

SECTION 28000

SECURITY SYSTEMS GENERAL CONDITIONS

1.01 GENERAL

- a. Installation of Electronic Security System to include but not limited to:
 1. Closed Circuit Television (CCTV)
 2. Building Access Control
 3. Gates Access Control
 4. Perimeter Door Alarms
 5. Video Intercom
 6. Burglar alarm
 7. Additional interfaces: Building Lighting, electrified locks and Fire alarm systems
- b. Electronic security related *equipment* such as cameras, card readers, gate operators and Goosenecks, controllers, power supplies, door contacts, motion detectors and others will be furnished to the bidder by the City of Yonkers (COY) / Yonkers Public Schools (YPS) authority and are *not* part of this contract. System commissioning, programming, and testing will be performed by owner's representatives and are not part of this contract. This bidder/ contractor ("contractor", "EC") is to provide all necessary labor, pipe, fasteners, wire and other electrical components needed to INSTALL AND TERMINATE owner's provided materials AS WELL AS WORK WITH OWNER'S REPRESENTATIVE DURING THE COMMISSIONING PROCESS and to provide the owner with a complete, turnkey system.
 1. All wire, conduit, supporting devices, boxes, connections, stub ups and rough in will be furnished and installed by this bidding Electrical Contractor ("contractor", "EC"). EC shall connect and terminate and punch down the devices to the patch panel/ control panel designated in the SE-xxx Security drawings. EC shall machine label, tag on both ends, and test all connections for proper continuity. EC shall certify network cabling and provide supporting testing reports to the owner to ensure proper wire has been installed, proper installation and cable lengths. EC shall test for ground faults and wire integrity on card access, burglar alarm and door stations wiring prior to turn over to owner.
 2. The EC shall provide firestopping for all penetrations required for work of their contract.
 3. Electronics system's Commissioning shall be done by the Owner's representative. EC shall have a responsible electrician/foreman with knowledge of the project's on-site installation during commissioning to correct any installation faults as instructed by Owner's representative.
 4. All burglar alarm device wiring is to be home-run to designated closet wall field device equipment. No cable splicing is allowed for any of the subsystems

- c. Install system as per security drawing's set SE-xxx and follow specific notes regarding intent, means and methods
- d. The general conditions for contracts of construction, referred to in the contract documents as the general conditions, together with the following articles of the specifications, which amend, modify and supplement various articles and provisions of the general conditions, are made part of the Contract and shall apply to all work under the Contract.
- e. All articles or parts of articles of the general conditions not so amended, modified or supplemented by these specifications shall remain in full force and effect. Should any discrepancy become apparent between the general conditions and the specifications the Contractor shall notify Owner/Engineer, in writing and the Owner/Engineer shall interpret and decide such matters in accordance with the provisions of the General Conditions.
- f. The Contractor shall comply with all applicable governmental regulations and with all Federal, State, County, City, and other applicable codes and ordinances.
- g. These specifications call out certain duties of the Contractor and his suppliers. They are not intended as a material list of items required by the Contract.
- h. This division of the specifications covers the security systems for the various schools and other city sites located in Yonkers, NY.
- i. Contractor should note that it shall be necessary to coordinate with other contractors who will be working in the space at the same time as this work.
- j. It is the intent of these specifications to provide complete and workable electronic security system ready for the Owner's use. Any item not specifically shown on the drawings or called for in the specifications, but normally required to conform with the intent, are to be considered as part of the Contract.
- k. These specifications are equipment and performance specifications. Actual installation shall be as indicated on the Drawings. Any discrepancies found between the Specification and the Drawing shall be immediately brought to the attention of the Owner/Engineer.

1.02 DEFINITIONS

- a. Certain terms such as "shall", "provide", "install", "complete", "startup" are not used in some parts of these specifications. This does not indicate that the items shall be less than completely installed or that systems shall be less than complete.
- b. Utilize the following abbreviations for discernment on the Drawings and within the Specifications:
 - 1. NEC National Electrical Code
 - 2. OSHA Occupational Safety and Health Act

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| 3. | ANSI | American National Standards Institute |
| 4. | NFPA | National Fire Protection Association |
| 5. | IEEE | Institute of Electrical and Electronics Engineers |
| 6. | CCTV | Closed Circuit Television |
| 7. | UL | Underwriters' Laboratories, Inc. |
| 8. | ASTM | American Society of Testing Materials |
| 9. | FCC | Federal Communications Commission |
| 10. | FBO | Furnished by others |
| 11. | EC | Bidding (electrical) contractor |

c. Utilize the following definitions for discernment within the Specifications:

1. "PROVIDE" or "FURNISH" means to supply, purchase, transport, place, erect, connect, test and turn over to Owner, complete and ready for regular operation, the particular work referred to.
2. "SUPPLY" means to purchase, procure, acquire, and deliver complete with related accessories.
3. "INSTALL" means to move from property line, set in place, join, unite, fasten, link, attach, set up or otherwise connect together before testing and turning over to Owner of equipment supplied under another division. Installation to be complete and ready for regular operation, the particular work referred to.
4. "WIRING" or "CABLING," means the inclusion of all fittings, conductors, connectors, connections, terminations and termination hardware and all other items necessary and/or required in connection with such work.
5. "DATA GATHERING PANEL", "iSTAR", "CONTROLLERS" means the inclusion of installations all I/O hardware, power supplies, alarm controllers, reader controllers, output relays, communications devices, and housings necessary to interface card readers, alarm contacts, door locking and control hardware, etc. to the system.
6. "CONDUIT" or "CABLE TRAY" or "LADDER RACK" means the inclusion of all fittings, hangers, supports, sleeves, etc.
7. "AS DIRECTED" means as directed by the Owner or his representative.

8. "CONCEALED," means embedded in masonry or other construction, installed behind wall furring or within double partitions, or installed within hung ceilings or under raised floors.
9. "EXPOSED" means not installed underground or "CONCEALED" as defined above.
10. "APPROVED," means as accepted and authorized, in writing, by the Owner or Engineer.
11. "COY", "YPS" or "OWNER" means City of Yonkers, Yonkers Public Schools
12. "ENGINEER" or "AGENT" means owner or his designated representative

1.03 SCOPE OF WORK

- d. The work covered by these specifications includes the installations described herein and illustrated on the SE Security drawings, including all labor necessary to perform and complete such construction, all materials and equipment incorporated in or to be incorporated in such installations and all services, facilities, tools and equipment necessary or used to perform and complete such installations.
- e. The scope of work includes, but is not limited to, the work described herein and in the following specifications sections, as applicable:
 1. Division 26 – Electrical Specifications
 2. Preparation and submission of unit pricing sheets, shop drawings, testing reports, record drawings, and documentation.
 3. Termination, connectorization, labeling, testing and documentation of all cables and components provided under these specification sections.
 4. Tile cuts, as noted on the drawings and in the individual specification sections, under equipment racks, server racks, frames, cabinets, etc.
 5. Fire stopping of all conduits, cable trays rated wall and floor penetrations, etc. as noted.
 6. Furnish shop drawings to the Construction Manager and the Engineer and receive written approval prior to fabrication, assembly and installation. The shop drawing submission shall be within sufficient time to allow endorsement by the Engineer prior to commencement of the work.
 7. Provide system's installation changes that were made due to field conditions to the owner. Documentation including copies of all relevant drawings and equipment manuals.

8. Provide warranty services for bidder's work portion only for the specified period from the date of acceptance.
 9. Remove and dispose of all refuse related to the security system installation from site.
 10. Panduit Laser *Machine Labeling* and documentation of all cables, wiring boxes, equipment cabinets, pull boxes and termination strips installed under this contract. Use of hand label machines such as 'Brother-P-Touch' is not acceptable
 11. Installation, final connections and terminations of all security cabling and owner's provided equipment.
 12. Position cameras in the direction that is acceptable to the owner and follow owner's instruction for camera views. Be present and work with Owner's representative during commissioning and re-point cameras as needed to the owner's
 13. Be present at and work with owner's commissioning agent during system's turn on. Remedy all installation and wiring faults as per agent's direction.
- f. Bidding Contractor - Provided under this contract. Follow Division 26 for additional scope instructions
1. 120 VAC power wiring. Connection between 120 VAC power sources and all security equipment panels and equipment cabinets.
 2. Conduits, electrical, and pull boxes (provided under electrical work). NEMA Type 1 enclosure for all junction boxes provided under this work.
 3. Fire-stopping of all rated wall and floor penetrations.

1.04 MATERIALS SUPPLIED BY OTHERS AND INSTALLED UNDER THIS WORK

- a. Electronic Equipment noted on drawings SE-xxx Security Drawings

1.05 SITE VISIT

- a. Prior to bid submission, the Contractor shall visit the site and examine the drawings of other trades to determine the existing design conditions that may affect the work. The Contractor shall be held responsible for any assumptions in regard thereto.
- b. The Contractor shall verify all dimensions and distances in the field and/or other provided document the cable lengths and materials to be furnished and installed. The provision and installation of non-specified miscellaneous hardware, i.e., nuts, bolts, tie wraps, etc., and shall be the Contractor's responsibility.
- c. Contractor should note this is an existing facility under construction. Existing site conditions, other contract documents and the overall construction schedule must be carefully reviewed to determine all required interfacing and timing of the work.
- d. Existing Contract Documents for all other trades shall be made available for review through the General Contractor.

1.06 CONTRACTOR QUALIFICATIONS

- a. The Contractor shall provide Contractor Qualifications to include name/address of three (3) similar security projects performed in the past 5 years.

1.07 BIDDING

- a. The bidder's submittal shall include detailed labor costs break down for installation of the provided equipment including the ADD/DEDUCT form. ADD/DEDUCT form to have a single dollar amount to be applied to either adding or deleting an item.
- b. Materials costs shall reflect all miscellaneous hardware, connectors, and materials required and shown as a separate cost.
- c. Material, labor, documentation, and shipping totals shall be entered in a Master Costs forms.
- d. Substitute Equipment
 - 1. All cable and fiber (where applicable) shall be bid as specified.
 - 2. Equivalency in quality, performance, construction, and function shall be demonstrated by submitting, as applicable or required by the Engineer, the following:
 - a) Specifications.
 - b) Laboratory test data.
 - c) List of advantages to the Owner and the Engineer.

- d) Cost differences compared to the "as specified" bid package.
- 3. The drawings and specifications are based on specific equipment, functions, and arrangements. Additions or revisions to equipment, materials, and labor may be necessary for the proper fit and function of any proposed substitute items to the purpose, arrangement and intent originally indicated. It is the responsibility of the Bidder to determine the electrical needs for such additions and/or revisions and identify them in the Bidder's submittal.
- 4. Costs for any additional labor and additions or revisions to wiring, space requirements, equipment, or other materials, required for the use of substitute equipment shall be included by the Bidder without claim for subsequent additional payment.
- 5. Consideration in the Bidding for a proposed substitute will be given only if, in the opinion of the Engineer, the substitute is equal to and/or offers significant advantage to the project over the specified item.
- e. Installation materials supplied shall be complete, model numbers accurate, and the performance shall conform to manufacturer's specifications.
- f. All materials shall be new and shall conform to applicable codes.
- g. Repair or replace any items damaged during installation.
- h. Procure and pay for all necessary permits, licenses, inspections, and observe any requirements stipulated therein.
- i. Comply with all applicable labor regulations and applicable union and trade regulations.
- j. The installation shall conform to the latest safety codes and regulations. Where conflicts exist, the most stringent code or regulation shall apply.
- k. Adhere to all Quality Assurance items in the Sub-Contract Agreement issued by the Owner/Engineer.

1.08 SUBMITTALS

- a. As directed by the Owner/Engineer and the Construction Program, submit hand marked detailed field changes so that they can be incorporated onto the final as-built set (by others)
- b. Shop drawings shall be based on actual equipment, installation, and field conditions. Note however, that locations and other information provided herein are only approximate. Therefore, where possible, make equipment and field measurements prior to the preparation of shop drawings, fabrication, and installation to ensure proper fit and function of the equipment. However, this requirement shall not delay the progress of the work. Allow for trimming and fitting wherever the taking of field, or other measurements, before fabrication might delay the work. Costs for failure to coordinate

equipment details with site conditions and designated equipment locations shall be borne by the Security Contractor.

- c. The review and approval of shop drawings shall be general only and shall not relieve the Contractor from responsibility for proper installation or for deviations from the specifications or drawings due to field conditions; conflict with the work of others that may result from such deviations; or for errors of any sort.
- d. Shop drawings shall include and clearly indicate any proposed modification of the specifications or drawings.
- e. Shop drawings shall include and clearly indicate the addition of any items not detailed herein, but necessary to provide a properly functioning and complete system.
- f. Changes to riser diagrams for power and grounding, Security systems cabling and fiber optic/patch panel, data gathering panels, power supplies interconnections, and all Security field devices.

1.09 DELIVERY, STORAGE AND HANDLING

- a. Delivery of Materials: Coordinate with owner's designated agent
- b. Storage of Materials, Equipment and Fixtures: Store materials suitably sheltered from the elements, but readily accessible for inspection until installed. Store all items subject to moisture damage in dry, heated spaces. Provide space requirements for storage in submittals list. The General Contractor shall assign storage space.
- c. Store all materials in a secure fashion to prevent the loss of these materials due to pilferage or theft.

1.10 COORDINATION OF WORK

- a. Carefully check space requirements and the physical confines of the area of work to ensure that all material can be installed in the spaces allotted thereto, including equipment racks, and cable supports.
- b. Transmit to other trades in a timely manner all information required for work to be provided under their respective Sections in ample time for installation.
- c. Wherever work interconnects with or contacts the work of other trades, coordinate with other trades to ensure that all trades have the information necessary so that they may properly install all the necessary connections and equipment. Identify all items of work that require access so that the floor tile trade shall know where to install tile cutouts.
- d. Attend all construction meetings, at the project site or at other location, as requested by the Owner or General Contractor.
- e. When directed by the Owner, the Contractor shall, without extra charge, make reasonable modifications in the layout as needed to prevent conflict with work of other trades or for

proper compliance with the design intent.

1.11 CODES, REGULATIONS AND STANDARDS

- a. The installation shall be in compliance with the requirements of the National Electrical Code, OSHA, recommendations and the rules, regulations and requirements of all state and federal codes.
- b. The installation shall comply fully with all County, city, and state laws and ordinances, regulations, and codes applicable to the installation.
- c. All equipment shall be equal to or exceed the minimum requirements of NEMA, IEEE, ASME, ANSI and Underwriters' Laboratories.

1.12 SPECIAL CONDITIONS

- a. The requirements and recommendations of all standards, specifications and codes referred to herein, including the security systems drawings, shall be considered a part of these specifications.
- b. All local fees, permits, and services of inspection authorities shall be obtained and paid for by the Contractor. The Contractor shall cooperate fully with local utility companies with respect to their services. Contractor shall include in his price, all costs to be incurred relative to the installation of the system described herein.

1.13 WARRANTY

- a. For a period of 1 year after full acceptance, Contractor to Repair/Replace any defects in its work/materials to remedy the condition.

1.14 MATERIALS

- a. Where specific items are called out in the specification or indicated on the drawings for a specific application, use those products or materials. Otherwise, use first class products and materials that have been approved by the owner/engineer at the time of bid. Materials substituted after the time of bid a subject to prior approval by the Owner/Engineer.

1.15 GENERAL INSTALLATION

- a. Requirements herein referring to materials, or work related to, or that may affect the system but not within the work scope of this specification, shall apply to the supplying and/or installing contractor who shall comply with said requirements. Where conflict exists with other specifications concerning such work, this specification takes precedence unless otherwise approved in writing by the Owner/Engineer.

- b. Follow manufacturers' instructions for installing, connecting, and adjusting all equipment and cabling.
- c. The locations of equipment, power outlets, boxes, devices, etc. indicated on the drawings are approximately correct and are understood to be subject to such revision as may be found necessary or desirable at the time the work is installed.
- d. Exercise particular caution with reference to the location of all field devices they have precise and definite locations accepted by the Owner/Engineer before proceeding with the installation.
- e. Maintain a current copy of this bid specification at the job site at all times.
- f. Maintain a complete file of shop drawings and other submissions at the job site at all times. These shop drawings and submissions shall be made available to the Owner/Engineer at his request.
- g. Keep all items protected before and after installation, with dust and moisture proof barrier materials. It shall be the contractor's responsibility to ensure the integrity of these protective measures throughout the life of the project.
- h. Ensure that safe ingress and egress from all work sites is maintained during movement and installation of materials.
- i. Clean up all debris generated by installation activities. Always keep all work areas free of debris.
- j. Perform all tests required by local authorities in addition to tests specified herein.
- k. At all times during the construction, protect all equipment from damage and theft. Equipment in the equipment room shall not be installed until such time as other trades have completed their work in that area so that the equipment will not be moved or damaged.
- l. Upon project completion, provide hand corrected as-built drawings and documentation as defined herein.

1.16 STAFFING

- a. The Contractor shall keep a qualified foreman in charge of the work at all times. The foreman shall be present in the field at all times during the performance of the work. Such foreman shall be replaced if deemed unsatisfactory by the Owner.
- b. The Contractor shall provide a supervisory work force sufficient to efficiently execute the Contractor's responsibilities.
- c. The Contractor shall provide the level of manpower necessary to meet all construction schedules.

- d. The Contractor shall use only skilled, experienced, and reliable workers and shall discontinue the services of anyone employed on this project upon written request of the Owner.
- e. Manufacturer's installation instructions shall be used for in-process quality control and final acceptance of the work installation.
- f. Craft personnel shall be required to provide and use the proper tools and test equipment in the performance of each activity. Tools must be in good working order and test equipment must be properly calibrated. Contractor is responsible for safe storage of tools and is responsible for their security.

1.17 COMPONENT INSTALLATION

- a. Location of Equipment
 - 1. The specifications describe only approximate locations of the work. Verify all locations in the field.
 - 2. GC to furnish electrified locking hardware and bidder to terminate electrified locking hardware as needed for both new and existing doors.
 - 3. Locate equipment and accessories to provide easy access for proper service and maintenance.
- b. Conduit and Raceway System
 - 1. Security cabling shall be in ferrous conduit, as shown on the drawings and described in the electrical and conduit specifications.
 - a) With Owner's prior approval, properly supported exposed security cabling shall be permitted above an accessible finished ceiling within the secure areas.
 - b) All security wiring installed in an inaccessible area shall be installed in appropriate metallic conduit.
 - 2. Exposed conduit shall be parallel with, or at right angles to, walls and ceilings. It shall be adequately supported by means of approved galvanized iron clamps or hangers.
 - 3. Conduit fill shall not exceed 40% of conduit cross-sectional area.
 - 4. Nominal trade sizes for conduit shall be 3/4-inch minimum and 4-inch maximum.
 - 5. All junction boxes and pull boxes utilized in the raceway system shall be installed.

c. Mounting Boxes/Enclosures

1. Mounting boxes and enclosures shall be rigidly and securely mounted to the building structure. Wiring contained in them shall be accessible. Install blanking devices or threaded plugs in all unused holes.
2. Clean all interiors thoroughly before installing plates, panels or covers.

d. Electrical Power 120 VAC

1. Any Electrical work to be provided and installed by the Contractor as described herein, shall be performed in accordance with all applicable electrical codes.
2. Review and coordinate electrical power system installation with the Electrical Trade Contractor to ensure proper function and operation of the Security systems.
3. Verify that all power circuits designated for Security equipment, both fixed-in-place and portable, are properly wired, phased and grounded. Report any discrepancies found to the Engineer and the Owner/Engineer so that appropriate corrective action can be taken.
4. Provide distribution of electrical power within all equipment racks, enclosures, and consoles. For each branch circuit provide a minimum of two (2) spare receptacles in each plugmold strip. Provide a minimum of one (1) unswitched receptacle power strip (rack mounted) per each equipment rack cabinet group.

e. Finishes

1. All enclosures, housings and supporting structures supplied by the Contractor not having a standard factory protective finish shall be painted. Paint specifications will be supplied by the Owner/Engineer or indicated herein.
2. Any equipment or materials supplied, which are exposed to public view, shall be approved by the Owner/Engineer. Provide, as may be required by the Owner/Engineer, custom color and/or finish for all such items. This does NOT exclude equipment or materials that are supplied with standard colors or finishes as specified herein.
3. Finish and color of blank, perforated vent, and custom rack panels shall match each other as closely as possible.

f. Installation of Cabling

1. Run all wiring in compliance with the requirements of the electrical specification and in accordance with authorities and codes having jurisdiction. Provide separate conduit for control wiring under this Section. Follow manufacturers' instructions for installing, connecting, and adjusting all equipment and cabling.
2. Installation of all wire and cable shall include ensuring proper:
 - a) Types
 - b) Lengths
 - c) Routing
 - d) Quantities
 - e) Pulling tensions
 - f) Circuit identification
 - g) Wire/cable group separations
3. Do not pull through any box, enclosure, or fitting where change of conduit or raceway alignment or direction occurs. Do not bend conductors to less than recommended radius. Employ temporary guides, sheaves, rollers, and other necessary items to protect cables from excess tension, abrasion, or damaging bending during pulling.
4. Provide wire pulling lubricants and pulling tensions strictly in accordance with wire and cable manufacturer's recommendations.
5. Cover edges of cable pass through holes in chassis, racks, boxes, plates, etc. with rubber grommets or Heyco or Brady GRNY nylon grommets.
6. Use Velcro-type cable ties for bundling cabling as required and securing cable bundles to racks as required. Use integral brass grommets for screw attachment. Attach to backboards using flat-headed screws with rigid support. Lengths vary as required. Types vary as required.
7. Provide ample service loops at each termination so that plates, panels, and equipment can be de-mounted for inspection, service, and so equipment in drawers or on slides can move freely.
8. Permanently identify all wires and cables at each end by labeling with Panduit or Brady (for example, not Brother P Touch type) wire markers printed on LaserJet or dot matrix printer via computer software program. Labeling information shall include the following:

- a) Cable prefixes and cable numbers as per Security Wiring Riser and CCTV Wiring Riser drawings.
 - b) Descriptive information related to the cable's equipment source.
 - c) Descriptive information related to the cable's equipment destination.
 - d) Enter all identifications on wire/cable run schedules and/or as part of the shop drawings.
9. Use the same wire color coding for the same circuit, circuit functions, or phasing throughout the system. No splices shall exist in any length of wire run except where noted on specification drawings or approved by the Engineer.
10. Exercise care in wiring to avoid damage to cables. Cables shall be well supported and neatly dressed between racks, cabinets, consoles, or modules. Make all connections to jacks and connectors with rosin-core solder. Soldering shall be neat and shall not exhibit "cold" solder joints. Avoid "solder splatter" which can cause shorts in exposed terminals or wiring.
11. Connections made with screw actuated pressure type terminal strips shall be made by stripping approximately 6mm of insulation from the stranded conductor, inserting the un-tinned wire into the pressure terminal, and tightening the terminal screw using a small screwdriver which securely fits the screw head.
12. All exposed shielded drain wires shall be sheathed in properly sized clear tubing, clear shrink tube, or white "spaghetti". Floating shields (at device outputs) shall be insulated using the proper size heat shrink tubing and completely protected against shorting to any other conductors or connector shell.
13. CAT-6/5E for CCTV, Intercoms and other connections shall only be using proper crimp type connectors of appropriate for the equipment or device terminations.
14. Cable Separation
- a) Cabling shall be bundled separately from other system cabling. Each cable bundle shall be tie wrapped and supported J - hooks every 5-feet.
 - b) Separate cables running parallel to electrical cables/conduits by a minimum of 12-inches. Maintain at least 18-inch separation from all lighting ballasts and fixtures.
 - c) Cables, which must cross-electrical cables/conduits, shall do so only at 90-degree angles.
- g. Installation of Security Equipment Panels

1. Provide security equipment panel installation in accordance with the provided SE series drawings.
- h. Installation of Security Equipment Racks and Cabinets
 1. Provide security equipment rack and cabinet installation in accordance with industry expected standards and per provided SE drawings.

1.18 IDENTIFICATION

- a. Furnish a nameplate for each security equipment panel, NEMA and power supply enclosures provided under this work. Plates shall be Panduit, self-laminating or 2 1/4" lamacoid or aluminum with a black enamel background with etched or engraved upper case 1/4" white letters or black and white laminated Bakelite plate with beveled edges. Coordinate labeling and nameplate requirements with the Owner/Engineer prior to installation. Nameplates shall be screwed on with countersunk screws.
- b. All cables and terminal strips shall be labeled with machine generated black uppercase lettering on a permanent adhesive label stock, covered with a permanent water resistant sealer. Labels shall be placed on both ends of the cable and no more than 6" from the point at which the cable is broken out into individual copper pairs or from the connector or terminal block. All labels shall be readily visible.
- c. Hand lettered label stock shall not be accepted for final installation. Hand lettered stock is only acceptable for use with temporary labeling required during construction phases.
- d. If at any time during the project, the cable label becomes illegible or removed, the Contractor shall immediately replace it with a duplicate pre-printed cable label.
- e. All cable IDs shall be both physically and visually accessible upon completion of the project.

1.19 FIRE STOP PENETRATION SEALANT

- a. Provide fire-resistant materials of a type and composition necessary to restore fire ratings to all wall or floor or ceiling penetrations. Material must be properly classified and meet national and local codes.
- b. All penetrations through fire rated floors and walls shall be sealed to prevent the passage of cold smoke, fire, toxic gas or water through the penetration either before, during or after a fire. The fire rating of the penetration seal shall be at least that of the floor or wall into which it is installed, so that the original fire rating of the floor or wall is maintained as required by Article 300-21 of the National Electrical Code.
- c. No flammable material may be used to line the chase or hole in which the fire stop material is to be installed.

- d. When damming materials are to be left in place after the seal is complete, and then all such materials shall be non-flammable.
- e. When damming materials are to be left in place after the seal is complete, and then all such materials shall be non-flammable.
- f. The sealant shall remain resilient and pliable to allow the removal and/or addition of cable without the necessity of drilling holes. It shall adhere to itself perfectly to allow any and all repairs to be made with the same material. It shall allow for vibration, expansion and/or contraction of anything passing through the penetration without affecting the seal, or cracking, crumbling and spalling.
- g. When sealant is injected into a penetration, the material shall expand to surround all the items within the penetration and maintain pressure against the walls of the penetration as well as the pass-through items. The material shall cure within five minutes. No heat shall be required to further expand the material to prevent the passage of fire and smoke or water.
- h. The materials shall have been subjected to fire exposure in accordance with standard time-temperature curve in the Standard, UL, ASTM E 119 and NFPA 251. The fire stop material shall have also been subjected to the hose stream test in accordance with UL 10B.

1.20 GROUNDING

- a. Grounding and shielding shall conform to the following procedures. AC grounding applies only to power circuits intended for powering Security equipment.
- b. It is the primary intent of the following procedures to provide a safe system for personnel to operate.
- c. The power cord from active equipment shall not have its third prong-grounding conductor defeated.
- d. To reduce noise voltages in the system it is intended that only one ground connection path exist between two pieces of equipment.
- e. Where mounting hardware is indicated as a means of grounding, ensure both a solid electrical and mechanical connection is made.
- f. Cable shields shall be considered grounded if connected to the shield connection points provided by the manufacturer of active equipment.
- g. Conduit/mounting boxes:
 - 1. Permanently and effectively, bond to building earth ground per applicable codes. Insulated connections between conduit and wall boxes, junction boxes, or wireways are not permitted.
- h. Passive Equipment Chassis: Connect an appropriately sized (green) insulated ground cable to the copper ground terminal block (provided under the electrical contract), to the

ground bus bar within each equipment rack. This ground bus bar shall be bonded to bright metal of each equipment rack with the appropriate antioxidant employed at the copper to rack interface. Each adjacent equipment rack shall have its grounding conductor homerun to the copper ground terminal block.

1.21 SYSTEM PROGRAMING AND INIALIZATION

- a. Programming, software, and materials necessary for initial configuration, programming and start-up of access control and CCTV systems is by others.
 - 1. Provide all labor and materials necessary to during system's commissioning.
 - 2. Provide labor to attend weekly project meetings for the duration of the project.

1.22 TRAINING

- a. Allow a minimum of 8 hours to walk the site with the owner for needed training on provided materials and installations to show location of junction boxes, breaker panels etc.

1.23 INSPECTIONS AND TESTING

- a. Help perform field I/O calibration and commissioning, system commissioning and integrated system program commissioning. Document all commissioning information on commissioning data sheets that shall be submitted prior to acceptance testing. Notify the Owner/Engineer in writing of the testing schedule so that operating personnel may observe calibration and commissioning.
 - 1. Inspections and Cable Testing
 - 2. System Programming
 - 3. System Operation
 - 4. Component Commissioning
 - 5. Primary Power Failure
 - 6. Fire alarm Interface Test
- b. After the installation is complete, in addition to any other required testing as described herein, and at such times as the Owner/Engineer directs, be present while the Owner/Engineer conducts an operating test for approval. The installation shall be demonstrated to be in accordance with the requirements of this specification. Any defects revealed shall be corrected promptly at the Contractor's expense and the tests performed again.

- c. As a minimum, test, as described below, all cables installed under these specifications.
 - 1. Conduct cable testing as described below upon completion of installation. Test fully completed systems only.
 - 2. Multi-conductor metallic cables: End-to-end testing of each cable pair/conductor for continuity ground fault, proper termination, shorts and crossed pairs.
 - 3. If a bad conductor is found, replace the entire cable. Remove any cables that contain a defective conductor from ceiling and/or floor duct. Do not abandon defective cables in place.
- d. The Owner/Engineer reserves the right to observe of any or all portions of the testing process.
- e. The Owner/Engineer further reserves the right to conduct, using contractor equipment and labor, a random re-test of 10% of the cables to confirm documented test results. Such retests may be observed and reported on by a third-party contractor retained by the Owner/Engineer.
- f. All test results and corrective procedures are to be documented and submitted to the Owner/Engineer within five (5) working days of test completion

1.24 ACCEPTANCE

- a. Submit a detailed acceptance procedure designed to demonstrate compliance with contract installation requirements at least 2 weeks before the start of testing. This procedure to be approved prior to the start of the testing.
- b. During acceptance testing, provide services to owner's security systems technician.
- c. Coordinate testing period so that free access, work lighting and electrical power are available on site.
- d. Furnish three portable VHF or UHF business band, two-way radios with sufficient range to cover the entire project. Include extra rechargeable batteries, battery charger and belt "holsters".
- e. Ensure that technical areas are in a clean and orderly condition, ready for acceptance testing.

1.25 RECORD DRAWINGS

- a. During construction, the Contractor shall keep an accurate record of all deviations between the work as shown on the drawings and that, which is accurately installed.

END OF SECTION

