

University of Houston Master Specification

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SECTION 27 0500 – COMMUNICATIONS GENERAL PROVISIONS

Maintain Section format, including the UH master spec designation and version date in bold in the center columns of the header and footer. Complete the header and footer with Project information.

Verify that Section titles referenced in this Section are correct for this Project's Specifications; Section titles may have changed.

Delete hidden text after this Section has been edited for the Project.

Designer is required to adhere to the University's "Network Infrastructure Design Standards," "UH System IT Facilities: Baseline Standards," and "Electronic Access Control Design Guide" available in Owner's Design Guidelines on the University Information Technology and Facilities Planning and Construction web sites.

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, apply to work of this Section.
- B. The Contractor's attention is specifically directed, but not limited, to the following documents for additional requirements:
 - 1. The current version of the *Uniform General Conditions for Construction Contracts*, State of Texas, available on the web site of the Texas Facilities Commission.
 - 2. The University of Houston's Supplemental General Conditions and Special Conditions for Construction.

1.2 SUMMARY

- A. This Section identifies the requirements for a complete and functional communications cable plant. The purpose of the communications cable plant as specified herein is to support voice, data, AV connectivity, and various other low voltage signaling and control devices.
- B. All work associated with Network Facilities shall comply with the National Electrical Code and state and local building codes. The guidelines developed by ANSI/TIA/EIA and Building Industry Consulting Services International shall be followed in both design and construction.

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1.3 PRE-INSTALLATION MEETING

- A. Conduct a pre-installation meeting, in compliance with the requirements of Section 01 3100 "Project Management and Coordination," with the Contractor, Owner's Project Manager and UIT Project Manager at the Project Site.
- B. Use the meeting to clarify all requirements (systems, services, distribution methods, etc.), identify responsibilities, and schedule the events necessary for implementation of the Project.
- C. Within two (2) weeks of the initial meeting, provide a written report and project schedule to all participants to clearly document the events and responsibilities associated with the Project.
- D. Meeting Agenda:
 1. Introductions
 2. Review of Contractor Qualifications
 3. Review of Project Scope
 4. Planned and Emergency Outage Guidelines (Division 00 6000 – OPF)
 - a. Emergency Contact Protocol (In event of an accidental cable cut or other incident)
 5. Review of Required Site Observation and Approval Walkthroughs
 - a. Underground / Under-slab (prior to concrete pour)
 - b. In-wall (Prior to sheet rock)
 - c. In-ceiling (Prior to ceiling installation)
 6. Review of Project Submittals – Approved and Pending
 7. Review of Project Close-Out Documentation and Timing.
 8. Action Items for Follow-Up.

1.4 AGENCIES, REFERENCE STANDARDS AND CODES

- A. Agencies
 1. ANSI American National Standards Institute
 2. BICSI Building Industry Consulting Service International
 3. EIA Electronic Industries Association
 4. FCC Federal Communications Commission
 5. FOTP Fiber Optic Testing Procedures
 6. IEEE Institute of Electrical and Electronic Engineers, Inc.
 7. NBC National Building Code
 8. NFPA National Fire Protection Association
 9. NEC National Electrical Code
 10. TIA Telecommunications Industry Association
 11. UL Underwriters Laboratories
 12. TAC Texas Administrative Code (specifically, Title 1, Part 10)

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- B. Codes and Standards (Latest issue and addenda, if more recent than edition shown)
1. ADA Standards for Accessible Design 28 CFR Part 36
 2. American Society for Testing Materials (ASTM)
 3. ANSI/TIA-568.1-D - Commercial Building Telecommunications Infrastructure Standard (through Addendum 1, March 6, 2018)
 4. ANSI/TIA-568.2-D - Balanced Twisted-Pair Telecommunications Cabling and Components Standard (through Addendum 1, April 9, 2019)
 5. ANSI/TIA-568.3-D - Optical Fiber Cabling And Components Standard (through Addendum 1, January 17, 2019)
 6. ANSI/TIA-568.4-D - Broadband Coaxial Cabling and Components Standard (June 27, 2017)
 7. ANSI/TIA-569-E - Telecommunications Pathways and Spaces (May 23, 2019)
 8. ANSI/TIA-606-C - Administration Standard for Telecommunications Infrastructure (June 19, 2017)
 9. ANSI/TIA-607-D - Generic Telecommunications Bonding and Grounding (Earthing) for Customer Premises (July 29, 2019)
 10. ANSI/TIA-526-7-A - Measurement of Optical Power Loss of Installed Single-Mode Fiber Cable Plant, Adoption of IEC 61280-4-2 edition 2: Fiber-Optic Communications Subsystem Test Procedures - Part 4-2: Installed Cable Plant - Single-Mode Attenuation and Optical Return Loss Measurement (July 29, 2015)
 11. ANSI/TIA-526-14-C - Optical Power Loss Measurement of Installed Multimode Fiber Cable Plant; Modification of IEC 61280-4-1 edition 2, Fiber-Optic Communications Subsystem Test Procedures- Part 4-1: Installed Cable Plant-Multimode Attenuation Measurement (April 2015)
 12. ANSI/TIA -758-B - Customer-Owned Outside Plant Telecommunications Infrastructure Standard (March 27, 2012)
 13. BICSI TDM, Cabling Installation, LAN Design, and Customer-Owned Outside Plant Manuals-Latest Editions
 14. Chapter 208- State of Texas Communications Wiring Standard
 15. International Standards Organization/International Electrotechnical Commission (ISO/IEC) IS 11801, 2000
 16. National Electric Code (NEC), Latest Issue
 17. National Electrical Manufacturers Association (NEMA)
 18. OSHA - U.S. Department of Labor Occupational Safety & Health Administration
 19. UH System IT Facilities: Baseline Standards (available on the University Information Technology web site)
 20. UL - Underwriters Laboratories (UL) Cable Certification and Follow Up Program
 21. University of Houston *Network Infrastructure Design Standards* (available on the University Information Technology web site)
- C. Acronyms and Abbreviations
1. ADA Americans with Disabilities Act
 2. ANSI American National Standards Institute
 3. ASTM American Society for Testing and Materials
 4. AWG American Wire Gauge

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5.	BMS	Building Management Systems
6.	BCT	Bonding Conductor for Telecommunications
7.	BD	Building Distributor (formerly BDF or Building Distribution Frame)
8.	BICSI	Building Industry Consulting Services International
9.	CD	Campus Distributor (formerly, MDF or Main Distribution Frame)
10.	CFCI	Contractor Furnished, Contractor Installed
11.	CO-OSP	Customer Owned Outside Plant
12.	EIA	Electronic Industries Alliance
13.	EMI	Electromagnetic Interference
14.	FCC	Federal Communications Commission
15.	FD	Floor Distributor (formerly, IDF or Intermediate Distribution Frame)
16.	Gb/s	Gigabits per Second
17.	HC	Horizontal Cross-Connect
18.	HVAC	Heating, Ventilation, and Air Conditioning
19.	IEEE	Institute of Electrical and Electronics Engineers
20.	IP	Internet Protocol
21.	ISO	International Organization for Standardization
22.	LAN	Local Area Network
23.	LF	Lateral Fiber
24.	Mb/s	Megabits Per Second
25.	MC	Main Cross-Connect
26.	MF	Metro Fiber
27.	NEMA	National Electrical Manufacturers Association
28.	NESC	National Electrical Safety Code
29.	NF	Network Facility (broad term for FD, BD or FD; also known as Telecommunications Room, TR, Equipment Room, or ER)
30.	NFPA	National Fire Protection Association
31.	NIC	Not in Contract
32.	NVR	Network Video Recorder
33.	OFCI	Owner Furnished Contractor Installed
34.	OFOI	Owner Furnished Owner Installed
35.	PBB	Primary Busbar
36.	PoE	Power over Ethernet
37.	PM	Project Manager
38.	RCDD	Registered Communications Distribution Designer
39.	RFP	Request for Proposal
40.	RFO	Request for Offer
41.	SBB	Secondary Busbar
42.	SCS	Structured Cabling System
43.	TBB	Telecommunications Bonding Backbone
44.	TIA	Telecommunications Industry Association
45.	TE	Telecommunications Enclosure
46.	UIT	University Information Technology
47.	UITNS	University Information Technology Network Services
48.	UL	Underwriters Laboratories

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- 49. UTP Unshielded Twisted-Pair
- 50. WAN Wide Area Network
- 51. WAP Wireless Access Point
- 52. Wi-Fi Wireless Telecommunications defined by IEEE 802.11

1.5 SCOPE OF WORK

- A. The Structured Cabling Contractor, herein after referred to as "Contractor," shall provide all materials, components, tools and labor necessary for the complete installation of all communications work required in the Contract Documents. Such work includes:
 - 1. Overhead cable runway system (basket trays) within the new NF's.
 - 2. Identification for Communications Systems.
 - 3. Communications Equipment Room Fittings.
 - 4. Communications Backbone Cabling.
 - 5. Communications Horizontal Cabling.
 - 6. Patch Cords, Station Cords, and Cross-Connect Wire.
 - 7. Bonding conductors from all cable tray, sleeves and conduits.
 - 8. Coordination with OFOI Communications Services.
 - 9. Coordination with OFOI Data Communications Equipment.
 - 10. Data cabling that terminates in BD, FD and other rooms required for Security, Audio Visual, Elevator, Fire Alarm or BMS.
- B. The Electrical Contractor shall provide materials, components, tools and labor to complete communications cabling pathways, electrical power distribution and communications building grounding systems as set forth in the Drawings and in Division 26 and Division 27 Sections. Work of the Electrical Contractor includes the following:
 - 1. Conduits and back boxes for work area telecommunications outlets.
 - 2. Installation of the PBB in the new BD.
 - 3. Installation of the TBB from the new BD to the new FD.
 - 4. Installation of the BCT that bonds the PBB to the electrical power ground compliant with ANSI J STD-607 C Standards.
 - 5. Electrical circuits in NF, Security and AV rooms.
- C. Work under this Division that is not in contract (NIC) and that will be Owner Furnished/Owner Installed (OFOI) includes:
 - 1. Communications services (e.g., ISP connectivity).
 - 2. Voice communications equipment (end user devices).
 - 3. Phone cords at the work area.
- D. Work furnished and installed by others as described in other Sections of the Specifications.
 - 1. Covering of NF walls, floor to ceiling, with rigidly fixed, 3/4-inch fire rated plywood, void free and capable of supporting attached connecting hardware; and painting of plywood with two coats of fire retardant paint per Section 27 1100 "Network Facility Fittings."
 - 2. Marking of fire-rated partitions to facilitate identification.

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3. Security systems and access control.
4. Fire sprinkler systems.
5. HVAC systems.

1.6 WORK RESULTS — DESCRIPTION OF PROJECT

- A. Work results are listed in Part 1 of each Section in Division 27.
- B. Network Connectivity for Other Trades:
 1. Audio/Visual – Provide network connectivity as required for A/V elements. Refer to AV Drawings and Division 27 Sections for details.
 2. Electronic Safety and Security – Provide copper and fiber cabling and termination hardware as required to facilitate voice and data network connectivity for IP video surveillance cameras, Emergency Call Towers, Access Control Panels, etc. Refer to Security Drawings and Division 28 Specifications for details.
 3. Fire Alarm – Provide copper/ fiber connectivity as required for Fire Alarm Panels.
 4. Building Management Systems – Provide network connectivity as required to facilitate operation of Building Management Systems (BMS) specified in Division 25.
 5. Elevator Equipment Room – Provide copper or fiber connectivity to elevator equipment room(s). Coordinate with Division 14 Specifications.
- C. Construction Progress Documentation
 1. Coordinate requirements with general provisions specified in Section 01 3200 “Construction Progress Documentation.”
 2. Provide weekly progress reports including a synopsis of the previous week’s completed tasks, a list of ongoing work, and an updated look-ahead schedule with Project milestones. Also include items for Owner coordination.
 3. Provide weekly reports of inspection by Project RCDD to confirm Work complies with industry and manufacturer standards.
 4. Maintain a set of clearly marked prints of the Drawings at the job site to record the work details, final size, location, interrelation, and similar items of all work under this Division.
 - a. Correct this set of Drawings daily as the Work progresses and indicate all changes to suit field conditions, changes made by "Field Order" or "Change Order," accurate dimensions and locations of all buried or concealed work, including concealed boxes, controls and devices, and any deviations from the work shown on the Construction Documents that are required for coordination.

1.7 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

- A. Follow Submittal Administrative Requirements as stated in Section 01 3300 “Submittal Procedures.” Use electronic format only.
- B. Submit shop drawings, product data, and samples promptly and in appropriate sequence to prevent Project schedule delays.

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- C. For renovation work: Update existing documentation so that a complete, consolidated inventory of all Work completed is maintained.

1.8 ACTION SUBMITTALS

- A. Additional Action Submittals are listed separately in each Section of Division 27.
- B. Within thirty days of award of the Contract
 1. Bill of materials, noting items with long lead time.
 2. Optical loss budget calculations for each optical fiber run.
 3. Project schedule, including all major work components that materially affect other work on the Project.
- C. Shop Drawings
 1. Backbone (riser) diagrams.
 2. System block diagram, indicating interconnection between system components and subsystems.
 3. Interface requirements, including connector types and pin-outs, to external systems and systems or components not supplied by Contractor.
 4. Fabrication drawings for custom-built equipment.
- D. Product Data — catalog cut sheets and information for
 1. Wire, cable, and optical fiber.
 2. Outlets, jacks, faceplates, and connectors.
 3. All metallic and nonmetallic raceways, including surface raceways, outlet boxes, and fittings.
 4. Terminal blocks and patch panels.
 5. Enclosures, racks, and equipment housings.
 6. Over-voltage protectors.
 7. Splice housings.
- E. Samples
 1. Material samples of any items proposed as substitutions for authorized manufacturers and products set forth in each Section of Division 27.
 2. Requests for substitutions must comply with requirements of Section 01 2500 "Substitution Procedures."

1.9 INFORMATIONAL SUBMITTALS

- A. Contractor Certification:
 1. Submit proof of Contractor's active membership in BICSI.
 2. Submit proof that all on-site personnel have BICSI, CommScope, and Panduit Certification in effect through bidding, installation, testing, documentation, and acceptance.

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3. Contractor shall have a minimum of one (1) Registered Communications Distribution Designer (RCDD) on staff, with Panduit-approved Certification plus RCDD equivalent submitted and approved by Panduit or CommScope. Submit a resume and copy of certifications for Contractor's RCDD.
 4. Contractor shall have worked satisfactorily for a minimum of five (5) years on systems of this Project type and size. Submit a minimum of three (3) representative educational facility cabling projects (higher education preferred) as references. Include the school's name, location, project Architect or Engineer, cost of the cabling project and the school contact person, including phone number.
- B. A list of technical product education courses (training) completed by Contractor's project personnel.
1. Submit resumes of the entire team, including completed training courses and copies of BICSI Installer as well as CommScope or Panduit training course certificates.
 2. Submit cable tester manufacturer or third-party certification for all copper and fiber cable test technicians.
- C. Unit Prices: Refer to Section 01 2200 "Unit Prices" for Division 27 items requiring unit prices.

1.10 QUALITY ASSURANCE

- A. Follow Section 01 4000 – "Quality Requirements (QA & QC)" and this Section.
- B. General
1. Materials shall be new and conform to grade, quality, and standards specified. Materials of the same type shall be a product of the same manufacturer throughout.
 2. Coordinate Quality Assurance inspections with UIT Project Manager.

1.11 DELIVERY, STORAGE AND HANDLING

- A. Delivery, Storage and Handling Requirements: Comply with Section 01 6000 "Product Requirements."
- B. Temporary Storage: Coordinate with Owner as necessary for temporary secure storage of equipment and materials during Project timeframes.

1.12 WARRANTY

- A. Provide an extended manufacturer Product Warranty and System Assurance Warranty for the wiring system (15 years for Panduit, 20 years for CommScope).
1. All communications work and materials not included in the SCS components shall be warranted by Contractor for a minimum of three years from the date of Substantial Completion.

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- B. The Labor, Material and Performance Warranty shall cover testing and replacement of all structured cabling components. The structured cabling system shall be a complete, certified system. The system and all components shall be performance matched and guaranteed by the manufacturer.
- C. Within 10 days of Substantial Completion, Contractor shall deliver a letter signed by local SCS Manufacturer's representative and Contractor's RCDD stating that installed cabling system complies with all requirements specified in installation guidelines and that there were no accidents, improper installation, mishandling, misuse, damage while in transit, unauthorized alteration, unauthorized repair, failure to follow instructions, or misuse with the structured cabling system that could adversely impact warranty.
- D. Within 21 days of Substantial Completion, Contractor and/or the manufacturer's local representative shall provide the Structured Cabling Performance Warranty signed by the manufacturer. The warranty shall list the Owner and name of the facility, including location, as holder of the warranty.
- E. For renovation projects, ensure continuation and maintenance of the existing warranty as required.
- F. Entity Covered: Each warranty is for the sole benefit of Owner and any successor in interest to the site in which the Registered SCS was originally installed.

PART 2 - PRODUCTS

2.1 PARTS AND MANUFACTURERS

- A. The following Division 27 Sections provide approved products and schedules for this Project.
 - 1. 27 0526 Bonding and Grounding for Communications System
 - 2. 27 0528 Pathways for Communications Systems
 - 3. 27 0543 Underground Duct and Raceways
 - 4. 27 0553 Identification for Communications Systems
 - 5. 27 1100 Network Facility Fittings
 - 6. 27 1300 Communications Backbone Cabling
 - 7. 27 1500 Communications Horizontal Cabling
 - 8. 27 1619 Patch Cords, Station Cords and Cross-Contact Wire
 - 9. 27 2000 Data Communications Equipment
 - 10. 27 3000 Voice Communications Equipment
- B. Comply with Section 01 2500 "Substitution Procedures" for proposed variations from approved manufacturers or parts. Substitutions require written approval from both the Owner's Project Manager and the UIT Project Manager before proceeding with the Work.

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2.2 PRODUCT QUALITY

- A. Provide materials that are typical commercial designs that comply with the requirements specified. All materials and equipment shall be readily available through manufacturers and/or distributors. All equipment shall be supplied complete with any optional items required for proper installation.
- B. In the event of a breach of the representations and warranties contained herein, Contractor, at his or her own expense, shall take all measures necessary to correct and make the cabling system work in compliance with the applicable manufacturer's written technical recommendations and standards.

PART 3 - EXECUTION

3.1 SITE CONDITIONS

- A. Use of Site
 - 1. Refer to Section 01 3100 "Project Management and Coordination."
- B. Continuity of Services
 - 1. Make advance arrangements with Owner's Project Manager and UIT Project Manager to avoid interference with or interruption of existing building services. Arrange the work to minimize down time.
 - 2. Should services be inadvertently interrupted, immediately furnish labor (including overtime), material, and equipment necessary for prompt restoration of interrupted service.
 - 3. Comply with the requirements of the Outage Planning Form in Division 00.

3.2 EXAMINATION

- A. Examine conditions for compliance with requirements of Division 27 Sections in which related work is specified. Determine if conditions affecting performance of the Work of this Division are satisfactory. Do not proceed with Work of this Division until unsatisfactory conditions have been corrected in an acceptable manner.
 - 1. Verify liquid-carrying pipes are not installed in or above voice and data system NF's.
 - 2. Verify fire-rated backboards are properly installed and painted in accordance with Section 06 1053 "Miscellaneous Rough Carpentry."
 - 3. Verify conduit, raceways, and boxes are properly installed.
- B. Prior to starting the installation, schedule a walk-through of the Project site with the Owner's Project Manager and UIT Project Manager to review the installation Drawings, verify that all construction necessary for the installation has been completed, and confirm installation methods and cable routes.

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3.3 PREPARATION

A. Protection of Surroundings

1. Any damage to building or site caused by Contractor shall be restored to match conditions prior to damage.
2. Patching of all openings cut by Contractor, or repairing of any damage to the work of other trades caused by cutting or by the failure of any part of the work installed under this Contract, shall be performed by the appropriate trade.
3. All openings shall be restored to "as-new" condition under the appropriate Specification section for the materials involved and shall match surrounding materials and finishes.
4. Refer to and comply with requirements of Article 3.6 "Cutting and Patching" in Section 01 7700 "Execution."

3.4 DEMOLITION/REMOVAL

- #### A.
- Refer to and comply with Sections 02 4119 "Selective Demolition" and 01 7419 "Construction Waste Management and Disposal."

3.5 FIRESTOPPING

- #### A.
- Properly firestop all penetrations through fire barriers used for the placement of cabling in keeping with the requirements of Section 07 8413 "Penetration Firestopping."
- #### B.
- Do not exceed cable loads and fill procedure defined in the UL Listing for each penetration.
- #### C.
- Ensure that firestopping is properly identified and labeled. Laminate and permanently affix the following information to each side of a fire-rated partition/floor penetration:
1. Installing Contractor's name, address and phone number.
 2. Alpha-numeric unique identifier (floor/penetration - A1).
 3. Name of manufacturer of firestop system.
 4. Part and model numbers of firestop system and all components.
 5. Phone numbers of manufacturer's corporate headquarters in U.S. and local distributor's name and phone number.

3.6 CONSTRUCTION WASTE MANAGEMENT

- #### A.
- Remove all excess material and debris from the Site upon completion of work each day and in compliance with Section 01 7419 "Construction Waste Management and Disposal."

3.7 LABELING

- #### A.
- Confirm administrative labeling scheme for cabling and its numerical positions on the termination hardware. Refer to Section 27 0553 "Identification for Communications Systems."

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3.8 CLOSEOUT SUBMITTALS

- A. Final approved Shop Drawings.
 - 1. Laminate one set of Shop Drawings and place them in the related NF's.
- B. Job Site Prints
 - 1. Maintain a set of clearly marked prints of the Drawings at the job site to record the work details, final size, location, interrelation, and similar items of all work under this Division.
 - 2. Correct this set of Drawings daily as the Work progresses and indicate all changes to suit field conditions, changes made by "Field Order" or "Change Order," accurate dimensions and locations of all buried or concealed work, and any deviations from the work shown on the Construction Documents that are required for coordination.
- C. As-Built Drawings: Show location and identification of work area outlets, nodes, NF plans and elevations, cable pathway details, backbone cable type and locations, and cable ID numbers. Submit in .dwg, .rvt and .pdf formats.
- D. Cable inventory data for all copper and fiber and termination hardware (prior to cutover to new cable plant if applicable). Submit data in Microsoft Excel format, listing products furnished, including:
 - 1. Manufacturer's name and part numbers.
 - 2. Cable numbers using the Owner's cable numbering standard.
- E. NF termination detail sheets.
 - 1. Location and riser assignments.
 - 2. Cross-connect schedules including entrance point, main cross-connects, intermediate cross-connects and horizontal cross-connects.
- F. Labeling and administration documentation.
- G. Warranty documents for equipment.
- H. Copper certification test result (readable reports and test equipment native format)
- I. Optical fiber power meter/light source, OTDR test results.
- J. Location table and spreadsheet with location detail for each wall jack:
 - 1. Jack numbers.
 - 2. Room number.
 - 3. Wall orientation (North, South, East, or West, or Power Pole if applicable).
 - 4. Landmark orientation and distance.
- K. Manufacturer Certificates.

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1. Letter(s) signed by local manufacturer's representative(s) of SCS components and Contractor's RCDD stating that installed cabling system complies with all requirements specified in manufacturer's installation guidelines and that there were no accidents, improper installation, mishandling, misuse, damage while in transit, unauthorized alteration, unauthorized repair, failure to follow instructions, or misuse with the structured cabling system that could adversely affect warranty.
- L. Structured Cabling Performance Warranty signed by the manufacturer.

3.9 EQUIPMENT RELOCATION AND SYSTEM STARTUP

1. Upon notice of Substantial Completion, the UIT Project Manager shall be responsible for system startup services for the new NF's. Contractor shall verify that new equipment rooms, cabinets, floors and walls are clean and ready for operation. Contractor shall be responsible for keeping the NF's clean and dust free at all times.
2. Contractor shall develop and implement a complete schedule for customer migration detailing the responsibilities of Contractor's assigned personnel, along with contingency plans. Contractor shall submit schedule to Owner's Project Manager and UIT Project Manager for approval.
3. During the transition, Contractor shall have the necessary supervisory, technical, and other personnel available during technology relocations and cutover of telephone, networking, and video systems. Contractor's technicians shall be on site to observe operation and maintenance of the equipment and to resolve any cabling issues during system startup.
4. Contractor shall ensure all amenities are present prior to equipment relocation. Contractor shall immediately contact Owner's Project Manager and UIT Project Manager if a required service such as HVAC, electrical, backup power, etc., is not present.
5. Contractor shall accomplish a smooth and successful transition of operations and services to the new NF's. The transition includes coordination, migration, testing, and problem resolution with system vendors and the UIT Project Manager.

3.10 CLOSEOUT ACTIVITIES

- A. Throughout the Project, Contractor and UIT Project Manager shall coordinate execution of the *CD-FD Checklist* as each relevant item is completed. The *CD-FD Checklist* is available on the UIT Network Infrastructure Design Standards web page.
- B. Acceptance is subject to completion of all Work and successful post-installation testing that yields a 100 percent PASS rating; and to performance of the following tasks:
 1. Completion of all Project Record and Closeout Submittals.
 2. Training of Owner's representatives on methods to add and remove firestop barriers, add and remove isolation conduit seals, and, when necessary, add and remove IP 67 rated outlets.

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3. Delivery of maintenance manuals to Owner regarding structured cabling system, fire-stopping and conduit sealing methods, and manufacturer's recommended maintenance instructions.
4. Completion of all punch list items within thirty (30) days of receipt of punch list.
5. Wiping down of all equipment, racks, cabinets, and sweeping and mopping NF floors prior to Substantial Completion.
6. Completion of Closeout Checklist showing status of all submittals, maintenance manuals, Owner training, and punch list in accordance with Section 01 7700 "Closeout Procedures."

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