General Notes:

1. *This guide specification is intended to provide the Design Professional with a basic guideline of suggested materials and installation requirements for a structural Lightning Protection System.*
2. *The guide specification shall be carefully reviewed and edited with respect to application-specific project requirements. Proposed modifications shall be reviewed by Harger Lightning and Grounding.*
3. *The finalized version shall be included in the project contract documents.*

*Editing Notes:*

1. *This specification section must only be altered by notation (i.e. deleted text with strikethrough and additional text with double underline). This shall be accomplished by using Tools / Track Changes / Highlight Changes, and select “Track changes while editing” in MS Word or equivalent.*
2. *The Review Submittal Specification section shall be provided in electronic form for Harger Review.*
3. *Leave the following note (“For Construction Document Review, Design Submittal”) as part of the review submittal to aid any reviewer to understand WHY there are strikeouts and underlines.*
4. *After comments are received from Harger and incorporated, the strikeouts, underlines and reviewer notes are to be deleted before the spec is issued for Bidding.*

SECTION 33 79 16

Tower Grounding

1. GENERAL
   1. SUMMARY
      1. Section includes requirements for Communications or Antenna Tower grounding and bonding.
   2. RELATED REQUIREMENTS
      1. Section 26 05 26 – Grounding and Bonding for Electrical Systems
      2. Section 26 01 40.13 - Operation and Maintenance of Lightning Protection Systems
      3. Section 26 41 13 – Lightning Protection for Structures
   3. REFERENCES
      1. ANSI/TIA 607-C – Generic Telecommunications Bonding and Grounding (Earthing) for Customer Premises

Remove paragraph 1.04 if it is determined that a surge threat is negligible or the lines are equivalently protected or where installation compromises safety.

* 1. FURNISHED AND INSTALLED BY 26 05 00
     1. Surge Protective Devices (SPD’s) shall be installed at the entrances of all power service entrances and conductive communications systems.
     2. Surge Protective Device Ratings
        1. The power service entrance SPD shall have a nominal discharge current (In) rating of at least 20 kA 8/20 µs per phase and be listed and labeled by UL 1449, *Standard for Safety for Surge Protective Devices.*
        2. Signal, data, and communications SPDs shall have a maximum discharge current (Imax) rating of at least 10 kA 8/20 µs when installed at the entrance.
  2. ADMINISTRATIVE REQUIREMENTS
     1. Pre-installation Meeting: Installing contractor shall coordinate a site walkthrough with the grounding and bonding manufacturer prior to the start of any work. Manufacturer representative shall provide a pre-installation site report which includes guidance for design changes or confirmation that current site conditions match contract documents.
     2. Post-Installation Meeting: Installing contractor shall coordinate a site walkthrough with the grounding and bonding manufacturer at the commencement of work. Manufacturer representative shall provide a post-installation site report to the installing contractor which contains the following:
        1. Any deficiencies in the installation or confirmation that the current installation meets the requirements of the standards specified.
        2. Electronic markup of the approved shop drawing with embedded images showing all concealed bonding (gas piping, electrical service ground, communication grounds) and a random selection of concealed connections (cable to ground rod, cable to cable, cable to reinforcing steel).
           1. Photographic documentation shall be provided from the installing contractor to the grounding and bonding manufacturer representative prior to concealing or backfilling.
     3. Sequencing: Coordinate installation of grounding and bonding system with installation of other building systems and components, including electrical wiring, supporting structures and building materials, and building finishes.
  3. SUBMITTALS
     1. Product Data: Manufacturer’s descriptive and technical literature or catalog cuts.
     2. Shop Drawings:
        1. Layout of the grounding and bonding system, specifically for the building(s) or structures included in the contract drawings.
        2. Installation details of the products to be used in the installation.
     3. Manufacturer’s Instructions: Installation instructions shall be provided for grounding and bonding components that require field assembly or fabrication.
     4. Qualification data for firms or persons specified in “Quality Assurance” Article to demonstrate their capabilities and experience. Include data on listing or certification by a Nationally Recognized Testing Laboratory (NRTL).
     5. Certification, signed by tower erection contractor, that the connection method to the tower is approved by manufacturers of the grounding and bonding components, and the tower manufacturer.
  4. CLOSEOUT SUBMITTALS

*While highly suggested, remove paragraph 1.07.A if a maintenance contract is not desired.*

* + 1. Maintenance Contracts: Installing contractor shall provide building owner with pricing for yearly system inspections. Building owner is under no obligation to have yearly inspections performed.
    2. Warranty Documentation: The completed installation shall carry a one-year guarantee against defects in material or installation.
       1. Exclusions: Routine preventative maintenance, accidental or intentional damage shall not be included as part of the warranty service.
    3. Record Documentation: Installing contractor shall provide building owner a copy of the pre-installation site report, post-installation site report and (3) full-size plots of accurate as-built shop drawings.
  1. QUALITY ASSURANCE
     1. Qualifications:
        1. Manufacturer shall maintain current grounding and bonding material listings by a Nationally Recognized Testing Laboratory (NRTL).
        2. Installer Qualifications: Engage an experienced installer who has been trained and certified to perform installations by the grounding and bonding manufacturer.
     2. The system shall be physically inspected by a Nationally Recognized Testing Laboratory (NRTL) to the current edition of ANSI/TIA-607-C. The certification shall be provided to the building owner at completion of the project.

1. PRODUCTS
   1. APPROVED MANUFACTURER
      1.  301 Ziegler Drive, Grayslake IL 60030

<http://www.harger.com> | <hargersales@harger.com>

* 1. BONDING BUSBARS
     1. Basis of Design: Subject to compliance with requirements, provide Harger Lightning and Grounding, bonding busbars.
     2. Substitution Limitations: No Substitutions
     3. Product Options:

|  |  |  |  |
| --- | --- | --- | --- |
| Tower Busbar | External Busbar | Internal Busbar | Entrance Panel Kit |
| [TGBIA14420M](https://www.harger.com/product/m-hole-pattern-5) | [TGBI14424TMGB](https://www.harger.com/product/tmgb-hole-pattern-2) | [GBI14424TMGB](https://www.harger.com/product/tmgb-hole-pattern) | [EPK24](https://www.harger.com/product/entry-panels) |

* 1. ground Conductors
     1. Basis of Design: Subject to compliance with requirements, provide Harger Lightning and Grounding, ground conductors.
     2. Substitution Limitations: No Substitutions
     3. Product Options:

|  |  |  |  |
| --- | --- | --- | --- |
| Tower Ground | Wooden Pole Ground | Cabinet Ground | Rooftop Ground |
| [2T (minimum)](https://www.harger.com/product/solid-0) | [2T (minimum)](https://www.harger.com/product/solid-0) | [2T (minimum)](https://www.harger.com/product/solid-0) | Refer to 26 41 13 |
| Transmission Line Ground | Fence Ground | Generator Ground | Satellite Dish Ground |
| [2T (minimum)](https://www.harger.com/product/solid-0) | [2T (minimum)](https://www.harger.com/product/solid-0) | [2T (minimum)](https://www.harger.com/product/solid-0) | [2T (minimum)](https://www.harger.com/product/solid-0) |

* 1. FENCE GROUNDING
     1. Basis of Design: Subject to compliance with requirements, provide Harger Lightning and Grounding, grounding components.
     2. Substitution Limitations: Soil conditions may dictate the use of a grounding electrode not shown. Installing contractor shall coordinate with lightning protection manufacturer to determine proper materials.
     3. Product Options:

|  |  |  |  |
| --- | --- | --- | --- |
| Deterrent Wire Bonding Clamp | Fence Fabric Bonding Clamp | Gate Jumper | Connection To Line/Gate Post |
| [FGC2TP](https://www.harger.com/product/fence-ground-clamps-tamper-proof) | [FGC2T](https://www.harger.com/product/fence-ground-clamps-tamper-proof)P | [GJX2S24](https://www.harger.com/product/exothermic-jumpers) | [VDRFP Series](https://www.harger.com/product/vdrfp) |

* 1. GROUNDING ELECTRODES
     1. Basis of Design: Subject to compliance with requirements, provide Harger Lightning and Grounding, grounding electrodes.
     2. Substitution Limitations: Soil conditions may dictate the use of a grounding electrode not shown. Installing contractor shall coordinate with lightning protection manufacturer to determine proper materials.
     3. Product Options:

|  |  |  |  |
| --- | --- | --- | --- |
| Standard Soil | Corrosive Soil | Shallow Topsoil | Rocky Conditions |
| [3410](https://www.harger.com/product/copper-clad-steel) | [3410SS3](https://www.harger.com/product/stainless-steel-0) | [336](https://www.harger.com/product/ground-plates) | [EGRSS10LWG4/0](https://www.harger.com/product/stainless-steel) |

* 1. GROUND ACCESS WELLS
     1. Basis of Design: Subject to compliance with requirements, provide a minimum of (1) Harger Lightning and Grounding ground access well.
     2. Substitution Limitations: Soil conditions may dictate the use of a ground access well not shown. Installing contractor shall coordinate with lightning protection manufacturer to determine proper materials.
     3. Product Options:

|  |  |  |
| --- | --- | --- |
| Standard | Traffic Rated | Heavy Duty |
| [GAW910](https://www.harger.com/product/hdpe) | [GAW121212HD](https://www.harger.com/product/polymer-concrete-wells) | [GAW121212TDLH](https://www.harger.com/product/high-security-wells) |

* 1. BELOW GRADE CONNECTIONS
     1. Basis of Design: Subject to compliance with requirements, provide UltraShot® exothermically welded connections by Harger Lightning and Grounding
     2. Substitution Limitations: No Substitutions
     3. Product Options:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parallel | “T” | Straight | Cross | Ground Rod |
| [PT Series](https://www.harger.com/product/pt) | [RT Series](https://www.harger.com/product/rt) | [BS Series](https://www.harger.com/product/bs) | [XO Series](https://www.harger.com/product/xo) | [GO Series](https://www.harger.com/product/go) |

1. EXECUTION
   1. INSTALLERS
      1. Installer List: Contact Harger Lightning and Grounding for a list of factory trained installers.
   2. INSTALLATION
      1. Install grounding and bonding system as indicated on approved shop drawing, according to manufacturer’s written instructions.
      2. Installation shall comply with all aspects of ANSI/TIA-607-C.
      3. Conductors shall be concealed from public view.
   3. CORROSION PROTECTION
      1. Do not combine materials that can form an electrolytic couple that will accelerate corrosion in the presence of moisture, unless moisture is permanently excluded from the junction of such materials.
      2. Use conductors with protective coatings where conditions would cause deterioration or corrosion of conductors.
   4. FIELD QUALITY CONTROL
      1. The system shall be physically inspected by a Nationally Recognized Testing Laboratory (NRTL) to the current edition of ANSI/TIA-607-C. The certification shall be provided to the building owner at the completion of the project.

END OF SECTION

*REMOVE IF AN EVEN NUMBER OF PAGES EXIST AFTER EDITING.*

THIS PAGE LEFT INTENTIONALLY BLANK