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SECTION 27 15 00 - COMMUNICATIONS HORIZONTAL CABLING

GENERAL

1.1 SUMMARY

A. This section of the horizontal cabling portion of a structured cabling system includes:
   1. UTP Copper cabling
   2. Termination and patch cables

B. Provide all horizontal cabling, terminating hardware, adapters, and cross-connecting hardware necessary to interconnect all system equipment including equipment located in communications rooms.

C. Related Sections
   1. Section 260000 Electrical (including related sub-sections)
   2. Section 270000 Communications
   3. Section 270526 Grounding and Bonding for Communications Systems
   4. Section 270528 Pathways for Communications
   5. Section 271100 Communications Equipment Room Fittings
   6. Section 271300 Communications Backbone Cabling
   7. Section 274100 Audio-Visual Systems

1.2 REFERENCES

A. The publications listed below form a part of this specification. The publications are referred to in the text by basic designation only.

B. Specific reference in specifications to codes, rules, regulations, standards, manufacturer's instructions, or requirements of regulatory agencies shall mean the latest printed edition of each in effect at the date of contract unless the document is shown dated.

C. Conflicts
   1. Refer to section 270000.

D. Codes and Standards
   1. Refer to section 270000.

1.3 SUBMITTALS

A. Refer to sections 270000 and 271300.

1.4 QUALITY ASSURANCE

A. Refer to section 270000.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Refer to sections 270000 and 271300.

B. Storage temperature range: -40°F to 149°F (-40°C to 65°C)

1.6 PROJECT SITE CONDITIONS

A. Refer to section 270000.

1.7 WARRANTY

A. Refer to section 270000.

PRODUCTS

1.8 ACCEPTABLE MANUFACTURERS

A. Labeling
   1. Refer to section 270000.

B. Firestopping
   1. Refer to section 270000.

1.9 ACCEPTABLE COPPER MANUFACTURERS

A. CAT 6 UTP Plenum Rated Cable
   1. CommScope or Uniprise, blue
   2. Owner approved alternate

B. Data/Voice Outlet Components
   1. CommScope or Uniprise, blue for data
   2. Owner approved alternate

C. Patch Panels (24 or 48 port)
   1. CommScope or Uniprise – 1 and 2 U
   2. Owner approved alternate

D. Copper Patch Cords
   1. CommScope or Uniprise – 1 and 2 U Owner approved alternate

E. Faceplates
   1. CommScope or Uniprise, 4 port, white
   2. CommScope or Uniprise, 2 port, white
   3. Wall phone faceplate, stainless-steel
   4. Owner approved alternate

1.10 ACCEPTABLE FIBER MANUFACTURERS

A. Fiber Cable Plenum-rated
   1. Corning
   2. CommScope or Uniprise
   3. Owner approved alternate

B. Fiber Connectors, (LC)
   1. Corning
   2. CommScope or Uniprise
   3. Owner approved alternate

C. Fiber Termination Shelves and Cabinets (Rack-Mountable)
   1. Corning
   2. CommScope or Uniprise
   3. Owner approved alternate

D. Fiber Distribution Cabinet (Wall Mounted)
   1. Corning
   2. CommScope or Uniprise
   3. Owner approved alternate

E. Fiber adapter panels (6-port)
   1. Corning
   2. CommScope or Uniprise
   3. Owner approved alternate

F. Fiber Duplex Patch Cables (Type SM and MM)
   1. Corning
   2. CommScope or Uniprise
   3. Owner approved alternate

1.11 ACCESSORIES

A. Mount one laminated full-size hard copy in color of an as-built floor plan designating workstation locations, pathways, and communications room locations. Confirm hard copy size with Owner.

B. Provide clear plastic lamination serving each communication room.

C. Install the laminated drawings within a protective Plexiglas encasement on the wall of the servicing communications rooms. To ease accessibility the Plexiglas encasement shall be in either flip-down format or file folder format.

1.12 HORIZONTAL COPPER CABLING

A. Recognized cabling for providing the signal medium from the work area to the communications room shall include the following:
   1. Category 6 UTP cable
   2. Category 6A UTP cable

B. Category 6 UTP Cable Requirements
   1. 23/24 AWG solid bare copper
   2. Cable jacket shall comply with NEC Article 800 for use as a plenum cable and shall be UL and c (UL) Listed Type CMP (communications multipurpose plenum)
   3. Cable shall terminate on an eight-pin modular jack at each outlet. All horizontal cabling shall meet or exceed the ANSI/TIA-568-C.2 Commercial Building Telecommunications Cabling Standard, Part 2: Balanced Twisted Pair Cabling Components
   4. Cables shall be marked as UL verified with a minimum of Category 6 rating
   5. The cable shall support Voice, Analog Base band Video/Audio, Fax, Modem, Switched-56, T-1, ISDN, RS-232, RS-422, RS-485, 10BASE-T Ethernet, Token Ring, 100Mbps TP-PMD, 100BASE-T Ethernet, 155 Mbps ATM, AES/EBU Digital Audio, 270 Mbps Digital Video, 622 Mbps 64-CAP ATM and emerging high-bandwidth applications, including 1 Gbps Ethernet, gigabit ATM, as well as all 77 channels (550 Mhz) of analog broadband video
   6. The maximum horizontal cable length for Category 6 copper cable from the termination of the cable in the communications room to the outlet is 295’-0”.
   7. Cable shall meet or exceed the following electrical characteristics:
   8. Cable shall be specified to 250 MHz and shall meet the manufacturer’s guaranteed electrical performance and physical specifications.

1.13 TERMINATION HARDWARE

A. Patch panels
   1. Patch panels shall be rated to match installed cable plant
   2. The wiring block shall accommodate #23 AWG cable conductors.
   3. All modular cross connect panels shall be UL-listed.

B. Work Area Outlet
   1. Universal eight-position jack pin/pair assignments
   2. Jack Color:
      a) Data: Blue
      b) VoIP: Green

C. Work Area Outlet Faceplates:
   1. White or ivory to match electrical outlets.

1.14 PATCH CABLES

A. Verify exact quantities and lengths with Owner prior to purchase

B. Patch Cable requirements:
   1. Category 6, stranded UTP cable
   2. Standard modular non-keyed, 8-position 8-conductor plug
   3. 94V-0 rated
   4. UL listed
   5. Meets FCC Part 68

C. Provide either a 3’-0”, 5’-0”, 7’-0”, or 10’-0” Patch Cords at the communications room for each installed port.
   1. Coordinate with Owner on the active equipment layout prior to purchase to ensure correct sizing of patch cords from patch panels to switching equipment.
   2. When connecting voice ports to a copper riser, provide a one-pair stranded 8P8C connector on one end and 110GS on the other end and shall be of appropriate length for application.

D. Provide a 10’-0” Station Cord for each work area outlet port.

E. Place each size/length patch cord in a separate container, and mark the containers that hold the patch cords with the length of patch cords contained within.

F. All cords shall conform to the requirements of ANSI/TIA-568-C.2 Commercial Building Telecommunications Cabling Standard, Horizontal Cabling Section, and be part of the UL LAN Certification and Follow-up Program.

G. Cords shall be equipped with an eight-pin modular connector on each end, wired straight through and shall be of appropriate length for application.

H. All rated patch cords shall be round, and consist of #23 AWG copper, stranded conductors, tightly twisted into individual pairs.

I. Patch cords shall be made and warranted by the manufacturer of the cabling system installed in this project and shall meet or exceed patch cord specifications as outlined in TIA standards.

1.15 IDENTIFICATION (LABELING) SYSTEM

A. Refer to sections 270000 and 271300.

EXECUTION

1.16 EXAMINATION

A. Refer to Section 270000 and 271300.

1.17 PREPARATION

A. Refer to section 270000.

B. The Contractor shall check pathways, raceways, and other elements for compliance with space allocations, installation tolerances, debris, hazards to cable installation, and other conditions affecting installation prior to installation.

1.18 INSTALLATION REQUIREMENTS

A. Refer to section 270000.

B. All installation shall be done in conformance with ANSI/TIA-568-C standards, BICSI methods, industry standards and manufacturer's installation guidelines.
   1. The Contractor shall ensure that the maximum pulling tensions of the specified distribution cables are not exceeded and cable bends maintain the proper radius during the placement of the facilities.
   2. Failure to follow the appropriate guidelines shall require the Contractor to provide in a timely fashion the additional material and labor necessary to properly rectify the situation.
   3. This shall also apply to any and all damages sustained to the cables by the Contractor during the implementation.

C. Install cable using techniques, practices, and methods that are consistent with specified data cabling and the installed components and that ensure specified performance levels of completed and linked signal paths, end to end.
   1. Pull cables in smooth and regular motions using methods that prevent cable kinking.

2. Pull cables simultaneously if more than one is being installed in the same raceway/pathway.
3. If necessary, use approved cable pulling lubricant
4. Use fish tape, cable, rope, basket weave wire/cable grips, and other tools that will ensure no damage to the media or raceway.
5. Install open cabling parallel and perpendicular to surfaces or structural members following surface contours where possible.
6. Do not bend cable greater than a bend radius of 0’-1”.

D. Provide a 10’-0” service loop at the communications room and shall provide a 3’-0” service loop above the access ceiling or cable trays unless specified otherwise.
1. All service loops shall be a minimum of 1’-6” (18”) in diameter and be accessible for maintenance.

E. Coordinate loop placement and orientation with the technology consultant.
1. This allows for future changes or expansion without installing new cables.

F. Install cables in continuous “home run” lengths from work station outlet to specified patch panel.
1. No intermediate punch down blocks or splices may be installed or utilized between the communications rooms and the workstation outlet without written Owner permission.

G. All cable must be handled with care during installation so as not to change performance specifications.
1. Factory twists of each individual pair must be maintained up to the connection points at both ends of the cable.
2. There shall never be more than 0’-½” of unsheathed cable at either the wiring closet or the workstation termination locations.

H. All cabling and associated hardware shall be placed so as to make efficient use of available space.
1. All cabling and associated hardware shall be placed so as not to impair equipment's efficient use of their full capacity.

1.19 CABLING METHODS

A. The Contractor shall provide cabling in accessible spaces, cable tray, (surface and/or enclosed raceway), conduits, and/or J-Hook cable support system.
1. Within consoles, racks, cabinets, desks, and counters, in accessible ceilings spaces and in gypsum board partitions where open cable method may be used.
2. Use UL or ETL listed plenum rated cable in all spaces.
3. Provide all necessary installation materials, hardware, tools and equipment to perform insulation displacement type terminations at all data outlets, patch panels, and voice termination materials.

B. Conceal raceway and cabling except in unfinished spaces as is practical.

C. Exposed Cable
1. All station cabling shall be installed inside walls or ceiling spaces whenever possible.
2. Exposed station cable will only be run where indicated on the drawings and will only be allowed when no other options exist.
a) Owner must approve all exceptions.

D. The Contractor shall utilize conduits/cable tray as indicated on the drawings.

E. All cabling placed above drop ceilings must be supported by cable tray, J-hooks, caddy bags or conduit.
1. The Contractor shall permanently affix cable supports to the building structure or substrates and provide attachment hardware and anchors designed for the structure to which attached and are suitably sized to sustain the weight of the cables to be supported.
a) Attaching cable to pipes or other mechanical items is not permitted.
b) Cabling shall not be attached to ceiling grid wires.

2. Multiple cables are to be dressed every 5’-0” to 7’-0”.
   a) Maximum cable sag between cable hooks is 3”-6”.

F. The Contractor shall route data and voice cables separately in a neat and orderly fashion.
   1. No cable ties or wraps shall be used to secure the cables in the runway outside of the communications rooms. Cable ties shall be rated for the environment.

G. Keep all items protected before and after installation with dust and moisture proof barrier materials/envelopes.

H. If wiring is terminated on patch panels, data, voice jacks prior to painting, carpet installation, and general finish clean up, these jacks shall be placed in a protective envelope to ensure dust, debris, moisture, and other foreign material do not settle onto jacks’ contacts.
   1. Envelope will be removed on final trim out after other trades have completed their finish work.
   2. It shall be the Contractor’s responsibility to ensure the integrity of these protective measures throughout the life/installation of the project.
      a) Cable bundles brought into the communications rooms shall be routed and dressed in such a manner that prior to termination the cables are not subject to damage and misuse such as installers walking on the bundles that are on the floor.
      b) Cable pulling force shall not exceed 25 lbs of pulling tension or cable manufacturer’s recommended pulling tensions.
      c) Do not leave cables on the floor unprotected or cable bundles hanging from the ceilings. Coil them up in a temporary manner and protect them from damage.

I. Communications room cables shall be combed and dressed in a manner as to prevent twists, “braiding” and crossed cables in the cable bundle from the communication room entrance to the termination point at the rear of the patch panel.
   1. Behind the patch panel, the cable bundle shall be attached to the rear cable support bar, and shall drop out each cable in a neat, cascading manner to prevent crossed and/or interwoven cables to each patch panel port termination point.
      a) Use Velcro wraps instead of cables ties for all bundling in the communications rooms.
      b) Plastic/nylon tie-wraps are not allowed to permanently secure cables inside the communications room.

1.20 CABLING SEPARATION

A. Comply with TIA rules for separating unshielded copper communication and data-processing equipment cables from potential EMI sources, including electrical power lines and equipment.

B. Maintain a minimum spacing of 1’-6” (18”) from electrical feeders and/or branch circuit wiring including, but not limited to, light fixtures, sources of heat and EMI sources.

C. Maintain a minimum spacing of 1’-0” from auxiliary systems cabling.

D. Maintain a 1’-0” separation where cables must pass perpendicularly to electrical, plumbing, or other wiring, conduit, or piping systems.
   1. Use non-conduit bushings, if necessary to maintain separation, which allow for the addition of a reasonable number of cables in the future.

E. Maintain communications pathways away from electrical apparatus such as motor driven equipment and transformers, minimum separation distance of 10’-0” is recommended.

1.21 CABLING TERMINATION

A. Terminate cables in consistent consecutive order.

B. Terminate cables onto 8P8C modular patch panels without damaging twisted pairs or jacket.

C. Arrange cables on patch panels and voice termination hardware in ascending order of room numbers and outlet numbers within rooms.

D. Provide a 10’-0” service loop for horizontal cables at each rack in communications rooms.
   1. Locate loop at ceiling deck or on bottom of cable runway in minimum 1’-6” (18”) diameter.

E. Provide a 3’-6” service loop for horizontal cables at work area outlets. Locate service loop above or below data/voice outlet were vertical cable run transitions to horizontal run.

F. Maintain twists in cable pairs to within 0’-½” of termination.

G. Video Surveillance Systems Cabling (Electronic Safety and Security <ESS> devices)
   1. Video Cameras will require a field terminated plug on the end of a horizontal cable to be directly plugged into device.
      a) Follow TIA-862-A Building Automation Standard.
      b) Contractor shall use applicable equipment in testing solid conductor plug.
   2. Group all security systems cables in one group.
   3. Clearly label cable number and function, in the last positions on the horizontal cabling blocks in each communications room.

H. Building Systems Cabling (BAS, FA, elevator line, etc)
   1. Coordinate exact placement and connectivity requirements with applicable trade prior to installation.
   2. Group all building systems cables in one group.
   3. Clearly label cable number and function, in the last positions on the horizontal cabling blocks in each communications room.

I. Limit cable-bending radius to 20X the cable diameter during installation, and 15X the cable diameter after installation.

J. Start numbering at the left of the main door to the room and continue in a clockwise direction around the room.
   1. The cables within the room will be terminated starting with the cables located to the left of the main door to the room and continue around the room in a clockwise direction.

1.22 TERMINATION HARDWARE

A. Station Hardware
   1. Flush mount jacks shall be mounted in a faceplate with back box.
   2. Outlets shall not be mounted on temporary, movable, or removable surfaces, doors, or access hatches without prior Owner approval.
   3. 8P8C Jack Pin Assignments for work area outlets shall match the T-~~568A~~ **568B** wiring scheme.

B. Patch panels
   1. Copper cables shall be terminated in eight position/eight conductor (8P8C) modular patch panels.
   2. All Modular jack panels shall match the T-~~568A~~ 568B wiring scheme.

C. Work Area Outlet
   1. 8P8C non-keyed modular outlets for applications up to one Gbps and ANSI/TIA-568-C compliant for the specified transmission requirements.

D. Work Area Outlet Faceplates:
   1. Furnish and install blank plates in all unused ports.

1.23 SPECIAL CIRCUITS

A. The Contractor shall coordinate with the Owner on the cable termination plan for special circuits, including cables to wireless access point locations, security, elevators, fire alarms, etc.

B. Wireless Access Points
   1. Install two (2) cable(s) from dedicated wireless patch panel(s) in communications room to outlets having 8P8C connectors within a secure metal enclosure.
   2. Enclosures shall be NEMA rated for the environment to which they are exposed.
   3. 20’-0” of cable slack shall be coiled and hung on a “J”-hook at the enclosure location.

1.24 IDENTIFICATION AND LABELING

A. Labeling system shall consist of a hand-held portable printer and labels appropriate to the application. Handwritten labels are not acceptable.

B. Fiber termination hardware (designation strip) shall have a 0'-¾" x 0'-¼" thermal transfer printable label with a permanent acrylic adhesive.

C. 110-type copper termination hardware shall have a laser printable, non-adhesive label designed for 110 terminal block marking.

D. All labels shall be permanent and shall not fade, peel, or deteriorate due to environment or time.

E. The Contractor shall provide a copy of the finalized plan in writing to the Owner representative and DataCom Design Group for review and authorization to proceed.
   1. Coordinate with Owner for specifications on labeling of all hardware, cabling, and related equipment prior to any testing.

F. Labeling requirements:
   1. Label cable terminations on designation strips.
   2. Label all cable at each terminating point.
   3. Label each port of the work area outlet.
   4. Cable identification numbers shall not be duplicated.
   5. Label patch panels and wall mounted termination blocks in the communications rooms to match those on the corresponding voice and data outlets.
      a) The font shall be at least 0'-1/8" in height.
   6. Where a wireless access point is installed above an acoustical ceiling, label the ceiling grid frame below the access point, displaying the data port number and, if applicable, the access point identification number. Coordinate labeling of grid with Owner and Architect prior to application of labels.
   7. Label each distribution rack, block and other terminating equipment unit and field within that unit within 0'-4" from the block or patch panel termination. Keep labels in a neat and orderly lineup.
   8. Label each connector and each discrete unit of cable-terminating and connecting hardware within connector fields, in wiring closets and equipment rooms.
      a) Where similar jacks and plugs are used for both communication and data-processing equipment, use a different color for jacks and plugs of each service.
   9. Post the cable schedule in a prominent location in each wiring closet and equipment room. List incoming and outgoing cables and their designations, origins, and destinations.

G. Location and termination field description
   1. Room location
   2. Rack-mount or Wall mount
   3. Termination field type
      a) Specific patch panel ports versus a separate dedicated patch panel
      b) 110-type

H. Unique identifiers
   1. Segregation and position on equipment rack
   2. Port color-coding
   3. Unique labeling

I. Documentation
   1. Provide electronic copy of final comprehensive schedules for project in software and format selected by Owner.
      a) All labels shall correspond to as-built drawings and to final test reports.
   2. All cable inventory data documentation shall be submitted in format coordinated with and approved by Owner so that data can be incorporated into existing databases.
   3. Documentation shall include cable identification number, source and destination, type of cable, length of cable and number of pairs or fibers.

4. Complete cross connect documentation is required.

1.25 FIELD QUALITY CONTROL

A. Refer to section 270000.

1.26 POST-INSTALLATION TESTING

A. Contractor shall test each pair or strand of every cable prior to acceptance. (100% PASS)

B. Contractor shall submit acceptance documentation as defined below. No cabling installation is considered complete until test results have been completed, submitted and approved.

C. Standards Compliance and Test Requirements:
   1. Cabling shall meet ANSI/TIA-568-C.2 Category 6 Horizontal cabling requirements.

D. Attenuation, NEXT, PSNEXT, Return Loss, ELFEXT, and PSELFEXT data that indicate the worst case result, the frequency at which it occurs, the limit at that point, and the margin.
   1. These tests shall be performed in a swept frequency manner from 1 MHz to highest relevant frequency, using a swept frequency interval that is consistent with TIA and ISO requirements.
   2. Information shall be provided for all pairs or pair combinations and in both directions when required by the appropriate standards.
   3. Length, propagation delay, and delay skew relative to the relevant limit.
      a) Length, propagation delay, and delay skew shall be tested relative to the relevant limit.
      b) Test shall also include mutual capacitance and characteristic impedance.
         i) Any individual test that fails the relevant performance specification shall be marked as a ‘FAIL”.

E. Cable Test Documentation:
   1. Cable test documentation shall be submitted in hard copy and electronic formats.
      a) If proprietary software is used, disk or CD shall contain any necessary software application required to view test results.
      b) Electronic reports shall be accompanied by a Certificate signed by an authorized representative of the Contractor warranting the truth and accuracy of the electronic report.
      c) Certificate shall reference traceable circuit numbers that match the electronic record.
   2. Each test record shall contain the cable ID as follows:
      a) “MEDIA TYPE – SOURCE ROOM – DESTINATION ROOM – STRAND/PAIR #”, e.g. MM-MC-HC23-001.
   3. Test results saved within the field-test instrument shall be transferred into an accessible database utility that allows for the maintenance, inspection and archiving of the test records.
      a) These test records shall be uploaded to the PC unaltered, i.e., “as saved in the field-test instrument”.
      b) The file format, CSV (comma separated value), does not provide adequate protection of these records and shall not be used.
   4. Test reports shall include the following information for each cabling element:
      a) Wire map results that indicate that 100% of the cabling has been tested for shorts, opens, miss-wires, splits, polarity reversals, transpositions, presence of AC voltage and end-to-end connectivity.
      b) Length, propagation delay, and delay skew relative to the relevant limit. Any individual test that fails the relevant performance specification shall be marked as a FAIL.
      c) Cable manufacturer, cable model number/type, and NVP
      d) Tester make & model, serial number, hardware version, and software version.
      e) Cable ID and project name
      f) Auto-test specification used

g) Overall pass/fail indication
h) Date of test

F. Cable Test Equipment
1. Contractor shall supply all of the required test equipment used to conduct acceptance tests.
2. Test equipment used under this contract shall be from manufacturers that have a minimum of 5 years experience in producing field test equipment. Manufacturers shall be ISO 9001 certified.
3. Testing equipment shall be UL-verified to meet Level III accuracy.
   a) The cable installers shall have a copy of this reference in their possession and be familiar with the contents.
4. Testing equipment shall be within the calibration period recommended by the manufacturer.
5. Testing equipment shall have the latest software and firmware installed.
6. Testing equipment of a given type shall be from the same manufacturer, and have compatible electronic results output.
7. Test adapter cables shall be approved by the manufacturer of the test equipment.
   a) Adapter cables from other sources are not acceptable.
   b) Adapter cables must be replaced after 1000 tests to ensure accuracy.
8. Test equipment must have a dynamic range of at least 100 dB to minimize measurement uncertainty.
9. Test equipment must be capable of storing full frequency sweep data for all tests and printing color graphical reports for all swept measurements.
10. Test equipment must include S-Band time domain diagnostics for NEXT and return loss (TDNXT and TDRL) for accurate and efficient troubleshooting.
11. Test equipment must be capable of running individual NEXT, return loss, etc measurements in addition to auto tests. Individual tests increase productivity when diagnosing faults.
12. Test equipment must include a library of cable types, sorted by major manufacturer.
13. Test equipment must be able to internally group auto tests and cables in project folders for good records management.
    a) Test equipment must store at least 1000 auto tests in internal memory.
14. Test equipment must include DSP technology for support of advanced measurements.
15. Test equipment must make swept frequency measurements in compliance with TIA standards.
16. The measurement reference plane of the test equipment shall start immediately at the output of the test equipment interface connector.
17. There shall not be a time domain dead zone of any distance that excludes any part of the link from the measurement.
18. Acceptable testers:
    a) Fluke DTX CableAnalyzer
    b) Owner approved equivalent

1.27 FIBER TESTING

A. Refer to Section 271300.

1.28 CLEANING

A. Refer to section 270000.

1.29 ACCEPTABLE

A. Once all work has been completed, test documentation has been submitted and approved, and the Owner is satisfied that all work has been completed in accordance with contract documents, the Owner will notify Contractor in writing of formal acceptance of the system.

B. Contractor’s RCDD shall warrant in writing that 100% of the installation meets the requirements specified herein.

C. Acceptance shall be subject to completion of all work, successful post-installation testing which yields 100% PASS rating, and submittal and approval of full documentation as described above. Tests with the "* PASS" (asterisk) will not be acceptable.
   1. These circuits must be repaired to meet "PASS".

END OF SECTION 27 15 00

SECTION 27 41 13 – AUDIOVISUAL INFRASTRUCTURE

PART 1 GENERAL

A. SUMMARY

1. Devices in this Section are to be provided and installed by Division 26 Electrical Contractor.

2. Section Includes:

   a) Floor Boxes
   b) Flat Panel Display In-Wall Junction/Storage Boxes
   c) Wall Mount Junction Boxes
   d) Ceiling Mount Plates
   e) Pull Boxes
   f) Projection Screens

B. CONDITIONS AND REQUIREMENTS

1. The General Conditions, Supplementary Conditions, and Division 01 – General Requirements apply.

C. APPLICABLE DRAWING SETS

1. AVI (Architecturally Integrated Infrastructure)

D. RELATED DRAWING SETS FOR COORDINATION

1. AVS Series (Audiovisual Systems and Equipment)
2. E Series (Electrical)

E. RELATED SECTIONS FOR COORDINATION

1. Division 00 – Procurement and Contracting Requirements
2. Division 01 – General Requirements
3. Division 02 – Existing Conditions
4. Division 09 – Finishes – Walls, Ceilings and Floors
5. Division 11 – Equipment
6. Division 12 – Furnishings
7. Division 23 – Heating, Ventilating and Air Conditioning (HVAC)
8. Division 26 – Electrical
9. Division 27 – Communications
10. Division 28 – Electronic Safety and Security

F. SUBMITTALS

1. Comply with requirements of Division 01 – General Requirements – Submittal Procedures.

   a) Product Data: For the following AV Infrastructure System components:

      (1) Floor Boxes
      (2) Flat Panel Display In-Wall Boxes
      (3) Wall Mount Junction Boxes

(4) Pull Boxes
(5) Ceiling Mount Plates
(6) Projection Screens

b) Shop Drawings: For the following AV Infrastructure System components. Include plans, elevations, sections, details, and attachments to other work:

(1) Floor Boxes
(2) Flat Panel Display In-Wall Boxes
(3) Wall Mount Junction Boxes
(4) Pull Boxes
(5) Ceiling Mount Plates
(6) Projection Screens

G. QUALITY ASSURANCE

1. General:

a) Floor Boxes provide the interface between power, audio-video (A/V), and communications cabling in concrete floors and decks at activation locations requiring power, audio-video, or communication device outlets.
(1) ADA Compliance: Flush-mounted floor device outlets shall not create tripping hazard.

b) Flat Panel Display In-Wall Storage Boxes provide the interface between power, audio-video (A/V), and communications cabling in recessed cavity of wall behind flat panel displays where power, communication and/or A/V device outlets and/or device storage/mounting is required.

c) Wall Mount Junction Boxes provide the interface between power, audio-video (A/V) and communications cabling in walls at activation locations requiring power, audio-video, or communication device outlets.

d) Pull Boxes provide an accessible pathway in a run of conduit to facilitate the pulling in of wires and cables.

e) Ceiling Mount Plates provide the structural interface to mounting active electronic devices provided and installed by Division 27 AV contractor.

2. Manufacturer Qualifications: Firms regularly engaged in manufacture of floor boxes, poke-thru devices and in-wall storage boxes of the types and sizes required, whose products have been in satisfactory use in similar service for not less than 10 years. Provide floor boxes, poke-thru devices, in-wall storage boxes, electrical junction boxes, pull boxes and plenum ceiling boxes that are produced by a manufacturer listed in this section.

3. Electrical Raceways and Components: Comply with requirements of applicable local codes, NEC, UL, and NEMA Standards pertaining to raceways and components. Listed and labeled in accordance with NFPA 70, Article 100.

H. DELIVERY, STORAGE AND HANDLING

1. Deliver floor boxes, poke-thru devices, and in-wall storage boxes and associated fittings in factory labeled packages.

2. Store and handle in strict compliance with manufacturer’s written instructions and

recommendations.

3. Protect from damage due to weather, excessive temperature, and construction operations.

PART 2 PRODUCTS

A. GUIDELINES

1. Floor Boxes, Flat Panel Display In-Wall Junction/Storage Boxes, Wall Mount Junction Boxes, Pull Boxes, Ceiling Mount Plates, Projection Screens and associated conduit where specified shall be furnished and installed by the Division 26 Electrical Contractor selected by the Owner unless specifically excluded in these specifications or drawings.

   a) Coordinate with AV Contractor regarding proper placement of duplex outlets for any AV designated floor box or Poke-thru Device. Electrical circuits should be connected (and outlets wired) to the designated AV circuit breaker panel (N.I.C). Ensure that “Star” ground configuration is properly implemented. Ensure that ground wires from each outlet are isolated from conduit, neutrals, and each other.

2. Floor Box Inserts/Plate and Poke-thru Device Inserts/Plates shall be furnished and installed by the AV Contractor selected by the Owner unless specifically excluded in these specifications or drawings.

3. Condition - Provide and install products listed in this section in factory new condition, conforming to applicable provisions of American National Standards Institute.

B. ACCEPTABLE MANUFACTURERS

1. Basis of Design Product:

   a) The design for floor boxes and fittings is based on the Evolution Floor Box Series manufactured by Legrand/Wiremold , 60 Woodlawn Street, West Hartford, CT 06110; toll-free 800-621-0049, telephone 860-233-6251, fax 860-232-2062; Web Site: www.legrand.us/wiremold.com.

   b) The design for in-wall storage boxes and fittings is based on the PAC52* Series In-Wall Storage Box Series manufactured by Chief Manufacturing, 6436 City West Parkway, Eden Prairie, MN 55344, toll-free 800-582-6480, telephone 952-894-6280, fax 877-894-6918, Web Site: www.chiefmfg.com.

   c) The design for wall junction boxes and fittings is based on products manufactured by: RACO, 3902 West Sample Street, South Bend IN 46634-4002, telephone 800-722-6437, Web Site: www.hubbell-rtb.com>,

   d) The design for pull boxes and fittings is based on products manufactured by Hoffman, a Pentair Company, 2100 Hoffman Way, Anoka, MN, telephone 763-421-2241, fax 763-422-2600; Web Site: www.hoffmanonline.com.

   e) The design for ceiling mount plates is based on products manufactured by Chief Manufacturing, 6436 City West Parkway, Eden Prairie, MN 55344; toll-free 800-582-6480, telephone 952-894-6280, fax 877-894-6918, Web

Site: www.chiefmfg.com.

f) ~~The design for projection screens is based on products manufactured by Draper, Inc., 411 South Pearl Street. Spiceland, IN 47385, toll free 800-238-7999, telephone 765-987-7999, fax 765-987-7142, Web Site: www.draperinc.com.~~ **Da-Lite Part #34529LSR Tensioned Advantage Electrol 94" diagonal, High Contrast Da-Mat with SCB-100 RS232 Control.**

2. Substitutions will be considered under provisions of Section 01 25 00.

C. FLOOR BOXES

1. Classification and Use: Floor boxes shall have been examined and tested by Underwriters Laboratories Inc. to meet UL514A and/or UL514C and Canadian Standard C22.2, No. 18.1-04 and 18.2-06 and bear the U.S. and Canadian UL Listing Mark. Floor boxes shall also have been tested by Underwriters Laboratories Inc. and classified for fire resistance and bear the U.S. and Canadian UL Classification Mark. Devices shall be classified for use in 2-hour rated, unprotected reinforced concrete floors and 2-hour rated floors employing unprotected steel floor units and concrete toppings (D900 Series Designs) or concrete floors with suspended ceilings (fire resistive designs with suspended ceilings should have provisions for accessibility in the ceiling below the floor boxes). Floor boxes shall also conform to the standards set in Section 300-21 of the National Electrical Code. Floor boxes shall meet UL scrub water requirements, but are not suitable for wet or damp locations, or other areas subject to saturation with water or other liquids such as commercial kitchens. Floor boxes shall also have been evaluated by UL to meet the applicable U.S. and Canadian safety standards for scrub water exclusion when used on tile, bare concrete, terrazzo, wood, and carpet covered floors. Floor boxes shall be suitable for use in air handling spaces in accordance with Section 300-22 (C) of the National Electrical Code.

2. Floor Boxes, General: Evolution Series Floor Boxes for use on above grade concrete floors, raised floors or wood floors. Provide boxes with a component to permit installation in polished concrete or terrazzo floors. Boxes shall be compatible with complete line of Ortronics® workstation connectivity outlets and modular inserts.

a) Floor boxes provide the interface between power, communication and audio/video (A/V) cabling in above-grade floors, on-grade concrete floors, raised floors, wood floors, and fire-classified floors and the workstation or activation location where power and communication and/or A/V device outlets are required. Boxes shall provide recessed device outlets that will not obstruct the floor area. Refer to Drawings for size and types.

b) Floor boxes shall permit all wiring to be completed at floor level. The FC models shall be used as defined by the UL Fire Resistance Directory at a minimum spacing of two (2) ft. [610mm] on center.

3. (FB T1) Model EFB6S Floor Boxes: Manufactured from stamped steel approved for use on above grade concrete floors, raised floors and wood floors with the same product. Boxes shall have the ability to accept a component (EFB610-CTR) that will allow the box to be installed in polished concrete or terrazzo floors. Boxes shall have a polyester based backed enamel finished interior (white). Boxes shall be 15-3/16" L x 13-7/8" W x 4-3/16" H [385mm x 351mm x 107mm]. Provide boxes

with provisions that enable installation into concrete floors, raised floors, or wood floors without having to purchase additional components or accessories. Provide boxes with six (6) independent wiring compartments that allow for up to six (6) receptacles, communication and/or audio/video services. Boxes shall have removable and relocatable dividers to permit custom configuration of compartments as well as permit feed to adjacent compartments. Boxes shall permit feed to compartments on the opposite side of the box through a tunnel. Each of the four (4) outer compartments shall have a minimum wiring capacity of 32-in^3 [524ml]. Each of the two (2) center compartments shall have a minimum wiring capacity of 38.5-in^3 [630ml]. Each of the six (6) compartments shall have a minimum depth of 3-7/8" [98mm] behind the plate. Provide boxes with removable compartments to facilitate installation and moves, additions, and changes. The compartments shall be removable from the top and back of the floor box. Provide boxes with two (2) cable guides to organize and maintain the cables egress out of the box. Provide boxes with removable knockout plates to allow for the maximum cable pass-through area. The cable pass-through area shall be a minimum of 6-15/16 in^2 [176mm^2]. The box shall contain the following number of knockouts: 10 1" trade size, six (6) 1-1/4" trade size, six (6) 3/4" trade size, and two (2) 2" trade size. Boxes shall be able to accept up to (6) six 2" trade size conduit feeds in the sides of the boxes, through the use of the EFB6S-2HUB and maintain a 4-inch deep concrete pour. Boxes shall be fully adjustable, accommodating a maximum 2-inch [51mm] pre-concrete pour and a maximum 1/2" [12.7mm] post-concrete pour adjustment. Equip boxes with toggle clamps to allow box to be secured to raised and wood floors. The box shall be able to accept 2-3/4" x 4-1/2" standard size wall plates. Include mounting brackets with the boxes that will accommodate 15 amp, 20 amp straight blade, 20 amp turn lock, 30 amp straight blade and 30 amp turn lock receptacles, Ortronics® workstation connectivity and modular adapters, a variety of audio/video devices from most manufacturers, and other open system devices.

4. (FB T2) Model EFB8S Floor Boxes: Manufactured from stamped steel approved for use on above grade concrete floors, raised floors and wood floors with the same product. Boxes shall have the ability to accept a component (EFB610-CTR) that will allow the box to be installed in polished concrete or terrazzo floors. Boxes shall have a polyester based backed enamel finished interior (white). Boxes shall be 15-3/16" L x 12-3/4" W x 6-1/16" H [385mm x 324mm x 154mm]. Provide boxes with provisions that enable installation into concrete floors, raised floors, or wood floors without having to purchase additional components or accessories. Provide boxes with eight (8) independent wiring compartments that allow for up to eight (8) receptacles, communication and/or audio/video services. Boxes shall accept standard size single gang (2-3/4" x 4-1/2"), double gang (4-9/16" x 4-1/2"), and triple gang (6-3/8" x 4-1/2") wall plates. Boxes shall permit feed to adjacent compartments. Boxes shall permit feed to compartments on the opposite side of the box through a tunnel. Each of the four (4) outer compartments shall have a minimum wiring capacity of 28-in^3 [455ml]. Each of the four (4) center compartments shall have a minimum wiring capacity of 34-in^3 [524ml]. Each of the eight (8) compartments shall have a minimum depth of 3-1/2" [89mm] behind the plate. Provide boxes with removable compartments to facilitate installation and moves, additions, and changes. The compartments shall be removable from the top and back of the floor box. Provide boxes with two (2) cable guides to organize and maintain the cables egress out of the box. Provide boxes with removable knockout plates to allow for the maximum cable pass-through area. The cable pass-through area shall be a minimum of 11-5/8 in^2 [7500mm^2]. The box shall contain the following number of knockouts: four (4) 3/4-inch trade size, eight (8) 1-

inch trade size, six (6) 1-1/4-inch trade size, and two (2) 2-inch trade size. Boxes shall be fully adjustable, accommodating a maximum 2-inch [51mm] pre-concrete pour and a maximum 1/2" [12.7mm] post-concrete pour adjustment. Equip boxes with toggle clamps to allow box to be secured to raised and wood floors. Include mounting brackets with the boxes that will accommodate 15 amp, 20 amp straight blade, 20 amp turn lock, 30 amp straight blade and 30 amp turn lock receptacles. Boxes shall have the ability to accommodate a bracket (EFB-50A) allowing for one (1) 50-amp receptacle. Boxes shall also accommodate Ortronics® workstation connectivity and modular adapters, a variety of audio/video devices from most manufacturers, and other open system devices.

D. FLAT PANEL DISPLAY IN-WALL JUNCTION/STORAGE BOX

1. Classification and Use: In-Wall Storage Boxes shall have shall have been tested by Underwriters Laboratories Inc. and classified for fire resistance and bear the U.S. UL Classification Mark. In-wall storage boxes shall be suitable for use in air handling spaces in accordance with Section 300-22 (C) of the National Electrical Code.

2. (FPD T1) Model PAC525FCW In-Wall Storage Box with Flange and Cover: Manufactured from stamped steel approved for use in standard 3.5" stud and 2.5" stud walls with the same product. Box shall have a finished interior, black in color. Boxes shall be 9" H x 14.25" W x 3.9" D [228.6mm x 361.95mm x 99.06mm]. Knockouts shall be provided for single gang outlets and 1-1/4" & ½" conduit. Box shall have universal zip tie anchor points. Box shall be provided with a paintable flange and cover. Cover shall include tamper proof security and include four knockouts for cable routing and ventilation.

   a) Provide with Raco 560 3" x 2" box, 2-3/4" deep electrical box.

   b) Provide with Raco 864 single duplex electrical box cover.

3. (FPD T2) Model PAC526FCW Large In-Wall Storage Box with Flange and Cover: Manufactured from stamped steel approved for use in standard 3.5" stud and 2.5" stud walls with the same product. Box shall have a finished interior, black in color. Boxes shall be 14.25" H x 14.25" W x 3.9" D [361.95mm x 361.95mm x 99.06mm]. Knockouts shall be provided for single gang outlets and 1-1/4" & ½" conduit. Box shall have universal zip tie anchor points. Box shall be provided with a paintable flange and cover. Cover shall include tamper proof security and include four knockouts for cable routing and ventilation.

   a) Provide with Raco 560 3" x 2" box, 2-3/4" deep electrical box.

   b) Provide with Raco 864 single duplex electrical box cover.

E. JUNCTION BOXES

1. All device boxes for communications systems shall be extra-deep designation.

2. Sheet Metal Junction Boxes: NEMA OS 1, UL 514A, galvanized steel with stamped knockouts.

3. Wall mounted communication boxes concealed within the wall shall be a minimum 4-11/16" square with a minimum depth of 3" with reducer device plate per schedule.

4. Antenna Junction Box (A) Raco Model 260 Electrical Junction Boxes shall be 3-1/4" deep, 4-11/16" square with (2) 1/2”-3/4”, (2) 3/4”-1”and (2) 1-1/4" side knockouts and (2) 1/2" & (2) 3/4"-1” bottom knockouts. Box shall be provided with Raco 843 single gang device cover.

5. AV Plate Junction Box (AVP 1G) Raco Model 260 Electrical Junction Boxes shall be 3-1/4" deep, 4-11/16" square with (2) 1/2”-3/4”, (2) 3/4”-1”and (2) 1-1/4" side knockouts and (2) 1/2" & (2) 3/4"-1” bottom knockouts. Box shall be provided with Raco 843 single gang device cover.

6. AV Plate Junction Box (AVP 2G) Raco Model 260 Electrical Junction Boxes shall be 3-1/4" deep, 4-11/16" square with (2) 1/2”-3/4”, (2) 3/4”-1”and (2) 1-1/4" side knockouts and (2) 1/2" & (2) 3/4"-1” bottom knockouts. Box shall be provided with Raco 818 two gang device cover.

7. AV Plate Junction Box (AVP 3G) Raco Model 263 Electrical Junction Boxes shall be 3-1/2” Deep, 6” Square with (6) 1/2"-3/4”, (2) 3/4"-1” and (2) 1”-1-1/4” side knockouts and (2) 1/2"-3/4”, (2) 3/4"-1” and (2) 1-1/4” bottom knockouts. Box shall be provided with Raco 793 three gang device cover.

8. Camera Junction Box (CAM) Raco Model 260 Electrical Junction Boxes shall be 3-1/4" deep, 4-11/16" square with (2) 1/2”-3/4”, (2) 3/4”-1”and (2) 1-1/4" side knockouts and (2) 1/2" & (2) 3/4"-1” bottom knockouts. Box shall be provided with Raco 818 two gang device cover.

9. Intercom Call Button (CB) Raco Model 260 Electrical Junction Boxes shall be 3-1/4" deep, 4-11/16" square with (2) 1/2”-3/4”, (2) 3/4”-1”and (2) 1-1/4" side knockouts and (2) 1/2" & (2) 3/4"-1” bottom knockouts. Box shall be provided with Raco 843 single gang device cover.

10. Listening Assist Transmitter Junction Box (LA) Raco Model 260 Electrical Junction Boxes shall be 3-1/4" deep, 4-11/16" square with (2) 1/2”-3/4”, (2) 3/4”-1”and (2) 1-1/4" side knockouts and (2) 1/2" & (2) 3/4"-1” bottom knockouts. Box shall be provided with Raco 818 two gang device cover.

11. Projector (PRJ) Raco Model 260 Electrical Junction Boxes shall be 3-1/4" deep, 4-11/16" square with (2) 1/2”-3/4”, (2) 3/4”-1”and (2) 1-1/4" side knockouts and (2) 1/2" & (2) 3/4"-1” bottom knockouts. Box shall be provided with Raco 818 two gang device cover.

12. Wall Mount Paging Speaker (PS) Raco Model 260 Electrical Junction Boxes shall be 3-1/4" deep, 4-11/16" square with (2) 1/2”-3/4”, (2) 3/4”-1”and (2) 1-1/4" side knockouts and (2) 1/2" & (2) 3/4"-1” bottom knockouts. Box shall be provided with Raco 843 single gang device cover.

13. Wall Mount Sound Reinforcement Speaker Junction Box (S) Raco Model 260 Electrical Junction Boxes shall be 3-1/4" deep, 4-11/16" square with (2) 1/2”-3/4”, (2) 3/4”-1”and (2) 1-1/4" side knockouts and (2) 1/2" & (2) 3/4"-1” bottom knockouts. Box shall be provided with Raco 843 single gang device cover.

14. Switch Junction Box (SWT) Raco Model 471 Electrical Junction Boxes shall be 2-1/4” deep, 3” x 2” with one ½” conduit knockout.

15. Volume Control Junction Box (VC) Raco Model 260 Electrical Junction Boxes shall be 3-1/4" deep, 4-11/16" square with (2) 1/2”-3/4”, (2) 3/4”-1”and (2) 1-1/4" side knockouts and (2) 1/2" & (2) 3/4"-1” bottom knockouts. Box shall be provided with

Raco 843 single gang device cover.

16. Wall Control Panel Junction Box (WCP 1G) Raco Model 260 Electrical Junction Boxes shall be 3-1/4" deep, 4-11/16" square with (2) 1/2”-3/4”, (2) 3/4”-1”and (2) 1-1/4" side knockouts and (2) 1/2" & (2) 3/4"-1” bottom knockouts. Box shall be provided with Raco 843 single gang device cover.

17. Wall Control Panel Junction Box (WCP 2G) Raco Model 260 Electrical Junction Boxes shall be 3-1/4" deep, 4-11/16" square with (2) 1/2”-3/4”, (2) 3/4”-1”and (2) 1-1/4" side knockouts and (2) 1/2" & (2) 3/4"-1” bottom knockouts. Box shall be provided with Raco 818 two gang device cover.

18. Wall Control Panel Junction Box (WCP 3G) Raco Model 263 Electrical Junction Boxes shall be 3-1/2” Deep, 6” Square with (6) 1/2"-3/4”, (2) 3/4"-1” and (2) 1”-1-1/4” side knockouts and (2) 1/2"-3/4”, (2) 3/4"-1” and (2) 1-1/4” bottom knockouts. Box shall be provided with Raco 793 three gang device cover.

19. Specific-use Wall Junction Boxes:

    a) For situations where oversized conduit is used so a standard 4-11/16”x4-11/16” box is inadequate for the terminations required, use:

    (1) Hubbell Recessed Wall Mounted Gang – WSCS-MMO-X per schedule, or approved equal.

F. PULL BOXES

1. Small Sheet Metal Pull Boxes: NEMA OS1; galvanized steel

2. Minimum size:

    a) 4” square by 2.125” deep for use with 1” conduit and smaller
    b) 4-11/16” square by 3” deep for use with 1-1/4” conduit and larger.

3. Maximum size:

    a) 24” square by 8” deep for collecting multiple 1” station conduit. Sheet metal boxes larger than 12” in any direction are required to have a hinged cover or a chain installed between box and cover.

4. Manufacturers: Hoffman Enclosures or approved equal. Field fabricated boxes are not allowed.

5. Floor Mounted Rack Pull Box (FRK) Hoffman Item #ASE16X14X4NK 16” x 14” x 4” deep square pull box. Box shall be provided with screw cover.

6. Millwork Mounted Rack Pull Box (MRK) HOFFMAN ASE8x9x3 8” x 9” x 3” NEMA 1 pull box. Box shall be provided with screw cover.

7. Wall Mounted Rack Pull Box (WRK) Hoffman Model ASE16X14X3 16" x 14" x 3" screw cover pull box at wall behind rack.

8. Ceiling Mount Paging Speaker Pull Box (PS) – Hoffman Model ASE4X4X3 4” x 4” x 3”.

9. Ceiling Mount Sound Reinforcement Loudspeaker (S) – Hoffman Model

ASE4X4X3 4” x 4” x 3”

G. MOTORIZED, CEILING RECESSED, FRONT PROJECTION SCREENS

1. Remove existing owner provided projection screens and re-install where indicated

PART 3 EXECUTION

A. EXAMINATION

1. Examine conditions under which boxes, poke-thrus’ fittings, and projection screens are to be installed and substrate that will support boxes. Notify the Architect in writing of conditions detrimental to proper completion of the work. Do not proceed with work until unsatisfactory conditions have been corrected.

a) Do not begin installation until substrates have been properly prepared.

b) Verify rough-in openings are properly prepared.

B. DOCUMENT INTERPRETATION

1. The locations of the outlet symbols shown in the Drawings represent a close approximation of the exact location where the outlet shall be installed. This location may be shifted left or right eight inches to allow for stud alignment or coordination with electrical outlet locations. Approval by Owner is required for more extensive adjustments to outlet location.

2. Outlet Schedule

a) Refer to the outlet schedule contained [on the Drawings sheet XXX] for outlet mounting height, device box size, and station conduit size.

C. PREPARATION

1. Clean surfaces thoroughly prior to installation.

2. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

D. INSTALLATION

1. Strictly comply with manufacturer's installation instructions and recommendations and approved shop drawings. Coordinate installation with adjacent work to ensure proper clearances and to prevent electrical hazards.

2. Mechanical Security: Raceway systems shall be mechanically continuous and connected to all electrical outlets, boxes, device mounting brackets, and cabinets, in accordance with manufacturer’s installation sheets.

3. Accessories: Provide accessories as required for a complete installation, including insulated bushings and inserts where required by manufacturer.

4. Unused Openings: Close unused box openings using manufacturers recommended accessories.

5. Outlet Box Mounting:

a) Station cable boxes shall be 4-11/16” square x 3” deep regardless of cable count or cable type.

b) Height: unless otherwise noted in the Outlet Schedule, all communication outlet boxes shall be installed at the same height as electrical outlets, except WCP outlets, which shall be installed at 48 inches AFF to center of box.

c) Install boxes to accommodate device indicated by symbol, in conformance with code requirements and consistent with type of construction.

d) Install the appropriate work cover on all outlet boxes.

e) Set front edge of device box flush with the finished surfaces except on walls of non0combustible materials where the boxes may have maximum set back of ¼”. Secure flush-mounted box to interior wall and partition studs. Accurately position to allow for surface finish thickness.

f) Set outlet boxes parallel to construction and independently attached to same.

g) Do not install back-to-back and through-the-wall boxes. Install with a minimum 6” horizontal separation between closest edges of the boxes. Install with minimum 24” separation in acoustic rated walls.

h) Outlet boxes for audiovisual shall be in a separate box from electrical outlets.

6. Box Support:

a) Mount boxes straight and plumb.

b) Install stud support one side, with short piece of stud, for up to 2-Gang device boxes.

c) Do not support boxes with tie-wire.

d) For one- and two-gang box support, manufactured bracket supports shall be accepted alternate.

e) Support boxes independently of raceways.

f) Install adjustable steel channel fasteners for hung ceiling outlet boxes.

g) Install stamped steel bridges to fasten flush-mounted junction box between studs.

h) Do not install boxes to ceiling support wires or other piping systems.

i) When boxes are installed in fire-resistive walls and partitions, provide 24” horizontal separation between boxes on opposite sides of a wall. In addition, limit penetrations to 16 square inches per penetration and not to exceed a total of 100 square inches per 100 square feet of wall area. Apply fire stop putty or muffins acceptable to the authority having jurisdiction (AHJ).

7. Projection Screen Installation

   a) Install in accordance with manufacturer's instructions.

   b) Install front projection screens with screen cases in position and relationship to adjoining construction as indicated, securely anchored to supporting substrate, and in manner that produces a smoothly operating screen with plumb and straight vertical edges and plumb and flat viewing surfaces when screen is lowered.

   c) Test electrically operated units to verify that screen, controls, limit switches, closure and other operating components are in optimum functioning condition.

E. CLEANING AND PROTECTION

1. Clean exposed surfaces using non-abrasive materials and methods recommended by manufacturer.

2. Protect boxes and fittings until acceptance.

F. STORAGE AND HANDLING

1. Schedule delivery to minimize delays in the project.

2. Provide storage protection against temperature and humidity extremes, theft, vandalism, physical damage, and environmental damage.

END OF SECTION

SECTION 01 23 00 – ALTERNATES

PART 1 - GENERAL

1.1 DEFINITIONS

A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the Bidding Requirements that may be added to or deducted from the Base Bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
   1. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

1.2 PROCEDURES

A. Coordination: Modify or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.
   1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.

B. This Section identifies each Alternate by number, and describes the basic changes to be incorporated into the Work, only when that Alternate is made a part of the Work by specific provisions in the Owner-Contractor Agreement.
   1. Ascertain all changes made in the Work if an Alternate is accepted. Claims for extras resulting from the changes caused by the Alternates will not be allowed.
   2. Indicate in the appropriate space on the Bid Form the cost associated with each Alternate Bid and whether the cost is to be added to or deducted from the Base Bid.

C. Coordinate related Work and modify or adjust adjacent Work as necessary to ensure that Work affected by each accepted Alternate is complete and fully integrated into the project. Indicate, on the bid form, the additive or deductive cost, as appropriate, for each Alternate listed below.

D. Immediately following the award of the Contract, prepare and distribute to each party involved, notification of the status of each Alternate. Indicate whether Alternates have been accepted, rejected or deferred for consideration at a later date. Include a complete description of negotiated modifications to Alternates.

E. Specification Sections referenced in the "Schedule of Alternates" contain requirements for materials and methods necessary to achieve the Work described under each Alternate.
   1. Include as part of each Alternate, miscellaneous devices, accessory objects and similar items incidental to or required for a complete installation whether or not mentioned as part of the Alternate.

1.3 SCHEDULE OF ALTERNATES

A. Alternate No. 1: If accepted by the Owner, state the amount to be added to the base bid for removal of the cork panel finish and replace with back painted glass. See Section 088113 Decorative Glazing.

B. Alternate No. 2: If accepted by the Owner, state the amount to be deducted from the base bid to salvage the existing and grid for reuse in Corridor XX.

C. Alternate No. 3: If accepted by the Owner, state the amount to be deducted from the base bid for deleting of the hot water system including the water heater, valves and piping and install a Insta-Hot system at all new sinks. See plumbing specs.

D. Alternate No. 4: If accepted by the Owner, state the amount to be deducted from the base bid for deleting the acoustical ceiling panels in Corridor XX.

E. Alternate No. 5~~4~~: If accepted by the Owner, state the amount to be added to the base bid for providing new projection screens in all rooms that currently show the existing screens being relocated. See Section

F. Alternate No. 6: If accepted by the Owner, state the amount to be deducted from to the base bid for providing Luxury Vinyl Tile by Seletech in lieu of the specified tile. This tile has not been approved pending a quality control review by the Architect.

~~E.~~G. Alternate No. 7: If accepted by the Owner, state the amount to be added to the base bid for providing a custom digital image on the Impact-Resistant Wall Covering, refer to Section 102600

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 23 00

SECTION 06 **06 40**~~64 23~~ – **ARCHITECTURAL** ~~RESIN~~ PANELS

PART 1 - GENERAL

1.1 SUBMITTALS

A. In accordance with the requirements of Division 01 section "Common Product Requirements," submit a complete listing of all manufacturers, products, model numbers, and designs proposed for use in the Work of this Section.

B. Maintain all submittals at the Project Site for use during construction and for distribution to the Owner, through the Architect, upon completion of the Work.

C. Submit only the items listed below to the Architect for review in accordance with Conditions of the Contract and Division 01 sections.

D. Product Data: Indicate product description, fabrication information, compliance with specified performance requirements.

E. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

F. Samples for Verification:
1. ~~Resin~~ Panel: 12-inch x 12-inch (300mm x 300mm) sample of each color and finish required.

G. Maintenance Data: Submit manufacturer's care and maintenance data, including care, repair and cleaning instructions. Include in Project close-out documents.

1.2 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced Installer who has successfully completed projects similar in material, design, and extent to that indicated for this Project.

B. Surface-Burning Characteristics: Provide panels with the following surface-burning characteristics as determined by testing identical products per ASTM E 84 by UL or other testing and inspecting agencies acceptable to authorities having jurisdiction.
1. Flame-Spread Rating: 25 or less.
2. Smoke-Developed Rating: 450 or less.

C. Single-Source Responsibilities: Obtain ~~resin~~ panels from one source from a single manufacturer.

1.3 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact. Package sheets on skids or pallets for shipment to project site.

B. Store materials protected from exposure to harmful weather conditions and at temperature and humidity conditions recommended by manufacturer. Store panels indoors in a dry place at the project site.

C. Remove foreign matter from face of panel by using a soft bristle brush, avoiding abrasive action.

1.4 PROJECT CONDITIONS

A. Do not begin installation until building is enclosed, permanent heating and cooling equipment is in operation, and residual moisture from plaster, concrete or terrazzo work has dissipated.

B. During installation, and for not less than 48 hours before, maintain an ambient temperature and relative humidity within limits required by type of adhesive used and recommendation of adhesive manufacturer.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. To establish standards of manufacture, operation, performance, and appearance, Drawings and Specifications are based on products of 3form "Profile Panel" as further defined in notes and schedules within the Documents. Provided compliance with Project requirements, and prior approval by the Owner and the Architect of a properly documented substitution request, products of other manufacturers may also be acceptable.

~~A.~~B. ~~The notes and schedules in the Documents establish manufacturer and model/design required for the Project. Provide the products as indicated on the drawings unless Architect approves products of other manufacturer specifically for this Project.~~

2.2 MATERIALS

A. MDF~~Resin~~ Panels:
1. Thickness: **3/4 inch** ~~As indicated on the drawings.~~
2. Pattern: **Burst** ~~As indicated on the drawings.~~
3. Color: **White** ~~As indicated on the drawings.~~
~~3.~~**4. Material: Flakeboard, MDF**
~~4.~~5. **Face Finish: Carved MDF with 1 of manufacturers standard finishes.** ~~Top Finish: As indicated on the drawings.~~
~~5. Bottom Finish: As indicated on the drawings:.~~

2.3 FABRICATION

A. Fabricate ~~resin~~ panels to designs, sizes and thicknesses indicated on Drawings.

B. Comply with manufacturer's written recommendations for fabrication.

C. Machining: Acceptable means of machining are listed below. Ensure that material is not chipped or warped by machining operations.

D. Forming: Form products to shapes indicated using the appropriate method in compliance with manufacturer's printed instructions.

E. Laminating: Laminate to substrates indicated using adhesives and techniques recommended by manufacturer.

2.4 MISCELLANEOUS MATERIALS

A. Provide products of material, size, and shape required for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

B. Cleaner: Type recommended by manufacturer.

~~B.~~C. Provide manufacturers standard mounting cleats

~~C.~~D. Fasteners: Use screws designed specifically for plastics. Self-threading screws are acceptable for permanent installations. Provide threaded metal inserts for applications requiring frequent disassembly such as light fixtures.

~~D.~~E. Bonding Cements: May be achieved with solvents or adhesives, suitable for use with product and application.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine surfaces and substrates for unsuitable conditions where fabrications are to be installed.

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

3.2 PREPARATION

A. Prepare substrates to achieve a smooth, dry, clean surface free of flaking, unsound coatings, cracks, and defects. Follow manufacturer's printed instructions.

3.3 INSTALLATION, GENERAL

A. Comply with panel manufacturer's Installation Guide.

B. Install panels plumb, level, true, and aligned with adjacent materials. Use concealed shims where required for alignment.
   1. Scribe and cut to fit adjoining Work.

C. Install with minimum number of joints practical, using full size panels.

D. Predrill fastener holes in fabrications. Clean fastener holes, removing loose dirt or oil.

E. Cut and drill panels with carbide tipped saw blades or drill bits, or cut with snips.

F. Install panels with manufacturer's recommended gap for panel field and corner joints.

G. Predrill fastener holes in panels with 1/8 inch (3.2 mm) oversize.

H. For trowel type and application of adhesive, follow adhesive manufacturer's recommendations.

I. Use products acceptable to panel manufacturer and install system in accordance with panel manufacturer's printed instructions.

3.4 CLEANING

A. Remove temporary coverings and protection of adjacent work areas. Repair or replace products that have been installed and are damaged. Clean installed products in accordance with manufacturer's printed instructions prior to Owner's acceptance. Remove construction debris from project site and legally dispose of debris.
   1. Remove all adhesive or excessive sealant from panel face using only products recommended in writing by panel manufacturer.

3.5 PROTECTION

A. Protect installed product and finish surfaces from damage during construction.

END OF SECTION 06 64 23

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SECTION 06 41 16 – PLASTIC LAMINATE-CLAD WOOD CABINETRY

PART 1 - GENERAL

1.1 SUBMITTALS, GENERAL

A. In accordance with the requirements of Division 01 section "Common Product Requirements," submit a complete listing of all manufacturers, products, model numbers, and designs proposed for use in the Work of this Section.

B. Maintain all submittals at the Project Site for use during construction and for distribution to the Owner, through the Architect, upon completion of the Work.

C. Submit only the items listed below to the Architect for review in accordance with Conditions of the Contract and Division 01 sections.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product indicated, including cabinet hardware and accessories.

B. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.
   1. Show details full size.
   2. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
   3. Show locations and sizes of cutouts and holes for plumbing fixtures faucets soap dispensers and other items installed in cabinetry.
   4. Indicate, in elevations and details, the kinds of materials, dimensions, thickness or gauges, of all parts, reinforcement, where applicable, and provision for concealed piping, including venting of piping spaces and items of hardware and accessories.

C. Samples for Initial Selection:
   1. Plastic Laminates: Six inch square sample of each color specified for Project.
   2. PVC Edge Material: Twelve inch long sample of each finish and thickness required for Project.
   3. Thermoset decorative panels.
   4. Solid-surfacing materials.

D. Samples for Verification:
   1. Plastic laminates, 8 by 10 inches, for each type, color, pattern, and surface finish, with one sample applied to core material and specified edge material applied to one edge.
   2. Thermoset decorative-panels, 8 by 10 inches, for each type, color, pattern, and surface finish, with edge banding on one edge.
   3. Solid-surfacing materials, 6 inches square.
   4. Corner pieces as follows:
      a. Cabinet-front frame joints between stiles and rails, as well as exposed end pieces, 18 inches high by 18 inches wide by 6 inches deep.
      b. Miter joints for standing trim.

1.3 INFORMATIONAL SUBMITTALS

A. Cabinetry Quality Standard Compliance Certificates: AWI Quality Certification Program certificates.

1.4 QUALITY ASSURANCE

A. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.

B. Quality Standard: Unless otherwise indicated, comply with the Architectural Woodwork Standard, Latest Edition, for grades of interior architectural woodwork, construction, finishes and other requirements.
   1. Provide AWI Quality Certification Program Labels and Certificates indicating that the woodwork, including installation, complies with requirements of grades specified.
      a. Upon award of Contract, register the Work under this section with the AWI Quality Certification Program.

C. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

1.5 DELIVERY, STORAGE, AND HANDLING

A. Do not deliver cabinetry until painting and similar operations that could damage cabinetry have been completed in installation areas. If cabinetry must be stored in other than installation areas, store only in areas where environmental conditions comply with requirements specified in "Project Conditions" Article.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install cabinetry until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

B. Field Measurements: Where cabinetry is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
   1. Locate concealed framing, blocking, and reinforcements that support cabinetry by field measurements before being enclosed, and indicate measurements on Shop Drawings.

1.7 COORDINATION

A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that cabinetry can be supported and installed as indicated.

B. Coordinate with Mechanical, Electrical, and Plumbing work for installation and connection of all utilities and fixtures, fittings, and trim installed in or on cabinetry.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Provide materials that comply with requirements of AWI's quality standard for each type of cabinetry and quality grade specified, unless otherwise indicated.
   1. Wood Moisture Content: 8 to 13 percent.

2.2 WOOD MATERIALS

A. Comply with the following:
   1. Medium-Density Fiberboard (MDF): ANSI A208.2, Grade 130.
   2. Particleboard: ANSI A208.1, Grade M-2.
   3. Softwood Plywood: DOC PS 1, medium-density overlay.
   4. High Performance Moisture Resistant Particleboard Core: 47 lb. density, and balanced construction with moisture content not to exceed 7 percent. Provide particleboard that meets or exceeds the requirements for its type and classification under Commercial Standard CS-236-66, Federal Specifications LLL-B-800A, and ASTM D 1037.

5. Thermoset Decorative Panels: Particleboard or medium-density fiberboard finished with thermally fused, melamine-impregnated decorative paper and complying with requirements of NEMA LD 3, Grade VGL, for test methods 3.3, 3.4, 3.6, 3.8, and 3.10.
   a. Provide PVC or polyester edge banding complying with LMA EDG-1 on components with exposed or semiexposed edges.
6. Veneer-Faced Panel Products (Hardwood Plywood): HPVA HP-1.

2.3 FINISH MATERIALS

A. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated or, if not indicated, as required by cabinetry quality standard.
   1. The notes and schedules in the Documents establish manufacturer and model/design required for the Project. Provide the products listed unless Architect approves products of other manufacturer specifically for this Project.
   2. Laminate Cladding for Exposed Surfaces:
      a. Horizontal Surfaces: Grade HGS.
      b. Postformed Surfaces: Grade HGP.
      c. Vertical Surfaces: Grade VGS.
      d. Pattern Direction: As indicated on the drawings.
   3. Materials for Semiexposed Surfaces:
      a. Surfaces Other Than Drawer Bodies: High-pressure decorative laminate, NEMA LD 3, Grade VGS.
      b. Drawer Sides and Backs: Thermoset decorative panels with PVC or polyester edge banding.
      c. Drawer Bottoms: Thermoset decorative panels.

B. Solid-Surfacing Material: Homogeneous solid sheets of filled plastic resin complying with ISSFA-2.
   1. The notes and schedules in the Documents establish manufacturer and model/design required for the Project. Provide the products listed unless Architect approves products of other manufacturer specifically for this Project.
   2. To establish standards of manufacture, performance, and appearance, Drawings and Specifications are based on products of the following listed manufacturers. Provided compliance with Project requirements, and prior approval by the Owner and the Architect of a properly documented substitution request, products of other manufacturers will also be acceptable.
      a. Aristech Surfaces (Avonite).
      b. DuPont.
      c. Formica Corporation.
      d. Wilsonart International, Inc.

C. Edging: Solid, high impact, purified, color-thru, acid resistant, PVC edging machine-applied with waterproof hot melt adhesives, automatically trimmed for uniform appearance. Color to match exterior laminate.
   1. Provide cabinet body edged with one millimeter thick PVC.
   2. Provide drawers and doors edged with three millimeter thick PVC, edges machine profiled to 1/8 inch radius, buffed and corners radiused.

2.4 CABINET HARDWARE AND ACCESSORIES

A. General: Provide cabinet hardware and accessory materials associated with architectural cabinets except for items specified in Division 08 sections.

B. Frameless Concealed Hinges (European Type): BHMA A156.9, B01602, 135 degrees of opening, self-closing.

C. Wire Pulls: Back mounted, solid metal, 4 inches long, 5/16 inch in diameter.

D. Drawer Slides: BHMA A156.9.
   1. Grade 1 and Grade 2: Side mounted and extending under bottom edge of drawer; full-extension type; zinc-plated steel with polymer rollers.
   2. Grade 1HD-100 and Grade 1HD-200: Side mounted; full-extension type; zinc-plated-steel ball-bearing slides.
   3. For drawers not more than 3 inches high and not more than 24 inches wide, provide Grade 2.
   4. For drawers more than 3 inches high but not more than 6 inches high and not more than 24 inches wide, provide Grade 1.
   5. For drawers more than 6 inches high or more than 24 inches wide, provide Grade 1HD-200.
   6. For computer keyboard shelves, provide Grade 1HD-100.
   7. For trash bins not more than 20 inches high and 16 inches wide, provide Grade 1HD-200.

E. Catches: Push-in magnetic catches, BHMA A156.9, B03131.

F. Door Locks: BHMA A156.11, E07121.

G. Drawer Locks: BHMA A156.11, E07041.

H. Door and Drawer Silencers: BHMA A156.16, L03011.

I. Adjustable Shelf Supports: BHMA A156.11, B04013. Injection molded friction fit into cabinet end panels and vertical dividers, adjustable with dual 5 mm diameter pins on 32 mm centers and locking tabs to accommodate 3/4 inch (19 mm) or 1 inch (25 mm) thick shelves.
   1. Product: Hardware Concepts 5030.

J. Hanging Rod: 1-inch- diameter steel tube or rod, chrome finished.

K. Countertop Support Brackets: Epoxy powder coated, 0.1119 inch (3.04 mm) thick steel with integral cleat mount opening and wire management opening.
   1. Product: A&M Hardware; Work Station Bracket.
      a. Color: As selected by the Architect. .

L. Grommets: Where indicated, provide plastic grommets with separate, removable cap with cable slot.
   1. Product: Doug Mockett and Co., Inc. "SG" Series, color selected by Architect.

M. Trim: Accessories of profiles and dimensions indicated.

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

a. Fry Reglet Corp.
b. Gordon, Inc.
c. Pittcon Industries.

2. Trim material: Stainless steel, Type 304
~~1.~~3. Finish: Bright, directional polish, No. 4

2.5 MISCELLANEOUS MATERIALS

A. Provide softwood lumber furring, blocking, shims, and hanging strips for installing cabinetry items unless these items are previously installed and concealed within other construction before cabinetry installation.
   1. Provide kiln softwood lumber dried to less than 15 percent moisture content.

B. Adhesives, General: Do not use adhesives that contain urea formaldehyde.

C. Adhesive for Bonding PVC Edge Material: Hot-melt adhesive.

2.6 PLASTIC LAMINATE-CLAD CABINETS

A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades of architectural plastic-laminate cabinets indicated for construction, finishes, installation, and other requirements.
   1. Provide labels and certificates from AWI certification program indicating that woodwork, including installation, complies with requirements of grades specified.

B. Grade: Premium.

C. AWI Type of Cabinet Construction: Flush overlay unless otherwise indicated.

D. Cabinet, Door, and Drawer Front Interface Style: Reveal overlay.
   1. Reveal Dimension: As indicated on the drawings. .

E. Cabinet Body Construction: Construct each cabinet body of polyester laminated high performance moisture resistant particleboard as a complete rigid case completely enclosed with sides, backs, bottoms, tops, headers, rails, and soffits fastened together forming a rigid integral unit.
   1. Sub-Base: provide a separate and continuous ladder type construction of 3/4 inch unfinished veneer core plywood with Type II adhesive. Particleboard base is not acceptable.
   2. Cabinet Top and Bottom (Wall and Base Cabinets):
      a. Provide 3/4 inch thick cabinet bottoms of white polyester laminated high performance moisture resistant particleboard on the interior side.
         1) Provide 1 inch thick bottom panels for wall cabinets and library stacks.
         2) Provide phenolic backer sheet on concealed side.
      b. Provide solid sub-top, 3/4 inches thick, for all base cabinets.
         1) Provide phenolic backer sheet on concealed side.
      c. Laminate exposed edges with color-through purified P.V.C.; color to match exterior high pressure plastic laminate.
   3. Cabinet Ends: Provide 3/4 inch thick cabinet ends of white polyester laminated high performance moisture resistant particleboard on the interior side.
      a. Finish interior of cabinet ends on units with glass doors or without doors with high pressure plastic laminate to match exterior plastic laminate color.
      b. Holes drilled for adjustable shelves on 32 mm centers.
      c. Laminate exposed edges with 1 mm thick, color through purified P.V.C., color to match exterior high pressure plastic laminate.
   4. Fixed and Adjustable Shelves:
      a. Thickness: 3/4 inch thick standard shelving up to 36 inches wide. 1 inch thick shelving 36 inches wide to a maximum of 48 inches wide.
      b. Provide shelves in semi-exposed cabinets behind solid doors with white colored polyester laminate top and bottom.
      c. Provide shelves in open cabinets or cabinets with glass doors with high pressure laminate same as cabinet exterior.
      d. Laminate exposed edges with 1 mm thick, color through purified P.V.C., color to match exterior high pressure plastic laminate.
         1) For adjustable shelves laminate all four edges.
   5. Cabinet Backs: 3/8 inch thick white colored prefinished hardboard for use on all cabinets.
      a. Exposed interior backs in cabinets without doors or with glass doors: Provide 3/4 inch high performance moisture resistant particleboard faced with high pressure plastic laminate same as cabinet exterior.
      b. Concealed side of Panels with Exposed Plastic Laminate Surfaces: High-pressure decorative laminate, Grade BKL.
   6. Doors and Drawer Fronts: Provide 13/16 inch thick plastic laminated high performance moisture resistant particleboard for drawer fronts and all hinged and sliding doors. Provide white colored heavy gauge balancing sheet on interior face. Maintain a maximum 1/8 inch reveal between pairs of doors, and drawer front or between multiple drawer fronts within the cabinet body. Color to match exterior laminate.
      a. Where indicated provide 13/16 inch thick plastic laminate clad stile and rail doors glazed with 1/4 inch float glass. Glaze with extruded vinyl glazing bead.

b. Where indicated provide all glass sliding doors of 1/4 inch thick tempered glass with ground and polished edges.
c. Provide 3 mm thick, solid, high-impact, purified, color-through, acid resistant, PVC edging machine-applied with hot melt adhesives. Machine profile all door and drawer edges and outside corners, exposed to view when doors and drawers are closed, to a 1/8 inch radius.

7. Drawers: Provide drawer fronts applied to separate drawer body sub-front. High Pressure plastic laminate on the exterior face and heavy gauge white colored backing sheet on interior face. Total thickness: 13/16 inch.
   a. Drawer sides and backs: 1/2 inch thick white colored polyester laminated fiberboard; sub-front, same except 5/8 inch thick.
   b. Provide dadoed drawer side panels to receive front and back panels.
   c. Provide 1/4 inch thick white colored polyester laminate fiberboard drawer bottoms. Provide reinforcement as required with intermediate spreaders.
   d. Dust Panels: 1/4-inch plywood or tempered hardboard above compartments and drawers unless located directly under tops.
8. Vertical and Horizontal Dividers: White colored polyester laminated plywood 3/4 inch thick, secured in cabinet with molded plastic clips. Laminate exposed edges with 1 mm thick, color through purified P.V.C., color to match exterior high pressure plastic laminate.
9. Door/Drawer Spreaders: Provide minimum 3/4 inch x 6 inch x full width white finished cabinet body spreaders immediately behind all door/drawer and multiple drawer horizontal joints to maintain exact body dimensions, and close off reveal. Provide white flat edge PVC.
10. Table Frames and Rails: Provide table frames and rails as structurally independent units consisting of front and back rails, approximately 4 inches high, but not exceeding 4-1/2 inches in height, with cross member reinforcing and stiffeners. Provide units suitable for free standing installation on table legs, between adjacent cabinets, or between cabinet and wall. Provide table frames and rails that provide support at front and back of countertop. Where indicated, provide legs to support the table frames at freestanding tables or open-end assemblies as needed.
    a. Where indicated provide drawers in table frame consisting of front and back rails as described in “Drawers” subparagraph above.
       1) Provide drawer hardware as specified in “Cabinet Hardware and Accessories” Article.
       2) Unless otherwise indicated, independent drawers fastened to underside of countertop are not acceptable.

2.7 FABRICATION, GENERAL

A. Cabinetry Grade: Unless otherwise indicated, provide cabinetry complying with referenced AWI quality standard in “Plastic Laminate-Clad Cabinets” Article of this section.
   1. Fabricate cabinetry completely from plywood panel products. No particleboard will be permitted.

B. Wood Moisture Content: Comply with requirements of referenced quality standard for wood moisture content in relation to ambient relative humidity during fabrication and in installation areas.

C. Complete fabrication, including assembly and hardware application, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
   1. Notify Architect seven days in advance of the dates and times cabinetry fabrication will be complete.
   2. Shop-cut openings to maximum extent possible to receive hardware, appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.

a. Seal edges of openings in countertops with a coat of varnish.

3. Trial fit assemblies at fabrication shop that cannot be shipped completely assembled. Install dowels, screws, bolted connectors, and other fastening devices that can be removed after trial fitting. Verify that various parts fit as intended and check measurements of assemblies against field measurements indicated on Shop Drawings before disassembling for shipment.
4. Install glass to comply with applicable requirements in Division 08 Section "Glazing" and in GANA's "Glazing Manual." For glass in wood frames, secure glass with removable stops.

D. Properly temper all material under controlled humidity and temperature conditions prior to gluing.

E. Provide cases that are square, plumb, and true.

F. Provide removable back panels and closure panels for plumbing access at all sink units.

G. Provide wall cabinets with a minimum clear inside depth of at least 11-3/4 inches (275 mm) unless indicated otherwise.

H. Prepare end panels and vertical dividers, except sink base units, to receive adjustable shelf support hardware by way of continuous line borings, 5 mm in diameter, on 32mm centers.
1. Mount door hinges, drawer slides, and pull-out shelves on line borings to maintain vertical alignment of components and provide for future relocation of doors, drawers, and pull-out shelves.

2.8 FABRICATION OF COUNTERTOPS

A. Provide countertops of types indicated on the Drawings.
1. Provide countertops in longest practicable lengths to minimize field joints with seams at same location for tops and curbs.
2. Note locations of field joints on shop drawings.
3. Provide countertops, backsplashes, and backsplash returns of dimensions indicated and which fit on top of base cabinet assemblies as follows.
a. Cabinet ends: Not more than 1 inch (25 mm).
b. Cabinet front: 1-1/2 inches (38 mm) plus or minus 1/4 inch (6 mm).
4. Exposed fasteners for countertops are not permitted.

B. Plastic Laminate-Clad Countertop, designated Type 1 Top: Fabricate from minimum 3/4 inch moisture resistant medium density fiberboard with a 24 hour thickness swell factor of 4.5 percent of less over 1/2 inch thick hardwood frame. Provide a finished countertop that is 1-1/2 inches thick.
1. At countertops over open spaces install a full sheet of 1/2 inch moisture resistant medium density fiberboard with a 24 hour thickness swell factor of 4.5 percent of less beneath the 3/4 inch material to provide a smooth, uninterrupted surface and cover the expose surface with a phenolic resin sheet or laminated plastic backing sheet.
2. At countertops containing sinks, provide moisture resistant medium density fiberboard with a 24 hour thickness swell factor of 4.5 percent of less.
3. Fabricate countertops 12 feet or less in length in one piece. Use field joints only when length of countertop exceeds 12 feet.
4. Form field joints with concealed flush-bolted construction that provides a hairline joint, sealed with an acceptable waterproof compound.
5. Edge Treatment: Three millimeter thick PVC, Solid, high impact, purified, color-thru, acid resistant, PVC edging machine-applied with hot melt adhesives. Machine profile all edges and outside corners exposed to view to a 1/8 inch radius. Color to match surface laminate.
6. Edge Treatment: Same as laminate cladding on horizontal surfaces.
7. Cover underside of core panel with a phenolic resin sheet or laminated plastic backing sheet.

C. Solid Surface Material, designated Type 7 Top: Fabricate from 3/4 inch) thick solid surfacing material over full 1/2 inch thick moisture resistant medium density fiberboard with a 24 hour

thickness swell factor of 4.5 percent of less; manufacturer and color of solid surface material as indicated in the Code To Finishes on the Drawings.

1. Fabricate countertops 12 feet or less in length from a single piece of material. Use field joints only when length of countertop exceeds 12 feet.
2. Provide curbs, return curbs, or box curbs in shop and as indicated on Drawings.
3. Install integral sink bowls in countertops in shop.
4. Form holes and other openings in countertops for plumbing fixtures and accessories in shop.
5. Provide tops with a continuous 1-1/2 inch deep finished front edge unless otherwise indicated.

PART 3 - EXECUTION

3.1 PREPARATION

A. Before installation, condition cabinetry to average prevailing humidity conditions in installation areas.

B. Examine shop-fabricated work for completion and complete work as required, including removal of packing materials.

3.2 INSTALLATION

A. Install cabinetry complying with referenced AWI quality standard in “Plastic Laminate-Clad Cabinets” Article of this section.

B. Install cabinetry level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb (including tops) to a tolerance of 1/8 inch in 96 inches.

C. Scribe and cut cabinets to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
   1. Minimize width and number of scribes used consistent with need and in no case exceeding 6 inches (150 mm) in width.

D. Cabinets: Install without distortion so doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.
   1. Install cabinets with no more than 1/8 inch in 96-inch sag, bow, or other variation from a straight line.
   2. Fasten wall cabinets through back, near top and bottom, at ends and not more than 16 inches o.c. with No. 10 wafer-head screws sized for 1-inch penetration into wood framing, blocking, or hanging strips No. 10 wafer-head sheet metal screws through metal backing or metal framing behind wall finish.

E. Countertops: Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop.
   1. Align adjacent solid-surfacing-material countertops and form seams to comply with manufacturer's written recommendations using adhesive in color to match countertop. Carefully dress joints smooth, remove surface scratches, and clean entire surface.
   2. Install countertops with no more than 1/8 inch in 96-inch sag, bow, or other variation from a straight line.
   1. Secure backsplashes to tops with concealed metal brackets at 16 inches o.c. and to walls with adhesive.
   2. Caulk space between backsplash and wall with sealant specified in Division 07 section "Joint Sealants."

3.3 ADJUSTING AND CLEANING

A. Repair damaged and defective cabinetry, where possible, to eliminate functional and visual defects; where not possible to repair, replace cabinetry. Adjust joinery for uniform appearance.

B. Clean, lubricate, and adjust hardware; ensure smooth operation without binding or interference with adjacent components.

C. Clean cabinetry on exposed and semiexposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

END OF SECTION 06 41 16

SECTION 08 14 16 - FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 SUBMITTALS

A. In accordance with the requirements of Division 01 section “Common Product Requirements,” submit a complete listing of all manufacturers, products, model numbers, and designs proposed for use in the Work of this Section.

B. Maintain all submittals at the Project Site for use during construction and for distribution to the Owner, through the Architect, upon completion of the Work.

C. Submit only the items listed below to the Architect for review in accordance with Conditions of the Contract and Division 01 sections.

D. Product Data: For each type of door. Include details of core and edge construction, and trim for openings.

E. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; location and extent of hardware blocking; and other pertinent data.
   1. Coordinate submittals with other doors, frames, and hardware and use the same "opening number identification" as given on the Drawings and the Door Schedule.
      a. Submittals not using the numbering identification system shown on Architect's Drawings and Schedules will be rejected.
   2. Indicate dimensions and locations of mortises and holes for hardware.
   3. Indicate dimensions and locations of cutouts.
   4. Indicate doors to be factory finished and finish requirements.
   5. Indicate fire ratings for fire doors.

F. Samples for Verification:
   1. Factory finishes applied to actual door face materials, approximately 4 by 6 inches, for each material and finish. For each wood species and transparent finish, provide set of three samples showing typical range of color and grain to be expected in the finished work.

G. Sample Warranty: For special warranty.

H. Quality Standard Compliance Certificates.

1.2 QUALITY ASSURANCE

A. Vendor Qualifications: A vendor that is certified for chain of custody by an FSC-accredited certification body.

B. Quality Standard: Comply with the following standards:
   1. WDMA I.S.1-A “Architectural Wood Flush Doors" (most recent edition).
      a. Provide AWI QCP (Quality Certification Program) labels or certificates indicating that doors comply with requirements of grades specified.

C. Fire-Rated Wood Doors: Doors complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to UL 10-C or UBC Standard 7-2.
   1. Test Pressure: After 5 minutes into the test, the neutral pressure plane in furnace shall be established at 40 inches or less above the sill.
   2. Oversize, Fire-Rated Wood Doors: For door assemblies exceeding sizes of tested assemblies, provide oversize fire door label or certificate of inspection, from a testing and inspecting agency acceptable to authorities having jurisdiction, stating that doors comply with requirements of design, materials, and construction.

3. Edge Construction: Provide edge construction with intumescent seals concealed by outer stile. Comply with specified requirements for exposed edges.

4. Pairs: Provide fire-retardant stiles that are listed and labeled for applications indicated without formed-steel edges and astragals. Provide stiles with concealed intumescent seals. Comply with specified requirements for exposed edges.

1.3 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install doors until building is enclosed, wet work is complete, and HVAC system is operating and will maintain temperature and relative humidity at occupancy levels during the remainder of the construction period.

1.4 WARRANTY

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

B. Special Warranty: Manufacturer's standard form, signed by manufacturer, Installer, and Contractor, in which manufacturer agrees to repair or replace doors that are defective in materials or workmanship, have warped (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section, or show telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span.
   1. Warranty shall also include installation required due to repair or replacement of defective doors.
   2. Warranty shall be in effect during the following period of time from date of Substantial Completion:
      a. Solid-Core Interior Doors: Life of installation.

PART 2 - PRODUCTS

2.1 DOOR CONSTRUCTION, GENERAL

A. Construction: Five plies with stiles and rails bonded to core, then entire unit abrasive planed before veneering.

B. Edge Construction: At hinge stiles, provide manufacturer's standard laminated-edge construction with improved screw-holding capability and split resistance and with outer stile matching face veneer.

2.2 DOOR FACING

A. Doors for Transparent Finish:
   1. Grade: Premium, with Grade A faces.
   2. Species and Cut: **Match existing** ~~Red oak, plain sliced.~~
   ~~3. Species and Cut: White oak, rift cut.~~
   ~~4. Species and Cut: White birch, rotary cut.~~
   ~~5. Species and Cut: White ash, plain sliced.~~
   ~~6.~~3. Match between Veneer Leaves: **Match existing** ~~Book match.~~
   ~~7.~~4. Assembly of Veneer Leaves on Door Faces: **Match existing.** ~~Balance Center balance match~~.
   ~~8.~~5. Pair and Set Match: Provide for doors hung in same opening or separated only by mullions.
   ~~9.~~6. Room Match: Match door faces within each separate room or area of building. Corridor door faces do not need to match where they are separated by 10 feet or more.
   ~~10.~~7. Stiles: Same species as faces.

2.3 20 MINUTE RATED DOORS

A. Core: Structural Composite Lumber.

B. Construction: Five plies with stiles and rails bonded to core, then entire unit abrasive planed before faces are applied.

C. Subject to compliance with requirements, provide manufacturer and product from one of the following:
1. Algoma Hardwoods, Inc. "SCLC-5, 20 Minute".

2.4 FIRE-RATED DOORS:

A. Construction: Manufacturer's standard 5-ply, mineral-core, construction as needed to provide fire rating indicated.

B. Blocking: For mineral-core doors, provide composite blocking with improved screw-holding capability approved for use in doors of fire ratings indicated as needed to eliminate through-bolting hardware and as follows:
1. 5-inch top-rail blocking.
2. 5-inch bottom-rail blocking, in doors indicated to have protection plates.
3. 5-inch midrail blocking, in doors indicated to have armor plates.
4. 5-inch midrail blocking, in doors indicated to have exit devices.

C. Edge Construction: Provide edge construction with intumescent seals concealed by outer stile matching face veneer, and laminated backing at hinge stiles for improved screw-holding capability and split resistance.

D. Pairs: Provide fire-rated pairs with fire-retardant stiles matching face veneer that are labeled and listed for kinds of applications indicated without formed-steel edges and astragals. Provide stiles with concealed intumescent seals.

E. Subject to compliance with requirements, provide manufacturer and product from one of the following:
1. Algoma Hardwoods, Inc. "FD Series Mineral Core Fire Door".

2.5 LIGHT FRAMES

A. Wood Beads for Light Openings in Wood Doors:
1. Wood Species: Same species as door faces.
2. Profile: Flush rectangular beads.
3. At 20-minute, fire-rated, wood-core doors, provide wood beads and metal glazing clips approved for such use.

B. Metal Frames for Light Openings: Manufacturer's standard frame formed of cold-rolled steel sheet; factory primed.
1. Profile: Flush rectangular beads.

C. Metal Frames for Light Openings in Fire Doors: Manufacturer's standard frame formed of 0.0478-inch- thick, cold-rolled steel sheet; factory primed and approved for use in doors of fire rating indicated.

D. Wood-Veneered Beads for Light Openings in Fire Doors: Manufacturer's standard wood-veneered noncombustible beads matching veneer species of door faces and approved for use in doors of fire rating indicated. Include concealed metal glazing clips where required for opening size and fire rating indicated.

2.6 FABRICATION

A. Factory fit doors to suit frame-opening sizes indicated, with the following uniform clearances and bevels, unless otherwise indicated:
   1. Comply with clearance requirements of referenced quality standard for fitting. Comply with requirements in NFPA 80 for fire-rated doors.

B. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame Shop Drawings, DHI A115-W series standards, and hardware templates.
   1. In addition to typical door and frame hardware, coordinate and factory prepare doors as required for security devices and all other building systems devices.
   2. Coordinate measurements of hardware mortises in metal frames to verify dimensions and alignment before factory machining.

C. Openings: Cut and trim openings through doors to comply with applicable requirements of referenced standards for kind(s) of door(s) required.
   1. Light Openings: Trim openings with moldings of material and profile indicated.
   2. Louvers: Factory install louvers in prepared openings.

2.7 SHOP PRIMING

A. Doors for Opaque Finish: Shop prime faces and edges of doors, including cutouts, with one coat of wood primer specified in Division 09 Section "Painting."

2.8 FACTORY FINISHING

A. Comply with referenced quality standard for factory finishing. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
   1. Finish faces, all four edges, edges of cutouts, and mortises. Stains and fillers may be omitted on bottom edges, edges of cutouts, and mortises.

B. Finish doors at factory that are indicated to receive transparent finish. Field finish doors indicated to receive opaque finish.

C. Transparent Finish:
   1. Grade: Premium.
   2. Finish: **Match existing.** ~~Manufacturer's standard finish with performance comparable to AWI System TR-6 catalyzed polyurethane.~~
   3. Staining, Effect (filled or unfilled), and Sheen: **Match existing.** ~~Match Architect's sample.~~

D. Opaque Finish:
   1. Grade: Custom.
   2. Finish: Manufacturer's standard finish with performance comparable to AWI System OP-2 catalyzed lacquer.
   3. Color: Match Architect's sample.
   4. Sheen: Satin, unless otherwise indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine doors and installed door frames before hanging doors.
   1. Verify that frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
   2. Reject doors with defects.

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

3.2 INSTALLATION

A. Hardware: For installation, see Division 08 Section "Door Hardware."

B. Manufacturer's Written Instructions: Install doors to comply with manufacturer's written instructions, referenced quality standard, and as indicated.
   1. Install fire-rated doors in corresponding fire-rated frames according to NFPA 80.

C. Job-Fitted Doors: Align and fit doors in frames with uniform clearances and bevels as indicated below; do not trim stiles and rails in excess of limits set by manufacturer or permitted for fire-rated doors. Machine doors for hardware. Seal cut surfaces after fitting and machining.
   1. Clearances: Provide 1/8 inch at heads, jambs, and between pairs of doors. Provide 1/8 inch from bottom of door to top of decorative floor finish or covering. Where threshold is shown or scheduled, provide 1/4 inch from bottom of door to top of threshold.
      a. Comply with NFPA 80 for fire-rated doors.
   2. Bevel non-fire-rated doors 1/8 inch in 2 inches at lock and hinge edges.
   3. Bevel fire-rated doors 1/8 inch in 2 inches at lock edge; trim stiles and rails only to extent permitted by labeling agency.

D. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.

E. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

3.3 ADJUSTING

A. Operation: Rehang or replace doors that do not swing or operate freely.

B. Finished Doors: Replace doors that are damaged or do not comply with requirements. Doors may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION 08 14 16

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SECTION 08 81 13 - DECORATIVE GLASS GLAZING

PART 1 - GENERAL

1.1 DEFINITION

A. Glass Thickness: Indicated by thickness designations in millimeters according to ASTM C 1036.

1.2 SUBMITTALS

A. In accordance with the requirements of Division 01 section “Common Product Requirements,” submit a complete listing of all manufacturers, products, model numbers, and designs proposed for use in the Work of this Section.

B. Maintain all submittals at the Project Site for use during construction and for distribution to the Owner, through the Architect, upon completion of the Work.

C. Submit only the items listed below to the Architect for review in accordance with Conditions of the Contract and Division 01 sections.

D. Product Data: For each decorative-glass and glazing product indicated.

E. Shop Drawings: For decorative glass. Show fabrication and installation details. Include the following:
1. Size and location of penetrations.
2. Glazing method.
3. Mounting method.
4. Attachments to other work.
5. Full-size details of edge-finished profiles.

F. Glass Samples: For the following products, 12 inches square:
1. Each type of decorative glass.

G. Product Schedule: For decorative glass. Use same designations indicated on Drawings.

H. Product Certificates: For each type of decorative glass, from manufacturer.

I.

J. Warranty: Sample of special warranty.

K. Maintenance Data: For each type of decorative glass and each applied coating to include in maintenance manuals.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under NGA's Certified Glass Installer Program.

B. Source Limitations for Glass: Obtain each type of decorative glass from single source from single manufacturer.

C. Glazing Publications: Comply with published recommendations inGANA's "Glazing Manual" unless more stringent requirements are indicated. See these publications for glazing terms not otherwise defined in this Section or in referenced standards.

D. Safety Glazing: Where safety glazing is indicated, comply with testing requirements in 16 CFR 1201 for Category II materials.
1. Labeling: Permanently mark glazing with certification label of the SGCC. Indicate on label manufacturer's name, type of glass, thickness, and safety glazing standard that glass complies with.

E. Preinstallation Conference: Conduct conference at Project site.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Protect decorative glass and glazing materials according to manufacturer's written instructions and as needed to prevent damage to surfaces and edges.

B. Retain packaging and sequencing numbers for decorative-glass units.

1.5 PROJECT CONDITIONS

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

B. Field Measurements: Verify actual dimensions of openings and construction contiguous with decorative glass by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 GLASS PRODUCTS, GENERAL

A. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass lites in thicknesses as needed to comply with requirements indicated.

B. Strength: Where float glass is indicated, provide annealed float glass, Kind HS heat-treated float glass, or Kind FT heat-treated float glass as needed to comply with requirements indicated. Where heat-strengthened glass is indicated, provide Kind HS heat-treated float glass or Kind FT heat-treated float glass as needed to comply with requirements indicated. Where fully tempered glass is indicated, provide Kind FT heat-treated float glass.

2.2 MONOLITHIC-GLASS PRODUCTS

A. Float Glass: ASTM C 1036, Type I, Quality-Q3, Class I (clear) unless otherwise indicated.

B. Heat-Treated Float Glass: ASTM C 1048; Type I; Quality-Q3; Class I (clear) unless otherwise indicated; of kind and condition indicated.
   1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.

2.3 DECORATIVE GLASS TYPES

A. Decorative Glass: Silk-screened glass with decorative glass paint or ink applied to glass surface and cured according to manufacturer's standard process.
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. AGC Glass Company North America, Inc.
      b. Guardian Industries Corp.
      c. Pilkington North America.
      d. Saint-Gobain Corporation.
      e. Schott North America, Inc.
   2. Glass Type: Clear fully tempered float glass.
   3. Glass Thickness: 6.0 mm.
   4. Comply with requirements for safety glazing.
   5. Colors and Patterns: Match Architect's samples.
   6. For use in replacing the existing flake board at the elevator lobby. Reuse the existing clear anodized aluminum frame system.

B. Decorative Glass : Sandblasted **laminated** glass with decorative pattern applied uniformly, with abrasive particles forced through a high-pressure air nozzle, according to manufacturer's standard process.
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. AGC Glass Company North America, Inc.
      b. Guardian Industries Corp.
      c. Pilkington North America.
      d. Saint-Gobain Corporation.
      e. Schott North America, Inc.
   2. Glass Type: Clear, fully tempered**, laminated** float glass.
   3. Glass Thickness: Not less than 6.0 mm**, 2-3.0 mm sheets.**
   4. Construction: Laminate glass with PVB interlayer to comply with interlayer manufacturer's written recommendations, ASTM C1172
   3.5. Interlayer Thickness: 0.060 inch (1.52 mm).
   4.6. Patterns: As indicated.
   5.7. Antifingerprint Coating: Protective coating recommended and provided by glass fabricator.
   6.8. Acid-Etched Finish: Acid etch glass with hydrofluoric and hydrochloric acids, evenly applied and maintaining detail of sandblasted pattern, according to manufacturer's standard process.

2.4 WOOD PRODUCTS: Comply with the following:
   1. Softwood Plywood: DOC PS 1, Veneer core plywood with Type II adhesive}.
   2. Hardwood Plywood: HPVA HP-1, made with adhesive containing no urea formaldehyde.

2.5 DECORATIVE-GLASS FABRICATION

A. Fabricate decorative glass and provide other glazing products in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written recommendations of product manufacturer and with referenced glazing standard.

B. Edge Finishing: Fabricate finished edges to produce smooth, polished edges without chips, scratches, or warps.
   1. Finished Edge: Clean cut.

C. Adhere decorative glass to plywood substrate with adhesive recommended by glass fabricator.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine decorative-glass framing members, with Installer present, for compliance with the following:
   1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
   2. Minimum required face or edge clearances.
   3. Effective sealing between joints of decorative-glass framing members.

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

3.2 PREPARATION

A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

B. Examine glazing units to locate orientation of outer surfaces as indicated on Drawings. Label or mark units as needed so that surface orientation is readily identifiable. Do not use materials that leave visible marks in the completed Work.

3.3 INSTALLATION

A. Set decorative-glass units in each series true in line with uniform orientation, pattern, draw, bow, and similar characteristics.

B. Set glass lites with proper orientation so that each outer surface faces the direction indicated on Drawings.

C. Set decorative glass in locations indicated on Drawings. Install glass with hardware and accessories according to hardware manufacturer's written instructions. Attach hardware securely to mounting surfaces.

D. Set decorative glass in locations indicated on Drawings..

3.4 GLAZING, GENERAL

A. Decorative Glass: Install glazing as specified in Division 08 section "Glazing."

B. Comply with combined written instructions of manufacturers of gaskets, glass, sealants, tapes, and other glazing materials unless more stringent requirements are indicated, including those in referenced glazing publications.

C. Adjust glazing channel dimensions during installation as required by Project conditions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

D. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.

E. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.

F. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

G. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

H. Provide spacers for glass lites where length plus width is more than 50 inches.
   1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances, and to comply with system performance requirements.
   2. Provide 1/8-inch minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.

I. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

3.5 CLEANING AND PROTECTION

A. Protect decorative glass from damage immediately after installation by attaching crossed streamers to framing and held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels, and clean surfaces.

B. Protect glass from contact with contaminating substances resulting from construction operations. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer.

C. Remove and replace glass that is broken, chipped, cracked, or abraded or that is damaged from natural causes, accidents, and vandalism, during construction period.

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

END OF SECTION 08 81 13

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SECTION 09 21 16 - GYPSUM BOARD ASSEMBLIES

PART 1 - GENERAL

1.1 SUBMITTALS

A. In accordance with the requirements of Division 01 section “Common Product Requirements,” submit a complete listing of all manufacturers, products, model numbers, and designs proposed for use in the Work of this Section.

B. Maintain all submittals at the Project Site for use during construction and for distribution to the Owner, through the Architect, upon completion of the Work.

C. Submit only the items listed below to the Architect for review in accordance with Conditions of the Contract and Division 01 sections.

D. Submit shop drawings showing locations, fabrication, and installation of control and expansion joints including plans, elevations, sections, details of components, and attachments to other units of Work.
   1. Include control and expansion joints in soffits and furr-downs.

E. Submit product data for all mold and moisture resistant products including wall board and joint compound.
   1. Included test reports indicating performance under ASTM D 3273 and ASTM D 3274.

1.2 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide gypsum board shaft-wall assemblies capable of withstanding **the full** air-pressure loads indicated for maximum heights of partitions without failing and while maintaining an airtight and smoke-tight seal. Evidence of failure includes deflections exceeding limits indicated, bending stresses causing studs to break or to distort, and end-reaction shear causing track (runners) to bend or to shear and studs to become crippled.
   1. Provide gypsum board shaft-wall assemblies for horizontal duct enclosures capable of spanning distances indicated within deflection limits indicated.
   2. Air-pressure loads and deflection limits are specified in "Gypsum Board Shaft Wall" Article in Part 2.

A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.
   1. Fire-Resistance-Rated Assemblies: Indicated by design designations from FM's "Approval Guide, Building Products.", UL's "Fire Resistance Directory.", or GA-600, "Fire Resistance Design Manual."

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.
   1. STC-Rated Assemblies: Indicated by design designations from GA-600, "Fire Resistance Design Manual."

C. Low Emitting Materials: For ceiling and wall assemblies, provide materials and construction identical to those tested in assembly and complying with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

1.3 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original packaging, containers, or bundles bearing brand name and identification of manufacturer or supplier.

B. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic, and other causes. Stack gypsum panels flat to prevent sagging.

C. Promptly remove defective materials from the Project Site.

1.4 PROJECT CONDITIONS

A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, 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 or damp, or have been wet or damp at any time, panels that are moisture damaged, or those that are mold damaged.
1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 GYPSUM WALLBOARD GENERAL

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

2.2 INTERIOR GYPSUM BOARD

A. Provide gypsum wallboard complying with ASTM C 36/C 36M or ASTM C 1396/C 1396M, as applicable to type of gypsum board indicated and whichever is more stringent.

B. Gypsum Wallboard: "Regular" Type, except where fire-resistive or special wallboard is required, as follows:
1. Long Edges: Tapered.
2. Thickness: 5/8 inch, unless otherwise indicated.

C. Subject to compliance with requirements, products which may be incorporated in the Work where "Regular" gypsum wallboard is indicated include:
1. “CertainTeed Regular Gypsum Board,” CertainTeed.
2. "ToughRock," GP Gypsum Corp.
3. "Regular Gypsum Board," Gold Bond Building Products Div., National Gypsum Co.
4. "Regular Gypsum Board"; Temple Inland Forest Products Inc.
5. "SHEETROCK Brand Gypsum Panels," United States Gypsum Co.

2.3 FIRE-RESISTIVE GYPSUM BOARD

A. Where UL 1 Hour fire-resistance rating is indicated on light gage metal framing, provide gypsum wallboard only from those manufacturers who have passed the appropriate UL fire resistance tests which include metal studs with base metal thickness intended for use on this project.

B. Subject to compliance with requirements, products which may be incorporated in the Work where "Type X" gypsum wallboard is indicated include:
1. “CertainTeed Type X”; CertainTeed.
2. "ToughRock Fireguard," GP Gypsum Corp.
3. "Fire-Shield"; Gold Bond Building Products Div., National Gypsum Co.
4. "Fire Rated Regular Gypsum Board"; Temple Inland Forest Products Inc.
5. "SHEETROCK Brand FIRECODE Core Type X Gypsum Panels"; United States Gypsum Co.

2.4 SPECIAL GYPSUM WALLBOARD

A. Sag-Resistant Gypsum Wallboard: manufactured to have more sag resistance than regular-type gypsum board.
   1. Thickness: 1/2 inch.
   2. Long Edges: Tapered.

2.5 TILE BACKER BOARD

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

B. Glass-Mat, Water-Resistant Backing Board: ASTM C 1178/C 1178M.
   1. Thickness: 1/2 inch.
      a. Where required in a fire-rated wall assembly, provide 5/8 inch thick Type X board.
   2. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.
   3. Subject to compliance with requirements, products which may be incorporated in the Work include:
      a. CertainTeed Corp.; DiamondBack GlasRoc Tile Backer.
      b. Georgia-Pacific Gypsum LLC; DensShield Tile Backer.
      c. National Gypsum Company, EXP Tile Backer Board.

2.6 SHAFT-WALL SYSTEM DESCRIPTION

A. Performance Requirements, General: Provide gypsum board shaft wall systems complying with performance requirements specified, as demonstrated by pretesting manufacturer's corresponding stock systems.

B. Fire-Resistance Ratings: Where indicated, provide materials and construction which are identical to those of assemblies, including those incorporating elevator door and other framing, whose fire resistance has been determined per ASTM E 119 by a testing and inspecting organization acceptable to authorities having jurisdiction.
   1. 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 UL "Fire Resistance Directory" or in listings of other testing and inspecting agencies acceptable to authorities having jurisdiction.

C. Steel Framing: ASTM C 645, of profile, size, and base metal thickness required to produce assemblies complying with structural performance requirements, with sectional properties computed to conform with AISI "Specification for Design of Cold-Formed Steel Structural Members."

D. Structural Performance Characteristics: Provide gypsum board shaft wall systems engineered to withstand the following lateral design loadings (air pressures), applied transiently and cyclically, for maximum heights of partitions required, within the following deflection limits, verified by pretesting for deflection characteristics:
   1. Lateral Loading: 5 psf unless otherwise indicated
   2. Lateral Loading: 7.5 psf for tiled walls
   3. Deflection Limit: 1/240 of partition height unless otherwise noted.
   4. Deflection Limit: 1/360 of partition height for tiled walls.
   5.

E. Sound Attenuation Performance: Provide gypsum board shaft wall systems designed and pretested to achieve the following minimum ratings for sound transmission class (STC) per ASTM E 90.
   1. STC Rating: As indicated but not less than 35.

2.7 STEEL SUSPENDED CEILING AND SOFFIT FRAMING

A. Components: Comply with ASTM C 754 for conditions indicated.

B. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.0625-inch- diameter wire, or double strand of 0.0475-inch- diameter wire.

C. Hangers: As follows:
1. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.162-inch diameter.
2. Rod Hangers: ASTM A 510, mild carbon steel.
   a. Diameter: 1/4-inch.
   b. Protective Coating: ASTM A 153/A 153M, hot-dip galvanized.
3. Angle Hangers: ASTM A 653/A 653M, G60, hot-dip galvanized commercial-steel sheet.

D. Furring Channels (Furring Members): Commercial-steel sheet with manufacturer's standard corrosion-resistant zinc coating.
1. Steel Studs: ASTM C 645.
   a. Minimum Base Metal Thickness: 0.0179 inch.
2. Hat-Shaped, Rigid Furring Channels: ASTM C 645, 7/8 inch deep.
   a. Minimum Base Metal Thickness: 0.0179 inch.
3. Resilient Furring Channels: 1/2-inch- deep members designed to reduce sound transmission.

E. Grid Suspension System for Interior 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.; Furring Systems/Drywall.
   b. Chicago Metallic Corporation; Drywall Furring 640 System.
   c. USG Interiors, Inc.; Drywall Suspension System.

2.8 TRIM ACCESSORIES

A. Interior Trim: ASTM C 1047.
1. Material: Galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized steel sheet.
2. Shapes:
   a. Cornerbead: Use at outside corners, unless otherwise indicated.
   b. LC-Bead: J-shaped; exposed long flange receives joint compound; use at exposed panel edges.
   c. Expansion (Control) Joint.
   d. 3/4 inch radius Bullnose Cornerbead: Use at inside and ceiling corners, unless otherwise indicated.

2.9 AUXILIARY MATERIALS

A. Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.

B. Joint Treatment Materials:
1. Joint Compound: Setting-type joint compound achieving a rating of 10 when tested in accordance with ASTM D 3273 and evaluated in accordance with ASTM D 3274.
2. Joint Tape for Glass Mat Gypsum Board: 10-by-10 glass mesh.
3. Joint Tape for Interior Gypsum Board: Paper.

C. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.
1. Use screws complying with ASTM C 954 for fastening panels to steel members 20 gage, 0.033 inch thick, and heavier.
2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.

D. Sound Attenuation Blankets: Comply with requirements in Division 09 Section "Acoustic Blanket Insulation."

E. Acoustical Sealant: Comply with requirements in Division 07 Section "Joint Sealants."
   1. Provide sealants that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

F. Outlet Putty Pads: At acoustically rated partitions, as indicated on Drawings, provide putty pads for electrical and communications boxes.
   1. Provide pads that maintain acoustical ratings when tested in accordance with ASTM C 919.
   2. Comply with Underwriters Laboratories® standards UL 263 and UL 1479.

G. Drywall Primer: As recommended by gypsum panel manufacturer for sealing drywall panels prior to skim coat or paint application for Level 3, 4, or 5 finishes.

PART 3 - EXECUTION

3.1 EXAMINATION

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

3.2 PREPARATION

A. Suspended Ceilings: Coordinate installation of ceiling suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive ceiling hangers at spacing required to support ceilings and that hangers will develop their full strength.
   1. Furnish concrete inserts and other devises indicated to other trades for installation in advance of time needed for coordination and construction.

B. Coordination with Sprayed Fire-Resistive Materials:
   1. Before sprayed fire-resistive materials are applied, attach offset anchor plates or ceiling runners (tracks) to surfaces indicated to receive sprayed-on fire-resistive materials. Where offset anchor plates are required, provide continuous plates fastened to building structure not more than 24 inches o.c.
   2. After sprayed fire-resistive materials are applied, remove them only to extent necessary for installation of gypsum board assemblies and without reducing the fire-resistive material thickness below that which is required to obtain fire-resistance rating indicated. Protect remaining fire-resistive materials from damage.

3.3 INSTALLING STEEL SUSPENDED CEILING AND SOFFIT FRAMING

A. Suspend ceiling 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 ceiling suspension system. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
   2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with the location of hangers required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.
   3. Secure wire hangers by looping and wire-tying, either directly to structures or to inserts, eyescrews, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause them to deteriorate or otherwise fail.

4. Secure hangers to structure, including intermediate framing members, by attaching to inserts, eyescrews, 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 support ceilings directly from permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
6. Do not attach hangers to steel deck tabs.
7. Do not attach hangers to steel roof deck. Attach hangers to structural members.
8. Do not connect or suspend steel framing from ducts, pipes, or conduit.

B. Installation Tolerances: Install steel framing components for suspended ceilings so members for panel attachment are level to within 1/8 inch in 12 feet measured lengthwise on each member and transversely between parallel members.

C. Sway-brace suspended steel framing with hangers used for support.

D. Install suspended steel framing components in sizes and spacings indicated, but not less than that required by the referenced steel framing and installation standards.

E. Grid Suspension System: Attach perimeter wall track or angle where grid suspension system meets vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.

3.4 APPLYING AND FINISHING PANELS, GENERAL

A. Gypsum Board Application and Finishing Standards: ASTM C 840 and GA-216.

B. Install sound attenuation blankets before installing gypsum panels, unless blankets are readily installed after panels have been installed on one side.

C. Where gypsum drywall is indicated at inside face of exterior walls, provide only special mold and mildew-resistant type board at those locations.
1. Use Mold And Moisture-Resistant Joint Treatment Materials at all locations where mold and mildew-resistant type board is installed.

D. Install ceiling board panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in the central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.

E. Install gypsum panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.

F. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.

G. Attach gypsum panels to steel studs so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

H. Attach gypsum panels to framing provided at openings and cutouts.

I. Do not attach gypsum panels across the flat grain of wide-dimension lumber, including floor joists and headers. Float gypsum panels over these members using resilient channels, or provide control joints to counteract wood shrinkage.

J. Form control and expansion joints with space between edges of adjoining gypsum panels.

K. Cover both faces of steel stud partition framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area.
2. Fit gypsum panels around ducts, pipes, and conduits.

3. Where partitions intersect 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 3/8-inch-wide joints to install sealant.

L. Isolate perimeter of non-load-bearing gypsum board partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch- wide spaces at these locations, and trim edges with U-bead edge trim where edges of gypsum panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

M. STC-Rated Assemblies: Seal construction at perimeters, behind control and expansion joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and manufacturer's written recommendations for locating edge trim and closing off sound-flanking paths around or through gypsum board assemblies, including electrical and communications boxes.
1. Seal partitions above acoustical ceilings.

N. Space fasteners in gypsum panels according to referenced gypsum board application and finishing standard and manufacturer's written recommendations.

O. Space fasteners in panels that are tile substrates a maximum of 8 inches o.c.

3.5 PANEL APPLICATION METHODS

A. Single-Layer Application:
1. On ceilings, apply gypsum panels before wall/partition board application to the greatest extent possible and at right angles to framing, unless otherwise indicated.
2. On partitions/walls, apply gypsum panels vertically (parallel to framing) or horizontally (perpendicular to framing), according to the framing system manufacturer’s requirements for spanning capability.
   a. Comply with fire-resistance-rated assembly requirements.
3. Stagger abutting vertical joints between boards not less than one framing member on opposite side of metal stud partitions.
   a. Minimize end joints.
4. On Z-furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.

B. Single-Layer Fastening Methods: Apply gypsum panels to supports with steel drill screws.

3.6 TILE BACKER BOARD

A. At showers, tubs, and other “wet” areas indicated to receive wall tile, provide one of the following tile backing boards:
1. Glass-Mat, Water-Resistant Backing Panel: Comply with manufacturer's written installation instructions and install with 1/4-inch gap where panels abut other construction or penetrations.

B. At areas indicated to receive wall tile but not subject to wetting, install mold and moisture resistant board.

C. Where tile backing panels abut other types of panels in the same plane, shim surfaces to produce a uniform plane across panel surfaces.

3.7 INSTALLING TRIM ACCESSORIES

A. For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

B. Control Joints: Install control joints at locations indicated on Drawings. If not indicated, install control joints according to ASTM C 840 and **as follows**. ~~in specific locations approved by Architect for visual effect.~~

1. Install where a partition, wall, or ceiling traverses a construction joint (expansion, seismic or building control element) in the base building structure.
2. Install where movement may occur at joints in a wall or partition supported by building systems that move differentially.
3. Install where a wall or partition runs in an uninterrupted straight plane exceeding 30 linear ft (9100 mm).
4. Install in interior ceilings with perimeter relief so that linear dimensions between control joints do not exceed 50 ft (15000 mm) and total area between control joints does not exceed 2500 sq ft (230 sq m).
5. Install in interior ceilings without perimeter relief so that linear dimensions between control joints do not exceed 30 ft (9100 mm) and total area between control joints does not exceed 900 sq ft (84 sq m).
6. Install in exterior ceilings and soffits so that linear dimensions between control joints do not exceed 30 ft (9100 mm) and total area between control joints does not exceed 900 sq ft (84 sq m).
7. Install where ceiling framing members change direction.
8. Install at one side of door frames. Full height door frames shall be considered equivalent to a control joint.
9. Install all control joints at specific locations approved by the Architect for visual effect.

3.8 FINISHING GYPSUM BOARD ASSEMBLIES

A. 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 damaged surface areas.

C. Apply joint tape over gypsum board joints, except those with trim having flanges not intended for tape.

D. Gypsum Board Finish Levels: Finish panels to levels indicated below, according to ASTM C 840:
1. Level 1: Embed tape at joints in ceiling plenum areas, concealed areas, and where indicated, unless a higher level of finish is required for fire-resistance-rated assemblies and sound-rated assemblies.
2. Level 2: Embed tape and apply separate first coat of joint compound to tape, fasteners, and trim flanges.
3. Level 3: Embed tape and apply separate first and fill coats of joint compound to tape, fasteners, and trim flanges.
4. Level 4: Embed tape and apply separate first, fill, and finish coats of joint compound to tape, fasteners, and trim flanges.
5. Level 5: Embed tape and apply separate first, fill, and finish coats of joint compound to tape, fasteners, and trim flanges, and apply skim coat of joint compound over entire surface.

E. Required Locations for Gypsum Board Finish Levels:

Gypsum Board Finish Level	Where Required	Notes
Level 1	In ceiling plenum areas, concealed areas, and where indicated, unless a higher level of finish is required for fire-resistance-rated assemblies and sound-rated assemblies	Ridges and tool marks in the joint compound are acceptable for Level 1
Level 2	Where water-resistant gypsum backing board panels form substrates for tile, and other locations indicated	

Level 3	Where gypsum board surfaces are indicated to receive medium- or heavy-textured finishes before painting	Primer is required for Levels 3, 4, and 5
Level 4	All paper-faced gypsum wallboard surfaces to receive wall covering, light texture, or flat paint except where Level 5 finish is indicated in Specifications or on Drawings	
Level 5	All glass-mat and paper-faced gypsum wallboard surfaces exposed to view in areas accessible to the public and patients including public and patient room toilets	Required where all semi-gloss or gloss finishes are indicted / not required in storage rooms, closets, and similar small spaces

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

G. At all hourly rated smoke partitions, fire partitions, fire/smoke partitions, fire/smoke barriers and fire barriers, permanently mark both sides of wall construction above ceilings with the words "Fire and Smoke Barrier – Seal all penetrations to maintain rating". Include the specific hourly rating of the wall assembly.
   1. Use stencils to create red lettering at least two inches high with message repeated every 10 feet and with a two inch thick red horizontal line from the nearest lettering terminating at a two inch thick red vertical line indicating the extent of the rated partition unless otherwise required by Authorities Having Jurisdiction.

H. Glass-Mat, Water-Resistant Backing Panels: Finish according to manufacturer's written instructions.

3.9 FIELD QUALITY CONTROL

A. Above-Ceiling Observation: Before Contractor installs gypsum board ceilings, Architect will conduct an above-ceiling observation and report deficiencies in the Work observed. Do not proceed with installation of gypsum board to ceiling support framing until deficiencies have been corrected.
   1. Notify Architect seven days in advance of date and time when Project, or part of Project, will be ready for above-ceiling observation.

END OF SECTION 09 21 16

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SECTION 10 11 00 - VISUAL DISPLAY SURFACES

PART 1 - GENERAL

1.1 SUBMITTALS

A. In accordance with the requirements of Division 01 section “Common Product Requirements,” submit a complete listing of all manufacturers, products, model numbers, and designs proposed for use in the Work of this Section.

B. Maintain all submittals at the Project Site for use during construction and for distribution to the Owner, through the Architect, upon completion of the Work.

C. Submit only the items listed below to the Architect for review in accordance with Conditions of the Contract and Division 01 sections.
1.

D. Shop Drawings: For each type of visual display board required.
1. Include dimensioned elevations. Show location of joints between individual panels where unit dimensions exceed maximum panel length.
2. Include sections of typical trim members.
3. Show anchors, grounds, reinforcement, accessories, layout, and installation details.
4. Wiring diagrams from manufacturer for motor-operated sliding markerboard panels.

E. Samples for Initial Selection: Manufacturer's color charts showing the full range of colors and textures available for the following:
1. Markerboards: Actual sections of glass finish.

F. Samples for Verification: Of the following products, showing color and texture or finish selected. Where finishes involve normal color and texture variations, include Sample sets showing the full range of variations expected. Prepare Samples from the same material to be used for the Work.
1. Visual Display Boards: Sample panels not less than 8-1/2 by 11 inches (215 by 280 mm), mounted on the substrate indicated for the final Work. Include a panel for each type, color, and texture required.
2. Aluminum Trim and Accessories: Samples of each finish type and color, on 6-inch- (150-mm-) long sections of extrusions and not less than 4-inch (100-mm) squares of sheet or plate. Include Sample sets showing the full range of color variations expected.

1.2 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced installer who is an authorized representative of manufacturer for both installation and maintenance of the type of sliding units required for this Project.

B. Source Limitations: Obtain visual display boards through one source from a single manufacturer.

C. Product Options: Drawings indicate size, profiles, and dimensional requirements of visual display boards and are based on the products indicated. Other manufacturers' products with equal performance characteristics may be considered. Refer to Division 01 Sections.
1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval and only to the extent needed to comply with performance requirements. Where modifications are proposed, submit comprehensive explanatory data to Architect for review.

1.3 PROJECT CONDITIONS

A. Field Measurements: Verify field measurements before preparation of Shop Drawings and before fabrication to ensure proper fitting. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1. Allow for trimming and fitting where taking field measurements before fabrication might delay the Work.
2. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating markerboards without field measurements. Coordinate wall construction to ensure actual dimensions correspond to established dimensions.

1.4 WARRANTY

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

B. Glass Markerboard Warranty: Submit a written warranty executed by manufacturer agreeing to replace glass markerboards that do not retain their original writing and erasing qualities, become slick and shiny, or exhibit crazing, cracking, or flaking within the specified warranty period, provided the manufacturer's written instructions for handling, installation, protection, and maintenance have been followed.
   1. Warranty Period: 50 years from date of Substantial Completion.
   2. Warranty Period: Life of the building.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Subject to compliance with requirements, provide fixed glass dry erase marker board by Clarus Glassboards LLC or a comparable products by one of the following:
   1. Glass Dry Erase Markerboards:
      a. Best-Rite Chalkboard Co.
      b. Claridge Products and Equipment, Inc.
      c. Ghent Manufacturing, Inc.
      d. Marsh Industries, Inc.
      e. Polyvision.

2.2 MATERIALS

A. Fixed, Glass Dry- Erase Markerboard
   1. Glass: ¼ inch thick, tempered, PPG Starphire safety writing glass, Clarus Opti-Clear Polished, Eased edges.

   2. Backing substrate: Stainless Steel Standoffs.

2.3 ACCESSORIES

A. Metal Trim and Accessories:

   1. Clarus Interactive Package for interactivity.
   2. Marker Tray: Manufacturer's standard, continuous, solid, extrusion-type, aluminum marker tray with ribbed section and smoothly curved exposed ends for each markerboard.

2.4 FINISHES

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

B. Finish designations prefixed by AA conform to the system established by the Aluminum Association for designating aluminum finishes.

C. Class II, Clear Anodic Finish: AA-M12C22A31 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class II, clear coating 0.010 mm or thicker) complying with AAMA 607.1.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine wall surfaces, with Installer present, for compliance with requirements and other conditions affecting installation of visual display boards.
   1. Surfaces to receive markerboards shall be free of dirt, scaling paint, and projections or depressions that would affect smooth, finished surfaces markerboards.
   2. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Deliver factory-built visual display boards completely assembled in one piece without joints, where possible. If dimensions exceed panel size, provide 2 or more pieces of equal length as acceptable to Architect. When overall dimensions require delivery in separate units, prefit components at the factory, disassemble for delivery, and make final joints at the site. Use splines at joints to maintain surface alignment.

B. Install units in locations and at mounting heights indicated and according to manufacturer's written instructions. Keep perimeter lines straight, plumb, and level. Provide grounds, clips, backing materials, adhesives, brackets, anchors, trim, and accessories necessary for complete installation.

C. Coordinate Project-site-assembled units with grounds, trim, and accessories. Join parts with a neat, precision fit.

3.3 ADJUSTING AND CLEANING

A. Verify that accessories required for each unit have been properly installed and that operating units function properly.

B. Clean units according to manufacturer's written instructions.

END OF SECTION 10 11 00

SECTION 10 26 00 - WALL AND DOOR PROTECTION

PART 1 - GENERAL

1.1 SUBMITTALS

A. In accordance with the requirements of Division 01 section “Common Product Requirements,” submit a complete listing of all manufacturers, products, model numbers, and designs proposed for use in the Work of this Section.

B. Maintain all submittals at the Project Site for use during construction and for distribution to the Owner, through the Architect, upon completion of the Work.

C. Submit only the items listed below to the Architect for review in accordance with Conditions of the Contract and Division 01 sections.

D. Product Data: Include physical characteristics, such as durability, resistance to fading, and flame resistance, for each impact-resistant wall protection system component indicated.

E. Shop Drawings: Show locations, extent, and installation details of each impact-resistant wall protection system component. Show methods of attachment to adjoining construction.

F. Samples for Verification: For the following products, showing the full range of color and texture variations expected in each impact-resistant wall protection system component. Prepare Samples from the same material to be used for the Work.
   1. Wall and Corner Guards: 12-inch- long Samples of each type of impact-resistant wall protection system component required. Include examples of joinery, corners, and field splices.
   2. Sheet or Panels: 6-by-6-inch- square Samples of each impact-resistant wall protection system component required.

G. Maintenance Data: For each impact-resistant wall protection system component to include in maintenance manuals specified in Division 01.
   1. Include recommended methods and frequency for maintaining optimum condition of vinyl plastic covers under anticipated traffic and use conditions. Include precautions against using cleaning materials and methods that may be detrimental to vinyl plastic finishes and performance.

1.2 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed installation of impact-resistant wall protection system components similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

B. Source Limitations: Obtain each color, grade, finish, and type of impact-resistant wall protection system component from a single source with resources to provide components of consistent quality in appearance and physical properties.

C. Product Options: Information on Drawings and in Specifications establishes requirements for systems aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including preconstruction testing, field testing, or in-service performance.

D. Product Options: Drawings indicate size, profiles, and dimensional requirements of impact-resistant wall protection system and are based on the specific system indicated. Other manufacturers systems with equal performance characteristics may be considered. Refer to Division 01 Sections.

1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architects approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.

E. Fire-Test-Response Characteristics: Provide impact-resistant wall protection system components with the following surface-burning characteristics, as determined by testing materials identical to those required in this Section per ASTM E 84 by a testing and inspecting agency acceptable to authorities having jurisdiction. Identify impact-resistant wall protection system components with appropriate markings of applicable testing and inspecting agency.
1. Flame Spread: 25 or less.
2. Smoke Developed: 450 or less.

F. Impact Strength: Provide impact-resistant wall protection system components with a minimum impact resistance of 25.4 ft-lb/in. of width when tested according to ASTM D 256, Test Method A.

1.3 PROJECT CONDITIONS

A. Environmental Limitations: Do not install wall surface-protection system components until the space is enclosed and weatherproof and ambient temperature within the building is maintained at not less than 70 deg F for not less than 72 hours before beginning installation. Do not install rigid plastic wall surface-protection systems until that temperature has been attained and is stabilized.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS:

A. To establish standards of manufacture, operation, performance, and appearance, drawings and specifications are based on products indicated on the drawings. . Provided compliance with requirements, products of other manufacturers may also be acceptable.
1. American Floor Products Co., Inc.
2. Arden Architectural Specialties, Inc.
3. Balco, Inc.
4. Boston Retail Products.
5. Construction Specialties, Inc.
6. IPC Door and Wall Protection Systems, Inc.
7. Koroseal Wall Protection Systems, Inc.
8. K. J. Miller Corp.
9. Pawling Corporation.
10. Tepromark International, Inc.
11. Tri-Guards, Inc.
12. Wilkinson Company, Inc.

2.2 MATERIALS

A. Extruded Rigid Plastic: Textured, chemical- and stain-resistant, high-impact-resistant, PVC or acrylic-modified vinyl plastic; thickness as indicated; with a minimum impact resistance of 25.4 ft-lbf/in. of width when tested according to ASTM D 256, Test Method A.
1. Color and Texture: Match Architect's samples.
2. Color and Texture: As indicated by referencing manufacturer's designations.
3. Color and Texture: As selected by Architect from manufacturer's full range for these characteristics.

B. Plastic Sheet Wall Covering Material: Semirigid, textured, chemical- and stain-resistant, high-impact-resistant, PVC or acrylic-modified vinyl plastic sheet; thickness as indicated; with a minimum impact resistance of 25.4 ft-lbf/in. of width when tested according to ASTM D 256, Test Method A.
   1. Color and Texture: Match Architect's samples.
   2. Color and Texture: As indicated by referencing manufacturer's designations.
   3. Color and Texture: As selected by Architect from manufacturer's full range for these characteristics.

C. Aluminum Extrusions: Provide alloy and temper recommended by the manufacturer for the type of use and finish indicated, but with not less than the strength and durability properties specified in ASTM B 221 for alloy 6063-T5.

D. Stainless-Steel Plate: Type 304, minimum 0.0625 inch.

E. Fasteners: Provide aluminum, nonmagnetic stainless-steel, or other noncorrosive metal screws, bolts, and other fasteners compatible with aluminum components, hardware, anchors, and other items being fastened. Use theft proof fasteners where exposed to view.

F. Adhesive: Type recommended by the manufacturer for use with material on the substrate indicated.

2.3 WALL GUARDS

A. Bumper/Crash-Rail-Type Wall Guards: Assembly consisting of a snap-on-type rigid plastic cover installed over a continuous aluminum retainer mounted at height indicated. Model as indicated on the drawings.
   1. Cover: Extruded, rigid plastic, minimum 0.078 inch (2.0 mm) thick, in profile indicated.
   2. Retainer: Continuous, one-piece, extruded-aluminum retainer; minimum 0.0625 inch thick; with continuous rubber or vinyl bumper cushion centered in the extrusion.
      a. Mounting Type: Surface mounted flush on wall.
   3. Accessories: Provide prefabricated, injection-molded end caps and inside and outside corners with concealed splices, cushions, mounting hardware, and other accessories as required.
      a. Provide end caps and inside and outside corners that match plastic cover color and are field adjustable for close alignment with snap-on plastic covers.

2.4 CORNER GUARDS

A. Surface-Mounted, Resilient Plastic Corner Guards: Surface-mounted, resilient plastic corner-guard assembly consisting of a snap-on-type plastic cover installed over a continuous aluminum retainer, height as indicated. Model as indicated on the drawings.

B. Stainless-Steel Corner and End Guards: Paper-covered, satin-finish, 0.0625-inch minimum, stainless-steel sheet corner guards; height as indicated. Provide 90-degree turn, unless otherwise indicated; and formed edges.
   1. Wing Size: 2-1/2 by 2-1/2 inches.
   2. Mounting Method: Double-faced, self-adhesive foam tape.
   3. Corner Radius: 1/8 inch.

2.5 IMPACT-RESISTANT WALL COVERINGS

A. Semirigid Sheet Wall Covering: Semirigid, embossed, fiber-backed, impact-resistant plastic sheets complying with fire-test-response characteristics specified and are chemical and stain resistant. Provide manufacturer's standard; match moldings and trim as required. Model as indicated on the drawings.
   1. Sheet Size: As indicated.
   2. Sheet Thickness: 0.04~~6~~0 inch.

B. Semirigid Vinyl Sheet Wall Covering: 100% pure homogenous vinyl, extruded, semi-rigid PVC sheet, contains no plasticizers or fillers. Model as indicated on the drawings.
1. Sheet Size: As indicated.
2. Sheet Thickness: 0.04~~6~~0 inch
~~2.~~3. Basis of Design: Altro Whiterock Chameleon

2.6 FABRICATION

A. Fabricate impact-resistant wall protection systems to comply with requirements indicated for design, dimensions, details, finish, and member sizes, including thicknesses of components.

B. Form metal fabrications from materials of size, thickness, and shapes indicated but not less than that needed to comply with performance requirements indicated. Work to dimensions indicated or accepted on shop drawings, using proven details of fabrication and support.

C. Remove sharp or rough areas on exposed traffic surfaces.

D. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors for interconnecting members to other construction.

E. Provide inserts and other anchoring devices for connecting components to concrete or masonry. Fabricate anchoring devices to withstand imposed loads. Coordinate anchoring devices with the supporting structure.

2.7 FINISHES, GENERAL

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

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

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, Clear Anodic Finish: AA-M12C22A31 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class II, clear coating 0.010 mm or thicker) complying with AAMA 607.1.

C. Powder-Coat Finish: After cleaning and pretreating, apply manufacturer's standard thermosetting polyester or acrylic urethane powder coating with cured-film thickness not less than 1.5 mils. Prepare, treat, and coat metal to comply with resin manufacturer's written instructions.
1. Color and Gloss: As indicated on the drawings

2.9 STAINLESS-STEEL FINISHES

A. Bright, Directional Polish: No. 4 finish.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions in which impact-resistant wall protection system components and impact-resistant wall covering materials will be installed.
   1. Complete finishing operations, including painting, before installing impact-resistant wall protection system components.

B. Impact-Resistant Wall Covering Materials: Ensure wall surfaces to receive impact-resistant wall covering materials are dry and free from dirt, grease, loose paint, and scale.

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

3.2 INSTALLATION

A. Before installation, clean substrate to remove dust, debris, and loose particles.

B. Install impact-resistant wall protection system components level, plumb, and true to line without distortions.
   1. Do not use materials with chips, cracks, voids, stains, or other defects that might be visible in the finished Work.

C. Install aluminum retainers, mounting brackets, and other accessories according to the manufacturer's written instructions.
   1. Where splices occur in horizontal runs of more than 20 feet, splice aluminum retainers and plastic covers at different locations along the run.

3.3 CLEANING

A. Immediately on completion of installation, clean plastic covers and accessories using a standard ammonia-based household cleaning agent. Clean metal components according to the manufacturer's written instructions.

B. Remove excess adhesive using methods and materials recommended by the manufacturer.

C. Remove surplus materials, rubbish, and debris, resulting from installation, on completion of work and dispose of legally.

D. Leave installation areas in neat, clean condition.

END OF SECTION 10 26 00

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SECTION 10 28 13 - TOILET ACCESSORIES

PART 1 - GENERAL

1.1 SUBMITTALS

A. In accordance with the requirements of Division 01 section “Common Product Requirements,” submit a complete listing of all manufacturers, products, model numbers, and designs proposed for use in the Work of this Section.

B. Maintain all submittals at the Project Site for use during construction and for distribution to the Owner, through the Architect, upon completion of the Work.

C. Submit only the items listed below to the Architect for review in accordance with Conditions of the Contract and Division 01 sections.

D. Product Data: Include construction details, material descriptions and thicknesses, dimensions, profiles, fastening and mounting methods, specified options, and finishes for each type of accessory specified.

E. Setting Drawings: For cutouts required in other work; include templates, substrate preparation instructions, and directions for preparing cutouts and installing anchoring devices.

F. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required. Use designations indicated in the Toilet and Bath Accessory Schedule and room designations indicated on Drawings in product schedule.

G. Maintenance Data: For accessories to include in maintenance manuals specified in Division 01. Provide lists of replacement parts and service recommendations.

1.2 QUALITY ASSURANCE

A. Source Limitations: Provide products of same manufacturer for each type of accessory unit and for units exposed to view in same areas, unless otherwise approved by Architect.

B. Product Options: Accessory requirements, including those for materials, finishes, dimensions, capacities, and performance, are established by specific products indicated in the Accessory Schedule.

1.3 COORDINATION

A. Coordinate accessory locations with other work to prevent interference with clearances required for access by disabled persons, proper installation, adjustment, operation, cleaning, and servicing of accessories.

B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

1.4 WARRANTY

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

B. Manufacturer's Mirror Warranty: Written warranty, executed by mirror manufacturer agreeing to replace mirrors that develop visible silver spoilage defects within minimum warranty period indicated.
   1. Minimum Warranty Period: 15 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS:

A. To establish standards of manufacture, operation, performance, and appearance, and unless otherwise indicated, drawings and specifications are based on products of Bobrick Washroom Equipment, Inc.. Provided compliance with requirements, products of the following manufacturers may also be acceptable.
1. AJW Washroom Accessories, Inc.
2. American Specialties, Inc.
3. Bradley Corporation.
4. General Accessory Manufacturing Co. (GAMCO).
5. McKinney/Parker Washroom Accessories Corp.

2.2 MATERIALS

A. Stainless Steel: ASTM A 666, Type 304, with No. 4 finish (satin), in 0.0312-inch (0.8-mm) minimum nominal thickness, unless otherwise indicated.

B. Brass: ASTM B 19, leaded and unleaded flat products; ASTM B 16 (ASTM B 16M), rods, shapes, forgings, and flat products with finished edges; ASTM B 30, castings.

C. Sheet Steel: ASTM A 366/A 366M, cold rolled, commercial quality, 0.0359-inch (0.9-mm) minimum nominal thickness; surface preparation and metal pretreatment as required for applied finish.

D. Galvanized Steel Sheet: ASTM A 653/A 653M, G60 (Z180).

E. Chromium Plating: ASTM B 456, Service Condition Number SC 2 (moderate service), nickel plus chromium electrodeposited on base metal.

F. Baked-Enamel Finish: Factory-applied, gloss-white, baked-acrylic-enamel coating.

G. Mirror Glass: ASTM C 1036, Type I, Class 1, Quality q2, nominal 6.0 mm thick, with silvering, electroplated copper coating, and protective organic coating complying with FS DD-M-411.

H. Galvanized Steel Mounting Devices: ASTM A 153/A 153M, hot-dip galvanized after fabrication.

I. Fasteners: Screws, bolts, and other devices of same material as accessory unit, tamper and theft resistant when exposed, and of galvanized steel when concealed.

2.3 FABRICATION

A. Names or labels are not permitted on exposed faces of accessories. On interior surface not exposed to view or on back surface of each accessory, provide printed, waterproof label or stamped nameplate indicating manufacturer's name and product model number.

B. Surface-Mounted Toilet Accessories: Unless otherwise indicated, fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with continuous stainless-steel hinge. Provide concealed anchorage where possible.

C. Recessed Toilet Accessories: Unless otherwise indicated, fabricate units of all-welded construction, without mitered corners. Hang doors and access panels with full-length, stainless-steel hinge. Provide anchorage that is fully concealed when unit is closed.

D. Framed Glass-Mirror Units: Fabricate frames for glass-mirror units to accommodate glass edge protection material. Provide mirror backing and support system that permits rigid, tamper-resistant glass installation and prevents moisture accumulation.
1. Provide galvanized steel backing sheet, not less than 0.034 inch (0.85 mm) and full mirror size, with nonabsorptive filler material. Corrugated cardboard is not an acceptable filler material.

E. Mirror-Unit Hangers: Provide mirror-unit mounting system that permits rigid, tamper- and theft-resistant installation, as follows:
1. One-piece, galvanized steel, wall-hanger device with spring-action locking mechanism to hold mirror unit in position with no exposed screws or bolts.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.

B. Secure mirrors to walls in concealed, tamper-resistant manner with special hangers, toggle bolts, or screws. Set units level, plumb, and square at locations indicated, according to manufacturer's written instructions for substrate indicated.

C. Install grab bars to withstand a downward load of at least 250 lbf (1112 N), when tested according to method in ASTM F 446.

3.2 ADJUSTING AND CLEANING

A. Adjust accessories for unencumbered, smooth operation and verify that mechanisms function properly. Replace damaged or defective items.

B. Remove temporary labels and protective coatings.

C. Clean and polish exposed surfaces according to manufacturer's written recommendations.

3.3 ACCESSORY SCHEDULE

A. Provide the following accessories at locations indicated.
1. Mirrors with Stainless Steel Frame
   a. B-165 24 x 30
2. Toilet Tissue Dispenser
   a. B-274

3. Shower Curtain and Rod
   a. B-6047 Rod
   b. B-204-2 Curtain

B. Toilet Tissue Dispenser : Where this designation is indicated, provide toilet tissue dispenser complying with the following:
1. Products: Provide one of the following;
2. Type: Single-roll dispenser
3. Mounting: Recess mounted designed for nominal **4-inch (100-mm)** wall depth
4. Material: Stainless steel
5. Operation: Eccentric-shaped, molded-plastic spindle revolves one-half revolution per dispensing operation for controlled delivery; core cannot be removed until roll is empty.
6. Capacity: Designed for **4-1/2- or 5-inch- (114- or 127-mm-)** diameter-core tissue rolls
7.

C. Mirror Unit : Where this designation is indicated, provide mirror unit complying with the following:
1. Products: :
2. Stainless-Steel, Channel-Framed Mirror: Fabricate frame from stainless-steel channels in manufacturer's standard satin or bright finish with square corners mitered to hairline joints and mechanically interlocked.
   a. Shelf: Stainless steel in thickness recommended by manufacturer, but not less than thickness of mirror frame, approximately 5 inches (127 mm) deep by width of mirror, with edges turned down and returned for rigidity; secure shelf to bottom of mirror frame and provide concealed, rigid bracket supports for widths exceeding 36 inches (900 mm).

D. Shower Curtain Rod : Where this designation is indicated, provide stainless-steel shower curtain rod with 3-inch (75-mm) stainless-steel flanges designed for exposed fasteners, in length required for shower opening indicated, and complying with the following:

1. Products: Provide one of the following:
2. Heavy-Duty Rod: 1-1/4-inch (32-mm) OD; fabricated from nominal 0.05-inch- (1.3-mm-) thick stainless steel.

E. Shower Curtain : Where this designation is indicated, provide shower curtain complying with the following:
1. Products: Provide one of the following:
2. Antibacterial Shower Curtain: Minimum 10-oz. (284-g), nylon-reinforced vinyl or 0.008-inch- (0.2-mm-) thick vinyl material with integral antibacterial agent and corrosion-resistant grommets at minimum 6 inches (152 mm) o.c. through top hem.
   a. Size: Minimum 6 inches (152 mm) wider than opening by 72 inches (1828 mm) high. .>
   b. Color: As selected by Architect from mfr's full range.
3. Shower Curtain Hooks: Chrome-plated or stainless-steel, spring wire curtain hooks with snap fasteners, sized to accommodate specified curtain rod. Provide one hook per curtain grommet.

END OF SECTION 10 28 13

SECTION 10 44 00 - FIRE-PROTECTION SPECIALTIES

PART 1 - GENERAL

1.1 SUBMITTALS

A. In accordance with the requirements of Division 01 section “Common Product Requirements,” submit a complete listing of all manufacturers, products, model numbers, and designs proposed for use in the Work of this Section.

B. Maintain all submittals at the Project Site for use during construction and for distribution to the Owner, through the Architect, upon completion of the Work.

C. Submit only the items listed below to the Architect for review in accordance with Conditions of the Contract and Division 01 sections.

D. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for fire-protection specialties.
   1. Fire Extinguishers: Include rating and classification.
   2. Cabinets: Include roughing-in dimensions, details showing mounting methods, relationships of box and trim to surrounding construction, door hardware, cabinet type, trim style, and panel style.

E. Samples for Initial Selection: Manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available for each type of cabinet finish indicated.

F. Samples for Verification: For each type of exposed cabinet finish required, prepared on Samples of size indicated below and of same thickness and material indicated for the Work. If finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
   1. Size: 6-by-6-inch- square Samples.

1.2 QUALITY ASSURANCE

A. Source Limitations: Obtain fire extinguishers and cabinets through one source from a single manufacturer.

B. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Standard for Portable Fire Extinguishers."

C. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to Authorities Having Jurisdiction.
   1. Provide extinguishers listed and labeled by FM.

PART 2 - PRODUCTS

2.1 FIRE EXTINGUISHERS

A. To establish standards of manufacture, operation, performance, and appearance, Drawings and Specifications are based on products of Larsen’s. Provided compliance with Project requirements, and prior approval by the Owner and the Architect of a properly documented substitution request,products by one of the following manufacturers...
   1. Amerex Corporation.
   2. Ansul Incorporated.
   3. Badger; Div. of Figgie Fire Protection Systems.
   4. J.L. Industries.
   5. Kidde.
   6. Potter-Roemer.

B. Provide fire extinguishers for each extinguisher cabinet and other locations indicated, in types, colors and finishes selected by Architect from manufacturer's standard, that comply with requirements of Authorities Having Jurisdiction.
   1. Multi-Purpose Dry Chemical, UL Rated 4A-80B:C, 10 lb. nominal capacity, in enameled steel container, for Class A, B, and C fires.
      a. Larsen's "MP10."

2.2 FIRE-PROTECTION CABINETS

A. Recessed **and Semi-Recessed** Cabinet: To establish standards of manufacture, operation, performance, and appearance, Drawings and Specifications are based on products of Larsen's, Occult Series. Provided compliance with Project requirements, products of the following manufacturers will also be acceptable.
   1. J.L. Industries.
   2. Potter-Roemer.

B. Nonrated Cabinet Construction: Provide manufacturer's standard box (tub), with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated. Weld joints and grind smooth. Miter and weld perimeter door frames.
   1. Provide cabinet with double walls fabricated from 0.0428-inch- thick, cold-rolled steel sheet lined with minimum 5/8-inch- thick, fire-barrier material. Provide factory-drilled mounting holes

C. Cabinet Mounting –Recessed **and Semi- Recessed**:
   1. Cabinet box recessed in walls of sufficient depth to suit style of trim indicated.

D. Cabinet Trim Style: Fabricate cabinet trim in one piece with corners mitered, welded, and ground smooth.
   1. Trimless with hidden flange of same metal and finish as box that overlaps surrounding wall finish and that is concealed from view by an overlapping door.

E. Door Material: Manufacturer's standard steel sheet.

F. Door Style: Manufacturer's standard Solid design.

G. Door Construction: Fabricate doors according to manufacturer's standards, of materials indicated, and coordinated with cabinet types and trim styles selected.
   1. Provide minimum 1/2-inch- thick door frames, fabricated with tubular stiles and rails, and hollow-metal design.

H. Door Hardware: Provide manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated. Provide either lever handle with cam-action latch, or exposed or concealed door pull and friction latch. Provide concealed or continuous-type hinge permitting door to open 180 degrees.

2.3 MATERIALS

A. Cold-Rolled Steel Sheet: Carbon steel, complying with ASTM A 366/A 366M, commercial quality, stretcher leveled, temper rolled.

2.4 ACCESSORIES

A. Mounting Brackets: Manufacturer's standard steel, designed to secure extinguisher, of sizes required for types and capacities of extinguishers indicated, with plated or baked-enamel finish.
   1. Provide brackets for extinguishers not located in cabinets.
   2. Provide brackets for extinguishers located in cabinets.

B. Identification: Provide lettering to comply with Authorities Having Jurisdiction for letter style, color, size, spacing, and location. Locate as indicated by Architect.
   1. Identify bracket-mounted extinguishers with the words "FIRE EXTINGUISHER" in red letter decals applied to wall surface.

2. Identify fire extinguisher in cabinet with the words "FIRE EXTINGUISHER" applied to door.
   a. Lettering Color: Red.

2.5 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" 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: 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.

D. Cabinet and Door Finishes: Provide manufacturer's standard baked-enamel paint for the following:
   1. Interior of cabinets and doors.

2.6 STEEL FINISHES

A. Surface Preparation: Clean surfaces of dirt, oil, grease, mill scale, rust, and other contaminants that could impair paint bond using manufacturer's standard methods.

B. Baked-Enamel Finish: Immediately after cleaning and pretreating, apply manufacturer's standard two-coat, baked-enamel finish consisting of prime coat and thermosetting topcoat. Comply with paint manufacturer's written instructions for applying and baking to achieve a minimum dry film thickness of 2 mils.
   1. Color and Gloss: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine walls and partitions for suitable framing depth and blocking where recessed and semi-recessed cabinets are to be installed.

B. Examine fire extinguishers for proper charging and tagging.
   1. Remove and replace damaged, defective, or undercharged units.

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

3.2 INSTALLATION

A. Comply with manufacturer's written instructions for installing fire-protection specialties.

B. Install in locations and at mounting heights indicated or, if not indicated, at heights acceptable to Authorities Having Jurisdiction.
   1. Prepare recesses for recessed **and semi-recessed** fire-protection cabinets as required by type and size of cabinet and trim style.
   2. Fasten cabinets to structure, square and plumb.
   3. Fasten mounting brackets to structure and cabinets, square and plumb.

C. Apply decals on field-painted fire-protection cabinets after painting is complete.

3.3 ADJUSTING, CLEANING, AND PROTECTION

A. Adjust cabinet doors to operate freely. Verify that integral locking devices operate properly.

B. Refinish or replace cabinets and doors damaged during installation.

C. Provide final protection and maintain conditions that ensure that cabinets and doors are without damage or deterioration at the time of Substantial Completion.

END OF SECTION 10 44 00