

## LIST OF DRAWINGS

G-001	Cover Sheet
A-001	Architectural Abbreviations, Legend and Notes
AD101	First Floor Demolition Plan
AD102	Third Floor Demolition Plan
A-101	First Floor New Work Plan
A-102	Third Floor New Work Plan
A-103	First Floor Reflected Ceiling Plan
A-104	Third Floor Reflected Ceiling Plan
A-601	Schedules and Details
M-001	HVAC Abbreviations, Legend and Notes
M-101	First Floor HVAC Demolition and New Work Plans
M-102	Third Floor Demolition and New Work Plans
E-001	Electrical Abbreviations, Legend and Notes
ED101	First Floor Demolition Plan
ED102	Third Floor Demolition Plan
E-101	First Floor Lighting and Power Plans
E-102	Third Floor Lighting and Power Plans
E-601	Panelboard Schedules and Riser Diagrams
SP001	Sprinkler Reference Sheet
SP101	First Floor Sprinkler Demolition Plan
SP102	Third Floor Sprinkler Demolition Plan
SP201	First Floor Sprinkler New Work Plan
SP202	Third Floor Sprinkler New Work Plan
SP501	Sprinkler Details
FA001	Fire Alarm Reference Sheet
FA002	Fire Alarm Specification Sheet
FA003	Fire Alarm Specification Sheet
FA101	First Floor Fire Alarm Demolition Plan
FA102	Third Floor Fire Alarm Demolition Plan
FA201	First Floor Fire Alarm New Work Plan
FA202	Third Floor Fire Alarm New Work Plan
FA501	Fire Alarm Details



SECTION 011000 - SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Project information.
2. Work covered by Contract Documents.
3. Work performed by Owner.
4. Owner-furnished/Contractor-installed (OFCI) products.
5. Owner-furnished/Owner-installed (OFOI) products.
6. Contractor's use of site and premises.
7. Coordination with occupants.
8. Work restrictions.
9. Specification and Drawing conventions.
10. Miscellaneous provisions.

B. Related Requirements:

1. Section 015000 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.
2. Section 017300 "Execution" for coordination of Owner-installed products.

1.3 DEFINITIONS

- A. Work Package: A group of specifications, drawings, and schedules prepared by the design team to describe a portion of the Project Work for pricing, permitting, and construction.

1.4 PROJECT INFORMATION

A. Project Identification: Office Suite Renovation.

1. Project Location: 700 E. Jackson Street, Richmond, Virginia.

B. Owner: J. Sargeant Reynolds Community College.

C. Architect: Austin Brockenbrough and Associates, LLC.

1. Architect's Representative: Jennifer Wiesinger, RA.
2. Phone: (804) 592-3897 Email: [jwiesinger@brockenbrough.com](mailto:jwiesinger@brockenbrough.com)

D. Architect's Consultants: Architect has retained the following design professionals, who have prepared designated portions of the Contract Documents:

1. Fire Protection Engineer: GHD.
  - a. Fire Protection Engineer's Representative: Bryan Stemen, CFP, CFPS
  - b. Phone: (804) 237-0304 Email: [bryan.stemen@ghd.com](mailto:bryan.stemen@ghd.com)

**1.5 WORK COVERED BY CONTRACT DOCUMENTS**

A. The Work of Project is defined by the Contract Documents and includes, but is not limited to, the following:

1. The scope of work includes partial interior renovations on the first and third floors of an existing six-story building. Floor renovated spaces will be used as office space (898 SF) and a food pantry (360 SF). The 785 SF third floor space will be used as a tutoring center and faculty offices for the community college. The total work area is 2,043 SF and includes architectural, mechanical, electrical, and fire protection work as indicated in the Contract Documents.

B. Type of Contract:

1. Project will be constructed under a single prime contract.

**1.6 WORK PERFORMED BY OWNER**

A. Cooperate fully with Owner, so work may be carried out smoothly, without interfering with or delaying Work under this Contract or work by Owner. Coordinate the Work of this Contract with work performed by Owner.

B. Subsequent Work: Owner will perform the following additional work at site after Substantial Completion. Completion of that work will depend on successful completion of preparatory Work under this Contract.

1. Data and Communication.

**1.7 OWNER-FURNISHED/OWNER-INSTALLED (OFOI) PRODUCTS**

A. The Owner will furnish and install products indicated.

B. Owner-Furnished/Owner-Installed (OFOI) Products:

1. Room signage.
2. Door access and security.



**1.8 CONTRACTOR'S USE OF SITE AND PREMISES**

- A. Limits on Use of Site: Limit use of Project site to areas within the Contract limits indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.
  - 1. Limits on Use of Site: Confine construction operations to work area, as indicated on drawings.
  - 2. Driveways, Walkways and Entrances: Keep driveways loading areas, and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or for storage of materials.
    - a. Schedule deliveries to minimize use of driveways and entrances by construction operations.
    - b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
- B. Condition of Existing Building: Maintain portions of existing building affected by construction operations in a weathertight condition throughout construction period. Repair damage caused by construction operations.
- C. Condition of Existing Grounds: Maintain portions of existing grounds, landscaping, and hardscaping affected by construction operations throughout construction period. Repair damage caused by construction operations.

**1.9 COORDINATION WITH OCCUPANTS**

- A. Partial Owner Occupancy: Owner will occupy the premises during entire construction period, with the exception of areas under construction. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's operations. Maintain existing exits unless otherwise indicated.
  - 1. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner and authorities having jurisdiction.
  - 2. Provide not less than 72 hours' notice to Owner of activities that will affect Owner's operations.

**1.10 WORK RESTRICTIONS**

- A. Comply with restrictions on construction operations.
  - 1. Comply with limitations on use of public streets, work on public streets, rights of way, and other requirements of authorities having jurisdiction.
- B. On-Site Work Hours: Limit work to between 8 a.m. to 6 p.m., Monday through Friday, unless otherwise indicated. Work hours may be modified to meet Project requirements if approved by Owner and authorities having jurisdiction.

1. Weekend Hours: Verify with Owner.
  2. Early Morning Hours: Verify with Owner.
  3. Hours for Utility Shutdowns: Verify with Owner.
  4. Hours for Core Drilling: Verify with Owner.
- C. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging for temporary utility services according to requirements indicated:
1. Obtain Owner's written permission before proceeding with utility interruptions.
- D. Noise, Vibration, Dust, and Odors: Coordinate operations that may result in high levels of noise and vibration, dust, odors, or other disruption to Owner occupancy with Owner.
1. Obtain Owner's written permission before proceeding with disruptive operations.
- E. Smoking and Controlled Substance Restrictions: Use of tobacco products, alcoholic beverages, and other controlled substances on Project site is not permitted.
- F. Employee Identification: Provide identification tags for Contractor personnel working on Project site. Require personnel to use identification tags at all times.
- G. Employee Screening: Comply with Owner's requirements for drug and background screening of Contractor personnel working on Project site.
1. Maintain list of approved screened personnel with Owner's representative.

#### 1.11 SPECIFICATION AND DRAWING CONVENTIONS

- A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
  2. Text Color: Text used in the Specifications, including units of measure, manufacturer and product names, and other text may appear in multiple colors or underlined as part of a hyperlink; no emphasis is implied by text with these characteristics.
  3. Hypertext: Text used in the Specifications may contain hyperlinks. Hyperlinks may allow for access to linked information that is not residing in the Specifications. Unless otherwise indicated, linked information is not part of the Contract Documents.
  4. Specification requirements are to be performed by Contractor unless specifically stated otherwise.
- B. Division 00 Contracting Requirements: General provisions of the Contract, including General and Supplementary Conditions, apply to all Sections of the Specifications.

- C. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.
- D. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:
  - 1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
  - 2. Abbreviations: Materials and products are identified by abbreviations scheduled on Drawings.
  - 3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 011000



SECTION 014000 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
  - 1. Specific quality-assurance and -control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
  - 2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
  - 3. Requirements for Contractor to provide quality-assurance and -control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.
  - 4. Specific test and inspection requirements are not specified in this Section.

1.3 DEFINITIONS

- A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Architect.
- C. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria.

- D. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.
- E. Source Quality-Control Testing: Tests and inspections that are performed at the source, e.g., plant, mill, factory, or shop.
- F. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- G. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
- H. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
  - 1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).
- I. Experienced: When used with an entity or individual, "experienced" means having successfully completed previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

#### 1.4 DELEGATED-DESIGN SERVICES

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
  - 1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.

#### 1.5 CONFLICTING REQUIREMENTS

- A. Referenced Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Architect for a decision before proceeding.
- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as

appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

#### 1.6 INFORMATIONAL SUBMITTALS

- A. Contractor's Quality-Control Plan: For quality-assurance and quality-control activities and responsibilities.
- B. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.
- C. Schedule of Tests and Inspections: Prepare in tabular form and include the following:
  - 1. Specification Section number and title.
  - 2. Entity responsible for performing tests and inspections.
  - 3. Description of test and inspection.
  - 4. Identification of applicable standards.
  - 5. Identification of test and inspection methods.
  - 6. Number of tests and inspections required.
  - 7. Time schedule or time span for tests and inspections.
  - 8. Requirements for obtaining samples.
  - 9. Unique characteristics of each quality-control service.

#### 1.7 REPORTS AND DOCUMENTS

- A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:
  - 1. Date of issue.
  - 2. Project title and number.
  - 3. Name, address, and telephone number of testing agency.
  - 4. Dates and locations of samples and tests or inspections.
  - 5. Names of individuals making tests and inspections.
  - 6. Description of the Work and test and inspection method.
  - 7. Identification of product and Specification Section.
  - 8. Complete test or inspection data.
  - 9. Test and inspection results and an interpretation of test results.
  - 10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
  - 11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
  - 12. Name and signature of laboratory inspector.
  - 13. Recommendations on retesting and reinspecting.

- B. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:
1. Name, address, and telephone number of technical representative making report.
  2. Statement on condition of substrates and their acceptability for installation of product.
  3. Statement that products at Project site comply with requirements.
  4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
  5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
  6. Statement whether conditions, products, and installation will affect warranty.
  7. Other required items indicated in individual Specification Sections.
- C. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:
1. Name, address, and telephone number of factory-authorized service representative making report.
  2. Statement that equipment complies with requirements.
  3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
  4. Statement whether conditions, products, and installation will affect warranty.
  5. Other required items indicated in individual Specification Sections.
- D. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

## 1.8 QUALITY ASSURANCE

- A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- D. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.



- E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar in material, design, and extent to those indicated for this Project.
- F. Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
  - 1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.
- G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 329; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.
  - 1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
  - 2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.
- H. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- I. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

## 1.9 QUALITY CONTROL

- A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, the Owner will engage a qualified testing agency to perform these services.
  - 1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
  - 2. Payment for these services will be made from testing and inspecting allowances, as authorized by Change Orders.
  - 3. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.

- B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not.
1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
  2. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
    - a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.
  3. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
  4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
  5. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
  6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- C. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing.
- D. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.
- E. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- F. Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
1. Notify Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
  2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
  3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
  4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
  5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.

6. Do not perform any duties of Contractor.
- G. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
1. Access to the Work.
  2. Incidental labor and facilities necessary to facilitate tests and inspections.
  3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
  4. Facilities for storage and field curing of test samples.
  5. Delivery of samples to testing agencies.
  6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
  7. Security and protection for samples and for testing and inspecting equipment at Project site.
- H. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
1. Schedule times for tests, inspections, obtaining samples, and similar activities.
- I. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents. Coordinate and submit concurrently with Contractor's construction schedule. Update as the Work progresses.
1. Distribution: Distribute schedule to Owner, Architect, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

#### 1.10 SPECIAL TESTS AND INSPECTIONS

- A. Special Tests and Inspections: Owner will engage a qualified testing agency to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner, as indicated in Statement of Special Inspections attached to this Section, and as follows:
- B. Special Tests and Inspections: Conducted by a qualified testing agency as required by authorities having jurisdiction, as indicated in individual Specification Sections and in Statement of Special Inspections attached to this Section, and as follows:
1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviews the completeness and adequacy of those procedures to perform the Work.
  2. Notifying Architect and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.

3. Submitting a certified written report of each test, inspection, and similar quality-control service to Architect with copy to Contractor and to authorities having jurisdiction.
4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
6. Retesting and reinspecting corrected work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

- A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:
  1. Date test or inspection was conducted.
  2. Description of the Work tested or inspected.
  3. Date test or inspection results were transmitted to Architect.
  4. Identification of testing agency or special inspector conducting test or inspection.
- B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Architect's reference during normal working hours.

3.2 REPAIR AND PROTECTION

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
  1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 017300 "Execution."
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 014000

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.
- B. Related Requirements:
  - 1. Section 011000 "Summary" for work restrictions and limitations on utility interruptions.

1.3 USE CHARGES

- A. Installation, removal, and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities engaged in the Project to use temporary services and facilities without cost, including, but not limited to, Owner's construction forces, Architect, testing agencies, and authorities having jurisdiction.
- B. Water and Sewer Service from Existing System: Water from Owner's existing water system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.
- C. Electric Power Service from Existing System: Electric power from Owner's existing system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

1.4 INFORMATIONAL SUBMITTALS

- A. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.
- B. Dust- and HVAC-Control Plan: Submit coordination drawing and narrative that indicates the dust- and HVAC-control measures proposed for use, proposed locations, and proposed time frame for their operation. Include the following:
  - 1. Locations of dust-control partitions at each phase of work.

2. HVAC system isolation schematic drawing.
  3. Location of proposed air-filtration system discharge.
  4. Waste-handling procedures.
  5. Other dust-control measures.
- C. Noise and Vibration Control Plan: Identify construction activities that may impact the occupancy and use of existing spaces within the building or adjacent existing buildings, whether occupied by others, or occupied by the Owner. Include the following:
1. Methods used to meet the goals and requirements of the Owner.
  2. Concrete cutting method(s) to be used.
  3. Location of construction devices on the site.
  4. Show compliance with the use and maintenance of quieted construction devices for the duration of the Project.
  5. Indicate activities that may disturb building occupants and that are planned to be performed during non-standard working hours as coordinated with the Owner.

#### 1.5 QUALITY ASSURANCE

- A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
- B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.
- C. Accessible Temporary Egress: Comply with applicable provisions in the United States Access Board's ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1.

#### 1.6 PROJECT CONDITIONS

- A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

### PART 2 - PRODUCTS

#### 2.1 MATERIALS

- A. Wood Enclosure Fence: Plywood, 8 feet high, framed with four 2-by-4-inch rails, with preservative-treated wood posts spaced not more than 8 feet apart.
- B. Polyethylene Sheet: Reinforced, fire-resistive sheet, 10-mil minimum thickness, with flame-spread rating of 15 or less in accordance with ASTM E84 and passing NFPA 701 Test Method 2.
- C. Dust-Control Adhesive-Surface Walk-Off Mats: Provide mats, minimum 36 by 60 inches.

- D. Insulation: Unfaced mineral-fiber blanket, manufactured from glass, slag wool, or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively.

## 2.2 TEMPORARY FACILITIES

- A. Field Offices: Use work area for Field Office Activities.
- B. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.
  - 1. Store combustible materials apart from building.

## 2.3 EQUIPMENT

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.
- B. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.
  - 1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
  - 2. Heating, Cooling, and Dehumidifying Units: Listed and labeled for type of fuel being consumed, by a qualified testing agency acceptable to authorities having jurisdiction and marked for intended location and application.
  - 3. Permanent HVAC System: If Owner authorizes use of permanent HVAC system for temporary use during construction, provide filter with MERV of 8 at each return-air grille in system and remove at end of construction.
- C. Air-Filtration Units: Primary and secondary HEPA-filter-equipped portable units with four-stage filtration. Provide single switch for emergency shutoff. Configure to run continuously.

## PART 3 - EXECUTION

### 3.1 TEMPORARY FACILITIES, GENERAL

- A. Conservation: Coordinate construction and use of temporary facilities with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.
  - 1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. See other Sections for disposition of salvaged materials that are designated as Owner's property.

3.2 INSTALLATION, GENERAL

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
  - 1. Locate facilities to limit site disturbance as specified in Section 011000 "Summary."
- B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.3 TEMPORARY UTILITY INSTALLATION

- A. General: Install temporary service or connect to existing service.
  - 1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
- B. Water Service: Connect to Owner's existing water service facilities. Clean and maintain water service facilities in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.
- C. Sanitary Facilities: Provide temporary toilets, wash facilities, safety shower and eyewash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.
  - 1. Use of Permanent Toilets: Use of Owner's existing or new toilet facilities is not permitted.
- D. Temporary Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.
  - 1. Provide temporary dehumidification systems when required to reduce ambient and substrate moisture levels to level required to allow installation or application of finishes and their proper curing or drying.
- E. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.
  - 1. Prior to commencing work, isolate the HVAC system in area where work is to be performed.
    - a. Disconnect supply and return ductwork in work area from HVAC systems servicing occupied areas.



- b. Maintain negative air pressure within work area, using HEPA-equipped air-filtration units, starting with commencement of temporary partition construction, and continuing until removal of temporary partitions is complete.
  2. Maintain dust partitions during the Work. Use vacuum collection attachments on dust-producing equipment. Isolate limited work within occupied areas using portable dust-containment devices.
  3. Perform daily construction cleanup and final cleanup using approved, HEPA-filter-equipped vacuum equipment.
- F. Electric Power Service: Connect to Owner's existing electric power service. Maintain equipment in a condition acceptable to Owner.
- G. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.
  1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.
- H. Telephone Service: Provide superintendent with cellular telephone for use.
  1. Post a list of important telephone numbers.
    - a. Police and fire departments.
    - b. Ambulance service.
    - c. Contractor's home office.
    - d. Contractor's emergency after-hours telephone number.
    - e. Architect's office.
    - f. Engineers' offices.
    - g. Owner's office.
    - h. Principal subcontractors' field and home offices.

### 3.4 SUPPORT FACILITIES INSTALLATION

- A. Comply with the following:
  1. Provide construction for temporary field offices, shops, and sheds located within construction area or within 30 feet of building lines that is noncombustible in accordance with ASTM E136. Comply with NFPA 241.
  2. Utilize designated area within existing building for temporary field offices.
  3. Maintain support facilities until Architect schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.
- B. Parking: Use designated areas of Owner's existing parking areas for construction personnel.
- C. Storage and Staging: Use designated areas of Project site for storage and staging needs.

- D. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.
  - 1. Identification Signs: Provide Project identification signs as indicated on Drawings.
  - 2. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.
    - a. Provide temporary, directional signs for construction personnel and visitors.
  - 3. Maintain and touch up signs, so they are legible at all times.
- E. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with progress cleaning requirements in Section 017300 "Execution."
- F. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.
  - 1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.
- G. Temporary Elevator Use: Use of elevators is to be coordinated with Owner.
- H. Existing Stair Usage: Use of Owner's existing stairs will be permitted, provided stairs are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore stairs to condition existing before initial use.
  - 1. Provide protective coverings, barriers, devices, signs, or other procedures to protect stairs and to maintain means of egress. If stairs become damaged, restore damaged areas, so no evidence remains of correction work.

### 3.5 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.
  - 1. Where access to adjacent properties is required in order to affect protection of existing facilities, obtain written permission from adjacent property owner to access property for that purpose.
- B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
  - 1. Comply with work restrictions specified in Section 011000 "Summary."
- C. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each workday.

- D. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
- E. Temporary Egress: Provide temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction. Provide signage directing occupants to temporary egress.
- F. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.
  - 1. Where heating or cooling is needed and permanent enclosure is incomplete, insulate temporary enclosures.
- G. Temporary Partitions: Provide floor-to-ceiling dustproof partitions to limit dust and dirt migration and to separate areas occupied by Owner from fumes and noise.
  - 1. Construct dustproof partitions with gypsum wallboard, with joints taped on occupied side, and fire-retardant-treated plywood on construction operations side.
  - 2. Construct dustproof partitions with two layers of 6-mil polyethylene sheet on each side. Cover floor with two layers of 6-mil polyethylene sheet, extending sheets 18 inches up the sidewalls. Overlap and tape full length of joints. Cover floor with fire-retardant-treated plywood.
    - a. Construct vestibule and airlock at each entrance through temporary partition with not less than 48 inches between doors. Maintain water-dampened foot mats in vestibule.
  - 3. Where fire-resistance-rated temporary partitions are indicated or are required by authorities having jurisdiction, construct partitions according to the rated assemblies.
  - 4. Insulate partitions to control noise transmission to occupied areas.
  - 5. Seal joints and perimeter. Equip partitions with gasketed dustproof doors and security locks where openings are required.
  - 6. Protect air-handling equipment.
  - 7. Provide walk-off mats at each entrance through temporary partition.
- H. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire-prevention program.
  - 1. Prohibit smoking in construction areas. Comply with additional limits on smoking specified in other Sections.
  - 2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition in accordance with requirements of authorities having jurisdiction.
  - 3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.

4. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign, stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

### 3.6 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Maintenance: Maintain facilities in good operating condition until removal.
  1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
- C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.
- D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
  1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
  2. Remove temporary roads and paved areas not intended for or acceptable for integration into permanent construction. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.
  3. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 017700 "Closeout Procedures."

END OF SECTION 015000

SECTION 017300 - EXECUTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:

- 1. Construction layout.
- 2. Installation of the Work.
- 3. Cutting and patching.
- 4. Coordination of Owner-installed products.
- 5. Progress cleaning.
- 6. Starting and adjusting.
- 7. Protection of installed construction.
- 8. Correction of the Work.

- B. Related Sections:

- 1. Division 01 Section "Project Record Documents" for submitting Project Record Documents.

1.3 DEFINITIONS

- A. Cutting: Removal of in-place construction necessary to permit installation or performance of other work.
- B. Patching: Fitting and repair work required to restore construction to original conditions after installation of other work.

1.4 SUBMITTALS

- A. Architect's Approval: Obtain approval of cutting and patching proposal before cutting and patching. Approval does not waive right to later require removal and replacement of unsatisfactory work.

## 1.5 QUALITY ASSURANCE

- A. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.
1. Structural Elements: When cutting and patching structural elements, notify Architect of locations and details of cutting and await directions from the Architect before proceeding. Shore, brace, and support structural element during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection
  2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety. Operational elements include the following:
    - a. Primary operational systems and equipment.
    - b. Fire separation assemblies.
    - c. Air or smoke barriers.
    - d. Fire-suppression systems.
    - e. Mechanical systems piping and ducts.
    - f. Control systems.
    - g. Communication systems.
    - h. Conveying systems.
    - i. Electrical wiring systems.
    - j. Operating systems of special construction.
  3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety. Other construction elements include but are not limited to the following:
    - a. Water, moisture, or vapor barriers.
    - b. Membranes and flashings.
    - c. Exterior wall construction.
    - d. Equipment supports.
    - e. Piping, ductwork, vessels, and equipment.
    - f. Noise- and vibration-control elements and systems.
  4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
- B. Cutting and Patching Conference: Before proceeding, meet at Project site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of

potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

- C. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

## 1.6 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
  - 1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to the Architect for the visual and functional performance of in-place materials.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance.
  - 1. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
  - 2. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
  - 3. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
  - 4. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

### 3.2 PREPARATION

- A. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- B. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- C. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of the Contractor, submit a request for information to Architect.

### 3.3 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
  - 1. Make vertical work plumb and make horizontal work level.
  - 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
  - 3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
- F. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- G. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.
  - 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.



2. Allow for building movement, including thermal expansion and contraction.
- H. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- I. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

### 3.4 CUTTING AND PATCHING

- A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
  1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Hazardous Materials:
  1. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner.
- C. Temporary Support: Provide temporary support of work to be cut.
- D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- E. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching in accordance with requirements of Division 01 Section "Summary."
- F. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to minimize interruption to occupied areas.
- G. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
  1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
  2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
  3. Concrete: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.

4. Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
  5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
  6. Proceed with patching after construction operations requiring cutting are complete.
- H. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.
1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
  2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.
    - a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
    - b. Restore damaged pipe covering to its original condition.
  3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
    - a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
  4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
- I. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

### 3.5 OWNER-INSTALLED PRODUCTS

- A. Site Access: Provide access to Project site for Owner's construction personnel.
- B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction personnel.
  1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually

agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.

2. Pre-installation Conferences: Include Owner's construction personnel at pre-installation conferences covering portions of the Work that are to receive Owner's work. Attend pre-installation conferences conducted by Owner's construction personnel if portions of the Work depend on Owner's construction.

### 3.6 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
  1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
  2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F.
  3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
    - a. Utilize containers intended for holding waste materials of type to be stored.
  4. Coordinate progress cleaning for joint-use areas where more than one installer has worked.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
  1. Remove liquid spills promptly.
  2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Division 01 Section "Temporary Facilities and Controls."

- H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

**3.7 STARTING AND ADJUSTING**

- A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- B. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.
- C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Manufacturer's Field Service: Comply with qualification requirements in Division 01 Section "Quality Requirements."

**3.8 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Comply with manufacturer's written instructions for temperature and relative humidity.

**3.9 CORRECTION OF THE WORK**

- A. Repair or remove and replace defective construction. Restore damaged substrates and finishes.
  - 1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.
- B. Restore permanent facilities used during construction to their specified condition.
- C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.

- D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.
- E. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

END OF SECTION 017300



SECTION 017839 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for project record documents, including the following:
  - 1. Record Drawings.
  - 2. Record Specifications.
  - 3. Record Product Data.
  - 4. Miscellaneous record submittals.

1.3 CLOSEOUT SUBMITTALS

- A. Record Drawings: Comply with the following:
  - 1. Number of Copies: Submit one set of marked-up record prints.
- B. Record Specifications: Submit one paper copy of Project's Specifications, including addenda and contract modifications.
- C. Record Product Data: Submit one paper copy of each submittal.
  - 1. Where record Product Data are required as part of operation and maintenance manuals, submit duplicate marked-up Product Data as a component of manual.
- D. Miscellaneous Record Submittals: Refer to other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit one paper copy of each submittal.

PART 2 - PRODUCTS

2.1 RECORD DRAWINGS

- A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings.

1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.
  - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
  - b. Accurately record information in an acceptable drawing technique.
  - c. Record data as soon as possible after obtaining it.
  - d. Record and check the markup before enclosing concealed installations.
2. Content: Types of items requiring marking include, but are not limited to, the following:
  - a. Dimensional changes to Drawings.
  - b. Revisions to details shown on Drawings.
  - c. Depths of foundations below first floor.
  - d. Locations and depths of underground utilities.
  - e. Revisions to routing of piping and conduits.
  - f. Revisions to electrical circuitry.
  - g. Actual equipment locations.
  - h. Duct size and routing.
  - i. Locations of concealed internal utilities.
  - j. Changes made by Change Order or Construction Change Directive.
  - k. Changes made following Architect's written orders.
  - l. Details not on the original Contract Drawings.
  - m. Field records for variable and concealed conditions.
  - n. Record information on the Work that is shown only schematically.
3. Mark the Contract Drawings and Shop Drawings completely and accurately. Utilize personnel proficient at recording graphic information in production of marked-up record prints.
4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
5. Mark important additional information that was either shown schematically or omitted from original Drawings.
6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

## 2.2 RECORD SPECIFICATIONS

- A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
  1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
  2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.



3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
  4. For each principal product, indicate whether record Product Data has been submitted in operation and maintenance manuals instead of submitted as record Product Data.
  5. Note related Change Orders and record Drawings where applicable.
- B. Format: Submit record Specifications as paper copy.

**2.3 RECORD PRODUCT DATA**

- A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
  2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
  3. Note related Change Orders, record Specifications, and record Drawings where applicable.
- B. Format: Submit record Product Data as paper copy.

**2.4 MISCELLANEOUS RECORD SUBMITTALS**

- A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.
- B. Format: Submit miscellaneous record submittals as paper copy.

**PART 3 - EXECUTION**

**3.1 RECORDING AND MAINTENANCE**

- A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and modifications to project record documents as they occur; do not wait until the end of Project.
- B. Maintenance of Record Documents and Samples: Store record documents and Samples in the field office apart from the Contract Documents used for construction. Do not use project record documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project record documents for Architect's reference during normal working hours.

END OF SECTION 017839



SECTION 024119 - SELECTIVE DEMOLITION

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 this Section.

1.2 SUMMARY

A. Section Includes:

- 1. Demolition and removal of selected portions of building or structure.

B. Related Requirements:

- 1. Section 011000 "Summary" for restrictions on use of the premises, Owner-occupancy requirements, and phasing requirements.
- 2. Section 017300 "Execution" for cutting and patching procedures.

1.3 DEFINITIONS

- A. Remove: Detach items from existing construction and dispose of them off-site unless indicated to be salvaged or reinstalled.
- B. Remove and Salvage: Detach items from existing construction, in a manner to prevent damage, and deliver to Owner ready for reuse.
- C. Remove and Reinstall: Detach items from existing construction, in a manner to prevent damage, prepare for reuse, and reinstall where indicated.
- D. Existing to Remain: Leave existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled.
- E. Dismantle: To remove by disassembling or detaching an item from a surface, using gentle methods and equipment to prevent damage to the item and surfaces; disposing of items unless indicated to be salvaged or reinstalled.

1.4 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.

- B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.
  - 1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For refrigerant recovery technician.
- B. Engineering Survey: Submit engineering survey of condition of building.
- C. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property, for dust control and, for noise control. Indicate proposed locations and construction of barriers.
- D. Schedule of Selective Demolition Activities: Indicate the following:
  - 1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's on-site operations are uninterrupted.
  - 2. Interruption of utility services. Indicate how long utility services will be interrupted.
  - 3. Coordination for shutoff, capping, and continuation of utility services.
  - 4. Use of elevator and stairs.
  - 5. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.
- E. Predemolition Photographs or Video: Show existing conditions of adjoining construction, including finish surfaces, that might be misconstrued as damage caused by demolition operations. Submit before Work begins.
- F. Warranties: Documentation indicating that existing warranties are still in effect after completion of selective demolition.

1.6 CLOSEOUT SUBMITTALS

- A. Inventory: Submit a list of items that have been removed and salvaged.

1.7 FIELD CONDITIONS

- A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.
- B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
- C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

- D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
  - 1. Hazardous materials will be removed by Owner before start of the Work.
  - 2. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.
- E. Storage or sale of removed items or materials on-site is not permitted.
- F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
  - 1. Maintain fire-protection facilities in service during selective demolition operations.

1.8 COORDINATION

- A. Arrange selective demolition schedule so as not to interfere with Owner's operations.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Standards: Comply with ASSE A10.6 and NFPA 241.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting selective demolition operations.
- B. Perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective building demolition operations.
  - 1. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.
- C. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs or video.

1. Inventory and record the condition of items to be removed and salvaged. Provide photographs or video of conditions that might be misconstrued as damage caused by salvage operations.
2. Before selective demolition or removal of existing building elements that will be reproduced or duplicated in final Work, make permanent record of measurements, materials, and construction details required to make exact reproduction.

### 3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.
- B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utility services and mechanical/electrical systems serving areas to be selectively demolished.
  1. Owner will arrange to shut off indicated services/systems when requested by Contractor.
  2. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
  3. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated on Drawings to be removed.
    - a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
    - b. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material and leave in place.
    - c. Equipment to Be Removed: Disconnect and cap services and remove equipment.
    - d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
    - e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
    - f. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
    - g. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material and leave in place.

### 3.3 PROTECTION

- A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
  1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.

2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
  3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
  4. Cover and protect furniture, furnishings, and equipment that have not been removed.
  5. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Section 015000 "Temporary Facilities and Controls."
- B. Temporary Shoring: Design, provide, and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
1. Strengthen or add new supports when required during progress of selective demolition.
- C. Remove temporary barricades and protections where hazards no longer exist.
- 3.4 SELECTIVE DEMOLITION, GENERAL
- A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
5. Maintain fire watch during and for at least 2 hours after flame-cutting operations.
6. Maintain adequate ventilation when using cutting torches.
7. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
8. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
9. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
10. Dispose of demolished items and materials promptly.

- B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
- C. Removed and Salvaged Items:
  - 1. Clean salvaged items.
  - 2. Pack or crate items after cleaning. Identify contents of containers.
  - 3. Store items in a secure area until delivery to Owner.
  - 4. Transport items to Owner's storage area designated by Owner.
  - 5. Protect items from damage during transport and storage.
- D. Removed and Reinstalled Items:
  - 1. Clean and repair items to functional condition adequate for intended reuse.
  - 2. Pack or crate items after cleaning and repairing. Identify contents of containers.
  - 3. Protect items from damage during transport and storage.
  - 4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.
- E. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and reinstalled in their original locations after selective demolition operations are complete.

### 3.5 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

- A. Concrete: Demolish in small sections. Using power-driven saw, cut concrete to a depth of at least 3/4 inch at junctures with construction to remain. Dislodge concrete from reinforcement at perimeter of areas being demolished, cut reinforcement, and then remove remainder of concrete. Neatly trim openings to dimensions indicated.
- B. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, and then remove masonry between saw cuts.
- C. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, and then break up and remove.
- D. Resilient Floor Coverings: Remove floor coverings and adhesive according to recommendations in RFCI's "Recommended Work Practices for the Removal of Resilient Floor Coverings."

### 3.6 DISPOSAL OF DEMOLISHED MATERIALS

- A. Remove demolition waste materials from Project site.
  - 1. Do not allow demolished materials to accumulate on-site.



2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
4. Comply with requirements specified in Section 017419 "Construction Waste Management and Disposal."

B. Burning: Do not burn demolished materials.

### 3.7 CLEANING

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION 024119



SECTION 079200 - JOINT SEALANTS

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 this Section.

1.2 SUMMARY

- A. Section Includes:
  - 1. Latex joint sealants.

1.3 ACTION SUBMITTALS

- A. Product Data: For each joint-sealant product.
- B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.
- C. Samples for Verification: For each kind and color of joint sealant required, provide Samples with joint sealants in 1/2-inch-wide joints formed between two 6-inch-long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.
- D. Joint-Sealant Schedule: Include the following information:
  - 1. Joint-sealant application, joint location, and designation.
  - 2. Joint-sealant manufacturer and product name.
  - 3. Joint-sealant formulation.
  - 4. Joint-sealant color.

1.4 INFORMATIONAL SUBMITTALS

- A. Sample Warranties: For special warranties.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

## 1.6 FIELD CONDITIONS

- A. Do not proceed with installation of joint sealants under the following conditions:
1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer.
  2. When joint substrates are wet.
  3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
  4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

## 1.7 WARRANTY

- A. Special Installer's Warranty: Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
1. Warranty Period: Two years from date of beneficial occupancy or final completion.
- B. Special Manufacturer's Warranty: Manufacturer agrees to furnish joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
1. Warranty Period: Five years from date of beneficial occupancy or final completion.
- C. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:
1. Movement of the structure caused by stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
  2. Disintegration of joint substrates from causes exceeding design specifications.
  3. Mechanical damage caused by individuals, tools, or other outside agents.
  4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

## PART 2 - PRODUCTS

### 2.1 JOINT SEALANTS, GENERAL

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.
- B. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

## 2.2 LATEX JOINT SEALANTS

- A. Acrylic Latex: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.

## 2.3 JOINT-SEALANT BACKING

- A. Sealant Backing Material, General: Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin), and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
- C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

## 2.4 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
  2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:
    - a. Concrete.
    - b. Unglazed surfaces of ceramic tile.
  3. Remove laitance and form-release agents from concrete.
  4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:
    - a. Metal.
    - b. Glass.
- B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

### 3.3 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

1. Do not leave gaps between ends of sealant backings.
  2. Do not stretch, twist, puncture, or tear sealant backings.
  3. Remove absorbent sealant backings that have become wet before sealant application, and replace them with dry materials.
- D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
1. Place sealants so they directly contact and fully wet joint substrates.
  2. Completely fill recesses in each joint configuration.
  3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
1. Remove excess sealant from surfaces adjacent to joints.
  2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
  3. Provide concave joint profile per Figure 8A in ASTM C 1193 unless otherwise indicated.
- 3.4 CLEANING
- A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.
- 3.5 PROTECTION
- A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out, remove, and repair damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.
- 3.6 JOINT-SEALANT SCHEDULE
- A. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces not subject to significant movement.

1. Joint Locations:
  - a. Perimeter joints between interior wall surfaces and frames of interior doors and windows.
  - b. Other joints as indicated on Drawings.
2. Joint Sealant: Acrylic latex.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

END OF SECTION 079200



SECTION 081113 - HOLLOW METAL DOORS AND FRAMES

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 this Section.

1.2 SUMMARY

- A. Section includes:

- 1. Interior standard steel doors and frames.

- B. Related Requirements:

- 1. Section 087100 "Door Hardware" for door hardware for hollow-metal doors.
- 2. Section 081416 "Flush Wood Doors"

1.3 DEFINITIONS

- A. Minimum Thickness: Minimum thickness of base metal without coatings according to NAAMM-HMMA 803 or ANSI/SDI A250.8.

1.4 COORDINATION

- A. Coordinate anchorage installation for hollow-metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.
- B. Coordinate requirements for installation of door hardware, electrified door hardware, and access control and security systems.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.

- 1. Include construction details, material descriptions, core descriptions, fire-resistance ratings, and finishes.

- B. Shop Drawings: Include the following:

1. Elevations of each door type.
2. Details of doors, including vertical- and horizontal-edge details and metal thicknesses.
3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
4. Locations of reinforcement and preparations for hardware.
5. Details of each different wall opening condition.
6. Details of electrical raceway and preparation for electrified hardware, access control systems, and security systems.
7. Details of anchorages, joints, field splices, and connections.
8. Details of accessories.
9. Details of moldings, removable stops, and glazing.

C. Samples for Verification:

1. Finishes: For each type of exposed finish required, prepared on Samples of not less than 3 by 5 inches.

D. Product Schedule: For hollow-metal doors and frames, prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final door hardware schedule.

#### 1.6 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For each type of fire-rated hollow-metal door and frame assembly for tests performed by a qualified testing agency indicating compliance with performance requirements.
- B. Oversize Construction Certification: For assemblies required to be fire-rated and exceeding limitations of labeled assemblies.
- C. Field quality control reports.

#### 1.7 CLOSEOUT SUBMITTALS

- A. Record Documents: For fire-rated doors, list of door numbers and applicable room name and number to which door accesses.

#### 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver hollow-metal doors and frames palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.
  1. Provide additional protection to prevent damage to factory-finished units.
- B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.

- C. Store hollow-metal doors and frames vertically under cover at Project site with head up. Place on minimum 4-inch-high wood blocking. Provide minimum 1/4-inch space between each stacked door to permit air circulation.

## PART 2 - PRODUCTS

### 2.1 INTERIOR STANDARD STEEL DOORS AND FRAMES

- A. Construct hollow-metal doors and frames to comply with standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.
- B. Heavy-Duty Doors and Frames: ANSI/SDI A250.8, Level 2; ANSI/SDI A250.4, Level B. At locations indicated in the Door and Frame Schedule.
  - 1. Frames:
    - a. Materials: Uncoated steel sheet, minimum thickness of 0.053 inch.
    - b. Sidelite Frames: Fabricated from same thickness material as adjacent door frame.
    - c. Construction: Knocked down.
  - 2. Exposed Finish: Prime.

### 2.2 FRAME ANCHORS

- A. Jamb Anchors:
  - 1. Type: Anchors of minimum size and type required by applicable door and frame standard, and suitable for performance level indicated.
  - 2. Quantity: Minimum of three anchors per jamb, with one additional anchor for frames with no floor anchor. Provide one additional anchor for each 24 inches of frame height above 7 feet.
  - 3. Postinstalled Expansion Anchor: Minimum 3/8-inch-diameter bolts with expansion shields or inserts, with manufacturer's standard pipe spacer.
- B. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor.
- C. Floor Anchors for Concrete Slabs with Underlayment: Adjustable-type anchors with extension clips, allowing not less than 2-inch height adjustment. Terminate bottom of frames at top of underlayment.
- D. Material: ASTM A879/A879M, Commercial Steel (CS), 04Z coating designation; mill phosphatized.
  - 1. For anchors built into exterior walls, steel sheet complying with ASTM A1008/A1008M or ASTM A1011/A1011M; hot-dip galvanized according to ASTM A153/A153M, Class B.

## 2.3 MATERIALS

- A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
- B. Cold-Rolled Steel Sheet: ASTM A1008/A1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- C. Hot-Rolled Steel Sheet: ASTM A1011/A1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.
- D. Metallic-Coated Steel Sheet: ASTM A653/A653M, Commercial Steel (CS), Type B.
- E. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A153/A153M.
- F. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow-metal frames of type indicated.
- G. Mineral-Fiber Insulation: ASTM C665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E136 for combustion characteristics.

## 2.4 FABRICATION

- A. Hollow-Metal Frames: Fabricate in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections, provide alignment plates or angles at each joint, fabricated of metal of same or greater thickness as frames.
  - 1. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
  - 2. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers as follows. Keep holes clear during construction.
    - a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
    - b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.
  - 3. Terminated Stops (Hospital Stops): Terminate stops 6 inches above finish floor with a 45-degree angle cut, and close open end of stop with steel sheet closure. Cover opening in extension of frame with welded-steel filler plate, with welds ground smooth and flush with frame.
- B. Hardware Preparation: Factory prepare hollow-metal doors and frames to receive templated mortised hardware, and electrical wiring; include cutouts, reinforcement, mortising, drilling, and tapping according to ANSI/SDI A250.6, the Door Hardware Schedule, and templates.

1. Reinforce doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.
2. Comply with BHMA A156.115 for preparing hollow-metal doors and frames for hardware.

## 2.5 STEEL FINISHES

- A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.
  1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with ANSI/SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces. Touch up factory-applied finishes where spreaders are removed.
- B. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

### 3.2 INSTALLATION

- A. Install hollow-metal doors and frames plumb, rigid, properly aligned, and securely fastened in place. Comply with approved Shop Drawings and with manufacturer's written instructions.
- B. Hollow-Metal Frames: Comply with ANSI/SDI A250.11.
  1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces without damage to completed Work.
    - a. Where frames are fabricated in sections, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces. Touch-up finishes.
    - b. Install frames with removable stops located on secure side of opening.
  2. Fire-Rated Openings: Install frames according to NFPA 80.
  3. Floor Anchors: Secure with postinstalled expansion anchors.
    - a. Floor anchors may be set with power-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.

4. Solidly pack mineral-fiber insulation inside frames.
5. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout or mortar.
6. In-Place Concrete or Masonry Construction: Secure frames in place with postinstalled expansion anchors.
7. Installation Tolerances: Adjust hollow-metal frames to the following tolerances:
  - a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
  - b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
  - c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
  - d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.

### 3.3 FIELD QUALITY CONTROL

- A. Inspection Agency: Owner will engage a qualified inspector to perform inspections and to furnish reports to Architect.
- B. Inspections:
  1. Fire-Rated Door Inspections: Inspect each fire-rated door according to NFPA 80, Section 5.2.
  2. Egress Door Inspections: Inspect each door equipped with panic hardware, each door equipped with fire exit hardware, each door located in an exit enclosure, each electrically controlled egress door, and each door equipped with special locking arrangements according to NFPA 101, Section 7.2.1.15.
- C. Repair or remove and replace installations where inspections indicate that they do not comply with specified requirements.
- D. Reinspect repaired or replaced installations to determine if replaced or repaired door assembly installations comply with specified requirements.
- E. Prepare and submit separate inspection report for each fire-rated door assembly indicating compliance with each item listed in NFPA 80 and NFPA 101.

### 3.4 REPAIR

- A. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.
- B. Metallic-Coated Surface Touchup: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.

- C. Factory-Finish Touchup: Clean abraded areas and repair with same material used for factory finish according to manufacturer's written instructions.
- D. Touchup Painting: Cleaning and touchup painting of abraded areas of paint are specified in painting Sections.

END OF SECTION 081113





## SECTION 081416 - FLUSH WOOD DOORS

## 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 this Section.

## 1.2 SUMMARY

- A. Section Includes:
  - 1. Solid-core doors with wood-veneer faces.
  - 2. Solid-core doors with MDO faces
  - 3. Factory finishing flush wood doors.
  - 4. Factory machining for hardware.

## 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of door. Include details of core and edge construction and trim for openings. Include factory-finishing specifications.
- B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; and the following:
  - 1. Dimensions and locations of blocking.
  - 2. Dimensions and locations of mortises and holes for hardware.
  - 3. Dimensions and locations of cutouts.
  - 4. Undercuts.
  - 5. Requirements for veneer matching.
  - 6. Doors to be factory finished and finish requirements.
- C. Samples for Verification:
  - 1. Corner sections of doors, approximately 8 by 10 inches (200 by 250 mm), with door faces and edges representing actual materials to be used.
    - a. Provide Samples for each species of veneer and solid lumber required.
    - b. Finish veneer-faced door Samples with same materials proposed for factory-finished doors.
  - 2. Frames for light openings, 6 inches (150 mm) long, for each material, type, and finish required.

1.4 INFORMATIONAL SUBMITTALS

- A. Sample Warranty: For special warranty.
- B. Quality Standard Compliance Certificates: AWI Quality Certification Program certificates.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of referenced standard and manufacturer's written instructions.
- B. Package doors individually in plastic bags or cardboard cartons.
- C. Mark each door on bottom rail with opening number used on Shop Drawings.

1.6 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during remainder of construction period.

1.7 WARRANTY

- A. A. Special Warranty: Manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Warping (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section.
    - b. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span.
  - 2. Warranty Period for Solid-Core Interior Doors: Life of installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain flush wood doors from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Wood Door and Frame Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction,

for fire-protection ratings [and temperature-rise limits indicated on Drawings, based on testing at positive pressure in accordance with UL 10C or NFPA 252.

### 2.3 FLUSH WOOD DOORS, GENERAL

- A. Quality Standard: In addition to requirements specified, comply with AWI's, AWMAC's, and WI's "Architectural Woodwork Standards."
  - 1. Provide AWI Quality Certification Labels indicating that doors comply with requirements of grades specified.
- B. Composite wood doors: Contain no added formaldehyde resins or comply with the California Air Resources Board (CARB) Airborne Toxic Control Measure (ATCM) for formaldehyde emissions for ultra-low-emitting formaldehyde (ULEF) resins or containing no added formaldehyde resins.
- C. WDMA I.S.1-A Performance Grade:
  - 1. Heavy Duty unless otherwise indicated.
- D. Structural-Composite-Lumber-Core Doors:
  - 1. Structural Composite Lumber: WDMA I.S.10.
    - a. Screw Withdrawal, Face: 700 lbf.
    - b. Screw Withdrawal, Edge: 400 lbf.

### 2.4 VENEER-FACED DOORS FOR TRANSPARENT FINISH

- A. Interior Solid-Core Doors:
  - 1. Grade: Premium, with Grade AA faces.
  - 2. Species: Select white birch.
  - 3. Cut: Rotary cut.
  - 4. Assembly of Veneer Leaves on Door Faces: Center-balance match.
  - 5. Exposed Vertical Edges: Same species as faces or a compatible species - edge Type A.
  - 6. Core: Glued wood stave at non fire-rated doors. As required for fire rating at rated doors.
  - 7. Construction: Five or seven plies. Stiles and rails are bonded to core, then entire unit is abrasive planed before veneering.

### 2.5 DOORS FOR OPAQUE FINISH

- A. Interior Solid-Core Doors:
  - 1. Grade: Premium.
  - 2. Faces: MDO.

- a. Apply MDO to standard-thickness, closed-grain, hardwood face veneers or directly to high-density hardboard crossbands.
3. Exposed Vertical Edges: Any closed-grain hardwood.
4. Core: Particleboard.
5. Construction: Three plies. Stiles and rails are bonded to core, then entire unit is abrasive planed before veneering. Faces are bonded to core using a hot press.

## 2.6 FABRICATION

- A. Factory fit doors to suit frame-opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.
  1. Comply with NFPA 80 requirements for fire-rated doors.
  2. Composite wood doors: Comply with California Air Resources Board (CARB) Airborne Toxic Control Measure (ATCM), Phase II for ultra-low-emitting formaldehyde (ULEF) resins or containing no added formaldehyde resins.
- B. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame Shop Drawings, BHMA-156.115-W, and hardware templates.
  1. Coordinate with hardware mortises in metal frames to verify dimensions and alignment before factory machining.
- C. Openings: Factory cut and trim openings through doors.
  1. Light Openings: Trim openings with moldings of material and profile indicated.
  2. Glazing: Factory install glazing in doors indicated to be factory finished. Comply with applicable requirements in Section 088000 "Glazing."

## 2.7 SHOP PRIMING

- A. Doors for Transparent Finish: Shop prime faces and all four edges with stain (if required), other required pretreatments, and first coat of finish as specified in Section 099300 "Staining and Transparent Finishing." Seal edges of cutouts and mortises with first coat of finish.
- B. Doors for Opaque Finish: Shop prime faces, all four edges, edges of cutouts, and mortises with one coat of wood primer specified in Section 099123 "Interior Painting."

## 2.8 FACTORY FINISHING

- A. General: Comply with referenced quality standard for factory finishing. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.

1. Finish faces, all four edges, edges of cutouts, and mortises. Stains and fillers may be omitted on bottom edges, edges of cutouts, and mortises.
- B. Factory finish doors.
- C. Transparent Finish:
  1. Grade: Premium.
  2. Finish: AWI's, AWMAC's, and WI's "Architectural Woodwork Standards" System 5, conversion varnish.
  3. Sheen: Satin.

**PART 3 - EXECUTION**

**3.1 EXAMINATION**

- A. Examine doors and installed door frames, with Installer present, before hanging doors.
  1. Verify that installed frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
  2. Reject doors with defects.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

**3.2 INSTALLATION**

- A. Hardware: For installation, see Section 087100 "Door Hardware."
- B. Installation Instructions: Install doors to comply with manufacturer's written instructions and referenced quality standard, and as indicated.
- C. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.
- D. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

**3.3 ADJUSTING**

- A. Operation: Rehang or replace doors that do not swing or operate freely.
- B. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if Work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION 081416



SECTION 087100 - DOOR HARDWARE

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Work under this section comprises furnishing and installing commercial door hardware needed for a complete and operational system for following:
  - a. Swinging doors.

B. Related Sections:

1. Section 081416 "Flush Wood Doors."
2. Section 081113 "Hollow Metal Doors and Frames."

1.2 REFERENCES

A. Publications listed herein are part of this specification to extent referenced.

B. American National Standards Institute:

1. ANSI A156 Series
2. ANSI A115W Wood Door Hardware Standards; Hardware Preparation
3. ANSI A115 Specifications for Steel Door and Frame Preparation for Hardware
4. ANSI A117.1 Accessible and Usable Buildings and Facilities
5. ANSI A250.6 Hardware on Steel Doors (Reinforcement - Applications)

C. ADA Standards for Accessible Design (ASAD), 2010.

D. Door and Hardware Institute:

1. DHI Publication - Abbreviations and Symbols
2. DHI Publication - Basic Architectural Hardware
3. DHI Publication - Hardware Reinforcements on Steel Doors and Frames
4. DHI Publication - Installation Guide for Doors and Hardware
5. DHI Publication - WDHS-1 Template Book Criteria for Wood Doors
6. DHI Publication - WDHS-3 Recommended Hardware Locations for Wood Flush Doors
7. DHI Publication - For Processing Hardware Schedules and Templates

E. National Fire Protection Association:

1. NFPA 101 Life Safety Code

F. Steel Door Institute:

1. SDI-109 Hardware for Standard Steel Doors and Frames
- G. Underwriters Laboratories, Inc.
  1. UL Building Materials Directory
- H. Virginia Uniform Statewide Building Code (VUSBC) 2012

**1.3 PRE-INSTALLATION CONFERENCE**

- (1) Keying Conference: conduct conference at project site. Conference participants shall include Installer's Architectural Hardware Consultant, Building Users, General Contractor, and RCC Project Manager.
- (2) Incorporate conference decisions into keying schedule after reviewing door hardware keying system including, but not limited to, the following:
  - a) Flow of traffic and degree of security required.
  - b) Preliminary key system schematic diagram.
  - c) Requirements for key control system.
  - d) Requirements for access control.
  - e) Address for delivery of keys.

**1.4 SUBMITTALS**

**A. Submittal Sequence:**

1. Submit final Door Hardware Schedule at earliest possible date, particularly where approval of Door Hardware Schedule must precede fabrication of other work that is critical in Project construction schedule.
2. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to coordinated review of Door Hardware Schedule.

**B. Product Data:**

1. Submit manufacturer's technical product fact sheets describing each item of hardware to be provided including material descriptions, dimensions of individual components and profiles, and finishes.

**C. Door Hardware Schedule:**

1. Submit door hardware schedule prepared by or under supervision of a DHI certified Architectural Hardware Consultant (AHC) or Certified Door Consultant (CDC) detailing fabrication and assembly of door hardware, as well as procedures and diagrams.



2. Coordinate Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
  3. Format:
    - a. Comply with scheduling sequence and vertical form as described in DHI's *Sequence and Format for the Hardware Schedule*.
    - b. Horizontal hardware schedules are not acceptable.
  4. Organization:
    - a. Organize door hardware schedule into hardware sets indicating complete designations of every item needed for each door or opening.
    - b. Organize door hardware sets in same order as in Door Hardware Schedule contained in Part 3 of this specification.
    - c. For doors of different sizes or where hinges, locks, or closers are different, a separate heading shall be used. No labeled openings shall be combined with non-labeled openings.
  5. Content:
    - a. Type, style, function, size, label, hand, and finish for each door hardware item
    - b. Name and manufacturer of each item
    - c. Fastenings and other pertinent information
    - d. Location of each door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule
    - e. Explanation of abbreviations, symbols, and codes contained in schedule
    - f. Mounting locations for door hardware
    - g. Door and frame sizes and materials
- D. Shop Drawings:
1. Provide a copy with each hardware schedule submitted.
- E. Quality Assurance Submittals:
1. Test Reports:
    - a. Provide product test reports based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, indicating current products comply with requirements.
  2. Manufacturer's Instructions:
    - a. Submit instructions for installation and maintenance of operating parts and finish.
    - b. Furnish templates and schedules needed for fabrication of hollow metal doors and frames, wood doors and frames, and other items related to hardware.
    - c. Submission for templates and template list shall follow procedures established by DHI publication *For Processing Hardware Schedules and Templates*.

## F. Closeout Submittals:

## 1. Operation and Maintenance:

- a. Provide operation and maintenance data for door hardware consisting of technical information as follows:

- 1) Maintenance instructions for each item of hardware
- 2) Catalog pages for each product
- 3) Parts list for each product
- 4) Copy of final hardware schedule
- 5) Copy of final keying schedule

- b. Include a copy of operational and maintenance descriptions in Operation and Maintenance Data Manual.

## 2. Warranties:

- a. Submit Special warranties specified in this Section.

## 3. Keying Schedule:

- a. Prepare and submit a keying schedule using keyset symbols referenced in DHI manual *Keying Systems and Nomenclature*. Include schematic keying diagram and index each key set to unique door designations.

- 1) Index keying schedule by door number, keyset, hardware heading number, cross keying instructions, and special key stamping instructions.

- b. Provide one complete bitting list of key cuts.
- c. Keying schedule shall be prepared by or under supervision of supplier, detailing Owner's final keying instructions for locks.
- d. Submit 4 copies of keying schedule.

4. Deliver keys to Owner by registered mail or overnight package service.

## 1.4 QUALITY ASSURANCE

## A. Qualifications:

## 1. Door Hardware Supplier:

- a. Door hardware supplier shall have warehousing facilities in Project's vicinity and shall employ a qualified Certified Architectural Hardware Consultant (AHC) available during course of Work to consult with Contractor, Architect, and Owner about door hardware and keying.

## 2. Architectural Hardware Consultant:

- a. Architectural Hardware Consultant shall be a person who is currently certified by Door and Hardware Institute as an Architectural Hardware Consultant (AHC) and who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project.

3. Installer:

- a. Door hardware shall be installed by an experienced installer who has completed door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

4. Single Source Responsibility:

- a. Obtain each type and variety of door hardware from a single manufacturer, unless otherwise indicated.

B. Regulatory Requirements:

- 1. Hardware and installation shall comply with provisions and standards listed.
- 2. Virginia Uniform Statewide Building Code (VUSBC) 2012.
- 3. Federal Accessibility Regulations:

- a. Americans with Disabilities Act - ADA
- b. ADA Standards for Accessible Design (ASAD), 2010.
- c. ANSI A117.1 Standard for Accessible and Usable Buildings and Facilities

4. National Fire Protection Association:

- a. NFPA 101 Life Safety Code

5. ANSI/BHMA Standards

- a. A115-W Series
- b. A115 Series
- c. A156 Series:

6. Door and Hardware Institute:

- a. Abbreviations and Symbols
- b. Basic Architectural Hardware
- c. Hardware Reinforcements on Steel Doors and Frames
- d. Installation Guide for Doors and Hardware
- e. WDHS-1 Template Book Criteria for Wood Doors
- f. WDHS-3 Recommended Hardware Locations for Wood Flush Doors

C. Coordination:

1. Templates:

- a. Obtain and distribute templates for doors, frames, and other work specified to be factory prepared for installing door hardware to parties involved.
- b. Check shop drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with specified requirements.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Packing, Shipping, Handling, and Unloading:

- 1. Inventory door hardware on receipt and provide secure lock-up for door hardware delivered to Site.
- 2. Tag each item or package separately with identification related to final Door Hardware Schedule, and include basic installation instructions with each item or package.

1.6 SPECIAL WARRANTY

A. Provide written warranty, executed by manufacturer agreeing to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period. Failures include but are not limited to following:

- 1. Structural failures including excessive deflection, cracking, or breakage
- 2. Faulty operation of operators and door hardware
- 3. Deterioration of metals, metal finishes, and other materials beyond normal weathering

B. Warranty period shall be for not less than 3 years from Date of Substantial Completion unless otherwise indicated.

- 1. Locks: 3 years
- 2. Manual Closers: 10 years

C. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of Contract Documents.

PART 2 PRODUCTS

2.1 MATERIALS

A. General Requirements:

- 1. Hardware shall be of best grade, entirely free of imperfections in manufacture and finish, and shall satisfactorily perform various functions needed.

2. Furnish necessary screws, bolts or others fastenings of suitable size and type to anchor hardware in position and match hardware as to material and finish. Provide Phillips flat-head screws except as otherwise indicated.
3. Do not use through-bolts for installations where bolt head or nut opposite face is exposed in other work. Use of sex bolts shall not be allowed.
4. Drawings show direction of slide, swing or hand of each door leaf. Furnish each item of hardware for proper installation and operation of door movement as indicated. Items of hardware not definitely specified, but needed for satisfactory installation of hardware shall be provided. Such items shall be of type and quality suitable for service needed and comparable to adjacent hardware.
5. Finishes shall comply with ANSI A156.18/ BHMA 1301. Finish designations cross references shall be as follows:

BHMAC Code	Description	Nearest US Equiv.	BHMA Category	Basis Metal
630	Stainless Steel, satin	US32D	A	Steel
652	Satin chromium plated	US26D	E	Steel
689	Aluminum painted	US28	E	Any

## 2.2 HINGES

### A. Butt Hinges: ANSI/ BHMA A156.1

1. Provide full mortise, template, 5-knuckle, button tip hinges with non-rising loose pins and ball type bearings.
2. Out-swinging exterior doors shall be furnished with solid bronze or stainless steel, hinges with non-removable pins or security studs.
3. Interior doors shall be furnished with ball bearing non-removable pin hinges.
4. Hinges shall be furnished in following quantities:
  - a. Doors up to 90 inches in height: 3 hinges.
  - b. Doors over 90 inches in height: Add 1 hinge for every additional 30 inches.
5. Furnish hinge sizes not less than as follows:
  - a. For 1 ¾ inches Thick Doors: Standard weight
    - 1) Doors up to 3 feet-0 inches wide: 4 1/2 x 4 1/2 x 0.134 gauge
6. Furnish hinges of sufficient throw where needed to clear trim or permit doors to swing 180 degrees.
7. Finishes:
  - a. Interior Doors: BHMA #652 (US26D)
8. Acceptable Manufacturers:

	Steel
a. Bommer:	BB5000
b. Stanley:	FBB179
c. H. B. Ives:	5BB1

## 2.3 LOCKSETS AND LATCHSETS

### A. General Requirements:

1. Shape of lever shall be easy to grasp with one hand and not require tight grasping, tight pinching or twisting of wrist.
2. Locksets and latchsets shall not require more than 15 lbft to release latch. Locks shall not require use of a key, tool or special knowledge for operation.
3. Provide manufacturer's standard wrought box strike for each latchset and lockset with curved lip extended to protect frame without catching clothing. Finish shall match hardware set.
4. Locks and cylinders shall be provided with manufacturer's standard 6-pin tumbler which complies with ANSI A156.5, unless otherwise indicated. Lock cylinder parts shall be made from brass/bronze, stainless steel, or nickel silver.

### B. Cylindrical Locksets and latchsets: Standard duty

1. Provide cylindrical locksets and latchsets that comply with ANSI A156.2, Series 4000, Grade 2 Functions as listed in Hardware Sets.
2. Certifications: UL listed for A label and lesser class single doors up to 4ft x 8ft.
3. Chassis: cylindrical design, corrosion-resistant plated cold-rolled steel, through-bolted.
4. Latch Retractors: forged steel. Balance of inner parts: corrosion-resistant plated steel or stainless steel.
5. Backset: 2 ¾ inch or as needed to accommodate frame, door, or other hardware.
6. Lever Trim: accessible design, independent operation, spring-cage supported, and minimum 2 inch clearance from lever mid-point to face of door.
7. Finish: BHMA #626 (US 26D).
8. Acceptable Manufacturers:
  - a. Schlage: AL Series with Saturn lever design
  - b. Falcon: B series with Dane lever design
  - c. Best: 7K with 15D lever design.

### C. Lock Cylinders: Tumbler type, constructed from brass or bronze, stainless steel, or nickel silver.

### D. Standard Lock Cylinders: BHMA A156.5; Grade 1 permanent cores; face finished to match lockset.

1. Core Type: Removable.
2. Compatible with and able to accommodate the Owner's permanent cylinders. Verify with Owner.
3. Acceptable Manufacturers:

- a. Locks, Cylinders and Keys: Schlage – Everest Open patented full size cylinders.
  - b. Locks, Cylinders and Keys: Schlage – Falcon conventional cylinders.
  - c. Locks, Cylinders and Keys: Schlage – Best SFIC cylinders.
- E. Construction Cores: Provide construction cores that are replaceable by permanent cores. Provide 10 construction master keys.

## 2.4 DOOR CLOSERS

### A. General Requirements:

1. Closers shall be sealed and filled with all-weather fluid. Provide stable hydraulic fluid to withstand a temperature range of 120 degrees F to minus 30 degrees F.
2. Size closers in compliance with requirements for accessibility for handicapped and recommendations of manufacturer. Provide barrier free and delayed action features as needed. Comply with following maximum opening-force requirements:
  - a. Interior Hinged Doors: 5.0 lbs.
  - b. Exterior Hinged Doors: 8.5 lbs.
  - c. Fire Doors: Minimum opening force allowable by authorities having jurisdiction

### B. Surface Closers: ANSI/ BHMA A156.4, Grade 1

1. Surface mounted closers shall be full rack-and-pinion type with cast iron body. Double heat-treated shaft, full complement bearings, single piece forged piston, chrome silicon steel spring, non-critical screw valves; back check, sweep and latch.
2. Furnish closers complete with rectangular, non-ferrous covers, necessary brackets and fasteners for top of door surface mounted units.
3. Closer products with any type of pressure relief valve system shall not be acceptable.
4. Closers shall be ISO 9000 certified. Units shall be stamped with date of manufacturer code.
5. Closers shall be non-sized, field adjustable from size 1 to 6.
6. Furnish non-sized closers with 1 ½ inches diameter piston.
7. Do not through-bolt if there has been special blocking specified in wood door specification.
8. Locate closers on interior side of exterior doors and on non-public side of interior doors, unless otherwise specified.
9. Provide extra-duty arms (EDA) at doors scheduled with parallel arm applications.
10. Provide plates, brackets and special templates when needed for interface with particular header door and wall conditions and adjacent hardware.
11. Closers shall be tested to 100 hours of salt spray test in compliance with ASTM B117; furnish data on request.
12. Closer finish shall be powder coated for better corrosion resistance. Painted finishes will not be accepted.
13. Acceptable Manufacturers:
  - a. LCN: 4010/4110 Series.

- b. Sargent: 281 series w/o PRV.
- c. Falcon SC70 series.

## 2.5 AUXILIARY HARDWARE

### A. Silencers: ANSI/ BHMA A156.16

- 1. Furnish tamper proof resilient cushions designed to absorb shock and noise at openings without gaskets.
- 2. Provide 3 silencers per single door, and 2 sets for pairs of doors.
- 3. Acceptable Manufacturers:
  - a. Ives: SR64
  - b. Rockwood: 608
  - c. Trimco: 1229A

### B. Wall Bumpers: 2 ½ inches diameter; 1 inch nominal projection

- 1. Finish: BHMA #626 (US26D)
- 2. Acceptable Manufacturers:
  - a. Ives: WS407CVX
  - b. Rockwood: 407
  - c. Trimco: 1270WX

### C. Stainless steel kickplates: 8" high by 34' wide, both sides.

- 1. Finish: BHMA #626 (US26D)
- 2. Match existing.

## PART 3 EXECUTION

### 3.1 EXAMINATION

#### A. Site Verification of Conditions:

- 1. Examine doors and frames with Installer present for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.
- 2. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.
- 3. Proceed with installation only after unsatisfactory conditions have been corrected.
- 4. Commencement of installation constitutes acceptance of conditions and responsibility for satisfactory performance.



### 3.2 PREPARATION

#### A. Surface Preparation:

1. Steel Doors and Frames: Comply with DHI A115 Series
  - a. Surface-Applied Door Hardware: Drill and tap doors and frames in compliance with SDI 109
2. Wood Doors: Comply with DHI A115-W Series.

### 3.3 INSTALLATION

#### A. General Requirements:

1. Install each door hardware item to comply with manufacturers' written instructions using manufacturers' supplied fasteners.
2. Securely install finish hardware items in compliance with accepted schedule and templates furnished with hardware.
3. Install mortised items flush with adjacent surfaces.
4. Install locksets, surface mounted closers, and trim after finishing of doors and frames is complete.
  - a. Where cutting and fitting is needed to install door hardware onto or into surfaces that are to be painted or finished in another way later, coordinate removal, storage, and reinstallation of door hardware with finishing work.
5. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
6. Drill and countersink units not factory-prepared for anchorage fasteners. Space fasteners and anchors in compliance with industry standards.

#### B. Mounting Heights:

1. Mount door hardware units at heights indicated in following applicable publications, unless otherwise specifically indicated or required to comply with governing regulations:
  - a. Steel Doors and Frames: ANSI A250.6
    - 1) DHI Publication Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames
    - 2) DHI Publication Recommended Locations for Builders' Hardware for Custom Steel Doors and Frames

#### C. Door Stops:

1. Door stops shall be furnished for every door leaf. Install floor-mounted or wall-mounted stops, as scheduled. Overhead door holder shall be provided where floor or wall stops cannot be used.
2. Place door stops in such a position that they permit maximum door swing, but do not present a hazard or obstruction. Furnish floor strikes for floor holders of proper height to engage holders of doors.
3. Floor stops shall be installed with risers as needed to accommodate finish flooring materials for proper relationship to door.

**3.4 ADJUSTING**

**A. Initial Adjustment:**

1. Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.
2. Adjust door closer sweep so that from an open position of 70 degrees, door will take at least 3 seconds to move to a point 3 inches from latch measured to leading edge of door.

**B. Final Adjustment:**

1. Return to Project during week prior to Substantial Completion and make final check and adjustment of hardware items.
2. Adjust hardware so doors operate in perfect order. Test and adjust hardware for quiet, smooth operation, free of sticking, binding, or rattling. Adjust closers for proper, smooth operation.
3. Adjust door control devices to compensate for final operation of HVAC equipment.

**3.5 CLEANING**

- A. Exposed hardware shall be carefully cleaned by methods not injurious to finish, immediately preceding occupancy. Replace defective, damaged, or missing hardware.
- B. Clean adjacent surfaces soiled by hardware installation.
- C. Clean operating items as needed to restore proper function and finish.

**3.6 PROTECTION**

- A. Provide final protection and maintain conditions that ensure door hardware shall be without damage or deterioration at time of Substantial Completion.
- B. Protect door hardware items from abuse, corrosion and other damage until Owner accepts Project as complete.

## 3.7 DOOR HARDWARE SCHEDULE

## A. General Requirements:

1. To define requirements for materials, size, and design specific products manufactured by certain manufacturers are indicated in door hardware sets.
  - a. Door hardware sets provide quantity, item, size, finish or color indicated and named manufacturer's product.

**Hardware Group No. HW1, For use on door #(s): 102A, 109A, 111A, 300A, 301A**

Provide each SGL door(s) with the following:

Qty		Description	Notes	Finish
3	EA	HINGE		652
1	EA	ENTRANCE/OFFICE LOCK		626
1	EA	WALL STOP		630
3	EA	SILENCER		GRY
1	EA	CYLINDER		626
2	EA	KICKPLATE (DOORS 300A AND 301A ONLY)		626

**Hardware Group No. 02, For use on door #(s): 108A**

Provide each SGL door(s) with the following:

Qty		Description	Notes	Finish
3	EA	HINGE		652
1	EA	STORAGE LOCK		626
1	EA	CLOSER		689
3	EA	SILENCER		GRY
1	EA	CYLINDER		626
1	EA	WALL STOP		630

END OF SECTION 087100



SECTION 088000 - GLAZING

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 this Section.

1.2 SUMMARY

- A. Section includes:
  - 1. Glass for doors.
  - 2. Glazing sealants and accessories.

1.3 DEFINITIONS

- A. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.
- B. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C 1036.
- C. IBC: International Building Code.
- D. Interspace: Space between lines of an insulating-glass unit.

1.4 COORDINATION

- A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Glass Samples: For each type of glass product other than clear monolithic vision glass; 12 inches square.
- C. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.

## 1.6 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For glass.
- B. Product Test Reports: For tinted glass insulating glass and glazing sealants, for tests performed by a qualified testing agency.
  - 1. For glazing sealants, provide test reports based on testing current sealant formulations within previous 36-month period.
- C. Preconstruction adhesion and compatibility test report.
- D. Sample Warranties: For special warranties.

## 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Protect glazing materials according to manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

## 1.8 FIELD CONDITIONS

- A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.
  - 1. Do not install glazing sealants when ambient and substrate temperature conditions are outside limits permitted by sealant manufacturer or are below 40 deg F.

## 1.9 WARRANTY

- A. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer agrees to replace coated-glass units that deteriorate within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.
  - 1. Warranty Period: 10 years from date of Substantial Completion.
- B. Manufacturer's Special Warranty for Laminated Glass: Manufacturer agrees to replace laminated-glass units that deteriorate within specified warranty period. Deterioration of laminated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.

1. Warranty Period: Five years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Source Limitations for Glass: Obtain from single source from single manufacturer for each glass type.
- B. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer for each product and installation method.

### 2.2 PERFORMANCE REQUIREMENTS

- A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.
- B. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.
- C. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:
  1. For monolithic-glass lites, properties are based on units with lites 6 mm thick.
  2. For laminated-glass lites, properties are based on products of construction indicated.

### 2.3 GLASS PRODUCTS, GENERAL

- A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below unless more stringent requirements are indicated. See these publications for glazing terms not otherwise defined in this Section or in referenced standards.
  1. GANA Publications: "Laminated Glazing Reference Manual" and "Glazing Manual."
- B. Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.
- C. Thickness: Where glass thickness is indicated, it is a minimum.

## 2.4 GLASS PRODUCTS

- A. Clear Annealed Float Glass: ASTM C 1036, Type I, Class 1 (clear), Quality-Q3.
- B. Tinted Annealed Float Glass: ASTM C 1036, Type I, Class 2 (tinted), Quality-Q3.
- C. Fully Tempered Float Glass: ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.
  - 1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.
- D. Heat-Strengthened Float Glass: ASTM C 1048, Kind HS (heat strengthened), Type I, Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.
  - 1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.

## 2.5 GLAZING SEALANTS

- A. General:
  - 1. Compatibility: Compatible with one another and with other materials they contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
  - 2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
  - 3. For interior wet-applied sealants and sealants primers: Documentation indicating compliance with California Department of Public Health (CDPH) Standard Method v1.1–2010.
  - 4. Interior wet-applied sealants and sealant primers: Comply with low-emitting requirements in Division 01 Section "Sustainable Design Requirements - LEED."
  - 5. Colors of Exposed Glazing Sealants: As indicated by manufacturer's designations.
- B. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 100/50, Use NT.

## 2.6 GLAZING TAPES

- A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C 1281 and AAMA 800 for products indicated below:



1. AAMA 804.3 tape, where indicated.
  2. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
  3. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.
- B. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; and complying with AAMA 800 for the following types:
1. AAMA 810.1, Type 1, for glazing applications in which tape acts as the primary sealant.
  2. AAMA 810.1, Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

## 2.7 MISCELLANEOUS GLAZING MATERIALS

- A. General: Provide products of material, size, and shape complying with referenced glazing standard, with requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.
- B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
- C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.
- D. Spacers: Elastomeric blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.
- E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).
- F. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

## 2.8 FABRICATION OF GLAZING UNITS

- A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.
1. Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.
    - a. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

- B. Grind smooth and polish exposed glass edges and corners.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:
  - 1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
  - 2. Presence and functioning of weep systems.
  - 3. Minimum required face and edge clearances.
  - 4. Effective sealing between joints of glass-framing members.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 PREPARATION

- A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.
- B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that leave visible marks in the completed Work.

#### 3.3 GLAZING, GENERAL

- A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.
- B. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass includes glass with edge damage or other imperfections that, when installed, could weaken glass, impair performance, or impair appearance.
- C. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.
- D. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
- E. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

- F. Provide spacers for glass lites where length plus width is larger than 50 inches.
  - 1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
  - 2. Provide 1/8-inch minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.
- G. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.
- H. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.
- I. Set glass lites with proper orientation so that coatings face exterior or interior as specified.
- J. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.
- K. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

### 3.4 TAPE GLAZING

- A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.
- B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.
- C. Cover vertical framing joints by applying tapes to heads and sills first, then to jambs. Cover horizontal framing joints by applying tapes to jambs, then to heads and sills.
- D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.
- E. Do not remove release paper from tape until right before each glazing unit is installed.
- F. Apply heel bead of elastomeric sealant.
- G. Center glass lites in openings on setting blocks, and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.

- H. Apply cap bead of elastomeric sealant over exposed edge of tape.

### 3.5 GASKET GLAZING (DRY)

- A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.
- B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.
- C. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- D. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- E. Install gaskets so they protrude past face of glazing stops.

### 3.6 SEALANT GLAZING (WET)

- A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.
- B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.
- C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

### 3.7 CLEANING AND PROTECTION

- A. Immediately after installation remove nonpermanent labels and clean surfaces.
- B. Protect glass from contact with contaminating substances resulting from construction operations. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains.

1. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer. Remove and replace glass that cannot be cleaned without damage to coatings.

C. Remove and replace glass that is damaged during construction period.

D. Wash glass on both exposed surfaces not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

### 3.8 MONOLITHIC GLASS SCHEDULE

A. Glass Type : Clear fully tempered float glass.

1. Minimum Thickness: 6 mm.
2. Safety glazing required where indicated.

END OF SECTION 088000



SECTION 092216 - NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
  - 1. Non-load-bearing steel framing systems for interior partitions.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.4 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For each type of code-compliance certification for studs and tracks.
- B. Evaluation Reports: For post-installed anchors and power-actuated fasteners, from ICC-ES or other qualified testing agency acceptable to authorities having jurisdiction.

1.5 QUALITY ASSURANCE

- A. Code-Compliance Certification of Studs and Tracks: Provide documentation that framing members are certified according to the product-certification program of the Certified Steel Stud Association, the Steel Framing Industry Association, or the Steel Stud Manufacturers Association.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated on Drawings, according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

## 2.2 FRAMING SYSTEMS

- A. Framing Members, General: Comply with ASTM C 754 for conditions indicated.
  - 1. Steel Sheet Components: Comply with ASTM C 645 requirements for metal unless otherwise indicated.
  - 2. Protective Coating: ASTM A 653/A 653M, G40, hot-dip galvanized unless otherwise indicated.
  
- B. Studs and Tracks: ASTM C 645.
  - 1. Steel Studs and Tracks:
    - a. Minimum Base-Metal Thickness: As indicated on Drawings.
    - b. Depth: As indicated on Drawings.
  
  - 2. Embossed Steel Studs and Tracks: Roll-formed and embossed with surface deformations to stiffen the framing members so that they are structurally equivalent to conventional ASTM C 645 steel studs and tracks.
    - a. Minimum Base-Metal Thickness: As indicated on Drawings.
    - b. Depth: As indicated on Drawings.
  
- C. Slip-Type Head Joints: 0.0269 base metal thickness. Where indicated, provide one of the following:
  - 1. Clip System: Clips designed for use in head-of-wall deflection conditions that provide a positive attachment of studs to tracks while allowing 1-1/2-inch minimum vertical movement.
  - 2. Single Long-Leg Track System: ASTM C 645 top track with 2 1/2-inch-deep flanges in thickness not less than indicated for studs, installed with studs friction fit into top track and with continuous bridging located within 12 inches of the top of studs and fastened to every stud to provide lateral bracing.
  - 3. Deflection Track: Steel sheet top track manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.
  
- D. Cold-Rolled Channel Bridging: Steel, 0.0538-inch minimum base-metal thickness, with minimum 1/2-inch-wide flanges.
  - 1. Depth: 1-1/2 inches.
  - 2. Clip Angle: Not less than 1-1/2 by 1-1/2 inches, 0.068-inch-thick, galvanized steel.
  
- E. Hat-Shaped, Rigid Furring Channels: ASTM C 645.
  - 1. Minimum Base-Metal Thickness: As indicated on Drawings.
  - 2. Depth: As indicated on Drawings.



- F. Cold-Rolled Furring Channels: 0.053-inch uncoated-steel thickness, with minimum 1/2-inch-wide flanges.
  - 1. Depth: As indicated on Drawings.
  - 2. Furring Brackets: Adjustable, corrugated-edge-type steel sheet with minimum uncoated-steel thickness of 0.0329 inch.
  - 3. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch-diameter wire, or double strand of 0.048-inch-diameter wire.

### 2.3 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards.
  - 1. Fasteners for Steel Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.
- B. Isolation Strip at Exterior Walls: Provide the following:
  - 1. Asphalt-Saturated Organic Felt: ASTM D 226/D 226M, Type I (No. 15 asphalt felt), nonperforated.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION, GENERAL

- A. Installation Standard: ASTM C 754.
  - 1. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.
- B. Install framing and accessories plumb, square, and true to line, with connections securely fastened.
- C. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.
- D. Install bracing at terminations in assemblies.

- E. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

### 3.3 INSTALLING FRAMED ASSEMBLIES

- A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
- B. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.
- C. Install studs so flanges within framing system point in same direction.
- D. Install tracks at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts that penetrate partitions above ceiling.
  - 1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
  - 2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install track section (for cripple studs) at head and secure to jamb studs.
    - a. Install two studs at each jamb unless otherwise indicated.
    - b. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch clearance from jamb stud to allow for installation of control joint in finished assembly.
    - c. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.
  - 3. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
- E. Direct Furring:
  - 1. Screw to wood framing.
  - 2. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches o.c.
- F. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch from the plane formed by faces of adjacent framing.

END OF SECTION 092216

SECTION 092900 - GYPSUM BOARD

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Interior gypsum board.
- 2. Sound Attenuation blankets.

- B. Related Requirements:

- 1. Section 092216 "Non-Structural Metal Framing" for non-structural steel framing and suspension systems that support gypsum board panels.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.5 FIELD CONDITIONS

- A. Environmental Limitations: Comply with ASTM C840 requirements or gypsum board manufacturer's written instructions, whichever are more stringent.
- B. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned.
- C. Do not install panels that are wet, moisture damaged, and mold damaged.
  - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.

2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

## PART 2 - PRODUCTS

### 2.1 GYPSUM BOARD, GENERAL

- A. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

### 2.2 INTERIOR GYPSUM BOARD

- A. Gypsum Board, Type X: ASTM C1396/C1396M.

1. Thickness: 5/8 inch
2. Long Edges: Tapered

### 2.3 TRIM ACCESSORIES

- A. Interior Trim: ASTM C1047.

1. Material: Galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized-steel sheet.
2. Shapes:
  - a. Cornerbead.
  - b. LC-Bead: J-shaped; exposed long flange receives joint compound.

### 2.4 JOINT TREATMENT MATERIALS

- A. General: Comply with ASTM C475/C475M.

- B. Joint Tape:

1. Interior Gypsum Board: Paper.

- C. Joint Compound for Interior Gypsum Board: For each coat, use formulation that is compatible with other compounds applied on previous or for successive coats.

1. Prefilling: At open joints, rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.
2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use drying-type, all-purpose compound.

- a. Use setting-type compound for installing paper-faced metal trim accessories.

3. Fill Coat: For second coat, use drying-type, all-purpose compound.
4. Finish Coat: For third coat, use drying-type, all-purpose compound.
5. Skim Coat: for skim coating existing walls use same products and procedures as for new interior gypsum board.

## 2.5 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written instructions.
- B. Steel Drill Screws: ASTM C1002 unless otherwise indicated.
  1. Use screws complying with ASTM C954 for fastening panels to steel members from 0.033 to 0.112 inch thick.
- C. Sound-Attenuation Blankets: ASTM C665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.
- D. Acoustical Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E90.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine areas and substrates including welded hollow-metal frames and support framing, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.
- B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 APPLYING AND FINISHING PANELS, GENERAL

- A. Comply with ASTM C840.
- B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.

- C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.
- D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.
- E. Form control and expansion joints with space between edges of adjoining gypsum panels.
- F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
  - 1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft in area.
  - 2. Fit gypsum panels around ducts, pipes, and conduits.
  - 3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch-wide joints to install sealant.
- G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments. Provide 1/4- to 1/2-inch-wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
- I. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

### 3.3 APPLYING INTERIOR GYPSUM BOARD

- A. Install interior gypsum board in the following locations:
  - 1. Wallboard Type: As indicated on Drawings. Vertical surfaces unless otherwise indicated].
  - 2. Type X: As indicated on Drawings
- B. Single-Layer Application:
  - 1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated.
  - 2. On partitions/walls, apply gypsum panels horizontally (perpendicular to framing) unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
    - a. Stagger abutting end joints not less than one framing member in alternate courses of panels.

3. On Z-shaped furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
4. Fastening Methods: Apply gypsum panels to supports with steel drill screws.

### 3.4 INSTALLING TRIM ACCESSORIES

- A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
- B. Control Joints: Install control joints according to ASTM C840 and in specific locations approved by Architect for visual effect.
- C. Interior Trim: Install in the following locations:
  1. Cornerbead: Use at outside corners unless otherwise indicated.
  2. LC-Bead: Use at exposed panel edges.

### 3.5 FINISHING GYPSUM BOARD

- A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.
- B. Prefill open joints, rounded or beveled edges, and damaged surface areas.
- C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.
- D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C840:
  1. Level 4: At panel surfaces that will be exposed to view unless otherwise indicated.
    - a. Primer and its application to surfaces are specified in Section 099123 "Interior Painting."
    - b. Skimcoat Application, see section 2.4.C.5.

### 3.6 PROTECTION

- A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.
- B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.

- C. Remove and replace panels that are wet, moisture damaged, and mold damaged.
  - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
  - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 092900



SECTION 095113 - ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes:
  - 1. Suspended metal grid ceiling system.
  - 2. Acoustical units.

1.3 DEFINITIONS

- A. AC: Articulation Class.
- B. CAC: Ceiling Attenuation Class.
- C. LR: Light Reflectance coefficient.
- D. NRC: Noise Reduction Coefficient.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for Initial Selection: For components with factory-applied color finishes.
- C. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of size indicated below.
  - 1. Acoustical Panel: Set of 6-inch square Samples of each type, color, pattern, and texture.
  - 2. Exposed Suspension System Members, Moldings, and Trim: Set of 6-inchlong Samples of each type, finish, and color.
- D. Maintenance Data: For finishes to include in maintenance manuals.

1.5 QUALITY ASSURANCE

- A. Source Limitations:

1. Acoustical Ceiling Panel: Obtain each type through one source from a single manufacturer.
2. Suspension System: Obtain each type through one source from a single manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver acoustical panels, suspension system components, and accessories to Project site in original, unopened packages and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.
- B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.
- C. Handle acoustical panels carefully to avoid chipping edges or damaging units in any way.

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

1.8 COORDINATION

- A. Coordinate layout and installation of acoustical panels and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

1.9 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  1. Acoustical Ceiling Panels: Full-size panels equal to 2 percent of quantity installed, but not less than 2 unopened cartons.
  2. Suspension System Components: Quantity of each exposed component equal to 2 percent of quantity installed.
  3. Hold-Down Clips: Equal to 2 percent of quantity installed.

## PART 2 - PRODUCTS

## 2.1 ACOUSTICAL PANELS, GENERAL

- A. Acoustical Panel Standard: Provide manufacturer's standard panels of configuration indicated that comply with ASTM E 1264 classifications as designated by types, patterns, acoustical ratings, and light reflectances, unless otherwise indicated.
- B. Acoustical Panel Colors and Patterns: Match appearance characteristics indicated for each product type.
  - 1. Where appearance characteristics of acoustical panels are indicated by referencing pattern designations in ASTM E 1264 and not manufacturers' proprietary product designations, provide products selected by Architect from each manufacturer's full range that comply with requirements indicated for type, pattern, color, light reflectance, acoustical performance, edge detail, and size.

## 2.2 ACOUSTICAL PANELS FOR ACOUSTICAL PANEL CEILING

- A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. Armstrong World Industries, Inc.
  - 2. BPB USA
  - 3. Chicago Metallic Corporation
  - 4. Ecophon CertainTeed, Inc.
  - 5. USG Interiors, Inc.
- B. Classification: Provide Fire Class A panels complying with ASTM E 1264 for type, form, and pattern as follows:
  - 1. Type and Form: Type III, Form, wet formed mineral fiber with factory applied latex paint.
  - 2. Pattern: Fine Textured.
- C. Color: White.
- D. LR: Not less than 0.90.
- E. NRC: Not less than 0.75.
- F. CAC: Not less than 35.
- G. Edge/Joint Detail: Match existing.
- H. Thickness: 3/4 inch.

- I. Modular Size: 24 by 48 inches.

## 2.3 METAL SUSPENSION SYSTEMS, GENERAL

- A. Metal Suspension System Standard: Provide manufacturer's standard direct-hung metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable requirements in ASTM C 635.
- B. Finishes and Colors, General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes. Provide manufacturer's standard factory-applied finish for type of system indicated.
- C. Attachment Devices: Size for five times the design load indicated in ASTM C 635, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.
- D. Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:
  - 1. Zinc-Coated, Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
  - 2. Stainless-Steel Wire: ASTM A 580/A 580M, Type 304, nonmagnetic.
  - 3. Nickel-Copper-Alloy Wire: ASTM B 164, nickel-copper-alloy UNS No. N04400.
  - 4. Size: Select wire diameter so its stress at 3 times hanger design load (ASTM C 635, Table 1, "Direct Hung") will be less than yield stress of wire.
- E. Hanger Rods; Mild steel, zinc coated or protected with rust-inhibitive paint.
- F. Angle Hangers: Angles with legs not less than 7/8 inchwide; formed with 0.04-inchthick, galvanized steel sheet complying with ASTM A 653/A 653M, G90coating designation; with bolted connections and 5/16-inch-diameter bolts.
- G. Hold-Down Clips: Where indicated, provide manufacturer's standard hold-down clips spaced 24 inches o.c. on all cross tees.

## 2.4 METAL SUSPENSION SYSTEM FOR ACOUSTICAL PANEL CEILING

- A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. Armstrong World Industries, Inc.
  - 2. BPB USA
  - 3. Chicago Metallic Corporation
  - 4. Ecophon CertainTeed, Inc
  - 5. USG Interiors, Inc.
- B. Wide-Face, Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet, prepainted, electrolytically zinc coated, or hot-dip galvanized according to ASTM A 653/A 653M, not less than G30 coating designation, with prefinished 15/16-inch wide metal caps on flanges.

1. Structural Classification: Heavy-duty system.
2. End Condition of Cross Runners: Override (stepped)
3. Face Design: Match Existing.
4. Cap Material: Steel or aluminum cold-rolled sheet.
5. Cap Finish: White.

## 2.5 METAL EDGE MOLDINGS AND TRIM

- A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
- B. Products: Subject to compliance with requirements, provide one of the following:
  1. Armstrong World Industries, Inc.
  2. Chicago Metallic Corporation
  3. Fry Reglet Corporation
  4. Gordon, Inc.
  5. USG Interiors, Inc.
- C. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that comply with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension system runners.
  1. Provide manufacturer's standard edge moldings that fit acoustical panel edge details and suspension systems indicated and that match width and configuration of exposed runners, unless otherwise indicated.
  2. For lay-in panels with reveal edge details, provide stepped edge molding that forms reveal of same depth and width as that formed between edge of panel and flange at exposed suspension member.
  3. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.
  1. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders and comply with layout shown on reflected ceiling plans.

### 3.3 INSTALLATION

- A. General: Install acoustical panel ceilings to comply with ASTM C 636 and seismic design requirements indicated, per manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."
- B. Suspend ceiling hangers from building's structural members and as follows:
  - 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
  - 2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, counters playing, or other equally effective means.
  - 3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
  - 4. Secure wire hangers to ceiling suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
  - 5. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for both structure to which hangers are attached and type of hanger involved. Install hangers in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.
  - 6. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, post-installed mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
  - 7. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
  - 8. Do not attach hangers to steel deck tabs.
  - 9. Do not attach hangers to steel roof deck. Attach hangers to structural members.
  - 10. Space hangers not more than 48 inches o.c. along each member supported directly from hangers, unless otherwise indicated; provide hangers not more than 8 inches from ends of each member.
  - 11. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.
- C. Secure bracing wires to ceiling suspension members and to supports with a minimum of four tight turns. Suspend bracing from building's structural members as required for hangers,

without attaching to permanent metal forms, steel deck, or steel deck tabs. Fasten bracing wires into concrete with cast-in-place or post installed anchors.

- D. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
  - 1. Screw attach moldings to substrate at intervals not more than 16 inches o.c. and not more than 3 inches from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet Miter corners accurately and connect securely.
  - 2. Do not use exposed fasteners, including pop rivets, on moldings and trim.
- E. Install suspension system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
- F. Install acoustical panels with undamaged edges and fit accurately into suspension system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit.
  - 1. Arrange directionally patterned acoustical panels as follows:
    - a. As indicated on reflected ceiling plans.
    - b. Install panels with pattern running in one direction parallel to long axis of space.
  - 2. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension system runners and moldings.
  - 3. For reveal-edged panels on suspension system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.
  - 4. For reveal-edged panels on suspension system members with box-shaped flanges, install panels with reveal surfaces in firm contact with suspension system surfaces and panel faces flush with bottom face of runners.
  - 5. Paint cut edges of panel remaining exposed after installation; match color of exposed panel surfaces using coating recommended in writing for this purpose by acoustical panel manufacturer.
  - 6. Install hold-down clips in areas indicated, in areas required by authorities having jurisdiction, and for fire-resistance ratings; space as recommended by panel manufacturer's written instructions, unless otherwise indicated.

### 3.4 CLEANING

- A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 095113





SECTION 096513 - RESILIENT BASE AND ACCESSORIES

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 this Section.

1.2 SUMMARY

- A. Section Includes:
  - 1. Vinyl base.
  - 2. Vinyl molding accessories.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples for Initial Selection: For each type of product indicated.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg for more than 90 deg F.

1.5 FIELD CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg for more than 95 deg F, in spaces to receive resilient products during the following periods:
  - 1. 48 hours before installation.
  - 2. During installation.
  - 3. 48 hours after installation.
- B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F
- C. Install resilient products after other finishing operations, including painting, have been completed.

**PART 2 - PRODUCTS**

**2.1 VINYL BASE**

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. Armstrong world Industries, Inc.
  - 2. Burke Mercer Flooring Products.
  - 3. Flexco, Inc.
  - 4. Johnsonite.
  - 5. Roppe Corporation.
  - 6. VPI, LLC.
- B. Product Standard: ASTM F1861, Type TV (vinyl, thermoplastic).
  - 1. Group: I (solid, homogeneous).
  - 2. Style and Location:
    - a. Style B, Cove.
- C. Minimum Thickness: 0.125 inch
- D. Height: 4 inches
- E. Lengths: Coils in manufacturer's standard length.
- F. Outside Corners: Job formed or preformed.
- G. Inside Corners: Job formed or preformed.
- H. Colors and Patterns: As selected by Architect from full range of industry colors.

**2.2 VINYL MOLDING ACCESSORY**

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. Armstrong world Industries, Inc.
  - 2. Burke Mercer Flooring Products.
  - 3. Flexco, Inc.
  - 4. Johnsonite.
  - 5. Roppe Corporation.
  - 6. VPI, LLC.
- B. Description: Vinyl transition strips.
- C. Profile and Dimensions: As indicated.

- D. Locations: In areas indicated on drawings.
- E. Colors and Patterns: As selected by Architect from full range of industry colors.

**2.3 INSTALLATION MATERIALS**

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based or blended hydraulic-cement-based formulation provided or approved by resilient-product manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by resilient-product manufacturer for resilient products and substrate conditions indicated.

**PART 3 - EXECUTION**

**3.1 EXAMINATION**

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
  - 1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
  - 1. Installation of resilient products indicates acceptance of surfaces and conditions.

**3.2 PREPARATION**

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.
- B. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
- C. Do not install resilient products until materials are the same temperature as space where they are to be installed.
  - 1. At least 48 hours in advance of installation, move resilient products and installation materials into spaces where they will be installed.
- D. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient products.

### 3.3 RESILIENT BASE INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient base.
- B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
- C. Install resilient base in lengths as long as practical without gaps at seams and with tops of adjacent pieces aligned.
- D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- E. Do not stretch resilient base during installation.
- F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.
- G. Preformed Corners: Install preformed corners before installing straight pieces.
- H. Job-Formed Corners:
  - 1. Outside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches in length.
    - a. Form without producing discoloration (whitening) at bends.
  - 2. Inside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches in length.
    - a. Miter or cope corners to minimize open joints.

### 3.4 RESILIENT ACCESSORY INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient accessories.
- B. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of floor covering that would otherwise be exposed.

### 3.5 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting resilient products.
- B. Perform the following operations immediately after completing resilient-product installation:
  - 1. Remove adhesive and other blemishes from surfaces.
  - 2. Sweep and vacuum horizontal surfaces thoroughly.

3. Damp-mop horizontal surfaces to remove marks and soil.
- C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- D. Cover resilient products subject to wear and foot traffic until Substantial Completion.

END OF SECTION 096513



SECTION 096519 - RESILIENT TILE FLOORING

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 this Section.

1.2 SUMMARY

- A. Section Includes:
  - 1. Vinyl composition floor tile.
- B. Related Sections:
  - 1. Division 09 Section "Resilient Base and Accessories" for resilient base and other accessories installed with resilient tile flooring.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples for Initial Selection: For each type of floor tile indicated.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Floor Tile: Furnish one box for every 50 boxes or fraction thereof, of each type, color, and pattern of floor tile installed.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store floor tile and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F. Store floor tiles on flat surfaces.

1.7 FIELD CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive floor tile during the following periods:
  - 1. 48 hours before installation.
  - 2. During installation.
  - 3. 48 hours after installation.
- B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg For more than 95 deg F.
- C. Close spaces to traffic during floor tile installation.
- D. Close spaces to traffic for 48 hours after floor tile installation.
- E. Install floor tile after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: For resilient floor tile, as determined by testing identical products according to ASTM E648 or NFPA 253 by a qualified testing agency.
  - 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

2.2 VINYL COMPOSITION FLOOR TILE

- A. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. Armstrong World Industries, Inc.
  - 2. Congoleum Corporation.
  - 3. Mannington Mills, Inc.
  - 4. Tarkett, Inc.
- B. Tile Standard: ASTM F1066, Class 2, through pattern.
- C. Wearing Surface: Smooth.
- D. Thickness: 0.125 inch
- E. Size: 12 by 12 inches



- F. Colors and Patterns: Marbleized, As selected by Architect from by manufacturer's full range of colors.

**2.3 INSTALLATION MATERIALS**

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based or blended hydraulic-cement-based formulation provided or approved by floor tile manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by floor tile and adhesive manufacturers to suit floor tile and substrate conditions indicated.
- C. Floor Polish: Provide protective, liquid floor-polish products recommended by floor tile manufacturer.

**PART 3 - EXECUTION**

**3.1 EXAMINATION**

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
  - 1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of floor tile.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

**3.2 PREPARATION**

- A. Prepare substrates according to floor tile manufacturer's written instructions to ensure adhesion of resilient products.
- B. Concrete Substrates: Prepare according to ASTM F710.
  - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
  - 2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by floor tile manufacturer. Do not use solvents.
  - 3. Alkalinity and Adhesion Testing: Perform tests recommended by floor tile manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing.
  - 4. Moisture Testing: Perform tests so that each test area does not exceed 200 sq. ft. and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.

- a. Anhydrous Calcium Chloride Test: ASTM F1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb. of water/1000 sq. ft. in 24 hours.
  - b. Relative Humidity Test: Using in-situ probes, ASTM F2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
- C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
- D. Do not install floor tiles until materials are the same temperature as space where they are to be installed.
1. At least 48 hours in advance of installation, move resilient floor tile and installation materials into spaces where they will be installed.
- E. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient floor tile.

### 3.3 FLOOR TILE INSTALLATION

- A. Comply with manufacturer's written instructions for installing floor tile.
- B. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.
1. Lay tiles square with room axis.
- C. Match floor tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.
1. Lay tiles with grain direction alternating in adjacent tiles (basket-weave pattern) in pattern of colors and sizes indicated.
- D. Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.
- E. Extend floor tiles into toe spaces, door reveals, closets, and similar openings. Extend floor tiles to center of door openings.
- F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent marking device.
- G. Install floor tiles on covers for telephone and electrical ducts, building expansion-joint covers, and similar items in installation areas. Maintain overall continuity of color and pattern

between pieces of tile installed on covers and adjoining tiles. Tightly adhere tile edges to substrates that abut covers and to cover perimeters.

- H. Adhere floor tiles to substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

**3.4 CLEANING AND PROTECTION**

- A. Comply with manufacturer's written instructions for cleaning and protecting floor tile.
- B. Perform the following operations immediately after completing floor tile installation:
  - 1. Remove adhesive and other blemishes from surfaces.
  - 2. Sweep and vacuum surfaces thoroughly.
  - 3. Damp-mop surfaces to remove marks and soil.
- C. Protect floor tile from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- D. Floor Polish: Remove soil, adhesive, and blemishes from floor tile surfaces before applying liquid floor polish.
  - 1. Apply number of coats recommended by resilient tile manufacturer.
- E. Cover floor tile until Substantial Completion.

END OF SECTION 096519



SECTION 096813 - TILE CARPETING

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 this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Modular carpet tile.

- B. Related Requirements:

- 1. Section 024119 "Selective Demolition" for removing existing floor coverings.
- 2. Section 096513 "Resilient Base and Accessories" Section 096519 "Resilient Tile Flooring" for resilient wall base and accessories installed with carpet tile.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

- 1. Include manufacturer's written data on physical characteristics, durability, and fade resistance.
- 2. Include manufacturer's written installation recommendations for each type of substrate.

- B. Samples: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.

- 1. Carpet Tile: Full-size Sample.
- 2. Exposed Edge, Transition, and Other Accessory Stripping: 12-inch-long Samples.

1.4 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For carpet tile, for tests performed by a qualified testing agency.

- B. Sample Warranty: For special warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For carpet tiles to include in maintenance manuals. Include the following:
  - 1. Methods for maintaining carpet tile, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.
  - 2. Precautions for cleaning materials and methods that could be detrimental to carpet tile.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Carpet Tile: Full-size units equal to 5 percent of amount installed for each type indicated, but not less than 10 sq. yd.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who is certified by the International Certified Floorcovering Installers Association at the Commercial II certification level.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Comply with the Carpet and Rug Institute's CRI 104.

1.9 FIELD CONDITIONS

- A. Comply with the Carpet and Rug Institute's CRI 104 for temperature, humidity, and ventilation limitations.
- B. Environmental Limitations: Do not deliver or install carpet tiles until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at levels planned for building occupants during the remainder of the construction period.
- C. Do not install carpet tiles over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by carpet tile manufacturer.
- D. Where demountable partitions or other items are indicated for installation on top of carpet tiles, install carpet tiles before installing these items.

## 1.10 WARRANTY

- A. Special Warranty for Carpet Tiles: Manufacturer agrees to repair or replace components of carpet tile installation that fail in materials or workmanship within specified warranty period.
  - 1. Warranty does not include deterioration or failure of carpet tile due to unusual traffic, failure of substrate, vandalism, or abuse.
  - 2. Failures include, but are not limited to, the following:
    - a. More than 10 percent edge raveling, snags, and runs.
    - b. Dimensional instability.
    - c. Excess static discharge.
    - d. Loss of tuft-bind strength.
    - e. Loss of face fiber.
    - f. Delamination.
  - 3. Warranty Period: 10 years from date of beneficial occupancy or final completion.

## PART 2 - PRODUCTS

## 2.1 CARPET TILE

- A. Products: Subject to compliance with requirements, provide one of the following or approved equal:
  - 1. Shaw Contract: Memory Tile (Style #5T263)
  - 2. Patcraft: Charcoal (Style # 10574)
  - 3. Interface: Aerial AE312 (Style # 138910)
- B. Color: As selected by Architect from manufacturer's full range.
- C. Pattern: Multi Level Pattern Loop.
- D. Applied Treatments:
  - 1. Soil-Resistance Treatment: Manufacturer's standard treatment.
  - 2. Antimicrobial Treatment: Manufacturer's standard treatment that passes AATCC 174.
- E. Fiber content: 100% Nylon.
- F. Tufted weight: 16 oz/sq. yd. minimum.
- G. Average Density: 5,760 oz/ cu. yd. minimum.
- H. Pile Thickness: 0.074 in. minimum for finished carpet according to ASTM D6859.
- I. Stitches: 9 per inch minimum.

- J. Gauge: 1/12 inch minimum.
- K. Primary Backing: Synthetic.
- L. Secondary Backing: Manufacturer's standard material.
- M. Size: 24" x 24" or 20" x 20".
- N. Performance characteristics:
  - 1. Pill Test: Pass.
  - 2. Radiant Panel: Class 1.
  - 3. NBS Smoke: Less than 450 according to ASTM E662.
  - 4. Electrostatic Propensity: Less than 3.5 kv.
  - 5. ADA Compliance: >0.6, meets the recommended static coefficient of friction for ADA walking surfaces and accessible routes.

## 2.2 INSTALLATION ACCESSORIES

- A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet tile manufacturer.
- B. Adhesives: Water-resistant, mildew-resistant, nonstaining, pressure-sensitive type to suit products and subfloor conditions indicated, that comply with flammability requirements for installed carpet tile, and are recommended by carpet tile manufacturer for releasable installation.
- C. Edge /Transition Strips: as specified in 096513.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet tile performance.
- B. Examine carpet tile for type, color, pattern, and potential defects.
- C. Concrete Slabs: Verify that finishes comply with requirements specified in Section 033000 "Cast-in-Place Concrete" and that surfaces are free of cracks, ridges, depressions, scale, and foreign deposits.
  - 1. Moisture Testing: Perform tests so that each test area does not exceed 200 sq. ft., and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.



- a. Anhydrous Calcium Chloride Test: ASTM F1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.
  - b. Relative Humidity Test: Using in situ probes, ASTM F2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
  - c. Perform additional moisture tests recommended in writing by adhesive and carpet tile manufacturers. Proceed with installation only after substrates pass testing.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. General: Comply with the Carpet and Rug Institute's CRI 104 and with carpet tile manufacturer's written installation instructions for preparing substrates indicated to receive carpet tile.
- B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch wide or wider, and protrusions more than 1/32 inch unless more stringent requirements are required by manufacturer's written instructions.
- C. Concrete Substrates: Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by adhesive and carpet tile manufacturers.
- D. Broom and vacuum clean substrates to be covered immediately before installing carpet tile.

### 3.3 INSTALLATION

- A. General: Comply with the Carpet and Rug Institute's CRI 104, Section 10, "Carpet Tile," and with carpet tile manufacturer's written installation instructions.
- B. Installation Method: Quarter Turn.
- C. Maintain dye-lot integrity. Do not mix dye lots in same area.
- D. Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet tile manufacturer.
- E. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.

- F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on carpet tile as marked on subfloor. Use nonpermanent, nonstaining marking device.
- G. Install pattern parallel to walls and borders.
- H. Access Flooring: Stagger joints of carpet tiles so carpet tile grid is offset from access flooring panel grid. Do not fill seams of access flooring panels with carpet adhesive; keep seams free of adhesive.

**3.4 CLEANING AND PROTECTION**

- A. Perform the following operations immediately after installing carpet tile:
  - 1. Remove excess adhesive and other surface blemishes using cleaner recommended by carpet tile manufacturer.
  - 2. Remove yarns that protrude from carpet tile surface.
  - 3. Vacuum carpet tile using commercial machine with face-beater element.
- B. Protect installed carpet tile to comply with the Carpet and Rug Institute's CRI 104, Section 13.7.
- C. Protect carpet tile against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet tile manufacturer.

END OF SECTION 096813

SECTION 099123 - INTERIOR PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes surface preparation and the application of paint systems on interior substrates.
  - 1. Concrete masonry units (CMUs).
  - 2. Steel and iron.
  - 3. Wood.
  - 4. Gypsum board.

1.3 DEFINITIONS

- A. MPI Gloss Level 1: Not more than five units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.
- B. MPI Gloss Level 2: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
- C. MPI Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
- D. MPI Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.
- E. MPI Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.
- F. MPI Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.
- G. MPI Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.

1. Include Printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.
  2. Indicate VOC content.
- B. Samples for Initial Selection: For each type of topcoat product.
- C. Samples for Verification: For each type of paint system and in each color and gloss of topcoat.
1. Submit Samples on rigid backing, 8 inches square.
  2. Apply coats on Samples in steps to show each coat required for system.
  3. Label each coat of each Sample.
  4. Label each Sample for location and application area.
- D. Product List: Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules. Include color designations.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
1. Paint: 5 percent, but not less than 1 gal. of each material and color applied.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
1. Maintain containers in clean condition, free of foreign materials and residue.
  2. Remove rags and waste from storage areas daily.

1.7 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.
- B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 PAINT, GENERAL

- A. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products Lists."

- B. Material Compatibility:
  - 1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
  - 2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.
- C. Colors: As selected by Architect from manufacturer's full range.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
  - 1. Masonry (Clay and CMUs): 12 percent.
  - 2. Wood: 15 percent.
  - 3. Gypsum Board: 12 percent.
- C. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.
- D. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.
- E. Proceed with coating application only after unsatisfactory conditions have been corrected.
  - 1. Application of coating indicates acceptance of surfaces and conditions.

#### 3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.
- B. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.
- C. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
  - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

- D. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants. Remove loose or scaling paint.
  - 1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
- E. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceeds that permitted in manufacturer's written instructions.
- F. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.
- G. Wood Substrates:
  - 1. Scrape and clean knots, and apply coat of knot sealer before applying primer.
  - 2. Sand surfaces that will be exposed to view, and dust off.
  - 3. Prime edges, ends, faces, undersides, and backsides of wood.
  - 4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.

### 3.3 APPLICATION

- A. Apply paints according to manufacturer's written instructions and to recommendations in "MPI Manual."
  - 1. Use applicators and techniques suited for paint and substrate indicated.
  - 2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
  - 3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
  - 4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
  - 5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
- B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.
- C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

- E. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:
  - 1. Paint the following work where exposed or concealed:
    - a. Sprinkler piping (color to match existing red).
  - 2. Paint the following work where exposed in occupied spaces:
    - a. Metal conduit.
    - b. Plastic conduit.
    - c. Sprinkler piping (color to match existing red).

### 3.4 FIELD QUALITY CONTROL

- A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.
  - 1. Contractor shall touch up and restore painted surfaces damaged by testing.
  - 2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

### 3.5 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

### 3.6 INTERIOR PAINTING SCHEDULE

- A. CMU Substrates:
  - 1. Institutional Low-Odor/VOC Latex System MPI INT 4.2E:
    - a. Block Filler: Block filler, latex, interior, MPI #4.
    - b. Intermediate Coat: Latex institutional low odor/VOC, interior, matching topcoat.

- c. Topcoat: Latex, interior, institutional low odor/VOC, semi-gloss (MPI Gloss Level 5), MPI #147.
  
- B. Steel Substrates:
  - 1. Institutional Low-Odor/VOC Latex System MPI INT 5.1S:
    - a. Prime Coat: Primer, rust inhibitive, water based MPI #107.
    - b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.
    - c. Topcoat: Latex, interior, institutional low odor/VOC, semi-gloss (MPI Gloss Level 5), MPI #147.
  
- C. Gypsum Board Substrates:
  - 1. Institutional Low-Odor/VOC Latex System MPI INT 9.2M:
    - a. Prime Coat: Primer sealer, interior, institutional low odor/VOC, MPI #149.
    - b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.
    - c. Topcoat: Latex, interior, institutional low odor/VOC. MPI gloss level 5.
  
- D. Wood Substrates: Wood doors.
  - 1. Latex over Latex Primer System MPI INT 6.3T:
    - a. Prime Coat: Primer, latex, for interior wood, MPI #39.
    - b. Intermediate Coat: Latex, interior, matching topcoat.
    - c. Topcoat: Latex, interior, semi-gloss (MPI Gloss Level 5) MPI #54.

END OF SECTION 099123



SECTION 260519 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

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 this Section.

1.2 SUMMARY

- A. Section Includes:
  - 1. Copper building wire rated 600 V or less.
  - 2. Metal-clad cable, Type MC, rated 600 V or less.
  - 3. Connectors, splices, and terminations rated 600 V and less.

1.3 DEFINITIONS

- A. RoHS: Restriction of Hazardous Substances.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.5 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.

PART 2 - PRODUCTS

2.1 COPPER BUILDING WIRE

- A. Description: Flexible, insulated and uninsulated, drawn copper current-carrying conductor with an overall insulation layer or jacket, or both, rated 600 V or less.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Cerro Wire LLC.
  - 2. Encore Wire Corporation.
  - 3. General Cable Technologies Corporation.

4. Southwire Company.

C. Standards:

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
2. RoHS compliant.
3. Conductor and Cable Marking: Comply with wire and cable marking according to UL's "Wire and Cable Marking and Application Guide."

D. Conductors: Copper, complying with ASTM B 3 for bare annealed copper and with ASTM B 8 for stranded conductors.

E. Conductor Insulation:

1. Type THHN and Type THWN-2: Comply with UL 83.
2. Type XHHW-2: Comply with UL 44.

## 2.2 METAL-CLAD CABLE, TYPE MC

A. Description: A factory assembly of one or more current-carrying insulated conductors in an overall metallic sheath.

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Encore Wire Corporation.
2. General Cable Technologies Corporation.
3. Southwire Company.

C. Standards:

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
2. Comply with UL 1569.
3. RoHS compliant.
4. Conductor and Cable Marking: Comply with wire and cable marking according to UL's "Wire and Cable Marking and Application Guide."

D. Circuits:

1. Only one circuit is allowed in each mc cable assembly.

E. Conductors: Copper, complying with ASTM B 3 for bare annealed copper and with ASTM B 8 for stranded conductors.

F. Ground Conductor: Insulated.

G. Conductor Insulation:

1. Type TFN/THHN/THWN-2: Comply with UL 83.

H. Armor: Aluminum, interlocked.

### 2.3 CONNECTORS AND SPLICES

A. Description: Factory-fabricated connectors, splices, and lugs of size, ampacity rating, material, type, and class for application and service indicated; listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. AFC Cable Systems; a part of Atkore International.
2. Gardner Bender.
3. Hubbell Power Systems, Inc.
4. NSi Industries LLC.
5. O-Z/Gedney; a brand of Emerson Industrial Automation.
6. Thomas & Betts Corporation; A Member of the ABB Group.

C. Lugs: One piece, seamless, designed to terminate conductors specified in this Section.

1. Material: Copper.
2. Termination: Compression.

## PART 3 - EXECUTION

### 3.1 CONDUCTOR MATERIAL APPLICATIONS

A. Branch Circuits: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

### 3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

A. Exposed Branch Circuits, Including in Crawlspace: Type THHN/THWN-2, single conductors in raceway or Metal-clad cable, Type MC.

B. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN/THWN-2, single conductors in raceway or Metal-clad cable, Type MC.

### 3.3 INSTALLATION OF CONDUCTORS AND CABLES

A. Conceal cables in finished walls, ceilings, and floors unless otherwise indicated.

- B. When running into a panel where the ceiling spaces are inaccessible, conduit (3/4" minimum) shall be run from the panel to a junction box in the nearest accessible ceiling.
- C. Complete raceway installation between conductor and cable termination points according to Section 260533 "Raceways and Boxes for Electrical Systems" prior to pulling conductors and cables.
- D. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
- E. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.
- F. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.
- G. Support cables according to Section 260529 "Hangers and Supports for Electrical Systems."

### 3.4 CONNECTIONS

- A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.
- B. Make splices, terminations, and taps that are compatible with conductor material.
- C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches of slack.

### 3.5 IDENTIFICATION

- A. Identify and color-code conductors and cables according to Section 260553 "Identification for Electrical Systems."
- B. Identify each spare conductor at each end with identity number and location of other end of conductor, and identify as spare conductor.

### 3.6 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
  - 1. Perform each of the following visual and electrical tests:
    - a. Inspect exposed sections of conductor and cable for physical damage and correct connection according to the single-line diagram.
    - b. Test bolted connections for high resistance using one of the following:

- 1) A low-resistance ohm meter.
  - 2) Calibrated torque wrench.
  - 3) Thermographic survey.
- c. Inspect compression-applied connectors for correct cable match and indentation.
  - d. Inspect for correct identification.
  - e. Inspect cable jacket and condition.
  - f. Continuity test on each conductor and cable.
  - g. Uniform resistance of parallel conductors.
- B. Cables will be considered defective if they do not pass tests and inspections.
- C. Prepare test and inspection reports to record the following:
1. Procedures used.
  2. Results that comply with requirements.
  3. Results that do not comply with requirements, and corrective action taken to achieve compliance with requirements.

END OF SECTION 260519



SECTION 260526 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

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 this Section.

1.2 SUMMARY

- A. Section includes grounding and bonding systems and equipment.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with UL 467 for grounding and bonding materials and equipment.

2.2 CONDUCTORS

- A. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.
- B. Bare Copper Conductors:
  - 1. Solid Conductors: ASTM B 3.
  - 2. Stranded Conductors: ASTM B 8.
  - 3. Tinned Conductors: ASTM B 33.
  - 4. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch in diameter.
  - 5. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.
  - 6. Bonding Jumper: Copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.
  - 7. Tinned Bonding Jumper: Tinned-copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.

## 2.3 CONNECTORS

- A. Listed and labeled by an NRTL acceptable to authorities having jurisdiction for applications in which used and for specific types, sizes, and combinations of conductors and other items connected.
- B. Beam Clamps: Mechanical type, terminal, ground wire access from four directions, with dual, tin-plated or silicon bronze bolts.
- C. Bus-Bar Connectors: Mechanical type, cast silicon bronze, solderless compression-type wire terminals, and long-barrel, two-bolt connection to ground bus bar.
- D. Cable-to-Cable Connectors: Compression type, copper or copper alloy.
- E. Conduit Hubs: Mechanical type, terminal with threaded hub.
- F. U-Bolt Clamps: Mechanical type, copper or copper alloy, terminal listed for direct burial.

## PART 3 - EXECUTION

### 3.1 APPLICATIONS

- A. Conductors: Install solid conductor for No. 10 AWG and smaller, and stranded conductors for No. 8 AWG and larger unless otherwise indicated.
- B. Conductor Terminations and Connections:
  - 1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.

### 3.2 EQUIPMENT GROUNDING

- A. Install insulated equipment grounding conductors with all feeders and branch circuits.
- B. Install insulated equipment grounding conductors with the following items, in addition to those required by NFPA 70:
  - 1. Feeders and branch circuits.
  - 2. Lighting circuits.
  - 3. Receptacle circuits.
  - 4. Single-phase motor and appliance branch circuits.
  - 5. Flexible raceway runs.



### 3.3 INSTALLATION

- A. Grounding Conductors: Route along shortest and straightest paths possible unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.
- B. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance except where routed through short lengths of conduit.
  - 1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
  - 2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install bonding so vibration is not transmitted to rigidly mounted equipment.
  - 3. Use exothermic-welded connectors for outdoor locations; if a disconnect-type connection is required, use a bolted clamp.
- C. Bonding Interior Metal Ducts: Bond metal air ducts to equipment grounding conductors of associated fans, blowers, electric heaters, and air cleaners. Install bonding jumper to bond across flexible duct connections to achieve continuity.

### 3.4 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Tests and Inspections:
  - 1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
  - 2. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with a calibrated torque wrench according to manufacturer's written instructions.
- C. Grounding system will be considered defective if it does not pass tests and inspections.

END OF SECTION 260526



## SECTION 260529 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

## 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 this Section.

## 1.2 SUMMARY

- A. Section Includes:
  - 1. Steel slotted support systems.
  - 2. Aluminum slotted support systems.
  - 3. Conduit and cable support devices.
  - 4. Mounting, anchoring, and attachment components, including powder-actuated fasteners, mechanical expansion anchors, concrete inserts, clamps, through bolts, toggle bolts, and hanger rods.

## 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for the following:
    - a. Slotted support systems, hardware, and accessories.
    - b. Clamps.
    - c. Hangers.
    - d. Sockets.
    - e. Eye nuts.
    - f. Fasteners.
    - g. Anchors.
  - 2. Include rated capacities and furnished specialties and accessories.

## PART 2 - PRODUCTS

## 2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

- A. Steel Slotted Support Systems: Preformed steel channels and angles with minimum 13/32-inch-diameter holes at a maximum of 8 inches o.c. in at least one surface.

1. Standard: Comply with MFMA-4 factory-fabricated components for field assembly.
  2. Material for Channel, Fittings, and Accessories: Plain steel.
  3. Channel Width: Selected for applicable load criteria.
  4. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
- B. Aluminum Slotted Support Systems: Extruded-aluminum channels and angles with minimum 13/32-inch-diameter holes at a maximum of 8 inches o.c. in at least one surface.
1. Standard: Comply with MFMA-4 factory-fabricated components for field assembly.
  2. Channel Material: 6063-T5 aluminum alloy.
  3. Fittings and Accessories Material: 5052-H32 aluminum alloy.
  4. Channel Width: Selected for applicable load criteria.
- C. Conduit and Cable Support Devices: Steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.
- D. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:
1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
  2. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel, for use in hardened portland cement concrete, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
  3. Concrete Inserts: Steel or malleable-iron, slotted support system units are similar to MSS Type 18 units and comply with MFMA-4 or MSS SP-58.
  4. Clamps for Attachment to Steel Structural Elements: MSS SP-58 units are suitable for attached structural element.
  5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
  6. Toggle Bolts: All-steel springhead type.
  7. Hanger Rods: Threaded steel.

## PART 3 - EXECUTION

### 3.1 APPLICATION

- A. Comply with the following standards for application and installation requirements of hangers and supports, except where requirements on Drawings or in this Section are stricter:
1. NECA 1.
  2. NECA 101
  3. NECA 102.
- B. Comply with requirements for raceways and boxes specified in Section 260533 "Raceways and Boxes for Electrical Systems."

- C. Maximum Support Spacing and Minimum Hanger Rod Size for Raceways: Space supports for EMT, IMC, and RMC as required by NFPA 70. Minimum rod size shall be 1/4 inch in diameter.
- D. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.
  - 1. Secure raceways and cables to these supports with single-bolt conduit clamps using spring friction action for retention in support channel.
- E. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch and smaller raceways serving branch circuits and communication systems above suspended ceilings, and for fastening raceways to trapeze supports.

### 3.2 SUPPORT INSTALLATION

- A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this article.
- B. Raceway Support Methods: In addition to methods described in NECA 1, EMT IMC and RMC may be supported by openings through structure members, according to NFPA 70.
- C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.
- D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:
  - 1. To Wood: Fasten with lag screws or through bolts.
  - 2. To New Concrete: Bolt to concrete inserts.
  - 3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
  - 4. To Existing Concrete: Expansion anchor fasteners.
  - 5. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inches thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches thick.
  - 6. To Steel: Beam clamps (MSS SP-58, Type 19, 21, 23, 25, or 27), complying with MSS SP-69.
  - 7. To Light Steel: Sheet metal screws.
  - 8. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate.

- E. Drill holes for expansion anchors in concrete at locations and to depths that avoid the need for reinforcing bars.

END OF SECTION 260529

SECTION 260533 - RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

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 this Section.

1.2 SUMMARY

- A. Section Includes:
  - 1. Metal conduits and fittings.
  - 2. Metal wireways and auxiliary gutters.
  - 3. Boxes, enclosures, and cabinets.

1.3 DEFINITIONS

- A. GRC: Galvanized rigid steel conduit.
- B. IMC: Intermediate metal conduit.

PART 2 - PRODUCTS

2.1 METAL CONDUITS AND FITTINGS

- A. Metal Conduit:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Allied Tube & Conduit; a part of Atkore International.
    - b. O-Z/Gedney; a brand of Emerson Industrial Automation.
    - c. Western Tube and Conduit Corporation.
    - d. Wheatland Tube Company.
  - 2. Listing and Labeling: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
  - 3. GRC: Comply with ANSI C80.1 and UL 6.
  - 4. IMC: Comply with ANSI C80.6 and UL 1242.
  - 5. EMT: Comply with ANSI C80.3 and UL 797.
  - 6. FMC: Comply with UL 1; zinc-coated steel or aluminum.

7. LFMC: Flexible steel conduit with PVC jacket and complying with UL 360.

B. Metal Fittings:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- a. Allied Tube & Conduit; a part of Atkore International.
- b. O-Z/Gedney; a brand of Emerson Industrial Automation.
- c. Western Tube and Conduit Corporation.
- d. Wheatland Tube Company.

2. Comply with NEMA FB 1 and UL 514B.

3. Listing and Labeling: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

4. Fittings, General: Listed and labeled for type of conduit, location, and use.

5. Fittings for EMT:

- a. Material: Steel.
- b. Type: Setscrew.

6. Expansion Fittings: PVC or steel to match conduit type, complying with UL 651, rated for environmental conditions where installed, and including flexible external bonding jumper.

C. Joint Compound for IMC or GRC: Approved, as defined in NFPA 70, by authorities having jurisdiction for use in conduit assemblies, and compounded for use to lubricate and protect threaded conduit joints from corrosion and to enhance their conductivity.

## 2.2 BOXES, ENCLOSURES, AND CABINETS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Crouse-Hinds, an Eaton business.
2. RACO; Hubbell.
3. Thomas & Betts Corporation; A Member of the ABB Group.
4. Wiremold / Legrand.

B. General Requirements for Boxes, Enclosures, and Cabinets: Boxes, enclosures, and cabinets installed in wet locations shall be listed for use in wet locations.

C. Sheet Metal Outlet and Device Boxes: Comply with NEMA OS 1 and UL 514A.

D. Cast-Metal Outlet and Device Boxes: Comply with NEMA FB 1, ferrous alloy, Type FD, with gasketed cover.



- E. Luminaire Outlet Boxes: Nonadjustable, designed for attachment of luminaire weighing 50 lb. Outlet boxes designed for attachment of luminaires weighing more than 50 lb shall be listed and marked for the maximum allowable weight.
- F. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.
- G. Cast-Metal Access, Pull, and Junction Boxes: Comply with NEMA FB 1 and UL 1773, cast aluminum or galvanized, cast iron with gasketed cover.
- H. Box extensions used to accommodate new building finishes shall be of same material as recessed box.
- I. Device Box Dimensions: 4 inches square by 2-1/8 inches deep or 4 inches by 2-1/8 inches by 2-1/8 inches deep.
- J. Gangable boxes are allowed.

### PART 3 - EXECUTION

#### 3.1 RACEWAY APPLICATION

- A. Outdoors: Apply raceway products as specified below unless otherwise indicated:
  - 1. Exposed Conduit: GRC, IMC.
  - 2. Concealed Conduit, Aboveground: GRC, IMC.
  - 3. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
  - 4. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R.
- B. Indoors: Apply raceway products as specified below unless otherwise indicated:
  - 1. Exposed, Not Subject to Physical Damage: EMT.
  - 2. Exposed, Not Subject to Severe Physical Damage: EMT.
  - 3. Exposed and Subject to Severe Physical Damage: GRC or IMC. Raceway locations include the following:
    - a. Loading dock.
    - b. Corridors used for traffic of mechanized carts, forklifts, and pallet-handling units.
  - 4. Concealed in Ceilings and Interior Walls and Partitions: EMT.
  - 5. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
  - 6. Damp or Wet Locations: GRC or IMC.
  - 7. Boxes and Enclosures: NEMA 250, Type 1.
- C. Minimum Raceway Size: 1/2-inch trade size.

- D. Raceway Fittings: Compatible with raceways and suitable for use and location.
  - 1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings unless otherwise indicated. Comply with NEMA FB 2.10.
  - 2. EMT: Use setscrew, steel fittings. Comply with NEMA FB 2.10.
  - 3. Flexible Conduit: Use only fittings listed for use with flexible conduit. Comply with NEMA FB 2.20.
- E. Do not install aluminum conduits, boxes, or fittings in contact with concrete or earth.
- F. Install surface raceways only where indicated on Drawings.
- G. Do not install nonmetallic conduit where ambient temperature exceeds 120 deg F.

### 3.2 INSTALLATION

- A. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for hangers and supports.
- B. Comply with NECA 1 and NECA 101 for installation requirements except where requirements on Drawings or in this article are stricter. Comply with NECA 102 for aluminum conduits. Comply with NFPA 70 limitations for types of raceways allowed in specific occupancies and number of floors.
- C. Do not install raceways or electrical items on any "explosion-relief" walls or rotating equipment.
- D. Do not fasten conduits onto the bottom side of a metal deck roof.
- E. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
- F. Complete raceway installation before starting conductor installation.
- G. Make bends in raceway using large-radius preformed ells. Field bending shall be according to NFPA 70 minimum radii requirements. Use only equipment specifically designed for material and size involved.
- H. Conceal conduit within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.
- I. Support conduit within 12 inches of enclosures to which attached.
- J. Stub-Ups to Above Recessed Ceilings:
  - 1. Use EMT, IMC, or RMC for raceways.
  - 2. Use a conduit bushing or insulated fitting to terminate stub-ups not terminated in hubs or in an enclosure.

- K. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.
- L. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors including conductors smaller than No. 4 AWG.
- M. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install bushings on conduits up to 1-1/4-inch trade size and insulated throat metal bushings on 1-1/2-inch trade size and larger conduits terminated with locknuts. Install insulated throat metal grounding bushings on service conduits.
- N. Install raceways square to the enclosure and terminate at enclosures with locknuts. Install locknuts hand tight plus 1/4 turn more.
- O. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to assembling conduit to enclosure to assure a continuous ground path.
- P. Cut conduit perpendicular to the length. For conduits 2-inch trade size and larger, use roll cutter or a guide to make cut straight and perpendicular to the length.
- Q. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire. Cap underground raceways designated as spare above grade alongside raceways in use.
- R. Install devices to seal raceway interiors at accessible locations. Locate seals so no fittings or boxes are between the seal and the following changes of environments. Seal the interior of all raceways at the following points:
  - 1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
  - 2. Where an underground service raceway enters a building or structure.
  - 3. Conduit extending from interior to exterior of building.
  - 4. Conduit extending into pressurized duct and equipment.
  - 5. Conduit extending into pressurized zones that are automatically controlled to maintain different pressure set points.
  - 6. Where otherwise required by NFPA 70.
- S. Flexible Conduit Connections: Comply with NEMA RV 3. Use a maximum of 36 inches of flexible conduit for recessed and semi-recessed luminaires, equipment subject to vibration, noise transmission, or movement; and for transformers and motors.
  - 1. Use LFMC in damp or wet locations subject to severe physical damage.
  - 2. Use LFMC or LFNC in damp or wet locations not subject to severe physical damage.
- T. Mount boxes at heights indicated on Drawings. If mounting heights of boxes are not individually indicated, give priority to ADA requirements. Install boxes with height measured to top of box unless otherwise indicated.

- U. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall. Prepare block surfaces to provide a flat surface for a raintight connection between box and cover plate or supported equipment and box.
- V. Horizontally separate boxes mounted on opposite sides of walls so they are not in the same vertical channel.
- W. Locate boxes so that cover or plate will not span different building finishes.
- X. Support boxes of three gangs or more from more than one side by spanning two framing members or mounting on brackets specifically designed for the purpose.
- Y. Fasten junction and pull boxes to or support from building structure. Do not support boxes by conduits.

3.3 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS

- A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Section 260544 "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."

3.4 PROTECTION

- A. Protect coatings, finishes, and cabinets from damage and deterioration.
  - 1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
  - 2. Repair damage to PVC coatings or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION 260533

SECTION 260553 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Color and legend requirements for raceways, conductors, and warning labels and signs.
2. Labels.
3. Bands and tubes.
4. Tapes and stencils.
5. Tags.
6. Signs.
7. Cable ties.
8. Paint for identification.
9. Fasteners for labels and signs.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Identification Schedule: For each piece of electrical equipment and electrical system components to be an index of nomenclature for electrical equipment and system components used in identification signs and labels. Use same designations indicated on Drawings.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Comply with ASME A13.1.
- B. Comply with NFPA 70.
- C. Comply with 29 CFR 1910.144 and 29 CFR 1910.145.
- D. Comply with ANSI Z535.4 for safety signs and labels.
- E. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.
- F. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.

1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

## 2.2 COLOR AND LEGEND REQUIREMENTS

### A. Raceways and Cables Carrying Circuits at 600 V or Less:

1. Black letters on an orange field.
2. Legend: Indicate voltage and system or service type.

### B. Color-Coding for Phase- and Voltage-Level Identification, 600 V or Less: Use colors listed below for ungrounded service, feeder, and branch-circuit conductors.

1. Color shall be factory applied.
2. Colors for 208/120-V Circuits:
  - a. Phase A: Black.
  - b. Phase B: Red.
  - c. Phase C: Blue.
3. Colors for 480/277-V Circuits:
  - a. Phase A: Brown.
  - b. Phase B: Orange.
  - c. Phase C: Yellow.
4. Color for Neutral: White.
5. Color for Equipment Grounds: Green.

### C. Warning Label Colors:

1. Identify system voltage with black letters on an orange background.

### D. Warning labels and signs shall include, but are not limited to, the following legends:

1. Multiple Power Source Warning: "DANGER - ELECTRICAL SHOCK HAZARD - EQUIPMENT HAS MULTIPLE POWER SOURCES."
2. Workspace Clearance Warning: "WARNING - OSHA REGULATION - AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 36 INCHES."

### E. Equipment Identification Labels:

1. Black letters on a white field.

## 2.3 LABELS

- ### A. Vinyl Wraparound Labels: Preprinted, flexible labels laminated with a clear, weather- and chemical-resistant coating and matching wraparound clear adhesive tape for securing label ends.

- B. Snap-around Labels: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeves, with diameters sized to suit diameters and that stay in place by gripping action.
- C. Self-Adhesive Wraparound Labels: Preprinted, 3-mil-thick, polyester flexible label with acrylic pressure-sensitive adhesive.
  - 1. Self-Lamination: Clear; UV-, weather- and chemical-resistant; self-laminating, protective shield over the legend. Labels sized such that the clear shield overlaps the entire printed legend.
  - 2. Marker for Labels: Machine-printed, permanent, waterproof, black ink recommended by printer manufacturer.

#### 2.4 BANDS AND TUBES

- A. Snap-around, Color-Coding Bands: Slit, pretensioned, flexible, solid-colored acrylic sleeves, 2 inches long, with diameters sized to suit diameters and that stay in place by gripping action.
- B. Heat-Shrink Preprinted Tubes: Flame-retardant polyolefin tubes with machine-printed identification labels, sized to suit diameter and shrunk to fit firmly. Full shrink recovery occurs at a maximum of 200 deg F. Comply with UL 224.

#### 2.5 TAPES AND STENCILS

- A. Self-Adhesive Vinyl Tape: Colored, heavy duty, waterproof, fade resistant; not less than 3 mils thick by 1 to 2 inches wide; compounded for outdoor use.

#### 2.6 TAGS

- A. Metal Tags: Brass or aluminum, 2 by 2 by 0.05 inch, with stamped legend, punched for use with self-locking cable tie fastener.
- B. Nonmetallic Preprinted Tags: Polyethylene tags, 0.015 inch thick, color-coded for phase and voltage level, with factory printed permanent designations; punched for use with self-locking cable tie fastener.
- C. Write-on Tags:
  - 1. Marker for Tags: Machine-printed, permanent, waterproof, black ink marker recommended by printer manufacturer.

#### 2.7 SIGNS

- A. Metal-Backed Butyrate Signs:

1. Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate signs, with 0.0396-inch galvanized-steel backing, punched and drilled for fasteners, and with colors, legend, and size required for application.
2. 1/4-inch grommets in corners for mounting.
3. Nominal Size: 10 by 14 inches.

B. Laminated Acrylic or Melamine Plastic Signs:

1. Engraved legend.
2. Thickness:
  - a. For signs up to 20 sq. in., minimum 1/16 inch thick.
  - b. For signs larger than 20 sq. in., 1/8 inch thick.
  - c. Engraved legend with black letters on white face.
  - d. Punched or drilled for mechanical fasteners.
  - e. Framed with mitered acrylic molding and arranged for attachment at applicable equipment.

## 2.8 CABLE TIES

A. General-Purpose Cable Ties: Fungus inert, self-extinguishing, one piece, self-locking, and Type 6/6 nylon.

1. Minimum Width: 3/16 inch.
2. Tensile Strength at 73 Deg F according to ASTM D 638: 12,000 psi.
3. Temperature Range: Minus 40 to plus 185 deg F.
4. Color: Black.

B. UV-Stabilized Cable Ties: Fungus inert, designed for continuous exposure to exterior sunlight, self-extinguishing, one piece, self-locking, and Type 6/6 nylon.

1. Minimum Width: 3/16 inch.
2. Tensile Strength at 73 Deg F according to ASTM D 638: 12,000 psi.
3. Temperature Range: Minus 40 to plus 185 deg F.
4. Color: Black.

C. Plenum-Rated Cable Ties: Self-extinguishing, UV stabilized, one piece, and self-locking.

1. Minimum Width: 3/16 inch.
2. Tensile Strength at 73 Deg F according to ASTM D 638: 7000 psi.
3. UL 94 Flame Rating: 94V-0.
4. Temperature Range: Minus 50 to plus 284 deg F.
5. Color: Black.



## 2.9 MISCELLANEOUS IDENTIFICATION PRODUCTS

- A. Paint: Comply with requirements in painting Sections for paint materials and application requirements. Retain paint system applicable for surface material and location (exterior or interior).
- B. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Self-Adhesive Identification Products: Before applying electrical identification products, clean substrates of substances that could impair bond, using materials and methods recommended by manufacturer of identification product.

### 3.2 INSTALLATION

- A. Verify and coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, Drawings, Shop Drawings, manufacturer's wiring diagrams, and operation and maintenance manual. Use consistent designations throughout Project.
- B. Install identifying devices before installing acoustical ceilings and similar concealment.
- C. Verify identity of each item before installing identification products.
- D. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and operation and maintenance manual.
- E. Apply identification devices to surfaces that require finish after completing finish work.
- F. Install signs with approved legend to facilitate proper identification, operation, and maintenance of electrical systems and connected items.
- G. System Identification for Raceways and Cables under 600 V: Identification shall completely encircle cable or conduit. Place identification of two-color markings in contact, side by side.
  - 1. Secure tight to surface of conductor, cable, or raceway.
- H. System Identification for Raceways and Cables over 600 V: Identification shall completely encircle cable or conduit. Place adjacent identification of two-color markings in contact, side by side.
  - 1. Secure tight to surface of conductor, cable, or raceway.

- I. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.
- J. Emergency Operating Instruction Signs: Install instruction signs with white legend on a red background with minimum 3/8-inch-high letters for emergency instructions at equipment used for power transfer, load shedding and other emergency operations.
- K. Accessible Fittings for Raceways: Identify the covers of each junction and pull box of the following systems with the wiring system legend and system voltage. System legends shall be as follows:
  - 1. "POWER."
  - 2. "CONTROL."
  - 3. "COMMUNICATIONS"
- L. Vinyl Wraparound Labels:
  - 1. Secure tight to surface of raceway or cable at a location with high visibility and accessibility.
  - 2. Attach labels that are not self-adhesive type with clear vinyl tape, with adhesive appropriate to the location and substrate.
- M. Snap-around Labels: Secure tight to surface at a location with high visibility and accessibility.
- N. Self-Adhesive Wraparound Labels: Secure tight to surface at a location with high visibility and accessibility.
- O. Snap-around Color-Coding Bands: Secure tight to surface at a location with high visibility and accessibility.
- P. Heat-Shrink, Preprinted Tubes: Secure tight to surface at a location with high visibility and accessibility.
- Q. Self-Adhesive Vinyl Tape: Secure tight to surface at a location with high visibility and accessibility.
  - 1. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding.
- R. Metal Tags:
  - 1. Place in a location with high visibility and accessibility.
  - 2. Secure using general-purpose cable ties.
- S. Nonmetallic Preprinted Tags:
  - 1. Place in a location with high visibility and accessibility.
  - 2. Secure using general-purpose cable ties.

- T. Write-on Tags:
  - 1. Place in a location with high visibility and accessibility.
  - 2. Secure using general-purpose cable ties.
- U. Metal-Backed Butyrate Signs:
  - 1. Attach signs that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.
  - 2. Unless otherwise indicated, provide a single line of text with 1/2-inch-high letters on 1-1/2-inch-high sign; where two lines of text are required, use labels 2 inches high.
- V. Laminated Acrylic or Melamine Plastic Signs:
  - 1. Attach signs that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.
  - 2. Unless otherwise indicated, provide a single line of text with 1/2-inch-high letters on 1-1/2-inch-high sign; where two lines of text are required, use labels 2 inches high.
- W. Cable Ties: General purpose, for attaching tags, except as listed below:
  - 1. Outdoors: UV-stabilized nylon.
  - 2. In Spaces Handling Environmental Air: Plenum rated.

### 3.3 IDENTIFICATION SCHEDULE

- A. Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment. Install access doors or panels to provide view of identifying devices.
- B. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, pull points, and locations of high visibility. Identify by system and circuit designation.
- C. Accessible Fittings for Raceways and Cables within Buildings: Identify the covers of each junction and pull box of the following systems with self-adhesive labels containing the wiring system legend and system voltage. System legends shall be as follows:
  - 1. "POWER."
  - 2. "CONTROL."
  - 3. "COMMUNICATIONS"
- D. Power-Circuit Conductor Identification, 600 V or Less: For conductors in vaults, pull and junction boxes, manholes, and handholes, use vinyl wraparound labels, self-adhesive wraparound labels, snap-around labels, snap-around color-coding bands, self-adhesive vinyl tape to identify the phase.

1. Locate identification at changes in direction, at penetrations of walls and floors, at 50-foot maximum intervals in straight runs, and at 25-foot maximum intervals in congested areas.
- E. Control-Circuit Conductor Identification: For conductors and cables in pull and junction boxes, manholes, and handholes, use write-on tags with the conductor or cable designation, origin, and destination.
- F. Control-Circuit Conductor Termination Identification: For identification at terminations, provide heat-shrink preprinted tubes with the conductor designation.
- G. Auxiliary Electrical Systems Conductor Identification: Self-adhesive vinyl tape that is uniform and consistent with system used by manufacturer for factory-installed connections.
  1. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.
- H. Instructional Signs: Self-adhesive labels, including the color code for grounded and ungrounded conductors.
- I. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Metal-backed, butyrate warning signs.
  1. Apply to exterior of door, cover, or other access.
  2. For equipment with multiple power or control sources, apply to door or cover of equipment:
- J. Arc Flash Warning Labeling: Self-adhesive labels.
- K. Operating Instruction Signs: Laminated acrylic or melamine plastic signs.
- L. Emergency Operating Instruction Signs: Laminated acrylic or melamine plastic signs with white legend on a red background with minimum 3/8-inch-high letters for emergency instructions at equipment used for power transfer, load shedding and other emergency operations.
- M. Equipment Identification Labels:
  1. Indoor Equipment: Metal-backed butyrate signs, Laminated acrylic or melamine plastic sign.
  2. Outdoor Equipment: Laminated acrylic or melamine sign.
  3. Equipment to Be Labeled:
    - a. Panelboards: Typewritten directory of circuits in the location provided by panelboard manufacturer. Panelboard identification shall be in the form of a engraved, laminated acrylic or melamine label.
    - b. Enclosures and electrical cabinets.
    - c. Access doors and panels for concealed electrical items.
    - d. Emergency system boxes and enclosures.
    - e. Enclosed switches.

- f. Enclosed circuit breakers.
- g. Enclosed controllers.
- h. Contactors.
- i. Remote-controlled switches, dimmer modules, and control devices.
- j. Monitoring and control equipment.

END OF SECTION 260553



SECTION 260923 - LIGHTING CONTROL DEVICES

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 this Section.

1.2 SUMMARY

- A. Section Includes:
  - 1. Indoor occupancy and vacancy sensors.
- B. Related Requirements:
  - 1. Section 262726 "Wiring Devices" for wall-box dimmers, non-networkable wall-switch occupancy sensors, and manual light switches.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.4 INFORMATIONAL SUBMITTALS

- A. Sample Warranty: For manufacturer's warranties.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For each type of lighting control device to include in operation and maintenance manuals.

1.6 WARRANTY

- A. Manufacturer's Warranty: Manufacturer and Installer agree to repair or replace lighting control devices that fail(s) in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Faulty operation of lighting control software.
    - b. Faulty operation of lighting control devices.

2. Warranty Period: Two year(s) from date of Beneficial Occupancy or Final Completion.

## PART 2 - PRODUCTS

### 2.1 INDOOR OCCUPANCY AND VACANCY SENSORS

A. Manufacturer: Provide products by the following with no substitutions:

1. Lithonia Lighting; Acuity Brands Lighting, Inc.
2. Leviton Manufacturing Co., Inc.
3. Lutron Electronics Co., Inc.
4. Wattstopper; a Legrand Group Brand

B. General Requirements for Sensors:

1. Ceiling-mounted and wall-mounted solid-state indoor occupancy and vacancy sensors.
2. Dual technology
3. Integrated or separate power pack.
4. Hardwired connection to stand-alone switch or dimmer as indicated on drawings.
5. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
6. Operation:
  - a. Combination Sensor: Unless otherwise indicated, sensor shall be programmed to turn lights on when coverage area is occupied and turn them off when unoccupied, or to turn off lights that have been manually turned on; with a time delay for turning lights off, adjustable over a minimum range of 1 to 30 minutes.
7. Sensor Output: Contacts rated to operate the connected relay, complying with UL 773A or sensor is powered from the power pack.
8. Power: Line voltage, integral photovoltaic.
9. Power Pack: Dry contacts rated for 20-A LED load at 120- and 277-V ac, for 13-A tungsten at 120-V ac, and for 1 hp at 120-V ac. Sensor has 24-V dc, 150-mA, Class 2 power source, as defined by NFPA 70.
10. Mounting:
  - a. Sensor: Suitable for mounting in any position on a standard outlet box.
  - b. Relay: Externally mounted through a 1/2-inch knockout in a standard electrical enclosure.
  - c. Time-Delay and Sensitivity Adjustments: Recessed and concealed behind hinged door.
11. Indicator: Digital display, to show when motion is detected during testing and normal operation of sensor.
12. Bypass Switch: Override the "on" function in case of sensor failure.
13. Automatic Light-Level Sensor: Adjustable from 2 to 200 fc; turn lights off when selected lighting level is present.



- C. Dual-Technology Type: Ceiling mounted; detect occupants in coverage area using PIR and ultrasonic detection methods. The particular technology or combination of technologies that control on-off functions is selectable in the field by operating controls on unit.
  - 1. Sensitivity Adjustment: Separate for each sensing technology.
  - 2. Detector Sensitivity: Detect occurrences of 6-inch-minimum movement of any portion of a human body that presents a target of not less than 36 sq. in., and detect a person of average size and weight moving not less than 12 inches in either a horizontal or a vertical manner at an approximate speed of 12 inches/s.
  - 3. Detection Coverage (Standard Room): Detect occupancy anywhere within a circular area of 1000 sq. ft. when mounted on a 96-inch-high ceiling.

## 2.2 CONDUCTORS AND CABLES

- A. Power Wiring to Supply Side of Remote-Control Power Sources: Not smaller than No. 12 AWG. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
- B. Classes 2 and 3 Control Cable: Multiconductor cable with stranded-copper conductors not smaller than No. 18 AWG. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
- C. Class 1 Control Cable: Multiconductor cable with stranded-copper conductors not smaller than No. 14 AWG. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine lighting control devices before installation. Reject lighting control devices that are wet, moisture damaged, or mold damaged.
- B. Examine walls and ceilings for suitable conditions where lighting control devices will be installed.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 SENSOR INSTALLATION

- A. Comply with NECA 1.
- B. Coordinate layout and installation of ceiling-mounted devices with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, smoke detectors, fire-suppression systems, and partition assemblies.

### 3.3 WIRING INSTALLATION

- A. Comply with NECA 1.
- B. Wiring Method: Comply with Section 260519 "Low-Voltage Electrical Power Conductors and Cables." Minimum conduit size is 1/2 inch.
- C. Wiring within Enclosures: Comply with NECA 1. Separate power-limited and nonpower-limited conductors according to conductor manufacturer's written instructions.
- D. Size conductors according to lighting control device manufacturer's written instructions unless otherwise indicated.
- E. Splices, Taps, and Terminations: Make connections only on numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures.

### 3.4 IDENTIFICATION

- A. Identify components and power and control wiring according to Section 260553 "Identification for Electrical Systems."
  - 1. Identify controlled circuits in lighting contactors.
  - 2. Identify circuits or luminaires controlled by photoelectric and occupancy sensors at each sensor.
- B. Label time switches and contactors with a unique designation.

### 3.5 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
  - 1. Operational Test: After installing time switches and sensors, and after electrical circuitry has been energized, start units to confirm proper unit operation.
  - 2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- B. Lighting control devices will be considered defective if they do not pass tests and inspections.
- C. Prepare test and inspection reports.

### 3.6 ADJUSTING

- A. Occupancy Adjustments: When requested within 12 months from date of Substantial Completion, provide on-site assistance in adjusting lighting control devices to suit actual occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose.

1. For occupancy and motion sensors, verify operation at outer limits of detector range. Set time delay to suit Owner's operations.

3.7 DEMONSTRATION

- A. Train Owner's maintenance personnel to adjust, operate, and maintain lighting control devices.

END OF SECTION 260923



SECTION 262726 - WIRING DEVICES

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 this Section.

1.2 SUMMARY

- A. Section Includes:
  - 1. Standard-grade receptacles, 125 V, 20 A.
  - 2. GFCI receptacles, 125 V, 20 A.
  - 3. Twist-locking receptacles.
  - 4. Toggle switches, 120/277 V, 20 A.
  - 5. Occupancy sensors.
  - 6. Wall plates.

1.3 DEFINITIONS

- A. GFCI: Ground-fault circuit interrupter.
- B. Pigtail: Short lead used to connect a device to a branch-circuit conductor.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.5 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.

1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For wiring devices to include in all manufacturers' packing-label warnings and instruction manuals that include labeling conditions.

**PART 2 - PRODUCTS**

**2.1 GENERAL WIRING-DEVICE REQUIREMENTS**

- A. Wiring Devices, Components, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
- B. Comply with NFPA 70.
- C. RoHS compliant.
- D. Comply with NEMA WD 1.
- E. Device Color:
  - 1. White unless otherwise indicated or required by NFPA 70 or device listing.
- F. Wall Plate Color: For plastic covers, match device color.
- G. Source Limitations: Obtain each type of wiring device and associated wall plate from single source from single manufacturer.

**2.2 STANDARD-GRADE RECEPTACLES, 125 V, 20 A**

- A. Duplex Receptacles, 125 V, 20 A:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Eaton (Arrow Hart).
    - b. Hubbell Incorporated; Wiring Device-Kellems.
    - c. Leviton Manufacturing Co., Inc.
    - d. Pass & Seymour/Legrand (Pass & Seymour).
  - 2. Description: Two pole, three wire, and self-grounding.
  - 3. Configuration: NEMA WD 6, Configuration 5-20R.
  - 4. Standards: Comply with UL 498 and FS W-C-596.

**2.3 GFCI RECEPTACLES, 125 V, 20 A**

- A. Duplex GFCI Receptacles, 125 V, 20 A:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Eaton (Arrow Hart).
    - b. Hubbell Incorporated; Wiring Device-Kellems.

- c. Leviton Manufacturing Co., Inc.
    - d. Pass & Seymour/Legrand (Pass & Seymour).
  2. Description: Integral GFCI with "Test" and "Reset" buttons and LED indicator light. Two pole, three wire, and self-grounding.
  3. Configuration: NEMA WD 6, Configuration 5-20R.
  4. Type: Feed or Non-feed through.
  5. Standards: Comply with UL 498, UL 943 Class A, and FS W-C-596.
- 2.4 TOGGLE SWITCHES, 120/277 V, 20 A
  - A. Single-Pole Switches, 120/277 V, 20 A:
    1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      - a. Eaton (Arrow Hart).
      - b. Hubbell Incorporated; Wiring Device-Kellems.
      - c. Leviton Manufacturing Co., Inc.
      - d. Pass & Seymour/Legrand (Pass & Seymour).
    2. Standards: Comply with UL 20 and FS W-S-896.
- 2.5 OCCUPANCY SENSORS
  - A. Wall Switch Sensor Light Switch, Dual Technology:
    1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      - a. Eaton (Arrow Hart).
      - b. Hubbell Incorporated; Wiring Device-Kellems.
      - c. Leviton Manufacturing Co., Inc.
      - d. Lithonia Lighting; Acuity Brands Lighting, Inc.
    2. Description: Switchbox-mounted, combination lighting-control sensor and conventional switch lighting-control unit using dual (ultrasonic and passive infrared) technology.
    3. Standards: Comply with UL 20.
    4. Rated 960 W at 120 V ac for tungsten lighting, 10 A at 120 V ac or 10 A at 277 V ac for fluorescent or LED lighting, and 1/4 hp at 120 V ac.
    5. Adjustable time delay of 30 minutes.
    6. Able to be locked to Manual-On mode.
    7. Automatic Light-Level Sensor: Adjustable from 2 to 200 fc.
    8. 0-10V dimming control.
    9. Capable of three-way switching

**2.6 WALL PLATES**

- A. Single Source: Obtain wall plates from same manufacturer of wiring devices.
- B. Single and combination types shall match corresponding wiring devices.
  - 1. Plate-Securing Screws: Metal with head color to match plate finish.
  - 2. Material for Finished Spaces: 0.035-inch-thick, satin-finished, Type 302 stainless steel.
  - 3. Material for Unfinished Spaces: Galvanized steel.
  - 4. Material for Damp Locations: Cast aluminum with spring-loaded lift cover; listed and labeled for use in wet and damp locations.
- C. Wet-Location, Weatherproof Cover Plates: NEMA 250, complying with Type 3R, weather-resistant, die-cast aluminum with lockable cover.
- D. Antimicrobial Cover Plates:
  - 1. Contact surfaces treated with a coating that kills 99.9 percent of certain common bacteria within two hours when regularly and properly cleaned.
  - 2. Tarnish resistant.

**2.7 INSTALLATION**

- A. Comply with NECA 1, including mounting heights listed in that standard, unless otherwise indicated.
- B. Coordination with Other Trades:
  - 1. Protect installed devices and their boxes. Do not place wall finish materials over device boxes, and do not cut holes for boxes with routers that are guided by riding against outside of boxes.
  - 2. Keep outlet boxes free of plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other material that may contaminate the raceway system, conductors, and cables.
  - 3. Install device boxes in brick or block walls so that the cover plate does not cross a joint unless the joint is troweled flush with the face of the wall.
  - 4. Install wiring devices after all wall preparation, including painting, is complete.
- C. Conductors:
  - 1. Do not strip insulation from conductors until right before they are spliced or terminated on devices.
  - 2. Strip insulation evenly around the conductor using tools designed for the purpose. Avoid scoring or nicking of solid wire or cutting strands from stranded wire.
  - 3. The length of free conductors at outlets for devices shall comply with NFPA 70, Article 300, without pigtailed.
  - 4. Existing Conductors:



- a. Cut back and pigtail or replace all damaged conductors.
  - b. Straighten conductors that remain and remove corrosion and foreign matter.
  - c. Pigtailling existing conductors is permitted, provided the outlet box is large enough.
- D. Device Installation:
1. Replace devices that have been in temporary use during construction and that were installed before building finishing operations were complete.
  2. Keep each wiring device in its package or otherwise protected until it is time to connect conductors.
  3. Do not remove surface protection, such as plastic film and smudge covers, until the last possible moment.
  4. Connect devices to branch circuits using pigtails that are not less than 6 inches in length.
  5. When there is a choice, use side wiring with binding-head screw terminals. Wrap solid conductor tightly clockwise, two-thirds to three-fourths of the way around terminal screw.
  6. Use a torque screwdriver when a torque is recommended or required by manufacturer.
  7. When conductors larger than No. 12 AWG are installed on 15- or 20-A circuits, splice No. 12 AWG pigtails for device connections.
  8. Tighten unused terminal screws on the device.
  9. When mounting into metal boxes, remove the fiber or plastic washers used to hold device-mounting screws in yokes, allowing metal-to-metal contact.
- E. Receptacle Orientation:
1. Install ground pin of vertically mounted receptacles down, and on horizontally mounted receptacles to the right.
- F. Device Plates: Do not use oversized or extra-deep plates. Repair wall finishes and remount outlet boxes when standard device plates do not fit flush or do not cover rough wall opening.
- G. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical and with grounding terminal of receptacles on top. Group adjacent switches under single, multigang wall plates.
- 2.8 GFCI RECEPTACLES
- A. Install non-feed-through GFCI receptacles where protection of downstream receptacles is not required.
- 2.9 IDENTIFICATION
- A. Comply with Section 260553 "Identification for Electrical Systems."

- B. Identify each receptacle with panelboard identification and circuit number. Use hot, stamped, or engraved machine printing with black-filled lettering on face of plate, and durable wire markers or tags inside outlet boxes.

#### 2.10 FIELD QUALITY CONTROL

- A. Test Instruments: Use instruments that comply with UL 1436.
- B. Test Instrument for Receptacles: Digital wiring analyzer with digital readout or illuminated digital-display indicators of measurement.
- C. Perform the following tests and inspections:
  - 1. Test Instruments: Use instruments that comply with UL 1436.
  - 2. Test Instrument for Receptacles: Digital wiring analyzer with digital readout or illuminated digital-display indicators of measurement.
- D. Tests for Receptacles:
  - 1. Line Voltage: Acceptable range is 105 to 132 V.
  - 2. Percent Voltage Drop under 15-A Load: A value of 6 percent or higher is unacceptable.
  - 3. Ground Impedance: Values of up to 2 ohms are acceptable.
  - 4. GFCI Trip: Test for tripping values specified in UL 1436 and UL 943.
  - 5. Using the test plug, verify that the device and its outlet box are securely mounted.
  - 6. Tests shall be diagnostic, indicating damaged conductors, high resistance at the circuit breaker, poor connections, inadequate fault-current path, defective devices, or similar problems. Correct circuit conditions, remove malfunctioning units and replace with new ones, and retest as specified above.
- E. Wiring device will be considered defective if it does not pass tests and inspections.
- F. Prepare test and inspection reports.

END OF SECTION 262726

SECTION 265213 - EMERGENCY AND EXIT LIGHTING

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 this Section.

1.2 SUMMARY

- A. Section Includes:
  - 1. Exit signs.
  - 2. Luminaire supports.

1.3 DEFINITIONS

- A. CCT: Correlated color temperature.
- B. CRI: Color Rendering Index.
- C. Emergency Lighting Unit: A lighting unit with internal or external emergency battery powered supply and the means for controlling and charging the battery and unit operation.
- D. Fixture: See "Luminaire" Paragraph.
- E. Lumen: Measured output of lamp and luminaire, or both.
- F. Luminaire: Complete lighting unit, including lamp, reflector, and housing.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of emergency lighting unit, exit sign, and emergency lighting support.
  - 1. Include data on features, accessories, and finishes.
  - 2. Include physical description of the unit and dimensions.
  - 3. Battery and charger for light units.
- B. Product Schedule:
  - 1. For emergency lighting units. Use same designations indicated on Drawings.
  - 2. For exit signs.

1.5 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For each type of luminaire.
- B. Sample Warranty: For manufacturer's warranty.

1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For luminaires and lighting systems to include in emergency, operation, and maintenance manuals.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Protect finishes of exposed surfaces by applying a strippable, temporary protective covering before shipping.

1.8 WARRANTY

- A. Warranty: Manufacturer and Installer agree to repair or replace components of luminaires that fail in materials or workmanship within specified warranty period.
  - 1. Warranty Period: Two year(s) from date of Beneficial Occupancy or Final Completion.
- B. Special Warranty for Emergency Lighting Batteries: Manufacturer's standard form in which manufacturer of battery-powered emergency lighting unit agrees to repair or replace components of rechargeable batteries that fail in materials or workmanship within specified warranty period.
  - 1. Warranty Period for Emergency Power Unit Batteries: Five years from date of Beneficial Occupancy or Final Completion.
  - 2. Warranty Period for Self-Powered Exit Sign Batteries: Five years from date of Beneficial Occupancy or Final Completion.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR EMERGENCY LIGHTING

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. NRTL Compliance: Fabricate and label emergency lighting units, exit signs, and batteries to comply with UL 924.
- C. Comply with NFPA 70 and NFPA 101.

- D. Internal Type Emergency Power Unit: Self-contained, modular, battery-inverter unit, factory mounted within luminaire body and compatible with ballast.
1. Emergency Connection: Operate lamp(s) continuously at an output of 1100 lumens upon loss of normal power. Connect unswitched circuit to battery-inverter unit and switched circuit to luminaire ballast.
  2. Operation: Relay automatically turns lamp on when power-supply circuit voltage drops to 80 percent of nominal voltage or below. Lamp automatically disconnects from battery when voltage approaches deep-discharge level. When normal voltage is restored, relay disconnects lamps from battery, and battery is automatically recharged and floated on charger.
  3. Environmental Limitations: Rate equipment for continuous operation under the following conditions unless otherwise indicated:
    - a. Ambient Temperature: Less than 0 deg For exceeding 104 deg F, with an average value exceeding 95 deg Fover a 24-hour period.
    - b. Ambient Storage Temperature: Not less than minus 4 deg Fand not exceeding 140 deg F.
    - c. Humidity: More than 95 percent (condensing).
    - d. Altitude: Exceeding 3300 feet.
  4. Test Push-Button and Indicator Light: Visible and accessible without opening luminaire or entering ceiling space.
    - a. Push Button: Push-to-test type, in unit housing, simulates loss of normal power and demonstrates unit operability.
    - b. Indicator Light: LED indicates normal power on. Normal glow indicates trickle charge; bright glow indicates charging at end of discharge cycle.
  5. Battery: Sealed, maintenance-free, nickel-cadmium type.
  6. Charger: Fully automatic, solid-state, constant-current type with sealed power transfer relay.
  7. Integral Self-Test: Factory-installed electronic device automatically initiates code-required test of unit emergency operation at required intervals. Test failure is annunciated by an integral audible alarm and a flashing red LED.

## 2.2 EXIT SIGNS

- A. General Requirements for Exit Signs: Comply with UL 924; for sign colors, visibility, luminance, and lettering size, comply with authorities having jurisdiction.
- B. Internally Lighted Signs:
1. Operating at nominal voltage of 277 V ac.
  2. Lamps for AC Operation: LEDs; 50,000 hours minimum rated lamp life.
  3. Self-Powered Exit Signs (Battery Type): Internal emergency power unit.

## 2.3 MATERIALS

### A. Metal Parts:

1. Free of burrs and sharp corners and edges.
2. Sheet metal components shall be steel unless otherwise indicated.
3. Form and support to prevent warping and sagging.

### B. Doors, Frames, and Other Internal Access:

1. Smooth operating, free of light leakage under operating conditions.
2. Designed to permit relamping without use of tools.
3. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.

### C. Housings:

1. High-impact, UV-stabilized, injection-molded thermoplastic housing.
2. White finish.

### D. Conduit: Electrical metallic tubing, minimum 3/4 inch in diameter.

## 2.4 METAL FINISHES

- A. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

## 2.5 LUMINAIRE SUPPORT COMPONENTS

- A. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for channel and angle iron supports and nonmetallic channel and angle supports.
- B. Support Wires: ASTM A 641/A 641M, Class 3, soft temper, zinc-coated steel, 12 gage.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for conditions affecting performance of luminaires.
- B. Examine roughing-in for luminaire to verify actual locations of luminaire and electrical connections before luminaire installation.

- C. Examine walls and ceilings for suitable conditions where emergency lighting luminaires will be installed.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. Comply with NECA 1.
- B. Install luminaires level, plumb, and square with ceilings and walls unless otherwise indicated.
- C. Install lamps in each luminaire.
- D. Supports:
  - 1. Sized and rated for luminaire weight.
  - 2. Able to maintain luminaire position when testing emergency power unit.
  - 3. Provide support for luminaire and emergency power unit without causing deflection of ceiling or wall.
  - 4. Luminaire-mounting devices shall be capable of supporting a horizontal force of 100 percent of luminaire and emergency power unit weight and vertical force of 400 percent of luminaire weight.
- E. Wall-Mounted Luminaire Support:
  - 1. Attached to structural members in walls.
  - 2. Do not attach luminaires directly to gypsum board.

### 3.3 IDENTIFICATION

- A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

### 3.4 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
  - 1. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery power and retransfer to normal.
- B. Luminaire will be considered defective if it does not pass operation tests and inspections.
- C. Prepare test and inspection reports.

3.5 STARTUP SERVICE

A. Perform startup service:

1. Charge batteries minimum of one hour and depress switch to conduct short-duration test.
2. Charge batteries minimum of 24 hours and conduct one-hour discharge test.

3.6 ADJUSTING

A. Adjustments: Within 12 months of date of Substantial Completion, provide on-site visit to do the following:

1. Inspect all luminaires. Replace lamps, batteries, signs, or luminaires that are defective.
  - a. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.
2. Conduct short-duration tests on all emergency lighting.

END OF SECTION 265213





**Solutions for all your Environmental and OSHA Concerns**

**March 1, 2010**

## **Asbestos & Lead Based Paint Inspection Report**

### **Project Location:**

J. Sargeant Reynolds Community College  
Downtown Campus  
Gordon Building – Phase I  
700 E. Jackson Street  
Richmond, Virginia 23285

### **Prepared For:**

Virginia Community College System  
Facilities Management Services  
101 N. 14<sup>th</sup> Street, 16<sup>th</sup> Floor  
Richmond, Virginia 23219

### **Prepared By:**

Robin H. Liebal

Lead Inspector /Asbestos Inspector

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## Scope of Work

HDH Technical, Inc. was contracted by the Virginia Community College System to provide an asbestos inspection and lead-based paint screening for the Phase I portion of the Gordon Building at the Downtown Campus of J. Sargeant Reynolds Community College, 700 East Jackson Street, Richmond, VA. The inspection was conducted by personnel trained and licensed in accordance with the regulations of the Environmental Protection Agency (EPA) and the Commonwealth of Virginia. This inspection was performed using current EPA AHERA standards. This protocol was used for the determination, sampling and analysis of suspected Asbestos Containing Materials (ACM).

Also included in this report is a Lead-Based Paint Screening at this location. The term "screening" is used as opposed to "inspection" due to the fact that a complete HUD type paint inspection of each surface in every space was not performed. Generally speaking, each differing type of interior and exterior component and each differing type of paint was tested, although each component was not tested in each room. This "screening" will be referred to as an "inspection" throughout this report and was conducted in accordance with accepted industry standards and applicable regulations established by OSHA and the EPA. This inspection only identifies lead-based paint that is accessible through non-destructive methods. It does not identify lead-based paint materials located within walls, concrete decks, subfloors, or other generally inaccessible areas.

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## **ASBESTOS INSPECTION**

An inspection of Phase I of the Gordon Building at J. Sargeant Reynolds Community College was performed on February 4, 2010 by representatives of HDHT. The objective of this inspection was to determine the location of suspect asbestos-containing building materials (ACBM) currently located on the interior of this building that may be disturbed in conjunction with upcoming renovation activities at this location. The roof was not included in this investigation.

The inspection was conducted by personnel trained and licensed in accordance with the regulations of the Environmental Protection Agency (EPA) and the Commonwealth of Virginia. This inspection meets the protocol outlined in current EPA AHERA regulations. This protocol was used for the determination, sampling and analysis of suspect asbestos containing materials. All identified asbestos-containing materials should be removed prior to renovation or demolition activities, **if they are to be disturbed**, to eliminate any potentially hazardous asbestos fiber release.

**AS THE SAMPLE SUMMARY INDICATES, THE FOLLOWING SUSPECT MATERIALS SAMPLED AT THIS LOCATION WERE REPORTED TO BE ASBESTOS-CONTAINING BY THE LABORATORY:**

- **THE 12"x12" KHAKI FLOOR TILE AND ITS ASSOCIATED MASTIC THROUGHOUT THE FACILITY. THIS TILE HAD BEEN PREVIOUSLY IDENTIFIED AS ACM AND ABATED IN SOME AREAS.**
- **WHITE END SEALER ON THE FIBERGLASS INSULATION ASSOCIATED WITH THE AIR HANDLING SYSTEM ON THE BOILER ROOM AND THE PENTHOUSE UNITS.**
- **THE RED DUCT MASTIC ON THE SEAMS OF THE ROUND METAL DUCT IN THE HVAC WALL CHASE.**

### **ASSUMED ACM:**

- **ALL LABORATORY COUNTERTOPS (black) AND SINKS ARE PRESUMED TO CONTAIN ASBESTOS.**
- **ALL BLACKBOARD/TACKBOARD MASTIC IS PRESUMED TO CONTAIN ASBESTOS. MAY BE SAMPLED PRIOR TO RENOVATION ACTIVITIES.**
- **TRANSITE FUME HOODS IN THE CHEMISTRY LAB AND PREP ROOMS ARE PRESUMED TO CONTAIN ASBESTOS.**

Based on this survey and reported laboratory results, we recommend this information be provided to the renovation contractor and all sub-contractors involved. All identified ACBM should be removed by licensed, contract personnel using approved methods prior to renovation activities, **if it is to be disturbed**. If additional suspect materials are identified during the course of renovations, the contractor should immediately discontinue construction activities and contact the Owner for further instructions.

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## **Asbestos Sample Summary**

## JSRCC Downtown Campus – Gordon Bldg. - Basement

SAMPLE #	LAB #	MATERIAL	RESULT	%
SO-1.1	110021185-01	Spray-On – Phase II	ND	
SO-1.2	02	Spray-On – Phase II	ND	
SO-2.1	03	Spray-On – Phase I	ND	
SO-2.2	04	Spray-On – Phase I	ND	
SO – 2.3	05	Spray-On – Phase I	ND	
ES-3.1	06	End Sealer on FGTSI - CHS	ND	
ES-3.2	07	End Sealer on FGTSI - CHS	ND	
ES-3.3	08	End Sealer on FGTSI - CHR	ND	
DC-4.1	09	Duct Caulk - Flange	ND	
DC-4.2	10	Duct Caulk - Flange	ND	
DC-4.3	11	Duct Caulk - Flange	ND	
FT-5.1	12	Floor Tile – 12x12 – White – Phase II Hallway	ND	
FT-6.1	13	Floor Tile – 12x12 – Khaki - Throughout	ND	
FM-7.1	14	Mastic on 6.1	■	<u>5%</u>
CT-8.1	15	Ceiling Tile - Newer	ND	
CT-8.2	16	Ceiling Tile - Newer	ND	
CT-9.1	17	Ceiling Tile - Older	ND	
CT-9.2	18	Ceiling Tile - Older	ND	
FT-10.1	19	Floor Tile – 12x12 Tan @ Stairwell	ND	
BM-11.1	20	Baseboard Mastic	ND	
BM-11.2	21	Baseboard Mastic	ND	
JC-12.1	22	SR - Jt. Compound	ND	
JC-12.2	23	SR - Jt. Compound	ND	

ND = NONE DETECTED

■ = CHRYSOTILE

## JSRCC Downtown Campus – Gordon Bldg. – 1<sup>st</sup> Floor

SAMPLE #	LAB #	MATERIAL	RESULT	%
SO-2.4	110021182-01	Spray-On Fireproofing	ND	
CT-13.1	02	Ceiling Tile – 2x2	ND	
CT-13.2	03	Ceiling Tile – 2x2	ND	
BM-14.1	04	Baseboard Mastic	ND	
BM-14.2	05	Baseboard Mastic	ND	
JC-15.1	06	SR - Jt. Compound	ND	
JC-15.2	07	SR - Jt. Compound	ND	
FT-16.1	08	Floor Tile – 12x12 – Khaki	ND	
FT-17.1	09	Floor Tile – 12x12 – White w/Blue – Bus. Office	ND	
CT-18.1	10	Ceiling Tile – 2x4	ND	
CT-18.2	11	Ceiling Tile – 2x4	ND	
DM-19.1	12	Duct Mastic – Red – HVAC Chase	ND	
DM-19.2	13	Duct Mastic – Red – HVAC Chase	ND	

ND = NONE DETECTED

■ = CHRYSOTILE

## JSRCC Downtown Campus – Gordon Bldg. – 2nd Floor

SAMPLE #	LAB #	MATERIAL	RESULT	%
SO-2.5	110021183-01	Spray-On Fireproofing	ND	
CT-20.1	02	Ceiling Tile – New	ND	
CT-20.2	03	Ceiling Tile – New	ND	
CT-21.1	04	Ceiling Tile – Old	ND	
CT-21.2	05	Ceiling Tile – Old	ND	
JC-22.1	06	SR - Jt. Compound	ND	
JC-22.2	07	SR - Jt. Compound	ND	
BM-23.1	08	Baseboard Mastic	ND	
BM-23.2	09	Baseboard Mastic	ND	
DM-24.1	10	Duct Mastic – Gray – HVAC	ND	
CM-25.1	11	Carpet Mastic - Library	ND	
CM-25.2	12	Carpet Mastic - Library	ND	
BM-26.1	13	Baseboard Mastic	ND	

ND = NONE DETECTED

■ = CHRYSOTILE



## JSRCC Downtown Campus – Gordon Bldg. – 3rd Floor

SAMPLE #	LAB #	MATERIAL	RESULT	%
SO-2.6	110021180-01	Spray-On – Fireproofing	ND	
CT-27.1	02	Ceiling Tile – New	ND	
CT-27.2	03	Ceiling Tile – New	ND	
CT-28.1	04	Ceiling Tile – Old	ND	
CT-28.2	05	Ceiling Tile – Old	ND	
BM-29.1	06	Baseboard Mastic	ND	
BM-29.2	07	Baseboard Mastic	ND	
JC-30.1	08	SR - Jt. Compound	ND	
JC-30.2	09	SR - Jt. Compound	ND	
FT-31.1	10	<u>Floor Tile – 12x12 - Khaki</u>	■	2%
FM-32.1	11	Mastic	ND	
FT-33.1	12	Floor Tile – 12x12 - Tan	ND	

ND = NONE DETECTED

■ = CHRYSOTILE

## JSRCC Downtown Campus – Gordon Bldg. – 4th Floor

SAMPLE #	LAB #	MATERIAL	RESULT	%
SO-2.7	110021184-01	Spray-On Fireproofing	ND	
CT-34.1	02	Ceiling Tile – New	ND	
CT-34.2	03	Ceiling Tile – New	ND	
CT-35.1	04	Ceiling Tile – Old	ND	
CT-35.2	05	Ceiling Tile – Old	ND	
JC-36.1	06	SR - Jt. Compound	ND	
JC-36.2	07	SR - Jt. Compound	ND	
BM-37.1	08	Baseboard Mastic	ND	
BM-37.2	09	Baseboard Mastic	ND	
DM-19.3	10	Duct Mastic – Red - HVAC Chase	■	2%

ND = NONE DETECTED

■ = CHRYSOTILE

## JSRCC Downtown Campus – Gordon Bldg. – 5th Floor

SAMPLE #	LAB #	MATERIAL	RESULT	%
SO-2.8	110021179-01	Spray-On Fireproofing	ND	
CT-38.1	02	Ceiling Tile – New	ND	
CT-38.2	03	Ceiling Tile – New	ND	
CT-39.1	04	Ceiling Tile – Old	ND	
CT-39.2	05	Ceiling Tile – Old	ND	
JC-40.1	06	SR - Jt. Compound	ND	
JC-40-2	07	SR - Jt. Compound	ND	
BM-41.1	08	Baseboard Mastic	ND	
BM-41.2	09	Baseboard Mastic	ND	
FT-42.1	10	Floor Tile – 12x12 – Beige - Rm # 534	ND	
FT-42.2	11	Floor Tile – 12x12 – Beige - Rm # 534	ND	
BM-43.1	12	Baseboard Mastic - Rm # 534	ND	
BM-43.2	13	Baseboard Mastic - Rm # 534	ND	
FT-44.1	14	Floor Tile – 12x12 – Khaki	ND	
FM-44.2	15	<u>Mastic on 44.1</u>	■	<u>5%</u>

ND = NONE DETECTED

■ = CHRYSOTILE

## JSRCC Downtown Campus – Gordon Bldg. – 6th Floor & Penthouse

SAMPLE #	LAB #	MATERIAL	RESULT	%
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### 6<sup>th</sup> FLOOR

SO-2.9	110021181-01	Spray-On Fireproofing	ND	
CT-46.1	02	Ceiling Tile–New	ND	
CT-46.2	03	Ceiling Tile–New	ND	
CT-47.1	04	Ceiling Tile–Old	ND	
CT-47.2	05	Ceiling Tile–Old	ND	
JC-48.1	06	SR - Jt. Compound	ND	
JC-48.2	07	SR - Jt. Compound	ND	
BM-49.1	08	Baseboard Mastic	ND	
BM-49.2	09	Baseboard Mastic	ND	

### PENTHOUSE

ES-50.1	110021181-10	End Sealer on FGTSI-AH 003	■	3%
ES-50.2	11	End Sealer on FGTSI-AH 003	■	3%
DM-51.1	12	Duct Mastic–White–Round Duct	ND	
DM-51.2	13	Duct Mastic–White–Round Duct	ND	
SO-2.10	14	Spray-On Fireproofing	ND	

### ADDITIONAL SAMPLES TAKEN IN PENTHOUSE ON FEB. 24, 2010

ES-52.1	110021628-01	End Sealer on FGTSI-AH 004–Phase I	■	3%
ES-52.2	02	End Sealer on FGTSI-AH 004–Phase I	■	3%
ES-53.1	03	End Sealer on FGTSI–AHU–Phase II	ND	
ES-53.2	04	End Sealer on FGTSI–AHU–Phase II	ND	

ND = NONE DETECTED

■ = CHRYSOTILE

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# Laboratory Report

# AMERISCI

America's Laboratory

## CHAIN OF CUSTODY RECORD

AMERISCI Richmond  
Job No.: **110021185**

**AmeriSci** Richmond  
13635 Genito Road  
Midlothian, VA 23112  
Phone: (804) 763-1200  
Fax: (804) 763-1800  
TOLL FREE: (800) 476-5227  
www.amerisci.com

<b>HDH Technical, Inc</b>	<b>400 W. Main Street Christiansburg, VA 24068</b>	<b>P.O.#:</b>
		<b>SPECIAL INSTRUCTIONS:</b>

PROJECT INFORMATION	ANALYSIS TYPE	TURNAROUND TIME (X)						AIR FILTER INFORMATION:
		6-8 HR	12 HR	24 HR	48 HR	72 HR	5 DAY	
JOB #: <i>Dwtn. JSRCC-Campus</i>	TEM/AHERA							MCE
JOB NAME: <i>Phase I, Gordon Bldg.</i>	TEM/LEVEL II							PC
JOB-MANAGER: <i>Basement</i>	TEM/7402							25 mm
JOB DESCRIPTION:	TEM/BULK							37 mm
	TEM/DUST							0.45 um
	TEM/WATER							0.80 um
	PLM				X			OTHER:
	PCM							
	OTHER:							

<b>RESULTS TO: ROBIN LIEBAL</b>	<b>INVOICE TO: HDH TECHNICAL, INC</b>	<b>Return Samples: Yes</b>	<b>No</b>
<b>EMAIL RESULTS: Y / N ROBIN@BEST-HDHT.COM</b>		<b>PHONE: (540) 381-7999</b>	
<b>WRITTEN REPORT TO:</b>		<b>FAX: (540) 381-7990</b>	
<b>COMMENTS:</b>		<b>SITE FAX:</b>	
		<b>PAGER/CELL:</b>	

Lab ID	Sample ID	Sample Location	START TIME	STOP TIME	TOTAL TIME X	LITERS /MIN.	TOTAL VOLUME	DATE COLLECTED
	50-1.1	Spray-on - Phase II						2/4/10
	50-1.2	"						
	50-2.1	Spray-on - Phase I						
	50-2.2	"						
	50-2.3	"						
	ES-3.1	Ends-panels on EGTS I - CHR						
	ES-3.2	"						
	ES-3.3	"						
	DC-4.1	Duct Casck - Flange						
	DC-4.2	"						
	DC-4.3	"						
	FT-5.1	12x12 white - Phase 75 - Hallway						
	FT-6.1	12x12 Khaki - Thruout						
	FM-7.1	Mastic on 6.1						
	CT-8.1	Ceiling Tile - Newer						
	CT-8.2	"						
	CT-9.1	Ceiling Tile - Older						
	CT-9.2	"						
	FT-10.1	12x12 Tan B. Steamwell						
	BM-11.1	Baseboard, Mastic						
	BM-11.2	"						
	SC-12.1	SR JT. Campd.						
	SC-12.2	"						

<b>SAMPLED BY:</b> <i>R.H. Liebal</i>	<b>DATE/TIME:</b> <i>2/4/10</i>	<b>RECEIVED BY:</b>	<b>DATE/TIME:</b>
<b>RELINQUISHED BY:</b> <i>R.H. Liebal</i>	<b>DATE/TIME:</b> <i>2/8/10</i>	<b>RECEIVED IN LAB BY:</b>	<b>DATE/TIME:</b>

By *[Signature]* DATE/TIME: *[Blank]*



**AmeriSci Richmond**

13635 GENITO ROAD  
MIDLOTHIAN, VIRGINIA 23112  
TEL: (804) 763-1200 • FAX: (804) 763-1800

**PLM Bulk Asbestos Report**

HDH Technical, Inc.  
Attn: Robin H. Liebal  
400 W. Main Street

Date Received 02/09/10  
Date Examined 02/09/10

AmeriSci Job # 110021185  
P.O. #  
Page 1 of 5

RE: Downtwn JSRCC - Campus; Phase I Gordon Bldg; Basement

Christiansburg, VA 24068

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
SO-1.1 Location: Spray-On - Phase II  Analyst Description: Gray, Heterogeneous, Fibrous, Spray-On Asbestos Types: Other Material: Fibrous glass 85 %, Non-fibrous 15 %	110021185-01	No	NAD (by CVES) by J. Samuel Baird on 02/09/10
SO-1.2 Location: Spray-On - Phase II  Analyst Description: Gray, Heterogeneous, Fibrous, Spray-On Asbestos Types: Other Material: Cellulose 2 %, Fibrous glass 85 %, Non-fibrous 13 %	110021185-02	No	NAD (by CVES) by J. Samuel Baird on 02/09/10
SO-2.1 Location: Spray-On - Phase I  Analyst Description: Gray, Heterogeneous, Fibrous, Spray-On Asbestos Types: Other Material: Cellulose 35 %, Fibrous glass 20 %, Mica 5 %, Non-fibrous 40 %	110021185-03	No	NAD (by CVES) by J. Samuel Baird on 02/09/10
SO-2.2 Location: Spray-On - Phase I  Analyst Description: Gray, Heterogeneous, Fibrous, Spray-On Asbestos Types: Other Material: Cellulose 35 %, Fibrous glass 20 %, Mica 5 %, Non-fibrous 40 %	110021185-04	No	NAD (by CVES) by J. Samuel Baird on 02/09/10
SO-2.3 Location: Spray-On - Phase I  Analyst Description: Gray, Heterogeneous, Fibrous, Spray-On Asbestos Types: Other Material: Cellulose 35 %, Fibrous glass 20 %, Mica 5 %, Non-fibrous 40 %	110021185-05	No	NAD (by CVES) by J. Samuel Baird on 02/09/10

## PLM Bulk Asbestos Report

Dwntwn JSRCC - Campus; Phase I Gordon Bldg; Basement

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
ES-3.1 <b>Location:</b> End Sealer On FG TSI - CHS	110021185-06	<b>No</b>	NAD (by CVES) by J. Samuel Baird on 02/09/10
<b>Analyst Description:</b> White, Heterogeneous, Non-Fibrous, Sealant <b>Asbestos Types:</b> <b>Other Material:</b> Non-fibrous 100 %			
ES-3.2 <b>Location:</b> End Sealer On FG TSI - CHS	110021185-07	<b>No</b>	NAD (by CVES) by J. Samuel Baird on 02/09/10
<b>Analyst Description:</b> White, Heterogeneous, Non-Fibrous, Sealant <b>Asbestos Types:</b> <b>Other Material:</b> Non-fibrous 100 %			
ES-3.3 <b>Location:</b> End Sealer On FG TSI - CHR	110021185-08	<b>No</b>	NAD (by CVES) by J. Samuel Baird on 02/09/10
<b>Analyst Description:</b> White, Heterogeneous, Non-Fibrous, Sealant <b>Asbestos Types:</b> <b>Other Material:</b> Wollastonite 4 %, Non-fibrous 96 %			
DC-4.1 <b>Location:</b> Duct Caulk - Flange	110021185-09	<b>No</b>	NAD (by CVES) by J. Samuel Baird on 02/09/10
<b>Analyst Description:</b> White/Brown, Heterogeneous, Non-Fibrous, Caulking <b>Asbestos Types:</b> <b>Other Material:</b> Cellulose 15 %, Non-fibrous 85 %			
DC-4.2 <b>Location:</b> Duct Caulk - Flange	110021185-10	<b>No</b>	NAD (by CVES) by J. Samuel Baird on 02/09/10
<b>Analyst Description:</b> White/Brown, Heterogeneous, Non-Fibrous, Caulking <b>Asbestos Types:</b> <b>Other Material:</b> Cellulose 15 %, Non-fibrous 85 %			
DC-4.3 <b>Location:</b> Duct Caulk - Flange	110021185-11	<b>No</b>	NAD (by CVES) by J. Samuel Baird on 02/09/10
<b>Analyst Description:</b> White/Brown, Heterogeneous, Non-Fibrous, Bulk Material <b>Asbestos Types:</b> <b>Other Material:</b> Cellulose 15 %, Non-fibrous 85 %			



## PLM Bulk Asbestos Report

Dwntwn JSRCC - Campus; Phase I Gordon Bldg; Basement

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
FT-5.1 <b>Location:</b> 12x12 White - Phase II - Hallway	110021185-12	No	NAD (by CVES) by J. Samuel Baird on 02/09/10
<b>Analyst Description:</b> White, Heterogeneous, Non-Fibrous, Floor Tile <b>Asbestos Types:</b> <b>Other Material:</b> Non-fibrous 100 %			
FT-6.1 <b>Location:</b> 12x12 Khaki - Throughout	110021185-13	No	NAD (by CVES) by J. Samuel Baird on 02/09/10
<b>Analyst Description:</b> Brown, Heterogeneous, Non-Fibrous, Floor Tile <b>Asbestos Types:</b> <b>Other Material:</b> Non-fibrous 100 %			
FM-7.1 <b>Location:</b> Mastic On 6.1	110021185-14	Yes	5 % (by CVES) by J. Samuel Baird on 02/10/10
<b>Analyst Description:</b> Black, Heterogeneous, Non-Fibrous, Mastic <b>Asbestos Types:</b> Chrysotile 5.0 % <b>Other Material:</b> Non-fibrous 95 %			
CT-8.1 <b>Location:</b> Ceiling Tile - Newer	110021185-15	No	NAD (by CVES) by J. Samuel Baird on 02/10/10
<b>Analyst Description:</b> White/Lt.Grey, Heterogeneous, Fibrous, Ceiling Tile <b>Asbestos Types:</b> <b>Other Material:</b> Cellulose 50 %, Fibrous glass 25 %, Non-fibrous 15 %, Perlite 10 %			
CT-8.2 <b>Location:</b> Ceiling Tile - Newer	110021185-16	No	NAD (by CVES) by J. Samuel Baird on 02/10/10
<b>Analyst Description:</b> White/Lt.Grey, Heterogeneous, Fibrous, Ceiling Tile <b>Asbestos Types:</b> <b>Other Material:</b> Cellulose 50 %, Fibrous glass 25 %, Non-fibrous 15 %, Perlite 10 %			
CT-9.1 <b>Location:</b> Ceiling Tile - Older	110021185-17	No	NAD (by CVES) by J. Samuel Baird on 02/10/10
<b>Analyst Description:</b> White/Lt.Grey, Heterogeneous, Fibrous, Ceiling Tile <b>Asbestos Types:</b> <b>Other Material:</b> Cellulose 50 %, Fibrous glass 25 %, Non-fibrous 15 %, Perlite 10 %			

Client Name: HDH Technical, Inc.

**PLM Bulk Asbestos Report**

Dwntwn JSRCC - Campus; Phase I Gordon Bldg; Basement

<b>Client No. / HGA</b>	<b>Lab No.</b>	<b>Asbestos Present</b>	<b>Total % Asbestos</b>
CT-9.2 <b>Location:</b> Ceiling Tile - Older	110021185-18	<b>No</b>	<b>NAD</b> (by CVES) by J. Samuel Baird on 02/10/10
<b>Analyst Description:</b> White/Lt.Grey, Heterogeneous, Fibrous, Ceiling Tile <b>Asbestos Types:</b> <b>Other Material:</b> Cellulose 50 %, Fibrous glass 25 %, Non-fibrous 15 %, Perlite 10 %			
FT-10.1 <b>Location:</b> 12x12 Tan @ Stairwell	110021185-19	<b>No</b>	<b>NAD</b> (by CVES) by J. Samuel Baird on 02/10/10
<b>Analyst Description:</b> Tan, Heterogeneous, Non-Fibrous, Floor Tile <b>Asbestos Types:</b> <b>Other Material:</b> Non-fibrous 100 %			
BM-11.1 <b>Location:</b> Baseboard Mastic	110021185-20	<b>No</b>	<b>NAD</b> (by CVES) by J. Samuel Baird on 02/10/10
<b>Analyst Description:</b> Tan, Heterogeneous, Non-Fibrous, Mastic <b>Asbestos Types:</b> <b>Other Material:</b> Non-fibrous 100 %			
BM-11.2 <b>Location:</b> Baseboard Mastic	110021185-21	<b>No</b>	<b>NAD</b> (by CVES) by J. Samuel Baird on 02/10/10
<b>Analyst Description:</b> White, Heterogeneous, Non-Fibrous, Mastic <b>Asbestos Types:</b> <b>Other Material:</b> Non-fibrous 100 %			
JC-12.1 <b>Location:</b> SR Jt. Cmpd.	110021185-22	<b>No</b>	<b>NAD</b> (by CVES) by J. Samuel Baird on 02/10/10
<b>Analyst Description:</b> White, Heterogeneous, Non-Fibrous, Joint Compound <b>Asbestos Types:</b> <b>Other Material:</b> Non-fibrous 100 %			
JC-12.2 <b>Location:</b> SR Jt. Cmpd.	110021185-23	<b>No</b>	<b>NAD</b> (by CVES) by J. Samuel Baird on 02/10/10
<b>Analyst Description:</b> White, Heterogeneous, Non-Fibrous, Joint Compound <b>Asbestos Types:</b> <b>Other Material:</b> Non-fibrous 100 %			

Client Name: HDH Technical, Inc.

# PLM Bulk Asbestos Report

Dwntwn JSRCC - Campus; Phase I Gordon Bldg; Basement

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### Reporting Notes:

Analyzed by: J. Samuel Baird

Date

*J. S. Baird* 2/10/10  
\*NAD = no asbestos detected, Detection Limit <1%, Reporting Limits: CVES = 1%, 400 Pt Ct = 0.25%, 1000 Pt Ct = 0.1%; "Present" or NVA = "No Visible Asbestos" are observations made during a qualitative analysis; NA = not analyzed; NA/PS = not analyzed / positive stop; PLM Bulk Asbestos Analysis by EPA 600/M4-82-020 per 40 CFR 763 (NVLAP Lab Code 101904-0) and ELAP PLM Analysis Protocol 198.1 for New York friable samples (198.6 for NOB samples)(NYSDOH ELAP Lab # 10984); CA ELAP Lab # 2508; Note: PLM is not consistently reliable in detecting asbestos in floor coverings and similar NOB materials. NAD or Trace results by PLM are inconclusive, TEM is currently the only method that can be used to determine if this material can be considered or treated as non-asbestos-containing in New York State (also see EPA Advisory for floor tile, FR 59, 146, 38970, 8/1/94). NIST Accreditation requirements mandate that this report must not be reproduced except in full without the approval of the laboratory. This PLM report relates ONLY to the items tested.

Reviewed By: \_\_\_\_\_



America's Laboratory

### CHAIN OF CUSTODY RECORD

AMERISCI RICHMOND  
Job No.: 110021188

**AmeriSci** Richmond  
13635 Genito Road  
Midlothian, VA 23112  
Phone: (804) 763-1200  
Fax: (804) 763-1800  
TOLL FREE: (800) 476-5227  
www.amerisci.com

HDH Technical, Inc	400 W. Main Street Christiansburg, VA 24068	P.O.#: SPECIAL INSTRUCTIONS:
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PROJECT INFORMATION	ANALYSIS TYPE	TURNAROUND TIME (X)							AIR FILTER INFORMATION:	
		6-8 HR	12 HR	24 HR	48 HR	72 HR	5 DAY	OTHER	MCE	
JOB #: DWATA	TEM/AHERA									PC
ISDCC - Campus	TEM/LEVEL II									25 mm
JOB NAME: Phase I	TEM/7402									37 mm
Garden Bldg.	TEM/BULK									0.45 um
JOB MANAGER:	TEM/DUST									0.80 um
1st Floor	TEM/WATER									OTHER:
JOB DESCRIPTION:	PLM									
	PCM									
	OTHER:									

RESULTS TO: ROBIN LIEBAL	INVOICE TO: HDH TECHNICAL, INC	Return Samples: Yes	No
EMAIL RESULTS: Y / N	ROBIN@BEST-HDHT.COM	PHONE: (540) 381-7999	
WRITTEN REPORT TO:		FAX: (540) 381-7990	
COMMENTS:		SITE FAX:	
		PAGER/CELL:	

Lab ID	Sample ID	Sample Location	START TIME	STOP TIME	TOTAL TIME X	LITERS /MIN.	TOTAL VOLUME	DATE COLLECTED
	SO-2.4	Spacy on Fireproof						2/4/10
	CT-13.1	Ceiling Tile - 2x2						
	CT-13.2	" "						
	BM-14.1	Baseboard mastic						
	BM-14.2	" "						
	JC-15.1	5R ST. Compd.						
	JC-15.2	" "						
	FT-16.1	12x12 Khaki						
	FT-17.1	12x12 white w/Blue						
	CT-18.1	Ceiling Tile - 2x4				" "		
	CT-18.2	" "				" "		
	DM-19.1	Duct Mastic - Roof HVAC chase				" "		
	DM-19.2	" "				" "		

SAMPLED BY: R.H. Liebal	DATE/TIME: 2/4/10	RECEIVED BY:	DATE/TIME:
RELINQUISHED BY: R.H. Liebal	DATE/TIME: 2/8/10	RECEIVED IN LAB BY:	DATE/TIME:



**AmeriSci Richmond**

13635 GENITO ROAD  
MIDLOTHIAN, VIRGINIA 23112  
TEL: (804) 763-1200 • FAX: (804) 763-1800

## PLM Bulk Asbestos Report

HDH Technical, Inc.  
Attn: Robin H. Liebal  
400 W. Main Street  
  
Christiansburg, VA 24068

**Date Received** 02/09/10    **AmeriSci Job #** 110021182  
**Date Examined** 02/09/10    **P.O. #**  
**Page** 1 of 3  
**RE:** Dwntwn JSRCC - Campus; Phase I Gordon Bldg; 1st Floor

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
SO-2.4 <b>Location:</b> Spray-On Fireproofing	110021182-01	No	NAD (by CVES) by C. David Mintz on 02/09/10
<b>Analyst Description:</b> Grayish Tan, Heterogeneous, Non-Fibrous, Bulk Material <b>Asbestos Types:</b> <b>Other Material:</b> Cellulose 15 %, Fibrous glass 10 %, Non-fibrous 75 %			
CT-13.1 <b>Location:</b> Ceiling Tile - 2x2	110021182-02	No	NAD (by CVES) by C. David Mintz on 02/09/10
<b>Analyst Description:</b> White/ Tan, Heterogeneous, Fibrous, Bulk Material <b>Asbestos Types:</b> <b>Other Material:</b> Cellulose 30 %, Fibrous glass 3 %, Non-fibrous 67 %			
CT-13.2 <b>Location:</b> Ceiling Tile - 2x2	110021182-03	No	NAD (by CVES) by C. David Mintz on 02/09/10
<b>Analyst Description:</b> White/ Tan, Heterogeneous, Fibrous, Bulk Material <b>Asbestos Types:</b> <b>Other Material:</b> Cellulose 30 %, Fibrous glass 3 %, Non-fibrous 67 %			
BM-14.1 <b>Location:</b> Baseboard Mastic	110021182-04	No	NAD (by CVES) by C. David Mintz on 02/09/10
<b>Analyst Description:</b> Cream, Heterogeneous, Non-Fibrous, Bulk Material <b>Asbestos Types:</b> <b>Other Material:</b> Cellulose 2 %, Non-fibrous 98 %			
BM-14.2 <b>Location:</b> Baseboard Mastic	110021182-05	No	NAD (by CVES) by C. David Mintz on 02/09/10
<b>Analyst Description:</b> Cream - Lt Tan, Heterogeneous, Non-Fibrous, Bulk Material <b>Asbestos Types:</b> <b>Other Material:</b> Cellulose 3 %, Non-fibrous 97 %			

Client Name: HDH Technical, Inc.

**PLM Bulk Asbestos Report**

Dwntwn JSRCC - Campus; Phase I Gordon Bldg; 1st Floor

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
JC-15.1 Location: SR Jt. Cmpd.	110021182-06	No	NAD (by CVES) by C. David Mintz on 02/09/10
<b>Analyst Description:</b> White, Heterogeneous, Non-Fibrous, Bulk Material <b>Asbestos Types:</b> <b>Other Material:</b> Cellulose Trace, Non-fibrous 100 %			
JC-15.2 Location: SR Jt. Cmpd.	110021182-07	No	NAD (by CVES) by C. David Mintz on 02/09/10
<b>Analyst Description:</b> White, Heterogeneous, Non-Fibrous, Bulk Material <b>Asbestos Types:</b> <b>Other Material:</b> Cellulose Trace, Non-fibrous 100 %			
FT-16.1 Location: 12x12 Khaki	110021182-08	No	NAD (by CVES) by C. David Mintz on 02/09/10
<b>Analyst Description:</b> Tan, Homogeneous, Non-Fibrous, Floor Tile <b>Asbestos Types:</b> <b>Other Material:</b> Cellulose 1 %, Non-fibrous 99 %			
FT-17.1 Location: 12x12 White w/Blue - Bus. Office	110021182-09	No	NAD (by CVES) by C. David Mintz on 02/09/10
<b>Analyst Description:</b> White, Homogeneous, Non-Fibrous, Floor Tile <b>Asbestos Types:</b> <b>Other Material:</b> Non-fibrous 100 %			
CT-18.1 Location: Ceiling Tile - 2x4 Bus. Office	110021182-10	No	NAD (by CVES) by C. David Mintz on 02/09/10
<b>Analyst Description:</b> White/Tan, Heterogeneous, Fibrous, Ceiling Tile <b>Asbestos Types:</b> <b>Other Material:</b> Cellulose 30 %, Fibrous glass Trace, Non-fibrous 70 %			
CT-18.2 Location: Ceiling Tile - 2x4 Bus. Office	110021182-11	No	NAD (by CVES) by C. David Mintz on 02/09/10
<b>Analyst Description:</b> White/ Tan, Heterogeneous, Fibrous, Ceiling Tile <b>Asbestos Types:</b> <b>Other Material:</b> Cellulose 30 %, Fibrous glass Trace, Non-fibrous 70 %			

# PLM Bulk Asbestos Report

Dwntwn JSRCC - Campus; Phase I Gordon Bldg; 1st Floor

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
DM-19.1 Location: Duct Mastic - Red - HVAC Chase	110021182-12	No	NAD (by CVES) by C. David Mintz on 02/09/10
<b>Analyst Description:</b> Red, Heterogeneous, Non-Fibrous, Bulk Material <b>Asbestos Types:</b> <b>Other Material:</b> Fibrous glass Trace, Non-fibrous 100 %			
DM-19.2 Location: Duct Mastic - Red - HVAC Chase	110021182-13	No	NAD (by CVES) by C. David Mintz on 02/09/10
<b>Analyst Description:</b> Red, Heterogeneous, Non-Fibrous, Bulk Material <b>Asbestos Types:</b> <b>Other Material:</b> Fibrous glass Trace, Non-fibrous 100 %			

**Reporting Notes:**

Analyzed by: C. David Mintz *C. David Mintz* Date 2/9/10  
\*NAD = no asbestos detected, Detection Limit <1%, Reporting Limits: CVES = 1%, 400 Pt Ct = 0.25%, 1000 Pt Ct = 0.1%; "Present" or NVA = "No Visible Asbestos" are observations made during a qualitative analysis; NA = not analyzed; NA/PS = not analyzed / positive stop; PLM Bulk Asbestos Analysis by EPA 600/M4-82-020 per 40 CFR 763 (NVLAP Lab Code 101904-0) and ELAP PLM Analysis Protocol 198.1 for New York friable samples (198.6 for NOB samples)(NYSDOH ELAP Lab # 10984); CA ELAP Lab # 2508; Note: PLM is not consistently reliable in detecting asbestos in floor coverings and similar NOB materials. NAD or Trace results by PLM are inconclusive, TEM is currently the only method that can be used to determine if this material can be considered or treated as non-asbestos-containing in New York State (also see EPA Advisory for floor tile, FR 59, 146, 38970, 8/1/94). NIST Accreditation requirements mandate that this report must not be reproduced except in full without the approval of the laboratory. This PLM report relates ONLY to the items tested.

Reviewed By: \_\_\_\_\_



### CHAIN OF CUSTODY RECORD

**AmeriSci** Richmond  
 13635 Genito Road  
 Midlothian, VA 23112  
**Phone: (804) 763-1200**  
**Fax: (804) 763-1800**  
 TOLL FREE: (800) 476-5227  
 www.amerisci.com

AMERISCI RICHMOND Job No.: **110021188**

<b>HDH Technical, Inc</b>	400 W. Main Street Christiansburg, VA 24068	P.O.#: SPECIAL INSTRUCTIONS:
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PROJECT INFORMATION	ANALYSIS TYPE	TURNAROUND TIME (X)							AIR FILTER INFORMATION:	
		6-8 HR	12 HR	24 HR	48 HR	72 HR	5 DAY	OTHER	MCE	
JOB #: <i>dwon twon.</i>	TEM/AHERA								MCE	
<i>JSRCC - Campus</i>	TEM/LEVEL II								PC	
JOB NAME.: <i>Phase F</i>	TEM/7402								25 mm	
<i>Garden Bldg.</i>	TEM/BULK								37 mm	
JOB MANAGER:	TEM/DUST								0.45 um	
<i>2nd floor</i>	TEM/WATER								0.80 um	
JOB DESCRIPTION:	PLM				X				OTHER:	
	PCM									
	OTHER:									

RESULTS TO: <b>ROBIN LIEBAL</b>	INVOICE TO: <b>HDH TECHNICAL, INC</b>	Return Samples: <b>Yes</b> <input type="checkbox"/> <b>No</b> <input type="checkbox"/>
EMAIL RESULTS: <b>Y / N</b> <b>ROBIN@BEST-HDHT.COM</b>		PHONE: <b>(540) 381-7999</b>
WRITTEN REPORT TO:		FAX: <b>(540) 381-7990</b>
COMMENTS:		SITE FAX:
		PAGER/CELL:

Lab ID	Sample ID	Sample Location	START TIME	STOP TIME	TOTAL TIME X	LITERS /MIN.	TOTAL VOLUME	DATE COLLECTED
	<i>SO-2.5</i>	<i>Spacy on Floor of 2g</i>						2/4/10
	<i>CT-20.1</i>	<i>ceiling tile - new</i>						
	<i>CT-20.2</i>	<i>"</i>						
	<i>CT-21.1</i>	<i>ceiling tile - old</i>						
	<i>CT-21.2</i>	<i>"</i>						
	<i>JC-22.1</i>	<i>SR JT. Compd</i>						
	<i>JC-22.2</i>	<i>"</i>						
	<i>BM-23.1</i>	<i>Baseboard Mastic</i>						
	<i>BM-23.2</i>	<i>"</i>						
	<i>DM-24.1</i>	<i>Duct Mastic - Grey - NUAC</i>						
	<i>CM-25.1</i>	<i>Carpet Mastic - Libany</i>						
	<i>CM-25.2</i>	<i>"</i>						
	<i>BM-26.1</i>	<i>Baseboard Mastic - "</i>						

RECEIVED  
 FEB 09 2010  
 By *AW*  
 DATE/TIME:

SAMPLED BY: <i>R.H. Liebal</i>	DATE/TIME: <i>2/4/10</i>	RECEIVED BY:	DATE/TIME:
RELINQUISHED BY: <i>R.H. Liebal</i>	DATE/TIME: <i>2/8/10</i>	RECEIVED IN LAB BY:	DATE/TIME:





**AmeriSci Richmond**

13635 GENITO ROAD  
MIDLOTHIAN, VIRGINIA 23112  
TEL: (804) 763-1200 • FAX: (804) 763-1800

**PLM Bulk Asbestos Report**

HDH Technical, Inc.  
Attn: Robin H. Liebal  
400 W. Main Street  
  
Christiansburg, VA 24068

**Date Received** 02/09/10    **AmeriSci Job #** 110021183  
**Date Examined** 02/09/10    **P.O. #**  
**Page** 1 of 3  
**RE:** Dwntrwn JSRCC - Campus; Phase I Gordon Bldg; 2nd Floor

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
SO-2.5 Location: Spray-On Fireproofing	110021183-01	No	NAD (by CVES) by J. Samuel Baird on 02/09/10
<b>Analyst Description:</b> Off White, Heterogeneous, Non-Fibrous, Spray-On <b>Asbestos Types:</b> <b>Other Material:</b> Cellulose 35 %, Fibrous glass 20 %, Mica 5 %, Non-fibrous 40 %			
CT-20.1 Location: Ceiling Tile - New	110021183-02	No	NAD (by CVES) by J. Samuel Baird on 02/09/10
<b>Analyst Description:</b> White/Lt.Grey, Heterogeneous, Fibrous, Ceiling Tile <b>Asbestos Types:</b> <b>Other Material:</b> Cellulose 55 %, Fibrous glass 20 %, Non-fibrous 15 %, Perlite 10 %			
CT-20.2 Location: Ceiling Tile - New	110021183-03	No	NAD (by CVES) by J. Samuel Baird on 02/09/10
<b>Analyst Description:</b> White/Lt.Grey, Heterogeneous, Fibrous, Ceiling Tile <b>Asbestos Types:</b> <b>Other Material:</b> Cellulose 55 %, Fibrous glass 20 %, Non-fibrous 15 %, Perlite 10 %			
CT-21.1 Location: Ceiling Tile - Old	110021183-04	No	NAD (by CVES) by J. Samuel Baird on 02/09/10
<b>Analyst Description:</b> Gray, Heterogeneous, Fibrous, Ceiling Tile <b>Asbestos Types:</b> <b>Other Material:</b> Cellulose 55 %, Fibrous glass 20 %, Non-fibrous 15 %, Perlite 10 %			
CT-21.2 Location: Ceiling Tile - Old	110021183-05	No	NAD (by CVES) by J. Samuel Baird on 02/09/10
<b>Analyst Description:</b> White/Lt.Grey, Heterogeneous, Fibrous, Ceiling Tile <b>Asbestos Types:</b> <b>Other Material:</b> Cellulose 55 %, Fibrous glass 20 %, Non-fibrous 15 %, Perlite 10 %			

Client Name: HDH Technical, Inc.

**PLM Bulk Asbestos Report**

Dwntwn JSRCC - Campus; Phase I Gordon Bldg; 2nd Floor

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
JC-22.1 Location: SR Jt. Cmpd.	110021183-06	No	NAD (by CVES) by J. Samuel Baird on 02/09/10
<b>Analyst Description:</b> White, Heterogeneous, Non-Fibrous, Joint Compound <b>Asbestos Types:</b> <b>Other Material:</b> Non-fibrous 100 %			
JC-22.2 Location: SR Jt. Cmpd.	110021183-07	No	NAD (by CVES) by J. Samuel Baird on 02/09/10
<b>Analyst Description:</b> White, Heterogeneous, Non-Fibrous, Joint Compound <b>Asbestos Types:</b> <b>Other Material:</b> Non-fibrous 100 %			
BM-23-1 Location: Baseboard Mastic	110021183-08	No	NAD (by CVES) by J. Samuel Baird on 02/09/10
<b>Analyst Description:</b> Brown, Heterogeneous, Non-Fibrous, Mastic <b>Asbestos Types:</b> <b>Other Material:</b> Non-fibrous 100 %			
BM-23-2 Location: Baseboard Mastic	110021183-09	No	NAD (by CVES) by J. Samuel Baird on 02/09/10
<b>Analyst Description:</b> Brown, Heterogeneous, Non-Fibrous, Mastic <b>Asbestos Types:</b> <b>Other Material:</b> Non-fibrous 100 %			
DM-24.1 Location: Duct Mastic - Grey - HVAC	110021183-10	No	NAD (by CVES) by J. Samuel Baird on 02/09/10
<b>Analyst Description:</b> Gray, Heterogeneous, Non-Fibrous, Mastic <b>Asbestos Types:</b> <b>Other Material:</b> Non-fibrous 100 %			
CM-25.1 Location: Carpet Mastic - Library	110021183-11	No	NAD (by CVES) by J. Samuel Baird on 02/09/10
<b>Analyst Description:</b> Yellow, Heterogeneous, Non-Fibrous, Carpet Mastic <b>Asbestos Types:</b> <b>Other Material:</b> Non-fibrous 100 %			

# PLM Bulk Asbestos Report

Dwntwn JSRCC - Campus; Phase I Gordon Bldg; 2nd Floor

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
CM-25.2 Location: Carpet Mastic - Library	110021183-12	No	NAD (by CVES) by J. Samuel Baird on 02/09/10
<b>Analyst Description:</b> Yellow, Heterogeneous, Non-Fibrous, Carpet Mastic <b>Asbestos Types:</b> <b>Other Material:</b> Non-fibrous 100 %			
BM-26.1 Location: Baseboard Mastic - Library	110021183-13	No	NAD (by CVES) by J. Samuel Baird on 02/09/10
<b>Analyst Description:</b> Brown, Heterogeneous, Non-Fibrous, Mastic <b>Asbestos Types:</b> <b>Other Material:</b> Non-fibrous 100 %			

**Reporting Notes:**

Analyzed by: J. Samuel Baird *J. Samuel Baird* Date *2/9/10*

\*NAD = no asbestos detected, Detection Limit <1%, Reporting Limits: CVES = 1%, 400 Pt Ct = 0.25%, 1000 Pt Ct = 0.1%; "Present" or NVA = "No Visible Asbestos" are observations made during a qualitative analysis; NA = not analyzed; NA/PS = not analyzed / positive stop; PLM Bulk Asbestos Analysis by EPA 600/M4-82-020 per 40 CFR 763 (NVLAP Lab Code 101904-0) and ELAP PLM Analysis Protocol 198.1 for New York friable samples (198.6 for NOB samples)(NYSDOH ELAP Lab # 10984); CA ELAP Lab # 2508; Note: PLM is not consistently reliable in detecting asbestos in floor coverings and similar NOB materials. NAD or Trace results by PLM are inconclusive, TEM is currently the only method that can be used to determine if this material can be considered or treated as non-asbestos-containing in New York State (also see EPA Advisory for floor tile, FR 59, 146, 38970, 8/1/94). NIST Accreditation requirements mandate that this report must not be reproduced except in full without the approval of the laboratory. This PLM report relates ONLY to the items tested.

Reviewed By: \_\_\_\_\_

# AMERISCI

America's Laboratory

## CHAIN OF CUSTODY RECORD

AMERISCI RICHMOND  
Job No.: **110021180**

**AmeriSci** Richmond  
13635 Genito Road  
Midlothian, VA 23112  
Phone: (804) 763-1200  
Fax: (804) 763-1800  
TOLL FREE: (800) 476-5227  
www.amerisci.com

<b>HDH Technical, Inc</b>	<b>400 W. Main Street Christiansburg, VA 24068</b>	<b>P.O.#:</b> <b>SPECIAL INSTRUCTIONS:</b>
---------------------------	--	---

PROJECT INFORMATION	ANALYSIS TYPE	TURNAROUND TIME (X)							AIR FILTER INFORMATION:	
		6-8 HR	12 HR	24 HR	48 HR	72 HR	5 DAY	OTHER	MCE	
JOB #: <b>Duonton, JSPCC-Campus</b>	TEM/AHERA								MCE	
JOB NAME: <b>Phase I, Garden Bldg</b>	TEM/LEVEL II								PC	
JOB MANAGER: <b>3rd Floor</b>	TEM/7402								25 mm	
JOB DESCRIPTION:	TEM/BULK								37 mm	
	TEM/DUST								0.45 um	
	TEM/WATER								0.80 um	
	PLM								OTHER:	
	PCM									
	OTHER:									

RESULTS TO: <b>ROBIN LIEBAL</b>	INVOICE TO: <b>HDH TECHNICAL, INC</b>	Return Samples: <b>Yes</b> <b>No</b>
EMAIL RESULTS: <b>Y / N ROBIN@BEST-HDHT.COM</b>		PHONE: <b>(540) 381-7999</b>
WRITTEN REPORT TO:		FAX: <b>(540) 381-7990</b>
COMMENTS:		SITE FAX:
		PAGER/CELL:

Lab ID	Sample ID	Sample Location	START TIME	STOP TIME	TOTAL TIME X LITERS /MIN. = TOTAL VOLUME	DATE COLLECTED
	SO-2.6	Spray-on fire proofing				2/4/10
	CT-27.1	Ceiling tile - new				}
	CT-27.2	"				
	CT-28.1	Ceiling tile - old				
	CT-28.2	"				
	BM-29.1	Baseboard mastic				
	BM-29.2	"				
	JC-30.1	SR JT. Carpet				
	JC-30.2	"				
	FT-31.1	12x12 Kwik-i				
	FM-32.1	Mastic				
	FT-33.1	12x12 Tan				

SAMPLED BY: <b>R.H. Liebal</b>	DATE/TIME: <b>2/4/10</b>	RECEIVED BY: <b>[Signature]</b>	DATE/TIME: <b>[Signature]</b>
RELINQUISHED BY: <b>R.H. Liebal</b>	DATE/TIME: <b>2/8/10</b>	RECEIVED IN LAB BY: <b>[Signature]</b>	DATE/TIME: <b>[Signature]</b>



**AmeriSci Richmond**

13635 GENITO ROAD  
MIDLOTHIAN, VIRGINIA 23112  
TEL: (804) 763-1200 • FAX: (804) 763-1800

## PLM Bulk Asbestos Report

HDH Technical, Inc.  
Attn: Robin H. Liebal  
400 W. Main Street

Christiansburg, VA 24068

**Date Received** 02/09/10 **AmeriSci Job #** 110021180

**Date Examined** 02/09/10 **P.O. #**

**Page** 1 of 3

**RE:** Dwntwn JSRCC - Campus; Phase I Gordon Bldg; 3rd Floor

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
SO-2.6 <b>Location:</b> Spray-On Fireproofing	110021180-01	No	NAD (by CVES) by Gordon T. Saleeby on 02/09/10
<b>Analyst Description:</b> Gray/Tan, Heterogeneous, Non-Fibrous, Bulk Material <b>Asbestos Types:</b> <b>Other Material:</b> Cellulose 20 %, Fibrous glass 3 %, Non-fibrous 77 %			
CT-27.1 <b>Location:</b> Ceiling Tile - New	110021180-02	No	NAD (by CVES) by Gordon T. Saleeby on 02/09/10
<b>Analyst Description:</b> White/Beige, Heterogeneous, Non-Fibrous, Bulk Material <b>Asbestos Types:</b> <b>Other Material:</b> Cellulose 40 %, Fibrous glass 30 %, Non-fibrous 30 %			
CT-27.2 <b>Location:</b> Ceiling Tile - New	110021180-03	No	NAD (by CVES) by Gordon T. Saleeby on 02/09/10
<b>Analyst Description:</b> White/Beige, Heterogeneous, Non-Fibrous, Bulk Material <b>Asbestos Types:</b> <b>Other Material:</b> Cellulose 40 %, Fibrous glass 30 %, Non-fibrous 30 %			
CT-28.1 <b>Location:</b> Ceiling Tile - Old	110021180-04	No	NAD (by CVES) by Gordon T. Saleeby on 02/09/10
<b>Analyst Description:</b> White/Beige, Heterogeneous, Non-Fibrous, Bulk Material <b>Asbestos Types:</b> <b>Other Material:</b> Cellulose 30 %, Fibrous glass 40 %, Non-fibrous 30 %			
CT-28.2 <b>Location:</b> Ceiling Tile - Old	110021180-05	No	NAD (by CVES) by Gordon T. Saleeby on 02/09/10
<b>Analyst Description:</b> White/Beige, Heterogeneous, Non-Fibrous, Bulk Material <b>Asbestos Types:</b> <b>Other Material:</b> Cellulose 30 %, Fibrous glass 40 %, Non-fibrous 30 %			

## PLM Bulk Asbestos Report

Dwntwn JSRCC - Campus; Phase I Gordon Bldg; 3rd Floor

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
BM-29.1 Location: Baseboard Mastic	110021180-06	No	NAD (by CVES) by Gordon T. Saleeby on 02/09/10
<b>Analyst Description:</b> Brown, Heterogeneous, Non-Fibrous, Bulk Material <b>Asbestos Types:</b> <b>Other Material:</b> Non-fibrous 100 %			
BM-29.2 Location: Baseboard Mastic	110021180-07	No	NAD (by CVES) by Gordon T. Saleeby on 02/09/10
<b>Analyst Description:</b> Brown, Heterogeneous, Non-Fibrous, Bulk Material <b>Asbestos Types:</b> <b>Other Material:</b> Non-fibrous 100 %			
JC-30.1 Location: SR Jt. Cmpd.	110021180-08	No	NAD (by CVES) by Gordon T. Saleeby on 02/09/10
<b>Analyst Description:</b> White, Heterogeneous, Non-Fibrous, Bulk Material <b>Asbestos Types:</b> <b>Other Material:</b> Non-fibrous 100 %			
JC-30.2 Location: SR Jt. Cmpd.	110021180-09	No	NAD (by CVES) by Gordon T. Saleeby on 02/09/10
<b>Analyst Description:</b> White, Heterogeneous, Non-Fibrous, Bulk Material <b>Asbestos Types:</b> <b>Other Material:</b> Non-fibrous 100 %			
FT-31.1 Location: 12x12 Khaki	110021180-10	Yes	2 % (by CVES) by Gordon T. Saleeby on 02/09/10
<b>Analyst Description:</b> Olive, Heterogeneous, Non-Fibrous, Bulk Material <b>Asbestos Types:</b> Chrysotile 2.0 % <b>Other Material:</b> Non-fibrous 98 %			
FM-32.1 Location: Mastic	110021180-11	No	NAD (by CVES) by Gordon T. Saleeby on 02/09/10
<b>Analyst Description:</b> Black, Heterogeneous, Non-Fibrous, Bulk Material <b>Asbestos Types:</b> <b>Other Material:</b> Non-fibrous 100 %			

Client Name: HDH Technical, Inc.

# PLM Bulk Asbestos Report

Dwntwn JSRCC - Campus; Phase I Gordon Bldg; 3rd Floor

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
FT-33.1  Location: 12x12 Tan	110021180-12	No	NAD (by CVES) by Gordon T. Saleeby on 02/09/10
<b>Analyst Description:</b> Tan, Heterogeneous, Non-Fibrous, Bulk Material <b>Asbestos Types:</b> <b>Other Material:</b> Non-fibrous 100 %			

**Reporting Notes:**

Analyzed by: Gordon T. Saleeby

*Gordon T. Saleeby* Date: *Feb 9, 2010*

\*NAD = no asbestos detected, Detection Limit <1%, Reporting Limits CVES = 1%, 400 Pt Ct = 0.25%, 1000 Pt Ct = 0.1%; "Present" or NVA = "No Visible Asbestos" are observations made during a qualitative analysis; NA = not analyzed; NA/PS = not analyzed / positive stop; PLM Bulk Asbestos Analysis by EPA 600/M4-82-020 per 40 CFR 763 (NVLAP Lab Code 101904-0) and ELAP PLM Analysis Protocol 198.1 for New York friable samples (198.6 for NOB samples)(NYSDOH ELAP Lab # 10984); CA ELAP Lab # 2508; Note: PLM is not consistently reliable in detecting asbestos in floor coverings and similar NOB materials. NAD or Trace results by PLM are inconclusive, TEM is currently the only method that can be used to determine if this material can be considered or treated as non-asbestos-containing in New York State (also see EPA Advisory for floor tile, FR 59, 146, 38970, 8/1/94). NIST Accreditation requirements mandate that this report must not be reproduced except in full without the approval of the laboratory. This PLM report relates ONLY to the items tested,

Reviewed By: \_\_\_\_\_



### CHAIN OF CUSTODY RECORD

**AmeriSci** Richmond  
 13635 Genito Road  
 Midlothian, VA 23112  
 Phone: (804) 763-1200  
 Fax: (804) 763-1800  
 TOLL FREE: (800) 476-5227  
 www.amerisci.com

**AMERISCI RICHMOND**  
 Job No.: 110021184

<b>HDH Technical, Inc</b>	400 W. Main Street Christiansburg, VA 24068	P.O.#: SPECIAL INSTRUCTIONS:
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PROJECT INFORMATION	ANALYSIS TYPE	TURNAROUND TIME (X)							AIR FILTER INFORMATION:	
		6-8 HR	12 HR	24 HR	48 HR	72 HR	5 DAY	OTHER	MCE	
JOB #: <u>Durham, SSRCC-campus</u>	TEM/AHERA									PC
JOB NAME.: <u>Phase I Garden Bldg.</u>	TEM/LEVEL II									25 mm
JOB MANAGER: <u>4th floor</u>	TEM/7402									37 mm
JOB DESCRIPTION:	TEM/BULK									0.45 um
	TEM/DUST									0.80 um
	TEM/WATER									OTHER:
	PLM									
	PCM									
	OTHER:									

RESULTS TO: <b>ROBIN LIEBAL</b>	INVOICE TO: <b>HDH TECHNICAL, INC</b>	Return Samples: <u>Yes</u> <input type="checkbox"/> <u>No</u> <input type="checkbox"/>
EMAIL RESULTS: <u>Y / N</u> <b>ROBIN@BEST-HDHT.COM</b>	PHONE: <b>(540) 381-7999</b>	FAX: <b>(540) 381-7990</b>
WRITTEN REPORT TO:	SITE FAX:	PAGER/CELL:
COMMENTS:		

Lab ID	Sample ID	Sample Location	START TIME	STOP TIME	TOTAL TIME X	LITERS /MIN.	TOTAL VOLUME	DATE COLLECTED
	<u>SO-2.7</u>	<u>spray-on fireproofing</u>						2/4/10
	<u>CT-34.1</u>	<u>ceiling tile - old</u>						
	<u>CT-34.2</u>	<u>"</u>						
	<u>CT-35.1</u>	<u>ceiling tile - new</u>						
	<u>CT-35.2</u>	<u>"</u>						
	<u>JC-36.1</u>	<u>SR ST. Compd</u>						
	<u>JC-36.2</u>	<u>"</u>						
	<u>BM-37.1</u>	<u>Baseboard mastic</u>						
	<u>BM-37.2</u>	<u>"</u>						
	<u>DM-19.3</u>	<u>Duct mastic - Recd. HVAC chase.</u>						

SAMPLED BY: <u>R.H. Liebal</u>	DATE/TIME: <u>2/4/10</u>	RECEIVED BY: <u>[Signature]</u>	DATE/TIME: <u>[Stamp]</u>
RELINQUISHED BY: <u>R.H. Liebal</u>	DATE/TIME: <u>2/8/10</u>	RECEIVED IN LAB BY: <u>[Signature]</u>	DATE/TIME: <u>[Stamp]</u>



**AmeriSci Richmond**13635 GENITO ROAD  
MIDLOTHIAN, VIRGINIA 23112  
TEL: (804) 763-1200 • FAX: (804) 763-1800**PLM Bulk Asbestos Report**HDH Technical, Inc.  
Attn: Robin H. Liebal  
400 W. Main StreetDate Received 02/09/10  
Date Examined 02/09/10AmeriSci Job # 110021184  
P.O. #  
Page 1 of 3

Christiansburg, VA 24068

RE: Downtwn JSRCC - Campus; Phase I Gordon Bldg; 4th Floor

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
SO-2.7 Location: Spray-On Fireproofing	110021184-01	No	NAD (by CVES) by C. David Mintz on 02/09/10
Analyst Description: Brown, Heterogeneous, Fibrous, Bulk Material Asbestos Types: Other Material: Cellulose 15 %, Fibrous glass 8 %, Non-fibrous 77 %			
CT-34.1 Location: Ceiling Tile - Old	110021184-02	No	NAD (by CVES) by C. David Mintz on 02/09/10
Analyst Description: White/Tan, Heterogeneous, Fibrous, Bulk Material Asbestos Types: Other Material: Cellulose 35 %, Fibrous glass 5 %, Non-fibrous 60 %			
CT-34.2 Location: Ceiling Tile - Old	110021184-03	No	NAD (by CVES) by C. David Mintz on 02/09/10
Analyst Description: White/ Tan, Heterogeneous, Fibrous, Bulk Material Asbestos Types: Other Material: Cellulose 35 %, Fibrous glass 5 %, Non-fibrous 60 %			
CT-35.1 Location: Ceiling Tile - New	110021184-04	No	NAD (by CVES) by C. David Mintz on 02/09/10
Analyst Description: White/ Tan, Heterogeneous, Fibrous, Bulk Material Asbestos Types: Other Material: Cellulose 30 %, Fibrous glass 3 %, Non-fibrous 67 %			
CT-35.2 Location: Ceiling Tile - New	110021184-05	No	NAD (by CVES) by C. David Mintz on 02/09/10
Analyst Description: White/ Tan, Heterogeneous, Fibrous, Bulk Material Asbestos Types: Other Material: Cellulose 30 %, Fibrous glass 3 %, Non-fibrous 67 %			

# PLM Bulk Asbestos Report

Dwntwn JSRCC - Campus; Phase I Gordon Bldg; 4th Floor

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
JC-36.1 Location: SR Jt. Cmpd.	110021184-06	No	NAD (by CVES) by C. David Mintz on 02/09/10
<b>Analyst Description:</b> White, Heterogeneous, Non-Fibrous, Bulk Material <b>Asbestos Types:</b> <b>Other Material:</b> Non-fibrous 100 %			
JC-36.2 Location: SR Jt. Cmpd.	110021184-07	No	NAD (by CVES) by C. David Mintz on 02/09/10
<b>Analyst Description:</b> White, Heterogeneous, Non-Fibrous, Bulk Material <b>Asbestos Types:</b> <b>Other Material:</b> Non-fibrous 100 %			
BM-37.1 Location: Baseboard Mastic	110021184-08	No	NAD (by CVES) by C. David Mintz on 02/09/10
<b>Analyst Description:</b> Brown, Homogeneous, Non-Fibrous, Bulk Material <b>Asbestos Types:</b> <b>Other Material:</b> Non-fibrous 100 %			
BM-37.2 Location: Baseboard Mastic	110021184-09	No	NAD (by CVES) by C. David Mintz on 02/09/10
<b>Analyst Description:</b> Brown, Homogeneous, Non-Fibrous, Bulk Material <b>Asbestos Types:</b> <b>Other Material:</b> Non-fibrous 100 %			
DM-19.3 Location: Duct Mastic - Red - HVAC Chase	110021184-10	Yes	2 % (by CVES) by C. David Mintz on 02/09/10
<b>Analyst Description:</b> Red, Heterogeneous, Non-Fibrous, Bulk Material <b>Asbestos Types:</b> Chrysotile 2.0 % <b>Other Material:</b> Cellulose 3 %, Fibrous glass 3 %, Non-fibrous 92 %			

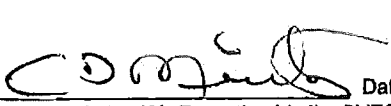
Client Name: HDH Technical, Inc.

# PLM Bulk Asbestos Report

Dwntwn JSRCC - Campus; Phase I Gordon Bldg; 4th Floor

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**Reporting Notes:**

Analyzed by: C. David Mintz  Date 2/9/10

\*NAD = no asbestos detected, Detection Limit <1%, Reporting Limits: CVES = 1%, 400 Pt Ct = 0.25%, 1000 Pt Ct = 0.1%; "Present" or NVA = "No Visible Asbestos" are observations made during a qualitative analysis; NA = not analyzed; NA/PS = not analyzed / positive stop; PLM Bulk Asbestos Analysis by EPA 600/M4-82-020 per 40 CFR 763 (NVLAP Lab Code 101904-0) and ELAP PLM Analysis Protocol 198.1 for New York friable samples (198.6 for NOB samples)(NYSDOH ELAP Lab # 10984); CA ELAP Lab # 2508; Note: PLM is not consistently reliable in detecting asbestos in floor coverings and similar NOB materials. NAD or Trace results by PLM are inconclusive, TEM is currently the only method that can be used to determine if this material can be considered or treated as non-asbestos-containing in New York State (also see EPA Advisory for floor tile, FR 59, 146, 38970, 8/1/94). NIST Accreditation requirements mandate that this report must not be reproduced except in full without the approval of the laboratory. This PLM report relates ONLY to the items tested.

Reviewed By: \_\_\_\_\_



### CHAIN OF CUSTODY RECORD

**AmeriSci** Richmond  
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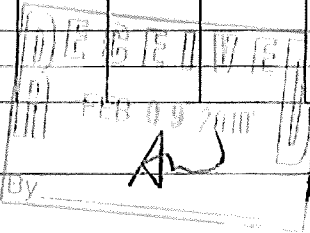
AMERISCI RICHMOND **110021179**  
 Job No.:

<b>HDH Technical, Inc</b>	400 W. Main Street Christiansburg, VA 24068	P.O.#: SPECIAL INSTRUCTIONS:
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PROJECT INFORMATION	ANALYSIS TYPE	TURNAROUND TIME (X)						AIR FILTER INFORMATION:
		6-8 HR	12 HR	24 HR	48 HR	72 HR	5 DAY	
JOB #: Doughton, JSRCC-Campus	TEM/AHERA							MCE
JOB NAME: Phase I Garden Bldg.	TEM/LEVEL II							PC
JOB MANAGER: J. H. F. Hoot	TEM/7402							25 mm
JOB DESCRIPTION:	TEM/BULK							37 mm
	TEM/DUST							0.45 um
	TEM/WATER							0.80 um
	PLM				X			OTHER:
	PCM							
	OTHER:							

RESULTS TO: ROBIN LIEBAL	INVOICE TO: HDH TECHNICAL, INC	Return Samples: Yes	No
EMAIL RESULTS: Y / N ROBIN@BEST-HDHT.COM		PHONE: (540) 381-7999	
WRITTEN REPORT TO:		FAX: (540) 381-7990	
COMMENTS:		SITE FAX:	
		PAGER/CELL:	

Lab ID	Sample ID	Sample Location	START TIME	STOP TIME	TOTAL TIME X	LITERS /MIN.	TOTAL VOLUME	DATE COLLECTED
	50-2.8	Spray-on Floor						2/4/10
	CT-38.1	Ceiling Tile - New						
	CT-38.2	" "						
	CT-39.1	Ceiling Tile - Old						
	CT-39.2	" "						
	SC-40.1	SR ST. Campd.						
	SC-40.2	" "						
	BM-41.1	Baseboard Mastic						
	BM-41.2	" "						
	FT-42.1	12x12 Beige - Rm. 5.34						
	FT-42.2	" "						
	BM-43.1	Baseboard Mastic - Rm. 5.34						
	BM-43.2	" "						
	FT-44.1	12x12 Khaki						
	FM-44.2	Mastic						



SAMPLED BY: <u>R. H. Liebal</u>	DATE/TIME: <u>2/4/10</u>	RECEIVED BY:	DATE/TIME:
RELINQUISHED BY: <u>R. H. Liebal</u>	DATE/TIME: <u>2/8/10</u>	RECEIVED IN LAB BY:	DATE/TIME:



**AmeriSci Richmond**

13635 GENITO ROAD  
MIDLOTHIAN, VIRGINIA 23112  
TEL: (804) 763-1200 • FAX: (804) 763-1800

**PLM Bulk Asbestos Report**

HDH Technical, Inc.  
Attn: Robin H. Liebal  
400 W. Main Street

**Date Received** 02/09/10    **AmeriSci Job #** 110021179  
**Date Examined** 02/09/10    **P.O. #**  
**Page** 1 of 3  
**RE:** Downtwn JSRCC - Campus; Phase I Gordon Bldg; 5th Floor

Christiansburg, VA 24068

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
SO-2.8 <b>Location:</b> Spray-On Fireproofing	110021179-01	No	NAD (by CVES) by William M. Dunstan on 02/09/10
<b>Analyst Description:</b> Lt. Gray, Heterogeneous, Fibrous, Bulk Material <b>Asbestos Types:</b> <b>Other Material:</b> Cellulose 20 %, Fibrous glass 20 %, Non-fibrous 60 %			
CT-38.1 <b>Location:</b> Ceiling Tile - New	110021179-02	No	NAD (by CVES) by William M. Dunstan on 02/09/10
<b>Analyst Description:</b> Lt. Gray, Heterogeneous, Fibrous, Bulk Material <b>Asbestos Types:</b> <b>Other Material:</b> Cellulose 30 %, Fibrous glass 30 %, Non-fibrous 40 %			
CT-38.2 <b>Location:</b> Ceiling Tile - New	110021179-03	No	NAD (by CVES) by William M. Dunstan on 02/09/10
<b>Analyst Description:</b> Lt. Gray, Heterogeneous, Fibrous, Bulk Material <b>Asbestos Types:</b> <b>Other Material:</b> Cellulose 30 %, Fibrous glass 30 %, Non-fibrous 40 %			
CT-39.1 <b>Location:</b> Ceiling Tile - Old	110021179-04	No	NAD (by CVES) by William M. Dunstan on 02/09/10
<b>Analyst Description:</b> Lt. Gray, Heterogeneous, Fibrous, Bulk Material <b>Asbestos Types:</b> <b>Other Material:</b> Cellulose 30 %, Fibrous glass 40 %, Non-fibrous 30 %			
CT-39.2 <b>Location:</b> Ceiling Tile - Old	110021179-05	No	NAD (by CVES) by William M. Dunstan on 02/09/10
<b>Analyst Description:</b> Lt. Gray, Heterogeneous, Fibrous, Bulk Material <b>Asbestos Types:</b> <b>Other Material:</b> Cellulose 30 %, Fibrous glass 40 %, Non-fibrous 30 %			

# PLM Bulk Asbestos Report

Dwntwn JSRCC - Campus; Phase I Gordon Bldg; 5th Floor

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
JC-40.1 Location: SR Jt. Cmpd.	110021179-06	No	NAD (by CVES) by William M. Dunstan on 02/09/10
<b>Analyst Description:</b> White, Heterogeneous, Non-Fibrous, Bulk Material <b>Asbestos Types:</b> <b>Other Material:</b> Non-fibrous 100 %			
JC-40.2 Location: SR Jt. Cmpd.	110021179-07	No	NAD (by CVES) by William M. Dunstan on 02/09/10
<b>Analyst Description:</b> White, Heterogeneous, Non-Fibrous, Bulk Material <b>Asbestos Types:</b> <b>Other Material:</b> Non-fibrous 100 %			
BM-41.1 Location: Baseboard Mastic	110021179-08	No	NAD (by CVES) by William M. Dunstan on 02/09/10
<b>Analyst Description:</b> Brown, Heterogeneous, Non-Fibrous, Bulk Material <b>Asbestos Types:</b> <b>Other Material:</b> Non-fibrous 100 %			
BM-41.2 Location: Baseboard Mastic	110021179-09	No	NAD (by CVES) by William M. Dunstan on 02/09/10
<b>Analyst Description:</b> Brown, Heterogeneous, Non-Fibrous, Bulk Material <b>Asbestos Types:</b> <b>Other Material:</b> Non-fibrous 100 %			
FT-42.1 Location: 12x12 Beige - Rm 534	110021179-10	No	NAD (by CVES) by William M. Dunstan on 02/09/10
<b>Analyst Description:</b> Beige, Heterogeneous, Non-Fibrous, Bulk Material <b>Asbestos Types:</b> <b>Other Material:</b> Non-fibrous 100 %			
FT-42.2 Location: 12x12 Beige - Rm 534	110021179-11	No	NAD (by CVES) by William M. Dunstan on 02/09/10
<b>Analyst Description:</b> Beige, Heterogeneous, Non-Fibrous, Bulk Material <b>Asbestos Types:</b> <b>Other Material:</b> Non-fibrous 100 %			

Client Name: HDH Technical, Inc.

# PLM Bulk Asbestos Report

Dwntwn JSRCC - Campus; Phase I Gordon Bldg; 5th Floor

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
BM-43.1 Location: Baseboard Mastic - Rm 534	110021179-12	No	NAD (by CVES) by William M. Dunstan on 02/09/10
<b>Analyst Description:</b> Beige, Heterogeneous, Non-Fibrous, Bulk Material <b>Asbestos Types:</b> <b>Other Material:</b> Non-fibrous 100 %			
BM-43.2 Location: Baseboard Mastic - Rm 534	110021179-13	No	NAD (by CVES) by William M. Dunstan on 02/09/10
<b>Analyst Description:</b> Beige, Heterogeneous, Non-Fibrous, Bulk Material <b>Asbestos Types:</b> <b>Other Material:</b> Non-fibrous 100 %			
FT-44.1 Location: 12x12 Khaki	110021179-14	No	NAD (by CVES) by William M. Dunstan on 02/09/10
<b>Analyst Description:</b> Brown, Heterogeneous, Non-Fibrous, Bulk Material <b>Asbestos Types:</b> <b>Other Material:</b> Non-fibrous 100 %			
FM-44.2 Location: Mastic	110021179-15	Yes	5 % (by CVES) by William M. Dunstan on 02/09/10
<b>Analyst Description:</b> Black, Heterogeneous, Non-Fibrous, Bulk Material <b>Asbestos Types:</b> Chrysotile 5.0 % <b>Other Material:</b> Non-fibrous 95 %			

**Reporting Notes:**

Analyzed by: William M. Dunstan William M. Dunstan Date 2/9/10  
 \*NAD = no asbestos detected, Detection Limit <1%, Reporting Limits: CVES = 1%, 400 Pt Ct = 0.25%, 1000 Pt Ct = 0.1%; "Present" or NVA = "No Visible Asbestos" are observations made during a qualitative analysis; NA = not analyzed; NA/PS = not analyzed / positive stop; PLM Bulk Asbestos Analysis by EPA 600/M4-82-020 per 40 CFR 763 (NVLAP Lab Code 101904-0) and ELAP PLM Analysis Protocol 198.1 for New York friable samples (198.6 for NOB samples)(NYSDOH ELAP Lab # 10984); CA ELAP Lab # 2508; Note: PLM is not consistently reliable in detecting asbestos in floor coverings and similar NOB materials. NAD or Trace results by PLM are inconclusive, TEM is currently the only method that can be used to determine if this material can be considered or treated as non-asbestos-containing in New York State (also see EPA Advisory for floor tile, FR 59, 146, 38970, 8/1/94). NIST Accreditation requirements mandate that this report must not be reproduced except in full without the approval of the laboratory. This PLM report relates ONLY to the items tested.  
 Reviewed By: \_\_\_\_\_



America's Laboratory

CHAIN OF CUSTODY RECORD

AMERISCI RICHMOND  
Job No.:

110021181

**AmeriSci** Richmond  
13635 Genito Road  
Midlothian, VA 23112  
Phone: (804) 763-1200  
Fax: (804) 763-1800  
TOLL FREE: (800) 476-5227  
www.amerisci.com

<b>HDH Technical, Inc</b>	<b>400 W. Main Street Christiansburg, VA 24068</b>	<b>P.O.#:</b> <b>SPECIAL INSTRUCTIONS:</b>
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PROJECT INFORMATION	ANALYSIS TYPE	TURNAROUND TIME (X)							AIR FILTER INFORMATION:	
		6-8 HR	12 HR	24 HR	48 HR	72 HR	5 DAY	OTHER	MCE	
JOB #: <i>Dwntown.</i>	TEM/AHERA								MCE	
<i>JSPCC - Campus</i>	TEM/LEVEL II								PC	
JOB NAME: <i>Phase I.</i>	TEM/7402								25 mm	
<i>Garden Bldg.</i>	TEM/BULK								37 mm	
JOB MANAGER:	TEM/DUST								0.45 um	
<i>6th + Penthouse</i>	TEM/WATER								0.80 um	
JOB DESCRIPTION:	PLM								OTHER:	
	PCM									
	OTHER:									

RESULTS TO: <b>ROBIN LIEBAL</b>	INVOICE TO: <b>HDH TECHNICAL, INC</b>	Return Samples: <b>Yes</b> <b>No</b>
EMAIL RESULTS: <b>Y / N</b> <i>ROBIN@BEST-HDHT.COM</i>	PHONE: <b>(540) 381-7999</b>	
WRITTEN REPORT TO:	FAX: <b>(540) 381-7990</b>	
COMMENTS:	SITE FAX:	
	PAGER/CELL:	

Lab ID	Sample ID	Sample Location	START TIME	STOP TIME	TOTAL TIME X	LITERS /MIN.	TOTAL VOLUME	DATE COLLECTED
	<i>SO-2.9</i>	<i>Spacy-on Fireproofing</i>						<i>2/4/10</i>
	<i>CT-46.1</i>	<i>Ceiling Tile - New</i>						
	<i>CT-46.2</i>	<i>" "</i>						
	<i>CT-47.1</i>	<i>Ceiling Tile - Old</i>						
	<i>CT-47.2</i>	<i>" "</i>						
	<i>JC-48.1</i>	<i>SR JT. Comp. O.</i>						
	<i>JC-48.2</i>	<i>" "</i>						
	<i>BM-49.1</i>	<i>Base Board Mastic</i>						
	<i>BM-49.2</i>	<i>" "</i>						
	<i>Penthouse</i>							
	<i>ES-50.1</i>	<i>End Sealer on FG-TSI-APP'S</i>						
	<i>ES-50.2</i>	<i>" "</i>						
	<i>DM-51.1</i>	<i>Duct Mastic - white - Round Duct</i>						
	<i>DM-51.2</i>	<i>" "</i>						
	<i>SO-2.10</i>	<i>Spacy-on Fireproofing</i>						

RECEIVED  
FEB 09 2010  
By *J*

SAMPLED BY: <i>R.H. Liebal</i>	DATE/TIME: <i>2/4/10</i>	RECEIVED BY:	DATE/TIME:
RELINQUISHED BY: <i>R.H. Liebal</i>	DATE/TIME: <i>2/8/10</i>	RECEIVED IN LAB BY:	DATE/TIME:





**AmeriSci Richmond**  
13635 GENITO ROAD  
MIDLOTHIAN, VIRGINIA 23112  
TEL: (804) 763-1200 • FAX: (804) 763-1800

## PLM Bulk Asbestos Report

HDH Technical, Inc.  
Attn: Robin H. Liebal  
400 W. Main Street  
  
Christiansburg, VA 24068

**Date Received** 02/09/10    **AmeriSci Job #** 110021181  
**Date Examined** 02/09/10    **P.O. #**  
**Page** 1 of 3  
**RE:** Downtwn JSRCC - Campus; Phase I Gordon Bldg; 6th & Penthouse

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
SO-2.9 Location: Spray-On Fireproofing	110021181-01	No	NAD (by CVES) by Gordon T. Saleeby on 02/09/10
<b>Analyst Description:</b> Tan/Grey, Heterogeneous, Non-Fibrous, Bulk Material <b>Asbestos Types:</b> <b>Other Material:</b> Cellulose 20 %, Fibrous glass 3 %, Non-fibrous 77 %			
CT-46.1 Location: Ceiling Tile - New	110021181-02	No	NAD (by CVES) by Gordon T. Saleeby on 02/09/10
<b>Analyst Description:</b> White/Beige, Heterogeneous, Non-Fibrous, Bulk Material <b>Asbestos Types:</b> <b>Other Material:</b> Cellulose 35 %, Fibrous glass 35 %, Non-fibrous 30 %			
CT-46.2 Location: Ceiling Tile - New	110021181-03	No	NAD (by CVES) by Gordon T. Saleeby on 02/09/10
<b>Analyst Description:</b> White/Beige, Heterogeneous, Non-Fibrous, Bulk Material <b>Asbestos Types:</b> <b>Other Material:</b> Cellulose 35 %, Fibrous glass 35 %, Non-fibrous 30 %			
CT-47.1 Location: Ceiling Tile - Old	110021181-04	No	NAD (by CVES) by Gordon T. Saleeby on 02/09/10
<b>Analyst Description:</b> White/Beige, Heterogeneous, Non-Fibrous, Bulk Material <b>Asbestos Types:</b> <b>Other Material:</b> Cellulose 30 %, Fibrous glass 40 %, Non-fibrous 30 %			
CT-47.2 Location: Ceiling Tile - Old	110021181-05	No	NAD (by CVES) by Gordon T. Saleeby on 02/09/10
<b>Analyst Description:</b> White/Beige, Heterogeneous, Non-Fibrous, Bulk Material <b>Asbestos Types:</b> <b>Other Material:</b> Cellulose 30 %, Fibrous glass 40 %, Non-fibrous 30 %			

# PLM Bulk Asbestos Report

Dwntwn JSRCC - Campus; Phase I Gordon Bldg; 6th & Penthouse

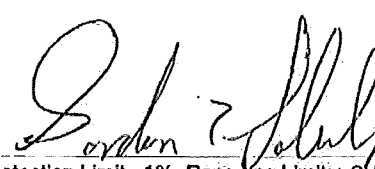
Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
JC-48.1 <b>Location:</b> SR Jt. Cmpd.	110021181-06	No	NAD (by CVES) by Gordon T. Saleeby on 02/09/10
<b>Analyst Description:</b> White, Heterogeneous, Non-Fibrous, Bulk Material <b>Asbestos Types:</b> <b>Other Material:</b> Non-fibrous 100 %			
JC-48.2 <b>Location:</b> SR Jt. Cmpd.	110021181-07	No	NAD (by CVES) by Gordon T. Saleeby on 02/09/10
<b>Analyst Description:</b> White, Heterogeneous, Non-Fibrous, Bulk Material <b>Asbestos Types:</b> <b>Other Material:</b> Non-fibrous 100 %			
BM-49.1 <b>Location:</b> Baseboard Mastic	110021181-08	No	NAD (by CVES) by Gordon T. Saleeby on 02/09/10
<b>Analyst Description:</b> Brown, Heterogeneous, Non-Fibrous, Bulk Material <b>Asbestos Types:</b> <b>Other Material:</b> Non-fibrous 100 %			
BM-49.2 <b>Location:</b> Baseboard Mastic	110021181-09	No	NAD (by CVES) by Gordon T. Saleeby on 02/09/10
<b>Analyst Description:</b> Brown, Heterogeneous, Non-Fibrous, Bulk Material <b>Asbestos Types:</b> <b>Other Material:</b> Non-fibrous 100 %			
ES-50.1 <b>Location:</b> End Sealer On FG TSI AHU's	110021181-10	Yes	3 % (by CVES) by Gordon T. Saleeby on 02/09/10
<b>Analyst Description:</b> White, Heterogeneous, Non-Fibrous, Bulk Material <b>Asbestos Types:</b> Chrysotile 3.0 % <b>Other Material:</b> Non-fibrous 97 %			
ES-50.2 <b>Location:</b> End Sealer On FG TSI AHU's	110021181-11	Yes	3 % (by CVES) by Gordon T. Saleeby on 02/09/10
<b>Analyst Description:</b> White, Heterogeneous, Non-Fibrous, Bulk Material <b>Asbestos Types:</b> Chrysotile 3.0 % <b>Other Material:</b> Non-fibrous 97 %			

# PLM Bulk Asbestos Report

Dwntwn JSRCC - Campus; Phase I Gordon Bldg; 6th & Penthouse

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
DM-51.1 <b>Location:</b> Duct Mastic - White - Round Duct	110021181-12	No	NAD (by CVES) by Gordon T. Saleeby on 02/09/10
<b>Analyst Description:</b> White/Red, Heterogeneous, Non-Fibrous, Bulk Material <b>Asbestos Types:</b> <b>Other Material:</b> Wollastonite 15 %, Non-fibrous 85 %			
DM-51.2 <b>Location:</b> Duct Mastic - White - Round Duct	110021181-13	No	NAD (by CVES) by Gordon T. Saleeby on 02/09/10
<b>Analyst Description:</b> White/Red, Heterogeneous, Non-Fibrous, Bulk Material <b>Asbestos Types:</b> <b>Other Material:</b> Wollastonite 15 %, Non-fibrous 85 %			
SO-2.10 <b>Location:</b> Spray-On Fireproofing	110021181-14	No	NAD (by CVES) by Gordon T. Saleeby on 02/09/10
<b>Analyst Description:</b> Off White/Tan, Heterogeneous, Non-Fibrous, Bulk Material <b>Asbestos Types:</b> <b>Other Material:</b> Cellulose 20 %, Fibrous glass 3 %, Non-fibrous 77 %			

**Reporting Notes:**

Analyzed by: Gordon T. Saleeby  Date Feb 9, 2010  
\*NAD = no asbestos detected, Detection Limit <1%, Reporting Limits: QVES = 1%, 400 Pt Ct = 0.25%, 1000 Pt Ct = 0.1%; "Present" or NVA = "No Visible Asbestos" are observations made during a qualitative analysis; NA = not analyzed; NA/PS = not analyzed / positive stop; PLM Bulk Asbestos Analysis by EPA 600/M4-82-020 per 40 CFR 763 (NVLAP Lab Code 101904-0) and ELAP PLM Analysis Protocol 198.1 for New York triable samples (198.6 for NOB samples)(NYSDOH ELAP Lab # 10984); CA ELAP Lab # 2508; Note: PLM is not consistently reliable in detecting asbestos in floor coverings and similar NOB materials. NAD or Trace results by PLM are inconclusive, TEM is currently the only method that can be used to determine if this material can be considered or treated as non-asbestos-containing in New York State (also see EPA Advisory for floor tile, FR 59, 146, 38970, 8/1/94). NIST Accreditation requirements mandate that this report must not be reproduced except in full without the approval of the laboratory. This PLM report relates ONLY to the items tested.  
Reviewed By: \_\_\_\_\_



America's Laboratory

CHAIN OF CUSTODY RECORD

AMERISCI RICHMOND Job No.: **11002162**

**AmeriSci** Richmond  
 13635 Genito Road  
 Midlothian, VA 23112  
 Phone: (804) 763-1200  
 Fax: (804) 763-1800  
 TOLL FREE: (800) 476-5227  
 www.ameriscil.com

<b>HDH Technical, Inc</b>	<b>400 W. Main Street Christiansburg, VA 24068</b>	<b>P.O.#:</b>
		<b>SPECIAL INSTRUCTIONS:</b>

PROJECT INFORMATION	ANALYSIS TYPE	TURNAROUND TIME (X)							AIR FILTER INFORMATION:	
		6-8 HR	12 HR	24 HR	48 HR	72 HR	5 DAY	OTHER	MCE	
JOB #: <i>5SRCC - computers</i>	TEM/AHERA									
JOB NAME: <i>Grandon Bldg.</i>	TEM/LEVEL II								PC	
JOB MANAGER: <i>Penthouse</i>	TEM/7402								25 mm	
JOB DESCRIPTION:	TEM/BULK								37 mm	
	TEM/DUST								0.45 um	
	TEM/WATER								0.80 um	
	PLM				X				OTHER:	
	PCM									
	OTHER:									

RESULTS TO: <b>ROBIN LIEBAL</b>	INVOICE TO: <b>HDH TECHNICAL, INC</b>	Return Samples: <b>Yes</b> <b>No</b>
EMAIL RESULTS: <b>Y / N</b> <i>ROBIN@BEST-HDHT.COM</i>		PHONE: <b>(540) 381-7999</b>
WRITTEN REPORT TO:		FAX: <b>(540) 381-7990</b>
COMMENTS:		SITE FAX:
		PAGER/CELL:

Lab ID	Sample ID	Sample Location	START TIME	STOP TIME	TOTAL TIME X	LITERS /MIN.	TOTAL VOLUME	DATE COLLECTED
	<i>ES-52.1</i>	<i>End Sealer - AH</i>		<i>00</i>	<i>4</i>	<i>Phase I</i>		<i>2/24/10</i>
	<i>ES-52.2</i>	<i>"</i>		<i>"</i>	<i>"</i>	<i>"</i>		}
	<i>ES-53.1</i>	<i>End Sealer - AH</i>				<i>Phase II</i>		
	<i>ES-53.2</i>	<i>"</i>		<i>"</i>	<i>"</i>			

By *[Signature]*  
 FEB 25 2010

SAMPLED BY: <i>R. H. Liebal</i>	DATE/TIME: <i>2/24/10</i>	RECEIVED BY: <i>[Signature]</i>	DATE/TIME:
RELINQUISHED BY: <i>R. H. Liebal</i>	DATE/TIME: <i>2/25/10</i>	RECEIVED IN LAB BY:	DATE/TIME:



**AmeriSci Richmond**

13635 GENITO ROAD  
MIDLOTHIAN, VIRGINIA 23112  
TEL: (804) 763-1200 • FAX: (804) 763-1800

## PLM Bulk Asbestos Report

HDH Technical, Inc.  
Attn: Robin H. Liebal  
400 W. Main Street

Christiansburg, VA 24068

**Date Received** 02/26/10    **AmeriSci Job #** 110021628  
**Date Examined** 02/26/10    **P.O. #**  
**Page** 1 of 2  
**RE:** Downtown JSRCC - Campus; Garden Bldg

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
ES-52.1 <b>Location:</b> End Sealer - AH 004 Phase I	110021628-01	<b>Yes</b>	3 % (by CVES) by Gordon T. Saleeby on 02/26/10
<b>Analyst Description:</b> Off White, Heterogeneous, Non-Fibrous, Bulk Material <b>Asbestos Types:</b> Chrysotile 3.0 % <b>Other Material:</b> Non-fibrous 97 %			
ES-52.2 <b>Location:</b> End Sealer - AH 004 Phase I	110021628-02	<b>Yes</b>	3 % (by CVES) by Gordon T. Saleeby on 02/26/10
<b>Analyst Description:</b> Off White, Heterogeneous, Non-Fibrous, Bulk Material <b>Asbestos Types:</b> Chrysotile 3.0 % <b>Other Material:</b> Non-fibrous 97 %			
ES-53.1 <b>Location:</b> End Sealer - AH - Phase II	110021628-03	<b>No</b>	NAD (by CVES) by Gordon T. Saleeby on 02/26/10
<b>Analyst Description:</b> Off White, Heterogeneous, Non-Fibrous, Bulk Material <b>Asbestos Types:</b> <b>Other Material:</b> Wollastonite 5 %, Non-fibrous 95 %			
ES-53.2 <b>Location:</b> End Sealer - AH - Phase II	110021628-04	<b>No</b>	NAD (by CVES) by Gordon T. Saleeby on 02/26/10
<b>Analyst Description:</b> Off White, Heterogeneous, Non-Fibrous, Bulk Material <b>Asbestos Types:</b> <b>Other Material:</b> Wollastonite 5 %, Non-fibrous 95 %			

Client Name: HDH Technical, Inc.

# PLM Bulk Asbestos Report

Downtown JSRCC - Campus; Garden Bldg

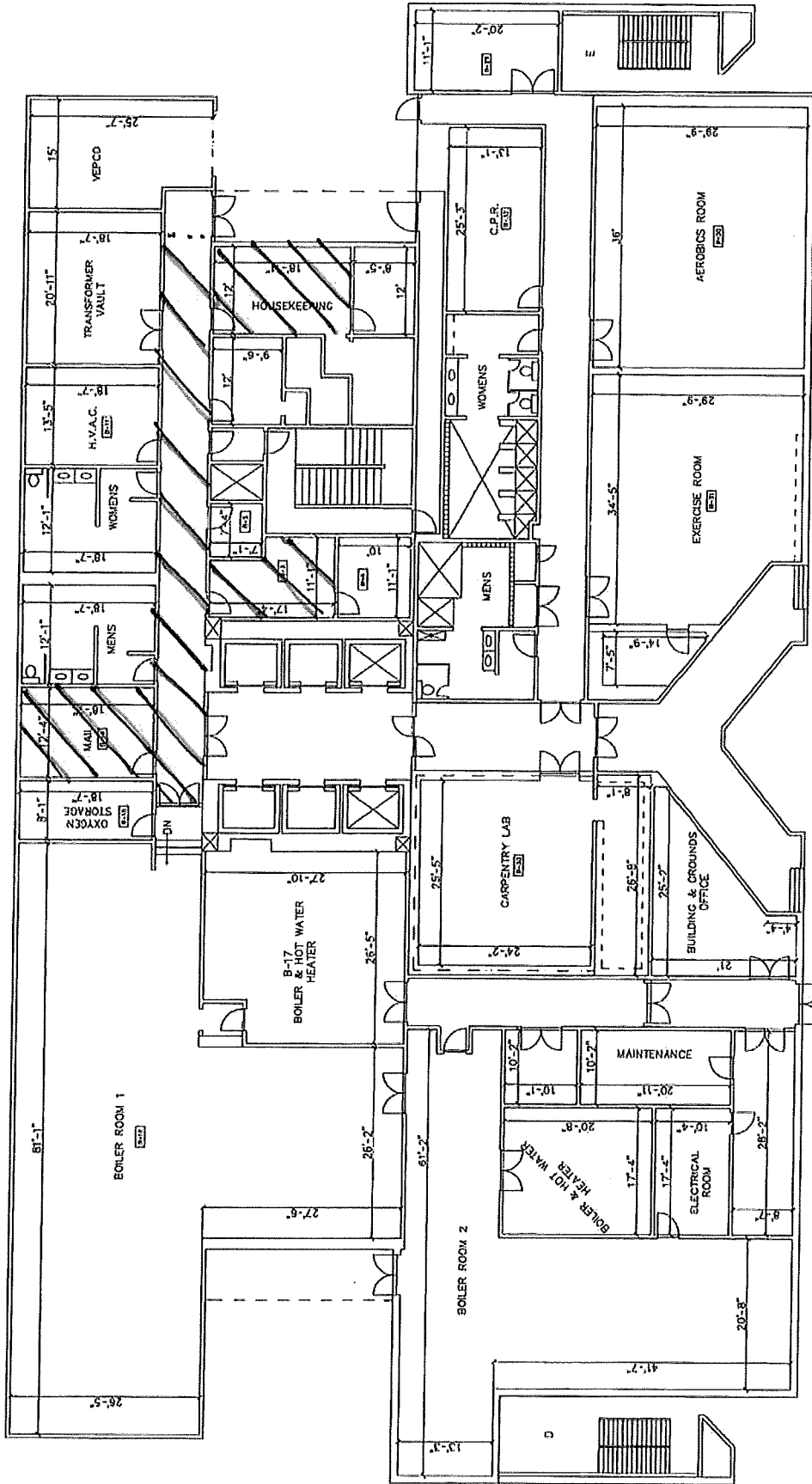
**Reporting Notes:**

Analyzed by: Gordon T. Saleeby *Gordon T. Saleeby* Date *Feb 26, 2010*  
\*NAD = no asbestos detected, Detection Limit <1%, Reporting Limits: CVES = 1%, 400 Pt Ct = 0.25%, 1000 Pt Ct = 0.1%; "Present" or NVA = "No Visible Asbestos" are observations made during a qualitative analysis; NA = not analyzed; NA/PS = not analyzed / positive stop; PLM Bulk Asbestos Analysis by EPA 600/M4-82-020 per 40 CFR 763 (NVLAP Lab Code 101904-0) and ELAP PLM Analysis Protocol 198.1 for New York friable samples (198.6 for NOB samples)(NYSDOH ELAP Lab # 10984); CA ELAP Lab # 2508; Note: PLM is not consistently reliable in detecting asbestos in floor coverings and similar NOB materials. NAD or Trace results by PLM are inconclusive, TEM is currently the only method that can be used to determine if this material can be considered or treated as non-asbestos-containing in New York State (also see EPA Advisory for floor tile, FR 59, 146, 38970, 8/1/94). NIST Accreditation requirements mandate that this report must not be reproduced except in full without the approval of the laboratory. This PLM report relates ONLY to the items tested.

Reviewed By: \_\_\_\_\_

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## **Homogeneous Areas**



- ① III = Floor tile and/or Mastic
- ② C = Carpet
- ③ End sealer in Penthouse + Boiler Room on AH system

DOWNTOWN CAMPUS - BASEMENT

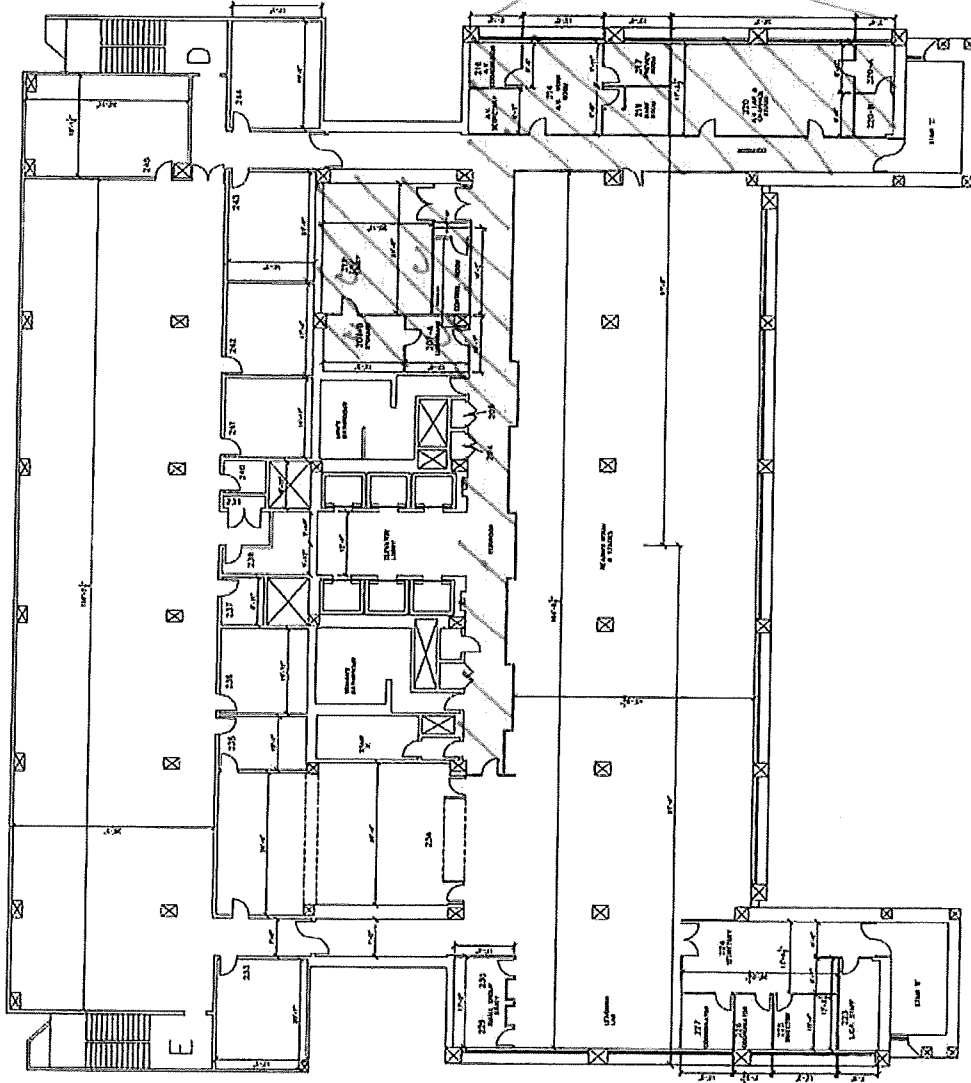
④ Duct Mastic in HVAC chase



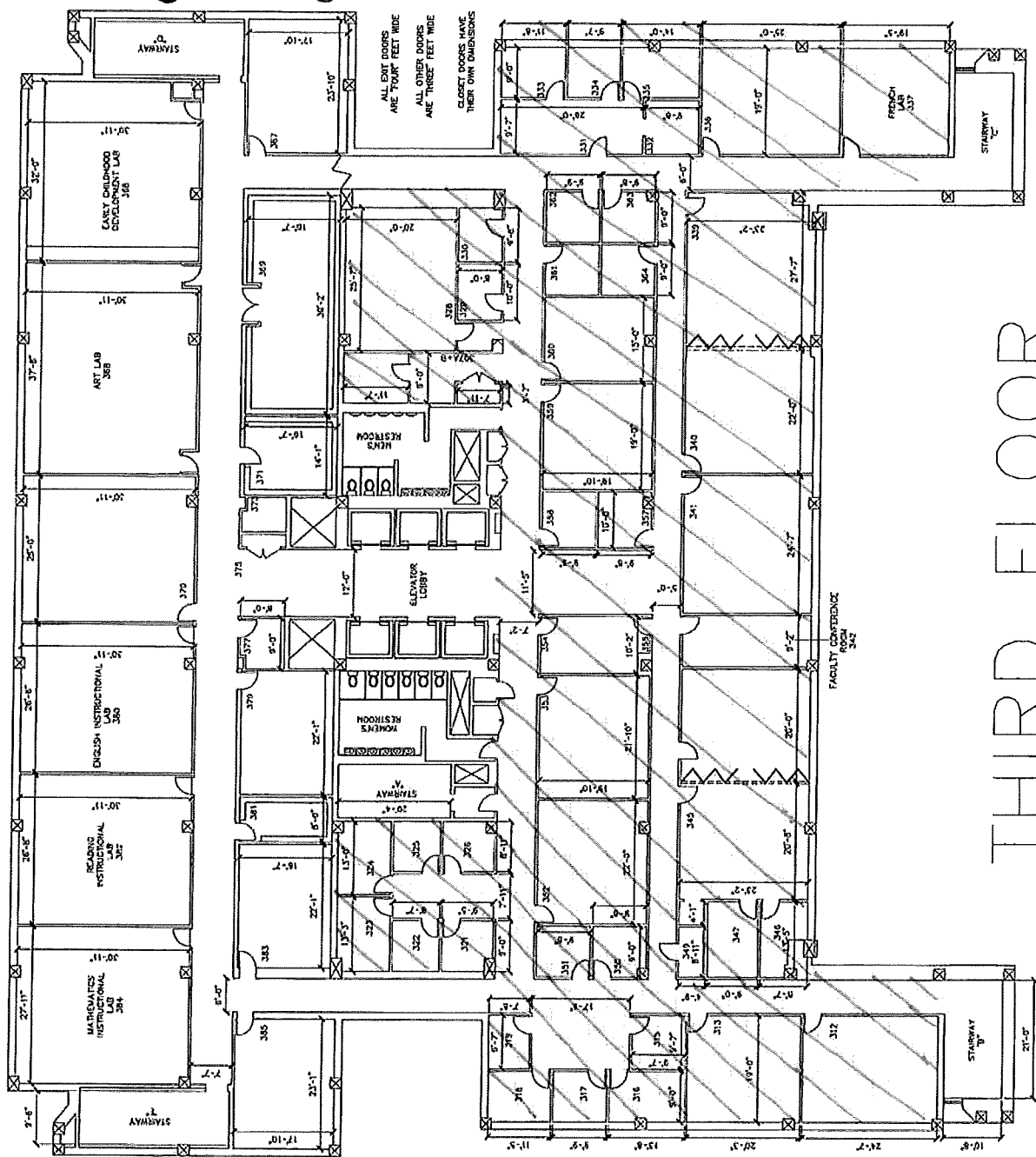


- ① 111 - Floor Tile and/or Mastic
- ② C - Carpet
- ③ End sealer in Penthouse + Berler Room on AH system
- ④ Duct Mastic on HVAC chase.

C Throughout except Hall



Floor Plan - 2nd Floor, DTC



- ① 111. Floor Tile and/or mastic
- ② C- Carpet Throughout.
- ③ End Sealer in Penthouse + Boiler Rm. on AH system
- ④ Duct Mastic in HVAC chase.

Carpet Throughout EXCEPT Hallways.

# THIRD FLOOR

ALL EXIT DOORS ARE FOUR FEET WIDE  
ALL OTHER DOORS ARE THREE FEET WIDE  
CLOSET DOORS HAVE THEIR OWN DIMENSIONS

FACULTY CONFERENCE ROOM 342

STAIRWAY 10

STAIRWAY 11

STAIRWAY 12

STAIRWAY 13

STAIRWAY 14

STAIRWAY 15

STAIRWAY 16

STAIRWAY 17

STAIRWAY 18

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STAIRWAY 278

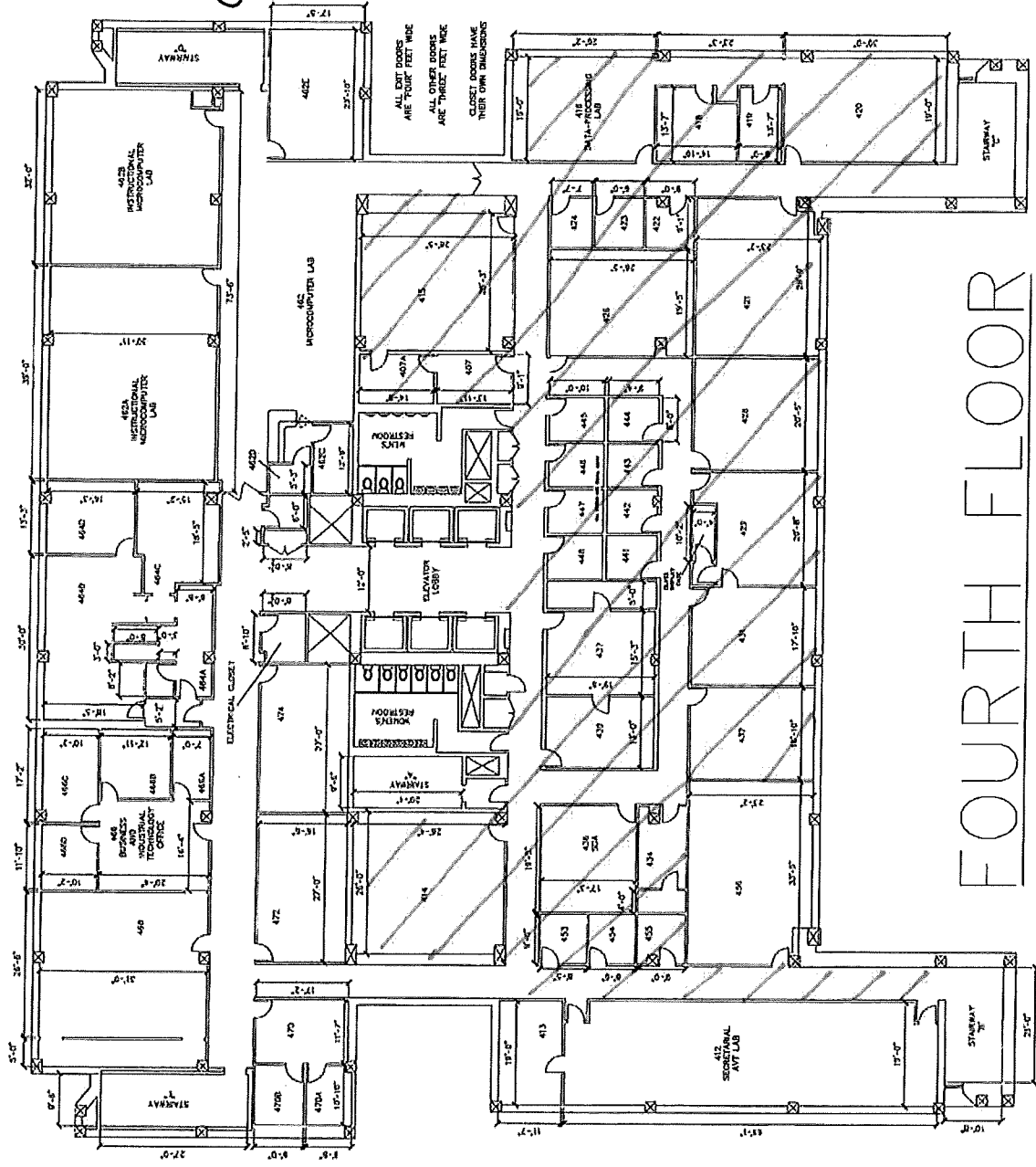
STAIRWAY 279

STAIRWAY 280

STAIRWAY 281

STAIRWAY 282

- ① 111- Floor Tile and/or Mastic
  - ② C- Carpet
  - ③ End Sealer in Penthouse + Boiler Room on AH System
  - ④ Duct Mastic in HVAC chase.
- Carpet throughout except Hallways.  
 ↳ Rm. 418 + 419.



FOURTH FLOOR

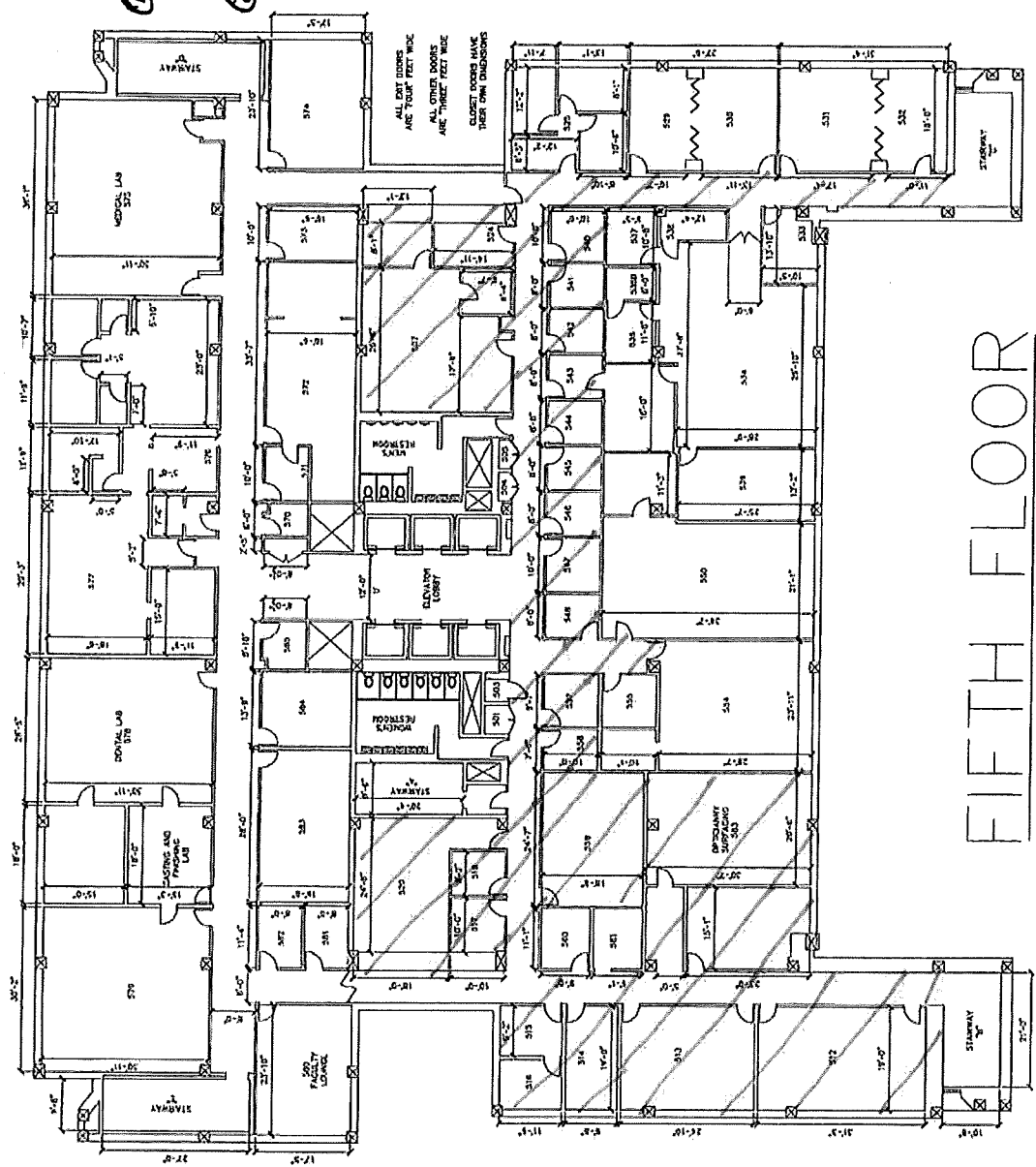
① 11"-Floor tile and/or mastic

② C-Carpet

③ End Sealer in Penthouse + Boiler Room on AH System.

④ Duct Mastic in HVAC chase.

Carpet Throughout except Hallways.



# FIFTH FLOOR

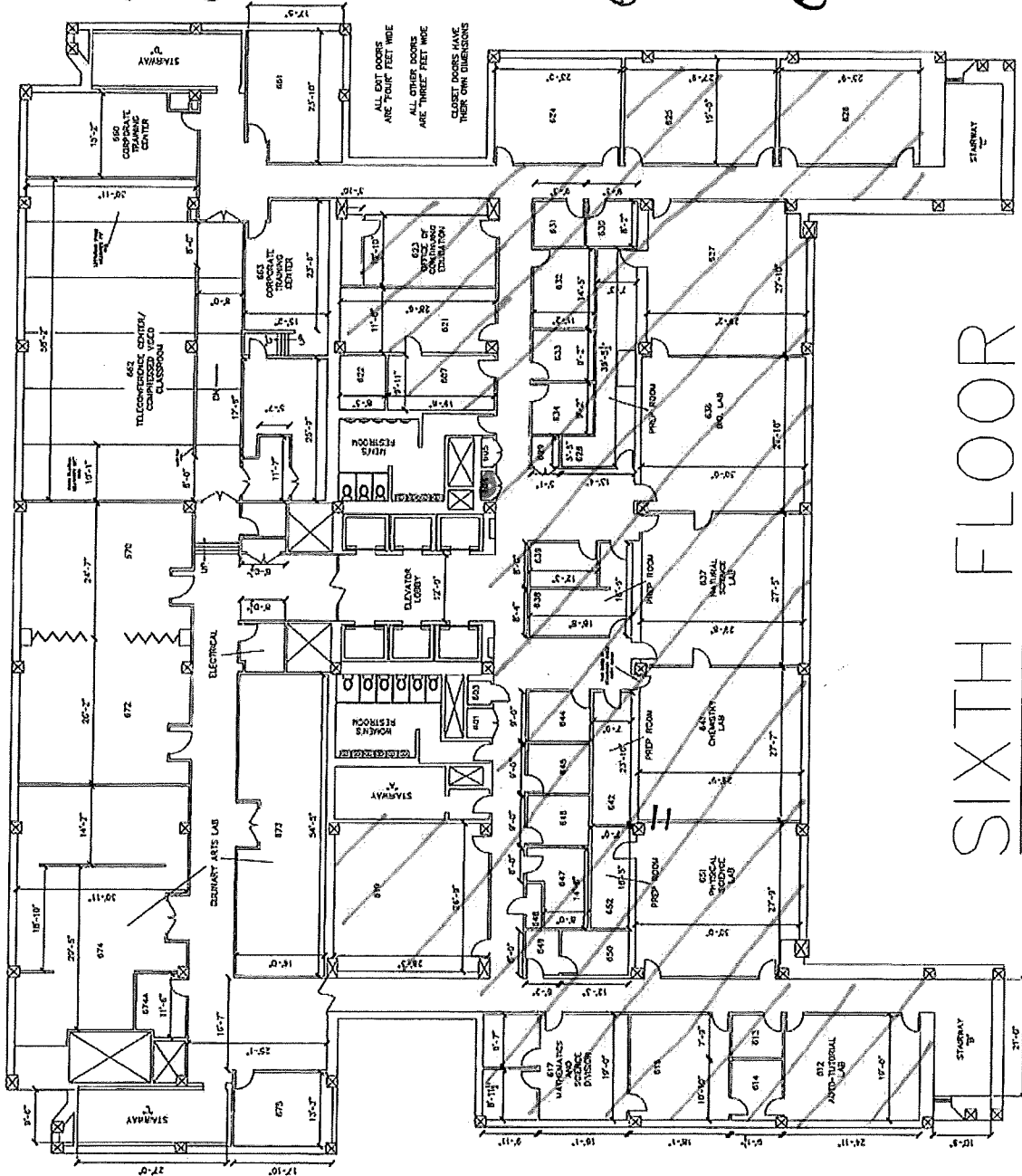
① 11" Floor Tile  
and/or Mastic

② C. Carpet  
throughout  
③ except halls +  
End sealer  
in Penthouse  
+ Boiler Room  
on AH System

④ Duct Mastic  
in HVAC  
chase.

⑤ Lab tables  
+ sinks  
throughout  
Assumed  
ACM

⑥ Transite  
Fume Hoods  
Assumed  
ACM  
Chem Lab  
+ Prep Room.  
Rm. 641 +  
642



SIXTH FLOOR

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## LEAD INSPECTION

On February 24, 2010 a Lead-Based Paint inspection was also conducted in Phase I of the Gordon Building. The inspection was conducted to identify potential lead-based paint concerns involved in this renovation project. The areas were inspected by Robin H. Liebal. The main entrance side of the building is referred to as side "A". Sides "B", "C" and "D" follow clockwise around the structure.

**The inspection determined the following surfaces tested contain lead greater than or equal to 1.0 mg/cm, and are considered to be lead-based paint surfaces as defined by the Virginia Department of Professional and Occupational Regulation (DPOR) and the Environmental Protection Agency (EPA):**

- **ALL METAL STAIRWAY COMPONENTS (i.e. handrails, baseboards, stringers, newel posts, etc.) IN ALL THREE STAIRWELLS.**

**If lead is present, regardless of quantity, OSHA regulations are applicable.** All persons involved in the disturbance of lead based or lead containing painted surfaces should be adequately trained to do so. All contractors should be provided with the results for their use in meeting current OSHA requirements for the protection of their workers and the environment.

This inspection was in compliance with the Virginia Lead-based Paint Activities Regulations, October 1, 1995. The Inspector is properly trained, licensed, and met the competency requirements spelled out in those regulations.

## FIELD VERIFICATION

**Ms. Robin H. Liebal, licensed lead-based paint inspector/risk assessor, inspected the affected areas of the structure on February 24, 2010.**

A total of one hundred sixty five (165) X-Ray Florescence (XRF) readings were taken in substantial conformance with industry standards and other applicable federal and state regulations. Ms. Liebal's Virginia Lead Inspector license number is 3355-000213.

**A complete copy of all tested surfaces and results are included in this report. All positive samples are listed in BOLD.**

HDH Technical, Inc. (HDHT) used the NITON Corporation model NITON XLp-303A (Serial#XL303A-12678) X-Ray Fluorescence (XRF) instrument for the screening. This unit was sourced in October, 2006 operated in the standard test mode using the rules and procedures found in the Performance Characteristic Sheet (Edition #4) for the NITON Corporation model XLp-303A series. The instrument is not substrate dependant according to that performance characteristic sheet, so no substrate corrections were required during this screening.

The XRF was calibrated prior to use and at the end of the testing, or every four hours, whichever came first. All calibrations were conducted on a  $1.10 \pm 0.1$  mg/cm<sup>2</sup> Orange NIST SRM paint film. All calibrations are noted on the x-ray fluorescence data sheets.

---

For the purposes of this inspection lead-based paint is defined as greater than or equal to 1.0 mg/cm<sup>2</sup>. The NITON XL instrument (model XLP-303A) used in this survey have published threshold values of 1.0 mg/cm<sup>2</sup> on all substrates and do not require substrate correction. Paint chip confirmation of inconclusive samples was not necessary since no inconclusive surfaces were identified during sampling with this X-ray Fluorescence Analyzer. Lastly, this report detailing the findings of the inspection report was written to document the inspection and provide a permanent record of the evaluation.

## **Qualifications**

The inspection was conducted by Ms. Robin H. Liebal, Virginia Licensed Lead Inspector #3355-000213 and Risk Assessor #3356-000422. The inspection was conducted in accordance with applicable Local, State, and Federal regulations.

## **Methodologies**

This inspection was conducted in accordance with accepted industry standards and applicable regulations established by OSHA and the EPA. This inspection only identifies lead-based paint that is accessible through non-destructive methods. It does not identify lead-based paint materials located within walls, concrete decks, subfloors, or other generally inaccessible areas.

## **Disclaimer**

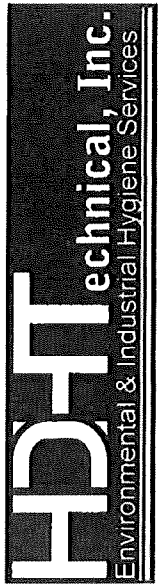
This inspection report is written for and intended for the use of the Owner and its representatives only. HDHT is not responsible nor will be held liable for any interpretation made, opinions formed, or conclusions drawn by any third party as a result of examining the lab results, inspection results or this report. Any interpretations, opinions, and conclusions will be those made, formed, and drawn solely by that third party.

A lead inspector/risk assessor properly trained by a training institution utilizing an approved HUD curriculum and subsequently licensed to perform inspections by the Commonwealth of Virginia performed the inspection of this structure. HDHT accepts no liability nor makes any claims regarding lead-based painted surfaces which were not tested and lead -based painted surfaces which were not accessible during the inspection process if such material was located behind or within walls, concrete decks, sub-floors, chases, or was otherwise generally inaccessible without destructive sampling.



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## **Lead Based Paint Testing Results**

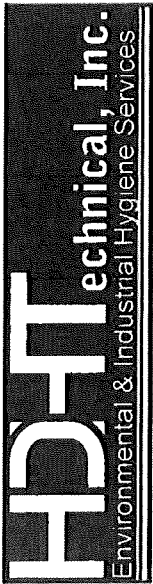


400 West Main Street  
 Christiansburg, Virginia 24073  
 Telephone: (540) 381-7999

# Lead Survey for Construction

Commonwealth of Virginia  
 Virginia Community College System  
 J. Sargeant Reynolds Community College  
 Downtown Campus - Gordon Bldg. - Phase I  
 700 East Jackson Street  
 Richmond, VA 23285

READING	DATE & TIME	TYPE	COMPONENT	SUBSTRATE	SIDE	CONDITION	COLOR	LOCATION	FLOOR	SITE	INSPECTOR	RESULTS	PBC
1	2/24/2010 11:33	SHUTTER_CAL											1.95
2	2/24/2010 11:35	PAINT	CALIBRATE FRONT							GORDON BLDG.	RHL	Negative	0.9
3	2/24/2010 11:36	PAINT	CALIBRATE FRONT							GORDON BLDG.	RHL	Positive	1.1
4	2/24/2010 11:37	PAINT	CALIBRATE BACK							GORDON BLDG.	RHL	Positive	1.2
5	2/24/2010 11:41	PAINT	Wall	Concrete	A		Beige	B 14	Basement	GORDON BLDG.	RHL	Negative	< LOD
6	2/24/2010 11:42	PAINT	Wall	Cinder Block	B		Beige	B 14	Basement	GORDON BLDG.	RHL	Negative	< LOD
7	2/24/2010 11:42	PAINT	Wall	Cinder Block	D		Beige	B 14	Basement	GORDON BLDG.	RHL	Null	< LOD
8	2/24/2010 11:43	PAINT	Wall	Cinder Block	D		Beige	B 14	Basement	GORDON BLDG.	RHL	Negative	< LOD
9	2/24/2010 11:43	PAINT	Win. Casing	Metal	C		Brown	B 14	Basement	GORDON BLDG.	RHL	Negative	< LOD
10	2/24/2010 11:44	PAINT	Door Casing	Metal	C		Brown	B 14	Basement	GORDON BLDG.	RHL	Negative	< LOD
11	2/24/2010 11:44	PAINT	Door	Metal	C		Brown	B 14	Basement	GORDON BLDG.	RHL	Negative	< LOD
12	2/24/2010 11:46	PAINT	Wall	Cinder Block	A		Beige	Hallway	Basement	GORDON BLDG.	RHL	Null	< LOD
13	2/24/2010 11:46	PAINT	Wall	Cinder Block	B		Green	Hallway	Basement	GORDON BLDG.	RHL	Negative	< LOD
14	2/24/2010 11:47	PAINT	Wall	Cinder Block	B		Green	Hallway	Basement	GORDON BLDG.	RHL	Negative	< LOD
15	2/24/2010 11:47	PAINT	Wall	Cinder Block	C		Beige	Hallway	Basement	GORDON BLDG.	RHL	Negative	< LOD
16	2/24/2010 11:48	PAINT	Door Casing	Metal	C		Beige	Hallway	Basement	GORDON BLDG.	RHL	Null	< LOD
17	2/24/2010 11:48	PAINT	Door	Metal	C		Beige	Hallway	Basement	GORDON BLDG.	RHL	Null	< LOD
18	2/24/2010 11:48	PAINT	Door	Metal	C		Beige	Hallway	Basement	GORDON BLDG.	RHL	Negative	< LOD
19	2/24/2010 11:49	PAINT	Door	Metal	C		Beige	Hallway	Basement	GORDON BLDG.	RHL	Negative	< LOD
20	2/24/2010 11:51	PAINT	Wall	Cinder Block	B		Blue	Hskping	Basement	GORDON BLDG.	RHL	Negative	< LOD
21	2/24/2010 11:52	PAINT	Wall	Cinder Block	B		Blue	Hskping	Basement	GORDON BLDG.	RHL	Negative	< LOD
22	2/24/2010 11:53	PAINT	Door Casing	Metal	C		Grey	Hskping	Basement	GORDON BLDG.	RHL	Negative	< LOD
23	2/24/2010 11:53	PAINT	Door	Metal	C		Grey	Hskping	Basement	GORDON BLDG.	RHL	Negative	< LOD
24	2/24/2010 11:54	PAINT	Beam	Metal	B		Blue	Hskping	Basement	GORDON BLDG.	RHL	Negative	< LOD
25	2/24/2010 11:54	PAINT	Beam	Metal	B		Blue	Hskping	Basement	GORDON BLDG.	RHL	Negative	< LOD
26	2/24/2010 11:57	PAINT	Wall	Cinder Block	A		Blue	Ladies	Basement	GORDON BLDG.	RHL	Negative	< LOD
27	2/24/2010 11:57	PAINT	Wall	Cinder Block	C		Blue	Ladies	Basement	GORDON BLDG.	RHL	Null	< LOD
28	2/24/2010 11:58	PAINT	Wall	Cinder Block	C		Blue	Ladies	Basement	GORDON BLDG.	RHL	Negative	< LOD
29	2/24/2010 11:58	PAINT	Panels	Metal	C		Blue	Ladies	Basement	GORDON BLDG.	RHL	Negative	< LOD
30	2/24/2010 11:59	PAINT	Floor	Ceramic Tile			Green	Mens	Basement	GORDON BLDG.	RHL	Null	< LOD
31	2/24/2010 12:01	PAINT	Floor	Ceramic Tile			Brown	Mens	Basement	GORDON BLDG.	RHL	Negative	< LOD
32	2/24/2010 12:01	PAINT	Floor	Ceramic Tile			Brown	Mens	Basement	GORDON BLDG.	RHL	Negative	< LOD
33	2/24/2010 12:02	PAINT	Wall	Cinder Block	B		Tan	Mens	Basement	GORDON BLDG.	RHL	Negative	< LOD
34	2/24/2010 12:02	PAINT	Wall	Cinder Block	D		Tan	Mens	Basement	GORDON BLDG.	RHL	Negative	< LOD
35	2/24/2010 12:03	PAINT	Panels	Metal	A		Brown	Mens	Basement	GORDON BLDG.	RHL	Negative	< LOD
36	2/24/2010 12:04	PAINT	Door Casing	Metal	C		Brown	Mens	Basement	GORDON BLDG.	RHL	Negative	< LOD
37	2/24/2010 12:04	PAINT	Door	Metal	C		Brown	Mens	Basement	GORDON BLDG.	RHL	Negative	< LOD
38	2/24/2010 12:06	PAINT	Elev DR	Metal	D		Beige	Mens	Basement	GORDON BLDG.	RHL	Negative	< LOD
39	2/24/2010 12:07	PAINT	Door Casing	Metal	A		Grey	Entry	First	GORDON BLDG.	RHL	Negative	< LOD
40	2/24/2010 12:08	PAINT	Door	Metal	A		Grey	Entry	First	GORDON BLDG.	RHL	Negative	< LOD
41	2/24/2010 12:08	PAINT	Door Casing	Metal	A		Blue	Entry	First	GORDON BLDG.	RHL	Negative	< LOD



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# Lead Survey for Construction

Commonwealth of Virginia  
 Virginia Community College System  
 J. Sargeant Reynolds Community College  
 Downtown Campus - Gordon Bldg. - Phase I  
 700 East Jackson Street  
 Richmond, VA 23285

READING	DATE & TIME	TYPE	COMPONENT	SUBSTRATE	SIDE	CONDITION	COLOR	LOCATION	FLOOR	SITE	INSPECTOR	RESULTS	PbC
42	2/24/2010 12:09	PAINT	Door Casing	Metal	A		Brown	Entry	First	GORDON BLDG.	RHL	Null	< LOD
43	2/24/2010 12:09	PAINT	Door Casing	Metal	A		Brown	Entry	First	GORDON BLDG.	RHL	Negative	< LOD
44	2/24/2010 12:10	PAINT	Door	Metal	A		Brown	Entry	First	GORDON BLDG.	RHL	Negative	< LOD
45	2/24/2010 12:10	PAINT	Hand Rail	Metal	A		Brown	Entry	First	GORDON BLDG.	RHL	Null	< LOD
46	2/24/2010 12:11	PAINT	Hand Rail	Metal	A		Brown	Entry	First	GORDON BLDG.	RHL	Negative	< LOD
47	2/24/2010 12:11	PAINT	Win. Casing	Metal	A		Brown	Entry	First	GORDON BLDG.	RHL	Negative	< LOD
48	2/24/2010 12:12	PAINT	Win. Casing	Metal	B		Grey	Entry	First	GORDON BLDG.	RHL	Negative	< LOD
49	2/24/2010 12:13	PAINT	Wall	Drywall	C		Beige	Entry	First	GORDON BLDG.	RHL	Negative	< LOD
50	2/24/2010 12:14	PAINT	Wall	Concrete	D		Beige	Entry	First	GORDON BLDG.	RHL	Negative	< LOD
51	2/24/2010 12:15	PAINT	Door Casing	Metal	C		Grey	Entry	First	GORDON BLDG.	RHL	Negative	< LOD
52	2/24/2010 12:15	PAINT	Door	Metal	C		Grey	Entry	First	GORDON BLDG.	RHL	Negative	< LOD
53	2/24/2010 12:17	PAINT	Wall	Drywall	D		Grey	Bus Off	First	GORDON BLDG.	RHL	Negative	< LOD
54	2/24/2010 12:17	PAINT	Wall	Cinder Block	B		Grey	Bus Off	First	GORDON BLDG.	RHL	Negative	< LOD
55	2/24/2010 12:18	PAINT	Win. Casing	Metal	A		Grey	Bus Off	First	GORDON BLDG.	RHL	Negative	< LOD
56	2/24/2010 12:19	PAINT	Wall	Drywall	B		Beige	Hallway	First	GORDON BLDG.	RHL	Negative	< LOD
57	2/24/2010 12:19	PAINT	Wall	Drywall	D		Beige	Hallway	First	GORDON BLDG.	RHL	Negative	< LOD
58	2/24/2010 12:20	PAINT	Door Casing	Metal	D		Grey	Hallway	First	GORDON BLDG.	RHL	Negative	< LOD
59	2/24/2010 12:20	PAINT	Door	Metal	D		Grey	Hallway	First	GORDON BLDG.	RHL	Negative	< LOD
60	2/24/2010 12:22	PAINT	Wall	Drywall	A		White	Fin	First	GORDON BLDG.	RHL	Negative	< LOD
61	2/24/2010 12:23	PAINT	Wall	Drywall	C		White	Fin	First	GORDON BLDG.	RHL	Negative	< LOD
62	2/24/2010 12:23	PAINT	Wall	Cinder Block	B		White	Stair C	First	GORDON BLDG.	RHL	Negative	< LOD
63	2/24/2010 12:25	PAINT	Wall	Cinder Block	A		Beige	Stair C	First	GORDON BLDG.	RHL	Negative	< LOD
64	2/24/2010 12:26	PAINT	Wall	Cinder Block	B		Blue	Stair C	First	GORDON BLDG.	RHL	Negative	< LOD
65	2/24/2010 12:26	PAINT	Door Casing	Metal	B		Blue	Stair C	First	GORDON BLDG.	RHL	Negative	< LOD
66	2/24/2010 12:27	PAINT	Door	Metal	B		Blue	Stair C	First	GORDON BLDG.	RHL	Null	< LOD
67	2/24/2010 12:27	PAINT	Door	Metal	B		Blue	Stair C	First	GORDON BLDG.	RHL	Negative	< LOD
68	2/24/2010 12:28	PAINT	Hand Rail	Metal	A		Tan	Stair C	First	GORDON BLDG.	RHL	Negative	< LOD
69	2/24/2010 12:29	PAINT	Stair Baseboard	Metal	A		Tan	Stair C	First	GORDON BLDG.	RHL	Positive	3.1
70	2/24/2010 12:30	PAINT	Stair Stringer	Metal	A		Tan	Stair C	First	GORDON BLDG.	RHL	Positive	11.7
71	2/24/2010 12:30	PAINT	Radiator	Metal	A		Tan	Stair C	First	GORDON BLDG.	RHL	Positive	11.2
72	2/24/2010 12:33	PAINT	Wall	Drywall	B		Blue	Cafe	First	GORDON BLDG.	RHL	Negative	< LOD
73	2/24/2010 12:34	PAINT	Win. Casing	Metal	D		Beige	Cafe	First	GORDON BLDG.	RHL	Negative	< LOD
74	2/24/2010 12:35	PAINT	Wall	Cinder Block	A		Blue	Ladies	First	GORDON BLDG.	RHL	Negative	< LOD
75	2/24/2010 12:36	PAINT	Chase DR	Metal	A		Blue	Ladies	First	GORDON BLDG.	RHL	Negative	< LOD
76	2/24/2010 12:36	PAINT	Panel	Metal	A		Blue	Ladies	First	GORDON BLDG.	RHL	Negative	< LOD
77	2/24/2010 12:37	PAINT	Floor	Ceramic Tile	A		Green	Ladies	First	GORDON BLDG.	RHL	Negative	< LOD
78	2/24/2010 12:38	PAINT	Wall	Cinder Block	A		Beige	Ladies	First	GORDON BLDG.	RHL	Negative	< LOD
79	2/24/2010 12:39	PAINT	Wall	Cinder Block	A		Blue	Stair A	First	GORDON BLDG.	RHL	Negative	< LOD
80	2/24/2010 12:39	PAINT	Hand Rail	Cinder Block	B		Tan	Stair A	First	GORDON BLDG.	RHL	Negative	< LOD
81	2/24/2010 12:40	PAINT	Newel Post	Cinder Block	A		Tan	Stair A	First	GORDON BLDG.	RHL	Positive	2.6
82	2/24/2010 12:41	PAINT	Stair Stringer	Cinder Block	A		Tan	Stair A	First	GORDON BLDG.	RHL	Positive	5.6

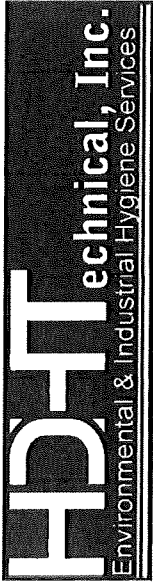


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Commonwealth of Virginia  
 Virginia Community College System  
 J. Sargeant Reynolds Community College  
 Downtown Campus - Gordon Bldg. - Phase I  
 700 East Jackson Street  
 Richmond, VA 23285

READING	DATE & TIME	TYPE	COMPONENT	SUBSTRATE	SIDE	CONDITION	COLOR	LOCATION	FLOOR	SITE	INSPECTOR	RESULTS	PBC
83	2/24/2010 12:42	PAINT	Door Casing	Metal	A	A	Blue	Stair A	First	GORDON BLDG.	RHL	Negative	< LOD
84	2/24/2010 12:43	PAINT	Door	Metal	A	A	Blue	Stair A	First	GORDON BLDG.	RHL	Negative	< LOD
85	2/24/2010 12:45	PAINT	Wall	Concrete	D	D	Tan	Hallway	Second	GORDON BLDG.	RHL	Negative	< LOD
86	2/24/2010 12:46	PAINT	Wall	Drywall	A	A	Beige	Hallway	Second	GORDON BLDG.	RHL	Negative	< LOD
87	2/24/2010 12:46	PAINT	Wall	Drywall	C	C	Beige	Hallway	Second	GORDON BLDG.	RHL	Negative	< LOD
88	2/24/2010 12:47	PAINT	Door Casing	Metal	C	C	Beige	Hallway	Second	GORDON BLDG.	RHL	Negative	< LOD
89	2/24/2010 12:47	PAINT	Door Casing	Metal	C	C	Maroon	Hallway	Second	GORDON BLDG.	RHL	Negative	< LOD
90	2/24/2010 12:48	PAINT	Door	Metal	C	C	Brown	Hallway	Second	GORDON BLDG.	RHL	Negative	< LOD
91	2/24/2010 12:50	PAINT	Wall	Drywall	D	D	Tan	Hallway	Second	GORDON BLDG.	RHL	Negative	< LOD
92	2/24/2010 12:52	PAINT	Wall	Drywall	A	A	Beige	Rm. 220	Second	GORDON BLDG.	RHL	Negative	< LOD
93	2/24/2010 12:52	PAINT	Wall	Drywall	C	C	Beige	Rm. 220	Second	GORDON BLDG.	RHL	Negative	< LOD
94	2/24/2010 12:53	PAINT	Wall	Drywall	C	C	Beige	Rm. 220	Second	GORDON BLDG.	RHL	Negative	< LOD
95	2/24/2010 12:53	PAINT	Win. Casing	Metal	D	D	Brown	Rm. 220	Second	GORDON BLDG.	RHL	Null	< LOD
96	2/24/2010 12:56	PAINT	Wall	Cinder Block	A	A	Green	Library	Second	GORDON BLDG.	RHL	Negative	< LOD
97	2/24/2010 12:57	PAINT	Wall	Drywall	A	A	Yellow	Library	Second	GORDON BLDG.	RHL	Null	< LOD
98	2/24/2010 12:57	PAINT	Wall	Drywall	A	A	Yellow	Library	Second	GORDON BLDG.	RHL	Negative	< LOD
99	2/24/2010 12:57	PAINT	Win. Casing	Metal	B	B	Green	Library	Second	GORDON BLDG.	RHL	Negative	< LOD
100	2/24/2010 12:58	PAINT	Door Casing	Metal	C	C	Green	Library	Second	GORDON BLDG.	RHL	Negative	< LOD
101	2/24/2010 12:59	PAINT	Door	Metal	C	C	Green	Library	Second	GORDON BLDG.	RHL	Negative	< LOD
102	2/24/2010 13:02	PAINT	Wall	Cinder Block	D	D	Green	Stair A	Third	GORDON BLDG.	RHL	Negative	< LOD
103	2/24/2010 13:02	PAINT	Door Casing	Metal	A	A	Green	Stair A	Third	GORDON BLDG.	RHL	Negative	< LOD
104	2/24/2010 13:03	PAINT	Door	Metal	A	A	Green	Stair A	Third	GORDON BLDG.	RHL	Negative	< LOD
105	2/24/2010 13:04	PAINT	Wall	Drywall	A	A	Beige	Hallway	Third	GORDON BLDG.	RHL	Negative	< LOD
106	2/24/2010 13:04	PAINT	Wall	Concrete	D	D	Beige	Hallway	Third	GORDON BLDG.	RHL	Null	< LOD
107	2/24/2010 13:05	PAINT	Wall	Concrete	D	D	Beige	Hallway	Third	GORDON BLDG.	RHL	Null	< LOD
108	2/24/2010 13:05	PAINT	Wall	Concrete	D	D	Beige	Hallway	Third	GORDON BLDG.	RHL	Negative	< LOD
109	2/24/2010 13:06	PAINT	Door Casing	Metal	C	C	Beige	Hallway	Third	GORDON BLDG.	RHL	Negative	< LOD
110	2/24/2010 13:06	PAINT	Door	Metal	C	C	Beige	Hallway	Third	GORDON BLDG.	RHL	Negative	< LOD
111	2/24/2010 13:07	PAINT	Wall	Drywall	D	D	Beige	Hallway	Third	GORDON BLDG.	RHL	Negative	< LOD
112	2/24/2010 13:08	PAINT	Wall	Cinder Block	D	D	Maroon	Hallway	Third	GORDON BLDG.	RHL	Negative	< LOD
113	2/24/2010 13:09	PAINT	Wall	Drywall	A	A	Beige	Rm. 341	Third	GORDON BLDG.	RHL	Negative	< LOD
114	2/24/2010 13:12	PAINT	Hand Rail	Metal	C	C	Black	Stair B	Third	GORDON BLDG.	RHL	Negative	< LOD
115	2/24/2010 13:13	PAINT	Stair Baseboard	Metal	C	C	Black	Stair B	Third	GORDON BLDG.	RHL	Positive	< LOD
116	2/24/2010 13:15	PAINT	Door Casing	Metal	C	C	Brown	Rm. 341	Third	GORDON BLDG.	RHL	Positive 10.8	< LOD
117	2/24/2010 13:16	PAINT	Door	Metal	C	C	Brown	Rm. 341	Third	GORDON BLDG.	RHL	Negative	< LOD
118	2/24/2010 13:18	PAINT	Door	Metal	C	C	Beige	Hallway	Fourth	GORDON BLDG.	RHL	Negative	< LOD
119	2/24/2010 13:18	PAINT	Door Casing	Metal	C	C	Beige	Hallway	Fourth	GORDON BLDG.	RHL	Null	< LOD
120	2/24/2010 13:19	PAINT	Door Casing	Metal	C	C	Beige	Hallway	Fourth	GORDON BLDG.	RHL	Negative	< LOD
121	2/24/2010 13:20	PAINT	Wall	Concrete	B	B	Purple	Hallway	Fourth	GORDON BLDG.	RHL	Negative	< LOD
122	2/24/2010 13:20	PAINT	Wall	Drywall	A	A	Beige	Hallway	Fourth	GORDON BLDG.	RHL	Negative	< LOD
123	2/24/2010 13:21	PAINT	Win. Casing	Metal	A	A	Beige	Hallway	Fourth	GORDON BLDG.	RHL	Null	< LOD



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READING	DATE & TIME	TYPE	COMPONENT	SUBSTRATE	SIDE	CONDITION	COLOR	LOCATION	FLOOR	SITE	INSPECTOR	RESULTS	PbC
124	2/24/2010 13:21	PAINT	Win. Casing	Metal	A		Beige	Hallway	Fourth	GORDON BLDG.	RHL	Negative	< LOD
125	2/24/2010 13:25	PAINT	Fire Panel	Metal	B		Beige	Hallway	Fourth	GORDON BLDG.	RHL	Negative	< LOD
126	2/24/2010 13:27	PAINT	Wall	Cinder Block	A		Beige	Rm. 431	Fourth	GORDON BLDG.	RHL	Negative	< LOD
127	2/24/2010 13:28	PAINT	Wall	Drywall	C		Beige	Rm. 431	Fourth	GORDON BLDG.	RHL	Negative	< LOD
128	2/24/2010 13:28	PAINT	Door Casing	Metal	C		Beige	Rm. 431	Fourth	GORDON BLDG.	RHL	Negative	< LOD
129	2/24/2010 13:29	PAINT	Door	Metal	C		Beige	Rm. 431	Fourth	GORDON BLDG.	RHL	Negative	< LOD
130	2/24/2010 13:30	PAINT	Wall	Cinder Block	B		Beige	Rm. 412	Fourth	GORDON BLDG.	RHL	Null	< LOD
131	2/24/2010 13:31	PAINT	Wall	Cinder Block	B		Beige	Rm. 412	Fourth	GORDON BLDG.	RHL	Negative	< LOD
132	2/24/2010 13:31	PAINT	Wall	Drywall	A		Beige	Rm. 412	Fourth	GORDON BLDG.	RHL	Negative	< LOD
133	2/24/2010 13:32	PAINT	Door Casing	Metal	A		Beige	Rm. 412	Fourth	GORDON BLDG.	RHL	Negative	< LOD
134	2/24/2010 13:32	PAINT	Door	Metal	A		Beige	Rm. 412	Fourth	GORDON BLDG.	RHL	Negative	< LOD
135	2/24/2010 13:34	PAINT	Panel	Metal	C		Blue	Ladies	Fourth	GORDON BLDG.	RHL	Negative	< LOD
136	2/24/2010 13:34	PAINT	Floor	Ceramic Tile	Cm		Green	Ladies	Fourth	GORDON BLDG.	RHL	Negative	< LOD
137	2/24/2010 13:35	PAINT	Door Casing	Metal	C		Brown	Ladies	Fourth	GORDON BLDG.	RHL	Negative	< LOD
138	2/24/2010 13:36	PAINT	Door	Metal	C		Brown	Ladies	Fourth	GORDON BLDG.	RHL	Negative	< LOD
139	2/24/2010 13:38	PAINT	Wall	Cinder Block	D		Green	Stair A	Fourth	GORDON BLDG.	RHL	Negative	< LOD
140	2/24/2010 13:39	PAINT	Door Casing	Metal	A		Green	Stair A	Fourth	GORDON BLDG.	RHL	Negative	< LOD
141	2/24/2010 13:39	PAINT	Door	Metal	A		Green	Stair A	Fourth	GORDON BLDG.	RHL	Negative	< LOD
142	2/24/2010 13:40	PAINT	Vent	Metal	D		Beige	Stair A	Fourth	GORDON BLDG.	RHL	Negative	< LOD
143	2/24/2010 13:41	PAINT	Wall	Concrete	D		Blue	Hallway	Fifth	GORDON BLDG.	RHL	Negative	< LOD
144	2/24/2010 13:42	PAINT	Wall	Drywall	A		Beige	Hallway	Fifth	GORDON BLDG.	RHL	Negative	< LOD
145	2/24/2010 13:46	PAINT	Wall	Drywall	C		Purple	Rm. 564	Fifth	GORDON BLDG.	RHL	Negative	< LOD
146	2/24/2010 13:47	PAINT	Wall	Drywall	D		Beige	Rm. 564	Fifth	GORDON BLDG.	RHL	Negative	< LOD
147	2/24/2010 13:51	PAINT	Wall	Concrete	D		Green	Hallway	Sixth	GORDON BLDG.	RHL	Negative	< LOD
148	2/24/2010 13:51	PAINT	Wall	Concrete	D		Green	Hallway	Sixth	GORDON BLDG.	RHL	Null	< LOD
149	2/24/2010 13:52	PAINT	Wall	Drywall	A		Beige	Hallway	Sixth	GORDON BLDG.	RHL	Negative	< LOD
150	2/24/2010 13:52	PAINT	Door Casing	Metal	D		Beige	Hallway	Sixth	GORDON BLDG.	RHL	Negative	< LOD
151	2/24/2010 13:53	PAINT	Door	Metal	D		Beige	Hallway	Sixth	GORDON BLDG.	RHL	Negative	< LOD
152	2/24/2010 13:55	PAINT	Floor	Ceramic Tile	A		Brown	Mens	Sixth	GORDON BLDG.	RHL	Negative	< LOD
153	2/24/2010 13:58	PAINT	Door Casing	Metal	B		Tan	Rm. 647	Sixth	GORDON BLDG.	RHL	Negative	< LOD
154	2/24/2010 13:59	PAINT	Wall	Drywall	D		Yellow	Copy Rm.	Sixth	GORDON BLDG.	RHL	Negative	< LOD
155	2/24/2010 14:00	PAINT	Door	Metal	B		Purple	Copy Rm.	Sixth	GORDON BLDG.	RHL	Negative	< LOD
156	2/24/2010 14:05	PAINT	Door	Metal	A		Tan	Stair A	Penthouse	GORDON BLDG.	RHL	Negative	< LOD
157	2/24/2010 14:05	PAINT	Door	Metal	A		Tan	Stair A	Penthouse	GORDON BLDG.	RHL	Negative	< LOD
158	2/24/2010 14:07	PAINT	Door Casing	Metal	B		Brown	Stair A	Penthouse	GORDON BLDG.	RHL	Negative	< LOD
159	2/24/2010 14:08	PAINT	Rf Ladder	Metal	C		Beige	Stair A	Penthouse	GORDON BLDG.	RHL	Negative	< LOD
160	2/24/2010 14:08	PAINT	Duct	Metal	C		Beige	Stair A	Penthouse	GORDON BLDG.	RHL	Negative	< LOD
161	2/24/2010 14:08	PAINT	Duct	Metal	C		Beige	Stair A	Penthouse	GORDON BLDG.	RHL	Negative	< LOD
162	2/24/2010 14:08	PAINT	AHU	Metal	C		Beige	Stair A	Penthouse	GORDON BLDG.	RHL	Negative	< LOD
163	2/24/2010 14:16	PAINT	CALIBRATE FRONT							GORDON BLDG.	RHL	Negative	0.9
164	2/24/2010 14:19	PAINT	CALIBRATE FRONT							GORDON BLDG.	RHL	Positive	1.1



400 West Main Street  
 Christiansburg, Virginia 24073  
 Telephone: (540) 381-7999

# Lead Survey for Construction

Commonwealth of Virginia  
 Virginia Community College System  
 J. Sargeant Reynolds Community College  
 Downtown Campus - Gordon Bldg. - Phase I  
 700 East Jackson Street  
 Richmond, VA 23285

READING	DATE & TIME	TYPE	COMPONENT	SUBSTRATE	SIDE	CONDITION	COLOR	LOCATION	FLOOR	SITE	INSPECTOR	RESULTS	PbC
165	2/24/2010 14:22	PAINT	CALIBRATE BACK					GORDON BLDG.			RHL	Positive	1.1

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## **Photos**

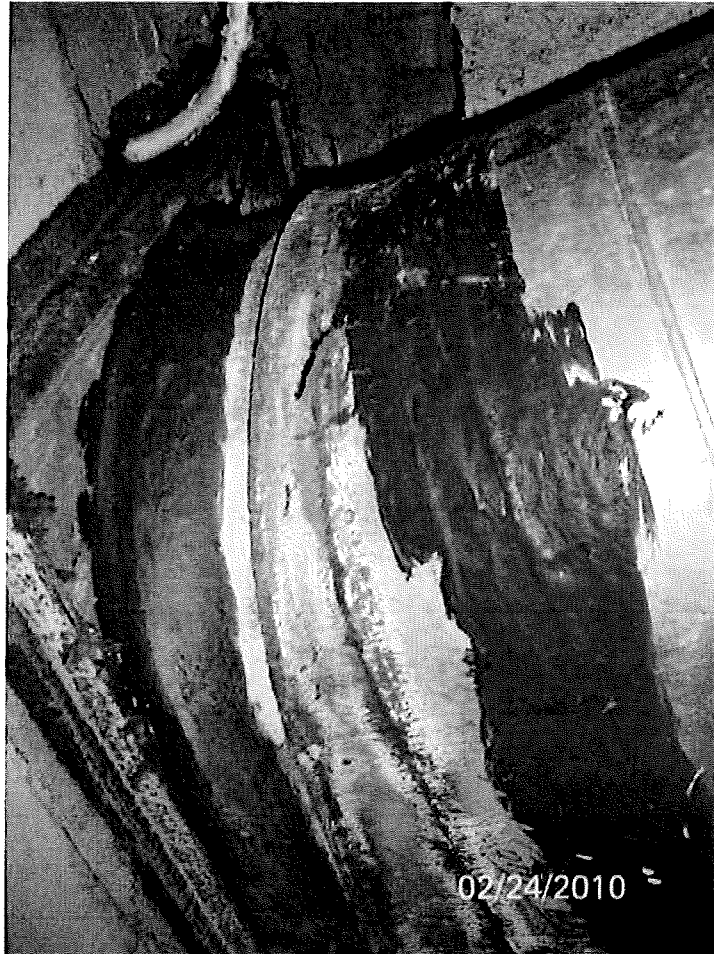
**JSRCC – DOWNTOWN CAMPUS  
GORDON BLDG. – PHASE I**



**ACM FLOOR TILE AND MASTIC (khaki) THROUGHOUT  
THE FACILITY IN HALLWAYS AND CLASSROOMS.**

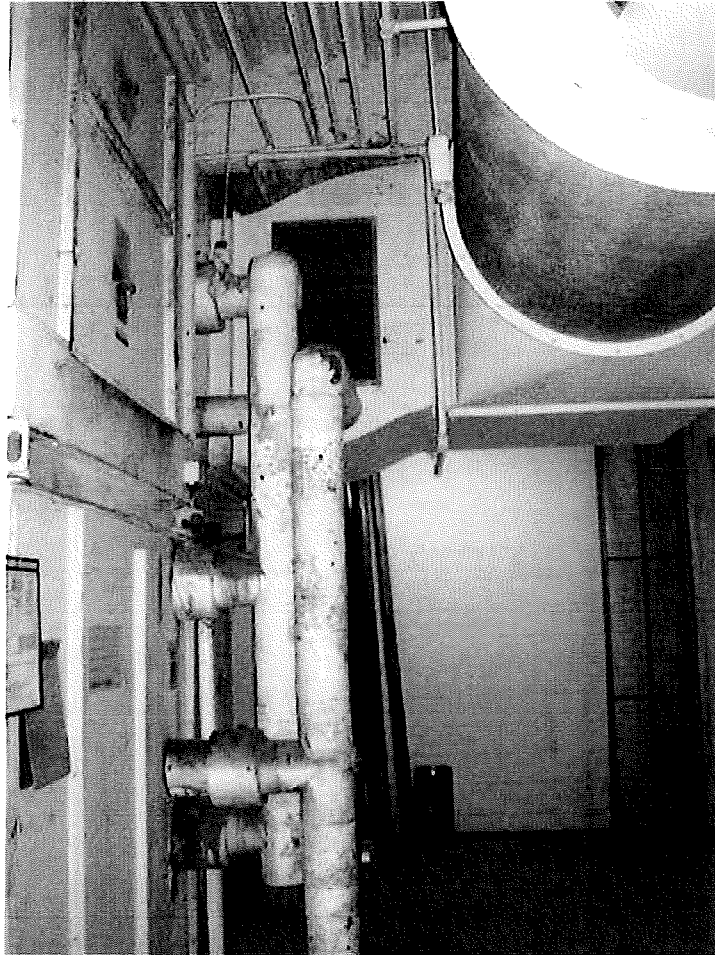


**JSRCC – DOWNTOWN CAMPUS  
GORDON BLDG. – PHASE I**



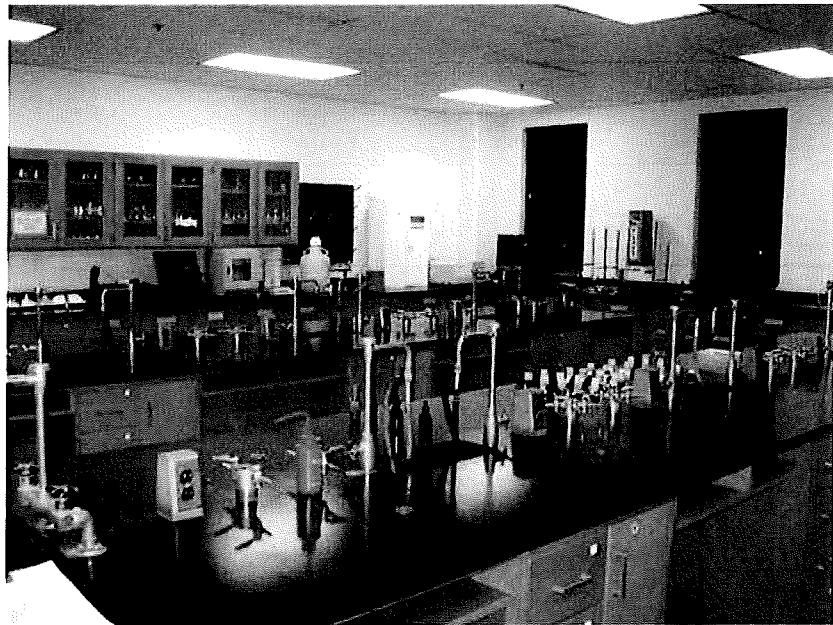
**RED MASTIC ON THE METAL DUCT IN THE HVAC WALL CHASE IDENTIFIED TO BE ACM. THERE IS A SLIGHT VARIANCE IN THE COLORS OF TWO TYPES OF THIS MATERIAL THAT HAVE BEEN INTERMITTENTLY APPLIED ON THE SEAMS. IT WOULD BE IMPOSSIBLE TO SEPARATE THE TWO.**

**JSRCC – DOWNTOWN CAMPUS  
GORDON BLDG. – PHASE I**



**ACM END SEALER IDENTIFIED ON THE FIBERGLASS  
INSULATION ON THE AIR HANDLING SYSTEM IN THE  
PENTHOUSE AND THE BOILER ROOM.**

**JSRCC – DOWNTOWN CAMPUS  
GORDON BLDG. – PHASE I**



**TRANSITE FUME HOODS AND LAB TABLES AND SINKS  
ARE PRESUMED TO BE ACM.**

**JSRCC – DOWNTOWN CAMPUS  
GORDON BLDG. – PHASE I**



**ALL METAL STAIRWAY COMPONENTS IDENTIFIED TO BE  
LEAD BASED PAINT IN ALL THREE STAIRWELLS.**

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## **Applicable Licenses**





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