100% PROJECT MANUAL

COMMERCE 2.0 MGD GROVE CREEK WPCP

COMMERCE, GEORGIA

for

CITY OF COMMERCE

BID DOCUMENTS

March 2025

Prepared By

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GMC PROJECT NUMBER: CATL230033

STATE OF GEORGIA
GOODWYN MILLS CAWOOD, LLC
No.PEF007898
Exp.06.30.2026
CERTIFICATE OF AUTHORIZATION

GEORGIA
REGISTERED
No. PE051452
PROFESSIONAL
Graham Sizemore
03.19.2025
ENGINEER
GRAHAM S. SIZEMORE

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COMMERCE 2.0 MGD GROVE CREEK
WATER POLLUTION CONTROL PLANT

FOR

CITY OF COMMERCE

COMMERCE, GEORGIA

GMC PROJECT NO. CATL230033

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SECTION 08 71 00 - DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Mechanical door hardware for the following:

    a. Swinging doors.
    b. Sliding doors.
    c. Folding doors.

2. Cylinders for door hardware specified in other Sections.
3. Electrified door hardware.

B. Related Requirements:

1. Coordinate products specified in Part 2 with Division 08 Sections in subparagraphs below. Astragals, silencers, and cylinders can be specified in this Section or with doors and frames.
2. Division 8 – Openings
3. Division 13 – Special Construction

1.3 COORDINATION

A. Floor-Recessed Door Hardware: Coordinate layout and installation with floor construction.

1. Cast anchoring inserts into concrete.

B. Installation Templates: Distribute for doors, frames, and other work specified to be factory prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

C. Security: Coordinate installation of door hardware, keying, and access control with Owner's security consultant.

D. Electrical System Roughing-In: Coordinate layout and installation of electrified door hardware with connections to power supplies and building safety and security systems.

SECTION 08 51 13 - ALUMINUM WINDOWS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes aluminum windows for exterior locations.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, glazing and fabrication methods, dimensions of individual components and profiles, hardware, and finishes for aluminum windows.

B. Shop Drawings: For aluminum windows.

1. Include plans, elevations, sections, hardware, accessories, insect screens, operational clearances, and details of installation, including anchor, flashing, and sealant installation.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For manufacturer and Installer.

B. Product Test Reports: For each type of aluminum window, for tests performed by a qualified testing agency.

C. Field quality-control reports.

D. Sample Warranties: For manufacturer's warranties.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: A manufacturer capable of fabricating aluminum windows that meet or exceed performance requirements indicated and of documenting this performance by test reports and calculations.

B. Installer Qualifications: An installer acceptable to aluminum window manufacturer for installation of units required for this Project.

1.5 WARRANTY

A. Manufacturer's Warranty: Manufacturer agrees to repair or replace aluminum windows that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

    a. Failure to meet performance requirements.
    b. Structural failures including excessive deflection, water leakage, condensation, and air infiltration.
    c. Faulty operation of movable sash and hardware.
    d. Deterioration of materials and finishes beyond normal weathering.
    e. Failure of insulating glass.

2. Warranty Period:

    a. Window: 10 years from date of Substantial Completion.
    b. Glazing Units: 10 years from date of Substantial Completion.
    c. Aluminum Finish: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain aluminum windows from single source from single manufacturer.

2.2 WINDOW PERFORMANCE REQUIREMENTS

A. Product Standard: Comply with AAMA/WDMA/CSA 101/I.S.2/A440 for definitions and minimum standards of performance, materials, components, accessories, and fabrication unless more stringent requirements are indicated.

    1. Window Certification: AAMA certified with label attached to each window.

B. Thermal Transmittance: NFRC 100 maximum whole-window U-factor of 0.30 Btu/sq. ft. x h x deg F.

C. Solar Heat-Gain Coefficient (SHGC): NFRC 200 maximum whole-window SHGC of 0.40.

D. Condensation-Resistance Factor (CRF): Provide aluminum windows tested for thermal performance according to AAMA 1503, showing a CRF of 45.

E. Thermal Movements: Provide aluminum windows, including anchorage, that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

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

F. Sound Transmission Class (STC): Rated for not less than 30 STC when tested for laboratory sound transmission loss according to ASTM E 90 and determined by ASTM E 413.

2.3 ALUMINUM WINDOWS

A. Operating Types: Provide the following operating types in locations indicated on Drawings:

1. Single hung.

B. Frames and Sashes: Aluminum extrusions complying with AAMA/WDMA/CSA 101/I.S.2/A440.

1. Thermally Improved Construction: Fabricate frames, sashes, and muntins with an integral, concealed, low-conductance thermal barrier located between exterior materials and window members exposed on interior side in a manner that eliminates direct metal-to-metal contact.

C. Glass: Clear annealed glass, ASTM C 1036, Type 1, Class 1, q3.

1. Kind: Fully tempered.

D. Insulating-Glass Units: ASTM E 2190.

1. Glass: ASTM C 1036, Type 1, Class 1, q3.

a. Tint: Bronze Green.
b. Kind: Fully tempered.

2. Lites: Two.
3. Filling: Fill space between glass lites with argon.
4. Low-E Coating: Pyrolytic on second surface.

E. Glazing System: Manufacturer's standard factory-glazing system that produces weathertight seal.

F. Hardware, General: Provide manufacturer's standard hardware fabricated from aluminum, stainless steel, carbon steel complying with AAMA 907, or other corrosion-resistant material compatible with adjacent materials; designed to smoothly operate, tightly close, and securely lock windows, and sized to accommodate sash weight and dimensions.

1. Exposed Hardware Color and Finish: As selected by Engineer from manufacturer's full range.

G. Hung Window Hardware:

1. Counterbalancing Mechanism: Complying with AAMA 902, concealed, of size and capacity to hold sash stationary at any open position.
2. Locks and Latches: Allow unobstructed movement of the sash across adjacent sash in direction indicated and operated from the inside only.
3. Tilt Latch: Releasing latch allows sash to pivot about horizontal axis to facilitate cleaning exterior surfaces from the interior.

H. Weather Stripping: Provide full-perimeter weather stripping for each operable sash unless otherwise indicated.

I. Fasteners: Noncorrosive and compatible with window members, trim, hardware, anchors, and other components.

1. Exposed Fasteners: Do not use exposed fasteners to greatest extent possible. For application of hardware, use fasteners that match finish hardware being fastened.

2.4 ACCESSORIES

A. Dividers (False Muntins): Provide extruded-aluminum divider grilles in designs indicated for each sash lite.

1. Type: Permanently located between insulating-glass lites.

B. Subsills: Thermally broken, extruded aluminum subsills in configurations indicated on Drawings.

C. Column Covers: Extruded-aluminum profiles in sizes and configurations indicated on Drawings.

D. Interior Trim: Extruded-aluminum profiles in sizes and configurations indicated on Drawings.

E. Panning Trim: Extruded-aluminum profiles in sizes and configurations indicated on Drawings.

F. Receptor System: Two-piece, snap-together, thermally broken, extruded-aluminum receptor system that anchors windows in place.

2.5 INSECT SCREENS

A. General: Fabricate insect screens to integrate with window frame. Provide screen for each operable exterior sash. Screen wickets are not permitted.

1. Type and Location: Half, outside for single-hung sashes.

B. Aluminum Frames: Manufacturer's standard aluminum alloy complying with SMA 1004 or SMA 1201. Fabricate frames with mitered or coped joints or corner extrusions, concealed fasteners, and removable PVC spline/anchor concealing edge of frame.

1. Tubular Framing Sections and Cross Braces: Roll formed from aluminum sheet.

C. Glass-Fiber Mesh Fabric: 18-by-14 or 18-by-16 mesh of PVC-coated, glass-fiber threads; woven and fused to form a fabric mesh resistant to corrosion, shrinkage, stretch, impact damage, and weather deterioration. Comply with ASTM D 3656.

1. Mesh Color: Manufacturer's standard.

2.6 FABRICATION

A. Fabricate aluminum windows in sizes indicated. Include a complete system for assembling components and anchoring windows.

B. Glaze aluminum windows in the factory.

C. Weather strip each operable sash to provide weathertight installation.

D. Weep Holes: Provide weep holes and internal passages to conduct infiltrating water to exterior.

E. Provide water-shed members above side-hinged sashes and similar lines of natural water penetration.

F. Mullions: Provide mullions and cover plates, matching window units, complete with anchors for support to structure and installation of window units. Allow for erection tolerances and provide for movement of window units due to thermal expansion and building deflections. Provide mullions and cover plates capable of withstanding design wind loads of window units.

G. Complete fabrication, assembly, finishing, hardware application, and other work in the factory to greatest extent possible. Disassemble components only as necessary for shipment and installation.

2.7 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM's "Metal Finishes Manual" for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

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

2.8 ALUMINUM FINISHES

A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.

B. Class II, Color Anodic Finish: AA-M12C22A32/A34 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class II, integrally colored or electrolytically deposited color coating 0.010 mm or thicker) complying with AAMA 611.

1. Color: As selected by Engineer from full range of industry colors and color densities.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Verify rough opening dimensions, levelness of sill plate, and operational clearances.

C. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure weathertight window installation.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Comply with manufacturer's written instructions for installing windows, hardware, accessories, and other components. For installation procedures and requirements not addressed in manufacturer's written instructions, comply with installation requirements in ASTM E 2112.

B. Install windows level, plumb, square, true to line, without distortion or impeding thermal movement, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction to produce weathertight construction.

C. Install windows and components to drain condensation, water penetrating joints, and moisture migrating within windows to the exterior.

D. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.

3.3 ADJUSTING, CLEANING, AND PROTECTION

A. Adjust operating sashes and hardware for a tight fit at contact points and weather stripping for smooth operation and weathertight closure.

B. Clean exposed surfaces immediately after installing windows. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.

1. Keep protective films and coverings in place until final cleaning.

C. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

D. Protect window surfaces from contact with contaminating substances resulting from construction operations. If contaminating substances do contact window surfaces, remove contaminants immediately according to manufacturer's written instructions.

END OF SECTION 08 51 13

E. Existing Openings: Where hardware components are scheduled for application to existing construction or where modifications to existing door hardware are required, field verify existing conditions and coordinate installation of door hardware to suit opening conditions and to provide proper door operation.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation and Keying Conference: Conduct conference at Project site.

1. Conference participants shall include Installer's Architectural Hardware Consultant.
2. Incorporate conference decisions into keying schedule after reviewing door hardware keying system including, but not limited to, the following:

    a. Flow of traffic and degree of security required.
    b. Preliminary key system schematic diagram.
    c. Requirements for key control system.
    d. Requirements for access control.
    e. Address for delivery of keys.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Shop Drawings: For electrified door hardware.

1. Include diagrams for power, signal, and control wiring.
2. Include details of interface of electrified door hardware and building safety and security systems.

C. Samples: For each exposed product in each finish specified, in manufacturer's standard size.

1. Tag Samples with full product description to coordinate Samples with door hardware schedule.

D. Samples for Initial Selection: For each type of exposed finish.

E. Samples for Verification: For each type of exposed product, in each finish specified.

1. Sample Size: Full-size units or minimum 2-by-4-inch Samples for sheet and 4-inch long Samples for other products.

    a. Full-size Samples will be returned to Contractor. Units that are acceptable and remain undamaged through submittal, review, and field comparison process may, after final check of operation, be incorporated into the Work, within limitations of keying requirements.

2. Tag Samples with full product description to coordinate Samples with door hardware schedule.

F. Door Hardware Schedule: Prepared by or under the supervision of Installer's Architectural Hardware Consultant. Coordinate door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.

1. Submittal Sequence: Submit door hardware schedule after or concurrent with submissions of Product Data, Samples, and Shop Drawings. Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate the fabrication of other work that is critical in Project construction schedule.
2. Format: Use same scheduling sequence and format and use same door numbers as in door hardware schedule in the Contract Documents.
3. Content: Include the following information:

a. Identification number, location, hand, fire rating, size, and material of each door and frame.
b. Locations of each door hardware set, cross-referenced to Drawings on floor plans and to door and frame schedule.
c. Complete designations, including name and manufacturer, type, style, function, size, quantity, function, and finish of each door hardware product.
d. Description of electrified door hardware sequences of operation and interfaces with other building control systems.
e. Fastenings and other installation information.
f. Explanation of abbreviations, symbols, and designations contained in door hardware schedule.
g. Mounting locations for door hardware.
h. List of related door devices specified in other Sections for each door and frame.

G. Keying Schedule: Prepared by or under the supervision of Installer's Architectural Hardware Consultant, detailing Owner's final keying instructions for locks. Include schematic keying diagram and index each key set to unique door designations that are coordinated with the Contract Documents.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer and Architectural Hardware Consultant.

B. Product Certificates: For each type of electrified door hardware.

1. Certify that door hardware for use on each type and size of labeled fire-rated doors complies with listed fire-rated door assemblies.

C. Product Test Reports: For compliance with accessibility requirements, for tests performed by manufacturer and witnessed by a qualified testing agency, for door hardware on doors located in accessible routes.

D. Field quality-control reports.

E. Sample Warranty: For special warranty.

1.7 CLOSEOUT SUBMITTALS

A. Maintenance Data: For each type of door hardware to include in maintenance manuals.

B. Schedules: Final door hardware and keying schedule.

1.8 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1.9 QUALITY ASSURANCE

A. Installer Qualifications: Supplier of products and an employer of workers trained and approved by product manufacturers and of an Architectural Hardware Consultant who is available during the course of the Work to consult Contractor, Architect, and Owner about door hardware and keying.

1. Warehousing Facilities: In Project's vicinity.
2. Scheduling Responsibility: Preparation of door hardware and keying schedule.
3. Engineering Responsibility: Preparation of data for electrified door hardware, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.

B. Architectural Hardware Consultant Qualifications: A person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project and who is currently certified by DHI as an Architectural Hardware Consultant (AHC).

1.10 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up for door hardware delivered to Project site.

B. Tag each item or package separately with identification coordinated with the final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package.

C. Deliver keys to manufacturer of key control system for subsequent delivery to Owner.

D. Deliver keys and permanent cores to Owner by registered mail or overnight package service.

1.11 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures including excessive deflection, cracking, or breakage.
b. Faulty operation of doors and door hardware.
c. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.

2. Warranty Period: Three years from date of Substantial Completion unless otherwise indicated below:

a. Exit Devices: Two years from date of Substantial Completion.
b. Manual Closers: 10 years from date of Substantial Completion.
c. Concealed Floor Closers: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain each type of door hardware from single manufacturer.

1. Provide electrified door hardware from same manufacturer as mechanical door hardware unless otherwise indicated. Manufacturers that perform electrical modifications and that are listed by a testing and inspecting agency acceptable to authorities having jurisdiction are acceptable.

2.2 PERFORMANCE REQUIREMENTS

A. Means of Egress Doors: Latches do not require more than 15 lbf to release the latch. Locks do not require use of a key, tool, or special knowledge for operation.

B. Accessibility Requirements: For door hardware on doors in an accessible route, comply with the ABA standards of the Federal agency having jurisdiction.

1. Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf.
2. Comply with the following maximum opening-force requirements:

a. Interior, Non-Fire-Rated Hinged Doors: 5 lbf applied perpendicular to door.
b. Sliding or Folding Doors: 5 lbf applied parallel to door at latch.
c. Fire Doors: Minimum opening force allowable by authorities having jurisdiction.

3. Bevel raised thresholds with a slope of not more than 1:2. Provide thresholds not more than 1/2 inch high.
4. Adjust door closer sweep periods so that, from an open position of 90 degrees, the door will take at least 5 seconds to move to a position of 12 degrees from the latch.
5. Adjust spring hinges so that, from an open position of 70 degrees, the door will take at least 1.5 seconds to move to the closed position.

2.3 SCHEDULED DOOR HARDWARE

A. Provide products for each door that comply with requirements indicated in Part 2 and door hardware schedule.

1. Door hardware is scheduled in Part 3.

2.4 HINGES

A. Hinges: BHMA A156.1. Provide template-produced hinges for hinges installed on hollow-metal doors and hollow-metal frames.

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

a. Hager Companies.
b. Stanley Commercial Hardware; a division of Stanley Security Solutions.
c. Or approved equal.

2.5 SELF-CLOSING HINGES AND PIVOTS

A. Self-Closing Hinges and Pivots: BHMA A156.17.

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

a. Hager Companies.
b. Stanley Commercial Hardware; a division of Stanley Security Solutions.
c. Or approved equal.

2.6 CENTER-HUNG AND OFFSET PIVOTS

A. Center-Hung and Offset Pivots: BHMA A156.4.

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

a. Hager Companies.
b. Stanley Commercial Hardware; a division of Stanley Security Solutions.
c. Or approved equal.

2.7 CONTINUOUS HINGES

A. Continuous Hinges: BHMA A156.26; minimum 0.120-inch-thick, hinge leaves with minimum overall width of 4 inches; fabricated to full height of door and frame and to template screw locations; with components finished after milling and drilling are complete.

B. Pin-and-Barrel-Type Hinges:

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

    a. Hager Companies.
    b. Select Products Limited.
    c. Stanley Commercial Hardware; a division of Stanley Security Solutions.
    d. Or approved equal.

2.8 MECHANICAL LOCKS AND LATCHES

A. Lock Functions: As indicated in door hardware schedule.

B. Lock Throw: Comply with testing requirements for length of bolts required for labeled fire doors, and as follows:

1. Bored Locks: Minimum 1/2-inch latchbolt throw.
2. Mortise Locks: Minimum 3/4-inch latchbolt throw.
3. Deadbolts: Minimum 1-inch bolt throw.

C. Lock Backset: 2-3/4 inches unless otherwise indicated.

D. Strikes: Provide manufacturer's standard strike for each lock bolt or latchbolt complying with requirements indicated for applicable lock or latch and with strike box and curved lip extended to protect frame; finished to match lock or latch.

E. Locks and Latches: BHMA A156.2, BHMA A156.12, BHMA A156.13, BHMA A156.16.

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

    a. Best Access Systems; Stanley Security Solutions, Inc.
    b. Corbin Russwin, Inc.; an ASSA ABLOY Group company.
    c. Stanley Commercial Hardware; a division of Stanley Security Solutions.
    d. Yale Security Inc; an ASSA ABLOY Group company.
    e. Or approved equal.

2.9 EXIT LOCKS AND EXIT ALARMS

A. Exit Locks and Alarms: BHMA A156.29, Grade 1.

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

    a. Precision Hardware, Inc.; a Stanley company.
    b. SARGENT Manufacturing Company; ASSA ABLOY.
    c. Or approved equal.

2.10 SURFACE BOLTS

A. Surface Bolts: BHMA A156.16.

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

a. Allegion plc.
b. Trimco.
c. Or approved equal.

2.11 MANUAL FLUSH BOLTS

A. Manual Flush Bolts: BHMA A156.16; minimum 3/4-inch throw; designed for mortising into door edge.

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

a. Allegion plc.
b. Trimco.
c. Or approved equal.

2.12 EXIT DEVICES AND AUXILIARY ITEMS

A. Exit Devices and Auxiliary Items: BHMA A156.3.

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

a. Precision Hardware, Inc.; a Stanley company.
b. SARGENT Manufacturing Company; ASSA ABLOY.
c. Yale Security Inc; an ASSA ABLOY Group company.
d. Or approved equal.

2.13 LOCK CYLINDERS

A. Lock Cylinders: Tumbler type, constructed from brass or bronze, stainless steel, or nickel silver. Provide cylinder from same manufacturer of locking devices.

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

a. Best Access Systems; Stanley Security Solutions, Inc.
b. Corbin Russwin, Inc.; an ASSA ABLOY Group company.
c. Hager Companies.
d. SARGENT Manufacturing Company; ASSA ABLOY.
e. Stanley Commercial Hardware; a division of Stanley Security Solutions.

f. Yale Security Inc; an ASSA ABLOY Group company.
g. Or approved equal.

B. Standard Lock Cylinders: BHMA A156.5; Grade 2 permanent cores; face finished to match lockset.

1. Core Type: Interchangeable.

C. Construction Master Keys: Provide cylinders with feature that permits voiding of construction keys without cylinder removal. Provide ten (10) construction master keys.

D. Construction Cores: Provide construction cores that are replaceable by permanent cores. Provide ten (10) construction master keys.

2.14 KEYING

A. Keying System: Factory registered, complying with guidelines in BHMA A156.28, appendix. Provide one extra key blank for each lock. Supplier is to closely coordinate with owner and architect all keying requirements. All lock cylinders shall be construction master keyed using split key method. Incorporate decisions made in keying conference.

1. Master Key System: Change keys and a master key operate cylinders.

a. Provide three (3) cylinder change keys and five (5) master keys.

2. Existing System:

a. Master key or grand master key locks to Owner's existing system.
b. Re-key Owner's existing master key system into new keying system.

3. Keyed Alike: Key all cylinders to same change key.

B. Keys: Nickel silver.

1. Stamping: Permanently inscribe each key with a visual key control number and include the following notation:

a. Notation: "DO NOT DUPLICATE."

2.15 OPERATING TRIM

A. Operating Trim: BHMA A156.6; aluminum or stainless steel unless otherwise indicated.

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

a. Allegion plc.
b. Hager Companies.
c. Trimco.
d. Or approved equal.

2.16 ACCESSORIES FOR PAIRS OF DOORS

A. Coordinators: BHMA A156.3; consisting of active-leaf, hold-open lever and inactive-leaf release trigger; fabricated from steel with nylon-coated strike plates; with built-in, adjustable safety release.

B. Carry-Open Bars: BHMA A156.3; prevent the inactive leaf from opening before the active leaf; provide polished brass or bronze carry-open bars with strike plate for inactive leaves of pairs of doors unless automatic or self-latching bolts are used.

C. Astragals: BHMA A156.22.

2.17 SURFACE CLOSERS

A. Surface Closers: BHMA A156.4; rack-and-pinion hydraulic type with adjustable sweep and latch speeds controlled by key-operated valves and forged-steel main arm. Comply with manufacturer's written instructions for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.

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

    a. SARGENT Manufacturing Company; ASSA ABLOY.
    b. Stanley Commercial Hardware; a division of Stanley Security Solutions.
    c. Yale Security Inc; an ASSA ABLOY Group company.
    d. Or approved equal.

2.18 CONCEALED CLOSERS

A. Concealed Closers: BHMA A156.4; rack-and-pinion hydraulic type with adjustable sweep and latch speeds controlled by key-operated valves. Comply with manufacturer's written instructions for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.

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

    a. SARGENT Manufacturing Company; ASSA ABLOY.
    b. Or approved equal.

2.19 MECHANICAL STOPS AND HOLDERS

A. Wall- and Floor-Mounted Stops: BHMA A156.16.

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

a. Hager Companies.
b. Rockwood Manufacturing Company; an ASSA ABLOY Group company.
c. Trimco.
d. Or approved equal.

2.20 OVERHEAD STOPS AND HOLDERS

A. Overhead Stops and Holders: BHMA A156.8.

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

a. Allegion plc.
b. Or approved equal.

2.21 DOOR GASKETING

A. Door Gasketing: BHMA A156.22; with resilient or flexible seal strips that are easily replaceable and readily available from stocks maintained by manufacturer.

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

a. Hager Companies.
b. Reese Enterprises, Inc.
c. Zero International, Inc.
d. Or approved equal.

B. Maximum Air Leakage: When tested according to ASTM E 283 with tested pressure differential of 0.3-inch wg, as follows:

1. Smoke-Rated Gasketing: 0.3 cfm/sq. ft. of door opening.
2. Gasketing on Single Doors: 0.3 cfm/sq. ft. of door opening.
3. Gasketing on Double Doors: 0.50 cfm per foot of door opening.

2.22 THRESHOLDS

A. Thresholds: BHMA A156.21; fabricated to full width of opening indicated.

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

a. Hager Companies.
b. National Guard Products, Inc.
c. Reese Enterprises, Inc.
d. Zero International, Inc.
e. Or approved equal.

2.23 AUXILIARY DOOR HARDWARE

A. Auxiliary Hardware: BHMA A156.16.

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

a. Allegion plc.
b. Or approved equal.

2.24 FABRICATION

A. Manufacturer's Nameplate: Do not provide products that have manufacturer's name or trade name displayed in a visible location except in conjunction with required fire-rating labels and as otherwise approved by Architect.

1. Manufacturer's identification is permitted on rim of lock cylinders only.

B. Base Metals: Produce door hardware units of base metal indicated, fabricated by forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness. Furnish metals of a quality equal to or greater than that of specified door hardware units and BHMA A156.18.

C. Fasteners: Provide door hardware manufactured to comply with published templates prepared for machine, wood, and sheet metal screws. Provide screws that comply with commercially recognized industry standards for application intended, except aluminum fasteners are not permitted. Provide Phillips flat-head screws with finished heads to match surface of door hardware unless otherwise indicated.

1. Concealed Fasteners: For door hardware units that are exposed when door is closed, except for units already specified with concealed fasteners. Do not use through bolts for installation where bolt head or nut on opposite face is exposed unless it is the only means of securely attaching the door hardware. Where through bolts are used on hollow door and frame construction, provide sleeves for each through bolt.
2. Spacers or Sex Bolts: For through bolting of hollow-metal doors.
3. Gasketing Fasteners: Provide noncorrosive fasteners for exterior applications and elsewhere as indicated.

2.25 FINISHES

A. Provide finishes complying with BHMA A156.18 as indicated in door hardware schedule.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are

acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance of the Work.

B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Steel Doors and Frames: For surface-applied door hardware, drill and tap doors and frames according to ANSI/SDI A250.6.

B. Wood Doors: Comply with door and hardware manufacturers' written instructions.

3.3 INSTALLATION

A. Mounting Heights: Mount door hardware units at heights indicated on Drawings unless otherwise indicated or required to comply with governing regulations.

1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
2. Custom Steel Doors and Frames: HMMA 831.
3. Wood Doors: DHI's "Recommended Locations for Architectural Hardware for Wood Flush Doors."

B. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work. Do not install surface-mounted items until finishes have been completed on substrates involved.

1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.

C. Hinges: Install types and in quantities indicated in door hardware schedule, but not fewer than the number recommended by manufacturer for application indicated or one hinge for every 30

inches of door height, whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.

D. Intermediate Offset Pivots: Where offset pivots are indicated, provide intermediate offset pivots in quantities indicated in door hardware schedule, but not fewer than one intermediate offset pivot per door and one additional intermediate offset pivot for every 30 inches of door height greater than.

E. Lock Cylinders: Install construction cores to secure building and areas during construction period.

1. Replace construction cores with permanent cores as directed by Owner.
2. Furnish permanent cores to Owner for installation.

F. Thresholds: Set thresholds for exterior doors and other doors indicated in full bed of sealant complying with requirements specified in Section 07 92 00 "Joint Sealants."

G. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they will impede traffic.

H. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.

1. Do not notch perimeter gasketing to install other surface-applied hardware.

I. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.

J. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.

3.4 FIELD QUALITY CONTROL

A. Independent Architectural Hardware Consultant: Engage a qualified independent Architectural Hardware Consultant to perform inspections and to prepare inspection reports.

1. Independent Architectural Hardware Consultant will inspect door hardware and state in each report whether installed work complies with or deviates from requirements, including whether door hardware is properly installed and adjusted.

3.5 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

1. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.
2. Spring Hinges: Adjust to achieve positive latching when door is allowed to close freely from an open position of 70 degrees and so that closing time complies with accessibility requirements of authorities having jurisdiction.

3. Electric Strikes: Adjust horizontal and vertical alignment of keeper to properly engage lock bolt.

B. Occupancy Adjustment: Approximately three months after date of Substantial Completion, Installer's Architectural Hardware Consultant shall examine and readjust each item of door hardware, including adjusting operating forces, as necessary to ensure function of doors, door hardware, and electrified door hardware.

3.6 CLEANING AND PROTECTION

A. Clean adjacent surfaces soiled by door hardware installation.

B. Clean operating items as necessary to restore proper function and finish.

C. Provide final protection and maintain conditions that ensure that door hardware is without damage or deterioration at time of Substantial Completion.

3.7 MAINTENANCE SERVICE

A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

B. Maintenance Service: Beginning at Substantial Completion, maintenance service shall include six months' full maintenance by skilled employees of door hardware Installer. Include quarterly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper door and door hardware operation. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.

3.8 DOOR HARDWARE SCHEDULE

A. Hardware Set #1

1. Door #: 011A, 012A
2. Doors: Typical exterior double door

Qty	Unit	Product	Description	Color	Manufacturer
1	ea	push/pull handle	by door manufacturer	-	-
1	ea	cylinder	20-013 x 118 x MK x 50-217	626	SCH
1	ea	surface bolt	by door manufacturer	-	-
1	ea	weather strip	by door manufacturer	-	-

B. Hardware Set #2

1. Door #: 101A, 101C, 102A
2. Doors: Typical exterior single door

Qty	Unit	Product	Description	Color	Manufacturer
3	ea	hinge	BB1199 4-1/2 X 4-1/2 X NRP	US32D	HAG
1	ea	rim exit (panic) device	98L X 996L (#06 SS) X 299 X 3-0	US32D	VON

1	ea	rim cylinder	20-021 x MK x 50-217	626	SCH
1	ea	closer, parallel arm	4040XP X SCUSH X SRT	AL	LCN
1	ea	kick plate	8400 12 x 34	US32D	IVE
1	ea	weatherstrip	160S X 36 X 84	MILL	NAT
1	ea	door bottom sweep	198NA X 36	AL	NAT
1	ea	threshold	513 X 36	MILL	NAT

C. Hardware Set #3

1. Door #: 102B
2. Doors: Typical interior pair of doors

Qty	Unit	Product	Description	Color	Manufacturer
6	ea	hinge	BB119 4-1/2 X 4-1/2	US32D	HAG
1	ea	removable mullion	KR4954 x 7'6	SP28	VON
1	ea	rim exit (panic) device	98L x 996L x 06SS x 299 x 3'0	US32D	VON
1	ea	rim exit (panic) device	98L-DTx 996L-DT x 06SS x 299 x 3'0	US32D	VON
1	ea	rim cylinder	20-021 x MK x 50-217	626	SCH
1	ea	mortise cylinder	20-001 x 114 x B502-191 x MK x 50-217	626	SCH
2	ea	closer, parallel arm	4040XP X SCUSH X SRT	AL	LCN
2	ea	kick plate	8400 12 x 34	US32D	IVE

D. Hardware Set #4

1. Door #: 103
2. Doors: Typical interior pair of doors

Qty	Unit	Product	Description	Color	Manufacturer
6	ea	hinge	BB119 4-1/2 X 4-1/2	US32D	HAG
1	ea	removable mullion	KR4954 x 7'6	SP28	VON
2	ea	rim exit (panic) device	98L-BE x 996L-BE x 06SS x 299 x 3'0	US32D	VON
1	ea	mortise cylinder	20-001 x 114 x B502-191 x MK x 50-217	626	SCH
2	ea	closer, parallel arm	4040XP X SCUSH X SRT	AL	LCN
2	ea	kick plate	8400 12 x 34	US32D	IVE
1	ea	threshold	513 X 72	MILL	NAT

E. Hardware Set #5

1. Door #: 101D
2. Doors: Typical interior pair of doors

Qty	Unit	Product	Description	Color	Manufacturer
8	ea	hinge	BB119 4-1/2 X 4-1/2	US32D	HAG
1	ea	removable mullion	KR4954 x 7'6	SP28	VON
1	ea	rim exit (panic) device	98L x 996L x 06SS x 299 x 3'0	US32D	VON
1	ea	rim exit (panic) device	98L-DTx 996L-DT x 06SS x 299 x 3'0	US32D	VON
1	ea	rim cylinder	20-021 x MK x 50-217	626	SCH
1	ea	mortise cylinder	20-001 x 114 x B502-191 x MK x 50-217	626	SCH
2	ea	closer, parallel arm	4040XP X SCUSH X SRT	AL	LCN
2	ea	kick plate	8400 12 x 46	US32D	IVE
1	ea	weatherstrip	160S x 96 x 96	MILL	NAT
2	ea	door bottom sweep	198NA X 48	AL	NAT
1	ea	Threshold	513 X 96	MILL	NAT

F. Hardware Set #6

1. Door #: 201
2. Doors: Typical interior pair of doors

Qty	Unit	Product	Description	Color	Manufacturer
6	ea	hinge	BB119 4-1/2 X 4-1/2	US32D	HAG
1	ea	rim exit (panic) device	98L x 996L x 06SS x 299 x 3'0	US32D	VON
1	ea	rim exit (panic) device	98L-DTx 996L-DT x 06SS x 299 x 3'0	US32D	VON
1	ea	rim cylinder	20-021 x MK x 50-217	626	SCH
1	ea	mortise cylinder	20-001 x 114 x B502-191 x MK x 50-217	626	SCH
2	ea	closer, parallel arm	4040XP X SCUSH X SRT	AL	LCN
2	ea	kick plate	8400 12 X 34	US32D	NAT
1	ea	threshold	513 X 72	MILL	NAT
2	ea	door bottom sweep	198NA X 36	AL	NAT
1	ea	weather strip	513 X 36	MILL	NAT

END OF SECTION 08 71 00

SECTION 09 22 16 - NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Non-load-bearing steel framing systems for interior partitions.
2. Suspension systems for interior ceilings and soffits.
3. Grid suspension systems for gypsum board ceilings.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.3 QUALITY ASSURANCE

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

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

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

B. Horizontal Deflection: For wall assemblies, limited to 1/240 of the wall height based on horizontal loading of 5 lbf/sq. ft..

2.2 FRAMING SYSTEMS

A. Framing Members, General: Comply with ASTM C 754 for conditions indicated.

1. Steel Sheet Components: Comply with ASTM C 645 requirements for metal unless otherwise indicated.
2. Protective Coating: ASTM A 653, G40, hot-dip galvanized unless otherwise indicated.

B. Studs and Tracks: ASTM C 645.

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

    a. MarinoWARE.
    b. MBA Building Supplies.
    c. MRI Steel Framing, LLC.
    d. Steel Construction Systems.
    e. Steel Network, Inc.
    f. Telling Industries.
    g. Or Approved Equal.

2. Steel Studs and Tracks:

    a. Minimum Base-Metal Thickness: 0.033 inch.
    b. Depth: As indicated on Drawings.

C. Slip-Type Head Joints: Where indicated, provide one of the following:

1. Single Long-Leg Track System: ASTM C 645 top track with 2-inch- deep flanges in thickness not less than indicated for studs, installed with studs friction fit into top track and with continuous bridging located within 12 inches of the top of studs to provide lateral bracing.
2. Double-Track System: ASTM C 645 top outer tracks, inside track with 2-inch- deep flanges in thickness not less than indicated for studs and fastened to studs, and outer track sized to friction-fit over inner track.
3. Deflection Track: Steel sheet top track manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.

D. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.

1. Minimum Base-Metal Thickness: 0.053 inch.

E. Cold-Rolled Channel Bridging: Steel, 0.053-inch minimum base-metal thickness, with minimum 1/2-inch- wide flanges.

1. Depth: 1-1/2 inches.
2. Clip Angle: Not less than 1-1/2 by 1-1/2 inches, 0.068-inch- thick, galvanized steel.

F. Hat-Shaped, Rigid Furring Channels: ASTM C 645.

1. Minimum Base-Metal Thickness: 0.018 inch.
2. Depth: 7/8 inch.

G. Resilient Furring Channels: 1/2-inch- deep, steel sheet members designed to reduce sound transmission.

1. Configuration: Asymmetrical or hat shaped.

2.3 SUSPENSION SYSTEMS

A. Tie Wire: ASTM A 641, Class 1 zinc coating, soft temper, 0.062-inch- diameter wire, or double

strand of 0.048-inch- diameter wire.

B. Hanger Attachments to Concrete:

1. Post-Installed Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC308 as appropriate for the substrate.

a. Uses: Securing hangers to structure.
a. Type: Torque-controlled, adhesive anchor.
b. Material for Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, unless otherwise indicated.

2. Power-Actuated Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

C. Wire Hangers: ASTM A 641, Class 1 zinc coating, soft temper, 0.16 inch in diameter.

D. Flat Hangers: Steel sheet, 1 by 3/16 inch by length indicated.

E. Carrying Channels: Cold-rolled, commercial-steel sheet with a base-metal thickness of 0.053 inch and minimum 1/2-inch- wide flanges.

1. Depth: 2 inches.

F. Furring Channels (Furring Members):

1. Cold-Rolled Channels: 0.053-inch uncoated-steel thickness, with minimum 1/2-inch- wide flanges, 3/4 inch deep.
2. Steel Studs and Tracks: ASTM C 645.

a. Minimum Base-Metal Thickness: 0.018 inch.
b. Depth: As indicated on Drawings.

3. Hat-Shaped, Rigid Furring Channels: ASTM C 645, 7/8 inch deep.

a. Minimum Base-Metal Thickness: 0.018 inch.

G. Grid Suspension System for Gypsum Board Ceilings: ASTM C 645, direct-hung system composed of main beams and cross-furring members that interlock.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Armstrong World Industries, Inc; Drywall Grid Systems.
b. Chicago Metallic Corporation; 640/660 Drywall Ceiling Suspension.
c. United States Gypsum Company; Drywall Suspension System.
d. Or Approved Equal.

2.4 AUXILIARY MATERIALS

A. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Installation Standard: ASTM C 754.

1. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.

B. Install framing and accessories plumb, square, and true to line, with connections securely fastened.

C. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.

D. Install bracing at terminations in assemblies.

3.2 INSTALLING FRAMED ASSEMBLIES

A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.

B. Install studs so flanges within framing system point in same direction.

C. Install tracks at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts penetrating partitions above ceiling.

1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.

    a. Install two studs at each jamb unless otherwise indicated.
    b. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch clearance from jamb stud to allow for installation of control joint in finished assembly.
    c. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.
3. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
4. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.

D. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch from the plane formed by faces of adjacent framing.

3.3 INSTALLING CEILING SUSPENSION SYSTEMS

A. Install suspension system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.

B. Isolate suspension systems from building structure where they abut or are penetrated by building

structure to prevent transfer of loading imposed by structural movement.

C. Suspend hangers from building structure as follows:

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.

    a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, counters playing, or other equally effective means.

2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.
3. Wire Hangers: Secure by looping and wire tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail.
4. Flat Hangers: Secure to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices and fasteners that are secure and appropriate for structure and hanger, and in a manner that will not cause hangers to deteriorate or otherwise fail.
5. Do not connect or suspend steel framing from ducts, pipes, or conduit.

D. Grid Suspension Systems: Attach perimeter wall track or angle where grid suspension systems meet vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.

E. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

END OF SECTION 09 22 16

SECTION 09 29 00 - GYPSUM BOARD

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Gypsum Wallboard
2. Gypsum Backing Board for Multi-Layer Applications.
3. Mold and Mildew Resistant Gypsum Board
4. Gypsum Sheathing Board with Water-Resistant Core

B. Related Requirements:

1. Section 07 92 00 – Joint Sealants
2. Section 09 96 00 – High-Performance Coatings

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples: For the following products:

1. Trim Accessories: Full-size Sample in 12-inch- long length for each trim accessory indicated.
2. Textured Finishes: Manufacturer's standard size for each textured finish indicated and on same backing indicated for Work.

C. Samples for Initial Selection: For each type of textured finish indicated.

D. Samples for Verification: For the following products:

1. Trim Accessories: Full-size Sample in 12-inch- (300-mm-) long length for each trim accessory indicated.
2. Textured Finishes: Manufacturer's standard size for each textured finish indicated and on same backing indicated for Work.

1.4 QUALITY ASSURANCE

A. Mockups: Build mockups of at least 100 sq. ft. (9 sq. m) in surface area to demonstrate aesthetic effects and to set quality standards for materials and execution.

1. Build mockups for the following:

a. Each level of gypsum board finish indicated for use in exposed locations.
b. Each texture finish indicated.

2. Apply or install final decoration indicated, including painting and wallcoverings, on exposed surfaces for review of mockups.
3. Simulate finished lighting conditions for review of mockups.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 DELIVERY, STORAGE AND HANDLING

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

1.6 FIELD CONDITIONS

A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written instructions, whichever are more stringent.

B. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned.

C. Do not install panels that are wet, moisture damaged, and mold damaged.

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

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Resistance-Rated Assemblies:

1. Where indicated, provide materials and construction which are identical with those of assemblies whose fire resistance rating has been determined per ASTM E 119 by a testing and inspecting organization acceptable to authorities having jurisdiction.
2. Provide fire-resistance rated assemblies identical to those indicated by reference to GA File numbers in GA-600 “Fire Resistance Design Manual” or to design designations in U.L.

"Fire Resistance Directory" or in listing of other testing agencies acceptable to authorities having jurisdiction.

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

2.2 GYPSUM BOARD, GENERAL

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

2.3 INTERIOR GYPSUM BOARD

A. Gypsum Wallboard: ASTM C 1396.

1. General: Provide gypsum board of types indicated in maximum lengths available to minimize end-to-end joints.

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

   a. BPB America, Inc.
   b. Gold Bond Building Products Div., National Gypsum Company
   c. LaFarge Gypsum
   d. Georgia-Pacific Building Products.
   e. United States Gypsum Company.

3. Type: High-impact abuse resistant; Type X at all locations.

4. Edges: Tapered and featured (rounded or beveled) for prefilling.
5. Thickness: 5/8-inch for general use, except where 1/4-inch layers (at least two layers) may be indicated or required for curved wall or ceiling assemblies.

B. Gypsum Backing Board for Multi-Layer Applications: ASTM C 1396. or, where backing board is not available from manufacturer, gypsum wallboard, ASTM C 1396, and as follows:

1. Type: High-impact abuse resistant; Type X at all locations.
2. Edges: Manufacturer's standard.
3. Thickness: 5/8-inch.

C. Mold & Mildew Resistant Gypsum Board: ASTM C 1396, and as follows:

1. Type: Type X, high-impact abuse resistant at all locations; Moisture- and mold- resistant core and facings/surfaces.
2. Edges: Manufacturer's standard.
3. Thickness: 5/8-inch.
4. Locations: At rooms with toilet fixtures and/or service sinks, entire wall behind sinks, and elsewhere only as indicated.

5. Use 5/8-inch thick Georgia-Pacific "Dens-Shield" tile backer board with sealed and facing-taped joints, at ceramic and hard tile; ASTM C 1177 or ASTM C 1178.
6. Use "exterior gypsum board" where exposed at any exterior locations; ASTM C 1396.
7. Old Style "Green board" will not be acceptable for any use.

D. Gypsum Sheathing Board with Water-Resistant Core: Gypsum sheathing board consisting of noncombustible gypsum core incorporating a water-resistant material, surfaced on face, back and long edges with water-repellent surface; complying with ASTM C 1396, and requirements indicated below:

1. Type: Type X at all locations.
2. Edge and End Configuration: Square.
3. Thickness: 5/8-inch, unless indicated otherwise on the Drawings.
4. Size: 4'-0" x 8'-0" or 9'-0" as required for coordination with framing.
5. Note: Use 5/8-inch thick BPB America "GlasRoc Sheathing" or Georgia-Pacific "Dens-Glass Gold", with **sealed and facing-taped joints** at any exterior EIFS systems, stucco systems, and metal siding systems, **only** where plywood or other wood sheathing is not indicated.

    a. Certain Teed "GlasRoc Sheathing"
    b. Georgia Pacific "Dense-Glass Gold"
    c. Gold Bond "e^{2}XP"
    d. LaFarge Weather Defense Platinum
    e. USG "Securock"

6. Cover ALL SHEATHING with air infiltration barrier (felt), or waterproof underlayment.

2.4 MISCELLANEOUS MATERIALS

1. General: Provide auxiliary materials for gypsum drywall construction which comply with referenced standards and the recommendations of the manufacturer of the gypsum board.
2. Spot Grout: ASTM C 475, setting-type joint compound of type recommended for spot grouting hollow metal door frames.
3. Fasteners: Type S steel drill screws, 1-inch long unless otherwise required for shaft wall or multi-layer application, with corrosion-resistant finish in form of cadmium plating or proprietary coating, and as follows:

    a. For attachment of gypsum board panels to light gauge steel framing of less than 0.033 of an inch in thickness (20 gauge), provide steel drill screws complying with ASTM C 1002.
    b. For attachment of gypsum board panels, including sheathing, to steel framing from 0.033 (20 gauge) to 0.112 of an inch in thickness, provide steel drill screws complying with ASTM C 954.

4. Air Infiltration Barrier: Asphalt-saturated organic felt complying with ASTM D 226, Type 1 (No. 15 asphalt felt), un-perforated; Unless indicated otherwise.

2.5 TRIM ACCESSORIES

A. Interior Trim: ASTM C 1047.

1. Corner bead and Edge Trim for Interior Installation: Provide corner beads, edge trim and control joints which comply with ASTM C 1047 and requirements indicated below:

a. Material: Formed metal, plastic, or metal combined with paper, with metal complying with the following requirement.

1) Sheet steel coated with zinc by hot-dip or electrolytic processes, or with aluminum.

2. Edge trim shapes indicated below by reference to designations of Fig. 1 in ASTM C 1047:

a. LC" Bead, unless otherwise indicated.
b. "L" Bead where indicated or required.
c. "U" Bead where indicated.

3. One-Piece Control Joint: Formed with vee-shaped slot per Fig. 1 in ASTM C 1047, with slot opening covered with removable strip.

2.6 JOINT TREATMENT MATERIALS

A. General: Provide materials complying with ASTM C 475, ASTM C 840, and recommendations of manufacturer of both gypsum board and joint treatment materials for the application indicated.

B. Joint Tape:

1. Paper reinforcing tape.

C. Drying-Type Joint Compounds:

1. Factory-prepackaged vinyl-based products complying with the following requirements for formulation and intended use.
2. Ready-Mix Formulation: Factory-premixed product.
3. Taping compound formulated for embedding tape and for first coat over fasteners and flanges of corner beads and edge trim.
4. Topping compound formulated for fill (second) and finish (third) coats.
5. All-purpose compound for use as both taping and topping compound.

D. Setting-Type Joint Compound:

1. Factory-prepackaged, job-mixed, chemical-hardening powder products formulated for uses indicated.
2. For filling joints and treating fasteners of water-resistant gypsum backing board behind base for ceramic tile, use formulation recommended by gypsum board manufacturer for this purpose.

2.7 MISCELLANEOUS MATERIALS

1. General: Provide auxiliary materials for gypsum drywall construction which comply with referenced standards and the recommendations of the manufacturer of the gypsum board.
2. Spot Grout: ASTM C 475, setting-type joint compound of type recommended for spot grouting hollow metal door frames.
3. Fasteners: Type S steel drill screws, 1-inch long unless otherwise required for shaft wall or multi-layer application, with corrosion-resistant finish in form of cadmium plating or proprietary coating, and as follows:

    a. For attachment of gypsum board panels to light gauge steel framing of less than 0.033 of an inch in thickness (20 gauge), provide steel drill screws complying with ASTM C 1002.
    b. For attachment of gypsum board panels, including sheathing, to steel framing from 0.033 (20 gauge) to 0.112 of an inch in thickness, provide steel drill screws complying with ASTM C 954.

4. Air Infiltration Barrier: Asphalt-saturated organic felt complying with ASTM D 226, Type 1 (No. 15 asphalt felt), un-perforated; Unless indicated otherwise.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates including welded hollow-metal frames and support framing, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.

B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION FOR METAL SUPPORT SYSTEMS

A. Ceiling Anchorages:

1. Coordinate installation of ceiling suspension system with installation of overhead structural systems to ensure that inserts and other structural anchorage provisions have been installed to receive ceiling anchors in a manner that will develop their full strength and at spacing required to support ceiling.

B. Gypsum Board Application and Finishing Standard: Install and finish gypsum board to comply with ASTM C 840 and GA-216.

C. Locate exposed end-butt joints as far from center of walls and ceilings as possible, and stagger not less than 24-inches in alternate courses of board.

D. Install ceiling boards across framing in the manner which minimizes the number of end-butt joints, and which avoids end joints in the central area of each ceiling. Stagger end joints at least 24- inches.

E. Install wall/partitions boards in manner which minimizes the number of end-butt joints or avoids them entirely where possible. At high walls, install boards horizontally with end joints staggered over studs.

F. Install exposed gypsum board with face side out. Do not install imperfect, damaged or damp boards. Butt boards together for a light contact at edges and ends with not more than 1/16-inch open space between boards. Do not force into place.

G. Locate either edge or end joints over supports, except in horizontal applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Position boards so that like edges abut, tapered edges against tapered edges and mill-cut or field-cut ends against mill-cut or field-cut ends. Do not place tapered edges against cut edges or ends. Stagger vertical joints over different studs on opposite sides of partitions.

H. Attach gypsum board to steel studs so that leading edge or end of each board is attached to open (unsupported) edge of stud flange first.

I. Attach gypsum board to supplementary framing and blocking provided for additional support at openings and cutouts.

J. Spot grout hollow metal door frames for solid core wood doors, hollow metal doors and doors over 32-inches wide. Apply spot grout at each jamb anchor clip just before inserting board into frame.

K. Form control joints and expansion joints at locations indicated, with space between edges of boards, prepared to receive trim accessories.

1. Provide control joints in long partitions and walls at a maximum spacing of 30 feet on center, unless a closer spacing is indicated. Provide control joints in large ceiling areas at a maximum spacing of 50 feet on center in each direction, unless a closer spacing is indicated. Consult with Engineer on locations of all control joints prior to beginning work.

L. Cover both faces of steel stud partition framing with gypsum board in concealed spaces (above ceilings, etc.), except inside double or chase walls which are required to be braced internally.

1. Except where concealed application is required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. area, and may be limited to not less than 75% of full coverage.
2. Fit gypsum board around ducts, pipes, and conduits.
3. Where partitions intersect open concrete coffers, concrete joists, and other structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by coffers, joists, and other structural members; allow 1/4-to-1/2-inch-wide joints to install sealant.
4. Fire-stop around penetrations as required by Codes and authorities having jurisdiction.

M. Where interior partitions are indicated to extend to the structure above, the drywall shall also extend to the structure with the same number of layers as required below the ceiling.

N. Isolate perimeter of non-load-bearing drywall partitions at structural abutments. Provide 1/4-inch to 1/2-inch space and trim edge with "U" bead edge trim. Seal joints with acoustical sealant.

O. At all interior walls, seal construction at perimeters, control and expansion joints, openings and penetrations with a continuous bead of acoustical sealant including a bead at both faces of partitions. Comply with ASTM C 919 and manufacturer's recommendations for location of edge trim, and close off sound-flanking paths around or through construction, including sealing of partitions above acoustical ceilings.

P. Space fasteners in gypsum boards in accordance with referenced gypsum board application and finishing standard and manufacturer's recommendations.

Q. Install "sound batts" and insulation as the work progresses.

3.3 METHODS OF GYPSUM BOARD APPLICATION

A. Single-layer Application: Install gypsum wallboard as follows:
1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated.
2. On partitions/walls, apply gypsum panels vertically (parallel to framing) unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
    a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
    b. At stairwells and other high walls, install panels horizontally unless otherwise indicated or required by fire-resistance-rated assembly.
3. On Z-shaped furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.

B. Multi-Layer Application:

1. On ceilings, apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints one framing member, 16 inches (400 mm) minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.
2. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.
3. On Z-shaped furring members, apply base layer vertically (parallel to framing) and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with vertical joints offset at least one furring member. Locate edge joints of base layer over furring members.

C. Single-Layer Fastening Methods: Apply gypsum boards to supports as follows:

1. Fasten with screws.

D. Multi-Layer Fastening Methods:

1. Apply base layer(s) of gypsum board and face layer to base layer(s) as follows:
2. Fasten both base layer(s) and face layer separately to supports with screws.

3.4 INSTALLING TRIM ACCESSORIES

A. General: Where feasible, use the same fasteners to anchor trim accessory flanges as required to fasten gypsum board to the supports. Otherwise, fasten flanges to comply with manufacturer's recommendations.

B. Control Joints: Install control joints as indicated on Drawings, or if not indicated, according to ASTM C 840 and in specific locations approved by Engineer for visual effect.

C. Install corner beads at external corners

D. Install metal edge trim whenever edge of gypsum board would otherwise be exposed or semi-exposed, and except where plastic trim is indicated. Provide type with face flange to receive joint compound except where "U" bead (semi-finishing type) is indicated.

1. Install "LC" bead where drywall construction is tightly abutted to other construction and back flange can be attached to framing or supporting substrate.
2. Install "L" bead where edge trim can only be installed after gypsum board is installed.
3. Install U-type trim where edge is exposed, revealed, gasketed, or sealant-filled (including expansion joints).

E. Install edge trim where indicated on wall panels at juncture with ceilings

3.5 FINISHING GYPSUM BOARD

A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.

B. Prefill open joints and rounded or beveled edges, if any, using setting-type joint compound.

C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.

D. Finish interior gypsum wallboard by applying the following joint compounds in 3 coats (not including prefill of openings in base), and sand between coats and after last coat:

1. Embedding and First Coat: Ready-mix drying-type all-purpose or taping compound.
2. Fill (Second) Coat: Ready-mix drying-type all-purpose or topping compound.
3. Finish (Third) Coat: Ready-mix drying-type all-purpose or topping compound

E. Water-Resistant Gypsum Board and Exterior Gypsum Board: Finish joints between water-resistant backing board with tape and setting-type joint compound to comply with gypsum board manufacturer's written recommendations and installation standards referenced in related sections.

F. Partial Finishing: Omit third coat and sanding on concealed drywall construction which is indicated for drywall finishing, except where finishing is required to achieve fire-resistance rating, sound rating or to act as air or smoke barrier.

3.6 GYPSUM WALL SHEATHING

A. General:

1. Comply with manufacturer's current written instructions, GA 252, and the following for the installation of gypsum sheathing.
2. Cut boards at penetrations, edges and other obstructions of the work; fit tight against abutting work, except provide 3/8-inch setback where non-loadbearing work abuts structural elements at head and jambs.
3. Coordinate installation of sheathing with installation of flashing and joint sealers so that these combined materials are installed in the sequence and manner which prevents exterior moisture from passing through complete exterior wall assembly to the interior.
4. Apply fasteners so that screw heads bear tightly against face of gypsum sheathing boards but do not cut into face paper.
5. Do not bridge building expansion joints with gypsum sheathing; cut and space edges to match spacing of structural support elements.

B. Vertical Installation: Install 4-feet wide gypsum sheathing boards vertically with vertical edges centered over flanges of steel studs. Abut ends and edges of each board with those of adjoining boards. Screw-attach boards at perimeter and within field of board to each steel stud as follows:

1. Fasteners spaced approximately 8-inches o.c. and set back 3/8-inch minimum from edges and ends of boards.

C. Air Infiltration Barrier Application:

1. Cover gypsum board sheathing with air infiltration barrier as follows:
2. Location: Apply felt type over gypsum sheathing occurring behind masonry veneer or metal siding.
3. Cut back air infiltration barrier 1/2-inch on each side of break in supporting members at control joint locations.
4. For asphalt-saturated organic felt and polyethylene film, apply horizontally with 2-inches overlap and 6-inches end-lap; fasten to sheathing with corrosion-resistant staples.

3.7 PROTECTION

A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.

B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.

C. Remove and replace panels that are wet, moisture damaged, and mold damaged.

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

END OF SECTION 09 29 00

SECTION 09 51 13 – ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes: Acoustical panels and exposed suspension systems for ceilings.

B. Extent of each type acoustical ceiling is shown and scheduled on drawings.

C. Related work specified elsewhere includes:

1. Division 6 Section – Rough Carpentry. (concealed P.T. wood blocking and grounds)
2. Division 7 Section – Joint Sealants.
3. Division 9 Section – Gypsum Board Assemblies.

1.3 PERFORMANCE REQUIREMENTS

A. Acoustical Panel Standard: Provide manufacturer's standard panels of configuration indicated that comply with ASTM E 1264 classifications as designated by types, patterns, acoustical ratings, and light reflectance, unless otherwise indicated.

B. Metal Suspension System Standard: Provide manufacturer's standard direct-hung metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable requirements in ASTM C 635.

C. Surface-Burning Characteristics: Complying with ASTM E 1264 for Class A materials and tested per ASTM E 84; testing performed by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Flame-Spread Index: 25 or less,
2. Smoke-Developed Index: 50 or less.

D. Broad Spectrum Antimicrobial Fungicide and Bactericide Treatment: Provide acoustical panels treated with manufacturer's standard antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested according to ASTM D 3273 and evaluated according to ASTM D 3274 or ASTM G 21.

1.4 SUBMITTALS

A. Product Data: Manufacturer's product specifications and installation instructions for each acoustical ceiling material required, and for each suspension system, including certified laboratory test reports and other data as required to show compliance with these specifications.

1. Include manufacturer's seismic installation details.
2. Include manufacturer's recommendations for cleaning and refinishing acoustical units, including precautions against materials and methods, which may be detrimental to finishes and acoustical performance.

B. Shop Drawings: Show layout of ceiling including locations of light fixtures, grilles, diffusers and sprinkler heads.

1. Indicate hanger spacings, clip anchors or inserts, fastening details, splicing methods for main and cross runners.
2. Include details for ceiling level changes, support methods for light fixture, diffusers, grilles and similar items.

C. Samples:

1. Set of 6-inch by 4-inch square samples for each acoustical unit required, showing full range of exposed color and texture to be expected in completed work.
2. Set of 12-inch length samples of each exposed runner and molding.

D. Qualification Data: Submit for qualified installer to demonstrate their capabilities and experience; include documentation indicating compliance with specified qualification requirements. (Submit for Architect's information only.)

E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each acoustical panel ceiling. (Submit for Architect's information only.)

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Firm with not less than three (3) years of successful experience in installation of acoustical ceilings similar to requirements for this project and which is acceptable to manufacturer of acoustical units, as shown by current written statement from manufacturer.

B. Source Limitations: Obtain each type of acoustical ceiling panel and supporting suspension system from single source from single manufacturer.

C. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Install a minimum 12-ft by 12-ft. area of each ceiling type specified, in spaces designated by Architect.
2. Notify Architect when spaces are ready for observation and review. Obtain Architect's approval of mockups before starting installation.

3. Approved mock up shall serve as a standard of quality for ceiling installations. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

D. Pre installation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver acoustical ceiling units to project site in original, unopened packages and store them in a fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination or other causes.

B. Before installing acoustical ceiling units, permit them to reach room temperature and stabilized moisture content.

C. Handle acoustical ceiling units carefully to avoid chipping edges or damaging units in any way.

1.7 PROJECT CONDITIONS

A. Space Enclosure: Do not install interior acoustical ceiling until space is enclosed and weatherproof, wet work in space is completed and nominally dry, work above ceilings is complete, and ambient conditions of temperature and humidity will be continuously maintained at values near those indicated for final occupancy.

B. Coordination:

1. Coordinate layout and installation of acoustical ceiling units and suspension system components with other work supported by or penetrating through, ceilings, including light fixtures, HVAC equipment, food service exhaust hoods, fire suppression system components (if any), conveyor systems and partition system (if any).
2. Schedule installation to occur after other work which can generate dust is completed. Schedule acoustical material installation to minimize need for removal and replacement to accommodate work of other trades.

1.8 EXTRA MATERIALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents. Deliver maintenance materials to Owner.

1. Acoustical Ceiling Units: Furnish quantity of full size units equal to two percent (2.0%) of amount installed.
2. Exposed Suspension Components: Furnish quantity of each exposed component required for actual installation equal to two percent (2.0%) of amount installed.

PART 2 - PRODUCTS

2.1 ACOUSTICAL CEILING PANELS

A. Basis of Design: Product as scheduled on drawings.

1. Acoustical ceiling panels of similar design, material, construction and of matching color, pattern and texture by other acceptable manufacturers may be submitted for Architect's acceptance.
2. Acceptance is subject to compliance with specified requirements as evidenced by submittal of manufacturer's product data, test reports and samples.

B. Acoustical Panel Colors and Patterns: Match appearance characteristics indicated for each product type.

C. Panel Type: ASTM E 1264, Type IV, Form 2, Pattern E; water felted mineral fiber, membrane-faced overlay panels with painted finish.

1. Size: 24 by 24 inches (2-ft. by 2-ft.), unless otherwise indicated on Drawings.
2. Thickness: 3/4 inch.
3. Edges: Rabbeted and beveled (Beveled Tegular).
4. Noise Reduction Coefficient (NRC): 0.70, minimum.
5. Ceiling Attenuation Class (CAC): 35, minimum.
6. Light Reflectance: 0.86.
7. Surface Finish: Factory applied latex paint finish, white color.
8. Broad Spectrum Antimicrobial Fungicide and Bactericide Treatment: Provide acoustical panels treated with manufacturer's standard antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested according to ASTM D 3273 and evaluated according to ASTM D 3274 or ASTM G 21.

D. Suspension System: Grid profile size as indicated on Drawings for scheduled ceiling panel. Provide grid module matching ceiling panel size.

2.2 METAL SUSPENSION SYSTEMS

A. Acceptable Manufacturers; subject to compliance with specified requirements:

1. Armstrong World Industries, Inc.
2. CertainTeed Corporation.
3. USG Interiors, Inc.

B. Narrow Profile Exposed Grid System: Narrow-face, capped, double-web, galvanized steel suspension system.

1. Structural Classification: Intermediate duty system in accord with ASTM C635.

2. Main and Cross Runners: Roll formed from cold-rolled steel sheet; prepainted, electrolytically zinc coated, or hot-dip galvanized according to ASTM A 653, not less than G30 coating designation; with prefinished metal caps on flanges.
3. End Condition of Cross Runners: Override (stepped) type.
4. Face Design: Flat, flush.
5. Cap Material: Galvanized cold-rolled steel.
6. Cap Face Size: 9/16 inch width.
7. Cap Finish: Factory applied low gloss paint finish; white color.

C. Standard Exposed Grid System: Wide-face, capped, double-web, galvanized steel suspension system.

1. Structural Classification: Intermediate duty system in accord with ASTM C635.
2. Main and Cross Runners: Roll formed from cold-rolled steel sheet; prepainted, electrolytically zinc coated, or hot-dip galvanized according to ASTM A 653, not less than G30 coating designation; with prefinished metal caps on flanges.
3. End Condition of Cross Runners: Override (stepped) type.
4. Face Design: Flat, flush.
5. Cap Material: Galvanized cold-rolled steel.
6. Cap Face Size: 15/16 inch width.
7. Cap Finish: Factory applied low gloss paint finish; white color.

D. Finishes and Colors: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes. Provide manufacturer's standard factory-applied finish for type of system indicated.

2.3 SUSPENSION SYSTEM ACCESSORIES

A. Attachment Devices: Size for five times the design load indicated in ASTM C 635, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.

1. Anchors in Concrete: Anchors of type and material indicated below, with holes or loops for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to five times that imposed by ceiling construction, as determined by testing per ASTM E 488 or ASTM E 1512 as applicable, conducted by a qualified testing and inspecting agency.

a. Type: Cast-in-place or Postinstalled expansion anchors.
b. Corrosion Protection: Either type as specified.

1) Carbon-steel components zinc plated to comply with ASTM B 633, Class Fe/Zn 5 (0.005 mm) for Class SC 1 service condition.
2) Stainless-steel components complying with ASTM F 593 and ASTM F 594, Group 1 Alloy 304 or 316 for bolts; Alloy 304 or 316 for anchor.

2. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hangers of type indicated, and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing per ASTM E 1190, conducted by a qualified testing and inspecting agency.

B. Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:

1. Zinc-Coated, Carbon-Steel Wire: ASTM A 641, Class 1 zinc coating, soft temper.
2. Size: Select wire diameter so its stress at 3 times hanger design load (ASTM C 635, Table 1, "Direct Hung") will be less than yield stress of wire, but provide not less than 12 gauge (0.106 inch) diameter wire.

C. Hanger Rods and Flat Hangers: Mild steel, zinc coated or protected with rust-inhibitive paint; sized to support design loads.

D. Angle Hangers: Angles with legs not less than 7/8 inch wide; formed with 0.04 inch thick, galvanized-steel sheet complying with ASTM A 653, G90 coating designation; with bolted connections and 5/16 inch diameter bolts.

E. Hold-Down Clips: Where indicated, provide manufacturer's standard hold-down clips spaced 24 inches on center on all cross tees.

F. Edge Moldings and Trim: Roll-formed, sheet-metal type in profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that comply with design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension system runners.

1. Provide manufacturer's standard edge moldings that fit acoustical panel edge details and suspension systems indicated and that match width and configuration of exposed runners, unless otherwise indicated.
2. For lay-in panels with reveal edge details, provide stepped edge molding that forms reveal of same depth and width as that formed between edge of panel and flange at exposed suspension member.
3. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.

2.4 MISCELLANEOUS MATERIALS

A. Fasteners: Cadmium plated, type recommended by suspension system manufacturer, but for not less than 1/2 inch penetration of substrate.

B. Acoustical Sealants:

1. Acceptable Products: Subject to compliance with requirements, provide one of the following:

a. Henkel Corporation; OSI Pro-Series SC-175 Acoustical Sound Sealant.
b. Pecora Corporation; AIS-919.
c. Specified Technologies, Inc.; SpecSeal Smoke N' Sound Acoustical Caulk.
d. Tremco, Inc.; Acoustical Sealant.
e. USG Corporation; Sheetrock Acoustical Sealant.

2. Characteristics: Manufacturer's non-hardening, non-bleeding, nonstaining, gunnable, synthetic rubber or acrylic latex compound complying with ASTM C834.

a. Acoustical Performance: Effective in reducing airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.
b. VOC Content: 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

PART 3 - EXECUTION

3.1 EXAMINATION

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

B. Examine acoustical panels before installation. Reject acoustical panels that are wet, moisture damaged, or mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Furnish layouts for inserts, clips, or other supports required to be installed by other trades for support of acoustical ceilings. Furnish concrete inserts, hanger clips and similar devices to other trades for installation well in advance of time needed for coordination of other work.

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

C. Where suspended acoustical ceilings are indicated to be hung below drywall sub ceilings, install sub-ceiling hanger clips at locations for hanger wire attachment. Attach clips screw fastened through gypsum board into support framing spaced at grid locations required for securing suspension system hangers wires.

3.3 INSTALLATION

A. Install acoustical panel ceilings to comply with ASTM C 636 and design requirements indicated, per manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."

B. Suspend ceiling hangers from building's structural members and as follows:

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.

3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
4. Secure wire hangers to ceiling suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
5. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for both the structure to which hangers are attached and the type of hanger involved. Install hangers in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.
6. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, post installed mechanical anchors, or power-actuated fasteners that extend through forms into concrete.
7. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
8. Do not attach hangers to steel deck tabs.
9. Do not attach hangers to steel roof deck. Attach hangers to structural members.
10. Space hangers not more than 48 inches on center along each member supported directly from hangers, unless otherwise indicated; provide hangers not more than 8 inches from ends of each member.
11. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.

C. Secure bracing wires to ceiling suspension members and to supports with a minimum of four tight turns. Suspend bracing from building's structural members as required for hangers, without attaching to permanent metal forms, steel deck, or steel deck tabs. Fasten bracing wires into concrete with cast-in-place or post installed anchors.

D. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.

1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
2. Screw attach moldings to substrate at intervals not more than 16 inches on center and not more than 3 inches from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet. Miter corners accurately and connect securely.

E. Install suspension system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.

F. Install acoustical panels with undamaged edges and fit accurately into suspension system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit.

1. Arrange acoustical units and orient directionally patterned units, (if any) in a manner shown by reflected ceiling plans.
2. Install panels with pattern running in one direction, as indicated, or if not indicated, as directed by Architect.

3. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension system runners and moldings.
4. For reveal-edged panels on suspension system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.
5. Paint cut edges of panel remaining exposed after installation; match color of exposed panel surfaces using coating recommended in writing for this purpose by acoustical panel manufacturer.
6. Install hold-down clips in areas indicated, in areas required by authorities having jurisdiction, and in spaces as recommended by panel manufacturer's written instructions, unless otherwise indicated.

3.4 CLEANING

A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage.

B. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 09 51 13

SECTION 09 96 00 - HIGH-PERFORMANCE COATINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: High-performance coatings and special preparation of surfaces.

1. Use high performance coating systems specified in this section to finish components, unless otherwise indicated. Without restricting volume or generality, work to be performed under this section may include, but is not limited to:

   a. Exterior steel
   b. Interior steel
   c. Exterior concrete
   d. Interior concrete
   e. Piping, hangers, and supports
   f. Exposed bare pipes (including color coding)

2. Painting or finishing is not needed for following:

   a. Surfaces or materials specifically scheduled or shown on Drawings to remain unfinished
   b. Items provided with factory finish.
   c. Equipment nameplates, fire rating labels, and operating parts of equipment

3. Materials and products having factory-applied primer shall not be considered factory finished.

1.2 REFERENCE STANDARDS

A. American Society for Testing and Materials:

1. ASTM D16 - Terminology Relating to Paint, Varnish, Lacquer, and Related Products
2. ASTM D522 – Test Methods for Mandrel Bend Test of Attached Organic Coatings
3. ASTM D6386 – Preparation of Zinc (Hot-Dip Galvanized) Coated Iron and Steel Product
4. ASTM D3359 – Test Methods for Rating Adhesion by Tape Test

B. SSPC: The Society for Protective Coatings:

1. SSPC - Painting Manual, Volume 2: Systems and Specifications.
2. SSPC-Paint 16 - Coal Tar Epoxy-Polyamide Black (or Dark Red).
3. SSPC-SP 2 - Hand Tool Cleaning.
4. SSPC-SP 3 - Power Tool Cleaning.
5. SSPC-SP 5 - White Metal Blast Cleaning.
6. SSPC-SP 6/NACE 3 - Commercial Blast Cleaning.

7. SSPC-SP 7/NACE 4 - Brush-Off Blast Cleaning.
8. SSPC-SP 10/NACE 2 - Near-White Metal Blast Cleaning.
9. SSPC-SP 11 - Power Tool Cleaning to Bare Metal.
10. SSPC-SP13/NACE 6 – Surface Preparation of Concrete

C. National Association of Pipe Fabricators

1. NAPF 500-03-01 Solvent Cleaning
2. NAPF 500-03-02 Hand Tool Cleaning
3. NAPF 500-03-03 Power Tool Cleaning
4. NAPF 500-03-04 Abrasive Blast Cleaning of Ductile Iron Pipe
5. NAPF 500-03-05 Abrasive Blast Cleaning of Cast Ductile Iron Fittings

D. International Concrete Repair Institute

1. ICRI-CSP 2 – Grinding
2. ICRI-CSP 3 – Light Shotblast
3. ICRI-CSP 4 – Light Scarification
4. ICRI-CSP 5 – Medium Shotblast
5. ICRI-CSP 6 – Medium Scarification

E. NSF International

1. ANSI / NSF 600: Health Effects Evaluation and Criteria for Chemicals in Drinking Water

1.3 PREINSTALLATION MEETINGS

A. Section 01 31 00 – Project Management and Coordination.

B. Convene minimum two weeks prior to commencing Work of this Section.

C. Schedule a conference and inspection to be held on-site before field application of coating systems begins.

D. Conference shall be attended by Contractor, Owner's Representative, Engineer, coating applicators, and a representative of coating material manufacturer.

E. Topics to be discussed at meeting shall include:

1. A review of Contract Documents and accepted shop drawings shall be made and deviations or differences shall be resolved.
2. Review items such as environmental conditions, surface conditions, surface preparation, application procedures, and protection following application.
3. Establish which areas on-site will be available for use as storage areas and working area

F. Pre-construction conference and inspection shall serve to clarify Contract Documents, application requirements and what work should be completed before coating application can begin.

1.4 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. Product Data:

1. Submit manufacturer information indicating coating materials, manufacturer's name, product name, product number, performance ratings, curing times, mixing, thinning and application requirements.

a. Provide material analysis, including vehicle type and percentage by weight and by volume of vehicle, resin and pigment.
b. Submit manufacturer's Material Safety Data Sheets (MSDS) and other safety requirements.

C. Samples: Submit one color chart/color samples, illustrating colors for selection.

D. Schedule: Contractor shall submit a schedule of items that will receive high-performance coatings per Specification 09 96 00.

E. Color: Contractor shall submit a schedule of colors based on Color System Material Identification.

F. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

G. Manufacturer Instructions: Submit special procedures, perimeter conditions requiring special attention.

H. Quality Assurance Submittals:

1. Certificates:

a. Coatings manufacturer shall certify that coating materials utilized are "non-lead" (less than 0.06% lead by weight in dried film) as defined in Part 1303 of Consumer Product Safety Act.
b. Provide certification that specialized equipment as may be required by manufacturer for proper application of coating materials shall be utilized for work of this Section.
c. Provide manufacturer's certification that products to be used comply with specified requirements and are suitable for intended application.

2. Manufacturer's Instructions:

a. Submit manufacturer's installation procedures which shall be basis for accepting or rejecting actual installation procedures.

I. Qualifications Statements:

1. Submit qualifications for manufacturer and applicator.
2. Submit manufacturer's approval of applicator.

1.5 CLOSEOUT SUBMITTALS

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for submittals.

B. Operation and Maintenance Data: Submit maintenance and cleaning requirements for coatings, repair and patching techniques.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for maintenance materials.

B. Extra Stock Materials:

1. Furnish 1 gal of each color of each type of coating specified, for Owner's maintenance use.
2. Label each container with manufacturer's name, product number, color number, and room names and numbers where used.

1.7 QUALITY ASSURANCE

A. Conform to applicable codes and ordinances for flame, fuel, smoke, and volatile organic compound (VOC) ratings requirements for finishes at time of application.

1.8 QUALIFICATIONS

A. Provide products from a company specializing in manufacture of high-performance coatings with a minimum of 10 years experience.

B. Applicator shall be trained in application techniques and procedures of coating materials and shall demonstrate a minimum of 2 years successful experience in such application.

1. Maintain, throughout duration of application, a crew of painters who are fully qualified to satisfy specified qualifications.

C. Single Source Responsibility:

1. Materials shall be products of a single manufacturer or items standard with manufacturer of specified coating materials.
2. Provide secondary materials which are produced or are specifically recommended by coating system manufacturer to ensure compatibility of system.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.

B. Container Labeling: Include manufacturer's name, type of coating, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

C. Inspection:

1. Accept materials on Site in manufacturer's sealed and labeled containers.
2. Inspect for damage and to verify acceptability.

D. Store materials in ventilated area and otherwise according to manufacturer instructions.

E. Protection:

1. Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.
2. Provide additional protection according to manufacturer instructions.

1.10 AMBIENT CONDITIONS

A. Section 01 50 00 - Temporary Facilities and Controls: Requirements for ambient condition control facilities for product storage and installation.

B. Minimum Conditions: Do not install materials when temperature is below 35°F or above 110°F.

C. Refer to specific product information sheets for minimum surface temperature requirements. Surface temperatures shall be at least 5°F (3°C) above dew point and in a rising mode.

D. Subsequent Conditions: Maintain above temperature range, 24 hours before, during, and 72 hours after installation of coating.

E. Relative humidity shall be no higher than 85%.

F. For exterior spray application, wind velocity shall be less than 15 mph (25 kph).

G. Atmosphere shall be relatively free of airborne dust.

H. Restrict traffic from area where coating is being applied or is curing.

1.11 WARRANTY

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for warranties.

B. Include coverage for bond to substrate, and degradation of chemical resistance.

PART 2 - PRODUCTS

2.1 HIGH-PERFORMANCE COATINGS

A. Manufacturers:

1. Tnemec Company, Inc.
2. Sherwin Williams Company
3. Or Approved Equal.

2.2 COMPONENTS

A. Coating System:

1. Shop Primed: See schedule

2. Surface Preparation: See schedule for SSPC / NACE, NAPF, ICRI, or ASTM standard.

3. Coating Type:

   a. Complete multicoat systems formulated and recommended by manufacturer for intended applications and in indicated thicknesses.
   b. Specified number of coats does not include primer, stripe, or filler coat.
   c. Each coat of a multicoat system shall be the product or recommendation of one manufacturer.

4. Chromium Content as Zinc Chromate or Strontium Chromate: None.
5. Colors: Selected from manufacturer's standard colors based on Color System Material Identification
6. Minimum Dry Film Thickness Per Coat: See schedule.
7. Primer: Per manufacturer’s recommendation.

B. Epoxy
   1. Product Code: ***A1***
      a. Vendor Reference
         1) **Sherwin Williams**: Macropoxy 646 (Non-NSF)
         2) **Tnemec**: L140 Pota-Pox Plus (W/WW – NSF)
         3) **Carboline**:
         4) **Raven**:

   2. Product Code: ***A2***
      a. Vendor Reference
         1) **Sherwin Williams:** Dura-Plate 6000 (W/WW - NSF)
         2) **Tnemec:** Series 22 Epoxoline (W/WW – NSF)
         3) **Carboline:**
         4) **Raven:**

3. Product Code: ***A3***
   a. Vendor Reference:
      1) **Sherwin Williams:** Dura-Plate 6000 (Mortar) (W/WW – NSF)
      2) **Tnemec:** Series G435 Perma-Glaze (WW)
      3) **Carboline:**
      4) **Raven:**

4. Product Code: ***A4***
   a. Vendor Reference:
      1) **Sherwin Williams:** Targuard
      2) **Tnemec:** Series 22 Epoxoline (W/WW – NSF)
      3) **Carboline:**
      4) **Raven:**

5. Product Code: ***A5***
   a. Vendor Reference:
      1) **Sherwin Williams:** Pro-Industrial Water-Based Epoxy
      2) **Tnemec:** Series 287 Enviro-Pox
      3) **Carboline:**
      4) **Raven:**

6. Product Code: ***A6***
   a. Vendor Reference:
      1) **Sherwin Williams:** Macropoxy 5500LT (W– NSF)
      2) **Tnemec:** Series L140 (W/WW – NSF)
      3) **Carboline:**
      4) **Raven:**

7. Product Code: ***A7***
   a. Vendor Reference:
      1) **Sherwin Williams:** SherPlate600 (W – NSF)
      2) **Tnemec:** Series L140 (W/WW – NSF)
      3) **Carboline:**
      4) **Raven:**

8. Product Code: ***A8***
   a. Vendor Reference:
      1) **Sherwin Williams:** Resuflor 3741 (W/WW)
      2) **Tnemec:** Series 282 Tneme-Glaze
      3) **Carboline:**
      4) **Raven:**

9. Product Code: ***A9***
   a. Vendor Reference:
      1) **Sherwin Williams:** Resuflor 3746
      2) **Tnemec:** Series 237 Power-Tread
      3) **Carboline:**
      4) **Raven:**

10. Product Code: ***A10***

a. Vendor Reference:
   1) **Sherwin Williams:** Cor-Cote HCR
   2) **Tnemec:** Series 282 Tneme-Glaze
   3) **Carboline:**
   4) **Raven:**

11. Product Code: ***A11***
    a. Vendor Reference:
       1) **Sherwin Williams:** Dura-Plate 235 (W/WW – NSF)
       2) **Tnemec:** Series 237 Power-Tread
       3) **Carboline**:
       4) **Raven**:

12. Product Code: ***A12***
    a. Vendor Reference:
       1) **Sherwin Williams:** Corobond 100 (W/WW)
       2) **Tnemec:** Series 201 Epoxoprime
       3) **Carboline**:
       4) **Raven**:

13. Product Code: ***A13***
    a. Vendor Reference:
       1) **Sherwin Williams:** Dura-Plate UHS (W/WW - NSF)
       2) **Tnemec:** Series 21 Epoxoline
       3) **Carboline**:
       4) **Raven**:

14. Product Code: ***A14***
    a. Vendor Reference:
       1) **Sherwin Williams:** Resuprime 3830/3835 (W/WW)
       2) **Tnemec:** Series 208 Epoxoprime MVT
       3) **Carboline**:
       4) **Raven**:

15. Product Code: ***A15***
    a. Vendor Reference:
       1) **Sherwin Williams:** Sher-Glass FF (W/WW - NSF)
       2) **Tnemec:** Series 142 Epoxoline
       3) **Carboline**:
       4) **Raven**:

16. Product Code: ***A16***
    a. Vendor Reference:
       1) **Sherwin Williams:** Sherplate PW (W - NSF)
       2) **Tnemec:** Series 21 Epoxoline
       3) **Carboline**:
       4) **Raven**:

17. Product Code: ***A17***
    a. Vendor Reference:
       1) **Sherwin Williams:** Steel-Seam FT910 (W/WW)

2) **Tnemec:** Series 215 Surfacing Epoxy
3) **Carboline**:
4) **Raven**:

18. Product Code: ***A18***
    a. Vendor Reference:
        1) **Sherwin Williams:** Dura-Plate 301K (W/WW)
        2) **Tnemec:** Series 132 Protuff-Mastic
        3) **Carboline**:
        4) **Raven**:

19. Product Code: ***A19***
    a. Vendor Reference:
        1) **Sherwin Williams:** Dura-Plate 301W (W/WW)
        2) **Tnemec:** Series 132 Protuff-Mastic
        3) **Carboline**:
        4) **Raven**:

20. Product Code: ***A20***
    a. Vendor Reference:
        1) **Sherwin Williams:** Macropoxy 5000 (W/WW)
        2) **Tnemec:** Series 201 Epoxoprime
        3) **Carboline**:
        4) **Raven**:

21. Product Code: ***A21***
    a. Vendor Reference:
        1) **Sherwin Williams:** Macropoxy 2600 (W/WW)
        2) **Tnemec:** Tnemec Series 27 F.C. Typoxy
        3) **Carboline**:
        4) **Raven**:

22. Product Code: ***A22***
    a. Vendor Reference:
        1) **Sherwin Williams**: Tank Clad HS (WW)
        2) **Tnemec:** Seres 21 Epoxoline
        3) **Carboline**:
        4) **Raven**:

23. Product Code: ***A23***
    a. Vendor Reference:
        1) **Sherwin Williams:** Dura-Plate 6100 (W/WW)
        2) **Tnemec:** Series 22 Epoxoline
        3) **Carboline**:
        4) **Raven**:

24. Product Code: ***A24***
    a. Vendor Reference:
        1) **Sherwin Williams:** Resuflor 3743
        2) **Tnemec:** Series 237 Power-Tread
        3) **Carboline**:

4) **Raven**:

25. Product Code: ***A25***
    a. Vendor Reference:
        1) **Sherwin Williams:** Magnalux 3743
        2) **Tnemec:** Series 237 Power-Tread
        3) **Carboline**:
        4) **Raven**:

C. Polyurethane Coating:

1. Product Code: ***B1***
    a. Vendor Reference:
        1) **Sherwin Williams:** Hi-Solids Polyurethane (W/WW)
        2) **Tnemec:** Series 1094/1095 Endura-Shield
        3) **Carboline**:
        4) **Raven**:

2. Product Code: ***B2***
    a. Vendor Reference:
        1) **Sherwin Williams:** Poly-Cote 115 (W/WW – NSF)
        2) **Tnemec:** Series 264 Elasto-Shield
        3) **Carboline**:
        4) **Raven**:

3. Product Code: ***B3***
    a. Vendor Reference:
        1) **Sherwin Williams:** Fluorokem HS
        2) **Tnemec:** Series 700 Hydro-Flon
        3) **Carboline**:
        4) **Raven**:

4. Product Code: ***B4***
    a. Vendor Reference:
        1) **Sherwin Williams:** Sherloxane 800
        2) **Tnemec:** Series 690FC Siloxilon
        3) **Carboline**:
        4) **Raven**:

5. Product Code: ***B5***
    a. Vendor Reference:
        1) **Sherwin Williams:** Acrolon 218 HS
        2) **Tnemec:** Series 1094/1095 Endura-Sield
        3) **Carboline**:
        4) **Raven**:

D. Alkyd Coatings:

1. Product Code: ***C1***
   a. Vendor Reference:
      1) **Sherwin Williams:** Kem Kromik
      2) **Tnemec:** Series 10V Tnemec Primer
      3) **Carboline**:
      4) **Raven**:

2. Product Code: ***C2***
   a. Vendor Reference:
      1) **Sherwin Williams:** Alkyd Coating B5400-Series
      2) **Tnemec:** Series 2H Hi-Build Tneme-Gloss
      3) **Carboline**:
      4) **Raven**:

E. Acrylic Coatings:

1. Product Code: ***D1***
   a. Vendor Reference:
      1) **Sherwin Williams:** Cement-Plex 875
      2) **Tnemec:** Series 130 Enviro-Fill
      3) **Carboline**:
      4) **Raven**:

2. Product Code: ***D2***
   a. Vendor Reference:
      1) **Sherwin Williams:** Loxon (Self-Cleaning)
      2) **Tnemec:** Series 180 W.B. Tneme-Crete
      3) **Carboline**:
      4) **Raven**:

3. Product Code: ***D3***
   a. Vendor Reference:
      1) **Sherwin Williams:** Loxon XP
      2) **Tnemec:** Series 1026 Enduratone
      3) **Carboline**:
      4) **Raven**:

4. Product Code: ***D4***
   a. Vendor Reference:
      1) **Sherwin Williams:** Conflex Ultracrete
      2) **Tnemec:** Series 157/157 Enviro-Crete
      3) **Carboline**:
      4) **Raven**:

5. Product Code: ***D5***
   a. Vendor Reference:
      1) **Sherwin Williams:** Conflex XL

2) **Tnemec:** Series 156/157 Enviro-Crete
3) **Carboline**:
4) **Raven**:

F. Zinc Based

1. Product Code: ***E1***
   a. Vendor Reference:
      1) **Sherwin Williams:** Corothane 1 Galvapac 1K (Zinc-Rich) (NSF)
      2) **Tnemec:** Series 91-H20/94-H2O Hydro-Zinc
      3) **Carboline**:
      4) **Raven**:

2. Product Code: ***E2***
   a. Vendor Reference:
      1) **Sherwin Williams:** Corothane 1 Galvapac 2K (Zinc-Rich)
      2) **Tnemec:** Series 90-97 Tneme-Zinc
      3) **Carboline**:
      4) **Raven**:

3. Product Code: ***E3***
   a. Vendor Reference:
      1) **Sherwin Williams:** Zinc Clad 4100 (W/WW)
      2) **Tnemec:** Series 90-97 Tneme-Zinc
      3) **Carboline**:
      4) **Raven**:

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for application examination.

B. Examine areas and conditions under which application of coating systems shall be performed for conditions that will adversely affect execution, permanence, or quality of coating system application.

C. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes until moisture content of surface is below following limits:

1. Masonry Surfaces: 12% maximum
2. Vertical Concrete Surfaces: 12% maximum
3. Horizontal Concrete Surfaces: 8% maximum

D. Correct conditions detrimental to timely and proper execution of Work.

E. Do not proceed until unsatisfactory conditions have been corrected.

F. Commencement of installation constitutes acceptance of conditions and responsibility for satisfactory performance.

3.2 PREPARATION

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for application preparation.

B. Protection:

1. Take precautionary measures to prevent fire hazards and spontaneous combustion. Remove empty containers from Site.
2. Place cotton waste, cloths and hazardous materials in containers, and remove from Site daily.
3. Provide drop cloths, shields, and other protective equipment.
4. Protect elements surrounding work of this section from damage or disfiguration.
5. As Work proceeds, promptly remove spilled, splashed, or splattered materials from surfaces.
6. During application of coating materials, post Wet Paint signs.
7. During application of solvent-based materials, post No Smoking signs.

C. Clean surfaces of loose foreign matter.

D. Remove substances that would bleed through finished coatings; if removal is not possible, seal surface with shellac.

E. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

F. Existing Painted and Sealed Surfaces:

1. Remove loose, flaking, and peeling paint, and feather edge and sand smooth edges of chipped paint.
2. Clean with mixture of trisodium phosphate and water to remove surface grease and foreign matter.

G. Galvanized Surfaces: Remove surface contamination and oils and wash with solvent. Surfaces shall be mechanically cleaned to remove passivation and to provide a uniform 1.0 mil anchor profile.

H. Ferrous Metal:

1. Surfaces shall be free of residual deposits of grease, rust, scale, dirt, dust, and oil.

a. Immersion Service: SSPC-SP 10 Near White Blast Cleaning
b. Non-Immersion Service: SSPC-SP 6 Commercial Blast Cleaning.

2. Field Repair of Shop Primed Surfaces:

a. Non-Immersion Service: Remove all dirt, dust, chalk, oil, grease, as well as any other foreign matter by solvent cleaning (SSPC-SP 1) and/or power washing. All areas damaged during transportation, construction or installation shall be cleaned in accordance with SSPC-SP 11 Power Tool Cleaning to Bare Metal or SSPC-SP 6 Commercial Blast Cleaning. All edges shall be feathered. All surfaces shall be clean and dry prior to coating
b. Immersion Service: Remove all dirt, dust, chalk, oil, grease, as well as any other foreign matter by solvent cleaning (SSPC-SP 1) and/or power washing. All areas damaged during transportation, construction or installation shall be cleaned in accordance with SSPC-SP 10 Near White Blast Cleaning. All edges shall be feathered. The remainder of the intact shop primer shall be cleaned in accordance with SSPC-SP 7 Brush-Off Blast Cleaning to provide a minimum, uniform, anchor profile of at least 1.0 mil. In order to prevent injury to surrounding painted areas, blast cleaning may necessitate use of lower air pressure, small nozzle and abrasive particle sizes, short blast nozzle distance from surface, shielding and masking. If damage is too extensive to touch-up, item shall be re-cleaned and coated or painted. All surfaces shall be clean and dry prior to receiving the specified finish coat(s).

3. For surfaces not shop primed, surfaces shall be cleaned in compliance with specifications of Steel Structures Painting Council as indicated in Schedule of Coating Systems below.

3.3 APPLICATION

A. Comply with MPI - Architectural Painting Manual.

B. Apply primer to each surface, unless specifically not required by coating manufacturer.

C. Apply coating systems in compliance with manufacturer's instructions and using application method best suited for obtaining full, uniform coverage of surfaces to be coated.

D. Apply primer, intermediate, and finish coats to comply with wet and dry film thickness and spreading rates for each type of material as recommended by manufacturer.

1. Application rates in excess of those recommended and fewer numbers of coats than specified shall not be accepted.

E. Number of coats specified shall be minimum number acceptable. Apply additional coats as needed to provide a smooth, even application.

1. Closely adhere to re-coat times recommended by manufacturer. Allow each coat to dry thoroughly before applying next coat. Provide adequate ventilation for tank interior to carry off solvents during drying phase.

F. Employ only application equipment that is clean, properly adjusted, and in good working order, and of type recommended by coating manufacturer.

G. After surface preparation, interior weld seams shall receive a stripe coat applied by brush.

H. Make edges of paint adjoining other materials or colors sharp and clean, without overlapping.

I. Apply coatings to specified thicknesses.

J. Apply in uniform thickness coats, without runs, drips, pinholes, brush marks, or variations in color, texture, or finish.

K. Finish edges, crevices, corners, and other changes in dimension with full coating thickness.

3.4 FIELD QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements: Requirements for inspecting and testing.

B. Section 01 70 00 - Execution and Closeout Requirements: Requirements for testing, adjusting, and balancing.

C. Inspecting and Testing: Comply with MPI - Architectural Painting Manual.

3.5 CLEANING

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for cleaning.

B. Collect waste material that may constitute fire hazard, place in closed metal containers, and remove daily from Site.

C. Clean surfaces immediately of overspray, splatter, and excess material.

D. After coating has cured, clean and replace finish hardware, fixtures, and fittings previously removed.

E. COLOR SYSTEM MATERIAL IDENTIFICATION

1. A schedule, approved by Engineer and Owner, shall be submitted prior to any material receiving color coatings.

2. The high-performance coating manufacturer shall submit their color selection along with manufacturer’s color numbers.

3.6 SCHEDULE

1. See plans.

END OF SECTION 09 96 00