

OUTLINE OF THE NATIONAL ELECTRICAL SAFETY CODE

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TABLE 1

1. GENERAL

1.1 Observance of the rules of the National Electrical Safety Code for the construction of telephone systems is determined by the various states as to compliance in whole or in part. Table 1 is intended to indicate the various states and their requirements.

1.2 Construction of REA-financed telephone systems must be in accordance with all applicable rules of the National Electrical Safety Code except in those states where local regulations are more stringent, in which case local regulations shall be followed.

1.3 The National Electrical Safety Code (N.E.S.C.) of current interest is the sixth edition of Part 2 with supplements as issued. The specific parts of the Code referred to above are published in Handbook H81 by the National Bureau of Standards of the U. S. Department of Commerce. In addition, the following sections of the N.E.S.C. 5th Edition, Part 3, Section 39 and Part 4, Section 44 and 45 must be complied with as applicable.

1.4 All of the parts, sections and discussion of the N.E.S.C. may be purchased from the:

Superintendent of Documents
U. S. Government Printing Office
Washington, D. C. 20402

1.5 Although all of the parts of the N.E.S.C. may have some bearing on the design and construction of telephone systems, Part 2 - Rules for the Installation and Maintenance of Electric Supply and Communication Lines is the most important part in this respect, and further discussion in this section will be confined exclusively to Part 2 except Subparagraphs 1.51 and 1.52 as follows:

1.51 Part 3, Section 39 of the N.E.S.C. 5th Edition applies specifically to telephone systems but has generally been regarded to have been superseded by the National Electrical Code. However, in states that have adopted the 5th Edition by law, the requirements of Section 39 must be strictly complied with.

1.52 Part 4, Section 44 and 45 of the N.E.S.C. 5th Edition also applies specifically to telephone systems and must be complied with. These are primarily safety rules that apply to employers and employees rather than to the physical plant.

1.6 This section of the manual will cover only the general aspects of the N.E.S.C. For specific information and guidance in a particular situation, the N.E.S.C. itself should be referred to.

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

2.1 Part 2 of the N.E.S.C. has been established to provide a set of rules governing the installation and maintenance of electric supply and communication lines so as to reduce hazards to life as far as practicable. In recognition of the varying degrees of hazard to the public and to workmen, the N.E.S.C. has graded its requirements in accordance with the degree of hazard involved. These graded requirements have resulted in rules which establish certain clearances which must be maintained. They have also resulted in rules which establish the strength requirements necessary to maintain the required clearance both by the degree of hazard and by the mechanical loads to which it is assumed the lines may be subjected.

3. PART 2, SECTION 20 - SCOPE, NATURE AND APPLICATION OF RULES

3.1 Section 20 includes rules 200-202 and covers the extent of application as well as the exemptions to the rules of Part 2.

4. PART 2, SECTION 21 - GENERAL REQUIREMENTS APPLYING TO OVERHEAD AND UNDERGROUND LINES

4.1 Section 21 which includes rules 210-216 strikes the keynote of Part 2 and includes a general statement of the object and purpose of the Code. It is recognized in these rules that hazards cannot be entirely eliminated and that circumstances vary so widely that it is necessary to provide for considerable latitude in the construction of lines according to the varying degrees of hazard, the number of persons exposed to the hazard and other determining conditions.

5. PART 2, SECTION 22 - RELATIONS BETWEEN VARIOUS CLASSES OF LINES

5.1 Section 22 covers rules 220-223 and deals with the relative levels of supply and communication lines as well as joint use lines, over-built lines, conflicting lines and separate lines.

6. PART 2, SECTION 23 - CLEARANCES

6.1 Section 23, rules 230-239 is one of the most important sections of Part 2 with respect to the construction of telephone lines. In view of this, clearances are discussed separately in REA TE & CM-602.

7. PART 2, SECTION 24 - GRADES OF CONSTRUCTION

7.1 In order to facilitate the establishment of rules covering strength requirements for conductors and their supporting structures, Section 24 establishes grades of construction based on the relative hazard involved.

7.2 The relative order for grades of construction is B, C, and N, Grade B being the highest. An additional grade, Grade D, is also established for communication lines. When Grades D and N are specified for communication lines, Grade D is higher.

7.3 Table 15 of Rule 242 indicates the grade of construction for communication lines under the various conditions which may be encountered. At railroad crossings, Grade D is required. In joint construction, the poles will have to be of Grade B or C, depending on the type of electric supply system involved. Elsewhere Grade N will meet N.E.S.C. requirements for the construction of telephone systems except in extremely unusual situations, such as telephone wires in the upper position at a crossing with an electric supply line.

7.31 Special attention is directed to the basic requirement of Grade B construction for open power supply conductors above communication conductors at crossings, conflicts, or on the same poles with communication conductors as indicated in Table 15. The only exception under which Grade C construction may be used for supply conductors of the type normally encountered in practice, is covered by Footnote 8. Footnote 8 permits coordinated power contact protection on the communication circuits, to be used as an alternate to Grade B construction of the power line. See TE & CM-815, 820, and 821 for details of providing coordinated power contact protection. In most instances rural power lines are built to Grade C construction. If construction of the telephone line requires conversion of an existing power line to Grade B construction, at one or more points, the cost of conversion is normally borne by the telephone company. The cost of providing power contact protection is also borne by the telephone company, but in most instances is less costly than conversion of the power line to Grade B construction.

8. PART 2, SECTION 25 - LOADING FOR GRADES B, C AND D

8.1 For Grades B, C and D construction, three general degrees of loading due to weather conditions are recognized by the N.E.S.C. These are designated as heavy, medium and light and Figure 3 of Section 25 shows the areas of the United States in which these loadings are applicable. It must be recognized, of course, that no abrupt changes in weather occur at these boundaries and that the boundaries cannot be precisely established. It has been found from experience, however, that long term weather differences between these areas warrant recognition in the construction of overhead lines.

9. PART 2, SECTION 26 - STRENGTH REQUIREMENTS

9.1 Section 26 establishes the strength requirements for the various components of plant such as poles, crossarms, pins, conductor fastenings, conductors, cable suspension strand, etc.

9.2 For Grades B, C, and D, the Code, in most cases, establishes definite requirements with respect to the percentages of ultimate stress which must not be exceeded under conditions of storm loadings as defined in Section 25. In the case of certain components, however, the Code specifies minimum dimensions rather than stress limitations.

9.3 For Grade N construction, the N.E.S.C. requires that plant components shall be installed and maintained so as to safely withstand the loads to which they may be subjected. In order to ensure that this condition is met by all plant components, definite stress limitations and minimum sizes have been established for plant components which are to be installed in REA-financed telephone systems. These limitations can be found in the REA TE & CM Sections which deal with the particular component of plant involved.

10. PART 2, SECTION 27 - LINE INSULATORS

10.1 None of the provisions of this sections are applicable to the construction of telephone systems except Rule 274 which applies to insulators used in the construction of medium and high power radio transmitters.

11. PART 2, SECTION 28 - MISCELLANEOUS REQUIREMENTS

11.1 Section 28 includes rules which are not covered elsewhere in Part 2. This section also establishes the requirements which are referred to in the other sections of Part 2 as the "Miscellaneous Requirements".

11.2 REA recommended construction practices will meet all applicable requirements of Section 28.

12. PART 2, SECTION 29 - RULES FOR UNDERGROUND LINES

12.1 Section 29 provides the rules for installation of both conduit and manhole and direct earth buried systems. The provisions of this section are particularly important with respect to the separations which must be maintained between underground (in conduit) and direct buried electric supply and communication lines.

TABLE 1
 STATE RULES REGARDING N.E.S.C. REQUIREMENTS
 FOR TELEPHONE SYSTEM CONSTRUCTION

RBA 72 & CH 601

State	Wires Crossing Over			Conflict- ing Lines	Joint Lines	Separate Lines		Underground Construction	
	Highways	Railroads	Wire Lines			Power	Telephone	General	At Railroads
Alabama	N	N	N	N	N	N	N	N	N
Alaska	N	N	N	N	N	N	N	N	N
*Arizona	N	N	N	N	N	N	N	N	N
Arkansas	N	N	N	N	N	N	N	N	N
California	Own	Own	Own	Own	Own	Own	Own	Law	-
Colorado	N	N	N	N	N	N	N	N	N
Connecticut	N	N	N	N	N	N	N	N	N
Delaware	Law	-	-	-	-	-	-	-	-
District of Columbia	N	Own	N	N	N	N	N	N	Own
Florida	-	-	-	-	-	-	-	-	-
Idaho	N	N	N	N	N	N	N	N	N
Illinois	N	N	N	N	N	N	N	N	N
Indiana	N	N	N	N	N	N	N	N	N
Iowa	N	N	N	N	N	N	N	N	N
Kansas	N	N	N	N	N	N	N	N	N
Kentucky	-	-	-	-	-	-	-	-	Own
Louisiana	-	-	-	-	-	-	-	-	-
**Maine	N	N	N	N	N	N	N	N	N
Maryland	-	-	-	-	-	-	-	-	-
Massachusetts	-	-	-	-	-	-	-	-	-
*Michigan	N	N	N	N	N	N	N	N	N
Minnesota	N	N	N	N	N	N	N	N	N
Mississippi	-	-	-	-	-	-	-	-	-
Missouri	-	Own	-	-	-	-	-	-	-
Montana	N	N	N	N	N	N	N	N	N
Nebraska	N	N	N	N	N	N	N	N	N
Nevada	N	N	N	N	N	N	N	N	N
New Hampshire	-	-	-	-	-	-	-	-	-
New Mexico	N	-	-	-	-	-	-	N	-
New York	N	N	N	N	N	N	N	N	N
New York	-	-	-	-	-	-	-	-	-
North Carolina	-	-	-	-	-	-	-	-	-
*North Dakota	N	N	N	N	N	N	N	N	N
Ohio	N	N	N	N	N	N	N	N	N
Oklahoma	N	N	N	N	N	N	N	N	N
ORCA	N	N	N	N	N	N	N	N	N
Pennsylvania	Own	Own	Own	Own	-	-	-	-	Own
Rhode Island	-	-	-	-	-	-	-	-	-
South Carolina	N	N	N	N	N	N	N	N	N
South Dakota	-	Own	-	-	-	-	-	-	-
Tennessee	-	Own	-	-	-	-	-	-	-
*Texas	Own	Own	Own	Own	Own	Own	Own	Own	Own
Utah	N	N	N	N	N	N	N	N	N
Vermont	N	N	N	N	N	N	N	N	N
Virginia	Law	Law	Law	-	-	-	-	-	-
Washington	N	N	N	N	N	N	N	N	N
West Virginia	Own	-	-	-	-	-	-	-	-
*Wisconsin	Own	Own	Own	Own	Own	Own	Own	Own	Own
Wyoming	N	N	N	N	N	N	N	N	N

N - N.E.S.C. 4th Edition
 * - States requiring 5th edition observance-categories as indicated.
 ** - States requiring 4th edition observance-categories as indicated.
 *** - States requiring 3rd edition observance-categories as indicated.
 - - N.E.S.C. non-observance-categories as indicated.

Note: The engineer should check with the appropriate state agency for possible changes in requirements prior to project design.