feeder circuits, continuity checks on all branch and control wiring, and rotation tests for all distribution and utilization equipment.

C. Implementation

1. Safety practices shall comply with applicable State and Local Safety Orders as well as with the Occupational Safety and Health Act of 1970 (OSHA). Compliance with the National Fire Protection Association Standard NFPA 70E and the Accident Prevention Manual for Industrial Operations of the National Safety Council shall be observed.

2. Tests shall only be performed on apparatus which is de-energized. The testing company's lead test engineer for the project shall be a designated safety representative and shall supervise testing observations and safety requirements. Work shall not proceed until he has determined that it is safe to do so.

3. Power circuits shall have conductors shorted to ground by hot-line grounded device approved for the purpose. Warning signs and protective barriers shall be provided as necessary to conduct the tests safely.

D. Equipment To Be Tested

1. The following equipment shall be tested in accordance with the scopes of work which follow:

a. Thermal Magnetic Circuit Breakers
b. Lighting Fixtures
c. Conductors (600volts and below)
d. Grounding System Tests

E. Thermal Magnetic Circuit Breakers

1. Visual and Mechanical Inspection

a. Inspect housing and check for broken or loose terminals.
b. Operate breaker to check operation.

F. Lighting Fixtures and Wiring Devices

1. Check all lighting fixtures and receptacles for proper operation, polarize tests for outlets.

G. Conductors (600Volts and Below)

1. Visual and Mechanical Inspection

a. Inspect for physical damage and proper connection in accordance with single line diagram.

b. Cable connections shall be torque tested to manufacturer's recommended values.

3. From panelboard ground bus to green **10-32** washer-in-head machine screw in junction box or disconnect switch through flexible metallic conduit to ground terminal in connection **box** mounted on single phase fractional horsepower motor.

3.08 EQUIPMENT CONNECTIONS

A. Make all final connections to equipment indicated on the drawings.

B. Equipment grounding integrity of all equipment and non-current carrying metal parts must be assured.

C. All equipment shown on the drawings which is furnished under other Sections of these specifications and by others shall be connected under this Section.

D. Before connecting any piece of equipment, check the nameplate rating against the information shown on the drawings and call to the attention of the Engineer any discrepancies.

3.09 EMPTY CONDUIT SYSTEMS

A. Furnish and install empty conduit and outlet systems as indicated on the drawings and specified herein for low voltage systems.

B. Outlet boxes for all system receptacles shall be recessed with raised cover and blank plate similar to wiring device plates. Refer to symbol list for size of each box for all systems.

C. Provide system of empty conduit, outlets and mounting boards, as specified and shown on the drawings, for all empty conduit systems.

D. A minimum **3/16** inch diameter, twisted nylon plastic fish cord shall be furnished and installed in all empty raceways. Provide a tag on each end of fish cord indicating the location of the other end. Conduits shall be of a size as indicated on the drawings, but shall not be smaller than 3/4 inch Trade size,

3.10 CLEANING

A. The Section of the specifications shall include the cleaning of all equipment on a day-to-day basis and final cleaning of all electrical equipment prior to turning building over to the Owner. All necessary cleaning referred to herein shall be cleaned to the satisfaction of the Engineer.

B. Electrical Distribution Equipment

1. All electrical distribution equipment impacted by construction shall be completely cleaned inside and out prior to re-energizing.

2. Cleaning shall consist of vacuuming all busses, enclosures (inside and out), etc. After vacuuming has been completed, all equipment shall be wiped down. If

1. Remove, store, and re-install all lighting fixtures as required on the drawings. Clean and re-lamp all furtures as indicated in Section 2 and on the drawings.

2. Lay-in recessed furtures in grid type ceiling shall be supported from the under side of roof or floor slab and utilize adequate hangers with attachments to building construction and independent of other systems.

3. All lighting fixtures shall be supported from the slab above and shall not be suspended from ducts, piping, equipment, ceiling support system, etc.

4. Electrical Contractor shall verify with the General Contractor the type of ceilings which will be used.

5. Mounting height and locations of all lighting fixtures shall be determined from Architectural ceiling plans and elevations.

6. Where job conditions require locations different from those shown to avoid equipment, etc., such changes shall be made without additional cost to the Owner.

F. Wiring Devices

1. All wiring devices shall be installed in appropriately sized outlet boxes. Where more than one (1) switch or a double duplex receptacle is indicated on the drawings, outlet boxes shall be ganged together to accept all devices in the area.

2. All duplex convenience and power receptacles shall be mounted vertically with the grounding posts at the top of the device. Where duplex receptacles are indicated to be mounted horizontally, the grounding posts shall be on the left as the outlet is viewed from the front.

3. Each and every receptacle, either wall or raceway mounted, shall be appropriately labeled, indicating the panel and circuit number from which they are served. Method of identification shall be as approved by the Owner.

4. All toggle switches, single pole, and three-way, shall be so installed such that, when lights are off, all switch posts shall be in the down position. Toggle switches ganged 3 or more together shall be labeled denoting area served by each switch.

5. All device plate screws shall be colored alike to the device plates. All screws shall be installed "finger-tight" to avoid device plate cracking.

3.06 MATERIALS AND WORKMANSHIP

A. All materials and equipment shall be new and unused and shall meet requirements of the latest Standards of NEMA, UL, IPCEA. ANSI and IEEE. Equipment shall have components required or recommended by OSHA, applicable NFPA documents and shall be UL approved and labeled.

14. A minimum 3/16 inch diameter, twisted nylon plastic type fish cord shall be furnished and installed in all empty raceways. Provide a tag on each end of fish cord indicating the location of the other end.

C. Pull, Junction, and Outlet Boxes

1. The Electrical Contractor shall furnish and install pull boxes for all feeders as required by NEC. Pull boxes shall be code gauge steel plates fastened to angle iron frames with removable covers. Covers shall be secured with brass machines screws.

2. The Electrical Contractor shall furnish and install junction boxes for feeders and branch circuits as required. Boxes shall be sized in accordance with NEC. Junction boxes shall be code gauge steel with removable covers. Covers shall be secured with brass machine screws.

3. The Electrical Contractor shall furnish and install outlet boxes for all wiring devices as shown on the drawings. Bar hanger type outlet boxes shall be used in hollow frame partitions, other than masonry or construction block partitions, with bar hanger supported from two (2) partition studs for wood stud partitions. For metal stud partitions, bar hanger shall be secured with self-threading metal screws or drill through hangers with caddy clips.

4. Through-the-wall outlet boxes shall not be permitted. Outlet boxes shall not be installed back-to-back but shall be staged on opposite sides of partitions a minimum of 12 inches on center.

5. If any discrepancies regarding the locations of outlet boxes are found to exist between the Electrical drawings and any other drawings associated with the project, notify the Engineer at once and have location verified before outlets are installed. Any reasonable change in location of outlets prior to roughing shall not involve additional expense to the Owner. The term "reasonable" shall be interpreted as moving outlet locations a maximum of 10 feet in any direction from the location indicated on the drawings.

6. Whenever outlet boxes of any system are installed in brick, masonry, or concrete construction, furnish and install the necessary boxes and conduit in connection therewith so that the Ceiling Tile Contractor may build them in as the work progresses. Box offsets shall be made at all outlets to provide for proper adjustment to finished surfaces.

7. The Electrical Contractor is responsible for cutting openings in brick, tile, and all types of construction blocks at outlets. Exposed mortar shall not be permitted around device plates.

8. All boxes shall be rigidly mounted to construction and shall be equipped with suitable screw fastened covers. Unused open knockouts in all boxes shall be plugged with suitable blanking devices. All boxes installed that do not have equipment mounted on them shall be provided with blank covers.

D. Feeder and Branch Circuit Conductors

4. The Electrical Contractor shall keep fully informed of size, shape and position of openings required for material and equipment provided under this and other Sections. Ensure that openings required for work of this Section are coordinated with work of other Sections. Provide cutting and patching as necessary.

5. All miscellaneous hardware and support accessories, including support rods, nuts, bolts, screws and other such items, shall be of a galvanized or cadmium plated finish or of another approved rust-inhibiting coating.

6. Throughout this Section where reference is made to steel channel supports, it shall be understood to mean that the minimum size shall be 1 5/8 inch mild strip steel with minimum wall thickness of 0.105 inch, similar to Unistrut P1000 or equal products manufactured by Kindorf or Husky Products Company.

B. Conduits and Raceways

1. Conduit ends shall be cut square, threaded and reamed to remove burrs and sharp edges. Field threads shall be of the same type and have the same effective length as factory cut threads. Excessive exposed threads will not be allowed. Wherever required in exposed conduit runs, turns shall be made by the use of factory-made bends, or field-made bends as approved. In conduits, or in the event of a multiplicity of conduits making the same turn, a steel junction box with a removable steel cover may be used. Offsets and bends for changes in elevation of exposed conduit runs shall be made at walls or beams and not in open spaces between walls or beams. Conduits shall be routed so as not to interfere with the operation or maintenance of any equipment. The entire job shall be done in a neat and workmanlike manner, as approved by the Engineer. Steel supports or racks shall be galvanized steel channel and fittings, as manufactured by Unistrut, Kindorf, Husky Products Company or equal.

2. All conduit work shall be carefully cleaned and dried inside before the installation or conductors. Wire shall not be pulled into conduit system until building roof and walls are weathertight and all rough plastering is completed. Plug conduit ends to exclude dust, moisture, plaster, or mortar while building is under construction. No lubricants or cleaning agents which might have a deleterious effect on conductor coverings shall be used for drawing conductors into raceways.

3. Drawings, in relation to routing of conduits, are diagrammatic. Except where additional conduits may be required to avoid derating of branch circuits, as required elsewhere within this Section, the number and size of conduits and wire shall be furnished and installed as indicated by the drawings. Conduits shall be routed in the field so as to be coordinated with the building structure. Concealed conduit shall be as short and direct as possible. Exposed conduit shall be run in straight lines parallel and perpendicular to walls, beams and columns and with right angle bends and threaded conduit fittings.

4. Conduits passing through floors, walls and beams shall be of such size, number and in such locations so as not to impair the strength of the construction.

A. Materials and equipment will be new and unused and will meet requirements of the latest Standards of **NEMA,** UL, ANSI, and IEEE. Equipment will have components required or recommended by **OSHA** and applicable NFPA documents, and will be UL approved and labeled.

B. Work will be installed in a neat and workmanlike manner and will be done in accordance with local and state codes.

3.04 COOPERATION AND WORK PROGRESS

A. The electrical work shall be carried on under the usual construction conditions, in conjunction with all other work at the site. The Electrical Contractor shall cooperate with the General Contractor all other Subcontractors and equipment suppliers working at their site. The Electrical Contractor shall coordinate the work and proceed in a manner so as not to delay the progress of the project.

B. The Electrical Contractor shall coordinate his work with the progress of the building and other Trades so that he will complete his work as soon as conditions permit and such that interruptions of the building functions will be at a minimum. Any overtime hours worked or additional costs incurred due to lack **of** or improper coordination with other Trades or the Owner by the Electrical Contractor shall be assumed by him without any additional cost to the Owner.

C. The Electrical Contractor shall furnish information on all equipment that is furnished under Section but installed under another Section to the installing Contractor as specified herein.

D. The Electrical Contractor shall provide all materials, equipment and workmanship to provide for adequate protection of all electrical equipment during the course of construction of the project. This shall also include protection frm moisture and all foreign matter. The Electrical Contractor shall also be responsible for damage which he causes to the work **of** other Trades, and he shall remedy such injury at his own expense.

E. Waste materials shall be removed promptly from the premises. All material and equipment stored on the premises shall be kept in a neat and orderly fashion. Material or equipment shall not be stored where exposed to the weather. The Electrical Contractor shall be responsible for the security, safekeeping and damages, including acts of vandalism, of all material and equipment stored at the job site.

F. The Electrical Contractor shall be responsible for unloading all electrical equipment and materials delivered to the site. This shall also include all large and heavy items or equipment which require hoisting.

G. It shall be the responsibility of the Electrical Contractor to coordinate the delivery of the electrical equipment to the project prior to the time installation of equipment will be required: but he shall also make sure such is not delivered too far in advance of such required installation, to assure that possible damage and deterioration of such equipment will not occur.

C. Receptacles, Straight-Blade, Special Features: Comply with the basic requirements specified above for straight-blade receptacles of the class and type indicted, and with the following additional requirements:

1. Ground-Fault Circuit Interrupter (GFCI) Receptacles: UL Standard 943, "Ground Fault Circuit Interrupters," feed-through type, with integral NEMA 5-20R duplex receptacle arranged to protect connected downstream receptacles on the same circuit. Design units for installation in a 2-3/4-inch (70-mm) deep outlet box without an adapter.

2. Tamper-proof Receptacles: All receptacles located within the patient care and waiting areas of the project shall be of the hospital grade tamper-proof type.

D. Switches: Heavy Duty, quiet type.

E. Wall Plates: Single and combination types that mate and match with corresponding wiring devices. Features include the following:

1. Color: Matches wiring device except as otherwise indicated.
2. Plate-Securing Screws: Metal with heads colored to match plate finish.
3. Material: Stainless steel.
4. Labeling: All devices shall be labeled in accordance with facility standards.

F. Manufacturers: Bryant, Hubbell, Leviton, Pass & Seymour.

2.13 LOW VOLTAGE CONDUIT SYSTEMS

A. The Electrical Contractor shall furnish and install empty raceway for low voltage systems. Empty conduit (3/4 inch) shall be installed from wall outlet to a point above an accessible ceiling. All empty raceways shall contain nylon pull line for installation of wiring by others. Failure to install nylon pull lines will subject the Electrical Contractor to pull in telephone and data lines.

B. Low voltage outlets shall be two-gang box with cover plate, unless otherwise required by owner furnished systems. Coordinate/confirm final box sizes required with owner prior to installation.

C. Coordinate with owner's Telecommunications Department for the disconnection and relocation of existing telephone/computer outlets if necessary.

D. The owner's Telecommunications Department shall furnish and install all cable, wire, and equipment for their systems (telephone/data, TV, nurse call, and security).

2.14 HANGERS AND SUPPORTS

A. Provide all required hangers, supports, sleeves, clamps, etc., as required and as indicated on the drawings.

B. All horizontal runs of conduits shall be properly grouped, aligned, using substantial hangers, straps, etc. Hangers and supports shall be installed at intervals not exceeding NEC recommendations.

2.05 GROUNDING

A. Provide grounding for all electrical equipment and devices, in accordance with the applicable requirements of the National Electrical Code as indicated on the drawings.

B. Bonding jumpers shall be installed at all locations required by NEC.

C. A green grounding conductor of proper size shall be installed and connected with the feeder circuit conductors, to wiring devices, circuits, panelboards, motor frames, lighting fuctures, etc. Connections to the equipment may be bolted or screwed using corrosion resisting bolts or screws.

D. Dry season resistance of the grounding system shall not exceed five (5) ohms. If such resistance cannot be obtained with the grounding system indicated on the drawings, the Electrical Contractor shall provide additional grounding as required and as directed by the Architect, to provide the five (5) ohms resistance value.

2.06 NAMEPLATES

A. Nameplates will be furnished and installed on service equipment, panelboards, junction boxes, cabinets, for special purpose switches, starters and other controls furnished under this contract to designate the equipment controlled and function.

B. Nameplates shall match existing. Where no existing style is present, nameplates will be laminated black bakelite with 1/4" high white recessed letters. Nameplates will be securely attached to the equipment with galvanized screws or rivets. Adhesives or cements will not be permitted.

C. Identify system junction boxes in conformance with Owner's standard markings or the following.

1. Panel and circuit numbers, voltage, and equipment served.

2.07 ENCLOSED DISCONNECT SWITCHES

A. Enclosed, Non-Fusible switch: NEMA KS1, Type GD. Provide NEMA Type 3R for outdoor applications.

B. Manufacturers: Cutler-Hammer, General Electric, Square D.

2.08 CIRCUIT BREAKERS

A. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads, and instantaneous magnetic trip element for short circuits.

B. Manufacturers: All breakers shall be compatible with and of the same manufacturer as the panel in which they are to be installed.

2.09 MANUAL ENCLOSED CONTROLLERS

G. Conductors #10 gauge and smaller will be solid. Conductors #8 gauge and larger will be stranded. Stranded conductors to have a total circular mil area within 1 percent of the total cross section called for.

H. Joints in solid wires to be mechanically strong by using 3M "Scotchloks" or equal.

I. Joints and connections in stranded wire to be made mechanically strong by using solderless lugs, T & B "Locktite," or equal.

J. Tag wires in junction boxes and pull boxes. Tags will be of the W.H. Brady type or equal with circuit and panel number stamped thereon.

K. Wire and cable will be as manufactured by General Electric Co., General Cable, Collyer Insulated Wire, Kerite, National, Okonite, Rome, or Simplex.

L. Any wiring run exposed in designated ceiling plenum areas will be rated for use in such an environment.

2.02 CONDUIT

A. Conduit for interior systems will be standard weight threaded steel or electric metallic tubing, hot galvanized or sheradized with an interior coating as manufactured by Triangle, Wheatland, Youngstown or equal. Electric metallic tubing may be used in masonry, second class construction and above hung ceilings, but not in concrete, below grade, or exposed on exterior of building.

1. Standard weight conduit fittings will be galvanized threaded and will be as manufactured by Appleton Electric Products.

2. Connectors and coupling for EMT 2" and smaller will be steel set-screw type, made of steel with case hardened steel locknuts (die cast locknuts will not be used).

3. Connectors and couplings for EMT 2-1/2" and larger will be steel set screw type, made of steel: connectors will have two set screws and couplings will have four set screws (one pair at each end).

B. No conduit will be used in any system smaller than 3/4 inch electric trade size and will have no more than four 90 degree bends in any one run, and where necessary pull boxes will be provided as directed, needed, or required by the NEC.

C. No wire will be pulled into any conduit until the conduit system is complete: in the case of concealed work, until all rough plastering or masonry has been completed.

D. The ends of conduits will be tightly plugged to exclude plaster, dust, and moisture while the building is in the process of construction.

E. Conduits and fittings on exposed work will be secured by metal clips, which will be held in place by wood screws and expansion sleeves. When running over concrete surfaces, the conduit will be run at right angles to and parallel with the surrounding walls and will conform to the forms of the ceilings. No diagonal runs will be allowed

(2) Remove free liquids or oil from all involved surfaces and penetration components.

(3) Install the specified damming materials to accommodate and insure the proper thickness/fire rating requirements and provide containment during foaming.

(4) Foam mixing and dispensing of equipment and materials shall be in strict accordance with manufacturers' instructions.

4. The materials installation procedures, clean-up, and safety precautions and requirements shall be in accordance with manufacturers published information relative to "Safe Handling Procedures," use of safety shoes, goggles, etc.

1.19 MISCELLANEOUS IRON AND STEEL

A. Except where indicated for the General Contractor to provide supports, Electrical Trade shall provide steel supports and hangers as shown on the drawings or required to support all equipment or materials provided under their Contract.

1.20 CONNECTIONS TO ARCHITECTURAL, HVAC, PLUMBING, AND OWNER FURNISHED EQUIPMENT

A. Electrical Contractor shall provide all conduit connections to equipment provided under other Sections of the specifications as shown on the drawings and herein specified, including final connections to equipment to result in a complete, fully operational system.

1.21 RECORD DRAWINGS

A. Electrical Contractor shall maintain at the site a set of his current drawings on which he shall accurately show the installation of all work provided under his Contract indicating hereon any variation from the Contract Drawings, in accordance with the General Conditions. Changes, whether resulting from formal change orders or other instructions issued by the Architect, shall be recorded. Include changes in sizes, location, and dimensions of conduit, raceways, equipment, etc.

B. At the completion of the job, these prints shall be submitted to the General Contractor and then to the Architect for final review and comments. The prints will be returned with appropriate comments and recommendations. These corrected prints, together with corrected prints indicating all the revisions, additions, and deletions of work, shall form the basis for preparing a set of Record Drawings.

C. The Contractor shall transfer all work to his mylar set and shall add the date of printing and the legend "Record Drawing Set" and submit a set of reproducible drawings through the General Contractor to the Architect for his review. The Architect shall comment on the set of reproducibles and shall return it to the Contractor to make final modifications to the drawings. After all corrections are made, Electrical Contractor shall add the date of printing and the legend "Record Drawing Set" on the mylar set.

anchors as shown on the drawings or as required and as furnished by the Contractor installing the various equipment.

D. Where conduits pass through masonry or concrete walls, foundations, or floors, the Electrical Contractor shall set sleeves necessary for passage of the conduits. Sleeves shall be of sufficient size to provide air space around the conduit passing through. Electrical Contractor shall be responsible for the location of sleeves provided under his Contract.

E. Sleeves and inserts shall not be used in any portions of the building where their use would impair strength or construction features of the building. Elimination of sleeves must be approved by the Architect.

F. Pipe sleeves shall be Schedule 40 galvanized steel and shall be set as follows:

1. Set sleeves 1 inch above finish floor and flush on each side of walls, except sleeves through floor occurring in walls and partitions shall terminate flush with finish floor.

2. Sleeves shall be at least 2 inches larger in diameter than the pipe passing through it.

G. Conduits passing through fire partitions shall be provided with 10 gauge steel pipe sleeves.

1.12 USE OF PREMISES

A. The Electrical Contractor shall confine all apparatus, storage of materials, and construction to the limits indicated on the drawings and directed by the Architect, and he shall not encumber the premises with his materials. The Electrical Contractor will be held responsible for repairs, patching, and cleaning arising from any unauthorized use of premises.

B. Notwithstanding any approvals or instructions which must be obtained by Electrical Contractor from the Architect in connection with use of the premises, the responsibility for safe working conditions at the site shall remain the Contractor's responsibility, and the Architect or Owner shall not have any responsibility or liability in connection therewith.

1.13 PROTECTION

A. Materials, conduit, lighting fuctures, etc., shall be properly protected, and all conduit openings shall be temporarily closed so as to prevent obstruction and damage. Post notice prohibiting the use of all systems provided under the Electrical Contract, prior to completion of work and acceptance of all systems by Owner except otherwise instructed by Architect. Take precautions to protect all materials furnished from damage and theft.

B. Electrical Contractor shall furnish, place, and maintain proper safety guards for the prevention of accidents that might be caused by the workmanship, materials, equipment, or electrical systems provided under this Contract.

quality and workmanship. Contractor will cooperate with the Architect so that no error or discrepancy in the Contract Documents will cause defective materials to be used or poor workmanship to be **performed.**

1.07 PRODUCT HANDLING

A. Protection: Use means necessary to protect materials of this Section before, during, and after installation and to protect installed work and materials for other trades.

B. Replacements: In case of damage, immediately make repairs and replacements necessary to the approval of the Architect at no change in Contract Sum.

1.08 WARRANTY

A. Upon completion of the Work and as a condition of its acceptance, deliver to the Architect two copies of a written Warranty agreeing to replace work of this Section which fails due to defective materials or workmanship within one year after Date of Substantial Completion as that date is determined in accordance with the General Conditions.

1.09 PHASING, DEMOLITION, AND MAINTAINING EXISTING SERVICES

A. During the execution of the work, required relocation of existing equipment and systems in the existing areas where new work and connections are scheduled to be made will be performed by the various Trades as indicated on the Drawings, as required by job conditions, and as determined by the Contractor, in close cooperation with the Architect and the Owner's representative to facilitate the installation of the new systems and completion of this Contract. The Owner may require the continuous operation of existing systems while demolition, relocation work, or new tie-ins are being performed. Outages required for construction purposes will be scheduled for the shortest practical periods of time in coordination with the Owner's representative for specific, mutually agreeable periods of time, after each of which the interruption will cease and service will be restored. This procedure will be repeated to suit the Owner's working schedule as many times as required until all work is completed.

B. Prior to any deactivation and relocation, tie-in, or demolition work, consult the Drawings and have a conference with the Architect and the Owner's representative in the field to inspect each **of** the items to be deactivated, removed, or relocated. Care will be taken to protect equipment designated to be relocated and reused. Give notice to all parties of a minimum of five working days in advance.

C. Refer to Section 02070 Selective Demolition. Electrical equipment, including fuctures, receptacles, conduit, wiring and all other such items required to be removed to complete the work will be disconnected, capped and lowered to the floor under the work of Division **16.** After such items have been lowered to the floor, removal from the site will be included under the work of Section 02070.

D. The phasing of the work will be performed in strict accordance with the Contractor's construction schedule. The new systems will be installed and completely commissioned prior to occupancy. Coordinate requirements for temporary

4. Section 09900 - Painting: Except as specified herein.

5. Section 07270 - Firestops and Smoke Seals.

1.03 APPLICABLE CODES AND STANDARDS

A. Electrical work **will** comply with the following codes and standards.

1. NFPA 70 - National Electrical Code

2. NFPA 72 - National Fire Alarm Code

3. NFPA 101 - Life Safety Code

4. Americans with Disabilities Act (ADA).

5. Institute of Electrical and Electronics Engineers (IEEE).

B. In addition to complying with the specified requirements, comply with pertinent regulations of governmental agencies and authorities having jurisdiction including local and state building, plumbing, mechanical, electrical, fire, and health department codes and standards.

1. Occupational Safety and Health Act **(OSHA).**

2. Factory Mutual Association (FM).

3. Underwriters' Laboratories (UL).

4. American National Standards Institute **(ANSI).**

5. National Electric Manufacturers Association (NEMA).

6. American Society for Testing and Materials (ASTM).

7. IES - Illuminating Engineering Society.

8. EIA/TIA - Electronic Industries Association/Telecommunications Industry Association.

a. EIA/TIA-568 Commercial Building Wiring Standard.
b. EIA/TIA-569 Commercial Building Standard for Telecommunication Pathways and Spaces.

1.04 **QUALITY** ASSURANCE

A. Use adequate numbers of skilled, licensed workers who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods for proper performance of the work of this Section.

11. Spiral Seam Round or Flat Oval Ductwork Semco, United McGill.
12. Strainers: Spirax Sarco, Mueller, Armstrong.
13. Thermometers: Trerice, Taylor, U.S. Gauge.

2.02 PIPING

A. Hot and Variable Water piping: Two inches and smaller copper type L with soldered joints, two and a half inches and larger welded or mechanical couplings with grooved pipe.

2.03 VALVES

A. Gate valves: Two inches and under shall be bronze body, solid wedge, rising stem, union bonnet Class 150. Two and a half inches and larger shall be IBBM, solid wedge, OS & Y, rising stem flanged end. Class 125.

B. Ball valves: Bronze body, bronze stem, and chrome ball, Teflon seats and seals, conventional port, extended lever.

C. Butterfly valves: Cast iron body, full-lug type, aluminum bronze disc, lever lock handle.

2.04 VALVE TAGS AND CHARTS

A. Upon completion of work, provide engraved laminated plastic tags on all valves. Tags shall have white characters on green face, consecutively numbered and prefixed to identify system.

B. Prepare valve tag charts with valve tag number, location of valve and fixtures or rooms controlled. Submit framed charts behind glass and include duplicates in the operation and maintenance manuals.

2.05 ELECTRIC COMPONENTS

A. Provide all electrical components including, but not limited to motors, starters, contractors, and controllers as required for all equipment included under this Section. Controllers shall be wired to require a single power supply provided under Section 16000 - Electrical.

PART THREE - EXECUTION

3.01 EXAMINATION

A. Inspect site conditions before starting preparatory work and verify that actual conditions are known and acceptable before starting work.

B. Inspect areas where piping and equipment will be installed and verify adequate space is available for access, service and removal of equipment. Coordinate with the Work of other Sections.

B. Acceptable manufacturers and substitutions: The manufacturers specified first in this Section are used for the design and to establish the standard of quality upon which the Contract is based.

1. Acceptable manufacturers' names are listed to provide competitive bids with the specified or scheduled manufacturer. The inclusion of a manufacturer's name within the list of acceptable manufacturers does not necessarily mean that the manufacturer's standard product is equal to the specified product without some required modification. The submitted product shall be equal in all respects to the specified product. Submit list of proposed substitutes for review and approval in compliance with Article 3 of the Instructions to Bidders, AIA Document A701.

2. Substitutions include manufacturers not listed as acceptable within the specifications or products, systems, and methods which differ from the name specified first.

1.07 REFERENCES

A. Codes and Regulations:

1. In addition to complying with the specified requirements, comply with pertinent regulations of governmental agencies and authorities having jurisdiction.

2. Local and state building, plumbing, mechanical, electrical, fire, and health department codes and standards.

3. Occupational Safety and Health Act (OSHA).

4. Factory Mutual Association (FM).

5. Underwriters' Laboratories (UL).

1.08 SUBMITTALS

A. SHEET METAL FABRICATION DRAWINGS: Sheet Metal fabrication drawings are the installation shop drawings normally prepared by the installing sheet metal sub-contractor.

B. Coordination Drawings: Prepare sheet metal fabrication drawings in accordance with the requirements for coordination drawings as specified in Section 01150 - Special Provisions.

C. Submit sheet metal fabrication drawings for review and approval after all coordination with specialty trades is completed. Drawings shall show the following:

1. Ductwork including sizes and elevation.
2. Duct fittings, transitions and takeoffs.
3. Equipment including terminal boxes, coils, diffusers, grilles, fans, and sound attenuators.
4. Volume, fire, and control dampers.

10. American Society of Heating, Refrigerating and Air-conditioning Engineers (ASHRAE).

11. NFPA 54, 1996 Edition.

12. ADA Accessibility Guidelines(1991).

13. Elevator code ANSI/ASME A17.1-1996.

14. City of Portland Code **of** Ordinances, section 14-1, land use, chapter 14, rev 2-21-01.

15. Maine Plumbing Code.

16. National Electric code 1999 Edition.

17. Sheet Metal and Air Conditioning Contractor's National Association (SMACNA).

18. Occupational Safety and Health Act (OSHA).

19. Factory Mutual Association (FM).

20. Underwriters' Laboratories (UL).

1.04 DESIGN PARAMETERS

A. Outdoor Design Conditions

Winter design dry bulb	**-3**" F
Summer design dry bulb	**83"** F
Coincident wet bulb.	74" F

B. Indoor Design Conditions

Room	Temperature	Humidity
Examination Rooms	75°F	30% - 50% RH
Waiting	70" F to 75" F	30% - 50% RH
Triage	70" F to 75" F	30% - 50% RH
Administrative Rooms	70" F to 75" F	30% - 50% RH

C. Ventilation

Ventilation standards shall be based on ASHRAE Standard 62-1989 "Ventilation for Acceptable Indoor Air Quality Including Requirements for Outside Air" and "Guidelines for Construction and Equipment of Hospitals and Medical Facilities - 1996-97 Edition". The more stringent for each space will be used.

D. Filtration

Filtration shall be as follows:

	Filter No. 1	Filter No. 2

A. Refer to Division 15 Section "Basic Mechanical Materials and Methods" for piping joining materials, joint construction, and basic installation requirements.

B. Install cleanouts in aboveground piping and building drain piping according to the following, unless otherwise indicated:

1. Size same as drainage piping up to NPS 4 (DN 100). Use NPS 4 (DN 100) for larger drainage piping unless larger cleanout is indicated.
2. Locate at each change in direction of piping greater than 45 degrees.
3. Locate at minimum intervals of 50 feet (15 m) for piping NPS 4 (DN 100) and smaller and 100 feet (30 m) for larger piping.
4. Locate at base of each vertical soil and waste stack.

C. Install cleanout deck plates with top flush with finished floor, for floor cleanouts for piping below floors.

D. Install cleanout wall access covers, of types indicated, with frame and cover flush with finished wall, for cleanouts located in concealed piping.

E. Install wood-blocking reinforcement for wall-mounting and recessed-type plumbing specialties.

F. Install individual shutoff valve in each water supply to plumbing specialties. Use ball, gate, or globe valve if specific valve is not indicated. Install shutoff valves in accessible locations. Refer to Division 15 Section "Valves" for general-duty ball, butterfly, check, gate, and globe valves.

G. Install air vents at piping high points. Include ball, gate, or globe valve in inlet [and drain piping from outlet to floor drain].

H. Install traps on plumbing specialty drain outlets. Omit traps on indirect wastes unless trap is indicated.

I. Install escutcheons at wall, floor, and ceiling penetrations in exposed finished locations and within cabinets and millwork. Use deep-pattern escutcheons if required to conceal protruding pipe fittings.

3.2 CONNECTIONS

A. Piping installation requirements are specified in other Division 15 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install piping adjacent to equipment to allow service and maintenance.

C. Connect plumbing specialties to piping specified in other Division 15 Sections.

D. Ground equipment.

A. Product Data: Include rated capacities and shipping, installed, and operating weights. Indicate materials, finishes, dimensions, required clearances, and methods of assembly of components; and piping and wiring connections for the following:

1. Cleanouts.
2. Sleeve penetration systems.

B. Shop Drawings: Diagram power, signal, and control wiring.

C. Field test reports.

D. Acceptable Substitute Manufacturers: All bidders desiring to furnish equipment other than that specified must submit a complete verification specification for the substituted equipment along with literature, wiring diagrams, piping diagrams, and a list of similar sized installations where proposed equipment is installed. The complete submittal must be presented to the Architect at least (7) full working days prior to the bid opening for approval. Substitutions will not be permitted after the contract has been awarded. Refer to Specification Section 01300, SUBMITTALS AND SUBSTITUTIONS.

1.6 QUALITY ASSURANCE

A. Product Options: Drawings indicate size, profiles, and dimensional requirements of plumbing specialties and are based on the specific system indicated. Refer to Division 1 Section "Product Requirements."

B. Plumbing specialties shall bear label, stamp, or other markings of specified testing agency.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

D. ASME Compliance: Comply with ASME B31.9, "Building Services Piping," for piping materials and installation.

E. NSF Compliance:

1. Comply with NSF **14,** "Plastics Piping Components and Related Materials," for plastic domestic water piping components. Include marking "NSF-pw" on plastic potable-water piping and "NSF-dwv" on plastic drain, waste, and vent piping.
2. Comply with NSF **61,** "Drinking Water System Components--Health Effects, Sections 1 through 9," for potable domestic water plumbing specialties.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

D. Ground equipment.

1. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

3.5 FIELD QUALITY CONTROL

A. Water-Cooler Testing: After electrical circuitry has been energized, test for compliance with requirements. Test and adjust controls and safeties.

B. Repair or replace malfunctioning units. Retest as specified above after repairs or replacements are made.

C. Report test results in writing.

3.6 ADJUSTING

A. Adjust fixture flow regulators for proper flow and stream height.

B. Adjust water-cooler temperature settings.

3.7 CLEANING

A. After completing fixture installation, inspect unit. Remove paint splatters and other spots, dirt, and debris. Repair damaged finish to match original finish.

B. Clean fixtures, on completion of installation, according to manufacturer's written instructions.

END OF SECTION 15415

B. Regulatory Requirements: Comply with requirements in ICC A117.1, "Accessible and Usable Buildings and Facilities"[; Public Law 90-480, "Architectural Barriers Act"; and Public Law 101-336, "Americans with Disabilities Act";] about fixtures for people with disabilities.

C. Regulatory Requirements: Comply with requirements in the U.S. Architectural & Transportation Barriers Compliance Board's "Uniform Federal Accessibility Standards (UFAS), 1985-494-187" about fixtures for people with disabilities.

D. NSF Standard: Comply with NSF 61, "Drinking Water System Components--Health Effects," for fixture materials that will be in contact with potable water.

E. ARI Standard: Comply with ARI 1010, "Self-contained, Mechanically Refrigerated Drinking-Water Coolers," for water coolers and with ARI's "Directory of Certified Drinking Water Coolers" for type and style classifications.

1.6 COORDINATION

A. Coordinate roughing-in and final fixture locations, and verify that fixtures can be installed to comply with original design and referenced standards.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Existing to be relocated.

2.2 PRESSURE WATER COOLERS

A. Existing Water Coolers, EWC-1: Existing water cooler to be removed and reinstalled as shown on drawings

1. Supply: NPS **3/8** (DN 10) with ball valve.
2. Drain: Grid with NPS 1-1/4 (DN 32) minimum horizontal waste and trap complying with ASME A112.18.1M.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine roughing-in for water and waste piping systems to verify actual locations of piping connections before fixture installation. Verify that sizes and locations of piping and types of supports match those indicated.

A. Certify performance of plumbed emergency plumbing fixtures by independent testing agency acceptable to authorities having jurisdiction.

PART 3 - EXECUTION

3.1 EXAMINATION

A, Examine roughing-in for water piping systems to verify actual locations of piping connections before plumbed emergency plumbing fixture installation. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 EMERGENCY PLUMBING FIXTURE INSTALLATION

A. Assemble emergency plumbing fixture piping, fittings, control valves, and other components according to manufacturer's written instructions.

B. Install fixtures level and plumb.

C. Fasten fixtures to substrate.

D. Install shutoff valves in water-supply piping to fixtures. Use ball, gate, or globe valve if specific type valve is not indicated. Install valves chained or locked in open position if permitted. Install valves in locations where they can easily be reached for operation. Refer to Division 15 Section "Valves" for general-duty shutoff valves.

1. Exception: Omit shutoff valves on valved supplies to group of plumbing fixtures that includes emergency plumbing fixture.
2. Exception: Omit shutoff valves on supplies to emergency equipment if prohibited by authorities having jurisdiction.

E. Install shutoff valve and strainer in steam piping and shutoff valve in condensate return piping.

F. Install dielectric fitting in supply piping to fixture if piping and fixture connections are made of different metals. Refer to Division 15 Section "Basic Mechanical Materials and Methods" for dielectric fittings.

G. Install trap and waste to wall on drain outlet of fixture receptors that are indicated to be directly connected to drainage system.

H. Install indirect waste piping to wall on drain outlet of fixture receptors that are indicated to be indirectly connected to drainage system. Refer to Division 15 Section "Drainage and Vent Piping" for piping.

D. Field Test Reports: Indicate and interpret test results for compliance with performance requirements.

E. Maintenance Data: For emergency plumbing fixtures to include in maintenance manuals specified in Division **1.**

1.5 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article **100,** by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. ANSI Standard: Comply with ANSI **Z358.1,** "Emergency Eyewash and Shower Equipment."

C. Regulatory Requirements: Comply with requirements in ICC A1**17.1,** "Accessible and Usable Buildings and Facilities"; Public Law **90-480,** "Architectural Barriers Act"; and Public Law **101-336,** "Americans with Disabilities Act"; about plumbing fixtures for people with disabilities.

D. Regulatory Requirements: Comply with requirements in U.S. Architectural & Transportation Barriers Compliance Board's "Uniform Federal Accessibility Standards (UFAS), **1985-494-187**" about plumbing fixtures for people with disabilities.

E. Regulatory Requirements: Comply with requirements in Public Law **102-486,** "Energy Policy Act," about water flow and consumption rates for plumbing fixtures.

F. NSF Standard: Comply with NSF **61,** "Drinking Water System Components--Health Effects," for fixture materials that will be in contact with potable water.

G. Acceptable Substitute Manufacturers: All bidders desiring to furnish equipment other than that specified must submit a complete verification specification for the substituted equipment along with literature, wiring diagrams, piping diagrams, and a list of similar sized installations where proposed equipment is installed. The complete submittal must be presented to the Architect at least **(7)** full working days prior to the bid opening for approval. Substitutions will not be permitted after the contract has been awarded. Refer to Specification Section 01**300,** SUBMITTALS AND SUBSTITUTIONS.

1.6 COORDINATION

A. Coordinate roughing-in and final plumbing fixture locations, and verify that fixtures can be installed to comply with original design and referenced standards.

PART **2** - PRODUCTS

1. Remove faucet spouts and strainers, remove sediment and debris, and reinstall strainers and spouts.
2. Remove sediment and debris from drains.

3.7 PROTECTION

A. Provide protective covering for installed fixtures and fittings.

B. Do not allow use of fixtures for temporary facilities unless approved in writing by Owner.

END OF SECTION 15410

1. Exception: Use ball, gate, or globe valve if stops are not specified with fixture. Refer to Division 15 Section "Valves" for general-duty valves.

H. Install trap and tubular waste piping on drain outlet of each fixture to be directly connected to sanitary drainage system.

I. Install tubular waste piping on drain outlet of each fixture to be indirectly connected to drainage system.

J. Install flushometer valves for accessible water closets with handle mounted on wide side of compartment. Install other actuators in locations that are easy for people with disabilities to reach.

K. Install toilet seats on water closets.

L. Install faucet-spout fittings with specified flow rates and patterns in faucet spouts if faucets are not available with required rates and patterns. Include adapters if required.

M. Install water-supply, flow-control fittings with specified flow rates in fixture supplies at stop valves.

N. Install faucet, flow-control fittings with specified flow rates and patterns in faucet spouts if faucets are not available with required rates and patterns. Include adapters if required.

O. Install traps on fixture outlets.

1. Exception: Omit trap on fixtures with integral traps.
2. Exception: Omit trap on indirect wastes, unless otherwise indicated.

P. Install escutcheons at piping wall ceiling penetrations in exposed, finished locations and within cabinets and millwork. Use deep-pattern escutcheons if required to conceal protruding fittings. Refer to Division **15** Section "Basic Mechanical Materials and Methods" for escutcheons.

Q. Seal joints between fixtures and walls, floors, and counters using sanitary-type, one-part, mildew-resistant, silicone sealant. Match sealant color to fixture color. Refer to Division 7 Section "Joint Sealants" for sealant and installation requirements.

3.3 CONNECTIONS

A. Piping installation requirements are specified in other Division 15 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Connect water supplies from water distribution piping to fixtures.

C. Connect drain piping from fixtures to drainage piping.

1. Products:

   a. Kohler; K-2053 “Soho”

2. Type: Flat rim with ledge.
3. Rectangular Lavatory Size: 20 by 18 inches (508 by 457 mm).
4. Faucet Hole Punching: Three, 8-inch centerset.
5. Faucet Hole Location: Top.
6. Color: White.
7. Faucet: Lavatory L-1.
8. Supplies: NPS 3/8 (DN 10) chrome-plated copper with stops.
9. Drain: Grid w/offset.
10. Drain Piping: NPS 1-1/4 by NPS 2 chrome-plated cast-brass trap, and brass waste to wall with wall escutcheon.
11. Protective Shielding Guard[s]: L-1.

2.10 SINKS

A. Sink, SK-1: Accessible, vitreous-china fixture.

1. Products:

   a. Kohler; K-2007 “Kingston”

2. Type: Flat rim with backsplash.
3. Rectangular Lavatory Size: 20 by 18 inches (508 by 457 mm).
4. Faucet Hole Punching: Single centerset.
5. Faucet Hole Location: Top.
6. Color: White.
7. Faucet: SK-1.
8. Supplies: NPS 3/8 (DN 10) chrome-plated copper with stops.
9. Drain: Grid.
10. Drain Piping: NPS 1-1/4 by NPS 2 chrome-plated cast-brass trap, and brass waste to wall with wall escutcheon.
11. Protective Sink Shield: SK-1.

2.11 CLINICAL SINKS

A. Clinical Sinks, CSS-1: Wall-mounting, back-outlet, vitreous-china, flushing-rim service sink.

1. Products:

   a. Kohler; K-12867 “Camerton”.

2. Size: Approximately 25 by 20 inches (635 by 510 mm).

6. Consumption: 1.6 gal./flush (6.0 Uflush).
7. Tailpiece Size: NPS 1-1/2 (DN 40) and standard length to top of bowl.
8. Bedpan Washer: Not required.

B. Flushometer, CSS-1: Cast-brass body with corrosion-resistant internal components, non-hold-open feature, control stop with check valve, vacuum breaker, and copper or brass tubing, and polished chrome-plated finish on exposed parts.
1. Manufacturer:

a. Sloan Royal. BPW 9000-1.6 W/V-500-AA Extension.

2. Internal Design: Diaphragm operation.
3. Style: Exposed.
4. Inlet Size: NPS 1 (DN 25).
5. Trip Mechanism: Push-button with stainless-steel access plate actuator. Coordinate mounting height with Owner.
6. Consumption: 1.6 gal./flush (6.0 L/flush).
7. Tailpiece Size: NPS 1-1/2 (DN 40) with extension tail piece.
8. Bedpan Washer: Factory fabricated, attached to tailpiece, and with spray head

2.5 TOILET SEATS

A. Toilet Seat, : Solid plastic.

1. Manufacturers:
a. Centoco, Beneke, Church or Bemis.

2. Configuration: Open front without cover.
3. Size: Elongated.
4. Class: Heavy-duty commercial.
5. Hinge Type: SC, self-sustaining, check.
6. Color: White.

2.6 PROTECTIVE SHIELDING GUARDS

A. Protective Lavatory/Sink Shield, L-1 & SK-1: Manufactured, molded ridged vinyl covering for hot and cold-water supplies, trap, drain piping, electric faucet connections, mixing valves and complying with ADA requirements.

1. Manufacturers:

a. Truebro, Inc.

2.7 FIXTURE SUPPORTS

A. Lavatory Faucet, L-1: Include hot- and cold-water indicators; coordinate faucet inlets with supplies and fixture holes and outlet with spout and fixture receptor.

1. Manufacturers:

   a. Chicago Faucet. 652-FC-CP with GN2AH8.

2. Maximum Flow Rate: 2.5 gpm (9.5 L/min.), unless otherwise indicated.
3. Body Material: Cast brass.
4. Finish: Polished chrome plate.
5. Type: Faucet with three-hole fixture.
6. Mixing Valve: Thermostatic mixing valve 119-NF.
7. Backflow Protection Device for Hose Outlet: Not required.
8. Centers: 8 inches (203mm)] Single hole.
9. Mounting: Deck.
10. Handle[s]: Infra-red sensor.
11. Inlet[s [NPS 3/8 (DN 10)tubing with NPS 1/2 (DN 15) male adapter
12. Spout: GN2AH8 Rigid gooseneck.
13. Spout Outlet: Plain end FC retrofit kit Part. No. 50-042 for laminar flow control.
14. Vacuum Breaker: Not required.
15. Operation: Electronic w/infrared sensor and hardwire transformer.
16. Hard-Wire Transformer: Mount transformer under sink within protective lavatory shield.
17. Drain: Grid.
18. Tempering Device: Deck mount.
19. Electrical: 120VAC, 15 AMP GFI circuit. Coordinate w/Div. 16.

2.3 SINK FAUCETS

A. Sink Faucet, SK-1: Include hot- and cold-water indicators; coordinate faucet inlets with supplies and fixture holes and outlet with spout and fixture receptor.

1. Manufacturers:

   a. Chicago Faucet. 652-FC-CP with GN2AH8.

2. Maximum Flow Rate: 2.5 gpm (9.5 L/min.), unless otherwise indicated.
3. Body Material: Cast brass.
4. Finish: Polished chrome plate.
5. Type: Faucet with three-hole fixture.
6. Mixing Valve: Thermostatic mixing valve 119-NF.
7. Backflow Protection Device for Hose Outlet: Not required.
8. Centers: 8 inches (203mm)] Single hole.
9. Mounting: Deck.
10. Handle[s]: Infra-red sensor.
11. Inlet[s [NPS 3/8 (DN 10)tubing with NPS 1/2 (DN 15)male adapter
12. Spout: GN2AH8 Rigid gooseneck.

approval. Substitutions will not be permitted after the contract has been awarded. Refer to Specification Section 01300, SUBMITTALS AND SUBSTITUTIONS.

1.5 QUALITY ASSURANCE

A. Source Limitations: Obtain plumbing fixtures, faucets, and other components of each category through one source from a single manufacturer.

1. Exception: If fixtures, faucets, or other components are not available from a single manufacturer, obtain similar products from other manufacturers specified for that category.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Regulatory Requirements: Comply with requirements in ICC A117.1, "Accessible and Usable Buildings and Facilities" Public Law 90-480, "Architectural Barriers Act"; and Public Law 101-336, "Americans with Disabilities Act" about plumbing fixtures for people with disabilities.

D. Regulatory Requirements: Comply with requirements in U.S. Architectural & Transportation Barriers Compliance Board's "Uniform Federal Accessibility Standards (UFAS), 1985-494-187" about plumbing fixtures for people with disabilities.

E. Regulatory Requirements: Comply with requirements in Public Law 102-486, "Energy Policy Act," about water flow and consumption rates for plumbing fixtures.

F. NSF Standard: Comply with NSF **61,** "Drinking Water System Components--Health Effects," for fixture materials that will be in contact with potable water.

G. Select combinations of fixtures and trim, faucets, fittings, and other components that are compatible.

H. Comply with the following applicable standards and other requirements specified for plumbing fixtures:

1. Hand Sinks: NSF 2 construction.
2. Vitreous-China Fixtures: ASME A112.19.2M.
3. Water-Closet, Flushometer Tank Trim: ASSE 1037.

I. Comply with the following applicable standards and other requirements specified for lavatory faucets:

1. Backflow Protection Devices for Faucets with Hose-Thread Outlet: ASME A112.18.3M.
2. Faucets: ASME A112.18.1M.

A. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction.

1. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in.
2. Final Inspection: Arrange for final inspection by authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.

B. Reinspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for reinspection.

C. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.

D. Test storm drainage piping according to procedures of authorities having jurisdiction or, in absence of published procedures, as follows:

1. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.
2. Leave uncovered and unconcealed new, altered, extended, or replaced storm drainage piping until it has been tested and approved. Expose work that was covered or concealed before it was tested.
3. Test Procedure: Test storm drainage piping on completion of roughing-in. Close openings in piping system and fill with water to point of overflow, but not less than 10-foot head of water (30 kPa). From 15 minutes before inspection starts to completion of inspection, water level must not drop. Inspect joints for leaks.
4. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.
5. Prepare reports for tests and required corrective action.

3.8 CLEANING

A. Clean interior of piping. Remove dirt and debris as work progresses.

B. Protect drains during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.

C. Place plugs in ends of uncompleted piping at end of day and when work stops.

END OF SECTION 15160

G. Install cast-iron soil piping according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings."

H. Make changes in direction for storm piping using appropriate branches, bends, and long-sweep bends. Do not change direction of flow more than 90 degrees. Use proper size of standard increasers and reducers if pipes of different sizes are connected. Reducing size of drainage piping in direction of flow is prohibited.

I. Lay buried building drain piping beginning at low point of each system. Install true to grades and alignment indicated, with unbroken continuity of invert. Place hub ends of piping upstream. Install required gaskets according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. Maintain swab in piping and pull past each joint as completed.

J. Install storm drainage piping at the following minimum slopes, unless otherwise indicated:

1. Building Storm Drain: 1 percent downward in direction of flow for piping NPS 3 (DN 80) and smaller; 1 percent downward in direction of flow for piping NPS 4 (DN 100) and larger.
2. Horizontal Storm-Drainage Piping: 2 percent downward in direction of flow.

K. Install force mains at elevations indicated.

L. Install engineered controlled-flow storm drainage piping in locations indicated.

M. Sleeves are not required for cast-iron soil piping passing through concrete slabs-on-grade if slab is without membrane waterproofing.

N. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.

3.4 JOINT CONSTRUCTION

A. Refer to Division 15 Section "Basic Mechanical Materials and Methods" for basic piping joint construction.

B. Cast-Iron, Soil-Piping Joints: Make joints according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings."

1. Gasketed Joints: Make with rubber gasket matching class of pipe and fittings.
2. Hubless Joints: Make with rubber gasket and sleeve or clamp.

3.5 HANGER AND SUPPORT INSTALLATION

A. Refer to Division 15 Section "Mechanical Vibration Controls and Seismic Restraints" for seismic-restraint devices.

1.5 QUALITY ASSURANCE

A. Piping materials shall bear label, stamp, or other markings of specified testing agency.

PART 2 - PRODUCTS

PIPING MATERIALS

Refer to Part 3 "Piping Applications" Article for applications of pipe, tube, fitting, and joining materials.

CAST-IRON SOIL PIPING

Hub-and-Spigot Pipe and Fittings: ASTM A 74, Extra-Heavy class[es].

1. Gaskets: ASTM C 564, rubber.

Hubless Pipe and Fittings: ASTM A 888 or CISPI 301.

1. Couplings: ASTM C 1277 assembly of metal housing, corrosion-resistant fasteners, and ASTM C **564** rubber sleeve with integral center pipe stop.

    a. Heavy-Duty, Type 304, Stainless-Steel Couplings: ASTM A 666, Type 304, stainless-steel shield; stainless-steel bands; and sleeve.

        1) NPS 1-1/2 to NPS 4 (DN 40 to DN 100): 3-inch- (76-mm-) wide shield with **4** bands.
        2) NPS **5** to NPS 10 (DN 125 to DN 250): 4-inch- (102-mm-) wide shield with 6 bands.

PART 3 - EXECUTION

3.1 EXCAVATION

A. Refer to Division 2 Section "Earthwork" for excavating, trenching, and backfilling.

3.2 PIPING APPLICATIONS

A. Transition and special fittings with pressure ratings at least equal to piping pressure ratings may be used in applications below, unless otherwise indicated.

B. Flanges may be used on aboveground pressure piping, unless otherwise indicated.

1. NPS 1-1/2 and NPS 2 (DN 40 and DN 50): 60 inches (1500 mm) with 3/8-inch (10-mm) rod.
2. NPS 3 (DN 80): 60 inches (1500 mm) with 1/2-inch (13-mm) rod.
3. NPS 4 and NPS 5 (DN 100 and DN 125): 60 inches (1500 mm) with 5/8-inch (16-mm) rod.
4. NPS 6 (DN 150): 60 inches (1500 mm) with 3/4-inch (19-mm) rod.

G. Install supports for vertical cast-iron soil piping every 15 feet (4.5 m).

3.6 CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Connect soil and waste piping to exterior sanitary sewerage piping. Use transition fitting to join dissimilar piping materials.

C. Connect drainage and vent piping to the following:

1. Plumbing Fixtures: Connect drainage piping in sizes indicated, but not smaller than required by plumbing code. Refer to Division 15 Section "Plumbing Fixtures."
2. Plumbing Fixtures and Equipment: Connect atmospheric vent piping in sizes indicated, but not smaller than required by authorities having jurisdiction.
3. Plumbing Specialties: Connect drainage and vent piping in sizes indicated, but not smaller than required by plumbing code. Refer to Division 15 Section "Plumbing Specialties."

3.7 FIELD QUALITY CONTROL

A. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction.

1. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.
2. Final Inspection: Arrange for final inspection by authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.

B. Reinspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for reinspection.

C. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.

D. Test sanitary drainage and vent piping according to procedures of authorities having jurisdiction or, in absence of published procedures, as follows:

3.3 PIPING INSTALLATION

A. Refer to Division 2 Section "Sanitary Sewerage" for Project-site sanitary sewer piping.

B. Refer to Division 15 Section "Basic Mechanical Materials and Methods" for basic piping installation.

C. Install cleanouts at grade and extend to where building sanitary drains connect to building sanitary sewers.

D. Install cleanout fitting with closure plug inside the building in sanitary force-main piping.

E. Install cast-iron sleeve with water stop and mechanical sleeve seal at each service pipe penetration through foundation wall. Select number of interlocking rubber links required to make installation watertight. Refer to Division 15 Section "Basic Mechanical Materials and Methods" for sleeves and mechanical sleeve seals.

F. Install wall penetration system at each service pipe penetration through foundation wall. Make installation watertight. Refer to Division 15 Section "Basic Mechanical Materials and Methods" for wall penetration systems.

G. Install cast-iron soil piping according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings."

1. Encase underground piping with PE film according to ASTM A 674 or AWWA C105.

H. Lay buried building drainage piping beginning at low point of each system. Install true to grades and alignment indicated, with unbroken continuity of invert. Place hub ends of piping upstream. Install required gaskets according to manufacturer's written instructions for use of lubricants, cements, and other ,installation requirements. Maintain swab in piping and pull past each joint as completed.

I. Install soil and waste drainage and vent piping at the following minimum slopes, unless otherwise indicated:

1. Building Sanitary Drain: 2 percent downward in direction of flow for piping NPS 3 (DN 80) and smaller; 1 percent downward in direction of flow for piping NPS 4 (DN 100) and larger.
2. Horizontal Sanitary Drainage Piping: 2 percent downward in direction of flow.
3. Vent Piping: 1 percent down toward vertical fixture vent or toward vent stack.

J. Sleeves are not required for cast-iron soil piping passing through concrete slabs-on-grade if slab is without membrane waterproofing.

K. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.

L. Install sanitary drainage systems with the following requirements:

approval. Substitutions will not be permitted after the contract has been awarded. Refer to Specification Section 01300, SUBMITTALS AND SUBSTITUTIONS.

1.5 QUALITY ASSURANCE

A. Piping materials shall bear label, stamp, or other markings of specified testing agency.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

A. Refer to Part 3 "Piping Applications" Article for applications of pipe, tube, fitting, and joining materials.

B. Sanitary and vent lines installed below floors, above ceilings, and inside walls shall be minimum of 2-inch ID, no-hub.

2.2 CAST-IRON SOIL PIPING

A. Hub-and-Spigot Pipe and Fittings: ASTM A 74, Extra-Heavy class[es]. (Underground)

1. Gaskets: ASTM C 564, rubber.

B. Hubless Pipe and Fittings: ASTM A 888 or CISPI 301. (Minimum 2-inch)

1. Couplings: ASTM C 1277 assembly of metal housing, corrosion-resistant fasteners, and ASTM C 564 rubber sleeve with integral, center pipe stop.

2. No-hub fittings: Fittings shall have a pipe stop on the interior of the fitting as well as a stainless steel shield that surrounds the coupling material. Dual pipe clamps shall be installed around the shield.

a. Heavy-Duty, Type 304, Stainless-Steel Couplings: ASTM A 666, Type 304, stainless-steel shield; stainless-steel bands; and sleeve.

1) NPS 1-1/2 to NPS 4 (DN 40 to DN 100): 3-inch- (76-mm-) wide shield with 4 bands.
2) NPS 5 to NPS 10 (DN 125 to DN 250): 4-inch- (102-mm-) wide shield with **6** bands.

2.3 COPPER TUBING

A. Copper DWV Tube: ASTM B 306, drainage tube, drawn temper. (Minimum 2-inch)

1. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.
2. Leave uncovered and unconcealed new, altered, extended, or replaced domestic water piping until it has been tested and approved. Expose work that was covered or concealed before it was tested.
3. Cap and subject piping to static water pressure of *50* psig **(345**kPa) above operating pressure, without exceeding pressure rating of piping system materials. Isolate test source and allow to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.
4. Repair leaks and defects with new materials and retest piping or portion thereof until satisfactory results are obtained.
5. Prepare reports for tests and required corrective action.

3.11 CLEANING

A. Clean and disinfect potable and non-potable domestic water piping as follows:

1. Purge new piping and parts of existing domestic water piping that have been altered, extended, or repaired before using.
2. Use purging and disinfecting procedures prescribed by authorities having jurisdiction or, if methods are not prescribed, procedures described in either AWWA C651 or AWWA C652 or as described below:

    a. Flush piping system with clean, potable water until dirty water does not appear at outlets.
    b. Fill and isolate system according to either of the following:

        1) Fill system or part thereof with water/chlorine solution with at least *50* ppm (50mg/L) of chlorine. Isolate with valves and allow to stand for 24 hours.
        2) Fill system or part thereof with water/chlorine solution with at least 200 ppm (200mg/L) of chlorine. Isolate and allow to stand for three hours.

    c. Flush system with clean, potable water until no chlorine is in water coming from system after the standing time.
    d. Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedures if biological examination shows contamination.

B. Prepare and submit reports of purging and disinfecting activities.

C. Clean interior of domestic water piping system. Remove dirt and debris as work progresses.

END OF SECTION 15140

A. Install sectional valve close to water main on each branch and riser serving plumbing fixtures or equipment. Use ball valves for piping NPS 3 and smaller. Use butterfly or gate valves for piping NPS 3-1/2 and larger.

B. Install shutoff valve on each water supply to equipment and on each water supply to plumbing fixtures without supply stops. Use ball valves for piping NPS 3 and smaller. Use butterfly or gate valves for piping NPS 3-1/2 (DN 65) and larger.

C. Install drain valves for equipment, at base of each water riser, at low points in horizontal piping, and where required to drain water piping.

1. Install hose-end drain valves at low points in water mains, risers, and branches.
2. Install stop-and-waste drain valves where indicated.

3.8 HANGER AND SUPPORT INSTALLATION

A. Refer to Division 15 Section "Mechanical Vibration Controls and Seismic Restraints" for seismic-restraint devices.

B. Refer to Division 15 Section "Hangers and Supports" for pipe hanger and support devices. Install the following:

1. Vertical Piping: MSS Type 8 or Type 42, clamps.
2. Individual, Straight, Horizontal Piping Runs: According to the following:

    a. 100 Feet (30 m) and Less: MSS Type 1, adjustable, steel clevis hangers.
    b. Longer Than 100 Feet (30 m): MSS Type 43, adjustable roller hangers.
    c. Longer Than 100 Feet (30 m), if Indicated: MSS Type 49, spring cushion rolls.

3. Multiple, Straight, Horizontal Piping Runs 100 Feet (30 m) or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
4. Base of Vertical Piping: MSS Type 52, spring hangers.

C. Install supports according to Division 15 Section "Hangers and Supports."

D. Support vertical piping and tubing at base and at each floor.

E. Rod diameter may be reduced 1 size for double-rod hangers, to a minimum of 3/8 inch (10 mm).

F. Install hangers for copper tubing with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 3/4 (DN 20) and Smaller: 60 inches (1500 mm) with 3/8-inch (10-mm) rod.
2. NPS 1 and NPS 1-1/4 (DN 25 and DN 32): 72 inches (1800 mm) with 3/8-inch (10-mm) rod.

A. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:

1. Shutoff Duty: Use bronze ball valves for piping NPS 3 and smaller. Use gate valves with flanged ends for piping NPS 3-1/2 and larger.
2. Drain Duty: Hose-end drain valves.

B. Cast-iron, grooved-end valves may be used with grooved-end piping.

C. Domestic Water Systems (Cold, Hot, and Hot Water Recirculation): Use valve types according to the following schedule:

DOMESTIC WATER SERVICE
Maximum Temperature - **250°F**
Maximum Pressure **(1/2"-12") – 175** psig
Maximum Pressure **(14"-24")– 125** psig

Type **of** Valve	Size	Specification Valve Type	Application **Notes**
Gate Valve	3½"-6"	GV	Throttling and Isolation
Ball Valve	½"-3"	BV	Throttling and Isolation
Butterfly Valve	3½"-6"	BF	Throttling and Isolation
Butterfly Valve	8"-12"	--	Not Used

3.4 PIPING INSTALLATION

A. Refer to Division 2 Section "Water Distribution" for site water distribution and service piping.

B. Refer to Division 15 Section "Basic Mechanical Materials and Methods" for basic piping installation.

C. Extend domestic water service piping to exterior water distribution piping in sizes and locations indicated.

D. Install cast-iron sleeve with water stop and mechanical sleeve seal at each service pipe penetration through foundation wall. Select number of interlocking rubber links required to make installation watertight. Refer to Division 15 Section "Basic Mechanical Materials and Methods" for sleeves and mechanical sleeve seals.

E. Install wall penetration system at each service pipe penetration through foundation wall. Make installation watertight. Refer to Division 15 Section "Basic Mechanical Materials and Methods" for wall penetration systems.

F. Install shutoff valve, hose-end drain valve, strainer, pressure gage, and test tee with valve, inside building at each domestic water service. Refer to Division 15 Section "Meters and

approval. Substitutions will not be permitted after the contract has been awarded. Refer to Specification Section 01300, SUBMITTALS AND SUBSTITUTIONS.

1.5 QUALITY ASSURANCE

A. Piping materials shall bear label, stamp, or other markings of specified testing agency.

B. Comply with NSF **61,** "Drinking Water System Components-Health Effects; Sections 1 through **9,**" for potable domestic water piping and components.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

A. Refer to Part **3** "Piping Applications" Article for applications of pipe, tube, fitting, and joining materials.

B. Dielectric Nipples: Victaulic clear-flow waterway. No substitutions.

2.2 COPPER TUBING

A. Hard Copper Tube: ASTM B 88, Types L (ASTM B 88M, Types B), water tube, drawn temper.

1. Copper Pressure Fittings: ASME B16.22, wrought- copper, solder-joint fittings. Furnish wrought-copper fittings if indicated.
2. Bronze Flanges: ASME B16.24, Class 150, with solder-joint end. Furnish Class 300 flanges if required to match piping.
3. Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body, with ball-and-socket, metal-to-metal seating surfaces and solder-joint or threaded ends.
4. Copper, Grooved-End Fittings: ASTM **B** 75 (ASTM B 75M) copper tube or ASTM B 584 bronze castings.

a. Copper-Tubing, Keyed Couplings: Copper-tube dimensions and design similar to AWWA C606. Include ferrous housing sections, gasket suitable for hot water, and bolts and nuts.

2.3 COPPER-ALLOY BALL VALVES

A. Manufacturers: Subject to compliance with requirements, provide copper-alloy ball valves by one of the following:

1. Ball Valves Type (BLV-A):

G. Install sprinkler zone control valves, test assemblies, and drain risers adjacent to standpipes when sprinkler piping is connected to standpipes.

H. Hangers and Supports: Comply with NFPA 13 for hanger materials.

1. Install sprinkler system piping according to NFPA 13.

I. Earthquake Protection: Install piping according to NFPA 13 to protect from earthquake damage.

J. Fill wet-pipe sprinkler system piping with water.

3.7 SPRINKLER APPLICATIONS

A. Drawings indicate sprinkler types to be used. Where specific types are not indicated, use the following sprinkler types:

1. Rooms without Ceilings: Upright sprinklers.
2. Rooms with Suspended Ceilings: Concealed sprinklers.
3. Wall Mounting: Sidewall sprinklers.
4. Spaces Subject to Freezing: Dry sprinklers or sidewall, dry sprinklers as indicated.
5. Sprinkler Finishes:

a. Upright, Pendent, and Sidewall Sprinklers: Chrome plated in finished spaces exposed *to* view; rough bronze in unfinished spaces not exposed to view.
b. Concealed Sprinklers: Rough brass, with factory-painted white cover plate.

3.8 SPRINKLER INSTALLATION

A. Install sprinklers in suspended ceilings in center of acoustical ceiling panels and tiles.

B. Do not install pendent or sidewall, wet-type sprinklers in areas subject to freezing. Use dry-type sprinklers with water supply from heated space.

3.9 CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install piping adjacent to equipment to allow service and maintenance.

3.10 LABELING AND IDENTIFICATION

A. Install labeling and pipe markers on equipment and piping according to requirements in NFPA 13 and in Division 15 Section "Mechanical Identification."

1. Concealed ceiling sprinklers, including cover plate (Office, Patient, Corridor & Staff areas) #G4QR or equal.
2. Sidewall sprinklers (Lobby).#F1FR/CCP or equal.

F. Sprinkler Finishes: Chrome plated, bronze, and painted white.

G. Sprinkler Escutcheons: Materials, types, and finishes for the following sprinkler mounting applications. Escutcheons for concealed, flush, and recessed-type sprinklers are specified with sprinklers.

1. Ceiling Mounting: Plastic, white finish, one piece, flat.

PART 3 - EXECUTION

3.1 PREPARATION

A. Perform fire-hydrant flow test according to NFPA 13, and NFPA 291. Use results for system design calculations required in Part 1 "Quality Assurance" Article.

B. Report test results promptly and in writing.

3.2 EXAMINATION

A. Examine roughing-in for hose connections and stations to verify actual locations of piping connections before installation.

B. Examine walls and partitions for suitable thicknesses, fire- and smoke-rated construction, framing for hose-station cabinets, and other conditions where hose connections and stations are to be installed.

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

3.3 PIPING APPLICATIONS, GENERAL

A. Shop weld pipe joints where welded piping is indicated.

B. Do not use welded joints for galvanized-steel pipe.

C. Flanges, flanged fittings, unions, nipples, and transition and special fittings with finish and pressure ratings same as or higher than system's pressure rating may be used in aboveground applications, unless otherwise indicated.

3.4 SPRINKLER SYSTEM PIPING APPLICATIONS

1. Sprinkler Cabinets: Finished, wall-mounting, steel cabinet with hinged cover, with space for minimum of six spare sprinklers plus sprinkler wrench. Include number of sprinklers required by NFPA 13 and sprinkler wrench. Include separate cabinet with sprinklers and wrench for each type of sprinkler on Project.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

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

2.2 STEEL PIPE AND FITTINGS (Schedule 40)

A. Threaded-End, Standard-Weight Schedule 40 Steel Pipe: ASTM A 53/A 53M, ASTM A 135, or ASTM A 795, hot-dip galvanized where indicated and with factory- or field-formed threaded ends.

1. Cast-Iron Threaded Flanges: ASME B16.1.
2. Malleable-Iron Threaded Fittings: ASME B16.3.
3. Gray-Iron Threaded Fittings: ASME B16.4.
4. Steel Threaded Pipe Nipples: ASTM A 733, made of ASTM A 53/A 53M or ASTM A 106, Schedule 40, seamless steel pipe hot-dip galvanized where indicated. Include ends matching joining method.
5. Steel Threaded Couplings: ASTM A 865 hot-dip galvanized-steel pipe where indicated.

B. Plain-End, Standard-Weight Schedule 40 Steel Pipe: ASTM A 53/A 53M, ASTM A 135, or ASTM A **795** hot-dip galvanized-steel pipe where indicated.

1. Locking-Lug Fittings: UL 213, ductile-iron body with retainer lugs that require one-quarter turn to secure pipe in fitting.

a. Available Manufacturers:

1) Anvil International, Inc.
2) Victaulic Co. of America.
3) Ward Manufacturing.

C. Plain-End, Standard-Weight Schedule 40 Steel Pipe: ASTM A 53/A 53M, ASTM A 135, or ASTM A 795 hot-dip galvanized-steel pipe where indicated.

2. Sprinkler Occupancy Hazard Classifications:

   a. Building Service Areas: Ordinary Hazard, Group 1.
   b. Electrical Equipment Rooms: Ordinary Hazard, Group 1.
   c. General Storage Areas: Ordinary Hazard, Group 1.
   d. Mechanical Equipment Rooms: Ordinary Hazard, Group 1.
   e. Office and Public Areas: Light Hazard.
   f. Patient areas: Light Hazard.

3. Minimum Density for Automatic-Sprinkler Piping Design:

   a. Light-Hazard Occupancy: 0.10 gpm over 1500-sq. ft. area.
   b. Ordinary-Hazard, Group 1 Occupancy: 0.15 gpm over 1500-sq. ft. area.
   c. Ordinary-Hazard, Group 2 Occupancy: 0.20 gpm over 1500-sq. ft. area.

4. Maximum Protection Area per Sprinkler:

   a. Patient/Staff Areas: 225 sq. ft.
   b. Storage Areas: 130 sq. ft.
   c. Mechanical Equipment Rooms: 130 sq. ft.
   d. Electrical Equipment Rooms: 130 sq. ft.
   e. Other Areas: According to NFPA 13 recommendations, unless otherwise indicated.

5. Total Combined Hose-Stream Demand Requirement: According to NFPA 13, unless otherwise indicated:

   a. Light-Hazard Occupancies: 100 gpm for 30 minutes.
   b. Ordinary-Hazard Occupancies: 250 gpm for 60 to 90 minutes.

C. Seismic Performance: Fire-suppression piping shall be capable of withstanding the effects of earthquake motions determined according to NFPA 13 and ASCE 7, "Minimum Design Loads for Buildings and Other Structures": Section 9, "Earthquake Loads."

1.6 SUBMITTALS

A. Product Data: For the following:

   1. Piping materials.
   2. Pipe hangers and supports, including seismic restraints.
   3. Sprinklers, escutcheons, and guards. Include sprinkler flow characteristics, mounting, finish, and other pertinent data.

B. Shop Drawings: Diagram power, signal, and control wiring.

C. Fire pump flow test report.

2.4 FINISHES

A. Aluminum Components: For metal components exposed to view, apply manufacturer's standard baked finish complying with manufacturer's written instructions for surface preparation including pretreatment, application, baking, and minimum dry film thickness

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, operational clearances, and other conditions affecting performance.

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

3.2 INSTALLATION

A. Install roller shades in windows level, plumb, square and true in accordance with manufacturer's product data and approved shop drawings.

B. Install units with the following tolerances:

1. Maximum variation of gap at window opening perimeter: 1/4-inch per 8 feet (± 1/8) of shade light.
2. Minimum clearance to interior face of glass not closer than 2-inches. Allow clearances for window operation hardware.

3.3 ADJUSTING

A. Adjust and balance roller shade drive/brake mechanisms to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.

B. Adjust shade and shadecloth to hang flat without buckling or distortion.

C. Replace any units or components which do not hang properly or operate smoothly.

3.4 CLEANING AND PROTECTION

A. Clean finished installation of all spots, smears, stains, etc., according to manufacturer's written instructions.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver shades to project site in manufacturer's original factory packages, marked with manufacturer and product name, and location of installation using same room designations indicated on Drawings and in a window treatment schedule.

1.5 PROJECT CONDITIONS

A. Field Measurements: Where roller shades are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Allow clearances for operable glazed units' operation hardware throughout the entire operating range. Notify Architect of discrepancies.

1.6 WARRANTY

A. Provide manufacturer standard five year written warranty against defects in manual shade materials and workmanship beginning at date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Manufacturer: Design is based on products by MechoShade Systems, Inc., Long Island, NY 11101, (718) 729-2020; and trade names of that manufacturer are used herein.

2.2 ROLLER SHADES

A. Shadecloth Material: "ThermoVeil - 1000 Series" shadecloth material consisting of non-raveling vinyl fabric.

1. Color, Pattern and Openness Factor: Dense vertical weave, 2-3% openess, in color(s) to be selected by the Architect.
2. Width: 96-inches.
3. Fire Retardance: Provide shade material tested in accordance with NFPA 701 - Vertical Bum Test and rated "PASS".
4. Anti-Microbial: Provide shade material indicating "No Growth" when tested in accordance with ASTM G21-and ASTM 85G22-80.

B. Shade - Roller Components:

1. General: All hardware shall be available with regular drive and offset drive and be reversible for left or right hand operation.
2. Shade Roller: Extruded aluminum tube 6063-T5 alloy, of diameter and wall thickness required to support shade fabric without deflection. The tube shall be extruded with 2

2.2 FLOOR MAT

A. Polypropylene Modular Matting Tiles: 100 percent heavy denier, solution dyed, needle punched polypropylene with bitumen backing as follows:

1. Product: Supreme Nop Tile.
2. Tile Size: 19-11/16 by 19-11/16 by 7/16 inch thick.
3. Total Weight: 142 oz/sq. yd.
4. Properties:

   a. Pill Test (ASTM D2829): Pass.
   b. Radiant Panel Test (ASTM E648): Passes Federal Flammability Standard.
   c. Coefficient of Friction (ASTM C1028): .60 wet / .61 dry.
5. Color: As indicated on the Materials and Finishes Index Sheet.

B. Accessories:

1. Adhesive: Mats, Inc. "Release-Bond Adhesive" or approved equal acceptable to floor mat manufacturer.
2. Vinyl Reducer: PVC reducer transition strip as recommended by manufacturer. Color as selected by Architect.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions where floor mats will be installed. Do not proceed with installation until unsatisfactory conditions are corrected. Subfloor shall be clean and dry, and within acceptable tolerances.

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

B. Verify that alkalinity and moisture content of concrete slabs, building air temperature, and relative humidity are within the limits recommended by the manufacturers of the materials being used.

1. Obtain copy of and review test results of alkalinity, adhesion and moisture testing of floors specified in Section 01456 - Testing Laboratory Services.
2. Proceed with installation only after substrates are acceptable to the adhesive and flooring product manufacturers.

3.2 INSTALLATION

A. General: Strictly comply with manufacturer's installation instructions and recommendations.

2.2 TOILET TISSUE HOLDER

A. Recessed toilet tissue holders: Double roll, stainless steel with open one piece shell and flange, satin finish.

1. A.S.I. No. 74022
2. Bobrick No. B-697
3. Gamco No. 212-Dbl

B. Provide theft resistant spindles at all toilet tissue holders.

2.3 PAPER TOWEL DISPENSERS

A. Surface Mounted Paper Towel Dispenser: Stainless steel with hinged dispenser door. satin finish, equipped with tumbler lock. Towel dispenser shall dispense 400 C-fold towels.

1. A.S.I. 0210
2. Bobrick B-262
3. Gamco No. TD-2.

2.4 MIRROR

A. Mirror with 3/4-inch by 3/4-inch stainless steel angle frame, vertical grain satin finish.

1. A.S.I. 0600
2. Bobrick B-290
3. Gamco No. A series

B. Size: 18-inch by 30-inch, unless otherwise indicated.

2.5 GRAB BARS

A. Grab bars:

1. Stainless steel tubing, 1-1/4" o.d., minimum 18 gauge, Type 304L.
2. Each flange shall be of sufficient strength and design to sustain a concentrated load of 250 pounds.
3. Standard wall clearance shall be 1-1/2", unless indicated otherwise.
4. Provide Snap Flange construction except where indicated otherwise. Heliarc weld mounting flanges to tubing to form single structural unit. Secure flanges to concealed mounting plate drilled and tapped to accommodate appropriate type stainless steel screws.
5. Provide snap-on cover unless other type mounting is indicated. Snap flange cover escutcheon shall be minimum 22 gage type 304 stainless steel.

2.2 MATERIALS

A. Extruded Rigid Plastic: ASTM D 1784, Class 1, textured, chemical- and stain-resistant, high-impact-resistant PVC or acrylic-modified vinyl plastic with integral color throughout; thickness as indicated.

1. Impact Resistance: Minimum 25.4 ft-lbf/in. of notch when tested according to ASTM D 256, Test Method A.
2. Chemical and Stain Resistance: Tested according to ASTM D 543.
3. Self-extinguishing when tested according to ASTM D 635.
4. Flame-Spread Index: 25 or less.
5. Smoke-Developed Index: 450 or less.

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

2.3 VINYL CORNER GUARDS

A. Acceptable Products: Design is based on use of standard products manufactured by Construction Specialties, Inc.. Provide specified product, or a comparable product by one of the listed manufacturers.

B. Non-Rated, Flush Mounted Comer Guards:

1. CG-1, Comer Guards (90 & 135 deg):
   a. C/S No.: SFS-20
2. CG-2, Partition End Guards:
   a. C/S No. FSC-25

C. Provide full height units, consisting of a snap-on vinyl cover installed over a continuous aluminum retainer. Install retainer from floor to 2-inches above finish ceiling except at soffit locations, terminate retainer at soffit. Provide structural aluminum support base installed at bottom of retainer for installation of coved base. Install vinyl cover from top of base to 2-inches above finish ceiling. In soffit locations, terminate at soffit and install end cap.

D. Colors: As indicated on the Materials and Finishes Index Sheet.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and wall areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.

meets the following criteria when tested under ASTM Designation E84-79a, "Standard Method of Test for Surface Burning Characteristics of Building Materials:"

1. 0-25 Class A

B. Special coating shall be a water base acrylic epoxy with a semigloss sheen, as may be provided by manufacturer and approved by the Architect, applied to the various building surfaces to a Dry Film Thickness, (D.F.T.) per coat, as indicated:

1. Gypsum Drywall Surfaces and Gypsum Plastered Surfaces
- **a.** First Coat - Primer: (D.F.T. 2.0 to 3.0)
  - 1) Duron - Acrylic Enamel Undercoater, 04-123
- b. Second Coat: (D.F.T. 4.0 to 6.0)
  - 1) Duron - Dura Clad Acrylic Semi-Gloss Epoxy White, 95-205
- c. Third Coat: (D.F.T. 4.0 to 6.0)
  - 1) Duron - Dura Clad Acrylic Semi-Gloss Epoxy White, 95-205

END OF SECTION 09900

1. Confine spray application to specified areas.
2. Wherever spray application is used, apply each coat to provide the equivalent hiding of brush-applied coats. Do not double back with spray equipment for the purpose of building up film thickness of two coats in one pass.

3.5 FINISHING FLUSH WOOD DOORS WITH MDO FACES

A. Preparation:

1. Surfaces shall be clean and dry.
2. Prior to finishing, lay doors horizontally and thoroughly block-sand or belt sand both faces with 120 to 180 grit sandpaper to remove all scuffs, scratches, burnishes, handling marks and effects of exposure to moisture.
3. Clean surface with tack rag or other suitable means.
4. Apply finish immediately after the doors have been properly prepared.

B. Finishing:

1. Clean all surfaces of dust and dirt.
2. Prior to applying finish, test surface for compatibility of field applied paint with factory applied primer.
3. Apply 2 coats of specified top coats. Allow to dry and sand between coats.
4. Apply finish to both faces, edges and glazing beads.
5. In the event field trimming of doors are required, apply primer and 2 top coats to trimmed surfaces.

3.6 INTERIOR PAINTING SCHEDULE

A. Interior Metal - Not Factory Primed
   1. First Coat - Primer:
      a. Duron - Dura - Clad Universal Acrylic Metal Primer, White 33-105
   2. Second Coat:
      a. Duron - Plastic Kote Interior Acrylic Latex Semi-Gloss Enamel, series 22
   3. Third Coat:
      a. Duron - Plastic Kote Interior Acrylic Latex Semi-Gloss Enamel, series 22

B. Interior Metal - Factory Primed (including interior galvanized metal doors and frames)
   1. First Coat:
      a. Duron - Plastic Kote Interior Acrylic Latex Semi-Gloss Enamel, series 22
   2. Second Coat:
      a. Duron - Plastic Kote Interior Acrylic Latex Semi-Gloss Enamel, series 22

C. Interior Aluminum Indicated to be Painted
   1. First Coat - Primer:
      a. Duron - Dura Clad Universal Acrylic Metal Primer, White 33-105

4. Stir all materials before application to produce a mixture of uniform density, and as required during the application of materials. Do not stir into the material any film and, if necessary, strain the material before using.

3.3 APPLICATION, GENERAL

A. Apply all products by means as specified herein and in strict accordance with the manufacturer's written instructions. Apply paints and varnishes to a Dry Film Thickness for each coat as indicated in the manufacturer's written instructions.

B. Apply painter's finish to surfaces as indicated in the Room Finish Schedule and the Contract Drawings.

C. In existing rooms and areas where alterations occur, all surfaces which have an existing painter's finish, and all acoustical ceilings, shall be washed and given 2 coats of a painter's finish.

1. Surfaces to receive painter's finish include, but are not limited to walls, ceilings, metal frames, all wood surfaces, metal and wood doors, and all items included in the Paint Schedule.
2. The finish to be applied shall be as indicated in the Painting Schedules for the type of surface to be finished. In the event a material is not listed, apply a new finish to match the existing finish.
3. When painting existing disturbed surfaces, paint the entire surface, terminating as follows:
   a. Walls: at the nearest intersection by a wall not in the same plane.
   b. Gypsum or Plaster Ceilings: entire ceiling within a space or room; in corridors or passages, to the nearest wall intersection.

D. Surfaces to receive painter's finish:

1. Except for surfaces which are excluded from receiving a painter's finish, it is the intent that all surfaces, existing and new, in rooms and spaces indicated in the Room Finish Schedule, shall receive painter's finish as specified herein.
2. Apply painter's finish to disturbed surfaces as specified above.

E. The following items shall be field painted

1. HVAC. items:
   a. All HVAC wall registers and grilles except those with a clear anodized aluminum finish. Registers which are to be painted shall receive two sprayed coats of paint.
   b. HVAC through wall incremental units.
   c. Fin tube radiation covers
2. All electrical panels located in walls which are scheduled or indicated to be painted, epoxy coating or receive wall covering.
3. Access panels.
4. Electrical Outlet Strips.
5. Plug molds

2.3 OTHER MATERIALS

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

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of work.

B. Carefully inspect the installed work of all other trades and verify that all such work is complete to the point where coating application may properly commence. Verify that painting may be completed in strict accordance with the original design and with the manufacturers' recommendations as approved by the Architect.

C. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.

1. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.

3.2 PREPARATION

A. General:

1. Spaces shall be clean, free from dust and rubbish, and well lighted before applying any paint. No Painter's finish shall be applied in any place not closed in, protected from draft and dust, or not well lighted.
2. Perform all preparation and cleaning procedures in strict accordance with the paint manufacturer's recommendations as approved by the Architect.
3. Remove all removable items which are in place and are not scheduled to receive paint finish, or provide surface-applied protection prior to surface preparation and painting operations.
4. Following completion of painting in each space or area, reinstall the removed items by using workmen skilled in the necessary trades.
5. Clean each surface to be painted prior to applying paint or surface treatment.
6. Remove oil and grease with clean cloths and cleaning solvents of low toxicity and a flash point in excess of 100 degrees **F,** prior to start of mechanical cleaning.
7. Schedule the cleaning and painting so that dust and other contaminants from the cleaning process will not fall onto wet newly painted surfaces.

1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.

C. Samples for Verification: For each type of paint system and in each color and gloss of topcoat indicated.

1. Make samples 8 x 10 inches in size and upon materials corresponding with those to be finished in the building. Step coats on Samples to show each coat required for system. Label each Sample for location and application area.
2. Approved samples shall constitute standards for color and finish for acceptance or rejection of completed work. After approval, two (2) record samples of each kind and color, properly identified with formula, manufacturer's name, brand and address shall be furnished to the Architect.

1.4 QUALITY ASSURANCE

A. VOC Compliance

1. In the event a specified product is not in compliance with the VOC. requirements of the regulatory agency having jurisdiction, provide, at no additional cost to the Owner, an equal product, as approved by the Architect, and meeting all such requirements.

B. Products: Only those products specified herein shall be used in the work of this section.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver all materials to the job site in original, new, and unopened containers bearing the manufacturer's name and label showing at least the name of the material, manufacturer's stock number, and contents by volume for major constituents.

B. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Duron Paint and Wallcovering, Beltsville, MD 20705; (800) 723-8766.
2. ICI Delux Paint, Cleveland, OH 44115; (800) 984-5444.

3.3 INSTALLATION

A. General: Comply with CRI 104, and with carpet manufacturer's written installation instructions for the following as applicable.

1. Carpet with Preapplied Adhesive Installation: Comply with CRI 104, Section 11.4, "Pre-Applied Adhesive Systems (Peel and Stick)."

B. Installation, Self-Adhering Carpet: Apply primer uniformly to substrate in accordance with manufacturer's instructions. Remove protective liner from back of carpet, pick up and feed carpet onto the floor, allowing 2-inch overlap along entire length. Roll carpet areas with a 100-lb carpet roller to insure uniform bond to substrate and eliminate air pockets. Cut through both breadths of carpet using dual blade seam trimmer and remove bottom carpet strip. Apply a bead of carpet seam sealer *to* backing only on one side.

C. Maintain dye lot integrity. Do not mix dye lots in same area. Check matching of carpet before cutting and ensure there is no visible variation between dye lots.

D. Cut and fit carpet to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Seal cut edges as recommended by carpet manufacturer.

E. Extend carpet into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.

F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on finish flooring as marked on subfloor. Use nonpermanent, nonstaining marking device.

G. Install pattern parallel to walls and borders. Lay carpet on floors with the run of the pile in same direction of anticipated traffic. Seams at doorways must be parallel *to* door and drop directly under door. Perpendicular seams at doorways will not be permitted.

H. Install edging strips where carpet terminates at other floor coverings. Use full length pieces only. Butt tight to vertical surfaces.

3.4 CLEANING AND PROTECTION

A. Immediately after installing carpet, remove excess adhesive, seam sealer, and other surface blemishes using cleaner recommended by carpet manufacturer. Remove all loose threads that protrude from carpet surface and vacuum carpet using commercial machine with face-beater element.

B. Protect installed carpet to comply with CRI 104, Section 16, "Protection of Indoor Installations."

END OF SECTION 09680

1.4 PROJECT CONDITIONS

A. Do not commence with carpet installation until painting and finishing work is complete and ceilings and overhead work, tested, approved and completed.

B. Do not install carpet over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by carpet manufacturer.

C. Maintain fresh air ventilation during installation using exhaust fans, and by operating the ventilation system at full capacity. Exhaust air to the outside and avoid re-circulation. After installation, maintain fresh air ventilation for 48-72 hours at normal room temperatures.

PART 2 - PRODUCTS

2.1 CARPET

A. Manufacturers: Subject to compliance with requirements, provide products as specified herein, from one of the following manufacturers:

1. Collins & Aikman Floor Covering, Dalton, GA (800) 248-2878.

B. Carpet (CPT):

1. Acceptable Products:
   a. "Gridworks" as manufactured by Collins & Aikman.
2. Construction: Patterned loop with 100% solution dyed, 6,6 nylon fiber (Dupont Anton Lumena), with anti-microbial protection, soil and stain repellent protection, and thermoplastic vinyl backing system.
3. Pile Height: 0.187-inch.
4. Size: 6-ft roll goods.
5. Pattern and Color: **As** indicated on the Materials and Finishes.
   a. Check matching of carpet before installation and ensure there is no visible variation between dye lots.

2.2 INSTALLATION MATERIALS

A. Edge Strips: Johnsonite, Flooring Products Division, Johnson Rubber Company, (800) 637-4995

1. Profile: As selected by Architect.
2. Color: Shall be selected by Architect.

3.3 TILE INSTALLATION

A. General:

1. Install materials only after finishing operations, including painting, have been completed and after permanent heating system is operating.

2. Maintain reference markers, holes, and openings that are in place or plainly marked for future cutting by repeating on the finish surface as marked in the subfloor. Use chalk or other non-permanent marking device.

3. Installation shall mean acceptance of the subfloor by the installer, as ready to receive the flooring materials.

B. Place units with adhesive cement in strict accordance with the manufacturer's recommendations as approved by the Architect. Butt joints tightly to vertical surfaces, nosings, edgings, and thresholds. Scribe as necessary around obstructions and to produce neat joints. Place tiles tightly laid, even, and in straight parallel lines. Extend units into toe spaces, door reveals, and in closets and similar spaces.

C. Lay units from center marks established with principal walls, discounting minor offsets, so that units at opposite edges of the room are of equal width. Adjust as necessary to avoid use of cut widths less than 3" wide at room perimeters. Lay units square to axes of the room or space.

D. Match units for color and pattern by using materials from cartons in the same sequence as manufactured and packaged.

E. Lay in square field pattern with striation of tile running in the same direction.

F. Install reducer strips wherever new resilient flooring terminates at dissimilar abutting material, and elsewhere as required to terminate resilient tile flooring on even plane.

G. Finished floors and bases shall be smooth and free from buckles, cracks, break waves and projecting edges, and shall be neatly fitted at seams at all pipes and other projections.

H. Spread adhesives evenly in strict accordance with manufacturer's directions. Closely butt all joints so that they are straight and inconspicuous.

3.4 BASE INSTALLATION

A. Install base in longest possible lengths where shown in Finish Schedules. Field form external comers in accordance with manufacturer's specifications, with joints occurring a minimum of 2 ft. from the corner in each direction.

B. Install top set and straight rubber base wherever indicated in the Room Finish Schedule and on the drawings.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Provide colors and patterns selected by the Architect from standard patterns of the approved manufacturer and scheduled on the Room Finish Schedule and Materials Distribution Sheet.

2.2 RESILIENT MATERIALS

A. Vinyl Composition Tile (VCT):

1. Manufacturer: Armstrong World Industries, Lancaster, PA, (800) 448-1405.
2. Product: "Excelon Imperial Texture".
   a. Pattern and Color: As indicated on the Materials and Finishes Index Sheet.
3. Description: Vinyl composition tile complying with ASTM F 1066, Composition 1 (nonasbestos formulated), Class 2 – through pattern; 12 in. by 12 in. by 1/8 in. thick
4. Fire Test Data:
   a. ASTM E 648, Critical Radiant Flux - 0.45 watts/cm2 or more - Class 1.
   b. ASTM E 662, Smoke - 450 or less.
5. Static Load Limit:
   a. ASTM F 970, 75 psi.

B. Rubber Base (RUB)

1. Acceptable Manufacturer: Johnsonite, Flooring Products Division, Johnson Rubber Company, (800) *637-4995*
2. Base: Shall be Johnsonite Rubber Wall Base, 4" high unless otherwise indicated, top set type, coved, ribbed back, 1/8" thick, rounded top. Provide straight base similar to above in carpeted areas. Rubber base shall be furnished in continuous lengths, approximately 100'long.
3. Colors: As indicated on the Materials and Finishes Index Sheet.

C. Resilient Reducer Strips: Johnsonite, Flooring Products Division, Johnson Rubber Company.

1. Resilient to carpet: CTA-XX-H.
2. Colors: Shall be as selected by Architect.

2.3 OTHER MATERIALS

A. Adhesive:

1. For TILE FLR-**1**: Armstrong "S-515".
2. For resilient base: Armstrong *"S-725".*

B. Trowelable underlayment for leveling and patching of VCT: Armstrong S-180 or Masco Latex Cement manufactured by Silpro Masonry Systems, Inc.

3.2 INSTALLATION, GENERAL

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

B. Install the grid system in the pattern shown on the reflected ceiling plans. Avoid using less-than-half-width panels at borders.

C. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels. Provide saw-cut miters at inside and outside corners. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.

D. Install suspension system runners so they are square and securely interlocked with one another. Make all grid level within tolerance of 1 in 1,000 and straight within a tolerance of 1 in 1,000.

E. Frame exposed grid openings for lay in type lighting fixtures. Support fixtures on main tees and provide additional support at each comer of fixture. Wherever recessed lights do not fit within the modular grid system, adjust grid layout to accept fixture installation, securing adjusted tee with concealed fasteners.

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

G. Where reveal edged acoustical panels occur and full panels cannot be installed, cut panels and rout edges which are exposed to view to match factory edge. Paint all cut edges which are exposed to view. Paint color shall match panels.

3.3 REMOVAL AND REINSTALLATION OF EXISTING ACOUSTICAL CEILINGS

A. Where required by the work of new construction, remove existing acoustical ceilings, including suspension system, as required for the completion **of** the work.

B. Remove only that portion of the acoustical materials and suspension system as is necessary for the required work. Coordinate with all trades to determine the extent of the area to be removed. Store materials in a neat manner and protect from damage.

C. After all associated trade work has been completed, reinstall the existing ceiling materials.

PART 2 - PRODUCTS

2.1 ACOUSTICAL MATERIALS

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

1. Armstrong World Industries, Inc., Lancaster, PA 17604; (800) 448-1405.
2. United States Gypsum (USG) Corp., Chicago, IL 60606; (800) 874-4968

B. Acoustical ceiling materials shall be non-combustible; shall conform to requirements of Federal Specification SS-S-118a, Type III, Class 25; and shall bear Underwriters Laboratories Label.

C. Basis-of-Design: The design for each acoustical panel is based on the product specified. Subject to compliance with requirements, provide either the named product or a comparable product by one of the other manufacturers specified.

Type	Product Description	Size	Grid	Color
Type-1	Armstrong Ultima, Beveled Tegular Edge: No. 1911	24" x 24" x 3/4"	15/16	White

D. Provide acoustical panels with face and back surfaces coated with antimicrobial treatment consisting of manufacturer's standard formulation with fungicide added to inhibit growth of mold and mildew and showing no mold or mildew growth when tested according to ASTM D 3273

E. Size, pattern, texture and color of acoustical panels for supplementing existing materials shall match that of panels in existing building.

2.2 SUSPENSION SYSTEM

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

1. Armstrong World Industries, Lancaster, PA 17604; (800) 448-1405.
2. Chicago Metallic Corp., Chicago, IL 60638 (800)323-7164.
3. Donn, a division of USG, Chicago, IL 60606 (800) 874-4968.

B. The acoustical grid system shall conform to requirements of the Intermediate Duty (12# minimum) structural classification ASTM C-635, applicable seismic codes and shall be as hereinafter specified.

C. Suspension Grid Requirements: Wide faced, double thickness web, bulb section design.

C. Prohibit foot and wheel traffic from newly tiled floors for at least three days, preferably seven days after grouting is completed. Place large flat boards in walkways and wheelways for seven days where use of newly tiled floors with cement grout is unavoidable.

D. Before final inspection, remove protective coverings and rinse neutral cleaner from tile surfaces.

END OF SECTION 09310

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.

1. Verify that substrates for setting tile are **firm;** dry; clean; free of oil, waxy films, and curing compounds; and within flatness tolerances required by referenced ANSI A108 Series of tile installation standards for installations indicated.

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

3.2 PREPARATION

A. Provide concrete substrates for tile floors that comply with flatness tolerances specified in referenced ANSI A108 Series of tile installation standards.

1. Fill cracks, holes, and depressions with trowelable leveling and patching compound according to tile-setting material manufacturer's written instructions. Use product specifically recommended by tile-setting material manufacturer.
2. Remove protrusions, bumps, and ridges by sanding or grinding.

3.3 INSTALLATION

A. TCA Installation Guidelines: TCA's "Handbook for Ceramic Tile Installation." Comply with TCA installation methods indicated in ceramic tile installation schedules.

B. Use all products in strict accordance with recommendations and directions of manufacturer. Supply first-class workmanship in all tile work.

C. Proportion all mixes in accordance with referenced ANSI Standard Specifications -unless otherwise indicated by product manufacturer, in which case use most stringent requirements.

D. Jointing Pattern: Lay tile in grid pattern, unless otherwise indicated. Align joints when adjoining tiles on floor, base, walls, and trim are same size. Lay out tile work and center tile fields in both directions in each space or on each wall area. Adjust to minimize tile cutting. Provide uniform joint widths, unless otherwise indicated.

1. Determine locations of all movement joints before starting tile work.
2. Locate tile cuts in both walls and floors so as to be least conspicuous.
3. Lay out tile wainscots to next full tile beyond dimension shown on drawings.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirement in ANSI A137.1 for labeling sealed tile packages.

PART 2 - PRODUCTS

2.1 CERAMIC TILE

A. General: Provide ceramic tile, quarry tile and accessories complying with Tile Council of America Specification 137.1, in colors and patterns selected by the Architect from the specified manufacturers.

B. Floor Tile (CT): Unglazed, vitreous impervious porcelain tile with non-directional, multi-colored pattern.

1. Acceptable Manufacturer: "Unglazed Ceramic Mosaic" as manufactured by American Olean, Dallas, TX 75217; (214) 398-1411.
2. Size: 2-inch by 2-inch (nominal) x 1/4 inch thick.
3. Finish: Slip-resistant.

C. Floor Tile (PORC-T): Unglazed, fully vitrified porcelain tile

1. Manufacturer: Ceramiche Keope as distributed by Shep Brown Associates, Woburn, MA 01801; (781) 935-8080.
2. Product: "Pietre di Keope".
3. Sizes: 12-inch by 12-inch by 3/8-inch (nominal)
4. Surface Finish: Unpolished, split stone texture.

D. Wall Tile (CT): Glazed, vitreous impervious porcelain tile with through color.

1. Acceptable Manufacturer: "SatinGlo" as manufactured by American Olean, Dallas, TX 75217; (214) 398-1411.
2. Size: 2-inch by 2-inch (nominal) x 1/4 inch thick.
3. Finish: Glazed, matte finish.

E. Trim:

1. Base shall be 5" high consisting of (1) coved trim piece and (2) 2" x 2" pieces, except where base occurs without ceramic tile walls, top of base shall be coved and sealed with sealant.

2. Accent trim shall be l-inch by 6-inch high gloss "Sizzlestrips" as manufactured by American Olean.

3. Trim shall include bull nosed internal and external comers and exposed edges.

3.7 INSTALLATION OF FLUSH MOUNTED METAL **CORNER** GUARDS

A. Install aluminum retainer in accordance with comer guard manufacturer's written instructions.

3.8 FINISHING GYPSUM BOARD

A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Apply joint tape over gypsum board joints, except those with trim having flanges not intended for tape. Promptly remove residual joint compound from adjacent surfaces.

1. Gypsum Board Finish: Level **4.**

3.9 PATCHING EXISTING GYPSUM WALLBOARD

A. Patch existing gypsum wallboard surfaces disturbed by new construction.

B. **All** patching material shall match existing surfaces to be patched.

C. Install metal framing necessary for the support of new wallboard.

D. Finish new wallboard as herein before specified. Finish shall match surrounding surfaces for texture.

END OF SECTION 09260

C. Apply gypsum board panels first to the ceiling and then to the walls.

D. At internal and external corners, conceal the cut edges of the boards by the overlapping covered edges of the abutting boards.

E. Stagger the boards so that corners of any four boards will not meet at a common point except in vertical corners.

F. Install acoustical sealant at perimeter of all partitions in which wallboard panels are installed full height, at all cutouts such as, but not limited to, receptacles, duct and pipe openings, and wherever acoustical sealant is indicated on the drawings in conjunction with gypsum wallboard construction.

G. Install compressible insulation filler where stud partitions abut window mullions.

H. Fully grout metal door frames located in metal stud partitions. Mix grout to a thick, workable mix and completely fill heads and jambs. Rake out joints along back bend of door frame to depth of back edge of anchors. Width of raked joint shall be of sufficient size so that gypsum panels can be installed behind back bend of frame. Provide a fully grouted frame on site, which shall act as a prototype for the installation of all frames for the project. Such a prototype shall be approved by the Architect prior to the installation of any door frames in metal stud partitions.

3.3 INSTALLATION ON CEILINGS

A. Install gypsum board panels with ends and edges at framing members. Use panels of maximum practical length installed either perpendicular or parallel to framing members *to* minimize end joints, unless otherwise indicated. Avoid abutting end joints in the central area of the ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.

B. Extend ceiling board to comers and make firm contact with the wall angle, channel or top plate. Fit ends and edges closely, but not forced together. Cut ends, edges, scribe or make cutouts within the field of panels in a workmanlike manner. Cut gypsum board to size using a knife and straight edge.

C. Attach gypsum panels to framing members with specified screws spaced 8-inches on center at periphery of gypsum panels and located 3/8-inch in from panel edges and spaced 12-inches on center in the field. Drive fasteners in field of panels first working toward ends and edges. Hold panels in firm contact with framing while driving fasteners. Drive fastener heads slightly below surface of gypsum panels in a uniform dimple without breaking face paper.

D. Install trim at all internal and external angles formed by the intersection of panel surfaces or other dissimilar materials. Apply corner bead to all vertical or horizontal external comer, and install control joints at locations indicated in accordance with manufacturer's directions.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: All materials for the various systems specified shall be manufactured one of the following.

1. United States Gypsum (USG), Chicago, IL 60606 (800) 874-4968.
2. Gold Bond (National Gypsum Company), Charlotte, NC 28211 (800) 628-4662.
3. G-P Gypsum Corp., Atlanta, GA 30303 (800) 225-6119.

B. In order to provide total systems, all materials to be used on a system, such as partition system, furred wall system or ceiling system shall be the products of one of the listed manufacturers, unless specified otherwise.

2.2 MATERIALS – GYPSUM WALLBOARD

A. Gypsum wallboard shall be fire rated Firecode Type 'X', 5/8 inch thick, as indicated, tapered edge supplied in 48 inch widths and in such lengths as will result in a minimum of joints. Wallboard shall be delivered to the job with taped ends bearing Underwriters' Laboratories labels with proper identification.

1. The interior gypsum wallboard panels installed on exterior walls constructed of metal studs and exterior furred walls shall be Firecode Type 'X', aluminum foil backed gypsum wallboard.

B. Water Resistant Gypsum Wallboard: Shall be fire rated Firecode Type 'X', 5/8 inch thick, tapered edges supplied in 48 inch widths and in such lengths as will result in a minimum of joints. Wallboard shall be delivered to the job with taped ends bearing Underwriters' Laboratories labels for proper identification.

2.3 MATERIALS

A. Gypsum Wallboard Screws:

1. Type "S" shall not be less than 1 inch long for one-ply application and not less than 1-5/8 inch for second ply attachment in two-ply application.

B. Metal Framing Accessories:

1. Metal Furring Channels: 24 gauge hot dipped galvanized steel. Sizes for Z-furring channels shall be as indicated on the drawings.

C. Trim:

1. Casing Reads: U. **S.** Gypsum No. 200-A; Gold Bond No. 100.

F. Steel Stud Partitions and Furred Walls

1. Erection of Steel Studs: Floor and ceiling tracks shall be aligned accurately according to partition layout, and secured to floor and slab or deck above with 1/2" concrete stub nails or other approved fasteners, not more than 2' on centers. Use track at top of door frames and over and under view windows. Studs shall be positioned in track at not over 16" on center, except where walls are used to support wall cabinets or other wall mounted equipment, reduce metal stud spacing to 12" on center and secure in place. Studs located adjacent to door, view windows or other similar openings, partition intersections and corners shall be secured by 3/8" drywall screws through both flanges of studs and bottom tracks (note: do not fasten through top track when deflection tracks are used).
2. Where horizontal studs are used for wall reinforcing or framing, cut pieces of stud and install horizontally between vertical studs. Cope horizontal studs to fit between flanges of vertical studs. Bend ends of horizontal studs or install clip angles in order to secure by screwing to vertical studs. Where curved partitions occur, space framing closer together than normal to prevent flat areas between framing members.
3. All door frames shall have metal stud reinforcing consisting of boxed double studs at each jamb, with gypsum panels screw attached 8" o.c. to both studs. Box studs shall consist of standard stud and 20 gauge stud, with 20 gauge stud next to jamb anchor clip. For doors over 48" wide and double doors, install two 20 gauge studs.

G. Double Stud Partitions

1. Align parallel rows of floor and ceiling runners spaced apart as detailed. Attach to concrete slabs with concrete stub nails or power driven anchors 24" O.C.
2. Position steel studs vertically in runners, 16" o.c. with flanges in the same direction and with studs on opposite sides of flanges in the same direction and with studs on opposite sides of chase directly across from each other.
3. Cut cross bracing to be placed between rows of studs from gypsum panels, 12" high by chase wall width. Space braces 48" o.c. vertically and attach to stud webs with six 1" - Type "S" screws per brace. If larger braces are used, space screws 8" o.c. maximum on each side.
4. Bracing of 2-1/2" steel studs may be used in place of gypsum panels. Anchor web at each end of steel brace to stud web with two 3/8" pan head screws. When chase wall studs are not opposite, install steel stud cross braces 24" o.c. horizontally and securely anchor each end to a continuous horizontal 2-1/2" runner screw attached to chase wall studs within the cavity.

H. Curved Partitions:

1. Bend track to uniform curve and locate straight lengths so they are tangent to arcs. Insert self-tapping screws in each hole along one side.
2. Begin and end each arc with a stud, and space intermediate studs equally along arcs. On straight lengths of not less than 2 studs at ends of arcs, place studs 6 inches o.c.

1. Standard Steel Studs:
   a. United States Gypsum (USG), Chicago, IL 60606; (800) 874-4968
   b. Marino / Ware, South Plainfield, NJ 07080; (800) 627-4661.
   c. Superior Steel Studs, Inc., Astoria, NY 11102; (718) (718) 545-7500.
2. Deflection Track:
   a. Fire Trak Corp., Kimball MN 55353; (800) 398-7660.
3. Radius Track
   a. Flex-Ability Concepts, Edmond, OK 73083; (405) 715-1799.

2.2 METAL STUDS

A. Steel Stud System:

1. Meet or exceed minimum requirements of ASTM C 645, including requirements for minimum thickness.
2. Steel studs:
   a. Partitions, furred walls and ceiling suspension systems shall be 20 gauge standard type, except provide heavier gage studs when recommended by manufacturer for spans and loads imposed.
   b. 3-5/8" and 6" unless otherwise indicated on the drawings, shop fabricated, complete with floor and ceiling track.
   c. Studs shall be continuous one-piece from floor to underside of slab **or** metal deck above.

2.3 ACCESSORIES

A. General:

1. Provide all accessories including, but not necessarily limited to, tracks, clips, anchors, fastening devices, and other accessories required for a complete and proper installation; all as recommended by the manufacturer of the steel studs used.

B. Deflection Track Assemblies:

1. Non Fire-Rated Assemblies: Manufacturer's standard top runner with extended flanges designed to prevent cracking of gypsum board applied to interior partitions resulting from deflection of the structure above fabricated from steel sheet complying with ASTM A 653 or ASTM A 568. Thickness as indicated for studs, and width to accommodate depth of studs, and the following configuration.
   a. Top runner with extended deep flanges that either have V-shaped offsets that compress; slots 1 inch o.c. that allow fasteners attached to studs through the slots; or 16 gage sliding clip assemblies attached to top track and clipped to stud
2. Fire-Rated Assemblies: Top runner designed to allow partition heads to expand and contract with movement of structure above while maintaining continuity of the assembly. Comply with requirements of ASTM C 645 except configuration, of thickness indicated for studs and width to accommodate depth of studs indicated with flanges offset to accommodate gypsum board thickness.

b. Place spacers opposite one another.
c. Make bite of spacer on glass 1/4" or more.

D. Set glass in a manner which produces the greatest possible degree of uniformity in appearance.

E. Do not use two different glazing materials in the same joint system.

F. Mask, or otherwise protect, surfaces adjacent to installation of sealants. Remove immediately after tooling sealants.

G. Miter-cut and seal the joints of glazing gaskets **in** accordance with the manufacturers' recommendations, to provide watertight and airtight seals at corners and other locations where joints are required.

H. Apply decorative film overlay to existing glass units in strict accordance with manufacturer's printed instructions.

END OF SECTION 08800

2.2 GLAZING TYPES

A. The various types of glazing listed herein correspond to the types of glass and glazing units indicated on the drawings.

1. Type 1 - 1 inch insulated unit consisting of 1/4 inch heat strengthened, clear outer light with VE 1-2m Solarscreen (Low-E) coating on No. 2 surface, 1/2 inch air space and 1/4 inch ceramic coated heat strengthened glass conforming to ASTM C-1048-85, Section 7-12. Ceramic color shall be one of manufacturer's colors, as selected by the Architect.
2. Type 2 – Clear, tempered glass; thickness as required by application but not less than 1/4-inch.

2.3 INSULATING GLASS UNITS

A. Sealed Edge Construction: Fabricate units with a permanent, hermetically sealed, dry air or gas filled space between sheets of glass. Provide an edge seal consisting of twin primary sealant beads of polyisobutylene; positioned and retained by a tubular aluminum spacer-bar frame with bent, soldered or welded sealed comers, and filled with desiccant with breather ports into sealed space; with secondary edge sealant of silicone or polyurethane completely encapsulating outer face of spacer bar and sealed to the opposing sheets of glass. Comer key construction will not be accepted.

B. Fill air spaces by fabricator's standard process, using either gas or **dry** air with a maximum dew point of -20 degrees F. Exercise extreme care to exclude dirt and other foreign substances.

C. Label each unit to show compliance with required standards and regulations, and to list generically each component including elements of edge seal. Indicate which face of unit is for exposure to exterior of weather. Provide removable label except where regulations require a permanent label.

1. Label interior-exposed edge of spacer bar with fabricator's name, date of completing hermetic seal and classification.

2.4 GLAZING MATERIALS

A. Glazing Materials - Shall be as recommended in the 1997 Edition of Glazing Manual, published by the Glass Association of North America, Topeka, Kansas. Unless otherwise approved, only polysulfide, polyurethane, or silicone sealants shall be used where sealants are required.

B. Install glass and glazing to meet requirement of Local Building Code, and Requirements of Regulatory Agencies having authority.

C. Reference Standards:

1. ASTM C-1036 covering float, sheet and rolled glass.
2. ASTM C-1048 covering heat strengthened and fully tempered flat glass.
3. C.P.S.C Safety Standard for Architectural Glazing Materials; 16 CFR 1201.
4. Safety Glass Standards: Provide safety glass which complies with ANSI 297.1 and requirements of 16 CFR Part 1201 for category II materials and is permanently marked with certification label of Safety Glass Certification Council.
5. Glass Association of North America:
   a. Glazing Manual, 1997 edition
6. Insulated Units:
   a. Manufacturer: Firm with not less than five (5) years of successful experience in production of insulating glass units of types and performances required for project.
   b. Fabricate and label units to match units which have been tested and certified by the Insulating Glass Certification Council in accordance with below listed standards and passed tests for the following classification: Insulating glass seal classification CBA, for coated and uncoated substrates.
   c. Standards
      1) ASTM E-773 and ASTM E-774, Specification for Sealed Insulating Glass Units.
      2) Insulating Glass Certification Council (IGCC): Certified Products Program or A.L.T. Certification.
      3) Sealed Insulating Glass Manufacturers Association **(SIGMA):** Sigma 70-7-1, Glazing Recommendations for Sealed Insulating Glass Units.

D. Glass Thickness: Determine exact sizes and thicknesses of glass products and certify that the work of this section meets or exceeds the performance requirements specified in this section. Provide proper thicknesses, edge clearances and tolerances to comply with the recommendations of the glass manufacturer. Provide thicknesses required for application indicated.

1.5 WARRANTIES

A. Provide written warranties signed by manufacturer and Installer, agreeing to repair or replace work which exhibits defects in materials or workmanship for the following periods. "Defects" is defined to include, but is not limited to, leakage of water, abnormal aging or deterioration, failure of hermetic seal in insulating units, edge separation or delamination of laminated glass, peeling, cracking, crazing or other failure of metallic coatings in coated glass, spoiling of mirrors, and failure to meet requirements of Contract Documents. Provide warranty periods standard with manufacturer, but not less than the following:

1. Insulating Glass: 10 years from date of manufacture of insulated glass unit.
2. Coated Glass: 5 years from date of Substantial Completion.

G. Adhesive: as recommended by door protection manufacturer for installation on the specified door surfaces and finishes. Coordinate with door manufacturers to determine compatibility between adhesive and door finishes.

PART 3 - EXECUTION

3.1 SCHEDULE

A. Armor plates, kick plates, and push plates shall be furnished and installed in the quantities listed below for each of the following Door Protection Set numbers in locations indicated by subscript on the drawings.

DP-1 1 Kick Plate	DP-2 2 Kick Plates
DP-3 1 Push Plate 1 Kick Plate	DP-4 2 Push Plates 2 Kick Plates
DP-5 2 Push Plates 2 Armor Plates	DP 6 4 Push Plates 4 Kick Plates
DP-7 1 Armor Plate	DP-8 2 Armor Plates
DP-9 1 Armor Plate 1 Push Plate	DP-10 4 Armor Plates

END OF SECTION 08711

B. Wherever cylinders are required to be furnished, provide collars or rings necessary for proper fit of cylinder in lock. The hardware supplier shall be responsible for furnishing the proper cylinder to fit the various hardware items which required cylinders.

2.7 BUMPERS

A. Wall bumpers shall be installed wherever an opened door or any item of hardware thereon strikes a wall, column, casework or other part of the building construction. Where wall bumpers cannot be effectively used, a floor stop shall be installed.

Wall Bumpers: Rockwood 409; Ives WS407CCV

Floor Bumpers: Rockwood: 440,442; Ives: FS436, FS438

2.8 SILENCERS

A. Silencers shall be Ives SR64, Rockwood 608, Corbin **33,** Yale 890 or approved equal. Provide three **(3)** for each single door, two (2) for each pair of doors.

PART **3** - EXECUTION

3.1 HARDWARE SETS

A. The hardware sets shown on the drawings are furnished as information and as a guide only. The complete quantity requirements for each and every opening shall be the responsibility of the Contractor. Lock numbers shown are for operating features only and are Sargent.

B. Hardware sets not shown on the drawings for new door shall be provided with hardware sets as indicated for other similar purposed rooms.

C. Provide door operating hardware (levers, panic bars, pulls, push plates, knobs, etc.) where indicated, to comply with handicap regulations. There devices shall be made identifiable to the touch by a textured surface on this item obtained by hurling, roughening or by a material applied to the surface. Textured surfaces for tactile warnings shall be standard throughout the facility.

HARDWARE SET NUMBERS AND DESCRIPTIONS

Set 5	Butts Passage Set 10U15
Set 6	Butts Privacy Set 10U65

2. Door closers:
   a. Finishes based on LCN-Powdered Coatings.
   b. Where US26D occurs - LCN No. **1**
3. **All** other hardware shall be bronze with US26D finish.

2.2 KEYED INSTRUCTIONS

A. Construction cores and keys shall be provided during the construction period. When directed by the Owner, remove the cores and install the new cores keyed into the existing Grand Master Key System.

B. Cylinders and Key System: Interchangeable-core pin tumble lock cylinders and nickel silver keys: Medico.

C. Keys:

1. Furnish three (3) keys for each cylinder keyed differently, **six** (6) keys for each set keyed alike, and in sets where only two (2) cylinders are keyed alike, four (4) keys will be required.
2. Privacy sets: Furnish (2) emergency keys for each privacy set.

2.3 **BUTTS**

A. Butts: Shall be Hager as specified in the following schedule. Butts manufactured by Soss or McKinney will be accepted.

B. Hinge pins: Except as otherwise indicated, provide hinge pins as follows:

1. Steel hinges: Steel pins.
2. Interior doors: Non-rising pins.
3. Tips: Flat button and matching plug, finished to match leaves.

C. Butt hinges required per door:

1. Doors 60 inches or less in height: 2 butts
2. Doors over **60** inches and not over 90 inches: 3 butts
3. Door over 90 inches high: **4** butts

INTERIOR DOORS

Type	Frame	Width	Thickness	Type and Size Butts
WD	WDF	3'–4" and less	1-3/8	BB1279-4x4
WD	PMF	3'–4" and less	1-3/8	BB1279-4x4
WD	WDF	3'–4" and less	1-3/4	BB1279-4-112x4
WD or HM	PMF	3'–4" and less	1-3/4	BB1279-4-1/2x4
WD	WDF	3'–6" and over	1-3/4	BB1168-5x4-1/2
WD or HM	PMF	3'–6" and over	1-3/4	BB1168-5x4-1/2

2. Tile and masonry - Milcor Style **M.**
3. Gypsum board walls and ceilings - Milcor Style DW

B. Provide fire rated access panels in rated partitions and ceilings. Fire rated access panels shall carry Underwriters Laboratories, Inc., 1-1/2 hour label in walls and Warnock-Hersey. 3 hour label **in** ceilings. Fire rated access panels shall be provided with a 20 gauge insulated door panel operated by a knurled knob.

C. Access panels shall be supported on invisible hinges and shall be fitted with standard cams to be operated by screwdriver. All panels shall be finished with one coat gray rust inhibitive paint.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with manufacturer's written instructions for installing access doors and frames.

B. Set frames accurately in position and attach securely to supports with plane of face panels aligned with adjacent finish surfaces.

C. Install doors flush with adjacent finish surfaces or recessed to receive finish material.

3.2 ADJUSTING AND CLEANING

A. Adjust doors and hardware after installation for proper operation.

END OF SECTION 08311

3.2 INSTALLATION

A. Manufacturer's Written Instructions: Install doors to comply with manufacturer's written instructions, referenced quality standard, and as indicated.

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

1. Should pre-machined doors require additional fitting, immediately seal and finish trimmed surfaces to exactly match finished door. Perform all trimming and finishing in strict accordance with door manufacturer's instructions

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

D. Field-Finished Doors: Refer to Section 09900, Painting for finishing requirements:

3.3 ADJUSTING

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

END OF SECTION 08211

B. Glazing beads for doors with transparent finish: Each section of the glazing bead comprising the glazing frame shall be compatible for color. Heartwood species shall have no sapwood; sapwood species shall have no heartwood.

2.5 GLASS

A. Clear tempered glass:

1. Install in non-rated wood doors.
2. Glass shall comply with:
   a. Federal Specification DD-G-001403B covering heat strengthened and fully tempered flat glass.
   b. ANSI 297.1-1975 Standard for Safety Glass.
3. Each individual glazing unit shall be permanently identified with a listing mark which shall be visible after installation.

2.6 FABRICATION

A. Fabricate doors in strict accordance with the above specified standards, the manufacturer's specifications, including the specified options as listed herein.

B. Factory prefit and premachine doors including properly sized and spaced pilot holes for all mortise butt hinges and mortise lock fronts. Request the following information to be received:

1. Approved metal buck schedule and shop details.
2. Approved hardware schedule and templates.

C. Finish Hardware Locations

1. Coordinate finish hardware locations with the work of Section 08113 - Steel Frames.
2. Except as otherwise indicated on the Drawings, or as required to comply with governing regulations, install finish hardware as indicated in NWWDA Industry Standard I.S. 1.7, "Hardware Locations for Flush Wood Doors".

D. Clearance:

1. For non-fire rated doors provide clearances of 1/8 inch at each jamb, 1/8 inch at head, 1/8 inch at meeting stiles for pairs of doors and 1/4 inch from bottom of door to top of decorative floor finish or covering.
2. Where thresholds occur provide 1/4 inch clearance from bottom of door to top of threshold, unless otherwise noted.
3. For fire-rated doors, provide clearances complying with the limitations of the authority having jurisdiction.
4. Where floor conditions required additional vertical trimming, trim within the limits of the bottom rail and to the specified clearance. Seal bottom edge of rail after trimming.

E. Provide all cut-outs.

1.4 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

B. Source Limitations: Obtain flush wood doors through one source from a single manufacturer.

C. Machining, glazing and finishing of doors (except where field finishing is indicated) shall be performed only in the door manufacturer's factory.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store and handle doors in strict compliance with AWI standards and the manufacturers written instructions and recommendations.

B. After finishing individually polybag doors and stretcher wrap for palletizing

1.6 WARRANTY

A. All door shall be warranted by the manufacturer to be free of manufacturing defects for the life of the original installation. Warranty shall provide for replacement of the door as originally furnished. Manufacturer shall pay a reasonable charge to remove a defective door, refinish and replace with a new door providing the defect was not apparent prior to its installation.

B. Warranty shall include replacement of glass and glazing if defective door has vision lite.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to complaince with requirements, provide products of one of the following: No other manufacturers will be accepted.

1. Algoma Hardwoods, Inc., Algoma, Wisconsin (800) **678-8910.**
2. Marshfield Door Systems, Inc, Marshfield, Wisconsin (800) **869-3667**

2.2 NON-FIRE-RATED FLUSH WOOD DOORS

A. Construct using 5 ply hot-press method. Wood used shall be thoroughly seasoned, kiln dried with a moisture content of not less than 5% and not greater than **8%.**

B. Thickness: 1-3/4 inches.

3.3 INSTALLATION

A. General: Install steel frames plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings, manufacturer's written instructions and applicable Steel Door Institute standard, unless otherwise indicated.

B. Place frames prior to construction of enclosing walls and ceilings. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. Prior to installation of gypsum panels, secure anchors to webs of metal studs with minimum of 2 self tapping screws at each anchor.

C. Metal frames in steel stud partitions shall have 16-gage (minimum) jamb anchor clips welded to the frame. Locate anchor clips at head; 12" down from head; and 24" (maximum) on centers to floor. Provide floor anchor clip at each jamb, welded to frame. Clips shall have at least two holes for power driven or expansion type attachment to concrete.

3.4 ADJUSTING AND CLEANING

A. Clean grout and other bonding material off steel frames immediately after installation.

B. Touchup: Immediately after erection, sand smooth all rusted or damaged areas of factory coat and apply touch up of compatible air-drying primer or galvanized repair type paint.

END OF SECTION 08113

B. Basis of Design: Provide metal frames of the types and styles indicated on the Drawings and in Schedules. Comply with applicable S.D.I. standard for minimum materials and construction requirements except as otherwise specified herein.

2.2 CUSTOM STEEL FRAMES

A. Materials:

1. Interior Openings: Frames shall be either commercial grade cold-rolled steel conforming to ASTM A366 or commercial grade hot-rolled and pickled steel conforming to ASTM A569, except frames manufactured by S. W. Fleming shall have a zinc coating supplied by the hot-dip process.

B. Frames shall be saw mitered and continuously welded. Fabricate frame units to be rigid, neat in appearance and free from defects, warp or buckle. Form metal accurately to required profiles. Gages shall be as follows:

1. Interior frames: 16 gage up to but not including 3–6"; 14 gage for 3'–6" and over in width.

C. Frame Reinforcing

1. Where door frame openings exceed 4' – 0", reinforce frames with 1/8 inch thick steel channel extending full length of frame head and welded thereto.

D. Wherever practicable, fit and assemble units in the manufacturer's plant. Clearly identify work that cannot be permanently factory-assembled before shipment, to assure proper assembly at the site.

E. Drill stops to receive three silencers on strike jambs of single-swing frames; two at heads of double-swing frames.

F. Provide 26-gage steel plaster guards or mortar boxes, welded to frame at back of all finish hardware cutouts where mortar or other materials might obstruct hardware operation.

G. Frames for interior borrowed lights shall be 16 gage, fabricated similar to door frames and be furnished with glazing stops. Provide loose, channel-shaped stops, prepared for screw application to frames.

H. Fabricate frames with the proper depth between flanges to receive the full thickness of the finished partition.

I. Provide door frames with a shipping bar welded to the base (bottom) of each frame for in-transit support.

3.3 INSTALLATION

A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. Use only the backup material recommended by the manufacturer of the sealant for the particular installation. Closed cell polyethylene foam backup material shall not be compressed in excess of 25 percent. Open cell polyurethane may be compressed 25 to 50 percent. When using backup of tube or rod stock, avoid lengthwise stretching of the material.

C. Install an approved bond-breaker where recommended by the manufacturer of the sealant and where directed by the Architect, adhering strictly to the installation recommendations.

D. Prior to start of installation in each joint, verify the joint type according to the details on the Drawings, and verify that the required proportion of width-of-joint to depth-of-joint as specified by the sealant manufacturer, has been obtained.

E. Apply sealant under pressure with hand or power-actuated gun or other appropriate means. Guns shall have nozzle of proper size and shall provide sufficient pressure to completely fill joints as designed. Tool all joints to the profile shown on the details in the Drawings.

3.4 CLEANING

A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

END OF SECTION 07920

PART 2 - PRODUCTS

2.1 SEALANTS

A. General: Use only the types of sealants described herein.

B. Silicone Sealants: Provide a one component, neutral cure, silicone sealant conforming to the requirements ASTM C719, FS TT-S 00230C, Type II, Class A and **FS** TT-S- 001543A, Class A. The sealant shall be compatible with the specified application's substrates and have a minimum movement capability o f f 50% and a shore A hardness of ±25.

1. Type "A": Not Used.
2. Type "B": for sealing joints between plumbing fixtures and abutting surfaces:
   a. Dow Corning 786.
   b. G.E. Sanitary 1700
3. Type "C": for sealing joints between all casework and abutting wall surfaces and gypsum soffit; for sealing joints between wood bases and floors and wood bases and walls; for sealing joints between wood wall trim with transparent finish and walls:
   a. Dow Corning 799.
   b. G.E. 1000

C. Acrylic Sealants:

1. Type "**E**"**:** For interior applications for sealing joints at perimeter of door frames, view windows, exterior windows, exterior louvers, wood wall trim with opaque finish , acoustical ceiling wall molding and walls, perimeter of prefabricated acrylic shower units.
   a. "Acrylic Latex 834" manufactured by Tremco

D. Sealant Colors: Provide custom colors to match the various abutting surfaces as follows:

1. Type "B": White or manufacturer's standard color, selected by Architect.
2. Type "C": Clear.
3. In concealed installation, standard gray or black sealant may be used.
4. Architect shall approve all colors for matching.

2.2 PRIMERS

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

3.2 PREPARATION

A. Surface to receive firestops shall be free of dirt, dust, grease, oil, form release agents, or other matter that would impair the bond of the firestop material to the substrate or penetrating item(s).

B. Voids and cracks in substrate shall be filled and unnecessary projection removed prior to installation of firestops.

C. All penetrating items shall be permanently installed prior to firestop installation.

3.3 INSTALLATION

A. General:

1. Installation of firestops shall be performed by applicators/installers qualified and trained by the manufacturer. Installation shall be performed in strict accordance with manufacturer's detailed installation procedures.
2. Apply firestops in accordance with fire test reports, fire resistance requirements, acceptable mock-up installations, and manufacturer's recommendations. Meet building code requirements.
3. Coordinate with plumbing, mechanical, electrical, and other trades to assure that all pipe, conduit, cable, and other items which penetrate fire rated construction have been permanently installed prior to installation of firestops, schedule and sequence the work to assure that partitions and other construction which would conceal penetrations are not erected prior to the installation of firestops.

B. Dam Construction

1. Install dams when required to properly contain firestopping materials within openings and as required to achieve required fire resistance rating. Combustible damming material must be removed after appropriate curing. Incombustible damming material may be left as a permanent component of the firestop system.
2. Placement of dams shall not interfere with function *or* adversely affect the appearance of adjacent construction.

C. Installation of Single Component Elastomeric Firestop

1. Apply with manual or powered caulking gun.
2. Use incombustible insulation as required to achieve fire resistance rating.
3. Surface of gun grade silicone firestop may be tooled using clean, potable water.
4. Clean excess material off of adjacent surfaces and tools within 10 minutes using either water or Xylol where the use of such would not be hazardous.

D. Installation of Cementitious Firestop Mortar.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. For convenience to describe the quality level required, Bio Fireshield, Inc. (718) 535-4550, specifications are included.

B. Products manufactured by the following manufactures meeting all the requirements of this Section will be considered as equal to the specified products:

1. Hevi-Duty/Nelson, [800] 331-7325.
2. 3M Ceramic Materials Department, [800] 328-1687.
3. Hilti Construction Chemicals, Inc.
4. Specified Technologies, Inc. (STI), [800] 992-1180.
5. Metacaulk, manufactured by Rectorseal Corporation [800] 231-3345.

C. Products manufactured by either Rectorseal (800) 231-3345 or Thermafiber LLC (888 834-2371), for firesafing insulation as described herein.

2.2 FIRESTOP SEALANTS, PUTTY AND SPRAYABLE MASTIC

A. Provide single component, non-combustible elastomeric firestop sealant, Biotherm 100 (Gun Grade), Biotherm 200 (Self Leveling), BioSTOP 500, Biostop 700, Biostop 750 and Biostop 150.

B. Sealant system shall have U.L. Classification as a "fill, void, or cavity material" for through penetration firestop system when tested in accordance with ASTM E-814/UL1479.

C. Sealant for sealing joints between underside of decks and tops of fire rated partitions.

2.3 CEMENTITIOUS FIRESTOP MORTAR

A. Provide cementitious firestop mortar B 10.

B. Firestop mortar shall have U.L. Classification as a "fill, void, or cavity material" for through penetration firestop system when tested in accordance with ASTM/UL1479.

C. Cementitious mortar shall be asbestos free.

1.2 SUBMITTALS

A. Product Data:

1. Submit manufacturers product literature for each type of firestop and smokeseal material to be installed. Literature shall indicate product characteristics, typical uses, performance and limitation criteria, test data and installation procedures.
2. Submit copies of Systems Designs as indicated in latest edition of Fire Resistance - Vol. 11, Underwriters Laboratories Inc. Directory for each type of firestop configuration in the Work.

1.3 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

B. Single source:

1. Firestopping used on this Project shall be from a single manufacturer except in the event there are penetrations or other requirements for fire/smoke stopping for which the proposed manufacturer has no listed Design System tests by Underwriters Laboratories, Inc., or other laboratories acceptable to authorities having jurisdiction, provide products by any of the specified manufacturer's for which Design Systems are listed.
2. Where penetrations occur for which no listed Design System tests exists, obtain from the firestop system manufacturer an engineered system acceptable to the authorities having jurisdiction for firestopping such penetrations. Engineered system from manufacturer shall include a detail drawing showing the engineered system and shall contain no disclaimers.

C. Comply with pertinent codes and regulations of governmental authorities having jurisdiction.

D. Labeling firestop systems:

1. Provide labels at all penetrations and joints where firestop systems have been applied.
2. Labels shall be self-adhering, minimum **3** inches by 5 inches, containing the following information:
   a. Printed message stating:

3.2 PREPARATION

A. Inspect all surfaces with regard to their suitability to receive moisture vapor reduction system with vapor reduction coating system by Manufacturer's Representative.

B. Clean all surfaces to receive moisture vapor reduction system. Shotblast all floors and clean surfaces with Shop Vac to remove all residue off the substrate. Remove defective materials, and foreign matter such as dust, adhesives, leveling compounds, paint, dirt, floor hardeners, bond breakers, oil, grease, curing agents, form release agents, efflorescence, laitance, Shotblast bee bees, etc. Repair all cracks, expansion joint, control joints, and open surface honeycombs and fill in accordance with Manufacturers recommendations. Inform vapor reduction system manufacturer if concrete additives like chlorides or any other soluble compounds that can contaminate surfaces have been used in the concrete mix. Reinforcing fibers must be burned off, scraped and vacuumed. Remove, after shotblasting, leaving no fibers left on the concrete surfaces..

C. Provide uncontaminated, absorptive, sound surface. DO NOT ACID ETCH!

D. Repair concrete prior to moisture vapor reduction system installation by utilizing Koester SB Bonding Emulsion with approved concrete repair materials. Comply with all requirements as listed in Manufacturer's technical data information. No exceptions. Consult with vapor reduction manufacturer.

E. Make sure that surfaces to be treated with moisture vapor reduction system have NOT previously been treated with other materials like underlayments, screeds, penetrating sealants, etc. If this is the case, consult with the Manufacturers Representative prior to any application of moisture vapor reduction system.

F. Only a surface substrate that remains uncontaminated, absorptive, and sound shall be considered fit to receive a water vapor reduction system. Comply with all requirements as listed in Manufacturer's technical data information. No exceptions.

G. Proper removal of contaminants may render surfaces too rough for certain flooring systems. Therefore shotblast a small test area and verify with the flooring applicator that the surfaces are fit to receive the specified flooring system without the application of an underlayment on top of the VAP 1 2000 System.

3.3 APPLICATION

A. VAP 1® 2000 System Application:

1. The coverage rates for this Single Coat system depend on the surface texture and porosity of the substrate as well as the measured level of moisture from Section 3.1 Examination. On average, coverage of 90 to 130 sq.ft./gal. can be expected.

2. Approximate Coverages Relative to Existing Levels of Moisture Vapor.

1.5 WARRANTY

A. Warranty: Provide manufacturer's written warranty signed by water vapor emission control system manufacturer and installer covering work of this Section, including removing and reinstalling flooring system and all related labor charges, for a period of 10 years.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Water vapor reduction system shall be the product of a single manufacturer, no substitutions.

B. Acceptable Manufacturer: Koester VAP 1*8* 2000 System by Koester American Corporation; Corporate Headquarters: (757) 425-1206.

C. Terminology hereafter is based upon the products of Koester American Corporation.

2.2 MATERIALS

A. General: Use materials of one manufacturer throughout the project as hereinafter specified.

B. Water-based primer/curing agent, 100% solids VAP 1 8 2000 coating, containing specifically formulated chemicals and resins to provide the following characteristics and properties.

1. ASTM **E** 96, Water Vapor Transmission (dry and wet methods) Performance shall be documented by an independent testing laboratory at a minimum 90% for Koester VAP 1® 2000 System water vapor transmission reduction compared to untreated ACI Committee 201 durable concrete.
2. Certify acceptance and exposure to continuous topical water exposure after final cure.

2.3 KOESTER VAP 1® 2000 SYSTEM

A. This one (1) coat system consists of one (1) coat of VAP 1® 2000 applied to a properly prepared concrete surface. The water vapor reduction system shall be required to reduce vapor emissions by a minimum of 90% after final cure.

B. Verify water vapor emission by anhydrous calcium chloride testing according to ASTM F 1869-98 prior to proceeding with any floor covering installation. Anhydrous calcium chloride testing performed by the Owner's Special Inspector resulting in water vapor transmission levels greater than **3** lbs/24hrs. per 1000/sf. and less than 25 lbs/24 hrs per 1,000/sf. (depending on individual conditions) shall determine where this system is utilized and the coverage rates required.

B. Insulation for exterior infill walls shall be unfaced glass fiber batts or blankets, 6-1/4 inches or 6-1/2 inches thick, (R=19), conforming with ASTM C665, Type 1.

C. Fire-Test-Response Characteristics: Provide batt and blanket insulation materials with maximum flame spread and smoke developed indexes of 25 and 50 respectively, as determined by ASTM **E84.**

D. Where fire-rated partitions occur, provide type insulation required by indicated fire tests.

2.3 GLASS-FIBER BOARD INSULATION

A. Insulation for application at spandrel glass shall be semi-rigid unfaced fiberglass, 1-inch thickness; Owens Coming Curtainwall Insulation/CW 225 or equal from one of the listed manufacturers.

B. Fire-Test-Response Characteristics: Provide insulation and related materials with maximum flame spread and smoke developed indexes of 25 and 175 respectively, as determined by ASTM E84.

C. Accessory Materials:

1. Insulation Hanger: 2 inch x 2 inch perforated hanger for adhesive application; GEMCO, Danville, IL 61834, (800) 331-1164.
2. Adhesive: Tuff-Bond Hanger Adhesive, or as required by manufacturer for adhering to substrate.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements of Sections in which substrates and related work are specified and for other conditions affecting performance.

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

3.2 INSTALLATION, GENERAL

A. Comply with insulation manufacturer's written instructions applicable to products and application indicated.

B. Extend insulation in thickness indicated to envelop entire area to be insulated without gaps or voids. Trim insulation neatly to fit spaces. Cut and fit tightly around obstructions and fill voids with insulation.

2.2 FABRICATION

A. Factory fabricate components to greatest extent practicable to sizes and shapes indicated, and in accordance with approved shop drawings.

B. Form joints between components using manufacturer's standard joint adhesive without consciousjoints. Reinforce with strip of solid surface material, 2" wide.

C. Cut and finish component edges with clean, sharp return. Route radii and contours to template. Repair or reject defective and inaccurate work.

D. Countertops and Transaction Tops: Fabricate tops in one piece with shop-applied backsplashes and edges, unless otherwise indicated. Comply with solid-surfacing-material manufacturer's written recommendations for adhesives, sealers, fabrication, and finishing.

E. Provide factory cutouts for plumbing fittings. Drill holes in countertops for plumbing fittings in shop.

PART **3** - EXECUTION

3.1 INSTALLATION

A. Install components plumb and level, scribed to adjacent finishes, in accordance with approved shop drawings and product installation data.

B. Align adjacent solid-surfacing-material countertops and form seams to comply with manufacturer's written recommendations using manufacturer's recommended adhesive in color to match countertop. Form field joints with joints inconspicuous in finished work. Keep components and hands clean when making joints.

C. Provide backsplashes and sidesplashes. Adhere to countertops using manufacturer's standard color-matched silicone sealants.

D. Remove adhesives, sealants and other stains. Replace stained components.

E. Protect surfaces from damage. Repair work or replace damaged work that cannot be repaired to Architect's satisfaction.

END OF SECTION 06655

C. Cabinet Tops, Bottoms, Ends and Backs: Shall be of 3/4 inch thick core minimum, except open face cabinets shall have tops and bottoms minimum 1 inch thick core.

D. Shelves:

1. In cabinets shall be of 3/4 inch thick core minimum to 27 inches wide. One inch shelving at **30** inch wide cabinet and over.
2. Thickness at all widths of open cabinets and wall mounted shelves shall be one inch.
3. All removable or adjustable shelves shall have all surfaces veneered with laminated plastic.

E. Wall Cabinet Dimensions: As indicated on Contract Drawings. Construct to permit alignment of adjacent cabinets, of full variety of types in one grouping.

F. Base and Full Height Cabinets: Construct to dimensions indicated to permit alignment of adjacent units of full variety of types in one grouping.

G. Recessed Toe Space: Toe space and all exposed to view surfaces shall be faced with resilient base furnished and installed under other sections, as noted.

H. Countertops and Splash Backs:

1. High pressure laminated plastic countertops and splash backs shall be of 3/4-inch thick plywood core minimum surfaced with plastic laminate, with backing sheet on the underside of countertop, self-edged unless otherwise indicated.
2. Height of back splash shall be 4 inches unless otherwise indicated. Provide end splashes wherever countertops abut end walls.
3. Wherever sinks occur in countertops, apply sealant at joint between backsplash and countertop. Sealant shall be G.E. SCS 1000. Color shall be Translucent.

I. Provide access panels in casework where indicated, or where required to access equipment or utilities. Use Selby propeller nuts with oval head screws and cup washers.

J. Install overhead door stops wherever cabinet doors or door pulls will engage or hit abutting wall surfaces.

K. Provide a grommet wherever the Owner's equipment wiring is required to penetrate countertops.

L. Scribes to walls: Provide scribes to allow 3/4 inch between the edge of the doors and adjacent walls, and to trim the countertops to the wall as indicated.

2.4 FACTORY FINISHING

A. Factory finish hardwood panels and trim:

1. Factory finish in accordance with AWI Finish System No. TR-6 Catalyzed Polyurethane, Premium Grade, with 2 top coats.
2. Sheen: Satin.

2. Matching Between Individual Pieces of Veneer: Slip matched with wood grain applied vertically to panel cores.
3. Assembly of Panel Faces: Center balanced match, with wood grain applied vertically to panel cores.
4. Select veneers so that all panels are similar in color and grain. Coordinate with panelwork specified in Section 06200, Finish Carpentry.

G. Solid Stock Wood: All solid stock wood exposed to view shall be White Maple, AWI Premium Grade.

H. Metal Accents:

1. Stainless Steel Trim: directional satin No. 4 finish.
   a. Sheet, Strip, Plate, and Flat Bar: ASTM **A** 666, Type 304.

I. Translucent Panels: Polyethelene terephtalate, glycol modified (PTEG) resin sheet; Varia™ as manufactured by 3-Form, Inc., Salt Lake City, UT (800) 726-0126.

1. Translucent Panels designated in the documents as "SP-_".
   a. Gauge: 1/4-inch thick.
   b. Series, Pattern, Color and Finish: As indicated in the Materials and Finishes Index Sheet.

J. Tackstrip: 1/4 inch thick linoleum resilient homogeneous tackable surface material with natural jute backing laminated to **1/4** inch hardboard; Uni-Colored Linoleum Bulletin Board by Forbo Linoleum Inc., Hazleton, PA (800) 842-7839.

1. Color: **As** indicated on the Materials and Finishes Index Sheet.

K. Tackboard: Tackboard shall consist of a core of 1/2-inch thick fiberboard wrapped with fabric.

1. Core: Class **A** fire rated, structural fiberboard; N.C.F.R. Homasote as manufactured by Homasote Company, West Trenton, NJ (609) 883-3300.
2. Fabric (FAB-2): Complying with ASTM E84, Class A rating; "Tek-Wall Style #303601 Lustra", as manufactured by Maharam
   a. Color and Pattern: As indicated on the Materials and Finishes Index Sheet.
3. Apply fabric to homosote core with light spray adhesive. Wrap all edges and staple from rear. Test adhesive with fabric and cork core prior *to* application to ensure compatibility of materials and avoidance of "bleed-through".

L. Hardware: Shall be as manufactured by Knape and Vogt, Garcy, Stanley Hardware or approved equal.

1. Hinges:
   a. For 1-3/8" thick doors, pivot set Stanley No. 327.
   b. For 3/4" thick core doors concealed type hinges, self-closing by Blum. Hinges shall be all metal, with screw-on type boss for 165 degree opening. Install one pair of hinges for door up to 36": one and half pairs for doors over 36". Finish shall be US26D.

B. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section..

1.4 PROJECT CONDITIONS

A. Field Measurements: Where woodwork 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

PART 2 - PRODUCTS

2.1 GENERAL

A. Casework design shall conform to the flush overlay design as indicated in the AWI Quality Standards. Horizontal and vertical reveals between all doors and drawers shall be 1/8" unless otherwise detail.

B. High pressure laminates shall be adhered to cores with adhesives in such manner that when tested in accordance with the Shear Strength Test set forth in the above mentioned quality standards of the Architectural Woodwork Institute, the shear strength shall be not less than 200 pounds per square inch at room temperature and not less than 15 pounds per square inch at 240 degrees.

C. Identification of Parts:

1. Plastic laminate casework:
   a. All surfaces, exterior or interior, of cabinets and cases exposed to view, and doors and drawer fronts of same shall be veneered with high pressure decorative laminate.
   b. Exposed to view applies equally to tops and bottoms of cabinets and cases, cabinet shelving and interior of cabinets and cases exposed when doors are open.
2. Wood veneer casework:
   a. Conform to requirements of AWI standards, Premium Grade.

D. Backing sheets shall be used on all unexposed cabinet surfaces and on the underside of all countertops.

E. Shop made joints in counter are allowed only when required length exceeds laminate length obtainable. Such a joint shall touch throughout **its** length and be flush within a tolerance of .005". Joints between adjoining tops which must be field assembled shall be shop prepared with bolt up type fasteners.

2.5 FABRICATION

A. Wood Moisture Content: Comply with requirements of specified inspection agencies and with manufacturer's written recommendations for moisture content of finish carpentry at relative humidity conditions existing during time of fabrication and in installation areas.

B. Back out or kerf backs of the following members, except members with ends exposed in finished work:

1. Interior standing and running trim.

C. Ease edges of lumber less than 1 inch in nominal thickness to 1/16-inch radius and edges of lumber 1 inch or more in nominal thickness to 1/8-inch radius.

D. Fabrication Tolerances for Hardwood Panels: Provide hardwood panels cut to required size within the following tolerances.

1. Thickness: Plus or minus 1/16 inch.
2. Size (dimension each side): Plus or minus 1/16 inch.
3. Squareness (difference in length of two diagonal measurements): Plus or minus 1/16 inch.

2.6 FACTORY FINISHING

A. Factory finish hardwood panels:

1. Factory finish in accordance with AWI Finish System No. TR-6 Catalyzed Polyurethane, Premium Grade, with 2 top coats.
2. Sheen: Satin.
3. Stain: Custom color to match existing adjacent hardwood panels.

B. Aluminum: Mechanical satin finish, AA-M33. Belt polish exposed to view faces of aluminum framework, lines parallel to length of members with 120-140 emory

C. Stainless Steel: Directional satin finish, No. 4.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.

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

PART 2 - PRODUCTS

2.1 INTERIOR STANDING AND RUNNING TRIM

A. Interior trim and related items shall be of solid stock matching wood, Premium grade, according to the Seventh Edition of Architectural Woodwork Institute Quality Standards, unless otherwise specified. All stock shall be free of wormholes, brash grain, checks or shakes.

B. Wood species and grade for transparent finish: Select White Maple, Plain Sawn, Grade I.

C. Wood species and grade for opaque finish: Yellow Poplar, Southern Yellow Pine, Plain Sawn, Grade 11.

D. Moisture Content: 6-8 percent.

2.2 PANELWORK

A. Panelwork shall conform to the Architectural Woodwork Quality Standards and Guide Specification, premium grade, according to the Seventh Edition of Architectural Woodwork Institute Quality Standards; for transparent finish, and to the design and details shown. Work shall be finished smooth and free from machine or tool marks that will show through the finish. All nail heads shall be set to receive putty.

B. Veneered Hardwood Panels: A.W.I. Premium Grade, Plain Sliced. Select White Maple, Grade AA for transparent finish. Veneers shall be 1/24 inch thick or less. Cores shall be fire retardant (Class A - with flame spread rating of 0 - 25) particle board with matching hardwood edge banding on exposed edges

1. Moisture Content: 6-8 percent.
2. Matching Between Adjacent Veneer Leaves: **Slip** matching.
3. Matching Within Individual Panels: Balance match.
   a. Wood grain applied vertically to panel core.
4. Matching of Panels Within an Area: Sequence matched and numbered.
5. Panel veneers shall be book matched with wood grain applied vertically to panel cores.
6. Panel Joints: As detailed on the Drawings.

2.3 TRANSLUCENT PANELS

A. Translucent Panels: Polyethelene terephtalate, glycol modified (PTEG) resin sheet; Varia™ as manufactured by 3-Form, Inc., Salt Lake City, UT (800) 726-0126.

1. Translucent Panels designated in the documents as "SP-_".
   a. Gauge: 1/4-inch thick.

Comply with applicable requirements of AWPA C20 (lumber) and AWPA C27 (plywood). Identify fire-retardant-treated wood with appropriate classification marking of UL; U.S. Testing; Timber Products Inspection, Inc.; or another testing and inspecting agency acceptable to authorities having jurisdiction.

a. Inspect each piece of treated lumber or plywood after drying and discard damaged or defective pieces.

2. Manufacturers:
   a. Baxter: J. H. Baxter Co.
   b. Chemical Specialties, Inc.
   c. Continental Wood Preservers, Inc.
   d. Hickson Corp.
3. Interior: For interior locations, use chemical formulation that produces treated lumber and plywood with the following properties under conditions present after installation:
   a. Bending strength, stiffness, and fastener-holding capacities are not reduced below values published by manufacturer of chemical formulation under elevated temperature and humidity conditions simulating installed conditions when tested by a qualified independent testing agency.
   b. No form of degradation occurs due to acid hydrolysis or other causes related to treatment.
   c. Contact with treated wood does not promote corrosion of metal fasteners.

B. Rough hardware: Provide fasteners of size and type indicated that comply with requirements specified for material and manufacture.

1. Bolts: Steel bolts complying with ASTM A 307, Grade **A;** with **ASTM A** 563 hex nuts and, where indicated, flat washers.
2. Wood Screws: **ASME** B 18.6.1.
3. Screws for Fastening to Cold-Formed Metal Framing: ASTM C 954, except with wafer heads and reamer wings, length as recommended by screw manufacturer for material being fastened.
4. Lag bolts: ASME B 18.2.1.
5. Nails, Brads, and Staples: Use common nails except as otherwise noted; ASTM F 1667.

2.3 **OTHER** MATERIALS

A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by Contractor, subject to Architect's approval.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit carpentry to other construction; scribe and cope as needed for accurate fit. Locate nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.

C. Vapor Barrier:

1. Griffolyn Type **T-85** as manufactured by Reef Industries, Inc., (800) 231-6074.
   a. Seal joints with FAB double-sided tape, as manufactured by Reef Industries.

PART **3** - EXECUTION

3.1 CUTTING FOR TRENCHES

A. Cut out designated portions of existing concrete slab to accommodate trench excavation. Coordinate with the work of Division 15, Mechanical.

B. Perform cutting of concrete slab-on-grade with suitable saws. Cut slabs in straight lines parallel to trench, leaving no jagged edges.

3.2 REPAIR OF VAPOR BARRIER

A. Where existing vapor barrier under concrete slab has been cut to accommodate new trenches, patch vapor barrier prior to patching slab in the following manner:

1. Patch openings in existing vapor barrier with new vapor barrier sheet. At seams between existing and new vapor barriers, overlap existing barrier a minimum of **4** inches with new barrier sheet and adhere new to existing with a continuous run of double-sided tape.

3.3 FILLING OF OPENINGS

A. Shortly before placing concrete, saturate the perimeter edges of the openings with water. After the free or glistening water disappears, the edges shall be given a thorough coating of neat cement slurry mixed to the consistency of thick paste and scrubbed in with a stiff bristle brush.

B. The concrete mixture shall consist of one part cement, approximately one part fine aggregate and approximately two parts coarse aggregate by damp loose volume. The coarse aggregate shall have a maximum size of *318".* The exact proportions of fine and coarse aggregate shall be adjusted to produce a well-graded total aggregate. Mixing water shall not exceed **4-112** gallons per sack of cement (0.399 absolute ratio by weight). The mixture shall be of zero slump.

C. Place mix and strike level with adjacent surfaces.

D. Install all framing , formwork and dowels required for the placing of concrete and of bonding new concrete to existing..

E. A commercial nonshrink, nonmetallic grout, approved by the Architect, may be used in lieu of the specified concrete mix.

F. Color and texture of concrete shall match that of existing abutting concrete.

1. Silflo 200 by Silpro Corp., Ayer, MA, (978) 772-4444.
2. Ultra/Plan by Mapei Corp., Deerfield Beach, FL 33442, (800) 426-2734.
3. Elastiment 945 by Boiardi Corp., Little Falls, NJ 07424, (800) 352-8668.

B. Performance Specifications:

1. Thickness Range: From feather edge to 2".
2. Working Time: At least **30** minutes at 70°F.
3. Flowing Time: At least 10 minutes at 70°F.
4. Initial Set: **As** defined by ASTM C191, **30** minutes at 70°F.
5. Final Set: As defined by ASTM C191, 2 hours at 70°F.
6. Compressive Strength: ASTM C109, 2630 psi after 1 day, 4100 psi after 28 days.
7. Flexural Strength: ASTM C348, 770 psi after 1 day, 1000 psi after 28 days.
8. Compatibility: Compatible with flooring adhesives which are compatible with normal concrete.
9. Meets other specification requirements.

C. Aggregate: Provide coarse sand for underlayment up to 1/8" thick and pea gravel for thicker installations.

D. Water: Clean and drinkable.

E. Primers: As recommended by underlayment manufacturer for subfloor condition and porosity.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for conditions affecting performance.

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

3.2 PREPARATION

A. General: Prepare and clean substrate according to manufacturer's written instructions except where more restrictive requirements are specified in this section.

B. Clean subfloors free of grease, wax, curing compounds and all other foreign materials. Subfloors shall be solid and sound; remove all soft or crumbly materials.

C. Make adhesion tests as recommended by manufacturer to ensure good bond to substrate.

D. Prime subfloors as recommended by underlayment manufacturer, using the correct primer for porous and non-porous subfloors.

PART **3** - EXECUTION

3.1 PREPARATION

A. Protect adjacent concrete slabs, structures, utilities, and other facilities from damage caused by settlement, lateral movement, undermining, and other hazards created by Work **of** this Section.

3.2 EXCAVATING

A. Earth Excavation:

1. For definition in this specification any material, regardless of type or origin, is considered earth and its removal is earth excavation.
2. After concrete slabs have been cut, excavate for underslab utilities.
3. Remove unsuitable material. Unsuitable materials shall include:
   a. All soft, spongy or compressible soils, including but not limited to clays, silts, and loose fine sand.
   b. Topsoil, loam, sod, roots or any other compressible material.
   c. Trash, rubbish, debris, or other discarded or abandoned materials.
   d. Fill of any character, including rock fill, when it occurs less than one foot below the bottom of slab.

B. Trench excavation:

1. Excavate subsoil required for installation of all underslab utilities.
2. Prepare trench bottom to provide a firm, stable and uniform support for full length of pipe.
3. Provide bell holes at each joint for assembly and alignment.
4. Remove ledge, rock, boulders, large stones and all unsuitable material to provide 6 inches of soil cushion on all sides of pipe and accessories.

3.3 COMPACTING IN-SITU **SOILS**

A. Prior to installation of underslab utilities, compact in-situ soils with vibratory equipment to achieve 95% of the maximum dry density as determined by ASTM D-1557.

3.4 BACKFILL FOR PIPING AND CONDUIT

A. Bedding all Areas:

1. Around piping with sand from **6** inches below to 12 inches above top of pipe or conduit. Apply by hand and compact under and at sides by mechanical means to obtain full support and proper compaction.

1. Items indicated to be salvaged shall be removed with extreme care to prevent damage. All components and parts of salvaged items shall be saved and packaged. Store salvaged items as directed by Owner.

D. Traffic: Conduct operations and removal of debris to ensure minimum interference with the normal use of public passages and other adjacent facilities. Do not close or obstruct exitways, corridors, traffic ways, streets, walks or other used facilities without the written permission of the Owner and authorities having jurisdiction.

E. Protection: Ensure the safe passage of persons in and around the space and the building during demolition. Prevent injury to persons and damage to property. Protect items to remain. Maintain fire protection systems in operation throughout the work of this project.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXECUTION

A. Remove all equipment and building items not required for new construction in an orderly and careful manner. Protect existing slabs, supporting structural members , and existing construction not required to be removed.

B. Mechanical and electrical equipment, including fixtures, receptacles, ductwork, piping, wiring, conduit, fans and all other such items required to be removed to complete the work, shall be disconnected, capped and lowered to the floor under the work of Division 15, Mechanical, and Division 16, Electrical. After such items have been lowered to the floor, removal from the site shall be included under the work of this Section 02070.

C. Proceed with demolition systematically. Demolish in small sections and avoid overloading. Remove all associated adhesives, clips, hangers and other attachment devices with removal of finishes.

1. Interior walls: Remove interior walls and partitions as indicated and as needed to accommodate new work. Where existing walls-to-remain are indicated to receive new finishes, completely remove trim and fasteners.
2. Doors and Frames: Where doors and frames are indicated to be removed from walls or partitions which are to remain, remove doors and frames carefully so as to minimize damage to wall. Repair and patch wall as necessary *to* accommodate new door frame or other new work.
3. Aluminum Storefront Framing: Remove designated portions of storefront framing assemblies and glazing.
4. Ceilings: Where ceilings are indicated to be removed, also remove ceiling mounted systems and equipment leaving only bare structure free from hangers.

DIVISION 7 - THERMAL AND MOISTURE PROTECTION

DIVISION 8 - DOORS AND WINDOWS

DIVISION 9 - FINISHES

DIVISION 10 - SPECIALTIES

DIVISION 11 - EOUIPMENT

***No Work** Included In **This** Division*

DIVISION 12 - FURNISHINGS

DIVISION 13 - SPECIAL CONSTRUCTION