed Resolution authorizing changes in General Orders Nos. 95 and 128.

BACKGROUND: The proposed changes reflect a simple replacement of obsolete technical specifications now listed in General Orders Nos. 95 and 128, by those of modern manufacturing standards, for plastic pipe and U-shaped moulding used as protective covering in electric and communication line construction.

DISCUSSION: The proposed changes have been distributed to electric and telephone-utility companies throughout the state for review. No adverse comment has been received.

An early approval by the Commission of this Resolution will expedite inclusion of those changes in a new printing of General Order No. 95 which is now being proofed and processed.

VR:KN
Attachment

Strikeout and Underline Section Added, August 12, 2002 by Raymond G Fugere

Original Version
GO 95 Rule 22.2-C

22.2 PROTECTIVE COVERING

- C. PLASTIC PIPE made of rigid unplasticized polyvinyl chloride having the properties and dimensions specified as Type II, High Impact, Normal Chemical Resistance in United States Department of Commerce Commercial Standard No. CS 207-60. The plastic pipe herein specified shall be installed only outside the climbing space on poles or structures.

Strikeout and Underline Version
GO 95 Rule 22.2-C

22.2 PROTECTIVE COVERING

- C. PLASTIC PIPE made of rigid unplasticized polyvinyl chloride having the properties and dimensions specified as ~~Type II, High Impact, Normal Chemical Resistance in United States Department of Commerce Commercial Standard No. CS 207-60.~~ EPC-40-PVC and EPC-80-pvc in NEMA Standards Publication No. TC2-1978. The plastic pipe herein specified shall be installed only outside the climbing space on poles or structures.

Final Version
GO 95 Rule 22.2-C

22.2 PROTECTIVE COVERING

- C. PLASTIC PIPE made of rigid unplasticized polyvinyl chloride having the properties and dimensions specified as EPC-40-PVC and EPC-80-pvc in NEMA Standards Publication No. TC2-1978. The plastic pipe herein specified shall be installed only outside the climbing space on poles or structures.

Original Version
GO 95 Rule 22.2-D

22.2-D RIGID U-SHAPED MOULDING made of unplasticized polyvinyl chloride having the properties and dimensions specified as Type II, High impact Normal Chemical Resistance in United States Department of Commerce Commercial Standards No. CS 207-60. The plastic moulding herein specified shall be installed only outside the climbing space on poles or structures.

Strikeout and Underline Version
GO 95 Rule 22.2-D

22.2-D RIGID U-SHAPED MOULDING made of unplasticized polyvinyl chloride having the properties and physical characteristics specific for plastic pipe (Rule 22.2-C). ~~dimensions specified as Type II, High impact Normal Chemical Resistance in United States Department of Commerce Commercial Standards No. CS 207-60.~~ The plastic moulding herein specified shall be installed only outside the climbing space on poles or structures.

Strikeout and Underline Version
GO 95 Rule 22.2-D

22.2-D RIGID U-SHAPED MOULDING made of unplasticized polyvinyl chloride having the properties and physical characteristics specific for plastic pipe (Rule 22.2-C). The plastic moulding herein specified shall be installed only outside the climbing space on poles or structures.

Original Version
GO 95 Rule 54.6-C(2)

- 54.6-C(2) CONDUCTORS OF 0-750 VOLTS: Lateral conductors of 0-750 volts may be installed with less than the radial clearances between conductors, specified in Table 2, Cases 16 and 17, and with less than the clearance from center line and surface of pole, and from the surface of crossarm, as specified in Table 1, Cases 8 and 9, provided such conductors are suitably insulated and placed along the bottom surface of crossarms and are protected by wood moulding or impregnated fiber conduit of thicknesses not less than as specified in Rule 22.2, or are protected by plastic pipe designated as Type II, in the standard specified in Rule 22.2-C. The plastic pipe shall have a minimum wall thickness of 0.10 inches.

Strikeout and Underline Version
GO 95 Rule 54.6-C(2)

- 54.6-C(2) CONDUCTORS OF 0-750 VOLTS: Lateral conductors of 0-750 volts may be installed with less than the radial clearances between conductors, specified in Table 2, Cases 16 and 17, and with less than the clearance from center line and surface of pole, and from the surface of crossarm, as specified in Table 1, Cases 8 and 9, provided such conductors are suitably insulated and placed along the bottom surface of crossarms and are protected by wood moulding or impregnated fiber conduit of thicknesses not less than as specified in Rule 22.2, or are protected by plastic pipe having the properties and physical characteristics specific for plastic pipe (Rule 22.2-C).-designated as Type II, in the standard specified in Rule 22.2-C. The plastic pipe shall have a minimum wall thickness of 0.10 inches.

Final Version

GO 95 Rule 54.6-C(2)

- 54.6-C(2) CONDUCTORS OF 0-750 VOLTS: Lateral conductors of 0-750 volts may be installed with less than the radial clearances between conductors, specified in Table 2, Cases 16 and 17, and with less than the clearance from center line and surface of pole, and from the surface of crossarm, as specified in Table 1, Cases 8 and 9, provided such conductors are suitably insulated and placed along the bottom surface of crossarms and are protected by wood moulding or impregnated fiber conduit of thicknesses not less than as specified in Rule 22.2, or are protected by plastic pipe having the properties and physical characteristics specific for plastic pipe (Rule 22.2-C).

Original Version
GO 95 Rule 54.6-E

54.6 Vertical and Lateral Conductors

E Risers

Risers from underground cables or other conductors shall be encased in grounded iron or steel shall (or other covering of equal strength) from the ground line to a level not less than 8 feet above ground line (see App. G, Fig. 61)

Risers from underground cables may be encased in plastic pipes or in plastic U-shaped moulding, as provided in this rule, in lieu of the grounded iron or steel pipe required by this rule, provided that risers of circuits in excess of 750 volts shall have an effectively grounded metallic shield. Such plastic pipe shall be of material as specified in Rule 22.2-D, designated as Schedule 80 with a minimum nominal pipe size of 2 ½ inches, or Schedule 120 with a minimum nominal pipe size of 2 inches. Such plastic moulding shall be of material specified in Rule 22.2-D, designated as Schedule 80 in nominal pipe sizes of 2 through 3 inches, and Schedule 40 in nominal pipe sizes of 4 inches or larger, installed with a backup plate of polyvinyl chloride material.

Any riser on the surface of a pole or not more than 18 inches from the center line of a pole shall be covered by a suitable protective covering where within a vertical distance of 8 feet from the level of communication conductors (including cables) or unprotected supply conductors (including the leads from the terminal) supported by the same pole or where within a radial distance of 6 feet from conductors not supported by the same pole.

Any riser more than 18 inches from the center line of a pole shall be covered by a suitable protective covering, or by securely supported impregnated fiber conduit without metal pipe, where within a vertical distance of 8 feet from the level of communication conductors (including cables) or unprotected supply conductors (including the leads from the terminal) supported by the same pole or within a radial distance of 6 feet from conductors not supported by the same pole.

The portion of any riser between the insulating covering required on the upper section and the metal or plastic covering required on the lower section by the foregoing shall be covered by the extension of either or both of such coverings. Where metal pipe is used as a protective covering, the fiber conduit shall not extend within 8 feet of the ground line and shall be installed in a workmanlike manner and securely supported in order to prevent it from slipping downward and exposing any upper section of the metal pipe.

The radial clearances between conductors, specified in Table 2, Cases 16 and 17, are not required between suitably insulated conductors in the same riser.

Protective covering (suitable) is not required over risers encased in effectively grounded non-climbable metal poles or iron or steel pipe attached to a steel pole, tower or other metal structure, provided the iron or steel pipe is effectively grounded and is metallically connected to such metal structure.

Strikeout and Underline Version

GO 95 Rule 54.6-E

54.6 Vertical and Lateral Conductors

E Risers

Risers from underground cables or other conductors shall be encased in grounded iron or steel shall (or other covering of equal strength) from the ground line to a level not less than 8 feet above ground line (see App. G, Fig. 61)

Risers from underground cables may be encased in plastic pipes or in plastic U-shaped moulding, as provided in this rule, in lieu of the grounded iron or steel pipe required by this rule, provided that risers of circuits in excess of 750 volts shall have an effectively grounded metallic shield. Such plastic pipe shall be of material as specified in Rule 22.2-~~DC~~, designated as ~~Schedule 80 EPC-80-pvc~~ with a minimum nominal pipe size of 2 ½ inches, ~~or Schedule 120 with a minimum nominal pipe size of 2 inches~~. Such plastic moulding shall be of material as specified in Rule 22.2-D, with a minimum nominal pipe size of 2 inches, with a minimum impact strength equal to 2 ½ nominal EPC-80-PVC plastic pipe, and designated as Schedule 80 in nominal pipe sizes of 2 through 3 inches, and Schedule 40 in nominal pipe sizes of 4 inches or larger, installed with a backup plate of polyvinyl chloride material.

Any riser on the surface of a pole or not more than 18 inches from the center line of a pole shall be covered by a suitable protective covering where within a vertical distance of 8 feet from the level of communication conductors (including cables) or unprotected supply conductors (including the leads from the terminal) supported by the same pole or where within a radial distance of 6 feet from conductors not supported by the same pole.

Any riser more than 18 inches from the center line of a pole shall be covered by a suitable protective covering, or by securely supported impregnated fiber conduit without metal pipe, where within a vertical distance of 8 feet from the level of communication conductors (including cables) or unprotected supply conductors (including the leads from the terminal) supported by the same pole or within a radial distance of 6 feet from conductors not supported by the same pole.

The portion of any riser between the insulating covering required on the upper section and the metal or plastic covering required on the lower section by the foregoing shall be covered by the extension of either or both of such coverings. Where metal pipe is used as a protective covering, the fiber conduit shall not extend within 8 feet of the ground line and shall be installed in a workmanlike manner and securely supported in order to prevent it from slipping downward and exposing any upper section of the metal pipe.

The radial clearances between conductors, specified in Table 2, Cases 16 and 17, are not required between suitably insulated conductors in the same riser.

Protective covering (suitable) is not required over risers encased in effectively grounded non-climbable metal poles or iron or steel pipe attached to a steel pole, tower or other metal structure, provided the iron or steel pipe is effectively grounded and is metallically connected to such metal structure.

Final Version
GO 95 Rule 54.6-E

54.6 Vertical and Lateral Conductors

E Risers

Risers from underground cables or other conductors shall be encased in grounded iron or steel shall (or other covering of equal strength) from the ground line to a level not less than 8 feet above ground line (see App. G, Fig. 61)

Risers from underground cables may be encased in plastic pipes or in plastic U-shaped moulding, as provided in this rule, in lieu of the grounded iron or steel pipe required by this rule, provided that risers of circuits in excess of 750 volts shall have an effectively grounded metallic shield. Such plastic pipe shall be of material as specified in Rule 22.2-C, designated as EPC-80-pvc with a minimum nominal pipe size of 2 ½ inches. Such plastic moulding shall be of material as specified in Rule 22.2-D, with a minimum nominal pipe size of 2 inches, with a minimum impact strength equal to 2 ½ nominal EPC-80-PVC plastic pipe, and installed with a backup plate of polyvinyl chloride material.

Any riser on the surface of a pole or not more than 18 inches from the center line of a pole shall be covered by a suitable protective covering where within a vertical distance of 8 feet from the level of communication conductors (including cables) or unprotected supply conductors (including the leads from the terminal) supported by the same pole or where within a radial distance of 6 feet from conductors not supported by the same pole.

Any riser more than 18 inches from the center line of a pole shall be covered by a suitable protective covering, or by securely supported impregnated fiber conduit without metal pipe, where within a vertical distance of 8 feet from the level of communication conductors (including cables) or unprotected supply conductors (including the leads from the terminal) supported by the same pole or within a radial distance of 6 feet from conductors not supported by the same pole.

The portion of any riser between the insulating covering required on the upper section and the metal or plastic covering required on

the lower section by the foregoing shall be covered by the extension of either or both of such coverings. Where metal pipe is used as a protective covering, the fiber conduit shall not extend within 8 feet of the ground line and shall be installed in a workmanlike manner and securely supported in order to prevent it from slipping downward and exposing any upper section of the metal pipe.

The radial clearances between conductors, specified in Table 2, Cases 16 and 17, are not required between suitably insulated conductors in the same riser.

Protective covering (suitable) is not required over risers encased in effectively grounded non-climbable metal poles or iron or steel pipe attached to a steel pole, tower or other metal structure, provided the iron or steel pipe is effectively grounded and is metallically connected to such metal structure.

Original Version
GO 95 Rule 84.6-B

84.6-B Ground Wires

Ground wires, other than lightning protection wires not attached to equipment or ground wires on grounded structures, shall be covered by metal pipe or suitable covering of wood or metal or of plastic pipe material designated as Type II in the standard specified in Rule 22.2, for a distance above ground sufficient to protect against mechanical injury, but in no case shall such distance be less than 7 feet. Such covering may be omitted providing the ground wire in this 7-foot section has a mechanical strength at least equal to the strength of No.6 AWG medium-hard-drawn copper.

Portions of ground wires which are on the surface of wood poles and within 6 feet vertically of unprotected supply conductors supported on the same pole, shall be covered with a suitable protective covering (see Rule 22.2).

Strikeout and Underline Version
GO 95 Rule 84.6-B

84.6-B Ground Wires

Ground wires, other than lightning protection wires not attached to equipment or ground wires on grounded structures, shall be covered by metal pipe or suitable covering of wood or metal or of plastic pipe material ~~designated as Type II in the standard~~ specified in Rule 22.2-C, for a distance above ground sufficient to protect against mechanical injury, but in no case shall such distance be less than 7 feet. Such covering may be omitted providing the ground wire in this 7-foot section has a mechanical strength at least equal to the strength of No.6 AWG medium-hard-drawn copper.

Portions of ground wires which are on the surface of wood poles and within 6 feet vertically of unprotected supply conductors supported on the same pole, shall be covered with a suitable protective covering (see Rule 22.2).

Final Version
GO 95 Rule 84.6-B

84.6-B Ground Wires

Ground wires, other than lightning protection wires not attached to equipment or ground wires on grounded structures, shall be covered by metal pipe or suitable covering of wood or metal or of plastic pipe material specified in Rule 22.2-C, for a distance above ground sufficient to protect against mechanical injury, but in no case shall such distance be less than 7 feet. Such covering may be omitted providing the ground wire in this 7-foot section has a mechanical strength at least equal to the strength of No.6 AWG medium-hard-drawn copper.

Portions of ground wires which are on the surface of wood poles and within 6 feet vertically of unprotected supply conductors supported on the same pole, shall be covered with a suitable protective covering (see Rule 22.2).

Original Version
GO 95 Rule 84.6-E

84.6-E Risers

Risers of wires or underground cables shall be encased in securely grounded iron or steel pipe (or other covering of equal strength) from the ground line to a level not less than 8 feet above the ground line. Risers from underground cables of Class C circuits may be encased in plastic pipes or in plastic U-shaped moulding, as provided in this rule, in lieu of the grounded iron or steel pipe required by this rule. Such plastic pipe shall be of material as specified in Rule 22.2-C, designated as Schedule 80 with a minimum nominal pipe size of 2 ½ inches, or Schedule 120 with a minimum nominal pipe size of 2 inches. Such plastic moulding shall be of material specified in Rule 22.2 -D, designated as Schedule 80 in nominal sizes of 2 through 3 inches, and Schedule 40 in nominal sizes larger than 3 inches. Backup plates are not required with U-shaped mouldings where Class C circuits are enclosed.

Risers shall be covered by a suitable protective covering as defined in Rule 22.2, where within a vertical distance of 3 feet above or 6 feet below the level of unprotected supply conductors supported on the same pole or structure.

Vertical risers where within both a 6-foot radius of another pole supporting supply conductors and within a vertical distance of 3 feet above or 6 feet below the level of any unprotected supply conductor shall be covered.

Strikeout and Underline Version

GO 95 Rule 84.6-E

84.6-E Risers

Risers of wires or underground cables shall be encased in securely grounded iron or steel pipe (or other covering of equal strength) from the ground line to a level not less than 8 feet above the ground line. Risers from underground cables of Class C circuits may be encased in plastic pipes or in plastic U-shaped moulding, as provided in this rule, in lieu of the grounded iron or steel pipe required by this rule. Such plastic pipe shall be of material as specified in Rule 22.2-C, designated as EPC-80-PVC Schedule 80 with a minimum nominal pipe size of 2 ½ inches, ~~or Schedule 120 with a minimum nominal pipe size of 2 inches.~~ Such plastic moulding shall be of material specified in Rule 22.2-D, designated as Schedule 80 in nominal sizes of 2 through 3 inches, and Schedule 40 in nominal sizes larger than 3 inches. Backup plates are not required with U-shaped mouldings where Class C circuits are enclosed.

Risers shall be covered by a suitable protective covering as defined in Rule 22.2, where within a vertical distance of 3 feet above or 6 feet below the level of unprotected supply conductors supported on the same pole or structure.

Vertical risers where within both a 6-foot radius of another pole supporting supply conductors and within a vertical distance of 3 feet above or 6 feet below the level of any unprotected supply conductor shall be covered.

Strikeout and Underline Version

GO 95 Rule 84.6-E

84.6-E Risers

Risers of wires or underground cables shall be encased in securely grounded iron or steel pipe (or other covering of equal strength) from the ground line to a level not less than 8 feet above the ground line. Risers from underground cables of Class C circuits may be encased in plastic pipes or in plastic U-shaped moulding, as provided in this rule, in lieu of the grounded iron or steel pipe required by this rule. Such plastic pipe shall be of material as specified in Rule 22.2-C, designated as EPC-80-PVC with a minimum nominal pipe size of 2 ½ inches.

Risers shall be covered by a suitable protective covering as defined in Rule 22.2, where within a vertical distance of 3 feet above or 6 feet below the level of unprotected supply conductors supported on the same pole or structure.

Vertical risers where within both a 6-foot radius of another pole supporting supply conductors and within a vertical distance of 3 feet above or 6 feet below the level of any unprotected supply conductor shall be covered.

Original Version

GO 128 Rule 33.4-D(1)(a)

- 33.4-D(1)(a) Steel conduit or plastic pipe made of rigid unplasticized polyvinyl chloride having the properties and dimensions specified in Type II, High Impact, Normal Chemical Resistance in United States Commercial Standard No. CS 207-60 with a minimum wall thickness of 0.15 inches.

Strikeout and Underline Version

GO 128 Rule 33.4-D(1)(a)

- 33.4-D(1)(a) Steel conduit or plastic pipe made of rigid unplasticized polyvinyl chloride having the properties and dimensions specified as EPC-40-pvc and EPC-80-pvc in NEMA Standards Publication No. TC2-1978, ~~in Type II, High Impact, Normal Chemical Resistance in United States Commercial Standard No. CS 207-60~~ with a minimum wall thickness of 0.15 inches.

Final Version

GO 128 Rule 33.4-D(1)(a)

- 33.4-D(1)(a) Steel conduit or plastic pipe made of rigid unplasticized polyvinyl chloride having the properties and dimensions specified as EPC-40-pvc and EPC-80-pvc in NEMA Standards Publication No. TC2-1978_ with a minimum wall thickness of 0.15 inches.