

## **SECTION 270001 - COMMON WORK RESULTS FOR COMMUNICATIONS**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, Division 27 Specification Sections, and Division 28 Sections (if applicable) apply to all sections.
- B. Related Drawings
  - a. All Technology (T-Series) Drawings

#### **1.2 GENERAL DIRECTION**

- A. Submittal of a bid indicates that the contractor has examined the drawings, specifications, and had an opportunity to visit the site to be able to provide a comprehensive complete bid.
- B. The intent of these specifications and the accompanying drawings is to provide complete and workable systems as shown, specified and required by applicable codes. Interpret these specifications in conjunction with the drawings and provide all work described. If work is shown on drawings and not mentioned in the specifications, or vice versa, it is to be included in the work the same as though clearly set forth by both. Should there be a conflict between the specifications and drawings, provide the greater quantity or better quality. Immediately notify owner's representative and design professional of such conflicts.
- C. The drawings that accompany these specifications are diagrammatic and although size and location of equipment is drawn to scale, wherever possible make use of submittal data and verify all dimensions on site. They do not show every conduit, offset or pull / junction box which may be required to install work in the space provided and avoid conflicts. Follow the drawings as closely as is practical and install additional pull / junction boxes and offsets where required by site conditions and codes at no additional cost. Install all new work in such manner as to conform to the structure, avoid obstructions, provide required service clearances and preserve headroom. Do not scale from drawings, measurements shall be taken in the field.
- D. Coordinate all new work with all other contractors and installers in addition to existing building obstructions and install accordingly. Refer to coordination drawings of other trades. Comply with requirements of architectural drawings including but not limited to mounting height and locations.
- E. Fully research peculiarities and limitations of space available for installation of work with materials being provided. Work around material lead times to not extend project schedule.

- F. Complete work, or part(s) thereof, at times as may be designated by the Owner's Representative, so that it can be used for temporary or permanent use. Do not construe such use of the system as an acceptance of it by Owner.
- G. During mobilization or construction, if an abnormal condition is uncovered either with existing conditions, equipment loads, submittal data, etc. bring these to the attention of the Design Professional for review.
- H. Owner's Representative or Design Professional may relocate fixtures, devices, equipment, etc. prior to installation within a 20-foot limit at no additional charge.
- I. Phasing - Where the scope of work dictates that the project shall be constructed in phases, all costs shall be incurred by this contractor for any temporary work required so that previous phases can be operational while construction is being done to adjacent spaces.

### **1.3 GENERAL STANDARDS**

- A. Provide work in compliance with applicable provisions of the following standards. Provide listing and labeling for all electrical materials, marked for respective intended uses, from UL or other Nationally Recognized Testing Laboratory (NRTL) that is acceptable to applicable Authorities Having Jurisdiction (AHJs).
- B. Provide materials, installation methods, workmanship, testing, etc., in strict accordance with the latest edition of applicable standards and adopted codes, including (but not limited to) the following.
  - 1. International Building Code
  - 2. State Building Code and applicable amendments
  - 3. State Energy Code
  - 4. Utility company requirements and standards as applicable
  - 5. All provisions and requirements of NFPA (National Fire Protection Association)
  - 6. National Electrical Code (NEC), NFPA 70
  - 7. Life Safety Code, NFPA 101
  - 8. Local governmental and other prevailing codes and ordinances
  - 9. ADA/ADAAG requirements (American with Disabilities Act) including all applicable Standards for Accessible Design.
  - 10. UL (Underwriters Laboratories Inc.)
  - 11. ETL (Intertek Testing Services NA, Inc.)
  - 12. CSA (CSA Group Testing and Certification Inc.)
  - 13. FM (Factory Mutual Insurance Company)
  - 14. ASME (American Society of Mechanical Engineers)
  - 15. NEMA (National Electrical Manufacturers Association).
  - 16. NECA (National Electrical Contractors Association)
  - 17. IP (International Protection Rating / Ingress Protection Rating)

## 1.4 PERMITS AND REGULATIONS

- A. Obtain and pay for permits, fees, certificates of inspection and approval, etc. required for this branch of the work. Furnish Owner with certificates of final inspection and approval prior to final acceptance of this branch of the work.
- B. Laws and regulations which bear upon or affect the various branches of this work shall be complied with by this contractor and are hereby made a part of this contract.

## 1.5 DEFINITIONS

- A. Furnish - Procure, supply and deliver to project site, ready for installation, install and warrant (unless indicated otherwise on documents). Include warranty expenses.
- B. Install - Assemble, wire and connect loose-shipped components on site. Place in position for service or use, including material, labor, accessories, services, and testing. Wire, connect, and render fully operational for intended use.
- C. Provide - Furnish and Install. Similar Terms: "include", "shall", "equip with", "consisting of"
- D. Equal or Equivalent - Determination of equivalency to be made by design professional for all products not listed as basis-of-design.
- E. Substantial Completion - Where frontend documentation does not define, products and systems must be fully installed as designed, tested, adjusted, labeled, and functionally demonstrated to owner.
- F. High Voltage: For the sake of this Division, greater than 70.7vac RMS; greater than 100vac P-P; greater than 49vdc.
- G. Low Voltage: For the sake of this Division, less than or equal to 70.7vac RMS; less than 100vac P-P; less than or equal to 49vdc.
- H. Structured Cabling: A standardized repetitive passive physical infrastructure of cables, conductors, terminations, hardware and supporting products that together are used to enable the conveyance of signals, information, and data between different locations. Such systems are commonly constructed in accordance with standards published by various standards organizations, including but not limited to the TIA, EIA and BICSI. In some cases, specialized derivatives of these standards are constructed to meet specialized system needs. Common usages of structured cabling systems include such things as computer or data networks (including wireless infrastructure), telephone systems, building automation systems, electronic safety and security systems, and building intercommunications systems. The structured cabling system does not include any active electronic equipment.
- I. Audio-Visual / Audio and Video Systems Work: That portion of the Project that involves the supply, installation, programming, or testing of products whose

fundamental purpose is the reproduction, pickup, storage, transporting, processing, control of audio and/or video signals. Scope of this definition includes all incidentals that are regularly and fundamentally required to provide complete and working systems from the small and simple to the large and complex.

## **1.6 REQUESTS FOR INFORMATION**

- A. Submit all questions, requests for information (RFIs) and similar queries through the formally-established RFI process for the project that has been accepted by the Owner's Representative, Design Professionals, Prime Contractor and subcontractors. Submit as a PDF file. Do not submit as text in an email.

## **1.7 AVAILABILITY OF ELECTRONIC DRAWINGS**

- A. If expressly permitted by the Owner and the terms of the Contract, editable electronic drawings may be made available for the creation of shop and as-built drawings upon request. Drawings will be made available at the discretion of the Engineer.
- B. "Request Drawings" form can be accessed, filled out and submitted at <http://www.klhengrs.com> (right hand side of page - Contractor Resources). Direct access to this form can be found here: <http://files.klhengrs.com/requestdrawings.html>
- C. Acronyms and Abbreviations:
  1. ADA: Americans with Disabilities Act.
  2. ANSI: American National Standards Institute.
  3. AWG: American Wire Gauge.
  4. BICSI: Building Industry Consulting Services International.
  5. BOM: Bill of Materials.
  6. Bps: Bits per second.
  7. LEC: Local Exchange Carrier.
  8. dB: Decibel.
  9. Device ID: A system specific label assigned to a product to uniquely identify it within a given a system.
  10. DSL: Digital Subscriber Line.
  11. EF: Entrance Facility.
  12. EIA: Electronics Industries Association.
  13. EMI: Electromagnetic Interference.
  14. ER: Equipment Room (a type of Communications Room).
  15. Gb/s (Gbps): Gigabits per second.
  16. GHz: Gigahertz.
  17. IDF: Intermediate Distribution Frame (Replaced by TR).
  18. IEEE: Institute of Electrical and Electronics Engineers.
  19. ISO: International Organization for Standardization.
  20. ISP: Internet Service Provider.
  21. LAN: Local Area Network.
  22. MAC: Media Access Control.

23. Mb/s (Mbps): Megabits per second.
24. MDF: Main Distribution Frame (Replaced by ER).
25. MHz: Megahertz.
26. MPLS: Multi Protocol Label Switching.
27. OFCI: Owner Furnished Contractor Installed.
28. OFE: Owner Furnished Equipment.
29. OFOI: Owner Furnished Owner Installed.
30. PoE: Power over Ethernet.
31. PSTN: Public Switched Telephone Network.
32. QoS: Quality of Service.
33. RAID: Random Array of Inexpensive Disks.
34. RAM: Random Access Memory.
35. RFC: Request for Comment.
36. RFI: Request for Information/ Radio Frequency Interference.
37. RFP: Request for Proposal.
38. RFQ: Request for Quotation.
39. SNMP: Simple Network Management Protocol.
40. SSD: Solid State Drive.
41. TB: Terabyte.
42. TCP: Transmission Control Protocol.
43. TCP/IP: Transmission Control Protocol/Internet Protocol.
44. TIA: Telecommunications Industries Association.
45. TR: Telecommunications Room (a type of Communications Room)
46. VoIP: Voice over Internet Protocol.

- D. Provide the services of locally licensed and authorized electrician(s) to perform that portion of the Work of this Division that is required by the applicable codes and/or the AHJ to be performed by licensed electrician(s).

## **1.8 ADMINISTRATION**

- A. Progress Meetings:

1. Progress meetings may be established to review progress of the Work, discuss anticipated progress during the following weeks, and review critical operations and existing and potential problems.
2. Contractor(s) shall attend and shall be represented at every progress meeting by a person authorized with signature authority to make decisions regarding possible modification of the Contract Documents.

## **1.9 WARRANTY / GUARANTEE**

- A. Provide a warranty/guarantee in written form as part of O&M manual stating that all work, materials, equipment and parts are warranted to be free of defect for a minimum period of one year from the date of Substantial Completion. Warranty period and requirements may be expanded in drawings or subsequent specification sections. Repair or replace (owner's option) any defects or failures at no cost to the owner within the

warranty period. Issues arising within warranty period must be attended to in a timely manner and in no case exceed four (2) working days. State this in writing as part of O&M manual. Replace defective items to the satisfaction of the Owner's Representative and the Design Professional.

## **PART 2 - PRODUCTS**

### **2.1 GENERAL**

- A. Materials, apparatus and equipment shall bear the Underwriter's Laboratory, Inc. label (or other nationally recognized testing laboratory label) where regularly supplied, and as additionally required by Code or the Contract Documents.
- B. Products furnished shall be new, full weight and of the best quality. Similar supplied materials shall be of the same type and from the same manufacturer.
- C. If a specified product is discontinued by the manufacturer and is no longer available for purchase, replacement product of equal or greater value, performance and function as the discontinued Basis of Design product shall be furnished. The replacement product shall be from the same manufacturer as the Basis of Design product unless written permission has been granted by the Designer. The Contractor is solely responsible for researching and submitting proposed replacement product. The final decision as to whether a Contractor proposed replacement is acceptable lies solely with the Designer.
- D. Substitute products shall only be considered if the Contractor has strictly adhered to the guidelines set forth under "Substitutions" as defined in this Section.

### **2.2 BASIS OF DESIGN**

- A. Some of the Contract Documents are prepared on the basis of specific products that are designated as the "Basis of Design."
- B. The Basis of Design products for the Work of this Division are designated explicitly within the specifications, and in the case of some products, designated by brand and model on the Drawings.
  - 1. Where a product brand and model is expressly identified on the Drawings, this product represents the Basis of Design for that instance of the product in the associated system.
- C. The combination of Basis of Design products and the interconnection thereof collectively represent a work that includes the feature set and performance intended by the Designer and the Owner. The specifications may identify additional manufacturers whose equipment may be used in the system, provided the use of such products achieves the same capabilities and performance as that of the specified combination of the Basis of Design products.

1. Due to the varied and integrated nature of modern communications products, there is no guarantee that any single product manufactured by any one of the listed additional manufacturers will be an exact equivalent to a single Basis of Design product in terms of functionality, capability or performance. Therefore, where the use of substitute product is considered, the product shall be verified by the substituting party to include the capabilities, features and performance as that of the Basis of Design product.
2. Work of the Contract shall include covering the cost of additional products and labor necessary to achieve the same end results as would be achieved by using the specified combination of Basis of Design products, including additional costs for coordination, modifications to the building, pathway modifications, casework and furniture modifications, power modifications, licensing, or anything else that may cause additional expense to the Owner.
3. In addition, costs incurred by the Owner's design team to accommodate such changes shall be the responsibility of the party making the substitution.

### **2.3 SUBSTITUTIONS**

- A. A substitution is the use of any product other than that identified as the "Basis of Design," the "Standard of Quality," or an "Additional Approved Product."
- B. Substitutions require pre-bid approval. Only substitutions authorized via addendum shall be considered.
- C. Substitutions are considered on a product-by-product and model specific basis.
- D. Substitution Submittal Requirements:
  1. Substitution requests must be received by the Designer sufficiently in advance of the scheduled bid date to allow time for review and issuance of an Addendum. If the timing of the request does not permit an Addendum, substitution shall not be considered or acceptable.
  2. Substitution requests shall consist of the following for each proposed substitution:
    - a. Substitution Request Letter
    - b. Product Datasheets/Brochures
- E. Costs that result from the use of substitute products and/or Additional Approved Manufacturer(s), including costs for additional equipment, coordination, accessories, modules, interface products, cables, software, and programming, as well as costs for any additional labor, materials, and products incurred by other trades or members of the project Design Team or Owner, are the sole responsibility of the Contractor making the substitution. This includes costs that may not be incurred or known until after Contract award or Work execution. Such costs shall be deducted from final sum payable to the Contractor.
- F. Post Contract award substitutions may be considered, but only if the proposed substitution includes substantial additional benefit to the Owner. Post award

substitutions are considered solely at the discretion and convenience of the Designer. For a post Contract award substitution to be considered, one or more of the following shall apply:

1. The Designer initiates the request for substitution.
2. A basis of design product has become discontinued and is no longer available, and as a result, the use of a substitute product has become a necessity to meet the Owner's objectives for the Project. See "Discontinued Products."
3. The request for substitution is accompanied by a proposal that identifies the benefits to the Owner, including a fair-market Contract price reduction.

## **2.4 DISCONTINUED PRODUCTS**

- A. The availability of products shall be verified by the Contractor prior to submitting pricing for Work of the Contract.
- B. In the event that a specified product is discontinued at any time and becomes unavailable for use on the Project, provide a replacement product deemed acceptable to the Designer. Replacement product shall be of equal or greater value, performance and functionality.
  1. Replacement product shall be from the basis of design manufacturer, from one of the additional product manufacturers identified for the product within the Section, or from another manufacturer deemed acceptable to the Designer.
- C. The cost for the supply and installation of suitable replacement product is the sole responsibility of the Contractor.
- D. Replacement products are considered substitutions and require Designer review and authorization. See "Substitutions."

## **PART 3 - EXECUTION**

### **3.1 WORK AND WORKMANSHIP**

- A. Provide labor, materials, equipment and services necessary for complete installation of systems required to comply with the requirements of authorities having jurisdiction (AHJ), as indicated within the Contract Documents.
- B. Work shall be functional and complete in every detail, including items required to complete the system, regardless of whether each necessary item is fully enumerated in the Specifications or shown on the Drawings.
- C. Contractor and Subcontractors shall be knowledgeable of the details of Work to be performed by other trades and take necessary steps to integrate and coordinate Work of this Division with that of other Divisions and other trades.



- D. Wherever tables or schedules show quantities, they shall not be interpreted to represent the total contract quantity requirement, but instead a portion of the Contract requirement. The Contractor shall be responsible for the higher quantity communicated by the Drawings, within the Specifications and on the schedules/tables. Seek clarification from the Designer should a discrepancy be found.
- E. The Designer and Owner's Representative may, at their sole discretion, condemn or reject any Work, materials or equipment not in accordance with the Contract Documents or the manufacturer's specifications or drawings reviewed by the Designer or Owner.
- F. Work or equipment that is rejected shall be removed and replaced to the satisfaction of the Owner and Designer at the Contractor's expense. Work or equipment that is rejected shall be so stated in writing by the Owner or Designer.
- G. Work shall fully comply with the Contract Documents and manufacturer's recommended installation guidelines.
- H. Work shall be performed with the best practices of the trade for performance, functionality, safety, endurance and aesthetics.
- I. Coordinate ordering and installation of equipment with long lead times or having a major impact on work by other trades so as not to delay the job or impact the schedule.
- J. Where mounting heights are not detailed or dimensioned, install systems, materials and equipment to provide the maximum headroom possible. Consult the Designer for direction.
- K. Supply scaffolding, rigging, hoisting and services necessary for erection and delivery of equipment and apparatus furnished into the premises. These items shall be removed from premises when no longer required.
- L. Work shall be installed level and plumb, parallel and perpendicular to prevailing building lines, except as expressly detailed otherwise or required for proper form, function or Designer-intended operation.
- M. Specialty tools shall be used for assembly, installation, termination, and removal of products as recommended by the product manufacturer.

### **3.2 TESTING**

- A. General:
  - 1. Upon complete physical installation of products, align, balance, and adjust equipment to make it usable to the Owner for the intended purpose, and ensure compliance with the Contract Documents.
  - 2. Test each system and each component thereof, and correct deficiencies prior to scheduling acceptance testing.

3. Replace malfunctioning or damaged products with new product, following immediately with retesting until satisfactory performance and specification compliant conditions are achieved.
- B. Operational Testing:
1. Perform operational testing of supplied products individually and collectively to verify conformance with the Contract Documents, to ensure compliance with the product manufacturer's published specifications, and as additionally necessary for the system to meet the intended purpose.
- C. Performance Testing:
1. Perform measurements and testing necessary to demonstrate performance compliance.

### **3.3 TRAINING**

- A. Training shall be supplied for each Section of this Division and for each unique system provided.
- B. The Owner shall have the right to use the total allocated training for a period of 1 year following final completion of onsite work, solely at its discretion.
- C. Training shall be supplied as expressly identified within individual Sections. Where training requirements are not otherwise expressly identified, the Contractor shall furnish a minimum of two (2) hours per unique system, per Section. The Contractor shall presume that at least two (2) discrete trips to the project site shall be required per unique system to conduct training.
- D. Training dates and times shall be coordinated with the Owner's designated training representative(s).
- E. Training shall cover the following:
1. Normal system use and operation.
  2. Procedures and schedules involved in troubleshooting and performing routine preventative maintenance.
  3. Other facets as identified in individual Sections.
- F. Agenda and relevant training handouts shall be prepared and distributed to attendees at each training session.
- G. A sign-in sheet shall be created and used for each training session. The sheet shall identify the following, at a minimum:
1. Specification Section reference and system(s) being trained.
  2. Date and starting time of the session.

3. Signatures of attendees.
4. Ending time of the session, along with a separate owner signature certifying the ending time.
5. Training outline/agenda.

H. Recording of Sessions:

1. Recordings shall be supplied on DVD video format media playable in standard consumer grade reproduction appliance. Recordings do not need to be professionally edited but shall feature intelligible audio and a clear image of the subject trainer and any supplemental visual content material to the training.
2. Recordings shall be turned over and signed for by an Owner's training representative at the end of each session. A copy of a signed delivery receipt shall be included as part of the closeout documentation.
3. Contractor shall require each attendee to sign-in at the start of each training session. The sign-in form shall summarize the training conducted, specification section reference and system being trained on, as well as the starting time and duration of training. Following training, a representative of the Owner shall sign the form, acknowledging the same. Contractor shall retain the original copy of these forms and turn over a photo copy of the form to the Owner's representative as evidence of training. Training conducted without this official record of training shall not be considered as part of the Contractor's training obligation.

I. For a training session to count towards the training obligation, each of the following shall be met:

1. Training occurs after Training Submittal review.
2. Training session outlines / agenda are distributed at the session.
3. Quality Assurance requirements for the instructor have been met.
4. Training occurs after the system / section is complete and working as intended by the Contract Documents, usually following Acceptance Testing. Training in advance of this requires Designer approval.
5. Sign-in sheets are used, completed and retained for the session.
6. A master log of training conducted for the project is maintained.

**END OF SECTION 270001**