National Electrical Safety Code
NESC (IEEE C2)

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National Electric Safety Code

Purpose - The practical safeguarding of **persons**, during the installation, operation, and maintenance of electric supply and communications facilities.

Scope - covers **supply and communication facilities** and associated work practices employed by an electric supply, communications, or railway in the exercise of its functions as a utility.

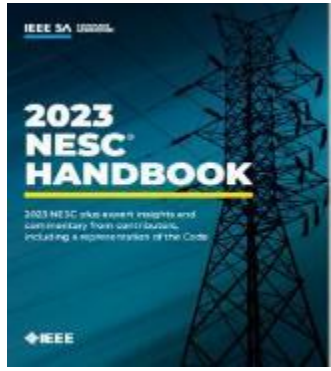
IEEE
Advancing Technology for Humanity

2028 Code development process

Preprint released in July 2025 for Public comments

Deadline for comments – March 24th 2026

NESC Scope and Uses



NESC Is Not a Design Guide or Instruction Manual; however

- The NESC is used as reference for Joint-Use Agreements (How to we work best together!), design choices, and construction guidelines across the supply power and communications industries as well as in legal compensation cases (i.e., Who's to blame! Who's at fault!).
- Part 4 Work Rules Harmonizes with OSHA (1910), IEEE 1584, …..
- Industry best practices such as Telcordia GRs & SRs, ATIS standards, IEEE Guides, and many industry practices align with the objectives of NESC rules
- The current NESC competes with but does not directly conflict with NFPA 70 (NEC) or 70E requirements in areas where their scopes meet and may overlap (peaceful handshakes!)
- The NESC is used by 90+% of the States in USA with 80-85% following the current version for regulatory purposes and rulings (California GO 95 is the major exception)

The NESC provides a critical safety-focused baseline and design guideline to help manage the logistics, business and technical (design/engineering) complications that may arise

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NESC Schedule -- 2023 to 2028

- **5-year Revision Schedule –**
- Administered by IEEE … ANSI Approved
- 2023 NESC issued August 2022 with Effective Date of Feb 2023
  applies on adoption by PUC, State legislative or local AHJ bodies
- 2023 – TIAs and Fast Track changes to the 2023 code were made for FMPS issues
- Feb 1st - May 15th 2024 = Submission of Change Proposals (CPs)
- August–October 2024 Subcommittee Review and action on all 500-600 CPs
- 1 July 2025 Preprint of 2028 Edition Issued
- 21-23 October 2025 -- NESC WORKSHOP - Review Preprint and look forward to 2028
- **24 March 2026 = Final date for Public Comments (PCs) on Draft for Aug/Oct 2026 review**
- 1 August 2027 Publication of the 2028 Edition of the NESC

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Major Changes accepted to 2023 NESC

- Added **new generation facilities** **Part 5** and sections to better cover grid-connected distributed energy facilities (solar & wind farms, energy storage..) – separated from, but based heavily on, the rules for **substations in Part 1**
  - Further adjustments expected on format and harmonizing for these 2 related parts
- Clarification of clearances associated with communications and wireless
  - Rule 235 and 238F – practical interpretation and application of these rules for wireless and other facilities in vertical space on poles **remains a challenge in congested communication space**, and in the negotiation of fair and consistent pole attachment agreements
- **Strength and loading for poles** – new updated ASCE wind and ice map references with refinements to Appendices of calculation examples
- The usual editorials, clarifications and format revisions

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“Resolved” Issues - 1

- **Ground Elecrodes** (Rule 094C2) – Replace “equivalent” with “acceptable” to recognize that the different electrodes are effective grounding means, but not strictly equal in all ways
- **Powering of Communications Equipment** (wireline/wireless) using **FMPS (Fault Managed Power Systems)** - Rules 224/344 & revised Definitions –
  - Interim modifications to accommodate FMPS were reaffirmed for 2023 and 2028 code to permitting no shield under specified conditions
  - Definitions updated for FMPS in communication applications
- **Construction Grades** – clarifications to Table 242-1 provide a clear concise guidance table for applicable construction grades (B, C or N) for joint use situations
- **Underground and Buried Plant (Part 3) - Terminology changes** for more consistent application of rules
  - Duct and conduit (single) --- Duct bank (one or more ducts or conduits) – Conduit Systems

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FMPS for Communications

Revisions to the definition of "communications lines" under "lines" in NESC Section 2

1. communication lines.

The conductors and their supporting or containing structures, equipment, and apparatus that are used for public or private signal or communications service. A communication line may include fault-managed power system (FMPS) circuits used exclusively for communications equipment that monitors for electrical faults and controls the current delivered to limit fault energy meeting Rule 224B.

a. located in the communication space. Communication lines located in the communication space and which operate at potentials not exceeding 400 V to ground or 750 V between any two points of the circuit, and the transmitted power of which does not exceed 150 W. When operating at not more than 90 V ac or 150 V dc or as an FMPS circuit, no limit is placed on the transmitted power of the system.

1. This revision links the FMPS application for powering communications equipment with rule 224B and the new definition of FMPS.
2. The existing 400 V to ground maximum is over 60 years old and will remain for 2028 edition. Any change would need to occur in the Change Proposal (CP) step of the next code cycle for 2033 edition; and require technical justification and safety data.

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“Resolved” Issues - 2

- **Section 25-27 -** Further refinements expected to **Pole Strength and Loading**
  - **Wind and Ice Loading maps** – load factors and calculation methods – the ASCE (American Society of Civil Engineers) guidelines ASCE-7 and ASCE-74 will be carefully considered and customized for possible alignment to utility pole applications and uses.
- **Sections 23 and 25** - traditional use of the
  - **Additive Constant** (“K factor”) retained for calculations of clearances (sags) and loads
  - **60 foot exemption for extreme wind loading** retained
- **Part 4 – Work Rules** - Refinements and Adjustments on
  - **Arc Flash clothing** default table (Rule 410A3) – updated with latest Laboratory test data
  - **Communications worker rules** (Section 43) remain the same.
  - Work rules around batteries and energy storage systems needs review for consist application between related rules in Parts 4, 5 and 1.

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Open Issues – Ground Clearances

- **Ground Clearances** for insulators on guys (215), cables over driveways (232), on climbable structures (239).
- Reference height for safety based on person reaching up at full extension is currently 8 ft which is practical to the bottom of guy insulators, and minimum gap to hand holds to make a structure not readily climbable.
  - Proposals to increase to 10 ft or more were withdrawn by submitter or rejected because of lack of technical rationale. One reduction made to allow 9.5 ft in footnote 7 (Table 232-1) where cars less than 8 ft are driven.
  - More Public Comments (PCs) expected during this and next code cycle
    - Taller RVs and delivery vans are common and require higher, more practical clearances over driveways
    - Higher clearances would be safer
    - Pole congestion in communications space could lead to
      - Taller poles being required = higher make-ready costs
      - Conflicts with other communications lines of CLEC and ILEC,

        streel lighting, and traffic signals
      - Compromising the Communications Worker Safety Zone (CWSZ) between communications space and power lines on joint-use structures.

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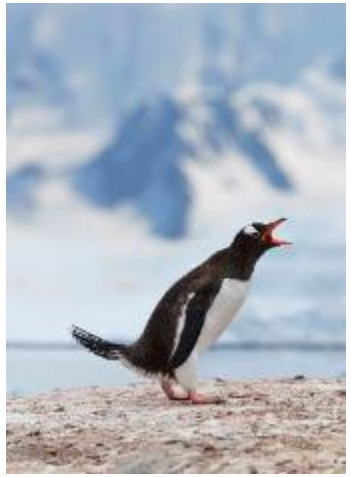
Open Issues – Congestion on Pole

- **Congestion/competition on Poles** – (Clearances - Section 23) –
  - Partly resolved by modifications and clarifications to Rules 235C (General Application), 235H (Within communications space) and 238F (Wireless).
  - The competition for vertical space between communications wireline, wireless carriers, ILECs and other players will escalate and continue.
  - The solution is not to be found in the NESC rules where great flexibility is found in rules for the communications space.
  - An economic viable solution is not to be found in bringing disputes to the regulatory arena with new public utility commissions rules and actions
  - Disputes between competing communications providers in communications space need to be resolved through mutual agreements and other industry guidelines and practices; for example - IEEE Guide on Joint Use P2939 "*IEEE Guide for Joint Use of Utility Poles with Wireline and/or Wireless Facilities*"
  -

Open Issues – Grounding, Bonding and NEC

- **<u>Grounding at Customer Premises</u>** – (Rule 099)
  - Customer Premises buildings is where the handshake between the two codes (NEC and NESC) occurs.
  - Specific cross references to NEC are in flux because of the major reorganization of the NEC planned for the 2026 and 2029 editions of the code
  - Currently Section 250.94 in the NEC on the IBT is the most likely best reference to cite for direction to other rules in NEC for communications facilities
    - NEC 250.94 is the least likely rule to move during the NEC reorganization
    - NEC 250.94 is likely to have references to other Grounding & Bonding rules for communications circuits and systems that are updated during the reorganizations and article changes.
    - NEC Reorganization will need to be tracked (and monitored) through 2029



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Submitted Public Comments - 1

- **Will be circulated to Committees in April or May 2026**
- **Ones we know about (submitted by us or our communications colleagues)**
  - Mainly Clarifications – grammatical and editorial
    - Definition of Wind Span - Definition
    - Deterioration criteria.- Rule 261
    - Grade N construction grade – Rule 263
    - Allowances for Emergency, temporary & routine installations and maintenance operations - Rules 14, 263 and grandfather rule 13B
    - Editorials and format edits – various rules 122,
    - Several clarifications in new Part 5 (generation stations) – 511, 521, 522, 527, 530,
  - FMPS – update references to ATIS and UL documents – in definitions
  - Clarify pole rules 217 and 218 for fire hazard and update referenced standards – and 593

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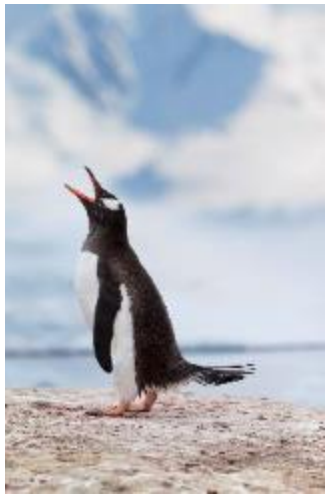
Submitted Public Comments - 2



- **Rule 261H - Aeolian Vibration** – Comment to revise rule to clarify that (1) limiting tension is not to be the only recommended means, it is one of several means to mitigate aeolian vibration effects, and (2) the appropriate temperature for the loading condition is listed in Table 251-1
- **Rule 302** – **Microduct** - Comment to clarify the application of these underground and directly buried rules to the newer microduct and microduct assembly arrays currently in use for communications applications. Distinctions between terms used in the NESC - duct, conduit and duct bank - need to be aligned with current products used.
- **Rule 354D3 - Random separation** – Separation less than 12 in (300 mm) – rules for joint burial of supply and communications cables. - Comment to revise the rule to emphasize that it is reasonable that **all parties should agree** to a reduced number of grounds per mile so that they can assess any safety consequences for their facility.

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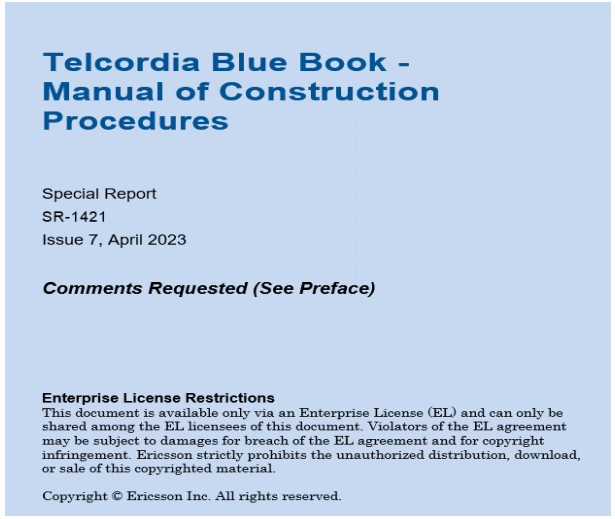
NESC Related Activities



- **SR-1421** - ***Telcordia Construction Blue Book*** – issued 2023
  - Revisions are under considerations – Date TBD
- **IEEE Guide - P2939** – Issued Nov 2023 - IEEE *Guide for the Joint Use of Utility Poles with Wireless Facilities* – needs to be tested through use to see if revisions, corrections and additions are needed
- Active work on **ATIS and UL Standards** on span powering and FMPS continues in for example
  - ATIS 0600040 (FMS), ATIS-0600333(Grounding and Bonding of Telecom Equipment), ATIS-0600315 (Voltage Levels for DC-Powered Equipment Used in the Telecom Environment), etc.…
  - UL 1400-1 and 1400-2 covering FMPS – refinements continue
- **NEC new proposed "Limited Energy" 2026** Articles 720, 721, 722, 723, 724, 725, 726, 728, 742, 750, 800, 805, 820, 820, 830 and 840 need review for practical use and viability relevant to best practices in the communications industry.

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Thank You and Questions

Summary of Submitted PCs - 1

Public Comment (CM)	Change Proposal (CP)	NESC Rule/Section	Comments
CM8000	CP6279 (RC6279_SC1)	Definition of Wind Span	Comment to clarify the definition of wind span for the general case where wind may impact pole line from various angles; allowing for engineering judgment for analysis. Backup plan would be to add a non-mandatory NOTE instead of revising rule text if CM8000 is not accepted.
CM8005	CP6016_SC5	Table 261-1	Corrections, clarifications and condensation to footnotes on deterioration criteria.
CM8006	CP6017_SC5	Rule 263	Clarification of Grade N criteria to coordinate with allowances for emergency/temporary installations.
CM8008	CP6282	Rule 013B2	Grammatical correction to help consistent use of important grandfather and application rule
CM8009	CP6166 CP6266	Definition of Lines	Verification of FMPS (Fault Managed Power System) updates to 2023 edition for communications lines and clarification that traffic signal lines are treated as supply lines.

Summary of Submitted PCs - 2

Public Comment (CM)	Change Proposal (CP)	NESC Rule/Section	Comments
CM8010	**CP6351**	**Rule 122A**	Comment to add a Note to clarify meaning of "suddenly moving parts" which include those automatically started by a computer or by an action of a person located remote from the equipment where a person in the vicinity of the moving parts cannot be seen.
CM8011	**CP6291**	**Rule 217A1 & A2**	Protection of Supporting Structures (poles) – Comment is to revise and clarify rule for fire hazard and update referenced standards.
CM8012	**CP6306**	**Rule 232 Table 232-1**	Editorial clarification – change "above ground" to "above the ground" to avoid confusion with "aboveground".
CM8013	**CP6307**	**Rule 232 Table 232-2**	Editorial clarification – change "above ground" to "above the ground" to avoid confusion with "aboveground".
CM8014	**CP6257**	**Rule 218A**	Vegetation Management – Comment is to add rule to address wildfire and brushfire concerns.

Summary of Submitted PCs - 3

Public Comment (CM)	Change Proposal (CP)	NESC Rule/Section	Comments
CM8018	CP6528 CP6384	Rule 261H1c	Aeolian Vibration – Comment to revise rule to clarify that (1) limiting tension is not to be the only recommended means, it is one of several means to mitigate aeolian vibration effects, and (2) the appropriate temperature for the loading condition is listed in Table 251-1
CM8019	CP6238	Rule 302	Comment to clarify the application of these underground and directly buried rules to the newer microduct and microduct assembly arrays currently in use for communications applications. Distinctions between terms used in the NESC - duct, conduit and duct bank - need to be aligned with current products used.
CM8015	CP6505	Rule 241C2	Comment to change format to list format for clarity and to explicitly reference Rule 242 and Table 242-1 to guide users to critical text and Table.
CM8016	CP6503 (and others)	Rule 243A	Comment to verify final rule text given that several CPs – including CPs 6503, 6502, 6496, 6501, 6591 – were accepted or accepted as modified.
CM8017	CP6545	Table 250-3(a)	Comment to eliminate the 200 foot limit for gust response factor and simplify the effective height measurement.

Summary of Submitted PCs - 4

			products used.
CM8020	**CP6010** **CP6253**	**Rule 354D3 Exception**	Random separation – Separation less than 12 in (300 mm) – rules for joint burial of supply and communications cables. Comment to revise the rule to emphasize that it is reasonable that all parties should agree to a reduced number of grounds per mile so that they can assess any safety consequences for their facility. In addition, the criteria for "*For such installations, the concentric neutral shall be effectively grounded where the cable does become accessible*." be retained to help make the installation is safer. It's removal would allow reduction in the number of grounds whenever convenient, based on undefined 'agreements' that may not actually be carefully considered.

Summary of Submitted PCs - 5

CM8021	**CP6033**	**Rule 511C**	Comment to better define "*dangerous proximity*" terminology in Rule 511C by replacing with a reference to a defined distance such as the MAD (Minimum Approach Distance) values in Part 4 – Rule 441 (Table 441-1 and 445-1).
CM8022	**CP6038**	**Rule 521B** **Rule 521C**	Editorial - A space is needed between "its" and "fitness" in the Rule 521B as shown in the 2028 preprint version. Technical question raised regarding the phrase "its fitness for service" used in 521B and 521C is vague but is assumed to be assessed by reference to the observations, inspections and test contained subsections 521A, 521C and 521D. How does one tell if it is "fit for service".
CM8023	**CP6039**	**Rule 522**	Comment to add a Note to clarify meaning of "suddenly moving parts" which include those automatically started by a computer or by an action of a person located remote from the equipment where a person in the vicinity of the moving parts cannot be seen. Rule 521 and 122A should be aligned.
			Comment raising question regarding

Summary of Submitted PCs - 6

CM8024	**CP6044**	**Rule 527**	Comment raising question regarding referencing older or withdrawn industry references (NFPA standards).
CM8025	**CP6044**	**Rule 521C1** **Rule 521C2**	Editorial correction to replace “40 lb/in2” to “40lb/in^2” with superscript.
CM8026	**CP6049**	**Rule 530**	The “when” used in the new 530A rule should be replaced with an “if” reflecting that it is a possible condition and not a time. It is too late to provide control once the harmful overspeed condition is occurring.
CM8027	**CP6132** **CP6445d**	**Rule 593**	This vegetation management for generating sites should align with Section 193 text and aerial Rule 218A1; including the guidance on factors to consider as well as consideration of wildfire threats.

Fast Track Changes to 2023 Code for FMPS - 1

New FMPS Definition in NESC Section 2

Fault-Managed Power System (FMPS). A powering system for communications equipment that monitors for electrical faults and controls the current delivered to limit fault energy.

NOTE 1: Fault- managed power systems consist of a power transmitter and a power receiver connected by a cabling system. These systems are characterized by monitoring the circuit for faults and controlling the power transmitted to ensure the energy and power delivered into any fault is limited with respect to electric shock between transmitter and receiver. ATIS Technical Report 0600040, - Fault Managed Power Distribution Technologies –- Human Contact Fault Analysis, provides a description of FMPS and testing protocols. FMPS circuits are also referred to as Class 4 circuits.

NOTE 2: The monitoring and control systems differentiate fault-managed power from electric light and supply power circuits with different requirements regarding minimum wire sizes, overcurrent and surge protection, insulation requirements, and wiring methods.

This description defines FMPS in the NESC as a method specifically for powering communications equipment and explicitly points to ATIS 0600040.

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Fast Track Changes to 2023 Code for FMPS - 2

Revisions to "communications lines" under "lines" definition in NESC Section 2

1. communication lines.

The conductors and their supporting or containing structures, equipment, and apparatus that are used for public or private signal or communications service. A communication line may include fault-managed power system (FMPS) circuits used exclusively for communications equipment that monitors for electrical faults and controls the current delivered to limit fault energy meeting Rule 224B. See: fiber-optic cable—supply and fiber-optic cable—communication.

a. located in the communication space. Communication lines located in the communication space and which operate at potentials not exceeding 400 V to ground or 750 V between any two points of the circuit, and the transmitted power of which does not exceed 150 W. When operating at not more than 90 V ac or 150 V dc or as an FMPS circuit, no limit is placed on the transmitted power of the system.

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This revision links the FMPS application for powering communications equipment with rule 224B and the new definition of FMPS .

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Fast Track Changes to 2023 Code for FMPS - 3

Revised 224B2(a) in NESC Part 2

B. Supply circuits used exclusively in the operation of communication circuits

Circuits used for supplying power solely to apparatus forming part of a communications system shall be installed as follows:

1. Open-wire circuits shall have the grades of construction, clearances, insulation, etc., prescribed elsewhere in these rules for supply or communication circuits of the voltage concerned.

2. Special circuits operating at voltages in excess of 90 V ac or 150 V dc and used for supplying power solely to communications equipment may be included in communication cables under the following conditions:

a. Such cables shall have a conductive sheath or shield that is effectively grounded.

EXCEPTION: Fault-managed power system (FMPS) cables are permitted to operate without a conductive sheath or shield.

This exception permits FMPS cable to not have shield. All other safety conditions (b) through (e) of 224B still apply. The allowance recognizes that the safety provide by a shield is replaced by the FMPS software system and its control features.

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Fast Track Changes to 2023 Code for FMPS - 4

Revised 344A1(a) in NESC Part 3 Underground and Buried Plant

B. Supply circuits used exclusively in the operation of communication circuits

344. Communication cables containing special supply circuits

A. Special circuits operating at voltages in excess of 90 V ac or 150 V dc and used for supplying power in excess of 150 W solely to communications equipment may be included in communication cables under the following conditions:

1. Such cables shall have a conductive sheath or shield that shall be effectively grounded.

EXCEPTION: Fault-managed power system (FMPS) cables are permitted to operate without a conductive sheath or shield.

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This exception permits FMPS cable to not have shield. All other safety conditions (2) through (7) of 344A still apply. The allowance recognizes that the safety provide by a shield is replaced by the FMPS software system and its control features.

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