

## Summary of Major 1997 NESC Changes

Rule	Description of Changes
012C	<b>Clarification.</b> It was made more clear that “good practice” must be applied for these expected conditions that are known at the time of construction or maintenance.
016	<b>Clarification.</b> There is no intent to require or prohibit the use of the new edition before the 180 day period has expired.
017	<b>New.</b> Metric measures will now come first.
Definitions	<b>New.</b> Definition of “vault”. Definitions regarding climbing, fall protection, etc. <b>Addition</b> to electric supply station definitions of “generating station” and “substation.”
References	<b>Updates, Additions, Removals</b>
92E	<b>Revision.</b> The 150-foot requirement has been deleted. The user has been referred to IEEE Std. 80. Attachment requirements were moved here from 93C6.
93C	<b>Clarification.</b> The wording has been changed to be more clear. The short-time ampacity must be large enough that any change to the design characteristics of the conductor is prohibited.
93C6.	<b>Revision.</b> The attachment requirement for grounding fences in Rule 93C6 was moved to Rule 92E.
93C7.	<b>Clarification.</b> The revision corrected awkward wording.
93E1 and 93E2.	<b>Revision.</b> The rules were revised to provide performance-based requirements.
95B	<b>Addition.</b> Flammable liquid pipelines were added to the recommendation for tests or calculations to determine clearances of HVDC ground electrodes.
97D2.	<b>Revision.</b> The change recognizes that, when there are separated primary and secondary grounding conductors, either, or both, may have to be insulated.
99	<b>Clarification.</b> The requirement to ground has been removed, recognizing that the requirement to do so lies elsewhere within the code. The title change better recognizes that other rules in Section 9 also apply to communication.
110	<b>Revisions.</b> The ANSI Z535 standards on safety signs have been added here and elsewhere where warning signs have been discussed. Safety signs are now required at each entrance to, and each side of, a supply station. Also, the requirements for clearances of energized parts from fences, partitions, walls, etc., are added.
110D	<b>Removal.</b> The requirements are now found in Rule 162A.
112B	<b>Revision.</b> Addition of reference to ANSI Z535.

<b>121D</b>	<b>Revision.</b> The exception has been removed and a new sentence added about testing equipment by standard industry practices.
<b>124C1</b>	<b>Revision.</b> Addition of reference to ANSI Z535.
<b>127A4</b>	<b>Revision.</b> Only Class II, Group F is now listed.
<b>127A6</b>	<b>Revision.</b> Updated reference to NFPA 8503.
<b>127C,D,E,F,K,L</b>	<b>Revision.</b> Instead of repeating all the details, the rule now refers to the appropriate standards (NFPA 30, NFPA 70, NFPA 58,59, 59A).
<b>142</b>	<b>Revision.</b> Instead of requiring the system to limit the accumulation of hydrogen, the rule requires the system to be <u>designed</u> to limit the buildup of hydrogen.
<b>146B</b>	<b>Revision.</b> The note on ANSI Z535 has been added.
<b>152A1</b>	<b>Clarification.</b> The words were revised to be more clear about the practical limitations of preventing inadvertent contact with energized parts and to add the allowance of isolation as recognized in Rule 123.
<b>153</b>	<b>New.</b> This new rule requires devices for deenergizing a power or station service transformer upon a high magnitude internal fault.
<b>162</b>	<b>Revision.</b> The words of previous Rule 110D have been relocated to this rule.
<b>171</b>	<b>Clarification.</b> The wording has been changed to apply to devices intended to interrupt fault current and not to limit the types of devices.
<b>173B</b>	<b>Clarification.</b> The wording was changed to recognize the practical limitations of installing locks or preventing accidental operation of switches or disconnects.
<b>180B11 and 180D2</b>	<b>Revision.</b> The notes regarding ANSI Z535 have been added.
<b>190</b>	<b>New.</b> A new note has been added to refer to IEEE Std C62 for additional information.
<b>215B5</b>	<b>New.</b> The note on monopolar operation has now become part of the rule.
<b>215C1, Exception3</b>	<b>Revision.</b> Messengers supporting only communication conductors have been excepted from the grounding requirement, if they are not exposed to open supply above 300V.
<b>215C2</b>	<b>Revision.</b> The wording has clarified that a guy should be exposed to conductors over 300 V due to a slack or broken conductor, guy or other attachment.
<b>217A1a</b>	<b>Clarification.</b> A note has been added making it clear that this portion of Rule 217 does not require protection or marking for structures located outside traveled ways. Also, the note recognizes that it is not practical to protect structures from out-of-control vehicles.
<b>217A1c, 217A2a</b>	<b>New.</b> The note on ANSI Z535 has been added.
<b>217A2c</b>	<b>New.</b> This new rule states the requirements for standoff brackets so that they do not create a readily climbable structure.
<b>217A3</b>	<b>Deletion.</b> The wording requiring the installation date of a structure to be recorded has been deleted.

<b>223A2</b>	<b>Clarification.</b> The word “possible” was deleted. Otherwise, <u>all</u> communication apparatus would have to be protected.
<b>230A2a</b>	<b>Revision.</b> The revision makes it more clear that the lower level where vehicles are not expected are those limited to pedestrians or vehicles of limited height. Notes 1 and 2 further clarify this.
<b>230A2d</b>	<b>Revision.</b> The requirements that supply cables meeting Rule 230C only can be laid directly on the ground has been changed to allow any supply cable unless above 600 V. Cables above 600 V must meet 230C or 350B.
<b>230A2e</b>	<b>New.</b> This new rule states that no specific clearances are required in areas where only qualified persons are allowed.
<b>230D</b>	<b>Revision.</b> The words have been changed to recognize the practical limits of preventing a short circuit on covered conductors making momentary contact between each other or to a grounded conductor.
<b>230F1c,d</b>	<b>Clarification.</b> The text has been revised to more clearly differentiate between fiber-optic cables supported on or in messengers and those on or in conductors.
<b>230I</b>	<b>New.</b> A note has been added on maintenance of clearances to refer to Rule 013 for determining the applicable edition of the NESC for a particular installation.
<b>231C</b>	<b>Revision.</b> The sentence referring to Rule 234I has been moved into a note, resulting in a revision of the rule organization. Lesser clearances are now allowed by agreement.
<b>232B2</b>	<b>Revision.</b> A sentence has been added referring to Table 232-1 for the clearances of drip loops.
<b>Table 232-1</b>	<b>Clarification and Revision and new.</b> Footnotes 7 and 8 were clarified to refer to building height. Attachments are expected to use the available building height to achieve required clearances. There has been a revision to Footnote 10(c) to recognize neutrals meeting 230E1. In new Footnote 14, ungrounded guys must have the same clearances as the highest voltage to which they might become energized. New Footnote 15 allows appropriately insulated guys to have the same clearance as grounded guys.
<b>Table 232-2</b>	<b>Clarification.</b> Footnote 7 has been modified to make it clear that some equipment may be mounted at lower levels, as long as it does not obstruct a walkway.
<b>Table 232-2</b>	<b>New.</b> New footnote 9 recognizes the US Army Corps of Engineers in setting crossing clearances in areas under Corps authority.
<b>Table 233-1</b>	<b>Revision.</b> The required clearance between communication and supply conductors of 750V-22kV changed from 1.80 m (6 ft) to 1.50 m (5 ft) to reflect previous voltage coordinations. The clearance of an energized supply conductor to a neutral was also changed to be 2 feet; the same as between energized conductors.

<b>Figure 233-2</b>	<b>New.</b> Footnote 5 has been added to provide instruction on how to structure the conductor movement envelope of a lower conductor to account for the upper levels of the lower conductor compared to the maximum lower position of the upper conductor.
<b>234A3</b>	<b>New.</b> There is a new exception for situations where the horizontal clearance is greater than the vertical clearance.
<b>234B1</b>	<b>Revision.</b> A new exception to the rule allows guys, messengers, neutrals, and cables meeting 230C (less than 300 V) to have a horizontal clearance of 3 feet.
<b>234B2</b>	<b>Revision.</b> For guys, messengers, and neutrals and cables meeting 230C (less than 300 V), the vertical clearance may be 2 feet.
<b>234C3d1</b>	<b>Revision.</b> Exception 2 for a service drop over a roof to a through-the-roof mast has been modified to allow the 18 inches of clearance in a radial distance of 6 feet from the mast, and 3 feet above the roof beyond the 6 foot radius from the mast. The requirement that the mast be no farther than 4 feet from the edge of the roof remains as before.
<b>Table 234-1</b>	<b>Revision.</b> New footnote 5 states that ungrounded guys must have clearances based on the highest voltage to which they could become energized. New footnote 13 allows insulated guys to have the same clearances as grounded guys.
<b>Table 234-1</b>	<b>New.</b> New footnote 14 states that railings, parapets or walls around roofs or balconies are to have clearances the same as for roofs not accessible to pedestrians.
<b>Table 234-2</b>	<b>New.</b> Footnote 4 requires ungrounded guys to have clearances based on the highest voltage to which they could become energized.
<b>Table 234-3</b>	<b>New.</b> Footnote 2 requires ungrounded guys to have clearances based on the highest voltage to which they could become energized. New footnote 3 allows insulated guys to have the same clearances as grounded guys.
<b>234E1</b>	<b>Revision.</b> Rigid live parts have been added to the facilities which may be over or near swimming areas.
<b>234F1</b>	<b>Revision.</b> The 18 foot clearance requirement now applies to all probe ports. Also, a horizontal clearance of 15 feet applies between open supply conductors and grain bins being served by a permanent grain auger.
<b>234J1</b>	Unguarded rigid live parts must meet clearances of Rules 234C or 234D, not just the bare wire clearances of those rules, as previously stated. This change allows padmount-type elbows meeting Rule 230C1 to have lesser clearances.
<b>Table 235-5</b>	<b>New.</b> New footnote 11 states no clearance is specified between fiber optic supply cables and other supply cables or conductors.

<b>235C2b</b>	<b>Revision.</b> The rule has been revised to consider the maximum sag of the upper conductor and the minimum sag of the lower conductor. The new exception exempts similar conductors of the same utility having the same sag and tension.
<b>239A</b>	<b>Additions.</b> Rule 239A1 was expanded to cover more items. Rule 239A5 was added to define nonmetallic coverings for use in Rule 239.
<b>239B</b>	<b>Addition.</b> A new note references Rule 236H for climbing space abstractions.
<b>239D,E,F,G</b>	<b>Clarification.</b> An extensive revision reorganized these rules to increase clarity—no major changes in requirements.
<b>239H</b>	<b>Expansion.</b> Other metal objects were added to the through-bolt clearance requirements.
<b>239J</b>	<b>New.</b> This new rule applies to standoff brackets supporting conduits or cables without conduits.
<b>Sections 24, 25 and 26</b>	<b>Complete Revision.</b> One of the most significant changes is the elimination of Grade D Construction.
<b>241B</b>	Grade D was merged into Grade B.
<b>241C3</b>	Grade D was merged into Grade B.
<b>242C</b>	Now references communication conductors in the supply space, in order to coordinate with Rules 224 and 235.
<b>242D</b>	With the removal of Grade D, fire-alarm conductors are now considered as other communication.
<b>Table 242-1</b>	The Table heading now includes communication conductors located in the supply space. There is no intent to require Grade B over ordinary streets and highways. The new Footnote 11 coordinates with the revised Definition of Limited Access Highways.
<b>Table 242-2</b>	The Table heading now includes communication conductors located in the supply space. Grade D was eliminated; communication over railroads and limited access highways now is Grade B. The new Footnote 5 coordinates with the revised Definition of Limited Access Highways.
<b>243A2</b>	Old rule was deleted with the merging of Grade D into Grade B.
<b>243B4</b>	Old rule was deleted with the merging of Grade D into Grade B.
<b>243C2</b>	Old rule was deleted with the merging of Grade D into Grade B.
<b>Section 25</b>	The main change was to combine the Loading Factors with the loads and Section 25, leaving Strength Factors in Section 26.
<b>250A1</b>	<b>Editorial.</b> Excess verbiage was removed.

<b>250C</b>	<p><b>Clarification.</b> High wind loads of Rule 250C are not required if neither the structure nor supported lines or equipment exceed 18 m (60 ft) above grade. The shape factors of Rules 251A2 and 251B2 are to be applied to the wind loads.</p> <p>The wind map reference was changed to ASCE 74. The newest ASCE 7 wind map values have been increased to include gust factors, while ASCE 74 retains the old “fastest mile” winds from the previous ASCE 7. The NESC presently allows the designer to choose the gust factor—see Rule 261A1.</p>
<b>251A2</b>	<p><b>Clarification.</b> The shape factor for conductors is 1.0, since the pressure formula used in the code is based upon wind on a cylindrical surface.</p>
<b>251B</b>	<p><b>Editorial.</b> No changes in requirements.</p>
<b>Table 251-1</b>	<p><b>Revision.</b> The light-loading constant was revised.</p>
<b>252A</b>	<p><b>Editorial.</b> Excess verbiage removed.</p>
<b>252B</b>	<p><b>Editorial.</b> Excess verbiage removed</p>
<b>252C</b>	<p><b>Editorial.</b> Excess verbiage removed; substitutes added.</p>
<b>253</b>	<p><b>New.</b> Overload factors have been moved to Section 25 from Section 26 to be with the assumed loads. Strength factors remain in Section 26.</p>
<b>Table 253-1</b>	<p><b>New.</b> Table 253-1 was derived from Rule 260C and Tables 261-2 and 261-3B. Table 253-2 was developed from Rule 260C and Tables 261-1 and 261-3A. Footnotes 6 and 7 were retained from old Grade D requirements.</p>
<b>260A1</b>	<p><b>Revised.</b> Now refers to Rule 253 for overload factors.</p>
<b>260BC</b>	<p><b>Revised/Moved.</b> Old Rule 260C was revised to reflect movement of overload factors to Section 25, and was moved to 260B.</p>
<b>260A2</b>	<p><b>Moved.</b> Was previous rule 260B.</p>
<b>261</b>	<p><b>Revisions/Deletions.</b> Rule 261 was extensively revised to reflect movement of overload factors to Section 25 and restatement of the two previous calculation methods to show the newer method as the main method and keep the older one as the alternate.</p>
<b>263</b>	<p><b>Clarification.</b> Grade N is not required to equal or exceed Grade C.</p>
<b>263A</b>	<p><b>Revision.</b> Requirements for location are in 231B and requirements for inspections are in Rule 214; both were deleted from 263A.</p>
<b>263I</b>	<p><b>New.</b> A reminder of the location of insulator strength requirements was added.</p>
<b>264B</b>	<p><b>Revision.</b> Coordinated with movement of Loading Factors to Section 25.</p>
<b>264E2</b>	<p><b>New.</b> This rule was added to meet concerns about structure damage due to people using rear view mirrors to back vehicles in parking lots at night. Slight contacts with guys can cause poles to move enough for conductors to slap together.</p>
<b>264E3</b>	<p><b>Clarification.</b> This ratifies the long-standing intent of this rule.</p>

277	<b>Clarification.</b> A new sentence flags the need to make appropriate allowance for Rule 250C high wind loads.
279A2a	<b>Clarification/New.</b> The concern about exposure is if a slack conductor or guy could cause more than 300V to be imposed on the guy. Exception 2 is new.
Part 3	<b>Revision.</b> In many of the rules of Part 3, wordings which had formerly said things like “prevent” or “minimize the possibility” have been changed to words like “limit the likelihood of” to recognize the practical limitations of being able to prevent certain things from happening and reflect similar changes in other Parts of the NESC.
314C4b	<b>Revision.</b> The Note allowing monopolar operation of HVDC for emergencies and limited periods for maintenance was made in Rule 314C4b.
323C4	<b>Revision.</b> The note on ANSI Z535 has been added.
Table 341-1	<b>Revision.</b> The metric value for 15-50kV was revised.
350G	<b>Revision.</b> The symbol is now allowed to be separate from other data.
352B2	<b>Revision.</b> <i>Detrimental</i> is more appropriate than <i>harmful</i> , because it also carries with it a connotation of slow degradation—not just an immediate connotation.
Table 353-1	<b>Revision.</b> The metric value above 50kV changed from 1070 mm to 1050 mm.
354D1e	<b>New.</b> Communication cables in random lay without deliberate separation from supply cables must have a continuous metallic shield under the outer jacket.
381D	<b>Editorial.</b> Language used was made compatible with other parts of code.
381G	<b>Revision.</b> All padmounts must now be locked or secured, even if in fenced area. The Note on ANSI Z535 has been added.
400	<b>Addition.</b> The reasonableness of the steps necessary to comply with the Code is addressed; unreasonable steps are not required.
402	<b>Revision.</b> The rules in Part 4 have been harmonized, to the extent possible, with recently issued OSHA standards 1910.137 and 1910.269.
411B	<b>Revision.</b> Lanyards were added and terms were coordinated with the rest of the Code.
411D	<b>Revision.</b> All warning signs in Part 4 are to comply with ANSI Z535.
411F	<b>New.</b> The employer is required to have an <i>effective</i> fall protection program. The employer is not to allow employees to use 100% leather positioning straps.

<b>420K</b>	<b>New.</b> This is the employee rule on fall protection. Once climbers go above 10 feet, they are required to appropriately use fall protection equipment and techniques. Only qualified climbers can climb without attachment to the structure or equipment. In addition to the general requirements, the rule provides guidance on the prevention of snaphooks unlatching during normal use.
<b>Table 431-1</b>	Several values were changed to coordinate with changes in the supply worker requirements.
<b>441</b>	<b>Revision.</b> Prohibition against approach now refers to exposed ungrounded parts, rather than to energized parts.
<b>441A2</b>	<b>Revision.</b> On Voltages between 51 and 300 V, instead on not allowing the employee to approach the part, the employee is prohibited from touching the part unless appropriate protective measures are taken.
<b>441A3</b>	<b>Revision.</b> On voltages from 301 to 72.5 kV, the major change is for work on supply equipment below 750 V. When using rubber gloves to work on such equipment, sleeves are not also required if the parts being worked on are the only ones exposed. Also, the previous restrictions on covering the exposed energized parts not being worked on have been changed for 300 V to 750 V, as long as appropriate insulated tools and/or gloves are used, and exposed parts are covered as much as is feasible to do so.
<b>Table 441-1</b>	<b>Revision.</b> Values of approach distances required when potential voltage problem is phase-to-ground or phase-to-phase were revised below 72.5 kV to reflect new flashover information.
<b>441A6(a)(3)</b>	<b>Revision.</b> A sentence has been added to indicate that minimum approach distances are composed of a <u>voltage dimension</u> plus an <u>inadvertent movement dimension</u> of either 0.31 m (1 ft) [301V-750V and >72.6kV] or 0.61 m (2 ft) [751V-72.5kV].
<b>441B</b>	<b>Revision.</b> The term “live line work” has been replaced with “live work.”
<b>442B</b>	<b>Addition.</b> A new Exception 2 provides methods for suspending normal notification rules <i>providing</i> that certain restraints are met.
<b>442E</b>	<b>Revision.</b> The tagging of SCADA–controlled systems has now been addressed to allow electronic displays instead of physical tags, as long as other methods are used to assure its effectiveness.
<b>442F1</b>	<b>Clarification.</b> The proper reference is to tagged equipment (not controls) that open automatically.
<b>446</b>	<b>Revision.</b> The term “live line work” has been replaced with “live work.”