

SECTION 01 45 29  
(01410)  
TESTING LABORATORY SERVICES

1.01 GENERAL

- A. *CONTRACTOR* shall employ and pay for the services of an Independent Testing Laboratory to perform specified testing. Include such costs in overall contract price.
  - 1. Employment of the laboratory shall in no way relieve *CONTRACTOR'S* obligations to perform the work of the contract.
  - 2. Employment of the laboratory shall in no way relieve *CONTRACTOR'S* obligations to perform the work of the contract.
- B. Related requirements specified elsewhere:
  - 1. Inspections and testing required by law, ordinances, rules, regulations, orders or approval of public authorities: General Conditions.
  - 2. Certification of products. The respective sections of these *Specifications*.
  - 3. Test, adjust and balance equipment. The respective sections of these *Specifications*.
  - 4. Laboratory testing, sampling required, and standards for testing: See each Specification Section listed below:
    - a. *Section 02 41 19: Selective Demolition*

1.02 QUALIFICATION OF LABORATORY

- A. Meet "Recommended Requirements for Independent Laboratory Qualification", published by American Council of Independent Laboratories.
- B. Authorized to operate in the state in which the project is located, and acceptable to *OWNER*.
- C. Testing equipment: Calibrated at reasonable intervals by devices of accuracy traceable to either:

1. National Bureau of Standards.
  2. Accepted values of natural physical constants.
- D. If requested by *ENGINEER*, submit copy of report of inspection of facilities made by Materials Reference Laboratory of National Bureau of Standards during the most recent tour of inspection.

### 1.03 LABORATORY DUTIES

- A. Cooperate with *ENGINEER* and *CONTRACTOR*. Provide qualified personnel after due notice.
- B. Perform specified inspections, sampling and testing of materials.
1. Comply with specified standards for testing.
  2. Ascertain compliance of materials with requirements of *Contract Documents*.
- C. Promptly notify *ENGINEER* and *CONTRACTOR* of observed irregularities or deficiencies of work or products.
- D. Promptly submit six (6) copies of written report of each test and/or inspection to *ENGINEER*. Each report shall include:
1. Date issued.
  2. Project title and number.
  3. Testing laboratory name, address and telephone number.
  4. Name and signature of laboratory inspector.
  5. Date and time of sampling or inspection.
  6. Record of temperature and weather condition.
  7. Date of test.
  8. Identification of product and specification section.
  9. Location of sample or test in the project.

10. Type of inspection or test.
  11. Results of tests and compliance with *Contract Documents*.
  12. Interpretation of test results, when requested by *ENGINEER*.
- E. Perform additional tests as required by *ENGINEER* or the *OWNER*.

1.04 LIMITATIONS OF AUTHORITY OF TESTING LABORATORY

- A. Laboratory is not authorized to:
1. Release, revoke, alter or enlarge on requirements of *Contract Documents*.
  2. Approve or accept any portion of the work.
  3. Perform any duties of the *CONTRACTOR*.

1.05 CONTRACTOR'S RESPONSIBILITIES

- A. Cooperate with laboratory personnel, provide access to work.
- B. Secure and deliver to the laboratory adequate quantities of representative samples of materials proposed to be used and which require testing.
- C. Provide to the laboratory the design mix proposed to be used for concrete, and other material mixes, which require control by the testing laboratory.
- D. Furnish incidental labor and facilities:
1. To provide access to work to be tested.
  2. To obtain and handle samples at the project site or at the source of the product to be tested.
  3. To facilitate inspections and tests.
  4. For storage and curing of test samples.
- E. Notify laboratory sufficiently in advance of operations to allow for assignment of personnel and scheduling of tests.

- F. Make arrangements with laboratory and pay for additional samples and tests required for *CONTRACTOR'S* convenience.
- G. Employ and pay for the services of a separate, equally qualified independent testing laboratory to perform additional sampling and testing required when initial tests indicate work does not comply with *Contract Documents*.

\*\*\*\*END OF SECTION\*\*\*\*



SECTION 01 54 00  
(01520)  
CONSTRUCTION AIDS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work included:

1. Furnish, install and maintain required construction aids, remove on completion of work.

B. Related work:

1. Other sections of the *Specifications*, not referenced below, shall also apply to the extent required for proper performance of this work.
2. *Section 01 11 00: Statement of Work*

1.02 REQUIREMENTS OF REGULATORY AGENCIES

- A. Comply with Federal, State and local codes and regulations.

1.03 QUALITY ASSURANCE

A. Qualifications of manufacturer:

1. Products used in the work of this section shall be produced by manufacturers regularly engaged in the manufacture of similar items and with a history of successful production acceptable to the *ENGINEER*.

B. Qualifications of workmen:

1. Provide at least one person who shall be present at all times during execution of the work of this section, who shall be thoroughly familiar with the specified requirements and the materials and methods needed for their execution, and who shall direct all work performed under this section.

2. Provide adequate numbers of workmen skilled in the necessary crafts and properly informed of the method and materials to be used.
  3. In acceptance or rejection of the work of this section, the *ENGINEER* will make no allowance for lack of skill on the part of workmen.
- C. Basis of acceptance:
1. The manufacturer's installation instructions, as approved by the *ENGINEER*, will provide the basis for acceptance or rejection of the work performed under this section.

## PART 2 - PRODUCTS

### 2.01 MATERIALS

- A. General: Materials may be new or used, suitable for the intended purpose, but must not violate requirements of applicable codes and standards.

### 2.02 CONSTRUCTION AIDS

- A. Provide construction aids and equipment required by personnel and to facilitate the execution of the work; scaffolds, staging, ladders, stairs, ramps, runways, platforms, railings, hoists, cranes, chutes and other such facilities and equipment.
1. Refer to respective sections for particular requirements for each trade.

### 2.03 TEMPORARY ENCLOSURES

- A. Provide temporary weathertight enclosure of exterior walls for successive areas of the building as work progresses, as necessary to provide acceptable working conditions, provide weather protection for interior materials, allow for effective temporary heating, and to prevent entry of unauthorized persons.
1. Provide temporary exterior doors with self-closing hardware and padlocks.
  2. Other enclosures shall be removable as necessary for work and for handling of materials.
- B. Provide temporary enclosures to separate work areas from the areas of existing building occupied by *OWNER*; to prevent penetration of dust or moisture into

occupied areas, to prevent damage to existing equipment, and to protect *OWNER'S* employees and operations from construction work.

### PART 3 - EXECUTION

#### 3.01 PREPARATION

- A. Consult with *ENGINEER*, review site conditions and factors which affect construction procedures and construction aids, including adjacent properties and public facilities which may be affected by execution of the work.

#### 3.02 GENERAL

- A. Comply with applicable requirements specified in sections of Divisions 2 through 16.
- B. Relocate construction aids as required by progress of construction, by storage or work requirements, and to accommodate legitimate requirements of *OWNER* and other *CONTRACTORS* employed at the site.

#### 3.03 REMOVAL

- A. Completely remove temporary materials, equipment and services:
  - 1. When construction needs can be met by use of permanent construction.
  - 2. At completion of the project.
- B. Restore permanent facilities used for temporary purposes to specified condition.

\*\*\*\*END OF SECTION\*\*\*\*



SECTION 01 56 00  
(01530)  
BARRIERS

PART 1 - GENERAL

1.01 DESCRIPTION

A. General:

1. Provide barriers to prevent unauthorized entry to construction areas to allow for Owner's use of site, and to protect existing facilities and adjacent properties from damage from construction operations and demolition.
2. Provide barricades and covered walkways required by authorities having jurisdiction for public rights-of-way and for public access to existing building.
3. Provide protection for plants designated to remain. Replace damaged plants.
4. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.
5. Remove when no longer needed, or at completion of work.

B. Related work:

1. Other sections of the *Specifications*, not referenced below, shall also apply to the extent required for proper performance of this work.
2. *Section 01 11 00: Statement of Work*
3. *Section 01 54 00: Construction Aids*
4. *Section 01 58 00: Project Identification and Signs*

1.02 REQUIREMENTS OF REGULATORY AGENCIES

- A. Comply with Federal, State and local codes and regulations.

## PART 2 - PRODUCTS

### 2.01 MATERIALS

- A. General: Materials may be new or used, suitable for the intended purpose, but must not violate requirements of applicable codes and standards.

### 2.02 BARRIERS

- A. Materials to *CONTRACTOR'S* option, minimum fence height 6 feet.

## PART 3 - EXECUTION

### 3.01 GENERAL

- A. Install facilities of a neat and reasonable uniform appearance, structurally adequate for the required purposes.
- B. Maintain barriers during entire construction period.
- C. Relocate barriers as required by progress of construction.

### 3.02 BARRIERS

- A. Prior to the start of work at the project site, install enclosure fence with suitably locked entrance gates.
  - 1. Locate fence to enclose substantially the entire project site, or that portion the *CONTRACTOR* establishes as required to encompass the entire project construction operation.
  - 2. Locate pedestrian entrance gates as required to provide controlled personnel entry, in suitable relation to construction parking facilities.
- B. Construct open-mesh fence in accordance with industry standards.

### 3.03 TREE AND PLANT PROTECTION

- A. Preserve and protect existing trees and plants at the site, which are designated to remain, and those adjacent to the site.

- B. Consult with *ARCHITECT/ENGINEER*, and remove agreed-on roots and branches, which interfere with construction.
  - 1. Employ qualified tree surgeon to remove, and to treat cuts.
- C. Provide temporary barriers to a height of 6 feet, around each, or around each group of trees and plants.
- D. Protect root zones of trees and plants:
  - 1. Do not allow vehicular traffic or parking.
  - 2. Do not store materials or products.
  - 3. Prevent dumping of refuse or chemically injurious materials or liquids.
  - 4. Prevent puddling or continuous running water.
- E. Carefully supervise excavating, grading and filling, and subsequent construction operations, to prevent damage.
- F. Replace, or suitably repair, trees and plants designated to remain which are damaged or destroyed due to construction operations.

### 3.04 REMOVAL

- A. Completely remove barricades, including foundations, when construction has progressed to the point that they are no longer needed, and when approved by *ARCHITECT/ENGINEER*.
- B. Clean and repair damage caused by installation, fill and grade the areas of the site to required elevations and slopes, and clean the area.

## PART 4 - PAYMENT

### 4.01 BARRIERS

- A. Unless otherwise noted in the Proposal Section, no separate payment shall be made for this item.
- B. Include all costs for *BARRIERS* in the prices bid for the various related items of work as designated in the Proposal.

\*\*\*\*END OF SECTION\*\*\*\*





SECTION 01 56 19  
(01564)  
NOISE CONTROL

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work included:

1. Requirements for controlling noise levels resulting from construction activities.

B. Related work:

1. Other sections of the *Specifications*, not referenced below, shall also apply to the extent required for proper performance of this work.
2. *Section 01 54 00: Construction Aids*
3. *Section 01 56 00: Barriers*
4. *Section 01 55 20: Dust Protection and Control*
5. *Section 01 74 00: Cleaning and Restorations*

1.02 SYSTEM DESCRIPTION

- A. The *CONTRACTOR* shall control the noise generated by his construction operations.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

3.01 PROJECT CONDITIONS

- A. Noise caused by construction activities shall not exceed the levels permitted by applicable federal, state or local regulations.

- B. All construction equipment powered by an internal combustion engine shall be equipped with a properly maintained muffler.
- C. Air compressors shall be operated in accordance with the manufacturer's instructions for proper noise abatement.
- D. Air-powered equipment shall be fitted with pneumatic exhaust silencers.
- E. Stationary equipment powered by an internal combustion engine shall not be operated within 150 feet of noise sensitive sites without temporary noise barriers placed between the equipment and the noise sensitive sites. Noise sensitive sites shall include residential buildings, motels, hotels, schools, churches, hospitals, nursing homes, libraries and public recreation areas. Temporary noise barrier shall be constructed of plywood or tongue and groove boards with a noise absorbent treatment on the interior surface (facing the equipment).
- F. Unless otherwise permitted, powered construction equipment shall not be operated before 7:00 A.M. or after 6:00 P.M. within 150 feet of a noise sensitive site. [NJAC 7:22-10.11(n)]
- G. No driving, pulling, or other operations entailing the use of vibratory hammers or compactors shall be permitted other than between the hours of 8:00 A.M. and 5:00 P.M. [NJAC 7:22-10.11(n)]
- H. The number of machines in operation at a given time shall be limited to the minimum practicable. [NJAC 7:22-10.11(n)]

#### PART 4 - PAYMENT

##### 4.01 NOISE CONTROL

- A. Unless otherwise noted in the *PROPOSAL* Section, no separate payment shall be made for this item.
- B. Include all costs for the *NOISE CONTROL* in the prices bid for the various related items of work as designated in the *PROPOSAL*.

\*\*\*\*END OF SECTION\*\*\*\*

## SECTION 01 56 20

### DUST PROTECTION AND CONTROL

#### PART 1 - GENERAL

##### 1.01 DESCRIPTION

A. Purpose:

1. Protect the Owner's employees, equipment and property/improvements against dust generated by the Contractor's operations.
2. Protect the Contractor's employees against dust generated by the Contractor.

B. Related work:

1. Other sections of the *Specifications*, not referenced below, shall also apply to the extent required for proper performance of this work.
2. *Section 01 54 00: Construction Aids*
3. *Section 01 56 00: Barriers*
4. *Section 01 56 19: Noise Control*
5. *Section 02 41 19: Selective Demolition*

#### PART 2 - PRODUCTS

##### 2.01 DEFINITIONS

- A. Dust Collection System: A dust control system using ventilation principles to capture the dust filled air stream as it is generated and carry it away from the source through ductwork to a collector or other acceptable discharge point.
- B. Wet Dust Suppression: Wet dust suppression techniques use water sprays to wet the material so that it generates less dust.
- C. Airborne Dust Capture: Airborne dust capture involves a water spray technique where by airborne dust particles are sprayed with atomized water capturing the dust particles in water droplets.

- D. Housekeeping Dust Control: Housekeeping dust control includes dusting/cleaning/vacuuming of surfaces exposed to dust and installation of sheet plastic barriers to prevent the spread of dust beyond the immediate work area.

### PART 3 – EXECUTION

#### 3.01 EQUIPMENT / MATERIALS

- A. The Contractor shall submit to the *ENGINEER* a description of the system(s) to be employed and the equipment/materials to be used for dust control. The systems to be employed by the Contractor shall include a Dust Collection System, Wet Dust Suppression, Airborne Dust Capture and Housekeeping Dust Control.
- B. Respirators shall be used in the work area in addition to the Dust Control Systems and Practices.

#### 3.02 COMPLIANCE

- A. Comply with United States Department of Labor, OSHA, Silica/Crystalline Dust Control Handbook, Chapter 3.
- B. Comply with OSHA Standard for Respiratory Crystalline Silica Maximum Exposure Limits (29 CFR 455, 1910.1000).
- C. If the *OWNER* determines that the Contractor means and methods for Dust Control are inadequate, the Contractor shall cease all work generating dust until additional dust control systems/methods are implemented.
- D. Conduct final clean-up of work area surfaces and areas adjacent to the work area.

### PART 4 - PAYMENT

#### 4.01 DUST CONTROL

- A. Unless otherwise noted in the *PROPOSAL* Section, no separate payment shall be made for this item.
- B. Include all costs for the *DUST CONTROL* in the prices bid for the various related items of work as designated in the *PROPOSAL*.

\*\*\*\*END OF SECTION\*\*\*\*

SECTION 01 58 00  
(01580)  
PROJECT IDENTIFICATION AND SIGNS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work included:

1. Furnish, install and maintain project identification sign as shown on the drawings.
2. Provide temporary on-site informational signs:
  - a. As required by codes, laws and regulatory agencies.
  - b. To direct traffic.
3. Remove signs on completion of construction.
4. Allow no other signs to be displayed.

B. Related work:

1. Other sections of the *Specifications*, not referenced below, shall also apply to the extent required for proper performance of this work.

1.02 DESIGN REQUIREMENTS

A. Informational signs:

1. Painted signs with painted lettering, or standard products.
2. Size of signs and lettering: As required by regulatory agencies, or as appropriate to the usage.
3. Colors: As required by regulatory agencies, otherwise of uniform colors throughout the project.

### 1.03 SUBMITTALS

- A. Comply with provisions of *Section 01 33 23, Shop Drawings, Product Data and Samples*.
- B. Manufacturer's product data:
  - 1. Complete materials list of all materials proposed to be furnished and installed under this section.
  - 2. *Specifications* and other data required to demonstrate compliance with the specified requirements.
- C. Manufacturer's recommended installation procedures.

### 1.04 QUALITY ASSURANCE

- A. Qualifications of manufacturer:
  - 1. Products used in the work of this section shall be produced by manufacturers regularly engaged in the manufacture of similar items and with a history of successful production acceptable to the *ENGINEER*.
- B. Qualifications of workmen:
  - 1. Provide at least one person who shall be present at all times during execution of the work of this section, who shall be thoroughly familiar with the specified requirements and the materials and methods needed for their execution, and who shall direct all work performed under this section.
  - 2. Provide adequate numbers of workmen skilled in the necessary crafts and properly informed of the methods and materials to be used.
  - 3. Sign painter: Professional experience in the type of work required.
  - 4. In acceptance or rejection of the work of this section, the *ENGINEER* will make no allowance for lack of skill on the part of workmen.

### 1.05 PRODUCT DELIVERY STORAGE AND HANDLING

- A. Comply with provisions of *Section 01 66 00, Storage and Protection*.

- B. Protection: Use all means necessary to protect the materials of this section before, during, and after installation and to protect the installed work and materials of all other trades.
- C. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of the *ENGINEER* and at no additional cost to the *OWNER*.

## PART 2 - PRODUCTS

### 2.01 GENERAL

- A. Proprietary Products: Whenever materials or equipment are described using a certain brand, make, supplier, manufacturer or by specification, such naming shall be regarded as a standard and be intended to convey function, design features, general style, type, materials of construction, character and quality of material or equipment, serviceability and other described essential characteristics.
- B. Other materials may be considered by, the *ENGINEER* in accordance with the provisions of *Section 01 25 13, Substitutions*.

### 2.02 SIGN MATERIALS

- A. Structure and framing: New wood in sound condition structurally adequate to the work and suitable for specified finish.
- B. Sign surfaces:
  - 1. Exterior softwood plywood in standard large sizes to minimize joints.
  - 2. Thickness: As required by standards to span across framing members, to provide even, smooth surface without waves or buckles; 3/4-inch minimum thickness.
- C. Rough hardware: Galvanized.
- D. Paint: Exterior quality, suitable for materials used.

### 2.03 OTHER MATERIALS

- A. All other materials, not specifically described but required for a complete and proper installation of the work of this section, shall be new, first quality of their

respective kinds, and as selected by the *CONTRACTOR* subject to the approval of the *ENGINEER*.

### PART 3 - EXECUTION

#### 3.01 EXAMINATION

- A. Prior to installation of the work of this section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.
- B. Verify that work may be completed in strict accordance with the original design and with the manufacturer's recommendations as approved by the *ENGINEER*.
- C. Do not proceed until unsatisfactory conditions are corrected.

#### 3.02 CONSTRUCTION

- A. Informational signs:
  - 1. Paint all exposed surfaces: One (1) coat of primer and one (1) coat of exterior paint.
  - 2. Paint graphics in the styles, sizes and colors as selected.

#### 3.03 INSTALLATION

- A. Construct and install sign in accordance with all applicable laws and ordinances.
- B. Do not install signs on private property.
- C. Erect on the site a lighted location of high public visibility, adjacent to the main entrance to the site, as approved by *ENGINEER*.
- D. If any possibility exists for obstruction to traffic line of sight, coordinate sign location and height with the agency responsible for highway or street safety in the area.
- E. Install informational signs at a height for optimum visibility, on ground-mounted poles or attached to temporary structural surfaces.



- F. Erect informational signs at appropriate locations to provide the required information.

#### 3.04 MAINTENANCE

- A. Maintain sign and supports in a neat, clean condition; repair damages to structure, framing or sign.
- B. Relocate informational signs as required by progress of the work.

#### 3.05 REMOVAL

- A. Remove sign, framing, supports and foundations at completion of project.
- B. Restore all disturbed areas to original condition.
- C. If at the end of the project the sign is reusable, it shall be disposed of as directed by the Community Development Office.

### PART 4 - PAYMENT

#### 4.01 PROJECT IDENTIFICATION AND SIGNS

- A. Unless otherwise noted in the *PROPOSAL* Section, no separate payment shall be made for this item.
- B. Include all costs for the *PROJECT IDENTIFICATION AND SIGNS* in the prices bid for the various related items of work as designated in the *PROPOSAL*.

\*\*\*\*END OF SECTION\*\*\*\*



SECTION 01 61 00  
(01600)  
MATERIALS AND EQUIPMENT

1.01 GENERAL

- A. Material and equipment incorporated into the work:
1. Conform to applicable *Specifications* and standards.
  2. Comply with size, make, type and quality specified, or as specifically approved in writing by the *ENGINEER*.
  3. Manufactured and fabricated products:
    - a. Design, fabricate and assemble in accord with the best engineering and shop practices.
    - b. Manufacture like parts of duplicate units to standard sizes and gauges to be interchangeable.
    - c. Two or more items of the same kind shall be identical, by the same manufacturer.
    - d. Products shall be suitable for service conditions.
    - e. Equipment capacities, sizes and dimensions shown or specified shall be adhered to unless variations are specifically approved in writing.
  4. Do not use material or equipment for any purpose other than that for which it is designed or is specified.
- B. Related requirements in other parts of the Contract Documents: See the General Provisions.

1.02 REUSE OF EXISTING MATERIAL

- A. Except as specifically indicated or specified, materials and equipment removed from the existing structure shall not be used in the completed work.

- B. For material and equipment specifically indicated or specified to be reused in the work:
  - 1. Use special care in removal, handling, storage and reinstallation to assure proper function in the completed work.
  - 2. Arrange for transportation, storage and handling of products which require off-site storage, restoration or renovation. Pay all costs for such work.

#### 1.03 MANUFACTURER'S INSTRUCTIONS

- A. When *Contract Documents* require that installation of work shall comply with manufacturer's printed instructions, obtain and distribute copies of such instructions to parties involved in the installation, including two (2) copies to *ENGINEER*.

Maintain one (1) set of complete instructions at the job site during installation and until completion.

- B. Handle, install, connect, clean, condition and adjust products in strict accord with such instructions and in conformity with specified requirements.
  - 1. Should job conditions or specified requirements conflict with manufacturer's instructions consult with *ENGINEER* for further instructions.
  - 2. Do not proceed with work without clear instructions.
- C. Perform work in accord with manufacturer's instructions. Do not omit any preparatory step or installation procedure unless specifically modified or exempted by *Contract Documents*.

#### 1.04 TRANSPORTATION AND HANDLING

- A. Arrange deliveries of products in accord with construction schedules, coordinate to avoid conflict with work and conditions at the site.
  - 1. Deliver products in undamaged condition, in manufacturer's original containers or packaging, with identifying labels intact and legible.
  - 2. Immediately on delivery, inspect shipments to assure compliance with requirements on *Contract Documents* and approved submittals, and that products are properly protected and undamaged.

- B. Provide equipment and personnel to handle products by methods to prevent soiling or damage to products or packaging.

#### 1.05 STORAGE AND PROTECTION

- A. Store products in accord with manufacturer's instructions, with seals and labels intact and legible.
  - 1. Store products subject to damage by the elements in weathertight enclosures.
  - 2. Maintain temperature and humidity within the ranges required by manufacturer's instructions.
- B. Exterior storage:
  - 1. Store fabricated products above the ground, on blocking or skids, prevent soiling or staining. Cover products which are subject to deterioration with impervious sheet coverings, provide adequate ventilation to avoid condensation.
  - 2. Store loose granular materials in a well-drained area on solid surfaces to prevent mixing with foreign matter.
- C. Arrange storage in a manner to provide easy access for inspection. Make periodic inspections of stored products to assure that products are maintained under specified conditions, and free from damage or deterioration.
- D. Protection after installation: Provide substantial coverings as necessary to protect installed products from damage from traffic and subsequent construction operations. Remove when no longer needed.

#### 1.06 SUBSTITUTIONS AND PRODUCT OPTIONS

- A. Products list: Within thirty (30) days after contract date, submit to *ENGINEER* a complete list of major products proposed to be used, with the name of the manufacturer and the installing subcontractor.
- B. Contractor's options:
  - 1. For products specified only by reference standard, select any product meeting that standard.

2. For products specified by naming several products or manufacturers, select any one (1) of the products or manufacturers named, which complies with the *Specifications*.
  3. For products specified by naming one (1) or more products or manufacturers and "or equal," *CONTRACTOR* must submit a request as for substitutions for any product or manufacturer not specifically named.
- C. Substitutions: Submit requests for substitutions as specified in Section 01 25 13.

\*\*\*\*END OF SECTION\*\*\*\*

SECTION 01 66 00  
(01620)  
STORAGE AND PROTECTION

PART 1 - GENERAL

1.01 SUMMARY

- A. Protect products scheduled for use in the Work by means including, but not necessarily limited to, those described in this Section.
- B. Related work:
  - 1. Additional procedures also may be prescribed in other Sections of these *Specifications*.

1.02 QUALITY ASSURANCE

- A. Include within the *CONTRACTOR'S* quality assurance program such procedures as are required to assure full protection of work and materials.

1.03 MANUFACTURERS' RECOMMENDATIONS

- A. Except as otherwise approved by the *ENGINEER*, determine and comply with manufacturer's recommendations on product handling, storage, and protection.

1.04 PACKAGING

- A. Deliver products to the job site in their manufacturer's original container, with labels intact and legible.
  - 1. Maintain packaged materials with seals unbroken and labels intact until time of use.
  - 2. Promptly remove damaged materials and unsuitable items from the job site, and promptly replace with material meeting the specified requirements, at no additional cost to the *OWNER*.
  - 3. Leave all plugs and caps in place on equipment and machinery.

- B. The *ENGINEER* may reject as non-complying such material and products that do not bear identification satisfactory to the *ENGINEER* as to manufacturer, grade, quality, and other pertinent information.

#### 1.05 PROTECTION

- A. Protect finished surfaces, including jambs and soffits of openings used as passageways, through which equipment and materials are handled.
- B. Provide protection for finished floor surfaces in traffic areas prior to allowing equipment or materials to be removed over such surfaces.
- C. Maintain finished surfaces clean, unmarred, and suitably protected until accepted by the *OWNER*.
- D. During construction, properly cap all pipes and equipment nozzles so as to prevent the entrance of sand, dirt, etc.

#### 1.06 REPAIRS AND REPLACEMENTS

- A. In event of damage, promptly make replacements and repairs to the approval of the *ENGINEER* and at no additional cost to the *OWNER*.
- B. Additional time required to secure replacement and to make repairs will not be considered by the *ENGINEER* to justify an extension in the Contract Time of Completion.

\*\*\*\*\*END OF SECTION\*\*\*\*\*



SECTION 01 73 29  
(01045)  
CUTTING AND PATCHING

PART 1 - GENERAL

1.01 DESCRIPTION

- A. *CONTRACTOR* shall be responsible for all cutting, fitting and patching, including attendant excavation and backfill, required to complete the work or to:
1. Make its several parts fit together properly.
  2. Uncover portions of the work to provide for installation of ill-timed work.
  3. Remove and replace defective work.
  4. Remove and replace work not conforming to requirements of *Contract Documents*.
  5. Remove samples of installed work as specified for testing.
  6. Provide routine penetrations of non-structural surfaces for installation of piping and electrical conduit.
- B. Related work:
1. Other sections of the *Specifications*, not referenced below, shall also apply to the extent required for proper performance of this work.
  2. *Section 01 11 00: Statement of Work*
  3. *Section 01 25 13: Substitutions*
  4. *Section 02 41 19: Selective Demolition*

1.02 SUBMITTALS

- A. Comply with provisions of *Section 01 33 23, Shop Drawings, Product Data and Samples*.

- B. Submit a written request to *ENGINEER* well in advance of executing any cutting or alteration which affects:
1. The work of the *OWNER* or any separate *CONTRACTOR*.
  2. The structural value or integrity of any element of the project.
  3. The integrity or effectiveness of weather-exposed or moisture-resistant elements or systems.
  4. The efficiency, operational life, maintenance or safety of operational elements.
  5. The visual qualities of sight-exposed elements.
- C. The request shall include:
1. Identification of the project.
  2. Description of the affected work.
  3. The necessity for cutting, alteration or excavation.
  4. The effect on the work of the *OWNER* or any separate *CONTRACTOR*, or on the structural or weatherproof integrity of the project.
  5. Description of the proposed work:
    - a. The scope of cutting, patching, alteration, or excavation.
    - b. The trades who will execute the work.
    - c. Products proposed to be used.
    - d. The extent of refinishing to be done.
  6. Alternatives to cutting and patching.
  7. Cost proposal, when applicable.
  8. Written permission of any separate *CONTRACTOR* whose work will be affected.

- D. Should conditions of the work or the schedule indicate a change of products from the original installation, *CONTRACTOR* shall submit a request for substitution as specified in *Section 01 25 13*.
- E. Submit a written notice to *ENGINEER* designating the date and the time the work will be uncovered.

## PART 2 - PRODUCTS

### 2.01 GENERAL

- A. Products: Whenever materials or equipment are described using a certain brand, make, supplier, manufacturer or by specification, such naming shall be regarded as a standard and be intended to convey function, design features, general style, type, materials of construction, character and quality of material or equipment, serviceability and other described essential characteristics.
- B. Other materials may be considered by, the *ENGINEER* in accordance with the provisions of *Section 01 25 13, Substitutions*.

### 2.02 MATERIALS

- A. As selected by *CONTRACTOR* and approved by the *ENGINEER*.
- B. Materials selected shall, as a minimum, be equivalent to existing adjacent materials.

### 2.03 OTHER MATERIALS

- A. All other materials, not specifically described but required for a complete and proper installation of the work of this section, shall be new, first quality of their respective kinds, and as selected by the *CONTRACTOR* subject to the approval of the *ENGINEER*.

## PART 3 - EXECUTION

### 3.01 INSPECTION

- A. Inspect existing conditions of the project, including elements subject to damage or to movement during cutting and patching.
- B. After uncovering work, inspect the conditions affecting the installation of products, or performance of the work.
- C. Report unsatisfactory or questionable conditions to the *ENGINEER* in writing; do not proceed with the work until the *ENGINEER* has provided further instructions.

### 3.02 PREPARATION

- A. Provide adequate temporary support as necessary to assure the structural value or integrity of the affected portion of the work.
- B. Provide devices and methods to protect other portions of the project from damage.
- C. Provide protection from the elements for that portion of the project, which may be exposed by cutting and patching work, and maintain excavations free from water.

### 3.03 PERFORMANCE

- A. Execute cutting and demolition by methods, which will prevent damage to other work, and will provide proper surfaces to receive installation of repairs.
- B. Execute excavating and backfilling by methods, which will prevent settlement or damage to other work.
- C. Employ the original installer or fabricator to perform cutting and patching for:
  - 1. Weather-exposed or moisture-resistant elements.
  - 2. Sight-exposed finished surfaces.
- D. Execute fitting and adjustment of products to provide a finished installation to comply with specified products, functions, tolerances and finishes.
- E. Restore work, which has been cut or removed; install new products to provide completed work in accord with requirements of *Contract Documents*.

- F. Fit work airtight to pipes, sleeves, ducts, conduit and other penetrations through surfaces.
- G. Refinish entire surfaces as necessary to provide an even finish to match adjacent finish:
  - 1. For continuous surfaces, refinish to nearest intersection.
  - 2. For an assembly, refinish the entire unit.

#### PART 4 - PAYMENT

##### 4.01 CUTTING AND PATCHING

- A. Unless otherwise noted in the *PROPOSAL* Section, no separate payment shall be made for this item.
- B. Include all costs for the *CUTTING AND PATCHING* in the prices bid for the various related items of work as designated in the *PROPOSAL*.

\*\*\*\*END OF SECTION\*\*\*\*



SECTION 01 74 00  
(01710)  
CLEANING AND RESTORATIONS

PART 1 - GENERAL

1.01 SUMMARY

A. Work Included:

1. Maintain premises and public properties free from accumulations of waste, debris and rubbish caused by work operations.
2. At completion of work, remove waste materials, rubbish, tools, equipment, machinery and surplus materials; clean all sight exposed surfaces; leave project clean and ready for occupancy.
3. At completion of work, restore or replace, any public or private property disturbed or damaged by *CONTRACTOR'S* work operations to a condition at least equal to that existing prior to beginning work, or as otherwise specified. Materials, equipment and methods, shall be approved by the *ENGINEER*.
4. In landscaped areas, environmental features shall be replaced or restored to pre-disturbance conditions or better. This includes sodding, replacement of trees, shrubs, fences, drives and other landscape features in-kind. [N.J.A.C. 7:22-10.11(e) 5]

B. Related work:

1. Other sections of the *Specifications*, not referenced below, shall also apply to the extent required for proper performance of this work.
2. General requirements for cleaning and restorations: See the General Conditions.
3. In addition to standards described in the Section, comply with requirements for cleaning and restorations as described in pertinent other Sections of these *Specifications*.

C. References:

1. New Jersey Department of Transportation Standard Specifications for Road and Bridge Construction, 2019, and all amendments thereto (Standard Specifications).

PART 2 - PRODUCTS

2.01 GENERAL

- A. Products: Whenever materials or equipment are described using a certain brand, make, supplier, manufacturer or by specification, such naming shall be regarded as a standard and be intended to convey function, design features, general style, type, materials of construction, character and quality of material or equipment, serviceability and other described essential characteristics.
- B. Other materials may be considered by, the *ENGINEER* in accordance with the provisions of *Section 01 25 13, Substitutions*.

2.02 MATERIALS

- A. All materials shall comply with the Standard Specifications.
- B. Grass restorations:
  1. Topsoil: Conforming to Subsection 917.01.
  2. Grass seed: Conforming to Subsection 917.05, Type A-3.
  3. Sod: Conforming to Subsection 917.09.
- C. Pavement restorations:
  1. Hot-Mix Asphalt Surface Course: Conforming to Subsection 902.02, Mix 9.5M64.
  2. Hot-Mix Asphalt Base Course: Conforming to Subsection 902.02, Mix 19M64.
- D. Restoration of Concrete structures:
  1. Concrete for curbs and islands shall conform to Section 607 of the Standard Specifications and shall be "Class B" as shown in Table 903.03.06-1 (NJDOT 2019).



2. Concrete for sidewalks, curb ramps, driveways and aprons shall conform to Section 606 of the Standard Specifications and shall be Class "B" as shown in Table 903.03.06-1 (NJDOT 2019).
  3. Concrete for swales and gutters shall conform to the requirements of Section 405, Concrete Surface Course, of the Standard Specifications and shall be Class "B" as shown in Table 903.03.06-1 (NJDOT 2019)
- E. Restoration of other concrete structures: All materials shall comply with the applicable sections of the Standard Specifications.
- F. All other materials: As approved by the *ENGINEER* or authorities having jurisdiction.

### PART 3 - EXECUTION

#### 3.01 REQUIREMENTS OF REGULATORY AGENCIES

- A. Dispose of all non-recyclable solid waste materials in permanently established licensed OSWA (Office of Solid Waste Administration, New Jersey Department of Environmental Protection) landfills, or in temporary landfill sites approved by OSWA.
- B. Dispose of all recyclable materials such as concrete, asphalt, wood waste, yard waste and similar materials at a recycling facility properly licensed to accept such waste materials.
- C. Waste materials include, but are not limited to, concrete, blacktop, trees, stumps, lumber and timbers, unacceptable backfill material including heavy clay soils, organic materials, silts and rock.

#### 3.02 SAFETY REQUIREMENTS

- A. Hazards control:
  1. Store volatile wastes in covered metal containers, and remove from premises daily.
  2. Prevent accumulation of wastes, which create a hazardous condition.
  3. Provide adequate ventilation during use of volatile or noxious substances.

- B. Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws:
  - 1. Do not burn or bury rubbish and waste materials on project site.
  - 2. Do not dispose of volatile wastes such as mineral spirits, oil or paint thinner in storm or sanitary drains.
  - 3. Do not dispose of wastes into streams or waterways.

### 3.03 CLEANING DURING CONSTRUCTION

- A. Execute periodic cleaning to keep the work, the site, and adjacent properties free from accumulations of waste materials, rubbish and windblown debris resulting from construction operations.
- B. Provide on-site containers for the collection of waste materials, debris and rubbish.
- C. Remove waste materials, debris and rubbish from site periodically and legally dispose at location provided by *CONTRACTOR*.

### 3.04 DUST CONTROL

- A. Clean interior spaces prior to the start of finish painting and continue cleaning on an as-needed basis until painting is finished.
- B. Schedule operations so that dust and other contaminants resulting from cleaning process will not fall on wet or newly coated surfaces.
- C. Wet down dry materials and rubbish to lay dust and prevent blowing dust.
- D. Handle waste or surplus materials in a controlled manner with as few handlings as possible; do not drop or throw material from heights.
- E. The *CONTRACTOR* shall employ construction methods and means that will keep flying dust to the minimum. He shall provide for the laying of water on the Project, and on roads, streets and other areas immediately adjacent to the Project limits, wherever traffic, or buildings that are occupied or in use, are affected by such dust caused by his hauling or other operations. The *CONTRACTOR* shall control dust using water. The cost of carrying out the foregoing provisions shall be included in the prices bid for the various items in the Contract.

- F. The *CONTRACTOR* shall provide for prompt removal from existing roadways of all dirt and other materials that have been spilled, washed, tracked or otherwise deposited thereon by his hauling and other operations whenever the accumulation is sufficient to cause the formation of mud, interfere with drainage, damage pavements or create a traffic hazard.
- G. In order to control dust, as often as required during each working day, and particularly prior to the conclusion of each working day, areas under immediate construction (including access roads and other areas affected thereby) shall be swept and wet down with water sufficiently to lay dust. In addition, these areas shall be wet down during non-working hours (including weekends) as often as required to keep the dust under control. The use of calcium chloride or petroleum products or other chemicals for dust control is prohibited. [N.J.A.C. 7:22-10.11 (m)]

### 3.05 FINAL CLEANING

- A. Employ skilled workmen for final cleaning.
- B. Remove grease, mastic, adhesives, dust, dirt, stains, fingerprints, labels, and other foreign materials from sight-exposed interior and exterior surfaces.
- C. Broom clean exterior paved surfaces; rake clean other surfaces of the grounds.
- D. Remove all temporary buildings and structures built by *CONTRACTOR*, all temporary works; tools, machinery or other construction equipment furnished by him.
- E. Prior to final acceptance, *CONTRACTOR* shall conduct an inspection of all work areas to verify that the entire work is clean.

### 3.06 RESTORATIONS

- A. General:
  - 1. All existing structures, unpaved areas and paved areas disturbed or damaged during the work under this Contract shall be restored or replaced to a condition at least equal to that existing prior to beginning work, or as otherwise specified.
  - 2. The methods of conducting this work shall, as a minimum, conform to the Standard Specifications.

- B. Grass restorations:
  - 1. Seeding shall conform to Section 806.
  - 2. Sodding shall conform to Section 808.
  - 3. Determination of seeding or sodding to be as directed by *ENGINEER*.
- C. Pavement restorations: Conform to Section 401.
- D. Restorations of Concrete Curbs & Islands: Conform to Section 607.
- E. Restoration of Sidewalks, Driveways, Curb Ramps and Aprons: Conform to Section 606.
- F. All other restorations: Restore in accordance with applicable Articles of the Standard Specifications, or as approved by the *ENGINEER* or authorities having jurisdiction.

#### PART 4 - PAYMENT

##### 4.01 CLEANING AND RESTORATIONS

- A. All costs for *CLEANING AND RESTORATIONS* shall be included in prices bid for various items scheduled in the *PROPOSAL*.

\*\*\*\*END OF SECTION\*\*\*\*

SECTION 01 77 19  
(01760)  
CONTRACT CLOSEOUT

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Comply with requirements stated in the *General Conditions* of the Contract and in the specifications for administrative procedures in closing out the work.
- B. Related requirements in other parts of the Project Manual:
  - 1. Fiscal provisions, legal submittals and additional administrative requirements: Conditions of the Contract.
- C. Related requirements specified in other sections:
  - 1. Other sections of the specifications, not referenced below, shall also apply to the extent required for proper performance of this work.
  - 2. *Section 01 11 00: Statement of Work*
  - 3. *Section 01 21 00: Cash Allowances*
  - 4. *Section 01 74 00: Cleaning and Restorations*
  - 5. *Section 01 78 23: Operating and Maintenance Data*
  - 6. *Section 01 78 36: Guarantees*
  - 7. *Section 01 78 39: Project Record Documents*
  - 8. *Section 01 78 45: Spare Parts and Maintenance Materials*
  - 9. Closeout submittals required of trades: The respective sections of specifications.

1.02 COMPLETION

- A. When Contractor considers the work is complete and ready for acceptance by the *OWNER*, he shall submit to the *ENGINEER*:

1. A written notice that the work or designated portion thereof is complete and ready for acceptance.
  2. Certification that equipment systems have been tested, in the presence of the *OWNER'S* representative and are operational.
  3. Operating and Maintenance Data, Instructions to *OWNER'S* Personnel: to requirements of Section 01 78 23.
  4. Guarantees: to requirement of Section 01 78 36.
  5. Project Record Documents: to requirements of Section 01 78 39.
  6. Contractors Certificate (N.J.S.A. 34:11-56.33): to requirements of Section 00 72 00, paragraph 37E and Section 00 65 01, Contractors' Certificate.
  7. ADA Compliance and As-Built Certification: to requirements of *Section 01 11 00 – Statement of Work*.
  8. A list of items to be completed or corrected.
- B. Within a reasonable time after receipt of such notice, *ENGINEER* will make or cause an inspection to be made to determine the status of completion.
- C. Should *ENGINEER* determine that the work is not complete:
1. *ENGINEER* will promptly notify the Contractor in writing, giving the reasons therefore.
  2. Contractor shall remedy the deficiencies in the work, and send a second written notice of completion to the *ENGINEER*.
  3. *ENGINEER* will reinspect the work.
- D. When *ENGINEER* concurs that the work is complete, he will:
1. Prepare a Certificate of Completion, accompanied by Contractor's list of items to be completed or corrected, as verified and amended by the *ENGINEER*.
  2. Submit the Certificate to *OWNER* and Contractor for their written acceptance of the responsibilities assigned to them in the Certificate.

### 1.03 FINAL INSPECTION

- A. When Contractor considers the work is complete, he shall submit written certification that:
  - 1. Contract documents have been reviewed.
  - 2. Work has been inspected for compliance with *Contract Documents*.
  - 3. Work has been completed in accordance with *Contract Documents*.
  - 4. Work is completed and ready for final inspection.
- B. *ENGINEER* will make an inspection to verify the status of completion with reasonable promptness after receipt of such certification.
- C. Should *ENGINEER* consider that the work is incomplete or defective:
  - 1. *ENGINEER* will promptly notify the Contractor in writing, listing the incomplete or defective work.
  - 2. Contractor shall take immediate steps to remedy the stated deficiencies, and send a second written certification to Construction Manager that the work is complete.
  - 3. *ENGINEER* will reinspect the work.
- D. When the *ENGINEER* finds that the work is acceptable under the *Contract Documents*, he shall request the Contractor to make closeout submittals.

### 1.04 REINSPECTION FEES

- A. Should *ENGINEER* perform reinspections due to failure of the work to comply with the claims of status of completion made by the Contractor:
  - 1. *OWNER* will compensate *ENGINEER* for such additional services.
  - 2. *OWNER* will deduct the amount of such compensation from the final payment to the Contractor.

### 1.05 CONTRACTOR'S CLOSEOUT SUBMITTALS TO ENGINEER

- A. Evidence of compliance with requirements of governing authorities:

1. Comply with the requirements of N.J.A.C. 5:23-2.23 for the Certificate of Occupancy.
  2. Certificates of Inspection.
- B. Evidence of payment and release of liens: to requirements of General and Supplementary Conditions.
- C. Certificate of Insurance for products and completed operations.

1.06 FINAL ADJUSTMENT OF ACCOUNTS

- A. Submit a final statement of accounting to *ENGINEER*.
- B. Statement shall reflect all adjustments to the Contract Sum:
1. The original Contract Sum.
  2. Additions and deductions resulting from:
    - a. Previous change orders.
    - b. Allowances.
    - c. Unit prices.
    - d. Deductions for uncorrected work.
    - e. Penalties and bonuses.
    - f. Deductions for liquidated damages.
    - g. Deductions for reinspection payments.
    - h. Other adjustments.
  3. Total Contract Sum, as adjusted.
  4. Previous payments.
  5. Sum remaining due.
- C. *ENGINEER* will prepare a final change order, reflecting approved adjustments to the Contract Sum that were not previously made by change orders.



- A. Payment for contract closeout will be made for the Fixed Price stated in the Proposal under the item *CONTRACT CLOSEOUT DOCUMENTATION*, which shall include Contractor's notice that the work is complete and ready for acceptance; certification that equipment and systems have been tested, in the presence of the *OWNER'S* representative and are operational; ADA Compliance and As-Built Certification as specified in *Section 01 11 00 – Statement of Work*. As-builts and Project Record Documents as specified in *Section 01 78 39; O & M Data and Instruction of OWNER'S Personnel* as specified in *Section 01 78 23; Warranties and Bonds* as specified in *Section 01 78 36; spare parts and maintenance materials* required under the various sections in accordance with *Section 01 78 45; Keys and Keying Schedules* as specified in *Section 08 71 00; the Contractors Certificate (Section 00 65 01)* and all other required submittals.

1.08 FINAL APPLICATION FOR PAYMENT

- A. No separate measurement will be made for this work. Contractor shall submit the final application for payment in accordance with procedures and requirements stated in the *General Conditions* of the contract after he has submitted the required Closeout Submittals.

\*\*\*\*\*END OF SECTION\*\*\*\*\*



SECTION 01 78 23  
(01730)  
OPERATING AND MAINTENANCE DATA

1.01 GENERAL

- A. Compile product data and related information appropriate for *OWNER'S* maintenance and operation of products furnished under the contract.
- B. Prepare operating and maintenance data as specified in this section and as referenced in other pertinent sections of *Specifications*.
- C. Instruct *OWNER'S* personnel in the maintenance of products and in the operation of equipment and systems.

1.02 QUALITY ASSURANCE

- A. Preparation of data shall be done by personnel:
  - 1. Trained and experienced in maintenance and operation of the described products.
  - 2. Completely familiar with requirements of this section.
  - 3. Skilled as a technical writer to the extent required to communicate essential data.
  - 4. Skilled as a draftsman competent to prepare required drawings.

1.03 FORM OF SUBMITTALS

- A. Prepare data in the form of an instructional manual for use by *OWNER'S* personnel.
- B. Format:
  - 1. Size: 8½ inches by 11 inches.
  - 2. Paper: Twenty (20) pound minimum, white, for typed pages.
  - 3. Text: Manufacturer's printed data, or neatly typewritten.

4. Drawings:
  - a. Provide reinforced punch binder tab, bind in with text.
  - b. Fold larger drawings to the size of the text pages.
5. Provide fly-leaf for each separate product, or each piece of operating equipment:
  - a. Provide typed description of product, and major component parts of equipment.
  - b. Provide indexed tabs.
6. Cover: Identify each volume with typed or printed title: "OPERATING AND MAINTENANCE INSTRUCTIONS." List:
  - a. Title of project.
  - b. Identity of separate structure as applicable.
  - c. Identity of general subject matter covered in the manual.

C. Binders:

1. Commercial quality 3-ring binders with durable and cleanable plastic covers.
2. Maximum ring size: 1 inch.
3. When multiple binders are used, correlate the data into related consistent groupings.

1.04 CONTENT OF MANUAL

- A. Neatly typewritten table of contents for each volume, arranged in a systematic order.
  1. *CONTRACTOR*, name of responsible principal, address and telephone number.
  2. A list of each product required to be included, indexed to the content of the volume.

3. List, with each product, the name, address and telephone number of:
    - a. Subcontractor or installer.
    - b. Maintenance contractor, as appropriate.
    - c. Identify the area of responsibility of each.
    - d. Local source of supply for parts and replacement.
  4. Identify each product-by-product name and other identifying symbols as set forth in *Contract Documents*.
- B. Product data:
1. Include only those sheets, which are pertinent to the specific product.
  2. Annotate each sheet to:
    - a. Clearly identify the specific product or part installed.
    - b. Clearly identify the data applicable to the installation.
    - c. Delete references to inapplicable information.
- C. Drawings:
1. Supplement product data with drawings as necessary to clearly illustrate:
    - a. Relations of component parts of equipment and systems.
    - b. Control and flow diagrams.
  2. Coordinate drawings with information in project record documents to assure correct illustration of completed installation.
  3. Do not use project record documents as maintenance drawings.
- D. Written text, as required to supplement product data for the particular installation:
1. Organize in a consistent format under separate heading for different procedures.
  2. Provide a logical sequence of instructions for each procedure.

- E. Copy of each warranty, bond and service contract issued.

Provide information sheet for Owner's personnel, give:

- 1. Proper procedures in the event of failure.
- 2. Instances, which might affect the validity of warranties or bonds.

#### 1.05 MANUAL FOR MATERIALS AND FINISHES

- A. Submit two (2) copies of complete manual in final form.
- B. Content, for architectural products, applied materials and finishes:
  - 1. Manufacturer's data, giving full information on products:
    - a. Catalog number, size, and composition.
    - b. Color and texture designations.
    - c. Information required for reordering special manufactured products.
  - 2. Instructions for care and maintenance:
    - a. Manufacturer's recommendation for types of cleaning agents and methods.
    - b. Cautions against cleaning agents and methods, which are detrimental to the product.
    - c. Recommended schedule for cleaning and maintenance.
- C. Content, for moisture-protection and weather-exposed products:
  - 1. Manufacturer's data, giving full information on products:
    - a. Applicable standards.
    - b. Chemical composition.
    - c. Details of installation.
  - 2. Instructions for inspection, maintenance and repair.

- D. Additional requirements for maintenance data: The respective sections of *Specifications*.
- E. Provide complete information for products specified in:
1. *Section 07 92 13: Sealants and Caulking*
  2. *Section 08 11 13: Metal Doors and Frames*
  3. *Section 08 17 43: Pultruded Doors and Frames*
  4. *Section 08 17 44: Pultruded Fiberglass Fire-Rated FRP Door and Frames*
  5. *Section 08 33 00: Overhead Coiling Doors*
  6. *Section 08 52 16: Plastic-Clad Wood Windows*
  7. *Section 08 54 00: Composite Windows*
  8. *Section 08 71 00: Hardware*
  9. *Section 08 80 00: Glazing*

1.06 SUBMITTAL SCHEDULE

- A. Submit two (2) copies of preliminary draft of proposed formats and outlines of contents prior to start of work.

*ARCHITECT/ENGINEER* will review draft and return one (1) copy with comments.

- B. Submit one (1) copy of completed data in final form thirty (30) days prior to completion and acceptance as defined in the General Conditions.

Copy will be returned with comments.

- C. Before Contract closeout, transfer all Operation and Maintenance Data to electronic media. All documents shall be in Portable Document File (pdf) format. Scan all documents in their original size. Electronic media shall be archival quality compact disc (CD), Memorex "Pro Gold™ Archival CD-Rs" or equivalent.

D. At Contract closeout, deliver 4 copies of original O&M data and CDs to the *ENGINEER*.

1. Each CD shall have a high gloss, laser printed label showing the following information:

Title: Project Title  
Owner:  
Contract #: 20\_\_-\_\_-\_\_  
Date:  
Contents: Operation & Maintenance Data  
Section \_\_\_\_ - (Section Title)  
Section \_\_\_\_ - (Section Title)  
Section \_\_\_\_ - (Section Title)  
Section \_\_\_\_ - (Section Title)

2. Each CD shall contain a "Readme" file describing the contents.
3. All O & M Data relating to a specific specification section or piece of equipment shall be contained as separate files in the same folder.
4. Each CD shall be contained in a Jewel Case with an insert showing the CD contents or a sleeve showing the CD contents.

#### 1.07 INSTRUCTION OF OWNER'S PERSONNEL

- A. Prior to final completion and acceptance as previously defined, fully instruct *OWNER'S* designated operating and maintenance personnel in the operation, adjustment and maintenance of all products, equipment and systems.
- B. Operating and maintenance manual shall constitute the basis of instruction.

Review contents of manual with personnel in full detail to explain all aspects of operations and maintenance.

\*\*\*\*END OF SECTION\*\*\*\*



SECTION 01 78 36  
(01740)  
GUARANTEES

1.01 GENERAL

- A. Compile specified warranties and bonds.
- B. Co-execute submittals.
- C. Review submittals to verify compliance with *Contract Documents*.
- D. Submit to *ENGINEER* for review and transmittal to *OWNER*.
- E. Related requirements in other parts of the *Contract Documents*:
  - 1. Bid or proposal bonds: See the *Instructions to Bidders*.
  - 2. Performance bond and maintenance bond: See the *General Conditions*.

1.02 SUBMITTAL REQUIREMENTS

- A. Assemble warranties and bonds executed by each of the respective manufacturers, suppliers and subcontractors.
- B. Number of original signed copies required: Two (2) each.
- C. Table of Contents: Neatly typed, in orderly sequence. Provide complete information for each item.
  - 1. Product or work item.
  - 2. Firm, with name of principal, address and telephone number.
  - 3. Scope.
  - 4. Date of beginning of warranty or bond.
  - 5. Duration of warranty or bond.
  - 6. Provide information for *OWNER'S* personnel:
    - a. Proper procedure in case of failure.

- b. Instances which might affect the validity of warranty or bond.
- 7. *CONTRACTOR*, name of responsible principal, address and telephone number.

#### 1.03 FORM OF SUBMITTALS

- A. Prepare in duplicate packets.
- B. Format:
  - 1. Size: 8½" by 11", punch sheets for 3-ring binder.  
Fold larger sheets to fit into binders.
  - 2. Cover: Identify each packet with typed or printed title "WARRANTIES AND BONDS." List:
    - a. Title of project.
    - b. Name of contractor.
- C. Binders: Commercial quality, 3-ring, D-type, with durable and cleanable plastic covers.

#### 1.04 SUBMITTAL REQUIREMENTS

- A. Submit documents within ten (10) days after inspection and written acceptance by the *ENGINEER*
- B. Submit warranties by the manufacturers of all equipment furnished; or furnished and installed by the *CONTRACTOR*.
  - 1. Manufacturer shall issue warranties in the name of the *CONTRACTOR* and *OWNER*.
  - 2. Warranties shall be valid for a period of two (2) years from the date of acceptance by the *OWNER* of the structures and equipment, unless a longer period is specified.
  - 3. Warranties shall cover all costs for repairing or replacing defective materials and equipment.

- C. Submit warranties, service and maintenance contracts as specified in the respective sections of *Specifications*.
- D. In the event the equipment manufacturer's warranty does not comply with the conditions outlined above or are otherwise unavailable as required above, the *CONTRACTOR* may:
  - 1. Provide a dedicated security deposit in lieu of the specified warranties.
  - 2. Provide either a separate Maintenance Bond or certification of extended warranty coverage under the *CONTRACTOR'S* overall bonding to guarantee *OWNER* for warranty and deficiencies.

1.05 WARRANTY REPAIRS

- A. *CONTRACTOR* shall repair and/or replace as required all equipment which may be defective due to manufacturing errors or faulty installation, at his expense, during the maintenance period.
- B. The *CONTRACTOR* shall be responsible for all costs of the repair work including removal, shipping, reinstallation and start-up during the two (2) year maintenance period. The *OWNER* shall not incur any additional costs as a result of warranted equipment failure.

\*\*\*\*END OF SECTION\*\*\*\*



SECTION 01 78 39  
(01720)  
PROJECT RECORD DOCUMENTS

1.01 GENERAL

- A. Maintain for the *OWNER* one (1) record copy of:
1. Drawings.
  2. Specifications.
  3. Addenda.
  4. Change Orders and other modifications to the contract.
  5. Change Orders or written instructions.
  6. Approved shop drawings, product data and samples.
  7. Field test records.
  8. As-built record drawings.

1.02 MAINTENANCE OF DOCUMENTS AND SAMPLES

- A. Maintain documents in a clean, dry, legible condition and in good order. Do not use record documents for construction purposes.
- B. Make documents and samples available at all times for inspection by the *ENGINEER*.

1.03 MARKING DEVICES

- A. Provide felt-tip marking pens for recording information in the color code accepted by the *ENGINEER*.

1.04 AS-BUILT DRAWINGS

- A. Furnish as-built information:

1. Provide complete set of architectural as-built drawings including:
    - a. Marked construction drawings showing any deviations from original design.
    - b. Any revisions to door, window or hardware schedules.
  2. Provide complete set of electrical as-built drawings including:
    - a. Point-to-point wiring of all field connections with wire numbers, conductor type and color.
    - b. Marked construction Plans showing any deviations from original design.
    - c. Any revisions to the conduit schedule.
    - d. Any revisions to panel schedules.
    - e. Manufacturer's schematics and field connection diagrams for all equipment installed.
    - f. Location of all underground electrical conduits and underground duct bank configuration. Identify all hand holes or manholes.
  3. All the above information must be submitted to the OWNER's Engineer for review and approval prior to acceptance of the system.
  4. The Contractor shall provide a digital copy of the as-built information on a disk or CD in AutoCAD format.
- B. The plans must be submitted on standard 24" x 36" sheets and at a scale appropriate to detail. All text must be drawn clearly and at a minimum size of 0.07" and a maximum size of 0.10".

#### 1.05 SUBMITTAL

- A. Before Contract closeout, transfer all record documents to electronic media. Drawings shall be provided in Tagged Image File (tif) format. All other documents shall be in Portable Document File (pdf) format. Scan all record documents in their original size. Electronic media shall be archival quality compact disc (CD), Memorex "Pro Gold™ Archival CD-Rs" or equivalent.

B. At Contract closeout, deliver original marked-up record documents and four (4) copies of the record documents on electronic media to the *ENGINEER*.

1. Each CD shall have a high gloss, laser printed label showing the following information:

Title: Project Title  
Owner:  
Contract #: 20\_\_-\_\_  
Date:  
Contents: Contract Drawings #\_\_\_\_ thru #\_\_\_\_  
Project Manual and Specifications  
Change Order #\_\_ thru #\_\_\_\_  
Submittals #\_\_\_\_ thru #\_\_\_\_  
Field Test Reports  
Inspection Certificates

2. Each CD shall contain a "Readme" file describing the contents.
3. All shop drawings, product data, test reports, inspection certificates and similar documents relating to a specific specification section or piece of equipment shall be contained as separate files in the same folder.
4. Each CD shall be contained in a Jewel Case with an insert showing the CD contents or a sleeve showing the CD contents.

\*\*\*\*END OF SECTION\*\*\*\*





SECTION 01 78 45  
(01750)  
SPARE PARTS AND MAINTENANCE MATERIALS

PART 1 - GENERAL

1.01 SUMMARY

- A. Work included:
  - 1. Receipt, storage and maintenance of spare parts and maintenance materials.
- B. Related work:
  - 1. Other sections of the *Specifications* requiring spare parts and/or maintenance materials.

1.02 SUBMITTALS

- A. Comply with provisions of *Section 01 33 23, Shop Drawings, Product Data and Samples*.
- B. Compile and submit inventory of spare parts and maintenance materials with first application for payment.
- C. Submit updated inventory monthly with each application for payment.
- D. Prior to completion and acceptance of the work as defined in the General Conditions, provide a complete inventory of all spare parts with the Operation and Maintenance manuals.

1.03 DELIVERY, STORAGE AND HANDLING

- A. Delivery:
  - 1. Deliver materials in manufacturers original packaging with all tags and labels intact.
  - 2. Receive and inventory spare parts prior to placement in storage.

B. Storage:

1. Provide secure storage space in *CONTRACTOR'S* field office or provide separate secure storage trailer for storage of spare parts and maintenance materials.
2. Provide heated space for temperature sensitive materials.
3. Store spare parts and maintenance materials in groups related to the specific pieces of equipment for which they are intended.
4. Maintain current inventory of spare parts and maintenance materials and update monthly.

C. Handling:

1. Handle spare parts and maintenance materials carefully to avoid damage to materials or packaging.
2. Spare parts and maintenance materials shall be tagged to identify the equipment for which they are intended.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Prior to delivery to *OWNER*, carefully inspect spare parts and maintenance materials and verify that all required parts and materials have arrived.
- B. Verify that all tags and labels are intact and legible.
- C. Correct all deficiencies.

3.02 DELIVERY TO OWNER

- A. At a time designated by *OWNER*, but not prior to completion, turn over all spare parts and maintenance materials to *OWNER*.

- B. If spare parts and maintenance materials are stored in a separate secure space, turn over keys to *OWNER*. *OWNER* shall have 10 working days to remove spare parts and maintenance materials to *OWNER'S* storage area.

#### PART 4 - PAYMENT

##### 4.01 SPARE PARTS AND MAINTENANCE MATERIALS:

- A. Unless otherwise noted in the Proposal Section, no separate payment shall be made for this item.
- B. Include all costs for *SPARE PARTS AND MAINTENANCE MATERIALS* in the prices bid for the various related items of work as designated in the Proposal.

\*\*\*\*END OF SECTION\*\*\*\*



SECTION 02 41 19  
(02070)  
SELECTIVE DEMOLITION

PART 1 - GENERAL

1.01 SUMMARY

A. Work included:

1. Demolishing designated building equipment and fixtures.
2. Demolishing designated construction.
3. Cutting and alterations for completion of the Work.
4. Removing designated items for reuse and Owner's retention.
5. Protecting items designated to remain.
6. Removing demolished materials.
7. Testing for the presence of any Asbestos Containing Material (ACM) and its removal and disposal, if and when directed.

B. Related work:

1. Other sections of the *Specifications*, not referenced below, shall also apply to the extent required for proper performance of this work.
2. *Section 01 73 29: Cutting and Patching*

1.02 SUBMITTALS

- A. Comply with provisions of *Section 01 33 23, Shop Drawings, Product Data and Samples*.
- B. Submit results of asbestos testing for structure.
- C. Submit documentation that the requirements of N.J.A.C. 5:23-2.17(e) have been or shall be met for each structure prior to demolition.

### 1.03 SCHEDULING

- A. Schedule Work to coincide with Owner's operation.
- B. Cooperate with *OWNER* in scheduling noisy operations and waste removal that may impact Owners operation.
- C. Perform noisy, malodorous or dusty work as directed by *OWNER*.
- D. Coordinate utility and building service interruptions with *OWNER*.
  - 1. Do not disable or disrupt building fire or life safety systems without three (3) days prior written notice to *OWNER*.
  - 2. Schedule tie-ins to existing systems to minimize disruption.
  - 3. Coordinate Work to ensure fire sprinklers, fire alarms, smoke detectors, emergency lighting, exit signs and other life safety systems remain in full operation in occupied areas.

### 1.04 QUALITY ASSURANCE

- A. Qualifications of workmen:
  - 1. Provide at least one person who shall be present at all times during execution of the work of this section, who shall be thoroughly familiar with the specified requirements and the materials and methods needed for their execution, and who shall direct all work performed under this section.
  - 2. Provide adequate numbers of workmen skilled in the necessary crafts and properly informed of the method and materials to be used.
- B. Comply with the requirements of the Uniform Construction Code of the State of New Jersey.

### 1.05 PROJECT CONDITIONS

- A. Conduct demolition to minimize interference with adjacent [and occupied] building areas.
- B. Cease operations immediately if structure appears to be in danger and notify *ARCHITECT/ENGINEER*. Do not resume operations until directed.

## PART 2 - PRODUCTS

Not used

## PART 3 - EXECUTION

### 3.01 EXISTING CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

### 3.02 ASBESTOS ABATEMENT

- A. Inspect building and test as required for the presence of Asbestos Containing Material (ACM) in wall, trim or related materials and elsewhere as required.
- B. Remove and dispose of Asbestos Containing Material (ACM) in accordance with N.J.A.C. 5:23-8, if and when directed.
- C. Before parts of a structure can be demolished or removed, the *CONTRACTOR* shall document that the requirements of USEPA 40 CFR 61 Subpart M have been or shall be met. A permit to demolish or remove the structure shall not be issued until *CONTRACTOR* notifies the enforcing agency that all friable asbestos or asbestos-containing material that will become friable during demolition or removal has been or will be properly abated prior to demolition. [N.J.A.C. 5:23-2.17(e)]

### 3.03 PREPARATION

- A. Notify affected utility companies before starting work and comply with their requirements.
- B. Mark location and termination of utilities.
- C. Erect, and maintain temporary barriers and security devices, including warning signs and lights, and similar measures, for protection of the public, *OWNER*, and existing improvements indicated to remain.
- D. Erect and maintain weatherproof closures for exterior openings.

- E. Erect and maintain temporary partitions to prevent spread of dust, odors, and noise to permit continued *OWNER* occupancy.
- F. Prevent movement of structure; provide temporary bracing and shoring required to ensure safety of existing structure.
- G. Provide appropriate temporary signage including signage for exit or building egress.
- H. Do not close or obstruct building egress path.
- I. Do not disable or disrupt building fire or life safety systems without three (3) days prior written notice to *OWNER*.

#### 3.04 SALVAGE REQUIREMENTS

- A. Coordinate with *OWNER* to identify building components and equipment required to be removed and delivered to *OWNER*.
- B. Tag components and equipment *OWNER* designates for salvage.
- C. Protect designated salvage items from demolition operations until items can be removed.
- D. Carefully remove building components and equipment indicated to be salvaged.
- E. Disassemble as required to permit removal from building.
- F. Package small and loose parts to avoid loss.
- G. Mark equipment and packaged parts to permit identification and consolidation of components of each salvaged item.
- H. Prepare assembly instructions consistent with disassembled parts. Package assembly instructions in protective envelope and securely attach to each disassembled salvaged item.
- I. Deliver salvaged items to *OWNER*. Obtain signed receipt from *OWNER*.

#### 3.05 DEMOLITION - GENERAL

- A. By careful study of the *Contract Documents*, determine the location and extent of selective demolition to be performed.



- B. In company with the *ENGINEER*, visit the site and verify the extent and location of selective demolition required.
  - 1. Carefully identify limits of selective demolition.
  - 2. Mark interface surfaces as required to, enable workmen also to identify items to be removed and items to be left in place intact.
- C. Prepare and follow an organized plan for demolition and removal of items.
- D. Conduct demolition to minimize interference with adjacent [and occupied] building areas. Use means necessary to prevent dust becoming a nuisance to the public, to neighbors, and to other work being performed on or near the site.
- E. Maintain protected egress from and access to adjacent existing buildings at all times.
- F. Do not close or obstruct roadways or sidewalks without permits.
- G. Cease operations immediately when structure appears to be in danger and notify *ENGINEER* and *OWNER*.
- H. Disconnect and remove utilities within demolition areas.
- I. Demolish in orderly and careful manner. Protect existing improvements, supporting structural members and finishes.
- J. Carefully remove building components indicated to be reused.
  - 1. Disassemble components as required to permit removal.
  - 2. Package small and loose parts to avoid loss.
  - 3. Mark components and packaged parts to permit reinstallation.
  - 4. Store components, protected from construction operations, until reinstalled.
- K. Remove demolished materials from site except where specifically noted otherwise. Do not burn or bury materials on site.
- L. Remove materials as Work progresses. Upon completion of Work, leave areas in clean condition.
- M. Remove temporary Work.

### 3.06 DEMOLITION - ELECTRICAL WORK

- A. Remove, relocate, and extend existing installations to accommodate new construction.
- B. Remove abandoned wiring to source of supply.
- C. Disconnect and protect electrical devices and equipment serving utilization equipment that is to be removed.
- D. Maintain access to existing electrical installations that remain active. Modify installation or provide access to panel as appropriate.
- E. Patch all abandoned wall openings using materials and finishes to match existing construction.

### 3.07 REPLACEMENTS

- A. In the event of demolition of items not so indicated to be demolished, promptly replace such items to the approval of the *ENGINEER* and at no additional cost to the *OWNER*.

## PART 4 - PAYMENT

### 4.01 TESTING FOR ASBESTOS CONTAINING MATERIAL (ACM)

- A. Measurement: The quantity for which payment will be made will be for the number of tests actually made to determine the presence of Asbestos Containing Material (ACM) if and when directed by the *ENGINEER*.
- B. Payment: Payment will be made for the quantity as above determined, measured in units, at the unit price per test bid for the item *TESTING FOR ASBESTOS CONTAINING MATERIAL (ACM)* which price shall include obtaining access to the structure, inspection and testing of the interior and exterior (including roofing) of the structure for the presence of asbestos containing material, test reports and all else necessary or required.

### 4.02 REMOVAL OF ASBESTOS CONTAINING MATERIAL

- A. Quantity: No separate measurement will be made for this item..

- B. Payment: Payment will be made for the item *REMOVAL AND DISPOSAL OF ASBESTOS CONTAINING MATERIALS* on a lump sum basis and in addition to the amounts bid for the other items listed in the proposal, which price shall be the incremental up-charge to handle and dispose of asbestos containing material (ACM) complete as specified, if and when directed by the *ENGINEER*. The amount bid for this item will not be paid unless there is asbestos in the existing materials as shown by actual testing paid for elsewhere

#### 4.03 SELECTIVE DEMOLITION

- A. Separate payment will be made for this item. Include all costs for *SELECTIVE DEMOLITION* as indicated under the specific Proposal item.
- B. The cost for this item shall include all materials, equipment, labor, and tools necessary and shall include those items, which are considered to be an integral part of this work, which may be specified elsewhere in these Specifications.

\*\*\*\*END OF SECTION\*\*\*\*



SECTION 06 20 00  
(06150)  
CARPENTRY

PART 1 - GENERAL

1.01 SUMMARY

A. Work Included:

1. Wood, nails, bolts, screws, framing anchors and other rough hardware
2. Framing, sheathing and siding.

B. Related Work:

1. Other sections of the specifications, not referenced below, shall also apply to the extent required for proper performance of this work.
2. *Section 08 11 13: Metal Doors and Frames*
3. *Section 08 17 43: Pultruded Fiberglass Doors and Frames*
4. *Section 08 33 00: Overhead Coiling Doors*
5. *Section 08 54 00: Composite Windows*

1.02 SUBMITTALS

A. Comply with provisions of *Section 01 33 23, Shop Drawings, Product Data and Samples*.

B. Manufacturer's product data:

1. Complete materials list of all materials proposed to be furnished and installed under this section.
2. Specifications and other data required that demonstrate compliance with the specified requirements.

### 1.03 QUALITY ASSURANCE

#### A. Qualifications of manufacturer:

1. Products used in the work of this section shall be produced by manufacturers regularly engaged in the manufacture of similar items and with a history of successful production acceptable to the *ENGINEER*.

#### B. Qualifications of workmen:

1. Provide at least one person who shall be present at all times during execution of the work of this section, who shall be thoroughly familiar with the specified requirements and the materials and methods needed for their execution, and who shall direct all work performed under this section.
2. Provide adequate numbers of workmen skilled in the necessary crafts and properly informed of the methods and materials to be used.
3. In acceptance or rejection of the work of this section, the *ENGINEER* will make no allowance for lack of skill on the part of workmen.

- C. Basis of acceptance: The manufacturer's installation instructions will provide the basis for acceptance or rejection of the work performed under this section.

### 1.04 DELIVERY, STORAGE AND HANDLING

- A. Comply with provisions of *Section 01 66 00, Storage and Protection*.
- B. Deliver the materials to the job site and store, in a safe area, out of the way of traffic, and shored up off the ground surface.
- C. Protect all lumber from the weather by use of suitable covers.
- D. Identify framing lumber as to grades, and store each grade separately from other grades.
- E. Protect metals with adequate waterproof outer wrapping.
- F. Use extreme care in off loading of lumber to prevent damage, splitting, and breaking of materials.

## PART 2 - PRODUCTS

### 2.01 GENERAL

- A. Products: Whenever materials or equipment are described using a certain brand, make, supplier, manufacturer or by specification, such naming shall be regarded as a standard and be intended to convey function, design features, general style, type, materials of construction, character and quality of material or equipment, serviceability and other described essential characteristics.
- B. Other materials may be considered by the *ENGINEER* in accordance with the provisions of *Section 01 25 13, Substitutions*.

### 2.02 DIMENSION LUMBER

- A. Provide lumber complying with the currently adopted International Building Code, New Jersey Edition and PS-20, American Softwood Lumber Standard and with applicable grading rules.
  - 1. Inspection Agencies:
    - a. RIS - Redwood Inspection Service.
    - b. NLGA - National Lumber Grades Authority (Canadian).
    - c. SPIB - Southern Pine Inspection Bureau.
    - d. WCLIB - West Coast Lumber Inspection Bureau.
    - e. WWPA - Western Wood Products Association.
- B. Grade stamps:
  - 1. Identify each piece of lumber with grade stamp of inspection agency evidencing compliance with grading rules and showing agency, grade, species and moisture content.
- C. Dimensions:
  - 1. Nominal sizes are indicated. Provide actual sizes as required by P.S.-20.
  - 2. Provide dressed lumber, S4S, unless otherwise indicated.
  - 3. Provide seasoned lumber with 19% moisture content.

4. For structural framing provide the following grade and species.
  - a. No. 2 grade, yellow pine or;
  - b. Any species and grade that complies with the requirements of Chapter 23 of the International Building Code and AF&PA NDS-05, *National Design Specification (NDS) for Wood Construction with 2005 Supplement*, as referenced in the Building Code.

#### 2.03 WOOD SHEATHING

- A. Provide APA performance rated panels complying with requirements designated under each application for grade, span rating, exposure, thickness and edge detail.
  1. Wall sheathing:
    - a. APA rated sheathing complying with IBC, Article 2304.6.
    - b. Exposure: exterior.
    - c. Span rating: to suit stud spacing.
  2. Roof sheathing:
    - a. APA rated sheathing complying with IBC, Article 2304.7.
    - b. Exposure durability rating: Exposure 1.
    - c. Thickness: 19/32" unless otherwise indicated.
    - d. Fire-retardant treated panels shall conform to IBC, Article 2303.2.

#### 2.04 GYPSUM SHEATHING

- A. Gypsum Roof Sheathing: Moisture resistant, Fire Resistant 5/8 inch thick, 24 x 96 inch sized sheets, square edges, water repellant paper faces.
- B. Gypsum Wall Sheathing: ASTM C1396; Type X fire resistant, 5/8 inch thick to match existing, 24 x 96 inch sized sheets, square and groove edges to match existing, water repellant paper faces.

2.05 Telephone backboard: 3/4" thick, A-D group 1, interior.



2.06 Panel siding: 303 siding grade, exterior, rough-sawn, 5/8" thick, Douglas Fir.

2.07 WOOD SIDING

- A. Western Red Cedar, WWPA "A" Grade Bevel Siding, 3½" weather, 19% moisture content, S4S, Grade stamped on back.
- B. Exterior soffits and trim: Western Red Cedar, WWPA "C" - Select, 19% moisture content, S4S, Grade stamped on back or ends.

2.08 PRESERVATIVE TREATED WOOD

- A. Wood installed above ground in the locations specified herein and in Sections 2304.11.2.1 through 2304.11.2.7 of the IBC shall be naturally durable wood or preservative-treated wood that uses waterborne preservatives, and shall be treated in accordance with AWWPA U1 (Commodity Specification A or F) for above ground use. (IBC, Section 2304.11.2)
  - 1. Where wood joists or the bottom of a wood structural floor without joists are closer than 18 inches, or wood girders are closer than 12 inches, to the exposed ground in crawl spaces or unexcavated areas located within the perimeter of the building foundation, the floor assembly (including posts, girders, joists and subfloor). (IBC, Section 2304.11.2.1)
  - 2. Wood framing members, including wood sheathing, that rest on exterior foundation walls and are less than 8 inches from exposed earth; and wood framing members and furring strips attached directly to the interior of exterior masonry or concrete walls below grade. (IBC, Section 2304.11.2.2 and 2304.11.2.3)
  - 3. Sleepers and sills on a concrete or masonry slab that is in direct contact with earth. (IBC, Section 2304.11.2.4)
  - 4. The ends of wood girders entering exterior masonry or concrete walls shall be provided with a ½-inch air space on top, sides and end, unless durable or preservative-treated wood is used. (IBC, Section 2304.11.2.5)
  - 5. Clearance between wood siding and earth on the exterior of a building shall not be less than 6 inches except where siding, sheathing and wall framing are of naturally durable or preservative-treated wood. (IBC, Section 2304.11.2.5)

6. Posts or columns supporting permanent structures and supported by a concrete or masonry slab or footing that is in direct contact with the earth. (IBC, Section 2304.11.2.6)
  - a. Posts or columns that are either exposed to the weather or located in basements or cellars, supported by concrete piers or metal pedestals projected at least 1 inch above the slab or deck and 6 inches above exposed earth, and are separated therefrom by an impervious moisture barrier are not required to be treated. (IBC, Section 2304.11.2.6, Exception 1)
  - b. Posts or columns in enclosed crawl spaces or unexcavated areas located within the periphery of the building, supported by a concrete pier or metal pedestal at a height greater than 8 inches from exposed ground, and are separated therefrom by an impervious moisture barrier are not required to be treated. (IBC, Section 2304.11.2.6, Exception 2)
7. The portions of glued laminated timbers that form the structural supports of a building or other structure and are exposed to weather and not properly protected by a roof, eave or similar covering shall be pressure treated with preservative, or be manufactured from naturally durable or preservative-treated wood. (IBC, Section 2304.11.3)
8. Wood in contact with the ground (exposed earth) that supports permanent structures shall be of naturally durable or preservative treated wood using waterborne preservatives and shall be treated in accordance with AWPA C2, C9 or other applicable AWPA standard for soil or fresh water contact, where used in the location specified in Sections 2304.11.4.1 and 2304.11.4.2 (IBC, Section 2304.11.4)
  - a. Untreated wood may be used where such wood is continuously and entirely below the ground water level or submerged in fresh water. (IBC, Section 2304.11.4, Exception)
9. Posts and columns supporting permanent structures that are embedded in concrete in direct contact with the earth or embedded in concrete exposed to the weather, or in direct contact with the earth. (IBC, Section 2304.11.4) (IBC, Section 2304.11.4.1)
10. Wood structural members that support moisture-permeable floors or roofs that are exposed to the weather, such as concrete or masonry slabs, shall be of naturally durable or preservative-treated wood unless separated from such floors or roofs by an impervious moisture barrier. (IBC, Section 2304.11.4.2)

11. For those portions of wood members that form the structural supports of buildings, balconies, porches or similar permanent building appurtenances where such members are exposed to the weather without adequate protection from a roof, eave, overhand or other covering to prevent moisture or water accumulation on the surface or at joints between members. (IBC, Section 2304.11.5)
  12. In geographical areas where hazard of termite damage is know to be very heavy, the floor framing shall be of natural durable or preservative-treated wood, or provided with approved methods of termite protection. (IBC, Section 2304.11.6)
  13. Wood installed in retaining or crib walls shall be of preservative-treated wood treated in accordance with AWPA C2 or C9 for soil and fresh water contact. (IBC, Section 2304.11.7)
- B. Items of naturally durable wood including, but not limited to, all-heart material of cedar, cypress, or redwood will not require preservative treatment, except when in direct contact with soil.
- C. Effective December 31, 2003, products containing ammoniacal copper zinc arsenate (ACZA) or chromated copper arsenate (CCA) may only be used for preservative treatment as indicated in the Federal Register; April 9, 2003 (Volume 68, Number 68) and in accordance with one of the following categories of forest products and in accordance with the respective cited standard (noted parenthetically) of the 2001 edition of the American Wood-Preservers Association Standards: Lumber and Timber for Salt Water Use Only (C2), Piles (C3), Poles (C4), Plywood (C9), Wood for Highway Construction (C14), Round, Half Round and Quarter Round Fence Posts (C16), Poles, Piles and Posts Used as Structural Members on Farms, and Plywood Used on Farms (C16), Wood for Marine Construction (C18), Lumber and Plywood for Permanent Wood Foundations (C22), Round Poles and Posts Used in Building Construction (C23), Sawn Timber Used To Support Residential and Commercial Structures (C24), Sawn Crossarms (C25), Structural Glued Laminated Members and Laminations Before Gluing (C28), Structural Composite Lumber (C33), and Shakes and Shingles (C34). Forest products treated with this product may only be sold or distributed for uses within the AWPA Commodity Standards under which the treatment occurred.
- D. Exposed areas of treated wood that are cut or drilled after treatment shall receive a field treatment in accordance with AWPA M4.
- E. Lumber, timber, plywood, piles and poles supporting permanent structures required by Section 2304.11 to be preservative-treated shall conform to the requirements of AWPA Standard U1 and M4, for species, product, preservative

and end use. Preservatives shall be as listed in Section 4 of AWP U1. (IBC 2018, Subsection 2303.1.8)

1. Lumber and timbers shall be treated in accordance with the AWP "Commodity Specifications" of the "Use Category System," AWP U-1.
2. Composite wood products include, but are not limited to, plywood, glue laminated members, and structural composite lumber.
  - a. Composite wood products shall be treated in accordance with AWP "Commodity Specification F" of the "Use Category System," AWP U-1.

F. Moisture Content

1. At the time lumber and other materials are delivered and when installed in the work their moisture content shall be as follows:
  - a. Treated and Untreated Lumber except Roof Planking:
    - (1) 4 inches or less, nominal thickness, 19 percent maximum.
    - (2) 5 inches or more, nominal thickness, 23 percent maximum in a 3 inch perimeter of the timber cross-section.
  - b. Roof Planking: 15 percent maximum.
  - c. Materials other than lumber: In accordance with standard under which product is produced.

2.09 FIRE-RETARDANT TREATED WOOD

- A. Fire-retardant treated wood shall be pressure treated in accordance with AWP C-20 or AWP C-27 and have, when tested in accordance with ASTM E-84, a listed flame spread of 25 or less and shall show no evidence of significant progressive combustion when tested for an additional 20-minute period. In addition the flame front shall not progress more 10.5 feet beyond the centerline of the burners at any time during the test. (IBC 2009, Section 2303.2)
- B. Fire-retardant treated wood shall be labeled in accordance with IBC, Section 2303.2.1.
- C. Fire-retardant treated wood exposed to the weather shall be identified as "Exterior" as required by IBC, Section 2303.2.3)

- D. Fire-retardant treated wood exposed to interior humid conditions shall be identified as "Interior Type A" as required by IBC, Section 2303.2.4)

## 2.10 AIR BARRIER/WEATHER RESISTANT BARRIER

- A. Complying with the following requirements:

1. Moisture vapor transmission rate (ASTM E96): 125 or less.
2. Flame spread (ASTM E84): 25 or less, Class 1.
3. Air stoppage: ASTM D-283 65% or less at 15 MPH wind.

- B. Acceptable manufacturers:

1. "Tyvek CommercialWrap"  
Fibers Department  
DuPont Company
2. "Rufeo-Wrap"  
Raven Industries
3. "Barricade Building Wrap"  
Simplex Products Division  
Anthony Industries, Inc.
4. Or equivalent.

## 2.11 ROUGH HARDWARE

- A. Fasteners for preservative-treated and fire-retardant treated wood shall be of hot-dipped zinc coated galvanized steel, stainless steel, silicon bronze or copper.
- B. Steel items:
1. Comply with ASTM A7 or ASTM A36.
  2. Use Hot Dip galvanized at exterior locations.
- C. Machine bolts: Comply with ASTM A307, Hot Dip galvanized at exterior locations.

D. Lag bolts: Comply with Fed Spec FF-B-561, Hot Dip galvanized at exterior locations.

E. Nails:

1. Use common except as otherwise noted.
2. Use spirally grooved or ring shank nails for exterior decks and ramps.
3. Use finishing nails for trim.
4. Comply with Fed Spec FF-N-105.
5. Use Hot Dip galvanized at exterior locations.

F. Framing anchors:

1. Provide metal framing anchors of type, size, metal, and finish indicated that comply with requirements specified including the following:
  - a) Provide products for which model code evaluation/research reports exist that are acceptable to authorities having jurisdiction and that evidence compliance with International Building Code, 2009.
2. Galvanized steel sheet: Steel sheet hot-dip galvanized prior to fabrication to comply with ASTM A525 for coating designation G60 and with ASTM A446, Grade A (structural quality); ASTM A526 (commercial quality); or ASTM A527 (lock forming quality).

2.12 BUILDING PAPER: Kraft paper complying with Fed Spec UU-B-790a.

2.13 VAPOR BARRIER: No. 15 asphalt saturated organic felt conforming to ASTM D-226.

2.14 CLOSET SHELIVING

- A. Shelves 11½" wide or less: Douglas Fir-Hemlock, B and Better grade; or Ponderosa Pine, B and Better grade.
- B. Shelves wider than 11½": ¾" thick, A-D group 1, interior plywood with 3/8" x 3/4" Douglas Fir or Pine bands on visible edges.

2.15 CLOTHES RODS

- A. Douglas Fir, 1⅜" diameter, with nylon sockets each end and Stanley 7045 steel bracket at center of all rods 48" long or longer.

2.16 WOOD BASE and CHAIR RAIL

- A. Base: Pine, Hemlock; "Ranch Base", 9/16" x 3¼".
- B. Chair rail: Pine, Hemlock; "Standard Chair Rail", 9/16" x 3"..

2.17 IMPORTED HARDWOODS

- A. All imported exotic hardwood shall be sourced and supplied in compliance with Certified Forest Products Council Purchasing Policy Guidelines. A certificate of Environmental Compliance from an independent third party inspection and grading agency shall be submitted prior to delivery confirming that the wood supplied was produced from legally harvested logs and was supplied in compliance with all foreign and domestic laws and regulations pertaining to the harvest and trade of timber products.
- B. Hardwood shall be IPE (Tabebuia Spp-Lapacho Group), partially air dried to a moisture content of 15% - 25% and surfaced four (4) sides with all edges eased (S4S-E4E). All ends shall be sealed to reduce checking.
- C. All lumber shall be third party graded and inspected to Premium Clear All Heart grading rules, defined as follows:
  - 1. Lumber shall be graded four faces, and four edges.
  - 2. Lumber shall be straight grained and parallel cut without heart center.
  - 3. Lumber shall be all heartwood; no sapwood is permitted.
  - 4. Lumber shall be in sound condition, free from worm holes or knots.
  - 5. Allowable Imperfections are defined as - Small drying cracks, small end splits (less than 5/32 inches in width), that do not impair the strength of the material or fastening, Discoloration caused by weathering or chemical reaction, Bow or twist that can be removed using normal installation methods and tools, Roey/Scale grain (one face only).
  - 6. Not Allowable Imperfections are defined as - Longitudinal heart cracks, Internal cracks, Firm or soft sap-wood, Fungi Affects - (blue to gray,

brown to red, white to yellow, or incipient decay), Bow or twist that cannot be removed by normal installation methods and tools.

2.18 OTHER MATERIALS

- A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Engineer.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Prior to installation of the work of this section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.
- B. Verify that work may be completed in strict accordance with the original design and with the manufacturer's recommendations as approved by the *ENGINEER*.
- C. Do not proceed until unsatisfactory conditions are corrected.

3.02 WORKMANSHIP

- A. Produce joints which are tight, true, and well nailed, with members assembled in accordance with the Drawings and with pertinent codes and regulations.
- B. Selection of lumber pieces:
  - 1. Carefully select the members.
  - 2. Select individual pieces so that knots and obvious defects will not interfere with placing bolts or proper nailing, and will allow making of proper connections.
  - 3. Cut out and discard defects which render a piece unable to serve its intended function.
  - 4. Lumber may be rejected by the *ARCHITECT*, whether or not it has been installed, for excessive warp, twist, bow, crook, mildew, fungus, or mold, as well as for improper cutting and fitting.



- C. Do not shim any framing component.

### 3.03 GENERAL FRAMING

#### A. General:

1. Comply with AF&PA, "Manual for Wood Frame Construction" and the International Building Code, 2009.
2. In addition to framing operations normal to the fabrication and erection indicated on the Drawings, install wood blocking and backing required for the work of other trades.
3. Set horizontal and sloped members with crown up.
4. Do not notch, cut, or bore members for pipes, ducts, or conduits, or for other reasons except as shown on the Drawings or as specifically approved in advance by the *ENGINEER/ARCHITECT*.

#### B. Bearings:

1. Make bearings full unless otherwise indicated on the Drawings.
2. Finish bearing surfaces on which structural members are to rest so as to give sure and even support.
3. Where framing members slope, cut or notch the ends as required to give uniform bearing surface.

### 3.04 BLOCKING AND BRIDGING

- A. Install blocking as required to support items of finish including hardware, toilet room accessories and other wall mounted items.

#### B. Bridging:

1. Install wood cross bridging (not less than 2" x 3" nominal), metal cross bridging of equal strength, or solid blocking between joists where the span exceeds 8'-0".
2. Provide maximum distance of 8'-0" between a line of bridging and a bearing.

3. Cross bridging may be omitted is permitted by code, except where otherwise indicated on the Drawings.
4. Install solid blocking between joists at points of support and wherever sheathing is discontinuous. Blocking may be omitted where joists are supported on metal hangers.

### 3.05 FIREBLOCKING AND DRAFTSTOPPING

- A. Fireblocking and draftstopping materials and installation shall conform to Section 717 of the International Building Code, 2018.
- B. Install firesblocking and draftstopping where required by Sections 717 and 1406 of the International Building Code, 2018.

### 3.06 ALIGNMENT

- A. On framing members to receive a finished surface, align the finish subsurface to vary not more than 1/8" from the plane of surfaces of adjacent furring and framing members.

### 3.07 INSTALLATION OF WOOD SHEATHING

- A. Placement:
  1. Place plywood with face grain perpendicular to supports and continuously over at least two supports, except where otherwise shown on the Drawings.
  2. Center joints accurately over supports, unless otherwise shown on the Drawings.
- B. Protect plywood from moisture by use of waterproof coverings until the plywood in turn has been covered with the next succeeding component or finish.

### 3.08 INSTALLATION OF VAPOR BARRIER

- A. Install one layer of vapor barrier horizontally on sheathed walls.
- B. Weather lap ends and edges minimum of 6".

- C. Stagger vertical joints.
- D. Staple or nail in place.

### 3.09 AIR BARRIER

- A. Install air infiltration barrier in accordance with manufacturers directions.

### 3.10 INSTALLATION OF WOOD SIDING

- A. Install bevel siding using single course method with 3½" exposure.
- B. Nail at 12" o.c. Fasten siding in place level and plumb. Blind nail except trim. Nail to aligned pattern.
- C. Miter horizontal joints tight at 45E. Butt siding tight to corner boards.
- D. Install siding for natural shed of water.
- E. Position cut ends over bearing surfaces. Sand cut edges smooth and clean.,\
- F. Miter siding tightly at corners.
- G. Install metal flashing at sills and heads of wall openings.

### 3.11 FASTENING

- A. General:
  - 1. Comply with the "Fastening Schedule," Table 2304.9.1 and Chapter 23 of the International Building Code, 2018.
  - 2. Install items straight, true, level, plumb, and firmly anchored in place.
  - 3. Where blocking or backing is required, coordinate as necessary with other trades to ensure placement of required backing and blocking in a timely manner.
  - 4. Nail trim with finish nails of proper dimension to hold the member firmly in place without splitting the wood.

B. Nailing:

1. Use only common wire nails or spikes of the dimension required, except where otherwise specified or noted on the Drawings.
2. Provide penetration into the piece receiving the point of not less than 1/2 the length of the nail or spike, provided, however, that 16d nails may be used to connect two pieces of 2" (nominal) thickness.
3. Nail without splitting wood.
4. Pre-bore as required.
5. Remove split members and replace with members complying with the specified requirements.

C. Bolting:

1. Drill holes 1/16" larger in diameter than the bolts being used.
2. Drill straight and true from one side only.
3. Do not bear bolt heads on wood, but use washers under head and nut where both bear on wood, and use washers under all nuts.

D. Screws:

1. For lag screws and wood screws, prebore holes same diameter as root of threads, enlarging holes to shank diameter for length of shank.

3.12 JOINTING

- A. Make joints to conceal shrinkage; miter exterior joints; cope interior joints; miter or scarf end-to-end joints.
- B. Install trim in pieces as long as possible, jointing only where solid support is obtained.

3.13 INSTALLATION OF OTHER ITEMS

- A. Install items in strict accordance with the Drawings and the recommended methods of the manufacturer as approved by the Architect, anchoring firmly into position at the prescribed locations, straight, plumb, and level.

### 3.14 FINISHING

- A. Sandpaper finished wood surfaces thoroughly as required to produce a uniformly smooth surface, always sanding in the direction of the grain; except do not sand wood which is designed to be left rough.
- B. No coarse grained sandpaper mark, hammer mark, or other imperfection will be accepted.

### 3.15 CLEANING UP

- A. Keep the premises in a neat, safe, and orderly condition at all times during execution of this portion of the Work, free from accumulation of sawdust, cut-ends, and debris.
- B. Sweeping:
  - 1. At the end of each working day, and more often if necessary, thoroughly sweep surfaces where refuse from this portion of the Work has settled.
  - 2. Remove the refuse to the area of the job site set aside for its storage.
  - 3. Upon completion of this portion of the Work, dispose of all debris and thoroughly broom clean all surfaces.

\*\*\*\*\*END OF SECTION\*\*\*\*\*



SECTION 07 92 13  
(07920)  
SEALANTS AND CAULKING

PART 1 - GENERAL

1.01 SUMMARY

A. Work included:

1. Throughout the work, seal and caulk joints where shown on the Drawings and elsewhere as required to provide a positive barrier against passage of moisture, air and water.
2. The work of this section includes preparation of substrate surfaces, backing material and sealant.

B. Related work:

1. Other sections of the specifications, not referenced below, shall also apply to the extent required for proper performance of this work.
2. *Section 09 90 00: Painting*

C. Payment:

1. Unless otherwise noted in the Proposal Section, no separate payment shall be made for this item.
2. Include all costs for the *SEALANTS AND CAULKING* in the prices bid for the various items of related work designated in the Proposal.

1.02 REFERENCES

A. American Society for Testing and Materials:

1. ASTM C790: Standard Practices for use of Latex Sealing Compounds.
2. ASTM C804: Standard Practice for use of Solvent-Release type Sealants.
3. ASTM C834: Standard Specification for Latex Sealing Compounds.

4. ASTM C919: Standard Practice for use of Sealants in Acoustical Applications.
5. ASTM C920: Standard Specification for Elastomeric Joint Sealants.
6. ASTM C1330: Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants.

#### 1.03 SUBMITTALS

- A. Comply with provisions of *Section 01 33 23, Shop Drawings, Product Data and Samples*.
- B. Manufacturer's product data:
  1. Complete materials list of all materials proposed to be furnished and installed under this section.
  2. Specifications and other data required to demonstrate compliance with the specified requirements.
- C. Shop drawings showing precise dimensions of the work of this section, and all other data needed to ensure proper and adequate provision in concrete forming, reinforcement, and placement to accommodate the work of this section.
- D. Manufacturer's recommended installation procedures.
- E. Samples: Upon request of the *ENGINEER*, submit Samples of each sealant, each backing material, each primer, and each bond breaker proposed to be used.

#### 1.04 QUALITY ASSURANCE

- A. Qualifications of manufacturer:
  1. Products used in the work of this section shall be produced by manufacturers regularly engaged in the manufacture of similar items and with a history of successful production acceptable to the *ENGINEER*.
- B. Qualifications of workmen:
  1. Provide at least one person who shall be present at all times during execution of the work of this section, who shall be thoroughly familiar with the specified requirements and the materials and methods needed for



their execution, and who shall direct all work performed under this section.

2. Provide adequate numbers of workmen skilled in the necessary crafts and properly informed of the methods and materials to be used.
3. In acceptance or rejection of the work of this section, the *ENGINEER* will make no allowance for lack of skill on the part of workmen.

C. Basis of acceptance:

1. The manufacturer's installation instructions will provide the basis for acceptance or rejection of the work performed under this section.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Comply with provisions of *Section 01 66 00, Storage and Protection*.
- B. Protection: Use all means necessary to protect the materials of this section before, during, and after installation and to protect the installed work and materials of all other trades.
- C. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of the *ENGINEER* and at no additional cost to the *OWNER*.
- D. Delivery and storage: Deliver all materials to the job site in their original unopened containers with all labels intact and legible at time of use. Store in strict accordance with the manufacturer's recommendations as approved by the *ENGINEER*.
- E. Do not retain at the job site material, which has exceeded the shelf life recommended by its manufacturer.

1.06 ENVIRONMENTAL REQUIREMENTS

- A. Do not install solvent curing sealants in enclosed building spaces.
- B. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

## PART 2 - PRODUCTS

### 2.01 GENERAL

- A. Proprietary Products: Whenever materials or equipment are described using a certain brand, make, supplier, manufacturer or by specification, such naming shall be regarded as a standard and be intended to convey function, design features, general style, type, materials of construction, character and quality of material or equipment, serviceability and other described essential characteristics.
- B. Other materials may be considered by the *ENGINEER* in accordance with the provisions of *Section 01 25 13, Substitutions*.
- C. Acceptable manufacturers:
1. Polymeric Systems, Inc. (PSI)  
Phoenixville, PA  
(800) 228-5548
  2. Bostik  
Middleton, MA  
(8088) 603-8558
  3. Sika Corporation  
Lyndhurst, NJ  
(800) 933-7452
  4. ChemRex, Inc. (Sonneborn)  
Shakoppe, MN  
(800) 433-9517
  5. Pecora Corporation  
Harleysville, PA  
(800) 523-6688
  6. Tremco  
Beachwood, OH  
(800) 321-7906
  7. G. E. Silicones  
Wilton, CT  
(800) 255-8886
  8. Dow Corning Corporation  
Midland, MI

(517) 496-6000

9. W. R. Meadows, Inc  
Hampshire, IL  
Phone: (847) 214-2100

10. Or equivalent.

## 2.02 SEALANTS

A. Provide the following sealants where specified, called for on the Drawings, or otherwise required for a complete and proper installation.

1. Sealant Type "A":

a. Self leveling, complying with ASTM C920, Type M, Grade P, Class 25, use T, A and M.

b. Acceptable products:

- (1) Bostik "Chem-Calk 550"
- (2) Vulkem 245
- (3) Pecora NR-200
- (4) Tremco THC-900
- (5) Sonneborn "Sonolastic SL-2"
- (6) Or equal.

2. Sealant Type "B":

a. Non-sag, complying with ASTM C920, Type S, Grade NS, Class 25, use NT, M, A and O.

b. Acceptable products:

- (1) Vulkem 116
- (2) Tremco Dymonic
- (3) Bostik "Chem-Calk 900"
- (4) Sika Sikaflex 1A
- (5) Sonneborn "Sonolastie NP1"
- (6) Or equal.

3. Sealant Type "C":

- a. Non-sag, fungicidal silicone complying with ASTM C920, Type S, Grade NS, Class 25, use NT, G, A and O.
  - b. Acceptable products:
    - (1) Rhodorsil 6B sanitary white
    - (2) Bostik silicone rubber bathroom caulk
    - (3) GE sanitary 1700
    - (4) Dow Corning 786
    - (5) Or equal
4. Sealant Type "D":
- a. Acoustical sealant:
    - (1) Non-hardening, gunnable (not-exposed):
      - (a) PTI 808
      - (b) Tremco acoustical sealant
      - (c) Or equal.
    - (2) Paintable, non-staining, gunnable (exposed):
      - (a) Pecora AC-20
      - (b) Tremco Acrylic Latex 834
      - (c) Red Devil Acrylic Latex 15 yr. Caulk
      - (d) Or equal.
5. Sealant Type "E":
- a. Conforming to ASTM C920, Type M, Grade P or NS, Class 25 and specifically suitable and NSF certified for Immersion Service in Potable Water Service.
  - b. Acceptable Products:
    - (1) PSI RC-270 (gun grade) (urethane)
    - (2) PSI RC-270 SL (self leveling) (urethane)
    - (3) Or equal.
6. Sealant Type "F":

- a. Conforming to ASTM C-920, Type M or S, Grade P or NS, Class 25 and specifically suitable for Immersion Service in Wastewater Treatment Facilities.
- b. Acceptable Products:
  - (1) Sonolastic "Polysulfide" (gun grade)
  - (2) Pecora "GC-2" (2 part polysulfide)
  - (3) PSI RC-270 (gun grade) (urethane)
  - (4) PSI RC-270 SL (self leveling) (urethane)
  - (5) W.R. Meadows Deck-O-Seal 785 (2 part polysulfide)
  - (6) Or equal.
- B. For other services, provide products especially formulated for the proposed use and approved in advance by the *ENGINEER*.
- C. Colors:
  - 1. Colors for each sealant installation will be selected by the *ENGINEER* from standard colors normally available from the specified manufacturer.
  - 2. Should such standard color not be available from an approved substitute manufacturer except at additional charge, provide such colors at no additional cost to the *OWNER*.
  - 3. In concealed installations, and in partially or fully exposed installations where so approved by the *ENGINEER*, use standard gray or black sealant.

## 2.03 PRIMERS

- A. Use only those primers that have been tested for durability on the surfaces to be sealed and are specifically recommended for this installation by the manufacturer of the sealant used.

## 2.04 BACKUP MATERIALS

- A. Use only those backup materials that are non-absorbent, non-staining, and specifically recommended for this installation by the manufacturer of the sealant used.
- B. Cylindrical Sealant Backings: ASTM C 1330, of type indicated below and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance:
  - 1. Type C: Closed-cell material for exterior, horizontal applications only.
  - 2. Type O: Open-cell material for all applications including hot poured sealants to 500 °F and chemical sealant products except exterior, horizontal applications.
  - 3. Type B: Bi-cellular material for vertical and horizontal joints, or where joints are more irregular, and to fill air-gap spaces in general construction. NOT for hot poured or chemical sealant applications unless specifically recommended otherwise by the manufacturer.
- 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 where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

#### 2.05 MASKING TAPE

- A. For masking tape around joints, provide an appropriate masking tape that will effectively prevent application of sealant on surfaces not scheduled to receive it, and that is removable without damage to substrate.

#### 2.06 OTHER MATERIALS

- A. 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 with joint substrates.
- B. All other materials, not specifically described but required for a complete and proper installation of the work of this section, shall be new, first quality of their respective kinds, and as selected by the *CONTRACTOR* subject to the approval of the *ENGINEER*.

## PART 3 - EXECUTION

### 3.01 EXAMINATION

- A. Prior to installation of the work of this section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.
- B. Verify that work may be completed in strict accordance with the original design and with the manufacturer's recommendations as approved by the *ENGINEER*.
- C. Do not proceed until unsatisfactory conditions are corrected.

### 3.02 PREPARATION

- A. General:
  - 1. Clean and prime joints in accordance with manufacturer's instructions.
  - 2. Remove loose materials and foreign matter, which might impair adhesion of sealant.
  - 3. Verify that joint backing and release tapes are compatible with sealant.
  - 4. Perform preparation in accordance with ASTM C804 for solvent release sealants and ASTM C790 for latex base sealants.
  - 5. Protect elements surrounding the work of this Section from damage or disfiguration.
- B. Concrete surfaces:
  - 1. Install only on surfaces, which are dry, sound, and well brushed, wiping free from dust.
  - 2. At open joints, remove dust by mechanically blown compressed air if so required.
  - 3. To remove oil and grease, use sandblasting or solvent cleaning and wire brushing.

4. Where surfaces have been treated, remove the surface treatment by sandblasting or wire brushing.
  5. Remove laitance and mortar from joint cavities.
- C. Steel surfaces:
1. Steel surfaces in contact with sealant:
    - a. Sandblast as required to achieve acceptable surface for bond.
    - b. If sandblasting is not practical, or would damage adjacent finish, scrape the metal or wire brush to remove mill scale and rust.
    - c. Use solvent to remove oil and grease, wiping the surfaces with clean white rags only.
  2. Remove protective coatings on steel by sandblasting or by using a solvent which leaves no residue.
- D. Aluminum surfaces:
1. Aluminum surfaces in contact with sealant:
    - a. Remove temporary protective coatings, dirt, oil, and grease.
    - b. When masking tape is used for protective cover, remove the tape just prior to applying the sealant.
  2. Use only such solvents to remove protective coatings as are recommended for that purpose by the manufacturer of the aluminum work, and which are non-staining.

### 3.03 INSTALLATION OF BACKUP MATERIAL

- A. Backup material shall be used when and where recommended by the manufacturer of the sealant.
- B. When using backup of tube or rod stock, avoid lengthwise stretching of the material. Do not twist or braid hose or rod backup stock.
- C. Measure joint dimensions and size material to achieve required width/depth ratios.



- D. Install joint backing to achieve a neck dimension no greater than 1/3 the joint width.
- E. Install bond breaker where joint backing is not used or where required.
- F. Installation tool:
  - 1. For installation of backup material, provide a blunt-surfaced tool of wood or plastic, having shoulders designed to ride on the adjacent finished surface and a protrusion of the required dimensions to assure uniform depth of backup material below the sealant.
  - 2. Do not, under any circumstance, use a screwdriver or similar tool for this purpose.
  - 3. Using the approved tool, smoothly and uniformly place the backup material to the depth indicated on the Drawings or otherwise required, compressing the backup material 25% to 50% and securing a positive fit.

#### 3.04 PRIMING

- A. Use only the primer approved by the manufacturer for the particular installation, applying in strict accordance with the manufacturer's recommendations as approved by the Architect.

#### 3.05 INSTALLATION OF SEALANTS

- A. Prior to start of installation in each joint, verify the joint type according to details on the Drawings, or as otherwise directed by the Architect, and verify that the required proportion of width of joint to depth of joint has been secured.
- B. Equipment:
  - 1. Apply sealant under pressure with power-actuated hand gun or manually-operated hand gun, or by other appropriate means.
  - 2. Use guns with nozzle of proper size, and providing sufficient pressure to completely fill the joints as designed.
- C. Thoroughly and completely mask joints where the appearance of primer or sealant on adjacent surfaces would be objectionable.

- D. Install the sealant in strict accordance with the manufacturer's recommendations, thoroughly filling joints to the recommended depth.
- E. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- F. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.
- G. Tool joints to the profile shown on the Drawings, or as otherwise required if such profiles are not shown on the Drawings.
  - 1. Provide uniformly smooth joints with slightly concave surface.
  - 2. Do not use tooling agent unless specifically so recommended in writing by the manufacturer of the sealant.

### 3.06 CLEANING UP

- A. Remove masking tape immediately after joints have been tooled.
- B. Clean adjacent surfaces free from sealant as the installation progresses, using solvent or cleaning agent recommended by the manufacturer of the sealant used.
- C. Upon completion of the work of this Section, promptly remove from the job site all debris, empty containers, and surplus material derived from this portion of the work.
- D. Repair or replace defaced or disfigured finishes caused by work of this Section.

### 3.07 PROTECTION OF FINISHED WORK

- A. Protect sealants until cured.
- B. Repair or replace disfigured or damaged sealants where necessary or required to provide finished appearance.

### 3.08 SCHEDULE

- A. The following schedule of sealant locations is provided as a guide only and is not all inclusive or limiting as to the quantity of work specified herein.
- B. Sealant schedule:

LOCATIONSEALANT TYPE

- |    |  |        |
|----|--|--------|
| 1. | Interior & Exterior Traffic Bearing Joints.  | Type A |
| 2. | Perimeter of Interior & Exterior Frames; Coping Joints; Coping to Facade Joints; Cornice & Wash (Horizontal) Joints; Interior and Exterior Control Joints; around Entrances, Store Fronts and Windows; Interior and Exterior Electrical and Mechanical Fixtures, Flashing. | Type B |
| 3. | Showers, Restroom Fixtures, Restrooms.   | Type C |
| 4. | For Sound Transmission Reduction   | Type D |
| 5. | Immersion Service and splash zones in potable water facilities.  | Type E |
| 6. | Immersion Service and splash zones in Wastewater Treatment Facilities  | Type F |

\*\*\*\*END OF SECTION\*\*\*\*



SECTION 08 11 13  
(08100)  
METAL DOORS AND FRAMES

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work included:

1. Steel Doors
2. Steel door frames
3. Transom frames
4. Fire-rated door and frame assemblies
5. Fire-rated window assemblies
6. Louvers in doors

B. Related work specified elsewhere:

1. Other sections of the specifications, not referenced below, shall also apply to the extent required for proper performance of this work.
2. *Section 06 20 00: Carpentry*
3. *Section 07 92 13: Sealants and Caulking*
4. *Section 08 71 00: Hardware*
6. *Section 08 80 00: Glazing*

1.02 SUBMITTALS

- A. Comply with provisions of *Section 01 33 23, Shop Drawings, Product Data and Samples*.
- B. Product Data: Provide manufacturer's standard catalog data for specified products demonstrating compliance with referenced standards.

- C. Shop Drawings: Show layout, profiles, product components, anchorages, accessories, and finish colors.
  - 1. Indicate door type, frame, steel, core, material thickness, mortises, reinforcements, exposed fastener locations, openings (glazed, paneled, or louvered), and hardware arrangements.
  - 2. Door schedule using same reference designations as indicated on drawings.
- D. Certificates: Product certificates signed by the manufacturer certifying material compliance with ANSI A250.8, specified performance characteristics and criteria, and physical requirements.
- E. Installation Instructions: Manufacturer's printed installation instructions, if other than as specified in SDI-105.
- F. Operation and Maintenance Data: Include methods for maintaining installed products and precautions against cleaning materials and methods detrimental to finishes and performance, if other than as specified in SDI-124.
- G. Manufacturers' warranty documents.

### 1.03 QUALITY ASSURANCE

- A. Qualifications of manufacturer:
  - 1. Products used in the work of this section shall be produced by manufacturers regularly engaged in the manufacture of similar items and with a history of successful production acceptable to the *ENGINEER*.
- B. Qualifications of workmen:
  - 1. Provide at least one person who shall be present at all times during execution of the work of this section, who shall be thoroughly familiar with the specified requirements and the materials and methods needed for their execution, and who shall direct all work performed under this section.
  - 2. Provide adequate numbers of workmen skilled in the necessary crafts and properly informed of the methods and materials to be used.
  - 3. In acceptance or rejection of the work of this section, the *ENGINEER* will make no allowance for lack of skill on the part of workmen.

C. Basis of acceptance:

1. The manufacturer's installation instructions will provide the basis for acceptance or rejection of the work performed under this section.

1.04 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Comply with provisions of *Section 01 66 00, Storage and Protection* and ANSI A250.8.

B. Protection:

1. Use all means necessary to protect the materials of this section before, during, and after installation and to protect the installed work and materials of all other trades.
2. Protect materials from exposure to harmful weather conditions and at temperature and humidity conditions recommended by manufacturer.

C. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of the *ENGINEER* and at no additional cost to the *OWNER*.

D. Delivery and storage:

1. Deliver all materials to the job site in their original unopened containers with all labels intact and legible at time of use.
2. Store doors protected at corners to prevent damage or marring of finish.
3. Store doors in upright position under cover on building site on wood sills or on floors in a manner to prevent rust and damage.
4. Store frames in upright position under cover on building site on wood sills or on floors in a manner to prevent rust and damage.
5. Do not use non-vented plastic or canvas shelters.
6. Store in strict accordance with the manufacturer's recommendations as approved by the *ENGINEER*.

E. Shipment: For welded type frames, provide temporary steel spreaders fastened across bottom of frames; where construction will permit concealment, leave spreaders in place after installation, otherwise remove spreaders after frames are

set and anchored. Before shipping, label each frame with metal or plastic tags to show their location, size, door swing and other pertinent information.

1.05 WARRANTY AND WARRANTY REPAIRS

- A. Warranties shall be provided as specified in *Section 01 78 36, Guarantees*. A copy of the manufacturer's warranty shall accompany the shop drawing submittal.
- B. The *CONTRACTOR* and/or equipment manufacturer shall be responsible for all costs of warranty repair work including removal, shipping, reinstallation and re-start-up during the warranty period.

PART 2 - PRODUCTS

2.01 GENERAL

- A. Products: Whenever materials or equipment are described using a certain brand, make, supplier, manufacturer or by specification, such naming shall be regarded as a standard and be intended to convey function, design features, general style, type, materials of construction, character and quality of material or equipment, serviceability and other described essential characteristics.
- B. Other materials may be considered by the *ENGINEER* in accordance with the provisions of *Section 01 25 13, Substitutions*.
- C. Acceptable Manufacturers:
  - 1. Amweld Building Products, Inc.
  - 2. Ceco Door Products
  - 3. Curries Company
  - 4. Deansteel Manufacturing Co.
  - 5. Mesker Door, Inc.
  - 6. Pioneer Industries, Inc.
  - 7. Republic Builders Products
  - 8. Steelcraft



9. Or equivalent.

D. All work of this Section shall be the products of a single manufacturer.

## 2.02 METAL FRAMES

A. Type and Design:

1. Frames shall comply with ANSI/SDI A250.8-2003 and as specified herein.
2. Provide frames in the dimensions and types shown on the Drawings, non-labeled and labeled as indicated on the Drawings, steel galvanized in accordance with ASTM A653, with an A60 galvanized coating and prime painted, properly reinforced for the finish hardware being provided under *Section 08 71 00, Hardware* of these Specifications.
3. Frames shall be of the same Grade and performance level as the doors unless otherwise indicated.
4. Welded Frames:
  - a. Provide Full Profile Welded (Fully Welded or Continuously Welded) frames for masonry construction. The joints between all elements of the head and jamb profiles, i.e., soffit, stops, rabbets, faces and returns, shall be completely arc welded. Faces and returns may be arc welded either internally or externally; all other frame elements shall be welded internally. Faces and returns shall be ground and finished smooth with no visible seam. The joint at other frame elements shall appear as a hairline seam on the external side. Face joints at meeting mullions or between mullions and other frame members shall be completely externally welded on the faces only, welds shall be ground and finished smooth.
  - b. Welded frames shall be provided with a temporary spreader bar for shipping and handling purposes only. This temporary spreader bar shall be removed and a setting spreader, supplied by the installer, shall be used for installation of the frame.
5. Knock Down Frames: Provide knock down frames for interior frame construction. Knock down frames shall have rigidly interlocked frame joints so as to maintain alignment and assure performance of completed frames when field assembled.

6. Slip-On Drywall Frames: Frames for installation in existing drywall construction shall be of the slip-on drywall type.

B. Anchors:

1. Sill anchors shall be furnished for attaching frames to floor, and jamb anchors for bonding to wall.
2. Jamb members shall have one (1) integral compression anchor to provide bearing surface against the wall.
3. Provide metal anchors of shapes and sizes required for the adjoining type of wall construction.
4. Fabricate jamb anchors of steel, not lighter than the gauge used for frame.
5. Locate anchors on jambs near the top and bottom of each frame and at intermediate points not over 24 inches apart.
6. Provide 10-inch long, corrugated or other deformed type adjustable anchors at jambs.
7. Each jamb shall be provided with snap-in sill anchors designed to be attached with no notching of the wallboard. There shall be no visible fastening devices along the faces of the frames.
8. Frames for metal building walls shall be of self-flashing design.

C. Rubber Door Silencers:

1. Provide three (3) silencers on strike jamb of single door frames and 3 silencers each strike jamb of double door frames with removable mullions.
2. Provide two (2) silencers on head of double door frames without removable mullions.
3. Omit silencers at gaskets.
4. Install plastic plugs to keep holes clear during construction.

## 2.03 DOORS

A. Type and design:

1. Doors shall comply with ANSI/SDI A250.8-2003 and as specified herein.
  2. Provide seamless design, fabricated from metal complying with ASTM A653, with an A60 galvanized coating and prime painted, with continuous flush top and inverted bottom channel closure and beveled lock edge, in the dimensions and types shown on the Drawings, reinforced for the finish hardware being provided under *Section 08 71 00, Hardware* of these Specifications, and in the following grades:
    - a. Exterior Doors (Insulated): ANSI A250.8, 1 ¼" thick.
      - (1) Level 2 – Heavy Duty, Model 1, full flush design.
      - (2) Level 2 – Heavy Duty, Model 2, seamless design.
      - (3) Level 3 – Extra Heavy Duty, Model 1, full flush design.
      - (4) Level 3 – Extra Heavy Duty, Model 2, seamless design.
      - (5) Level 3 – Extra Heavy Duty, Model 3, stile and rail flush design.
    - b. Interior Doors (Non-Rated): ANSI A250.8, 1 ¼" thick.
      - (1) Level 2 – Heavy Duty, Model 1, full flush design.
      - (2) Level 2 – Heavy Duty, Model 2, seamless design.
      - (3) Level 3 – Extra Heavy Duty, Model 1, full flush design.
      - (4) Level 3 – Extra Heavy Duty, Model 2, seamless design.
      - (5) Level 3 – Extra Heavy Duty, Model 3, stile and rail flush design.
    - c. Interior Doors (Fire Rated): ANSI 250.8, 1 ¼" thick.
      - (1) Level 2 – Heavy Duty, Model 1, full flush design.
      - (2) Level 2 – Heavy Duty, Model 2, seamless design.
      - (3) Level 3 – Extra Heavy Duty, Model 1, full flush design.
      - (4) Level 3 – Extra Heavy Duty, Model 2, seamless design.
      - (5) Level 3 – Extra Heavy Duty, Model 3, stile and rail flush design.
  3. Exterior doors shall be thermal rated with a polyurethane or polystyrene core.
  4. Restroom and office doors shall be sound deadened.
- B. Where indicated on the Drawings, provide inserted louvers fabricated in a sightproof arrangement, complete with aluminum screen.

- C. Thermal-Rated (Insulating) Assemblies: At exterior locations and elsewhere as shown or scheduled, provide doors and frames that have been fabricated as thermal insulating assemblies and tested in accordance with ASTM C236 or C976.
1. Unless otherwise indicated, provide exterior assemblies U-value rating of 0.24 BTU/hour or better (hour by sq. ft. by degree F).
- D. Sound-Rated (Acoustical) Assemblies: Where shown or scheduled, provide door and frame assemblies fabricated as sound-reducing type, tested according to ASTM E 1408, and classified according to ASTM E 413.
1. Unless otherwise indicated, provide acoustical assemblies with STC sound ratings of 33 or better.
- E. Vision Lite Systems:
1. Manufacturer's standard kits consisting of glass lite moldings to accommodate glass thickness and size of vision lite indicated.
  2. Glazing:
    - a. Glazing shall be as specified in *Section 08 80 00* and in conformance with Chapter 24 of the International Building Code.
    - b. Glazing in fire rated doors shall conform to Subsection 714.2.6 of the International Building Code.

## 2.04 LABEL DOORS AND FRAMES

- A. All doors and frames for fire rated openings shall be of the construction and design as furnished by the manufacturer, having a specific fire rating.
- B. All doors and frames for fire rated openings shall be part of an assembly consisting of the door, door frame, hardware, glazing, louvers and accessories which, together, have been fire tested and found to be capable of providing a specific degree of fire protection. Such doors shall be labeled by an approved third party inspection agency and such label shall be permanently affixed as required by the building code. All such assemblies shall conform to Article 715.0 of the International Building Code.
- C. Construction details and hardware applications authorized by testing or certification laboratories shall take precedence over project details or specifications.

## 2.05 DOOR LOUVERS

- A. Furnish extruded aluminum door louvers as manufactured by Anemostat Door Products, Carson, CA, (310) 835-7500, or equal. All blades, frames, and trim members to be 6063-T52 alloy, minimum 16 B & S gauge. All fastenings to be stainless steel or aluminum. A separate adjustable trim member shall be supplied to securely and neatly clamp louver in opening. Interior trim flange to be secured by counter-sunk Jackson Head Screws. All frames and trim members to be mitered at corners and rigidly secured by corner brackets. Colors to be as selected by the *ARCHITECT*.
- B. Fire rated doors shall have Model #FL-DLUL louvers with fusible links. Louvers for all other doors to have louvers shall be inverted "Y", Non-Vision, Model #AF-DL.
- C. Louvers shall be furnished in manufacturer's standard colors as selected by the *ENGINEER*.

## 2.06 SHOP FINISH

- A. Pre-clean and shop prime each door and frame for finish painting.
- B. Finish: The finish on all doors and frames shall be capable of passing the following:
  - 1. Salt Spray Test: In accordance with ASTM Designation B117 (latest issue) for a total exposure of 120 continuous hours.
  - 2. Water Fog Test (humidity): In accordance with ASTM Designation 1735 (latest issue) for a total exposure of 250 continuous hours.
  - 3. Film Adhesion Test: In accordance with ASTM Designation D1654 (latest revision).

## 2.07 OTHER MATERIALS

- A. All other materials, not specifically described but required for a complete and proper installation of the work of this section, shall be new, first quality of their respective kinds, and as selected by the *CONTRACTOR* subject to the approval of the *ENGINEER*.

## PART 3 - EXECUTION

### 3.01 EXAMINATION

- A. Prior to installation of the work of this section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.
- B. Verify that work may be completed in strict accordance with the original design and with the manufacturer's recommendations as approved by the *ENGINEER*.
- C. Do not proceed until unsatisfactory conditions are corrected.
- D. Assure that frame openings correspond to dimensions of frame furnished.
- E. Check that surfaces to contact frame are free of debris.

### 3.02 INSTALLATION

- A. Install steel doors and frames in accordance with the manufacturers printed installation instructions as approved by the *ENGINEER*.
- B. Fire rated assemblies shall be installed in accordance with the third party testing agencies' Fire Resistance Design Number in order to maintain the required fire resistance rating for the opening.
- C. Placing frames:
  - 1. Where practicable, place frames prior to construction of enclosing walls and ceilings.
  - 2. Set frames accurately into position, plumbed, aligned, and braced securely until permanent anchors are set.
  - 3. After wall construction is completed, remove temporary braces and spreaders, leaving surfaces smooth and undamaged.
  - 4. At in-place construction, set frames and secure to adjacent construction with machine screws and suitable anchorage devices. Provide "Z" fillers at each screw location.
  - 5. When installed in prepared openings in concrete construction, provide sealant between frame and concrete in accordance with provisions of *Section 07 92 13, Sealants and Caulking* of these Specifications.

### 3.03 ADJUSTMENT

- A. Final adjustments:
  - 1. Check and re-adjust operating finish hardware items in hollow metal work just prior to final inspection.
  - 2. Leave work in complete and proper operating condition.
  - 3. Remove defective work and replace with work complying with the specified requirements.

### 3.04 CLEANING

- A. Clean exposed surface of all grease, dirt and other foreign materials.
- B. Remove dirt and excess sealants or glazing compound from exposed surfaces.
- C. Touch up marred or abraded surfaces to match original finish, as recommended by the manufacturer.

## PART 4 - PAYMENT

### 4.01 METAL DOORS AND FRAMES

- A. Unless otherwise noted in the Proposal Section, no separate payment shall be made for this item.
- B. Include all costs for the *METAL DOORS AND FRAMES* in the prices bid for the various related items of work as designated in the Proposal.

\*\*\*\*END OF SECTION\*\*\*\*





SECTION 08 17 43

PULTRUDED FIBERGLASS DOORS & FRAMES

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Included:

1. AF-100 smooth pultruded fiberglass door.
2. AF-100 smooth pultruded fiberglass door installed in AF-150 pultruded fiberglass framing.

B. Related work:

1. Other sections of the specifications, not referenced below, shall also apply to the extent required for proper performance of this work.
2. *Section 08 71 00: Hardware*

C. References:

1. American Architectural Manufacturer's Association (AA.MA):
  - a. AA.MA 920: Specification for Operating Cycle Performance of Side-Hinged Exterior Door Systems.
  - b. AA.MA 1304: Voluntary Specification for Forced Entry Resistance of Side-Hinged Door Systems.
2. American Society for Testing and Materials (ASTM):
  - a. ASTM-C203: Standard Test Methods for Breaking Load and Flexural Properties of Block-Type Thermal Insulation.
  - b. ASTM-C272: Standard Test Method for Water Absorption of Core Materials for Sandwich Constructions.

- c. ASTM-C273: Standard Test Method for Shear Properties of Sandwich Core Materials.
- d. ASTM-C518: Standard Test Method for Steady-State Thermal Transmission Properties by Means of Heat Flow Meter Apparatus.
- e. ASTM-C1363: Standard Test Method for Thermal Performance of Building Materials and Envelope Assemblies by Means of a Hot Box Apparatus.
- f. ASTM-D1621: Standard Test Method for Compressive Properties of Rigid Cellular Plastics.
- g. ASTM-D1622: Standard Test Method for Apparent Density of Rigid Cellular Plastics.
- h. ASTM-D1623: Standard Test Method for Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics.
- i. ASTM-D1761: Standard Test Methods for Mechanical Fasteners in Wood.
- j. ASTM-D5116: Standard Guide for Small-Scale Environmental Chamber Determinations of Organic Emissions from Indoor Materials/ Products.
- k. ASTM-D6670: Standard Practice for Full-Scale Chamber Determination of Volatile Organic Emissions from Indoor Materials/ Products.
- l. ASTM-E84: Standard Test Method for Surface Burning Characteristics of Building Materials.
- m. ASTM-E90: Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions.
- n. ASTM-E283: Standard Test Method for Determining Rate of Air Leakage through Exterior Windows, Curtain Walls and Doors Under Specified Pressure Differences Across the Specimen.
- o. ASTM-E330: Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.

- p. ASTM-E1886: Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors and Storm Shutters Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials.
    - q. ASTM-E1996: Standard Specification for Performance of Exterior Windows, Glazed Curtain Walls, Doors and Storm Shutters Impacted by Wind Borne Debris in Hurricanes.
    - r. ASTM-F1642-04: Standard Test Method for Glazing Systems Subject to Air Blast Loading.
  - 3. National Fenestration Rating Council (NFRC):
    - a. NFRC 100: Procedure for Determining Fenestration Products Li-Factors.
    - b. NFRC 400: Procedure for Determining Fenestration Products Air Leakage.
- D. Payment:
  - 1. Unless otherwise noted in the Proposal Section, no separate payment shall be made for this item.
  - 2. Include all costs for *FIBERGLASS DOORS & FRAMES* in the prices bid for the various related items of work as designated in the Proposal.

## 1.02 SUBMITTALS

- A. Comply with provisions of *Section 01 33 23, Shop Drawings, Product Data and Samples*.
- B. Manufacturer's product data:
  - 1. Complete materials list of all materials proposed to be furnished and installed under this section.
  - 2. Specifications and other data required that demonstrate compliance with the specified requirements.
- C. Shop drawings showing precise dimensions of the work of this section, and all other data needed to ensure proper and adequate provision in concrete forming, reinforcement, and placement to accommodate the work of this section.

- D. Manufacturer's recommended installation procedures.

### 1.03 QUALITY ASSURANCE

A. Qualifications of manufacturer:

1. Products used in the work of this section shall be produced by manufacturers regularly engaged in the manufacture of similar items and with a history of successful production acceptable to the *ENGINEER*.

B. Qualifications of workmen:

1. Provide at least one person who shall be present at all times during execution of the work of this section, who shall be thoroughly familiar with the specified requirements and the materials and methods needed for their execution, and who shall direct all work performed under this section.
2. Provide adequate numbers of workmen skilled in the necessary crafts and properly informed of the method and materials to be used.
3. In acceptance or rejection of the work of this section, the *ENGINEER* will make no allowance for lack of skill on the part of workmen.

- C. Basis of acceptance: The manufacturer's installation instructions will provide the basis for acceptance or rejection of the work performed under this section.

### 1.04 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Comply with provisions of *Section 01 66 00, Storage and Protection*.
- B. Protection: Use all means necessary to protect the materials of this section before, during, and after installation and to protect the installed work and materials of all other trades.
- C. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of the *ENGINEER* and at no additional cost to the *OWNER*.
- D. Delivery and storage: Deliver all materials to the job site in their original unopened containers with all labels intact and legible at time of use. Store in

strict accordance with the manufacturer's recommendations as approved by the *ENGINEER*.

#### 1.05 WARRANTY AND WARRANTY REPAIRS

- A. Warranties shall be provided as specified in *Section 01 78 36, Guarantees*. A copy of the manufacturer's warranty shall accompany the shop drawing submittal.
- B. The *CONTRACTOR* and/or equipment manufacturer shall be responsible for all costs of warranty repair work including removal, shipping, reinstallation and re-start-up during the maintenance period.

#### 1.06 OPERATION AND MAINTENANCE MANUALS

- A. Operation and maintenance manuals shall be provided in accordance with *Section 01 78 23, Operation and Maintenance Data*.
- B. Manuals in final form shall be available a minimum of five (5) working days prior to the instruction of the *OWNER'S* personnel.

### PART 2 - PRODUCTS

#### 2.01 GENERAL

- A. Products: Whenever materials or equipment are described using a certain brand, make, supplier, manufacturer or by specification, such naming shall be regarded as a standard and be intended to convey function, design features, general style, type, materials of construction, character and quality of material or equipment, serviceability and other described essential characteristics.
- B. Other materials may be considered by the *ENGINEER* in accordance with the provisions of *Section 01 25 13, Substitutions*.
- C. Acceptable manufacturers:
  - 1. Special-Lite, Inc.  
PO Box 6  
Decatur, Michigan 49045  
Tel: 800-821-6531

Tel: 269-423-7068  
Fax: 800-423-7610  
Web: [www.special-lite.com](http://www.special-lite.com)  
Email: [info@special-lite.com](mailto:info@special-lite.com)

2. Or equivalent.

## 2.02 PRODUCTS

- A. Model: AF-100 Smooth Pultruded Fiberglass Door.
- B. Door Opening Size: Reference drawings.
- C. Construction:
  1. Door Thickness: 1 3/4"
  2. Pultruded as one monolithic panel with integral stiles.
  3. Stiles: Seamless 9/16" thick solid FRP.
  4. Top Rail: Six-inch pultruded tube profile designed to fit flush and be chemically welded inside of door cavity.
  5. Bottom Rail:
    - a. Standard pultruded inverted U channel designed to fit flush and be chemically welded inside the door which allows doors to be field trimmed.
    - b. Optional closed bottom rail.
  6. Core:
    - a. Polyurethane foam.
    - b. Minimum 6 pcf density.
  7. Face Sheet:
    - a. Smooth, pultruded FRP integral to construction of door.
    - b. Attachment of face sheet.
      - (1) Door to be pultruded as one monolithic panel.

8. Cutouts:
  - a. Manufacturer doors with cutouts for required vision lites, louvers, and panels.
9. Hardware:
  - a. Pre-machine doors in accordance with templates from specified hardware manufacturers.
  - b. Surface mounted closures will be reinforced for but not prepped or installed at factory.
10. Reinforcements:
  - a. No metallic reinforcements will be allowed.

## 2.03 FRAMING

- A. Model: AF-150.
  1. Jamb Depth: Reference drawings.
  2. Materials: See paragraph 2.05A.
  3. Perimeter Frame Members.
    - a. ¼" thick pultruded fiberglass open throat with return.
    - b. Factory fabricated.
    - c. 2" or 4" face available for frame headers.
  4. Transoms and Side-lites.
    - a. Same as perimeter frame members.
    - b. Removable stop for ¼", ⅝" or 1" glass or panels.
  5. Integral Door Stops.
    - a. ⅝" x 2¼".
  6. Frame Assembly.
    - a. Single frames chemically welded at factory.

- b. Pairs knock down for field assembly.
- 7. Frame Member to Member Connections.
  - a. Corners mitered with 4" x 4" x  $\frac{3}{8}$ " pultruded FRP angle reinforcement with interlocking pultruded FRP brackets.
  - b. All member to member connections chemically welded at factory unless in a knock down configuration.
  - c. Provide hairline butt joint appearance.
- 8. Reinforcements:
  - a.  $\frac{1}{4}$ " thick pultruded FRP chemically welded to frame at all hinge, strike, and closer locations.
- 9. Hardware:
  - a. Pre-machine and reinforce frame members for hardware in accordance with manufacturer's standards and door hardware schedule.
  - b. Surface mounted closures will be reinforced for but not prepped or installed at factory.
- 10. Anchors.
  - a. Masonry:
    - (1) Existing concrete or block punch and dimple.
    - (2) Sill anchor.
    - (3) Concealed existing masonry anchor.
    - (4) Fiberglass masonry t anchor.
  - b. Drywall:
    - (1) Standard jamb anchor tuck.
    - (2) KD wrap.
    - (3) Optional punch and dimple tuck with either metal or wood studs.

## 2.04 PERFORMANCE

### A. Pultruded Fiberglass Skin.

- 1. Surface Burning, ASTM-E84: Flame Spread  $\leq$ , Smoke Developed  $\leq$  450.



2. Tensile Strength, ASTM-D638:12,300 psi.
3. Percent Fiberglass: 50%.

B. Stiles and Rails:

1. Fastener Withdrawal, ASTM-D1761: 894 lbs.

C. Door Core:

1. Surface Burning, ASTM-E84: Flame Spread  $\leq 25$ , Smoke Developed  $\leq 450$ .
2. Density, ASTM-D1622: 6.0 pcf.
3. Compressive Strength, ASTM-D1621: 139 psi.
4. Compressive Modulus= 4,527 psi.
5. Shear Strength, ASTM-C273: 84 psi.
6. Shear Modulus, ASTM-C273: 788 psi.
7. Tensile Modulus, ASTM-D1623: 136 psi.
8. Flexural Strength, ASTM-C203: 204 psi.
9. Flexural Modulus. ASTM-C203: 4,767 psi.
10. K-Factor, ASTM-C518: 0.16 Btu·in/hr·ft<sup>2</sup>·°F.
11. R-Factor, ASTM-C518: 6.25 hr·ft<sup>2</sup>·°F/Btu .
12. Water Absorption, ASTM-C272: < 0.7% by volume.

D. Door Panel:

1. Thermal Transmittance, ASTM-C1363-11: U-Factor= 0.13 Btu/hr ft<sup>2</sup>·°F,  
R-Value = 7.42 hr·ft<sup>2</sup>·°F/Btu.

E. AF-150 Framing:

1. Tensile Strength, ASTM-D638: 15,900 psi.
2. Tensile Modulus of Elasticity. ASTM-D638:  $1.58 \times 10^6$  psi.
3. Maximum Compressive Strength. ASTM-D695: 15,500 psi.
4. Compressive Modulus of Elasticity. ASTM-D695:  $6.7 \times 10^5$  psi.
5. Flexural Strength, ASTM-D790:  $39.3 \times 10^3$  psi.
6. Flexural Modulus, ASTM-D790:  $1.23 \times 10^6$  psi.
7. Izod Impact, ASTM-D256: 8.1 ft-lb/in.
8. Barcol Hardness. ASTM-D2583: 57.
9. Specific Gravity, ASTM-D792: 1.45 @ 23 °C.
10. Density, ASTM-D792: 1445.6 kg.m<sup>3</sup>@ 23 °C.
11. Coefficient of Linear Expansion, ASTM-D696:  $1.26 \times 10^{-6}$  in/in/°F.
12. Short Beam Strength, ASTM-D2344: 3,980 psi.
13. Fastener Withdrawal, ASTM-D1761:924 lbs.

14. Percent Fiberglass: 60%.

F. Door and AF-150 Frame Assembly:

1. Physical Endurance, AAMA 920-11: 2,000,000 Cycles, No damage.
2. Thermal Transmittance, NFRC 100.
  - a. Opaque Swinging Door (< than 50% glass)
    - (1) U-Factor = 0.23 Btu/hr·ft<sup>2</sup>·°F.
  - b. Commercially Glazed Swinging Entrance Door (> than 50% glass)
    - (1) U-Factor = 0.41 Btu/hr·ft<sup>2</sup>·°F
3. Air Leakage, NFRC 400, ASTM-E283.
  - a. Opaque Swinging Door (< than 50% glass)
    - (1) 0.03 cfm/sq. ft. @ 1.57 psf.
    - (2) 0.06 cfm/sq. ft. @ 6.24 psf.
  - b. Commercially Glazed Swinging Entrance Door (> than 50% glass)
    - (1) 0.02 cfm/sq. ft. @ 1.57 psf.
    - (2) 0.05 cfm/sq. ft. @ 6.24 psf.
4. STC and OITC, ASTM-E90: STC = 30, OITC = 28.
5. Structural Performance, ASTM E-330.
  - a. Single Door, 3'0" x 7'0" overall size, single point latching.
    - (1) ± 180 psf design pressure, pass.
6. Structural Performance, ASTM E-330.
  - a. Single Door, 3'0" x 7'0" overall size, single point latching.
    - (1) ± 100 psf design pressure, pass.
7. Impact and Cycle Test, ASTM-E1886.
  - a. Single Door, 3'0" x 7'0" overall size, single point latching.
    - (1) 9 lbs. missile @ 50 fps, minimum 2 impacts, no rips, tears, or penetrations.
    - (2) ± 100 psf design pressure, pass.
8. Forced Entry, AAMA 1304.
  - a. Single Door, 3'0" x 7'0" overall size, single point latching.
    - (1) 3001b Pull Test. pass.
9. Blast Test, ASTM-F1642.
  - a. 6.9 psi @ 48 psi-msec, no hazard, GSA performance condition 2.

## 2.05 MATERIALS

### A. Fiberglass:

1. Face Sheet: See paragraph 2.04A.
2. Stiles and Rails: See paragraph 2.04B.
3. Framing: See paragraph 2.04E.

### B. Fasteners:

1. All exposed fasteners will have a finish to match material being fastened.
2. 410 stainless steel or other non-corrosive metal.
3. Must be compatible with items being fastened.

## 2.06 FABRICATION

### A. Factory Assembly.

1. Door and frame components from the same manufacturer.
2. Required size for door and frame units shall be as indicated on the drawings.
3. Complete cutting, fitting, forming, drilling, and grinding of metal before assembly.
4. All cut edges to be free of burs.
5. Electrical arc welding of doors or frames is not acceptable.
6. Maintain continuity of line and accurate relation of planes and angles.
7. Secure attachments and support at mechanical joints with hairline fit at contact surfaces.

### B. Shop Fabrication.

1. All shop fabrication to be completed in accordance with manufactures process work instructions.
2. Quality control to be performed before leaving each department.

## 2.07 FINISHES

### A. Door:

1. Two-part aliphatic polyurethane paint.
  - a. Color: To be selected by *OWNER* from manufacturer's standard colors.
  - b. Custom colors available, consult manufacturer.
  - c. Unique, high-solids, high-build, multifunctional coating.
  - d. Low VOC, high-gloss, self-priming coating.
  - e. Impact Resistance, ASTM-02794; 140 in/lbs (direct), 50 in/lbs (reverse) @ 5 mils thickness.
  - f. Taber Abrasion, 1 kg load, 1000 cycles, CS-17 wheel: 60.2 mg.
  - g. Graffiti cleaning with Amerase with gloss retention: 100 cycles.
  - h. Chemical Resistance.
    - (1) Excellent.
      - (a) Acidic
      - (b) Frame
      - (c) Alkaline
      - (d) Salt Solutions
      - (e) Seawater
      - (f) Fresh Water
      - (g) Petroleum Products

### B. Frame.

1. Two-part aliphatic polyurethane paint.
  - a. Color: To be selected by *OWNER* from manufacturer's standard colors.
  - b. Custom colors available, consult manufacturer.
  - c. Unique, high-solids, high-build, multifunctional coating.
  - d. Low VOC, high-gloss, self-priming coating.
  - e. Impact Resistance, ASTM-02794; 140 in/lbs (direct), 50 in/lbs (reverse) @ 5 mils thickness.
  - f. Taber Abrasion, 1 kg load, 1000 cycles, CS-17 wheel: 60.2 mg.
  - g. Graffiti cleaning with Amerase with gloss retention: 100 cycles.
  - h. Chemical Resistance.
    - (1) Excellent.
      - (a) Acidic
      - (b) Frame
      - (c) Alkaline

- (d) Salt Solutions
- (e) Seawater
- (f) Fresh Water
- (g) Petroleum Products

## 2.08 ACCESSORIES

### A. Fiberglass Vision Lites.

1. Reference Door Schedule.
2. Glazing Thickness: 3/16" wired, clear.
  - a. Reference drawings for sizes.

### B. Fiberglass Louvers.

1. Reference Door Schedule.
2. Exterior side of louver shall be free of fasteners.
3. Pultruded fiberglass.
4. Finish to match door.

### C. Hardware.

1. Pre-machine doors in accordance with templates from specified hardware manufacturer's and hardware schedule.
2. Hardware Schedule: See Section 0871 00, Hardware.

## 2.09 OTHER MATERIALS

- A. All other materials, not specifically described but required for a complete and proper installation of the work of this section, shall be new, first quality of their respective kinds, and as selected by the *CONTRACTOR* subject to the approval of the *ENGINEER*.

## PART 3 - EXECUTION

### 3.01 EXAMINATION

- A. Prior to installation of the work of this section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.
  - 1. Notify *ARCHITECT* of conditions that would adversely affect installation or subsequent use.
- B. Verify that work may be completed in strict accordance with the original design and with the manufacturer's recommendations as approved by the *ENGINEER*.
- C. Do not proceed until unsatisfactory conditions are corrected.

### 3.02 INSTALLATION

- A. General: Install the work of this section in strict accordance with the manufacturer's recommendations as approved by the *ENGINEER*.
  - 1. Install doors in accordance with manufacturer's instructions.
  - 2. Install doors plumb, level, square, true to line, and without warp or rack.
  - 3. Anchor frames securely in place.
  - 4. Separate aluminum from other metal surfaces with bituminous coatings or other means approved by *ARCHITECT*.
  - 5. Set thresholds in bed of mastic and back seal.
  - 6. Install exterior doors to be weathertight in closed position.
  - 7. Repair minor damages to finish in accordance with manufacturer's instructions and as approved by *ARCHITECT*.
  - 8. Remove and replace damaged components that cannot be successfully repaired as determined by *ARCHITECT*.
- B. Painting: Marred or abraded surfaces shall be cleaned and refinished in accordance with manufacturer's recommendations.

3.03 CLEANING

- A. Comply with requirements of *Section 01 74 00, Cleaning and Restorations*.
- B. Remove and dispose of all debris.

3.04 TESTS

- A. Upon completion of this portion of the work and prior to acceptance by the *OWNER*, make all required tests and adjustments for free and smooth operation.
- B. Secure all approvals from agencies having jurisdiction.

3.05 START-UP

- A. The equipment manufacturer shall provide the services of a trained qualified representative, for one (1) trip(s) each with a minimum of one (1) day, excluding travel time for the purpose of inspecting the installation.
- B. The representative shall prepare and submit a written report to both the *CONTRACTOR* and *ENGINEER* regarding the installation, including any conditions which might affect the manufacturer's guarantee. The equipment shall not be accepted by the *OWNER* until such time as this report has been received and accepted by the *ENGINEER*.

3.06 INSTRUCTIONS

- A. The manufacturer's representative shall instruct the *OWNER'S* operating personnel, at a time designated by the *OWNER*, as to the proper method of operation and recommended maintenance procedures.
- B. The scheduling of the instruction shall be at the convenience of the *OWNER* and may not coincide with the start-up inspection.

\*\*\*\*\*END OF SECTION\*\*\*\*\*





SECTION 08 17 44

PULTRUDED FIBERGLASS FIRE-RATED FRP  
DOORS & FRAMES

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Included:

1. AF-200FR Smooth fire-rated fiberglass door.
2. AF-200FR Smooth fire-rated fiberglass door installed in fire-rated fiberglass framing.
3. AF-200FR Smooth fire-rated fiberglass door installed in fire-rated metal framing.

B. Related work:

1. Other sections of the specifications, not referenced below, shall also apply to the extent required for proper performance of this work.
2. *Section 08 71 00: Hardware*
3. *Section 08 80 00: Glazing*

C. References:

1. American Society for Testing and Materials (ASTM):
  - a. ASTM-D256: Standard Test Methods for Determining the Pendulum Impact Resistance of Plastics.
  - b. ASTM-D570: Standard Test Method for Water Absorption of Plastics.
  - c. ASTM-D638: Standard Test Method for Tensile Properties of Plastics.

- d. ASTM-D790: Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
  - e. ASTM-D2583: Standard Test Method for Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor.
  - f. ASTM-D2794: Standard Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact).
  - g. ASTM-E84: Standard Test Method for Surface Burning Characteristics of Building Materials.
  - h. CAN / ULC S104: Standard Test Method for Fire Tests of Door Assemblies.
- 2. Underwriter's Laboratories (UL):
    - a. UL 10B: Standard for Fire Tests of Door Assemblies.
    - b. UL 10C: Standard for Positive Pressure Fire Tests of Door Assemblies.
  - 3. National Fire Protection Agency (NFPA):
    - a. NFPA 80: Standard for Fire Doors and Other Opening Protectives.
    - b. NFPA 252: Fire Tests of Door Assemblies.

D. Payment:

- 1. Unless otherwise noted in the Proposal Section, no separate payment shall be made for this item.
- 2. Include all costs for *PULTRUDED FIBERGLASS FIRE-RATED FRP DOORS & FRAMES* in the prices bid for the various related items of work as designated in the Proposal.

## 1.02 SUBMITTALS

- A. Comply with provisions of *Section 01 33 23, Shop Drawings, Product Data and Samples*.

- B. Manufacturer's product data:
  - 1. Complete materials list of all materials proposed to be furnished and installed under this section.
  - 2. Specifications and other data required that demonstrate compliance with the specified requirements.
- C. Shop drawings showing precise dimensions of the work of this section, and all other data needed to ensure proper and adequate provision in concrete forming, reinforcement, and placement to accommodate the work of this section.
- D. Manufacturer's recommended installation procedures.

#### 1.03 QUALITY ASSURANCE

- A. Qualifications of manufacturer:
  - 1. Products used in the work of this section shall be produced by manufacturers regularly engaged in the manufacture of similar items and with a history of successful production acceptable to the *ENGINEER*.
- B. Qualifications of workmen:
  - 1. Provide at least one person who shall be present at all times during execution of the work of this section, who shall be thoroughly familiar with the specified requirements and the materials and methods needed for their execution, and who shall direct all work performed under this section.
  - 2. Provide adequate numbers of workmen skilled in the necessary crafts and properly informed of the method and materials to be used.
  - 3. In acceptance or rejection of the work of this section, the *ENGINEER* will make no allowance for lack of skill on the part of workmen.
- C. Basis of acceptance: The manufacturer's installation instructions will provide the basis for acceptance or rejection of the work performed under this section.

#### 1.04 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Comply with provisions of *Section 01 66 00, Storage and Protection*.

- B. Protection: Use all means necessary to protect the materials of this section before, during, and after installation and to protect the installed work and materials of all other trades.
- C. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of the *ENGINEER* and at no additional cost to the *OWNER*.
- D. Delivery and storage: Deliver all materials to the job site in their original unopened containers with all labels intact and legible at time of use. Store in strict accordance with the manufacturer's recommendations as approved by the *ENGINEER*.

#### 1.05 WARRANTY AND WARRANTY REPAIRS

- A. Warranties shall be provided as specified in *Section 01 78 36, Guarantees*. A copy of the manufacturer's warranty shall accompany the shop drawing submittal.
- B. The *CONTRACTOR* and/or equipment manufacturer shall be responsible for all costs of warranty repair work including removal, shipping, reinstallation and re-start-up during the maintenance period.

#### 1.06 OPERATION AND MAINTENANCE MANUALS

- A. Operation and maintenance manuals shall be provided in accordance with *Section 01 78 23, Operation and Maintenance Data*.
- B. Manuals in final form shall be available a minimum of five (5) working days prior to the instruction of the *OWNER'S* personnel.

### PART 2 - PRODUCTS

#### 2.01 GENERAL

- A. Products: Whenever materials or equipment are described using a certain brand, make, supplier, manufacturer or by specification, such naming shall be regarded as a standard and be intended to convey function, design features, general style, type, materials of construction, character and quality of material or equipment, serviceability and other described essential characteristics.

B. Other materials may be considered by the *ENGINEER* in accordance with the provisions of *Section 01 25 13, Substitutions*.

C. Acceptable manufacturers:

1. Special-Lite, Inc.  
PO Box 6  
Decatur, Michigan 49045  
Tel: 800-821-6531  
Tel: 269-423-7068  
Fax: 800-423-7610  
Web: [www.special-lite.com](http://www.special-lite.com)  
Email: [info@special-lite.com](mailto:info@special-lite.com)
2. Or equivalent.

## 2.02 PRODUCTS

A. AF-200FR Smooth Fire-Rated Fiberglass Door.

1. Door Opening Size: Reference drawings.
2. Construction:
  - a. Door Thickness: 1 $\frac{3}{4}$ "
  - b. Stiles.
    - (1) Single Swing: Hinge and lock stile, 2" minimum tectonite with Palusol P-100 intumescent and 0.090" thick fiberglass edge painted to match door face.
  - c. Standard Pairs.
    - (1) Hinge stile, 2" minimum tectonite with Palusol P-100 intumescent and 0.090" thick fiberglass edge painted to match door face.
    - (2) Meeting edge, 3" minimum with Palusol P-100 intumescent and 0.090" thick fiberglass edge painted to match door face.

d. Rails.

- (1) Top rail, 6" minimum tectonite with Palusol P-100 intumescent and 0.090" thick fiberglass edge painted to match door face.
- (2) Bottom rail, 4" minimum for single swing, 4½" minimum for pairs tectonite with 0.090" thick fiberglass edge painted to match door face.

e. Core:

- (1) WSCP-412 proprietary mineral core
- (2) 1½" nominal thickness
- (3) 18 pcf minimum density
- (4) Five (5) pieces maximum for single swing and three (3) pieces per leaf maximum for standard pairs.

f. Face Sheet.

- (1) 0.090" thick, smooth fiberglass painted with two-part aliphatic polyurethane coating.
- (2) Bonded to core with adhesive according to manufacturers listing.

g. Cutouts.

- (1) Manufacture doors with cutouts for required vision lites per the manufactures listing.

h. Hardware.

- (1) Pre-machine doors in accordance with templates from specified hardware manufacturers.
- (2) Field apply factory supplied gaskets and seals, full width intumescent and smoke seal required at top of door, smoke seals required on both jambs.

## 2.03 FRAMING

A. Model: FR-Series Framing:

1. Materials.

- a. ¼" thick, solid, pultruded FRP profiles.
  - b. No corrosive components or reinforcements.
  - c. Solid tectonite filler.
  - d. No steel or aluminum filler is allowed.
- 2. Perimeter frame members.
  - a. Factory fabricated.
  - b. Integral ⅝" x 2¼" doorstop.
  - c. Mitered with 4" x 4" x ⅜" pultruded FRP angle reinforcement with interlocking pultruded FRP brackets.
  - d. 5¾" or 6¾" jamb depth.
  - e. 2" face on jambs.
  - f. 2" or 4" face on header.
  - g. Knocked down for field assembly.
- 3. Anchors.
  - a. Factory furnished as specified by drawings.
  - b. Drywall tuck available.
- B. Any category C standard frame.
- C. Any category C proprietary frame.

## 2.04 PERFORMANCE

- A. Face Sheet.
  - 1. Standard interior and exterior Class C or 0.090" thick, smooth finish.
    - a. Flexural Strength, ASTM-D790:  $14 \times 10^3$  psi.
    - b. Flexural Modulus, ASTM-D790:  $0.4 \times 10^6$  psi
    - c. Tensile Strength, ASTM-D638:  $6 \times 10^3$  psi
    - d. Tensile Modulus, ASTM-D638:  $0.4 \times 10^6$  psi
    - e. Barcol Hardness, ASTM-D2583: 35.
    - f. Izod Impact, ASTM-D256: 5.0 ft-lb/in.
    - g. Chemical Resistance.
      - (1) Excellent Rating.
        - (a) Acetic Acid, Concentrated
        - (b) Acetic acid, 5%%

- (c) Bleach Solution
- (d) Detergent Solution
- (e) Distilled Water
- (f) Ethyl Acetate
- (g) Formaldehyde
- (h) Heptane
- (i) Hydrochloric Acid, 10%
- (j) Hydrogen Peroxide, 3%
- (k) Isooctane
- (l) Lactic Acid, 10%

h. USDA/FSIS Requirements.

- (1) FRP face sheet with surfaseal is a finished outer surface material that is rigid; durable; non-toxic; non-corrosive; moisture resistant; a light, solid color such as white; easily inspected; smooth or an easily cleaned texture.
- (2) FRP face sheet with surfaseal does not contain any known carcinogen, mutagen, or teratogen classified as hazardous substances; heavy metals or toxic substances; antimicrobials; pesticides or substances with pesticidal characteristics.
  - (a) Distilled Water
  - (b) Ethyl Acetate
  - (c) Formaldehyde
  - (d) Heptane
  - (e) Hydrochloric Acid, 10%
  - (f) Isooctane
  - (g) Lactic Acid, 10%

i. USDA/FSIS Requirements.

- (1) FRP faces sheet with surfaseal is a finished outer surface material that is rigid; durable; non-toxic; non-corrosive; moisture resistant; a light, solid color such as white; easily inspected; smooth or an easily cleaned texture.
- (2) FRP face sheet with surfaseal does not contain any known carcinogen, mutagen, or teratogen classified as hazardous substances; heavy metals or toxic substances; antimicrobials; pesticides or substances with pesticidal cararacteristics.



B. Door Assembly.

1. 60 min pp category A door.
2. 90 min pp category B door.
3. Temperature rise @ 30 min, 250°F when vision lites do not exceed 100 in<sup>2</sup>.
4. Temperature rise @ 60 min, 450°F max.

2.05 MATERIALS

A. Fiberglass:

1. Face Sheet: See 2.02A.2.e.
2. Stiles and Rails: See 2.02A.2.b and c.
3. Framing: See 2.03A.1.a.
  - a. Painted.

2.06 FINISHES

A. Door:

1. FRP Face Sheets.
  - a. Painted.
    - (1) Two-part aliphatic polyurethane low VOC industrial coating, 5 mils thick, and gloss finish.
    - (2) Impact Resistance ASTM D2794 @ 5 mils thick, 140 in/lbs.
    - (3) Taber Abrasion, 1 kg load, 1000 cycles, CS-17 wheels, 60.2 mg.
    - (4) Color: To be selected from manufacturer's standard colors.
    - (5) Custom colors available consult manufacturer.

2.07 ACCESSORIES

A. Vision Lites.

1. Factory glazing
2. Stainless steel vision kit with 3/16" NGP Firelite NT, clear

3. Size as indicated on the drawings.
4. 60 to 90 minute rated doors.
  - a. Maximum 704 in<sup>2</sup> in listed and labeled kit for positive pressure applications using listed glazing. Minimum 5" from top or edge or door to lite cutout and minimum 5" from latch cutout to lite cutout.
  - b. Maximum 32" high.
  - c. Maximum 22" wide.
  - d. Multiple lights are allowed when the sum of the areas do not exceed the tested area with the maximum length and width limitations.
5. 20 to 45 minute rate doors.
  - a. Listed metal vision frames and listed glazing are limited to a maximum clear view area of 616 in<sup>2</sup> per lite with a maximum of 1232 in<sup>2</sup>. Lite kits exceeding 100 in<sup>2</sup> void the temperature requirements per NFPA 80 unless temperature resistive glazing is used.

B. Louvers.

1. Listed and labeled louvers.
2. Maximum 100 in<sup>2</sup>.
3. Must be below 40" from bottom of door.

C. Hardware.

1. All hardware must be listed and labeled for use in mineral core fire doors.
2. Pre-machine doors in accordance with templates from specified hardware manufacturers and hardware schedule.
3. Factory install hardware.
4. EPT Units:
  - a. Allowed between top and middle hinge locations.
  - b. 1/16" maximum clearance per side when installing EPT.
  - c. Limited to maximum 60 min positive and neutral pressure applications.
  - d. Intumescent caulk or strips are required on bottom, top, and side of EPT device.
5. Hardware.

D. Wire Raceway.

1. Single swing applications only.
2.  $\frac{3}{8}$ " x  $\frac{3}{8}$ " bore.

- c. Maximum height of 40" from bottom edge of door.

## 2.08 OTHER MATERIALS

- A. All other materials, not specifically described but required for a complete and proper installation of the work of this section, shall be new, first quality of their respective kinds, and as selected by the *CONTRACTOR* subject to the approval of the *ENGINEER*.

## PART 3 - EXECUTION

### 3.01 EXAMINATION

- A. Prior to installation of the work of this section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.
  - 1. Notify *ARCHITECT* of conditions that would adversely affect installation or subsequent use.
- B. Verify that work may be completed in strict accordance with the original design and with the manufacturer's recommendations as approved by the *ENGINEER*.
- C. Do not proceed until unsatisfactory conditions are corrected.

### 3.02 INSTALLATION

- A. General: Install the work of this section in strict accordance with the manufacturer's recommendations as approved by the *ENGINEER*.
  - 1. Install doors in accordance with manufacturer's instructions.
  - 2. Install doors plumb, level, square, true to line, and without warp or rack.
  - 3. Anchor frames securely in place.
  - 4. Separate aluminum from other metal surfaces with bituminous coatings or other means approved by *ARCHITECT*.

5. Set thresholds in bed of mastic and back seal.
  6. Install exterior doors to be weathertight in closed position.
  7. Repair minor damages to finish in accordance with manufacturer's instructions and as approved by *ARCHITECT*.
  8. Remove and replace damaged components that cannot be successfully repaired as determined by *ARCHITECT*.
- B. Painting: Marred or abraded surfaces shall be cleaned and refinished in accordance with manufacturer's recommendations.

### 3.03 CLEANING

- A. Comply with requirements of *Section 01 74 00, Cleaning and Restorations*.
- B. Remove and dispose of all debris.

### 3.04 TESTS

- A. Upon completion of this portion of the work and prior to acceptance by the *OWNER*, make all required tests and adjustments for free and smooth operation.
- B. Secure all approvals from agencies having jurisdiction.

### 3.05 START-UP

- A. The equipment manufacturer shall provide the services of a trained qualified representative, for one (1) trip(s) each with a minimum of one (1) day, excluding travel time for the purpose of inspecting the installation.
- B. The representative shall prepare and submit a written report to both the *CONTRACTOR* and *ENGINEER* regarding the installation, including any conditions which might affect the manufacturer's guarantee. The equipment shall not be accepted by the *OWNER* until such time as this report has been received and accepted by the *ENGINEER*.

3.06 INSTRUCTIONS

- A. The manufacturer's representative shall instruct the *OWNER'S* operating personnel, at a time designated by the *OWNER*, as to the proper method of operation and recommended maintenance procedures.
- B. The scheduling of the instruction shall be at the convenience of the *OWNER* and may not coincide with the start-up inspection.

\*\*\*\*END OF SECTION\*\*\*\*



SECTION 08 33 00  
(08330)  
OVERHEAD COILING DOORS

PART 1 - GENERAL

1.01 SUMMARY

A. Work included:

1. Electric operated, automatic closing, overhead coiling insulated fire doors.
2. Electric operated overhead coiling insulated doors.

B. Related work:

1. Other sections of the specifications, not referenced below, shall also apply to the extent required for proper performance of this work.
2. *Division 26: Electrical*

C. Payment:

1. Unless otherwise noted in the *Proposal* Section, no separate payment shall be made for this item.
2. Include all costs for *OVERHEAD COILING DOORS* in the prices bid for the various related items of work as designated in the *Proposal*.

1.02 SYSTEM DESCRIPTION

A. Design Requirements:

1. Wind loading: Supply doors to withstand a wind load pressure of at least 25 psf acting inward and outward with horizontal deflection of 1/120<sup>th</sup> of the opening width.
2. Cycle life:
  - a. Design doors of standard construction for a minimum of 35,000 cycles with up to 20 cycles per day maximum.

B. Performance Requirements:

1. Provide fire rated door with Underwriter's Laboratories, Inc. label for the fire rating classification, 1 hr.

1.03 SUBMITTALS

A. Comply with provisions of *Section 01 33 23, Shop Drawings, Product Data and Samples*.

B. Manufacturer's product data:

1. Complete materials list of all materials proposed to be furnished and installed under this section.
2. Specifications and other data required to demonstrate compliance with the specified requirements.

C. Shop drawings showing precise dimensions of the work of this section, and all other data needed to ensure proper installation and operation of the work of this section. Show construction, hardware, bracing, wiring diagrams, motor data and characteristics, hand chain operator specifications, door guides, appurtenances and installation details of doors proposed.

D. Manufacturer's current recommended installation procedures.

1.04 QUALITY ASSURANCE

A. Qualifications of manufacturer:

1. Products used in the work of this section shall be produced by manufacturers regularly engaged in the manufacture of similar items and with a history of successful production acceptable to the *ENGINEER*.

B. Qualifications of workmen:

1. Provide at least one person who shall be present at all times during execution of the work of this section, who shall be thoroughly familiar with the specified requirements and the materials and methods needed for their execution, and who shall direct all work performed under this section.



2. Provide adequate numbers of workmen skilled in the necessary crafts and properly informed of the methods and materials to be used.
  3. In acceptance or rejection of the work of this section, the *ENGINEER* will make no allowance for lack of skill on the part of workmen.
- C. Basis of acceptance:
1. The manufacturer's installation instructions will provide the basis for acceptance or rejection of the work performed under this section.

#### 1.05 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Comply with provisions of *Section 01 66 00, Storage and Protection*.
- B. Protection: Use all means necessary to protect the materials of this section before, during, and after installation and to protect the installed work and materials of all other trades.
- C. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of the *ENGINEER* and at no additional cost to the *OWNER*.
- D. Delivery and storage: Deliver all materials to the job site in their original unopened containers with all labels intact and legible at time of use. Store in strict accordance with the manufacturer's recommendations as approved by the *ENGINEER*.

#### 1.06 WARRANTY AND WARRANTY REPAIRS

- A. Warranties shall be provided as specified in *Section 01 78 36, Guarantees*. A copy of the manufacturer's warranty shall accompany the shop drawing submittal.
- B. Provide manufacturer's standard 2-year warranty against defects in materials and workmanship.
- C. The *CONTRACTOR* and/or equipment manufacturer shall be responsible for all costs of warranty repair work including removal, shipping, reinstallation and re-start-up during the warranty period.

## 1.07 OPERATION AND MAINTENANCE MANUALS

- A. Operation and maintenance manuals shall be provided in accordance with *Section 01 78 23, Operation and Maintenance Data*.
- B. Manuals in final form shall be available a minimum of five (5) working days prior to the instruction of the *OWNER's* personnel.

## PART 2 - PRODUCTS

### 2.01 GENERAL

- A. Products: Whenever materials or equipment are described using a certain brand, make, supplier, manufacturer or by specification, such naming shall be regarded as a standard and be intended to convey function, design features, general style, type, materials of construction, character and quality of material or equipment, serviceability and other described essential characteristics.
- B. Other materials may be considered by the *ENGINEER* in accordance with the provisions of *Section 01 25 13, Substitutions*.
- C. Acceptable manufacturers:
  - 1. Cornell Iron Works  
Mountaintop, PA  
(800) 233-8366
  - 2. Overhead Door Corporation  
Dallas, TX  
(214) 376-8261
  - 3. North American Rolling Door, Inc.  
Dalton, OH  
(216) 828-2247
  - 4. Or equivalent.

### 2.02 FIRE RATED SERVICE DOORS

- A. Cornell Iron Works Model ERD20 or equivalent.

B. Curtain:

1. Slat material: No. 6M (listed exterior/interior):
  - a. Galvanized steel face slat with galvanized steel back cover: 22/22 gauge, Grade 40 steel, ASTM A-653 galvanized steel zinc coating.
  - b. Insulation: 7/8-inch thick fire retardant mineral wool, ASTM C665 or ASTM C612. Surface burning characteristics per ASTM E-84, flame spread index = 0, smoke development index = 0.
  - c. Total slat thickness: 15/16-inch (24 mm).
2. Bottom bar material:
  - a. Two 2 x 2 x minimum 1/8-inch (51 x 51 x 3.2 mm) structural steel angles.
3. Assemble interlocking slat sections with high strength cast iron combination endlock/windlocks on alternate slats each secured with a minimum of two 1/4-inch (6.35 mm) rivets.
4. Slat finish (interior and exterior):
  - a. Galvanized steel: Phosphate treatment followed by baked-on polyester powder coat, color as selected by *ARCHITECT* from manufacturer's standard color range, minimum 2.5 mils (0.065 mm) cured film thickness; ASTM D-3363 pencil hardness: H or better.
5. Bottom bar finish (interior and exterior): Powder coat to match slats.

C. Guides: Fabricate with minimum 1/4-inch (6.35 mm) structural steel angles. Top of inner and outer guide angles to be flared outwards to form bellmouth for smooth entry of curtain into guides. Provide removable guide stoppers to prevent over travel of curtain and bottom bar. Top 16-1/2" (419.10 mm) of coil side guide angles to be removable for ease of curtain installation and as needed for future curtain service.

1. Finish:
  - a. Galvanized steel: Phosphate treatment followed by baked-on polyester powder coat, color as selected by *ARCHITECT* from manufacturer's standard color range, minimum 2.5 mils (0.065

mm) cured film thickness; ASTM D-3363 pencil hardness: H or better.

D. Counterbalance Shaft Assembly:

1. Barrel: Steel pipe capable of supporting curtain load with maximum deflection of 0.03 inches per foot (2.5 mm per meter) of width.
2. Spring balance: Oil-tempered, heat-treated steel helical torsion spring assembly designed for proper balance of door to ensure that effort to operate manually operated units will not exceed 25 lbs. Provide wheel for applying and adjusting spring torque.

E. Brackets: Fabricate from minimum ¼-inch (6.35 mm) steel plate with permanently lubricated ball or roller bearings at rotating support points to support counterbalance shaft assembly and form end closures.

1. Finish:

- a. Galvanized steel: Phosphate treatment followed by baked-on polyester powder coat, color as selected by ARCHITECT from manufacturer's standard color range, minimum 2.5 mils (0.065 mm) cured film thickness; ASTM D-3363 pencil hardness: H or better.

F. Hood: 24 gauge galvanized steel with reinforced top and bottom edges. Provide minimum ¼-inch (6.35 mm) steel intermediate support brackets as required to prevent excessive sag.

1. Finish:

- a. Galvanized steel: Phosphate treatment followed by baked-on polyester powder coat, color as selected by ARCHITECT from manufacturer's standard color range, minimum 2.5 mils (0.065 mm) cured film thickness; ASTM D-3363 pencil hardness: H or better.

G. Combination Weather/Smoke Seals:

1. Bottom bar motor operated doors: Combination weather/smoke seal sensing edge.
2. Guides and head: Replaceable, UL listed nylon pile weather/smoke seals sealing against fascia side of curtain.

H. Accessories:

1. Padlockable slide bolt on inside of bottom bar at each jamb extending into slots in guides. Provide interlock switches on motor operated units.
2. Photoelectric smoke/heat detector: UL listed.
3. Fire emergency annunciator: Provide ADA compliant sounder/strobe fire emergency annunciator to give advanced warning that the fire door is about to close. Warning signal to activate upon alarm signal.
4. Operator and full bracket mechanism cover: Provide 24 gauge galvanized steel sheet metal cover to enclose exposed moving operating components at coil area of unit. Finish to match door hood.

2.03 NON-FIRE RATED SERVICE DOORS

A. Cornell Iron Works Model No. ESD20 or equivalent.

B. Curtain:

1. Slat material: No. 6F.
  - a. Galvanized steel/galvanized steel: 22/22 gauge, Grade 40, ASTM A-653 galvanized steel zinc coating.
  - b. Insulation: 7/8-inch (22 mm) foamed-in-place, closed cell urethane.
  - c. Total slat thickness: 15/16-inch (24 mm).
2. Bottom bar: Reinforced extruded aluminum interior face with full depth insulation and exterior skin slat to match curtain material and gauge.
3. Fabricate interlocking sections with high strength nylon endlocks on alternate slats each secured with two (2) ¼-inch (6.35 mm) rivets. Provide windlocks as required to meet specified wind load.
4. Slat finish (interior and exterior):
  - a. Galvanized steel: Galvanex coating system (stock colors).
    - (1) ASTM A653 galvanized base coating treated with dual process rinsing agents in preparation for chemical bonding

baked-on base coat and gray baked-on polyester enamel finish coat.

5. Bottom bar finish (interior and exterior): Hot dipped galvanized steel; two (2) 2" x 2" x 1/8" angles.
- C. Guides: Fabricate with minimum 3/16-inch structural steel angles. Provide windlock bars of same material when windlocks are required to meet specified wind load. Top of inner and outer guide angles to be flared outwards to form bellmouth for smooth entry of curtain into guides. Provide removable guide stoppers to prevent over travel of curtain and bottom bar. Top 16-1/2" (419.10 mm) of coil side guide angles to be removable for ease of curtain installation and as needed for future curtain service.
1. Finish: Hot-dip galvanized; ASTM A123 grade 85 zinc coatings; hot-dip galvanized after fabrication.
- D. Counterbalance Shaft Assembly:
1. Barrel: Steel pipe capable of supporting curtain load with maximum deflection of 0.03 inches per foot (2.5 mm per meter) of width.
  2. Spring balance: Oil-tempered, heat-treated steel helical torsion spring assembly designed for proper balance of door to ensure that maximum effort to operate will not exceed 25 lbs. Provide wheel for applying and adjusting spring torque.
- E. Brackets: Fabricate from minimum 3/16-inch (5 mm) steel plate with permanently lubricated ball or roller bearings at rotating support points to support counterbalance shaft assembly and form end closures.
1. Finish:
    - a. ASTM A-123, Grade 85 zinc coating, hot-dip galvanized after fabrication.
- F. Hood: 24 gauge galvanized steel with reinforced top and bottom edges. Provide minimum 1/4-inch (6.35 mm) steel intermediate support brackets as required to prevent excessive sag.
1. Finish:
    - a. Galvanized steel: Galvanex coating system (stock colors).

- (1) ASTM A653 galvanized base coating threated with dual process rinsing agents in preparation for chemical bonding baked-on base coat and gray baked-on polyester enamel finish coat.

G. Weatherstripping:

1. Bottom bar motor operated doors: Weather/sensing edge with neoprene or rubber astragal extending full width of door bottom bar.
2. Guides: Replaceable vinyl strip on guides sealing against fascia side of curtain.
3. Lintel seal: Nylon brush seal fitted at door header to impede air flow.

H. Accessories:

1. Visionpanels: 10 x 1½ x ¾ inch thick (254 x 38 x 19 mm) oval acrylic panels set with double-sided foam glazing tape and fully contained within slat assembly. Refer to drawings for number and placement.
2. Operator and bracket mechanism cover: Provide 24 gauge galvanized steel sheet metal cover to enclosed exposed moving operating components at coil area of unit. Finish to match door hood.

## 2.04 OPERATION

A. Motor – Continuous Use – Model SG (Super Duty Gear Head) Operator:

1. The operator must not extend above or below the door coil when mounted front-of-coil. cULus listed (to comply with UL requirements in The United States and Canada). Totally Enclosed Fan Cooled gear head operator(s) rated 1/2) as recommended by door manufacture for size and type of door, 480 Volts, 3 Phase. Provide complete with electric motor and factory pre-wired motor control terminals, maintenance free solenoid actuated brake, emergency manual chain hoist provided up to 2 hp and control station(s). Motor shall be high starting torque, industrial type, with overload protection. Primary speed reduction shall be heavy-duty gears running in grease or oil bath with mechanical braking to hold the door in any position. When equipped, the emergency manual chain hoist assembly is automatically disengaged when motor is energized. A disconnect chain shall not be required to engage or release the manual chain hoist. Operator drive and door driven sprockets shall be provided with minimum #50 roller chain. Operator drive and door driven sprockets shall be provided

with minimum #50 roller chain. Operator shall be capable of driving the door at a speed of up to 9" per second or as recommended for door size. Fully adjustable, driven linear screw type cam limit switch mechanism shall synchronize the operator with the door. The motor shall be removable without affecting the limit switch settings. The electrical contractor shall mount the control station(s) and supply the appropriate disconnect switch, all conduit and wiring per the overhead door wiring instructions.

- B. Provide NEMA 4 motors and controls for doors at sludge dewatering.
- C. Provide NEMA 1 motors and controls for doors at maintenance building.
- D. Control Station:
  - 1. Surface mounted: "Open/Close/Stop" push buttons; NEMA 1 at maintenance building and NEMA 4 at sludge dewatering.
- E. Control Operation:
  - 1. Momentary contact to close: Fail-safe, UL325-2010 Compliant Entrapment Protection to Motor Operation.
    - a. 2-wire, E.L.R. electric sensing/weather edge seal extending full width of door bottom bar.
  - 2. Sensing/Weather Edge: Automatic reversing control by an automatic sensing switch within neoprene or rubber astragal extending full width of door bottom bar.
    - a. Electric sensing edge device. Provide a wireless sensing edge connection to motor operator eliminating the need for a physical traveling electric cord connection between bottom bar sensing edge device and motor operator.

## 2.05 OTHER MATERIALS

- A. All other materials, not specifically described but required for a complete and proper installation of the work of this section, shall be new, first quality of their respective kinds, and as selected by the *CONTRACTOR* subject to the approval of the *ENGINEER*.



## PART 3 - EXECUTION

### 3.01 EXAMINATION

- A. Prior to installation of the work of this section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.
- B. Verify that work may be completed in strict accordance with the original design and with the manufacturer's recommendations as approved by the *ENGINEER*.
- C. Do not proceed until unsatisfactory conditions are corrected.

### 3.02 INSTALLATION

- A. All doors and components shall be installed and adjusted in accordance with the manufacturer's installation instructions, the details shown and the approved shop drawings.
- B. Doors shall be tested for full and effective operation by the *ENGINEER* and shall be tested in manual and/or electric operation as appropriate.
- C. Make required adjustments to provide operation as approved.
- D. Finish painting as specified in *Section 09 90 00*.

### 3.03 CLEANING

- A. Clean unit according to manufacturer's instructions.
- B. Comply with provisions of *Section 01 74 00, Cleaning and Restorations*.
- B. Clean exposed surface of all grease, dirt and other foreign materials.
- C. Touch up all marred or abraded surfaces in accordance with manufacturer's directions.

### 3.04 TESTS

- A. Upon completion of this portion of the work and prior to acceptance by the *OWNER*, where all required tests and adjustments for free and smooth operation.

- B. Secure all approvals from agencies having jurisdiction.

\*\*\*\*END OF SECTION\*\*\*\*

SECTION 08 52 16

PLASTIC-CLAD WOOD WINDOWS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Included:

1. Vinyl-clad wood-framed windows of the following types:
  - a. Casement.

B. Related work:

1. Other sections of the specifications, not referenced below, shall also apply to the extent required for proper performance of this work.
2. *Section 06 20 00: Carpentry*
3. Section 08 80 00: Glazing

C. References:

1. American Architectural Manufacturer's Association (AAMA):
  - a. AAMA 450 - Voluntary Performance Rating Method for Mulled Fenestration Assemblies.
  - b. AAMA 502 - Voluntary Specification for Field Testing of Newly Installed Fenestration Products.
  - c. AAMA 613 - Voluntary Performance Requirements and Test Procedures for Organic Coatings on Plastic Profiles.
  - d. AAMA 614 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Plastic Profiles.
  - e. AAMA 623 - Voluntary Specification, Performance Requirements and Test Procedures for Organic Coatings on Fiber Reinforced Thermoset Profiles.
  - f. AAMA 624 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Fiber Reinforced Thermoset Profiles.

- g. AAMA 902 - Voluntary Specification for Sash Balances.
- 2. North American Fenestration Standard (NAFS):
  - a. NAFS - North American Fenestration Standard/Specification for Windows, Doors, and Skylights.
- 3. Andersen Corporation: Andersen 400 Series Installation Guide.
- 4. American Society for Testing and Materials (ASTM) (International):
  - a. ASTM C1036 - Standard Specification for Flat Glass.
  - b. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass.
  - c. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
  - d. ASTM E1886 - Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials.
  - e. ASTM E1996 - Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Windborne Debris in Hurricanes.
  - f. ASTM E1105 - Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference.
  - g. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation.
  - h. ASTM F2090 - Standard Specification for Window Fall Prevention Devices with Emergency Escape (Egress) Release Mechanisms.
- 5. Forest Stewardship Council (FSC): FSC Chain-of-Custody Certification.
- 6. Insulating Glass Certification (IGCC): Insulating Glass Unit Certification.
- 7. Insulating Glass Manufacturers Alliance of Canada (IGMAC) and Canadian General Standards Board (CGSB): Insulating Glass Units Standard CAN/CGSB 12.8-97.
- 8. International Standards Organization (ISO): ISO 14021 – Environmental Labels and Declarations – Self Declared Environmental Claims (Type II Environmental Labeling).

9. Declarations -- Self-Declared Environmental Claims (Type II Environmental Labeling).
  10. National Fenestration Rating Council (NFRC):
    - a. NFRC 100 - Procedure for Determining Fenestration Product U-Factors.
    - b. NFRC 200 - Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence.
  11. U.S. Environmental Protection Agency (EPA): ENERGY STAR.
  12. Window and Door Manufacturers Association (WDMA):
    - a. WDMA Hallmark Certification Program for Manufacturers.
    - b. WDMA I.S. 4 - Industry Specification for Preservative Treatment for Millwork.
- D. Separate payment:
1. Separate payment will be made for this item. Include all costs for *PLASTIC-CLAD WOOD WINDOWS* as indicated under the specific proposal item.
  2. The cost for this item shall include all materials, equipment, labor, and tools necessary and shall include those items that are considered to be an integral part of this work that may be specified elsewhere in these specifications.

## 1.02 SUBMITTALS

- A. Comply with provisions of *Section 01 33 23, Shop Drawings, Product Data and Samples*.
- B. Manufacturer's product data:
  1. Complete materials list of all materials proposed to be furnished and installed under this section.
  2. Specifications and other data required that demonstrate compliance with the specified requirements.

- C. Shop drawings showing precise dimensions of the work of this section, and all other data needed to ensure proper and adequate provision in concrete forming, reinforcement, and placement to accommodate the work of this section.
- D. Manufacturer's recommended installation procedures.

#### 1.03 QUALITY ASSURANCE

- A. Qualifications of manufacturer:
  - 1. Products used in the work of this section shall be produced by manufacturers regularly engaged in the manufacture of similar items and with a history of successful production acceptable to the *ENGINEER*.
- B. Qualifications of workmen:
  - 1. Provide at least one person who shall be present at all times during execution of the work of this section, who shall be thoroughly familiar with the specified requirements and the materials and methods needed for their execution, and who shall direct all work performed under this section.
  - 2. Provide adequate numbers of workmen skilled in the necessary crafts and properly informed of the method and materials to be used.
  - 3. In acceptance or rejection of the work of this section, the *ENGINEER* will make no allowance for lack of skill on the part of workmen.
- C. Basis of acceptance: The manufacturer's installation instructions will provide the basis for acceptance or rejection of the work performed under this section.

#### 1.04 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Comply with provisions of *Section 01 66 00, Storage and Protection*.
- B. Protection: Use all means necessary to protect the materials of this section before, during, and after installation and to protect the installed work and materials of all other trades.
- C. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of the *ENGINEER* and at no additional cost to the *OWNER*.

- D. Delivery and storage: Deliver all materials to the job site in their original unopened containers with all labels intact and legible at time of use. Store in strict accordance with the manufacturer's recommendations as approved by the *ENGINEER*.

#### 1.05 WARRANTY AND WARRANTY REPAIRS

- A. Warranties shall be provided as specified in *Section 01 78 36, Guarantees*. A copy of the manufacturer's warranty shall accompany the shop drawing submittal.
1. Warranty Period, Glass: 20 Years
  2. Warranty Period, Non-Glass Parts: 10 Years
- B. The *CONTRACTOR* and/or equipment manufacturer shall be responsible for all costs of warranty repair work including removal, shipping, reinstallation and re-start-up during the maintenance period.

#### 1.06 OPERATION AND MAINTENANCE MANUALS

- A. Operation and maintenance manuals shall be provided in accordance with *Section 01 78 23, Operation and Maintenance Data*.
- B. Manuals in final form shall be available a minimum of five (5) working days prior to the instruction of the *OWNER'S* personnel.

#### 1.07 MAINTENANCE

- A. Spare parts and materials:
1. Comply with provisions of *Section 01 78 45, Spare Parts and Maintenance Materials*.

### PART 2 - PRODUCTS

#### 2.01 GENERAL

- A. Products: Whenever materials or equipment are described using a certain brand, make, supplier, manufacturer or by specification, such naming shall be regarded as a standard and be intended to convey function, design features, general style,

type, materials of construction, character and quality of material or equipment, serviceability and other described essential characteristics.

- B. Other materials may be considered by the *ENGINEER* in accordance with the provisions of *Section 01 25 13, Substitutions*.
- C. Acceptable manufacturers:
  - 1. Anderson Corporation - 400 Series
  - 2. Or equivalent
- D. Substitutions Limitations: Contractor to review Substitution Limitations in the Window Sections to insure compliance with the Contract requirements.

## 2.02 PRODUCTS

- A. Construction:
  - 1. Frame: Finger-jointed or laminated veneer lumber capped with rigid vinyl, preservative treated WDMA I.S. 4.
  - 2. Interior Sash: Solid lumber, kiln dried and suitable for stain or painted finish, preservative treated WDMA I.S. 4.
  - 3. Exterior Sash: Co-extruded rigid vinyl or liquid-applied vinyl over finger-jointed lumber.
- B. Wood Species: Clear pine.
- C. Interior Finish:
  - 1. Painted: Factory-applied before assembly, White.
- D. Exterior Finish:
  - 1. Frame and Sash: AAMA 613 for color retention, Terratone.
  - 2. Trim: AAMA 623 - Terratone.

## 2.03 WINDOW

- A. Window Type: Casement



B. Performance Grade Requirements:

1. Casement Performance Class LC and Grade, Impact-Resistant:
  - a. PG70.
2. Casement Picture Performance Class LC and Grade, Impact-Resistant:
  - a. PG70

C. Air Infiltration Requirements:

1. Air Infiltration Rate:  $< 0.2 \text{ cfm/sf}^2$ .

D. Environmental Certifications:

1. ENERGY STAR performance requirements.
2. Indoor air quality performance.

E. Weatherstrip:

1. Type and Material for Casement: Flexible vinyl bulb or vinyl covered foam gasket.

F. Attachment Flange:

1. Type and Material for Casement: None.

G. Hardware:

1. Operator Gear Type and Material: Rotary, die-cast zinc and stainless steel components.
2. Hinge Type and Material: Concealed hinge and track, corrosion-resistant, 300 series stainless steel.
3. Crank Handle Material and Style: Die-cast zinc - Contemporary Folding.
4. Sash Lock Type and Material: Single actuation, die-cast zinc and engineered polymer components.
5. Crank and Sash Lock Color, Contemporary Folding: White.

I. Insect Screens:

1. Type: Conventional.

- a. Frame Material: Aluminum.
  - b. Painted Finish and Color: Factory-applied baked-on silicone polyester enamel Match window frame.
  - c. Insect Screen Material: TruScene stainless steel wire cloth.
- J. Exterior Trim and Accessories:
  - 1. Type: 2-inch Brick Mould.
  - 2. Material: Fibrex composite material.
  - 3. Finish and Color: Terratone.
- K. Mullions: Structural aluminum configured to be structurally sound and designed in accordance with AAMA 450.
- L. Interior Trim and Accessories:
  - 1. Provide Extension Jambs as required – Field verify.
  - 2. Provide Drywall Returns as required – Field verify.
  - 3. Finish and Color: White

#### 2.04 IMPACT-RESISTANT GLAZING

- A. Thermal Transmission (U-Factor), NFRC 100:
  - 1. Casement: 0.33 without grilles
- B. Solar Heat Gain Coefficient (SHGC), NFRC 200:
  - 1. Casement: 0.31 without grilles
- C. Visible Light Transmittance (VLT), NFRC 200:
  - 1. Casement: 0.53 without grilles
- D. Sound Transmission Class (STC)/Outdoor Indoor Transmission Classification (OITC), ASTM E90:
  - 1. Casement: 30 STC /26 OITC
- E. Glass Units: Provide insulating glass units certified through Insulating Glass Certification Council as conforming to the requirements of IGCC and ASTM E2190.

1. Manufacturer Designation: Andersen Low-E4 Insulated Impact-Resistant Glass.
2. Glazing Configuration: Dual-pane.
3. Tint: None.
4. Seal and Spacer Type: Dual sealed insulating glass units with polyisobutylene primary seal, silicone secondary seal and stainless steel spacers.
5. Glass Type: Fully tempered glass, ASTM C1048.
6. Opacity: None.
7. Laminate Interlayer Thickness: 0.090 inch.

## 2.05 OTHER MATERIALS

- A. All other materials, not specifically described but required for a complete and proper installation of the work of this section, shall be new, first quality of their respective kinds, and as selected by the *CONTRACTOR* subject to the approval of the *ENGINEER*.

## PART 3 - EXECUTION

### 3.01 EXAMINATION

- A. Prior to installation of the work of this section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.
- B. Verify that work may be completed in strict accordance with the original design and with the manufacturer's recommendations as approved by the *ENGINEER*.
- C. Do not proceed until unsatisfactory conditions are corrected.

### 3.02 INSTALLATION

- A. General: Install the work of this section in strict accordance with the manufacturer's recommendations as approved by the *ENGINEER*.
- B. Install windows plumb, level and square. Anchor windows securely to structure in correct orientation to flashing and adjacent construction as indicated. Comply with product installation instructions for proper flashing integration into wall system. Install windows so as to drain water penetration to the exterior.

- C. Adjust sashes, insect screens, ventilators, hardware and accessories as applicable for correct fit. Adjust weatherstrip for smooth operation and weather-tight closure.
- D. Painting: Marred or abraded surfaces shall be cleaned and refinished in accordance with manufacturer's recommendations.

### 3.03 CLEANING

- A. Comply with requirements of *Section 01 74 00, Cleaning and Restorations*.
- B. Remove and dispose of all debris.

### 3.04 TESTS

- A. Upon completion of this portion of the work and prior to acceptance by the *OWNER*, make all required tests and adjustments for free and smooth operation.
- B. Field Testing: Provide field testing of installed units.
  - 1. Test units in compliance with AAMA 502.
  - 2. Use test equipment calibrated according to ASTM E1105.
- C. Secure all approvals from agencies having jurisdiction.

### 3.05 START-UP

- A. The equipment manufacturer shall provide the services of a trained qualified representative, once per day of each day of installation.
- B. The representative shall prepare and submit a written report to both the *CONTRACTOR* and *ENGINEER* regarding the installation, including any conditions which might affect the manufacturer's guarantee. The equipment shall not be accepted by the *OWNER* until such time as this report has been received and accepted by the *ENGINEER*.

### 3.06 INSTRUCTIONS

- A. The manufacturer's representative shall instruct the *OWNER'S* operating personnel, at a time designated by the *OWNER*, as to the proper method of operation and recommended maintenance procedures.

- B. The scheduling of the instruction shall be at the convenience of the *OWNER* and may not coincide with the start-up inspection.

\*\*\*\*END OF SECTION\*\*\*\*



SECTION 08 54 00  
COMPOSITE WINDOWS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Included:

1. Composite-framed windows of the following types:
  - a. Awning
  - b. Fixed

B. Related work:

1. Other sections of the specifications, not referenced below, shall also apply to the extent required for proper performance of this work.
2. *Section 06 20 00: Carpentry*
3. *Section 08 80 00: Glazing*

C. References:

1. General: Standards listed by reference form a part of this specification section. Standards listed are identified by issuing authority, abbreviation, designation number, title or other designation. Standards subsequently referenced in this Section are referred to by issuing authority abbreviation and standard designation.
2. American Architectural Manufacturers Association (AAMA):
  - a. AAMA 502 - Voluntary Specification for Field Testing of Newly Installed Fenestration Products.
  - b. AAMA 615 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Plastic Profiles.
  - c. NAFS - North American Fenestration Standard/Specification for windows, doors and skylights.

2. Andersen Unit Installation Guide.
3. American Society of Testing and Materials (ASTM) (International):
  - a. ASTM C1036 - Standard Specification for Flat Glass.
  - b. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass.
  - c. ASTM D2244 - Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates.
  - d. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
  - e. ASTM E1105 - Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls.
  - f. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation.
  - g. ASTM F2090 - Standard Specification for Window Fall Prevention Devices with Emergency Escape (Egress) Release Mechanisms.
4. Insulating Glass Certification Council (IGCC):
  - a. Insulating Glass Unit Certification.
5. Insulating Glass Manufacturers Alliance of Canada (IGMAC) and Canadian General Standards Board (CGSB):
  - a. Insulating Glass Units Standard CAN/CGSB 12.8-97.
6. International Standards Organization (ISO):
  - a. ISO 14021 – Environmental Labels and Declarations – Self Declared Environmental Claims (Type II Environmental Labeling).



7. National Fenestration Rating Council (NFRC):
    - a. NFRC 100 – Procedure for Determining Fenestration Product U-Factors.
    - b. NFRC 200 – Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence.
  8. U.S. Environmental Protection Agency (EPA):
    - a. ENERGY STAR.
  9. Window and Door Manufacturers Association (WDMA):
    - a. WDMA Hallmark Certification Program for Manufacturers.
- D. Separate payment:
1. Separate payment will be made for this item. Include all costs for *COMPOSITE WINDOWS* as indicated under the specific proposal item.
  2. The cost for this item shall include all materials, equipment, labor, and tools necessary and shall include those items that are considered to be an integral part of this work that may be specified elsewhere in these specifications.

## 1.02 SUBMITTALS

- A. Comply with provisions of *Section 01 33 23, Shop Drawings, Product Data and Samples*.
- B. Manufacturer's product data:
  1. Complete materials list of all materials proposed to be furnished and installed under this section.
  2. Specifications and other data required that demonstrate compliance with the specified requirements.
- C. Shop drawings showing precise dimensions of the work of this section, and all other data needed to ensure proper and adequate provision in concrete forming, reinforcement, and placement to accommodate the work of this section.

- D. Manufacturer's recommended installation procedures.

### 1.03 QUALITY ASSURANCE

A. Qualifications of manufacturer:

1. Products used in the work of this section shall be produced by manufacturers regularly engaged in the manufacture of similar items and with a history of successful production acceptable to the *ENGINEER*.
  - a. Member in good standing of The Insulating Glass Certification Council (IGCC).
  - b. Hallmark Certified Manufacturer and member in good standing of the Window and Door Manufacturer's Association (WDMA).
  - c. Member in good standing of U.S. Green Building Council.
  - d. U.S. Energy Start Partner.

B. Qualifications of workmen:

1. Provide at least one person who shall be present at all times during execution of the work of this section, who shall be thoroughly familiar with the specified requirements and the materials and methods needed for their execution, and who shall direct all work performed under this section.
2. Provide adequate numbers of workmen skilled in the necessary crafts and properly informed of the method and materials to be used.
3. In acceptance or rejection of the work of this section, the *ENGINEER* will make no allowance for lack of skill on the part of workmen.

- C. Basis of acceptance: The manufacturer's installation instructions will provide the basis for acceptance or rejection of the work performed under this section.

### 1.04 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Comply with provisions of *Section 01 66 00, Storage and Protection*.

- B. Protection: Use all means necessary to protect the materials of this section before, during, and after installation and to protect the installed work and materials of all other trades.
- C. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of the *ENGINEER* and at no additional cost to the *OWNER*.
- D. Delivery and storage: Deliver all materials to the job site in their original unopened containers with all labels intact and legible at time of use. Store in strict accordance with the manufacturer's recommendations as approved by the *ENGINEER*.

#### 1.05 WARRANTY AND WARRANTY REPAIRS

- A. Warranties shall be provided as specified in *Section 01 78 36, Guarantees*. A copy of the manufacturer's warranty shall accompany the shop drawing submittal.
  - 1. Warranty Period, Glass: 20 years
  - 2. Warranty Period, Non-Glass parts: 10 years
  - 3. Warranty Period, Color Fade: 5 years
- B. Special Warranty: Installer's standard form in which installer agrees to repair or replace composite windows that fail due to poor workmanship or faulty installation within the specified warranty period.
  - 1. Warranty Period: Ten (10) years from date of Substantial Completion.
- C. The *CONTRACTOR* and/or equipment manufacturer shall be responsible for all costs of warranty repair work including removal, shipping, reinstallation and re-start-up during the maintenance period.

#### 1.06 OPERATION AND MAINTENANCE MANUALS

- A. Operation and maintenance manuals shall be provided in accordance with *Section 01 78 23, Operation and Maintenance Data*.
- B. Manuals in final form shall be available a minimum of five (5) working days prior to the instruction of the *OWNER'S* personnel.

## 1.07 MAINTENANCE

### A. Spare parts and materials:

1. Comply with provisions of *Section 01 78 45, Spare Parts and Maintenance Materials*.

## PART 2 - PRODUCTS

### 2.01 GENERAL

- A. Products: Whenever materials or equipment are described using a certain brand, make, supplier, manufacturer or by specification, such naming shall be regarded as a standard and be intended to convey function, design features, general style, type, materials of construction, character and quality of material or equipment, serviceability and other described essential characteristics.
- B. Other materials may be considered by the *ENGINEER* in accordance with the provisions of *Section 01 25 13, Substitutions*.
1. Substitutions Limitations:
    - a. Equivalent products will be taken into consideration.
    - b. Submit windows to be considered as equals to the basis of design as outlined herein no less than ten (10) days prior to bid date. Windows that have been reviewed and accepted as equals to the specified units will be listed in an addendum prior to bid date; only then will equals be accepted at bidding. All submittal packages for equals to be considered shall comply with the submittal requirements outlined herein.
    - c. Submit substitution request in accordance with Section 01 25 13, Substitutions.
      - (1) Failure to comply with the above "Substitutions Limitations" will negate the Contractor of the privilege of substituting for this product and the requirements stated within this Section after the awarding of the Contract.
- C. Acceptable manufacturers:
1. Anderson Corporation Series 100 Windows
  2. Or equivalent.

## 2.02 MATERIALS

- A. Material Composition: Extruded composite profile consisting of 40 percent reclaimed pre-consumer wood fiber and 60 percent thermoplastic polymer, by weight.
- B. Manufacturer Designation: Fibrex material.
- C. Pre-consumer Recycled Content: Eighteen (18%) percent minimum, third-party certified.
- D. Interior Color: White.
- E. Exterior Color: White
- F. Exterior Color Retention: Resist fading with a change of no more than 5 Delta E units over 10 years in compliance with color retention provisions of AAMA 615 and ASTM D2244.

## 2.03 WINDOW

- A. Window Type: Awning
  - 1. Performance Requirements: Comply with NAFS.
  - 2. Air Infiltration Requirements:
    - a. Air Infiltration Rate:  $< 0.2 \text{ cfm/sf}^2$ .
  - 3. Environmental Qualifications:
    - a. ENERGY STAR performance where applicable.
    - b. Indoor air quality performance per New Jersey requirements.
  - 4. Overall Depth:  $3\frac{1}{4}"$  (82.6 mm).
  - 5. Attachment Flange: No flange.
  - 6. Hardware:
    - a. Operator Gear Type and Material: Rotary, die cast zinc.

- b. Hinge Type and Material: Hinged, 300 series stainless steel with heavy gauge arms.
  - c. Operator Handle Type and Material: Folding, polycarbonate with integral color.
  - d. Sash Lock Type and Material: Single actuations, galvanized steel and engineered polymer components.
- 7. Grilles:
  - a. Type and Designation: None
- 8. Insect Screens:
  - a. Frame Material: Roll-formed aluminum.
  - b. Frame Color: Match window frame.
  - c. Insect Screen Material: TruScene “stainless steel wire secured with vinyl spline.

B. Window Type: Fixed

- 1. Performance Requirements: Comply with NAFS.
- 2. Air Infiltration Requirements:
  - a. Air Infiltration Rate: < 0.2 cfm/sf<sup>2</sup>.
- 3. Environmental Qualifications:
  - a. ENERGY STAR performance where applicable.
  - b. Indoor air quality performance per New Jersey requirements.
- 4. Overall Depth: 3¼" (82.6 mm).
- 5. Attachment Flange: No flange.
- 6. Hardware: None
- 7. Grilles: None
- 8. Insect Screens: None

## 2.03 GLAZING

### A. Type: Awning.

1. Thermal Transmission (U-Factor), NFRC 100: 0.27 without grilles.
2. Solar Heat Gain Coefficient (SHGC), NFRC 200: 0.28 without grilles.
3. Visible Light Transmittance (VLT), NFRC 200: 0.47 without grilles.
4. Sound Transmission Class (STC)/Outdoor-Indoor Transmission Classification (OITC), ASTM E90: 30 STC / 25 OITC.
5. Glass Units: Provide insulating glass units certified through Insulating Glass Certification Council as conforming to the requirements of IGCC and ASTM E2190.
  - a. Manufacturer Designation: Andersen High-Performance Low-E glass.
  - b. Seal and Spacer Type: Dual sealed insulating glass units with polyisobutylene corners.
  - c. Glass Type: Heat strengthened tempered glass, ASTM C1048.
  - d. Glass Pattern: None.

### B. Type: Fixed.

1. Thermal Transmission (U-Factor), NFRC 100: 0.28 without grilles.
2. Solar Heat Gain Coefficient (SHGC), NFRC 200: 0.20 without grilles.
3. Visible Light Transmittance (VLT), NFRC 200: 0.31 without grilles.
4. Sound Transmission Class (STC)/Outdoor-Indoor Transmission Classification (OITC), ASTM E90: 29 STC / 24 OITC.
5. Glass Units: Provide insulating glass units certified through Insulating Glass Certification Council as conforming to the requirements of IGCC and ASTM E2190.
  - a. Manufacturer Designation: Andersen Low-Performance Low-E glass.

- b. Seal and Spacer Type: Dual sealed insulating glass units with polyisobutylene primary seal, silicone secondary seal and metal spacers with bent or soldered corners.
- c. Glass Type: Heat strengthened tempered glass, ASTM C1048.
- d. Glass Pattern: None.

## 2.04 OTHER MATERIALS

- A. All other materials, not specifically described but required for a complete and proper installation of the work of this section, shall be new, first quality of their respective kinds, and as selected by the *CONTRACTOR* subject to the approval of the *ENGINEER*.

## PART 3 - EXECUTION

### 3.01 EXAMINATION

- A. Prior to installation of the work of this section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.
- B. Verify that work may be completed in strict accordance with the original design and with the manufacturer's recommendations as approved by the *ENGINEER*.
- C. Do not proceed until unsatisfactory conditions are corrected.

### 3.02 INSTALLATION

- A. General: Install the work of this section in strict accordance with the manufacturer's recommendations as approved by the *ENGINEER*.
  - 1. Comply with manufacturer's product recommendations, including but not limited to the Andersen Unit Installation Guide, and installation information in product literature and on product packaging. Comply with Drawings and Shop Drawings for installing windows, hardware, accessories, and other components.
  - 2. Install windows plumb, level and square. Anchor windows securely to structure in correct orientation to flashing and adjacent construction as



indicated. Comply with installation instructions for proper flashing integration of window into wall system. Install windows so as to drain water penetration to the exterior.

3. Adjust sashes, insect screens, ventilators, hardware and accessories as applicable for correct fit. Adjust weatherstrip for smooth operation and weather-tight closure.

- B. Painting: Marred or abraded surfaces shall be cleaned and refinished in accordance with manufacturer's recommendations.

### 3.03 CLEANING

- A. Comply with requirements of *Section 01 74 00, Cleaning and Restorations*.
  1. Remove protective films and non-permanent labels prior to 90 days after installation.
  2. Remove excess sealant, soiling, dirt and other substances. Clean window frame and glass surfaces. Avoid damaging coatings and finishes.
  3. Touch-up, repair or replace glass or other window components broken, scratched or damaged during construction prior to Substantial Completion.
  4. Remove and lawfully dispose of construction debris from Project site.
- B. Remove and dispose of all debris.

### 3.04 FIELD QUALITY CONTROL AND TESTS

- A. Upon completion of this portion of the work and prior to acceptance by the *OWNER*, make all required tests and adjustments for free and smooth operation.
  1. Manufacturer's Field Services: If requested by Owner, provide manufacturer's field service consisting of product use recommendations and periodic site visits for observation of product installation in accordance with manufacturer's recommendations.
    - a. Site Visits: Minimum two (2) times per each day of installation.
  2. Field Testing: Provide field testing of installed units.

- a. Test units in compliance with AAMA 502.
  - b. Use test equipment calibrated according to ASTM E1105.
- B. Secure all approvals from agencies having jurisdiction.

### 3.05 START-UP

- A. The equipment manufacturer shall provide the services of a trained qualified representative, for two (2) trips each with a minimum of two (2) days, excluding travel time for the purpose of inspecting the installation.
- B. The representative shall prepare and submit a written report to both the *CONTRACTOR* and *ENGINEER* regarding the installation, including any conditions which might affect the manufacturer's guarantee. The equipment shall not be accepted by the *OWNER* until such time as this report has been received and accepted by the *ENGINEER*.

### 3.06 INSTRUCTIONS

- A. The manufacturer's representative shall instruct the *OWNER'S* operating personnel, at a time designated by the *OWNER*, as to the proper method of operation and recommended maintenance procedures.
- B. The scheduling of the instruction shall be at the convenience of the *OWNER* and may not coincide with the start-up inspection.

\*\*\*\*END OF SECTION\*\*\*\*

SECTION 08 71 00  
(08710)  
HARDWARE

PART 1 - GENERAL

1.01 SUMMARY

A. Work Included:

1. Door hardware.
2. Thresholds
2. Gasketing
3. Padlocks.
4. Keying, master keying and grand master keying to meet OWNER'S requirements.
5. All trim, attachments and fastenings required.
6. All other hardware required for a complete installation.
7. Provide all new and existing doors with cylinders having interchangeable cores. New locks and latches shall be provided for all doors to remain as required to provide interchangeable cores.

B. Related work:

1. Other sections of the specifications, not referenced below, shall also apply to the extent required for proper performance of this work.
2. *Section 06 20 00: Carpentry*
3. *Section 08 11 13: Metal Doors and Frames*
5. *Section 08 17 43: Pultruded Fiberglass Doors and Frames*
6. *Section 08 17 44: Pultruded Fiberglass Fire-Rated Doors and Frames*

C. Payment:

1. Unless otherwise noted in the Proposal Section, no separate payment shall be made for this item.
2. Include all costs for the *HARDWARE* in the prices bid for the various related items of work as designated in the Proposal.

1.02 REFERENCES

A. American National Standards Institute

1. ANSI A156.1 Butts & Hinges
2. ANSI A156.2 Locks & Lock Trim
3. ANSI A156.3 Exit Devices
4. ANSI A156.4 Door Controls (Closers)
5. ANSI A156.5 Auxiliary Locks
6. ANSI A156.6 Architectural Door Trim
7. ANSI A156.7 Template Hinge Dimensions
8. ANSI A156.8 Door Controls (Overhead Holders)
9. ANSI A156.13 Mortise Locks & Latches
10. ANSI A156.15 Closer Holder Release Devices
11. ANSI A156.18 Materials & Finishes
12. ANSI A156.21 Thresholds

B. Steel Door Institute:

1. SDI-107; Hardware on Steel Doors.
2. SDI-109; Hardware for Standard Steel Doors and Frames.

### 1.03 SUBMITTALS

- A. Comply with provisions of *Section 01 33 23, Shop Drawings, Product Data and Samples*.
- B. Manufacturer's product data:
  - 1. Complete materials list of all materials proposed to be furnished and installed under this section.
  - 2. Specifications and other data required to demonstrate compliance with the specified requirements.
  - 3. For fire rated assemblies, submit third party testing agencies' design number showing component parts and installation instructions.
- C. Submit hardware schedule, product data, shop drawings, and keying schedule. Include product data on each type of hardware listed in hardware schedule.
  - 1. Upon return of the reviewed finish hardware schedule, arrange for a keying meeting with the *ENGINEER* and *OWNER*, hardware supplier, and other involved parties to insure all locksets are functionally correct and keying fulfills the project requirements. As soon as possible after the keying conference, typed copies of the keying schedule shall be furnished to the *ENGINEER* and *OWNER*.
  - 2. Approval of the hardware schedule by the *ENGINEER* shall not relieve the Contractor from the responsibility for furnishing all required finish hardware.
- D. Samples: Within 15 calendar days after execution of the contract deliver to the *ENGINEER* samples of each finish hardware item.
- E. Operation and Maintenance data:
  - 1. Submit operation and maintenance data under provisions of *Section 01 78 23*.
  - 2. Include data on operating hardware, lubrication requirements, and inspection procedures related to preventative maintenance.
- F. Submit warranties as specified in *Section 01 78 36, Guarantees*.

#### 1.04 QUALITY ASSURANCE

A. Qualifications of manufacturer:

1. Products used in the work of this section shall be produced by manufacturers regularly engaged in the manufacture of similar items and with a history of successful production acceptable to the *ENGINEER*.

B. Qualifications of workmen:

1. The locksmith shall be licensed in accordance with NJSA 45:5A-1 et seq. and as required by NJSA 45:5A-25.
2. Provide adequate numbers of workmen skilled in the necessary crafts and properly informed of the methods and materials to be used.
3. In acceptance or rejection of the work of this section, the *ENGINEER* will make no allowance for lack of skill on the part of workmen.

C. Basis of acceptance:

1. The manufacturer's installation instructions will provide the basis for acceptance or rejection of the work performed under this section.

D. Fire rated openings: Comply with the requirements of Underwriters' Laboratories, Inc.

E. Provide the services of an AHC or DAHC member of the Door Hardware Institute to:

1. Be available for consultation with the *ENGINEER* at no additional cost to the *OWNER* during progress of construction;
2. Be present at completion of construction, and:
  - a. Inspect installation of all finish hardware items;
  - b. Make all minor adjustments required; and
  - c. Report to the *ENGINEER* on completeness of the installation.

1.05 PRODUCT DELIVERY STORAGE AND HANDLING

- A. Comply with provisions of *Section 01 66 00, Storage and Protection*.
- B. Deliver hardware items in their original factory shipping cartons.
- C. Package and label each item of hardware individually for each opening to match hardware schedule.
- D. Store and protect products under provisions of Section 01620.
- E. Protect hardware from theft by cataloging and storing in secure area.
- F. Deliver permanent keys and interchangeable cores to *OWNER* by security shipment direct from hardware supplier.
- G. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of the *ENGINEER* and at no additional cost to the *OWNER*.

1.06 WARRANTY AND WARRANTY REPAIRS

- A. Warranties shall be provided as specified in *Section 01 78 36, Guarantees*. A copy of the manufacturer's warranty shall accompany the shop drawing submittal.
- B. The *CONTRACTOR* and/or equipment manufacturer shall be responsible for all costs of warranty repair work including removal, shipping, reinstallation and re-start-up during the warranty period.

1.07 OPERATION AND MAINTENANCE MANUALS

- A. Operation and maintenance manuals shall be provided in accordance with *Section 01 78 23, Operation and Maintenance Data*.
- B. Manuals in final form shall be available a minimum of five (5) working days prior to the instruction of the *OWNER'S* personnel.

1.08 MAINTENANCE

- A. Maintenance materials:

1. Provide special wrenches and tools applicable to each different or special hardware component.
2. Provide maintenance tools and accessories supplied by hardware component manufacturer.

## PART 2 - PRODUCTS

### 2.01 GENERAL

- A. Products: Whenever materials or equipment are described using a certain brand, make, supplier, manufacturer or by specification, such naming shall be regarded as a standard and be intended to convey function, design features, general style, type, materials of construction, character and quality of material or equipment, serviceability and other described essential characteristics.
- B. Other materials may be considered by the *ENGINEER* in accordance with the provisions of *Section 01 25 13, Substitutions*.
- C. Acceptable manufacturers:
  1. Hinges: Hager, McKinney, Stanley, Lawrence
  2. Locks and latches: Sargent, Yale, Schlage, Corbin, Best.
  3. Exit devices: Sargent, Yale, Schlage, Monarch, Stanley-Precision
  4. Pulls and plates: Rockwood, IVES, Builders Brass, LCN, Dorma
  5. Closers:
    - a. General environment: Sargent, Yale, Norton, LCN, Dorma
    - b. Corrosive environment: Norton Series 7500SS.
  6. Cylinders: Schlage, Sargent, Yale
  7. Flush bolts: Rockwood, IVES
  8. Removable mullion: Sargent, Yale, Schlage
  9. Thresholds, drips, gaskets, astragals: Pemko, Reese, National Guard
  10. Kick Plate: Trimco or equal.



## 2.02 MATERIALS

- A. Materials shall be as specified herein, indicated in the schedule and in conformance with the referenced standards.
- B. All hardware for fire rated openings shall comply with Article 1008.1.10.1 of the International Building Code, 2018, New Jersey Edition.
  - 1. Panic hardware shall be listed in accordance with UL 305.
  - 2. Fire exit hardware shall be listed in accordance with UL 10C and UL 305.
  - 3. The maximum unlatching force shall not exceed 15 pounds.
  - 4. All such hardware shall be labeled by an approved third party inspection agency and such label shall be permanently affixed as required by the building code.
- C Hinges:
  - 1. Hinges shall conform to ANSI A156.1, Grade 1.
  - 2. Hinges for metal doors and frames shall also conform to ANSI A156.7.
  - 3. Designated hinges shall have pins that are made non-removable by means of a set screw in the barrel, or safety stud, when the door is in the closed position.
- D. Locksets and latchsets:
  - 1. To the maximum extent possible, locksets, latch sets and dead locks, and all components thereof, including cylinders and removable cores, shall be for the products of a single manufacturer. Lock fronts for double-acting doors shall be rounded. Strikes for wood frames and pairs of wood doors shall be furnished with wrought boxes.
  - 2. Mortise type:
    - a. Locksets and latchsets shall be heavy-duty mortise type with hinged, anti-friction, 3/4 inch throw latchbolt with anti-friction piece made of self lubricating stainless steel. Functions and design as indicated in the hardware groups. Deadbolt functions shall be one inch projection with two hardened steel roll pins.

Both deadbolt and latchbolt to extend into lock case a minimum of 3/16 inch when fully extended.

- b. Furnish locksets and latchsets with sufficient strike lip to protect door trim.
- c. All mortise locksets and latchsets must conform to ANSI A156.13, Series 1000, Operational Grade 1 (Security Grade 2 for locksets in security areas) and be listed by U.L.
- d. Locksets must fit ANSI A115.1 door preparation.
- e. Locksets and latchsets to have self-aligning thru-bolted trim.
- f. Auxiliary deadlatch to be made one piece stainless steel, permanently lubricated.
- g. Locksets must be available with tactile or knurled knobs or levers for identification of hazardous areas.
- h. Knobs must be brass or bronze material and a minimum of .100 inch thick at the thinnest point of the knob wall.
- i. Lever handles must be of forged or cast brass, bronze or stainless steel construction and conform to ANSI A117.1. Levers which contain a hollow cavity are not acceptable.
- j. Provide locksets with 6-pin interchangeable core cylinders.
- k. Locksets and cores to be of same manufacturer to maintain complete lockset warranty.

2. Cylindrical type:

- a. Locksets must be extra heavy-duty cylindrical type with 2-3/4 inch backset, or greater as specified, with a 9/16 inch throw latchbolt.
- b. Knobs must be brass or bronze material and a minimum of .100 inch thick at the thinnest point of the knob wall.
- c. Locksets and latchsets must conform to ANSI A156.2, Series 4000, Grade 1, and be U.L. Listed.

- d. Locksets and latchsets with knobs must fit ANSI A115.2 door preparation.
- e. Locksets and latchsets with levers must fit modified ANSI A115.2 door preparation.
- f. Locksets must be available with tactile or knurled knob or lever for identification of hazardous areas.
- g. Provide locksets with 6 pin interchangeable core.
- h. Locksets and cores to be of the same manufacturer to maintain complete lockset warranty.

E. Auxiliary locks and associated products:

- 1. Bored and mortise dead locks and dead latches, narrow style dead locks and dead latches, rim latches, dead latches, and dead bolts, and electric strikes shall conform to BHMA A156.5. Bolt and latch retraction shall be dead bolt style. Strike boxes shall be furnished with dead bolt and latch strikes for Grade 1. Electric strikes shall be locked from a remote location in fail safe mode. Electric strike for rated openings shall be fail secured.

F Lock cylinders (Mortise, Rim and Bored):

- 1. Lock cylinders shall comply with BHMA A156.5. Lock cylinder shall have not less than six pins. Cylinders shall have key removable type cores. A master keying system shall be provided. An extension of the existing keying system shall be provided. The cylinders shall be compatible with existing locks that were manufactured by Sargent, have interchangeable cores and have a compatible type keyway. Construction interchangeable cores shall be provided. Disassembly of knob or lockset shall not be required to remove core from lockset. All locksets, lockable exit devices, and padlocks shall accept same interchangeable cores.

G. Exit devices:

- 1. Exit devices and accessories shall conform to ANSI A156.3, Grade 1.
  - a. Specification based on Stanley Precision Apex 2020 System:
    - (1) Passage Function – Reference Schedule 3.07

2. Electronic Strike:
  - a. Electronic strikes are to be compatible with existing system.
  - b. Interface with existing as required.
- H. Door closing devices:
  1. Door closing devices shall conform to BHMA A156.4, Grade 1. Closing devices shall be products of one manufacturer for each type specified. The opening resistance of closing devices shall not exceed 67 N 15 lbf applied at the latch stile or exceed 22 N 5 lbf where low opening resistance is scheduled.
  2. Door closers for use on labeled fire door assemblies shall be listed by an NRTL for such purpose.
  3. Surface type closers shall be Grade 1, Series C02000 Full Cover with options PT-4H, Size 1 or 2 through Size 6, and PT-4D with back check position valve. Except as otherwise specified, sizes shall conform to the manufacturer's published recommendations. Closers for out swinging exterior doors shall have parallel arms or shall be top jamb mounted. Closers for doors close to a wall shall be of narrow projection so as not to strike the wall at the 90-degree open position.
  4. All closers shall have operating forces conforming to ANSI A117.1.
  5. Closers for use in and around wastewater treatment plants, pumping stations or water treatment plants shall be highly corrosion resistant and shall have all external body components of aluminum, zinc alloy or stainless steel material and all fasteners of stainless steel. Closers shall be enclosed in a molded resin cover. Closers shall be Norton Series 7500SS where designated.

## 2.03 FASTENERS

- A. Furnish all hardware with all necessary screws, bolts, and other fasteners of suitable size and type to anchor the hardware in position for long life under hard use.
- B. Furnish fastenings where necessary with expansion shields, toggle bolts, sex bolts, and other anchors approved by the *ENGINEER* according to the material to which the hardware is to be applied and the recommendations of the hardware manufacturer.

## 2.04 KEYING SCHEDULE

- A. Each building or facility shall be keyed, masterkeyed, grandmasterkeyed with the other buildings and facilities as required by the *OWNER* and *ENGINEER*.
- B. Locks shall be keyed in sets or subsets as scheduled. Change keys for locks shall be stamped with change number and the inscription - "Do Not Duplicate." Keys shall be supplied as follows:
  - 1. Locks: Three (3) (Std) keys each lock.
    - a. Locks to be configured to match existing keyway.

## 2.05 TOOLS AND MANUALS

- A. With the delivery of permanent keys, deliver to the *OWNER* one complete set of adjustment tools and one set of maintenance manuals for locksets, latchsets, closers and panic devices.

## 2.06 OTHER MATERIALS

- A. All other materials, not specifically described but required for a complete and proper installation of the work of this section, shall be new, first quality of their respective kinds, and as selected by the *CONTRACTOR* subject to the approval of the *ENGINEER*.

## PART 3 - EXECUTION

### 3.01 EXAMINATION

- A. Prior to installation of the work of this section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.
- B. Verify that work may be completed in strict accordance with the original design and with the manufacturer's recommendations as approved by the *ENGINEER*.
- C. Do not proceed until unsatisfactory conditions are corrected.

### 3.02 PREPARATION

- A. Stockpile all items sufficiently in advance to ensure their availability, and make all necessary deliveries in a timely manner to ensure orderly progress of the total work.

### 3.03 INSTALLATION

#### A. General:

1. Install the work of this section in strict accordance with the manufacturer's recommendations as approved by the *ENGINEER*.
2. A complete hardware schedule and templates are to be furnished to the door suppliers.
3. Install each hardware item in compliance with manufacturer's instructions and recommendations. Wherever cutting and fitting is required to install hardware onto or into surfaces which are later to be painted or finished in another way, install each item completely and then remove and store in a secure place during the finish application. After completion of the finishes, reinstall each item. Do not install surface mounted items until finishes have been completed on the substrate.
1. Fire rated assemblies shall be installed in accordance with the third party testing agencies' Fire Resistance Design Number in order to maintain the required fire resistance rating for the opening.

#### B. Locations:

1. Using only the specified finish hardware, and the proper equipment for this purpose, install all other finish hardware in the following locations throughout the work:
  - a. Armor plates: On the push sides of single-acting doors, and on both sides of double-acting doors.
  - b. Combination push-and-pull plates: Centered 40-5/16" above the finish floor.
  - c. Door pulls on plates: Centered 40-5/16" above the finish floor.
  - d. Door pulls, sectional: Centered 40-5/16" above the finish floor.

- e. Door-closing devices: Install and adjust in strict accordance with the templates and printed instructions supplied by the manufacturer of the devices. Insofar as practicable, doors opening to or from halls or corridors shall have the closer mounted on the room side of the door.
- f. Extension lever flush bolts: In the edge of the door. Center to bolt fronts 12" from bottom and 12" from top edge of the door.
- g. Flush cap pulls: Centered 40-5/16" above the finish floor.
- h. Key cabinet: Install where directed.
- i. Kick plates: On single-acting doors, with kickplate on push side. On double-acting doors, with kickplate on both sides.
- j. Mortise deadlock strike: Center 60" above the finish floor.
- k. Knob lock and knob latch strikes: Center 40-5/16" above the finish floor.
- l. Roller latch strikes: Center 40-5/16" above the finish floor.
- m. Panic bolt cross bars: Align in horizontal position with top and bottom bolts and rods aligned vertically. Install the center line of strike 40-5/16" above the finish floor.
- n. Push bars, single: Centered 42" above the finish floor.
- o. Push bars, type 476: Centered 42" above the finish floor.
- p. Push plates: Centered 48" above the finish floor.
- q. Roller bumpers: Install at the top of the door near the edge of the lock stile.
- r. Other hardware items, not described above: Install as directed.

C. Anchoring: Anchor all components firmly into position for long life under hard use. Use only the anchoring devices furnished with the hardware item, unless otherwise specifically directed.

### 3.04 FIELD QUALITY CONTROL

#### A. Tests:

1. Upon completion of this portion of the work and prior to acceptance by the *OWNER*, make all required tests and adjustments for free and smooth operation.
2. Secure all approvals from agencies having jurisdiction.

#### B. Field services:

1. Supplier shall inspect the completed installation and certify that the hardware has been furnished and installed in accordance with the manufacturers' instructions and as specified. The inspection report shall identify any malfunctioning items and recommend adjustment or replacement as appropriate.
2. The representative shall prepare and submit a written report to both the *CONTRACTOR* and *ENGINEER* regarding the installation, including any conditions which might affect the manufacturer's guarantee. The equipment shall not be accepted by the *OWNER* until such time as this report has been received and accepted by the *ENGINEER*.

### 3.05 PROTECTION AND CLEANING

- A. After installation, clean metal surfaces on both interior and exterior of all mortar, plaster, paint and other contaminants. After cleaning, protect work against damage.

### 3.06 FINAL ADJUSTMENT

- A. Whenever hardware is installed more than one month prior to acceptance or occupancy of a space or area, return during the week prior to acceptance or occupancy and make a final check and adjustment of all hardware items in such space or area.
- B. At the completion of the project, manufacturers' suppliers or representatives shall inspect their hardware and make any corrections required due to errors or improper installation.
- C. Submit certification that items specified have been properly installed and are functioning properly.



### 3.07 HARDWARE SCHEDULE

A. Hardware Set #1 – Exterior Masonry  
Door #1 and 3

<u>Item</u>	<u>ANSI Finish</u>	<u>ANSI #</u>
Hinges (1 ½ Pair):	630	A5111, NRP
Exit Device:	630	Grade 1, Type 1, Function – F84
Closer:	Alum	C02021
Door Gasket:		Pemko S88D or Equal
Threshold:	628	J32130
Kick Plate:	630	J102
Cane Bolt	SS 304	Stanley ½" by 24" or equal

B. Hardware Set #2 – Exterior Masonry  
Doors #2

<u>ITEM</u>	<u>ANSI Finish</u>	<u>ANSI #</u>
Hinges (2 Pair):	630	A5111, NRP
Exit Device:	630	Grade 1, Type 1, Function – F84
Closer:	Alum	C02021
Door Gasket:		Pemko S88D or Equal
Threshold:	628	J32130
Kick Plate:	630	J102
Cane Bolt	SS 304	Stanley ½" by 24" or equal

C. Hardware Set #3 – Exterior Masonry  
Door #4

<u>ITEM</u>	<u>ANSI Finish</u>	<u>ANSI #</u>
Hinges (1-1/2 Pair):	630	A5111, NRP
Exit Device:	630	Grade 1, Type 1, Function – F84
Closer:	Alum	C02021
Door Gasket:		Pemko S88D or Equal
Threshold:	628	J32130
Kick Plate:	630	J102
Cane Bolt	SS 304	Stanley ½" by 24" or equal

D. Hardware Set #4 – Exterior (PEB)  
Doors #5, 6, 20, 21, 22 AND 23

<u>ITEM</u>	<u>ANSI Finish</u>	<u>ANSI #</u>
Hinges (1 ½ Pair):	630	A5111, NRP
Exit Device:	630	Grade 1, Type 1, Function F84
Closer:	Molded Plastic	Norton P7500 SS

Door Gasket:		Pemko S88D or Equal
Threshold:	628	J32130
Kick Plate:	630	J102
Cane Bolt:	SS 304	Stanley ½" x 24" or Equal
Door Stop	626	L02251

E. Hardware Set #5 - Double Doors - PEB  
Doors #7

ITEM	ANSI Finish	ANSI #
Hinges (3 Pair):	630	A5111, NRP
Exit Device:	630	Grade 1, Type 3, Function – F01
Closer:	Molded Plastic	Norton P7500 SS
Door Gasket:		Pemko S88D or Equal
Threshold:	628	J32130
Kick Plate:	630	J102
Flush Bolts:	630	L04081
Astragal:		Pemko 355SNV, or Equal
Cane Bolt:	SS 304	Stanley ½" x 24" or Equal

F. Hardware Set #6 – Interior Masonry  
Door #10

ITEM	ANSI Finish	ANSI #
Hinges (1½ Pair):	630	A5111, NRP
Lockset:	630	Grade 1, Type 1, Function – F80
Closer:	Molded Plastic	Norton P7500 SS
Door Gasket:		Pemko S88D or Equal
Threshold:	628	J32130
Kick Plate:	630	J102

G. Hardware Set #7 – Interior Masonry  
Door #11

ITEM	ANSI Finish	ANSI #
Hinges (1½ Pair):	630	A5111, NRP
Lockset:	630	Grade 1, Type 1, Function – F80
Closer:	Molded Plastic	Norton P7500 SS
Door Gasket:		Pemko S88D or Equal
Kick Plate:	630	J102

H. Hardware Set #8 – Exterior Masonry  
Door #12, 13, 14, 24 and 25

ITEM	ANSI Finish	ANSI #
Hinges (1½ Pair):	630	A5111, NRP
Exit Device:	630	Grade 1, Type 1, Function – F84
Closer:	Molded Plastic	Norton P7500 SS
Door Gasket:		Pemko S88D or Equal
Threshold:	628	J32130
Kick Plate:	630	J102
Cane Bolt:	SS 304	Stanley ½” x 24” or Equal

I. Hardware Set #8 – Interior Masonry  
Door #17

ITEM	ANSI Finish	ANSI #
Hinges (1½ Pair):	630	A5111, NRP
Lockset:	630	Grade 1, Type 1, Function – F37
Closer:	Molded Plastic	Norton P7500 SS
Door Gasket:		Pemko S88D or Equal
Kick Plate:	630	J102

J. Hardware Set #9 – Interior Masonry  
Door #18

ITEM	ANSI Finish	ANSI #
Hinges (1½ Pair):	630	A5111, NRP
Lockset:	630	Grade 1, Type 1, Function – F41
Closer:	Molded Plastic	Norton P7500 SS
Door Gasket:		Pemko S88D or Equal
Kick Plate:	630	J102

K. Hardware Set #10 – Interior Masonry  
Door #19

ITEM	ANSI Finish	ANSI #
Hinges (1½ Pair):	630	A5111, NRP
Lockset:	630	Grade 1, Type 1, Function – F44
Deadbolt	630	Interior Thumb Latch
Closer:	Molded Plastic	Norton P7500 SS
Door Gasket:		Pemko S88D or Equal
Kick Plate:	630	J102

\*\*\*\*END OF SECTION\*\*\*\*



SECTION 08 80 00  
(08800)  
GLAZING

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work included:

1. Provide 1" thick insulating units for exterior windows and doors.
2. Provide glass and glazing for all interior doors and windows.
3. Provide and install tinted, insulating glass units.
4. All glass and glazing shall be as specified herein and shown on the Plans.

B. Related work:

1. Other sections of the Specifications, not referenced below, shall also apply to the extent required for proper performance of this work.
2. *Section 08 11 13: Metal Doors and Frames*
3. *Section 08 17 43: Pultruded Fiberglass Doors and Frames*
4. *Section 08 17 44: Pultruded Fire-Rated Fiberglass Doors and Frames*
5. *Section 08 54 00: Composite Windows*

C. Payment:

1. Unless otherwise noted in the Proposal Section, no separate payment shall be made for this item.
2. Include all costs for the *GLAZING* in the prices bid for the various related items of work as designated in the Proposal.

## 1.02 REFERENCE STANDARDS

- A. Uniform Construction Code of the State of New Jersey; N.J.A.C. 5:23.
- B. International Code Council, Inc.
  - 1. International Building Code, 2018.
- C. American National Standards Institute:
  - 1. ANSI Z 97.1, Performance Specifications and Methods of Test for Safety Glazing Material Used in Buildings.
- D. Sealed Insulating Glass Manufacturers Association: Number 65-7-2, Sealed Insulating Glass Units.
- E. Code of Federal Regulations:
  - 1. 16 CFR 1201; Safety Standard for Architectural Glazing.

## 1.03 SUBMITTALS

- A. Comply with provisions of *Section 01 33 23, Shop Drawings, Product Data and Samples*.
- B. Manufacturer's product data:
  - 1. Complete materials list of all materials proposed to be furnished and installed under this section.
  - 2. Specifications and other data required that demonstrate compliance with the specified requirements.
- C. Shop drawings: Sections and details of glass installation at framing members.
- D. Manufacturer's recommended installation procedures.
- E. Samples:
  - 1. Two 12-inch x 12-inch pieces of each type of glass.
  - 2. Two 12-inch lengths of each type of gasket employed.

3. One bead, approximately ¼-inch wide and 3-inches long of each sealant employed, indicating color of set or cured material.

F. Certificates:

1. Manufacturer's certification that materials meet specification requirements.
2. Installer's certification of experience.

1.04 QUALITY ASSURANCE

A. Qualifications of manufacturer:

1. Products used in the work of this section shall be produced by manufacturers regularly engaged in the manufacture of similar items and with a history of successful production acceptable to the *ENGINEER*.

B. Qualifications of workmen:

1. Provide at least one person who shall be present at all times during execution of the work of this section, who shall be thoroughly familiar with the specified requirements and the materials and methods needed for their execution, and who shall direct all work performed under this section.
2. Provide adequate numbers of workmen skilled in the necessary crafts and properly informed of the methods and materials to be used.
3. In acceptance or rejection of the work of this section, the *ENGINEER* will make no allowance for lack of skill on the part of workmen.

C. Installer qualifications: Minimum of three (3) years experience on comparable projects.

D. Requirements of regulatory agencies: Install glass and glazing to meet requirements of all applicable codes and regulations.

1.05 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Comply with provisions of *Section 01 66 00, Storage and Protection*.

- B. Protection: Use all means necessary to protect the materials of this section before, during, and after installation and to protect the installed work and materials of all other trades.
- C. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of the *ENGINEER* and at no additional cost to the *OWNER*.
- D. Deliver glass with manufacturer's labels intact.
- E. Do not remove labels until glass has been installed.
- F. Keep glass free from contamination by materials capable of staining glass.
- G. Deliver glazing compounds and sealants in manufacturer's unopened, labeled containers.

#### 1.06 WARRANTY AND WARRANTY REPAIRS

- A. Warranties shall be provided as specified in *Section 01 78 36, Guarantees*. A copy of the manufacturer's warranty shall accompany the shop drawing submittal.
- B. The *CONTRACTOR* and/or equipment manufacturer shall be responsible for all costs of warranty repair work including removal, shipping, reinstallation and re-start-up during the maintenance period.

#### 1.07 ENVIRONMENTAL REQUIREMENTS

- A. Perform glazing when ambient temperature is above 40°F.
- B. Perform glazing on dry surfaces only.

### PART 2 - PRODUCTS

#### 2.01 GENERAL

- A. Products: Whenever materials or equipment are described using a certain brand, make, supplier, manufacturer or by specification, such naming shall be regarded as a standard and be intended to convey function, design features, general style, type, materials of construction, character and quality of material or equipment, serviceability and other described essential characteristics.



- B. Other materials may be considered by the *ENGINEER* in accordance with the provisions of *Section 01 25 13, Substitutions*.
- C. Materials shall comply with the applicable listed reference standards. In case of conflict, the requirements of the more stringent standard shall govern.
- D. Acceptable Fire Resistive Glass Manufacturers:
1. Pilkington.
  2. Technical Glass Products.
  3. SAFTI First.
  4. Vetrotech Saint-Gobain North America, Inc.
  5. Or equivalent.
- E. All glass and glazing shall be in conformance with Chapter 24 of the International Building Code, 2018.
- F. Marking: Each light shall bear the manufacturer's mark designating the type and thickness of glass. Safety glazing shall bear a permanent identifying mark issued by an *approved agency* which specifies the marking agency, whether manufacturer or installer, and the test standard. The mark shall not be omitted from tempered glass. Each unit of tempered glass shall be permanently identified by the manufacturer's mark. The identifying mark shall be etched or ceramic fired on the glass and shall be visible when the unit is glazed. Tempered spandrel glass is exempted from permanent marking, but shall be provided with a removable paper marking by the manufacturer.
- G. Impact loads:
1. Individual glazed areas, including glass mirrors, in locations such as those indicated below shall pass the test requirements of CPSC 16 CFR;1201.
    - a. Glazing in ingress and means of egress doors except jalousies.
    - b. Glazing in fixed and sliding panels of sliding (patio) door assemblies and panels in swinging doors.
    - c. Glazing in storm doors.
    - d. Glazing in all unframed swinging doors.
    - e. Glazing in doors and enclosures for hot tubs, whirlpools, saunas, steam rooms, bathtubs and showers. Glazing in any portion of a building wall enclosing these compartments where the bottom

exposed edge of the glazing is less than 60 inches (1525 mm) above a standing surface.

- f. Glazing in an individual fixed or operable panel adjacent to a door where the nearest exposed edge of the glazing is within a 24-inch (610 mm) arc of either vertical edge of the door in a closed position and where the bottom exposed edge of the glazing is less than 60 inches (1525 mm) above the walking surface.
- g. Glazing in an individual fixed or operable panel, other than in those locations described in preceding items e and f which meets all of the following conditions:
  - (1) Exposed area of an individual pane greater than 9 square feet (0.84m<sup>2</sup>).
  - (2) Exposed bottom edge of less than 18 inches (460 mm) above the floor.
  - (3) Exposed top edge greater than 36 inches (915 mm) above the floor; and
  - (4) One or more walking surface(s) within 36 inches (915 mm) horizontally of the plan of the glazing.
- h. All glazing in guards and railing regardless of area or height above a walking surface. Included are structural baluster panels and non-structural in-fill panels.

## 2.02 FLOAT GLASS MATERIALS

- A. Materials shall comply with the applicable listed reference standards. In case of conflict, the requirements of the more stringent standard shall govern.
- B. Annealed Glass: ASTM C1036, Type 1 transparent flat, Quality Q3, float glass.
  - 1. Furnish annealed glass except where heat strengthened or tempered glass is required to meet specified performance requirements.
- C. Heat Strengthened Glass: ASTM C1048, Type 1 transparent flat, Quality Q3, Kind HS heat strengthened, Condition A uncoated, float glass.
  - 1. Furnish heat strengthened glass where annealed glass cannot meet specified performance requirements.

- D. Tempered Glass: ASTM C1048, Type 1 transparent flat, Quality Q3, Kind FT full tempered, Condition A uncoated, float glass with horizontal tempering.
  - 1. Furnish tempered glass conforming to CPSC 16 CFR 1201 at locations where safety glass is required by the International Building Code.
- E. Wired glass is not permitted.

## 2.03 FLOAT GLASS

- A. Clear Glass: Annealed, heat strengthened and tempered float glass as specified; Class 1 clear.
  - 1. Clear annealed glass (FG-CA).
  - 2. Clear heat strengthened glass (FG-CH).
  - 3. Clear tempered glass (FG-CT).
  - 4. Minimum Thickness: 1/4" unless otherwise indicated.

## 2.04 FIRE RESISTIVE GLASS

- A. Fire Rated Window Glazing: Tested in accordance with NFPA 257 and complying with NFPA 80.
  - 1. NFPA 257; adjusted so two-thirds of test specimen is above neutral pressure plane at 10 minutes into test.
- B. Fire Rated Door Glazing: Tested in accordance with one (1) of the following and complying with NFPA 80.
  - 1. NFPA 252; with neutral pressure level at 40 inches maximum above sill at 5 minutes into test.
  - 2. UL 10C.
- C. Fire Resistive Ceramic Glass: Transparent polished both surfaces.
  - 1. Clear fire resistive ceramic glass (FRG-CC).
  - 2. Thickness: 1/4".

3. Fire Rating: 90 minute rating as listed in UL Building Materials Directory and approved by authority having jurisdiction for applications.

#### 2.05 PATTERNED GLASS

- A. Patterned Glass: Heat strengthened and Tempered float glass as specified except Type II patterned flat, Quality Q6, Class 1 clear.
  1. Minimum Thickness: ¼" unless otherwise indicated.
  2. Finish: F1 patterned one side.
  3. Pattern: P3 random.

#### 2.06 WIRED GLASS

- A. ASTM C1036, Type II wired flat, Class 1 clear, polished both sides, Quality Q6 glazing; Mesh M1 diamond, of woven stainless steel wire, manufacturer's standard grid size; conforming to ANSI Z91.7.
  1. Clear Wired Glass (FRG-CW): Polished both sides.
  2. Patterned Wired Glass (FRG-PW): Finish F1 patterned one side, Pattern P3, random.
  3. Minimum Thickness: ¼ inch unless otherwise indicated.

#### 2.07 LAMINATED GLASS

- A. Consisting of heat strengthened glass lites inter layered with clear or tinted 0.060" thick PVB (Polyvinyl Butyral), total thickness of 5/16".
- B. Laminated glass shall conform to ASTM C1172, CPSC 16CFR-1201 and ANSI Z97.1

#### 2.08 INSULATING GLASS

- A. Formed of two pieces of Type I, Class 1, Quality Q3, ¼" thick glass separated by a ½" dehydrated air space and hermetically sealed.

B. Sealed insulating units shall be certified as Class A meeting requirements of ASTM E 774 through use of test methods ASTM E 546 and E 773.

C. Low "E" films and coatings shall be applied to the #2 surface unless otherwise required by the manufacturer or approved by the *ENGINEER*.

D. Performance characteristics:

1. Transmittance:

a.	UV	35%
b.	Visible	73%
c.	Total Solar Energy	43%

2. Reflectance:

a.	Visible Light	12%
b.	Total Solar Energy	21%

3. U-Value:

a.	Winter, Nighttime	0.31
b.	Summer, Daytime	0.32

4. Shading coefficient: 0.59

5. Solar heat gain coefficient: 0.51

E. Tinted insulating glass units:

1. Formed of two pieces of Type I, Class I, Quality Q3, 1/4" thick glass separated by a 1/2" dehydrated air space and hermitically sealed.

2. Sealed insulating units shall be certified as Class A meeting requirements of ASTM E 774 through use of Test Methods ASTM E546 and E773.

3. Low "E" films and coatings shall be applied to the #2 surface unless otherwise required by the manufacturer or approved by the *ENGINEER*.

4. Color shall be light bronze.

5. Performance characteristics:

a. Transmittance:

(1)	UV	15%
(2)	Visible	44%
(3)	Total Solar Energy	27%

b. Reflectance:

(1)	Visible Light	7%
(2)	Total Solar Energy	12%

c. U-Value:

(1)	Winter, Nighttime	0.31
(2)	Summer, Daytime	0.33

d. Shading coefficient: 0.41

e. Solar heat gain coefficient: 0.35

## 2.09 OTHER MATERIALS

- A. All other materials, not specifically described but required for a complete and proper installation of the work of this section, shall be new, first quality of their respective kinds, and as selected by the *CONTRACTOR* subject to the approval of the *ENGINEER*.

## PART 3 - EXECUTION

### 3.01 EXAMINATION

- A. Prior to installation of the work of this section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.
- B. Verify that work may be completed in strict accordance with the original design and with the manufacturer's recommendations as approved by the *ENGINEER*.
- C. Check that glazing channels are free of burrs, irregularities, and debris.
- D. Check that glass is free of edge damage or face imperfections.
- E. Do not proceed with installation until conditions are satisfactory.

### 3.02 PREPARATION

#### A. Field measurements:

1. Measure size of frame to receive glass.
2. Compute actual glass size, allowing for edge clearances.

#### B. Preparation of surfaces:

1. Remove protective coatings from surfaces to be glazed.
2. Clean glass and glazing surfaces to remove dust, oil and contaminants, and wipe dry.

### 3.03 INSTALLATION

#### A. Apply primer-sealer to joint surfaces.

#### B. Positioning glass: Orient pattern, and draw of glass pieces in same direction.

#### C. Do not cut, seam, nip, or abrade tempered, heat strengthened, coated, or insulating glass.

#### D. Sealant glazing:

1. Install spacers in channel.
2. Install filler rod in channel.
3. Apply sealant to back and bottom of rabbet.
4. Bed glass in position, centered vertically and horizontally, with glazing points or clips.
5. Apply sealant to face with sufficient force to eliminate voids.
6. Trim sealant to form water shed sloping away from glass.

#### E. Tape glazing:

1. Cut glazing tape to length and set against permanent stops.
2. Remove paper backing from tape.

3. Position glass and press against tape for full contact.
4. Place glazing tape on free perimeter of glass.
5. Seal butt joints of tape with joint sealant.
6. Install removable stop, avoiding displacements of tape, and exert pressure on tape for full continuous contact.

F. Gasket Glazing:

1. Cut gasket to length of channel without stretching.
2. Cut lock strips 1/8 inch (3 mm) longer than gaskets.
3. Apply gasket to outside fixed edge of rabbet perimeter.
4. Place setting blocks at quarter points of sill rabbet.
5. Place glass on setting blocks and center horizontally.
6. Apply gaskets to inside stop, mitering corners.
7. Force locking strip into position in gasket channel.

3.04 CLEANING

- A. Remove excess glazing compound from installed glass.
- B. Remove labels from glass surface as soon as installed.
- C. Wash and polish both faces of glass.
- D. Remove debris from work site.

3.05 PROTECTION OF COMPLETE WORK

- A. Attach crossed streamers away from glass face.
- B. Do not apply markers to glass surface.
- C. Replace damaged glass.

\*\*\*\*END OF SECTION\*\*\*\*



SECTION 26 05 00  
(16010)  
BASIC ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Basic Electrical Requirements specifically applicable to Division 26 sections, in addition to Division 1 - General Requirements.

1.02 REFERENCES/STANDARDS

- A. American National Standards Institute (ANSI)
- B. National Fire Protection Association (NFPA)
- C. National Electrical Code (NEC) (NFPA-70)
- D. Life Safety Code (NFPA-101)
- E. American Society for Testing and Materials (ASTM)
- F. Illuminating Engineering Society (IES)
- G. Institute of Electrical and Electronics Engineers (IEEE)
- H. Insulated Cable Engineers Association (ICEA)
- I. National Electrical Manufacturers Association (NEMA)
- J. National Electrical Safety Code (NESC) (ANSI-C2)
- K. Standard for Electrical Safety in the Workplace (NFPA-70E)
- L. National Electrical Testing Association (NETA)
- M. Occupational Safety and Health Administration (OSHA)
- N. Underwriters Laboratories (UL)

1.03 SUBMITTALS

- A. Submit under provisions of *Section 01 33 23, Shop Drawings, Product Data and Samples*.
- B. Submit shop drawings and product data grouped to include complete submittals of related systems, products, and accessories in a single submittal.
- C. Mark dimensions and values in units to match those specified.

#### 1.04 REGULATORY REQUIREMENTS

- A. Conform to the Uniform Construction Code for the State of New Jersey and N.J.A.C. 5:23-3.16 et. seq. as applicable.
- B. Conform to applicable References and Standards as listed in Section 1.02.
- C. Obtain permits, and request inspections from Authority having jurisdiction.
- D. All work shall be performed by a State of New Jersey licensed electrician.
- E. Comply with Local, County, State and Federal Regulations and Codes in effect as of date of purchase.

#### 1.05 CONTRACT DRAWINGS

- A. The Contractor shall furnish all labor and material necessary and shall install, complete to be ready for use, the electrical power systems, including the installation and wiring of miscellaneous electrical power equipment, panels, and other electrical equipment as indicated on the Drawings and as herein specified.
- B. The Contract Drawings, which constitute an integral part of this Contract, are for engineering and general arrangement purposes only. They indicate the general layout of the electrical power system, arrangement of switchgear, substation equipment, conduits and other work. Raceway locations shown in details and in the plan on the Contract Drawings indicate the approximate location and routing of all raceways.
- C. Electrical devices and material shall comply with the standards of NEMA and shall be listed and/or labeled by the Underwriters' Laboratories, Inc. Where Underwriters' Laboratories listing is not available for equipment, the Contractor shall submit certified test reports of an adequately equipped, recognized, independent testing laboratory, approved by the local inspecting authority, indicating that the equipment is in conformance with the local code requirements or any other applicable requirements. In lieu of the independent test reports, written approval of the equipment by the local electrical inspecting authority will be acceptable. The Contractor shall pay all cost of tests and/or inspections necessary for approval of the equipment.
- D. All work shall be systematically, carefully and neatly performed in a workmanlike manner, and shall comply with all applicable current standards and practices of the latest National Electric Code (NEC), the latest National Electrical Safety Code (NESC), National Fire Code (NFC), the Institute of Electrical and Electronic Engineers, Inc. (IEEE), Occupational Safety and Health Administration (OSHA),

and any local codes or standards which may govern the work being performed or equipment furnished under this Contract.

- E. All manufacturers published data including installation and operation recommendations shall be part of the specifications for this Contract. All equipment shall be installed and connected as recommended by its manufacturer, as specified in these specifications and as shown on the Contract Drawings.
- F. All programmable devices which include but are not limited to circuit breakers, ground faults, timers, generators, transfer switches, variable frequency drives and control panels shall be programmed by the Contractor. All settings shall be programmed based on the end user owner requirements, final field installed components, and per the devices manufacturer recommendations. Contractor shall provide and perform all calculations, system reports and electrical system studies required for these programmable parameters based on manufacturer requirements and shall be included within their final bid at no additional cost to the OWNER and with no assistance from the Design Engineer. All devices shall be fully programmed and commissioned and all systems and subsystems shall be demonstrated to be fully operational. All settings, calculations and system studies required shall be included within the submittal packages and final operations and maintenance manuals. Approval of devices without these documents being submitted does not alleviate the Contractor of these requirements.
- G. In case of interference with other work or erroneous locations with respect to equipment or structures, the Contractor shall furnish all labor and materials necessary to complete the work in an acceptable manner without additional cost to the Owner.
- H. The plans, as drawn, show conditions as accurately as it is possible to indicate them in scale. Plans are diagrammatical and do not necessarily show all the fittings, etc., necessary to suit the building conditions. Locations of outlets, equipment, etc. are approximate. The Contractor shall be responsible for the proper location in order to make them fit with the site details to the satisfaction of the Engineer.

#### 1.06 PROJECT/SITE CONDITIONS

- A. The Contractor is responsible for field verification of all scale dimension on drawings. Actual locations, distances and levels will be governed by actual field conditions. Dimensional changes required due to differing site conditions shall be made at no additional cost.
- B. The Contractor shall check structural, mechanical, equipment, and site plans, shop drawings and equipment wiring diagrams, to avert possible installation conflicts.

Should drastic changes from original plans be necessary to resolve such conflicts, the Contractor shall notify the Engineer and secure written approval and agreement on necessary adjustments before installation is started.

- C. The Contractor shall promptly, and before such conditions are disturbed, notify the Engineer or Construction Manager in writing of subsurface, latent or unknown physical conditions at the site of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in this Contract. The Engineer shall promptly investigate the conditions, and if such conditions do materially so differ and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the work under this Contract, whether or not changed as a result of such conditions, an equitable adjustment shall be made, and the Contract modified accordingly.
- D. The Contractor represents that he/she has carefully examined all of the Contract Documents and the construction site and has satisfied himself as to the character, quality and quantity of work to be performed, the materials, equipment and other items to be furnished, and all other requirements of this Contract, as well as conditions that will be encountered at the site or otherwise may affect the cost of performing the work or providing the equipment required for this Contract.
- E. The Contractor shall provide to the Owner at the completion of the contract, certificates of approval for compliance with the National Electric Code and any other authority having jurisdiction.

#### 1.07 ELECTRICAL WORKING DRAWINGS/RECORD DOCUMENTS

- A. The Contract Drawings are not intended to serve as working or installation drawings. These drawings are for engineering and general arrangement purposes only. The Contractor shall prepare and submit to the Engineer for approval of his own working and installation drawings based on the Contract Drawings, but showing all details of construction, such as equipment dimensions, as-built circuit information, conduit plan views/sections, junction box wiring tables, interconnection wiring tables (showing each wire/cable installed), motor mounting details and dimensions, pad and vault details and transformer mounting details, interconnection wiring diagrams, wire label tables and similar drawings depicting the construction and installation work to be performed.
- B. The working drawings shall be prepared based on certified manufacturer's shop drawing of equipment furnished under this and other contracts. It shall be the responsibility of the Contractor to obtain all required shop drawings and wiring diagrams from manufacturers and other contractors, and other relate drawings to

properly coordinate all electrical installations and to fulfill the intent of these specifications.

- C. Installation of any electrical equipment, conduit, or wire prior to the approval of these working drawings will be the contractor's responsibility and any modification of the electrical work necessary to meet the equipment requirements or changes made by the Engineer shall be made without additional cost to the Owner.
- D. The interconnection wiring diagrams shall show all connections between the control panels or starters and any field device.
- E. During the course of work, the Contractor shall maintain a record set of as-built drawings on-site (available for the resident Engineer's use) on which the actual physical location of all equipment will be noted with dimensions as well as wiring numbers and/or connection diagrams. The Contractor shall bring these as-built drawings to each monthly job meeting for inspection by the Engineer.
- F. At the completion of the project, the Contractor shall obtain a copy of the O&M manuals and shop drawings from each manufacturer. The Contractor shall mark all as-built records on these drawings and shall correct/change his own working drawings and shall supply any other as-built wiring diagrams, schematics, interconnection tables or layout drawings that differ in any way from the approved shop drawings, working drawings and the Contract Drawings.
- G. Submission and approval of these as-built drawings/tracings shall be made before any final payment of non-retainer money owed to the Contractor. The Contractor may choose to submit as-built drawings by building/area as he completes such an area to the satisfaction of the Engineer.

#### 1.08 SEQUENCING AND SCHEDULING

- A. Construct work in sequence as required.
- B. Description of work:
  - 1. Grounding and bonding as required by the National Electrical Code (NEC).
  - 2. Cutting and patching associated with Electrical work.
  - 3. Furnishing and setting of all sleeves through floors and walls, including waterproof and fireproof sealing and cap flashing. Restore integrity of fire

barriers by sealing all electrical openings through fire-rated walls and floors.

4. Hardware, such as inserts, bolts, etc., associated with concrete housekeeping pads and/or for mounting and securing electrical equipment.
5. Perform all tests, setup, adjustments, and furnish all certificates of approval.
6. Provide all work of every description detailed in these specifications or shown on the Drawings, including connections for all equipment, and all other labor and material as may be needed to make the work of this section complete and acceptable to the *OWNER*.
7. Provide instructions and training for *OWNER'S* personnel.
8. Coordinate scheduled outages with the *OWNER*.
9. Pay all relevant fees.
10. Excavation and backfill for electrical work (inside and outside). All concrete work required for pads (including housekeeping pads), underground conduits and conduit bases.
11. Prime and finish painting, where required, for new and relocated electrical equipment and installation of components.
12. Demolition work as described in these specifications and as shown on the Drawings.
13. Electrical work in connection with equipment specified or furnished under other sections of the Specifications including:
  - a. Garage equipment including door openers and lifts.

## PART 2 - PRODUCTS

Not Used.

## PART 3 - EXECUTION

Not Used.

\*\*\*\*END OF SECTION\*\*\*\*

SECTION 26 05 03  
(16180)  
EQUIPMENT WIRING SYSTEMS

PART I - GENERAL

1.01 DESCRIPTION

- A. Work included:
  - 1. Electrical connections to equipment specified under other Sections or furnished by *OWNER*.
- B. Related work:
  - 1. Other sections of the *Specifications*, not referenced below, shall also apply to the extent required for proper performance of this work.
  - 2. *Section 26 05 26: Grounding and Bonding for Electrical Systems*
- C. References:
  - 1. NEMA WD 1 - General Purpose Wiring Devices
  - 2. NEMA WD 6 - Wiring Devices-Dimensional Requirements.

1.02 SUBMITTALS

- A. Comply with provisions of *Section 01 33 23, Shop Drawings, Product Data and Samples*.
- B. Manufacturer's product data:
  - 1. Complete list of all materials proposed to be furnished and installed under this section.
  - 2. Specifications and other data required that demonstrate compliance with the specified requirements.
- C. Manufacturer's recommended installation procedures.

### 1.03 QUALITY ASSURANCE

A. Qualifications of manufacturer:

1. Products used in the work of this section shall be produced by manufacturers regularly engaged in the manufacture of similar items and with a history of successful production acceptable to the *ENGINEER*.

B. Qualifications of workmen:

1. Provide at least one person who shall be present at all times during execution of the work of this section, who shall be thoroughly familiar with the specified requirements and the materials and methods needed for their execution, and who shall direct all work performed under this section.
2. Provide adequate numbers of workmen skilled in the necessary crafts and properly informed of the method and materials to be used.
3. In acceptance or rejection of the work of this section the *ENGINEER* will make no allowance for lack of skill on the part of workmen.

C. Basis of acceptance:

1. The manufacturer's installation instructions will provide the basis for acceptance or rejection of the work performed under this section.

### 1.04 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Comply with provisions of *Section 01 66 00, Storage and Protection*.
- B. Protection: Use all means necessary to protect the materials of this section before, during, and after installation and to protect the installed work and materials of all other trades.
- C. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of the *ENGINEER* and at no additional cost to the *OWNER*.
- D. Delivery and storage: Deliver all materials to the job site in their original unopened containers with all labels intact and legible at time of use. Store in strict accordance with the manufacturer's recommendations as approved by the *ENGINEER*.



## 1.05 COORDINATION

- A. Comply with requirements of *Section 01 31 13, Project Coordination*.
- B. Obtain and review shop drawings, product data, manufacturer's wiring diagrams, and manufacturer's instructions for equipment furnished under other sections.
- C. Determine connection locations and requirements.
- D. Sequence rough-in of electrical connections to coordinate with installation of equipment.
- E. Sequence electrical connections to coordinate with start-up of equipment.

## PART 2 - PRODUCTS

### 2.01 GENERAL

- A. Products: Whenever materials or equipment are described using a certain brand, make, supplier, manufacturer or by specification, such naming shall be regarded as a standard and be intended to convey function, design features, general style, type, materials of construction, character and quality of material or equipment, serviceability and other essential characteristics inherent in the named product.
- B. Other materials may be considered by the *ENGINEER* in accordance with the provisions of *Section 01 25 13, Substitutions*.
- C. Acceptable Manufacturers - Cords and Caps:
  - 1. Bryant
  - 2. Hubbell
  - 3. ITT Royal
  - 4. Or equivalent.

### 2.02 CORDS AND CAPS

- A. Straight-blade attachment plug: NEMA WD 1.
- B. Locking-blade attachment plug: NEMA WD 5.

- C. Attachment plug configuration: Match receptacle configuration to outlet provided for equipment.
- D. Cord construction: Oil-resistant thermoset insulated Type SO multiconductor flexible cord with identified equipment grounding conductor, suitable for extra hard usage in damp locations.
- E. Cord size: Suitable for connected load of equipment and rating of branch circuit overcurrent protection.

## 2.03 OTHER MATERIALS

- A. All other materials, not specifically described but required for a complete and proper installation of the work of this section, shall be new, first quality of their respective kinds, and as selected by the *CONTRACTOR* subject to the approval of the *ENGINEER*.

## PART 3 - EXECUTION

### 3.01 EXAMINATION

- A. Prior to installation of the work of this section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.
- B. Verify that work may be completed in strict accordance with the original design and with the manufacturer's recommendations as approved by the *ENGINEER*.
- C. Do not proceed until unsatisfactory conditions are corrected.

### 3.02 PREPARATION

- A. Review equipment submittals prior to installation and electrical rough-in. Verify location, size, and type of connections. Coordinate details of equipment connections with supplier and installer.

### 3.03 DEMOLITION OF EXISTING WORK

- A. Remove exposed abandoned equipment wiring connections, including abandoned connections above accessible ceiling finishes.

- B. Disconnect abandoned utilization equipment and remove wiring connections. Remove abandoned components when connected raceway is abandoned and removed. Install blank cover for abandoned boxes and enclosures not removed.
- C. Extend existing equipment connections using materials and methods compatible with existing electrical installations, or as specified.

### 3.04 INSTALLATION

- A. Connect heat producing equipment using wire and cable with insulation suitable for temperatures encountered.
- B. Make conduit connections to equipment using flexible conduit. Use liquid-tight flexible conduit with watertight connectors in damp or wet locations.
- C. Install pre-finished cord set where connection with attachment plug is indicated or specified, or provide cable and attachment plug with suitable strain-relief clamps.
- D. Install suitable strain-relief clamps and fittings for cord connections at outlet boxes and equipment connection boxes.
- E. Install receptacle outlet to accommodate connection with attachment plug.
- F. Make wiring connections in control panel or in wiring compartment or pre-wired equipment in accordance with manufacturer's instructions. Provide interconnecting wiring as indicated or required.
- G. Install disconnect switches, controllers, control stations, and control devices such as limit switches and temperature switches as indicated or as required by vendors of equipment furnished in other Specification sections. Connect with conduit and wiring as indicated or required.

### 3.05 ADJUSTING

- A. Cooperate with utilization equipment installers and field service personnel during checkout and starting of equipment to allow testing and balancing and other startup operations. Provide personnel to operate electrical system and checkout wiring connection components and configurations.

3.06 CLEANING

- A. Comply with requirements of *Section 01 74 00, Cleaning and Restorations*.
- B. Remove and dispose of all debris.

PART 4 - PAYMENT

4.01 EQUIPMENT WIRING SYSTEMS

- A. Quantity and Payment: No separate payment shall be made for this item. Include all costs for *EQUIPMENT WIRING SYSTEMS* in the prices bid for the various related items of work as designated in the Proposal.

\*\*\*\*END OF SECTION\*\*\*\*

SECTION 26 05 19  
(16120)  
WIRE AND CABLE

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work included:

1. Building wire.
2. Wiring connections and terminations.

B. Related work:

1. Other sections of the *Specifications*, not referenced below, shall also apply to the extent required for proper performance of this work.
2. *Section 26 05 26: Grounding and Bonding for Electrical Systems*
3. *Section 26 05 33: Raceways and Boxes for Electrical Systems*
4. *Section 26 05 53: Electrical Identification*

C. References:

1. NEMA WC 70/ICEA S-95-658-1999 – Standard for Non-shielded Power Cable Rated 2000 Volts or Less for Distribution of Electrical Energy.

1.02 SUBMITTALS

A. Comply with provisions of *Section 01 33 23, Shop Drawings, Product Data and Samples*.

B. Manufacturer's product data:

1. Complete list of all materials proposed to be furnished and installed under this section.
2. Specifications and other data required to demonstrate compliance with the specified requirements.

- C. Shop drawings showing precise dimensions of the work of this section, and all other data needed to ensure proper and adequate provisions in construction to accommodate the work of this section.
- D. Manufacturer's recommended installation procedures.

#### 1.03 QUALITY ASSURANCE

- A. Qualifications of manufacturer:
  - 1. Products used in the work of this section shall be produced by manufacturers regularly engaged in the manufacture of similar items and with a history of successful production acceptable to the *ENGINEER*.
- B. Qualifications of workmen:
  - 1. Provide at least one person who shall be present at all times during execution of the work of this section, who shall be thoroughly familiar with the specified requirements and the materials and methods needed for their execution, and who shall direct all work performed under this section.
  - 2. Provide adequate numbers of workmen skilled in the necessary crafts and properly informed of the method and materials to be used.
  - 3. In acceptance or rejection of the work of this section, the *ENGINEER* will make no allowance for lack of skill on the part of workmen.
- C. Basis of acceptance:
  - 1. The manufacturer's installation instructions will provide the basis for acceptance or rejection of the work performed under this section.

#### 1.04 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Comply with provisions of *Section 01 66 00, Storage and Protection*.
- B. Protection: Use all means necessary to protect the materials of this section before, during, and after installation and to protect the installed work and materials of all other trades.

- C. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of the *ENGINEER* and at no additional cost to the *OWNER*.
- D. Delivery and storage: Deliver all materials to the job site in their original unopened containers with all labels intact and legible at time of use. Store in strict accordance with the manufacturer's recommendations as approved by the *ENGINEER*.

#### 1.05 WARRANTY AND WARRANTY REPAIRS

- A Warranties shall be provided as specified in *Section 01 78 36, Guarantees*. A copy of the manufacturer's warranty shall accompany the shop drawing submittal.
- B The *CONTRACTOR* and/or equipment manufacturer shall be responsible for all costs of warranty repair work including removal, shipping, reinstallation and re-start-up during the maintenance period.

### PART 2 - PRODUCTS

#### 2.01 GENERAL

- A. Products: Whenever materials or equipment are described using a certain brand, make, supplier, manufacturer or by specification, such naming shall be regarded as a standard and be intended to convey function, design features, general style, type, materials of construction, character and quality of material or equipment, serviceability and other essential characteristics inherent in the named product.
- B. Other materials may be considered by the *ENGINEER* in accordance with the provisions of *Section 01 25 13, Substitutions*.
- C. Acceptable manufacturers:
  - 1. Belden Cable Company
  - 2. General Cable Company
  - 3. Okonite Cable Company
  - 4. Triangle - PWC Inc.
  - 5. Or equivalent.

## 2.02 BUILDING WIRE

### A. Single conductor power cable:

1. Power cable #12 AWG to #6 AWG:
  - a. Conductor: Soft drawn copper. #12 solid, #10 through #6 Class B stranding.
  - b. Insulation: Crosslinked polyethylene, 600 volt, 90°C dry, 75°C wet.
  - c. Jacket: None.
  - d. UL Type: XHHW.
  - e. Identification (minimum): Conductor size, voltage rating, UL listing, and manufacturer.
  - f. Application: Power feeders from motor starters and panelboards to motors, lighting, and power utilizing appliances, via underground and exposed conduit systems.

## 2.03 SPLICES AND TERMINALS

### A. Twist-on wire connectors:

1. Wire connectors shall have an insulated case and a fixed square wire spring to assure gripping action on conductors.
2. Connectors shall be rated 600 volts.

### B. Mechanical split bolt connectors shall be Bundy Type KS Service or equal manufactured from high strength copper alloy.

### C. Compression type sleeve connectors:

1. Wire sizes #22 AWG to #8 AWG. Sleeves shall be T&B STA-KON or equal nylon insulated butt type splices with insulation support. Splices shall be manufactured from high conductivity electrolytic copper and shall be color coded by wire size.



2. Wires sizes #6 AWG and larger. Sleeves shall be T&B or equal compression sleeves manufactured from high conductivity wrought copper with electro tin plate finish.
  3. Compression type splices are to be used on stranded wire only.
- D. Compression type terminals:
1. Wire sizes #16 to #8 AWG. Terminals shall be T&B STA-KON or equal nylon insulated ring tongue terminals with insulation support.
  2. Wire sizes #6 AWG and larger. Terminals shall be T&B or equal compression type terminals with a one-hole tongue manufactured from high conductivity wrought copper with electro tin plate finish.
  3. Compression type terminals are to be used on stranded wire only.
- E. Heat-shrink splice materials:
1. Heat-shrink materials shall be used for both insulating splices and for maintaining moisture and flame resistance of power cables. Material shall be Raychem Type WCSF or equal, sized to match conductors being spliced.

#### 2.04 OTHER MATERIALS

- A. All other materials, not specifically described but required for a complete and proper installation of the work of this section, shall be new, first quality of their respective kinds, and as selected by the *CONTRACTOR* subject to the approval of the *ENGINEER*.

### PART 3 - EXECUTION

#### 3.01 EXAMINATION

- A. Prior to installation of the work of this section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.
- B. Verify that work may be completed in strict accordance with the original design and with the manufacturer's recommendations as approved by the *ENGINEER*.
- C. Do not proceed until unsatisfactory conditions are corrected.

### 3.02 INSTALLATION

#### A. General wiring methods:

1. Use no wire smaller than #12 AWG for power and lighting circuits, and no wire smaller than #14 AWG for control circuits.
2. Use #10 AWG conductor for 20 ampere, 120 volt branch circuit home runs longer than 75 feet, and for 20 ampere, 277 volt branch circuit home runs longer than 200 feet.
3. Place an equal number of conductors for each phase of a circuit in same raceway or cable.
4. Splice only in junction or outlet boxes.
5. Neatly train and lace wiring inside boxes, equipment, and panelboards.
6. Make conductor lengths equal for parallel circuits.

#### B. Wiring installation in raceways:

1. Pull all conductors into a raceway at the same time. Use UL listed wire-pulling lubricant for pulling #4 AWG and larger wires.
2. Install wire in raceway after interior of building has been physically protected from the weather and all mechanical work likely to injure conductors has been completed.
3. Completely and thoroughly swab new raceway systems before installing conductors.

#### C. Cable installation:

1. Provide protection for exposed cables where subject to damage.
2. Support cables above accessible ceilings; do not rest on ceiling tiles. Use spring metal clips or plastic cable ties to support cables from structure. Include bridle rings or drive rings.
3. Use suitable cable fittings and connectors.
4. Install cable per manufacturer's instructions.

D. Wiring connections and terminations:

1. Splice only in accessible junction boxes, and only when unavoidable.
2. Splices shall be made in accordance with manufacturer's instructions.
3. Use solderless pressure connectors with insulating covers for solid copper wire splices and taps, #10 AWG and smaller. Tape connector in wet areas.
4. Use split-bolt connectors for copper wire taps, #8 AWG and larger. Tape uninsulated conductors and connectors with electrical tape to 150 percent of the insulation value of conductor.
5. Use butt-type compression sleeve connectors for in-line splices of stranded wire. Tape connector in wet areas.
6. Thoroughly clean wires before installing lugs and connectors.
7. Make splices, taps and terminations to carry full ampacity of conductors without perceptible temperature rise.
8. Terminate spare conductors with electrical tape.
9. Splices in underground cables and splices installed in underground manholes shall be avoided. If unavoidable, splices shall be made with long barrel compression type butt splices. Each splice shall be insulated using a Raychem WCSF, or equal, heat-shrink sleeve. All splices shall be supported and not allowed to lay in the bottom of handholes and manholes. Splices shall not be allowed in conduits or ducts.
10. Use insulated butt-type splices for stranded wires #22 AWG to #8 AWG. Use long barrel type two way compression connectors for butt splices of #6 AWG and larger cables. Insulate each splice with 600 volt rated heat-shrink tubing, or tape splice with electrical tape to 150 percent of the insulation value of conductor. Provide heat-shrink tubing for cables with overall jacket to maintain jacket integrity.
11. Use compression type one-hole terminals for connection to motors for stranded wire #12 AWG and larger. Connect the terminals of the motor to the cable terminals of the feeder cable using stainless steel nuts, bolts and lockwashers. Insulate the connection using 600 volt heat-shrink sleeves or tape to 150% of conductor insulation value. Use two-hole terminals for larger cable sizes if two-hole terminals are provided with the motor leads.

### 3.03 CLEANING

- A. Comply with requirements of *Section 01 74 00, Cleaning and Restorations*.
- B. Remove and dispose of all construction debris.

### 3.04 FIELD QUALITY CONTROL

- A. Upon completion of this portion of the work and prior to acceptance by the *OWNER*, make all required tests and adjustments for free and smooth operation.
- B. Secure all approvals from agencies having jurisdiction.
- C. Field inspection and testing will be performed under provisions of this specification.
- D. Inspect wire and cable for physical damage and proper connection.
- E. Torque test conductor connections and terminations to manufacturer's recommended values.
- F. Perform continuity test on all power and equipment branch circuit conductors. Verify proper phasing connections.

## PART 4 - PAYMENT

### 4.01 WIRE AND CABLE

- A. Quantity and Payment: No separate payment shall be made for this item. Include all costs for *WIRE AND CABLE* in the prices bid for the various related items of work as designated in the Proposal.

\*\*\*\*END OF SECTION\*\*\*\*

SECTION 26 05 26  
(16450)  
GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Work included:
  - 1. Electrical equipment and raceway grounding and bonding.
- B. Related work:
  - 1. Other sections of the *Specifications*, not referenced below, shall also apply to the extent required for proper performance of this work.
  - 2. *Section 26 05 19: Wire and Cable*
- C. References:
  - 1. ANSI/NFPA 70 National Electrical Code Article 250 "Grounding".

1.02 SYSTEM DESCRIPTION

- A. Maintain the integrity and continuity of the existing grounding system throughout the construction period.
- B. Ground each separately-derived system neutral to facility ground system.
- C. Ground each electrical component ground connection point to the facility grounding system.
- D. Bond together system and equipment neutrals, service equipment enclosures, exposed non-current carrying metal parts of electrical equipment, metal raceway systems, grounding conductor in raceways and cables, receptacle ground connectors, ground rods and plumbing systems. Bond transformer secondary neutral to transformer enclosure.

### 1.03 SUBMITTALS

- A. Comply with provisions of *Section 01 33 23, Shop Drawings, Product Data and Samples*.
- B. Manufacturer's product data:
  - 1. Complete list of all materials proposed to be furnished and installed under this section.
  - 2. Specifications and other data required to demonstrate compliance with the specified requirements.
- C. Shop drawings:
  - 1. Show precise dimensions of the work of this section, and all other data needed to ensure proper and adequate provisions in construction to accommodate the work of this section.
  - 2. Indicate location of system grounding electrode connections, and routing of grounding electrode conductor.

### 1.04 QUALITY ASSURANCE

- A. Qualifications of manufacturer:
  - 1. Products used in the work of this section shall be produced by manufacturers regularly engaged in the manufacture of similar items and with a history of successful production acceptable to the *ENGINEER*.
- B. Qualifications of workmen:
  - 1. Provide at least one person who shall be present at all times during execution of the work of this section, who shall be thoroughly familiar with the specified requirements and the materials and methods needed for their execution, and who shall direct all work performed under this section.
  - 2. Provide adequate numbers of workmen skilled in the necessary crafts and properly informed of the method and materials to be used.
  - 3. In acceptance or rejection of the work of this section, the *ENGINEER* will make no allowance for lack of skill on the part of workmen.

C. Basis of acceptance:

1. The manufacturer's installation instructions will provide the basis for acceptance or rejection of the work performed under this section.

1.05 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Comply with provisions of *Section 01 66 00, Storage and Protection*.
- B. Protection: Use all means necessary to protect the materials of this section before, during, and after installation and to protect the installed work and materials of all other trades.
- C. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of the *ENGINEER* and at no additional cost to the *OWNER*.
- D. Delivery and storage: Deliver all materials to the job site in their original unopened containers with all labels intact and legible at time of use. Store in strict accordance with the manufacturer's recommendations as approved by the *ENGINEER*.

1.06 WARRANTY AND WARRANTY REPAIRS

- A. Warranties shall be provided as specified in *Section 01 78 36, Guarantees*. A copy of the manufacturer's warranty shall accompany the shop drawing submittal.
- B. The *CONTRACTOR* and/or equipment manufacturer shall be responsible for all costs of warranty repair work including removal, shipping, reinstallation and re-start-up during the maintenance period.

PART 2 - PRODUCTS

2.01 GENERAL

- A. Products: Whenever materials or equipment are described using a certain brand, make, supplier, manufacturer or by specification, such naming shall be regarded as a standard and be intended to convey function, design features, general style, type, materials of construction, character and quality of material or equipment, serviceability and other essential characteristics inherent in the named product.

- B. Other materials may be considered by the *ENGINEER* in accordance with the provisions of *Section 01 25 13, Substitutions*.

## 2.02 MATERIALS

- A. Ground rods: Copper-encased steel, ¾-inch diameter, minimum length 10 feet.
- B. Ground wire: Soft drawn copper, Class B stranding, green colored PVC insulation. Buried ground wires shall be uninsulated.
- C. Grounding clamps: Ground rods and grounding clamps shall be cast, high-copper content bronze alloy.

## 2.03 OTHER MATERIALS

- A All other materials, not specifically described but required for a complete and proper installation of the work of this section, shall be new, first quality of their respective kinds, and as selected by the *CONTRACTOR* subject to the approval of the *ENGINEER*.

## PART 3 - EXECUTION

### 3.01 EXAMINATION

- A. Prior to installation of the work of this section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.
- B. Verify that work may be completed in strict accordance with the original design and with the manufacturer's recommendations as approved by the *ENGINEER*.
- C. Do not proceed until unsatisfactory conditions are corrected.

### 3.02 INSTALLATION

- A. Provide a separate, insulated equipment grounding conductor in feeder and branch circuits. Terminate each end on a grounding lug, bus, or bushing.



- B. Connect equipment grounding conductors to existing ground loop using exothermal welds. Verify the integrity of the ground loop or grounding conductor connections to the ground rods. Where loose, corroded or otherwise high-resistance or faulty connections are detected, repair or replace connections to restore integrity of grounding system.
- C. Size grounding conductors in accordance with the National Electrical Code.
- D. Connections to reinforcing steel, structural steel and buried ground conductors shall be made using exothermal welds.

### 3.03 CLEANING

- A. Comply with requirements of *Section 01 74 00, Cleaning and Restorations*.
- B. Remove and dispose of all debris.

### 3.04 TESTS

- A. Upon completion of this portion of the work and prior to acceptance by the *OWNER*, make all required tests and adjustments for free and smooth operation.
- B. Secure all approvals from agencies having jurisdiction.
- C. Field quality control:
  - 1. Inspect grounding and bonding system conductors and connections for tightness and proper installation.
  - 2. Measure ground resistance from system neutral connection at service entrance to convenient ground reference point using suitable ground testing equipment. Resistance shall not exceed 5 ohms.

## PART 4 - PAYMENT

### 4.01 GROUNDING & BONDING FOR ELECTRICAL SYSTEMS

- A. Quantity and Payment: No separate payment shall be made for this item. Include all costs for *GROUNDING & BONDING FOR ELECTRICAL SYSTEMS* in the prices bid for the various related items of work as designated in the Proposal.

\*\*\*\*END OF SECTION\*\*\*\*



SECTION 26 05 29  
(16190)  
HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Work included:
  - 1. Conduit and equipment supports.
  - 2. Fastening hardware.
- B. Related work:
  - 1. Other sections of the *Specifications*, not referenced below, shall also apply to the extent required for proper performance of this work.
  - 2. *Section 26 05 33: Raceways and Boxes for Electrical Systems*
  - 3. *Section 26 28.16 10: Disconnect Switches*
- C. References:
  - 1. MFMA-1 - Metal Framing Manufacturers Association Standard

1.02 SUBMITTALS

- A. Comply with provisions of *Section 01 33 23, Shop Drawings, Product Data and Samples*.
- B. Manufacturer's product data:
  - 1. Complete list of all materials proposed to be furnished and installed under this section.
  - 2. Specifications and other data required to demonstrate compliance with the specified requirements.
- C. Shop drawings showing precise dimensions of the work of this section, and all other data needed to ensure proper and adequate provisions in construction to accommodate the work of this section.

- D. Manufacturer's recommended installation procedures.

### 1.03 QUALITY ASSURANCE

- A. Qualifications of manufacturer:

1. Products used in the work of this section shall be produced by manufacturers regularly engaged in the manufacture of similar items and with a history of successful production acceptable to the *ENGINEER*.

- B. Qualifications of workmen:

1. Provide at least one person who shall be present at all times during execution of the work of this section, who shall be thoroughly familiar with the specified requirements and the materials and methods needed for their execution, and who shall direct all work performed under this section.
2. Provide adequate numbers of workmen skilled in the necessary crafts and properly informed of the method and materials to be used.
3. In acceptance or rejection of the work of this section, the *ENGINEER* will make no allowance for lack of skill on the part of workmen.

- C. Basis of acceptance:

1. The manufacturer's installation instructions will provide the basis for acceptance or rejection of the work performed under this section.

### 1.04 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Comply with provisions of *Section 01 66 00, Storage and Protection*.
- B. Protection: Use all means necessary to protect the materials of this section before, during, and after installation and to protect the installed work and materials of all other trades.
- C. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of the *ENGINEER* and at no additional cost to the *OWNER*.

- D. Delivery and storage: Deliver all materials to the job site in their original unopened containers with all labels intact and legible at time of use. Store in strict accordance with the manufacturer's recommendations as approved by the *ENGINEER*.

#### 1.05 WARRANTY AND WARRANTY REPAIRS

- A. Warranties shall be provided as specified in *Section 01 78 36, Guarantees*. A copy of the manufacturer's warranty shall accompany the shop drawing submittal.
- B. The *CONTRACTOR* and/or equipment manufacturer shall be responsible for all costs of warranty repair work including removal, shipping, reinstallation and re-start-up during the maintenance period.

### PART 2 - PRODUCTS

#### 2.01 GENERAL

- A. Products: Whenever materials or equipment are described using a certain brand, make, supplier, manufacturer or by specification, such naming shall be regarded as a standard and be intended to convey function, design features, general style, type, materials of construction, character and quality of material or equipment, serviceability and other essential characteristics inherent in the named product.
- B. Other materials may be considered by the *ENGINEER* in accordance with the provisions of *Section 01 25 13, Substitutions*.
- C. Support systems shall be adequate for weight of equipment and conduit, including wiring, which they carry.

#### 2.02 ELECTRICAL MOUNTING CHANNEL SYSTEMS

- A. Pre-galvanized steel: Pre-galvanized channel shall be made from steel in accordance with ASTM A446, Grade A and mill-galvanized in accordance with ASTM A525, Coating Designation G90.
- B. Hot-dip galvanized after fabrication steel: Channels hot-dip galvanized after fabrication shall be made from steel meeting the minimum requirements of ASTM A570, Grade 33. Sixteen-gauge and lighter channel shall be ASTM A611, Grade C steel. Channels shall be hot-dip galvanized after fabrication in

accordance with ASTM A123. All ¼" fittings shall be formed from ASTM A635 steel and hot-dip galvanized after fabrication in accordance with ASTM A123.

- C. Stainless steel: Stainless steel channel and accessories shall be of AISI Type 304 or Type 316 stainless steel.
- D. Green epoxy: Painted channel shall meet the minimum mechanical properties of ASTM A570 Grade 33 steel and painted with electrodeposited, epoxy-base dark green paint. All ¼" accessories shall be produced from ASTM A635 steel and painted with electrodeposited, epoxy base dark green paint.
- E. Dimensions: Metal framing channel shall be cold formed from 12-gauge steel. All channels shall have a nominal overall width of 1½" and have a ⅞" slot face opening. Standard lengths are to be 10 and 20 foot. All testing and tolerancing shall be in accordance with the latest MFMA-1 Standard.
- F. Hardware: Corrosion resistant. Hot-dip galvanized or stainless steel in accordance with ASTM A153.

## 2.03 PLYWOOD BACKBOARDS

- A. Material: ¾" thick, A-D, Group 1, interior. Refer to drawings for size of backboard, or as required.

## 2.04 OTHER MATERIALS

- A. All other materials, not specifically described but required for a complete and proper installation of the work of this section, shall be new, first quality of their respective kinds, and as selected by the *CONTRACTOR* subject to the approval of the *ENGINEER*.

# PART 3 - EXECUTION

## 3.01 EXAMINATION

- A. Prior to installation of the work of this section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.
- B. Verify that work may be completed in strict accordance with the original design and with the manufacturer's recommendations as approved by the *ENGINEER*.

- C. Do not proceed until unsatisfactory conditions are corrected.

### 3.02 INSTALLATION

- A. Coordinate size, shape and location of concrete pads with *Section 03 30 00, Concrete*.
- B. Load capability of the supporting system shall be determined by the Contractor for present and future, if indicated, equipment and the system shall be designed to accommodate determined loads. However, as a minimum, the support channels shall be minimum 12-gauge with a minimum section width of 1½ inches deep.
- C. Provide all anchor bolts, steel bracing, and accessories required for a sound installation that shall withstand the stresses of the environment, wind loading, and equipment operation and maintenance.
- D. Fasten hanger rods, conduit clamps, and outlet and junction boxes to building structure using expansion anchors, beam clamps or spring steel clips as appropriate.
- E. Use toggle bolts or hollow wall fasteners in hollow masonry, plaster, or gypsum board partitions and walls; expansion anchors or preset inserts in solid masonry walls; self-drilling anchors or expansion anchors on concrete surfaces; sheet metal screws in sheet metal studs; and wood screws in wood construction.
- F. Do not fasten supports to piping, ductwork, mechanical equipment, or conduit.
- G. Do not use powder-actuated anchors.
- H. Do not drill structural steel members.
- I. Fabricate supports from structural steel or steel channel, rigidly welded or bolted to present a neat appearance. Use hexagon head bolts with spring lock washers under all nuts.
- J. In wet locations install free-standing electrical equipment on concrete housekeeping pads.
- K. Install surface-mounted cabinets, panelboards, motor control enclosures and disconnect switches with a minimum of four anchors each.
- L. Bridge studs top and bottom with channels to support flush-mounted cabinets and panelboard in stud walls.

- M. Use galvanized steel or stainless steel unistrut for outdoor locations. Use epoxy green unistrut for indoor locations.
- N. Finish paint sides and edges of termination backboards with two coats of durable black enamel under provisions of *Section 09 90 00, Painting* prior to installation. Fasten backboard to wall using electrical mounting channels.

### 3.03 CLEANING

- A. Comply with requirements of *Section 01 74 00, Cleaning and Restorations*.
- B. Remove and dispose of all debris.

## PART 4 - PAYMENT

### 4.01 SUPPORTING DEVICES

- A. Quantity and Payment: No separate payment shall be made for this item. Include all costs for *SUPPORTING DEVICES* in the prices bid for the various related items of work as designated in the Proposal.

\*\*\*\*END OF SECTION\*\*\*\*



SECTION 26 05 33  
(16111)  
RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work included:

1. Rigid metal conduit and fittings.

B. Related work:

1. Other sections of the *Specifications*, not referenced below, shall also apply to the extent required for proper performance of this work.
2. *Section 26 05 03: Equipment Wiring Systems*
3. *Section 26 05 19: Wire and Cable*
4. *Section 26 05 26: Grounding and Bonding for Electrical Systems*
5. *Section 26 05 29: Hangers and Supports for Electrical Systems*
6. *Section 26 05 53: Electrical Identification*

C. References:

1. ANSI C80.1 - Rigid Steel Conduit, Zinc-Coated.
2. ANSI C80.3 - Electrical Metallic Tubing, Zinc-Coated.
3. ANSI C80.5 – Rigid Aluminum Conduit.
4. ANSI/NEMA FB 1 - Fittings and Supports for Conduit and Cable Assemblies.
5. NEMA RN 1 - PVC Externally-Coated Galvanized Rigid Steel Conduit and Electrical Metallic Tubing.
6. NEMA TC 2 - Electrical Plastic Tubing (EPT) and Electrical Plastic Conduit (EPC-40 and EPC-80).

7. NEMA TC 3 - PVC Fittings for Use with Rigid PVC Conduit and Tubing.

1.02 SUBMITTALS

- A. Comply with provisions of *Section 01 33 23, Shop Drawings, Product Data and Samples*.
- B. Manufacturer's product data:
  - 1. Complete list of all materials proposed to be furnished and installed under this section.
  - 2. Specifications and other data required to demonstrate compliance with the specified requirements.

1.03 QUALITY ASSURANCE

- A. Qualifications of Workmen:
  - 1. Provide at least one person who shall be present at all times during execution of the work of this section, who shall be thoroughly familiar with the specified requirements and the materials and methods needed for their execution, and who shall direct all work performed under this section.
  - 2. Provide adequate numbers of workmen skilled in the necessary crafts and properly informed of the method and materials to be used.
  - 3. In acceptance or rejection of the work of this section, the *ENGINEER* will make no allowance for lack of skill on the part of workmen.

1.04 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Comply with provisions of *Section 01 66 00, Storage and Protection*.
- B. Protection: Use all means necessary to protect the materials of this section before, during, and after installation and to protect the installed work and materials of all other trades.

- C. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of the *ENGINEER* and at no additional cost to the *OWNER*.
- D. Delivery and storage: Deliver all materials to the job site in their original unopened containers with all labels intact and legible at time of use. Store in strict accordance with the manufacturer's recommendations as approved by the *ENGINEER*.

#### 1.05 WARRANTY AND WARRANTY REPAIRS

- A. Warranties shall be provided as specified in *Section 01 78 36, Guarantees*. A copy of the manufacturer's warranty shall accompany the shop drawing submittal.
- B. The *CONTRACTOR* and/or equipment manufacturer shall be responsible for all costs of warranty repair work including removal, shipping, reinstallation and re-start-up during the maintenance period.

### PART 2 - PRODUCTS

#### 2.01 GENERAL

- A. Products: Whenever materials or equipment are described using a certain brand, make, supplier, manufacturer or by specification, such naming shall be regarded as a standard and be intended to convey function, design features, general style, type, materials of construction, character and quality of material or equipment, serviceability and other essential characteristics inherent in the named product.
- B. Other materials may be considered by the *ENGINEER* in accordance with the provisions of *Section 01 25 13, Substitutions*.

#### 2.02 RIGID METAL CONDUIT

- A. Manufacturers:
  - 1. Wheatland Tube Company
  - 2. Allied Tube Conduit
  - 3. Republic Conduit
  - 4. Or equivalent.
- B. Rigid Aluminum Conduit: ANSI C80.5.

- C. Fittings and Conduit Bodies: NEMA FB 1; material to match conduit.

## 2.03 PULL AND JUNCTION BOXES

- A. Acceptable manufacturers:

1. Carlon Electrical Products
2. Hubbell Wiring Devices
3. Thomas & Betts Corp.
4. Walker Systems Inc.
5. The Wiremold Co.
6. Or equivalent.

- B. Surface Mounted Cast Metal Box: NEMA 250, Type [4] [4X] [6]; flat-flanged, surface mounted junction box:

1. Material: [Galvanized cast iron] [Cast aluminum].
2. Cover: Furnish with ground flange, neoprene gasket, and stainless steel cover screws.

## 2.04 OTHER MATERIALS

- A All other materials, not specifically described but required for a complete and proper installation of the work of this section, shall be new, first quality of their respective kinds, and as selected by the *CONTRACTOR* subject to the approval of the *ENGINEER*.

## PART 3 - EXECUTION

### 3.01 EXAMINATION

- A. Prior to installation of the work of this section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.
- B. Verify that work may be completed in strict accordance with the original design and with the manufacturer's recommendations as approved by the *ENGINEER*.
- C. Do not proceed until unsatisfactory conditions are corrected.

### 3.02 EXISTING CONDITIONS

- A. Remove exposed abandoned raceway[, including abandoned raceway above accessible ceiling finishes]. Cut raceway flush with walls and floors, and patch surfaces.
- B. Remove concealed abandoned raceway to its source.
- C. Disconnect abandoned outlets and remove devices. Remove abandoned outlets when raceway is abandoned and removed. Install blank cover for abandoned outlets not removed.
- D. Maintain access to existing boxes and other installations remaining active and requiring access. Modify installation or provide access panel.
- E. Extend existing raceway and box installations using materials and methods [compatible with existing electrical installations, or] as specified.
- F. Clean and repair existing raceway and boxes to remain or to be reinstalled.

### 3.03 CONDUIT SIZING, ARRANGEMENT, AND SUPPORT

- A. Size conduit in accordance with the latest issue of the National Electrical Code unless a larger size is shown on the drawings. Use ¾-inch minimum size where exposed and 1" minimum size where buried below grade or in concrete slab.
- B. Arrange conduit to maintain working clearance in compliance with National Electrical Code, Paragraphs 110.26 through 110.34, and to present a neat appearance.
- C. Route exposed conduit parallel or perpendicular to walls, building lines and/or adjacent piping.
- D. Maintain a minimum 6-inch clearance between conduit and piping. Maintain 12-inch clearance between conduit and heat sources such as flues, steam pipes, or heating appliances.
- E. Arrange conduit supports to prevent distortion of conduit alignment by wire-pulling operations. Fasten conduit using galvanized straps, lay-in adjustable hangers, clevis hangers, or bolted split stamped galvanized hangers.

- F. Group conduit in parallel runs where practical and provide conduit rack constructed of galvanized steel channel "Unistrut" in accordance with *Section 26 05 29, Hangers and Supports for Electrical Systems*.
- G. Do not fasten conduit with wire or perforated pipe straps. Remove all wire used for temporary conduit support during construction, before conductors are pulled.
- H. Support conduit at a maximum of 8 feet on center.
- I. Provide a short length (approximately 36") of flexible liquid-tight metal conduit at motors or other equipment as required to accommodate vibration, for ease of adjustment and future maintenance.
- J. Conduits shall be supported independently of electrical enclosures. Physical stresses caused by vibration or thermal expansion shall not be transmitted to or from electrical enclosures or rotating equipment.
- K. Where conduits are utilized to carry/enclose cables exiting a cable-tray, each conduit shall be rigidly and permanently attached to the top of the cable-tray side rail, and a suitable bending radius provided. Conduit connections through the bottom or side rails of the cable tray are unacceptable.
- L. Conduits shall enter field equipment enclosures through the back, side or bottom (not top) via weatherproof hubs. Conduit entry shall be near the wiring terminal point and not obstruct access to, or removal of, components. Top entry of conduit is permitted with prior written approval, and only if a vapor seal is provided directly above the weatherproof hub.
- M. Conduits may enter pull or terminal boxes at any location except through a removable cover. Provide adequate protection against moisture accumulation and dripping on exposed terminals.
- N. Each end of all conduit runs terminating in a NEMA 1 general purposed or NEMA 3R raintite sheet-metal box or cabinet shall be provided with a galvanized or sherardized lock nut inside and outside of the box and with an approved insulated bushing. Where grounding requirements dictate, provide a grounding bushing inside of the box or cabinet.
- O. Each end of all conduit runs terminating in a NEMA 4, NEMA 12 or NEMA 13 sheet metal box or cabinet shall be provided with a watertight hub.

### 3.04 CONDUIT INSTALLATION

- A. Cut each conduit square using a saw or pipe-cutter; ream conduit to de-burr cut ends. Field-cut threads shall be of the same type and length as factory-cut threads. No “running threads” shall be permitted. For galvanized conduit, apply a zinc-base paint on the threads prior to assembly.
- B. Bring conduit to the shoulder of fittings and couplings and fasten securely. All conduit connections shall be arranged and installed to be electrically continuous, and to provide a positive electrical ground.
- C. Use conduit hubs for fastening conduit to cast boxes, and for fastening conduit to sheet-metal boxes in damp or wet locations.
- D. Install no more than the equivalent of three 90-degree bends in any run of conduit. Where more bends would be required, provide a pull box. In long conduit runs, pull boxes or expansion fittings with ground straps shall be provided every 125 feet.
- E. Use conduit bodies to make sharp changes in direction, such as around beams.
- F. Use hydraulic one-shot conduit bender or factory elbows for bends in conduit larger than 2-inch. Where possible, conduit bends shall be of the long radius type, machine made, without kinks, flattening, or crushing. Field bends shall be made only where unavoidable. Field bends shall be made by means of mechanical benders designed to produce radii required by the National Electrical Code.
- G. Avoid moisture traps where possible. Where unavoidable, provide a junction box with a drain fitting at each conduit low point. Slope all conduit toward conduit system low point for complete drainage.
- H. Each complete run of conduit shall be thoroughly cleaned, and no cable or wire shall be pulled until the run is completely free of water and other foreign matter. After cleaning, each conduit shall be sealed and capped with a galvanized or brass fitting and conduit bushing, or by means of plastic caps or other approved methods until wire or cable is to be pulled. The intent is to protect installed conduit against the entrance of dirt or moisture during construction. Permanently cap all spare conduits.
- I. Provide #12 AWG insulated conductor or suitable pull string in each empty conduit, except for sleeves and nipples.

- J. Install expansion fittings with grounding jumper where conduit crosses building expansion joints. Also, install expansion fittings in straight runs of 125 feet or more and at 125-foot intervals in runs exceeding 250 feet in unheated areas.
- K. Where conduit penetrates fire-rated walls or floors, seal the opening around each conduit with UL listed foamed silicone elastomer compound. Seal the conduit openings to prevent vapors from entering the building via the conduit.
- L. Route conduit through roof openings for piping and ductwork where possible; otherwise, route through roof jack in accordance with Drawing details.
- M. Use PVC-coated rigid steel factory elbows for bends in PVC conduit runs longer than 100 feet, or in PVC conduit runs, which have more than two bends regardless of length.
- N. Wipe PVC conduit clean and dry before joining. Apply full even coat of cement to entire area that will be inserted into fitting. Let joint cure for 20 minutes minimum before applying stress to the joint.
- O. Repair nicks, scratches, abrasions and/or other damage to PVC-coated conduit using appropriate products offered by the conduit manufacturer for the intended purpose.
- P. Where corrosive or potentially hazardous vapors are present, provide approved cable seals in all conduits entering panels, control stations and all other electrical equipment to prevent migration of detrimental vapors into electrical enclosures.
- Q. Fittings or boxes shall be installed where necessary for pulling, even though not shown on the drawings. Conduit systems shall have a sufficient number of supports to provide a rigid installation. Conduits may be bolted or clamped to building members or structural framework. Welding of conduits or conduit fittings directly to structural steel shall not be permitted. Any galvanizing or paint on conduit, conduit fittings, or boxes damaged during installation shall be repaired by the Contractor.

### 3.05 COORDINATION OF BOX LOCATIONS

- A. Provide electrical boxes as shown on Drawings, and as required for splices, taps, wire pulling, equipment connections, and code compliance.
- B. Electrical box locations shown on *Contract Drawings* are approximate unless dimensioned. Verify location of outlets in offices and work area prior to rough-in.



- C. Locate and install boxes to allow access.
- D. Locate and install to maintain headroom and to present a neat appearance.

### 3.06 PULL AND JUNCTION BOXES

- A. Locate pull boxes and junction boxes above accessible ceilings or in unfinished areas.
- B. Support pull and junction boxes independent of conduit.
- C. Refer to pull box schedule on drawings for box identification and enclosure type.

### 3.07 CLEANING

- A. Comply with requirements of *Section 01 74 00, Cleaning and Restorations*.
- B. Remove and dispose of all debris.

## PART 4 - PAYMENT

### 4.01 RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

- A. Quantity and Payment: No separate payment shall be made for this item. Include all costs for *RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS* in the prices bid for the various related items of work as designated in the Proposal.

\*\*\*\*END OF SECTION\*\*\*\*



SECTION 26 05 53  
(16195)  
ELECTRICAL IDENTIFICATION

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work included:

1. Wire and cable markers.
2. Conduit labels.
3. Nameplates and labels.

B. Related work:

1. Other sections of the *Specifications*, not referenced below, shall also apply to the extent required for proper performance of this work.
2. *Section 26 05 03: Equipment Wiring Systems*
3. *Section 26 05 19: Wire and Cable*
4. *Section 26 05 33: Raceways and Boxes for Electrical Systems*

1.02 SUBMITTALS

A. Comply with provisions of *Section 01 33 23, Shop Drawings, Product Data and Samples*.

B. Manufacturer's product data:

1. Complete list of all materials proposed to be furnished and installed under this section.
2. Specifications and other data required to demonstrate compliance with the specified requirements.

C. Include schedule for nameplates and tape labels.

- D. Manufacturer's recommended installation procedures.

### 1.03 QUALITY ASSURANCE

A. Qualifications of manufacturer:

1. Products used in the work of this section shall be produced by manufacturers regularly engaged in the manufacture of similar items and with a history of successful production acceptable to the *ENGINEER*.

B. Qualifications of workmen:

1. Provide at least one person who shall be present at all times during execution of the work of this section, who shall be thoroughly familiar with the specified requirements and the materials and methods needed for their execution, and who shall direct all work performed under this section.
2. Provide adequate numbers of workmen skilled in the necessary crafts and properly informed of the method and materials to be used.
3. In acceptance or rejection of the work of this section, the *ENGINEER* will make no allowance for lack of skill on the part of workmen.

C. Basis of acceptance:

1. The manufacturer's installation instructions will provide the basis for acceptance or rejection of the work performed under this section.

### 1.04 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Comply with provisions of *Section 01 66 00, Storage and Protection*.
- B. Protection: Use all means necessary to protect the materials of this section before, during, and after installation and to protect the installed work and materials of all other trades.
- C. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of the *ENGINEER* and at no additional cost to the *OWNER*.
- D. Delivery and storage: Deliver all materials to the job site in their original unopened containers with all labels intact and legible at time of use. Store in

strict accordance with the manufacturer's recommendations as approved by the *ENGINEER*.

#### 1.05 WARRANTY AND WARRANTY REPAIRS

- A Warranties shall be provided as specified in *Section 01 78 36, Guarantees*. A copy of the manufacturer's warranty shall accompany the shop drawing submittal.
- B The *CONTRACTOR* and/or equipment manufacturer shall be responsible for all costs of warranty repair work including removal, shipping, reinstallation and re-start-up during the maintenance period.

### PART 2 - PRODUCTS

#### 2.01 GENERAL

- A. Products: Whenever materials or equipment are described using a certain brand, make, supplier, manufacturer or by specification, such naming shall be regarded as a standard and be intended to convey function, design features, general style, type, materials of construction, character and quality of material or equipment, serviceability and other essential characteristics inherent in the named product.
- B. Other materials may be considered by the *ENGINEER* in accordance with the provisions of *Section 01 25 13, Substitutions*.
- C. Manufacturers:
  - 1. 3M Products
  - 2. W. H. Brady
  - 3. Or equivalent

#### 2.02 WIRE AND CABLE MARKERS

- A. The alpha-numeric coding on both ends of each individual 600 Volt conductor size #6 AWG and smaller (including neutrals) shall be made using 3M printable markers catalog number PLP-WHT Series with vinyl flexible overlap or equivalent, in addition to color coding.
- B. The alpha-numeric coding on both ends of each individual 600 Volt conductor size #4 through #1/0 AWG shall be made using W. H. Brady Series 3420 wire

markers or equivalent (minimum six characters) in addition to color coding "A", "B", and "C" Phase throughout.

- C. The alpha-numeric coding on both ends of each individual 600 Volt conductor size #2/0 through #500 MCM shall be made using W. H. Brady Series 3430 wire markers or equivalent (minimum six characters) in addition to color coding "A", "B", and "C" Phase.
- D. All 5 kV power wires shall be color-coded on both ends with orange electrical tape. Each phase shall be marked with one, two, or three bands of orange tape (Phase A, B, C) and with W. H. Brady Series 3430 wire markers or equivalent (minimum six characters).
- E. All 15 kV power wires shall be color-coded on both ends with yellow electrical tape. Each phase shall be marked with one, two, or three bands of yellow tape (Phase A, B, C) and with W. H. Brady Series 3440 wire markers or equivalent (minimum six characters).
- F. All 35 kV cables shall be color-coded on both ends with red electrical tape. Each phase shall be marked with one, two, or three bands of red tape (Phase A, B, C.) and with W. H. Brady Series 3440 wire markers or equivalent.

## 2.03 CONDUIT/LABELS

- A. All raceways labels shall be multiple part chemical resistant, non-adhesive, tags as manufactured by ALMETEK INDUSTRIES, INC., "MINI-TAGS" Catalog #SV-5. Tag holders shall be black polyvinyl chloride (PVC). Tag characters shall be yellow medium density, polyethylene with black characters. Tag holders shall be vertical style and fastened to each raceway using two (2) black, ultra-violet (UV) protected, self-locking, nylon ties as manufactured by Thomas and Betts, "TYRAP", or equivalent.

## 2.04 NAMEPLATES AND LABELS

- A. Nameplates shall be made of laminated sheet plastic, 1/16-inch thick, engraved to provide black letters on a white background. The nameplates shall be made of laminated sheet plastic, 1/16-inch thick, engraved to provide black letters on a white background. The nameplates shall be fastened in place with stainless steel screws and adhesive backing. Nameplate information shall be as called out on the Contract Drawings specified herein and approved by the Engineer. The Contractor shall provide a sample and submit for approval a list of legends for nameplates he proposes to use.

- B. Panel voltage hazard labels by W. H. Brady Series 96157 or equivalent.

## 2.05 OTHER MATERIALS

- A. All other materials, not specifically described but required for a complete and proper installation of the work of this section, shall be new, first quality of their respective kinds, and as selected by the *CONTRACTOR* subject to the approval of the *ENGINEER*.

## PART 3 - EXECUTION

### 3.01 EXAMINATION

- A. Prior to installation of the work of this section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.
- B. Verify that work may be completed in strict accordance with the original design and with the manufacturer's recommendations as approved by the *ENGINEER*.
- C. Do not proceed until unsatisfactory conditions are corrected.

### 3.02 INSTALLATION

- A. General:
  - 1. Degrease and clean surfaces to receive nameplates and tape labels.
  - 2. Install nameplates and tape labels parallel to equipment lines.
  - 3. Secure nameplates to equipment fronts using aluminum, rivets. Secure nameplate to inside face of recessed panelboard doors in finished locations. Use of screws or adhesive is unacceptable.
  - 4. Embossed tape will not be permitted for identification of electrical equipment other than individual wall switches, receptacles, control device stations and instruments.
  - 5. All tags and/or nameplates shall be located in a position to be readable after completion of the installation of the equipment. Final nameplate wording will be as approved by the *ENGINEER*.

6. Provide and install nameplates for all equipment installed, and all equipment circuits modified. If a source is changed for any electrical equipment, nameplates and wire markers shall be modified for every circuit, equipment, receptacle, or device affected.

B. Wire identification:

1. All power, control, and instrumentation wire and cable installed shall be clearly and permanently labeled within six (6") inches of all electrical terminations, splices, and connections using pre-printed alpha-numeric vinyl cloth marking tags. All labeling shall conform to the alpha-numeric system approved by the Engineer during construction. Labeling shall indicate the field identification number of all wire and cable and the phase of all power connectors.
2. Provide wire markers on each conductor in panelboard gutters, pull boxes, outlet and junction boxes, and at load connection. Identify with branch circuit or feeder number for power and lighting circuits, and with control wire number as indicated on schematic and interconnection diagrams for control wiring.
3. All wire and cable furnished, installed and/or terminated under this Contract shall be externally color-coded and at all termination points, contain an alpha-numeric coding for each phase, neutral, and/or grounding conductor installed. This coding shall be used consistently throughout the power distribution system installed under this Contract.
4. All 480V power wiring phases shall be color-coded brown, orange, yellow (A, B, C) along their entire length not concealed in the conduit system.
5. All 240/120V power wires shall be color-coded black, red, white (A, B, N) along their entire length not concealed in the conduit system.
6. Terminal strips shall be clearly and permanently marked with waterproof ink or indelible pencil. Each wire shall be marked consistently throughout the entire system, using wherever possible the notation of the wires given on the manufacturer's wiring diagrams, Contractor's working drawings, as shown on the Contract Drawings and as approved by the Engineer. Each wire shall be labeled at both termination points. All wire numbers shall appear on as-built drawings before these drawings will be accepted.
7. The entire length of exposed ground conductors and the entire exposed portion in junction boxes, FD boxes, and other enclosures (not concealed by the conduit system) shall be marked with green tape along the entire length.



8. All ground wires shall be color-coded green.

C. Conduit Identification:

1. Under this Contract, the Contractor shall clearly and permanently label as specified in this Section all electrical raceways installed under *Section 25 05 33, Raceway and Boxes for Electrical Systems*, and shown on the Contract Drawings. Labels shall be installed at all raceway termination points.

D. Nameplate engraving schedule:

1. Provide nameplates to identify all electrical distribution and control equipment, and loads served. Letter height: 1/8-inch for individual switches and loads served, 1/4-inch for distribution and control equipment identification.
2. The Contractor shall furnish and install nameplates on all junction boxes, motor starters, ventilation equipment, unit heaters, control panels, transformers, panelboards, pushbuttons, indicating lights, disconnect switches, circuit breakers and any other electrical equipment installed and/or connected to under this Contract as specified herein.
3. All junction and pull boxes shall have the words "JUNCTION BOX" or "PULL BOX" on the nameplate with the individual box number listed below these words, e.g., (JBX-1) and shall be two (2") inches high by four (4") inches wide.
4. All variable frequency drives, motor starters, circuit breakers, panelboards, transformers, capacitors, disconnects, control panel and control station/pilot devices shall have the individual name as listed on the Contract Drawings and shall be one (1") inch high by three (3") inches wide.
5. All other miscellaneous equipment and motors shall have the individual name listed (as directed by the Engineer) on a one (1") inch high by two (2") inch wide nameplate.
6. Identify all panels, load centers, disconnect switches, motor starters and motor control centers with voltage rating using Brady labels.

### 3.03 CLEANING

- A. Comply with requirements of *Section 01 74 00, Cleaning and Restorations*.

- B. Remove and dispose of all debris.

PART 4 - PAYMENT

4.01 ELECTRICAL IDENTIFICATION

- A. Quantity and Payment: No separate payment shall be made for this item. Include all costs for *ELECTRICAL IDENTIFICATION* in the prices bid for the various related items of work as designated in the Proposal.

\*\*\*\*END OF SECTION\*\*\*\*

SECTION 26 28 16.10  
(16440)  
DISCONNECT SWITCHES

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work included:

1. Disconnect switches.

B. Related work:

1. Other sections of the *Specifications*, not referenced below, shall also apply to the extent required for proper performance of this work.
2. *Section 26 05 19: Wire and Cable*
3. *Section 26 05 26: Grounding and Bonding for Electrical Systems*
4. *Section 26 05 33: Raceway and Boxes for Electrical Systems*

C. References:

1. NEMA KS 1 - Enclosed Switches.
2. ANSI/UL 198C – High-capacity fuses; current limiting type.
3. ANSI/UL - Class R Fuses.

1.02 SUBMITTALS

A. Comply with provisions of *Section 01 33 23, Shop Drawings, Product Data and Samples*.

B. Manufacturer's product data:

1. Complete list of all materials proposed to be furnished and installed under this section.

2. Specifications and other data required to demonstrate compliance with the specified requirements.
- C. Shop drawings:
1. Showing precise dimensions of the work of this section, and all other data needed to ensure proper and adequate provisions in construction to accommodate the work of this section.
  2. Include outline drawings with dimensions and equipment ratings for voltage, capacity, horsepower and short circuit.
- D. Manufacturer's recommended installation procedures.

### 1.03 QUALITY ASSURANCE

- A. Qualifications of manufacturer:
1. Products used in the work of this section shall be produced by manufacturers regularly engaged in the manufacture of similar items and with a history of successful production acceptable to the *ENGINEER*.
- B. Qualifications of workmen:
1. Provide at least one person who shall be present at all times during execution of the work of this section, who shall be thoroughly familiar with the specified requirements and the materials and methods needed for their execution, and who shall direct all work performed under this section.
  2. Provide adequate numbers of workmen skilled in the necessary crafts and properly informed of the method and materials to be used.
  3. In acceptance or rejection of the work of this section, the *ENGINEER* will make no allowance for lack of skill on the part of workmen.
- C. Basis of acceptance:
1. The manufacturer's installation instructions will provide the basis for acceptance or rejection of the work performed under this section.

#### 1.04 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Comply with provisions of *Section 01 66 00, Storage and Protection*.
- B. Protection: Use all means necessary to protect the materials of this section before, during, and after installation and to protect the installed work and materials of all other trades.
- C. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of the *ENGINEER* and at no additional cost to the *OWNER*.
- D. Delivery and storage: Deliver all materials to the job site in their original unopened containers with all labels intact and legible at time of use. Store in strict accordance with the manufacturer's recommendations as approved by the *ENGINEER*.

#### 1.05 WARRANTY AND WARRANTY REPAIRS

- A. Warranties shall be provided as specified in *Section 01 78 36, Guarantees*. A copy of the manufacturer's warranty shall accompany the shop drawing submittal.
- B. The *CONTRACTOR* and/or equipment manufacturer shall be responsible for all costs of warranty repair work including removal, shipping, reinstallation and re-start-up during the warranty period.

### PART 2 - PRODUCTS

#### 2.01 GENERAL

- A. Products: Whenever materials or equipment are described using a certain brand, make, supplier, manufacturer or by specification, such naming shall be regarded as a standard and be intended to convey function, design features, general style, type, materials of construction, character and quality of material or equipment, serviceability and other essential characteristics inherent in the named product.
- B. Other materials may be considered by the *ENGINEER* in accordance with the provisions of *Section 01 25 13, Substitutions*.

## 2.02 DISCONNECT SWITCHES

- A. Double throw switch assembly: NEMA KS1 heavy duty double throw quick make, quick break manual transfer switch with externally operable handle interlocked to prevent opening front cover with switch in "ON" position. Handle lockable in "OFF" position.
- B. Rating (Amps & Volts): Per drawings.
- C. Enclosures:
  - 1. Indoor: NEMA 1 - in heated and ventilated areas.  
NEMA 12 - in process areas.
  - 2. Outdoor: NEMA 12 - field modified to suit outdoor requirements by drilling (4) 1/8" diameter weep holes in the bottom of the enclosure.  
NEMA [3R/4X] – in exposed outdoor locations.
  - 3. Or per schedule on drawings.
- D. Acceptable Manufacturers:
  - 1. Eaton/Cutler Hammer
  - 2. General Electric Company
  - 3. Square D
  - 4. Or equivalent.

## 2.03 ACCESSORIES

- A. Provide a rain hub for NEMA 3R and 4X disconnect switches.
- B. Provide a solid neutral assembly for each switch where indicated on drawings.
- C. Provide an equipment ground kit on each switch.
- D. Provide an auxiliary switch contact to disable the respective control circuit when a disconnect switch is opened. Furnish auxiliary switch contact for each position of double-throw switch.

## 2.04 OTHER MATERIALS

- A. All other materials, not specifically described but required for a complete and proper installation of the work of this section, shall be new, first quality of their respective kinds, and as selected by the *CONTRACTOR* subject to the approval of the *ENGINEER*.

## PART 3 - EXECUTION

### 3.01 EXAMINATION

- A. Prior to installation of the work of this section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.
- B. Verify that work may be completed in strict accordance with the original design and with the manufacturer's recommendations as approved by the *ENGINEER*.
- C. Do not proceed until unsatisfactory conditions are corrected.

### 3.02 INSTALLATION

- A. Install disconnect switches where indicated on Drawings.
- B. Install disconnect switches in accordance with the National Electrical Code and manufacturer's instructions.

### 3.03 CLEANING

- A. Comply with requirements of *Section 01 74 00, Cleaning and Restorations*.
- B. Remove and dispose of all debris.

## PART 4 - PAYMENT

### 4.01 DISCONNECT SWITCHES

- A. Quantity and Payment: No separate payment shall be made for this item. Include all costs for *DISCONNECT SWITCHES* in the prices bid for the various related items of work as designated in the Proposal.

\*\*\*\*END OF SECTION\*\*\*\*

